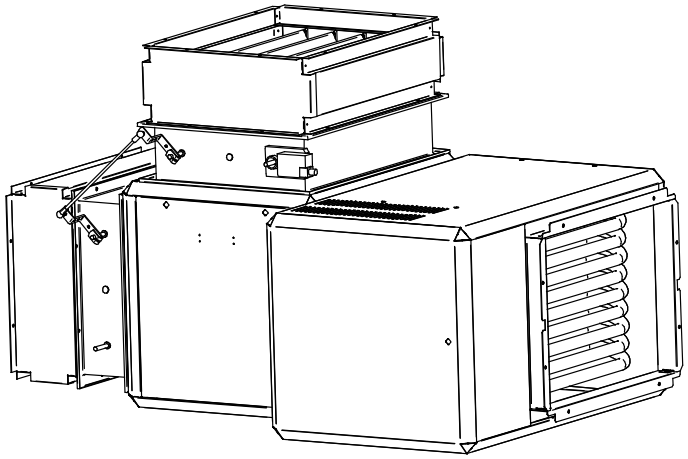
SUPPLEMENTARY INSTRUCTION BOOKLET

HEATER

TYPE TR

centrifugal system ventilator

GB139a



YOU MUST READ THIS DOCUMENT BEFORE COMMENCING INSTALLATION.
THE USER MUST BE INSTRUCTED IN USING THE APPLIANCE.
KEEP THIS DOCUMENT NEAR THE APPLIANCE.

Instructions TR series Centrifugal
version GB 139a
date: 25-11-2008
Appliances for the UK

Contents

1 Foreword

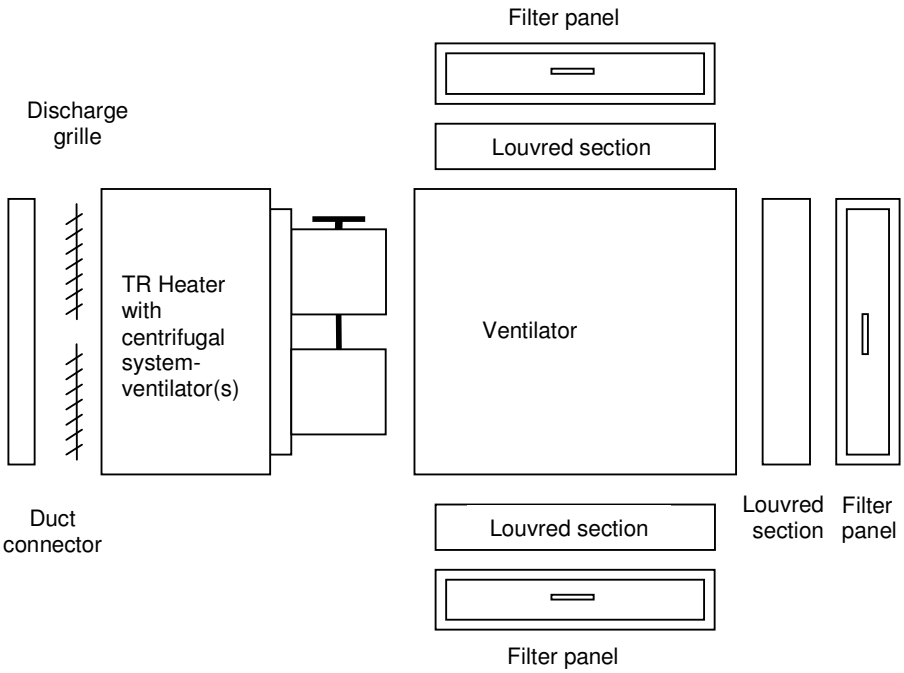
These operating and installation instructions are a supplement for the TR series heater combined with a centrifugal system ventilator instead of an axial system ventilator for systems which require greater uplift pressure.
TR heaters with a centrifugal system ventilator are used for systems with:

- suction and/or diffusion ducts
- ventilator casings with optional louvred sections and/or filter panels
- combinations of the above

The TR heater with centrifugal system ventilator is designated with the letter C in the type designation, e.g. TR40 C. This installation and user manual for the TR heater is the leading document for the installation of this appliance.
These operating and installation instructions deal with the specific matters that apply to supplementary use and installation of a centrifugal design.

