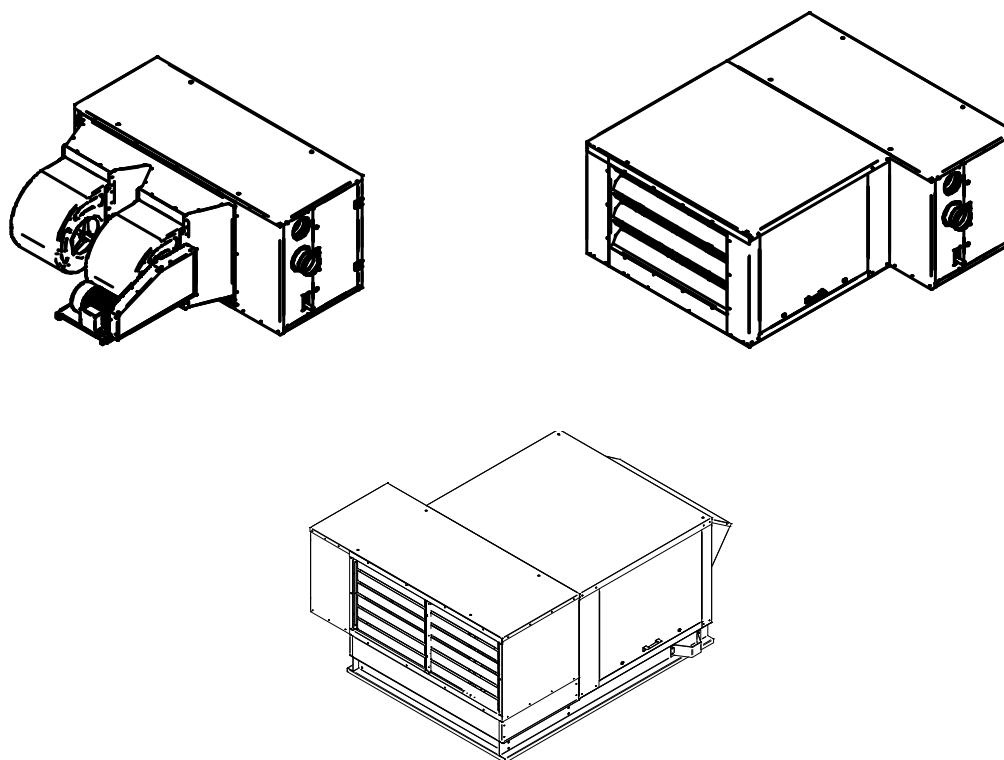


SUPPLEMENTARY INSTRUCTION BOOKLET

HEATER

TYPE TR
Centrifugal / Rooftop

GB139c



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 & Rooftop
version GB 139c cen. & rooftop
date: 19-09-2013

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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 external pressure.

TR heaters with a centrifugal system ventilator are used for systems with:

- suction and/or diffusion ducts
- Fan box with optional dampers and/or filter panels
- Rooftop version
- Combinations of above.

The TR heater with centrifugal system ventilator is designated with the letter C in the type designation, e.g. TR40 C. The TR heater with centrifugal system ventilator in the Rooftop version is designated with the letter R in the type designation, e.g. TR40 R 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.

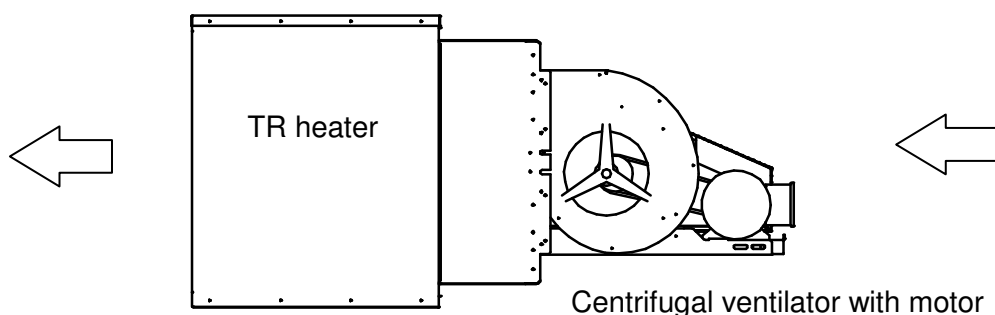
2 Design

- External pressure:

The TR air heater with centrifugal system ventilator(s) is available with the following pressure: 60, 120, 180, 240 and 300 Pa. The pressure level of the heater is selected depending on the air resistance in the installation.

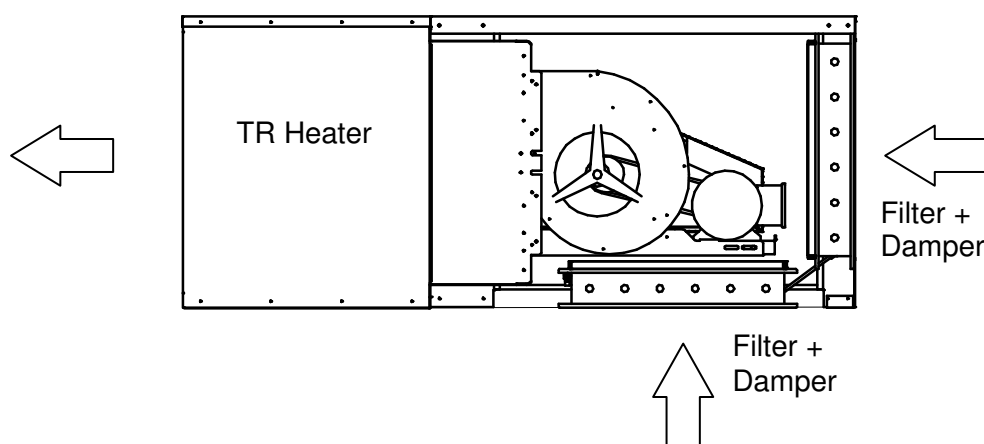
Basic version:

TR air heater with centrifugal ventilator



Fan box:

TR air heater with centrifugal ventilator and fan box



Discharge, outlet side:

- Flange connection for ducting (standard)
- Discharge grill on front (optional)

Suction, inlet side:

- unrestricted suction (basic version)
- Fan box with on either top or bottom and/or rear side flange connection for ducting
- Optional: dampers with interlink fresh and recirculation air and filter sets.

Construction frame:

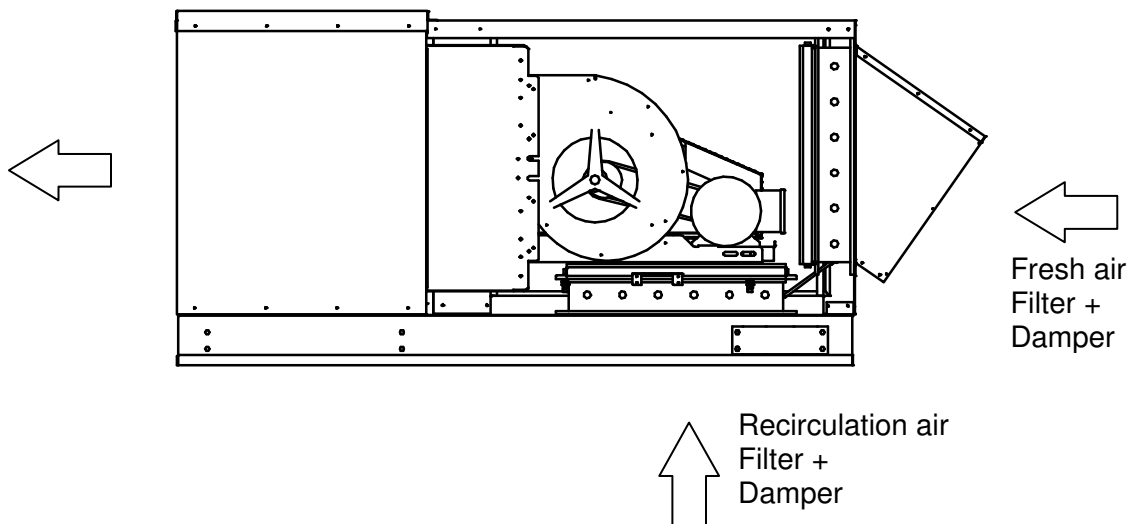
- C frame: optional

Additional:

- Isolation Fan box: optional
- Soft starter standard: 3-Phase 400 Vac version from 2,2 kW motor power capacity.

Rooftop:

TR air heater with centrifugal ventilator, fan box and Rooftop construction frame



Discharge, outlet side:

- Flange connection for ducting (standard)
- Air outlet module, see 8.8

Suction, inlet side:

- Fan box with on either top or bottom and/or rear side flange connection for ducting
- Optional: dampers with interlink fresh and recirculation air and filter sets.

Construction frame:

- Rooftop frame
- C Frame (optioneel)

Additional:

- Isolation heater + Fan box: standard
- Soft starter standard: 3-Phase 400 Vac version from 2,2 kW motor power capacity.
- Frost protection burner compartment : optional

3 Technical data

Centrifugal fan 1-Phase 230 Vac / 50Hz											
Type:			TR24C	TR28C	TR40C	TR50C	TR60-2C	TR80-2C	TR100-2C	TR125-2C	TR150-2C
ext. Pressure	Air output max.	m3/h	3000	3000	4000	5000	6000	7500	9.000	12.000	13.500
Δp [Pa]	Throw horizontal	m	16	16	22	26	28	30	30	30	30
60	Electrical supply (50 Hz)	V	230	230	230	230	230	230	230	n.v.t.	n.v.t.
	Power consumption	W	520	520	770	1000	900	1050	1275		
	Power consumption motor nom.	A	2,5	2,5	3,6	4,7	4,0	4,7	5,2		
	Power consumption motor max.	A	3,1	3,1	4,2	5,5	5,5	5,5	7,3		
120	Electrical supply (50 Hz)	V	230	230	230	230	230	230	230	n.v.t.	n.v.t.
	Power consumption	W	570	570	820	1050	1050	1320	1550		
	Power consumption motor nom.	A	2,8	2,8	3,9	4,9	4,8	5,7	6,5		
	Power consumption motor max.	A	3,1	3,1	4,2	5,5	5,5	7,3	7,3		
180	Electrical supply (50 Hz)	V	230	230	230	230	230	230	230	n.v.t.	n.v.t.
	Power consumption	W	620	620	1000	1100	1250	1700	1750		
	Power consumption motor nom.	A	3,1	3,1	4,7	5,1	5,6	7,9	8,5		
	Power consumption motor max.	A	4,2	4,2	5,5	5,5	7,3	9,9	9,9		
240	Electrical supply (50 Hz)	V	230	230	230	230	230	230	n.v.t.	n.v.t.	n.v.t.
	Power consumption	W	780	780	1050	1330	1700	1700			
	Power consumption motor nom.	A	3,9	3,9	4,9	6,0	8,1	8,1			
	Power consumption motor max.	A	4,2	4,2	5,5	7,3	9,9	9,9			
300	Electrical supply (50 Hz)	V	230	230	230	230	230	n.v.t.	n.v.t.	n.v.t.	n.v.t.
	Power consumption	W	920	920	1270	1450	1800				
	Power consumption motor nom.	A	4,4	4,4	5,7	6,6	8,6				
	Power consumption motor max.	A	5,5	5,5	7,3	7,3	9,9				
Centrifugal fan 3-Phase 400 VAC / 50Hz											
Type:			TR24C	TR28C	TR40C	TR50C	TR60-2C	TR80-2C	TR100-2C	TR125-2C	TR150-2C
ext. Pressure	Air output max.	m3/h	3000	3000	4000	5000	6000	7500	9.000	12.000	13.500
Δp [Pa]	Throw horizontal	m	16	16	22	26	28	30	30	30	30
60	Electrical supply (50 Hz)	V	400	400	400	400	400	400	400	400	400
	Power consumption	W	520	520	770	1000	900	1050	1275	2300	2600
	Power consumption motor nom.	A	0,9	0,9	1,3	1,8	1,6	1,8	2,1	3,9	4,4
	Power consumption motor max.	A	1,1	1,1	1,5	2,1	2,1	2,1	2,8	5,1	5,1
120	Electrical supply (50 Hz)	V	400	400	400	400	400	400	400	400	400
	Power consumption	W	570	570	820	1050	1050	1320	1550	2325	2660
	Power consumption motor nom.	A	1,0	1,0	1,4	1,9	1,9	2,3	2,6	3,9	4,5
	Power consumption motor max.	A	1,1	1,1	1,5	2,1	2,1	2,8	2,8	5,1	5,1
180	Electrical supply (50 Hz)	V	400	400	400	400	400	400	400	400	400
	Power consumption	W	620	620	1000	1100	1250	1700	1750	2575	2970
	Power consumption motor nom.	A	1,1	1,1	1,8	2,0	2,3	2,9	3,0	4,4	5,0
	Power consumption motor max.	A	1,5	1,5	2,1	2,1	2,8	3,7	3,7	5,1	6,3
240	Electrical supply (50 Hz)	V	400	400	400	400	400	400	400	400	400
	Power consumption	W	780	780	1050	1330	1700	1700	2050	2850	3900
	Power consumption motor nom.	A	1,4	1,4	1,9	2,3	3,0	3,0	3,4	4,8	6,5
	Power consumption motor max.	A	1,5	1,5	2,1	2,8	3,7	3,7	5,1	6,3	8,3
300	Electrical supply (50 Hz)	V	400	400	400	400	400	400	400	400	400
	Power consumption	W	920	920	1270	1450	1800	2000	2450	3900	4200
	Power consumption motor nom.	A	1,7	1,7	2,2	2,6	3,2	3,3	4,1	6,5	7,0
	Power consumption motor max.	A	2,1	2,1	2,8	2,8	3,7	5,1	5,1	8,3	8,3
Weight TR C			TR24C	TR28C	TR40C	TR50C	TR60-2C	TR80-2C	TR100-2C	TR125-2C	TR150-2C
TRC basic		kg	115	120	135	150	215	225	235	300	350
TRC with Fan box		kg	165	170	185	200	265	275	300	360	420
TRC rooftop		kg	215	220	235	250	365	375	400	460	520

Dimensions, see Chapter 8.

