

# Unica

PROFESSIONAL

# Unical<sup>®</sup> AG S.p.A.

Unical was founded in 1972 by a young engineer, Giovanni Jahier, to design and produce boilers for domestic and industrial applications.

The company later expanded its product portfolio to include air conditioning systems, radiant panels, solar panels, etc., forming one of the industry's most complete catalogues.

Unical has always seen – and still sees – improving the quality of life as one of its top priorities.

This means maintaining a commitment to improving comfort and safety, reducing energy consumption and respecting the environment.

Made in Italy: the Unical's focus.

Unical operates four plants around the country to cover production and logistics, all strategically interconnected and equipped with the latest automatic and robotic assembly lines.

Our Caorso plant produces wall-mounted and floor-standing boilers, both traditional and condensing, (up to 900 kW), while our Carbonara Po plant focuses on biomass fuelled boilers and steel boilers for use with jet burners (up to 7,000 kW).

Our industrial range covers generators of up to and over 14,000 kW, and includes special high efficiency boilers with patented heat exchange tubes.





# PROFESSIONAL



PROFESSIONAL



INDUSTRIAL



DOMESTIC



BIOMASS



SOLAR



INTEGRATED SYSTEMS



HEAT PUMPS



AIR CONDITIONING



RADIANT SYSTEMS

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(\*) The product can be sold only outside the UE

(\*\*) The models with an output smaller than 400 kW can be sold only outside de UE (update 01/2019)



# ALKON 50 C-70 C





ALKON 50 C



ALKON 70 C

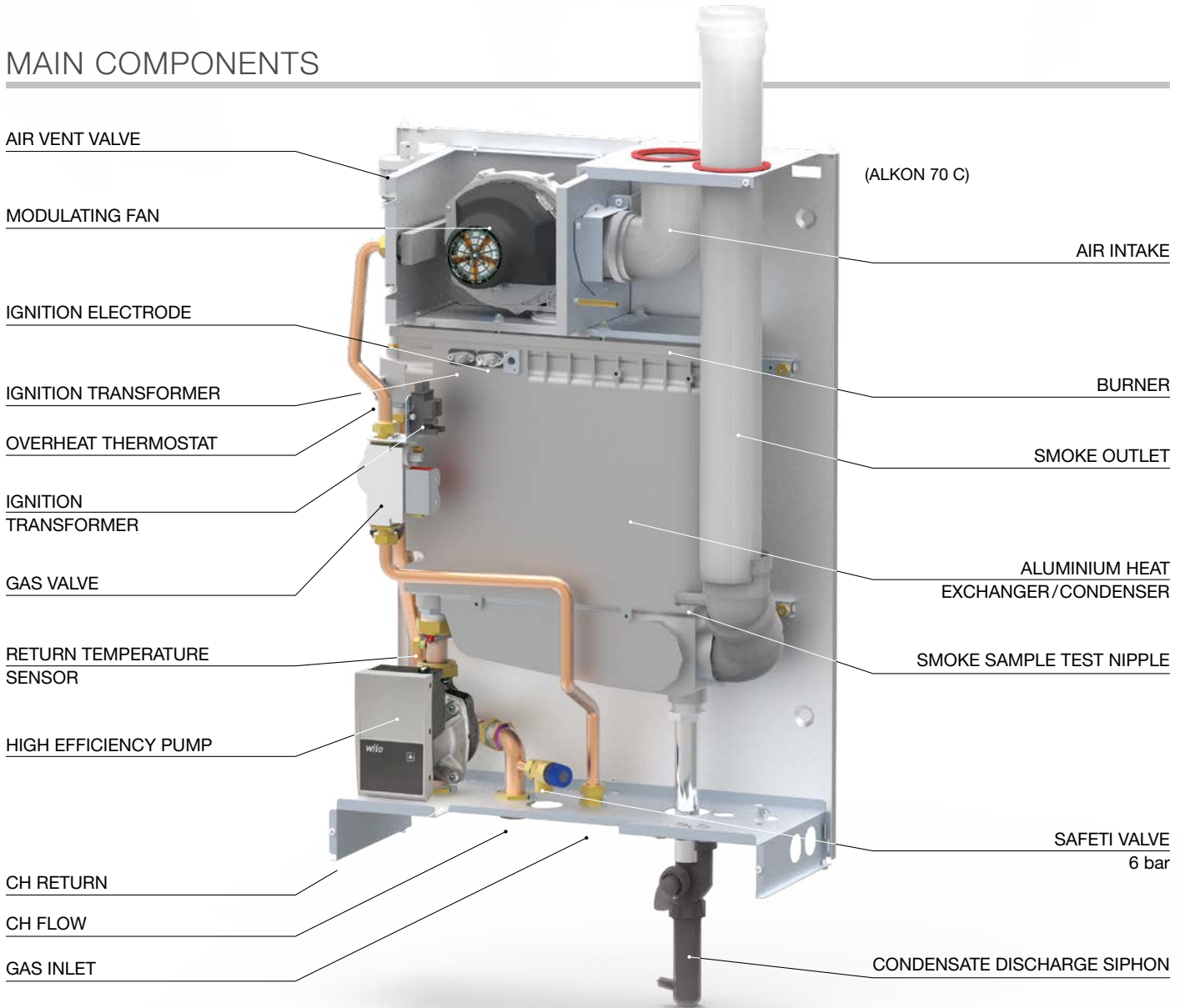


**WALL HUNG GAS BOILER FOR C.H. LOW NO<sub>x</sub>  
AND PREDISPOSITION FOR INSTANTANEOUS D.H.W. PRODUCTION (with optional kit)**

OUTPUT RANGE	from 50 to 560 kW (in battery)	
WORKING TEMPERATURE	no limit on return temperature	
SUPPLY	natural gas / LPG	
MODELS	50 C	70 C
SEASONAL EFFICIENCY	 <b>A</b>	 <b>A</b>

Heat exchanger in Aluminium / Silicium / Magnesium  
**Wall hung installation also in battery (up to 2 batteries of 4 boilers each)  
 can be combined both with MIXING HEADER and with PLATE HEAT EXCHANGERS**

## MAIN COMPONENTS

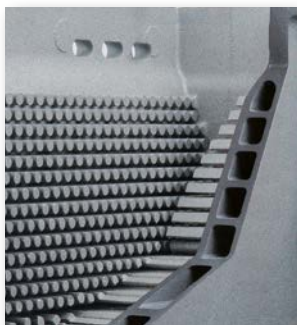


## DESCRIPTION

- Aluminium Heat exchanger / Condenser
  - Total premixing burner with constant CO<sub>2</sub>
  - Electronic ignition
  - Safety limit thermostat
  - Flow temperature sensor
  - Return temperature sensor
  - Automatic air vent
  - Condensate discharge siphon
  - Panel board with IPX4D electrical protection degree
  - Possibility of e-BUS connection
  - C.H. temperature adjustment range 30 to 85°C
  - Flame modulation according to the absorbed output
  - Pump over-run function
  - Additional functions: diagnostic of working parameters and errors, anti-frost, technical service and digital error indication
  - Minimum water pressure switch at 0.5 bar
  - Constant combustion ratio
  - Self adapting output according to the flue length
  - High efficiency modulating pump (standard supplied only for ALKON 70)
- Optional kits:**
- Manifold kit for additional safety devices
  - Additional safety devices kit
  - Thermoregulation and Control Manager Ufly P (boiler cascade manager complete with BCM 2.0)
  - High efficiency modulating pump kit (optional for ALKON 50)
  - mixing header / plate heat exchanger kit
  - Single chimney / battery
  - Supporting frames
  - D.H.W. priority kit
  - Hydraulic manifolds and blind flanges kit
  - Harness kit for external DHW producer
  - Instantaneous D.H.W. production kit
    - 28,5 l/min for ALKON 50 C
    - 37,4 l/min for ALKON 70 C



## PRODUCT PLUS VALUES



Ultra compact aluminium heat exchanger-condenser (Al/Si/Mg)



Combustion always under control, Low NOx - Class 6 (premix burner and modulating fan)



Ultra flat: only 26.6 cm in depth



Thermoregulation Ufly P and kit Gateway P for remote connection (optional)



- **EFFICIENCY CLASS A**
- **CLASS 6 Low NOx**  
thanks to the pre-mix burner with gas-air ratio control which offers a constant CO<sub>2</sub> content for the whole modulation range
- **CERTIFICATION IN OUTPUT RANGE**
- **EXCHANGER/CONDENSER**  
aluminium (Al/Si/Mg)
- **CONTAINED DIMENSIONS**  
height 93 cm, width 61.5 and only 26.6 in depth.
- **PREMIX COMBUSTION GROUP WITH CONSTANT CO<sub>2</sub>** in Al/Si/Mg alloy
- **MICROPROCESSOR PCB**  
for boiler control
- **VERY HIGH MODULATION RATIO**  
• 1:7 for ALKON 70 • 1:5 for ALKON 50
- **INTEGRAL STANDARD INTERFACE**  
for modulating heating controllers with protocol communication (bus-data).
- **COUPLING WITH A MODULATING PUMP HIGH EFFICIENCY**  
supplied as standard for ALKON 70
- **Optional manifold with additional safety devices kit**
- **INSTANTANEOUS D.H.W. PRODUCTION KIT (optional)**  
It allows a large DHW production without having recourse to voluminous cylinders
- **PREDISPOSITION FOR IN BATTERY INSTALLATIONS (optional)**



Up to 4 units batteries



Boiler operation assured even with low gas pressures (13 mbar)

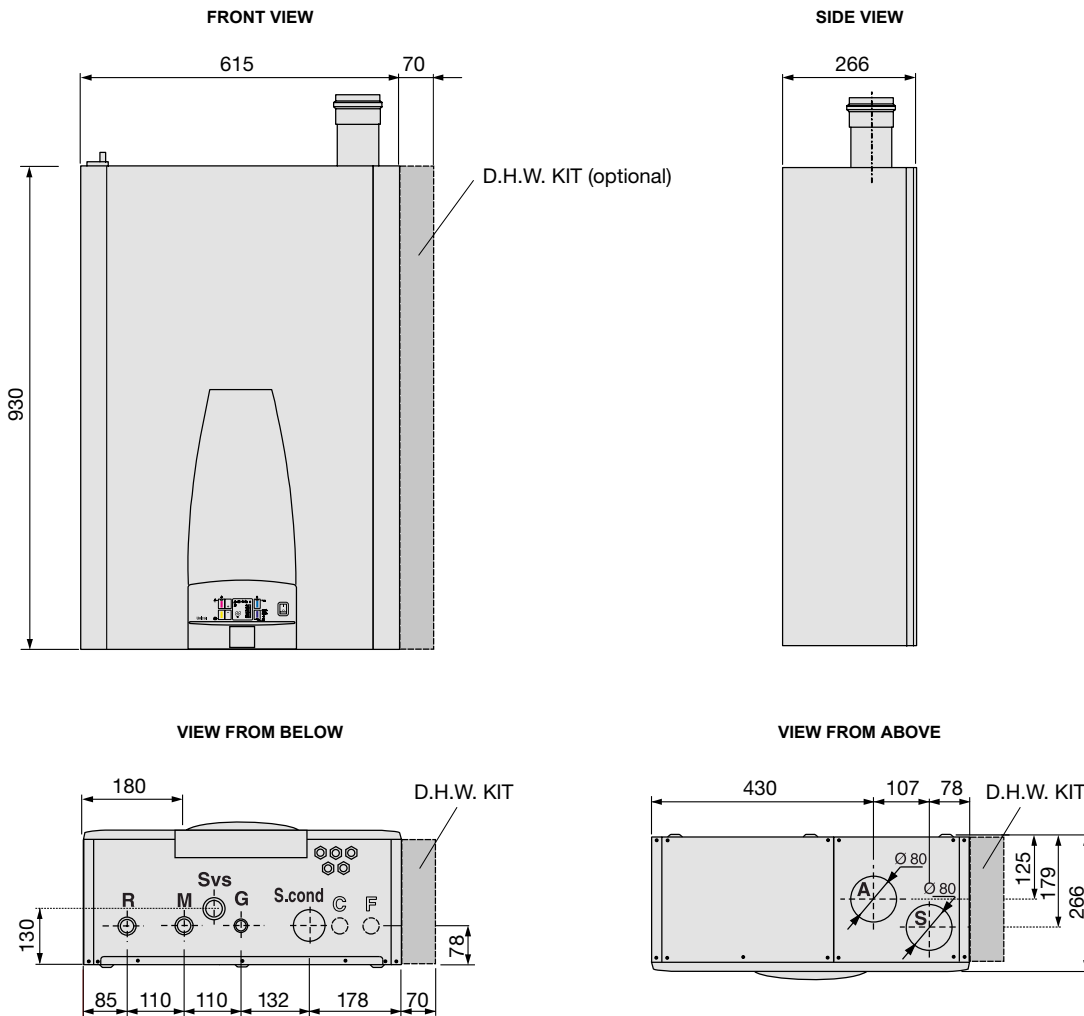


Quick and easy to service



D.H.W. production kit

DIMENSIONS



Key:

- R** - Heating system return  
(G1" for mod. 50, G1 1/4" for mod. 70)
- M** - Heating system flow  
(G1" for mod. 50, G1 1/4" for mod. 70)
- G** - Gas inlet (G 3/4")

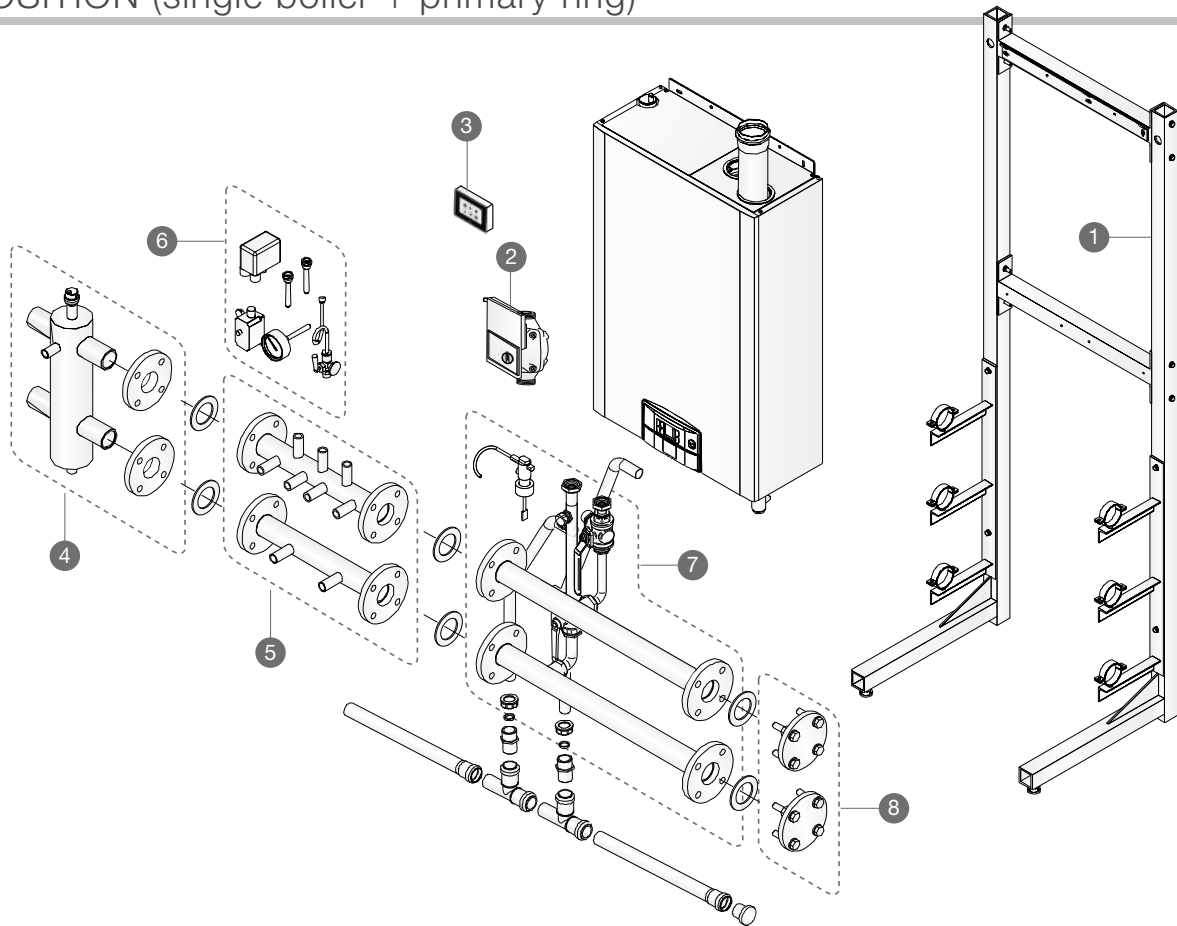
- Scond** - Condensation drain
- A** - Air Suction
- S** - Exhaust Smoke

ALKON	Net Weight kg	Gross Weight (with packaging) kg
50 C	50	55
70 C	58.4	64

**Kit for preparation of an external D.H.W. cylinder (optional), made by:** electrical harness and temperature sensor for the control of a 3 way diverting valve (common – D.H.W. – C.H.). Valve electrical supply: 230 V.

For further information consult the manual on the site [www.unical.eu](http://www.unical.eu) in the section of the product.

## COMPOSITION (single boiler + primary ring)



## COMPONENTS (optional)

- ① - SUPPORTING FRAME FOR ONE MODULE
- ② - MODULATING PUMP high efficiency (optional for ALKON 50: to be ordered separately)
- ③ - KIT CONTROL PANEL Ufly P  
composed of: thermoregulation Ufly P, Outdoor temp. sensor
- ④ - MIXING HEADER KIT (maximum flow rate 6 m<sup>3</sup>/h)
- ⑤ - ADDITIONAL SAFETY DEVICES COLLECTOR KIT
- ⑥ - ADDITIONAL SAFETY DEVICES KIT  
composed of:  
3-way cock 1/2", pressure gauge R 3/8, R 1/2 bulb holders (2x),  
100°C H.L. thermostat, 5 bar safety max pressure switch, thermometer,  
shock absorber for pressure gauge.
- ⑦ - COLLECTORS KIT  
composed of: Ballstop valves, 3 way valve, Flow collector, Return collector,  
Return pipe connection, Differential pressure switch, Flow pipe connection  
+ differential pressure switch
- ⑧ - BLIND FLANGES KIT

NOTE: the gas feeding pipes are not supplied.

## REGULATION ACCESSORIES (optional)

- SHC MULTIFUNCTION MODULE (for zones management)  
+ 3 control probes (it is possible to drive up to a maximum of 4 SHC cards)
- NTC sensor for SHC Module
- Probe PT 1000 for management of solar collectors
- KIT GATEWAY P for Ufly P remote connection

Available in combination with PLATE HEAT EXCHANGERS

CASCADE (composition of the battery + primary ring)\*



	NUMBER OF ALKON 50/70 UNITS IN BATTERY					
	2 ALKON 50/70		3 ALKON 50/70		4 ALKON 50/70	
	ALKON 50 quantity	ALKON 70 quantity	ALKON 50 quantity	ALKON 70 quantity	ALKON 50 quantity	ALKON 70 quantity
<b>1</b> - ALKON 50 C	2		3		4	
- ALKON 70 C		2		3		4
<b>2</b> - Kit CONTROL MANAGER Ufly P made of: cascade manager card BCM 2.0, viewer / programmer Ufly P, power pack 24V, outdoor temperature sensor, D.H.W. temperature sensor Can be used for cascade management up to 8 modules	1	1	1	1	1	1
<b>3</b> - SUPPORTING FRAME FOR 2 UNITS	1	1	1	1	1	1
<b>3a</b> - EXPANSION FRAME FOR 1 UNIT			1	1	2	2
<b>4</b> - COLLECTORS KIT + DIFFERENTIAL PRESSURE SWITCH	2	2	3	3	4	4
<b>5</b> - ADDITIONAL SAFETY DEVICES KIT STUB PIPE 50-200 KW	1	1	1	1	1	1
<b>6</b> - ADDITIONAL SAFETY DEVICES KIT	1	1	1	1	1	1
<b>7</b> - HYDRAULIC SEPARATOR KIT UP TO 180 KW (PER MOD. ALKON 50)	1	1	1			
- HYDRAULIC SEPARATOR KIT UP TO 450 KW (PER MOD. ALKON 70)				1	1	1
<b>8</b> - SEPARATOR CONNECTION KIT UP TO 180 KW (PER MOD. ALKON 50)	1	1	1			
- SEPARATOR CONNECTION KIT UP TO 450 KW (PER MOD. ALKON 70)				1	1	1
<b>9</b> - FLUE OUTLET KIT 2 ALKON UNITS	1	1	1	1	1	1
<b>9a</b> - EXPANSION FLUE OUTLET KIT 1 ALKON UNIT			1	1	2	2
- SMOKE THERMOSTAT KIT	2	2	3	3	4	4
<b>10</b> - BLIND FLANGE KIT	1	1	1	1	1	1
- MODULATING PUMP (optional for ALKON 50)	2		3		4	

Note: all the assembly of evacuation system and the additional accessories are in certified translucent Polypropylene.  
The gas supply pipes are not supplied. If supplies with power exceeding 200 kW are foreseen, contact the Technical Office / Presale.  
Available in combination with PLATE HEAT EXCHANGERS

\*For the configurations refer to the Technical Manual for Use and Maintenance on the web site [www.unical.eu](http://www.unical.eu)

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

		ALKON 50 C	ALKON 70 C
Appliance category		II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation Ratio		1:5	1:7
Nominal Heat Input on P.C.I. Qn	kW	48.5	67.5
Minimum Heat Input on P.C.I. Qmin	kW	9.6	9.6
Nominal Output (Tr 60 / Tm 80 °C) Pn	kW	47.2	65.7
Minimum Output (Tr 60 / Tm 80 °C) Pn min	kW	9.1	9.1
Nominal Output (Tr 30 / Tm 50 °C) Pcond	kW	49.4	68.7
Minimum Output (Tr 30 / Tm 50 °C) Pcond min	kW	10.04	10.33
Efficiency at max. output (Tr 60 / Tm 80°C)	%	97.29	97.29
Efficiency at min. output (Tr 60 / Tm 80°C)	%	94.9	94.9
Efficiency at max. output (Tr 30 / Tm 50°C)	%	101.82	101.72
Efficiency at min. output (Tr 30 / Tm 50°C)	%	104.55	107.58
Efficiency at 30% output (Tr 30°C)	%	107.33	107.33
Combustion efficiency with nominal load	%	97.82	97.38
Combustion efficiency with minimum load	%	98.51	98.34
Heat loss at casing with burner in operation (Qmin)	%	3.60	3.44
Heat loss at casing with burner in operation (Qn)	%	0.52	0.09
Flue gas temperature tf-ta (min)(*)	°C	30.6	34
Flue gas temperature tf-ta (max)(*)	°C	43.6	51.3
Maximum allowable temperature	°C	100	100
Maximum operating temperature	°C	85	85
Flue gas mass flow rate (min)	kg/h	15.9	15.9
Flue gas mass flow rate (max)	kg/h	80.0	111.4
Excess λ air	%	25.53	28.17
Flue losses with burner in operation (min)	%	1.49	1.66
Flue losses with burner in operation (max)	%	2.18	2.62
Minimum heating circuit pressure	bar	0.5	0.5
Maximum heating circuit pressure	bar	6	6
Water content	l	3.9	3.9
Gas Consumption Natural (20 mbar) gas G 20 a Qn	m <sup>3</sup> /h	5.13	7.14
Gas Consumption Natural gas (20 mbar) G 20 a Qmin	m <sup>3</sup> /h	1.02	1.02
Gas Consumption G25 (supply pressure 25 mbar) Qn	m <sup>3</sup> /h	5.96	8.30
Gas Consumption G25 (supply pressure 25 mbar) Qmin	m <sup>3</sup> /h	1.18	1.18
Gas Consumption G31 (supply pressure 37/50 mbar) Qn	kg/h	3.76	5.24
Gas Consumption G31 (supply pressure 37/50 mbar) Qmin	kg/h	0.75	0.75
Max. available pressure at the chimney base	Pa	40	40
Condensate production max	kg/h	7.8	10.87
<b>Emissions</b>			
CO at Minimum Heat Input with 0% of O <sub>2</sub>	mg/kWh	71.3	82
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	56	59
NO <sub>x</sub> Class		6	6
<b>Electrical Data</b>			
Voltage/Frequency electric power supply	V/Hz	230/50	230/50
Fuse on main supply	A (R)	6	6
Insulation degree	IP	X4D	X4D

Room Temperature = 20°C.