2 Designs

- Uplift levels:
The TR air heater with centrifugal system ventilator(s) is available with the following uplift levels:
The uplift level of the heater is selected depending on the air resistance in the installation.



Discharge side:

- discharge grille (unrestricted diffusion)
- duct connector

Suction side

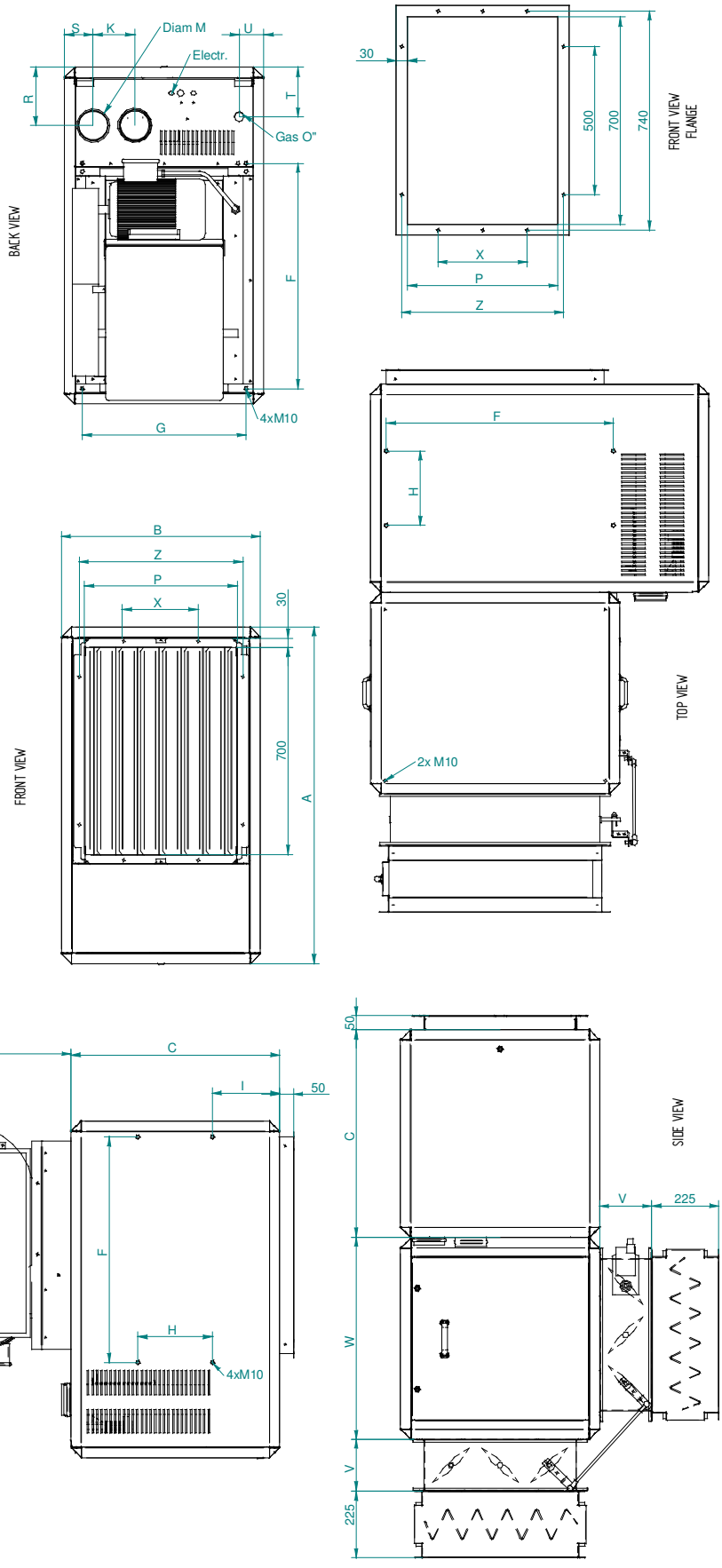
- unrestricted suction
- ventilator casing with louvred sections on either top or bottom and/or rear side with possible connection to either outside or for recirculation or filter panels