4 Installation

4.1 General:

General installing instructions are provided in the TR instruction manual for appliances with axial ventilators. This supplementary booklet presents specific installing instructions for the centrifugal and rooftop version of the TR.

- The appliance must have a clear suck and throw. If these are blocked the heater will overheat. There should not be materials within 5m in front of the heater when there is a free outlet. Pay particular attention to flammable materials
- Take into account the possibility to open the door of the heater for necessary service and maintenance work.
- Make sure that after fitting, there is no mechanical tension on any connected gas or electrical supplies.

4.2 Suspension / positioning

4.2.1 Suspension TR C basic and TR C with Fan box

The heater is provided with fixing points for suspension, consisting of 4 or 6x M10 threaded sockets on top.

Check and make sure that the support is strong enough.

For the TR C with Fan box there is an C frame optional available. (8.7.2 / 8.7.4)

4.2.2 Positioning TR R Rooftop

The TR Rooftop must be placed on a so called platform.

- Rooftop frame
- C frame (optional)

See example drawing of the rooftop frame Chapter 8.7.

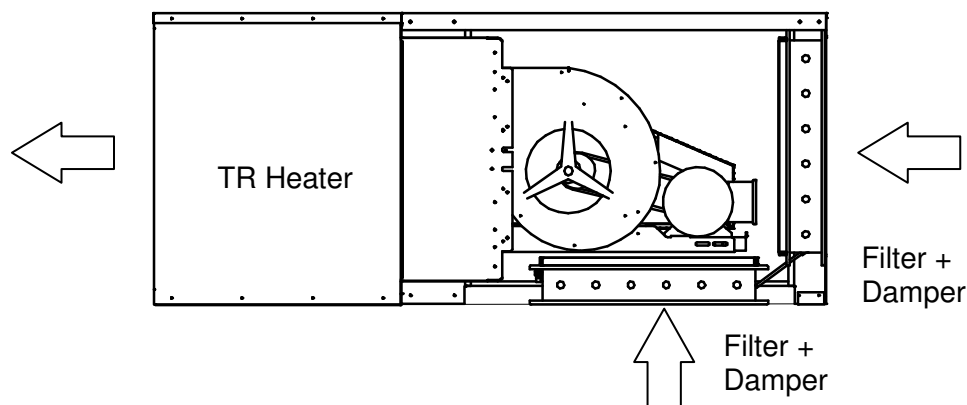
Check if the support is strong enough.

4.3 Duct connection:

The discharge side of the heater has a connection flange on which a duct can be fixed with M5 bolts. Dimensions: see chapter 8.

The Rooftop version is also optional available with a discharge down flow module.

4.3.1 Air resistance and accessories



Application of basic accessories can imply following resistance losses:

Fan box	20 Pa
Dampers	10 Pa
Filter panel (Class EU2), clean	40 Pa
Fresh air grill	10 Pa
Discharge down flow module	20 Pa

4.3.2 Minimum distance to bends or other appendages

It is essential that the heat exchanger is being blown equally over the full frontal surface. If the air, for example only covers the lower part of the exchanger, the upper region will probably get no cooling and get overheated.

De TR C heater should have at least 1 meter of straight duct with a cross section that is equal to that of the flange connection, behind the exchanger.

If these conditions are not being fulfilled, the heat exchanger will get thermally overloaded. This will result in heater errors and damage to the exchanger (shorter lifetime). This can mean invalidation of warranty!

4.3.3 Air Duct

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.

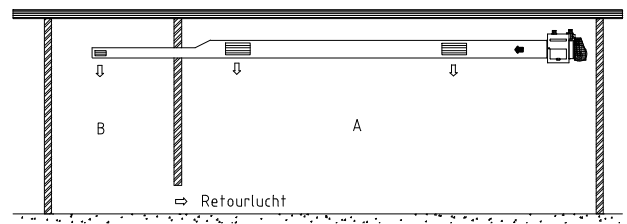
The table below shows the diameter of the appropriate size round air duct (standard sizes for spirally seamed ducting) for the given air displacement [m³/h] and acceptable speed of the air [m/sec].

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 meters 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.

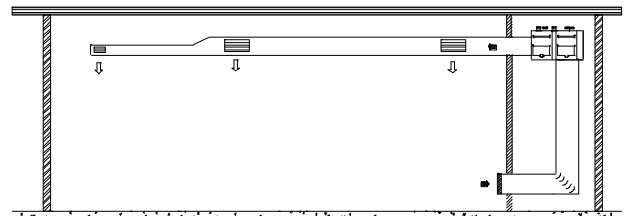
Air displacement	Air speed	Duct size (mm)
m ³ /h	m/s	Round or square
15.000	6,5	900
12.500	6,5	800
10.000	6,3	750
9.000	6,3	710
8.000	5,6	710
7.000	5,4	630
6.000	5,4	630
5.000	4,9	600
4.000	4,5	560
3.000	4,3	500
2.000	3,5	450
1.000	3,6	315
900	3,5	300
800	3,1	300
700	3,1	280
600	2,7	280
500	2,8	250

4.4 Examples of industrial installations

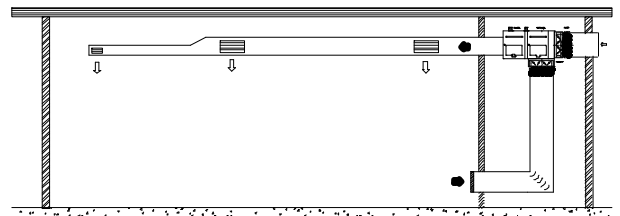
An installation with warm air blowing into two or more spaces *must* provide for the used air to return to the heater.



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



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 servo motor. The return and/or outside air can be potentially filtered.



5 Electrical Connection

5.1 General

The installation must comply with the local and/or national regulations.

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 of this manual (chapter 7).

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 earth connection). This isolating switch must have a contact gap of at least 3 millimeters.

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.

5.2 230Vac Version

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

230V Version with ventilator motor and **external thermal safety device**.

This appliance employs Electrical diagram 7.1. 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.

5.3 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 Electrical diagram 7.2. The thermal fuse in the current supply to the motor will trip when the motor is under overload 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 power can be switched back on again and the unit will start.

The TR heaters with a centrifugal ventilator from 2,2 kW motor power capacity is standard provided with a soft starter (Electrical diagram 7.3). For versions with the centrifugal motor power capacity smaller than 2,2 kW the soft starter is optional.

6 Adjusting the ventilator

In order to prevent overload of the electric motor, the ventilator has been set to a certain speed in the factory that is correct for the static pressure to be delivered by the appliance. This pressure is printed on the type plate.

A feature of these ventilators is that increased air displacement also demands more amps to the motor.

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 tripping 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.

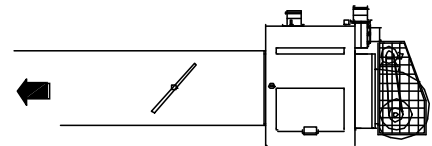
Always check the direction of rotation of 3-phase motors!

6.1 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.

The speed of the motor is 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 pulley and 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 $1.2 \times 1.2 = 1.44$ 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.

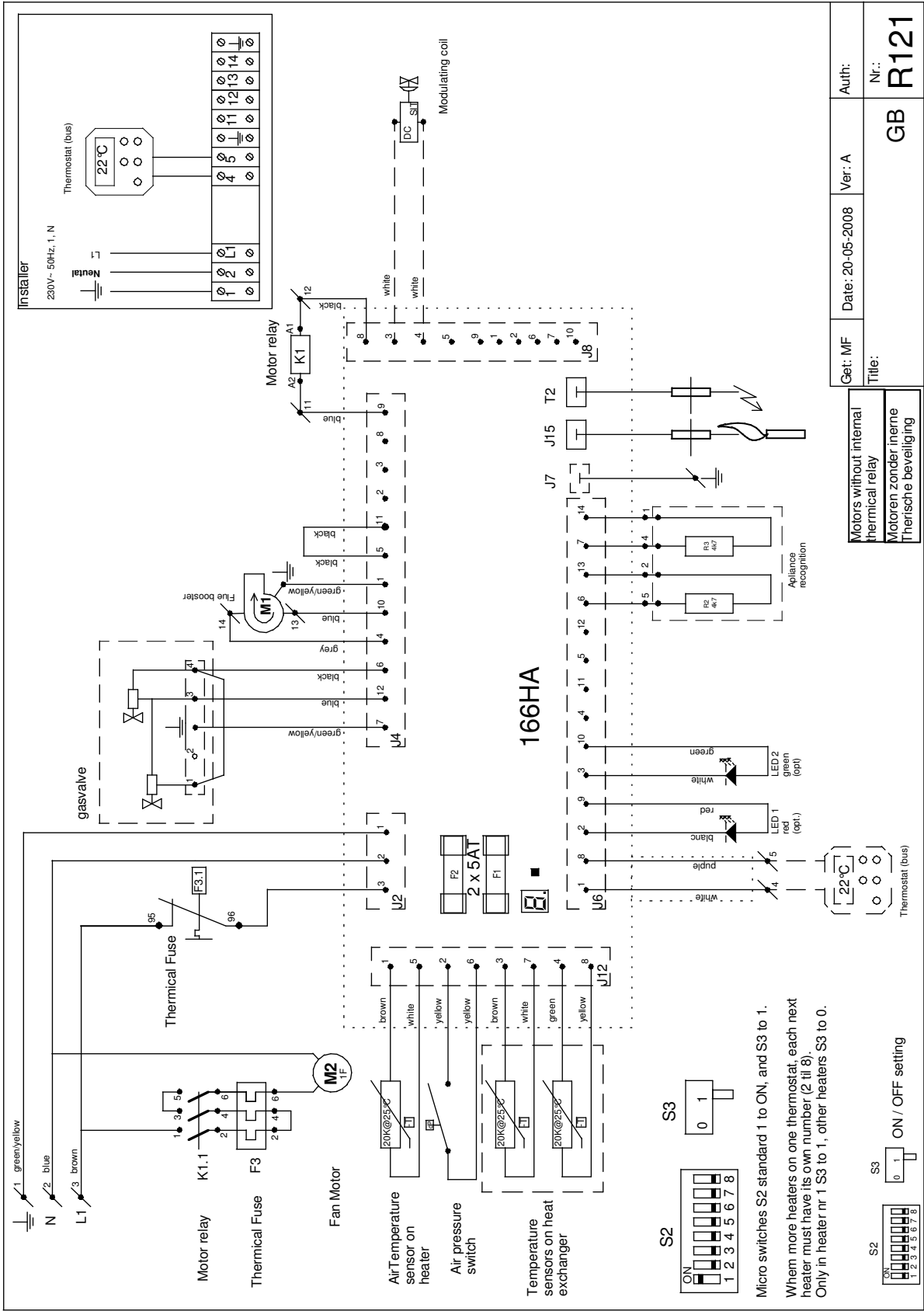
Refer to the Technical data for the maximum air displacement, the static air capacity and the maximum amperage of the ventilator motor.

6.2 Insufficient air displacement

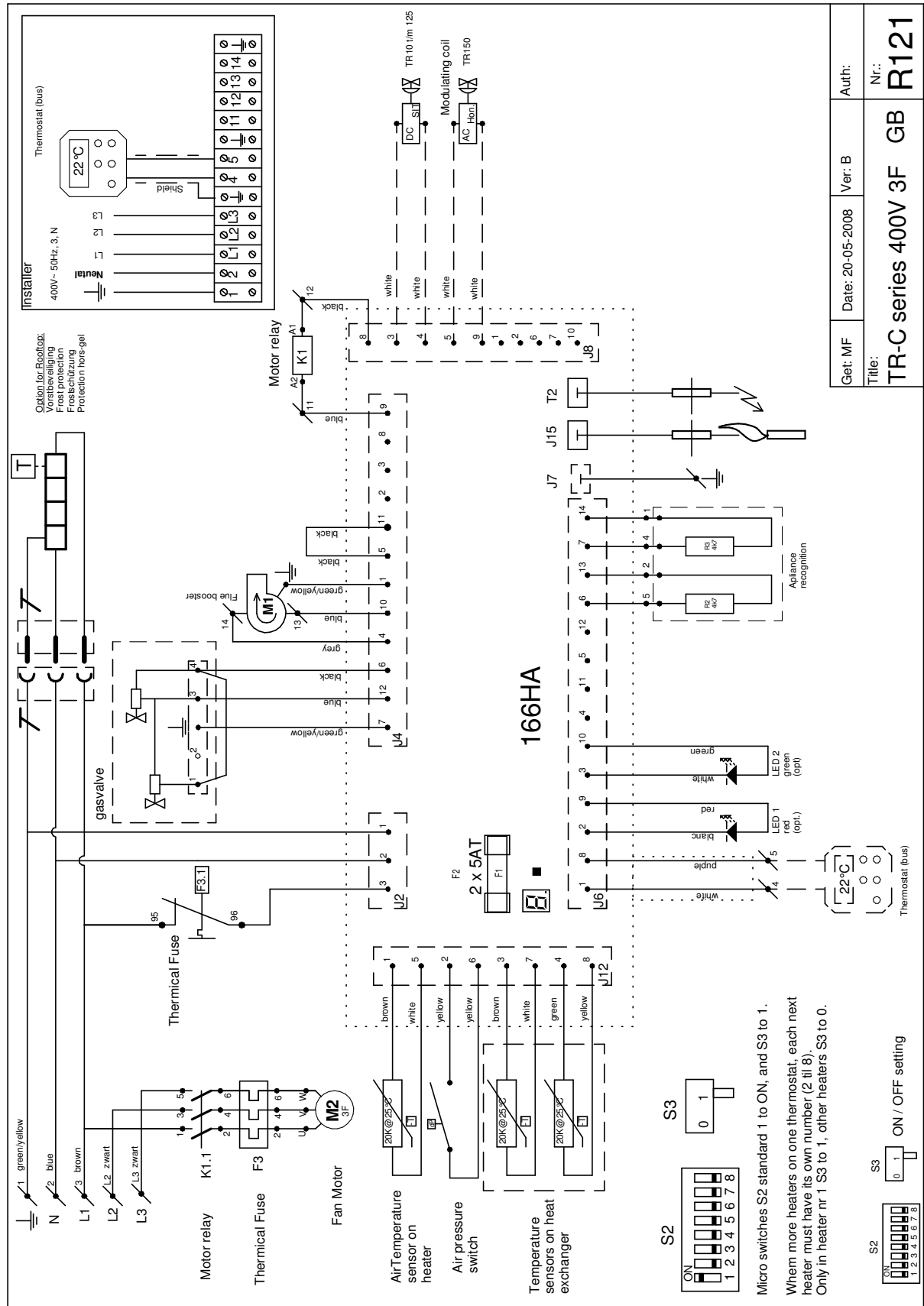
The appliance will not displace a sufficient amount of air when the resistance in the system is too high. This is not a problem for the ventilator but the heat exchanger in the appliance can become too hot and will cut out because of overheating. In that case the resistance in the system must be reduced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