(\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)



Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs <= 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K - P<sub>stby</sub> - See Erp Table

Standstill electrical consumption - P<sub>sb</sub> - See Erp Table

DATA ACCORDING TO ErP DIRECTIVE


**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

			ALKON 50 C	ALKON 70 C
NOMINAL HEAT OUTPUT	$P_n$	kW	47	66
SEASONAL SPACE HEATING ENERGY EFFICIENCY	$\eta_s$	%	93	93
<b>SEASONAL EFFICIENCY CLASS IN HEATING MODE</b>			<b>A</b>	<b>A</b>
<b>FOR CH ONLY AND COMBINATION BOILERS: USEFUL HEAT OUTPUT</b>				
USEFUL HEAT OUTPUT in high temperature regime (Tr 60 °C / Tm 80 °C)	$P_4$	kW	47	66
USEFUL EFFICIENCY AT NOM. HEAT OUTPUT in high-temperature regime (Tr 60°C / Tm 80°C)	$\eta_4$	%	93	93
USEFUL HEAT OUTPUT AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30°C)	$P_1$	kW	<b>A</b>	<b>A</b>
USEFUL EFFICIENCY AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30 °C)	$\eta_1$	%	97.1	97.3
RANGE-RATED BOILER: YES / NO			NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>				
AT FULL LOAD	$e_{l_{max}}$	kW	0.203	0.267
AT PART LOAD	$e_{l_{min}}$	kW	0.162	0.172
IN STAND-BY MODE	$P_{SB}$	kW	0.005	0.005
<b>OTHER ITEMS</b>				
STAND-BY HEAT LOSS	$P_{stby}$	kW	0.151	0.151
EMISSIONS OF NITROGEN OXIDES referred to NCV & (GCV)	$NO_x$	mg/kWh	45 (41)	46 (42)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	92	120
<b>FOR CH &amp; DHW PRODUCTION BOILERS</b>				
DECLARED LOAD PROFILE			-	-
ENERGY EFFICIENCY IN DHW PRODUCTION MODE	$\eta_{WH}$	%	-	-
DAILY ELECTRICITY CONSUMPTION	$Q_{elec}$	kWh	-	-
DAILY FUEL CONSUMPTION	$Q_{fuel}$	kWh	-	-
INSIDE SOUND POWER LEVEL	$L_{wa}$	dB(A)	60	63
<b>SEASONAL EFFICIENCY CLASS IN DHW PRODUCTION MODE</b>			-	-

# KONf 100-115

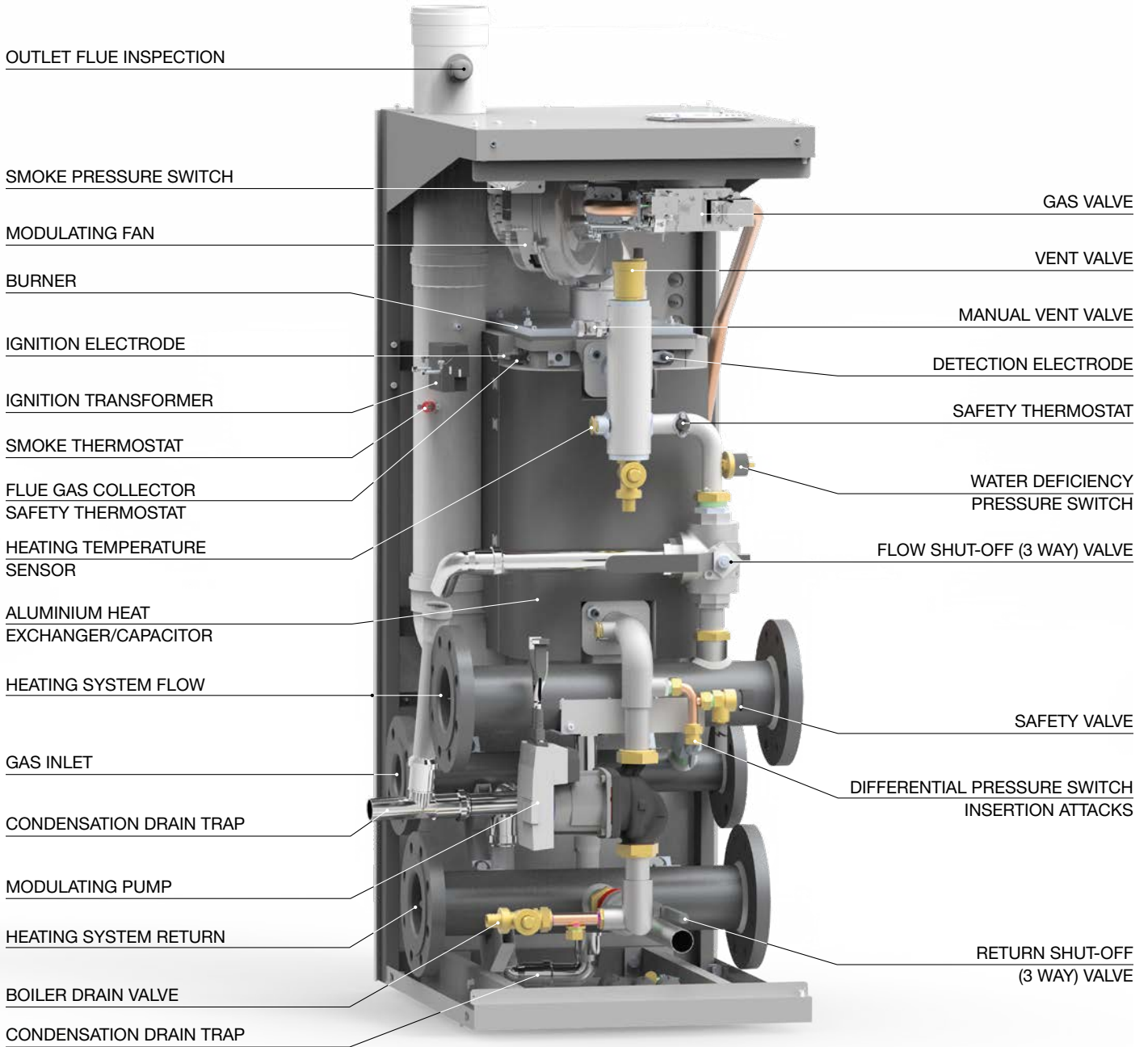


**FLOOR STANDING, MODULATING CONDENSING BOILER  
WITH LOW NO<sub>x</sub> PREMIX BURNER - FOR INDOOR & OUTDOOR INSTALLATION**

OUTPUT RANGE	from 99.5 to 920 kW in battery (115 kW x 8)	
WORKING TEMPERATURE	no limit on the return temperature	
SUPPLY	Natural Gas or LPG	
MODELS	KONf 100	KONf 115
SEASONAL EFFICIENCY		

Heat exchanger in Al/Si/Mg alloy – floor standing installation – IPX5D (for Outdoor installation)  
**Battery (up to batteries of 4 boilers each)**  
**can be combined both with MIXING HEADER and with PLATE HEAT EXCHANGERS**

## MAIN COMPONENTS



## DESCRIPTION

The KONf is a low water content (ca. 9 litres) gas boiler, with integral totally premix burner, FOR HEATING ONLY.

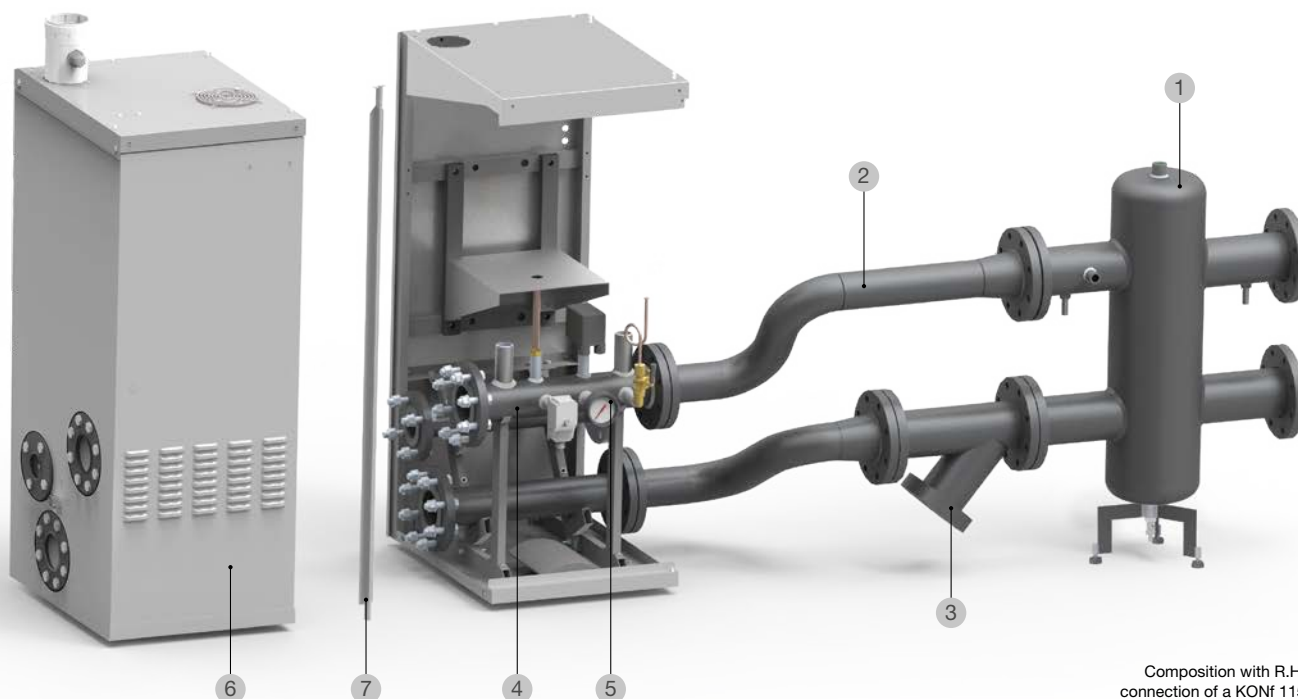
### PECULIAR FEATURES:

- 1) High integration modular structure
- 2) Specially for Outdoor installation (Protection degree IPX5D)
- 3) Predisposition for quick installation "Plug & Play", also in cascade up to 8 units
- 4) Modulating pump controlled by the on board electronics for the maximum efficiency in condensing mode
- 5) Optional controller for the management of each individual unit or the complete cascade and of the thermal charges (possible from remote)
- 6) High modulation ratio for each individual unit ( up to 1:5,75)
- 7) Control panel on board of each unit, with display and diagnostics
- 8) Smoke evacuation: elbow in polypropylene PPP and terminal in stainless steel.