3 Technical data

System ventilator: Centrifugal 1-Phase 230 Vac / 50 Hz								
Type:		TR24 C	TR28 C	TR40 C	TR50 C	TR60 C	TR80 C	TR100C
Uplift Level	Max air yield warm	3000	3000	4000	5000	6000	7500	9000
Δp [Pa]	Max Horizontal discharge	16	16	22	26	28	30	30
60	Connection voltage (50 Hz)	230	230	230	230	230	230	230
	Consumption El. Capacity max.	520	520	770	1000	850	1050	1430
	Current consumption vent. motor nom.	2,5	2,5	3,6	4,7	3,6	4,7	6,3
	Current consumption vent. motor max.	3,1	3,1	4,2	5,45	5,45	5,45	7,3
120	Connection voltage (50 Hz)	230	230	230	230	230	230	230
	Consumption El. Capacity max.	570	570	820	1050	1000	1320	1480
	Current consumption vent. motor nom.	2,8	2,8	3,9	4,9	4,4	5,7	6,5
	Current consumption vent. motor max.	3,1	3,1	4,2	5,45	5,45	7,3	7,3
180	Connection voltage (50 Hz)	230	230	230	230	230	230	230
	Consumption El. Capacity max.	620	620	1000	1100	1050	1700	1850
	Current consumption vent. motor nom.	3,1	3,1	4,7	5,05	4,7	7,85	8,7
	Current consumption vent. motor max.	4,2	4,2	5,45	5,45	5,45	9,9	9,9
240	Connection voltage (50 Hz)	230	230	230	230	230	230	n.a.
	Consumption El. Capacity max.	780	780	1050	1330	1350	1750	
	Current consumption vent. motor nom.	3,9	3,9	4,9	6,0	5,90	8,1	
	Current consumption vent. motor max.	4,2	4,2	5,45	7,3	7,3	9,90	
300	Connection voltage (50 Hz)	230	230	230	230	230	n.a.	n.a.
	Consumption El. Capacity max.	920	920	1270	1450	1620		
	Current consumption vent. motor nom.	4,4	4,4	5,7	6,55	7,50		
	Current consumption vent. motor max.	5,45	5,45	7,3	7,3	9,90		

System ventilator: Centrifugal 400 Vac / 50 Hz								
Type:		TR24 C	TR28 C	TR40 C	TR50 C	TR60 C	TR80 C	TR100C
Uplift Level	Max air yield warm	3000	3000	4000	5000	6000	7500	9000
Δp [Pa]	Max Horizontal discharge	16	16	22	26	28	30	30
60	Connection voltage (50 Hz)	400	400	400	400	400	400	400
	Consumption El. Capacity max.	520	520	770	1000	850	1050	1430
	Current consumption vent. motor nom.	0,9	0,9	1,3	1,8	1,4	1,8	2,4
	Current consumption vent. motor max.	1,1	1,1	1,5	2,1	2,1	2,1	2,8
120	Connection voltage (50 Hz)	400	400	400	400	400	400	400
	Consumption El. Capacity max.	570	570	820	1050	1000	1320	1480
	Current consumption vent. motor nom.	1,0	1,0	1,4	1,9	1,7	2,2	2,5
	Current consumption vent. motor max.	1,1	1,1	1,5	2,1	2,1	2,8	2,8
180	Connection voltage (50 Hz)	400	400	400	400	400	400	400
	Consumption El. Capacity max.	620	620	1000	1100	1050	1700	1850
	Current consumption vent. motor nom.	1,1	1,1	1,8	1,95	1,8	2,9	3,2
	Current consumption vent. motor max.	1,5	1,5	2,1	2,1	2,1	3,65	3,65
240	Connection voltage (50 Hz)	400	400	400	400	400	400	400
	Consumption El. Capacity max.	780	780	1050	1330	1350	1750	2500
	Current consumption vent. motor nom.	1,4	1,4	1,9	2,3	2,25	3,0	4,3
	Current consumption vent. motor max.	1,5	1,5	2,1	2,8	2,8	3,65	5,1
300	Connection voltage (50 Hz)	400	400	400	400	400	400	400
	Consumption El. Capacity max.	920	920	1270	1450	1620	2230	2900
	Current consumption vent. motor nom.	1,7	1,7	2,2	2,55	2,75	3,75	5,0
	Current consumption vent. motor max.	2,1	2,1	2,8	2,8	3,65	5,1	6,3

