

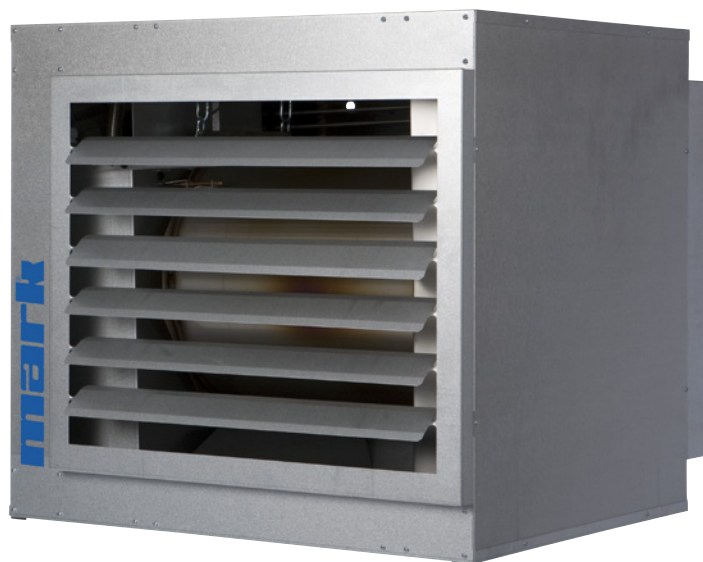
mark®

Technical manual **EN**

building climate technology

MARK GS+ / GC+ / G+

0660600_R46



Read this document before installing the heater

Warning

Incorrect installation, adjustment, alteration, repair or maintenance work may lead to material damage or injury. All work must be carried out by certified, qualified professionals. If the appliance is not positioned in accordance with the instructions, the warranty shall be rendered void. This appliance is not intended for use by children or persons with a physical, sensory or mental handicap, or who lack the required experience or expertise, unless they are supervised or have been instructed in the use of the appliance by somebody who is responsible for their safety. Children must be supervised to ensure that they do not play with the appliance.

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.

1.0 General

1.1 Application

Appliance type GS+ is solely suitable for the free and direct intake of the air to be heated and the free discharge of heated air into the room. Appliance type G+ with a centrifugal fan is suitable both for the free and direct intake of the air to be heated and the free discharge of heated air into the room, and for connection to a duct system.

If areas are to be heated in which corrosive vapours are present (chlorinated hydrocarbons in particular), which are either produced directly in the area, or which may be drawn in from the outside by the heater via a duct or an open connection, wall air heaters cannot be used because of the risk of corrosion to the heat exchanger.

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 general 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 indication

GS +	G+
G Gas	G Gas
S Axial fan	External centrifugal fan
+ High efficiency	+ High efficiency

All the types of appliance are listed in table [3]. The various types are shown in the rows, and technical information relating to the appliances is shown in the columns. See the key below. Key to table [3]

- A Nominal load (upper value)
 - B Nominal load (lower value)
 - C Efficiency at 100% full load
 - D Efficiency at 30% partial load
 - E Gas consumption for a specified gas type (15°) max/min
 - E1 CO₂/O₂ for a specified gas type: max. load %
 - E2 CO₂/O₂ for a specified gas type: min. load %
 - E3 Gas pre-pressure for a specified gas type
 - F Burner turndown ratio
 - G Flue gas temperature (min-max load)
 - J Admissible flue gas flow resistance
 - K Diameter of the flue gas duct/air supply duct
 - L Electrical supply
 - M Electrical power
 - N Appliance fuse rating
 - O Protection class
 - Q Air displacement (20°C)
 - R Air temperature rise
 - S Throw
 - U Ambient temperature min. /max.
 - V Fan diameter(s)
 - W Fan speed
 - X Noise level at 5m (unobstructed)
 - Y Weight
 - Z Condensate acidity
 - ZI Flue gas mass
 - AB Max. condensate quantity
 - AC Gas connection
- * NL, BE, DE 50 mbar

Information for Belgium

- AA Nominal load (lower value) H gas / L gas
- BB Power H gas / L gas

1.3 General warnings

Incorrect installation, adjustment, alteration, maintenance 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. Faulty installation, adjustment, alteration, maintenance activity or repair shall render the warranty void.

Appliance

When installing wall air heaters, you must comply with the relevant national and, if applicable, regional and local regulations (e.g. gas company regulations, building regulations etc.). The wall air heater may be installed only in an area and position suitable for the purpose, see Chapter 2 Installation. In Belgium, the wall air heater must be installed in accordance with Belgian standard

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 must be fitted to the inner pipeline.

Flue gas route

Combustion air supply pipelines and combustion gas exhaust ducts should have as few bends as possible; in general, flow resistance should be kept to a minimum and in all cases, the diameter should be constant along the entire length. The exhaust duct may not rest on the 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 far away from the combustible material to prevent fire.

1.4 Think of your safety

If you smell gas, you must not under any circumstances:

- Ignite an appliance
- Touch electrical switches or telephone from the area in question

Take the following action:

- Switch off the gas and electricity
- Activate the operational emergency plan
- Evacuate the building if necessary

2.0 Installation

2.1 Positioning the appliance

After unpacking, check the appliance for damage. Check that the information relating to the type/model and the electrical voltage is correct. Place the appliance and any accessories to a sufficiently solid structure [2], taking into account the minimum free space required [1].

For GS+ you should use the four M10-sized suspension points [21]. GC+ devices provided with a support frame should, when hung up, always be mounted to the support frame, see the detail in picture [22]. Never mount to the M10-sized suspension points, as these are not intended for this purpose. Also, remove the transport feet of the frame when the device is to be hung, see picture [23]. Frames can be connected by means of the connection pieces as shown in picture [24].

2.2 Positioning the flue gas exhaust system and 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 have a stainless steel inner pipe. This has been chosen because of the maximum flue gas temperature and because of the stainless steel heat exchanger.

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.

When the maximum length of the flue systems is exceeded, as shown in table [4], the diameter of the single flue sets, including extension pipes and elbows, must be increased by one size.

Caution:

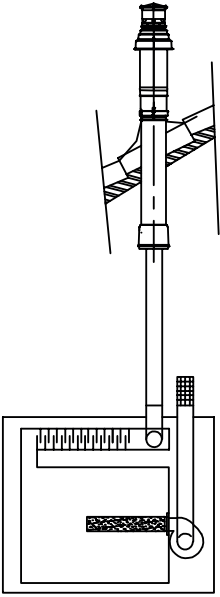
- The values shown in the resistance table [4] apply only to the delivered and advised flue systems supplied by the manufacturer.
- Discharge material with a different resistivity can influence the length of the total supply and discharge route.
- The Ph-value of condensate is 3.4!

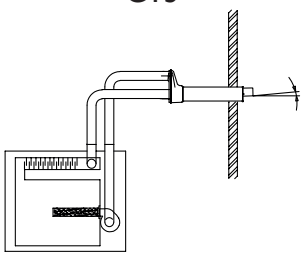
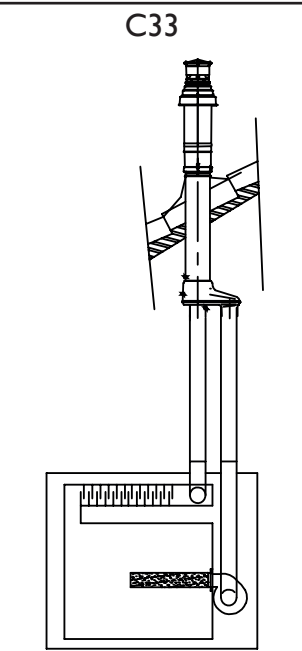
The roof and wall pass-throughs supplied by the manufacturer are identified by the following item numbers:

Appliance type	Roof pass-through C33	Wall pass-through C13
G+ 15/25/35/40	59 90 557	59 90 581
G+ 60/80/100	59 90 561	59 90 585
G+ 135/150/200	59 90 564	59 90 589

The extension pipes and bends of the gas flue exhaust system must satisfy the following requirements:

Appliance type	Minimum diameter
G+ 15/25/35/40	80 mm
G+ 60/80/100	100 mm
G+ 135/150/200	130 mm

Type	Flue gas exhaust			Accessories		Installation remarks
	Appliance type	Ø	Article code	Ø	Article code	
<p>B23</p> 	Single flue set vertical			Extension pipe stainless steel L=500		
	15/25/35/40		5990557	80	5990201	
	60/80/100		5990561	100	5990211	
	135/150/200		5990564	130	5990221	
				Extension pipe stainless steel L=1000		
				80	5990202	
				100	5990212	
				130	5990222	
				Elbow 45° stainless steel		
				80	5990204	
				100	5990214	
				130	5990224	
				Elbow 90° stainless steel		
				80	5990203	
				100	5990213	
				130	5990223	
				Air inlet mesh		
				80	3002532	
				100	3002533	
				130	3002534	

 <p>C13</p>	Single flue set horizontal stainless steel			Flue gas exhaust	
				Extension pipe stainless steel L=500	
	15/25/35/40	80/125	5990581	80	5990201
	60/80/100	100/150	5990585	100	5990211
135/150/200	130/200	5990589	130	5990221	
			Extension pipe stainless steel L=1000		
 <p>C33</p>	Single flue set vertical stainless steel			80	5990202
	15/25/35/40	80/125	5990557	130	5990222
	60/80/100	100/150	5990561	Elbow 45° stainless steel	
	135/150/200	130/200	5990564		
				80	5990204
				100	5990214
				130	5990224
				Elbow 90° stainless steel	
				80	5990203
				100	5990213
				130	5990223
				Combustion air	
				Extension pipe stainless steel L=500	
				80	5990201
				100	5990211
				130	5990221
				Extension pipe stainless steel L=1000	
				80	5990202
				100	5990212
				130	5990222
				Extension pipe aluminum	
			80	5990532	
			100	5990536	
			130	5990540	
			Duct bend 45° aluminum		
			80	5990534	
			100	5990538	
			130	5990544	
			Elbow 90° aluminum		
			80	5990533	
			100	5990537	
			130	5990542	

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

When the maximum length of the flue systems is exceeded, as shown in table [4], the diameter of the single flue sets, including extension pipes and elbows, must be increased by one size.

Reducer kits:
 Ø80- Ø100
 5990230
 Ø100- Ø130
 5990240

<p>C53</p>	RVS Single flue set horizontal			Extension pipe Polyethylene L=500	
	15/25/35/40	80/125	5990557	80	5989205
	60/80/100	100/150	5990561	100	5989206
	135/150/200	130/200	5990564	130	5989207
	In combination with single flue set horizontal			Extension pipe Polyethylene L=1000	
	15/25/35/40		5990511	80	5989210
	60/80/100		5990512	100	5989211
	135/150/200		5990513	130	5989212
	OR			Elbow 45° Polyethylene	
	15/25/35/40		0703100	80	5989224
	60/80/100		0703101	100	5989233
				130	5989234
				Elbow 90° Polyethylene	
				80	5989225
			100	5989236	
			130	5989237	
<p>C43</p>					
<p>C83</p>	Single flue set horizontal				
	15/25/35/40		5990511		
	60/80/100		5990512		
	135/150/200		5990513		
					<p>C43: Minimum internal area of a round common drain pipe AV, see table [5]</p> <p>Applicable only if the combined flue gas system has sufficient natural draft: the unit does not have an internal non-return valve.</p> <p>Condensate is not allowed to flow back from the flue system into the unit.</p>

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 [3]. If the connection line is subject to pressures above 60mbar, this gas tap must be closed. If there is any possibility of the presence of

dirt in the gas, use a gas filter. Always blow through the gas pipe in compliance with the regulations prior to operating the appliance. If the appliance needs to be converted to a different type of gas than that indicated on the type plate, the supplier of the appliance must be contacted. The supplier can advise you which parts must be replaced in order to ensure correct operation of the appliance with the desired type of gas. Conversion to a different type of gas is not permitted in Belgium.

2.4 Electrical connection

Installation must comply with the relevant local and/or national regulations. Ensure that there is a correct connection group with a mains fuse. The electrical diagram is displayed on the appliance. A basic diagram for the GS+ appliance can be found in chapter 8 and 9 Electrical diagrams. In the case of the G+ with a centrifugal fan, please refer to the diagram on the appliance.

PLEASE NOTE:

- The appliance must be adequately earthed. The appliance must be fitted with an isolator switch which interrupts phase and zero (not earth).
- The isolator switch must be accessible at all times.
- Never, under any circumstances, allow the supply to the appliance to be interrupted by other switches. This could result in the appliance overheating.
- The unit is phase sensitive.

2.5 Siphon [1]

The boiler siphon that is included in the scope of supply must be connected to the appliance. The boiler siphon must connect to the odour trap siphon in the drainage system to the sewer via an open connection. Make sure that the siphon is protected against frost (risk of freezing).

3.0 Controls

3.1 Room thermostat and reset button

The room thermostat must be located at a height of approx. 1.5m and not directly within the flow of warm air. Connect the room thermostat using a shielded data cable in accordance with the wiring diagram supplied for the appliance. Refer also to the technical information handbook supplied with the room thermostat. Incorrect connection will render the manufacturer's warranty void.

PLEASE NOTE:

- The maximum lengths and diameters are specified in the table [26].
- Earth the cable shielding to the appliance.
- For connecting multiple appliances, see [25] + [26]

3.2 Choice of bus cable

Selection of the correct type of bus cable is based on the specific model for the country concerned. When selecting the cable, the values noted in the technical details must be complied with. Bus cables of the appropriate specifications, which are offered in countries with an EIB market, are:

- | | |
|---------------------------------|--|
| – YCYM
EIB specification | Fixed system
Dry, damp, wet rooms
In the open air (no direct exposure to sunlight)
Face-fit, flush-fit, in conduits |
| – J-Y(st)Y
EIB specification | Fixed system
Only in interior spaces
Face-fit, in conduits |
| – JH(st)H | Halogen-free conduits, remote system |

- A-2Y(L)2Y or A-2YF(L)2Y Telephone ground cable, system in the outside area

4.0 Start-up/shutdown

4.1 General

Before being packed, each appliance is fully tested for safety and correct operation. Among other checks, the gas pressure and CO₂ are set. You must however always check the gas pre-pressure. Never turn the adjustment screws without good cause. Do not forget to instruct the user on the proper use and operation of the appliance and peripherals.

4.2 Checks

- Switch off the electricity supply at the main switch.
- Set the room thermostat to the minimum temperature.
- Open the gas stop cock, then carefully purge the gas pipes of air and check for leaks. Under no circumstances use a naked flame! [27]
- Close the gas stop cock.
- Check whether the siphon has been correctly mounted and is protected against frost. Fill it with water before starting up the appliance for the first time.
- In the case of the GS+, check whether the vanes in the air discharge port are set to the open position (open to a min. of 45°).
- In the case of appliances with a centrifugal fan, check the external static system pressure, direction of rotation of the fan, current draw and check the belt tension after 20 to 40 operating hours. Adjust the tension regularly during the first year of operation [19].
- Switch on the electrical supply at the main switch and set the room thermostat to maximum temperature. After the purge time has elapsed, the automatic ignition control will generate an electric spark and the safety valve on the gas control unit will open. Because the gas stop clock is closed, no flame will appear. The automatic ignition control will lock out after 4 attempts at ignition, each lasting about 5 seconds. After waiting for approximately 30 seconds, the automatic controller can be reset and the same cycle can be repeated.
- Open the gas stop cock, the appliance will now start up.
- Check the flame pattern at the main burner (clearly defined inner core, even combustion).
- In the case of appliances with an external fan, check that the maximum temperature increase of 30K is not exceeded.