7 Electrical diagram

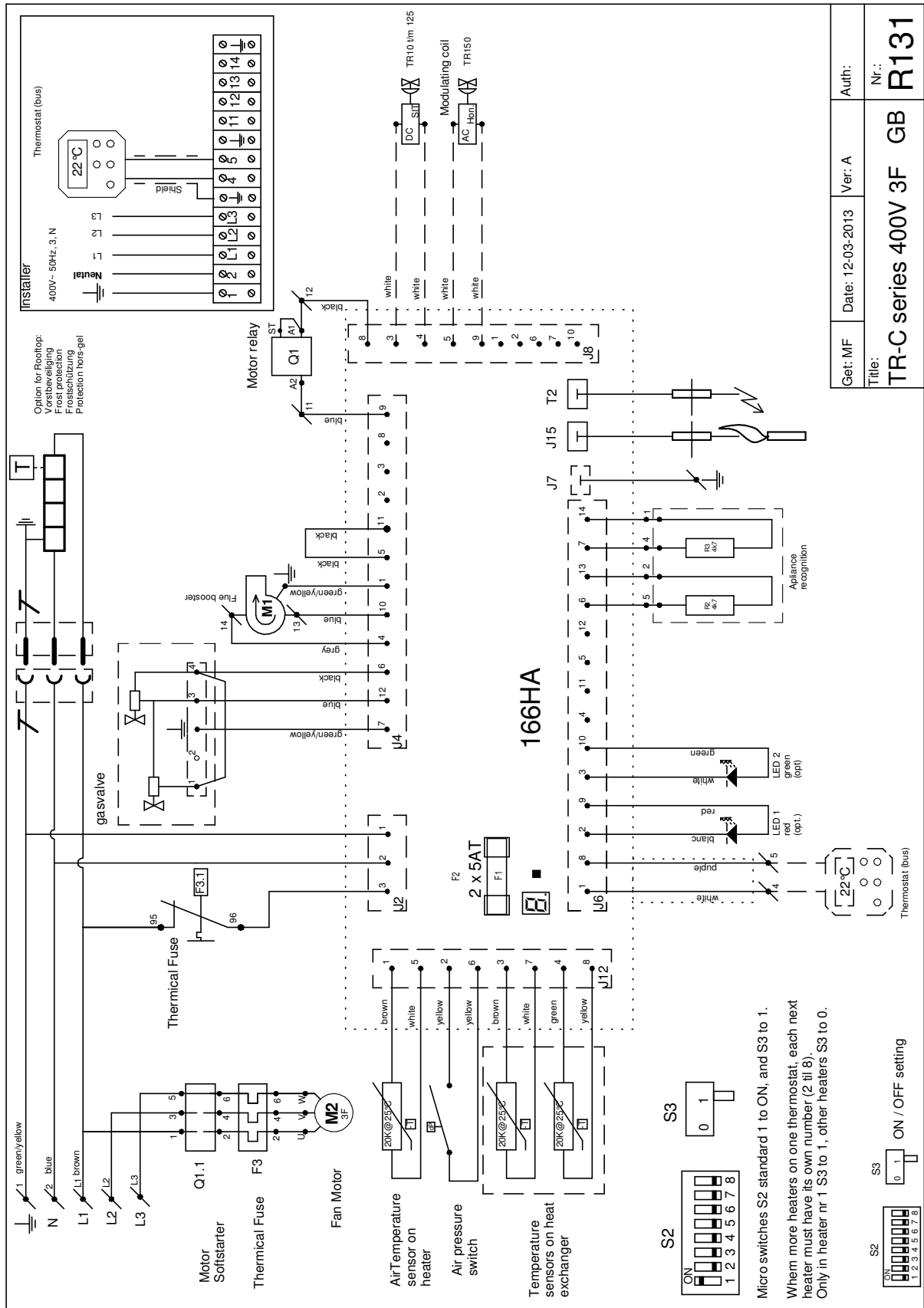
7.1 230Vac version with external thermal safety device



7.2 3-Phase 400Vac Version



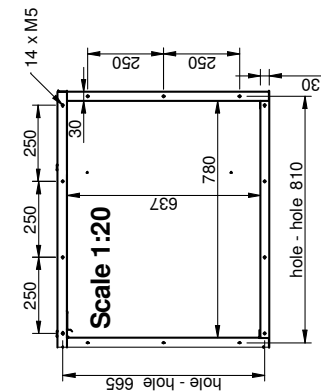
7.3 3-Phase 400Vac Version with soft starter



8 Dimensions

8.1 TR24 & 28 Centrifugal / Rooftop

8.1.1 TR24 C & 28 C Basic

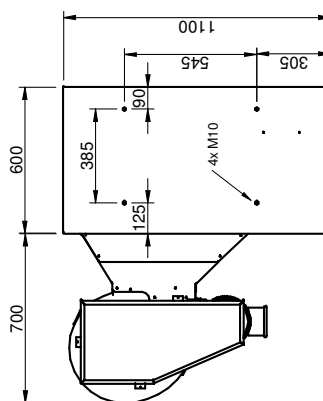


Air OUT flange
TR24 C, 28 C & 31 C

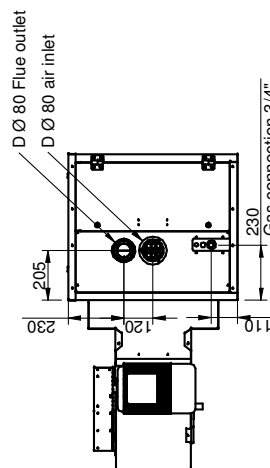


Front view
TR24 C, 28 C & 31 C

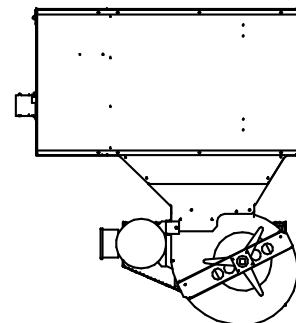
TR24 C, 28 C & 31 C basic
Scale 1:25



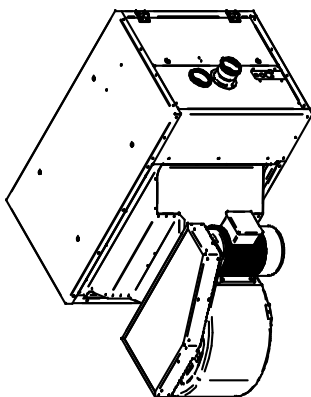
Top view
TR24 C, 28 C & 31 C



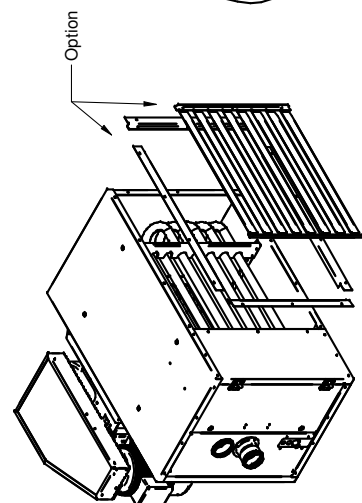
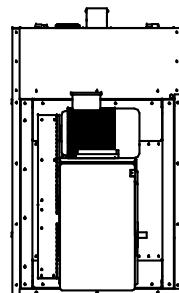
Side view
TR24 C, 28 C & 31 C