Dimensions TR Centrifugaal / Duct				**TR24**	**TR28**	**TR40**	**TR50**	**TR60**	**TR80**	**TR100**
A			mm	1040	1040	1130	1130	1130	1130	1130
B			mm	540	540	540	670	1000	1000	1250
C			mm	630	630	700	700	700	700	700
W			mm	680	680	680	680	985	985	1135
X			mm	250	250	250	250	500	500	800
F			mm	763	763	763	763	763	763	763
G			mm	426	426	426	550	875	875	1125
H			mm	250	250	250	250	580	580	580
I			mm	190	190	225	225	60	60	60
K			mm	110	110	140	140	225	225	225
M			mm	Ø 80	Ø 80	Ø 100	Ø 100	Ø 130	Ø 130	Ø 130
N			mm	Ø 80	Ø 80	Ø 100	Ø 100	Ø 130	Ø 130	Ø 130
O			mm	1/2"	1/2"	3/4"	3/4"	3/4"	3/4"	3/4"
P			mm	400	400	400	510	850	850	1000
R			mm	145	145	195	195	185	185	185
S			mm	95	95	95	95	175	175	300
T			mm	75	75	165	165	165	165	165
U			mm	80	80	70	80	90	90	60
V			mm	100	100	100	175	175	175	175
Z			mm	440	440	440	550	880	880	1045
weight: Heater + Ventilator			kg	90	95	105	115	180	195	250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SIDE VIEW

4 Electrical connection

4.1 General

The installation must comply with the local and/or national regulations including NEN 1010. Ensure that it is connected to the correct consumer group protected by a MCB / RCD or main fuse.
The wiring diagram for the appliance can be found at the end this manual.

Isolating switch or plug
The appliance must be equipped with a 230-400 Volt isolating switch which interrupts the phase(s) and the neutral (but not the earthing connection). This isolating switch must have a contact gap of at least 3 millimetres.
If the appliance is provided with a plug for use in a wall socket, the wall socket must be within reach at all times. NEVER interrupt the power supply to the appliance with other switches. This could lead to overheating of the appliance.

4.2 230Vac Version

The supply is 230Vac. (50Hz) with earth connection.

230V Version with ventilator motor and external thermal safety device.
This appliance employs Electric diagram 6.1. The thermal safety feature in the current supply to the motor will trip when this motor is under excess load and the entire appliance will cease operation including burner and ventilator. The control of the appliance will also cease to operate and the thermostat control will not show a display. When the thermal fuse has cooled down the thermostat can be switched on again and the current will start the controls.

