

# Yakut Aquatherm Boilers

F U E L O I L / G A S S T E E L B O I L E R S

YAKUT 8-80: from 98 to 930 kW

YAKUT PLUS 100-250: from 1210 to 2900 kW



Yakut Aquatherm 8-80



Yakut Aquatherm PLUS 100-250



Heating only  
(DHW production by  
independent tank)



Oil or Gas



CE No.:  
YAKUT...: 1312BR4873  
YAKUT PLUS...: 1312BS4965

**EAC**



CE efficiency class

Yakut and Yakut PLUS boilers are pressurised, steel boilers with 2-pathways flue gas evacuation and high combustion efficiency, to be fitted with a pressure jet oil or gas burner.

Available with different control panels which can be used to control 2-stage or modulating burners:

- Aquatherm Ygnis: for simple on/off control.
- Aquatherm Ygnis: for high/low burner control.
- Aquatherm Ygnis: for boilers requiring full modulating control.

## CONDITIONS OF USE

Max. working pressure:

- YAKUT: 6 bar\*
- YAKUT PLUS: 6 bar\*\*

Max. working temperature: 100°C

Adjustable thermostat: from 55 to 85°C

Safety thermostat: 110°C

\* YAKUT 8-80: up to 10 bar

\*\* YAKUT PLUS: up to 10 bar on request,

# YAKUT AQUATHERM RANGE: PRESENTATION

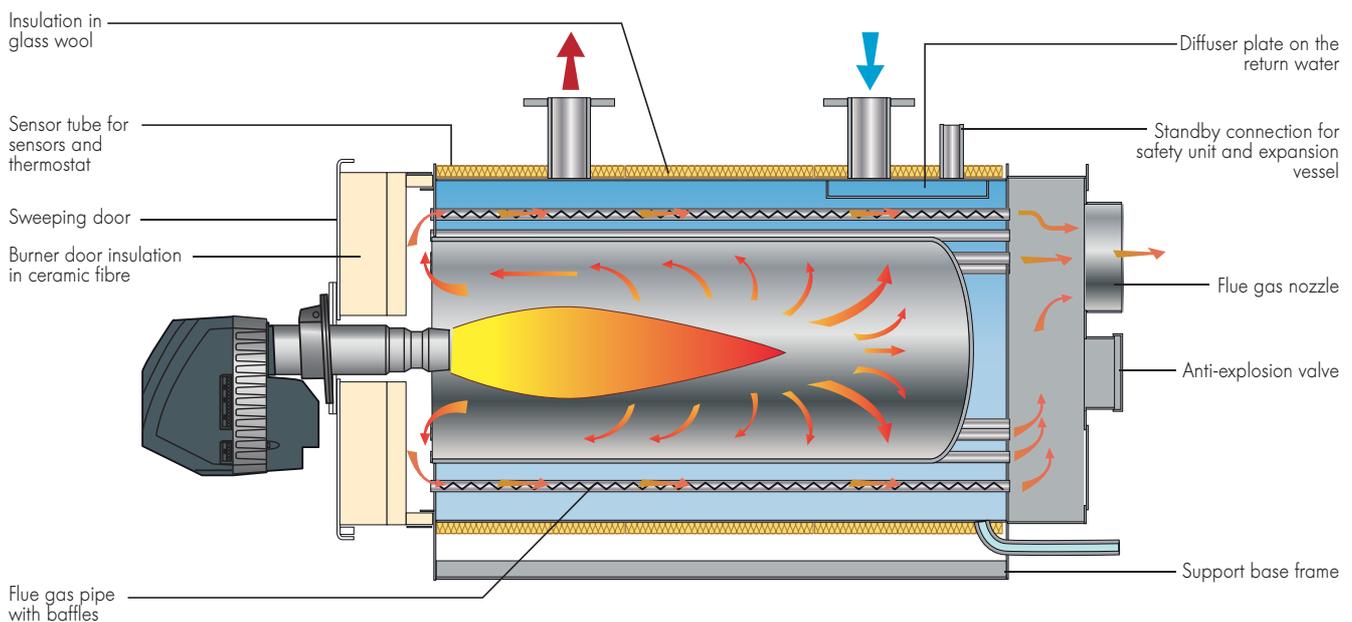
## STRONG POINTS

- YAKUT are medium to high output pressurised steel boilers to be fitted with a fuel oil or gas pressure jet burner.
- Single-unit steel heating body, with 2 flue gas pathways and combustion efficiency up to 92.4%
- Combustion chamber designed for easy adaptation of all air burners, including ones with low NOx emissions.
- Second flue gas pathway in the pipes fitted with baffles for optimised heat transfer and operation with no risk of condensation (min. return temp.: 55°C).
- Efficient insulation in high density glass wool covered with aluminium on the outside.
- Door giving access to the flue gas pipes and burner door with ceramic insulation mounted on reversible hinges.
- Available with control panels: Ygnis control panel to be placed on the boiler, control panels to be installed on the top cover of the boiler which can be used to control 2-stage or even modulating burners:

