

**INSTALLATION, OPERATION AND
MAINTENANCE**



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Receiving the goods

The boiler is delivered in a wooden frame. On the bottom is a pallet, which can be used to lift the boiler safely. It is advisable to open the package as close as possible to the installation location. The factory insures the boiler against transport damage, which includes transport from the factory to the first intermediate storage point. It is important that whoever receives the boiler should check its condition before accepting it. In cases of damage, the seller must be contacted immediately.

Storage

The boiler can be stored in the open air if protected from rain, but storage indoors is recommended.

Opening the package

After opening the package, open up all the hatches and check the final inspection report to see that all loose equipment has been supplied. Disposal of packaging: plastic cover to the refuse tip, wooden planks can be burned. Care must be taken with the insulation plates during transportation.

Installation of the boiler can only be done by a business with the necessary professional accreditations. Installation should be performed in compliance with the relevant standards in force.

The base of the boiler must be even and horizontal, and must be able to withstand the weight of the boiler without distortion.

Because the boiler is delivered without accessories such as safety vents, etc, the company in charge of installation must request an inspection of the equipment from a competent authority (e.g. Inspecta Oy) prior to introduction into use.

The boiler room must have a fresh air vent large enough to ensure air speed in the room of at least 1.5 m/s.

The corner piece of the chimney must be designed so that any water condensing inside it cannot run down into the boiler's ash box. The chimney coupling is sealed to a metal flue by welding and to a brick flue using fiberglass yarn and filling agent.

The height of the flue has no relevance for the boiler.

If the boiler is to be used with a brick flue without an acid-resistant inner pipe, the temperature of the flue gases must be increased to about 160 C by removing the lower flue gas control plates from the boiler coupling.

The free area of the combustion air opening must be 1.5 times the size of the flue. This opening must not be covered.

■ Pipe installations

Connecting the boiler to the pipe network must be planned and performed professionally in compliance with the relevant regulations in force. Components used must be selected bearing in mind the maximum pressure and operating temperature of the unit. Only CE-accredited components meeting the essential safety requirements of the EU Pressure Equipment Directive may be used as pressure-bearing components.

As far as installation and safe operation are concerned, the essential values are printed on the boiler specifications plate.

The boiler must be equipped with at least the following accessories:

- Thermometer for measuring the temperature in the boiler output pipe
- Pressure gauge for measuring the boiler pressure
- Boiler thermostat to control the burner
- Overheat protection to stop the burner from overheating
- Safety equipment (safety vents), which operate when the maximum permitted pressure is exceeded, and whose opening pressure is no greater than the boiler operating pressure and whose blow-out efficiency is sufficient to prevent a rise in boiler pressure exceeding the operating pressure by more than 10% in case of boiling. No equipment the connection of which can be closed must be installed between the boiler and the safety vent.
- Safety equipment connected to the boiler must be Class IV pressure equipment
- Boil-dry protector in boilers of more than 120 kW, which stops the burner if the level of water drops.
- Expansion tank for changes in liquid volume
- Discharge valve in the lower part of the boiler
- Filling equipment for replenishing boiler water

Blow-off power levels required for the safety vents

Operating pressure 4 bar

Two safety vents must be fitted, both with a blow-off power at least in accordance with the adjacent table.

The choice of safety vents must be made in accordance with the HEPAC plan for the unit in question.

The blow-off pipe of the safety vent must be dimensioned and fitted so that it neither restricts the blow-off efficiency of the valve nor causes a hazard in the operation of the valve.

With basic models, we recommend the use of a boiler water mixing pump, which evens out temperature differences in the boiler. The heat exchanger pump built into the k- and LV models also acts as a mixing pump, so no separate mixing pump is required.

Recommended opening pressures for safety vents: E75-1000 1.0 – 4.0 bar.

Boiler power kW	Boiler blow-off power kg/h (steam)
50	80
75	120
100	160
120	192
160	260
200	320
250	400
320	510
400	640
500	800
650	1040
800	1280
1000	1600

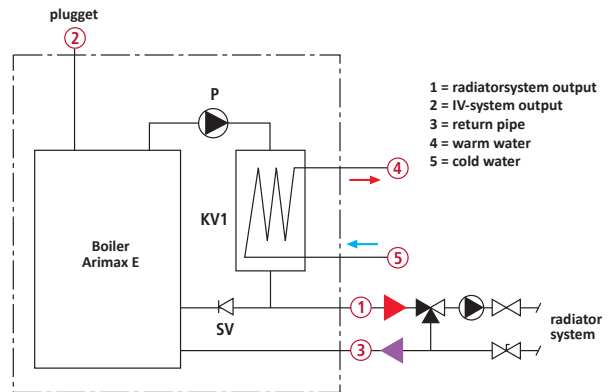
Pleas note!

In the E 75- E320 k- and LV models, a heat exchanger circulation pump is fitted under the boiler's front plate, and this pump should be powered up to keep a constant supply of boiler water.