4.3 3-Phase 400Vac Version

The supply is 3 x 400Vac (50Hz) with Neutral and Earth
Neutral is also required for the smooth running of the appliance controls.
After connecting the appliance, the direction of rotation of the ventilator must first be checked. If this is incorrect, the 2 phases must be changed round in the supply to the appliance.
The ventilator has a thermal safety device in the current supply to the motor.
This appliance employs Electric diagram 6.2. The thermal fuse in the current supply to the motor will trip when this motor is under excess load and the entire appliance will cease operation including the burner and ventilator. The control of the appliance will also stop and the thermostat will not show a display. When the thermal fuse has cooled down, the thermostat can be switched on again and the current will start the control.

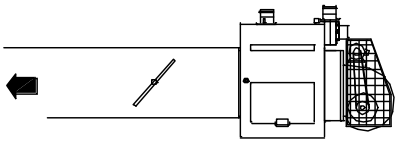
5 Adjusting the ventilator

In order to prevent overload of the electric motor, the ventilator has been set at the revolution speed in the factory that is correct for the static pressure to be delivered by the appliance. This pressure capacity is printed on the type plate.
A feature of these ventilators is that increased air displacement also demands more current.
If the resistance of the air in the system is in practice lower than the static pressure setting of the air heater, the displacement of air in the ventilator will increase. This could lead to overload of the ventilator motor and hence to the appliance cutting out. Check the amperage of the ventilator motor. This needs to be lower than the maximum amperage printed on the type plate of the electric motor and/or the Technical Data.

Always check the direction of rotation of 3-phase motors!

5.1 Excess amperage, too much air displacement

When the amperage is too high the ventilator speed must be reduced or the static pressure must be increased.



Revolutions are not adjustable in three-phase current. In that case resistance in the ducting system should be increased by means of a choke or a reducing valve, which in turn will displace less air and reduce the amperage. Refer to the table with Technical Data.
Reducing the revolutions can only be done by changing the V-belts. Also check this with an amp meter and an air reading if possible.

The air speed will increase proportionally when ducts have to be used that are narrower than shown in the table. The resistance will increase by the root mean square.