## MODELS

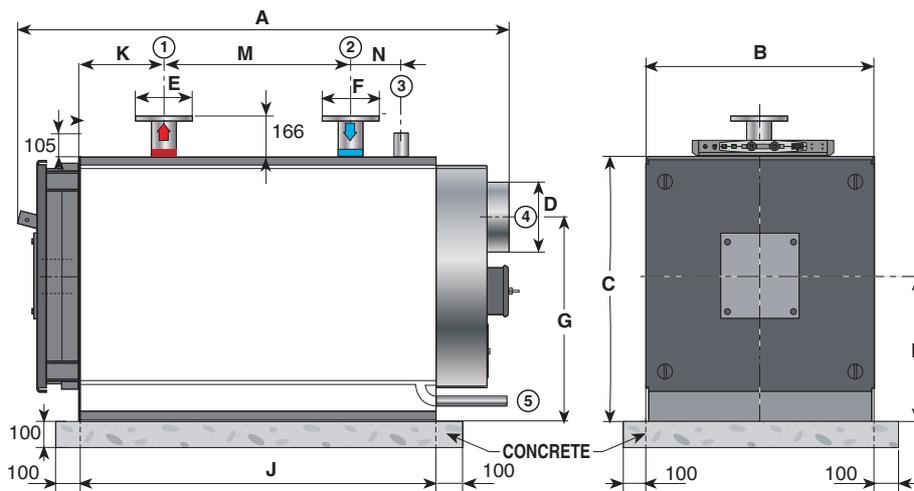
Boiler	Output range kW	TZ Part Number	Description
	200 Kw	341-000-012	6 Bar 200Kw boiler
	300 Kw	341-000-013	6 Bar 300Kw boiler
	400 Kw	341-000-014	6 Bar 400Kw boiler
	600 Kw	341-000-015	6 Bar 600Kw boiler
	700 Kw	341-000-016	6 Bar 700Kw boiler
	950 Kw	341-000-017	6 Bar 950Kw boiler

## DESCRIPTION



# YAKUT RANGE: SPECIFICATIONS

## MAIN DIMENSIONS (MM)



- ① Heating flow
- ② Heating return
- ③ Safety device connections R 1" 1/2
- ④ Flue gas nozzle
- ⑤ Drain tube R 1"

(\*) Choice of 4 control panels:

- Ygnis controller to be fitted to the boiler.

(2) Lateral control panel: its position on one of the lateral panels is left to the installer's discretion.

R: threading

YAKUT-		200	300	400	600	700	950
A	mm	1550	1760	1995	2070	2070	2350
B	mm	740	800	850	1125	1125	1125
C	mm	890	930	950	1200	1200	1200
D Ø ext.	mm	247	247	296	346	346	346
E	mm	DN65	DN80	DN80	DN100	DN100	DN100
F	mm	DN65	DN80	DN80	DN100	DN100	DN100
G	mm	670	725	745	890	890	890
H	mm	500	512	510	640	640	640
J	mm	1030	1210	1460	1487	1487	1725
K	mm	260	300	312	312	312	312
M	mm	530	665	850	850	850	1050
N	mm	180	180	180	180	180	215

## MAIN SPECIFICATIONS

Type: heating only  
 Energy: oil/gas  
 Max. working pressure: 6 bar\*

Ref. "EC certificate": CE 1312BR4873  
 Combustion evacuation: chimney

Max. working temperature: 100°C  
 Min. return temperature: 55°C  
 Safety thermostat: 110°C