Each unit develops an Output of 100/115 kW and belongs to the category II2H/3P, then can operated with Natural Gas or LPG.



## COMPONENTS FOR THE CONNECTION TO THE C.H. SYSTEM (optional)



Composition with R.H. side connection of a KONf 115 with primary ring, casing and top cover

1 - MIXING HEADER Ø 220 mm FOR C.H. SYSTEM UP 350 kW, DN 100

2 - RH SIDE CONNECTION KIT FOR MIXING HEADER DN 100

3 - Y SHAPED FILTER DN 100

4 - ADDITIONAL SAFETY DEVICES MANIFOLD + GAS, FLOW AND RETURN MANIFOLDS

5 - ADDITIONAL SAFETY KIT

made of: - 1/2" 3 way valve - N. 2 bulb holders 1/2" for calibration purposes - Thermometer Ø 100 mm with bulb holder

- Safety pressure switch 5 bar - Thermostat 100°C - Shock absorber for manometer.

Note: Some of the additional devices aren't supplied because their setting depends on the C.H. system features.

6 - KIT OF OUTDOOR CASING COMPLETE WITH SUPPORTS FOR SAFETY DEVICES \*

- KIT OF EMPTY CASING (to be used as container for accessories) \*

- KIT OF SUPPORTS FOR SAFETY DEVICES (suggested for indoor installation)

7 - UNION KIT FOR INDOOR INSTALLATIONS for 2 elements

- DIFFERENTIAL PRESSURE SWITCH

(\*) In case the kit of outdoor casing, complete with supports for safety devices, or the kit of empty casing is installed (pos. 6), ask also for the top cover (equipped with the closing cap on the not used evacuation hole), considering an additional element. If both, the a.m. kits are installed, ask for a top cover two elements longer. (E.g.: for N.1 KONf 115 + Kit of outdoor casing complete with supports for safety devices + Kit of empty casing, ask for a top cover for 3 elements)

In case of combination with PLATE HEAT EXCHANGERS do not supply the items 2 - 3 - 5 - 6

PRODUCT PLUS VALUES

- **HIGHT EFFICENCY CLASS**
- **CLASS 6 Low NOx (UNI EN 15502-1)**  
thanks to the pre-mix burner with gas-air ratio control  
which offers a constant CO<sub>2</sub>
- **UP TO 109% EFFICIENCY**
- **CERTIFICATION IN OUTPUT RANGE**
- **EXCHANGER/CONDENSER**  
aluminium (Al/Si/Mg)
- **CONTAINED DIMENSIONS**  
Height 130 cm, Width 51 cm, Depth 60 cm
- **PREMIX COMBUSTION GROUP WORKING AT CONSTANT CO<sub>2</sub>**
- **MICROPROCESSOR BOARD**  
of boiler control
- **THERMOREGULATION Ufly P (optional)**
- **KIT GATEWAY P (optional)**  
for Ufly P remote connection
- **CASCADE** formation for a bank  
of up to 4 boilers (2x)
- **MODULATING PUMP (std supplied)**  
for the maximum condensate production
- **ELEVATED MODULATING RATIO: 1:5.75**
- **BCM (Burner Cascade Manager)**  
interface for remote control (optional)
- **PANEL BOARD CAN BE OPEN**  
for an easy servicing
- **EASY TO INSTALL**  
compact and simple connections
- **CERTIFICATION OF THE ADDITIONAL SAFETY DEVICES**
- **IPX5D PROTECTION GRADE**  
for outdoor installation
- **PLATE HEAT EXCHANGERS**  
available on request  
up to batteries of 4 modules



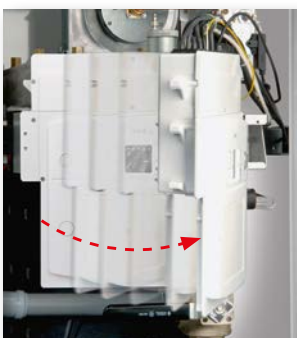
Pre-mixed combustion system with constant CO<sub>2</sub> emission (modulating gas valve, modulating fan and stainless steel burner)



Heat module complete with primary ring, composed of additional safety devices kit and mixing header



Thermoregulation Ufly P (optional) for complex heating plants and battery applications



The control panel can be opened to facilitate maintenance



BCM 2.0 board for remote control (optional accessory)



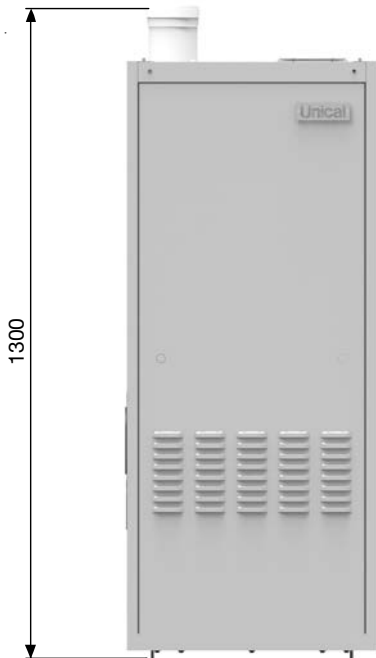
Aluminium (AlSiMg) heat exchanger/condenser (a detail of the combustion chamber)



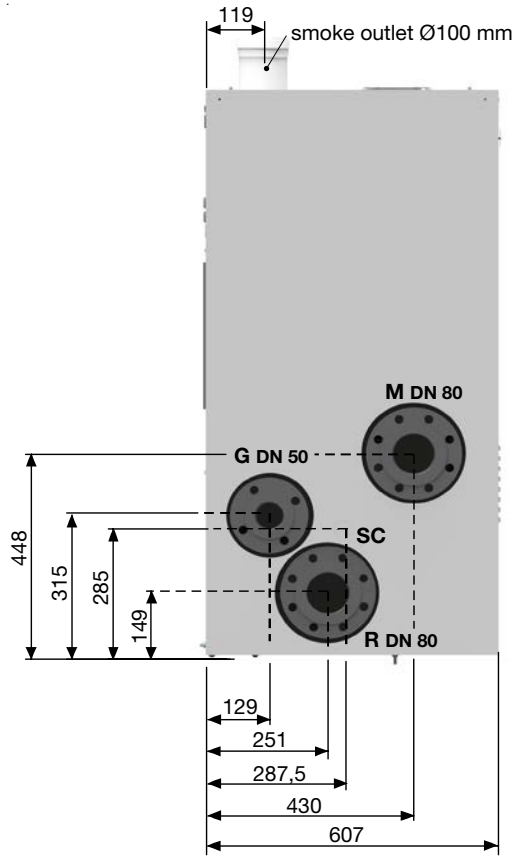
Modulating pump for maximum condensate production

DIMENSIONS OF SINGLE BOILER

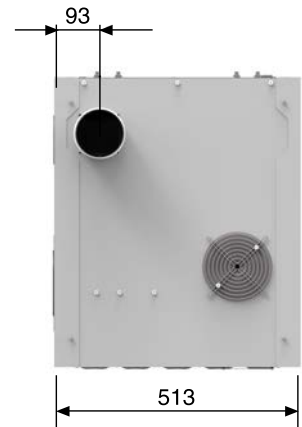
FRONT VIEW



LEFT SIDE VIEW



VIEW FROM ABOVE



Key:

- R** - CH safety system return DN 80
- M** - CH flow system DN 80
- G** - Gas Inlet DN 50
- Sc** - Outlet condensate drain siphon Ø 32

KONf	Net Weight kg	Gross Weight (with packaging) kg
100-115	157.8	171.6

KONf IN BATTERY



## CONTROL PANEL (std. supplied)

The panel board equipping the boiler allows the management of an heating circuit with fixed set-point



+/- Increase/decrease key

**A** Digital system pressure gauge (only for boilers equipped with pressure encoder)

**B** Central Heating adjustment key

**C** Domestic hot water adjustment key

**D** Reset /chimney-sweeper key

**E** Information display

**F** Led/Simbol Heating function active

**G** Led/Simbol Domestic hot water function active

**I** Block symbol

**L** Burner in operation symbol

**M** Fault symbol

**N** Temperature or fault code indication

**O** Power On indicator led

**P** Activation sweeper mode

**Q** Power supply

**S** Function key: Stand-by / Heating / Domestic hot water + Heating / Antifreeze protection

## SHC - MULTI-FUNCTION MODULE - HEATING CIRCUITS MANAGEMENT (optional)

The board is designed as a multi-function support for heating systems. It should be considered part of a modular system joined by an **eBUS** or **Modbus** communication system.

**It is possible to control up to a maximum of 4 SHC printed circuit boards.**

Its input and output resources make it suitable for a variety of applications:

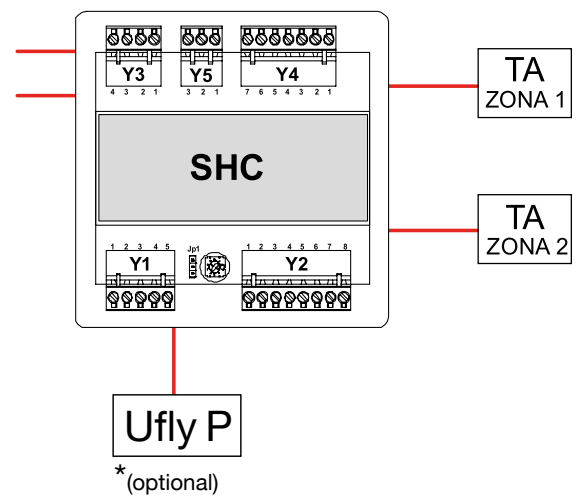
1. Direct or mixed heating circuits
2. Domestic hot water with storage tank.
3. Domestic hot water with plate heat exchanger.
4. Domestic hot water with plate heat exchanger and mixing valve
5. Solar collector with tank.

The multi-function module interacts with the system like a user, whose demands must be met by a manager controller Ufly P, which is responsible for the running of the heat generator.

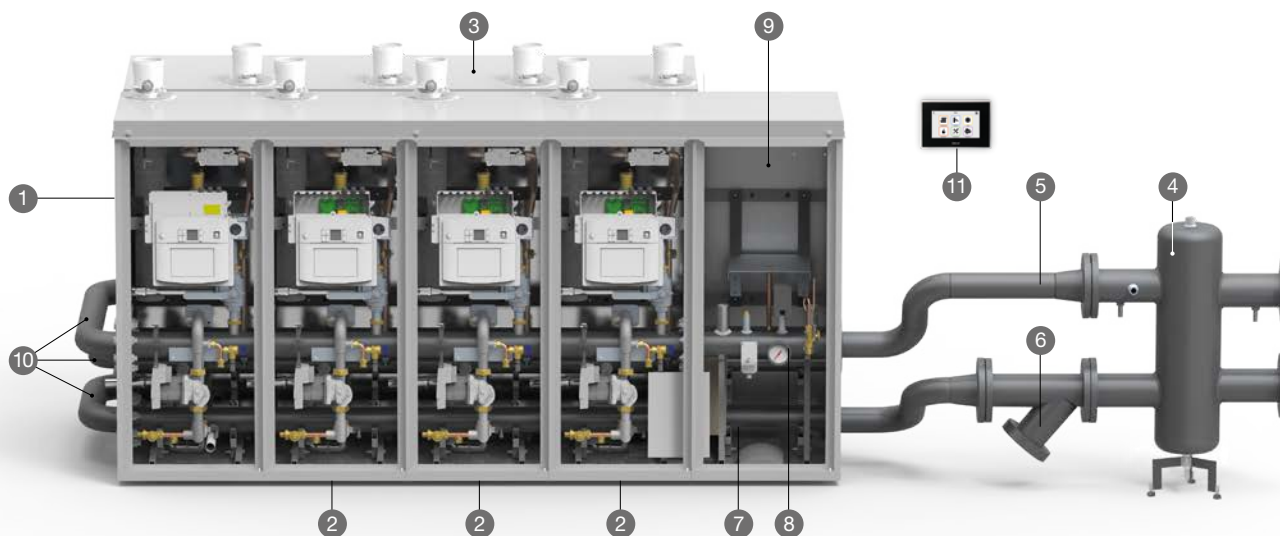
The multi-function module kit consists of:

- Panel
- NTC temperature sensor (3 pcs.)
- Technical assembly instructions

For further information consult the site [www.unical.eu](http://www.unical.eu) in the section Accessories of the product.