4.3 Check that the room thermostat is functioning correctly

If the setting is lower than the ambient temperature, the burner will extinguish. At a setting higher than the ambient temperature, the burner should ignite.

4.4 Check the pre-pressure

The gas pre-pressure must be measured at the gas unit when the appliance is in operation. The pre-pressure is indicated on the appliance's type plate. To check, the volume of gas consumed [3] can be measured via the gas meter (temporarily switch off all other appliances that consume gas).

4.5 Check appliance operation.

Finally, check that the operation of the appliance cannot be influenced by other appliances close to it, localised air flows or corrosive or explosive vapours, etc.

4.6 Set the gas control unit [6]

Before being packed, each appliance is fully tested for safety and correct operation. The correct

combustion values are set during this procedure. If checks indicate that the CO₂ value is different from that in table [3], adjustments may be made (difference of more than 0.2%). Never adjust set screws without the correct measuring equipment.

Legend [6]

- 1 Measuring point for gas pre-pressure
- 2 Measuring point for offset
- 3 Offset adjustment screw
- 4 Throttle adjustment screw

Step 1

Set the appliance to run at full operational load by pressing and holding the reset button of the unit for at least 5 seconds. The fault lamp in the reset button flashes at a high frequency. Check the CO₂ when the appliance is operating at high output. If the CO₂ is too high, turn the throttle adjuster to the right (less gas). If the CO₂ is too low, turn the screw to the left (more gas). The correct CO₂ value is shown in table [3] (E1).

Step 2

Set the appliance to minimum load by shortly pressing the reset button of the unit. The fault lamp in the reset button flashes at a low frequency. Check the CO₂ against the value in table [3] (E2). If different, correct by turning the offset adjuster under the cap. To the left for lower CO₂, to the right for higher CO₂.

After setting the gas control unit press the reset button again (the light goes out).

4.7 Shutting down the heater

For short periods of time:

- Set the room thermostat to the minimum temperature.
- Do not switch off the electricity supply at the main switch as this may damage the maximum temperature and safety thermostat.

For longer periods of time:

- Set the room thermostat to the minimum temperature.
- After ± 5 minutes, the electrical power may be switched off.

5.0 Maintenance

5.1 General

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

5.2 Cleaning

All gas-fired appliances require periodical maintenance. This maintenance work must be performed by qualified maintenance technicians.

- Before starting maintenance work, the gas and electrical supplies must be shut off. See also paragraph 4.7
- Check all gaskets and replace if required.
- The gas transport section is located on the side of the appliance in the electrical compartment.

The gas transport section can be removed from the appliance as a single assembly. To do so, six M6 nuts must be removed and the electrical wiring disconnected.

- Removal of the gas transport section provides access to the burner and the ignition/ionisation electrode. It is recommended to replace the ignition/ionisation electrode yearly during regular maintenance.
- Check the burner surface for irregularities. Never use a steel brush!
- Clean the gas mixer using a soft brush. Make sure that no dust gets into the burner and the gas suction tube. Refit the gas transport section, reconnect the wiring and the gas and electrical supplies. [27]
- The condensation drain nozzle is located in the base-plate of the flue gas collection chamber. This opening and the siphon should be checked regularly for dirt build-up.
- A GS+ 135/150 has a water level sensor fitted in the flue gas collection chamber. This switches the appliance off if a blockage forms in the condensation water pipe or the siphon in order to avoid an unacceptable build-up of water in the flue gas collection chamber.
- If a G+ with a centrifugal fan is fitted with filters, the flow resistance through the filters increases as dirt accumulates. This flow resistance may not exceed the value shown on the type plate. Only replacement filters of the same class may be used. Refer to the sticker on the filter housing for more information about the filter set(s).
- Check the fan pulley(s) and belt tension, clean the pulley(s) if required.
- When using a condensate pump (3100585) with condensation neutralization kit (3100586) the cartridge needs to be replaced annually.

6.0 Description of parts

The parts are:

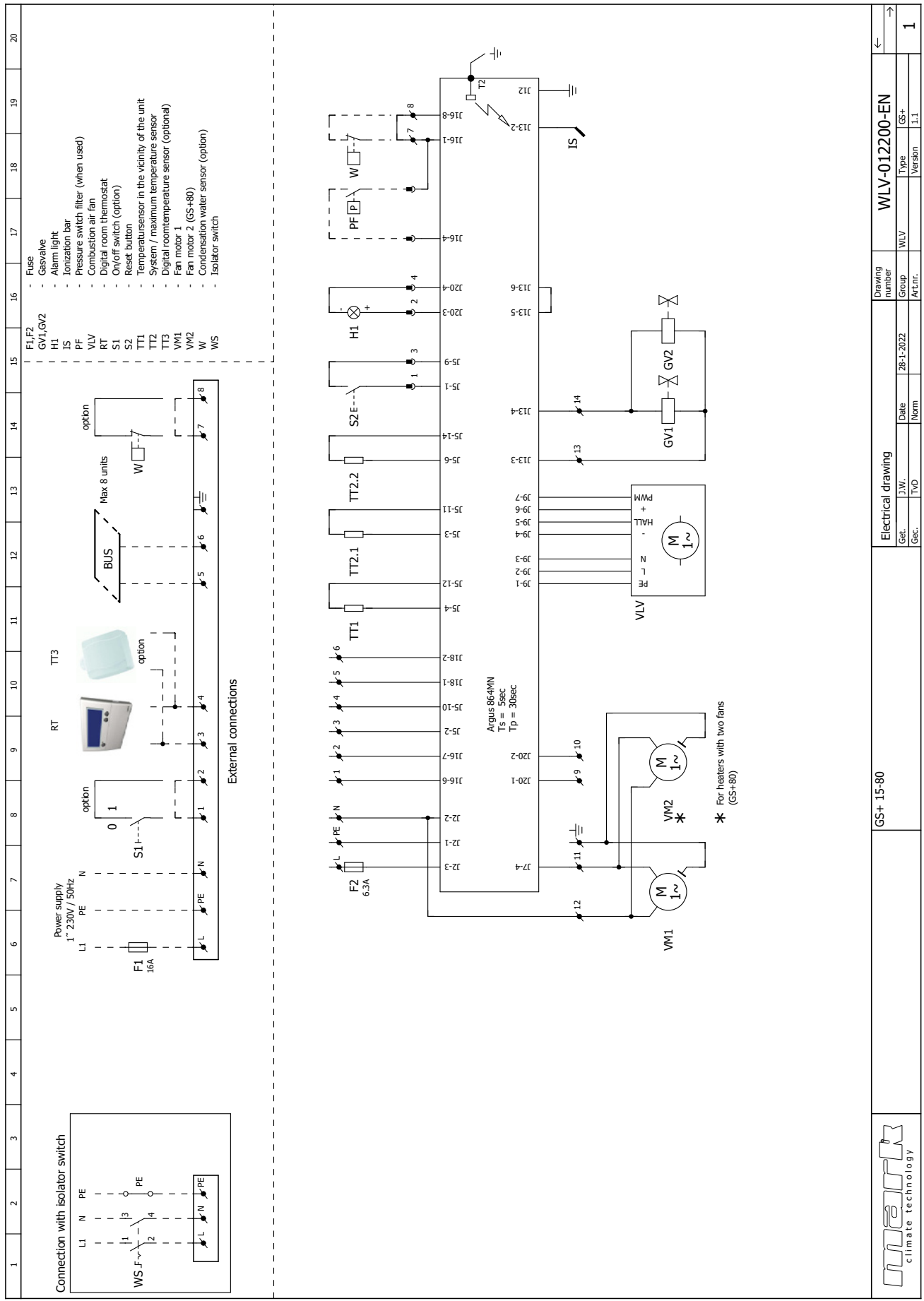
- Fan [7]
- Combustion air fan [8]
- Ignition set [9]
- Water level sensor [10]
- Burner [11]
- Gas control unit [12]
- Ambient temperature sensor [13]
- Outlet temperature sensor / max [14]
- Gasket set [15]
- Microprocessor [16]
- Gas mixer [17]
- Siphon [18]

7.0 Fault codes

Code	Error	Description
01	Ignition failure	Ignition has failed (three attempts at ignition).
02	Gas valve relay/T max.	Maximum thermostat is open
03	Gas valve	Gas valve faulty / Wire connecting the gas valve to the burner control box is open-circuit or has been incorrectly connected.
10	Sensor diff too high	Temperature difference between both outlet temperature sensors is too high.
23	Filters/system fan	Filter is dirty/system fan has suffered a thermal failure
25	T max.	Maximum thermostat is open
31	Too many attempts to restart	Flame goes out (3x) when the device is in operation.
42	Choke relay broken	Relay of the choke valve is broken
43	Combustion air fan failure	The current speed of the combustion air fan deviates too much
62	Block drain	Condensate drain blocked. Condensate pump failure.
65	Phase and zero back to front	Phase and zero not connected correctly
72	Air out sensor open	Outlet temperature sensor interrupted
73	Unit temp sensor open	Ambient temperature sensor interrupted
78	Air out safety open	Outlet temperature sensor interrupted
80	Air out shorted	Outlet temperature sensor has short circuited
81	Unit temp shorted	Ambient temperature sensor has short circuited
86	Air out safety shorted	Outlet temperature sensor has short circuited
<p><i>When a different error code displayed on the thermostat appears, press the Reset button. If the fault returns, please contact the vendor of the device.</i></p>		

8.0 Electrical diagram GS+ 15 - 80

For G+: see inside the appliance.

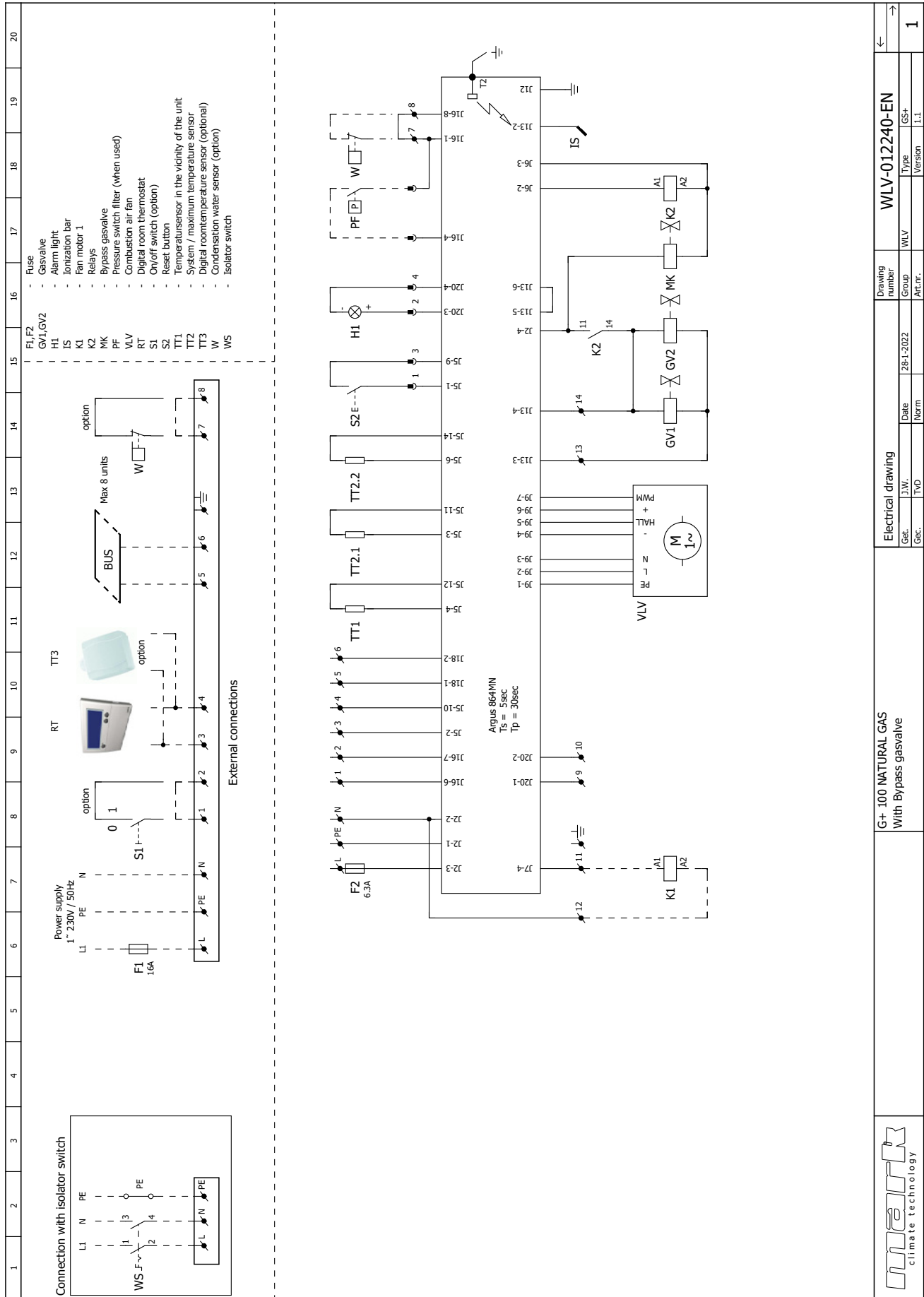


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Get.	J.W.	Date	28-1-2022	Group	GS+
Geç.	T.V.D.	Norm		Art.Nr.	1.1
GS+ 15-80			Type		
			Version		
			1		



9.0 Electrical diagram GS+ 100

For G+: see inside the appliance.



G+ 100 NATURAL GAS
With Bypass gasvalve

Electrical drawing

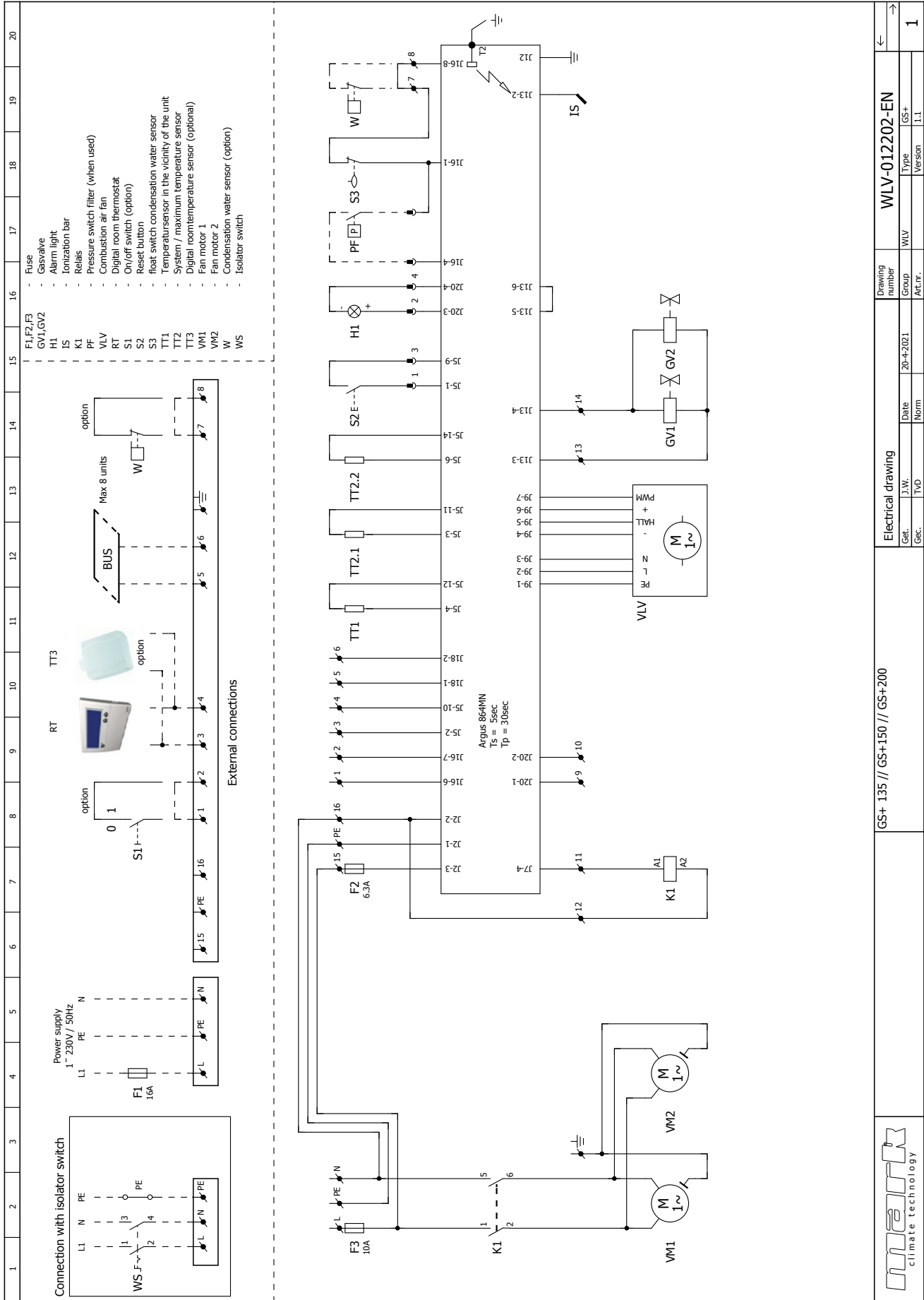
Get.	J.W.	Date	Norm
		28-1-2022	

Drawing number	Group	Att.r.
WLV-012240-EN	WLV	

Type	Version
GS+	1.1

10.0 Electrical diagram GS+ I35 / I50 / 200

For G+: see inside the appliance.