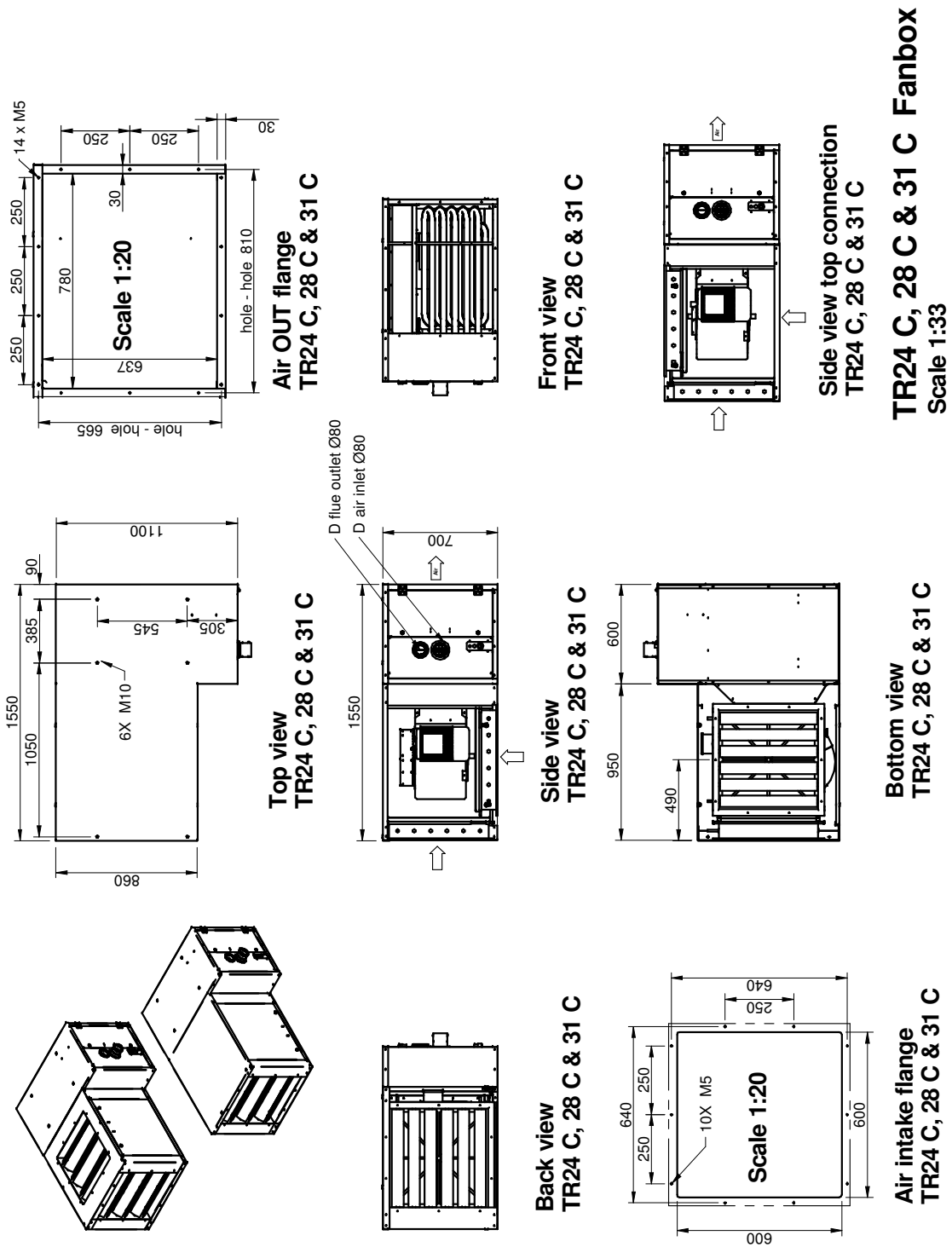
Bottom view
TR24 C, 28 C & 31 C



Back view
TR24 C, 28 C & 31 C



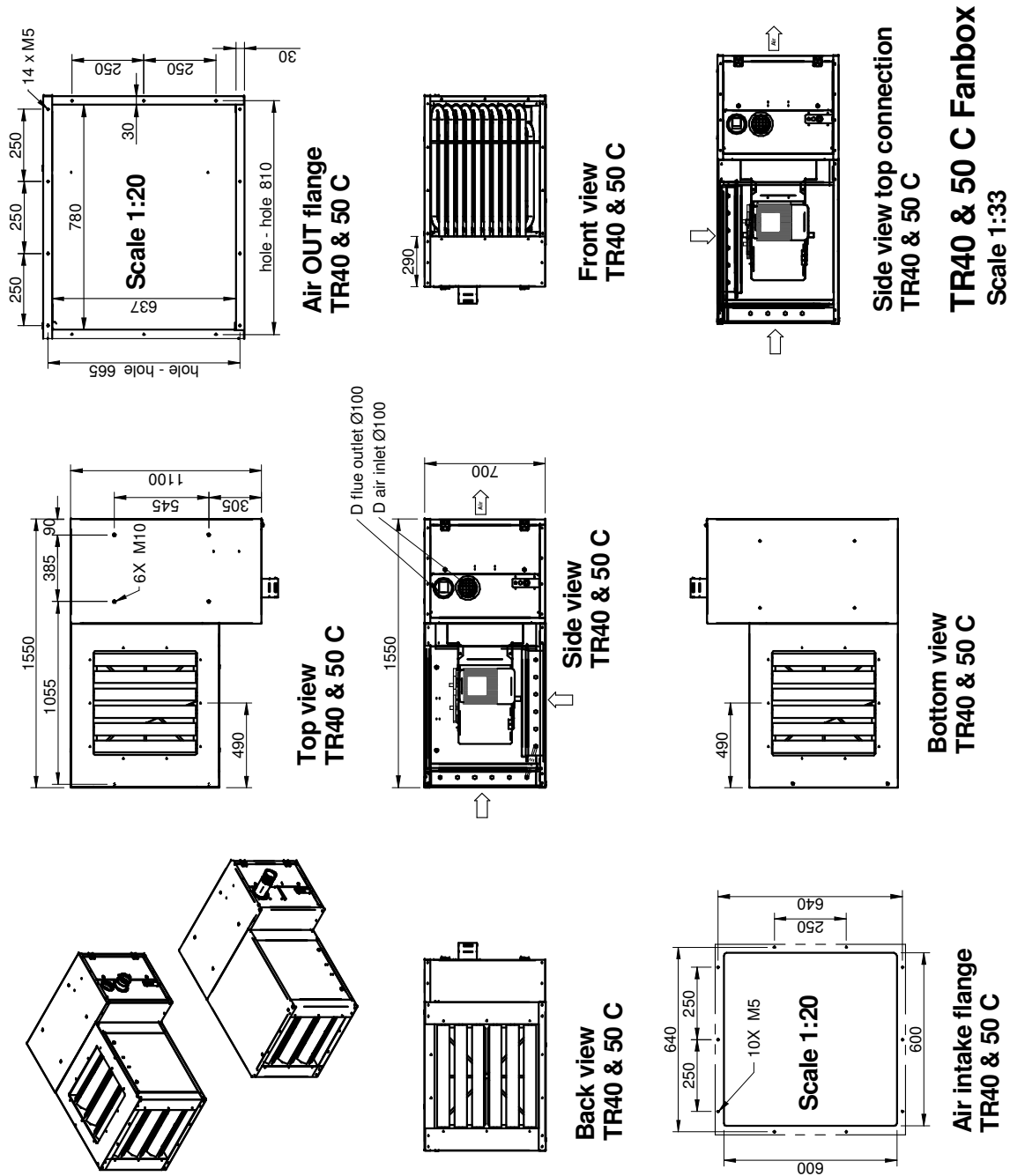
8.1.2 TR24 C & 28 C Fanbox



Annex to Instructions TR Centrifugal



8.2.2 TR40 & 50 C Fanbox

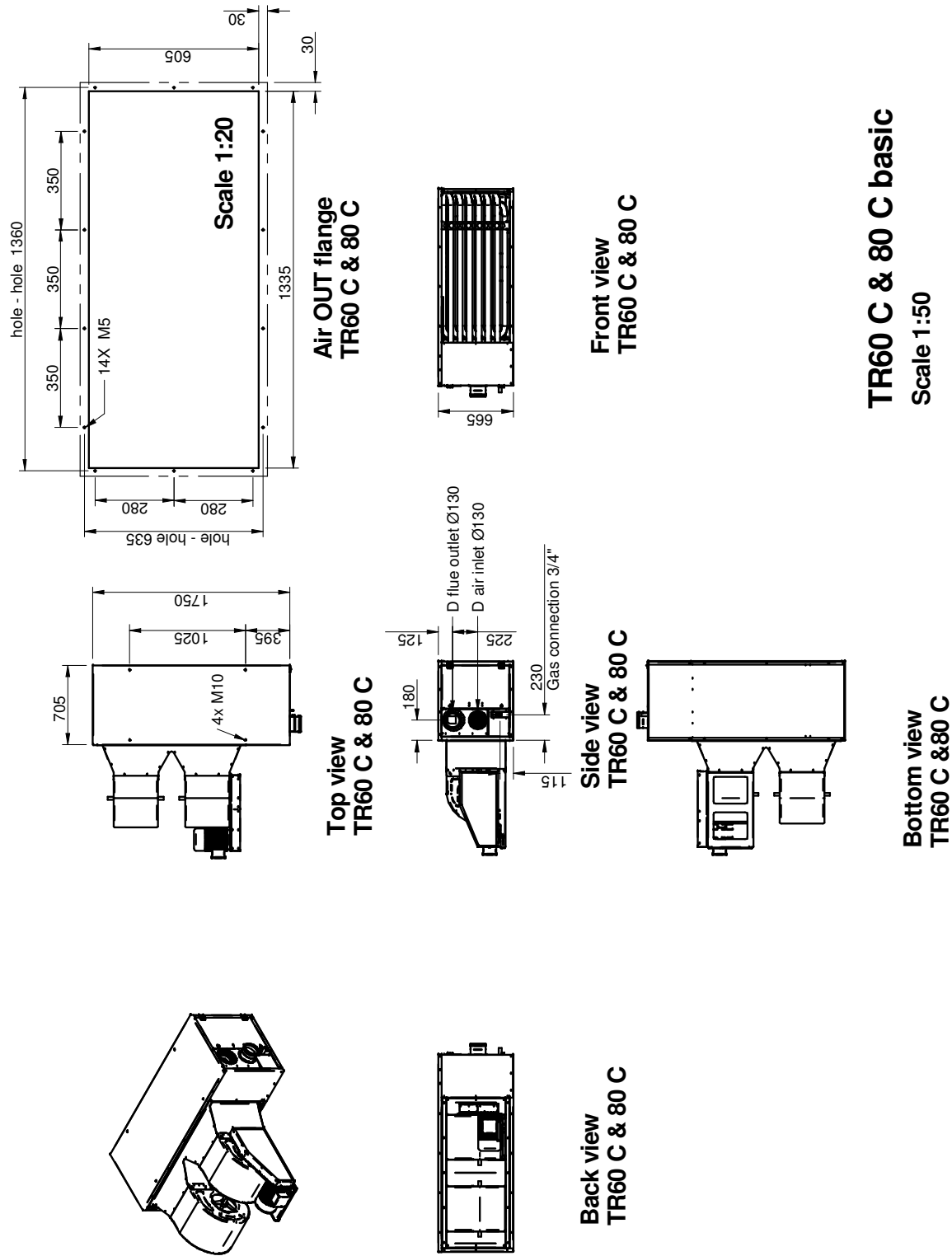


Annex to Instructions TR Centrifugal

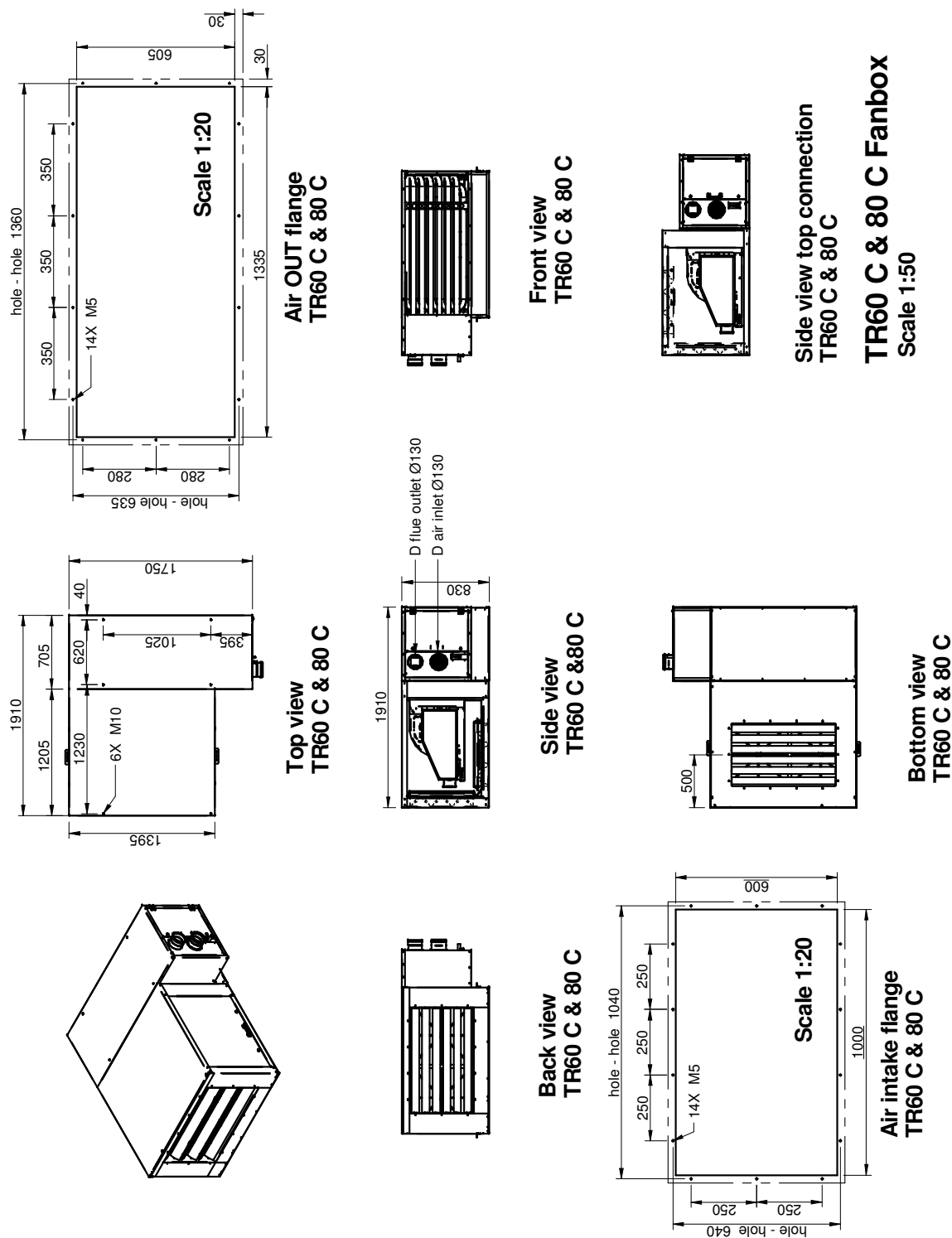


8.3 TR60 & 80 Centrifugal / Rooftop

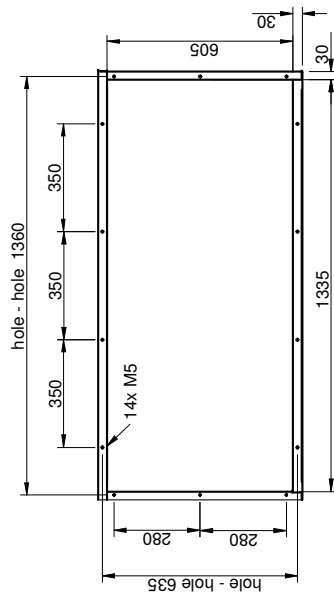
8.3.1 TR60 C & 80 C Basic



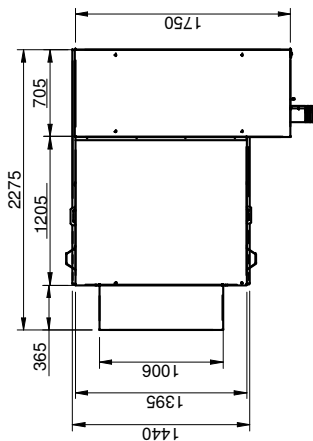
8.3.2 TR60 C & 80 C Fanbox



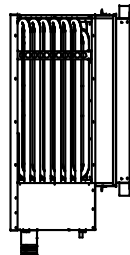
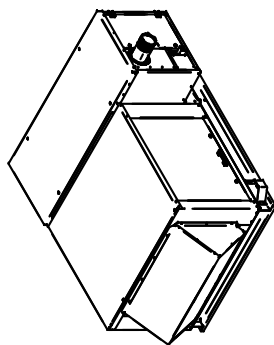
8.3.3 TR60 R & 80 R Rooftop