### Model

YAKUT -		200	300	400	600	700	950
Nominal useful output at Pn	kW	209	290	406	581	697	930
Min. useful output	kW	167	232	325	465	558	774
Efficiency at 100% Pn and average temp. 70°C	% Pci	90.4	90.5	91	91.8	92.2	92.4
Stand-by losses at ΔT=30 K	W	1595	2210	3078	4367	5216	6944
Water content	l	186	250	320	635	635	690
Water flow at ΔT=20 K	m <sup>3</sup> /h	8.9	12.4	17.4	24.8	29.9	39.6
Water resistance at ΔT=20 K	mbar	10.5	14.5	24.4	41.4	58.4	80
Flue gas circuit volume	l	283	381	494	788	788	872
Flue gas volume flow rate	m <sup>3</sup> /h	416	576	803	1139	1361	1811
Flue gas mass flow rate	- oil	kg/s	0.154	0.248	0.349	0.492	0.592
	- gas	kg/s	0.156	0.244	0.344	0.486	0.586
Combustion chamber pressure	mbar	1.7	2.1	3	3.7	3.9	4.5
Length of the combustion chamber	mm	990	1197	1344	1429	1429	1642
Ø of the combustion chamber	mm	440	488	533	648	648	642
Volume of the combustion chamber	m <sup>3</sup>	0.135	0.201	0.270	0.424	0.424	0.478
Flue gas temperature (80-60°C)	°C	190	190	190	170	170	170
	°C	210	210	210	190	190	190
Net weight	kg	433	520	665	1087	1087	1339

Measurement conditions: Boiler flow/return temperature: 80/55°C, Fuel oil CO<sub>2</sub> = 13%; Gas CO<sub>2</sub> = 10%

# YAKUT PLUS RANGE: PRESENTATION

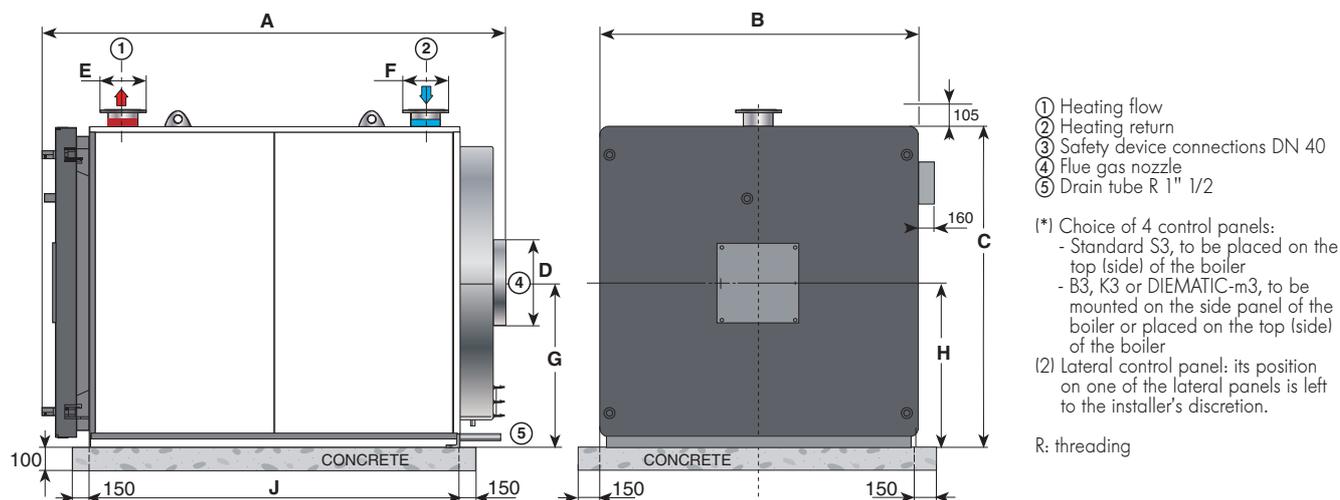
## STRONG POINTS

- CABK PLUS boilers are high output pressurised steel boilers to be fitted with a fuel oil or gas pressure jet burner.
- Single-unit steel heating body, with 2 flue gas pathways and combustion efficiency > 90% at 80/60°C
- Combustion chamber designed for easy adaptation of all blown air burners, including ones with low NOx emissions.
- Second flue gas pathway in the pipes shaped in variable sections and geometries, thus optimising heat transfer and operation with no risk of condensation (min. return temp.: 55° C).
- Efficient insulation in high density glass wool covered with aluminium on the outside.
- Lifting rings in the top section used for handling for easy positioning
- Door giving access to the flue gas pipes and burner door with ceramic insulation mounted on adjustable reversible hinges.
- Top cover with textured surface taking on the role of walkway on the boiler
- Available with control panels: Ygnis control panel to be placed on the boiler, control panels to be installed on the top cover of the boiler which can be used to control 2-stage or even modulating burners:

## MODELS

Boiler	Output range kW	TZ Part Number	Description
	1200	341-000-018	6 Bar 1200 Kw Boiler complete with Ygnis controller
	1800	341-000-019	6 Bar 1800 Kw Boiler complete with Ygnis controller
	2300	341-000-020	6 Bar 2000 Kw Boiler complete with Ygnis controller
	3000	341-000-021	6 Bar 3000 Kw Boiler complete with Ygnis controller

## MAIN DIMENSIONS (MM)



YAKUT PLUS-		1200	1800	2300	3000
A	mm	2380	2760	2980	3425
B	mm	1450	1750	1900	2400
C	mm	1466	1800	1970	2350
D Ø ext.	mm	500	550	600	650
E	mm	DN125	DN125	DN150	DN200
F	mm	DN125	DN125	DN150	DN200
G	mm	766	925	1020	1225
H	mm	766	925	1020	1225
J	mm	1804	2330	2400	2739

# YAKUT PLUS RANGE: SPECIFICATIONS

## MAIN SPECIFICATIONS

Type: heating only

Energy: oil/gas

Max working pressure: 6 Bar\*

\* On request:

- YAKUT PLUS 100-130-160: up to 10 bar
- YAKUT PLUS 200: up to 9 bar
- YAKUT PLUS 250: up to 6 bar

Ref. "CE certificate": CE 1312BS4965

Combustion evacuation: chimney

Max. working temperature: 100°C

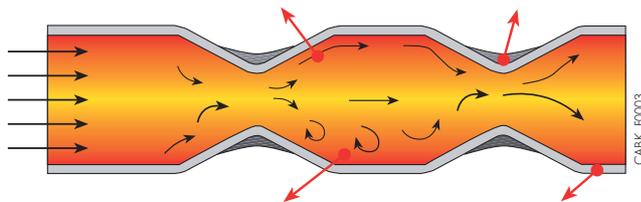
Min. return temperature: 55°C

Safety thermostat: 110°C

Model	YAKUT PLUS -	1200	1800	2300	3000	
Nominal useful output at Pn	kW	1210	1815	2310	2900	
Min. useful output	kW	968	1452	1846	2320	
Efficiency at 100% Pn and average temperature 70°C	%	90.6	90.6	90.6	90.6	
Stand-by losses at $\Delta T = 30K$	W	9215	13823	17593	22086	
Water content	l	1327	2377	3047	4700	
Water flow at $\Delta T=20K$	m <sup>3</sup> /h	49.1	79.2	98.7	126.2	
Water resistance at $\Delta T=20 K$	mbar	85	95	102	110	
Flue gas circuit volume	l	846	1439	1970	2400	
Flue gas volume flow rate	m <sup>3</sup> /h	1515	2271	2907	3444	
Flue gas mass flow rate	- oil	kg/s	1.022	1.532	1.949	2.446
	- gas	kg/s	1.012	1.518	1.932	2.425
Combustion chamber pressure	mbar	5.0	6.1	6.1	6.1	
Length of the combustion chamber	mm	1690	2030	2242	2590	
Ø of the combustion chamber	mm	780	930	1030	1405	
Volume of the combustion chamber	m <sup>3</sup>	0.726	1.240	1.680	3.612	
Flue gas temperature (80-60°C)	°C	190-220	190-220	190-220	190-220	
Net weight	kg	2500	3250	4000	5500	

Measurement conditions: Boiler flow/return temperature: 80/55°C. Fuel oil CO<sub>2</sub> = 13%; Gas CO<sub>2</sub> = 10%

## DESCRIPTION



Flue gas pipe in shaped steel generating surface turbulence assisting with heat transfer from the combustion gases to the heating water.

# INSTALLATION INFORMATION

## INSTALLATION IN BOILER ROOMS

### Ventilation

This must comply with prevailing national regulations.

Examples (valid in France)

Top and bottom ventilation mandatory

- Top ventilation:

Cross section equal to half of the total cross section of the flue gas conduits with a minimum of 2.5 dm<sup>2</sup>

- Bottom ventilation:

Direct air inlet:  $S \text{ (dm}^2) \geq \frac{0.86 P}{20}$

P = Installed output in kW

The air inlets must be located in such a way in relation to the top ventilation vents that air is renewed in the entire volume of the boiler room.