## BATTERY COMPOSITION + PRIMARY RING



COMPOSITION WITH R.H. SIDE CONNECTION	Nr of KONf UNITS IN BATTERY							
	2	3	4	5	6	7	8	
<b>1</b> - KONf 100-115 "MASTER"	1	1	1	2	2	2	2	
- KONf 100-115 in combination with "MASTER" Does not include : Side panels – Black flanges with bolts and nuts – Casing cover of one unit	1	2	3	3	4	5	6	
<b>3</b> - Top casing for 1 units	1	2	3	4	5	6	7	
- ASS.Y KIT FOR INDOOR INSTALLATIONS for 2 units	1	2	7	4	5	6	7	
<b>4</b> - MIXING HEADER UP TO 350 kW DN 100 ø220	1	1	1					
- MIXING HEADER UP 360 kW DN 100 ø320				1	1	1	1	
<b>5</b> - R.H. SIDE CONNECTION KIT FOR MIXING HEADER DN 100	1	1	1	1	1	1	1	
<b>6</b> - Y SHAPE FILTER DN 200	1	1	1	1	1	1	1	
<b>7</b> - ADDITIONAL SAFETY DEVICES KIT + HYDRAULIC AND GAS MANIFOLDS	1	1	1	1	1	1	1	
<b>8</b> - PROTECTION AND CONTROL KIT for hydraulic manifold for additional safety devices	1	1	1	1	1	1	1	
<b>9</b> - OUTDOOR CASING KIT, complete with supports for additional safety devices*	1	1	1	1	1	1	1	
- EMPTY CASING KIT * (it can be used as container for accessories)	1	1	1	1	1	1	1	
- KIT OF SUPPORTS for ADDITIONAL SAFETY DEVICES (suggested for indoor installation)	1	1	1	1	1	1	1	
<b>10</b> - KIT OF MANIFOLDS FOR WATER & GAS				1	1	1	1	
<b>11</b> - REGULATION ACCESSORIES	1	1	1	1	1	1	1	
- DIFFERENTIAL PRESSURE SWITCH KIT (in combination with each unit)	2	3	4	5	6	7	8	

<sup>(\*)</sup> If a casing kit for outdoor installation, complete with supports for safety kit (pos. 9), or the kit of empty casing is installed, place the order for the top casing (complete with plug to close the unused hole) considering one additional unit. In case both of the casing kits are installed place the order for the top casing considering two additional units. Example: for 2 x KONf + complete kit for outdoor installation + empty casing kit, place the order for 4 unit top casing)

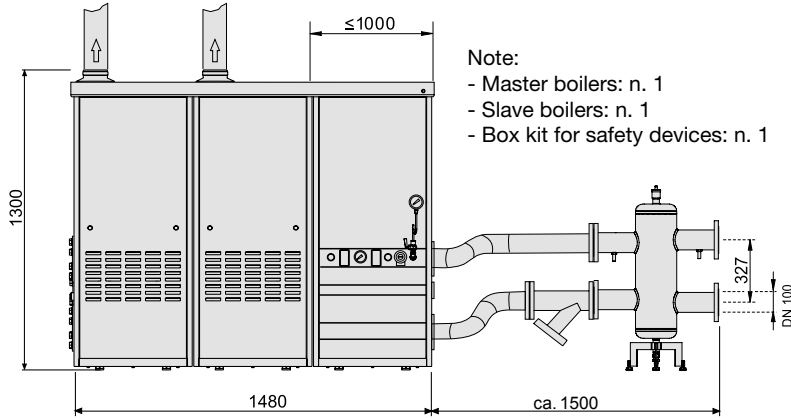
### ACCESSORIES FOR SMOKE EVACUATION IN BATTERY in PPS (optional)

- SMOKE EVACUATION EXPANSION KIT		1	2	3	3	4	5	6
- SIPHON		1	1	1	2	2	2	2
- SINGLE SMOKE MANIFOLD		1	1	1	2	2	2	2
- SMOKE DUCT EXTENSION Ø200					3	2	1	

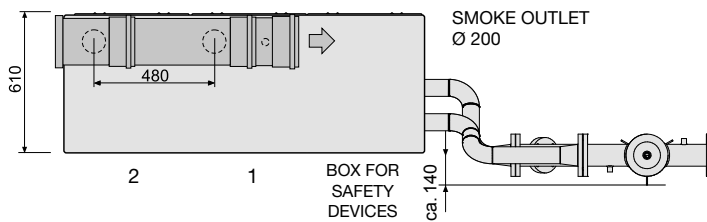
**NOTE.** There are 2 flue exhaust manifolds that flow in a single flue. If you want to connect the 2 smoke manifolds together, it is necessary to have a thermo-technician that calculates them with a special union collector not supplied. For information, refer to the "Battery Mounting Instruction" document at [www.unical.eu](http://www.unical.eu).

DIMENSIONS KONf 100-115 IN BATTERY (n.2 boilers)

BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT

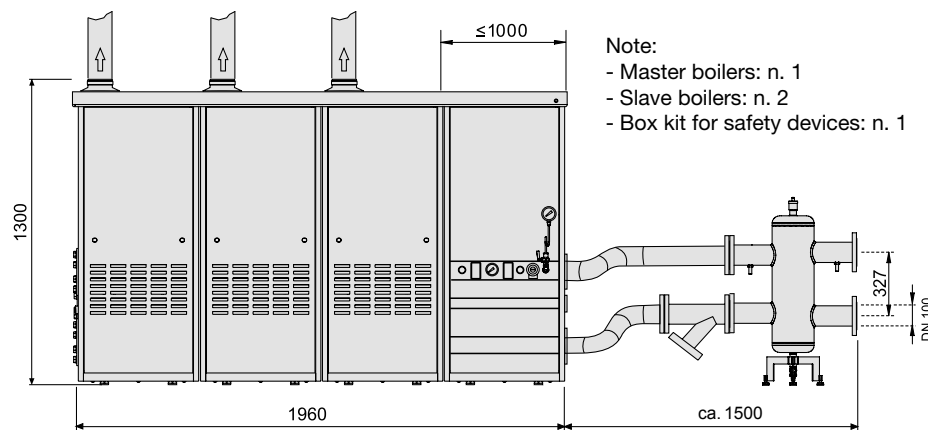


Operational data		KONf 100	KONf 115
Minimum Input n N.C.V. Qmin	kW	20	20
Nominal Input on N.C.V. Qn	kW	199	230
Nominal Output (60/80°C) Pn	kW	197.6	223
Nominal Output (30/50°C) Pcond	kW	210	240.6

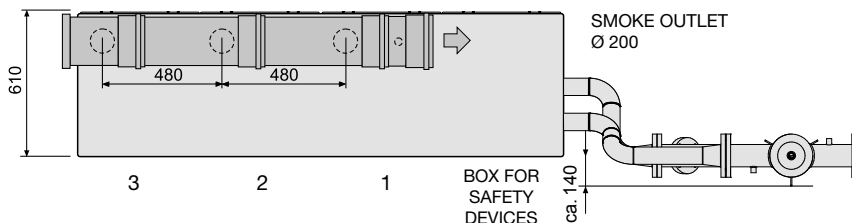


DIMENSIONS KONf 100-115 IN BATTERY (n.3 boilers)

BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER +Y FILTER KIT

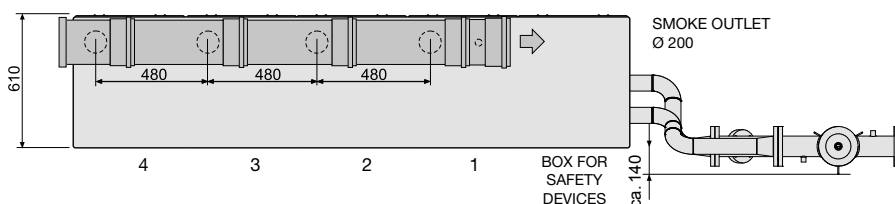
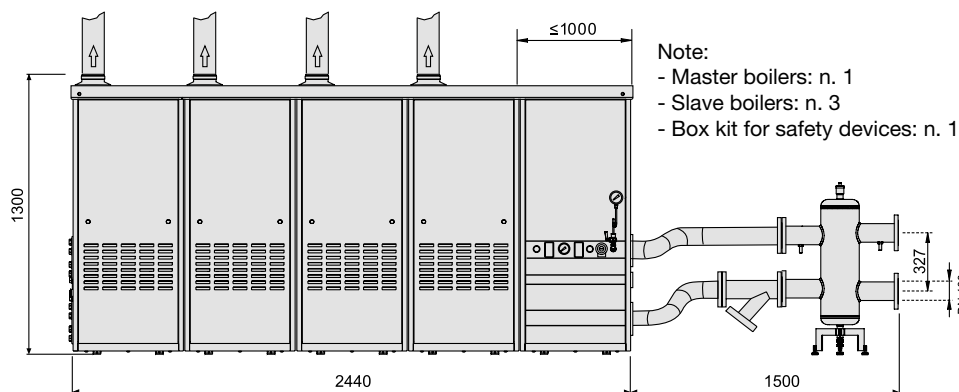


Operational data		KONf 100	KONf 115
Minimum Input n N.C.V. Qmin	kW	20	20
Nominal Input on N.C.V. Qn	kW	298.5	345
Nominal Output (60/80°C) Pn	kW	296.4	334.5
Nominal Output (30/50°C) Pcond	kW	315	360.9



DIMENSIONS KONf 100-115 IN BATTERY (n.4 boilers)

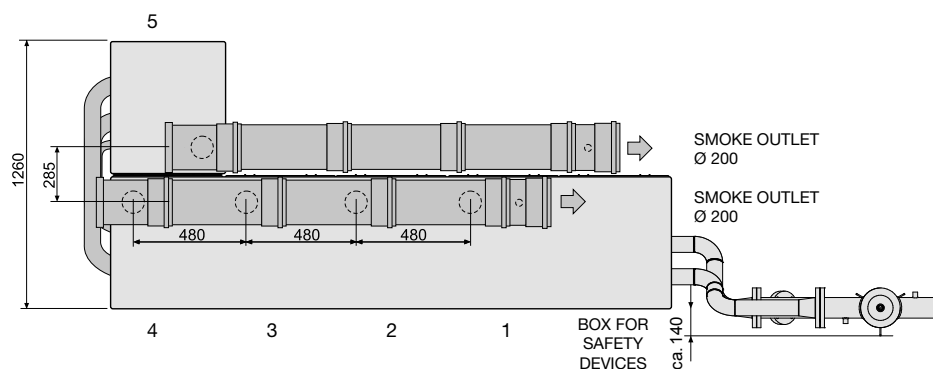
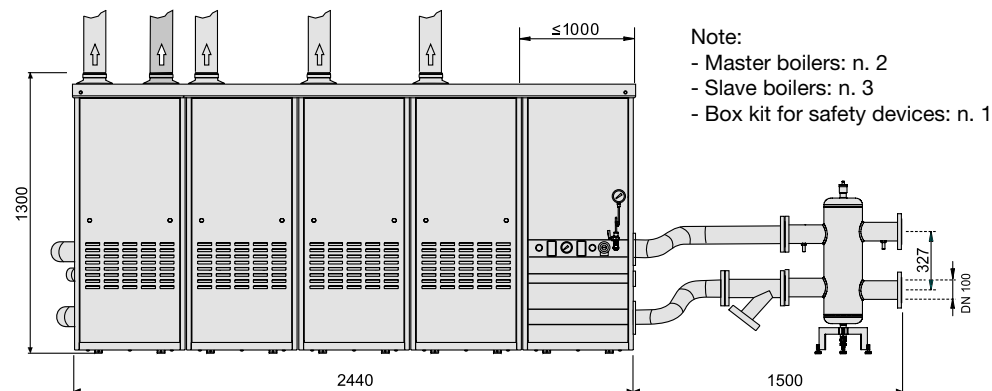
BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER + Y FILTER KIT