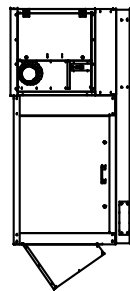
**Air OUT flange
TR60 R & 80 R**



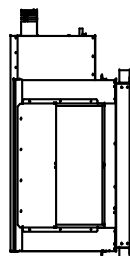
**Top view
TR60 R & 80 R**



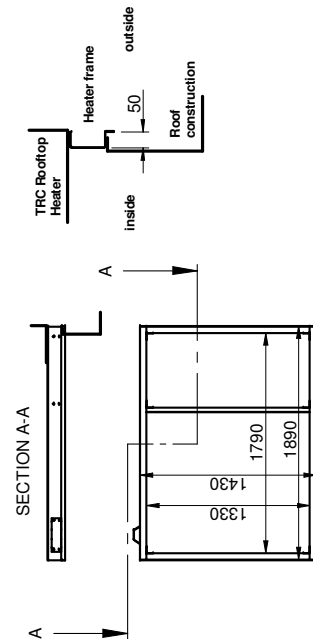
**Front view
TR60 R & 80 R**



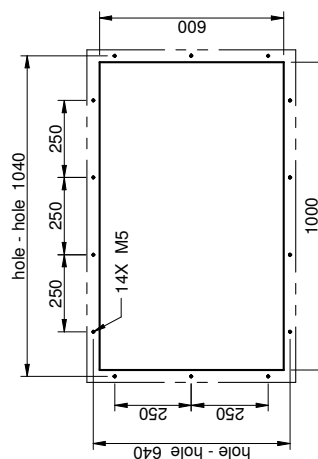
**Side view
TR60 R & 80 R**



**Back view
TR60 R & 80 R**



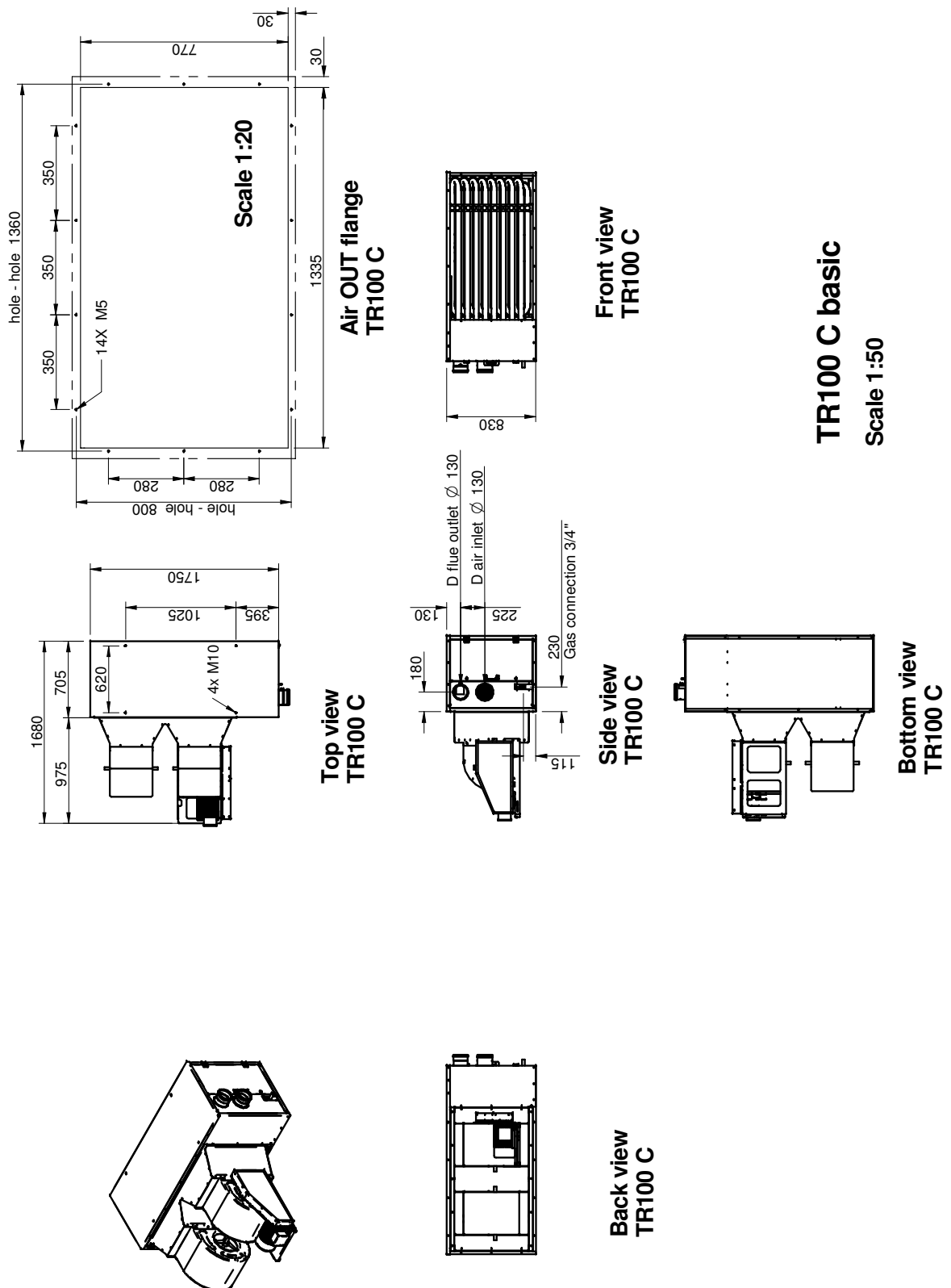
**TR60 R & 80 R Rooftop
Scale 1:50**



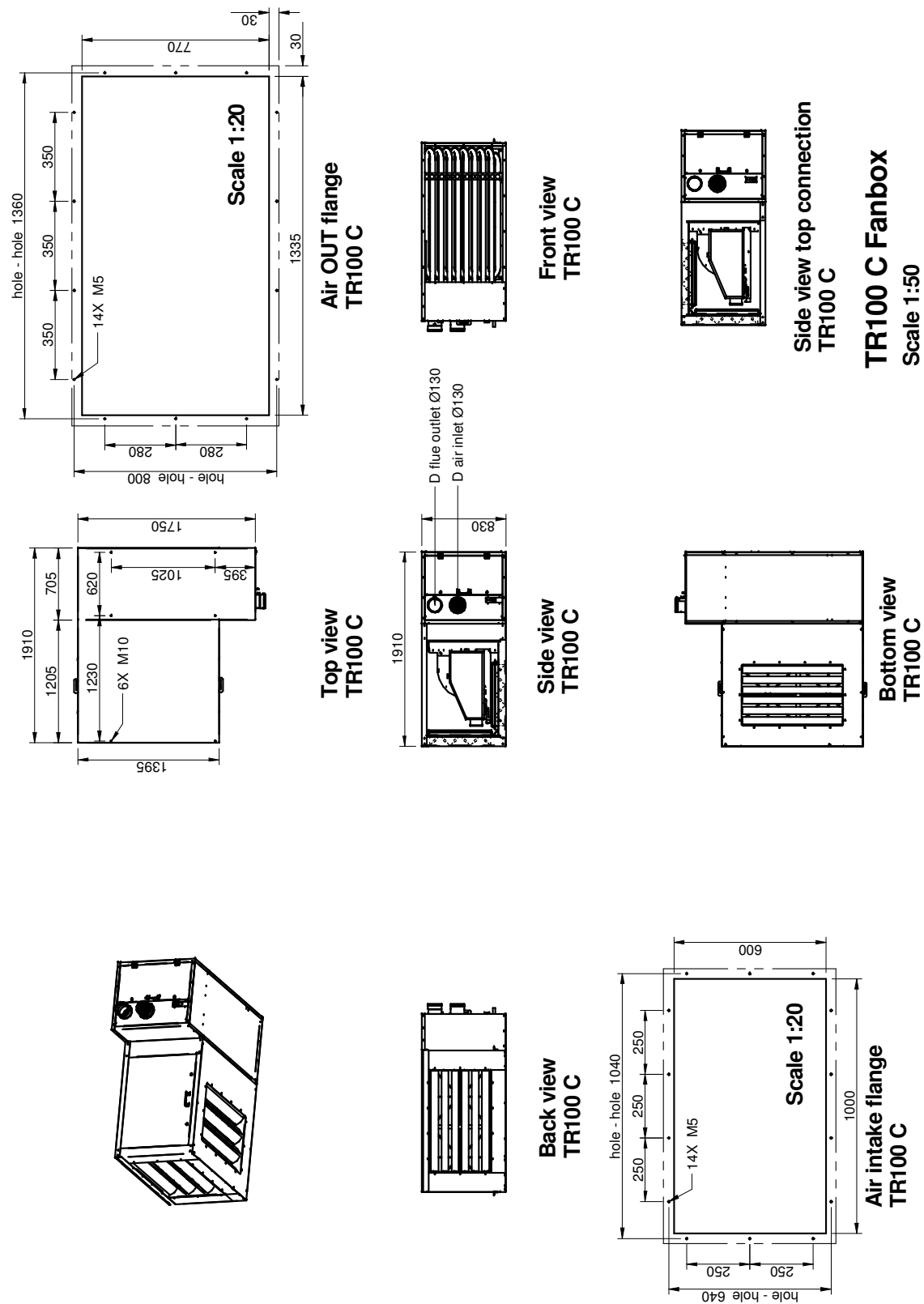
**Air intake flange
TR60 R & 80 R**