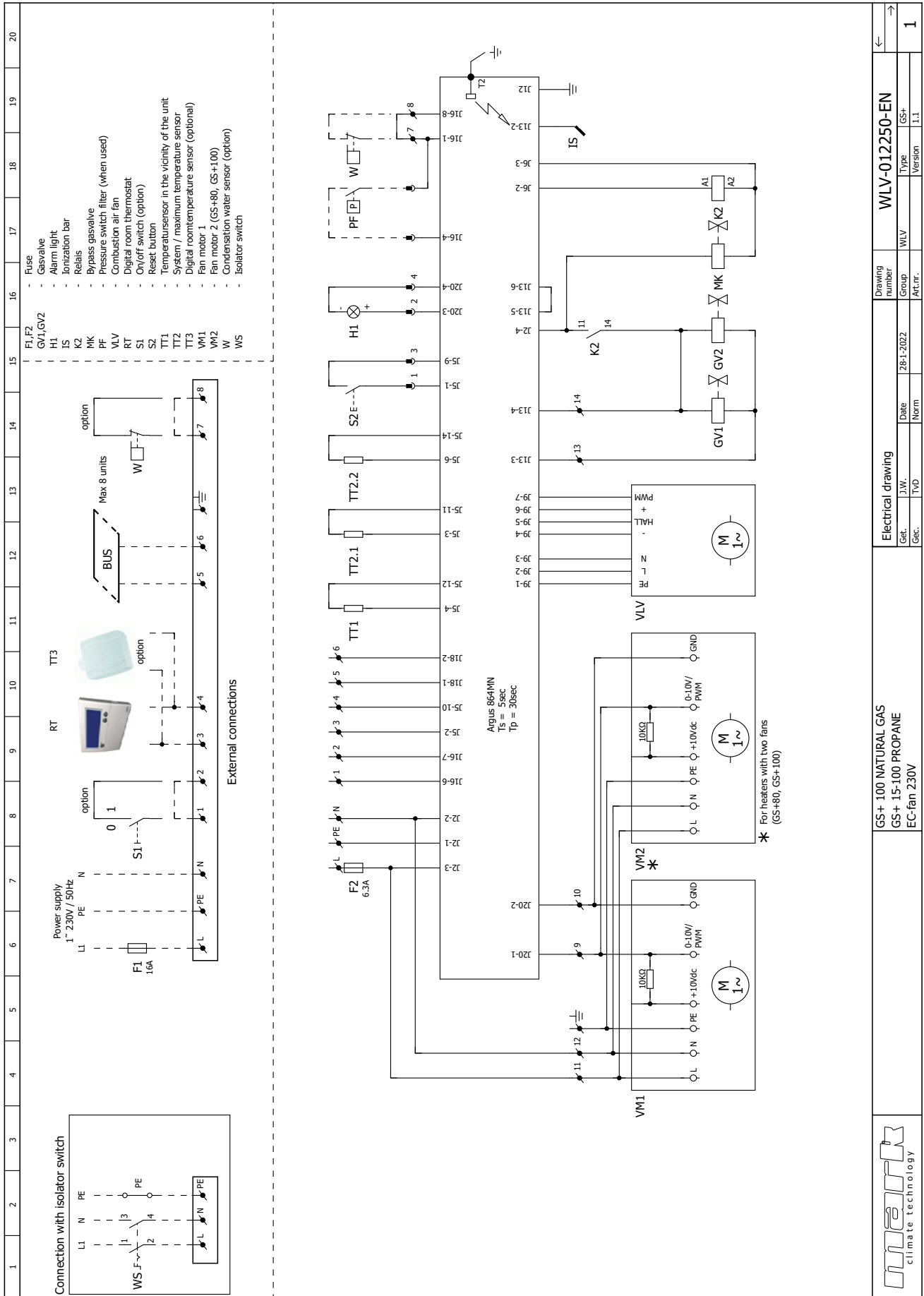


Electrical drawing		Drawing number		WLV-012202-EN	
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Geç.	T.Y.D.	Norm:		Version:	1.1
GS+ I35 // GS+I50 // GS+200			Group:	WLV	
			Att.pr.:		
			1		



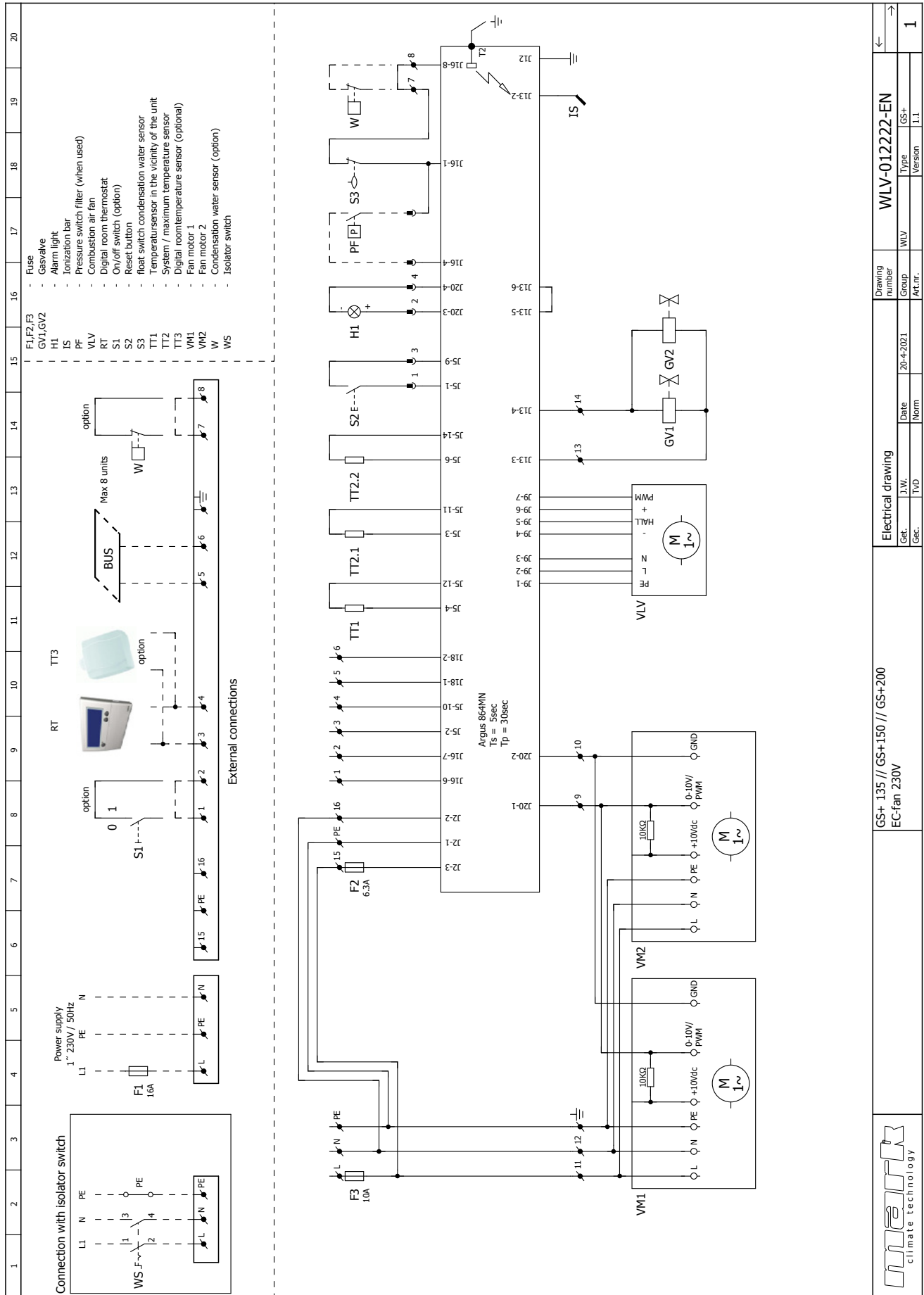
12.0 Electrical diagram GS+ 100 EC

For G+: see inside the appliance.

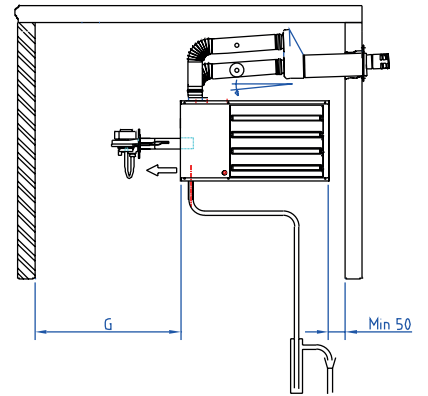
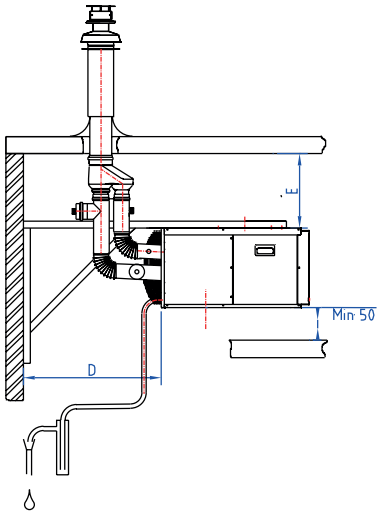
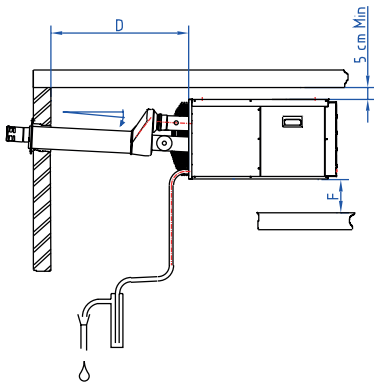
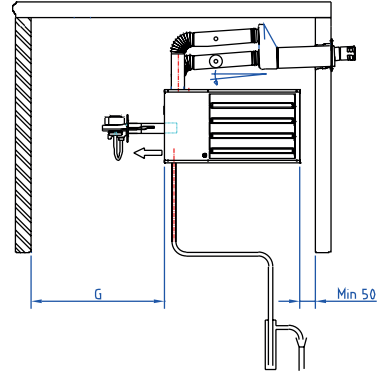
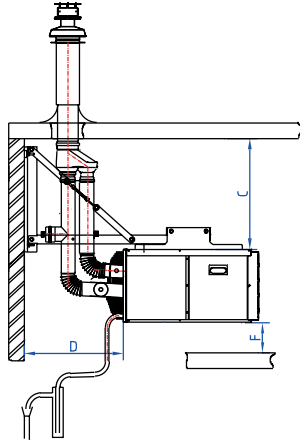
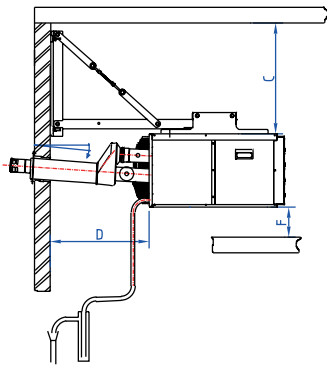


13.0 Electrical diagram GS+ I35 EC / I50 EC / 200 EC

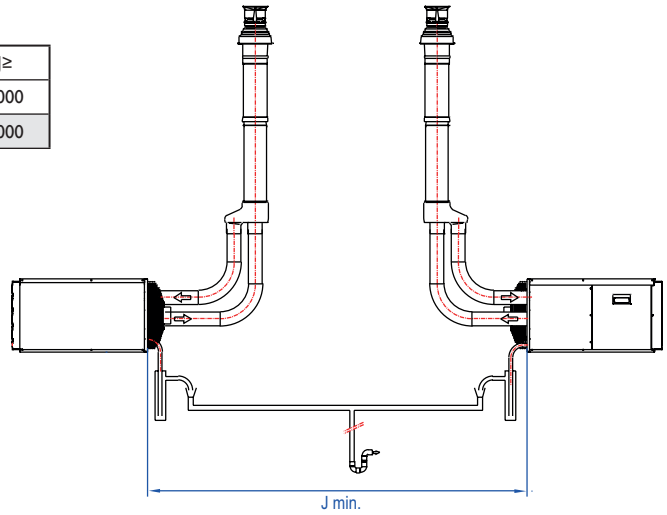
For G+: see inside the appliance.