Operational data		KONf 100	KONf 115
Minimum Input n N.C.V. Q <sub>min</sub>	kW	20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW	398	460
Nominal Output (60/80°C) P <sub>n</sub>	kW	395.2	446
Nominal Output (30/50°C) P <sub>cond</sub>	kW	420	481.2

DIMENSIONS KONf 100-115 IN BATTERY (n.5 boilers 4+1 ON THE OPPOSITE SIDE)

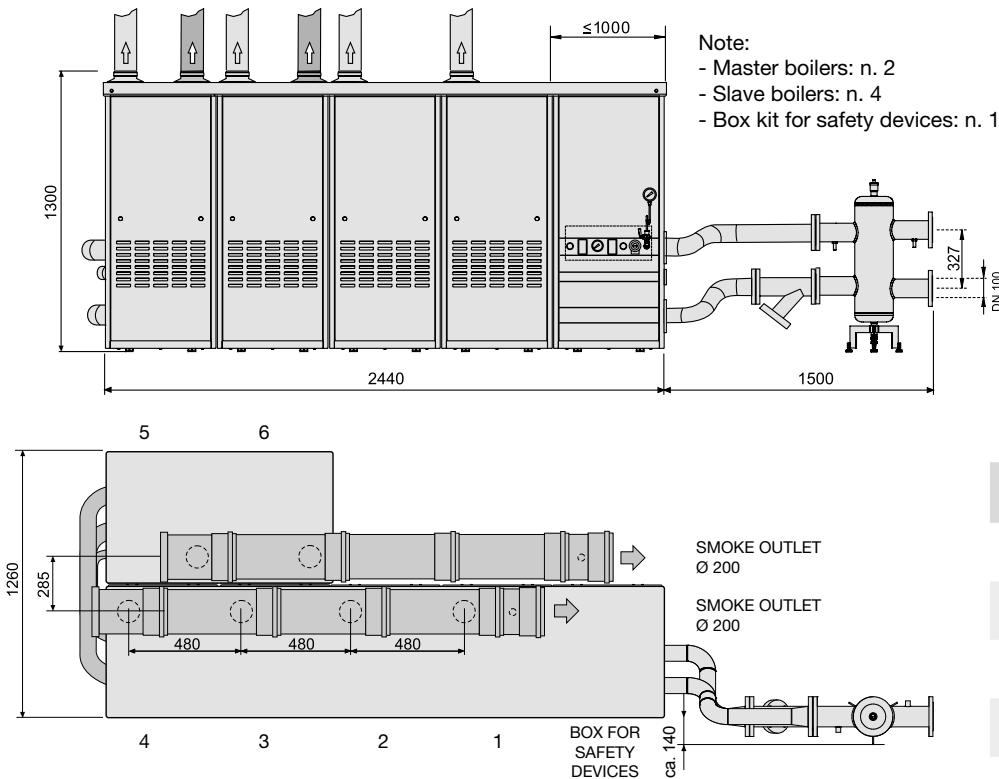
BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER + Y FILTER KIT



Operational data		KONf 100	KONf 115
Minimum Input n N.C.V. Q <sub>min</sub>	kW	20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW	497.5	575
Nominal Output (60/80°C) P <sub>n</sub>	kW	494	557.5
Nominal Output (30/50°C) P <sub>cond</sub>	kW	525	601.5

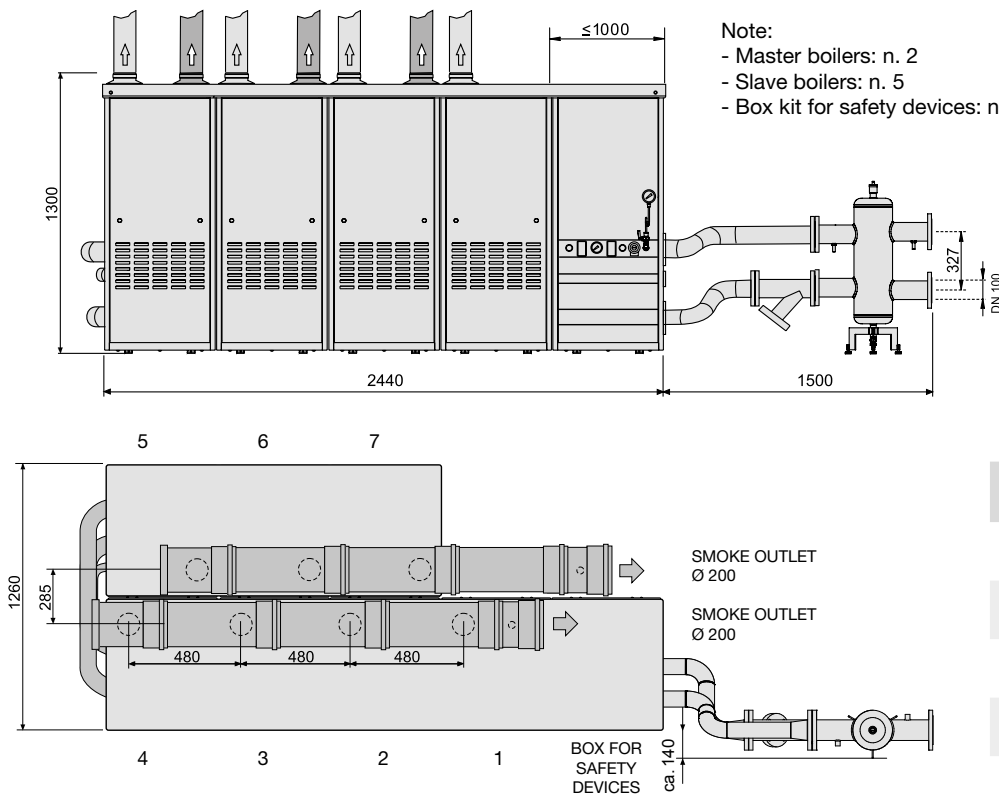
DIMENSIONS KONf 100-115 IN BATTERY (n.6 boilers 4+2 ON THE OPPOSITE SIDE)

BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER + Y FILTER KIT



DIMENSIONS KONf 100-115 IN BATTERY (n.7 boilers 4+3 ON THE OPPOSITE SIDE)

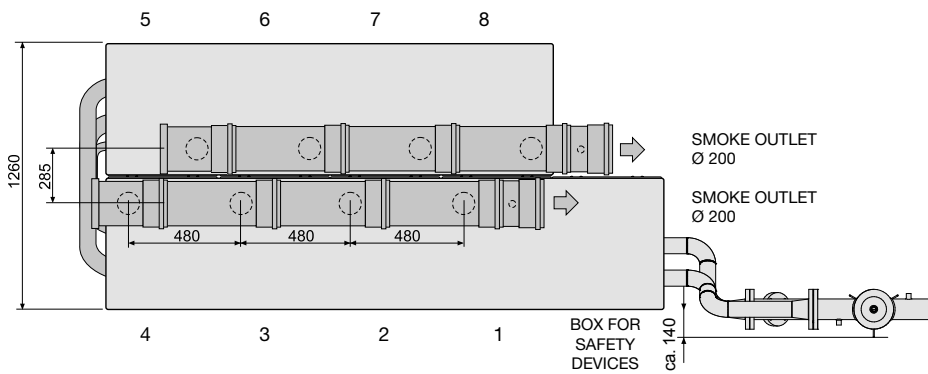
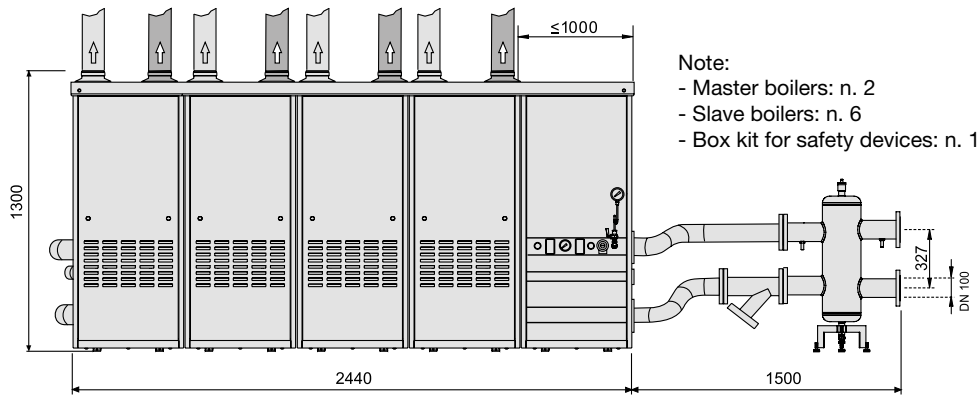
BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER + Y FILTER KIT





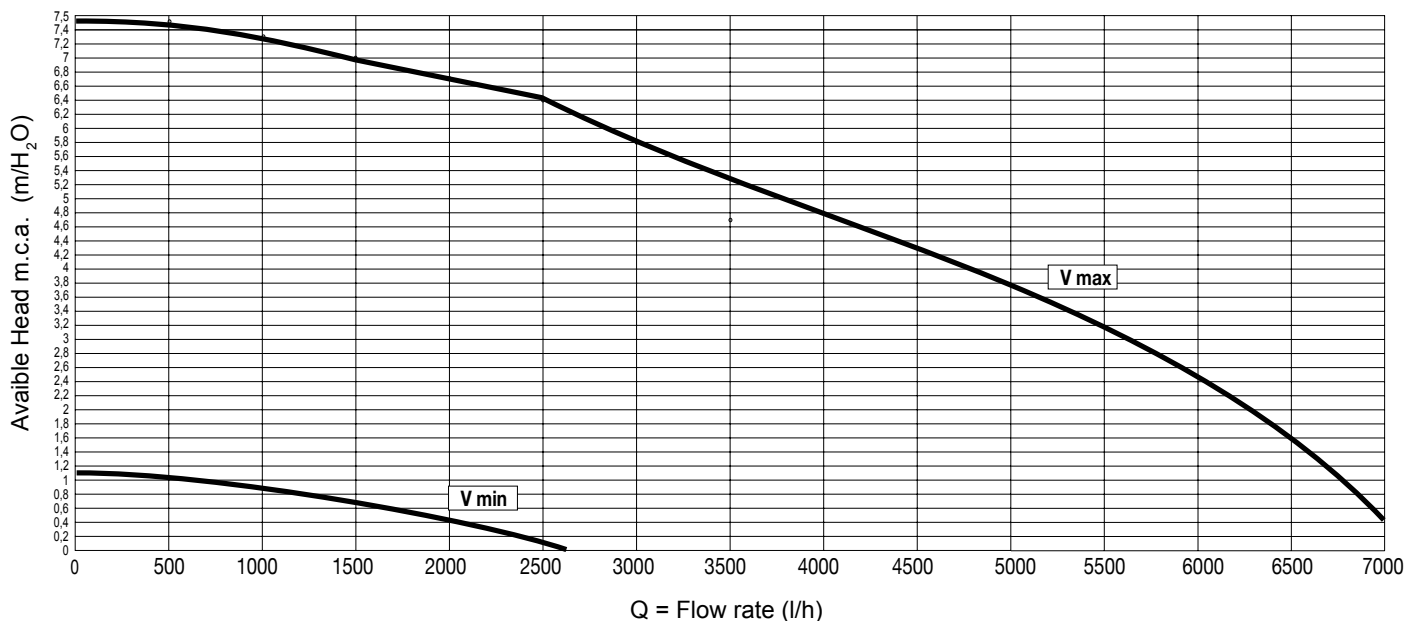
**DIMENSIONS KONf 100-115 IN BATTERY (n.8 boilers 4+4 ON THE OPPOSITE SIDE)**