8.4 TR100 Centrifugal / Rooftop

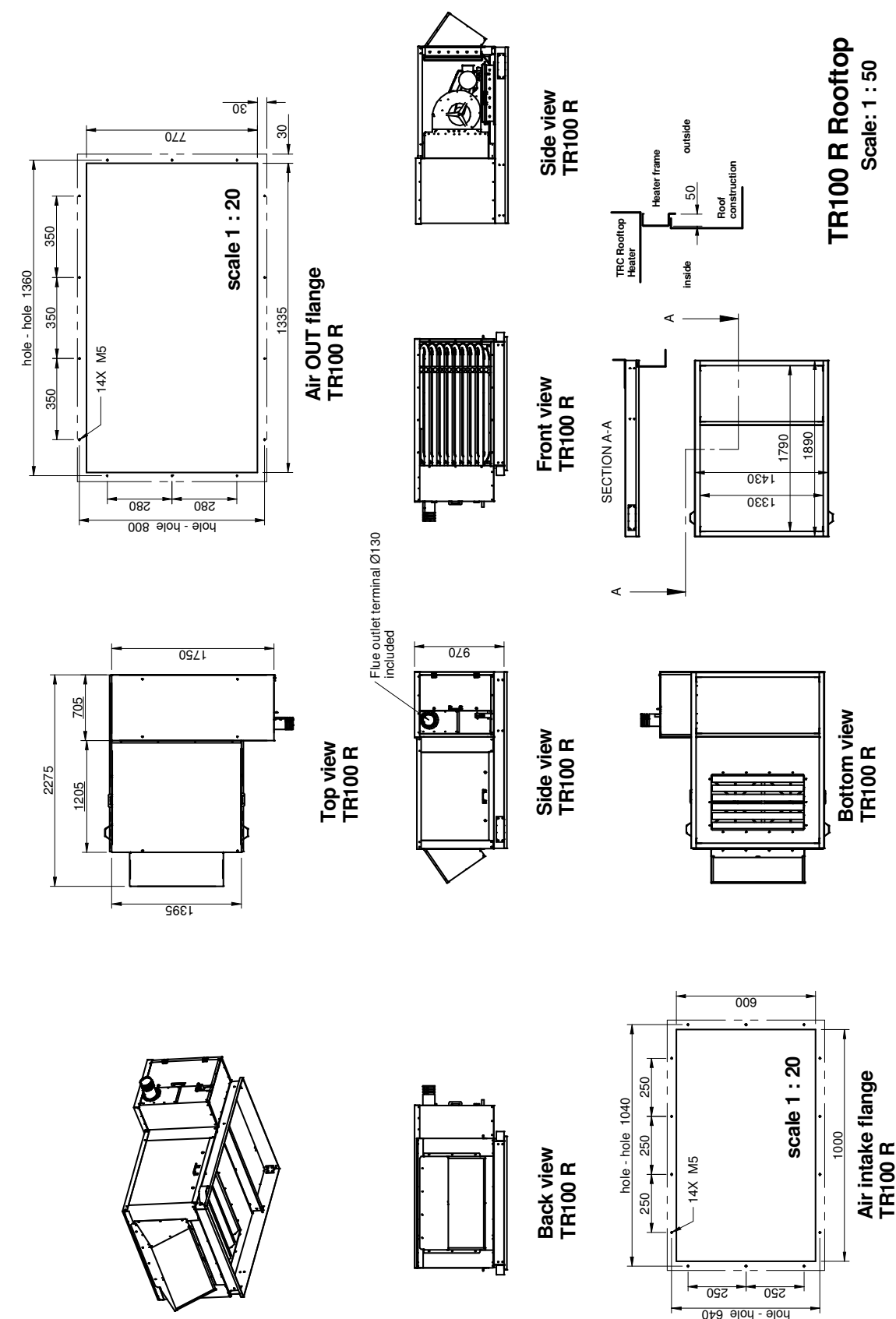
8.4.1 TR100 C Basic



8.4.2 TR100 C Fanbox

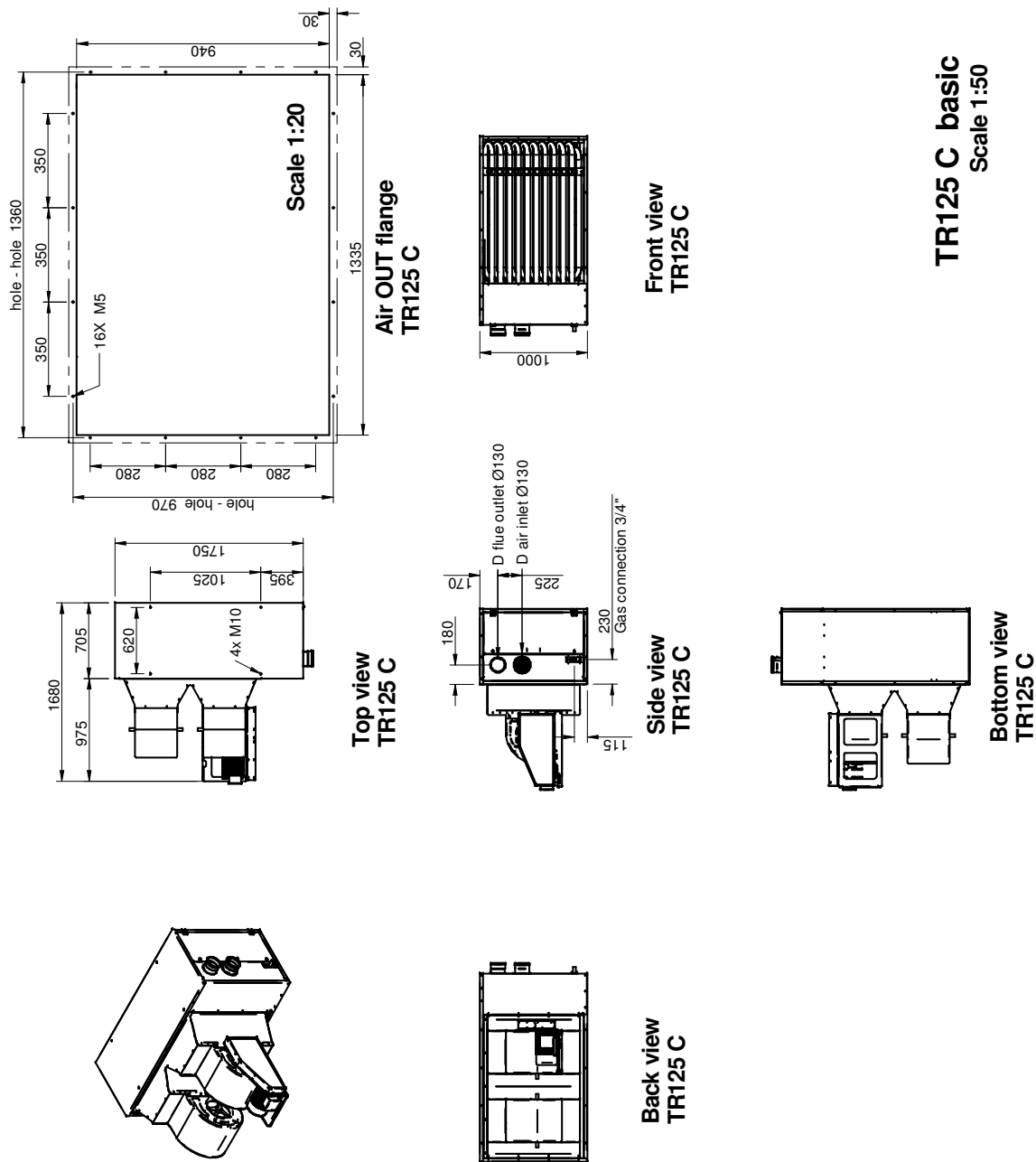


8.4.3 TR100 R Rooftop

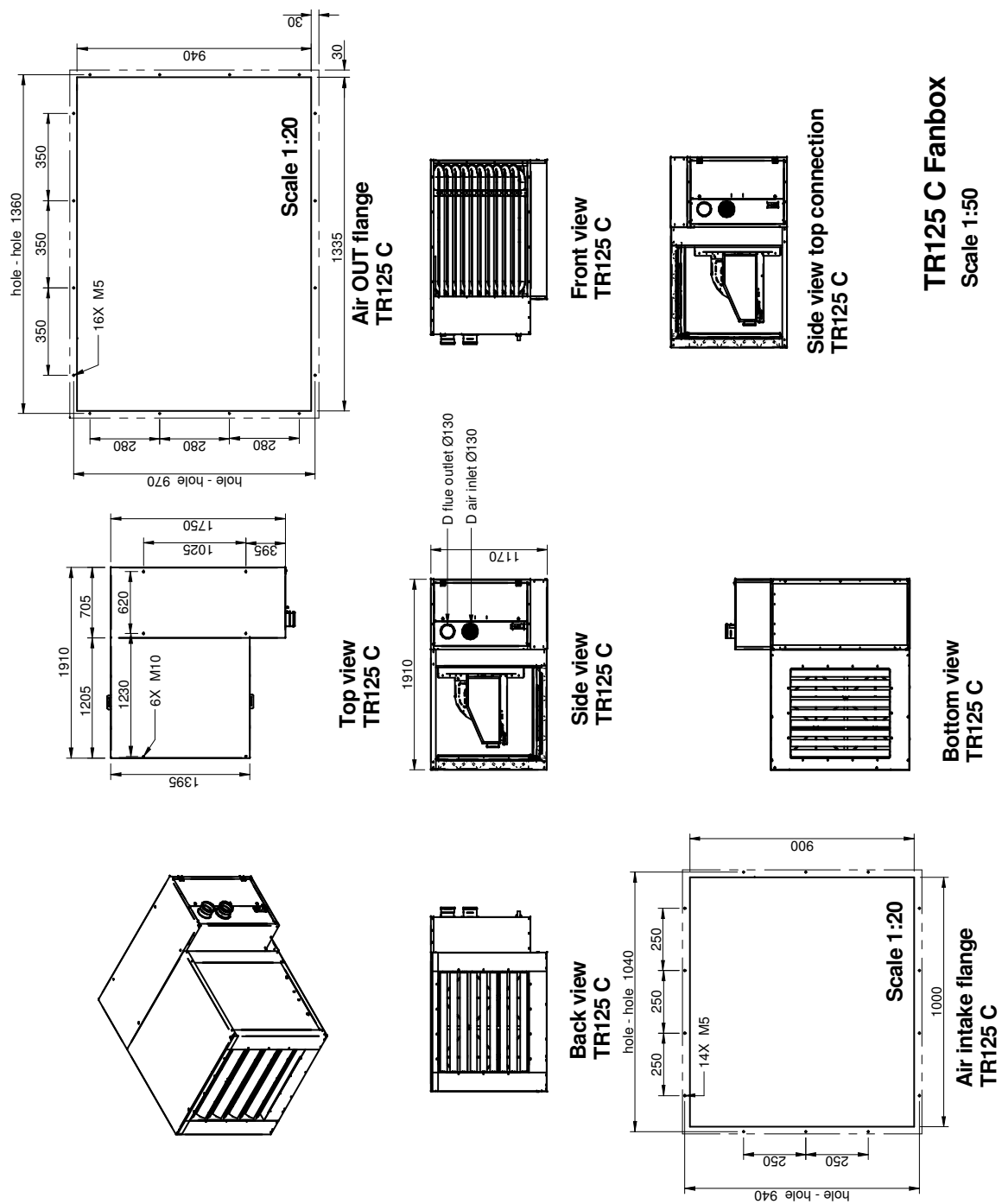


8.5 TR125 Centrifugal / Rooftop

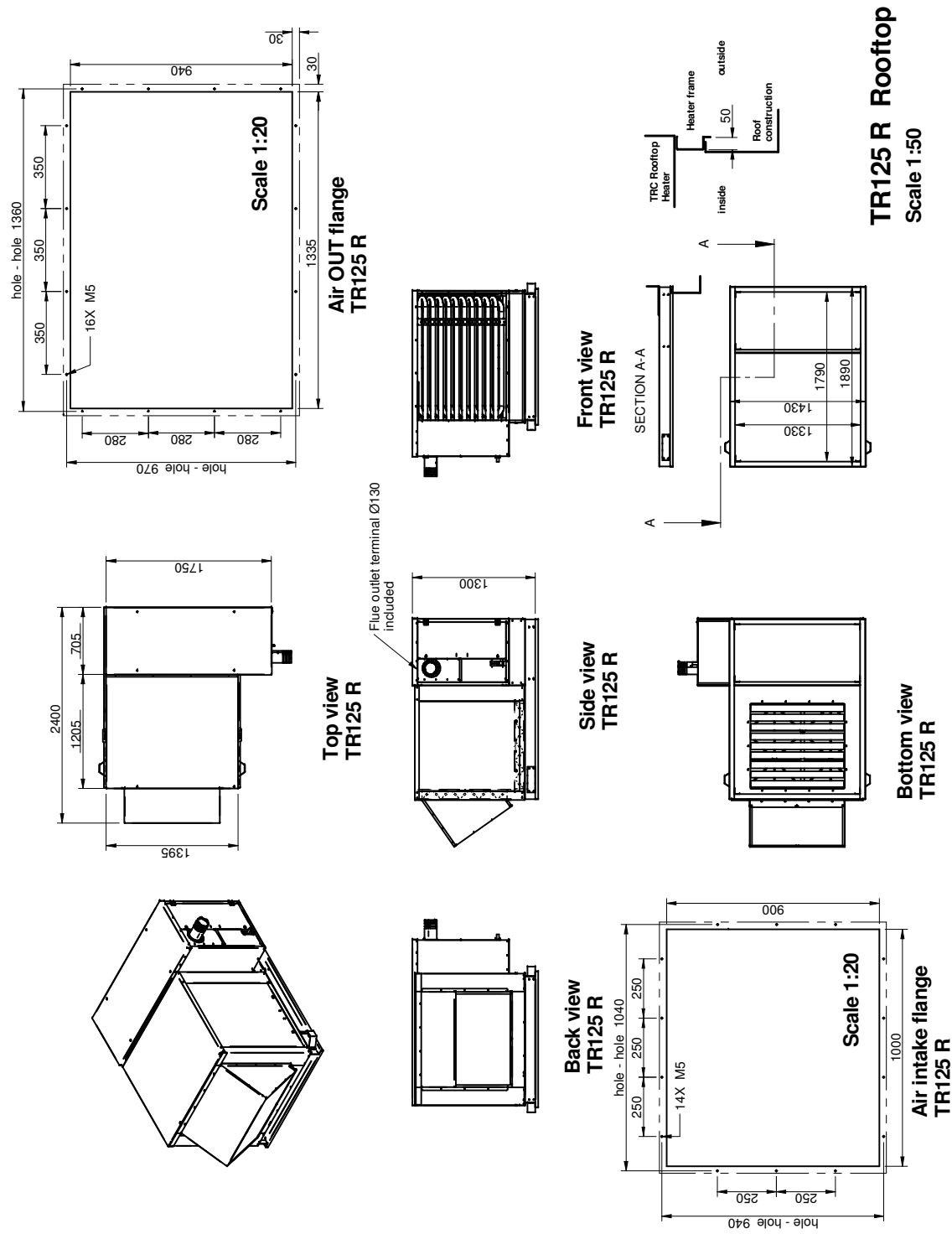
8.5.1 TR125 C Basic



8.5.2 TR125 C Fanbox

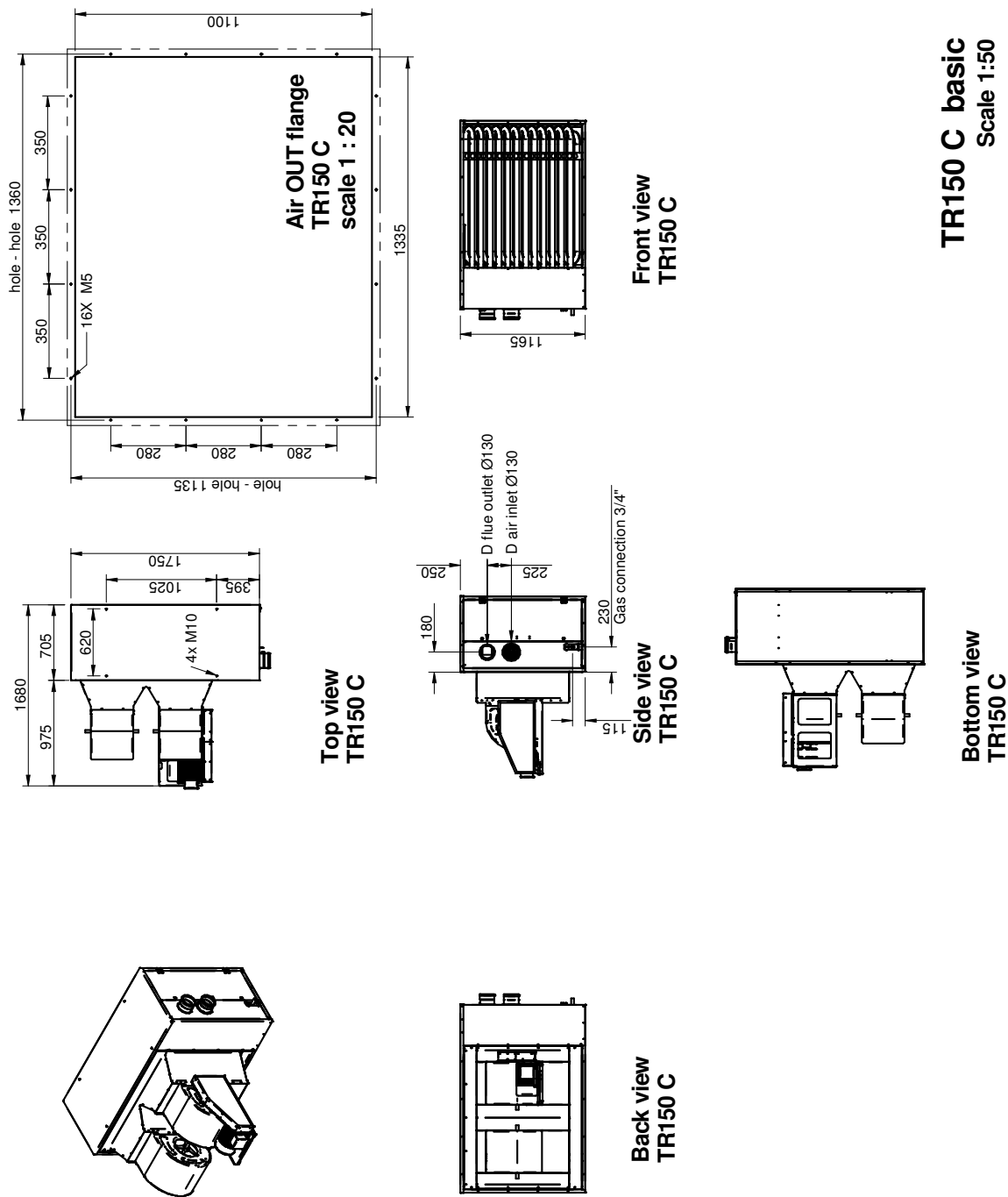


8.5.3 TR125 R Rooftop

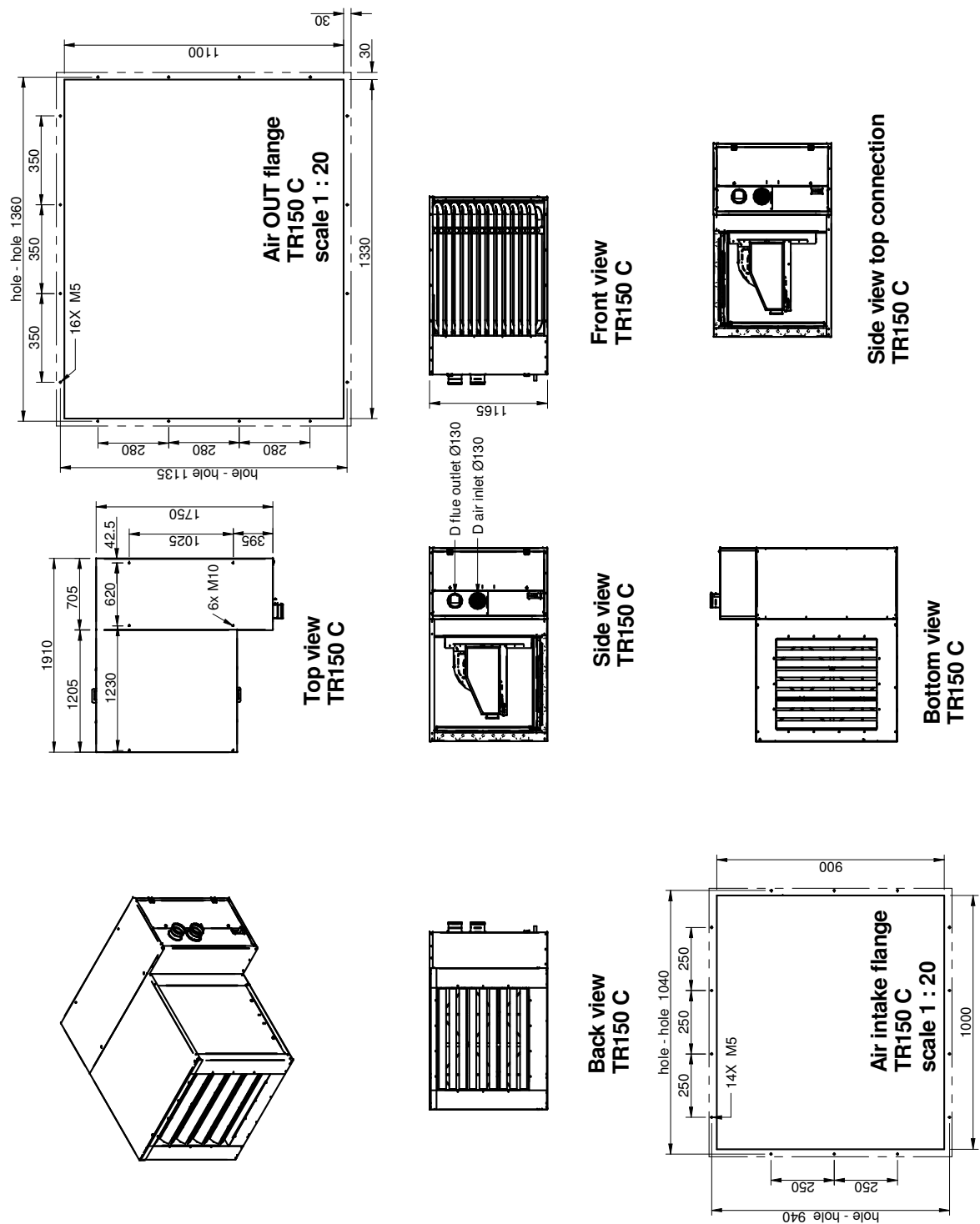


8.6 TR150 Centrifugal / Rooftop