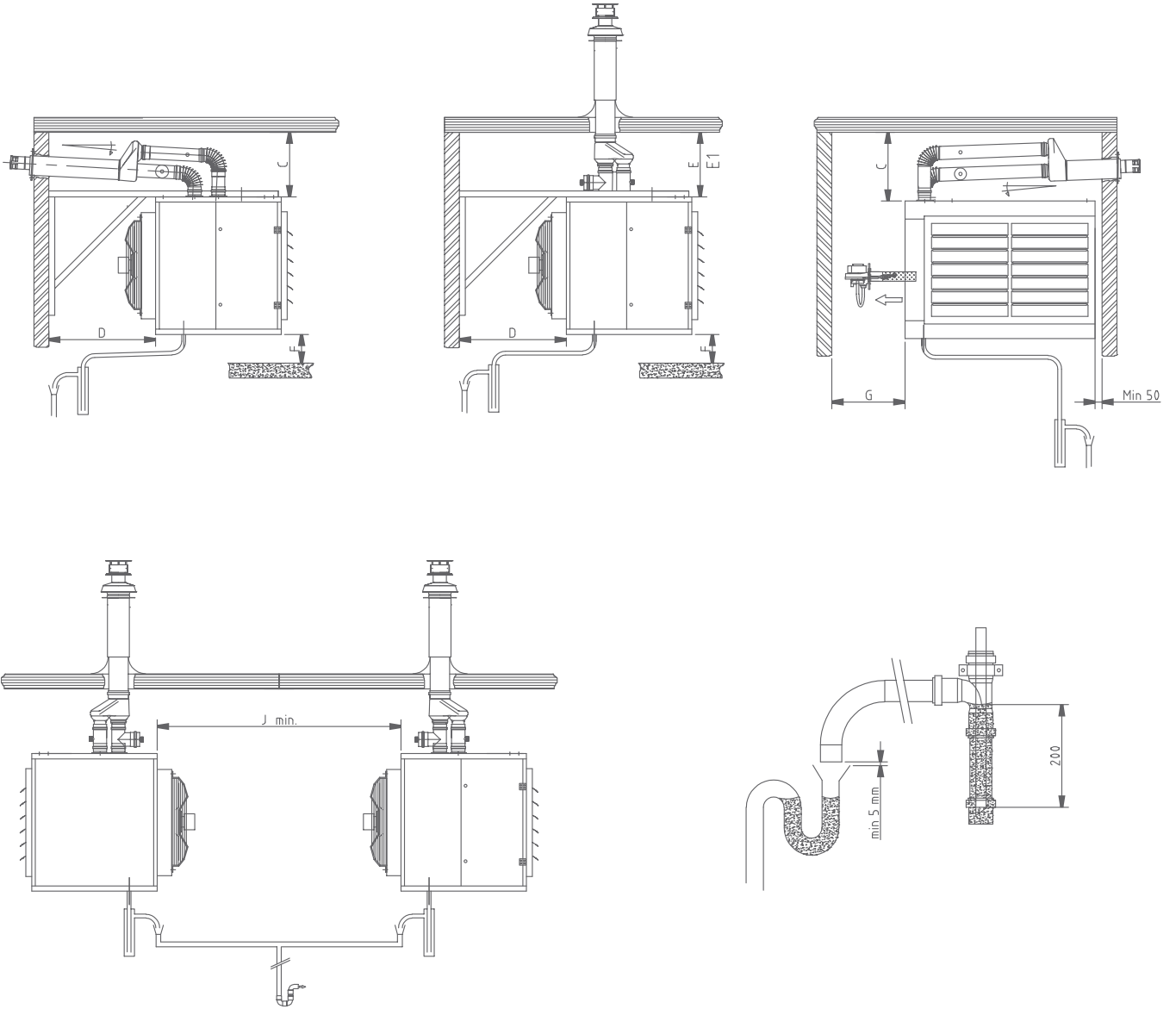


<p>[20] Basic instructions</p> <p>Single-wall steel flue system</p> <p>These basic requirements are only applicable to connecting pipes with the following characteristics:</p> <ul style="list-style-type: none"> • Connection to a heater with built-in ventilator. • Connection in the installation area of the appliance and in sight. • Single-walled, rigid aluminium or stainless steel pipes with CE certification (cf EN 1856-1/2, PI, V). • Maximum flue gas temperature of 160°C. • Diameters from Ø80 to Ø130 mm. <p>Caution! This checklist includes some basic instructions. For further instructions for this unit paragraph 2.2.</p>	<p>Air supply system</p> <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 Ø130 mm. <p>Caution! This checklist includes some basic instructions. For further instructions for this unit paragraph 2.2.</p>
<p><input checked="" type="checkbox"/> Checklist</p>	<p><input checked="" type="checkbox"/> Checklist</p>
<p>General</p> <p>We recommend using the brackets of manufacturer Cox Geelen.</p>	<p>General</p> <p>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"/> When using plastic air supply pipes make sure that the distance to the flue pipe is at least 35mm.</p>
<p><input type="checkbox"/> The minimum insertion length of sleeves and spigot ends is 40mm.</p>	<p><input type="checkbox"/> Mount tension free.</p>
<p><input type="checkbox"/> Mount tension free.</p>	<p><input type="checkbox"/> Place the first bracket on a maximum of 0.5m pipe length from the unit.</p>
<p><input type="checkbox"/> Create a slope 3 degrees (so 50mm per meter) to the unit for a proper drainage of the condensate.</p>	<p><input type="checkbox"/> Horizontal and non-vertical pipes</p> <ul style="list-style-type: none"> - Maximum bracket distance of 1m. - Divide lengths between brackets evenly.
<p>Connecting and bracing</p> <p>Brace every corner to or close to the sleeve. Exception when connecting to the unit:</p>	<p><input type="checkbox"/> Vertical pipes</p> <ul style="list-style-type: none"> - Maximum bracket distance of 2m. - Divide lengths between brackets evenly.
<ul style="list-style-type: none"> - If the connecting pipe is shorter than 0.25m before and after the first bend, the bracket at the first bend can be omitted. - Place the first bracket on a maximum of 0.5m pipe length from the unit. 	<p><input type="checkbox"/> Gaskets and seals</p> <p>Avoid damaging of the sealing rings by cutting of in an angle and deburring.</p>
<p>Horizontal and non-vertical pipes</p> <ul style="list-style-type: none"> - Maximum bracket distance of 1m. - Divide lengths between brackets evenly. 	<p><input type="checkbox"/> Seals of metal air supply pipes may be bolted or parked. This is not allowed for plastic air supply pipes.</p>
<ul style="list-style-type: none"> - Maximum bracket distance of 2m. - Divide lengths between brackets evenly. 	<p><input type="checkbox"/> Guarantee the gas-tightness by using components that are provided with a seal.</p>
<p>Vertical pipes</p> <ul style="list-style-type: none"> - Maximum bracket distance of 2m. - Divide lengths between brackets evenly. 	<p><input type="checkbox"/> If necessary lubricate sealing rings exclusively with max. 1% soap solution or water.</p>
<p>Gaskets and seals</p> <p>Avoid damaging of the sealing rings by cutting of in an angle and deburring.</p> <p>When using tension-proof connections follow the instructions of the manufacturer.</p> <p>Do not screw or park connections.</p>	<p><input type="checkbox"/> Caution! Do not use grease, Vaseline, petroleum jelly or oil.</p>
<ul style="list-style-type: none"> - It is not allowed to seal foam or paste (for example PUR, silicone, etc.). - If necessary lubricate sealing rings exclusively with max. 1% soap solution or water. 	
<p>Caution! Do not use grease, Vaseline, petroleum jelly or oil.</p>	



T	C ≥	D ≥	E ≥	F >	G ≥	J ≥
15	575	350	70	400 - 2500	430	1000
25	575	350	70	400 - 2500	430	1000

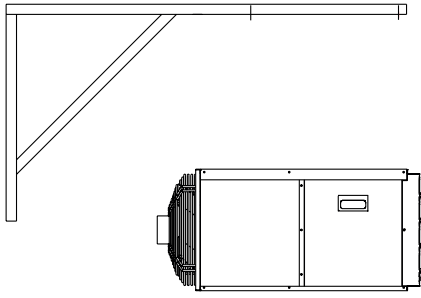




T	C \geq	D \geq	E \geq	E1* \geq	F \geq - \leq	G \geq	J \geq
35	430	780	305	350	400 - 4000	600	1400
40	430	780	305	350	400 - 4000	600	1400
60	450	780	395	450	400 - 4500	600	1600
80	450	780	395	460	400 - 5000	600	1800
100	450	780	395	450	400 - 5000	700	2200
135	600	1100	495	600	400 - 7000	750	2600
150	600	1100	495	600	400 - 7000	750	2600

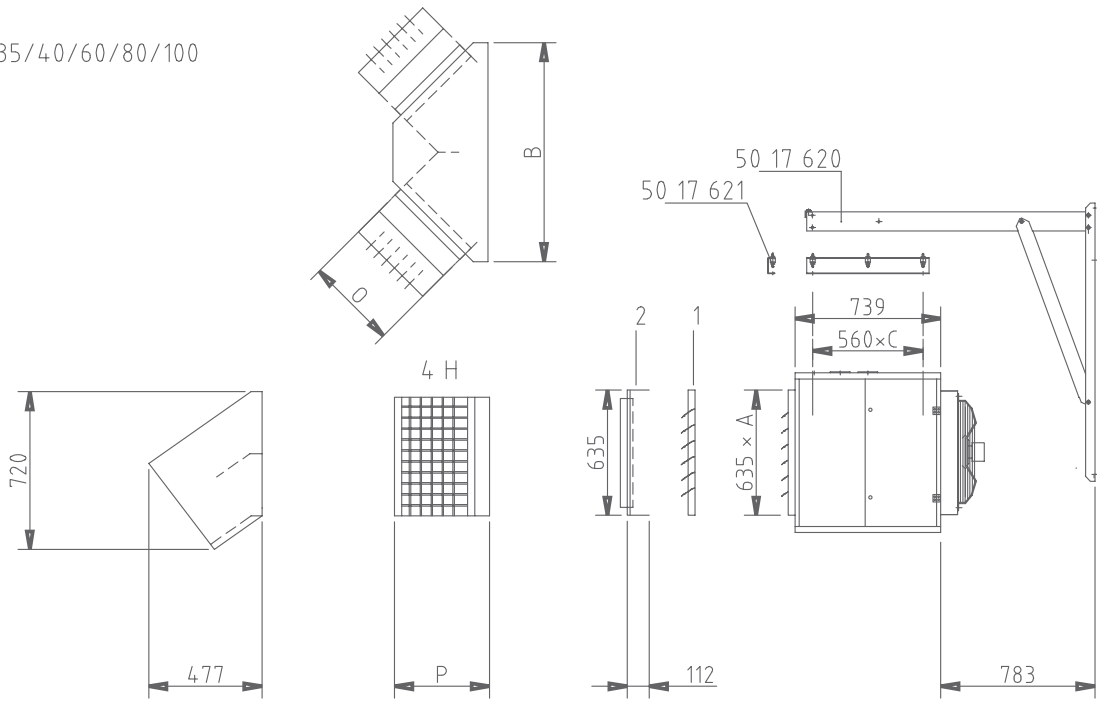
* Germany / Deutschland.

GS+ 15/25

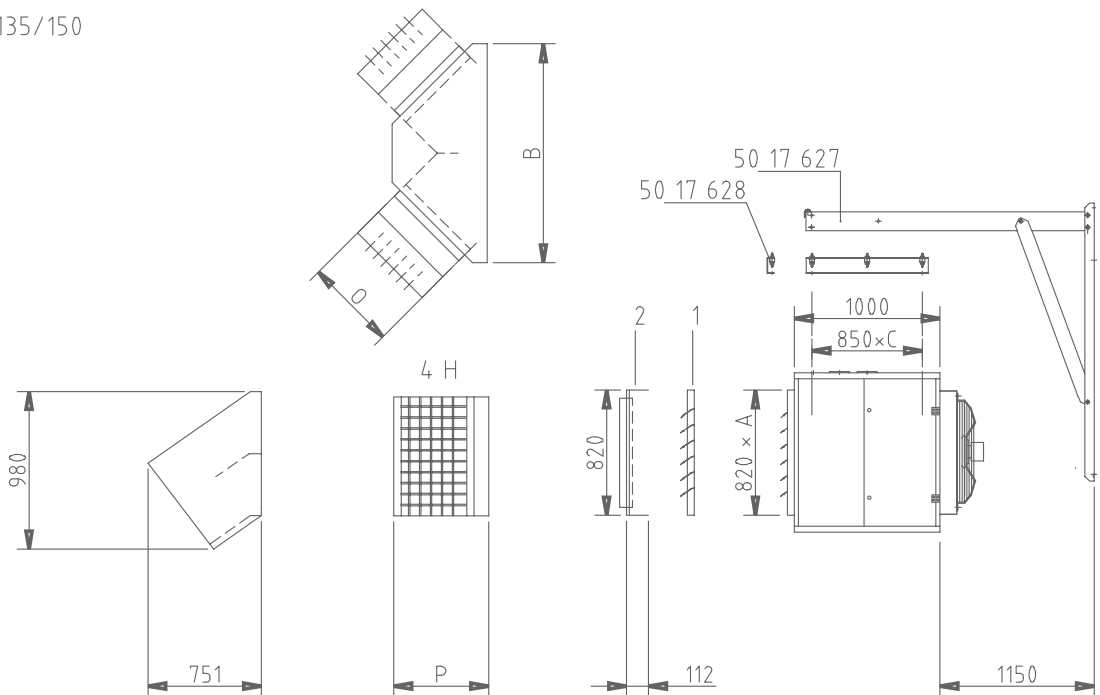


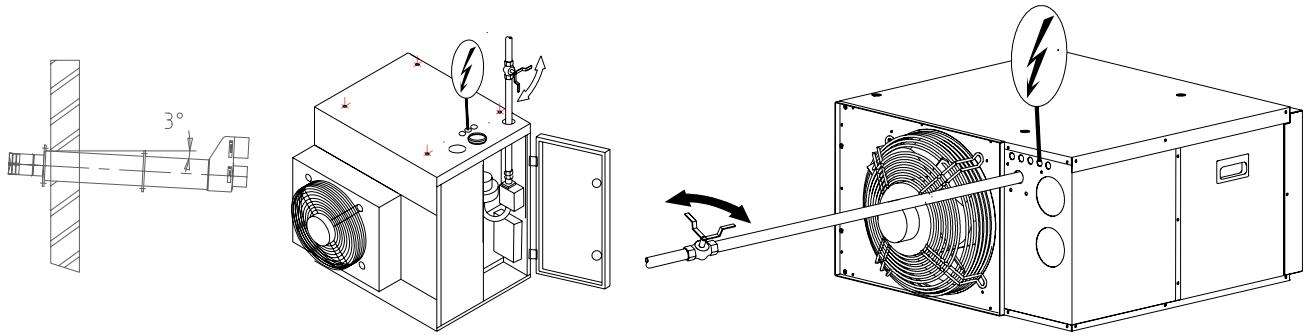
T	mm					kg	
	A	B	C	O	P	2	4H
35	760	760	470	320	314	5	12
40	760	760	470	320	314	5	12
60	1005	1005	715	490	490	7	18.5
80	1190	1190	900	620	620	9	26
100	1480	1480	1190	825	825	11.5	35.5
135	1660	1890	1455	850	850	16.5	46
150	1660	1890	1455	850	850	16.5	46