For example: Speed 1.2 x higher
Resistance 1.2 x 1.2 = 1.44 higher

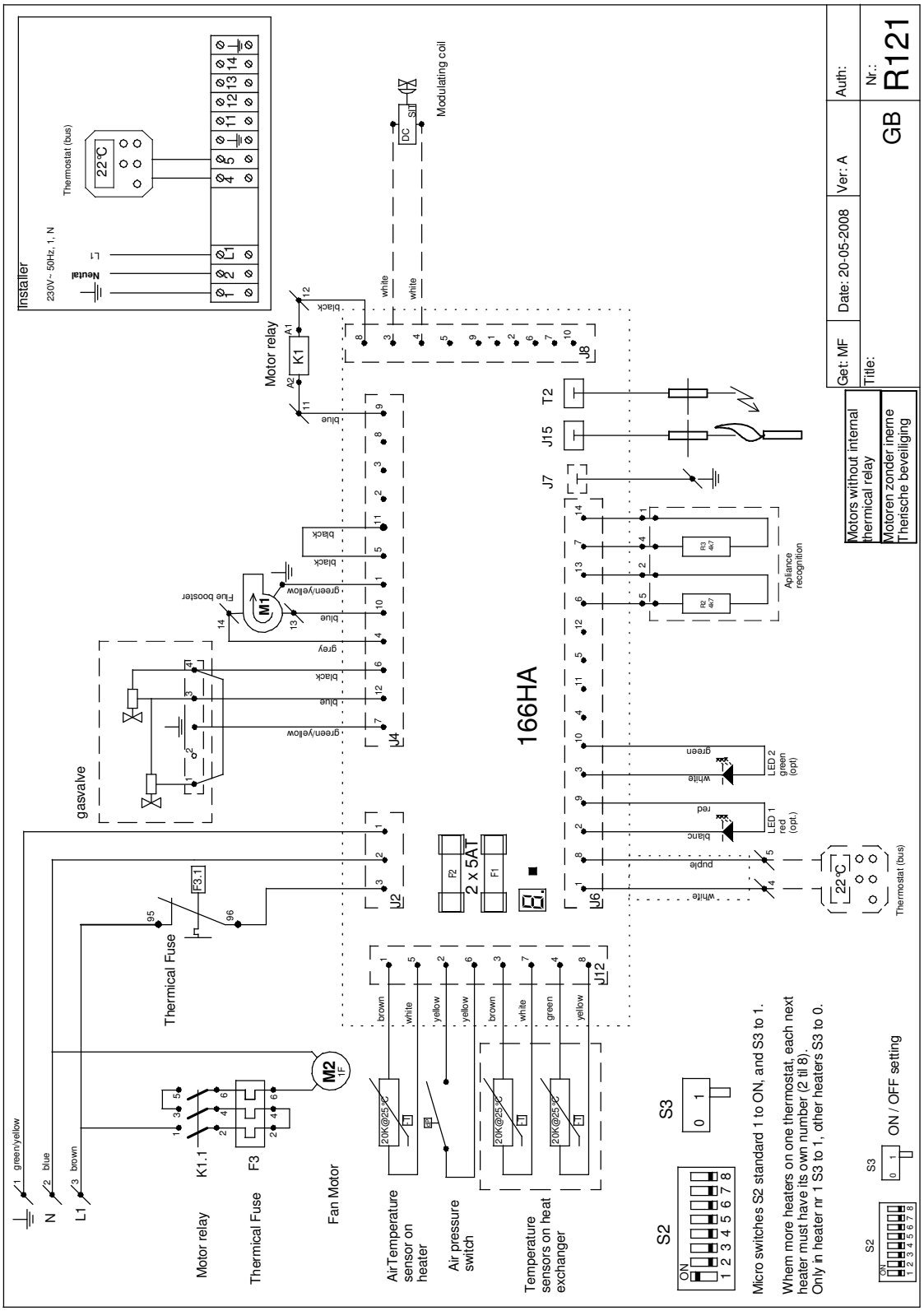
Important!
If an air heater is intended to be connected to a duct system with a high static pressure this must not under any circumstances be implemented with unrestricted air diffusion without taking further measures. This will inevitably lead to the electric motor cutting out.
Refer to the Technical data for the maximum air displacement, the static air capacity and the maximum amperage of the ventilator motor.