Boilers containing an LV heat exchanger are fitted with two heating circuit output couplings and one return coupling. Because of this, the boiler can be connected to the building's heating system by the following alternative methods:

Residential building connection Model LV

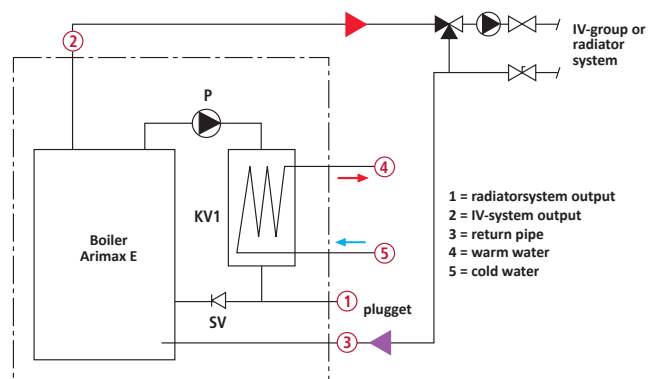
Used in residential buildings and other buildings that may experience significant peaks in the consumption of warm water. Series connection based on the connection diagram of the boiler, the LV heat exchanger (KV1) and the heating pipe network works on the lending principle and prioritises the need for warm water power. The heat exchanger pump (P) also acts as a boiler mixing pump.



Output to heating pipe network is connected to coupling 1. Coupling 2 is plugged.

Industrial hall connection Model k

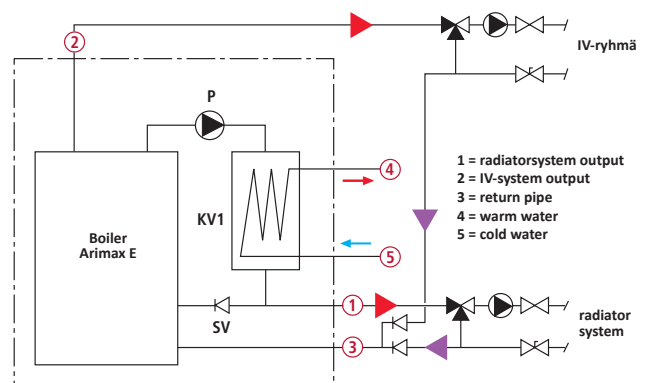
Used in industrial halls and similar buildings where consumption of warm water is not so great. In the industrial hall connection, the LV heat exchanger (KV1) is connected in parallel with the boiler and heating pipe network. The heat exchanger pump (P) also acts as a boiler mixing pump.



Output to heating pipe network is connected to coupling 2. Coupling 1 is plugged.

Ventilation and radiator system connection Model LV

If the building has water-filled radiators, the IV group must be connected to output coupling 2. The radiator system is connected to output coupling 1. That way, it is possible to stop the IV radiators from freezing. Heat exchanger pump (P) also acts as a boiler mixing pump.



P = LV-HEAT EXCHANGER PUMP/BOILER WATER MIXING PUMP
KV1 = LV HEAT EXCHANGER
SV = NON-RETURN VALVE

The burner for the boiler must be selected in accordance with the manufacturer's table of recommendations. Burner installation may only be carried out by a business with the required professional accreditations. In the installation of the burner, instructions issued by the burner manufacturer must be observed.

The spray pattern of the nozzles must be selected so that the flame does not touch the walls of the firebox. The power of the burner must not exceed the nominal power of the boiler. From a point of view of power requirement, excessively high burner power will result in short running periods, which will needlessly stress the boiler and adversely affect its annual utilisation rate. The power of the burner must then be reduced. The burner's high-low function can be used to lengthen running periods.

Power should not be adjusted so low that water condenses at the bottom of the boiler. If the power has been set exceptionally low, the temperature of the flue gas must be increased by removing the lower flue gas control plates. The lowest permitted flue gas temperature is 130°C

■ Introduction into use

Before starting the boiler, it must be ensured that it has been filled with water and that the valves and damper plates are open. If the boiler is to be kept out of use, for example during the summer, it must be cleaned immediately and the damper plate kept closed to prevent corrosion.

■ Daily operation

To ensure the safe operation of the boiler, it is important to observe all the instructions for equipment related to the boiler.

As far as the boiler is concerned, it is important to monitor the following:

- Changes in flue gas temperature; increased flue gas temperature indicates that there is a need for cleaning
- Boiler water temperature and pressure
- The tightness of the hatches

In order to ensure the economic and safe operation of the boiler and its related equipment, it is advisable to carry out regular measurement of emissions and preventive maintenance.

- Operation of safety and alarm equipment
- Open the safety vents
- Test the overheat protection system
- Check the expansion system
- Test the boil-dry protection system
- Test the operation of the temperature and pressure gauges
- Keep the boiler and its surroundings clean
- Check the tightness of the hatches and adjust if necessary
- Clean the hot surfaces, especially the convector as required
- Service and clean the flue and possible flue gas extraction equipment

■ Cleaning

The firebox is cleaned through the burner hatch. The cleanliness of the convector significantly affects the utilisation rate of the boiler. Loose soot falls into the firebox under the convector, from which it can be removed after cleaning. Cleaning of the boiler must be carried out no later than when the flue gas temperature has risen by 60 C from the flue gas temperature of a clean boiler, when the water temperature is 85 C. The main switch of the oil burner must be put in the 0 position. .

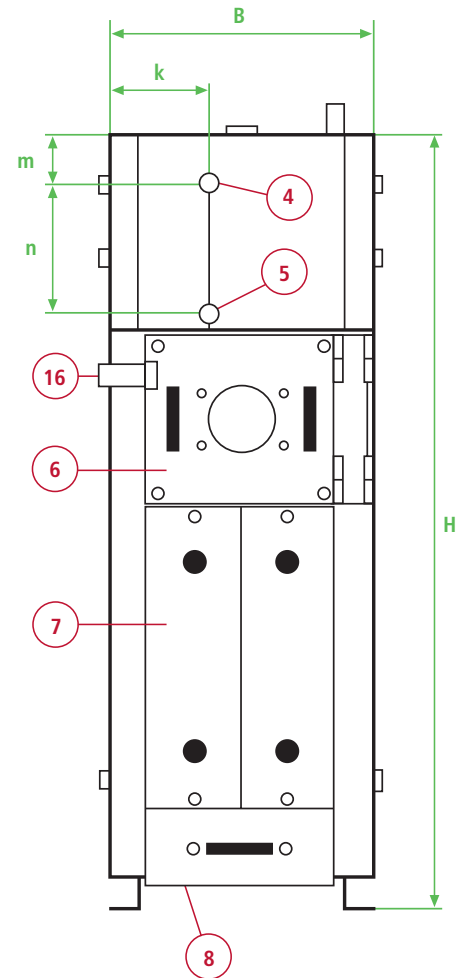
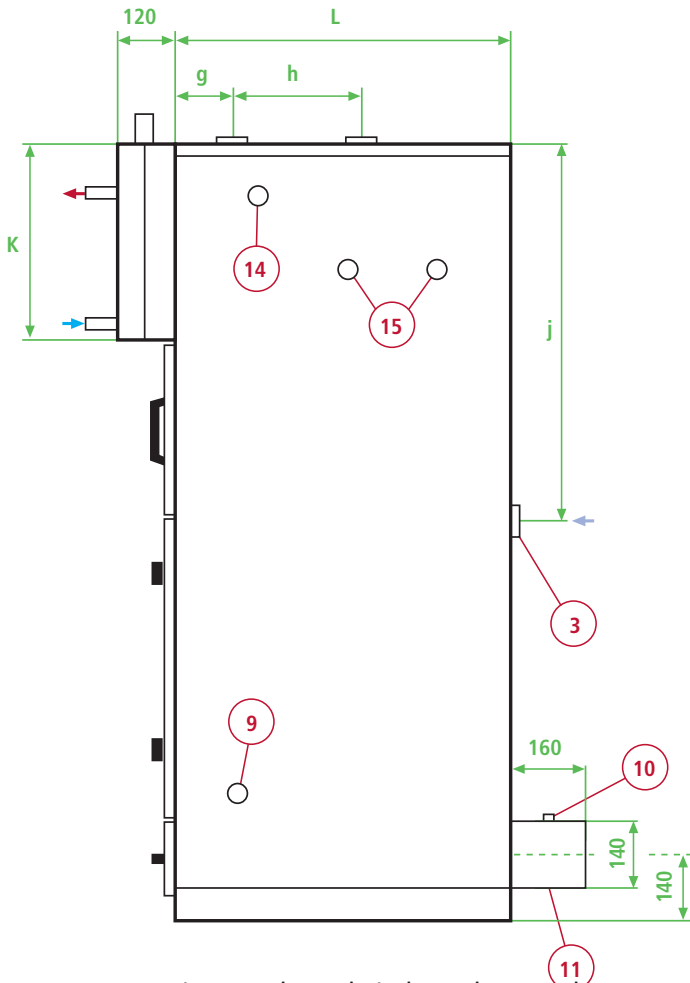
Open the nuts of the cleaning hatches and remove the hatch doors. Remove the control plates so that any ash on the plates falls between the bars of the grate. Brushing is done in an up-to-down motion. If the firebox is sooted up, open the oil burner hatch. Clean the firebox and burner head. If ceramic gas balancing components have been removed, handle them with care.

After cleaning, replace the gas control plates, remove ash from the bottom of the ashbox and tightly replace the hatch. Under no circumstances must the boiler be used without the ceramic balancers in position.

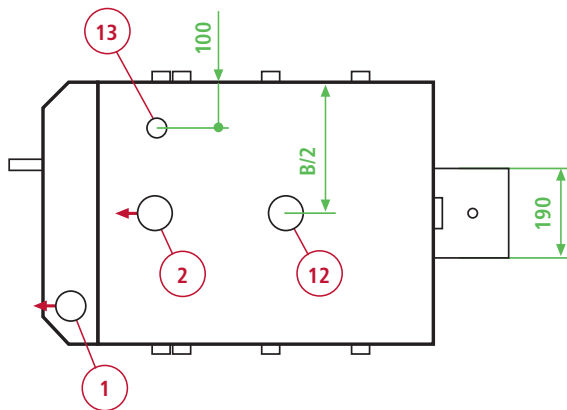
After cleaning, ensure that the hatches are not leaking when the burner is running.

■ Instructions for changing the cleaning hatch heat insulation

1. On the hatch and the frame above it, mark a number that will help you to replace the hatches in their previous position.
2. Remove the hatches and the mineral wool bricks
3. Check the steel sealing surfaces and remove any impurities from them
4. Put the mineral wool brick plate on the floor
5. Put the hatch door on the brick and press it against the brick so that the edge of the hatch door is imprinted on the brick.
6. Saw off the part of the mineral wool brick that you need.
7. Round off the corners that will be against the hatch door.
8. Once the mineral wool brick has been fitted to the hatch, the brick cannot be so large that it breaks when placed into the hatch, but, on the other hand, no gaps must be left.
9. Replace the hatch door and tighten the nuts. When opening and closing, the cleaning hatches must be handled with care, because the sealing mineral wool brick is relatively brittle. The nuts should be tightened in turn, so that the steel edge of the cleaning hatch is evenly forced about 5 mm into the mineral wool brick, ensuring a gas-tight joint. If the joint leaks, at the location of the leak the flue gas and boiler room air will combine to produce light grey sulphur, which will corrode the edge of the cleaning hatch opening and break the hatch seal.



Water units 4 and 5 only in k- and LV-models. Boiler can be equipped with max. 4 electrical resistor couplings, countersunk depth 500 mm.



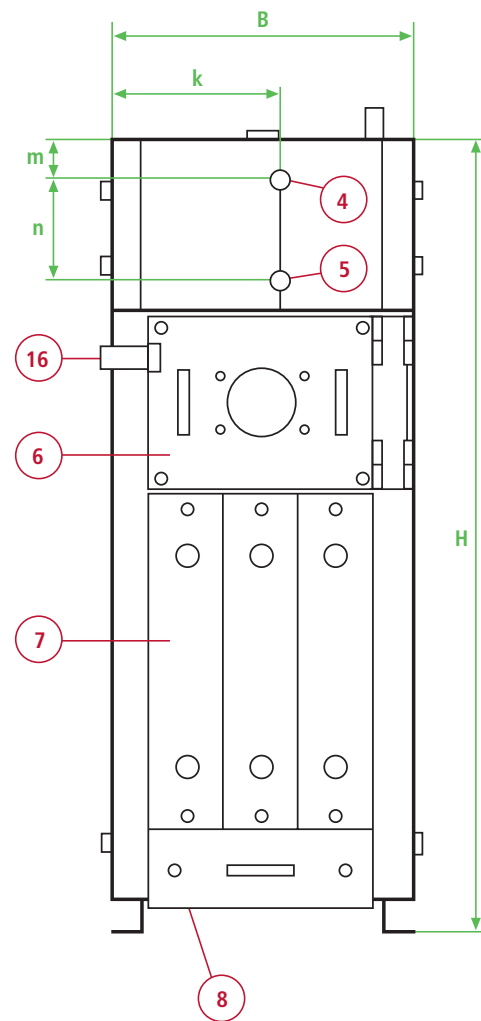
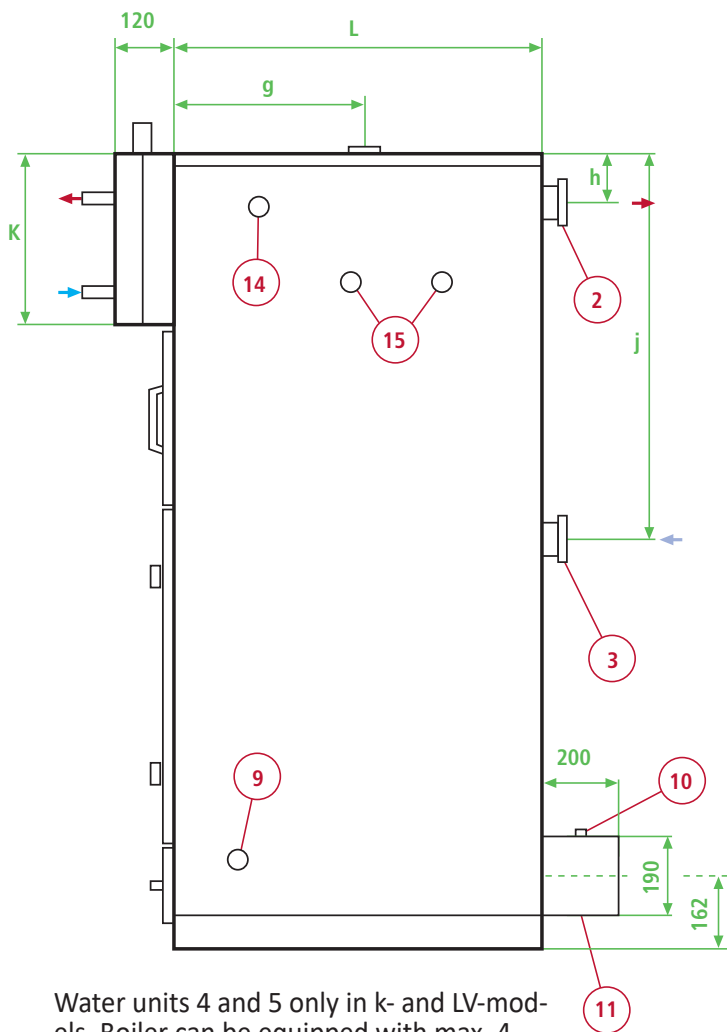
FLUE RECOMMENDATION

Acid-resistant steel flue, brick flue fitted with acid-resistant pipe. When using a steel flue and an unmodified brick flue, please ensure that the temperature of the flue gases is sufficiently high. Flue gas temperature can easily be increased by removing the flue gas control plates. The max. operating temperature of the boilers is 120 C.

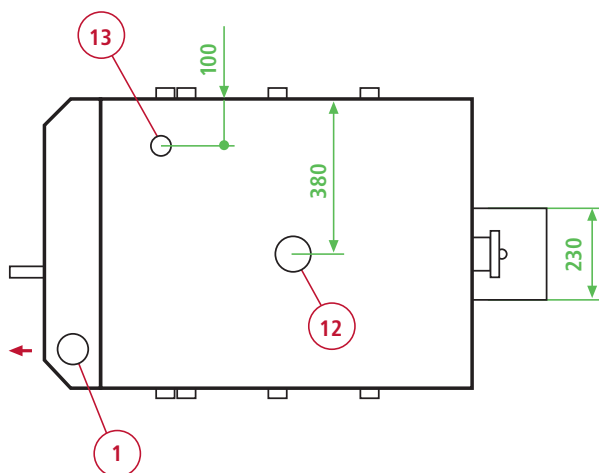
- 1. Radiator system output.....DN 25 (LV-models) Plugged in k-models!
- 2. Radiator system outputDN 50
IV-system output.....(k- and basic models)(all models)
- 3. Return pipeDN 50 (all models)
- 4. Warm water \varnothing 22 Cu (75 k/LV, 100 k/LV)
- 5. Cold water..... \varnothing 28 Cu (120 k/LV, 160k/LV)
- 6. Oil burner hatch
- 7. Convector cleaning hatch
- 8. Ashbox cleaning hatch
- 9. Discharge coupling.....DN 20
- 10. Flue gas measuring coupling
- 11. Flue
- 12. Expansion coupling.....DN 50
- 13. Boil-dry protection coupling.....DN 25
- 14. Thermometer couplingDN 20
- 15. Thermostat coupling.....DN 20
- 16. Hatch coupling

DIMENSIONS AND TECHNICAL SPECIFICATIONS 75 - 160 KW

	75	75 k	75 LV	100	100 k	100 LV	120	120 k	120 LV	160	160 k	160 LV
Power kW	75	75	75	100	100	100	120	120	120	160	160	160
Volume l	150	150	150	180	180	180	215	215	215	245	245	245
Weight kg	355	365	370	430	440	445	520	530	535	630	640	650
Width B mm	565	565	565	565	565	565	565	565	565	565	565	565
Depth L mm	670	670	670	710	710	710	785	785	785	865	865	865
Height H mm	1535	1535	1535	1645	1645	1645	1755	1755	1755	1865	1865	1865
Dimension K mm	415	415	415	415	415	415	415	415	415	415	415	415
Dimension g mm	125	125	125	125	125	125	125	125	125	120	120	120
Dimension h mm	275	275	275	275	275	275	275	275	275	275	275	275
Dimension j mm	795	795	795	800	800	800	790	790	790	790	790	790
Dimension k mm	-	210	210	-	210	210	-	240	240	-	240	240
Dimension m mm	-	100	100	-	100	100	-	100	100	-	100	100
Dimension n mm	-	278	278	-	278	278	-	243	243	-	243	243
Flue recommendation \varnothing mm	150	150	150	150	150	150	200	200	200	200	200	200
Hot surface m ²	4,4	4,4	4,4	5,9	5,9	5,9	7,1	7,1	7,1	9,4	9,4	9,4
Gas volume dm ³	155	155	155	180	180	180	225	225	225	275	275	275
Idling loss W	320	320	320	350	350	350	400	400	400	450	450	450
Operating pressure min. bar	1	1	1	1	1	1	1	1	1	1	1	1
Operating pressure max. bar	4	4	4	4	4	4	4	4	4	4	4	4
Water flow resistance Pa	260	260	260	470	470	470	640	640	640	1170	1170	1170
Firebox pressure relief	30-40	30-40	30-40	40-70	40-70	40-70	80-115	80-115	80-115	130-165	130-165	130-165
Water flow by nominal power l/s	0,59	0,59	0,59	0,79	0,79	0,79	0,95	0,95	0,95	1,27	1,27	1,27
Oil flow by nominal power kg/h	6,9	6,9	6,9	9,1	9,1	9,1	11,0	11,0	11,0	14,7	14,7	14,7
Gas flow by nominal power Nm ³ /h	8,24	8,24	8,24	10,99	10,99	10,99	13,18	13,18	13,18	17,57	17,57	17,57
FLUE GAS VOLUME AT NOMINAL POWER LEVEL												
- in oil in normal state m ³ /s	0,027	0,027	0,027	0,036	0,036	0,036	0,043	0,043	0,043	0,057	0,057	0,057
- in oil in 150° C temperature m ³ /s	0,040	0,040	0,040	0,060	0,060	0,060	0,070	0,070	0,070	0,090	0,090	0,090
- in gas in normal state m ³ /s	0,028	0,028	0,028	0,038	0,038	0,038	0,045	0,045	0,045	0,060	0,060	0,060
- in gas in 150° C temp m ³ /s	0,043	0,043	0,043	0,059	0,059	0,059	0,070	0,070	0,070	0,093	0,093	0,093



Water units 4 and 5 only in k- and LV-models. Boiler can be equipped with max. 4 electrical resistor couplings, countersunk depth 700 mm.



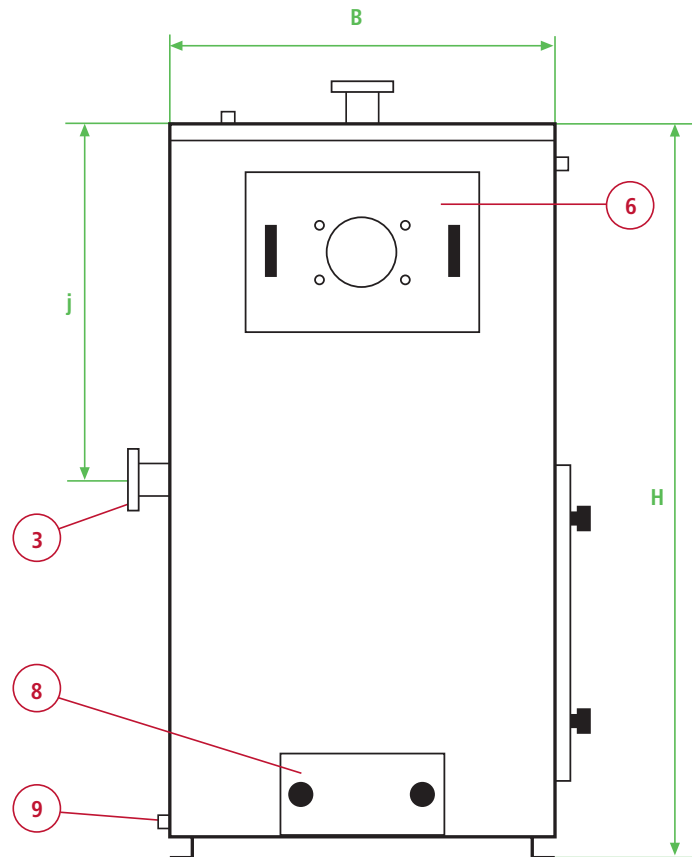
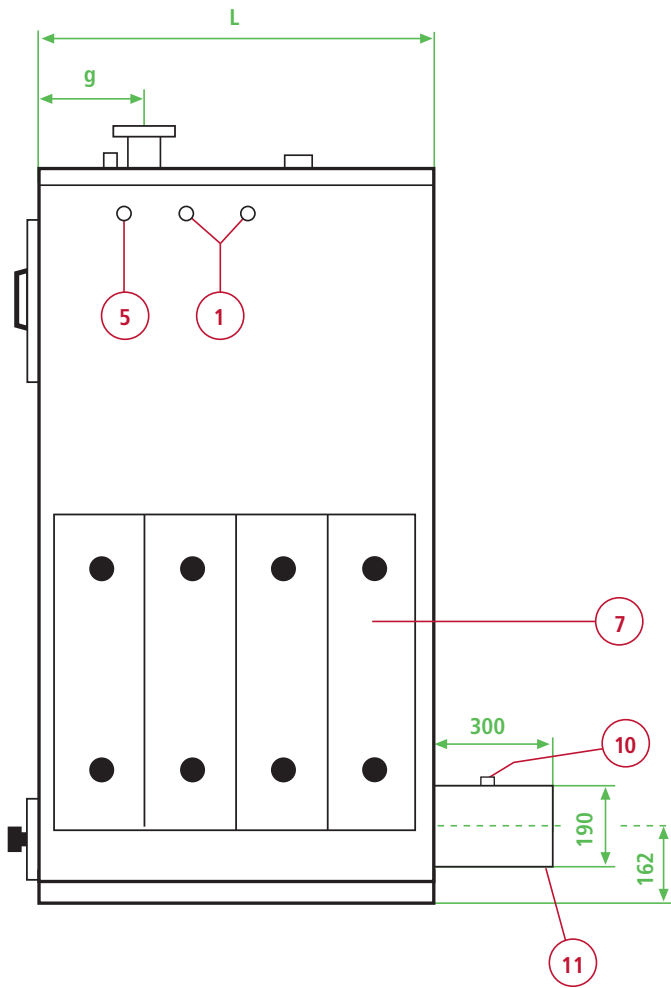
FLUE RECOMMENDATION

Acid-resistant steel flue, brick flue fitted with acid-resistant pipe. When using a steel flue and an unmodified brick flue, please ensure that the temperature of the flue gases is sufficiently high. Flue gas temperature can easily be increased by removing the flue gas control plates. The max. operating temperature of the boilers is 120 °C.

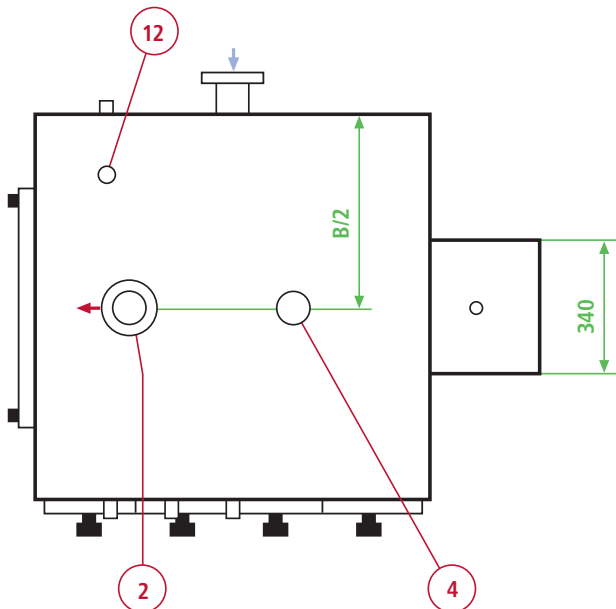
- 1. Radiator system outputDN 25 (200 LV)
DN 32 (250 LV ja 320 LV) Plugged in k-models!
- 2. Radiator system outputDN 65 (k- and basic models) IV-system outputall models
- 3. Return pipeDN 65 (all models)
- 4. Warm waterØ 28 Cu (200 k/LV)
- 5. Cold waterØ 28 Cu (250 k/LV and 320 k/LV)
- 6. Oil burner hatch
- 7. Convector cleaning hatch
- 8. Ashbox cleaning hatch
- 9. Discharge couplingDN 20
- 10. Flue gas measuring coupling
- 11. Flue
- 12. Expansion couplingDN 50
- 13. Boil-dry protection coupling ..DN 25
- 14. Thermometer couplingDN 20
- 15. Thermostat couplingDN 20
- 16. Hatch coupling