**BATTERY + KIT SAFETY DEVICES + HYDRAULIC HEADER + Y FILTER KIT**



Operational data		KONf 100	KONf 115
Minimum Input n N.C.V. Q <sub>min</sub>	kW	20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW	796	920
Nominal Output (60/80°C) P <sub>n</sub>	kW	790.4	892
Nominal Output (30/50°C) P <sub>cond</sub>	kW	840	962.4

DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



		KONf 100	KONf 115
Power supply	kW	99,5	115
Max flow rate demanded l/h (Δt 15 K)	l/h	5700	6600
Nominal flow rate request (Δt 20 K)	l/h	4280	4950
Power supply in condensation (50/30)	kW	105	120,3
Max flow rate demanded l/h (Δt 15 K)	l/h	6020	6897
Nominal flow rate request (Δt 20 K)	l/h	4520	5173

approximate data

The Δt between supply and return boiler must never be less than 15 °K.

NOTE:

The use of a mixing header fitted between the boiler circuit and the system circuit is always advisable.

It becomes INDISPENSABLE if the system requires flow rates superior to the maximum permitted boiler flow rates, which is to say lower than 15K.

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

		KONf 100	KONf 115
Appliance category		II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation Ratio		1:5.0	1:5.75
Nominal Heat Input on P.C.I. Q <sub>n</sub>	kW	99,5	115
Minimum Heat Input on P.C.I. Q <sub>min</sub>	kW	20	20
Nominal Output (Tr 60 / Tm 80 °C) P <sub>n</sub>	kW	98.8	111.5
Minimum Output (Tr 60 / Tm 80 °C) P <sub>n</sub> min	kW	19.2	19.2
Nominal Output (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	105	120.3
Minimum Output (Tr 30 / Tm 50 °C) P <sub>cond</sub> min	kW	21.75	21.75
Efficiency at max. output (Tr 60 / Tm 80°C)	%	98.81	97.1
Efficiency at min. output (Tr 60 / Tm 80°C)	%	95.90	95.90
Efficiency at max. output (Tr 30 / Tm 50°C)	%	105.03	104.6
Efficiency at min. output (Tr 30 / Tm 50°C)	%	108.77	108.77
Efficiency at 30% output (Tr 30°C)	%	109.3	107.27
Combustion efficiency with nominal load	%	98.05	97.7
Combustion efficiency with minimum load	%	98.28	98.28
Heat loss at casing with burner in operation (Q <sub>min</sub> )	%	2.30	2.69
Heat loss at casing with burner in operation (Q <sub>n</sub> )	%	0.1	0.7
Flue gas temperature tf-ta (min)(*)	°C	35.0	36.0
Flue gas temperature tf-ta (max)(*)	°C	39.4	46.6
Maximum allowable temperature	°C	100	100
Maximum operating temperature	°C	85	85
Flue gas mass flow rate (min)	kg/h	37.71	34.31
Flue gas mass flow rate (max)	kg/h	163.59	184.6
Excess λ air	%	25.53	23
Flue losses with burner in operation (min)	%	1.72	1.87
Flue losses with burner in operation (max)	%	1.95	2.29
Minimum heating circuit pressure	bar	0.5	0.5
Maximum heating circuit pressure	bar	6	6
Water content	l	9	9
Gas Consumption Natural (20 mbar) gas G 20 a Q <sub>n</sub>	m <sup>3</sup> /h	10.57	12.08
Gas Consumption Natural gas (20 mbar) G 20 a Q <sub>min</sub>	m <sup>3</sup> /h	2.11	2.11
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>n</sub>	m <sup>3</sup> /h	12.3	14.0
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>min</sub>	m <sup>3</sup> /h	2.46	2.46
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>n</sub>	kg/h	7.76	8.92
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>min</sub>	kg/h	1.55	1.55
Max. available pressure at the chimney base	Pa	150	150
Condensate production max	kg/h	8.46	8.46
<b>Emissions</b>			
CO at Minimum Heat Input with 0% of O <sub>2</sub>	mg/kWh	140	147
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	31	34
NO <sub>x</sub> Class		6	6
<b>Electrical Data</b>			
Voltage/Frequency electric power supply	V/Hz	230/50	230/50
Fuse on main supply	A (R)	4	4
Insulation degree	IP	X5D	X5D

Room Temperature = 20°C.

(\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)



Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs <= 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K - P<sub>stby</sub> - See Erp Table

Standstill electrical consumption - P<sub>sb</sub> - See Erp Table

## DATA ACCORDING TO ErP DIRECTIVE



**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

			KONf 100	KONf 115
NOMINAL HEAT OUTPUT	$P_n$	kW	99	112
SEASONAL SPACE HEATING ENERGY EFFICIENCY	$\eta_s$	%	94	92
<b>SEASONAL EFFICIENCY CLASS IN HEATING MODE</b>			<b>A</b>	<b>A</b>
<b>FOR CH ONLY AND COMBINATION BOILERS: USEFUL HEAT OUTPUT</b>				
USEFUL HEAT OUTPUT in high temperature regime (Tr 60 °C / Tm 80 °C)	$P_4$	kW	98.8	111.5
USEFUL EFFICIENCY AT NOM. HEAT OUTPUT in high-temperature regime (Tr 60°C / Tm 80°C)	$\eta_4$	%	89.0	87.4
USEFUL HEAT OUTPUT AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30°C)	$P_1$	kW	32.2	36.9
USEFUL EFFICIENCY AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30 °C)	$\eta_1$	%	98.5	96.5
RANGE-RATED BOILER: YES / NO			NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>				
AT FULL LOAD	$e_{l_{max}}$	kW	0.289	0.314
AT PART LOAD	$e_{l_{min}}$	kW	0.156	0.160
IN STAND-BY MODE	$P_{SB}$	kW	0.018	0.028
<b>OTHER ITEMS</b>				
STAND-BY HEAT LOSS	$P_{stby}$	kW	0.641	0.642
EMISSIONS OF NITROGEN OXIDES referred to NCV & (GCV)	$NO_x$	mg/kWh	43 (39)	47 (42)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	301	349
<b>FOR CH &amp; DHW PRODUCTION BOILERS</b>				
DECLARED LOAD PROFILE			-	-
ENERGY EFFICIENCY IN DHW PRODUCTION MODE	$\eta_{WH}$	%	-	-
DAILY ELECTRICITY CONSUMPTION	$Q_{elec}$	kWh	-	-
DAILY FUEL CONSUMPTION	$Q_{fuel}$	kWh	-	-
INSIDE SOUND POWER LEVEL	Lwa	dB(A)	-	-
<b>SEASONAL EFFICIENCY CLASS IN DHW PRODUCTION MODE</b>			-	-

# KON 100-115

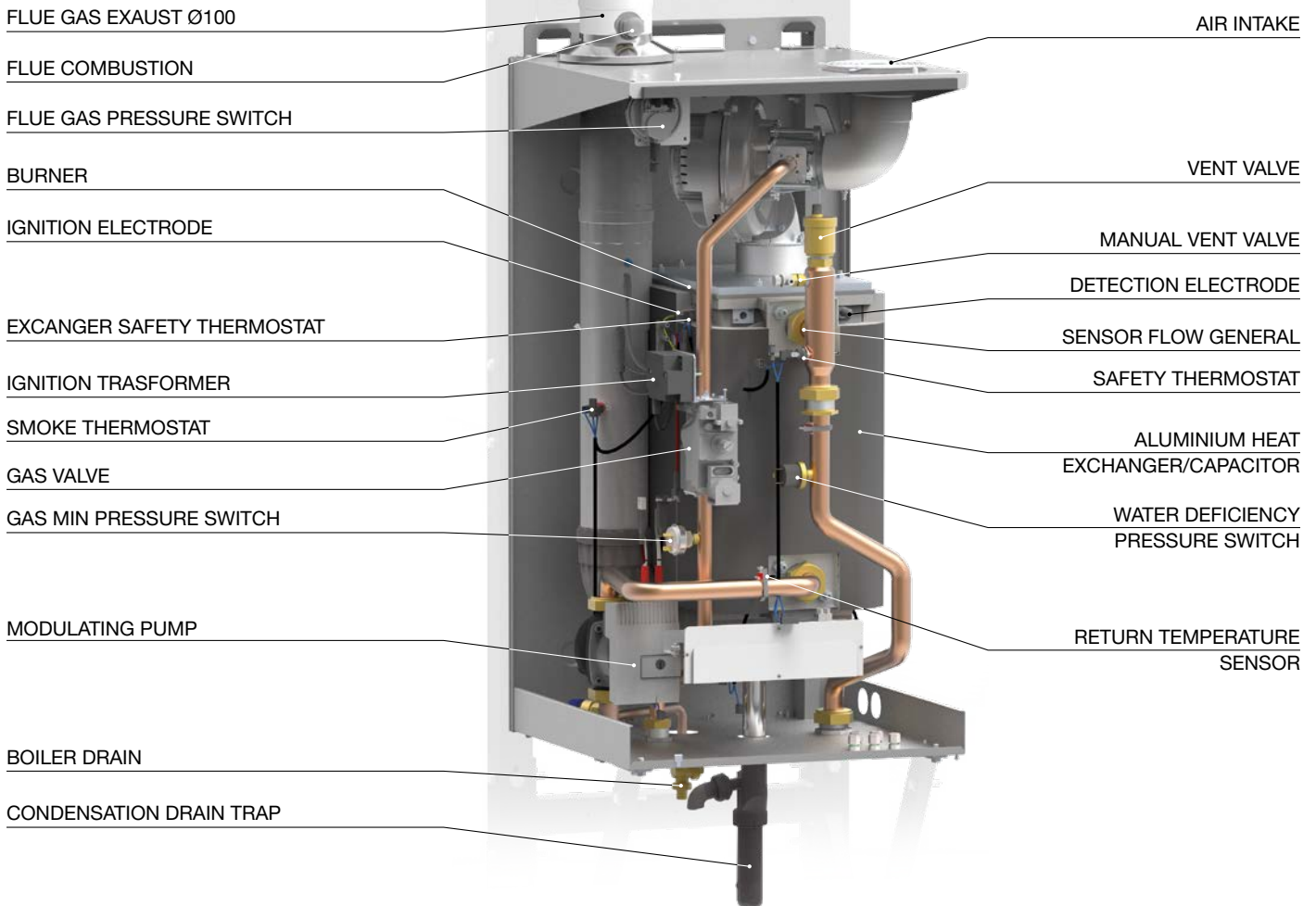


## MODULATING CONDENSING BOILER WITH LOW NO<sub>x</sub> PREMIX BURNER FOR OUTDOOR INSTALLATION (IPX5D)

OUTPUT RANGE	from 99.5 to 920 kW in battery (115kW x8)	
WORKING TEMPERATURE	No temperature limit on the return (max. $\Delta t$ 20K) For outdoor installation in partially protected places: - 15C (with dedicated kits and protections)	
SUPPLY	Natural Gas or LPG	
MODELS	KON 100	KON 115
SEASONAL EFFICIENCY	 <b>A</b>	 <b>A</b>

