KOB

VIESMANN Group

PYROMAT ECO

Wood gasification boiler, 40 to 170 kW

Technical guide

PYROMAT ECO

Wood gasification boiler for logs up to 100 cm in length and residual wood, with a connection option for an oil burner

5822 546 GB 5/2013

Index

5822 546 GB

Index (cont.)

1.1 Principles of log combustion for generating heat

Units of measurement for wood fuel

The units of measurement commonly used in forestry and the timber industry for wood fuel are solid measures of timber (smt) and stacked cubic metres (stcm). The solid measure of timber (smt) describes 1 m^3 of solid timber mass in the form of assorted round timbers.

The stacked cubic metre (stcm) is a measure for stacked or tipped wood, measuring a total volume of 1 m^3, including air gaps. On average, one solid measure of timber equals 1.4 stacked cubic metres.

Conversion table for assorted common wood fuel

Unit of measurement	Solid measure of timber (smt)	Stacked cubic metre (stcm)	Stacked cubic metre (stcm)	Tipped cubic metre (tcm)	Tipped cubic metre (tcm)
Assorted	Round timbers	Split logs	Logs		Woodchips
			Stacked	Tipped	G 50 "medium"
1 smt round timber	1	1.40	1.20	2.00	3.00
1 stcm split logs 1 m long, stacked	0.70	1.00	080	1.40	(2.10)
1 stcm logs split, stacked	0.85	1.20	1.00	1.70	
1 tcm logs split, tipped	0.50	0.70	0.60	1.00	
1 tcm (forest) - woodchips G 50 "medium"	0.33	(0.50)			1.00

Calorific and emission values

Timber is a renewable fuel. During combustion, on average approx. 4.0 kWh/kg units of energy are released.
The table shows the net calorific value of various types of timber with a water content of 20 %.

Type of timber	Density	Net calorific value (approx. at 20 % water content)		
	kg/m^3	kWh/smt	kWh/stcm	kWh/kg
Conifers				
Spruce	430	2100	1500	4.0
Fir	420	2200	1550	4.2
Pine	510	2600	1800	4.1
Larch	545	2700	1900	4.0
Deciduous				
Birch	580	2900	2000	4.1
Elm	620	3000	2100	3.9
Beech	650	3100	2200	3.8
Ash	650	3100	2200	3.8
Oak	630	3100	2200	4.0
Hornbeam	720	3300	2300	3.7

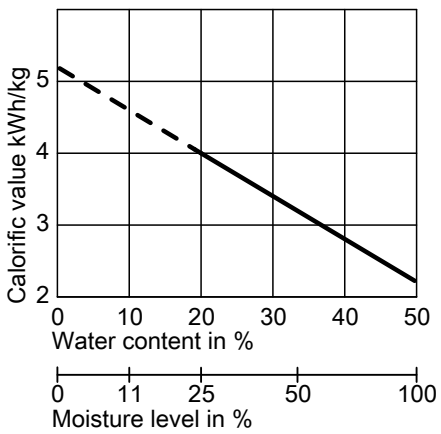
1 litre of fuel oil can be replaced by 3 kg of timber, considering the usual efficiencies. A stacked cubic metre (stcm) of beech corresponds to the energy of approx. 200 litres of fuel oil or 200 m^3 of natural gas. Therefore burning wood contributes to the preservation of the finite reserves of oil and gas.
Timber has a generally neutral CO_2 balance, as the CO_2 created during combustion is immediately reabsorbed into the photosynthesis cycle and therefore contributes to the formation of new biomass. Another environmental aspect is the fact that timber contains hardly any sulphur, therefore almost no sulphur dioxide is created during combustion.

Influence of moisture on the net calorific value

The water content of timber substantially influences its net calorific value. The more water timber contains, the lower its net calorific value, since the water evaporates during combustion and consumes energy in the process.
Two measures are used to specify the water content.

- Water content
  The water content of timber is its water mass as a percentage of the total timber mass.
- Timber moisture level
  The timber moisture level (hereafter referred to as moisture or moisture level) is the water mass as a percentage of the total timber mass excluding water.

The graph shows the relationship between the water content and the moisture level, as well as the dependency of the net calorific value.



Freshly cut timber has a moisture level of 100 %. During storage over one summer, this moisture level reduces to approx. 40 %. During storage over several years, this moisture level reduces to approx. 25 %.

The diagram shows the dependency of the net calorific value on the water content, using spruce as an example. With a water content of 20 % (moisture level 25 %), the net calorific value is 4.0 kWh/kg. The net calorific value of timber stored over several years is approx. twice that of freshly cut timber.

Storage

Not only is the combustion of moist wood uneconomical, it also leads to low combustion temperatures and high emissions plus tar deposits inside the chimney.

Information on storing firewood

- Split round logs from a diameter of 10 cm upwards. Enlarging the surface area enables the wood gases to be expelled more quickly and simply. The drying process is also accelerated during storage.
- Stack the logs in a ventilated and preferably sunny spot underneath a rain canopy.
- Stack the logs with generous air gaps to enable the flowing air to carry off the dissipating moisture.
- A hollow should be created underneath the wood pile (e.g. in the form of support timbers) to allow moist air to escape downwards.
- Never store freshly cut wood in a cellar, as air and sunshine are required for drying. However, dried wood can be stored in a well ventilated cellar.

1.2 Minimum wood fuel requirements

Wood remnants, coarse woodchips and compressed shavings can be used in the Pyromat Eco. The Pyromat Eco is ideal for the combustion of logs. The wood should have an edge length between 45 and 50 cm or up to 100 cm (depending on the boiler type: boilers for 50 cm logs or 100 cm logs). The rated wood boiler heating output will only be achieved with dry wood with maximum 20 % water content (air-dried wood). Wood of poorer quality and higher moisture content also reduces the rated heating output and the length of combustion.

When using softwood (e.g. spruce), note that the energy per volume unit is lower than with hardwood (e.g. beech). Softwood is therefore suitable for "initial heat-up" - however, its use shortens the intervals between recharging considerably and increases the volume to be used (up to 44 %). Observe the requirements specified in the next chapter relating to non-combustible substances and their limits for warranty period claims. Deviations are only possible through written, system-specific manufacturer declarations.

Substances

When procuring wood for combustion in a Pyromat Eco, ensure that foreign objects (e.g. stones, metal parts, pieces of brick, plastics etc.) are avoided. These would change the composition of the fuel and therefore the critical parameters of the combustion process.

The values must not exceed or fall below the following limits (per kg of dry fuel) for the non-combustible content (ash at an analysis temperature of 815 °C):

		Limit	Comparison with natural wood from forests
Chlorine Cl	mg/kg	max. 300	10
Sulphur S	mg/kg	max. 1000	120
Total Cl, S	mg/kg	max. 1000	130
Ash content total	g/kg	max. 15.0	5.0
Alkali oxides in the ash (K_2O and Na_2O)	g/kg	max. 1.0	0.35
SB start of ash sintering	°C	min. 1000	approx. 1200

Exceeding the above limits will shorten the service life of the combustion chamber and wood boiler. This also means that maintenance work is increased and service intervals are reduced.

The proportion of dust-like and fine-grained materials should also be minimised (in accordance with ÖNORM M 7133).

Origin, treatment and storage

Depending on the origin, wood can be natural wood (e.g. forest wood and waste from sawmills), residual wood from wood processing plants or waste wood (building rubble, furniture). The wood must be obtained and cut to the desired size, and foreign objects deal with appropriately. In addition to the requirement to adhere to ÖNorm M 7133, a max. proportion of 5 % outliers in the fuel should be observed.

The length of the outliers must not exceed 16 cm (with a cross-section of max. 5 cm²). The surface of the fuels should be roughened where possible (e.g. through shredder, etc.). When using briquettes, ensure compression is matched to charging. The maximum diameter is 60 mm.

Size of the woodchips

The Pyromat Eco is also suitable for the combustion of coarse woodchips. To prevent increased maintenance work, appropriate coarse woodchips in accordance with ÖNorm M 7133 should be used.

Principles of wood combustion for generating heat (cont.)

Further information

Ash and cleaning
Natural wood without bark has a percentage of ash less than 0.5 % of the supplied fuel mass. All information regarding cleaning work is based on natural wood with attached bark and an ash percentage of 0.8 %. The cleaning and maintenance work for other wood fuels should be adapted according to the quantity, the specific weight and the ash characteristics.

Changing fuels
Frequent and intensive changes in fuel quality, e.g. bulk density, water content, dust proportion and ash content, can require a manual adjustment of the combustion system parameters.

Non-wood biomass fuels

Non-wood fuels made from biomass such as needles, leaves, cereals, straw, husks, fruit stones, etc. are unsuitable as fuels for fault-free operation, and are therefore not permitted.

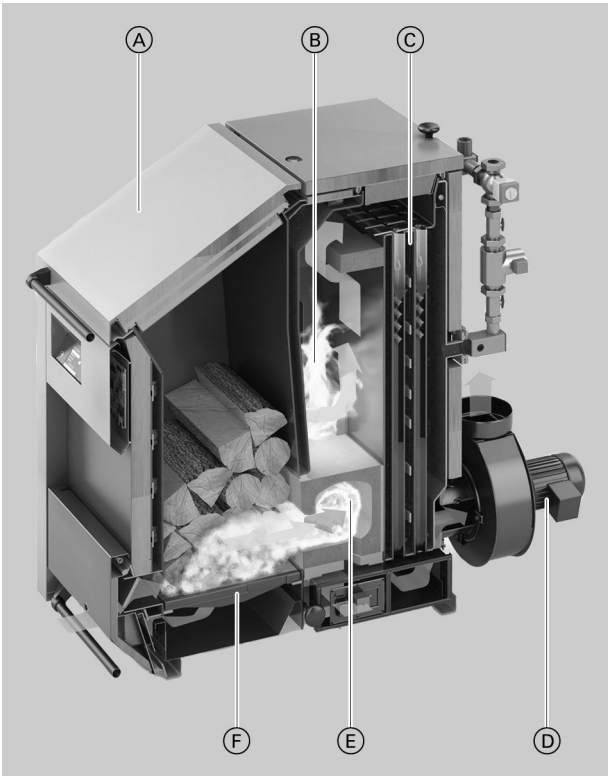
In some cases, the fuel properties (elemental composition, ash sintering point, etc.) differ considerably from those of wood. Combustion of such fuels in a Pyromat Eco can lead to an impairment of the combustion characteristics and increased stress on the fireclay lining and the heat exchanger surfaces. Warranty claims can therefore only be asserted when using approved fuels.

Wood fuel regulations and standards

Germany	Revised first version of BImSchV dated 22.03.2010
Austria	FAV dated 18.11.1997 "Ordinance for Combustion Systems" § 3.(1) 3. Solid fuels
	Agreement between the Federation and the Laender in accordance with section 15a, B-VG on energy savings
	Agreement between the Federation and the Laender in accordance with section 15a, B-VG on safety measures for small combustion appliances
Switzerland	Clean air regulations LRV dated 16.12.1985 (version 28.03.2000)
France	NF Bois de chauffage
ÖNORM M 7133	Woodchips for energy purposes (1998)
EN 303-5	Boilers for solid fuels, table 8 "Test fuels"
EN 14961-1	Solid biofuels - fuel specifications and classes - part 1: General requirements (2010 04 01)
EN 14961-3	Solid biofuels - fuel specifications and classes - part 3: Wood briquettes for non-industrial use (2010 07 15)
EN 14961-5	Solid biofuels - fuel specifications and classes - part 5: Firewood for non-industrial use (2011 04 15)

2.1 Product description

Benefits



Ⓐ Upper charging door with a large hopper, extended downward taper
Ⓑ Secondary combustion chamber for complete burnout
Ⓒ Vertical tubular heat exchanger for optimum heat transfer
Ⓓ Flue gas fan; strong underpressure for high safety; low power consumption
Ⓔ Patented combustion chamber made from refractory concrete for degassing
Ⓕ Solid cast grate for a hot degassing zone and long service life

The Pyromat ECO was developed specifically for the combustion of logs and represents state of the art combustion technology.
The Pyromat ECO log boiler has already proven itself thousands of times. Charging from the top offers easy handling, control via the Lambda probe guarantees low emissions, and the integral heat management ensures maximum convenience.

Clean and efficient combustion
The microprocessor control captures all details relevant for the operation and regulates the amount of heat required and provided. As a result, the boiler system is monitored permanently in all operating phases, from heat-up and operation under load right through to burnout, and is held within its optimum operating range by its motorised air dampers. This guarantees clean and efficient combustion.

Large hopper
The Pyromat ECO offers the greatest operating convenience when heating with logs thanks to its large charging chute. Log boilers in the rated heating output range 40 to 75 kW can operate with logs of 0.5 m length; in the range 85 to 170 kW, the hopper width increases to 1080 mm, ensuring convenient charging even with logs of 1 m length.

With oil burner connection
The Pyromat ECO is also approved as an oil boiler compliant with EN standard; the necessary connections are already in place. Fitting an oil burner may, for example, help to bridge holiday times when manual charging with logs is not feasible.
The Pyromat ECO is particularly suitable for the combustion of logs, wood briquettes and wood remnants, either loose or in pieces.
The Pyromat ECO boiler system has been tested in accordance with the latest quality criteria to EN 303-5 "Heating boilers for solid fuels", and can be brought into circulation with CE designation (directive 98/38/EC etc.) and VKF approval.

Pyromat Eco	Rated heating output in kW
Log boiler (0.5 m logs)	40, 50, 60, 75
Log boiler (1 m logs)	85, 100, 120, 170

Benefits at a glance

- Log boiler for logs of 0.5 and 1 m length with high operating convenience through charging from the top
- For the following fuels: logs, wood briquettes and wood remnants, either loose or in pieces
- Large hopper capacity (185 to 500 l)
- Fully wired
- No secondary air device (draught stabiliser) required
- Constantly regulating air damper with heat-up and burnout optimisation
- Accurate temperature stratification of a heating water buffer cylinder by means of the buffer cylinder control valve – no possible irritation of the buffer stratification through the return
- Return temperature raising facility fully fitted
- Display and control unit integrated into the boiler
- Clear backlit display
- Intuitive menu prompts through multi line plain text display
- Context-sensitive help function
- Integral buffer heating management
- Not sensitive to foreign bodies (nails, screws etc.)
- Lambda probe control

Delivered condition

Boiler with the following components:
- Fully wired flue gas fan with flue gas temperature sensor and Lambda probe
- Fully assembled return temperature raising facility
- Buffer cylinder control valve with drive
- Ash pans, stoking and cleaning equipment
- Fully assembled casing panels
- Ecotronic control unit
  - Electronic module integrated in the boiler, incl. high limit safety cut-out (STB)
- 3 sensors (Pt1000) incl. sensor well (R ½, 280 mm long) wired jointly to connector
- Outside temperature sensor (Pt1000), supplied separately
- Pre-installed lifting eye

Fully assembled return temperature raising facility
The return temperature raising facility is fully fitted to the connection flange. It comprises a boiler pump, boiler control valve, flow and return temperature sensor including connectors. The pump is located between 2 shut-off valves.

2.2 Specification

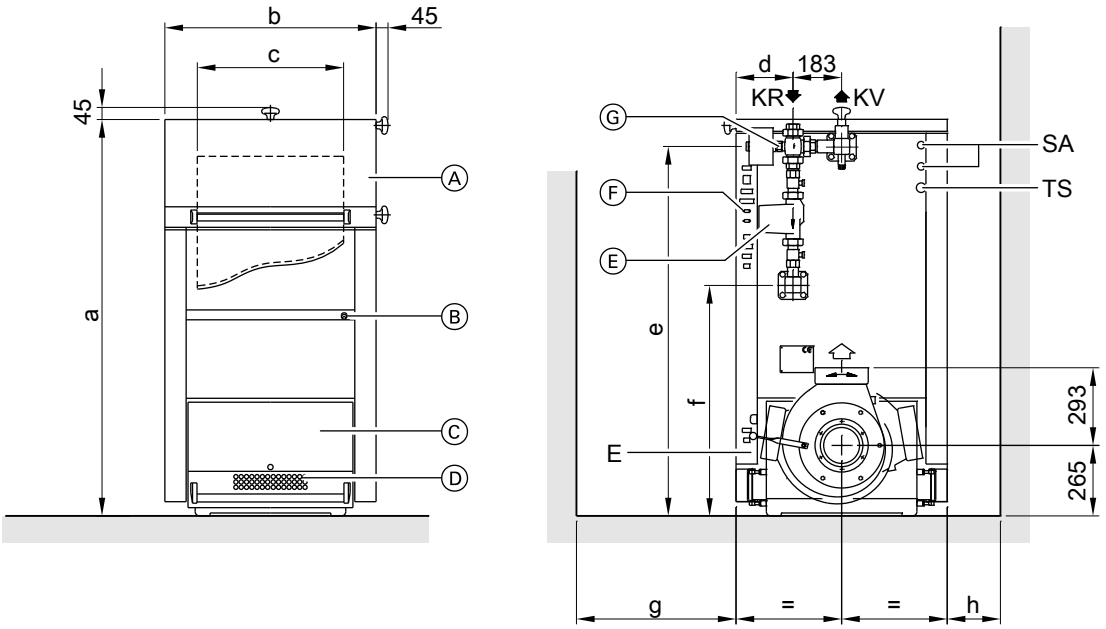
Specification

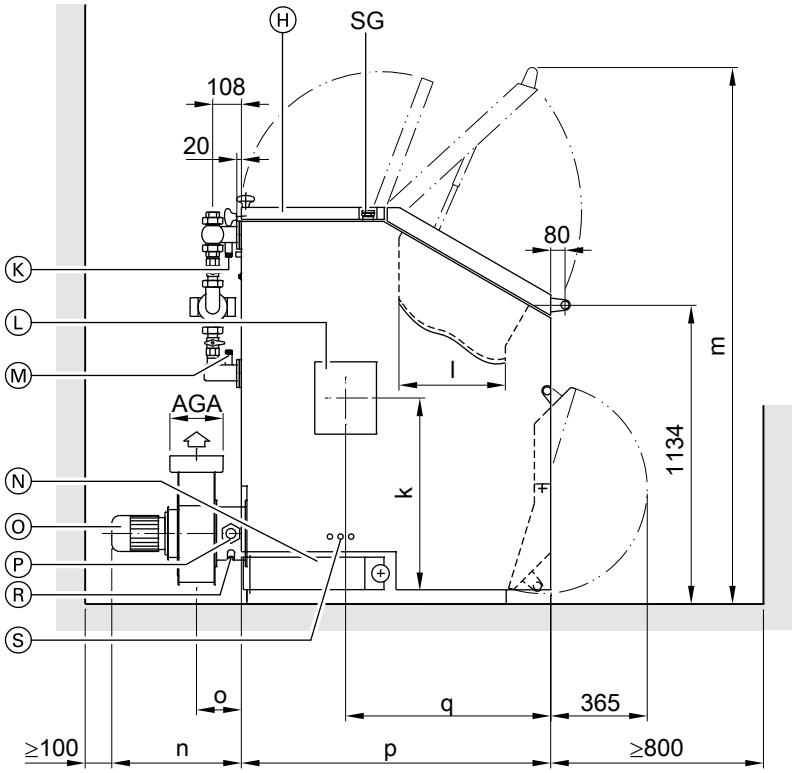
Boiler type Pyromat ECO...		35	45	55	65	61	81	101	151
Part no.		**PMEA001**	**PMEA002**	**PMEA003**	**PMEA005**	**PMEA004**	**PMEA006**	**PMEA007**	**PMEA008**
Rated heating output	kW	40	50	60	75	85	100	120	170
Minimum heat consumption, wood	kW	35	38	45	55	60	75	90	110
Max. log length	m	0.5	0.5	0.5	0.5	1	1	1	1
Hopper capacity	l	185	185	255	255	375	375	500	500
Boiler water content	l	130	130	170	170	230	230	300	300
Boiler weight (dry)	kg	750	760	920	935	1300	1320	1680	1720
Test pressure	bar	6	6	6	6	6	6	6	6
Max. operating pressure	bar	3	3	3	3	3	3	3	3
Max. boiler water temperature, wood	°C	100	100	100	100	100	100	100	100
Min. return temperature	°C	70	70	70	70	70	70	70	70
Pressure drop, water side (diff. 10 K)	mbar	32	32	62	62	56	56	112	112
Pressure drop, water side (diff. 20 K)	mbar	8	8	16	16	14	14	28	28
Thermally activated safety valve: min. flow rate at 2.5 bar	kg/h	2000	2000	2800	2800	3500	3500	5500	5500
Boiler efficiency (rated heating output, wood)	%	92	92	92	92	92	92	92	92
Flue gas temperature (rated heating output, wood)	°C	180	180	180	180	180	180	180	180
Flue gas mass flow rate (rated heating output, wood)	g/s	30.4	35.2	44	56	58.4	72	88	108
Max. draught, wood*1	Pa	25	25	25	25	25	25	25	25
Rated heating output, oil	kW	35	38	45	55	60	75	90	110
Boiler efficiency (rated heating output, oil)	%	87	87	87	87	87	87	87	87
Flue gas temperature (rated heating output, oil)	°C	168	168	168	168	172	172	168	168
Required chimney draught*2	Pa	±0	±0	±0	±0	±0	±0	±0	±0
Electrical output, flue gas fan	W	80	80	80	80	150	150	250	250
Return temperature raising facility with buffer cylinder control valve									
Boiler pump Wilo	Type	RS 30/6	RS 30/6	TOP-S 30/7 EM	TOP-S 30/7 EM	TOP-S 30/7 EM	TOP-S 30/7 EM	TOP-S 40/7 EM	TOP-S 40/7 EM
Electrical output, pump	W	46 - 93	46 - 93	85 - 195	85 - 195	85 - 195	85 - 195	220 - 390	220 - 390
Pump output	m^3/h at mWC	2.5 at 6.5	2.5 at 6.5	7.5 at 7.0	7.5 at 7.0	7.5 at 7.0	7.5 at 7.0	16.5 at 7.0	16.5 at 7.0
Boiler control valve Siemens	Type	VXG 48.32	VXG 48.32	VXG 48.32	VXG 48.32	VXG 48.40	VXG 48.40	VBF 21.50	VBF 21.50
Drive, boiler control valve Siemens		SSY 319	SSY 319	SSY 319	SSY 319	SSY 319	SSY 319	SQK 21.50	SQK 21.50
Siemens buffer cylinder control valve	Type	VXG 48.32	VXG 48.32	VXG 48.32	VXG 48.32	VXG 48.40	VXG 48.40	VXG 48.40	VXG 48.40
Drive for Siemens buffer cylinder control valve		SSY 319	SSY 319	SSY 319	SSY 319	SSY 319	SSY 319	SSY 319	SSY 319
Weight of return temperature raising facility with buffer cylinder control valve	kg	14	14	16	16	20	20	40	40
Weight, cylinder control valve	kg	2.5	2.5	2.5	2.5	2.5	2.5	6.9	6.9
Connections									
Flue gas connection	DN	200*3	200*3	200*3	200*3	200	200	250	250
Drain	R	½	½	½	½	½	½	½	½
Boiler return	R	1¼	1¼	1¼	1¼	1½	1½	1½	1½
Boiler flow	R	1¼	1¼	1¼	1¼	1½	1½	1½	1½
Safety connection	R	½	½	½	½	½	½	½	½
Temperature sensor	R	½	½	½	½	½	½	½	½
Sight glass	R	1	1	1	1	1	1	1	1