DIMENSIONS AND TECHNICAL SPECIFICATIONS 200 - 320 KW

	200	200 k	200 LV	250	250 k	250 LV	320	320 k	320 LV
Power kW	200	200	200	250	250	250	320	320	320
Volume l	410	410	410	470	470	470	505	505	505
Weight kg	795	815	825	910	920	930	1110	1120	1135
Width B mm	765	765	765	765	765	765	765	765	765
Depth L mm	835	835	835	920	920	920	990	990	990
Height H mm	1880	1880	1880	2130	2130	2130	2220	2220	2220
Dimension K mm	375	375	375	500	500	500	475	475	475
Dimension g mm	420	420	420	450	450	450	495	495	495
Dimension h mm	120	120	120	120	120	120	120	120	120
Dimension j mm	845	845	845	995	995	995	950	950	950
Dimension k mm	-	190	190	-	220	220	-	220	220
Dimension m mm	-	105	105	-	105	105	-	105	105
Dimension n mm	-	243	243	-	320	320	-	320	320
Flue recommendation Ø mm	200	200	200	200	200	200	250	250	250
Hot surface m ²	11,8	11,8	11,8	14,7	14,7	14,7	18,8	18,8	18,8
Gas volume dm ³	210	210	210	500	500	500	605	605	605
Idling loss W	500	500	500	570	570	570	650	650	650
Operating pressure min. bar	1	1	1	1	1	1	1	1	1
Operating pressure max. bar	4	4	4	4	4	4	4	4	4
Water flow resistance Pa	600	600	600	1020	1020	1020	1640	1640	1640
Firebox pressure relief	75-130	75-130	75-130	95-150	95-150	95-150	130-175	130-175	130-175
Water flow by nominal power l/s	1,59	1,59	1,59	1,98	1,98	1,98	2,54	2,54	2,54
Oil flow by nominal power kg/h	18,3	18,3	18,3	23	23	23	29,3	29,3	29,3
Gas flow by nominal power Nm ³ /h	21,97	21,97	21,97	27,46	27,46	27,46	35,15	35,15	35,15
FLUE GAS VOLUME AT NOMINAL POWER LEVEL									
- in oil in normal state m ³ /s	0,072	0,072	0,072	0,090	0,090	0,090	0,114	0,114	0,114
- in oil in 150° C temperature m ³ /s	0,11	0,11	0,11	0,14	0,14	0,14	0,18	0,18	0,18
- in gas in normal state m ³ /s	0,075	0,075	0,075	0,094	0,094	0,094	0,120	0,120	0,120
- in gas in 150° C temp m ³ /s	0,116	0,116	0,116	0,145	0,145	0,145	0,186	0,186	0,186



- 1. Thermostat couplingDN 20
- 2. Heating outputDN 80 (410 - 500)
DN 100 (650 - 1000)
- 3. Heating returnDN 80 (410 - 500)
DN 100 (650 - 1000)
- 4. Expansion couplingDN 50
- 5. Thermometer coupling.....DN 20
- 6. Oil burner hatch
- 7. Convector cleaning hatch
- 8. Ashbox cleaning hatch
- 9. Discharge couplingDN 20
- 10. Flue gas measurement coupling
- 11. Flue
- 12. Boil-dry protection coupling.....DN 25



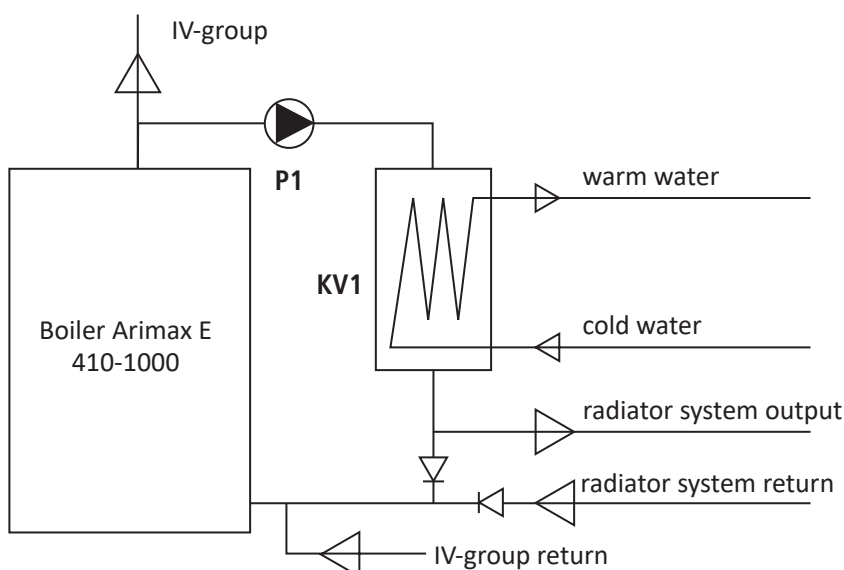
FLUE RECOMMENDATION

Acid-resistant steel flue, brick flue fitted with acid-resistant pipe. When using a steel flue and an unmodified brick flue, please ensure that the temperature of the flue gases is sufficiently high. Flue gas temperature can easily be increased by removing the flue gas control plates.