In order to avoid damage to boilers, it is necessary to prevent the contamination of combustion air by chloride and/or fluoride compounds, which are particularly corrosive.

These compounds are present, for example, in aerosol spray cans, paints, solvents, cleaning products, washing powders/liquids, detergents, glues, snow clearing salts, etc.

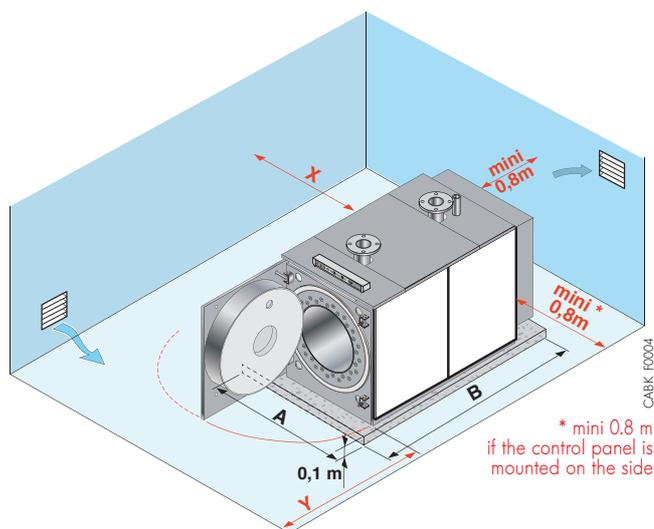
It is therefore necessary:

- To avoid sucking in air discharged from premises using such products: hairdressers, dry cleaners, industrial premises (solvents), premises containing refrigeration systems (risk of leaking refrigeration fluid), etc.
- To avoid the storage of such products close to boilers.

**Please note that, if the boiler and/or its peripherals become corroded by chloride and/or fluoride compounds, our contractual warranty cannot be invoked.**

### Installation

The dimensions shown in red are the minimum recommended dimensions for providing adequate access around the boiler. They are given in meters.



Bear in mind the minimum clearance required to open the door when the burner is fitted.

YAKUT-	8	10	12	15	18	20	25	30	35	40	50	60	70	80	100	130	160	200	250
A m	0.9	0.92	0.92	0.94	1.0	1.0	1.0	1.05	1.05	1.22	1.325	1.325	1.325	1.325	1.75	2.05	2.05	2.20	2.70
B m	1.045	1.19	1.19	1.23	1.23	1.41	1.41	1.66	1.66	1.687	1.687	1.687	1.925	1.925	2.10	2.63	2.63	2.70	3.04
X m	0.6	0.6	0.6	0.6	0.6	0.75	0.75	0.75	0.75	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.4	1.5
Y m	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.3	2.5	3.0

### Minimum door (T) and corridor (K) widths necessary for clearance of the boiler

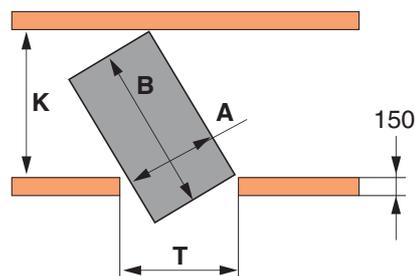
(These are minimum calculated values)

$$K = \frac{A}{T} \times B \quad \text{and} \quad T = \frac{A}{K} \times B$$

#### Example:

Calculation of the min. width of a corridor (K) necessary for the clearance of a CABK 50 boiler through a door width T = 1000 mm

$$K = \frac{1125}{1000} \times 2070 = 2328 \text{ mm minimum}$$



# INSTALLATION INFORMATION

## CHIMNEY CONNECTION

The high performances of modern boilers, their use in particular conditions connected with the development of burner technologies (operation at 1<sup>st</sup> stage or at the lower end of the modulation range) provide low, or even very low flue gas temperatures. This necessitates the use of flues designed to enable the flow of the condensates which may result from such operating modes, thus preventing the risk of damage to the chimney.

To define the cross section and height of the chimney, refer to the prevailing regulations.

### Note:

Depending on the configuration of the chimney, it may be necessary to add a draft moderator to ensure a partial vacuum of zero at the boiler nozzle.