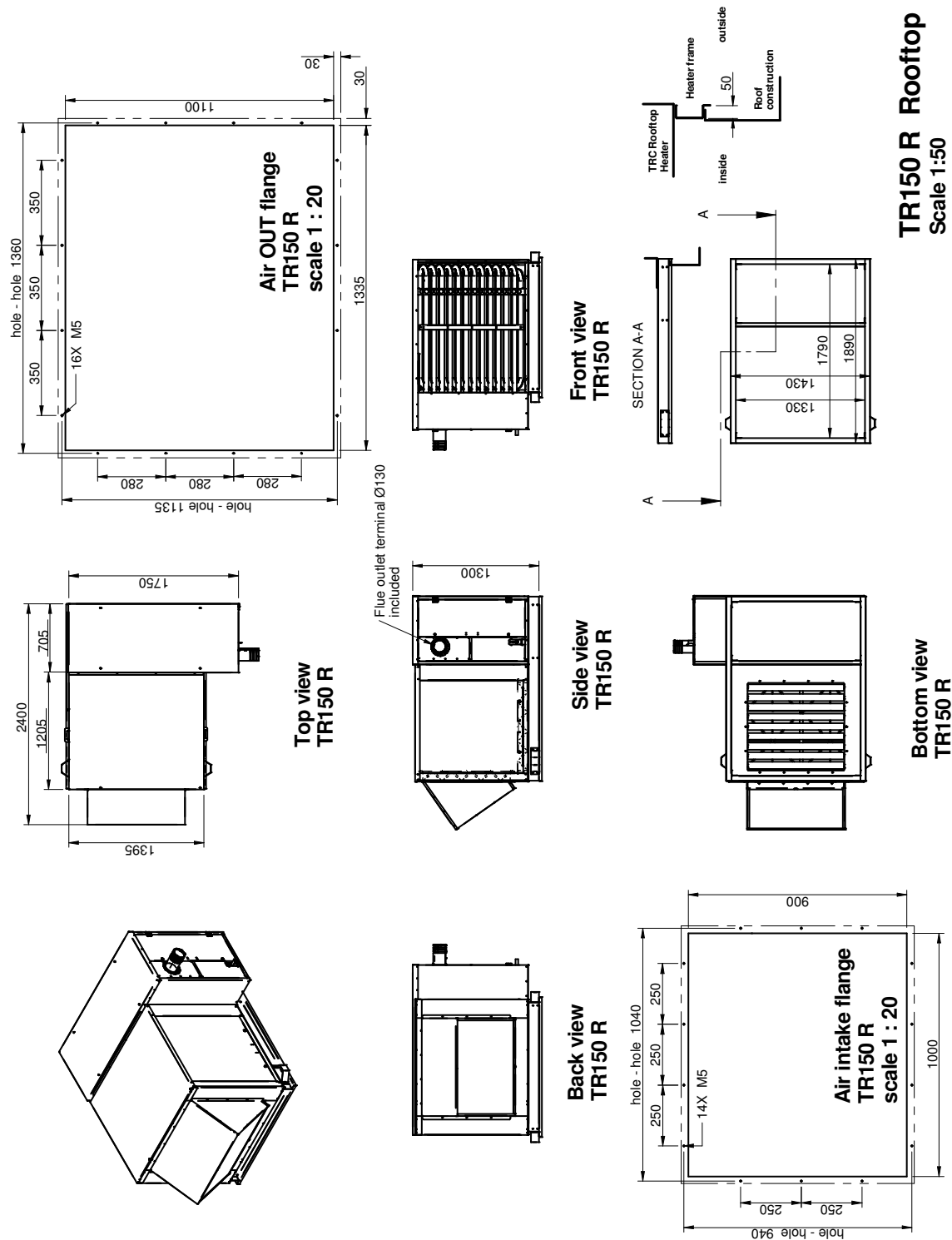
8.6.1 TR150 C Basic



8.6.2 TR150 C Fanbox

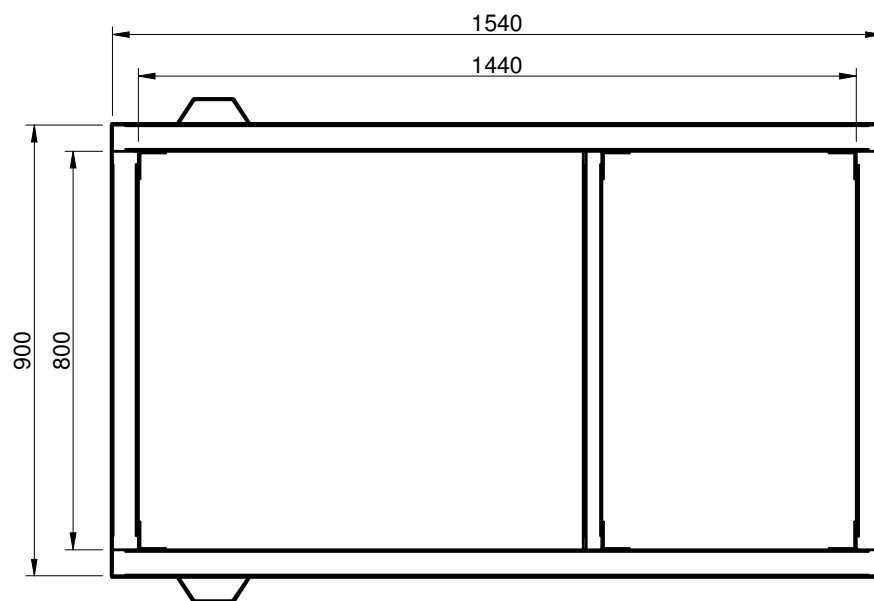
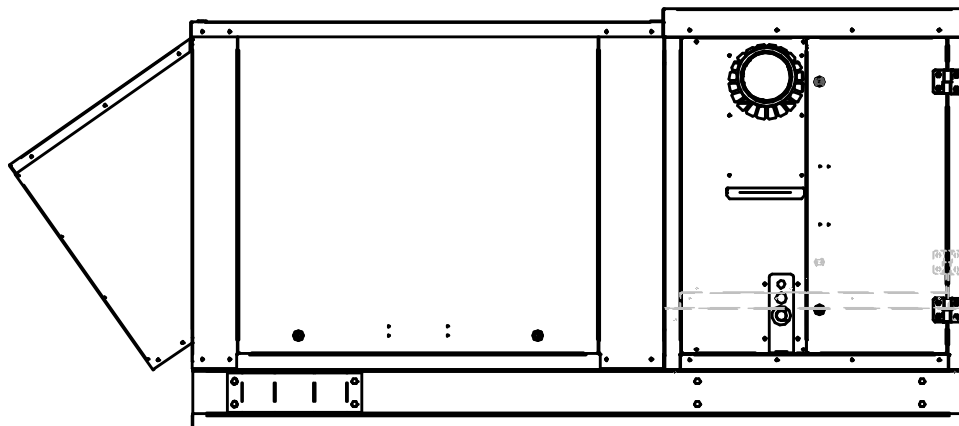


8.6.3 TR150 R Rooftop



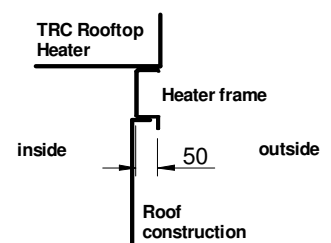
8.7 Construction frames

8.7.1 Rooftop Frame TR24 R – 50 R

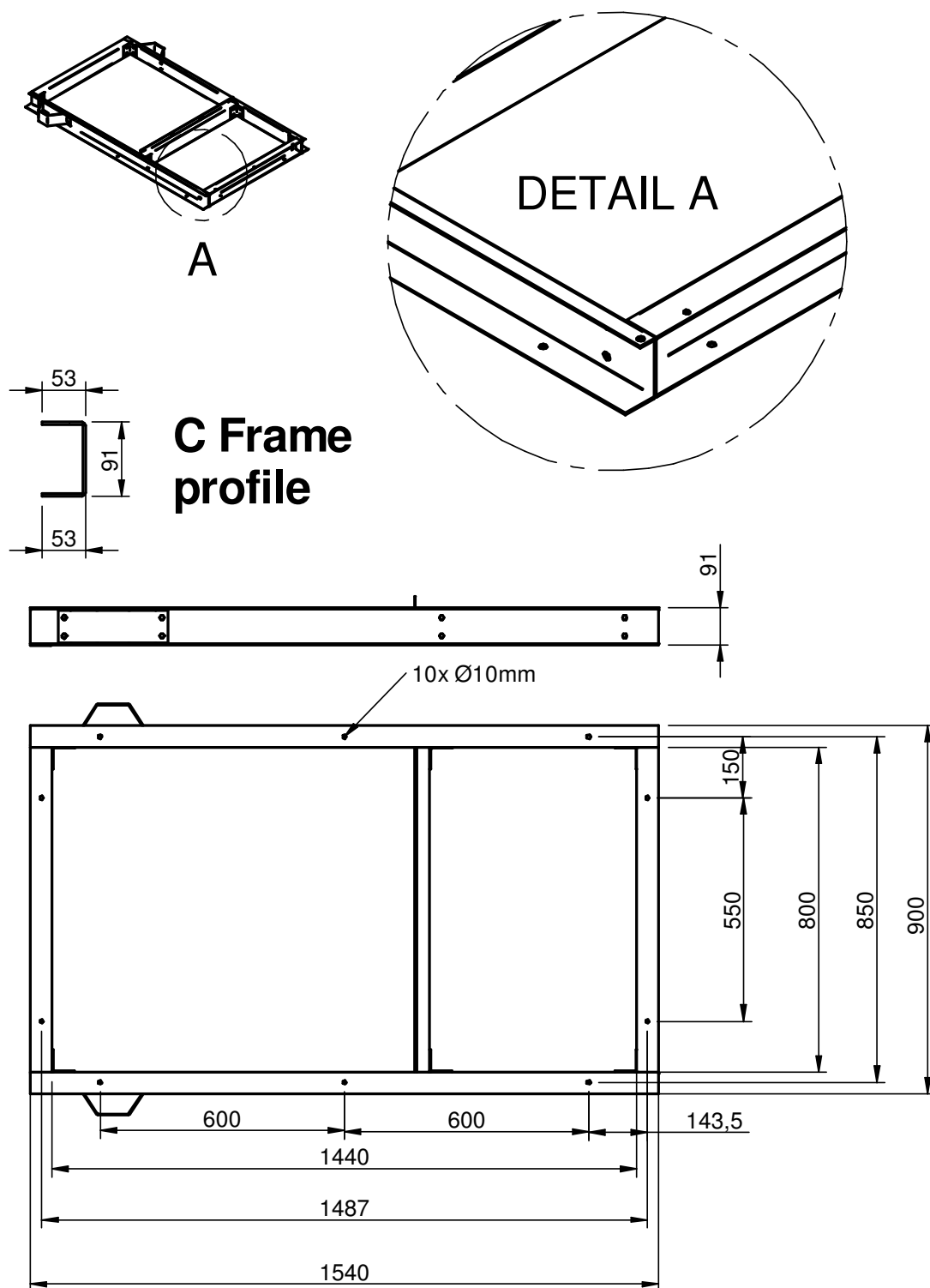


Rooftop Frame TR24-28-40-50 R

Scale: 1 : 20

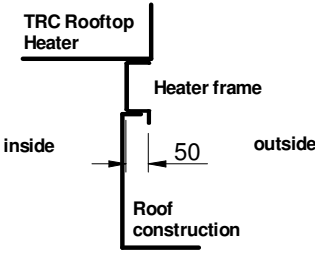
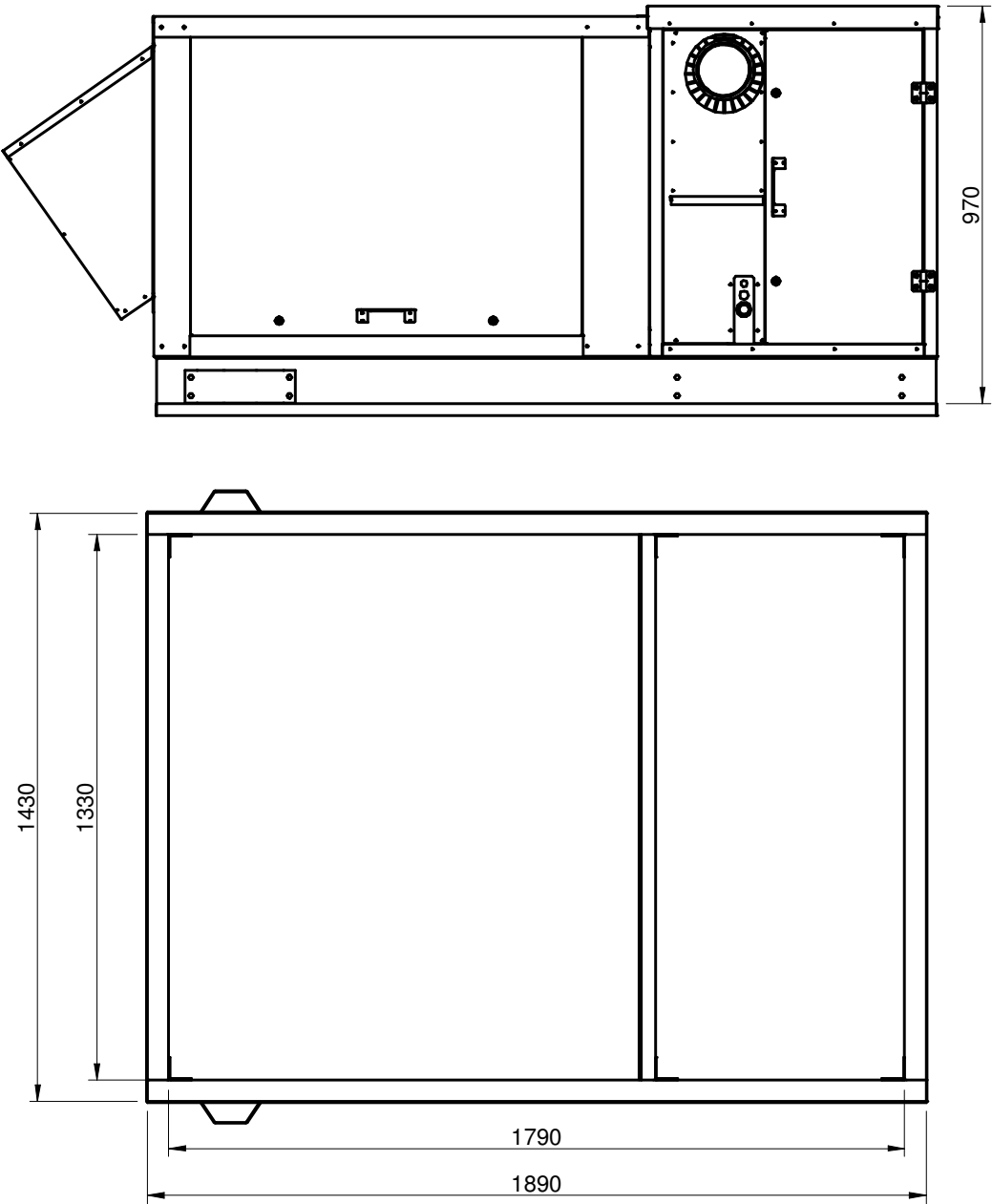