*1 *Maximum overpressure in the start phase (chimney cold) in the flue pipe downstream of the flue gas fan*

*2 *No secondary air device (draught limiter) required*

*3 *Reduction to DN 160 or DN 180 possible*





AGA Flue gas connection
E Drain
KR Boiler return
KV Boiler flow
SA Safety connection for thermally activated safety valve
SG Sight glass (transportation hook)
TS Temperature sensor for thermally activated safety valve
Ⓐ Hopper door
Ⓑ Boiler module with high limit safety cut-out
Ⓒ Ash chamber door
Ⓓ Primary air damper with servomotor
Ⓔ Boiler pump
Ⓕ Sockets for electrical connection
Ⓖ Boiler control valve with servomotor
Ⓗ Cleaning door, top
Ⓚ Flow temperature sensor (in boiler)
Ⓛ Flange for fitting the burner trolley, maintenance cover, combustion chamber (on both sides)
Ⓜ Return temperature sensor (in boiler)
Ⓝ Cleaning door, bottom
Ⓞ Motor, flue gas fan
Ⓟ Lambda probe
Ⓡ Flue gas temperature sensor
Ⓢ Secondary air damper with servomotor

5822 546 GB

Pyromat ECO (cont.)

Dimensions

Pyromat ECO ...		35	45	55	65	61	81	101	151
Part no.		**PMEA001**	**PMEA002**	**PMEA003**	**PMEA005**	**PMEA004**	**PMEA006**	**PMEA007**	**PMEA008**
a	mm	1433	1433	1490	1490	1433	1433	1490	1490
b	mm	795	795	795	795	1324	1324	1324	1324
b excl. thermal insulation	mm	686	686	686	686	1246	1246	1246	1246
b if boiler is on a transport pallet	mm	970	970	970	970				
c	mm	550	550	550	550	1080	1080	1080	1080
d	mm	214	214	214	214	480	480	480	480
e	mm	1331	1331	1389	1389	1328	1328	1386	1386
f	mm	811	811	869	869	635	635	636	636
g	mm	≥ 600	≥ 600	≥ 600	≥ 600	≥ 800	≥ 800	≥ 800	≥ 800
h	mm	≥ 200	≥ 200	≥ 200	≥ 200	≥ 400	≥ 400	≥ 400	≥ 400
k	mm	770	770	773	773	770	770	876	876
l	mm	300	300	400	400	300	300	400	400
m	mm	1892	1892	2012	2012	1892	1892	2012	2012
n	mm	500	500	500	500	630	630	630	630
o	mm	175	175	175	175	300	300	300	300
p	mm	958	958	1163	1163	1018	1018	1353	1353
q	mm	647	647	769	769	631	631	820	820

Note

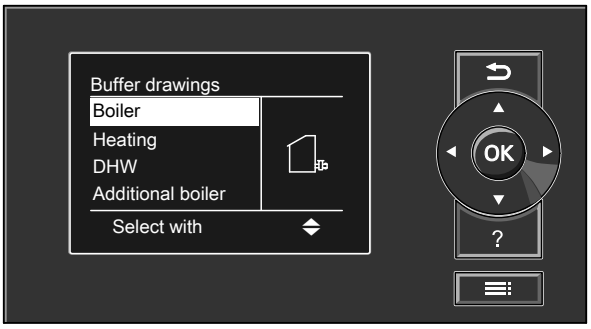
The boilers for logs up to 0.5 m long are delivered positioned vertically on a transport pallet. Pallet trucks can approach the pallet from 2 sides. The pallet makes the boiler's transport width wider. In such cases, please observe the dimensions for b.

3.1 Specification for Ecotronic

Design and function

Modular design
The Ecotronic boiler control unit is a decentralised microprocessor system. To control the boiler system, the Ecotronic comprises a PCB and programming unit (display) integrated into the boiler. 3-sensor cylinder management is part of the standard Ecotronic version.
The Ecotronic can be extended with mixer extensions (max. 3).

Display



Functions
- Constantly regulating air dampers optimise the heat-up and burnout procedure
- Lambda probe enables efficient combustion control and maximum efficiency
- Return temperature raising facility
- Release of the complete heating output during the start phase of the boiler to the consumers (no output transfer into cylinder via return)
- Accurate temperature stratification of the heating water buffer cylinder with the buffer cylinder control valve
- Use of the residual boiler heat after burnout
- Supporting auxiliary and service functions
- Control of an additional oil burner or a second heat source
- Protection against overheating through heat transfer to the heating water buffer cylinder, shutting down the flue gas fan and closing the primary air damper

3.2 Accessories for Ecotronic

The standard Ecotronic version can be customised with extension kits for heating circuits with mixers. Heat consumers or DHW cylinders can be incorporated into the control system.

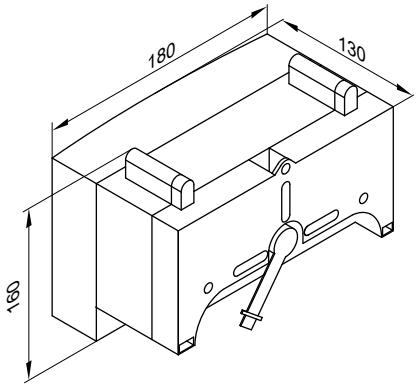
Mixer extension kit with integral mixer motor

Part no. 7301 063
KM BUS subscriber

Components:
- Mixer PCB with mixer motor for Viessmann mixer DN 20 to 50 and R ½ to 1¼
- Flow temperature sensor (contact temperature sensor)
- Plug for connecting the heating circuit pump
- Power cable (3.0 m long) with plug
- BUS cable (3.0 m long) with plug

The mixer motor is mounted directly onto the Viessmann mixer DN 20 to 50 and R ½ to 1¼.

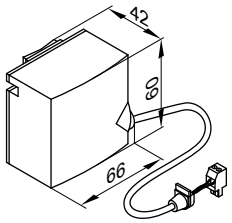
Mixer PCB with mixer motor



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	5.5 W
IP rating	IP 32D to EN 60529 ensure through appropriate design/installation
Safety category	I
Permissible ambient temperature	
– during operation	0 to +40 °C
– during storage and transport	–20 to +65 °C
Rated breaking capacity of the relay output for heating circuit pump [20]	2(1) A 230 V~
Torque	3 Nm
Runtime for 90 ° ◁	120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

Control unit (cont.)

Specification

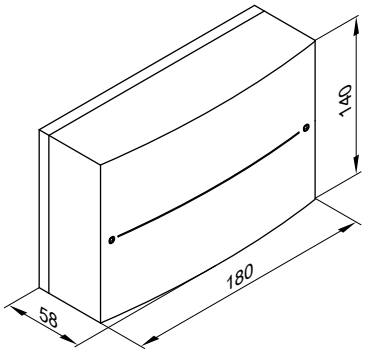
Lead length	2.0 m, fully wired
IP rating	IP 32D to EN 60529 ensure through appropriate design/installation
Sensor type	Viessmann NTC, 10 kΩ at 25 °C
Permissible ambient temperature	
– during operation	0 to +120 °C
– during storage and transport	–20 to +70 °C

Extension kit for one heating circuit with mixer

Mixer extension kit for separate mixer motor

Part no. 7301 062
KM BUS subscriber
For the connection of a separate mixer motor.
Components:
- Mixer PCB for the connection of a separate mixer motor
- Flow temperature sensor (contact temperature sensor)
- Plug for connecting the heating circuit pump and the mixer motor
- Power cable (3.0 m long) with plug
- BUS cable (3.0 m long) with plug

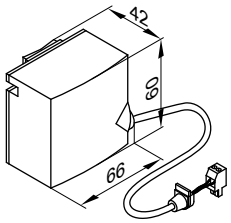
Mixer PCB



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
IP rating	IP 20D to EN 60529 Ensure through design/installation
Safety category	I
Permissible ambient temperature	
– During operation	0 to +40 °C
– During storage and transport	–20 to +65 °C
Rated relay output breaking capacity	
Heating circuit pump [20]	2(1) A 230 V~
Mixer motor	0.1 A 230 V~
Required runtime of the mixer motor for 90 ° ◁	approx. 120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

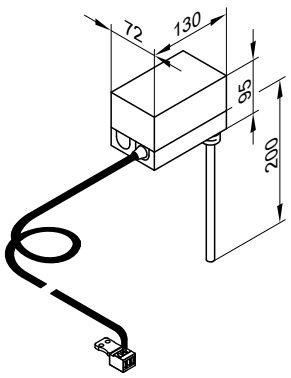
Specification

Cable length	5.8 m, fully wired
IP rating	IP 32D to EN 60529 Ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– During operation	0 to +120 °C
– During storage and transport	–20 to +70 °C

Temperature limiter to restrict the maximum temperature of underfloor heating systems

Immersion temperature controller

Part no. 7151 728
May be used as a maximum temperature limiter for underfloor heating systems.
The temperature limiter is installed into the heating flow and switches the heating circuit pump OFF if the flow temperature is too high.



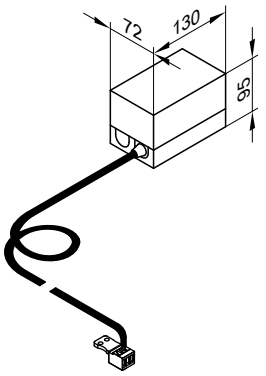
Control unit (cont.)

Specification

Cable length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	max. 11 K
Breaking capacity	6(1.5) A 250 V~
Setting scale	inside the casing
Stainless steel sensor well	R ½ x 200 mm
DIN reg. no.	DIN TR 1168

Contact temperature controller

Part no. 7151 729
May be used as a maximum temperature limiter for underfloor heating systems (only in conjunction with metal pipes).
The temperature limiter is installed into the heating flow and switches the heating circuit pump OFF if the flow temperature is too high.



Specification

Cable length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	max. 14 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	inside the casing
DIN reg. no.	DIN TR 1168

3

Plug 52 for mixer motor

Part no. 7415 057
3 pce

Required for mixer motors without a cable.

Temperature sensor

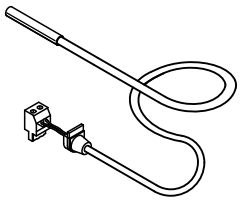
Immersion temperature sensor for DHW heating as a cylinder temperature sensor (to plug 17 of the extension kit). The contact temperature sensor, which is included as part of the standard delivery of the extension kit, is used as a return temperature sensor (to plug 2 of the extension kit).
The sensor well is not included in the standard delivery and must be ordered separately.

Immersion temperature sensor

Part no. 7438 702
To capture the temperature in a sensor well.

Specification

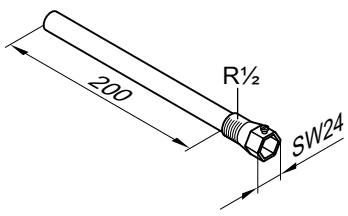
Cable length	5.8 m, fully wired
IP rating	IP 32 to EN 60529, ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– During operation	0 to +90 °C
– During storage and transport	−20 to +70 °C



Stainless steel sensor well

Part no. 7819 693

- For on-site DHW cylinders.
- Part of the standard delivery of Viessmann DHW cylinders.

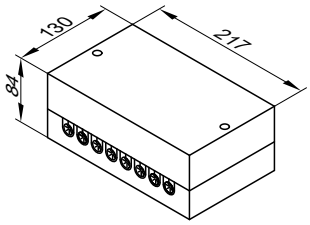


5822 546 GB

External extension H5

Part no. 7199 249
Function extension inside the casing.
With plug [150] for the following functions:
- External demand and blocking
  or
  Connection of a flue gas damper
- Connection of additional safety equipment

Cable 2.0 m long with plugs "X12" and [41] for connection to the control unit.



Specification

Rated voltage	230 V–
Rated frequency	50 Hz
Rated current	6 A
Protection class	I
Protection	IP 20 to EN 60529; safeguard through appropriate design and installation
Permissible ambient temperature	
– during operation	0 to +40 °C
– during storage and transport	-20 to +65 °C

Vitotrol 350

CAN BUS subscriber
Control unit extension with touch screen

The Vitotrol control unit extension is used for:
- Remote control of the boiler with all relevant setting options
- Display of all information pertinent to the boiler
- Charge indicator for the heating water buffer cylinder
- Expansion of the system to include up to 20 additional control unit extensions by CAN BUS (controller modules, data cable and controllers required)

  Possible extensions include:
  – Control of a heating circuit with 1 temperature sensor
  – Control of DHW heating with 2 temperature sensors
  – Control of a long-distance heat line with 1 temperature sensor (sub-distributor)
- Setting of parameters and control of all extensions connected via controller modules

Standard delivery:
- Programming unit with touch screen
- Wall socket for wall mounting
- Fixing materials for wall mounting

Extensions and sensors that can be used by expanding the system with Vitotrol together with controller modules

	Vitotrol with 1 controller module	Vitotrol with 2 controller modules	Vitotrol with 3 controller modules	Vitotrol with 4 controller modules	Vitotrol with 5 controller modules
Max. number of extensions	4	8	12	16	20
Max. number of sensors	8	16	24	32	40

Accessories for Vitotrol 350

Controller module

Part no. 7453 165
- Up to 4 extensions per controller module
- 5 controller modules can be combined in series via CAN BUS
- Max. 20 extensions can be connected to Vitotrol 350

Standard delivery:
- Controller module in plastic casing (length 325 mm, height 195 mm, depth 75 mm)

Data line 10 m

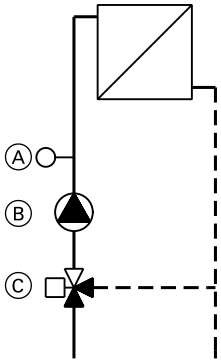
Part no. 7522 616
CAN BUS data cable. Type of cable: LiYCY 2x2x0,34 mm^2, screened.

Each additional controller module requires a data cable.
The total length of all CAN BUS cables must not exceed 200 m.

Control unit (cont.)

HC temperature sensor (heating circuit controller)

Part no. 7528 121



Weather-compensated heating control unit with digital time switch for setback mode according to individual day and seven-day program, with pump control unit, frost protection function, eco mode and limited flow temperature.

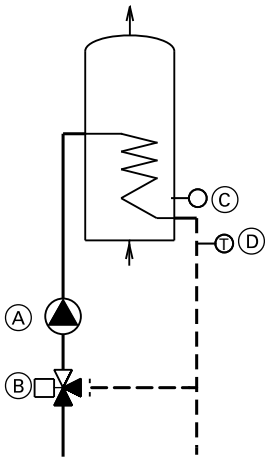
Standard delivery
- QAD 2012 contact temperature sensor

3

Ⓐ QAD 2012 contact temperature sensor
Ⓑ Pump
Ⓒ Mixing valve

DHW heating temperature sensor (DHW heating controller)

Part no. 7528 122



When the temperature at the cylinder temperature sensor falls below the set value, the circulation pump for cylinder heating starts and the DHW cylinder is heated.
The flow rate of the heating water is controlled via the return temperature (flow control). This results in optimum stratification of the buffer cylinder with sustained high temperature at the cylinder flow. The heating periods (individual day and seven-day program) can be adjusted via the integrated time switch.

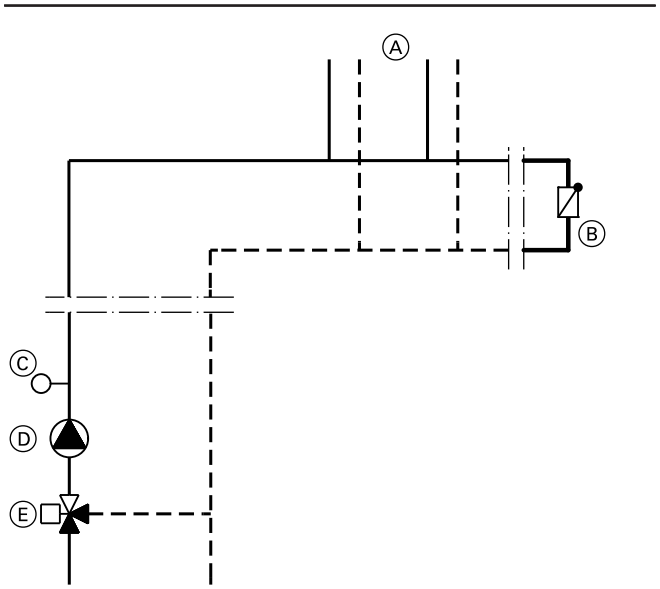
Standard delivery
- QAD 2012 contact temperature sensor
- Pt1000 temperature sensor (∅ 6 mm, L = 2000 mm) with sensor well

Note
The standard delivery does not include positions Ⓐ and Ⓑ.

Ⓐ Pump
Ⓑ Control valve
Ⓒ Pt1000 temperature sensor
Ⓓ QAD 2012 contact temperature sensor

Control unit (cont.)

Long-distance heat line (sub-distributor)



Order the following: HC temperature sensor, part no. 7528 121
Via a long-distance heat line, a building is supplied with separate heat distribution. The long-distance line is controlled upstream according to the demand of the heating circuits. The heating circuits of the separate heat distribution must be controlled via the Vitotrol 350.

Note
The long-distance heat line can only be used if Köb extensions are also being used in the sub-distributor.

Ⓐ Sub-distributor
Ⓑ Bypass
Ⓒ QAD 2012 contact temperature sensor
Ⓓ Pump
Ⓔ Control valve

Adjacent building
The line to the adjacent building is controlled with weather compensation via the heating circuit control unit.

An adjacent building line can be implemented using a controller module for the adjacent building and the required controllers.

D-SUB 9 adapter

Part no. 7395 520
Adapter for connecting the data cable to the boiler.

Information on room temperature hook-up (RS function) for remote control units Vitotrol 200A and Vitotrol 300A

Never activate the RS function in the case of underfloor heating circuits (inertia).

In heating systems that have heating circuits with and without mixers, the RS function must only affect the heating circuits with mixers.

Information on the Vitotrol 200A and Vitotrol 300A

One Vitotrol 200A or one Vitotrol 300A can be used for every heating circuit in a heating system.
The Vitotrol 200A can regulate one heating circuit; the Vitotrol 300A up to three heating circuits.

No more than two Vitotrol 200A or one Vitotrol 300A can be connected to the control unit.

Vitotrol 200A

Part no. Z008 341
KM BUS subscriber
- Indications:
  - Room temperature
  - Outside temperature
  - Operating condition
- Settings:
  - Set room temperature for standard mode (day temperature)

Note
The set room temperature for reduced mode (night temperature) is set at the control unit.