## HEATING CIRCUIT CONNECTION

YAKUT and YAKUT PLUS boilers must only be used in closed circuit heating installations. The central heating systems must be cleaned to eliminate the debris (copper, strands, brazing flux) linked

to the installation of the system and deposits that can cause malfunctions (noise in the system, chemical reaction between metals). More particularly, if fitting a boiler to an existing installation, it is strongly recommended that you clear sludge

### Heating water requirements

- Total hardness: TH < 25 °F

### Water treatment

- When the heating water is treated (antifreeze product), it must be compatible with the various materials used in the boiler and the system circuits.

out of the system before installing the new boiler. After carrying out this work, particular monitoring of the installation may be necessary both in respect of the water in the network and the quality of the water used for topping it up in order to be in full control of the consequences. Suitable filters may be necessary in some cases

- Every precaution should be taken to prevent the formation of oxygen in the various parts of the system.

## Additional instructions for connecting boilers with an output equal to or higher than 116 kW

The levels of heat exchange, which are high in efficient boilers, mean carefully constructing boiler room systems in line with the codes of practice.

### Operating in cascade

After stopping the burner:

- time delay required before the order to close a gate valve: 3 min.

- order to stop the shunt pump (located between the boiler and the gate valves) using the limit switch contact on the gate valve.

### Operation in 2 stages with an oil or gas pressure jet burner

- boiler temperature maintained at 65°C or higher; the first stage must be set to a minimum of 30% of the nominal output.

### Operating with a modulating gas pressure jet burner

- boiler temperature maintained at 65°C or higher; the burner can modulate down to 30% of the nominal output.

### Water flow rate in the boiler

When the burner is operating, the water flow rate in the boiler must be between 1/3 of the nominal flow rate and 3 times the nominal flow rate.

$$\text{Nominal flow } Q_n = \frac{0.86 P_n}{15}$$

$$\text{Minimum flow } Q_{\min} = \frac{Q_n}{3} = \frac{0.86 P_n}{45}$$

(this flow rate also corresponds to the minimum shunt flow rate in the boiler)

$$\text{Maximum flow } Q_{\max} = 3 \times Q_n = \frac{0.86 P_n}{5}$$

$Q_n$  in m<sup>3</sup>/h

$P_n$  Nominal output (maximum boiler output) in kW

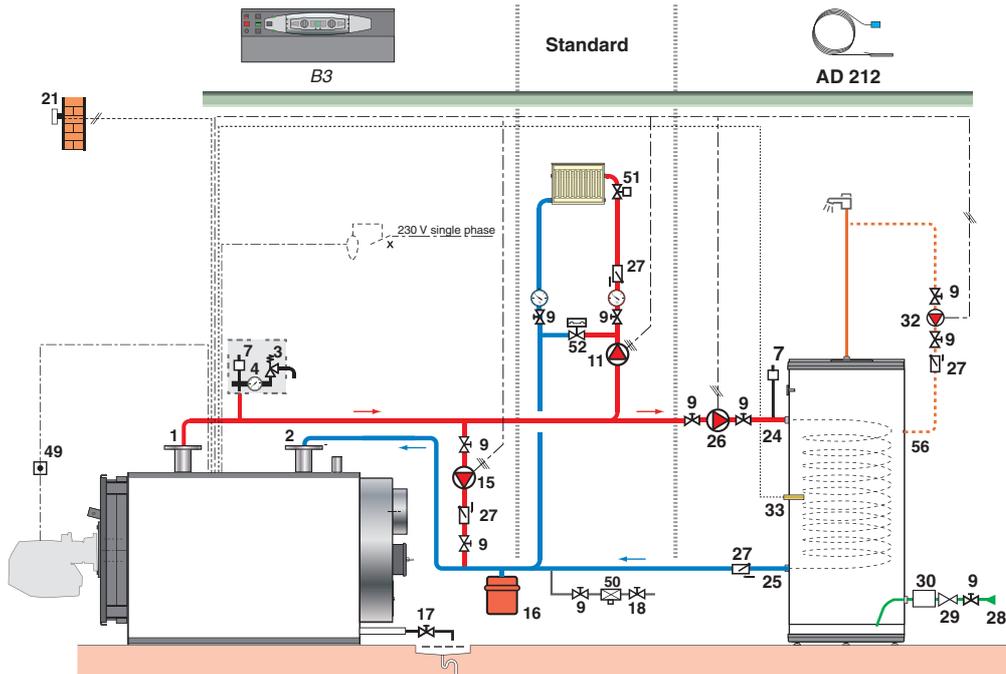
# INSTALLATION EXAMPLES

The examples presented below cannot cover the full range of installation scenarios which may be encountered. Their purpose is to draw the attention to the basic rules to be followed. A certain number of control and safety devices are represented but, in the last resort, it is up to the experts, consultant engineers and design departments to make the final decision on the control and safety devices to be used in the boiler room, depending on its specificities. In all events, it is necessary to abide by the codes of practice and the prevailing local and national regulations.