GS+ 35/40/60/80/100



GS+ 135/150





Type			15	25	35	40	60
A		kW	16,1	27,2	38,8	44,4	66,7
B		kW	14,5	24,5	34,9	40	60
C	100%	%	94,1	93,9	95,7	94,8	94,2
D	30%	%	104,4	105,3	105,7	105,7	105,8
E	G25	m³/h	1,75-0,49	2,95-0,74	4,10-1,02	4,73-1,02	7,03-1,47
E1	CO2	%	8,9	9,0	9	9	9
E2	CO2	%	8,1	8,1	8,4	8,4	8,3
E3		mBar	25	25	25	25	25
E	G25.3	m³/h	1,76-0,53	2,99-0,73	4,10-0,95	4,70-0,95	7,05-1,38
E1	O2	%	5,2	5,0	5,6	5,3	5,0
E2	O2	%	6,4	6,0	6,5	6,7	6,4
E3		mBar	25	25	25	25	25
E	G20	m³/h	1,56-0,45	2,61-0,66	3,65-0,88	4,18-0,88	6,22-1,34
E1	CO2	%	8,9	8,8	8,8	8,8	8,8
E2	CO2	%	7,9	8,0	8,0	8,0	8,2
E3		mBar	20	20	20	20	20
E	G30	kg/h	1,19-0,33	2,02-0,51	2,92-0,72	3,46-0,72	5,05-1,11
E1	CO2	%	10,7	10,7	11,1	11,1	10,8
E2	CO2	%	10,4	10,2	10,6	10,6	10,6
E3		mBar	28-30 / 50*	28-30 / 50*	28-30 / 50*	28-30 / 50*	28-30 / 50*
E	G31	kg/h	1,13-0,32	1,91-0,48	2,68-0,64	3,17-0,64	4,72-1,04
E1	CO2	%	10,2	10,2	10,3	10,3	10,2
E2	CO2	%	9,4	9,3	9,2	9,2	9,0
E3		mBar	37 / 50*	37 / 50*	37 / 50*	37 / 50*	37 / 50*
E	G27	m³/h	1,85 - 0,52	3,12 - 0,78	4,45-1,14	5,10-1,14	7,65-1,60
E1	CO2	%	9,0	9,0	9	9	9
E2	CO2	%	8,5	8,5	8,5	8,5	8,6
E3		mBar	20	20	20	20	20
E	G350	m³/h	2,13 - 0,59	3,60 - 0,90	5,13-1,28	5,88-1,28	8,82-1,84
E1	CO2	%	8,7	8,7	8,7	8,7	8,7
E2	CO2	%	8,3	8,3	8,3	8,3	8,3
E3		mBar	13	13	13	13	13
F		∴	3:1	4:1	4:1	5:1	5:1
G		°C	40-135	33-140	38-105	38-124	33-134
J		Pa	70,0	90,0	110	130	130
K		Ø-Ø	80-80	80-80	80-80	80-80	100-100
L		V/Hz	230/50	230/50	230/50	230/50	230/50
M GS+		kW	0,16	0,18	0,32	0,32	0,4
M G+		W	30	40	40	55	90
N		A	6,3	6,3	6,3	6,3	6,3
O		IP	00B	00B	00B	00B	00B
Q GS+	AC	m³/h	1410	2190	5000	5000	5300
Q GS+	EC	m³/h	850-1730	1090-2470	1350-3900	1350-3900	2700-5500
Q G+		m³/h	1250-4100	2000-4100	3760-7200	3760-7200	5640-8640
R GS+	AC	ΔT	29,0 - 9,2	31,5 - 9,0	20,0 - 5,5	23,1 - 5,5	31,8 - 7,7
R GS+	EC	ΔT	23,4 - 14,8	28,0 - 17,8	25,7 - 20,4	29,3 - 19,9	30,8 - 14,5
S		M	10-16	14-20	28-36	26-36	26-36
U		°C	-15/+40	-15/+40	-15/+40	-15/+40	-15/+40
V		ø	350	350	500	500	560
W		min-l	900	1290	925	925	815
X		dB(A)	44	48	48	48	51
Y GS+		kg	50	56	95	95	111
Y G+		kg	46	52	75	75	86
Z		Ph	3,4	3,4	3,4	3,4	3,4
ZI		kg/h	27-8	45-12	62-16	72-16	107-24
AB		ltr/h	0,37	0,73	1,23	1,23	1,9
AC			1/2" (M)	1/2" (M)	3/4" (M)	3/4" (M)	3/4" (M)

* NL BE DE AT 50 mBar

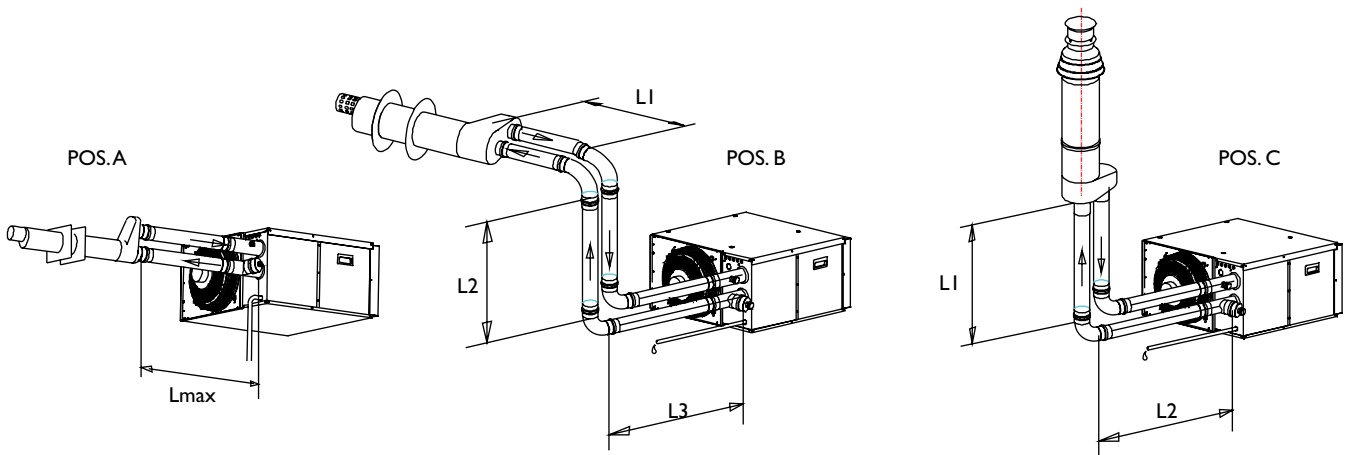
BE							
A		kW	14,5 / 12,2	24,5 / 20,7	34,9 / 28,9	40 / 33,3	60 / 48,4
B		kW	13,6 / 11,5	23,0 / 22,0	33,4 / 27,6	37,9 / 31,4	56,6 / 45,7

Type			80	100	135	150	200
A		kW	88,8	110,6	149,8	166,7	216,7
B		kW	80	99,5	134,9	150	195
C	100%	%	94,3	94,2	95,1	94,8	93,6
D	30%	%	105,8	105,6	106,8	104,9	105,7
E	G25	m³/h	9,30-1,40	11,57-1,85	15,98-2,25	17,05-3,75	23,10-4,43
E1	CO2	%	9	9	9	8,9	9
E2	CO2	%	8,3	8,0	8,1	8,3	7,9
E3		mBar	25	25	25	25	25
E	G25.3	m³/h	9,37-1,41	11,69-1,85	15,84-2,28	17,61-3,72	22,90-4,43
E1	O2	%	5,0	5,0	5,0	5,0	5,0
E2	O2	%	6,9	6,4	6,4	6,4	6,4
E3		mBar	25	25	25	25	25
E	G20	m³/h	8,16-1,25	10,30-1,78	14,05-1,98	15,3-3,37	20,31-4,05
E1	CO2	%	8,8	8,8	8,8	8,5	8,8
E2	CO2	%	8,1	8,3	8,6	8,0	8,1
E3		mBar	20	20	20	20	20
E	G30	kg/h	6,70-0,96	8,19-1,48	11,1-1,85	12,35-2,72	16,06-3,89
E1	CO2	%	10,8	10,7	11,5	10,7	10,8
E2	CO2	%	10,5	10,3	11,3	9,3	10,6
E3		mBar	28-30 / 50 *	28-30 / 50 *	28-30 / 50 *	28-30 / 50 *	28-30 / 50 *
E	G31	kg/h	6,22-0,89	7,76-1,34	10,51-2,23	11,69-2,57	15,20-3,25
E1	CO2	%	10,1	10,2	10,5	10,3	10,0
E2	CO2	%	9,6	9,0	10,2	9,2	9,3
E3		mBar	37 / 50*	37 / 50*	37 / 50*	37 / 50*	37 / 50*
E	G27	m³/h	10,2-2,82	12,69-3,54	17,21-2,42	19,14-4,45	24,88-4,85
E1	CO2	%	9	9	9	8,9	9
E2	CO2	%	8,5	8,5	8,5	8,5	8,5
E3		mBar	20	20	20	20	20
E	G350	m³/h	11,75-3,25	-	-	-	-
E1	CO2	%	8,7	-	-	-	-
E2	CO2	%	8,3	-	-	-	-
E3		mBar	13	-	-	-	-
F		:-	7:1	6:1	7:1	4:1	5:1
G		°C	37-131	35-133	24-113	30-121	28-147
J		Pa	225	213	250	200	200
K		Ø-Ø	100-100	100-100	130-130	130-130	130-130
L		V/Hz	230/50	230/50	230/50	230/50	230/50
M GS+		kW	0,72	0,7	1,3	1,4	1,45
M G+		W	160	160	250	250	300
N		A	6,3	6,3	6,3 (10A)**	6,3 (10A)**	6,3 (10A)**
O		IP	00B	00B	00B	00B	00B
Q GS+	AC	m³/h	9000	9800	16300	16300	18500
Q GS+	EC	m³/h	4500-8800	5400-9400	7350-14500	7350-16300	-
Q G+		m³/h	7520-13680	9400-16200	13500-20880	14200-20880	17500-24500
R GS+	AC	ΔT	25,2 - 7,9	29,6 - 9,2	23,7 - 3,8	25,9 - 6,5	30,1 - 6,6
R GS+	EC	ΔT	25,9 - 15,6	30,9 - 16,5	26,7 - 8,3	26,2 - 14,2	-
S		M	32-46	36-50	48-68	48-68	-
U		°C	-15/+40	-15/+40	-15/+40	-15/+40	-15/+40
V		ø	(2x) 500	(2x) 560	(2x) 650	(2x) 650	(2x) 650
W		min-l	925	815	925	925	925
X		dB(A)	52	52	58	58	58
Y GS+		kg	136	155	228	230	246
Y G+		kg	103	114	200	202	218
Z		Ph	3,4	3,4	3,4	3,4	3,4
ZI		kg/h	141-23	182-32	243-38	262-62	352-77
AB		ltr/h	2,5	3,2	4,9	4,7	6,5
AC			1" (M)	1" (M)	1" (F)	1" (F)	1" (F)

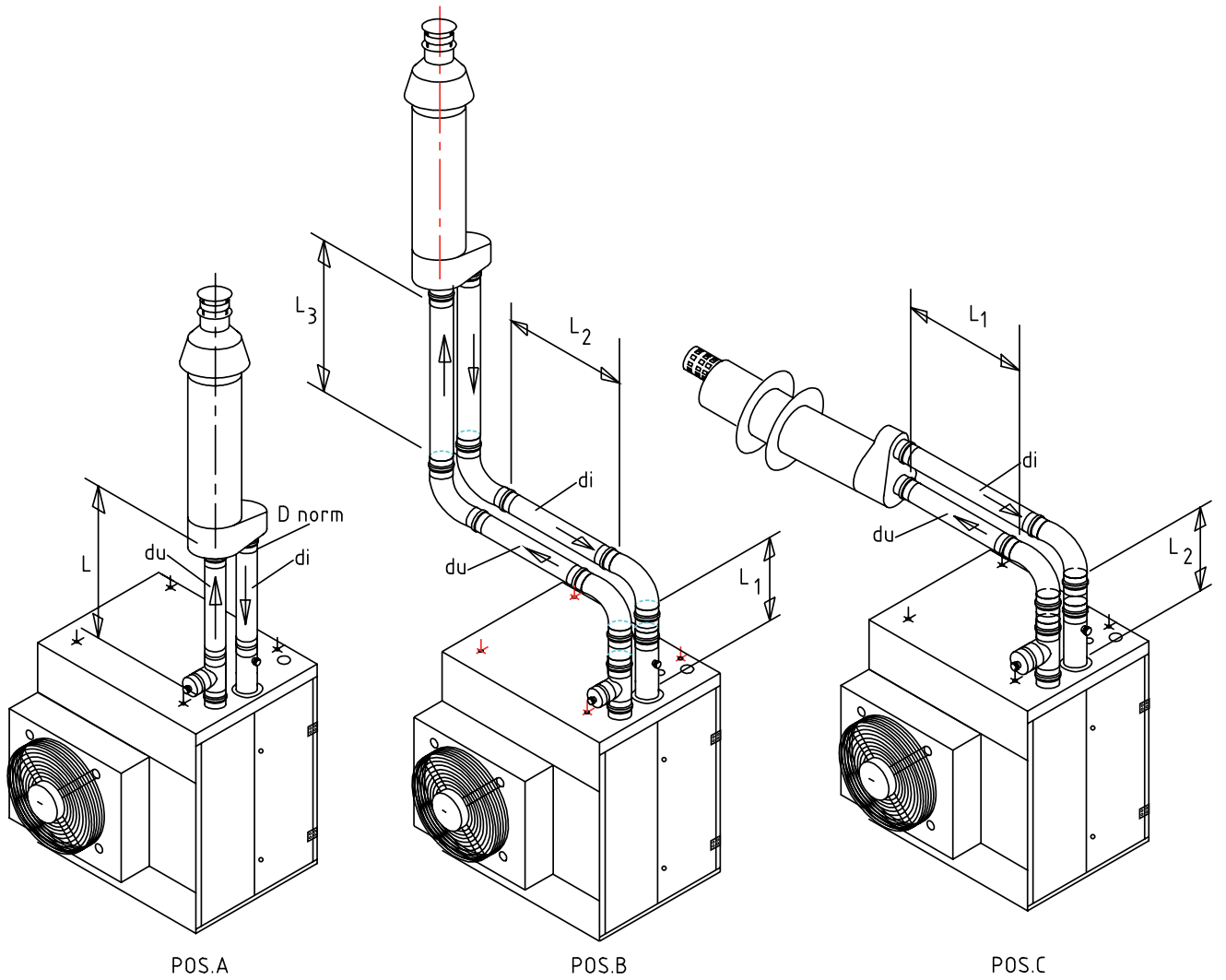
* NL BE DE AT 50 mBar

** GS version

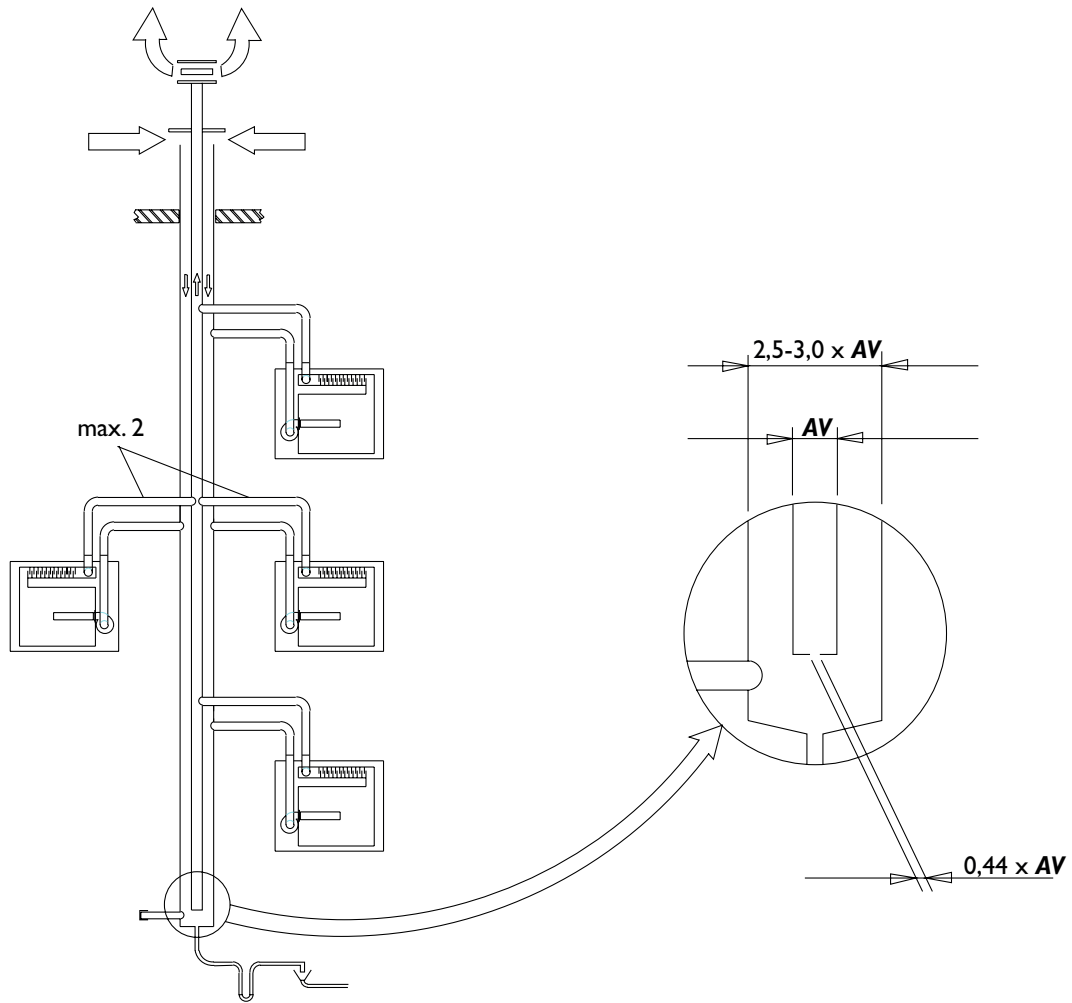
BE							
A		kW	80 / 66,7	99,5 / 85,1	134,9 / 109,7	150 / 127,7	195 / 159
B		kW	75,8 / 63,1	93,8 / 80,2	128,3 / 103,7	141,8 / 121,3	182,5 / 148