  - Operating program
- Party and economy mode can be enabled via keys
- Integral room temperature sensor for room temperature hook-up (only for one heating circuit with mixer)

Control unit (cont.)

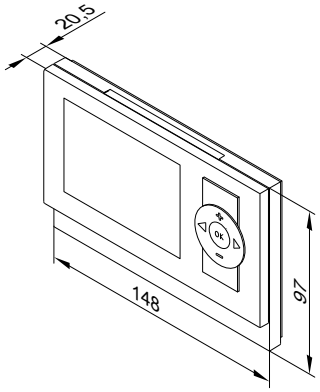
Installation site:
- Weather-compensated mode:
  Installation anywhere in the building.
- Room temperature hook-up:
  The integral room temperature sensor captures the actual room temperature and corrects the flow temperature if necessary.

  The captured room temperature is dependent on the installation site:
  – Main living room on an internal wall opposite radiators.
  – Not on shelves or in recesses.
  – Never install immediately by a door or heat source (e.g. direct sunlight, fireplace, TV set, etc.).

Connection:
- Two-core cable, length max. 50 m (even if connecting several remote control units).
- Never route this cable immediately next to 230/400 V cables.
- LV plug as standard delivery.

Specification

Power supply via KM BUS	
Power consumption	0.2 W
Safety category	III
IP rating	IP 30 to EN 60529 Ensure through design/installation
Permissible ambient temperature	
– during operation	0 to +40 °C
– during storage and transportation	−20 to +65 °C
Setting range of the set room temperature for standard mode	3 to 37 °C



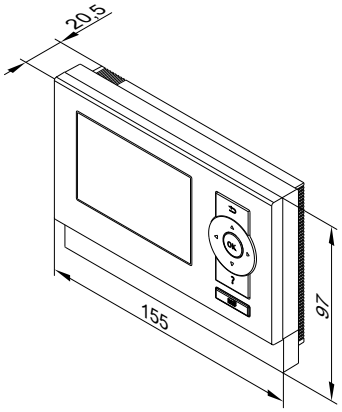
Vitotrol 300 A

Part no. Z008 342
KM BUS subscriber.
- Displays:
  – Room temperature
  – Outside temperature
  – Operating program
  – Operating condition
- Settings:
  – Set room temperature for standard mode (day temperature) and reduced mode (night temperature)
  – Set DHW temperature
  – Operating program, switching times for heating circuits, DHW heating and DHW circulation pump plus further settings via plain text menu on the display
- Party and economy mode can be enabled via the menu
- Integral room temperature sensor for room temperature hook-up (only for one heating circuit with mixer)

Installation location:
- Weather-compensated mode:
  Installation anywhere in the building.
- Room temperature hook-up:
  The integral room temperature sensor captures the actual room temperature and effects any necessary correction of the flow temperature.

  The captured room temperature depends on the installation site:
  – Main living room on an internal wall opposite radiators.
  – Not on shelves or in recesses.
  – Never in the immediate vicinity of doors or close to heat sources (e.g. direct sunlight, fireplace, TV set, etc.).

Connection:
- 2-core lead, length max. 50 m (even if connecting several remote control units).
- Never route this cable immediately next to 230/400 V cables.
- LV plug included in standard delivery.



Control unit (cont.)

Specification

Power supply via KM BUS	
Power consumption	0.5 W
Safety category	III
IP rating	IP 30 to EN 60529 Ensure through design/installation
Permissible ambient temperature	
– During operation	0 to +40 °C
– During storage and transport	−20 to +65 °C
Setting range for set room temperature	3 to 37 °C

4.1 Boiler accessories

Thermally activated safety valve 100 °C

Part no. 7387 405
Standard version for fixed response temperature approx. 100° C, connection R ¾
Standard delivery:
Thermally activated safety valve incl. sensor well

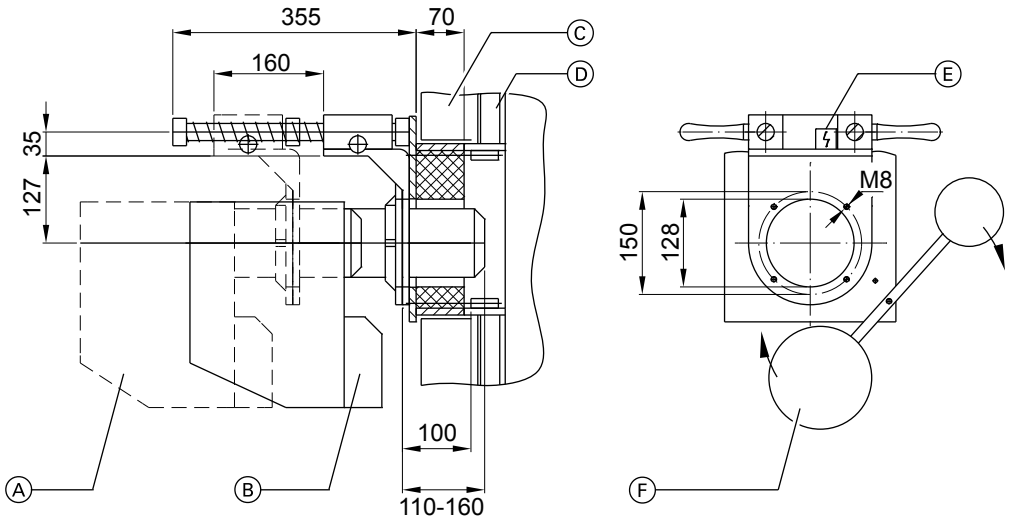
Note
Even if this safety equipment is not required by local safety regulations, its use is strongly recommended.

Burner trolley

Part no. 7437 906
Allows an oil burner to be pulled out from the boiler.
For fitting on the Pyromat on the l.h or r.h side; retracting the burner manually against spring pressure; when pulled out, the weight valve closes automatically, providing protection of the burner against contamination; fuse protected with a limit switch.
Flange diameter, internal: 128 mm
PCD: 150 mm
Retraction stroke: 160
Weight without burner: 24 kg

Standard delivery:
- 1 limit switch mounted on trolley
- 1 limit switch, loose, for on-site installation on fill cover

Note
The burner trolley is always needed if an oil burner is to be used.



Ⓐ Burner pulled out with closed cover (solid fuel operation)
Ⓑ Burner retracted (oil operation)
Ⓒ Insulation
Ⓓ Boiler jacket
Ⓔ Limit switch
Ⓕ Weight valve

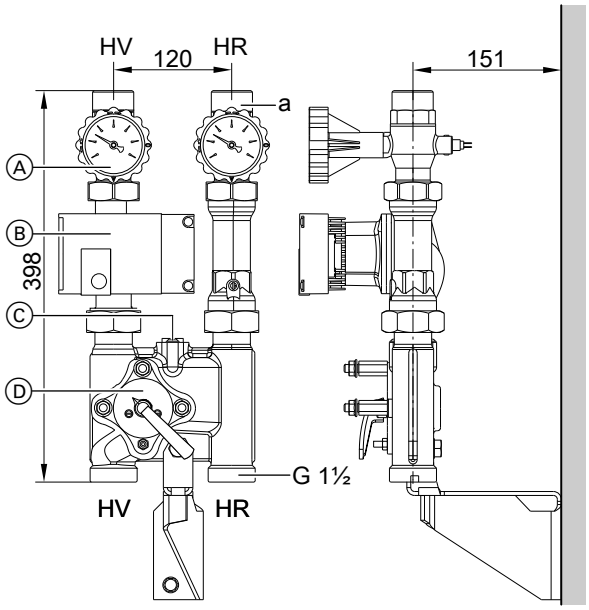
4.2 Accessories for heat distribution

Divicon heating circuit distributor

Design and function

- Available with R ¾, R 1 and R 1¼ connections.
- With heating circuit pump, check valve, ball valves with integral thermometers and 3-way mixer or without mixer.
- Quick and simple installation through pre-assembled unit and compact design.
- Low radiation losses through all-round thermal insulation shells.
- Low electricity costs and precise control characteristics through the use of high efficiency pumps and optimised mixer curve.
- The bypass valve for hydraulic balancing of the heating system is available as an accessory as a threaded component for inserting into the prepared hole in the cast body.
- For direct connection to the boiler by means of a pipe assembly (single installation) or for wall mounting with a single, double or triple manifold.
- Also available as a kit. For further details, see the Viessmann pricelist.

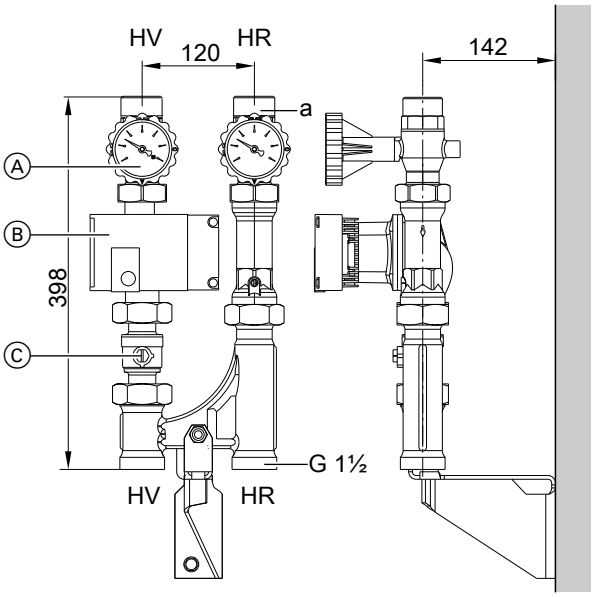
For part numbers in conjunction with the different circulation pumps, see the Viessmann pricelist.
The dimensions of the heating circuit distributor are the same, with or without mixer.



Divicon with mixer (wall mounting, shown without thermal insulation or mixer drive extension kit)

HR Heating return
HV Heating flow
Ⓐ Ball valves with thermometer (as programming unit)
Ⓑ Circulation pump
Ⓒ Bypass valve (accessories)
Ⓓ Mixer-3

Heating circuit connection	**R**	**¾**	**1**	**1¼**
Flow rate (max.)	m^3/h	1.0	1.5	2.5
a (female)	Rp	¾	1	1¼
a (male)	G	1¼	1¼	2



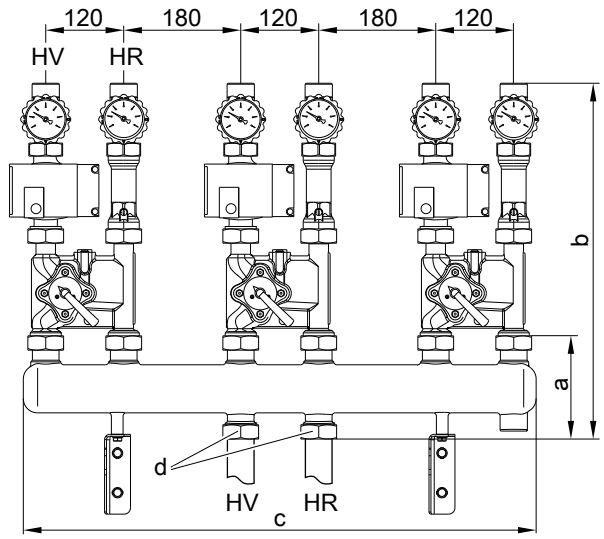
Divicon without mixer (wall mounting, shown without thermal insulation)

HR Heating return
HV Heating flow
Ⓐ Ball valves with thermometer (as programming unit)
Ⓑ Circulation pump
Ⓒ Ball valve

Heating circuit connection	**R**	**¾**	**1**	**1¼**
Flow rate (max.)	m^3/h	1.0	1.5	2.5
a (female)	Rp	¾	1	1¼
a (male)	G	1¼	1¼	2

Installation accessories (cont.)

Installation example: Divicon with triple manifold

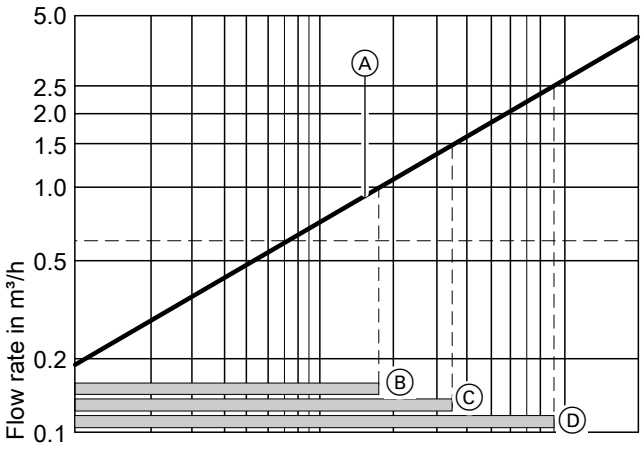


(shown without thermal insulation)

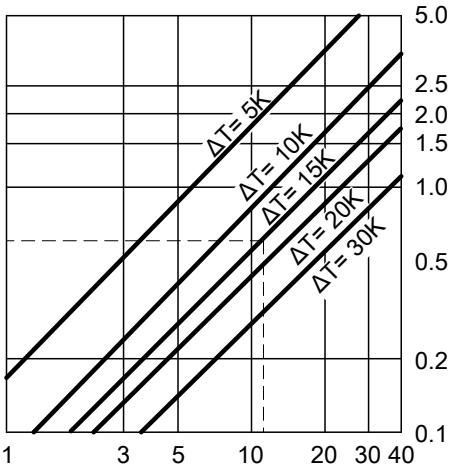
Dimensions	Manifold with heating circuit connection	
	R ¾ and R 1	R 1¼
a	135	183
b	535	583
c	784	784
d	G 1¼	G 2

HR Heating return
HV Heating flow

Determining the required nominal diameter



Mixer control characteristics



Heating circuit output in kW

Ⓐ Divicon with mixer-3
The operating ranges marked Ⓑ to Ⓓ provide optimum control characteristics with the Divicon mixer:
Ⓑ Divicon with mixer-3 (R ¾)
Application range: 0 to 1.0 m ^{3}/h
Ⓒ Divicon with mixer-3 (R 1)
Application range: 0 to 1.5 m ^{3}/h
Ⓓ Divicon with mixer-3 (R 1¼)
Application range: 0 to 2.5 m ^{3}/h

Example:
Heating circuit for radiators with an heating output of $\dot{Q}$ = 11.6 kW
Heating system temperature 75/60 °C (ΔT = 15 K)

c Specific thermal capacity
$\dot{m}$ Mass flow rate
$\dot{Q}$ Heating output
$\dot{V}$ Flow rate

$$\dot{Q} = \dot{m} \cdot c \cdot \Delta T \qquad c = 1.163 \ \frac{Wh}{kg \cdot K} \qquad \dot{m} \triangleq \dot{V} \ (1\ kg \approx 1\ dm^3)$$

$$\dot{V} = \frac{\dot{Q}}{c \cdot \Delta T} = \frac{11600\ W \cdot kg \cdot K}{1.163\ Wh \cdot (75\text{-}60)\ K} = 665 \ \frac{kg}{h} \triangleq 0.665 \ \frac{m^3}{h}$$

Select the smallest possible mixer within the application limit with the value $\dot{V}$.

Result of this example: Divicon with mixer-3 (R ¾)

Circulation pump curves and pressure drop on the heating water side
The residual pump head results from the differential between the selected pump curve and the pressure drop curve of the respective heating circuit distributor or further components (pipe assembly, distributor etc.).
The following pump graphs show the pressure drop curves of the different Divicon heating circuit distributors.
Maximum flow rate for Divicon:
- with R ¾ = 1.0 m^3/h
- with R 1 = 1.5 m^3/h
- with R 1¼ = 2.5 m^3/h

Example:
Flow rate $\dot{V}$ = 0.665 m^3/h

Selected:
- Divicon with mixer R ¾
- Wilo Yonos Para 25/6 circulation pump, variable differential pressure operating mode and set to maximum delivery head
- Pump rate 0.7 m^3/h

Head of the relevant pump curve:	48 kPa
Divicon pressure drop:	3.5 kPa
Residual head:	48 kPa – 3.5 kPa = 44.5 kPa.

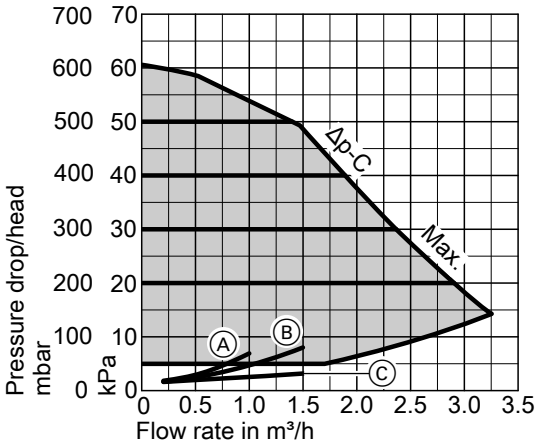
Note
For further components (pipe assembly, distributor, etc.) determine the pressure drop and deduct it from the residual head.

Differential pressure-dependent heating circuit pumps
According to the [German] Energy Saving Ordinance (EnEV), circulation pumps in central heating systems must be sized in accordance with current technical rules.
Ecodesign Directive 2009/125/EC requires high efficiency circulation pumps to be used throughout Europe from 1 January 2013, if the pumps are not installed in the heat source.

Design information
The use of differential pressure-dependent heating circuit pumps requires heating circuits with variable pump rates. These include, for example, single and twin line heating systems with thermostatic valves and underfloor heating systems with thermostatic or zone valves.

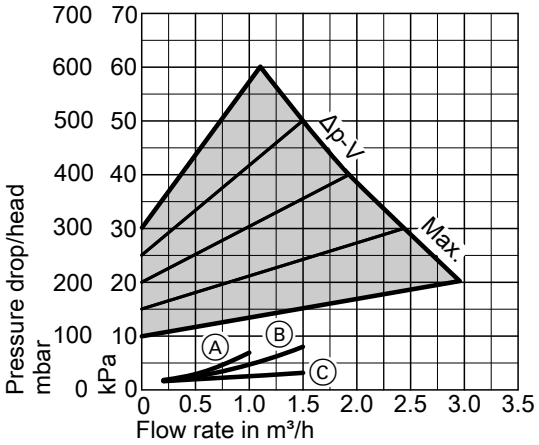
Wilo Yonos Para 25/6
- Very economical HE pump (compliant with Energy Label A)

Operating mode: Constant differential pressure



Ⓐ Divicon R ¾ with mixer
Ⓑ Divicon R 1 with mixer
Ⓒ Divicon R ¾ and R 1 without mixer

Operating mode: Variable differential pressure



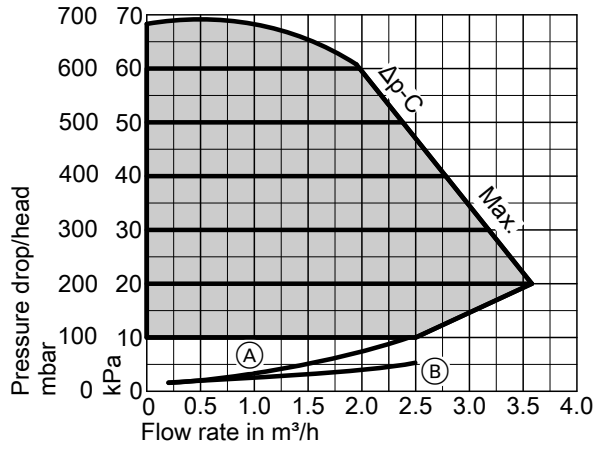
Ⓐ Divicon R ¾ with mixer
Ⓑ Divicon R 1 with mixer
Ⓒ Divicon R ¾ and R 1 without mixer

4

Installation accessories (cont.)