5.2 Insufficient air displacement

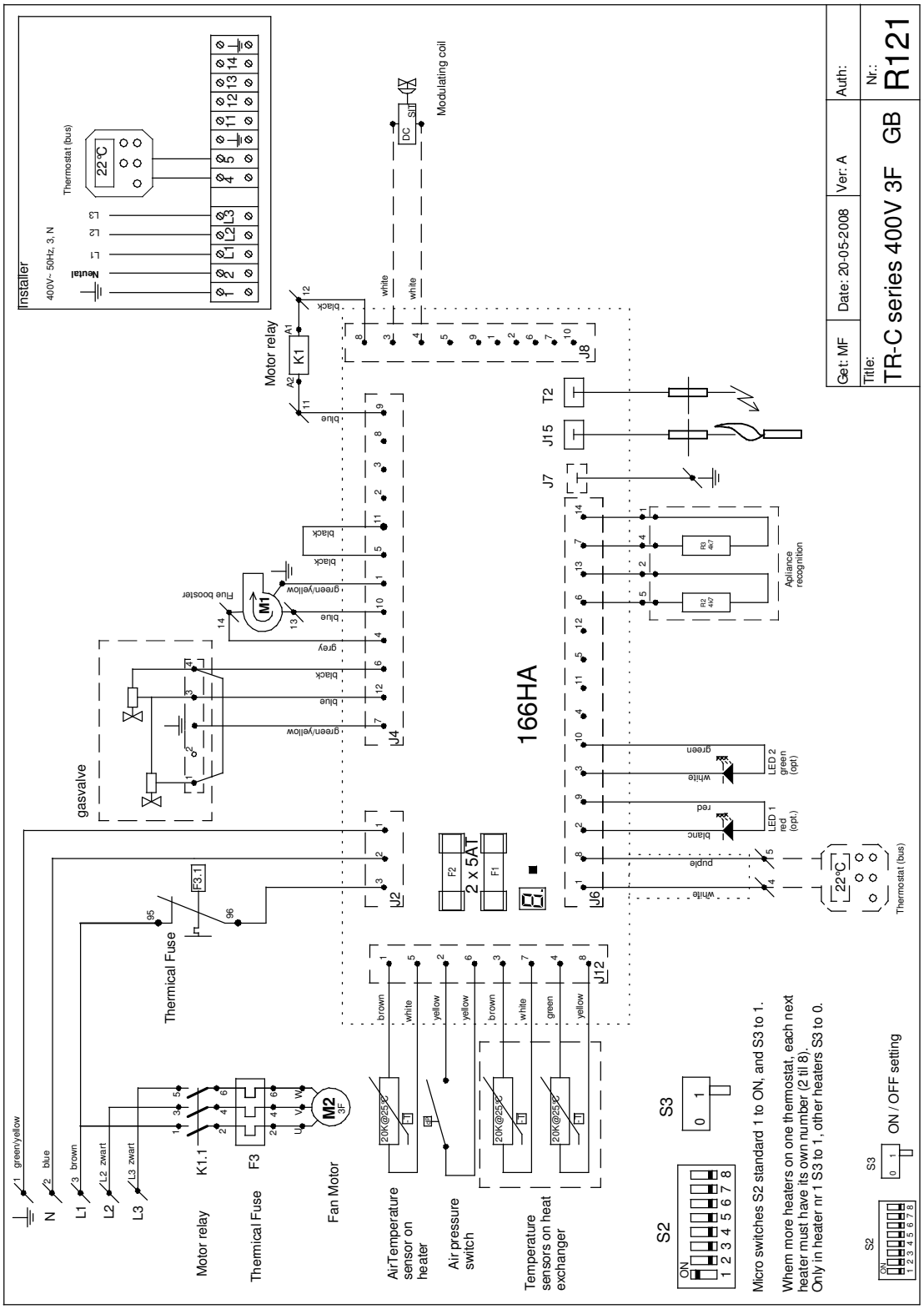
The appliance will not displace a sufficient amount of air when the resistance in the system is too great. This is not a problem for the ventilator but the heat exchanger in the appliance will become too hot and will cut out because of overheating. In that case the resistance in the system must be reduced or the ventilator must run at higher revolution speeds. The latter case my have consequences for the choice of motor. Always contact the manufacturer in cases like these.