PLEASE NOTE!

The Arimax E 410-1000 kW boilers are cleaned from the side. Boiler delivery includes a cleaning hatch opening either on the right or left. Please specify which you require when you order. Max. operating temp. of boilers is 120 °C.

	410	500	650	800	1000
Power kW	410	500	650	800	1000
Volume l	410	490	580	660	740
Weight kg	1280	1510	1740	1970	2200
Width B mm	960	960	960	960	960
Depth L mm	990	1200	1400	1600	1800
Height H mm	2090	2090	2090	2090	2090
Dimension g mm	250	250	250	250	250
Dimension j mm	895	895	965	855	855
Flue recommendation Ø mm	250	300	300	350	400
Hot surface m ²	23,5	29,4	38,2	47,1	56,0
Gas volume dm ³	830	990	1250	1440	1630
Idling loss W	700	790	880	960	1040
Operating pressure min. bar	1	1	1	1	1
Operating pressure max. bar	4	4	4	4	4
Water flow resistance Pa	1370	2140	1440	2200	2960
Firebox pressure relief	100-200	100-220	110-230	130-250	150-280
Water flow by nominal power l/s	3,25	3,97	5,16	6,35	7,94
Oil flow by nominal power kg/h	36,7	45,8	59,6	73,3	110,0
Gas flow by nominal power Nm ³ /h	43,93	54,92	71,39	87,87	110,0
FLUE GAS VOLUME AT NOMINAL POWER LEVEL					
- in oil in normal state m ³ /s	0,143	0,179	0,233	0,287	0,359
- in oil in 150° C temperature m ³ /s	0,22	0,28	0,36	0,44	0,54
- in gas in normal state m ³ /s	0,150	0,188	0,244	0,300	0,370
- in gas in 150° C temp m ³ /s	0,232	0,291	0,378	0,465	0,581



If you wish to produce warm water through the LV heat exchanger, connection should be done in accordance with the adjacent diagram.

If the water power is clearly less than the heating power, connect the radiator system output pipe directly to the output coupling, as shown in the adjacent diagram of an IV group.

Water yield Arimax E 50 LV (fitted with LV loop)

Indicative number of dwellings in the building	Boiler power (kW)	Boiler water output temp.	Water yield l/s (+40 °C)	Water yield l/s (+55 °C)
3 - 6	50	+85 °C	0,62	0,33

Water table Arimax E 75 LV - 320 LV (fitted with heat exchanger)

Indicative number of dwellings in the building	Boiler power (kW)	primary (t=30°C) flow l/s		secondary flow l/s (+40 °C)		secondary flow l/s (+55 °C)				LV heat exchanger pump Grundfos
		constant	pressure loss (kPa)	constant	pressure loss (kPa)	constant	pressure loss (kPa)	3 min.	pressure loss (kPa)	
5 - 9	75	0,60	19	0,6	25	0,40	11	0,7	30	UPS 25-80
7 - 12	100	0,79	22	0,79	28	0,53	12	0,9	32	UPS 25-80
10 - 16	120	0,95	24	0,95	34	0,63	13	1,1	37	UPS 25-80
14 - 22	160	1,27	26	1,27	33	0,85	14	1,4	35	UPS 25-80
16 - 27	200	1,59	28	1,59	33	1,06	14	1,7	35	UPS 25-80
23 - 39	250	1,98	27	1,98	29	1,32	14	2,0	30	UPS 32-80
32 - 48	320	2,54	32	2,54	29	1,69	16	2,2	26	UPS 32-80

Water table Arimax E 75 k - 320 k (fitted with heat exchanger)

Boiler power (kW)	primary (t=30°C) flow l/s		secondary flow l/s (+40 °C)		secondary flow l/s (+55 °C)				LV heat exchanger pump Grundfos
	constant	pressure loss (kPa)	constant	pressure loss (kPa)	constant	pressure loss (kPa)	3 min.	pressure loss (kPa)	
75 - 320	0,45	13	0,45	19	0,3	7	0,4	15	UPS 25-60

Warranty

Ariterm Energy Oy grants the equipment it delivers a one-year warranty. The warranty is valid for one year from the commissioning date or at maximum 18 months from the delivery date. The warranty for the pressure vessels manufactured by Ariterm Energy is 5 years from the date of delivery.

Ariterm Energy will deliver new parts to replace the faulty ones and the warranty applies to possible manufacturing and material defects. The warranty does not cover consumables or travel costs. The warranty does not cover faults caused by incorrect designing, installation, maintenance or operation, or faults caused by off-specification fuel.

Spare part warranty is 12 months. Ariterm Energy will deliver new parts to replace the damaged ones. Unless there are mandatory laws, no other warranty is included in the contract. This paragraph determines exhaustively the Seller's liability for defects and buyer's legal remedies in defect situations.

Removal from use

A boiler that has reached the end of its life can be used for scrap.