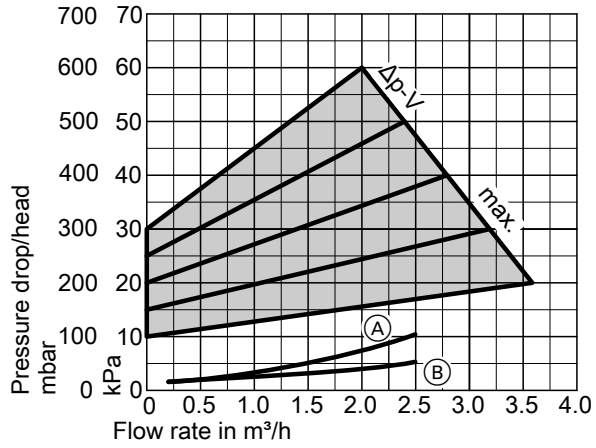
Wilo Stratos Para 25/1-7
- Very economical HE pump (compliant with Energy Label A)

Operating mode: Constant differential pressure



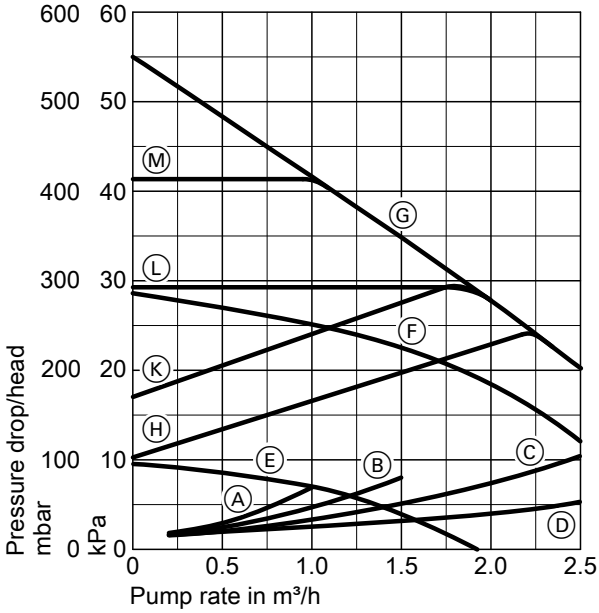
Ⓐ Divicon R 1¼ with mixer
Ⓑ Divicon R 1¼ without mixer

Operating mode: Variable differential pressure



Ⓐ Divicon R 1¼ with mixer
Ⓑ Divicon R 1¼ without mixer

Grundfos Alpha 2-60
- Very economical HE pump (compliant with Energy Label A)
- With power consumption display
- With Autoadapt function (automatic matching to the pipework)
- With night setback function



Ⓐ Divicon R ¾ with mixer
Ⓑ Divicon R 1 with mixer
Ⓒ Divicon R 1¼ with mixer
Ⓓ Divicon R ¾, R 1 and R 1¼ without mixer
Ⓔ Stage 1
Ⓕ Stage 2
Ⓖ Stage 3
Ⓗ Min. proportional pressure
Ⓚ Max. proportional pressure
Ⓛ Min. constant pressure
Ⓜ Max. constant pressure

Bypass valve

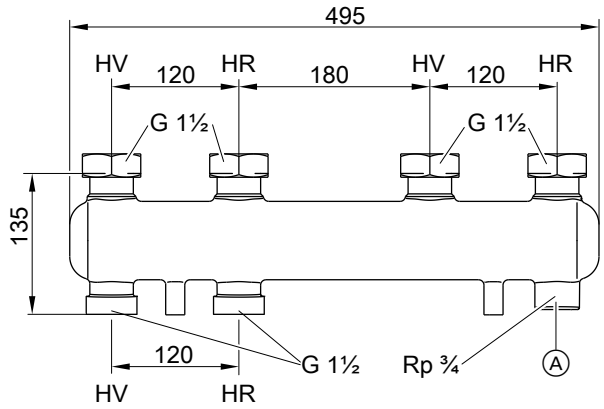
Part no. 7464 889
To hydraulically balance the heating circuit with mixer. Inserted into the Divicon.

4

Installation accessories (cont.)

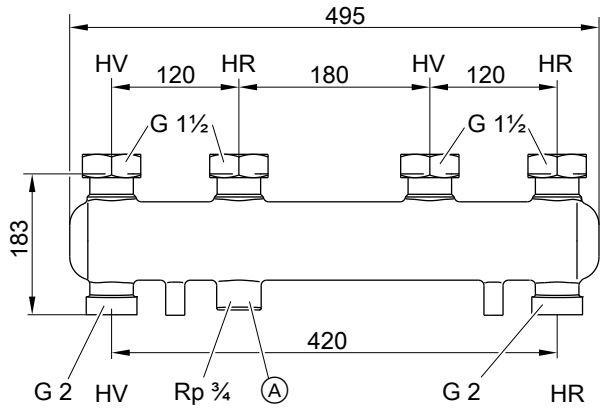
Manifold
With thermal insulation
Wall mounted with wall mounting bracket to be ordered separately.
The connection between boiler and manifold must be made on site.

For 2 Divicon
Part no. 7460 638 for Divicon R ¾ and R 1



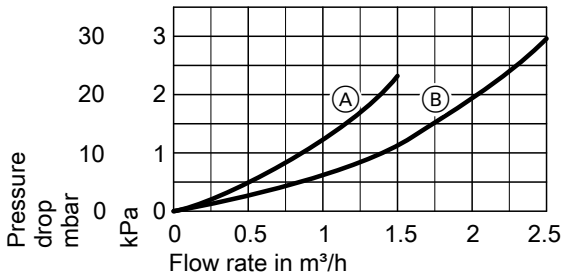
Ⓐ Connection option for expansion vessel
HV Heating water flow
HR Heating water return

Part no. 7466 337 for Divicon R 1¼



Ⓐ Connection option for expansion vessel
HV Heating water flow
HR Heating water return

Pressure drop



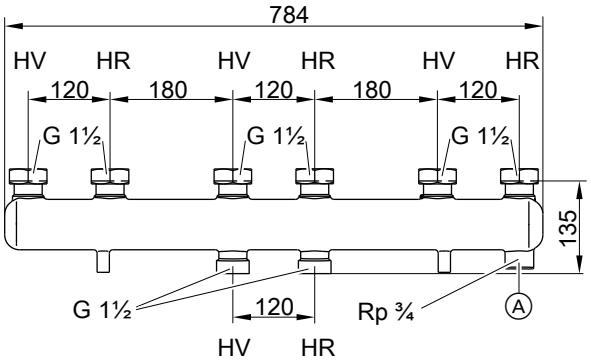
Ⓐ Manifold for Divicon R ¾ and R 1
Ⓑ Manifold for Divicon R 1¼

Note
The curves always refer to one pair of connectors only (HV/HR).

4

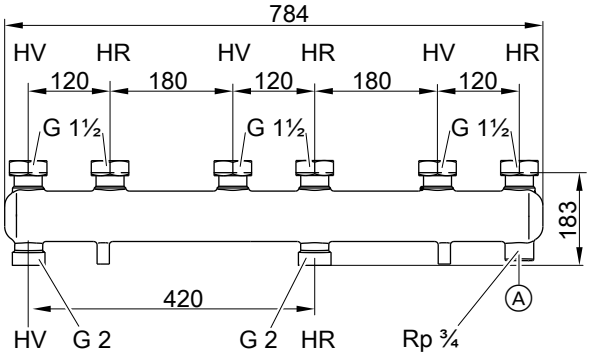
Installation accessories (cont.)

For 3 Divicon
Part no. 7460 643 for Divicon R ¾ and R 1



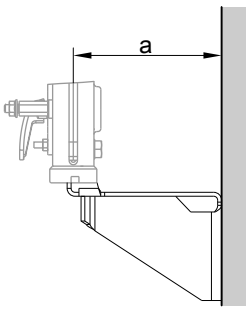
Ⓐ Connection option for expansion vessel
HV Heating water flow
HR Heating water return

Part no. 7466 340 for Divicon R 1¼



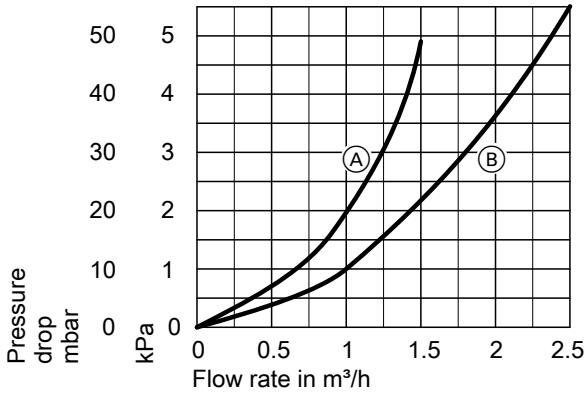
Ⓐ Connection option for expansion vessel
HV Heating water flow
HR Heating water return

Wall mounting bracket
Part no. 7465 894
For individual Divicon
With screws and rawl plugs.



For Divicon		With mixer	Without mixer
a	mm	151	142

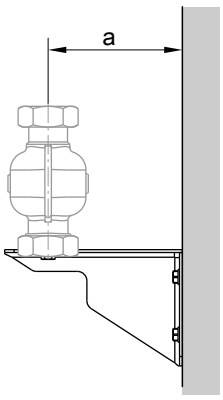
Pressure drop



Ⓐ Manifold for Divicon R ¾ and R 1
Ⓑ Manifold for Divicon R 1¼

Note
The curves always refer to one pair of connectors only (HV/HR).

Part no. 7465 439
For manifold
With screws and rawl plugs.



For Divicon		R ¾ and R 1	R 1¼
a	mm	142	167

Motorised two-way valve

Part no. 7441 735
Used as control valve for flow rate control during DHW heating

Standard delivery:
- Motorised 2-way valve incl. gaskets, with fittings
- Valve drive SSY 319

Motorised three-way valve

Designation	DN	Part no.
Motorised three-way valve, VXG 48.25/SSY 319	25	7441 732
Motorised three-way valve, VXG 48.32/SQS 35.0	32	7441 731
Motorised three-way valve, VXG 48.40/SQS 35.0	40	7441 730

Standard delivery:
- Motorised 3-way valve incl. gaskets, with fittings
- Valve drive SSY 319 or SQS 35.0 (see following table)

Precise control characteristics and an airtight seal without leaks.

DN [mm]	Kvs [m^3/h]	Servomotor 230 V	Incl. complete fitting
25	10	SSY 319	R 1 – G 1½
32	16	SQS 35.0	R 1¼ – G 2
40	20	SQS 35.0	R 1½ – G 2¼

Note
No individual issue: only supplied as part of an overall system

Pumps

Wilo Stratos PICO high efficiency pumps
- ECM technology and integral electronic output control for variable differential pressure control
- Pre-selectable control types for optimum output matching
- Automatic setback mode
- Integral motor overload relay
- LCD screen showing continuous consumption in watts
- Ventilation routine for automatic ventilation of the rotor chamber
- Pump casing made from grey cast iron
- **ErP READY**
- System temperature from +2 °C to +110 °C (no icing up)
- 1 × 230 V~, 50/60 Hz
- IP rating: IP 44

Designation	Part no.	Rp mm	Installed length mm	Nominal pressure
Wilo Stratos PICO 25/1-4	7439 062	1	180	PN 10
Wilo Stratos PICO 25/1-6	7439 063	1	180	PN 10
Wilo Stratos PICO 30/1-4	7439 064	1¼	180	PN 10
Wilo Stratos PICO 30/1-6	7439 065	1¼	180	PN 10

Note
We reserve the right to select the pump manufacturers and types.
No individual issue: Only supplied as part of an overall system.

5.1 Overview of heating water buffer cylinders that can be used

Heating water buffer cylinder	Application	
HPM	**For storing heating water** For Pyromat Eco: 1500 and 2500 litre cylinder capacity	from p. 29
Vitocell 100-E, type SVPA	**For storing heating water** For Pyromat Eco: Cylinder capacity 950 litres	from p. 31
Vitocell 140–E, type SEIA	**For storing heating water** For Pyromat Eco: Cylinder capacity 950 litres	from p. 33
Vitocell 160–E, type SESA	**For storing heating water** For Pyromat Eco: Cylinder capacity 950 litres	from p. 33

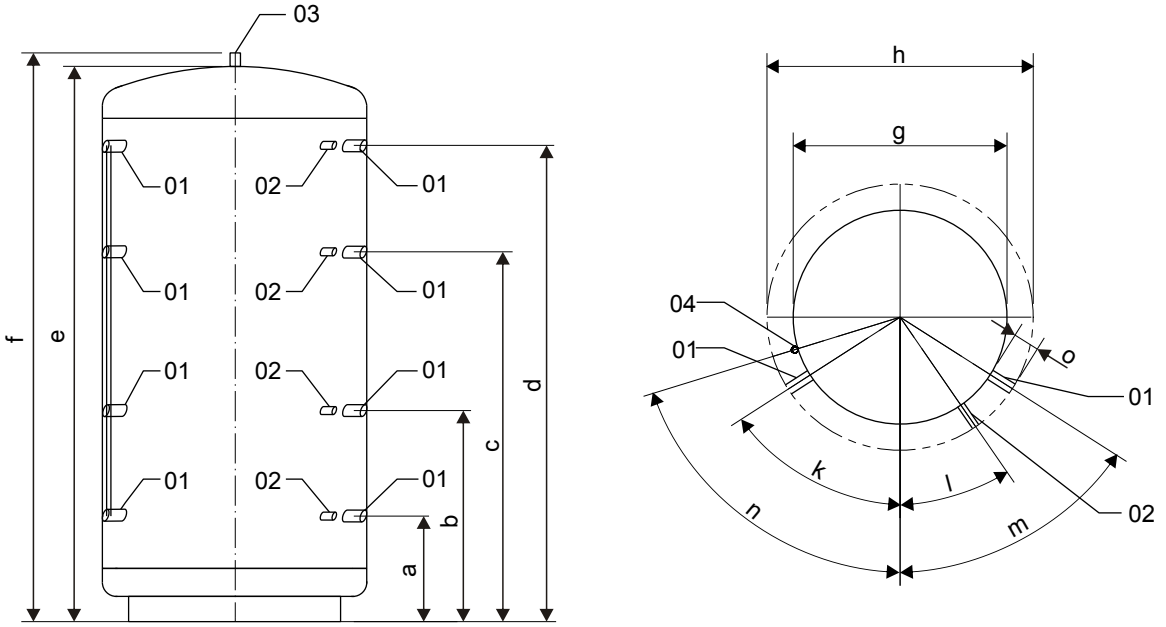
5.2 Heating water buffer cylinder HPM

Buffer cylinder for integration in a wood combustion system with a maximum rated heating output of 150 kW. Type HPM 2500 and HPM 3000 can be used for a rated heating output of up to 220 kW.

Version:
- Steel S 235 JRG2, untreated inside, anti-rust coating outside
- Operating pressure: max. 3.0 bar; test pressure: 4.5 bar
- Max. temperature: 95 °C
- Connections: 8 female connections R 1½ or 2, 4 female connections R ½, 1 sensor pipe 14 x 1.5 mm, 1 female connection top R 1¼, air vent valve R 1

Flexible foam insulation for HPM
The insulation is made from 100 mm thick flexible PUR foam elements with a skai jacket.
Fire safety category B3.

Note
On the inside, there are deflector plates at the connections marked 01. Immersion heaters should not be inserted here.



Part no. buffer cylinder HPM			**7424 132**	**7424 134**
Part no. flexible foam insulation to buffer cylinder HPM			**7424 138**	**7424 140**
Type			**1500**	**2500**
Capacity		l	1500	2304
Type of support			Support feet	Support feet
Weight				
Total weight		kg	203	281
Weight of heating water buffer cylinder		kg	165	236
Weight of insulation		kg	38	45
Dimensions				
Height when tilted		mm	2195	2395
a		mm	380	535
b		mm	825	975
c		mm	1350	1415
d		mm	1760	1855
f	Height excl. insulation	mm	2150	2280
	Height incl. insulation	mm	2200	2330
g	Diameter without insulation	mm	1000	1250
h	Diameter with insulation	mm	1200	1450

5

Heating water buffer cylinder (cont.)

Part no. buffer cylinder HPM			**7424 132**	**7424 134**
Part no. flexible foam insulation to buffer cylinder HPM			**7424 138**	**7424 140**
Type			**1500**	**2500**
Connections				
k			50°	50°
l			32.9°	36.2°
m			50°	50°
n			70°	70°
o	Length of female connections	mm	100	100
01	Female connections, flow/return	R	1½	2
02	Female connections, sensor	R	½	½
03	Air vent valve	R	1¼	1¼
04	Sensor pipe		Ø14xL1400	Ø14xL1250

5

5.3 Heating water buffer cylinder Vitocell 100-E, type SVPA

Heating water buffer cylinder Vitocell 100-E, type SVPA

Heating water buffer cylinder Vitocell 100-E, type SVPA		
Cylinder capacity (litres)	750	950
Part no.	Z007362	Z007363

Delivered condition

Vitocell 100-E, type SVPA
750 and 950 litres

Heating water buffer cylinder, made from steel.
- Welded sensor wells
  - 4 sensor wells
- 3 additional fittings for thermometer sensors or additional sensors
- Adjustable feet
- Thermal insulation, packed separately

The colour of the plastic-coated thermal insulation is Vitosilver.

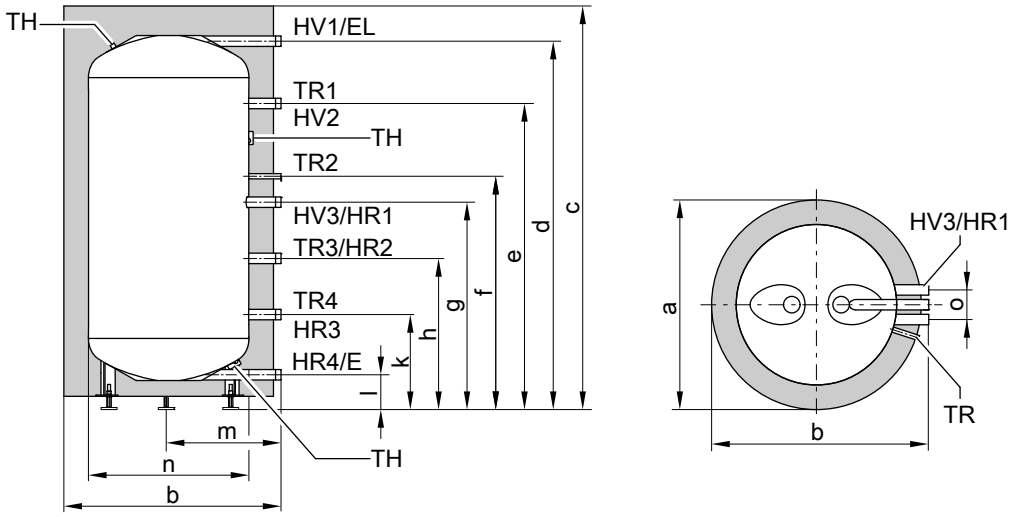
Specification

For storing heating water in conjunction with solar collectors, heat pumps and solid fuel boilers.

Suitable for the following systems:
- Heating water flow temperature up to **110 °C**
- Operating pressure on the heating side up to **3 bar**

Cylinder capacity		**l**	**750**	**950**
Dimensions				
Length (∅)				
– incl. thermal insulation	a	mm	1004	1004
– excl. thermal insulation		mm	790	790
Width	b	mm	1059	1059
Height				
– incl. thermal insulation	c	mm	1895	2195
– excl. thermal insulation		mm	1814	2120
Height when tilted excl. thermal insulation and adjustable feet		mm	1890	2195
Weight				
– incl. thermal insulation		kg	147	168
– excl. thermal insulation		kg	125	143
Connections				
Heating water flow and return		R	2	2
Standby heat loss q_{BS} at 45 K temperature differential (actual value to DIN 4753-8)		kWh/24 h	3.4	3.9

Heating water buffer cylinder (cont.)



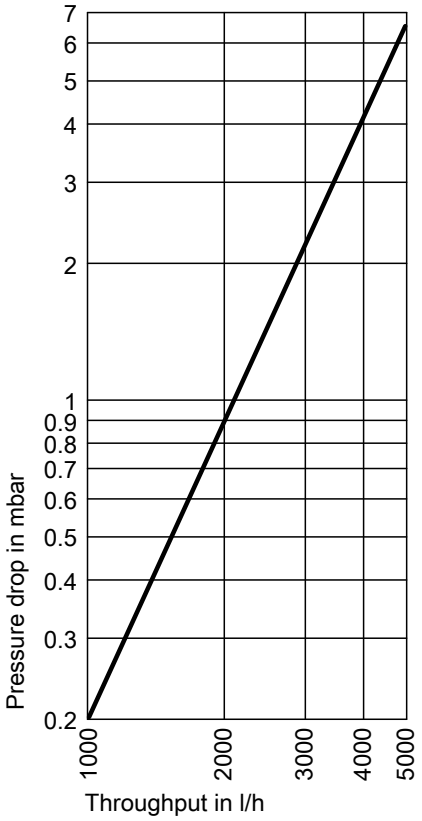
Vitocell 100-E (type SVPA, 750 and 950 litres)

E Drain
EL Air vent valve
HR Heating water return
HV Heating water flow
TH Retainers for thermometer sensor or additional sensor
TR Sensor well for cylinder temperature sensor or control thermostat

Dimensions Vitocell 100-E

Cylinder capacity		**l**	**750**	**950**
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1777	2083
	e	mm	1547	1853
	f	mm	1067	1219
	g	mm	967	1119
	h	mm	676	752
	k	mm	386	386
	l	mm	155	155
	m	mm	535	535
∅ excl. thermal insulation	n	mm	∅ 790	∅ 790
	o	mm	140	140

Pressure drop on the heating water side



Vitocell 100-E

5.4 Heating water buffer cylinders Vitocell 140-E, type SEIA and 160-E, type SESA

Heating water buffer cylinders Vitocell 140-E, type SEIA and 160-E, type SESA

Heating water buffer cylinder Vitocell 140-E , type SEIA		
Cylinder capacity (litres)	750	950
Part no.	Z007364	Z007365

Heating water buffer cylinders Vitocell 160-E, type SESA		
Cylinder capacity (litres)	750	950
Part no.	Z007366	Z007367

Delivered condition

Vitocell 140-E, type SEIA
750 and 950 litres

Heating water buffer cylinder, made from steel.
- 4 welded-in sensor wells
- 3 additional fittings for thermometer sensors or additional sensors
- Adjustable feet
- Solar indirect coil
- Air vent valve for solar indirect coil
- Thermal insulation, packed separately

The colour of the plastic-coated thermal insulation is Vitosilver.