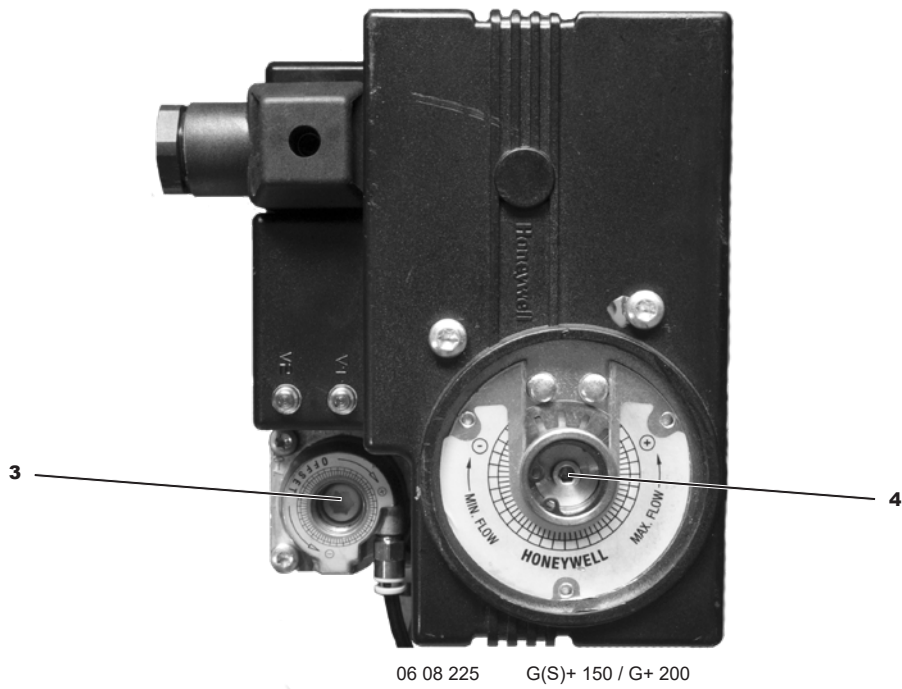
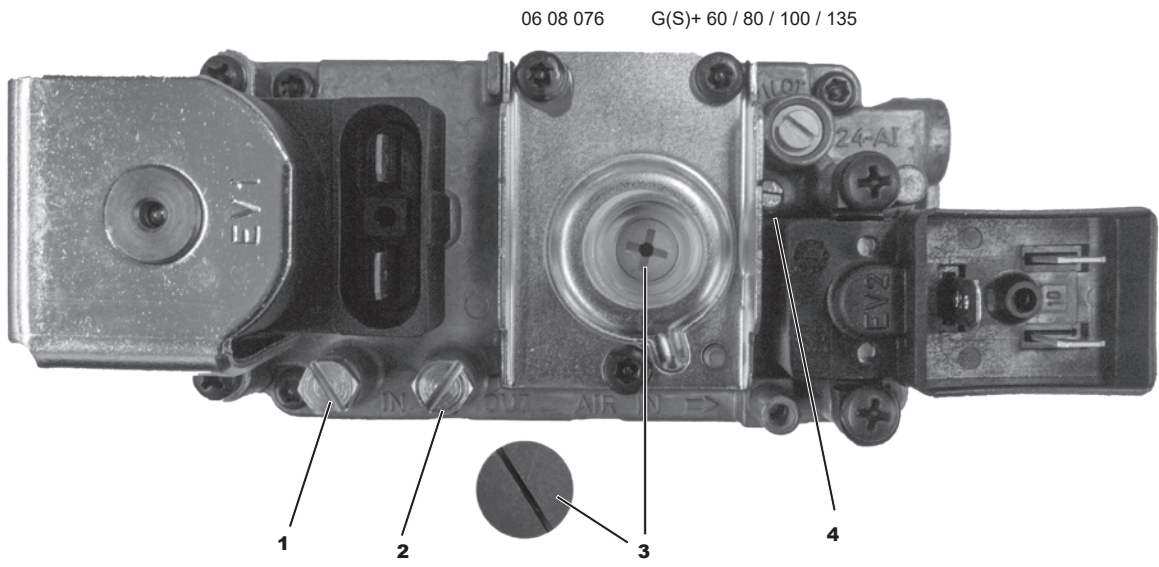
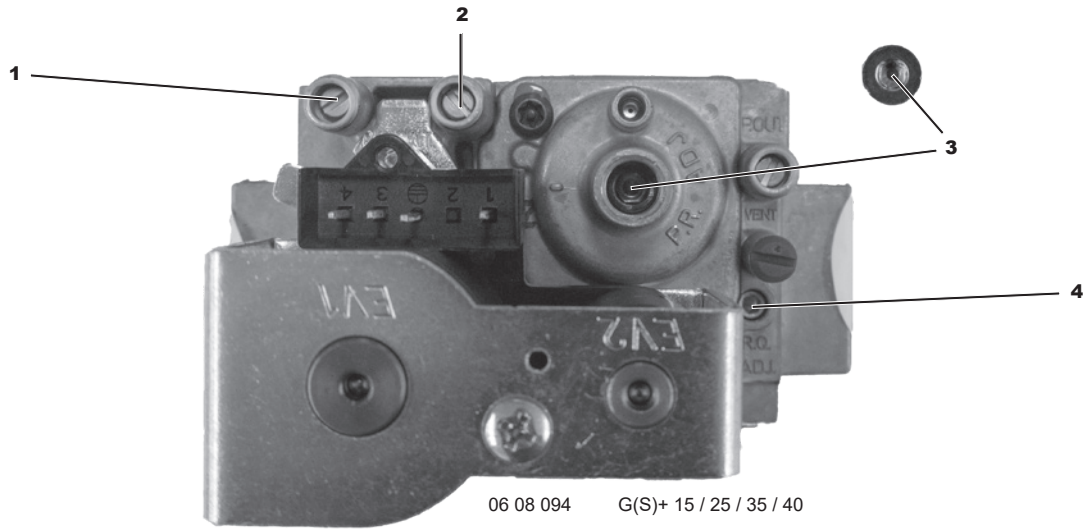
			Pos. A	Pos. B	Pos. C
T	D norm *	du/di	L max	L1+L2+L3	L1+L2
	ø mm	ø mm	m	m	m
15	80	80/80	2x77	2x73,6	2x75,3
25	80	80/80	2x31	2x27,6	2x29,3



T	D norm *	du/di	Pos. A	Pos. B	Pos. C
	ø mm	ø mm	L max m	L1+L2+L3 m	L1+L2 m
35	80	80/80	2x20	2x16,6	2x18,3
	100	100/100	2x75	2x71,2	2x73,1
40	80	80/80	2x14	2x10,6	2x12,3
	100	100/100	2x60	2x56,2	2x58,1
60	100	100/100	2x28	2x24,2	2x26,1
	130	130/130	2x125	2x121	2x123
80	100	100/100	2x27	2x23,2	2x25,1
	130	130/130	2x125	2x121	2x123
100	100	100/100	2x11	2x7,2	2x9,1
	130	130/130	2x74	2x70	2x72
135	130	130/130	2x48	2x44	2x46
150	130	130/130	2x26	2x22	2x24
200	130	130/130	2x4		2x2

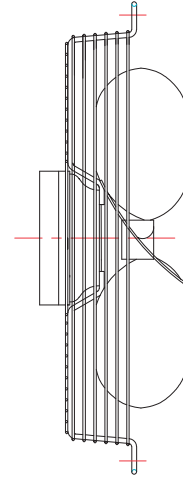


Počet jednotiek	T	15	25	35	40	60	80	100	135	150	200
		AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]	AV [cm ²]
0											
1											
2		99	167	238	273	410	546	703	920	1024	1331
3		117	198	283	324	486	648	834	1092	1216	1580
4		132	223	318	364	546	727	937	1226	1365	1774
5		148	250	356	408	612	815	1050	1375	1530	1989
6		164	277	395	452	679	903	1164	1524	1696	2204
7		181	305	436	499	749	997	1285	1682	1872	2433
8		198	335	478	547	822	1095	1410	1846	2055	2671
9		217	367	524	599	900	1198	1544	2021	2249	2924
10		237	400	571	653	981	1306	1683	2204	2452	3188
11		258	436	622	712	1069	1424	1834	2401	2672	3474
12		279	471	672	769	1155	1538	1981	2594	2887	3753
13		301	509	726	831	1248	1662	2141	2803	3119	4055
14		324	548	782	894	1344	1789	2305	3018	3358	4365
15		348	588	838	959	1441	1919	2472	3237	3602	4682
16		372	629	897	1027	1543	2054	2646	3464	3855	5012
17		398	672	958	1097	1647	2193	2825	3700	4117	5352
18		424	716	1022	1169	1757	2339	3013	3945	4390	5707
19		452	764	1090	1247	1874	2494	3214	4208	4683	6087
20		480	811	1157	1324	1989	2648	3412	4467	4971	6462



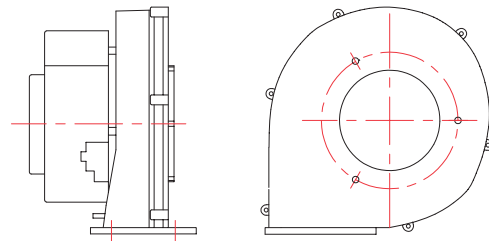
[7]

T	Code number AC	Code number EC
15	06 21 561	06 21 528
25	06 21 551	06 21 528
35/40	06 21 565	06 21 530
60	06 21 563	06 21 531
80	(2x) 06 21 565	(2x) 06 21 530
100	(2x) 06 21 563	(2x) 06 21 531
135	(2x) 06 21 564	(2x) 06 21 532
150	(2x) 06 21 564	(2x) 06 21 532



[8]

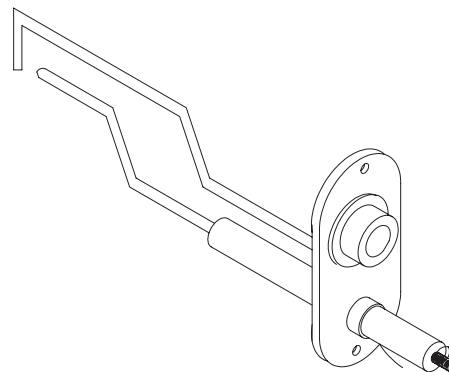
T	Code number
15/25/35/40	06 00 830
60/80/100/135	06 00 831
150	06 00 844
200	06 00 832



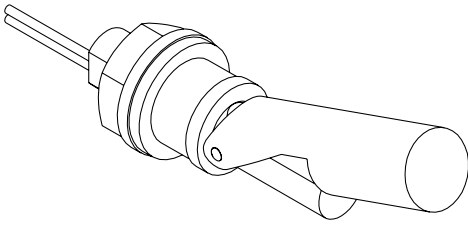
03-1403

[9]

T	Code number
15/25/35/40/60/80/100	06 25 360
150/200	12 90 847
135	12 90 848



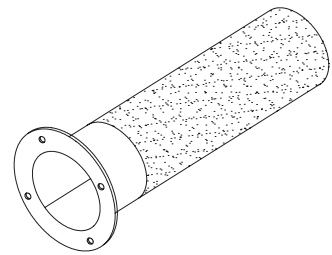
[10]



T	code
GS+ 135/150	06 29 059

[11]

T	Code number
15/25/35/40	06 03 405
60/80	06 03 410
100	06 03 415
135/150/200	06 03 420

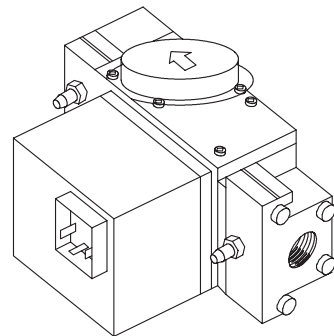
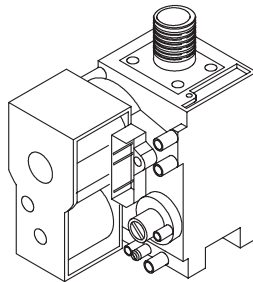
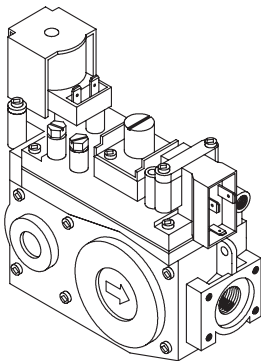


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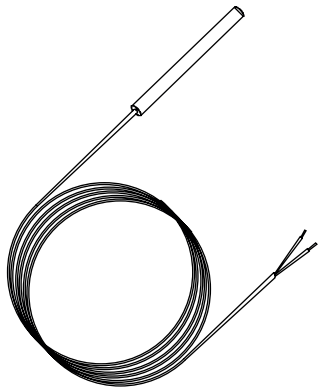
T	Code number
60/80/ 100/135	06 08 076
100	06 08 050 (bypass)

T	Code number
15/25/35/40	06 08 094

T	Code number
150/200	06 08 225

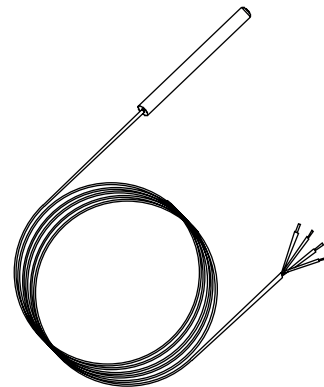


[13]



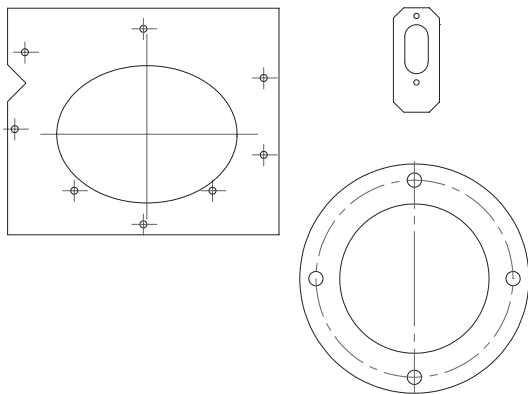
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135/150/200	06 29 058

[14]