6 Electrical diagram

6.1 230Vac version with <u>external</u> thermal safety device

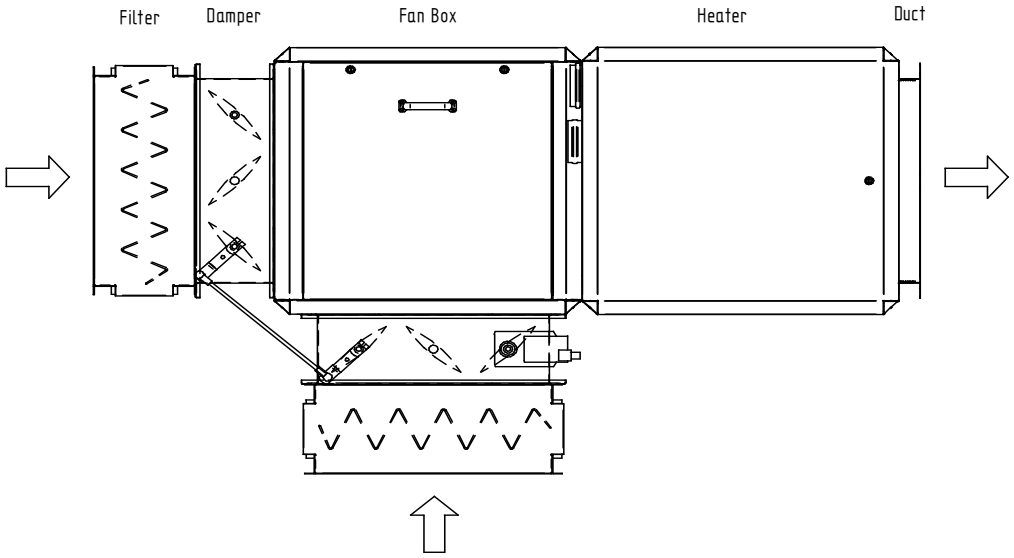


6.2 3-Phase 400Vac Version



7 Air resistance and speed

7.1 Air resistance accessories



The following losses in pressure should be calculated in when standard accessories are used:

Ventilator casing	20 Pa
Louvred section	10 Pa
Filter panel (class EU2), clean condition	40 Pa
Fresh air grille	10 Pa

7.2 Examples of industrial installations

An installation with warm air blowing into two or more spaces *must* provide for the used air to return to the heater.

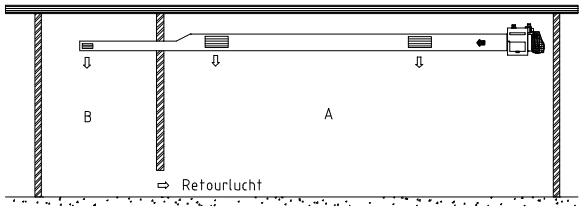


Figure 7-1: example for two spaces

A heater that is installed in a separate space with ducts connected to the adjacent room.

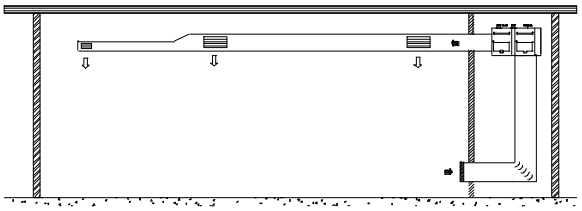
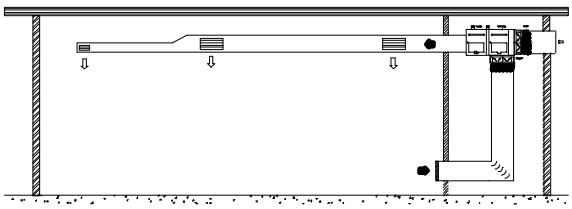


Figure 7-2: heater in separate space

A heater with fresh air supply and return connection. The fresh air to indoor air ratio can be linked and adjusted by hand or by means of a stepped control and servomotor.
The return and/or outside air can be potentially filtered.



7.3 Air ducts

This paragraph gives a general representation of the requirements a simple duct system must meet. The reader is referred to specialist installers for accurate calculations of more complicated systems.
The table below shows the diameter of the appropriate size round air duct (standard sizes for

Air displacement	Air speed	Duct size (mm)
m3/h	m/s	Round or Square Section
9,000	6.32	710
8,000	5.62	710
7,000	5.35	630
6,000	5.35	630
5,000	4.92	600
4,000	4.51	560
3,000	4.25	500
2,000	3.50	450
1,000	3.57	315
900	3.54	300
800	3.14	300
700	3.16	280
600	2.70	280
500	2.82	250

spirally seamed ducting) for the given air displacement [m3/h] and acceptable speed of the air [m/sec].

The ducts must be airtight, internally smooth and sufficiently heat resistant. The ducting connection to the heater must be made of metal for a length of no less than 2 metres and run smoothly into the connector sizes of the appliance without any buffeting edges.
Bends in square section ducts must be provided with baffles conducting the air.
Sizes and the resistance of air grilles must be requested from the manufacturer.