Vitocell 160-E, type SESA
750 and 950 litres

Heating water buffer cylinder, made from steel.
- 4 welded-in sensor wells
- 3 additional fittings for thermometer sensors or additional sensors
- Adjustable feet
- Solar indirect coil with stratification system
- Air vent valve for solar indirect coil
- Thermal insulation, packed separately

The colour of the plastic-coated thermal insulation is Vitosilver.

Specification

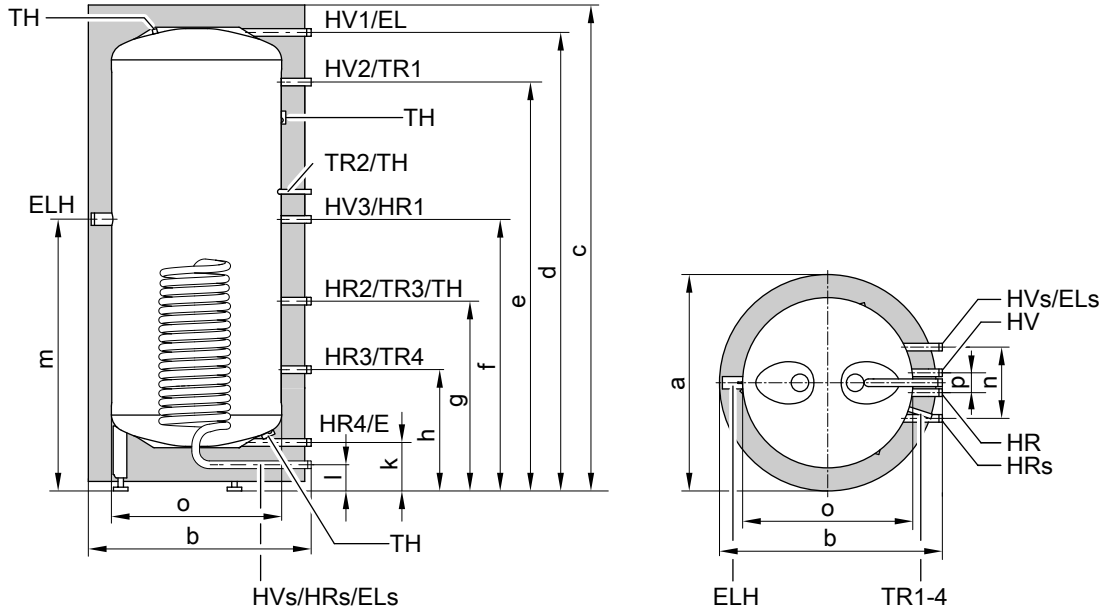
For storing heating water in conjunction with solar collectors, heat pumps and solid fuel boilers.

Suitable for the following systems:
- Heating water flow temperature up to **110 °C**
- Solar flow temperature up to **140 °C**
- Operating pressure **on the heating water side** up to **3 bar (0.3 MPa)**
- Operating pressure **on the solar side** up to **10 bar (1.0 MPa)**

			Vitocell 140-E		Vitocell 160-E	
Cylinder capacity		**l**	**750**	**950**	**750**	**950**
DIN register no.				0264/07E		0265/07E
Solar indirect coil capacity		l	12	14	12	14
Dimensions						
Length (∅)						
– Incl. thermal insulation	a	mm	1004	1004	1004	1004
– Excl. thermal insulation		mm	790	790	790	790
Width	b	mm	1059	1059	1059	1059
Height						
– Incl. thermal insulation	c	mm	1895	2195	1895	2195
– Excl. thermal insulation		mm	1814	2120	1814	2120
Height when tilted						
– Excl. thermal insulation and adjustable feet		mm	1890	2195	1890	2195
Weight						
– Incl. thermal insulation		kg	174	199	183	210
– Excl. thermal insulation		kg	152	174	161	185
Connections (male thread)						
Heating water flow and return		R	2	2	2	2
Heating water flow and return (solar)		G	1	1	1	1
Internal indirect solar coil						
Heating surface		m^2	1.8	2.1	1.8	2.1
Standby heat loss q_{BS} (standard parameter)		kWh/24 h	1.63	1.67	1.63	1.67

Heating water buffer cylinder (cont.)

		Vitocell 140-E		Vitocell 160-E	
Cylinder capacity	**l**	**750**	**950**	**750**	**950**
Standby capacity V_{aux}	l	380	453	380	453
Solar capacity V_{sol}	l	370	497	370	497



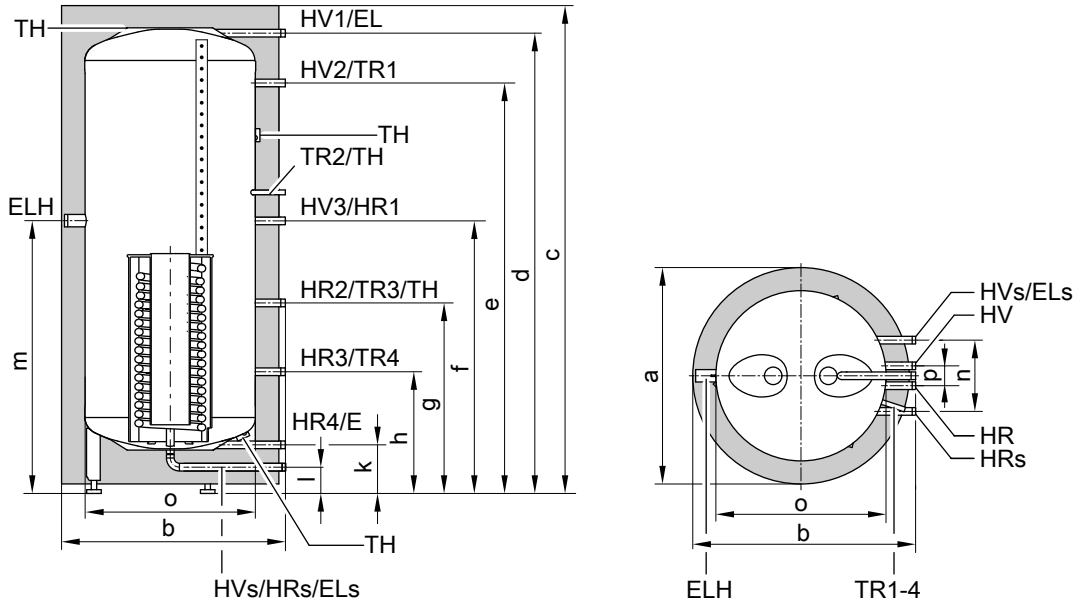
Vitocell 140-E (type SEIA, 750 and 950 litres)

E Drain
EL Air vent valve
EL_s Solar indirect coil, air vent valve
ELH Immersion heater (female connection Rp 1½)
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
TH Retainer for thermometer sensor or additional sensor
TR Temperature sensor or temperature controller

Dimensions Vitocell 140-E

Cylinder capacity		**l**	**750**	**950**
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1777	2083
	e	mm	1547	1853
	f	mm	967	1119
	g	mm	676	752
	h	mm	386	386
	k	mm	155	155
	l	mm	75	75
	m	mm	991	1181
	n	mm	370	370
Length (∅) excl. thermal insulation	o	mm	790	790
	p	mm	140	140

Heating water buffer cylinder (cont.)



Vitocell 160-E (type SESA, 750 and 950 litres)

E Drain
EL Air vent valve
EL_s Solar indirect coil, air vent valve
ELH Immersion heater (female connection Rp 1½)
HR Heating water return
HR_s Heating water return, solar thermal system
HV Heating water flow
HV_s Heating water flow, solar thermal system
TH Retainer for thermometer sensor or additional sensor
TR Temperature sensor or temperature controller

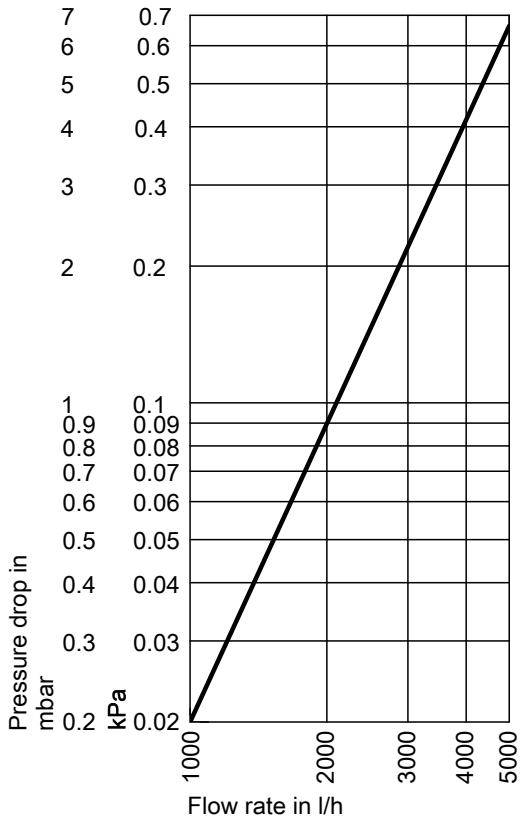
Dimensions Vitocell 160-E

Cylinder capacity		**l**	**750**	**950**
Length (∅)	a	mm	1004	1004
Width	b	mm	1059	1059
Height	c	mm	1895	2195
	d	mm	1777	2083
	e	mm	1547	1853
	f	mm	967	1119
	g	mm	676	752
	h	mm	386	386
	k	mm	155	155
	l	mm	75	75
	m	mm	991	1181
	n	mm	370	370
Length (∅) excl. thermal insulation	o	mm	790	790
	p	mm	140	140

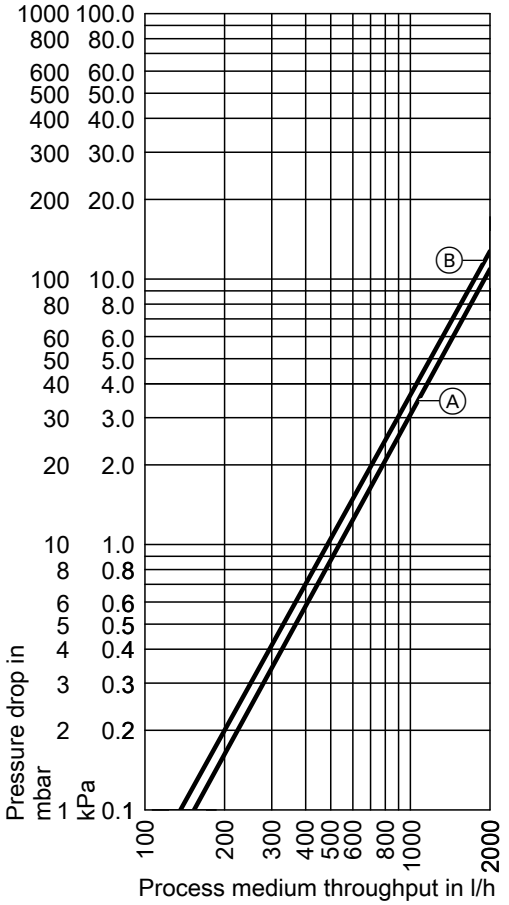
5

Heating water buffer cylinder (cont.)

Pressure drops



Pressure drop on the heating water side



Pressure drop on the solar side

Ⓐ Cylinder capacity 750 l
Ⓑ Cylinder capacity 950 l

5

6.1 DHW cylinder Vitocell 100-V

DHW cylinder Vitocell 100-V

DHW cylinder Vitocell 100-V						
Cylinder capacity (litres)	160	200	300	500	750	1000
Part no.	3003702	3003703	Z002575	Z002576	Z004044	Z004045

Delivered condition

Vitocell 100-V, type CVA
160, 200 and 300 litre capacity
DHW cylinder made from steel with Ceraprotect enamel coating for DHW heating.
- Welded-in sensor well for cylinder temperature sensor or thermostat
- Adjustable feet
- Protective magnesium anode
- Fitted thermal insulation

Colour of the epoxy-coated sheet steel casing: Vitosilver.
DHW cylinders with 160, 200 and 300 litre capacity are also available in white.

Vitocell 100-V, type CVA
500 litre capacity
DHW cylinder made from steel with Ceraprotect enamel coating for DHW heating.
- Welded-in sensor well for cylinder temperature sensor or thermostat
- Adjustable feet
- Protective magnesium anode

Packed separately:
- Removable thermal insulation; the colour of the plastic-coated thermal insulation is Vitosilver

Vitocell 100-V, type CVA
750 and 1000 litre capacity
DHW cylinder made from steel with Ceraprotect enamel coating for DHW heating.
- Thermometer
- Welded-in sensor well for cylinder temperature sensor or thermostat
- Adjustable feet
- 2 protective magnesium anodes

Packed separately:
- Removable thermal insulation; the colour of the plastic-coated thermal insulation is Vitosilver

Specification

For DHW heating in conjunction with boilers and district heating systems, as option with electric heater as accessory for DHW cylinders with 300 and 500 l capacity.

Suitable for the following systems:
- DHW temperatures up to **95 °C**
- Heating water flow temperature up to **160 °C**
- Operating pressure on the **heating water side** up to **25 bar (2.5 MPa)**
- Operating pressure on the **DHW side** up to **10 bar (1.0 MPa)**

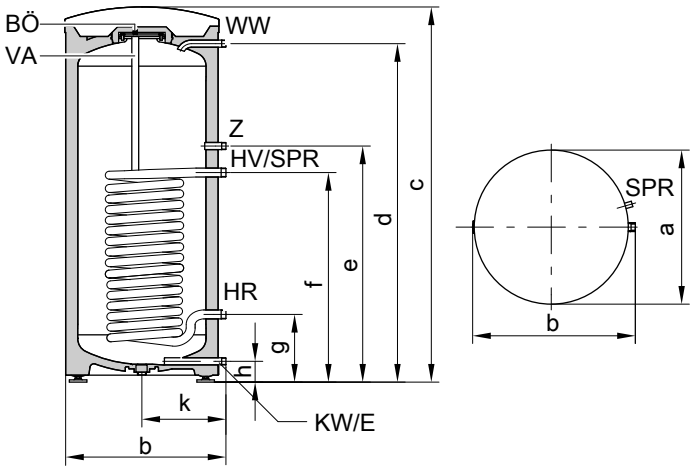
Cylinder capacity		**l**	**160**	**200**	**300**	**500**	**750**	**1000**
DIN register number			9W241/11–13 MC/E					
Continuous output	90 °C	kW	40	40	53	70	123	136
For DHW heating from **10 to 45 °C**		l/h	982	982	1302	1720	3022	3341
and a **heating water** flow temperature of ... at the heating water throughput stated below	80 °C	kW	32	32	44	58	99	111
		l/h	786	786	1081	1425	2432	2725
	70 °C	kW	25	25	33	45	75	86
		l/h	614	614	811	1106	1843	2113
	60 °C	kW	17	17	23	32	53	59
		l/h	417	417	565	786	1302	1450
	50 °C	kW	9	9	18	24	28	33
		l/h	221	221	442	589	688	810
Continuous output	90 °C	kW	36	36	45	53	102	121
For DHW heating from **10 to 60 °C**		l/h	619	619	774	911	1754	2081
and a **heating water** flow temperature of ... at the heating water throughput stated below	80 °C	kW	28	28	34	44	77	91
		l/h	482	482	584	756	1324	1565
	70 °C	kW	19	19	23	33	53	61
		l/h	327	327	395	567	912	1050
Heating water throughput for the stated continuous outputs		m^3/h	3.0	3.0	3.0	3.0	5.0	5.0
Standby heat loss q_{BS} at a temp. differential of 45 K (actual values to DIN 4753-8).		kWh/ 24 h	1.50	1.70	2.20	2.50	3.50	3.90
Dimensions								

DHW cylinder (cont.)

Cylinder capacity		l	160	200	300	500	750	1000
Length (∅)								
– Incl. thermal insulation	a	mm	581	581	633	859	960	1060
– Excl. thermal insulation		mm	—	—	—	650	750	850
Width								
– Incl. thermal insulation	b	mm	608	608	705	923	1045	1145
– Excl. thermal insulation		mm	—	—	—	837	947	1047
Height								
– Incl. thermal insulation	c	mm	1189	1409	1746	1948	2106	2166
– Excl. thermal insulation		mm	—	—	—	1844	2005	2060
Height when tilted								
– Incl. thermal insulation		mm	1260	1460	1792	—	—	—
– Excl. thermal insulation		mm	—	—	—	1860	2050	2100
Installation height		mm	—	—	—	2045	2190	2250
Weight incl. thermal insulation		kg	86	97	151	181	295	367
Heating water capacity		l	5.5	5.5	10.0	12.5	24.5	26.8
Heating surface		m^2	1.0	1.0	1.5	1.9	3.7	4.0
Connections (male thread)								
Heating water flow and return		R	1	1	1	1	1¼	1¼
Cold water, DHW		R	¾	¾	1	1¼	1¼	1¼
DHW circulation		R	¾	¾	1	1	1¼	1¼

Information regarding continuous output
When engineering systems with the specified or calculated continuous output, select a matching circulation pump. The stated continuous output is only achieved when the rated boiler heating output is ≥ the continuous output.

160 and 200 litre capacity

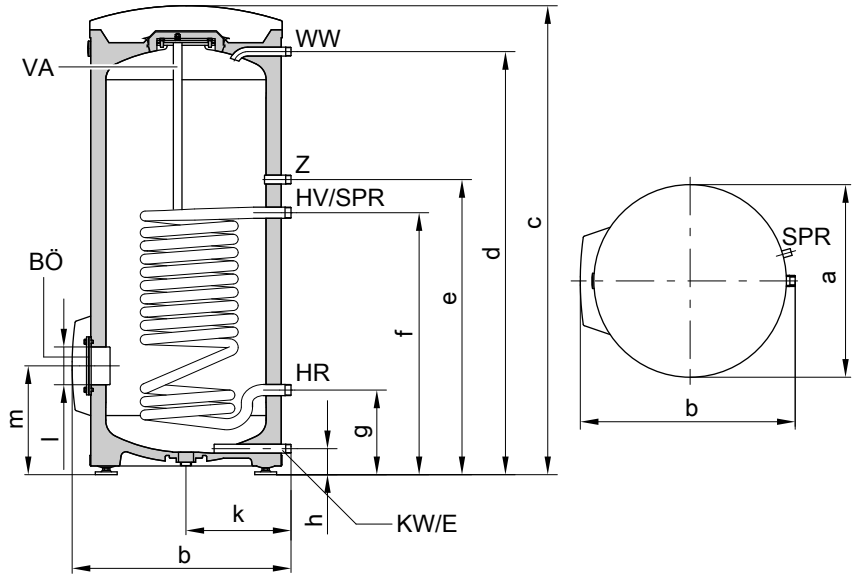


BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

DHW cylinder (cont.)

Cylinder capacity		l	160	200
Length (∅)	a	mm	581	581
Width	b	mm	608	608
Height	c	mm	1189	1409
	d	mm	1050	1270
	e	mm	884	884
	f	mm	634	634
	g	mm	249	249
	h	mm	72	72
	k	mm	317	317

300 litre capacity

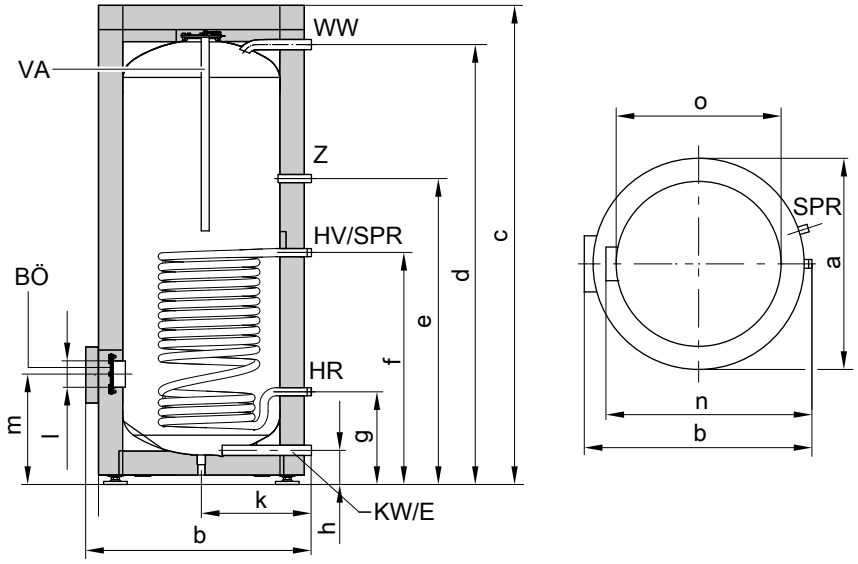


BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	300
Length (∅)	a	mm	633
Width	b	mm	705
Height	c	mm	1746
	d	mm	1600
	e	mm	1115
	f	mm	875
	g	mm	260
	h	mm	76
	k	mm	343
	l	mm	∅ 100
	m	mm	333

DHW cylinder (cont.)