T	Code number
15 - 200	06 29 053

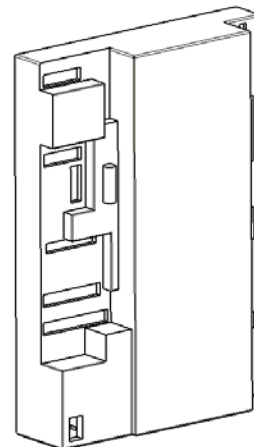
[15]



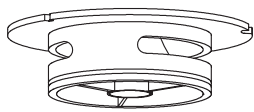
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35 - 100	19 99 075
135/150/200	19 99 076

[16]

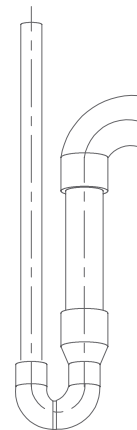
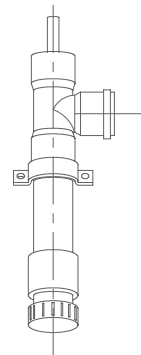
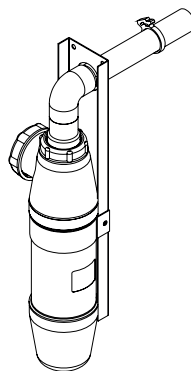
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15	30 05 600	30 05 610
25	30 05 601	30 05 611
35	30 05 602	30 05 612
40	30 05 603	30 05 613
60	30 05 604	30 05 614
80	30 05 605	30 05 615
100	30 05 606	30 05 616
135	30 05 607	30 05 617
150	30 05 608	30 05 618
200	30 05 609	30 05 619



[17]



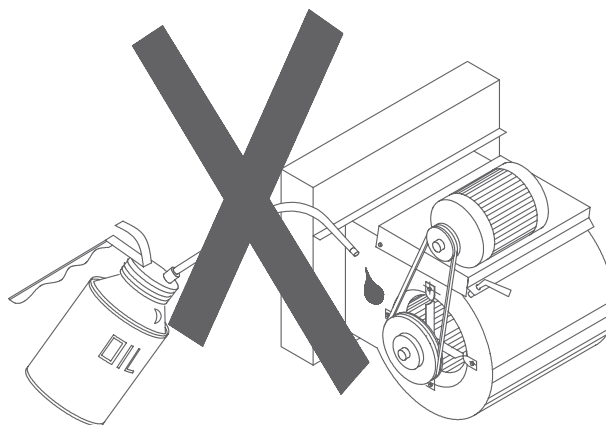
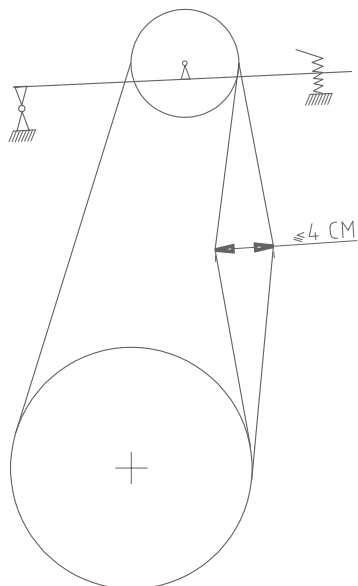
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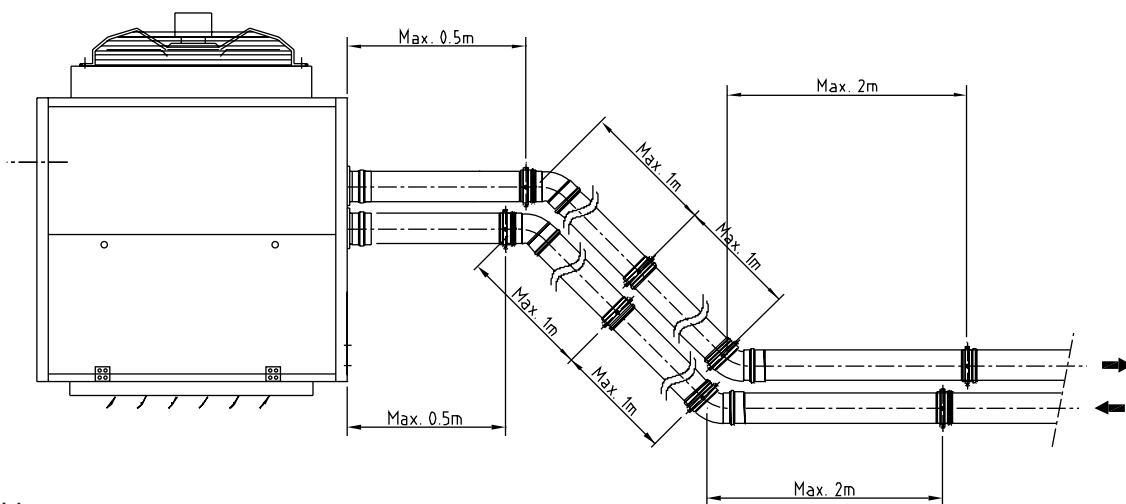
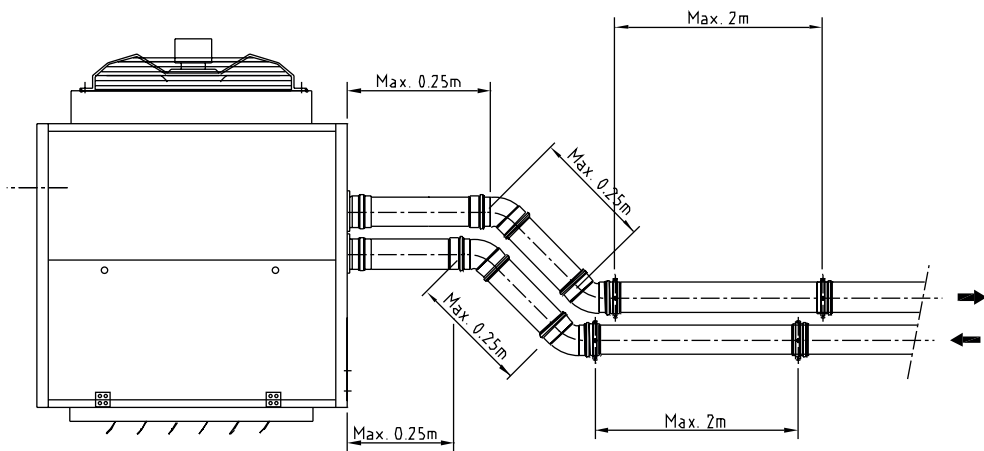
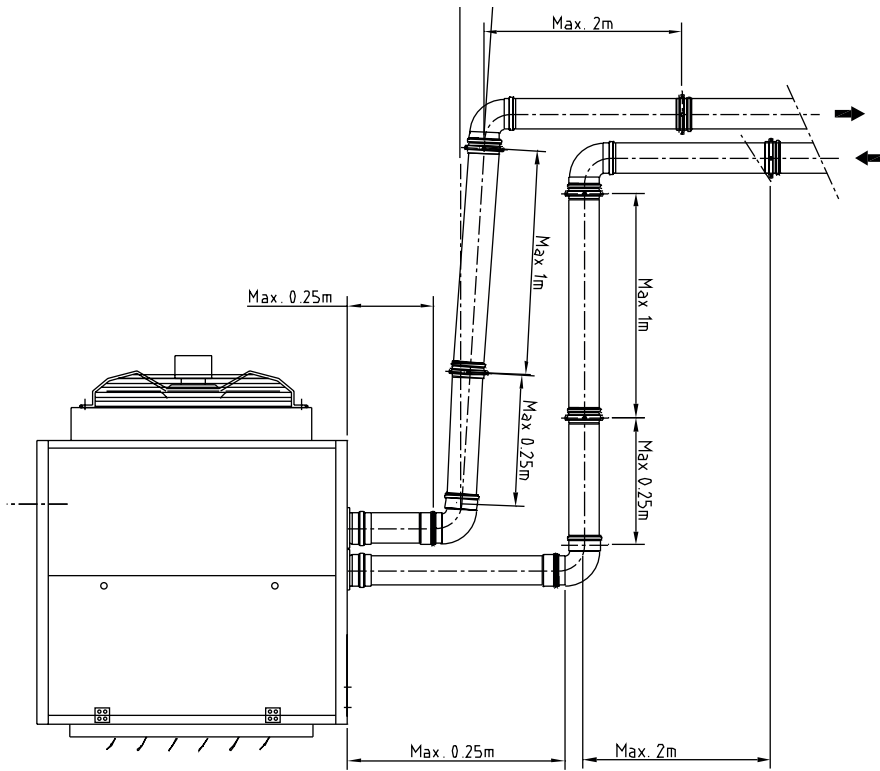


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100/135	04 01 615
150	04 01 620
200	04 01 625

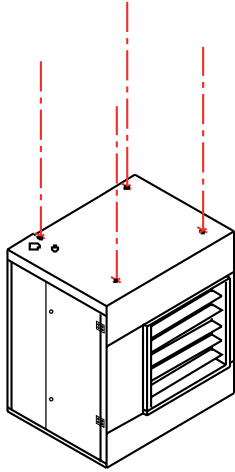
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15 - 25	31 00 575
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135 - 200	31 00 595

[19]

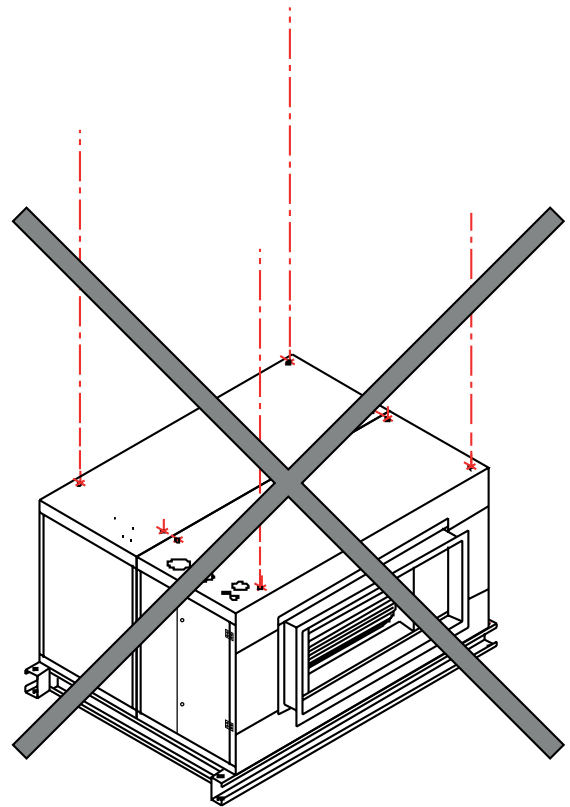
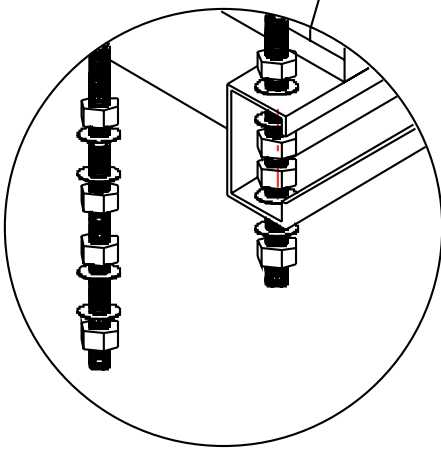
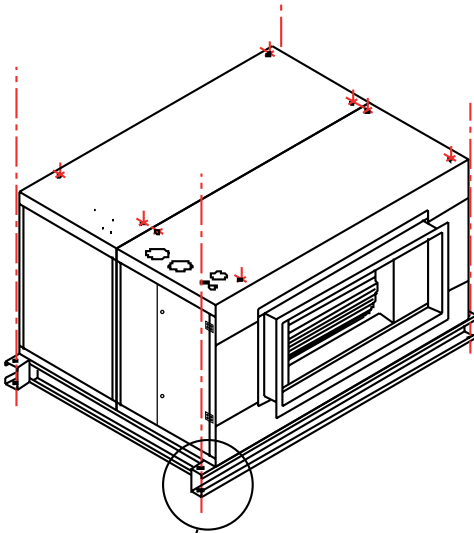