8.7.2 C Frame TR24 R – 50 C / R



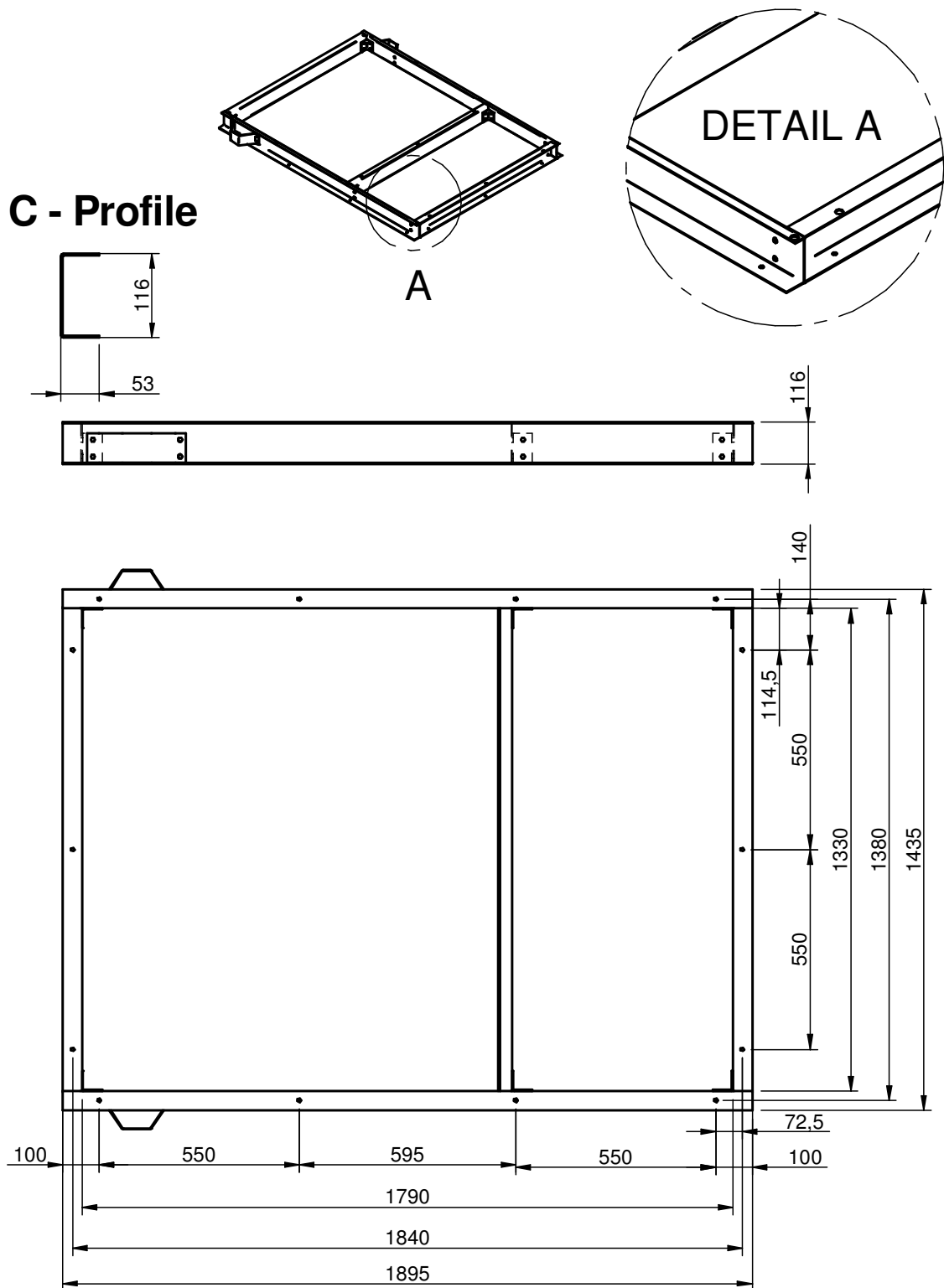
C Frame
TR24, 28, 40, 50 C / R
 scale 1 : 20

8.7.3 Rooftop frame TR60 R-150 R



**Rooftop Frame
TR60 C - 150 C**
scale: 1 : 20

8.7.4 C Frame TR60 -150 C / R

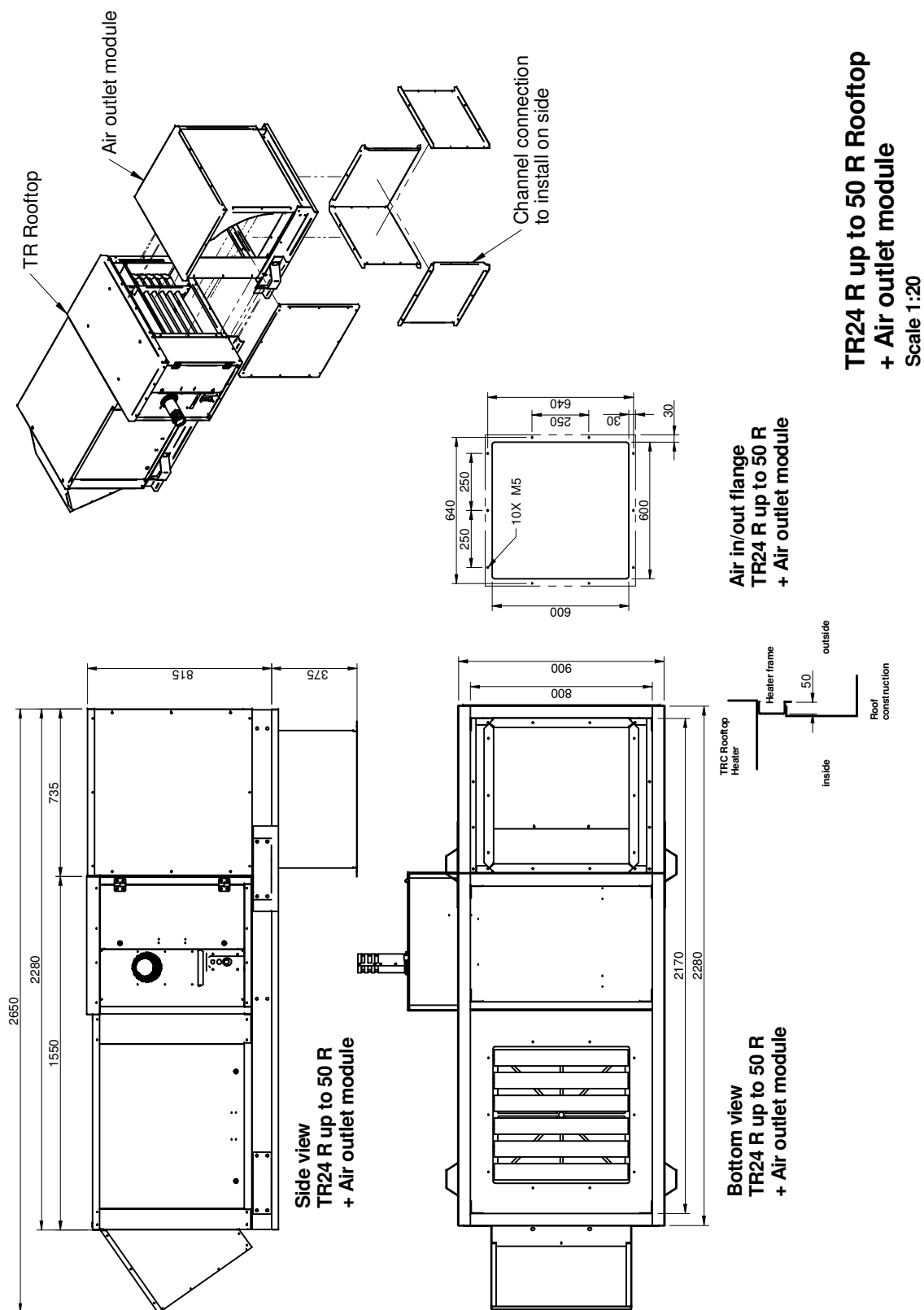


C Frame
TR60 t/m 150 C / R

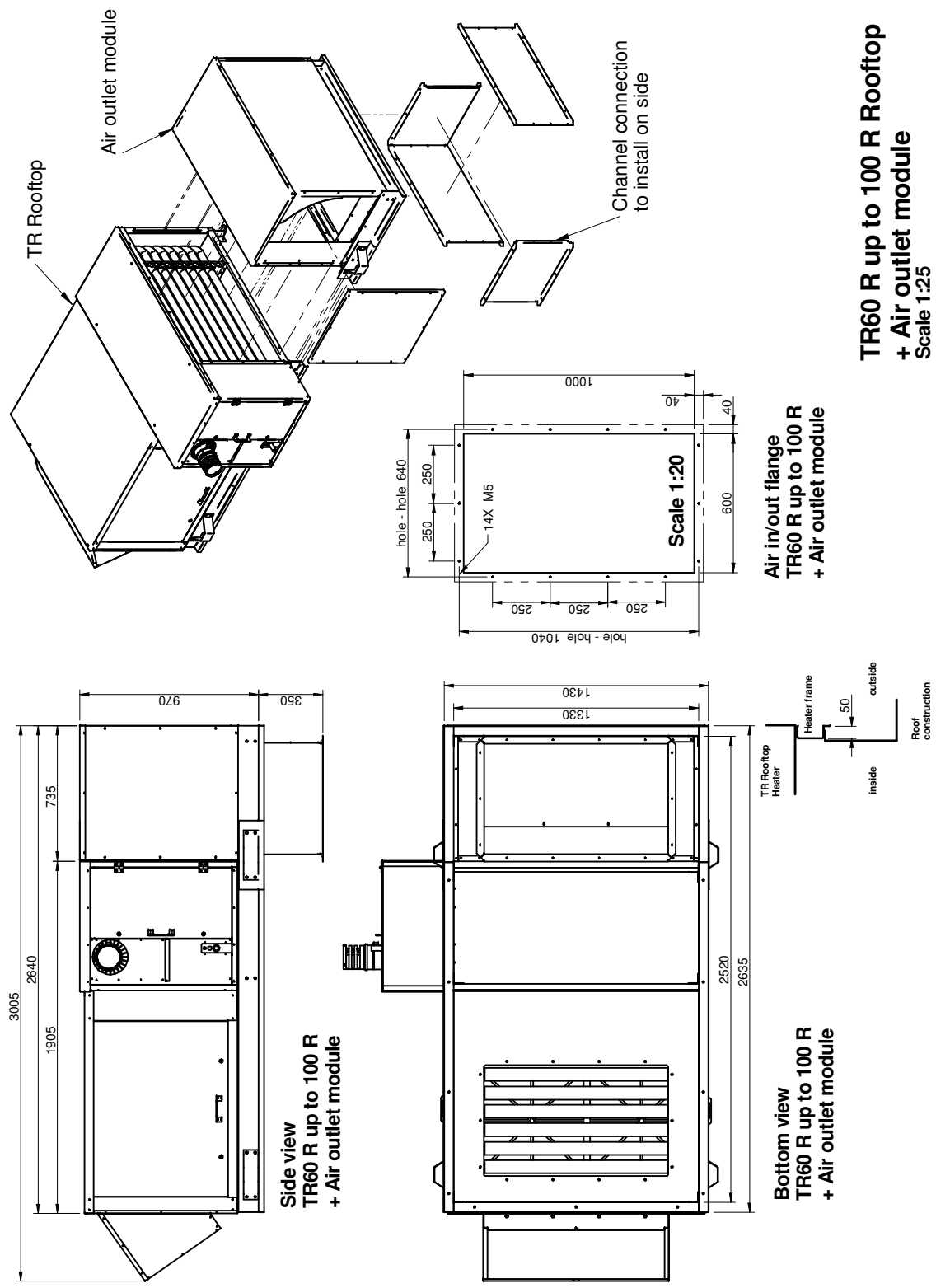
scale: 1 : 20

8.8 TR Rooftop + Air Outlet module

8.8.1 TR24 R - 50 R Rooftop + Air outlet module



8.8.2 TR60 R - 100 R Rooftop + Air outlet module



8.8.3 TR125 R - 150 R Rooftop + Air outlet module