500 litre capacity



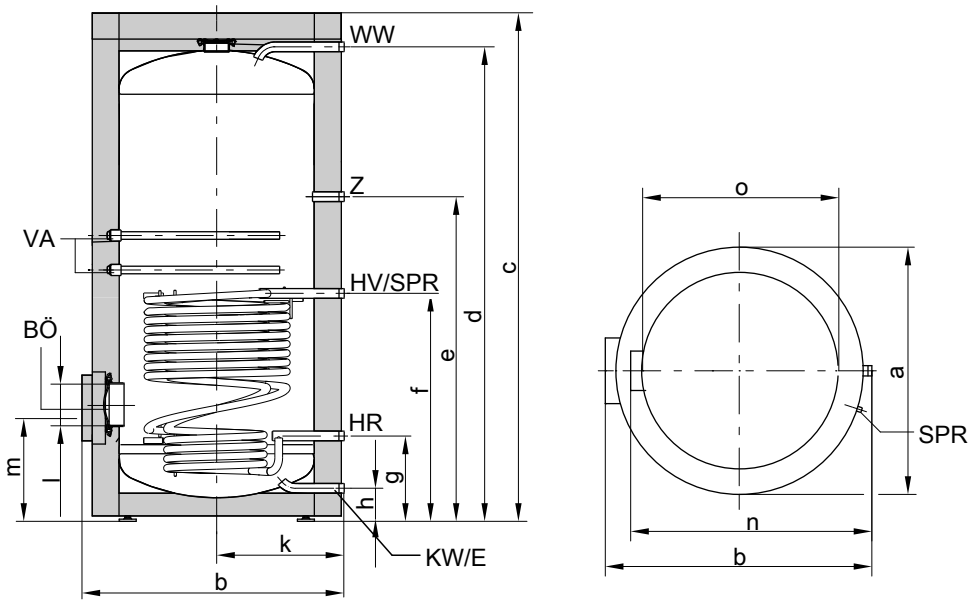
BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		**l**	**500**
Length (∅)	a	mm	859
Width	b	mm	923
Height	c	mm	1948
	d	mm	1784
	e	mm	1230
	f	mm	924
	g	mm	349
	h	mm	107
	k	mm	455
	l	mm	∅ 100
	m	mm	422
	n	mm	837
Excl. thermal insulation	o	mm	∅ 650

6

DHW cylinder (cont.)

750 and 1000 litre capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or thermostat
VA Protective magnesium anode
WW DHW
Z DHW circulation

Cylinder capacity		l	750	1000
Length (∅)	a	mm	960	1060
Width	b	mm	1045	1145
Height	c	mm	2106	2166
	d	mm	1923	2025
	e	mm	1327	1373
	f	mm	901	952
	g	mm	321	332
	h	mm	104	104
	k	mm	505	555
	l	mm	∅ 180	∅ 180
	m	mm	457	468
	n	mm	947	1047
Excl. thermal insulation	o	mm	∅ 750	∅ 850

Performance factor N_L
To DIN 4708.
Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\ K/-0\ K}$

Cylinder capacity l	160	200	300	500	750	1000
Performance factor N_L at heating water flow temperature						
90 °C	2.5	4.0	9.7	21.0	40.0	45.0
80 °C	2.4	3.7	9.3	19.0	34.0	43.0
70 °C	2.2	3.5	8.7	16.5	26.5	40.0

Information regarding performance factor N_L
The performance factor N_L depends on the cylinder storage temperature T_{cyl}.

Standard values
- *T_{cyl} = 60 °C → 1.0 × N_L*
- *T_{cyl} = 55 °C → 0.75 × N_L*
- *T_{cyl} = 50 °C → 0.55 × N_L*
- *T_{cyl} = 45 °C → 0.3 × N_L*

DHW cylinder (cont.)

Peak output (over 10 minutes)
Relative to the performance factor N_L.
DHW heating from 10 to 45 °C.

Cylinder capacity l	160	200	300	500	750	1000
Peak output (l/10 min) at heating water flow temperature						
90 °C	210	262	407	618	898	962
80 °C	207	252	399	583	814	939
70 °C	199	246	385	540	704	898

Max. draw-off rate (over 10 minutes)
Relative to the performance factor N_L.
With reheating.
DHW heating from 10 to 45 °C.

Cylinder capacity l	160	200	300	500	750	1000
Max. draw-off rate (l/min) at heating water flow temperature						
90 °C	21	26	41	62	90	96
80 °C	21	25	40	58	81	94
70 °C	20	25	39	54	70	90

Drawable water volume
Cylinder content heated to 60 °C.
Without reheating.

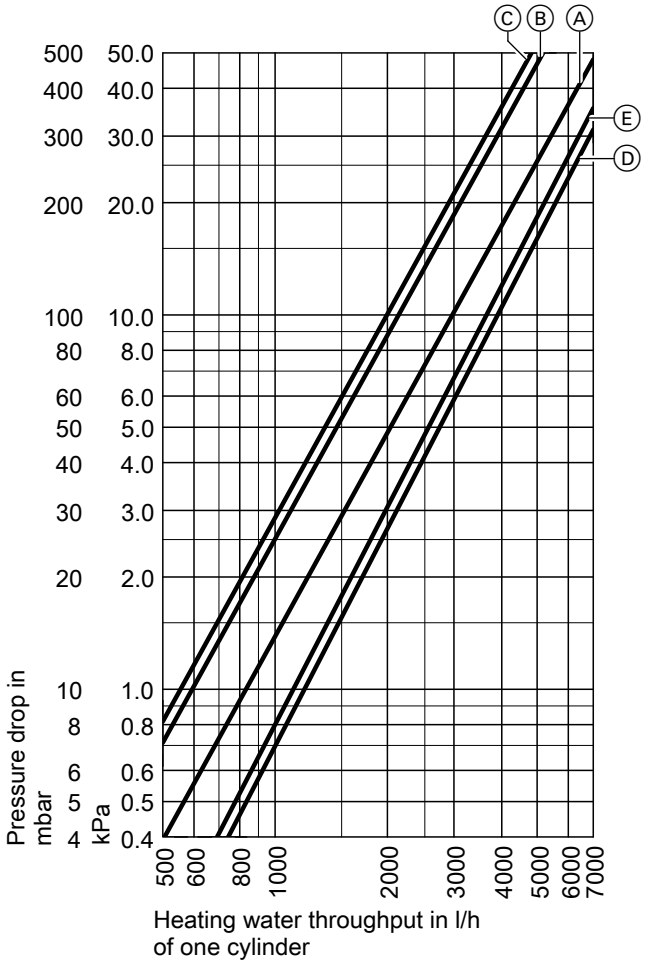
Cylinder capacity	l	160	200	300	500	750	1000
Draw-off rate	l/min	10	10	15	15	20	20
Drawable water volume Water at t = 60 °C (constant)	l	120	145	240	420	615	835

Heat-up time
The heat-up times will be achieved when the maximum continuous output of the DHW cylinder is made available at the relevant heating water flow temperature and when DHW is heated from 10 to 60 °C.

Cylinder capacity l	160	200	300	500	750	1000
Heat-up time (min.) at heating water flow temperature						
90 °C	19	19	23	28	24	36
80 °C	24	24	31	36	33	46
70 °C	34	37	45	50	47	71

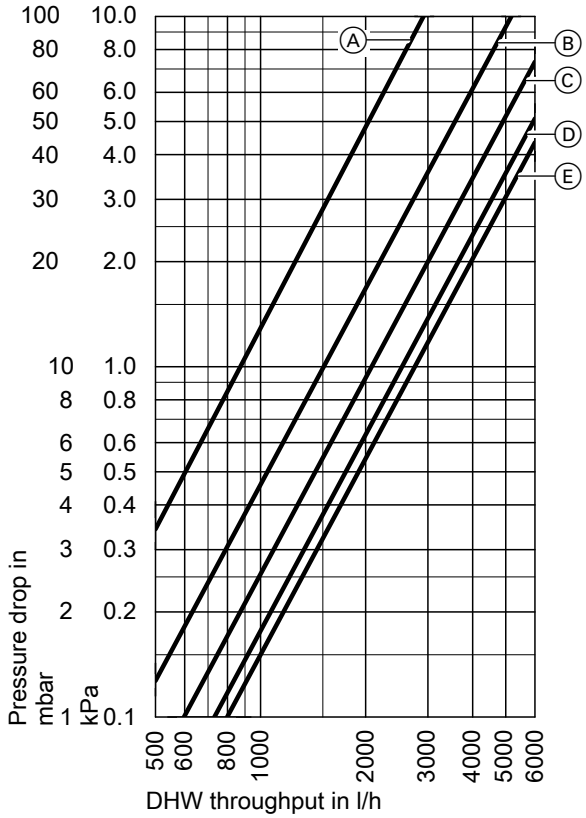
DHW cylinder (cont.)

Pressure drops



Pressure drop on the heating water side

Ⓐ Cylinder capacity 160 and 200 l
Ⓑ Cylinder capacity 300 l
Ⓒ Cylinder capacity 500 l
Ⓓ Cylinder capacity 750 l
Ⓔ Cylinder capacity 1000 l



Pressure drop on the DHW side

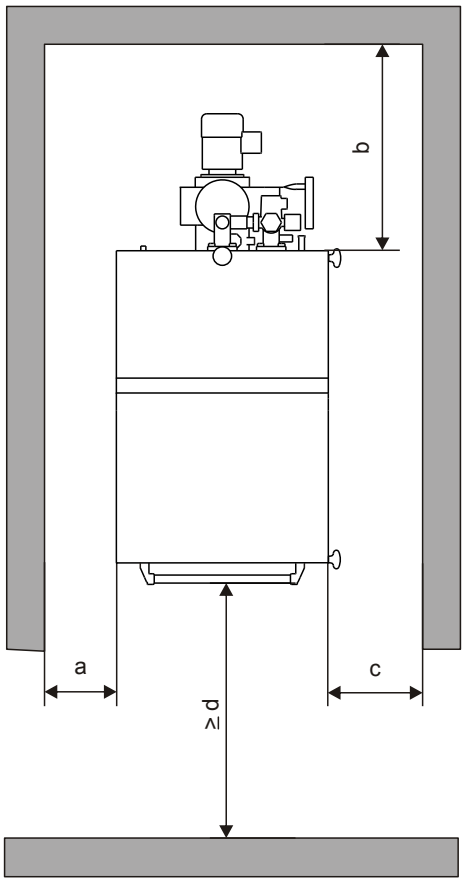
Ⓐ Cylinder capacity 160 and 200 l
Ⓑ Cylinder capacity 300 l
Ⓒ Cylinder capacity 500 l
Ⓓ Cylinder capacity 750 l
Ⓔ Cylinder capacity 1000 l

6

7.1 Positioning

The specified wall clearances are required for installation and maintenance work, and must therefore be observed.

Minimum clearances



Wall clearances

Pyromat ECO...		35 – 65	61	81	101	151
a	mm	≥ 200	≥ 400	≥ 400	≥ 400	≥ 400
b	mm	600	730	730	730	730
c	mm	600	800	800	800	800
d	mm	800	800	800	800	800

Note

If an oil burner is used on the boiler, dimension a is increased if the burner is fitted on the left, or dimension c if the burner is fitted on the right.

Siting

The following points must be observed for siting:

- Avoid air contamination by halogenated hydrocarbons (e.g. as contained in sprays, paints, solvents and cleaning agents)
- Avoid very dusty conditions
- Avoid high levels of humidity
- Prevent frost and ensure good ventilation

7.2 Connection on the flue gas side

The boiler is equipped with a flue gas fan, therefore the combustion equipment does not require a draught.
The chimney must be designed in the same way as for combustion equipment with a pressure-jet oil or gas burner without draught requirement (flue gas temperature at rated load 160 - 200 °C).
To prevent the risk of soot contamination, provision must be made for an insulated chimney.

The route from the flue gas fan to the chimney should be as short as possible. 90° bends should be avoided wherever possible.
Flue pipes more than 1 m long should be insulated.
The chimney should be connected rising at an angle of 30 - 45°. The flue pipe, including inlet to the chimney, must be gas-tight.

7.3 Water connection

Sizing of the heating water buffer cylinder to EN 303-5

Minimal cylinder volume for a typical Q_H with $T_B \times Q_N$ for dry beech wood.

$V_{cyl.}$ Buffer cylinder capacity in litres
Q_N Rated heating output in kW

T_B Burnout time in h
Q_H Heat load of the building in kW
Q_{min} Smallest heating output in kW
$V_{cyl.}$ = 15 × T_B × Q_N × (1 - 0.3 × Q_H / Q_{min})

Pyromat ECO ...	Rated heating output Q_N kW	$T_B \times Q_N$ kWh	Q_H kW	Min. V_{SP} l
35	40	179	23	2156
45	50	179	28	2091
55	60	247	33	2890
65	75	247	41	2876
61	85	363	46	4193
81	100	363	55	4247
101	130	485	66	5675
151	170	485	82	5784

Safety equipment according to DIN EN 12828

DIN EN 12828 requirements include having the following safety equipment installed:

Sealed system:
- Sealed expansion vessel, type-tested.
- A safety valve (max. set pressure 3.0 bar, type-tested to DIN 3440) at the highest point of the boiler or on a pipe connected to this point. It must not be possible to shut off the connection line between the boiler and the safety valve. No pumps, fittings or constrictions may be present in this line. The discharge pipe must be designed in such a way that no pressure increase is possible. Any expelled heating water must be drained off safely. The outlet point of the discharge pipe must be arranged in such a way that any water expelled from the safety valve can be drained off safely and visibly.
  Nominal diameter of the valve, the connection line and the discharge pipe to DIN 4751 Part 2.
- Thermally activated safety valve, R ¾, individually tested, opening temperature 95 - 100 °C (safety heat exchanger integrated into the boiler)
- High limit safety cut-out
- Cold water supply DN15 R ½, fixed metal pipe, min. 2.5 bar, max. 3.5 bar, drain line R ¾
- Air separator (recommendation: absorption dust extractor)
- Thermometer and pressure gauge.
- Low water indicator not required.

7.4 Frost protection

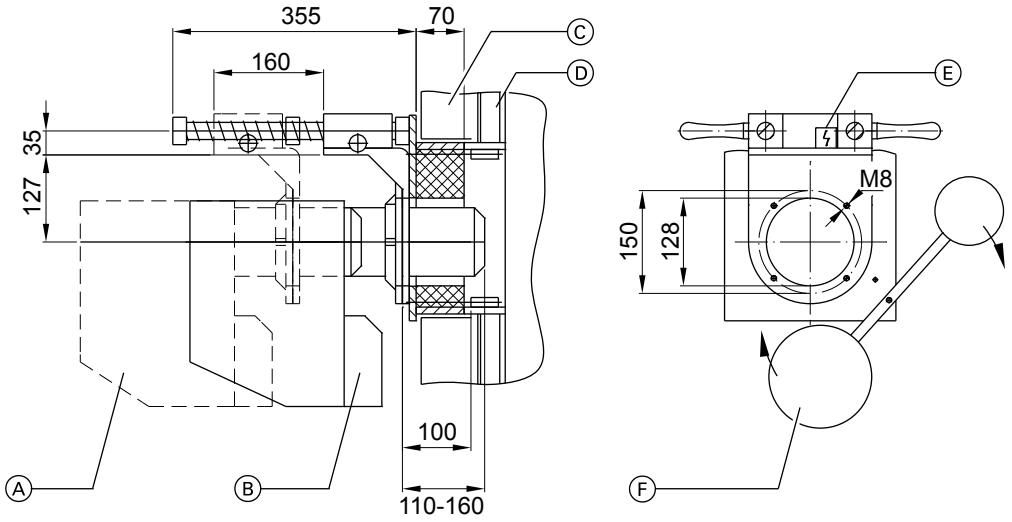
An antifreeze additive suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability, since otherwise damage to gaskets and diaphragms can occur as well as noise during heating operation. Köb accepts no liability for any resulting damage or consequential losses.

7.5 Operating the boiler with an oil burner

- The oil burner can be fitted to the left or right of the boiler for emergency operation.
  The burner trolley is required for this (see page 20).
- Before being used, the burner must be pushed into the boiler's combustion chamber
- The boiler's combustion chamber must be thoroughly cleaned before and after use of the burner
- The oil burner must be selected according to its max. rated heating output. See specifications in the following table

Pyromat ECO...		35	45	55	65	61	81	101	151
Part no. Pyromat Eco		PMEA001	PMEA002	PMEA003	PMEA005	PMEA004	PMEA006	PMEA007	PMEA008
Rated heating output, wood operation	kW	40	50	60	75	85	100	120	170
Max. rated heating output, oil burner	kW	35	38	45	55	60	75	90	110
Boiler efficiency, oil burner operation (rated heating output, oil)	%	87	87	87	87	87	87	87	87

Note
The burner trolley is always needed if an oil burner is to be used. See page 20

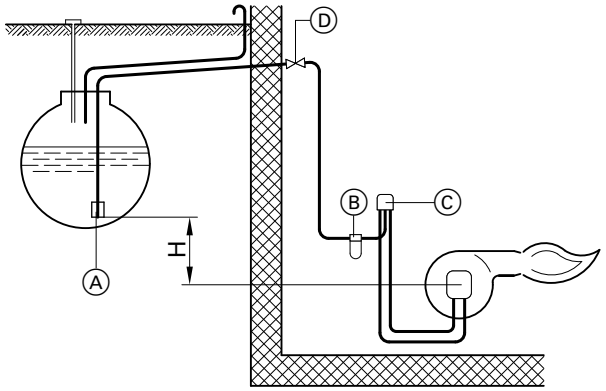


Ⓐ Burner pulled out with closed cover (solid fuel operation)
Ⓑ Burner retracted (oil operation)
Ⓒ Insulation
Ⓓ Boiler jacket
Ⓔ Limit switch
Ⓕ Weight valve

Oil supply

Single line system
Size the oil line in accordance with the following table. For this, observe the oil line requirements to DIN 4755-2 [or local regulations].
The height differential H (see fig.) between the oil burner pump and the foot valve in the tank set below the oil burner pump must not exceed 4 m. Greater height differentials lead to noisy operation and pump wear.
An oil feed pump with intermediate tank is required in the immediate vicinity of the boiler, if the suction head or maximum pipe run for tanks set below the boiler is greater than that shown in the following table. Site the intermediate tank so that the oil supply can occur using the integral oil burner pump.
The oil feed pump must be regulated independently of the boiler, i.e. no signal from the boiler must be used for this purpose.
The oil line should have a vacuum pressure of no more than 0.40 bar.

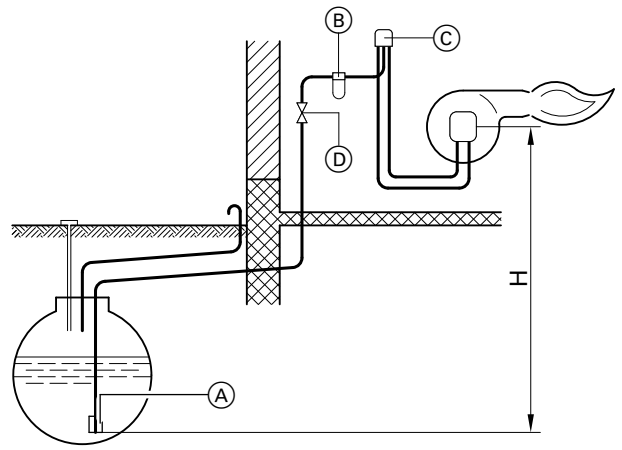
Anti-lift valve
- Fuel oil tank systems where the highest possible fuel oil level inside the tank is (or could become) higher than the lowest point of the fuel oil suction line require an anti-lift valve.
- Where a tank is set above (level of foot valve or floating inlet is higher than the oil pump), do not install mechanical anti-lift valves. Instead, use an electric solenoid valve.
- When installing an anti-lift valve ensure that the negative pressure on the inlet side of the oil burner pump will not exceed -0.4 bar in the most unfavourable case.