## Note:

For the connection of domestic hot water, a sleeve made of steel, cast iron or any other insulating material must be interposed between the hot water outlet and these pipes to prevent any corrosion to the connections, if the distribution pipes are made of copper.

### Installation of a YAKUT... B3 with 1 direct circuit + 1 DHW circuit (Schematic valid by analogy for a CABK PLUS... B3)



CABK\_F00068

## Key

- |                               |   |   |   |
|-------------------------------|---|---|---|
| 1 Heating flow                | 22 Boiler control system sensor                 | 39 Injection pump   | 61 Thermometer  |
| 2 Heating return              | 23 Flow temp. sensor downstream of mixing valve | 44 Thermostat limiting the temperature to 65°C with manual reset for underfloor heating   | 65 Low temperature circuit (radiator or underfloor heating)   |
| 3 Safety valve                | 24 Primary inlet on the DHW tank exchanger      | 49 Contactor mandatory if the burner is powered with three-phase current or if the specifications of the 230 V burner are higher than those admissible by the control panel | 123 Cascade flow sensor (*)   |
| 4 Pressure gauge              | 25 Primary outlet on the DHW tank exchanger     |   | (*) In this kind of system, the installation of a dip sensor (package AD 218) in the decoupling cylinder is recommended. However, it is also possible to use the boiler sensor provided with the CABK/CABK PLUS DIEMATIC-m3 |
| 5 Flow rate controller        | 26 DHW load pump                                |   | * mandatory, in compliance with safety directives: we recommend hydraulic safety units with membranes.  |
| 7 Automatic air vent          | 27 Non-return valve                             | 50 Disconnector   |   |
| 8 Manual air vent             | 28 Domestic cold water inlet                    | 51 Thermostatic valve   |   |
| 9 Valve                       | 29 Pressure reducer                             | 52 Differential valve (only with module fitted with a 3-speed pump)   |   |
| 10 3-way mixing valve         | 30 Sealed safety unit calibrated to 7 bar*      | 56 DHW circulation loop return  |   |
| 11 Heating pump               | 32 DHW loop pump (optional)                     |   |   |
| 13 Flush valve                | 33 DHW temperature sensor                       |   |   |
| 15 Shunt pump                 | 36 Motorised gate valve                         |   |   |
| 16 Expansion tank             |   |   |   |
| 17 Drainage valve             |   |   |   |
| 18 Heat circuit filling       |   |   |   |
| 21 Outside temperature sensor |   |   |   |

# TECHNICAL DESCRIPTION

## YAKUT... - YAKUT PLUS...

### Pressurized steel boilers with high combustion efficiency

Brand: De Dietrich  
Model: YAKUT \_\_\_\_ / YAKUT  
PLUS \_\_\_\_ Useful output: \_\_\_\_ kW  
Water content: \_\_\_\_ litres  
Max. operating pressure: 6 bar  
Max. operating temperature: 110°C

Pressure in combustion chamber: \_\_\_\_ mbar  
Footprint: \_\_\_\_ (L) x \_\_\_\_ (l) mm  
Net weight: \_\_\_\_ kg  
Ø Flue gas nozzle: \_\_\_\_ mm  
Ø Departure/return: \_\_\_\_ / \_\_\_\_

## DESCRIPTION

- Complies with the requirements of European Directives.
- Monobloc heating body in steel, with a wet pressurized open (unstoppered) combustion chamber having a built-in 2-way flue, modulated down to 55°C.
- The combustion chamber design ensures a low NOx level.
- Operating efficiency up to 90%; efficiency class ★★ CE
- Convection turbulators are fitted as standard to all flues ways.
- Total insulation of the heating body with glass wool.
- Reversible burner door (left or right opening) with thick ceramic insulation.
- YAKUT and YAKUT PLUS are available the Ignis control panel which can be used to control 2-stage or modulating burners: