

mark[®]

building climate technology

Technical manual **EN**

MARK INFRA / INFRA MONO

0661507_R36



Read this document before installing the appliance

Warning

EN

An incorrectly performed installation, adjustment, alteration, repair or maintenance activity may lead to material damage, injury or explosion. All work must be carried out by approved, qualified professionals. If the appliance is not positioned in accordance with the instructions, the warranty shall be voided.

If the manual refers to an image or table, a number will be shown between square brackets, for example [3]. The number refers to images and tables at the back of the manual with the stated number. All measurements are in millimeters unless otherwise indicated.

1.0 General

1.1 Application

The Infra radiant heater heats the room through a fully automatic gas burner with electrical ignition and complete protection. The flue gases are conducted by the heater tubes, which makes them hot. On account of the danger of corrosion, radiant heaters cannot be used in areas where there are corrosive fumes. This relates in particular to chlorinated hydrocarbons which are either produced directly in the area, or may be drawn in from the outside by the heater via a connection or an open connector.

Subject to change

The manufacturer is committed to constantly improving its products and reserves the right to make changes in the specifications without prior notice. The technical details are considered correct but do not form the basis for a contract or warranty. All orders are accepted according to the standard terms of our sales and delivery conditions (available upon request).

The information in this document is subject to change without notice. The most recent version of this manual is always available at www.markclimate.com/downloads.

1.2 Type designation

Infra 10-3 (H/L)(+)(++)	Infra 40-9 (H/L)(+)(++)
Infra 15-5 (H/L)(+)(++)	Infra 50-9 (H/L)(-)(-)
Infra 20-6 (H/L)(+)(++)	Infra 50-12 (H/L)(+)(++)
Infra 30-6 (H/L)(+)(++)	Infra 30-12 Mono (H/L)
Infra 30-9 (H/L)(+)(++)	Infra 50-18 Mono (H/L)

(-) : On/off

(H/L) : High/Low

(-) : Single-walled reflector

+

++ : Double-walled reflector + flue fan cooler

The gas technical data per unit are shown in Table **[1A]**. See the explanation below.

- T type
- B nominal load (NCV)
- C gas consumption (m³/h)
- D1 burner pressure mode high
- D2 burner pressure mode low / minimum in type H/L and M

The general data per device are shown in Table **[1B]**. See the explanation below.

- E1 weight Infra with single-walled reflector
- E2 weight Infra with double-walled reflector
- F1 electrical power
- F2 nominal power consumption (inrush current $5 \times I_{nom}$)
- G recommended mounting height horizontal
- H recommended mounting height at 30° angle
- I nozzle diameter G20/G25
- J nozzle diameter G30/G31
- K diameter gas connection
- L minimum distance **[2B]**
- M sound level at 5 meter

The remaining data per unit are shown in Table **[1C]**. See the explanation below.

- N CO₂ flue gas without flue fan cooler, mode high
- O temperature flue gas (°C), mode high
- P CO₂ flue gas without flue fan cooler, mode low
- Q temperature flue gas (°C), mode low
- R CO₂ flue gas with flue fan cooler, mode high
- S temperature flue gas (°C), mode high
- T CO₂ with flue fan cooler, mode low
- U temperature flue gas (°C), mode low
- V setting LDS (mbar)
- W flue gas mass (kg/h)

1.3 General warnings

An incorrect installation, adjustment, alteration, maintenance activity or repair may lead to material or environmental damage and/or injuries. The appliance should therefore be installed, adapted or converted by a skilled and qualified installer, taking into account national and international regulations. A faulty installation, adjustment, alteration, maintenance activity or repair shall void the warranty.

Appliance

When installing radiant heaters, observe the national and, if applicable, regional and local regulations (e.g. gas company regulations, building regulations etc.). Installation of a radiant heater is only permitted in an area and a position suitable for the purpose, see Chapter 2 Positioning the appliance.

Gas supply and connection

Before installation check that the local distribution conditions, gas type and pressure and the current adjustment of the appliance all match. An approved gas stop cock and flexible connection must be fitted to the inner pipeline.

Flue gas exhaust and outlet vent / exhaust duct

Combustion air supply pipelines and flue gas exhaust ducts should contain as few bends as possible. In general, the resistance should be kept to a minimum and in all cases the diameter should be constant along its entire length. The duct may not rest on the radiant heater but should be suspended efficiently! If the flue gas exhaust duct passes along or through combustible walls or floors, the duct must be sufficiently free (> 20mm) to prevent fire.

1.4 Think of your safety

If you smell gas, it is expressly prohibited

- To ignite an appliance
- To touch electrical switches, or to telephone from the area in question

Take the following actions

- Switch off the gas and electricity
- Activate the operational emergency plan

Evacuate everyone from the building

2.0 Positioning the appliance

After unpacking, check the unit for damage. Check the accuracy of the type/model, the voltage (230V) and the gas type. When determining the suspension height, remember to keep a sufficient distance from any crane gantries. If necessary, shield any flammable goods. Place the appliance and any accessories on a sufficiently solid structure, taking into account the minimum required free space. Wall-mounting support frames are available to order. [2a][2b]

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The radiant heater can be suspended with galvanised chains with links with a minimum diameter of 4 mm and with 10 mm cross bars with good rust protection. In order to suspend the radiant heaters in the right way, it is advisable to use eyebolts with which the radiant heaters can be readily adjusted to the correct height. The radiant heaters can be suspended at a maximum inclination of 30°. If the radiant heaters are suspended inclined, the burner is installed horizontally TO THE LOWEST TUBE on the right, as seen from the heated area. The radiant heater must be mounted with the flue sloping with a drop of approximately 25 mm [3].

2.1 Mounting instructions

See enclosed installation instructions.

2.2 Positioning the flue and combustion air supply

The device only has the CE approval in combination with its flue gas system. The flue gas system includes: single flue set vertical or horizontal, extension pipes and elbows. Table [4] indicates which parts can be used per appliance type. The flue gas system must be installed according to the instructions attached.

The extension pipes must be laid in parallel. In exceptional cases, for example with thick roofs or walls, the roof or wall terminal may be extended concentrically by a maximum of 1 meter.

If a flue gas set is to be installed sideways to or through a flammable floor or wall, then there must be a minimum air gap of 25 mm around the flue gas sets. This to prevent fire and / or scorch hazard. The mentioned flue gas products are made of stainless steel or aluminium, or have an inner pipe of the same material. This has been chosen because of the maximum flue gas temperature.

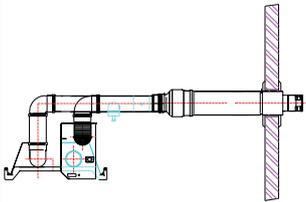
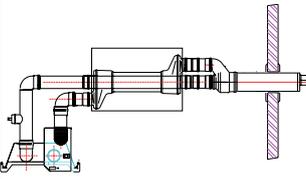
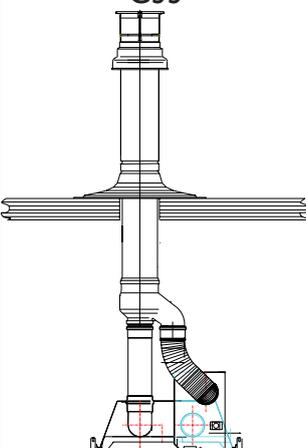
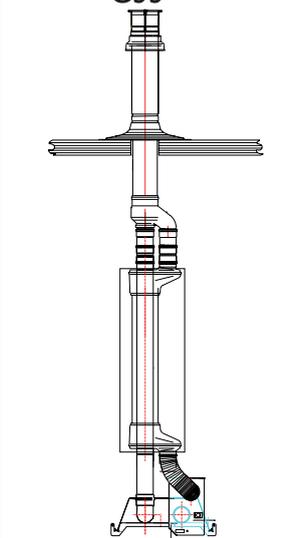
The combustion air inlet pipes may consist of the same materials as specified for the flue gas discharge, but may also consist of materials mentioned in the table on pages 7-9. Other materials are not allowed.

Device type	Nominal diameter
10-3, 15-5, 20-6	80 mm
30-6, 30-9	80 mm
40-9, 50,9, 50-12	100 mm
30-12 mono	80 mm
50-18 mono	100 mm

Caution:

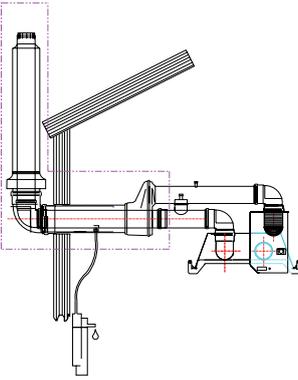
- The maximum length of the flue gas discharge and combustion air inlet is: 2x6 meter pipe and 2x3 bends 90°
- Discharge material with a different resistivity can influence the length of the total supply and discharge route.

Type	Flue gas exhaust			Accessories		Installation remarks
	Appliance type	Ø	Article code	Ø	Article code	
<p>B23</p>	Single flue set vertical			ALU Extension pipe L=500		<p>The flue gas exhaust pipes must be made of aluminium or stainless steel. The combustion air inlet pipes can be made of stainless steel, aluminum or polyethylene.</p> <p>The maximum length of the flue gas discharge is: 6 meter pipe, with 3 elbows 90°.</p>
	10-3/20-6/ 30-6/30-9/ 30-12 Mono		5990556	80	5990727	
	40-9/50-9/ 50-12/ 50-18 Mono		5990560	100	5990728	
				ALU Extension pipe L=1000		
				80	5990732	
				100	5990736	
				ALU Elbow 45°		
				80	5990734	
				100	5990738	
				ALU Elbow 90°		
				80	5990733	
				100	5990737	
				Stainless steel Extension pipe L=500		
				80	5990201	
				100	5990211	
				Stainless steel Extension pipe L=1000		
				80	5990202	
				100	5990212	
				Stainless steel Elbow 45°		
				80	5990204	
				100	5990214	
				Stainless steel Elbow 90°		
				80	5990203	
			100	5990213		
			Air inlet mesh			
			80	3002532		
			100	3002533		

 <p>C13</p>  <p>C13++</p>	Single flue set horizontal stainless steel			Flue gas exhaust		
				ALU Extension pipe L=500		80
	10-3/20-6/ 30-6/30-9/ 30-12 Mono	80/125	5990579	100	5990728	
	40-9/50-9/ 50-12/ 50-18 Mono			ALU Extension pipe L=1000		
				80	5990732	
	ALU Elbow 45°		80	5990734		
	ALU Elbow 90°		100	5990738		
	ALU Elbow 90°		80	5990733		
	ALU Elbow 90°		100	5990737		
	Extension pipe stainless steel L=500					
	80		5990201			
	100		5990211			
	130		5990221			
	Extension pipe stainless steel L=1000					
 <p>C33</p>  <p>C33++</p>	Single flue set vertical stainless steel			80	5990202	
				10-3/20-6/ 30-6/30-9/ 30-12 Mono		80/125
	40-9/50-9/ 50-12/ 50-18 Mono		100/150	5990560	130	5990222
	Elbow stainless steel 45°			80	5990204	
				100	5990214	
	Elbow stainless steel 90°			130	5990224	
	80		5990203			
	100		5990213			
	Flue gas cooler					
	80		5990520			
	100		5990521			

The flue gas exhaust pipes must be made of aluminium or stainless steel. The combustion air inlet pipes can be made of stainless steel, aluminum or polyethylene.

The maximum length of the flue gas discharge is: 2x6 meter pipe, with 2x3 elbows 90°.

 <p>C53</p>	Single flue set horizontal			Combustion air	
	10-3/20-6/ 30-6/30-9/ 30-12 Mono	80/125	5990556	Stainless steel or ALU exten- sion pipe (see above)	
	40-9/50-9/ 50-12/ 50-18 Mono	100/150	5990560		
	In combination with single flue set horizontal				
	10-3/20-6/ 30-6/30-9/ 30-12 Mono		5990511		
	40-9/50-9/ 50-12/ 50-18 Mono		5990512		
	OR				
	10-3/20-6/ 30-6/30-9/ 30-12 Mono		0703100		
	40-9/50-9/ 50-12/ 50-18 Mono		0703101		
			Flexible connec- tion intake side		
			80	5018047	
			100	5018057	

Type A [4].

The combustion air is drawn in from the room and no flue is used. This system may only be used in well-ventilated areas, at least 10 m³/kW per hour. The fumes must not come into contact with flammable substances and/or cold surfaces (risk of fire or condensation respectively). The supplied mesh guard should be placed on the combustion air intake.

Type B [5]. B23

The combustion air is drawn in from the room and flue gases are discharged outside. The maximum length L of the flue pipe is six metres, including 2 bends of 90°. In this application only a vertical roof pass-through in a flat roof is permitted. The supplied mesh guard should be placed on the combustion air intake. To supply the appliance with sufficient combustion air, this system should only be used if at least 2 m³/kW per hour is ventilated. If significant pollution or low pressure is likely to occur in the room, a closed design of type C must always be used.

Type C [6]. C13

The maximum length L of the intake and flue pipe is six metres, including 2x2 bends of 90°. Each additional right-angled bend shortens the length by 2 metres. If possible, use bends of 45°. The gas flue must have an incline of at least 3° from the appliance.

Type C [7]. C33

The maximum length of the intake and flue pipe is six metres, including 2 x 2 bends of 90°. Each additional bend shortens the length by 2 metres. If possible, use bends of 45°.

Type C [8]. C53

The maximum length L of the supply and discharge is six meters, including 2 x 2 bends 90°. If possible, use 45° bends. Through the outer wall, the maximum length of the flue may be extended with 3 meters. The outlet must be located above the facade. To make sure that the combustion air is heated as little as possible, the combustion air intake needs to be placed immediately after the bend outside (fresh air). Because the flue gases will condense, the condensate must be discharged efficiently, according to the applicable national regulations.

2.3 Gas connection

The installation of the gas pipeline and gas tap must comply with the relevant local and/or national regulations. The gas tap must be positioned within reach of the appliance [9]. If the connection line is subject to pressures above 60mbar, this gas tap must be closed. In the event of any doubt about entrained dirt, apply a gas filter. It is necessary to make the last section of the gas connection flexible by means of an approved stainless steel flexible connecting hose or a copper expansion loop. The flexible gas hose must be positioned in such a way that an appliance in operation can expand freely. Make sure that no tension or twisting can occur on the flexible connection.

Minimum diameter: 3/4". Flexible length between 0.5 and 2 meters.

When connecting the gas line, excessive torque should not be applied to the internal connection of the burner.

The length of the flexible gas hose must be such that the following expansion can be absorbed:

Infra 10-3	: 30 mm	Infra 30-9 + 40-9	: 50 mm
Infra 15-5	: 40 mm	Infra 50-9 + 50-12	: 50 mm
Infra 20-6	: 40 mm	Infra 30-12 mono	: 50 mm
Infra 30-6	: 30 mm	Infra 50-18 mono	: 60 mm

2.4 Electrical connection [10]

The installation must comply with the relevant local and/or national regulations and should be protected with a fuse of max. 16A. Ensure that there is a correct connection set with main fuse. The electrical diagram for the appliance can be found at the back of this manual. **PLEASE NOTE:** The unit is phase sensitive and will only operate when it has been appropriately earthed.

2.5 Room thermostat / black bulb sensor

Position the room thermostat in a draught-free location, exposed to direct radiation at a height of around 1.5m from the floor. Connect the room thermostat in accordance with the electrical diagram for the appliance. If a room thermostat has been purchased from the supplier of the appliance, the connection diagram is included in the room thermostat manual. An incorrect connection will void the manufacturer's warranty. The appliance can be reset by disconnecting the electricity, for example by setting the thermostat to the minimum position. The room thermostat and, where applicable, the burner load high/low switch, must have a minimum switch-on voltage of 230V AC and be able to

tolerate a switch-on current of 1 A.

3.0 Start-up / shutdown

3.1 General

Before being packed, each appliance is fully tested for safety and correct operation. This includes the setting of the gas pressure and burner pressure. However, always check the burner pressure and the pre-pressure. Never turn set screws incorrectly. Do not forget to instruct the user on the proper use and operation of the appliance and peripherals. After assembly and before commissioning, remove the instruction stickers from the pipes. When a new Infra unit is started up for the first time it will produce some smoke, as a result of the evaporation of the preservative oils present. It is therefore necessary to ensure sufficient ventilation during start-up. A newly installed Infra should be allowed to operate for at least 1 hour before starting a flue gas analysis. This prevents the measuring equipment being damaged.

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3.2 Checking activities

- Switch off electricity main switch.
- Set the room thermostat to the minimum temperature.
- Open the gas stop cock, then carefully purge the gas pipes and check for leaks. Under no circumstances use an open flame!
- Close gas stop cock.
- Switch on electricity main switch.
- Set room thermostat to maximum temperature.
- Open the gas stop cock, the appliance will now start up.

3.3 Check that the room thermostat functions correctly

At a setting below the ambient temperature the burner should switch off. At a setting higher than the ambient temperature the burner should ignite.

3.4 Check the burner pressure: [11]

Connect a gas pressure gauge to the pressure-measuring nipple and measure the burner pressure (A). The burner pressure can be corrected by adjusting the screw (C) of the pressure regulator (anti-clockwise gives a lower pressure; clockwise a higher pressure). For high/low the following applies: to set the burner pressure for maximum load, you can turn the outermost set nut (SW10) (H) until the correct pressure is achieved. To set the burner pressure to the low position, you can turn the innermost set nut (G) until the correct pressure is achieved. For the correct burner pressure see table [IA]. ATTENTION!: after the measurement, the pressure tap needs to be closed again. For checking the appropriate CO₂ rate and flue gas temperature see table [IC].

3.5 Check the pre-pressure

Make sure that during the checking of the unit, the unit is not turned off by the room thermostat. To avoid the unit being turned off by the room thermostat, set the room thermostat to the highest setting. Connect a pressure gauge to the pressure tap and measure the gas pressure (B). For the correct gas pressure see the type plate of the unit.

3.6 Checking the environment

Finally, check that the operation of the appliance cannot be influenced by other objects close to the unit. In particular, pay attention to items with potential for explosive or corrosive fumes, etc.

3.7 Shutting down the heater

For short periods of time:

- Set the room thermostat to the minimum temperature.

For longer periods of time:

- Set the room thermostat to the minimum temperature.
- Close the gas tap.
- Switch off the main switch.

3.8 Conversion to another type of gas

The appliance may only be converted to another type of gas by an authorised person. Consult the manufacturer in order to obtain the correct parts and instructions.

4.0 Maintenance

4.1 General

The appliance must be maintained at least once a year, more often if necessary. If applicable, ask a qualified installer for maintenance advice. When performing maintenance, the appliance must have been shut down for an extended period. Make sure that you comply with all safety rules.

- Check the position of the ionisation and ignition electrodes [12]. If necessary, correct and/or clean them.
- Check the burner and return pipes for soot and/or condensation. If necessary, clean them.
- Check the connections between the flanges and bend to make sure that they are still completely tight.
- Check the combustion air fan. Clean it if necessary *
- Open the gas stop cock, switch on the main switch and set the room thermostat to its highest setting.
- With the appliance in operation, check the burner pressure and the flame quality.
- Check the flame protection by closing the gas stop valve.

**Cleaning*

Combustion air fan:

To clean the combustion air fan, the electrical switch needs to be switched off and gas valve needs to be closed by loosening the combustion air fan screws [14] the impeller and volute can be cleaned with the aid of a brush and/or air spray.

In case of a replacement of the fan, the original restriction and connection flange should be transferred.

5.0 Description of parts

Faulty parts may only be replaced by original parts from the manufacturer.

5.1 Gas control unit [11]

The gas control unit opens and regulates the burner pressure. The maximum pre-pressure is 60 mbar.

- A burner pre-pressure.
- B gas pre-pressure.
- C Adjusting screw burner pressure on/off.
- F Cover plate.
- G Adjusting screw burner pressure low position.
- H Adjusting screw burner pressure high position.

5.2 Ignition electrode [12]

This method of protection makes use of the ability of a flame to conduct electricity. It is important that the ionisation electrode should not be in contact with earth, and that the appliance is also properly earthed. The gas control produces a spark between the earth and the ignition electrode. This causes the gas/air mixture to ignite. It is important that the preset opening between the two ignition electrodes should be 3 mm.

- A Ignition electrode (+)
- B Ignition electrode (-)
- C Ionisation electrode

5.3 Air pressure switch [13]

The differential pressure switch checks the transport of the combustion gases. If no or insufficient combustion-gas transport is detected, the feed to the gas control interrupted.

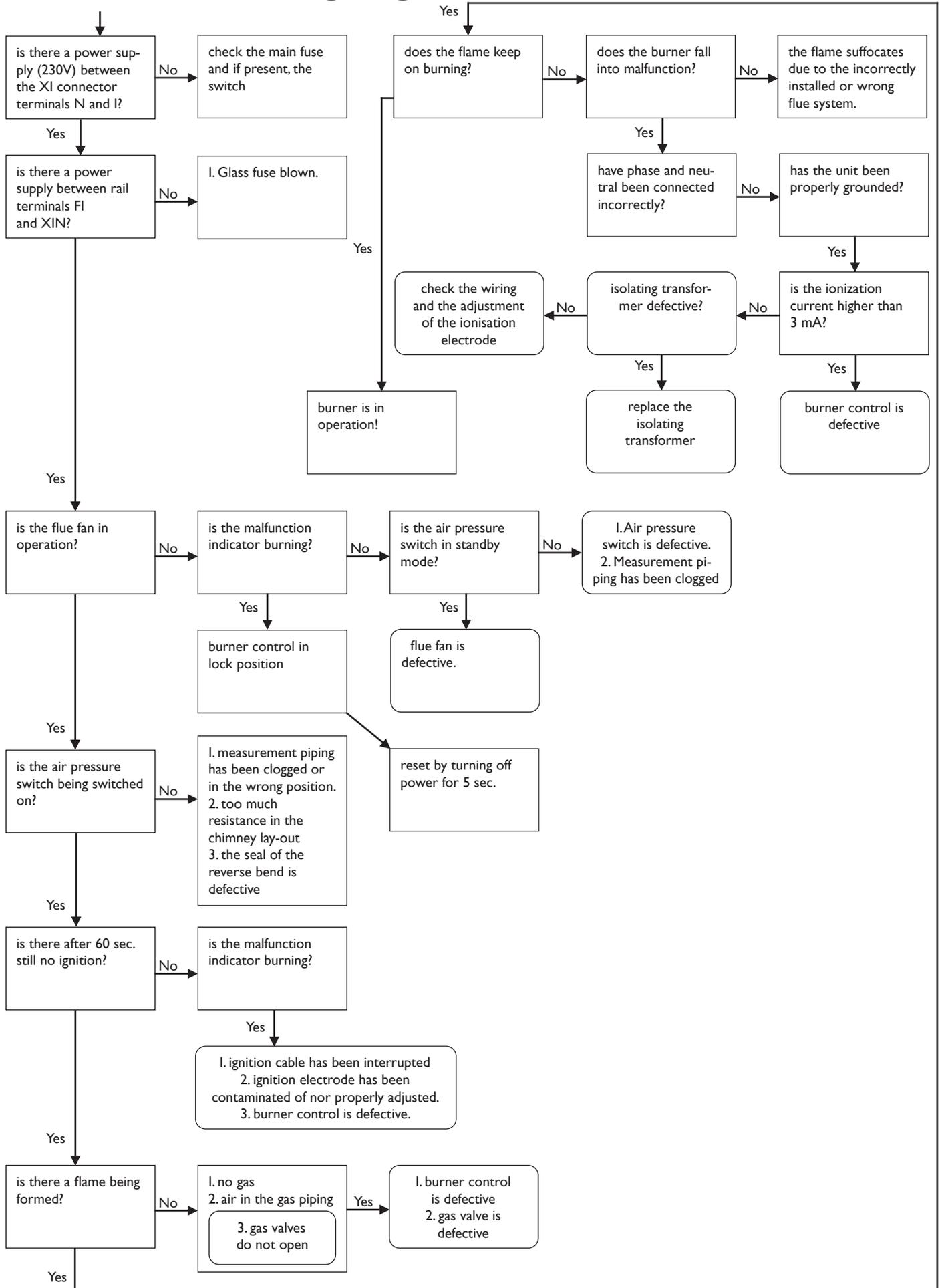
Setting: Adjusted at the factory [1C]

- D Adjustment disc
- E Low pressure connection
- F High pressure connection

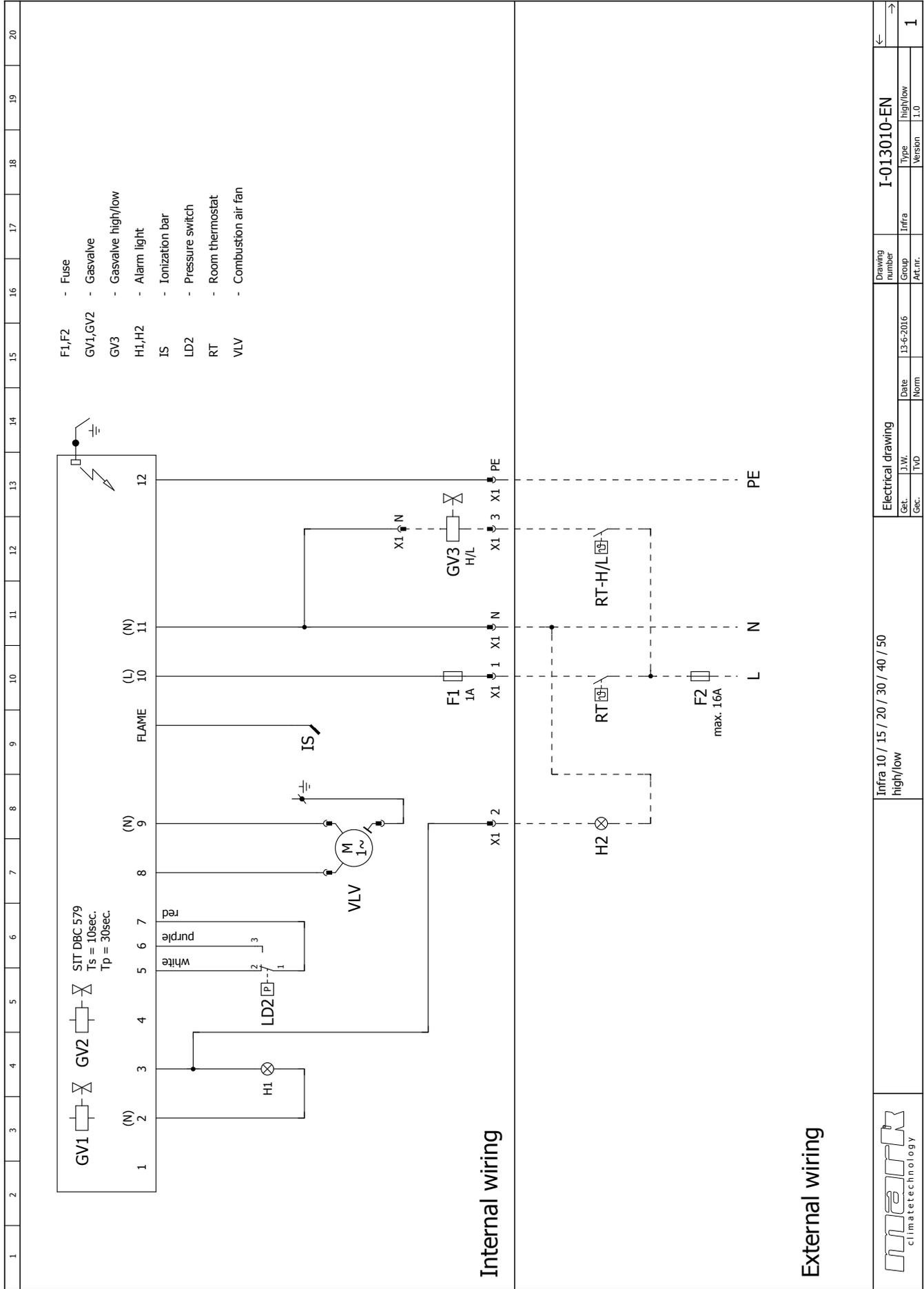
5.4 Combustion air fan [14]

The combustion air fan is programmed at the factory. In case of a defect it must be replaced by a type with exactly the same code number, as indicated in table [14].

6.0 Troubleshooting diagram



7.0 Electrical diagram High/Low

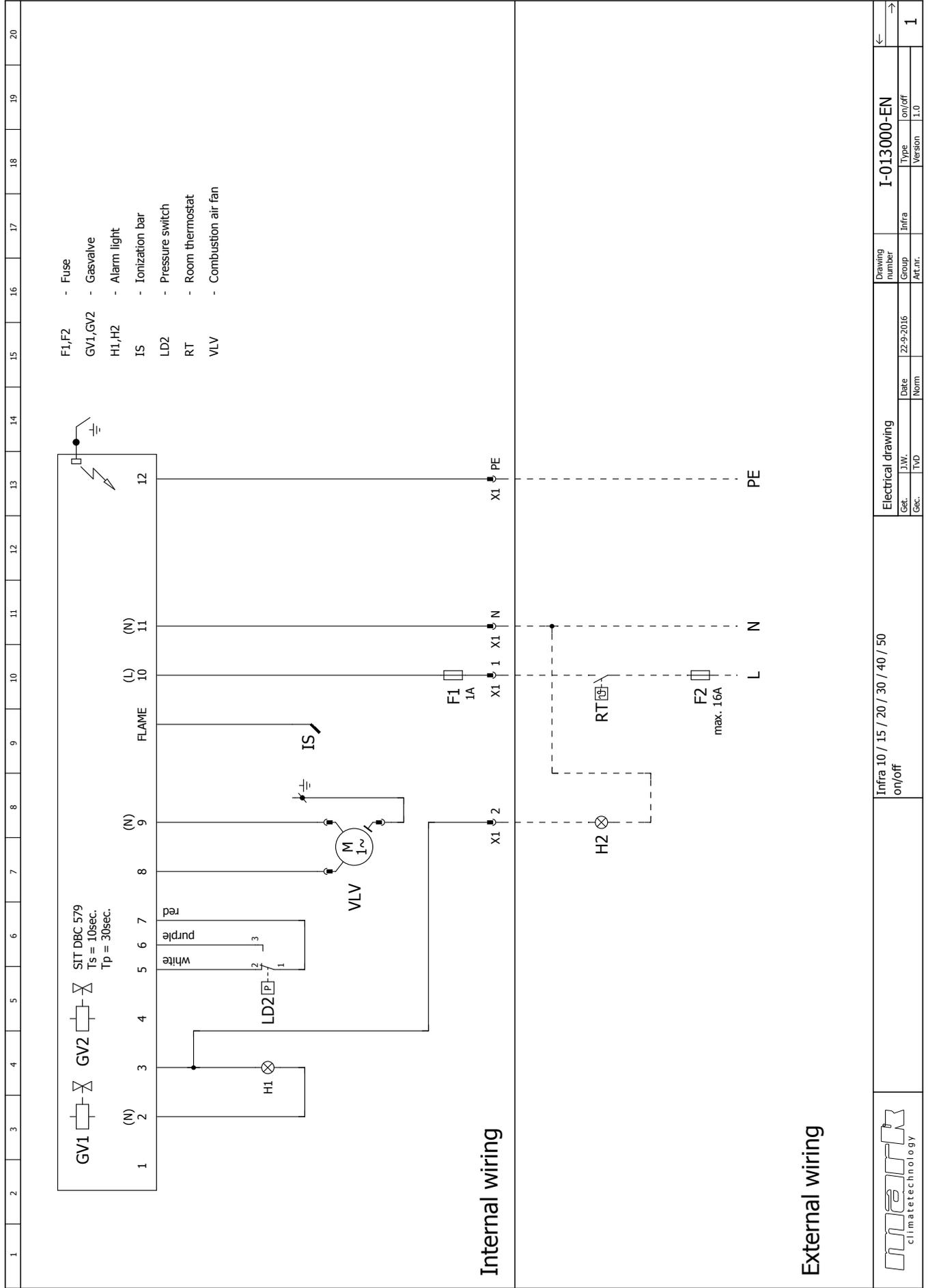


Infra 10 / 15 / 20 / 30 / 40 / 50 high/low

Electrical drawing

Get.	J.W.	Date	13-6-2016	Drawing number	I-013010-EN
Geç.	T.V.D.	Norm		Group	Infra
				Version	high/low
				Acfr.	1,0
					1

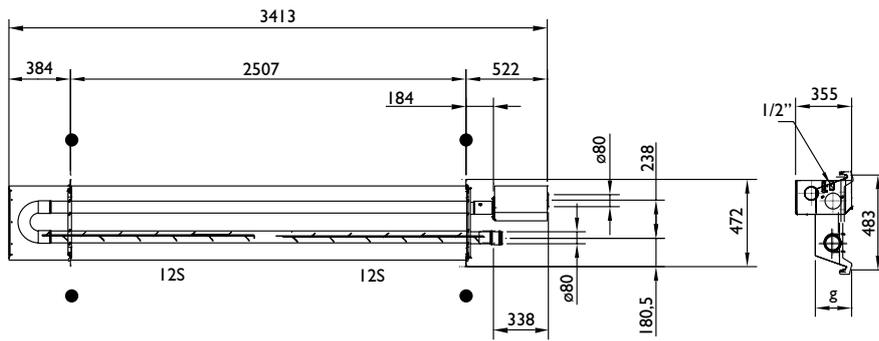
8.0 Electrical diagram On/Off



9.0 Bracket instructions [15]

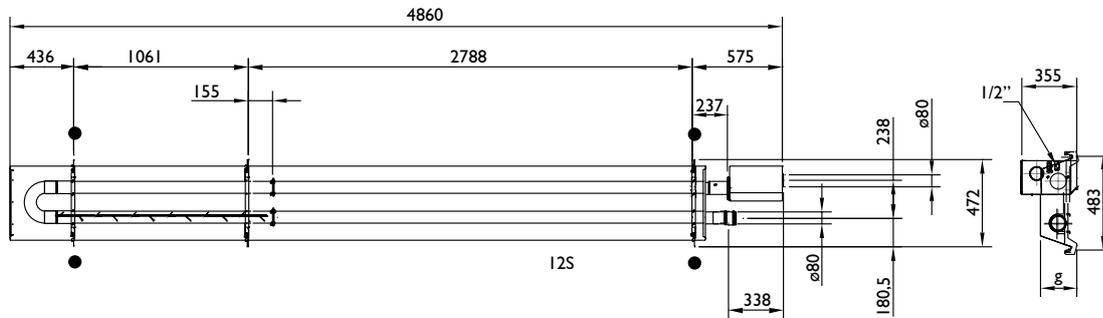
<p>[15] Basic instructions</p>	
<p>Single-wall steel flue system</p>	<p>Air supply system</p>
<p>These basic requirements are only applicable to connecting pipes with the following characteristics:</p> <ul style="list-style-type: none"> • Connection to a heater with built-in ventilator. • Connection in the installation area of the appliance and in sight. • Single-walled, rigid aluminium or stainless steel pipes with CE certification (cf EN 1856-1/2, P1, W). • Maximum flue gas temperature of 250°C. • Diameters from Ø80 to Ø100 mm. 	<p>These basic instructions are only applicable to air supply pipes with the following characteristics:</p> <ul style="list-style-type: none"> • Connection to a closed heater with built-in fan. • Connection in the installation area of the appliance and in sight. • Aluminium, stainless steel or plastic air supply pipes. • Diameter air supply pipe of Ø80 to Ø100 mm.
<p>Caution! This checklist includes some basic instructions. For further instructions for this unit paragraph 2.2.</p>	<p>Caution! This checklist includes some basic instructions. For further instructions for this unit paragraph 2.2.</p>
<p>Checklist</p>	<p>Checklist</p>
<p>General</p>	<p>General</p>
<p><input type="checkbox"/> We recommend using the brackets of manufacturer Cox Geelen.</p>	<p><input type="checkbox"/> Do not combine components of various materials or finished products for the connecting pipe.</p>
<p><input type="checkbox"/> Do not combine components of various materials or finished products for the connecting pipe, except where the manufacturer of the system allows this. Exception to this rule: components tested according to Gastec Qa KE83-3 (thick-walled aluminium) and 5 (stainless steel).</p>	<p><input type="checkbox"/> The minimum insertion length of sleeves and spigot ends is 40mm.</p>
<p><input type="checkbox"/> The minimum insertion length of sleeves and spigot ends is 40mm.</p>	<p><input type="checkbox"/> When using plastic air supply pipes make sure that the distance to the flue pipe is at least 35mm.</p>
<p><input type="checkbox"/> Mount tension free.</p>	<p><input type="checkbox"/> Mount tension free.</p>
<p>Connecting and bracing</p>	<p>Connecting and bracing</p>
<p><input type="checkbox"/> Brace every corner to or close to the sleeve. Exception when connecting to the unit:</p>	<p><input type="checkbox"/> Place the first bracket on a maximum of 0.5m pipe length from the unit.</p>
<p>- If the connecting pipe is shorter than 0.25m before and after the first bend, the bracket at the first bend can be omitted.</p>	<p><input type="checkbox"/> Horizontal and non-vertical pipes</p>
<p>- Place the first bracket on a maximum of 0.5m pipe length from the unit.</p>	<p>- Maximum bracket distance of 1m.</p>
<p>Horizontal and non-vertical pipes</p>	<p>- Divide lengths between brackets evenly.</p>
<p>- Maximum bracket distance of 1m.</p>	<p>Vertical pipes</p>
<p>- Divide lengths between brackets evenly.</p>	<p>- Maximum bracket distance of 2m.</p>
<p>Vertical pipes</p>	<p>- Divide lengths between brackets evenly.</p>
<p>- Maximum bracket distance of 2m.</p>	<p>Gaskets and seals</p>
<p>- Divide lengths between brackets evenly.</p>	<p>Avoid damaging of the sealing rings by cutting of in an angle and deburring.</p>
<p>Gaskets and seals</p>	<p>Seals of metal air supply pipes may be bolted or parked. This is not allowed for plastic air supply pipes.</p>
<p>Avoid damaging of the sealing rings by cutting of in an angle and deburring.</p>	<p>Guarantee the gas-tightness by using components that are provided with a seal.</p>
<p>Do not screw or park connections.</p>	<p>If necessary lubricate sealing rings exclusively with max. 1% soap solution or water.</p>
<p>It is not allowed to seal foam or paste (for example PUR, silicone, etc.).</p>	<p>Caution! Do not use grease, Vaseline, petroleum jelly or oil.</p>
<p>If necessary lubricate sealing rings exclusively with max. 1% soap solution or water.</p>	
<p>Caution! Do not use grease, Vaseline, petroleum jelly or oil.</p>	

INFRA 10-3



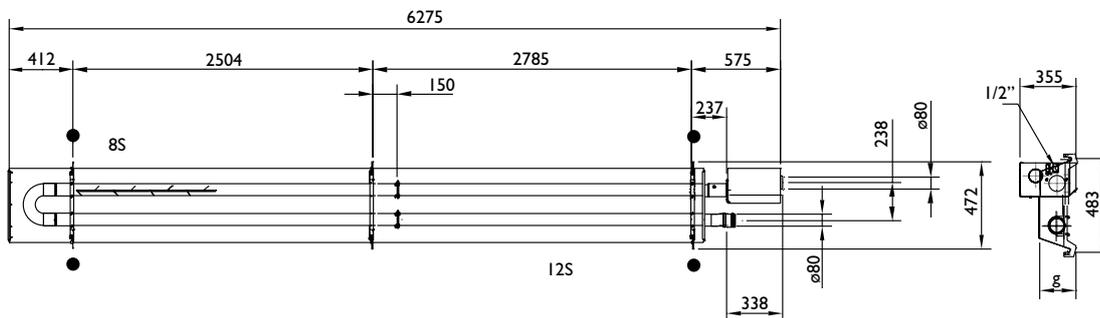
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+ / ++	239

INFRA 15-5



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(-)	201
+ / ++	239

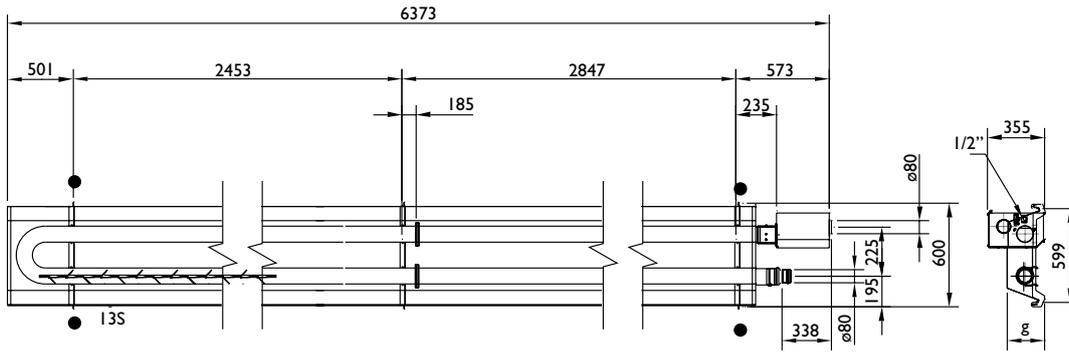
INFRA 20-6



	g
(-)	201
+ / ++	239

● suspension point

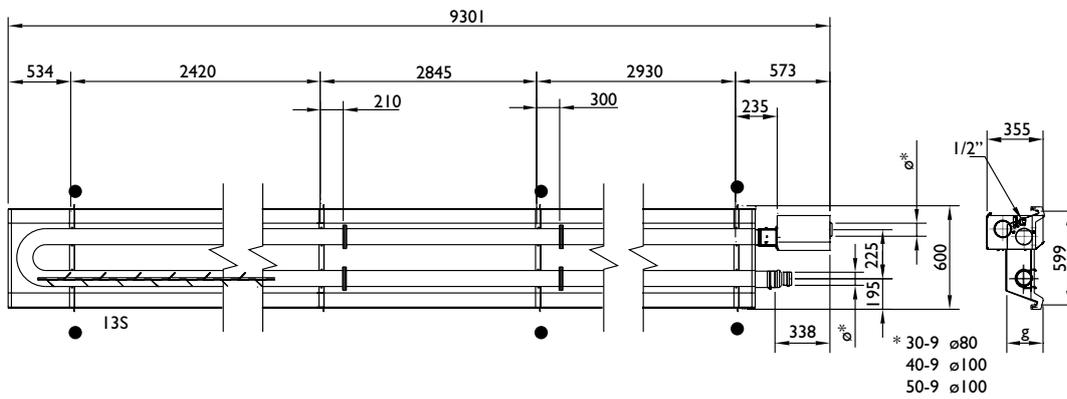
INFRA 30-6



	g
(-)	226
+ / + +	276

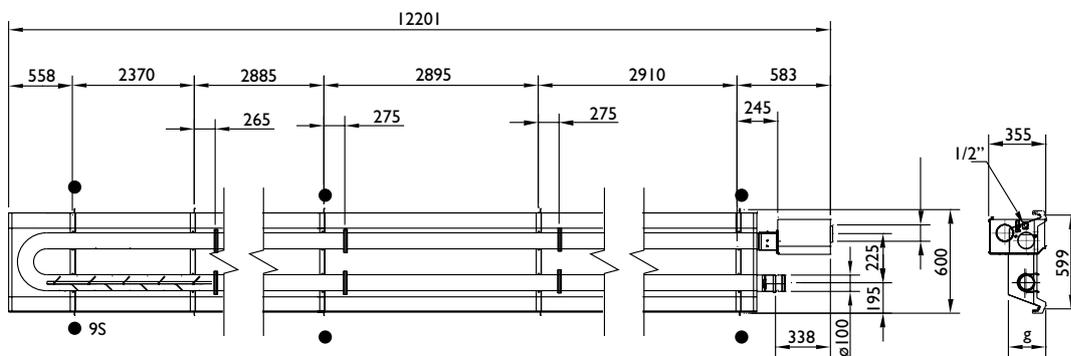
EN

INFRA 30-9, 40-9, 50-9



	g
(-)	226
+ / + +	276

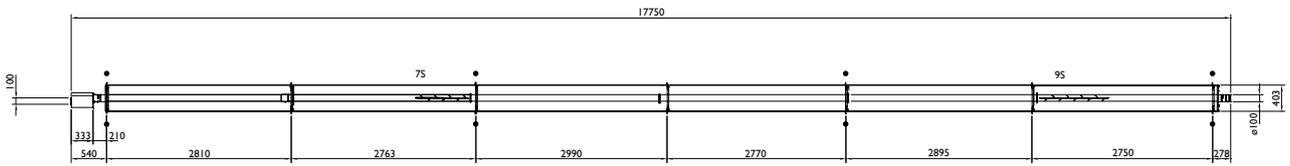
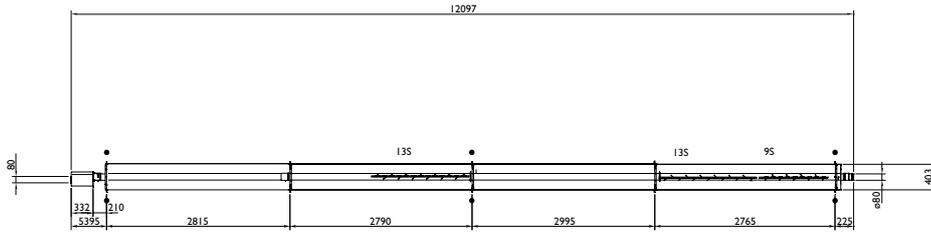
INFRA 50-12



	g
(-)	226
+ / + +	276

● suspension point

INFRA mono 30-12, 50-18



● *suspension point*

[IA]

EN

T	G20				G25			
	B	C	D		B	C	D	
				H/L, M				H/L, M
kW	m3/h	mbar	mbar	kW	m3/h	mbar	mbar	
INFRA 10-3	10,0	1,1	11,0	7,5	10,0	1,2	16,0	10,5
INFRA 15-5	14,0	1,5	11,0	7,5	14,0	1,7	16,0	10,5
INFRA 20-6	18,0	1,9	11,0	8,0	18,0	2,2	16,0	11,0
INFRA 30-6	28,0	2,9	11,5	8,0	28,0	3,3	16,0	11,0
INFRA 30-9	30,0	3,2	11,5	8,5	30,0	3,6	16,0	11,5
INFRA 40-9	38,0	3,9	11,5	8,0	38,0	4,6	16,0	11,0
INFRA 50-9	46,0	4,9	11,5	8,5	46,0	5,4	16,0	11,5
INFRA 50-12	49,9	5,3	11,5	8,0	49,9	5,9	16,0	11,0
INFRA 30-12m	30,0	3,2	12,0	9,0	30,0	3,6	16,0	11,5
INFRA 50-18m	49,9	5,3	12,0	9,0	49,9	5,9	16,0	11,5

T	G30				G31			
	B	C	D		B	C	D	
				H/L, M				H/L, M
kW	kg/h	mbar	mbar	kW	kg/h	mbar	mbar	
INFRA 10-3	10,0	0,81	27,2	17,0	10,0	0,79	35,1	24,0
INFRA 15-5	14,0	1,14	27,2	18,0	14,0	1,11	35,1	24,0
INFRA 20-6	18,0	1,46	27,2	18,0	18,0	1,42	35,1	23,0
INFRA 30-6	28,0	2,19	27,2	18,0	28,0	2,12	35,1	24,0
INFRA 30-9	30,0	2,27	27,2	18,0	30,0	2,21	35,1	24,0
INFRA 40-9	38,0	3,08	27,2	18,0	38,0	2,99	35,1	24,0
INFRA 50-9	46,0	3,64	27,2	18,0	46,0	3,72	35,1	24,0
INFRA 50-12	49,9	4,04	27,2	18,0	49,9	3,92	35,1	23,0
INFRA 30-12m	30,0	2,43	27,2	19,0	30,0	2,36	35,1	24,0
INFRA 50-18m	49,9	4,04	27,2	18,0	49,9	3,92	35,1	24,0

[IB]

T	E1	E2	F1	F2	G	H	I	J	K	L [2B] min.	M
	kg	kg	W	A	m	m	mm	mm	inch	m	dB(A)
INFRA 10-3	48	65	55	0,3	3,8	3,5	2,8	1,6	1/2"	1,25	41
INFRA 15-5	66	91	57	0,3	4,2	3,7	3,3	1,9	1/2"	1,25	41
INFRA 20-6	81	112	60	0,3	4,2	3,7	3,8	2,2	1/2"	1,25	42
INFRA 30-6	97	136	60	0,3	4,8	4,2	4,6	2,7	1/2"	1,75	42
INFRA 30-9	132	190	60	0,3	4,8	4,2	4,9	2,8	1/2"	1,75	42
INFRA 40-9	132	190	63	0,3	5,5	5,0	5,8	3,2	1/2"	2,30	43
INFRA 50-9	132	-	63	0,3	6,8	6,3	6,7	3,5	1/2"	2,50	43
INFRA 50-12	168	244	63	0,3	6,8	6,3	6,8	3,6	1/2"	2,50	43
INFRA 30-12m	101	-	60	0,3	4,8	4,2	5,1	2,8	1/2"	1,75	42
INFRA 50-18m	143	-	63	0,3	6,8	6,3	7,0	3,6	1/2"	2,50	43

	N	O	P	Q	R	S	T	U	V	W
Infra 10-3										
G25/G20	8,3% - 9,5%	180 - 210	6,6% - 7,6%	175 - 190	8,5% - 9,7%	195 - 220	6,7% - 7,6%	180 - 210	0,65	17,9
G30/G31	8,5% - 10,5%	160 - 190	6,8% - 8,0%	150 - 170	8,7% - 10,7%	170 - 200	6,9% - 8,1%	165 - 195	0,80	17,9
Infra 15-5										
G25/G20	8,1% - 8,8%	190 - 230	6,2% - 6,9%	180 - 220	8,3% - 9,5%	200 - 220	6,3% - 7,0%	180 - 210	0,95	26,9
G30/G31	8,9% - 9,4%	190 - 220	6,8% - 7,2%	190 - 210	9,4% - 9,9%	200 - 220	7,2% - 7,4%	200 - 220	1,10	26,9
Infra 20-6										
G25/G20	7,7% - 8,9%	190 - 230	6,1% - 6,7%	175 - 210	7,9% - 9,4%	200 - 225	6,3% - 6,9%	190 - 210	1,60	32,3
G30/G31	8,6% - 9,7%	190 - 230	6,4% - 7,2%	180 - 220	8,8% - 9,9%	200 - 240	6,6% - 7,4%	190 - 230	1,35	32,3
Infra 30-6										
G25/G20	8,0% - 9,0%	210 - 240	6,5% - 7,2%	200 - 220	8,5% - 9,4%	220 - 240	6,6% - 7,3%	210 - 225	0,75	51,2
G30/G31	9,0% - 10,0%	200 - 240	7,2% - 8,0%	190 - 230	9,4% - 10,4%	210 - 240	7,3% - 8,1%	200 - 220	0,55	51,2
Infra 30-9										
G25/G20	7,8% - 8,6%	160 - 190	6,6% - 7,1%	150 - 180	8,5% - 9,0%	170 - 200	6,8% - 7,4%	160 - 180	1,00	53,6
G30/G31	8,8% - 9,5%	170 - 190	7,2% - 7,8%	160 - 180	9,0% - 9,7%	180 - 200	7,3% - 8,0%	170 - 190	0,75	53,6
Infra 40-9										
G25/G20	7,6% - 8,7%	190 - 210	5,7% - 6,4%	170 - 200	8,2% - 9,2%	200 - 220	6,5% - 7,2%	180 - 200	1,55	65,8
G30/G31	8,7% - 9,5%	215 - 235	6,8% - 7,5%	200 - 220	9,2% - 9,7%	210 - 240	7,0% - 7,6%	210 - 225	1,20	65,8
Infra 50-9										
G25/G20	7,8% - 8,7%	215 - 235	6,0% - 6,9%	200 - 225	-	-	-	-	1,75	78,7
G30/G31	9,0% - 10,0%	225 - 240	7,0% - 7,8%	200 - 225	-	-	-	-	2,10	78,7
Infra 50-12										
G25/G20	7,7% - 8,7%	190 - 210	6,0% - 6,7%	170 - 200	7,9% - 8,9%	200 - 220	6,2% - 6,9%	190 - 210	1,90	85,4
G30/G31	8,7% - 9,8%	200 - 230	6,7% - 7,6%	190 - 210	9,2% - 10,3%	210 - 240	7,5% - 8,3%	200 - 220	1,90	85,4
Infra 30-12 Mono										
G25/G20	8,2% - 8,8%	170 - 200	6,5% - 7,0%	170 - 190					0,90	51,2
G30/G31	9,2% - 9,6%	170 - 190	6,8% - 7,4%	160 - 180					0,90	51,2
Infra 50-18 Mono										
G25/G20	8,3% - 9,2%	180 - 200	6,2% - 6,8%	170 - 190					2,15	85,4
G30/G31	9,1% - 10,0%	180 - 200	6,6% - 7,3%	170 - 190					2,00	85,4

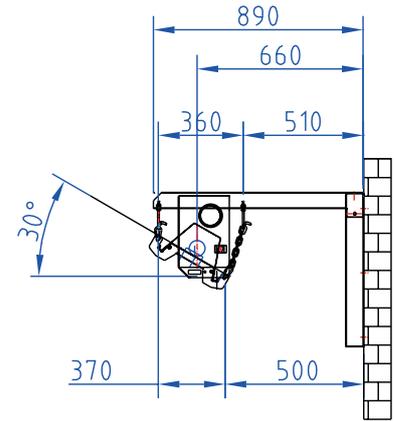
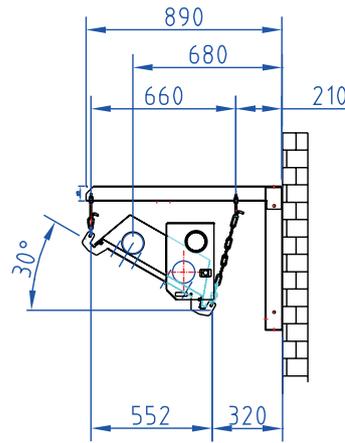
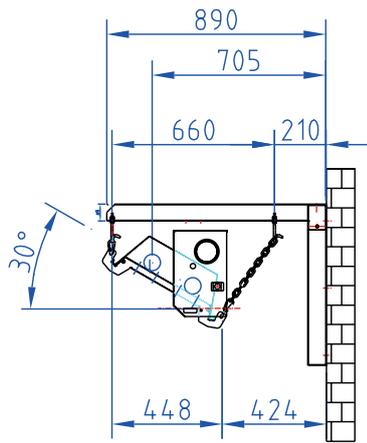
[2A]

INFRA 10, 15, 20

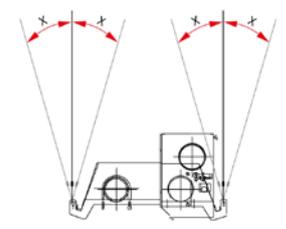
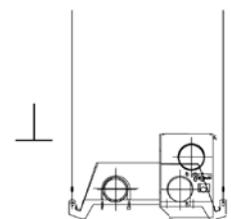
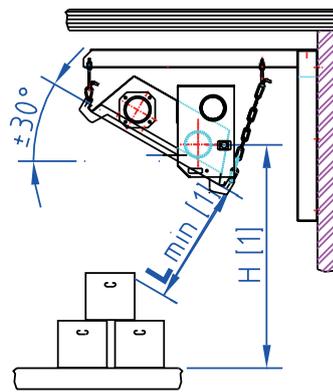
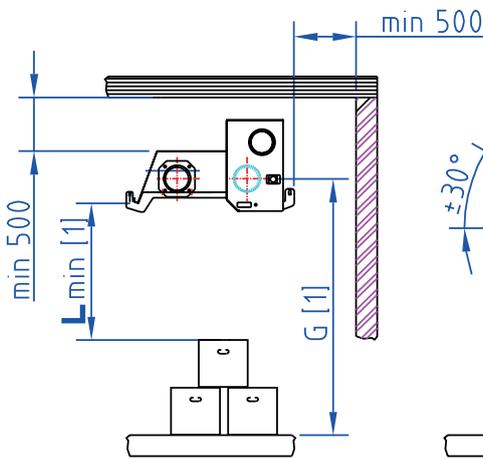
INFRA 30, 40, 50

INFRA mono 30, 50

EN



[2B]

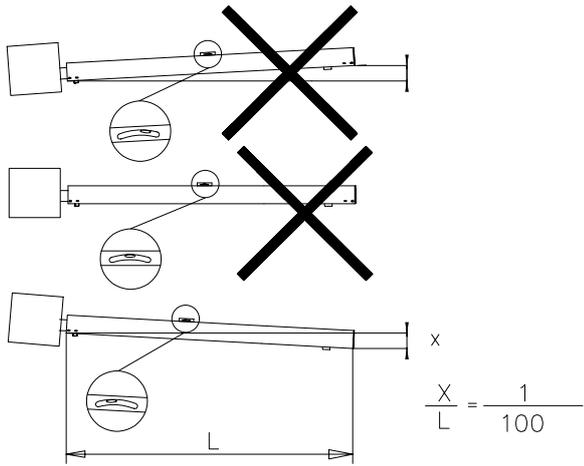


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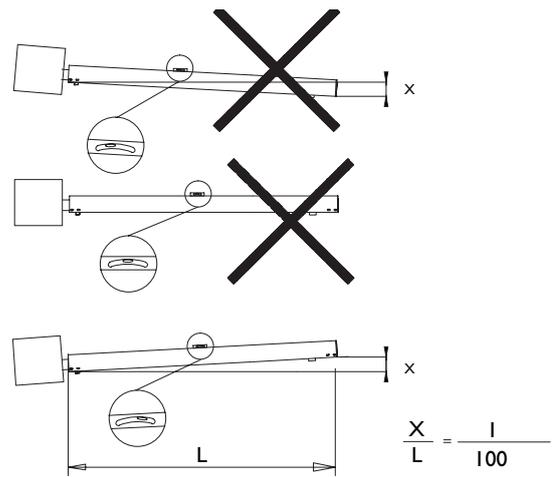
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[3]

INFRA

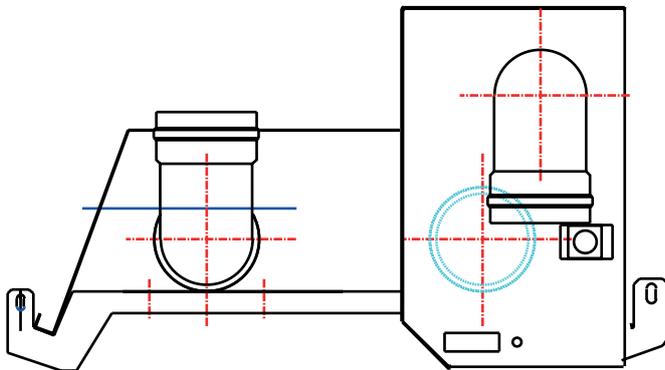


INFRA MONO

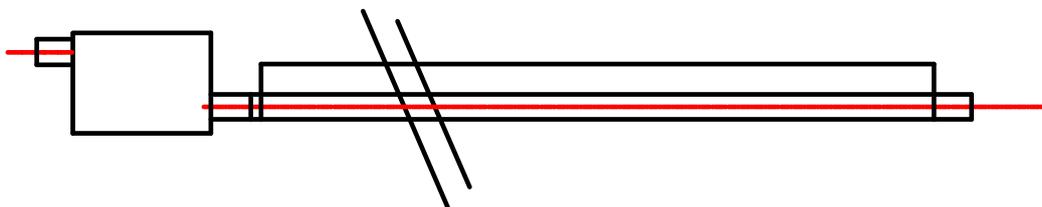


[4] A

INFRA

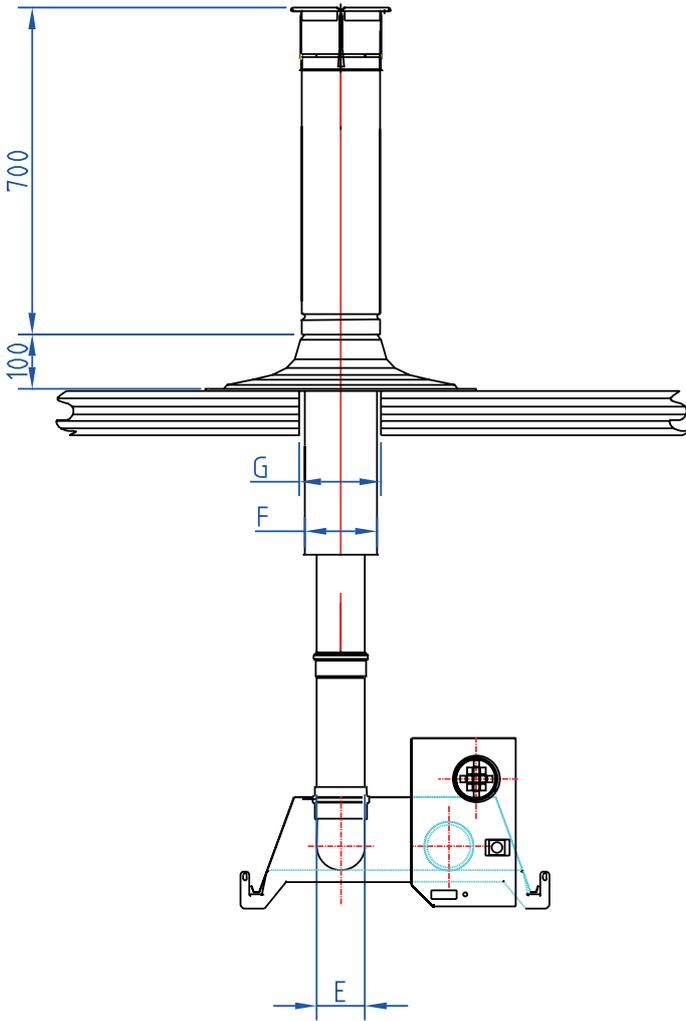


INFRA MONO



[5] B23

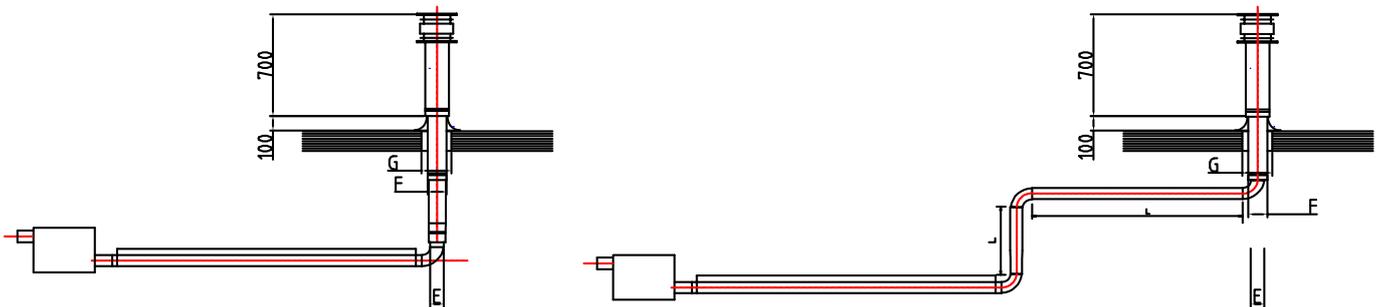
INFRA



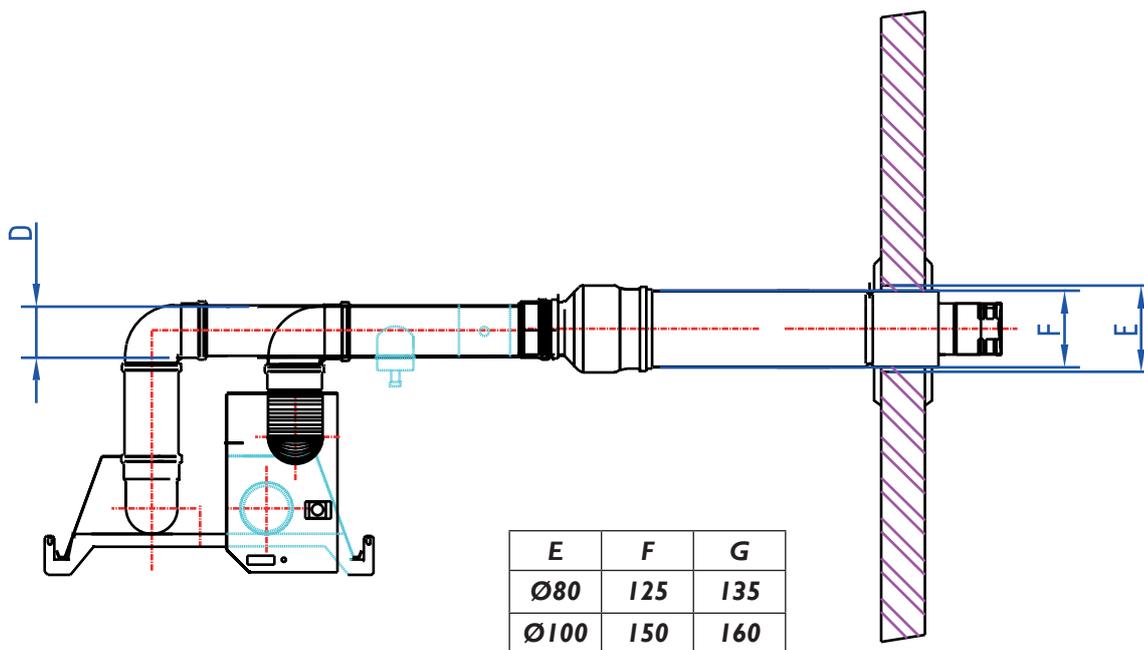
E	F	G
Ø80	125	135
Ø100	150	160

EN

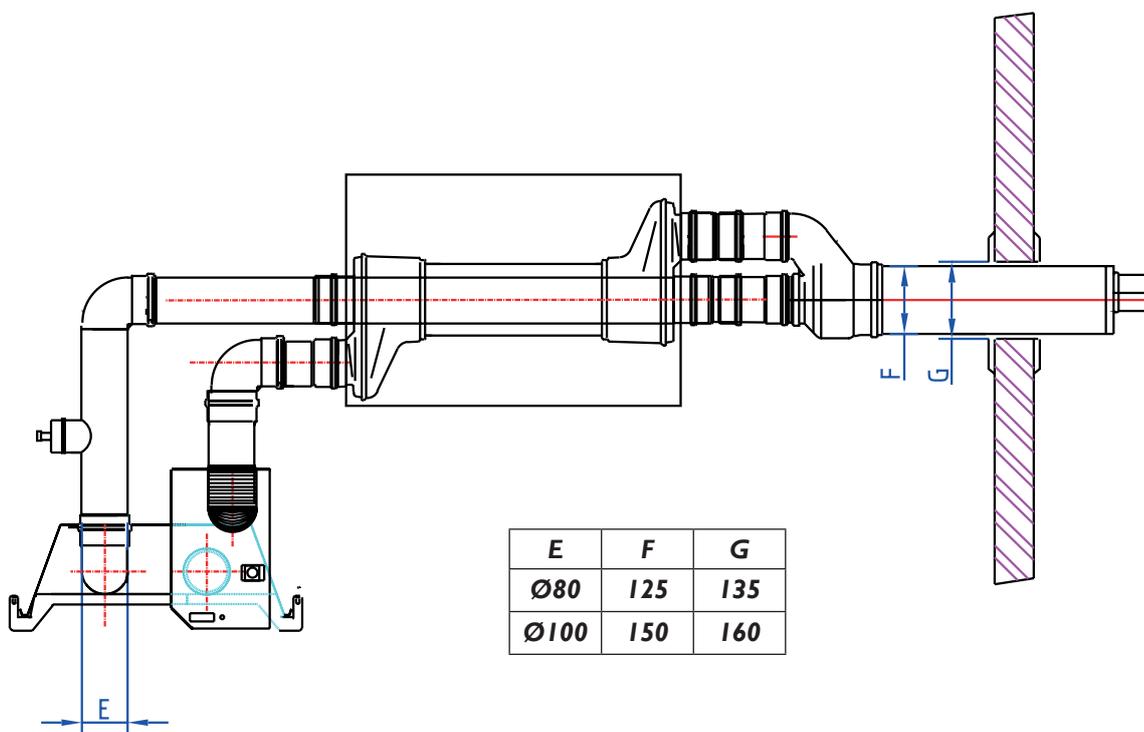
INFRA MONO



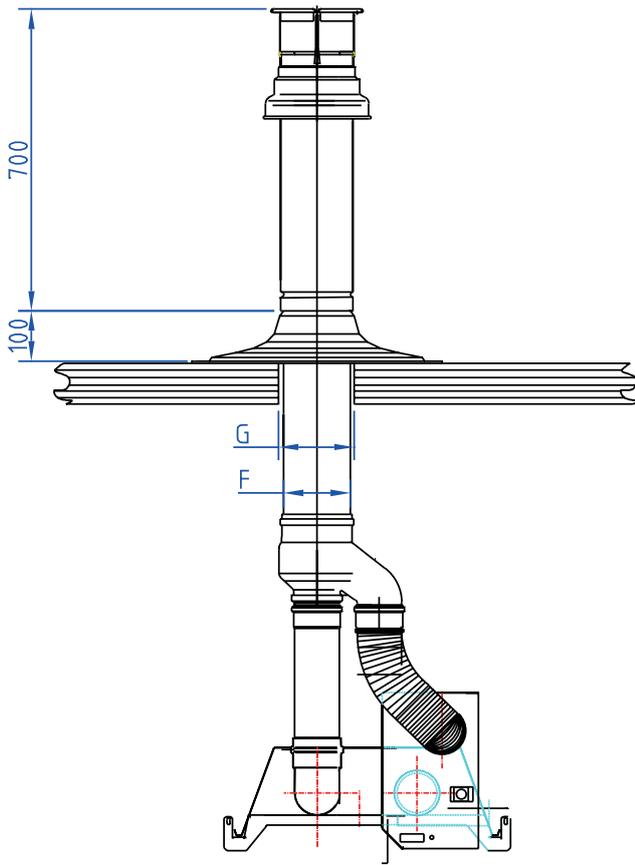
[6] C13



[6] C13++



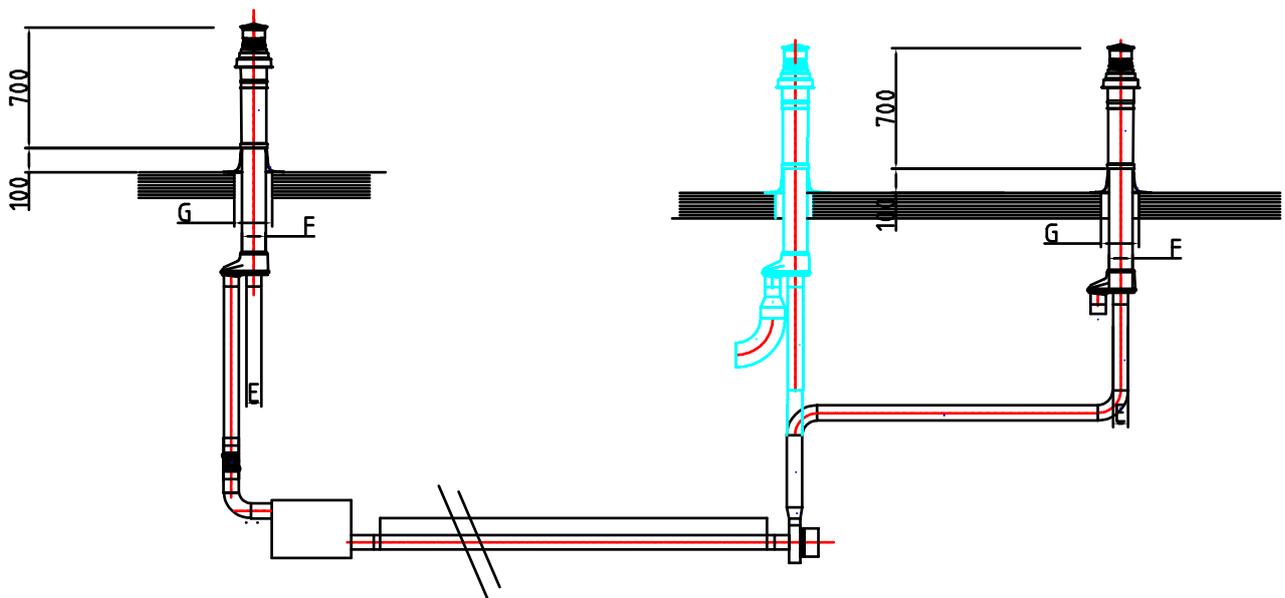
INFRA



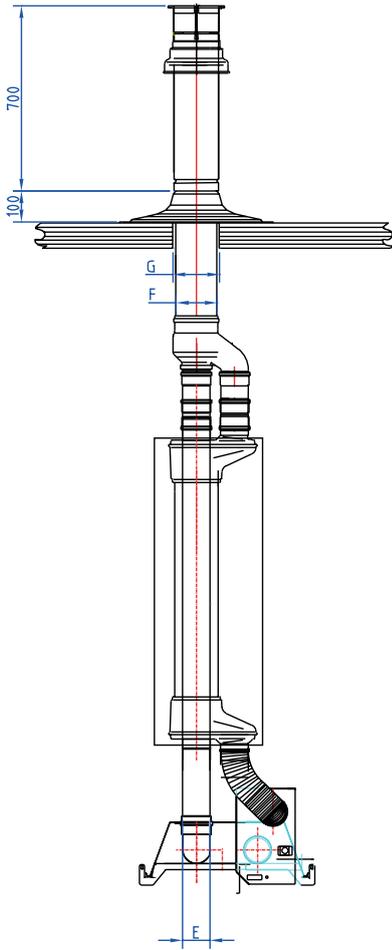
E	F	G
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Ø100	150	160

EN

INFRA MONO



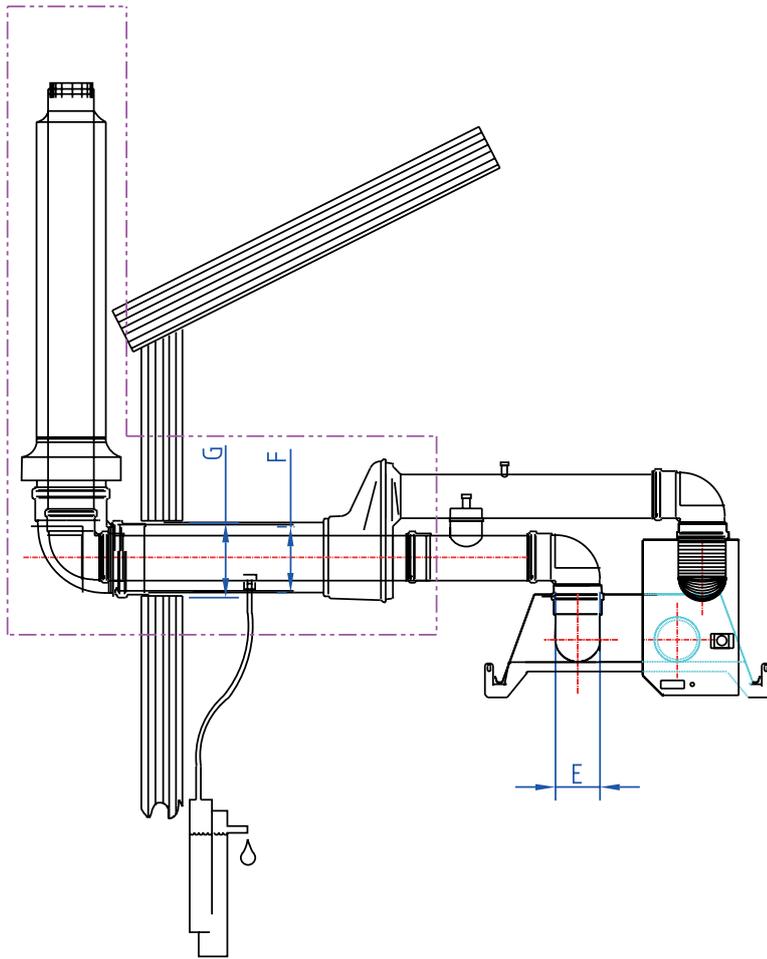
[7] C33++



E	F	G
Ø80	125	135
Ø100	150	160

[8] C53

EN

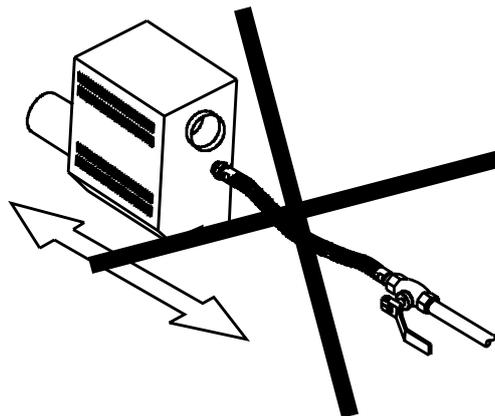
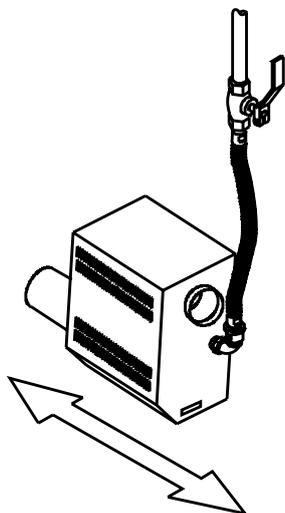


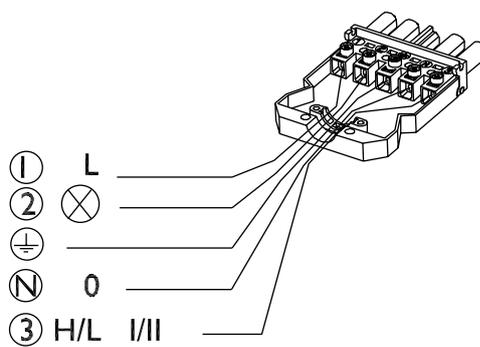
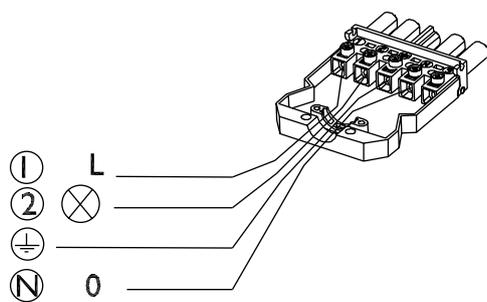
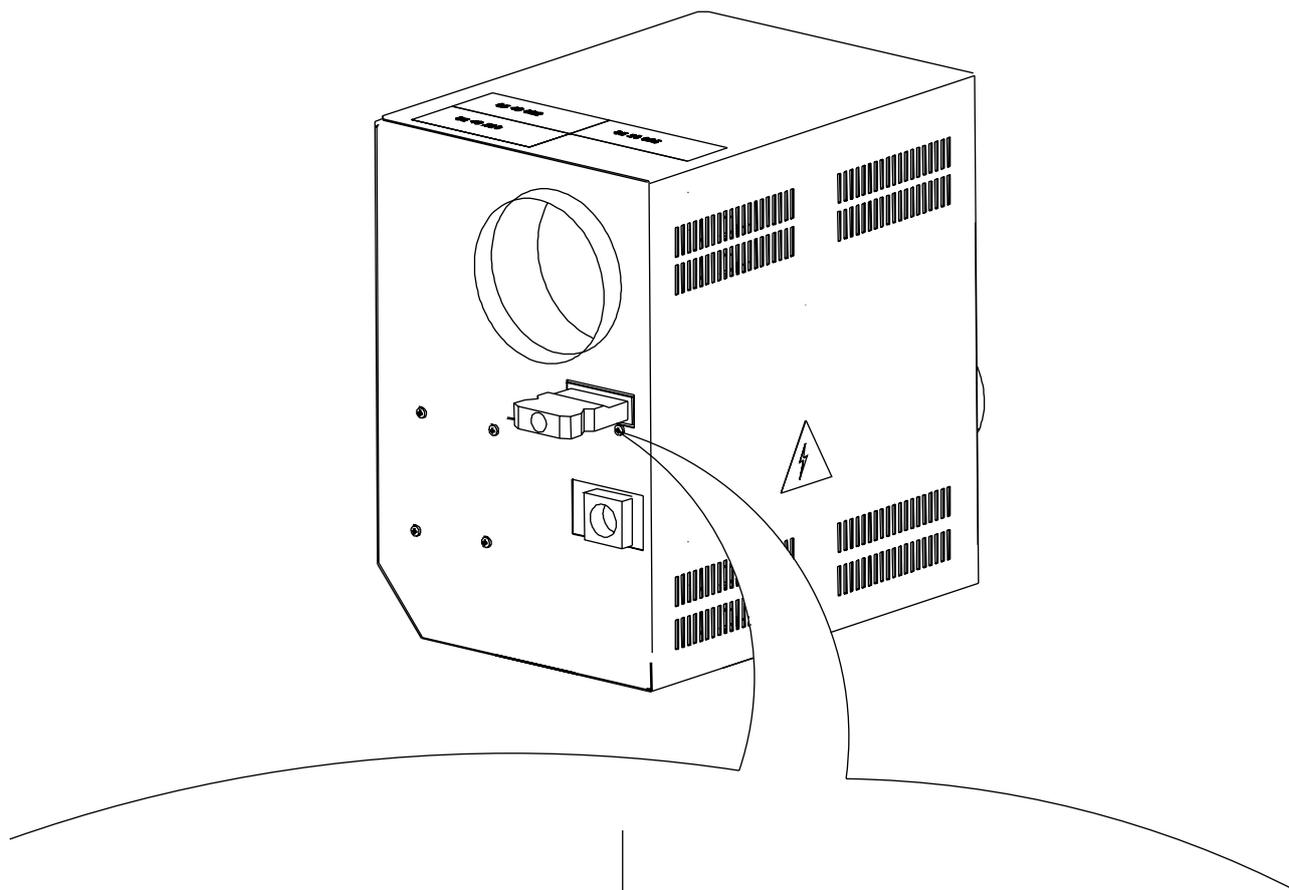
80 Ø 07 03 100
100 Ø 07 03 101

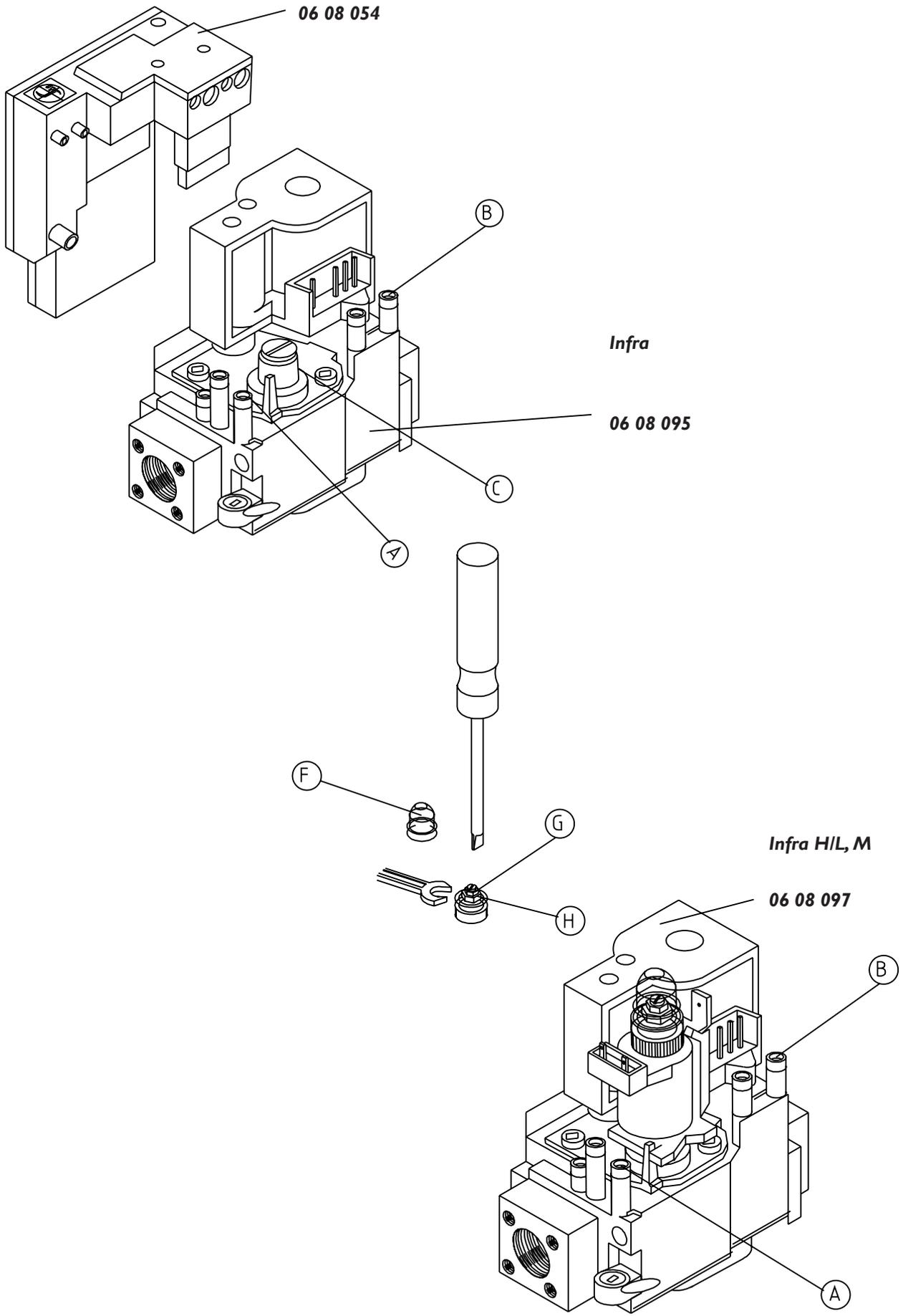
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Ø100	150	160

[9]

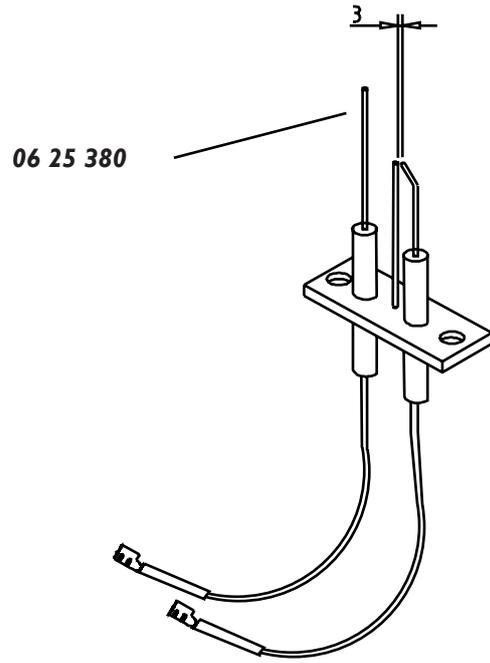
50 18 020



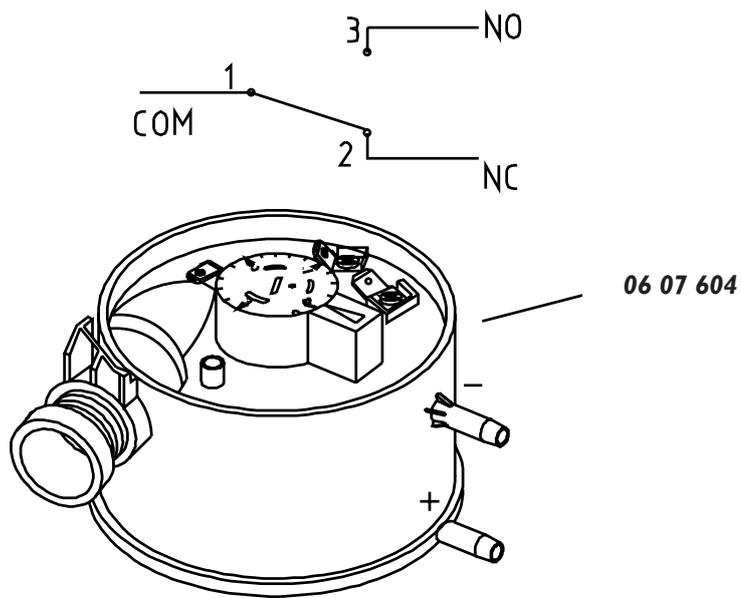


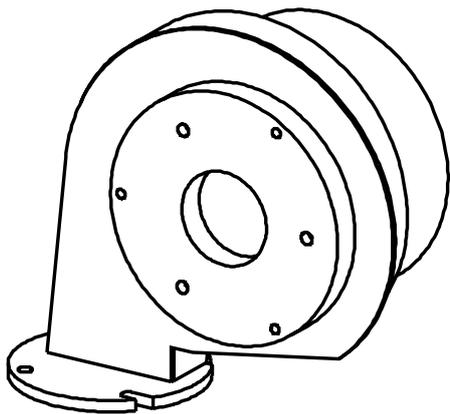


[12]

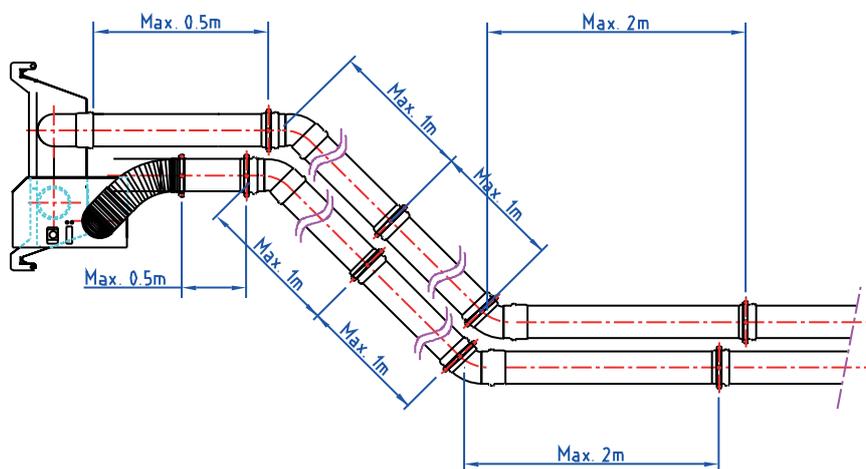
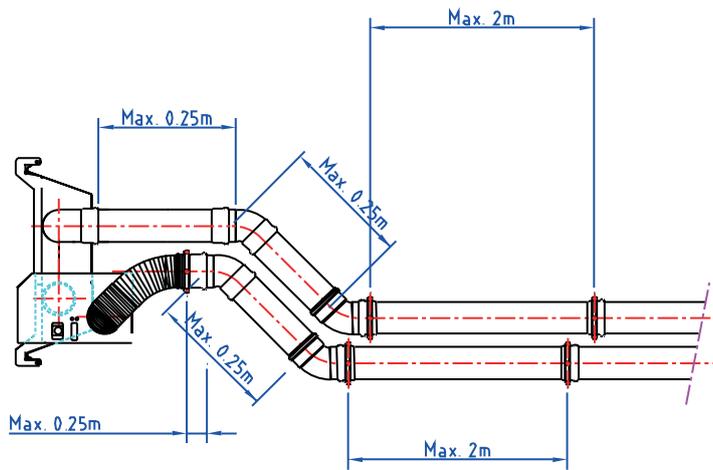
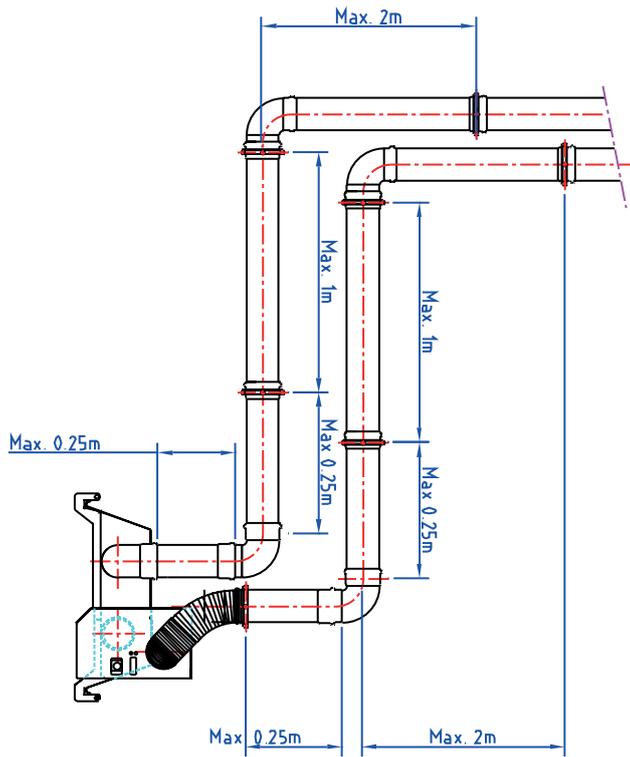


[13]





Type	G20/G25	G30/G31
10-3	31 03 550	31 03 550
15-5	31 03 551	31 03 551
20-6	31 03 553	31 03 553
30-6	31 03 552	31 03 552
30-9	31 03 552	31 03 552
40-9	31 03 555	31 03 556
50-9	31 03 557	31 03 557
50-12	31 03 557	31 03 557
30-12 mono	31 03 554	31 03 554
50-18 mono	31 03 557	31 03 557



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