Tank above oil burner pump

Ⓐ Foot valve
Ⓑ Fuel oil filter
Ⓒ Fuel oil air vent valve
Ⓓ Anti-lift valve

7



Tank below oil burner pump

Ⓐ Foot valve
Ⓑ Fuel oil filter
Ⓒ Fuel oil air vent valve
Ⓓ Shut-off assembly

Suction head H in m	Max. pipe length in m when the suction line has the following diameter:	
	6x1 mm	8x1 mm
+4.0	100	100
+3.5	95	100
+3.0	89	100
+2.5	83	100
+2.0	77	100
+1.5	71	100
+1.0	64	100
+0.5	58	100
0.0	52	100
-0.5	46	100
-1.0	40	100
-1.5	33	100
-2.0	27	100
-2.5	21	100
-3.0	15	75
-3.5	9	44
-4.0	—	12

At the max. pipe run, a total pressure drop of 0.35 bar is assumed, based on fuel oil EL with 6.0 cSt (DIN 51603-1) when used with 1 shut-off valve, 1 foot valve and 1 fuel oil filter.

Prevention of damage due to corrosion on the water side

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water.
The cost of a water treatment facility is certainly less than the cost of repairing damage to the heating system.
Adherence to the following requirements is a warranty condition. The manufacturer's warranty excludes damage due to corrosion and scaling.
The following is a summary of essential water qualities.
A chemical water treatment can be ordered from Viessmann for filling.

Prevention of damage through corrosion on the water side
The corrosion resistance of ferrous materials on the heating water side of heating systems and boilers depends on the absence of oxygen in the heating water.
The oxygen, which enters the water in the heating system when it is filled for the first time or topped up, reacts with system materials without causing any damage.
The characteristic blackening of the water after some time in use indicates that free oxygen is no longer present.

The technical rules and in particular VDI Directive 2035-2 therefore recommend that heating systems are designed and operated so that a constant ingress of oxygen into the heating water is prevented.

Opportunities for oxygen ingress during operation:
- Through open expansion vessels receiving a flow
- Through negative pressure in the system
- Through gas-permeable components

Sealed unvented systems, e.g. with a diaphragm expansion vessel, offer good protection against the ingress of airborne oxygen into the system, if correctly sized and operating at the correct pressure.
At all points in the heating system, including on the intake side of the pump, the pressure must be higher than the pressure of the surrounding atmosphere in all operating states.
The pre-charge pressure of the diaphragm expansion vessel should be checked at least during the annual service.

Design information (cont.)

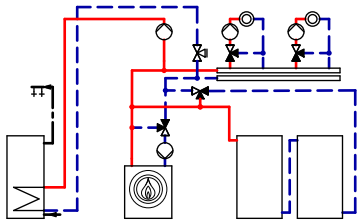
8

The use of permeable components, e.g. permeable plastic pipes in underfloor heating systems, should be avoided. Provide system separation if such components are nevertheless used. This must separate the water flowing through the plastic pipes from other heating circuits, e.g. from the heat source, by the provision of a heat exchanger made of corrosion-resistant material.
No further anti-corrosion measures are required for sealed unvented hot water heating systems subject to the above points being observed.
However, take additional precautions where there is a risk of oxygen ingress, for example by adding oxygen binder sodium sulphite (5 - 10 mg/litre into the excess). The pH value of the heating water should be between 9.0 and 10.5.

Different conditions apply to systems that contain aluminium components.
Where chemicals are used as part of the corrosion protection, we recommend that the manufacturer of the chemicals issues a certificate of suitability of the additives with regard to the boiler materials and the materials of the other heating system components.
We recommend you refer questions about water treatment to Viessmann industrial services or an appropriate specialist.
Further details can be found in VDI Directive 2035-2 and EN 14868.
(A): In Austria, detailed information can be found in the ÖNORM H 5195-1: Heat exchanger for domestic systems, part 1

Application examples

8.1 Pyromat Eco with two heating circuits with mixer, heating water buffer cylinder and DHW heating with DHW cylinder



ID: 4605384_1304_04

Applications
Heating system with log boiler, with one or several heating circuits with 3-way mixer, heating water buffer cylinder plus DHW heating.

Main components
- Pyromat Eco
- Ecotronic boiler control unit
- Return temperature raising facility
- Heating water buffer cylinder
- DHW cylinder
- Buffer cylinder control valve

Function description
In order to achieve the required set temperatures in heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪, the Pyromat Eco ① runs through the following operating phases:
- Heat up
- Load operation
- Residual heat utilisation
- Drawing [heat] from the buffer cylinder

These are shown on the control unit display.

Heat up
Boiler ① starts after charging and lighting the fuel. Initially, the air dampers are zeroed.

Load operation
If the flue gas temperature exceeds 120 °C or the residual oxygen content is less than 15 % (for 2 minutes), the air dampers enter their controlled mode. For this, the air dampers are constantly regulated to the respective set value via the value of the actual residual oxygen content.
The actual flue gas temperature will be prevented from exceeding its max. value by the flue gas fan and the adjustment of the primary air dampers.

Residual heat utilisation
The residual heat utilisation phase begins if the flue gas temperature falls below 100 °C. Buffer cylinder control valve ④⑤ remains closed and boiler control valve ④ remains fully open for as long as the boiler flow temperature is higher than the set system temperature.

Drawing [heat] from the buffer cylinder
If the boiler flow temperature falls below the set system temperature, the heat for heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪ is drawn from heating water buffer cylinders ④⓪/④① . For this purpose, boiler control valve ④ is completely closed and buffer cylinder control valve ④⑤ fully opened.

Return temperature raising facility
The Pyromat Eco ① requires a minimum return temperature. When boiler circuit pump ③ starts, boiler control valve ④ opens the path from the central heating return to the Pyromat Eco ① in line with the increasing return temperature and closes the path from the boiler flow to the boiler return (bypass).
As soon as boiler control valve ④ is fully open, buffer cylinder control valve ④⑤ takes over return temperature raising.

Charging the heating water buffer cylinder
During the combustion phase, heating circuits ⑤⓪/⑥⓪/⑦⓪ are supplied with heat first of all by boiler circuit pump ③. As soon as the consumers enter controlled mode, the boiler heat not required for heating purposes is routed via buffer cylinder control valve ④⑤ into the heating water buffer cylinder, maintaining a precise temperature stratification. Following burnout, the residual boiler heat is utilised by the buffer charging management, before the consumers are supplied by heating water buffer cylinders ④⓪/④① .

Heating by the Pyromat Eco
The boiler heat is routed to the heating distributor by boiler circuit pump ③ if the boiler water temperature of the Pyromat Eco ① exceeds 65 °C. At this point, 3-way mixers ⑤④/⑥④ regulate the flow temperature in accordance with the specified heating curve in weather-compensated mode.

Heating by the heating water buffer cylinder (heat drawn from the buffer)
If the boiler flow temperature falls below the set system temperature, the heat for heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪ is drawn from heating water buffer cylinders ④⓪/④① . For this purpose, boiler control valve ④ is completely closed and buffer cylinder control valve ④⑤ fully opened. The heat required to supply the heating circuits is drawn from the heating water buffer cylinders using heating circuit pumps ⑤③/⑥③. The flow temperatures are also regulated in weather-compensated mode via 3-way mixers ⑤④/⑥④.

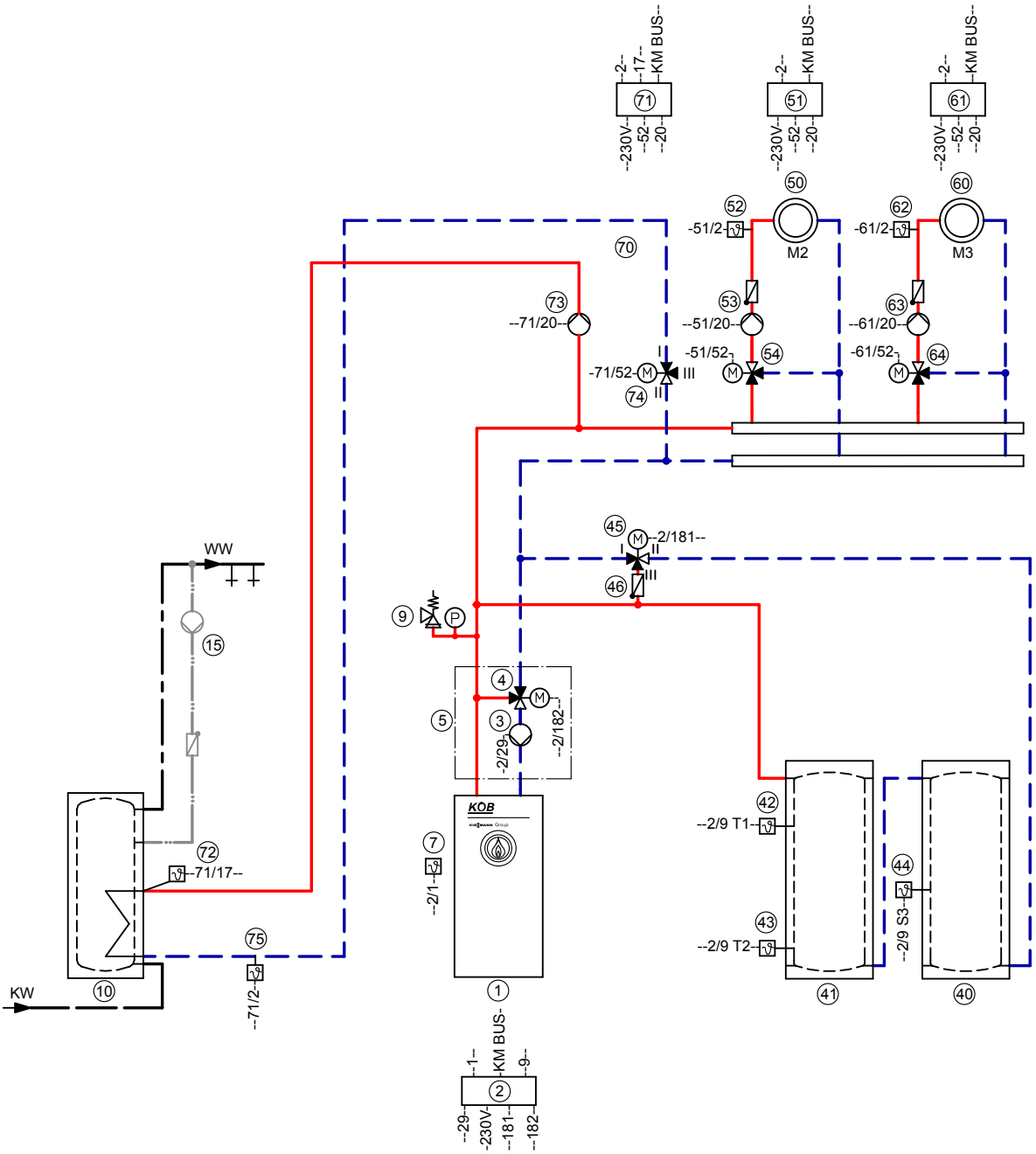
DHW heating
When the temperature at cylinder temperature sensor ⑦② falls below the set value, circulation pump for cylinder heating ⑦③ starts and DHW cylinder ⑩ will be heated. Circulation pump for cylinder heating ⑦③ continues running until the DHW temperature at cylinder temperature sensor ⑦② has reached its set value. To optimise cylinder heating, regulating valve ⑦④ takes the flow rate higher or lower, depending on the temperature spread between cylinder temperature sensor ⑦② and return temperature sensor ⑦⑤.

ID: 4605384_1304_04

Service address Ecotronic		
Group	Code	Function
"Hardware"	"Number of HC : 2"	2 heating circuits installed
"Hardware"	"Number of DHW : 1"	1 DHW group installed (DHW cylinder with circulation pump)
Additional settings on the extension kits		
"Extension kit 1"	"Rotary selector S1 : 1"	Heating circuit 1
"Extension kit 2"	"Rotary selector S1 : 3"	Heating circuit 2
"Extension kit 3"	"Rotary selector S1 : 5"	Heating circuit for DHW heating

Application examples (cont.)

Hydraulic installation scheme ID: 4605384_1304_04



Note: This scheme is a general example without shut-off valves or safety equipment. This does not replace the need for on-site engineering.

Application examples (cont.)

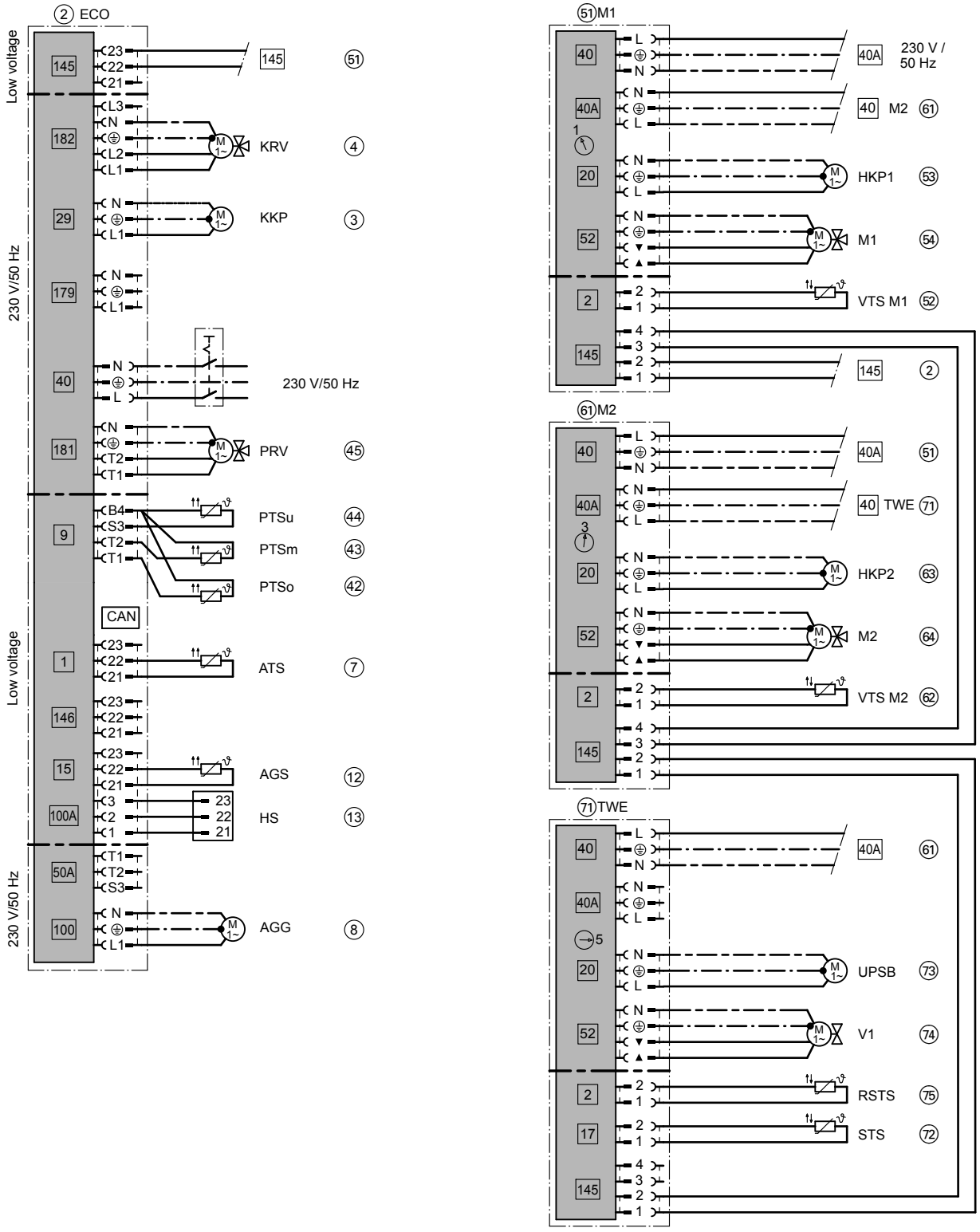
Equipment required

ID: 4605384_1304_04

Pos.	Designation	Part no.
	Heat source	
①	Pyromat Eco	As per Viessmann pricelist
②	Ecotronic boiler control unit	Standard delivery pos. 1
③	Boiler circuit pump KKP (pre-fitted and connected)	Standard delivery pos. 5
④	Boiler control valve	Standard delivery pos. 5
⑤	Return temperature raising facility	Standard delivery pos. 1
⑦	Outside temperature sensor ATS	Standard delivery pos. 1
⑧	Flue gas fan (for Pyromat Eco type 35 to 65 pre-fitted and connected)	Standard delivery pos. 1
⑨	Safety equipment block with safety valve	As per Viessmann pricelist
⑪	Thermally activated safety valve 100 °C	7441 729
⑫	Flue gas temperature sensor	Standard delivery pos. 1
⑬	Hall sensor	Standard delivery pos. 1
	DHW heating	
⑩	DHW cylinder	As per Viessmann pricelist
⑮	DHW circulation pump ZP (connection and control on site, e.g. by time switch)	See Vitoset pricelist
	Heating water buffering	
㊵	Heating water buffer cylinder 1	As per Viessmann pricelist
㊶	Heating water buffer cylinder 2	As per Viessmann pricelist
㊷	Top buffer temperature sensor PTS	Standard delivery pos. 1
㊸	Centre buffer temperature sensor PTS	Standard delivery pos. 1
㊹	Bottom buffer temperature sensor PTS	Standard delivery pos. 1
㊺	Buffer cylinder control valve	Standard delivery pos. 1
㊻	Check valve	See Vitoset pricelist
㊿	**Heating circuit with mixer M1**	
(51)	Extension kit for one heating circuit with mixer M1	7301 063
	Components:	
(52)	– Flow temperature sensor VTS M1 (contact temperature sensor)	
	and	
(54)	– Mixer PCB with mixer motor	
	or	
(51)	Extension kit for one heating circuit with mixer M1	7301 062
	Components:	
(52)	Mixer PCB and flow temperature sensor (contact temperature sensor)	
(54)	Mixer motor M1	As per Viessmann pricelist
(53)	Heating circuit pump HKP M1	As per Viessmann pricelist
	or	
	Divicon (with 3-way mixer, heating circuit pump, flow temperature sensor and mixer motor)	
(60)	**Heating circuit with mixer M2**	
(61)	Extension kit for one heating circuit with mixer M2	7301 063
	Components:	
(62)	– Flow temperature sensor VTS M2 (contact temperature sensor)	
	and	
(64)	– Mixer PCB with mixer motor	
	or	
(61)	Extension kit for one heating circuit with mixer M2	7301 062
	Components:	
(62)	Mixer PCB and flow temperature sensor (contact temperature sensor)	
(64)	Mixer motor M2	As per Viessmann pricelist
(63)	Heating circuit pump HKP M2	As per Viessmann pricelist
	or	
	Divicon (with 3-way mixer, heating circuit pump, flow temperature sensor and mixer motor)	
(70)	**Heating circuit for DHW heating**	
(71)	Extension kit for DHW heating	7301 062
(72)	Cylinder temperature sensor STS	7438 702
	and	
	Stainless steel sensor well (not required for Vitocell DHW cylinders)	7819 693
(73)	Circulation pump for cylinder heating UPSB	As per Viessmann pricelist
(74)	2-way valve for restricting the flow rate	As per Viessmann pricelist
(75)	Return temperature sensor RSTS	Standard delivery pos. 71
	Accessories	
(77)	Vitotrol 200A	Z008 341
(78)	Vitotrol 300A (max. one Vitotrol 300A per Ecotronic)	Z008 342

Application examples (cont.)

Electrical installation scheme



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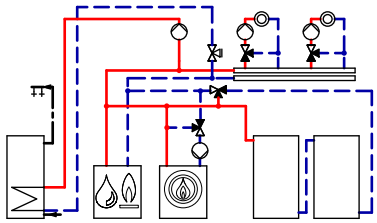
8.2 Pyromat Eco with oil/gas boiler, two heating circuits with mixer, heating water buffer cylinder and DHW heating with DHW cylinder



ID: 4605385_1304_04

Applications
Heating system with log boiler, oil/gas boiler, with one or several heating circuits with 3-way mixer, heating water buffer cylinder plus DHW heating.

Main components
- Pyromat Eco
- Ecotronic boiler control unit
- Oil/gas boiler
- Vitotronic 200, type KO1B, KO2B or KW6B
- Return temperature raising facility
- Heating water buffer cylinder
- DHW cylinder
- Buffer cylinder control valve

Function description
In order to achieve the required set temperatures in heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪, the Pyromat Eco ① runs through the following operating phases:
- Heat up
- Load operation
- Residual heat utilisation
- Drawing [heat] from the buffer cylinder

These are shown on the control unit display.

Heat up
Boiler ① starts after charging and lighting the fuel. Initially, the air dampers are zeroed.

Load operation
If the flue gas temperature exceeds 120 °C or the residual oxygen content is less than 15 % (for 2 minutes), the air dampers enter their controlled mode. For this, the air dampers are constantly regulated to the respective set value via the value of the actual residual oxygen content.
The actual flue gas temperature will be prevented from exceeding its max. value by the flue gas fan and the adjustment of the primary air dampers.

Residual heat utilisation
The residual heat utilisation phase begins if the flue gas temperature falls below 100 °C. Buffer cylinder control valve ④⑤ remains closed and boiler control valve ④ remains fully open for as long as the boiler flow temperature is higher than the set system temperature.

Drawing [heat] from the buffer cylinder
If the boiler flow temperature falls below the set system temperature, the heat for heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪ is drawn from heating water buffer cylinders ④⓪/④① . For this purpose, boiler control valve ④ is completely closed and buffer cylinder control valve ④⑤ fully opened.

Return temperature raising facility
The Pyromat Eco ① requires a minimum return temperature. When boiler circuit pump ③ starts, boiler control valve ④ opens the path from the central heating return to the Pyromat Eco ① in line with the increasing return temperature and closes the path from the boiler flow to the boiler return (bypass).
As soon as boiler control valve ④ is fully open, buffer cylinder control valve ④⑤ takes over return temperature raising.

Charging the heating water buffer cylinder
During the combustion phase, heating circuits ⑤⓪/⑥⓪/⑦⓪ are supplied with heat first of all by boiler circuit pump ③. As soon as the consumers enter controlled mode, the heat not required for heating purposes is routed via buffer cylinder control valve ④⑤ into the heating water buffer cylinder, maintaining a precise temperature stratification. Following burnout, the residual boiler heat is utilised by the buffer charging management, before the consumers are supplied by heating water buffer cylinders ④⓪/④① .

Heating by the Pyromat Eco
The heat is routed to the heating distributor by boiler circuit pump ③ if the boiler water temperature of the Pyromat Eco ① exceeds 65 °C. At this point, 3-way mixers ⑤④/⑥④ regulate the flow temperature in accordance with the specified heating curve in weather-compensated mode.

Heating by the heating water buffer cylinder (heat drawn from the buffer)
If the boiler flow temperature falls below the set system temperature, the heat for heating circuits ⑤⓪/⑥⓪ or for DHW heating ⑦⓪ is drawn from heating water buffer cylinders ④⓪/④① . For this purpose, boiler control valve ④ is completely closed and buffer cylinder control valve ④⑤ fully opened. The heat required to supply the heating circuits is drawn from the heating water buffer cylinders using heating circuit pumps ⑤③/⑥③. The flow temperatures are also regulated in weather-compensated mode via 3-way mixers ⑤④/⑥④.

Heating by the oil/gas boiler
Boiler control unit ② of Pyromat Eco ① enables oil/gas boiler ③⓪ via contactor relay ③⑧ if the actual boiler water and heating water buffer cylinder temperatures are below the set system temperature. At the same time, buffer cylinder control valve ④⑤ closes and the two-way valve in the boiler return of oil/gas boiler ③⓪ opens. Oil/gas boiler ③⓪ now takes over heat supply for the heating distributor in weather-compensated mode. The flow temperatures are also regulated in weather-compensated mode via 3-way mixers ⑤④/⑥④ by boiler control unit ② of Pyromat ①.

DHW heating
When the temperature at DHW cylinder sensor ⑦② falls below the value selected, circulation pump for cylinder heating ⑦③ starts and DHW cylinder ① ⓪ is heated. Circulation pump for cylinder heating ⑦③ continues running until the DHW temperature at cylinder temperature sensor ⑦② has reached its set value. To optimise cylinder heating, regulating valve ⑦④ takes the flow rate higher or lower, depending on the temperature spread between cylinder temperature sensor ⑦② and return temperature sensor ⑦⑤.
With DHW heating by oil/gas boiler ③⓪, the boiler water temperature of oil/gas boiler ③⓪ is raised for DHW heating through a demand from extension kit ⑦① via external EA1 extension ③② and contactor relay ⑦⑥.

Application examples (cont.)

Note

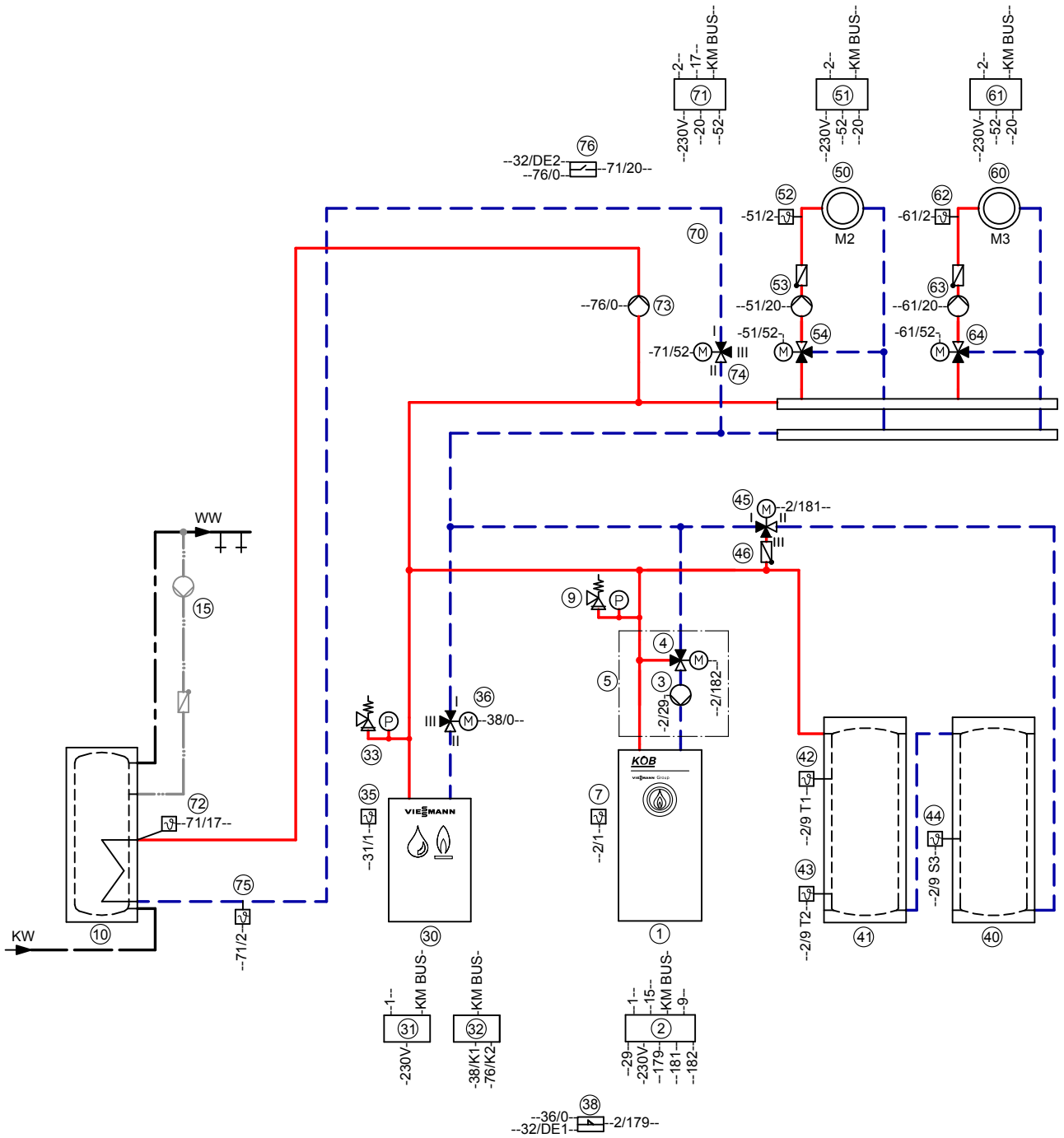
Pyromat Eco and oil/gas boilers must be connected to separate chimney stacks.
Match the heating curve of the oil/gas boiler to the heating curve of the heating circuit with the highest flow temperature. Depending on the system scope and layout, we recommend that these are offset upwards in parallel.

ID: 4605385_1304_04

Service address KO1B/KO2B		
Group	**Code**	**Function**
"General"	"3A:3"	DE1 external blocking
"General"	"3b:2"	DE2 external demand with set minimum boiler water temperature
Service address Ecotronic		
"Hardware"	"Number of HC : 2"	2 heating circuits installed
"Hardware"	"Number of DHW : 1"	1 DHW group installed (DHW cylinder with circulation pump)
"Boiler"	"0A:2"	External additional heat source installed
Additional settings on the extension kits		
"Extension kit 1"	"Rotary selector S1 : 1"	Heating circuit 1
"Extension kit 2"	"Rotary selector S1 : 3"	Heating circuit 2
"Extension kit 3"	"Rotary selector S1 : 5"	Heating circuit for DHW heating

Application examples (cont.)

Hydraulic installation scheme ID: 4605385_1304_04



Note: This scheme is a general example without shut-off valves or safety equipment. This does not replace the need for on-site engineering.

Application examples (cont.)

Equipment required

ID: 4605385_1304_04

Pos.	Designation	Part no.
	Heat source	
①	Pyromat Eco	As per Viessmann pricelist
②	Ecotronic boiler control unit	Standard delivery pos. 1
③	Boiler circuit pump KKP (pre-fitted and connected)	Standard delivery pos. 5
④	Boiler control valve	Standard delivery pos. 5
⑤	Return temperature raising facility	Standard delivery pos. 1
⑦	Outside temperature sensor ATS	Standard delivery pos. 1
⑧	Flue gas fan (for Pyromat Eco type 35 to 65 pre-fitted and connected)	Standard delivery pos. 1
⑨	Safety equipment block with safety valve	As per Viessmann pricelist
⑪	Thermally activated safety valve 100 °C	7441 729
⑫	Flue gas temperature sensor	Standard delivery pos. 1
⑬	Hall sensor	Standard delivery pos. 1
	DHW heating	
⑩	DHW cylinder	As per Viessmann pricelist
⑮	DHW circulation pump ZP (connection and control on site, e.g. by time switch)	See Vitoset pricelist
	External heat source	
㉚	Oil/gas boiler with	As per Viessmann pricelist
㉛	Boiler control unit Vitotronic 200, type KO1B, KO2B or KW6B	As per Viessmann pricelist
㉜	EA1 extension	7452 091
㉝	Safety equipment block with safety valve	See Vitoset pricelist
㉟	Outside temperature sensor ATS	Standard delivery pos. 31
㊱	2-way valve to enable the external heat source	As per Viessmann pricelist
㊲	Boiler water temperature sensor KTS	Standard delivery pos. 31
㊳	Contactor relay K1	7814 681
	Heating water buffering	
㊵	Heating water buffer cylinder 1	As per Viessmann pricelist
㊶	Heating water buffer cylinder 2	As per Viessmann pricelist
㊷	Top buffer temperature sensor PTS	Standard delivery pos. 1
㊸	Centre buffer temperature sensor PTS	Standard delivery pos. 1
㊹	Bottom buffer temperature sensor PTS	Standard delivery pos. 1
㊺	Buffer cylinder control valve	Standard delivery pos. 1
㊻	Check valve	See Vitoset pricelist
㊿	**Heating circuit with mixer M1**	
㊶	Extension kit for one heating circuit with mixer M1	7301 063
	Components:	
㊷	– Flow temperature sensor VTS M1 (contact temperature sensor)	
	and	
㊹	– Mixer PCB with mixer motor	
	or	
㊶	Extension kit for one heating circuit with mixer M1	7301 062
	Components:	
㊷	Mixer PCB and flow temperature sensor (contact temperature sensor)	
㊹	Mixer motor M1	As per Viessmann pricelist
㊸	Heating circuit pump HKP M1	As per Viessmann pricelist
	or	
	Divicon (with 3-way mixer, heating circuit pump, flow temperature sensor and mixer motor)	
㊿	**Heating circuit with mixer M2**	
㊶	Extension kit for one heating circuit with mixer M2	7301 063
	Components:	
㊷	– Flow temperature sensor VTS M2 (contact temperature sensor)	
	and	
㊹	– Mixer PCB with mixer motor	
	or	
㊶	Extension kit for one heating circuit with mixer M2	7301 062
	Components:	
㊷	Mixer PCB and flow temperature sensor (contact temperature sensor)	
㊹	Mixer motor M2	As per Viessmann pricelist
㊸	Heating circuit pump HKP M2	As per Viessmann pricelist
	or	
	Divicon (with 3-way mixer, heating circuit pump, flow temperature sensor and mixer motor)	

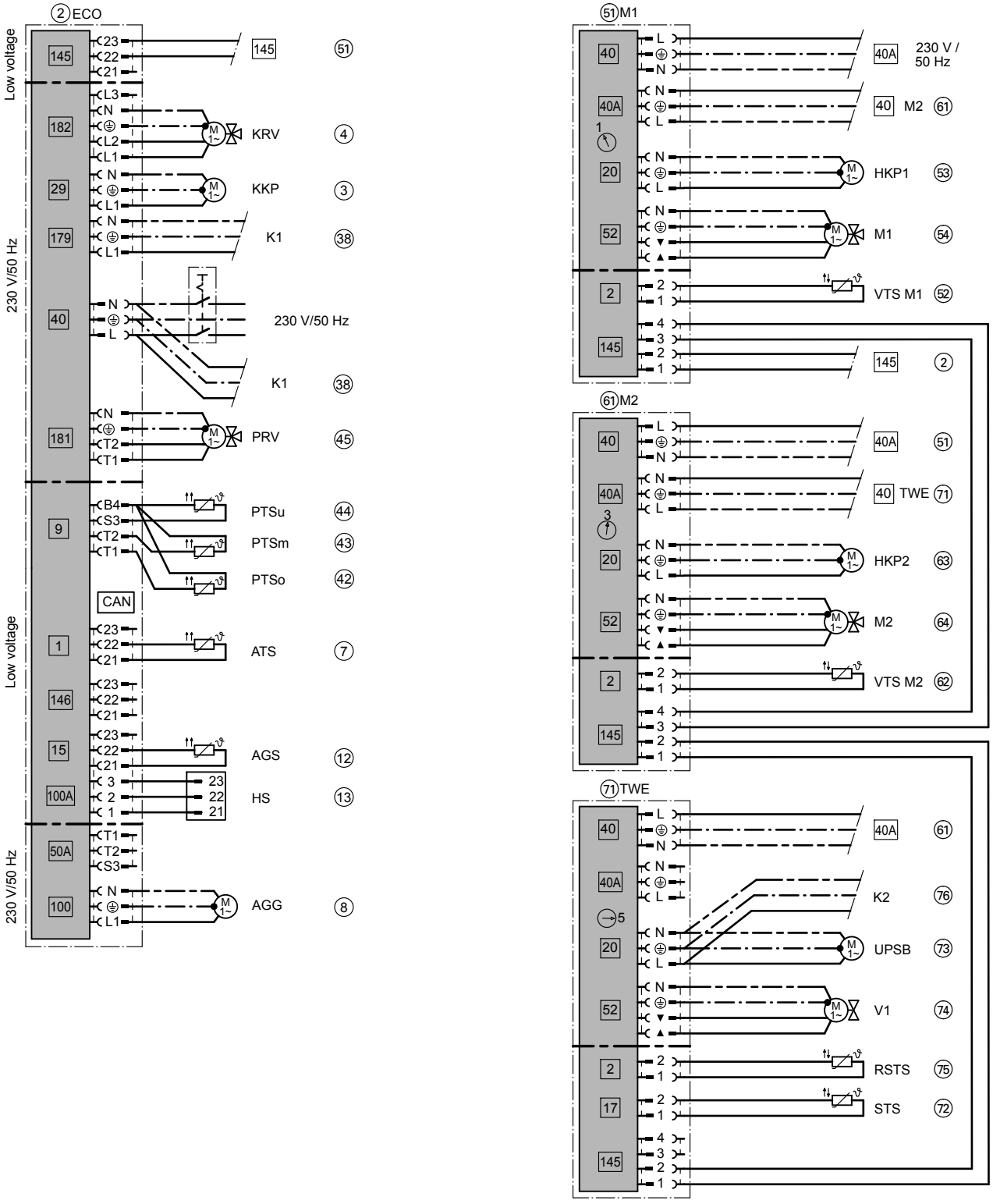
Application examples (cont.)

ID: 4605385_1304_04

Pos.	Designation	Part no.
⑦⓪	**Heating circuit for DHW heating**	
⑦①	Extension kit for DHW heating	7301 062
⑦②	Cylinder temperature sensor STS	7438 702
	and	
	Stainless steel sensor well (not required for Vitocell DHW cylinders)	7819 693
⑦③	Circulation pump for cylinder heating UPSB	As per Viessmann pricelist
⑦④	2-way valve for restricting the flow rate	As per Viessmann pricelist
⑦⑤	Return temperature sensor RSTS	Standard delivery pos. 71
⑦⑥	Contactor relay K2	7814 681
	Accessories	
⑦⑦	Vitotrol 200A	Z008 341
⑦⑧	Vitotrol 300A (max. one Vitotrol 300A per Ecotronic)	Z008 342

Application examples (cont.)

Electrical installation scheme



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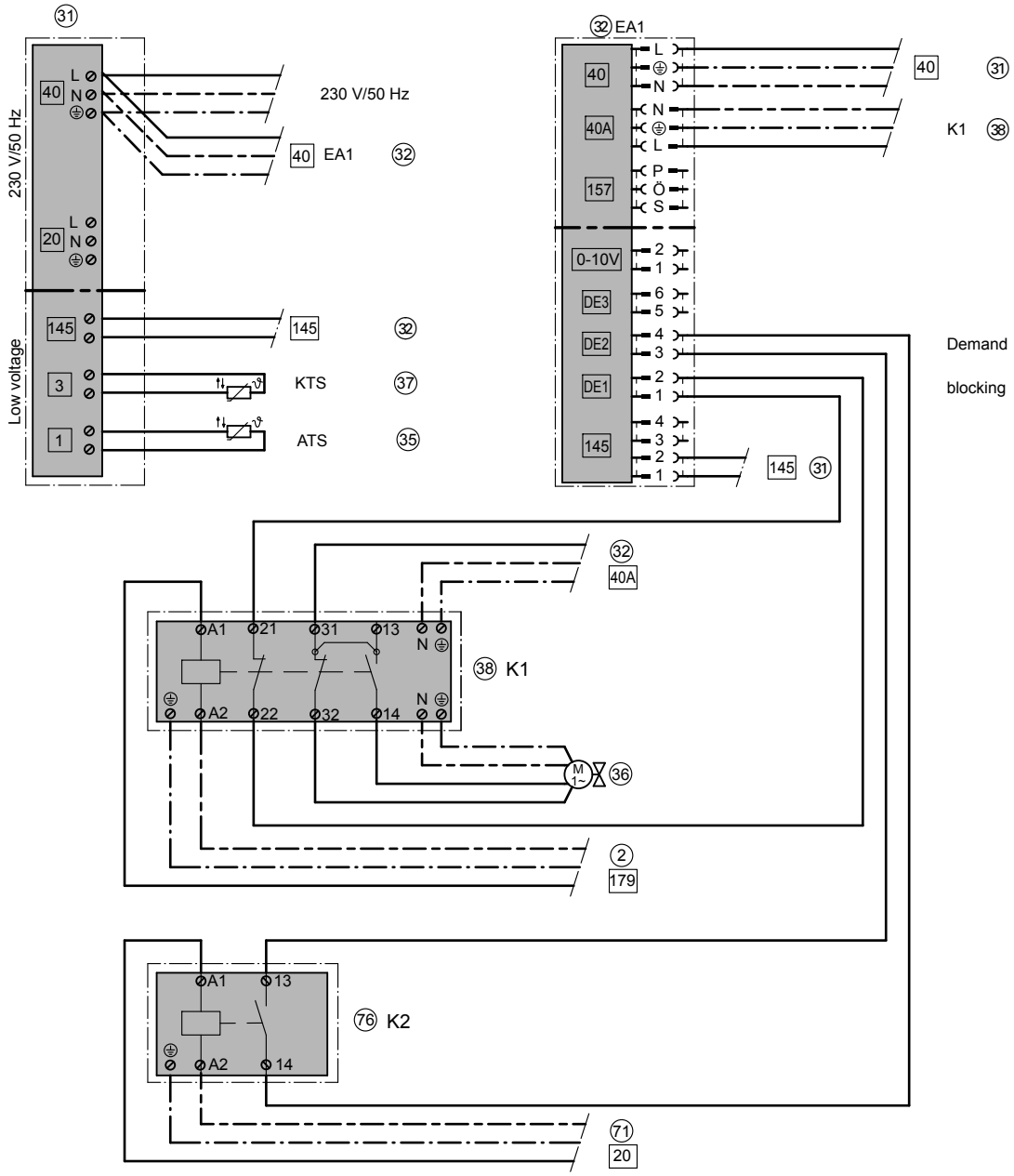
Application examples (cont.)



ID: 4605385_1304_04

9.1 Sizing the expansion vessel

The expansion vessel must be sized in accordance with the system parameters.

For selection tables for expansion vessels, see Vitoset pricelist.

9.2 Connections

		ECO 33 to 55 and 65	ECO 61 to 151
Flow	DN	32	40
	R	1¼	1½
Return	DN	32	40
	R	1¼	1½
Cold water supply, on site	DN	15	15
	R	½	½
Cold water drain, on site	R	¾	¾

Keyword index

Subject to technical modifications.

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