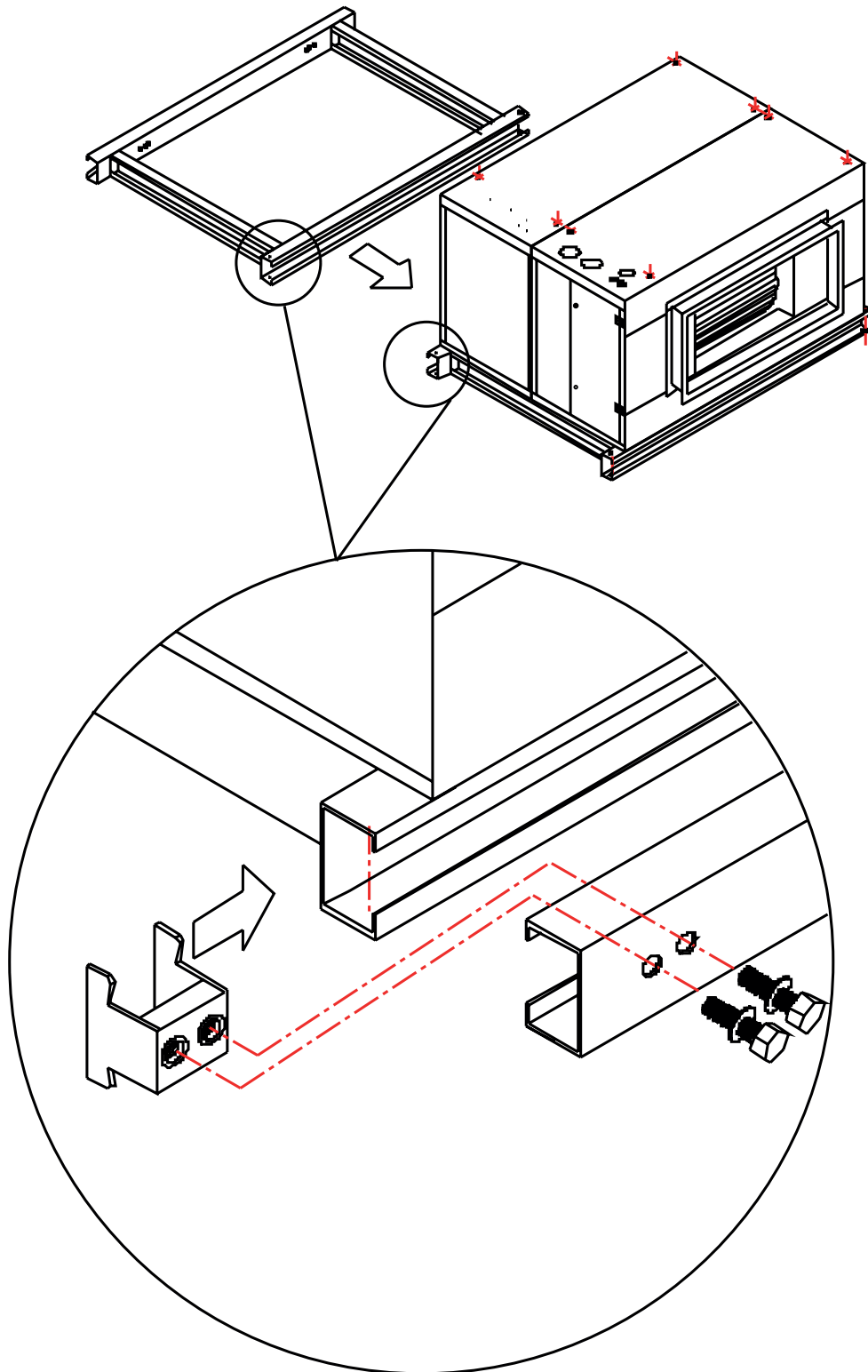


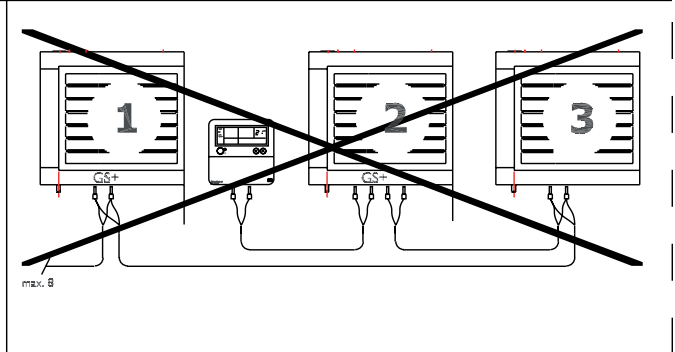
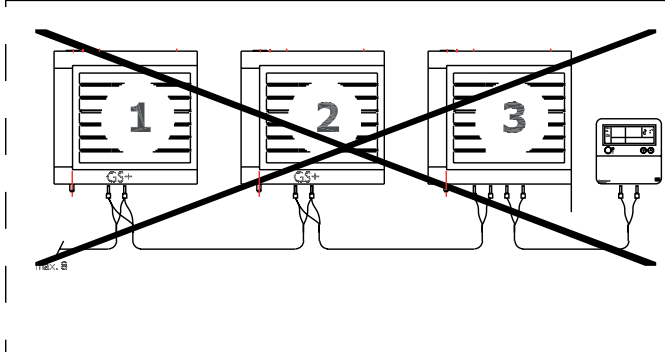
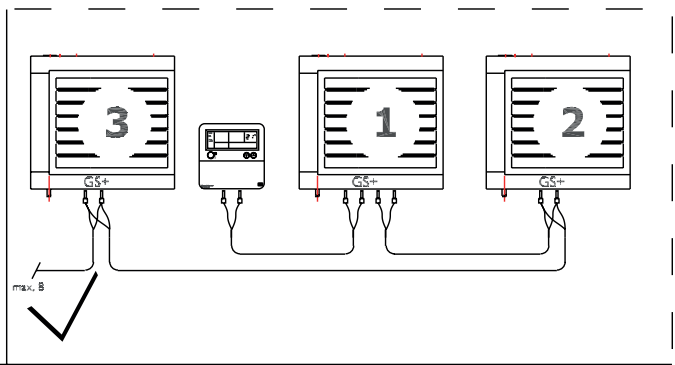
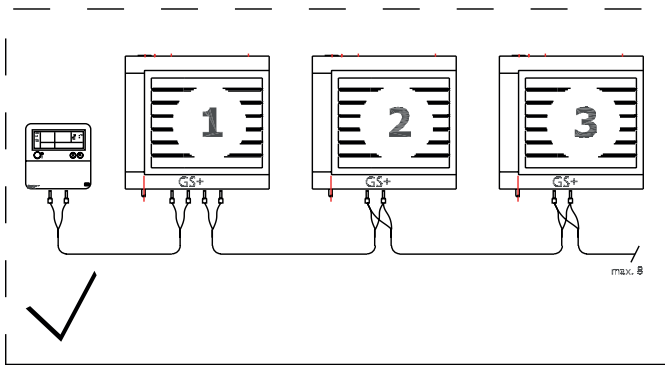
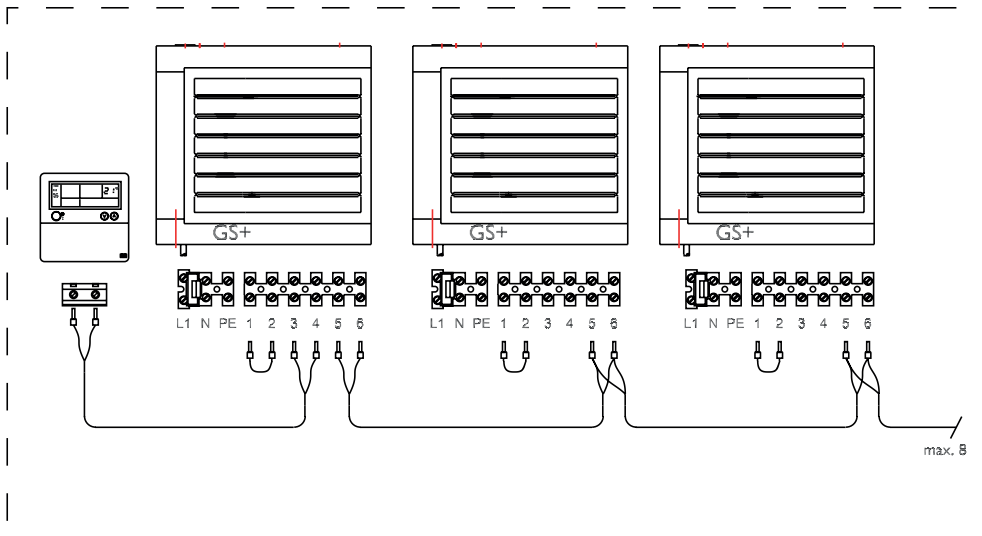
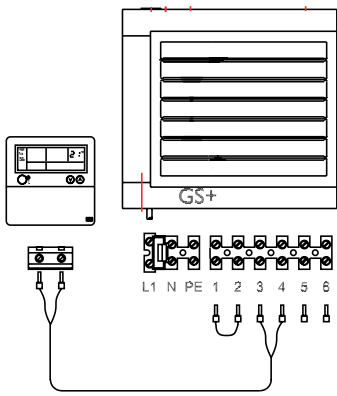
[21] GS+



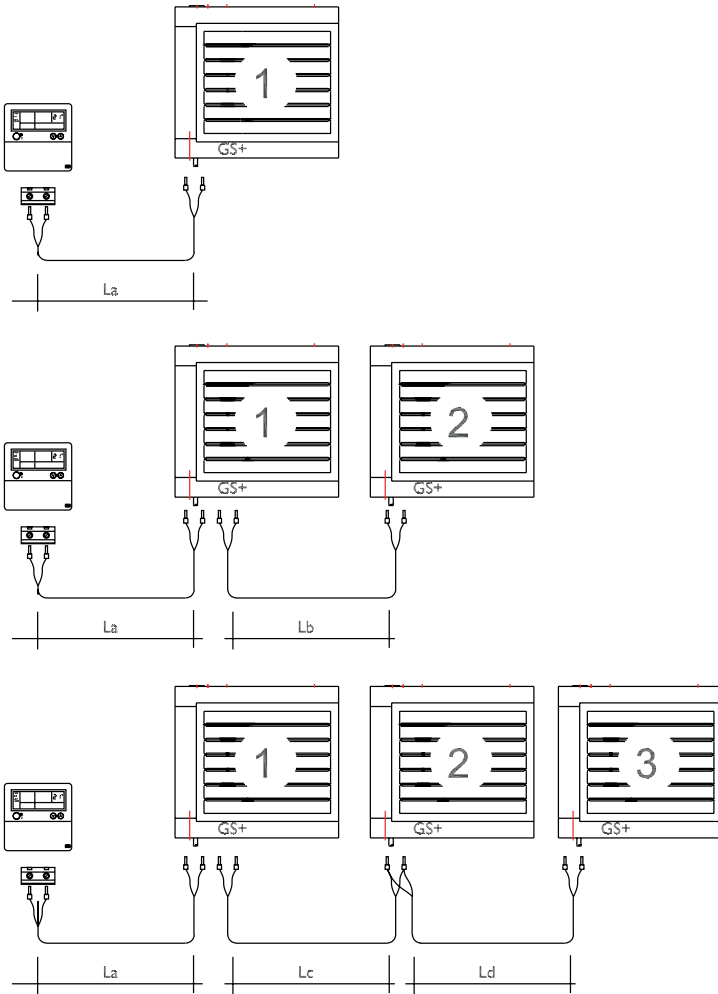
[22] G(C)+



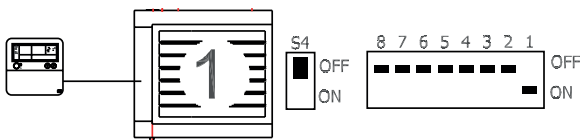




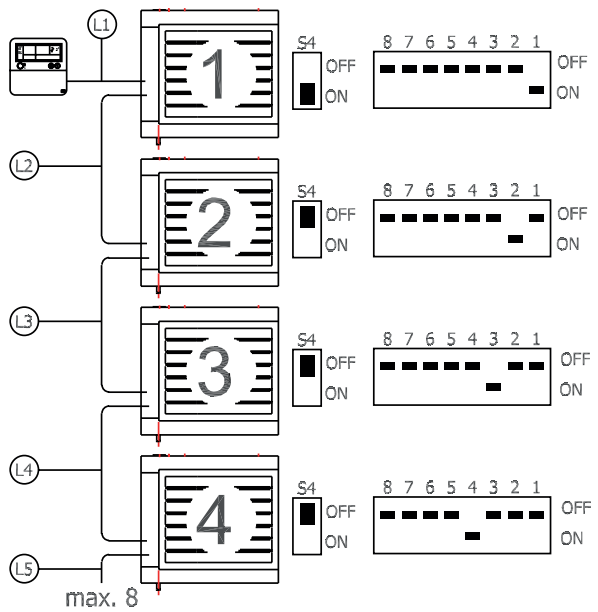
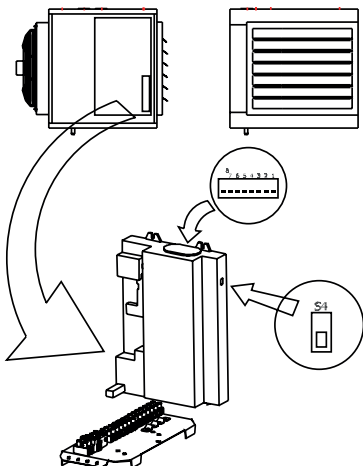
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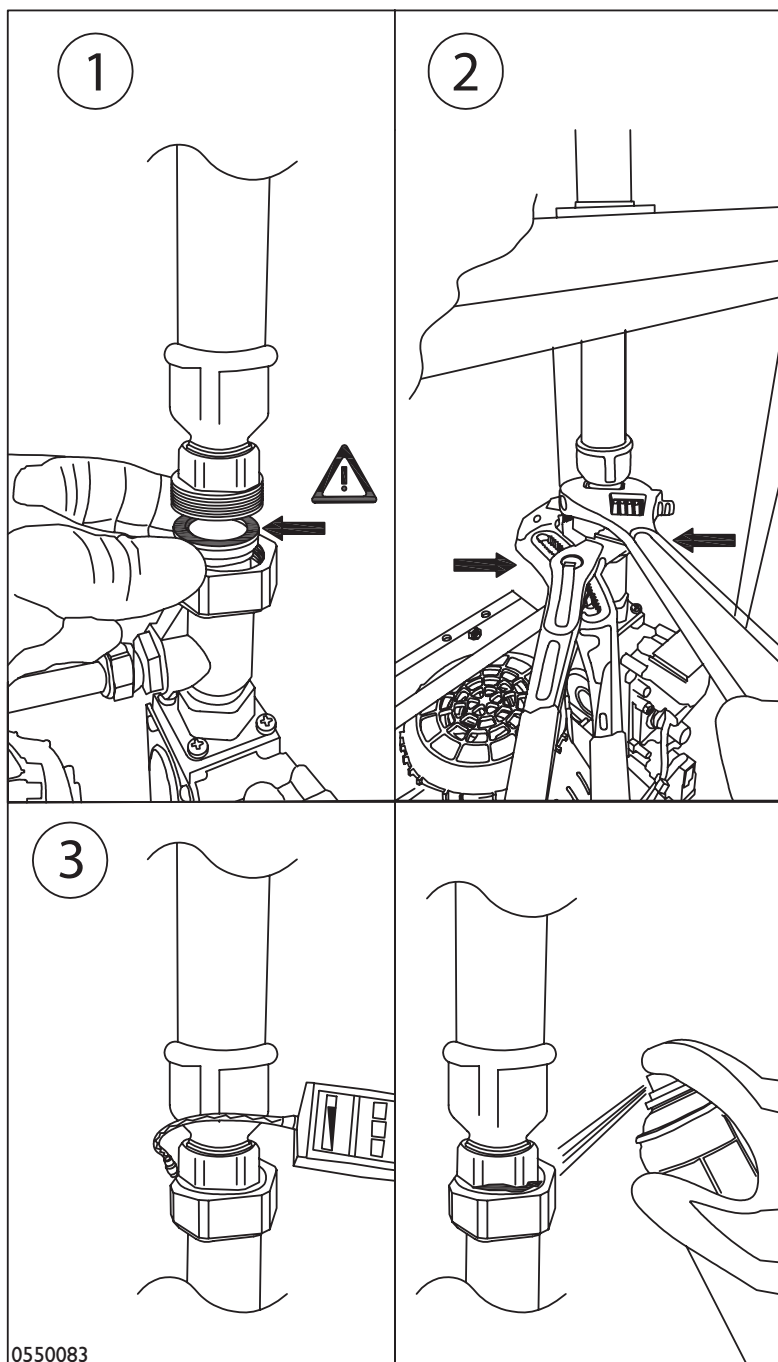


[26]



∅	L1	L2+L3+L4+...L8
0.8mm ²	160m	800m
1.0mm ²	200m	1000m
1.5mm ²	300m	1500m





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①

- EN** Caution! Check position of the gasket.
- DE** Vorsicht! Position der Dichtung prüfen.
- FR** Attention! Vérifier la position du joint.
- NL** Let op! Controleer de positie van de pakking.
- PL** Uwaga! Sprawdź pozycję uszczelki.
- RO** Atentie! Verificatiie pozitia garniturii.
- SK** Pozor! Skontrolujte polohu tesnenia.

②

- EN** Always tighten the connection with 2 spanners.
- DE** Ziehen Sie die Verbindung immer mit 2 Schraubenschlüsseln an.
- FR** Toujours serrer la connexion avec clés.
- NL** Draai de koppeling altijd aan met 2 tangen.
- PL** Zawsze używaj 2 kluczy nastawnych do zaciśnięcia połączenia.
- RO** Strangeti intotdeauna conexiunea cu 2 chei.
- SK** Spojenie vždy dotiahnite 2 kľúčmi.

③

- EN** Before starting up the unit: check for leakage of gas by means of a gas detection device or leakspray!
- DE** Vor der Inbetriebnahme des Gerätes: Kontrolle auf Gasaustritt durch Gaswarngerät oder Lecksuchspray.
- FR** Avant le démarrage de l'unité: vérifier les fuites de gaz au moyen de dispositif de détection de gaz ou pulvérisation d'étanchéité.
- NL** Voordat u het toestel gaat ontsteken: controleer voor gaslekkage door middel van een gaslek tester of lekspray!
- PL** Zanim uruchomisz urządzenie: upewnij się, że nie ma wycieku gazu, używając w tym celu detektora gazu lub wykrywacza w aerozolu.
- RO** Inainte de a porni unitatea: verificati daca exista scurgeri de gaz cu ajutorul dispozitivului de detectare a gazului sau prin pulverizare.
- SK** Pred spustením jednotky: skontrolujte únik plynu pomocou zariadenia na detekciu úniku plynu alebo spreja!

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