Wall hung with optional dedicated supporting kit - **available in battery (up to 8 for a total of 920 kW)**  
**can be combined both with MIXING HEADER and with PLATE HEAT EXCHANGERS**

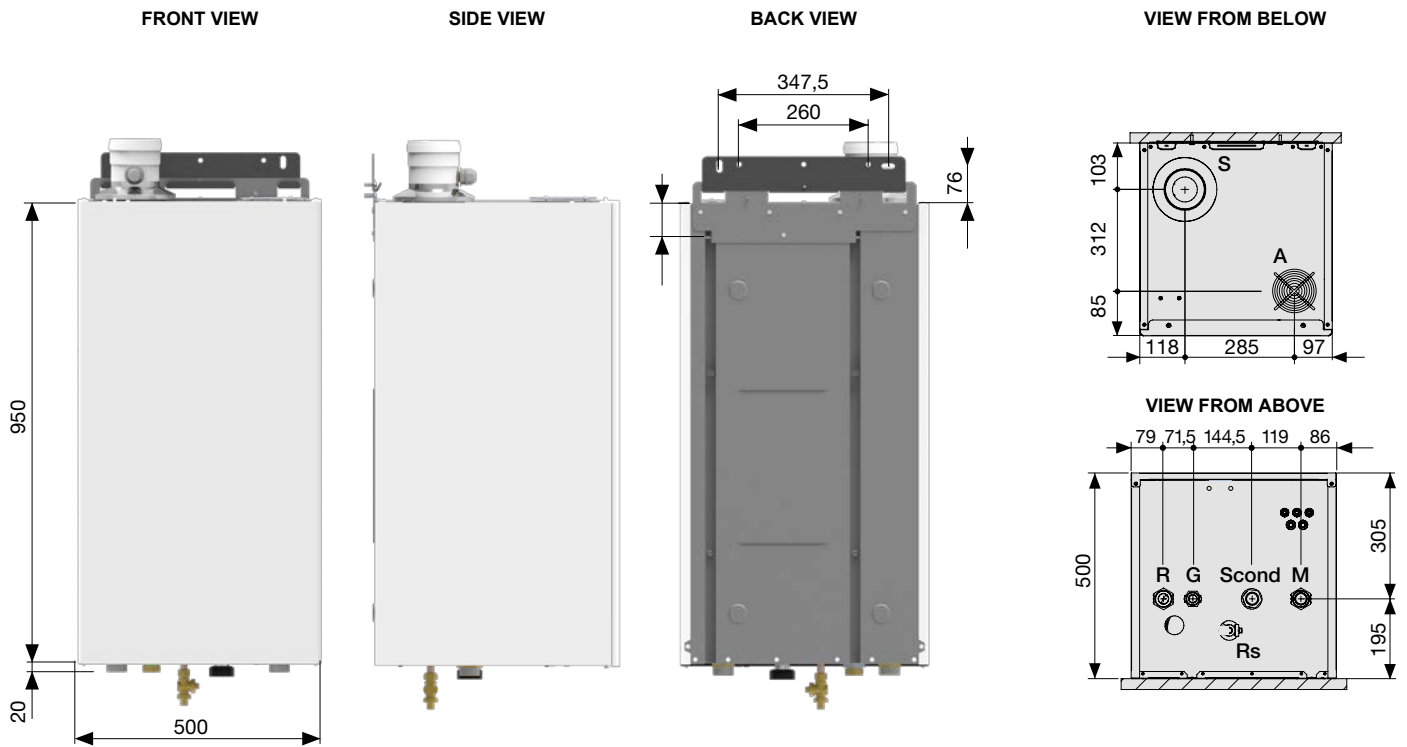
## MAIN COMPONENTS



## PRODUCT PLUS VALUES

- **CERTIFICATION IN OUTPUT RANGE**  
it is possible to have the customization of the input
- **WALL HUNG** with metallic load bearing structure (optional)
- **COMPACTNESS:** dimensions (WxHxD): 50x95x48 cm
- **PERFORMANCES** ■■■■ ErP class A
- **EFFICIENCY**  
up to 108,8% (ex Directive 92/42)  
 $\eta_s=94\%$  according to ErP Directive
- **EMISSIONS:** Low NOx Class 6
- **ISOLATION DEGREE IPX5D** can be installed outdoor in partially protected place (with antifreeze kit)
- **BODY STRUCTURE** with double furnace
- **BOILER BODY in Al/Si/Mg**  
low water content - 100% wet surfaces
- **EXCELLENT THERMAL EXCHANGE**  
Sophisticated cooling circuit with triple water circulation on 3 vertical columns
- **SIMPLE CONSTRUCTION**  
for a quick and economic servicing
- **DURATION**  
thanks to the multi-year Unical experience in the metallurgy the body is guaranteed 5 years
- **RELIABILITY**  
thanks to the optimized circulation that avoids thermal overcharges; heat exchanger carefully designed, high efficiency modulating pump, NTC control sensors
- **EFFICIENCY GUARANTEED FOR LONG TIME**  
thanks to the absence of scaling
- **ACCESSORIES (optional)**
  - PRIMARY RING, with MIXING HEADER / PLATE HEAT EXCHANGER
  - ADDITIONAL SAFETY DEVICES KIT
  - DIFFERENTIAL PRESSURE SWITCH with fittings
  - CONTROL PANEL BOARD HSCP
  - MULTI-FUNCTION MODULE SHC (for zones control)
  - NTC SENSOR FOR SHC MODUL
  - MULTI-FUNCTION MODULES FEEDER
  - PT1000 SENSOR for management of solar collectors
  - SIPHON HEATING KIT
  - KIT OF RESISTANCES FOR LOW TEMPERATURES
  - ACIDIC CONDENSATE INHIBITORS
- **EXPANDABLE IN CASCADE (up to 8 modules)**
- **GAS FEEDING PIPES** available (optional)
- **Available, on request, PLATE HEAT EXCHANGERS up to 4 modules in battery**

DIMENSIONS

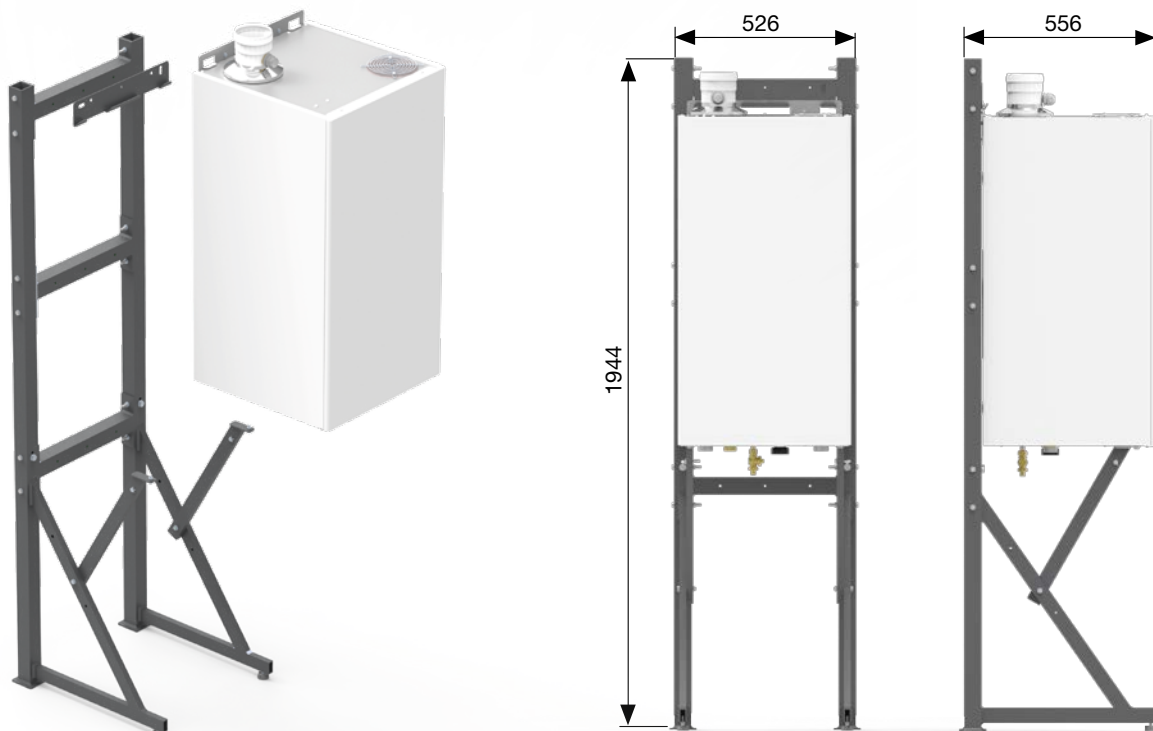


- Key:
- G** - Gas inlet G1"
  - M** - Mandata impianto riscaldamento G1 ¼"
  - R** - Heating system return G1 ¼"
  - Rs** - Boiler drain

- Scond** - Condensation drain Ø 32
- S** - Flue gas exaust Ø 100
- A** - Air intake Ø 80-100

KON	Net Weight kg	Gross Weight (with packaging) kg
100-115	96	120

DIMENSIONS WITH SUPPORTING FRAME (optional)



## CONTROL PANEL (std. supplied)

The panel board equipping the boiler allows the management of an heating circuit with fixed set-point



+/- Increase/decrease key

**A** Digital system pressure gauge (only for boilers equipped with pressure encoder)

**B** Central Heating adjustment key

**C** Domestic hot water adjustment key

**D** Reset /chimney-sweeper key

**E** Information display

**F** Led/Simbol Heating function active

**G** Led/Simbol Domestic hot water function active

**I** Block symbol

**L** Burner in operation symbol

**M** Fault symbol

**N** Temperature or fault code indication

**O** Power On indicator led

**P** Activation sweeper mode

**Q** Power supply

**S** Function key: Stand-by / Heating / Domestic hot water + Heating / Antifreeze protection

## SHC - MULTI-FUNCTION MODULE - HEATING CIRCUITS MANAGEMENT (optional)

The board is designed as a multi-function support for heating systems. It should be considered part of a modular system joined by an **eBUS** or **Modbus** communication system.

**It is possible to control up to a maximum of 4 SHC printed circuit boards.**

Its input and output resources make it suitable for a variety of applications:

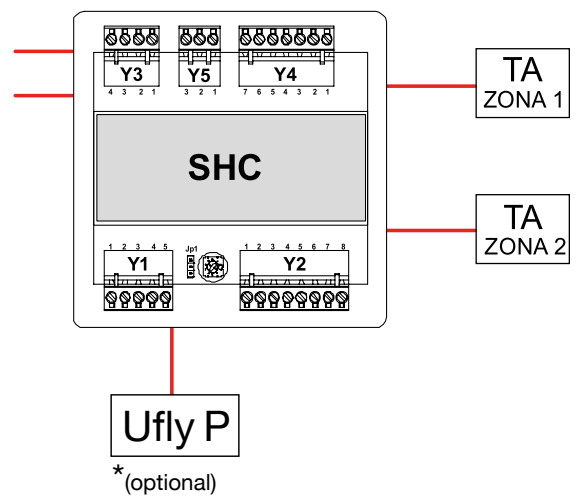
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The multi-function module kit consists of:

- Panel
- NTC temperature sensor (3 pcs.)
- Technical assembly instructions

For further information consult the site [www.unical.eu](http://www.unical.eu) in the section Accessories of the product.





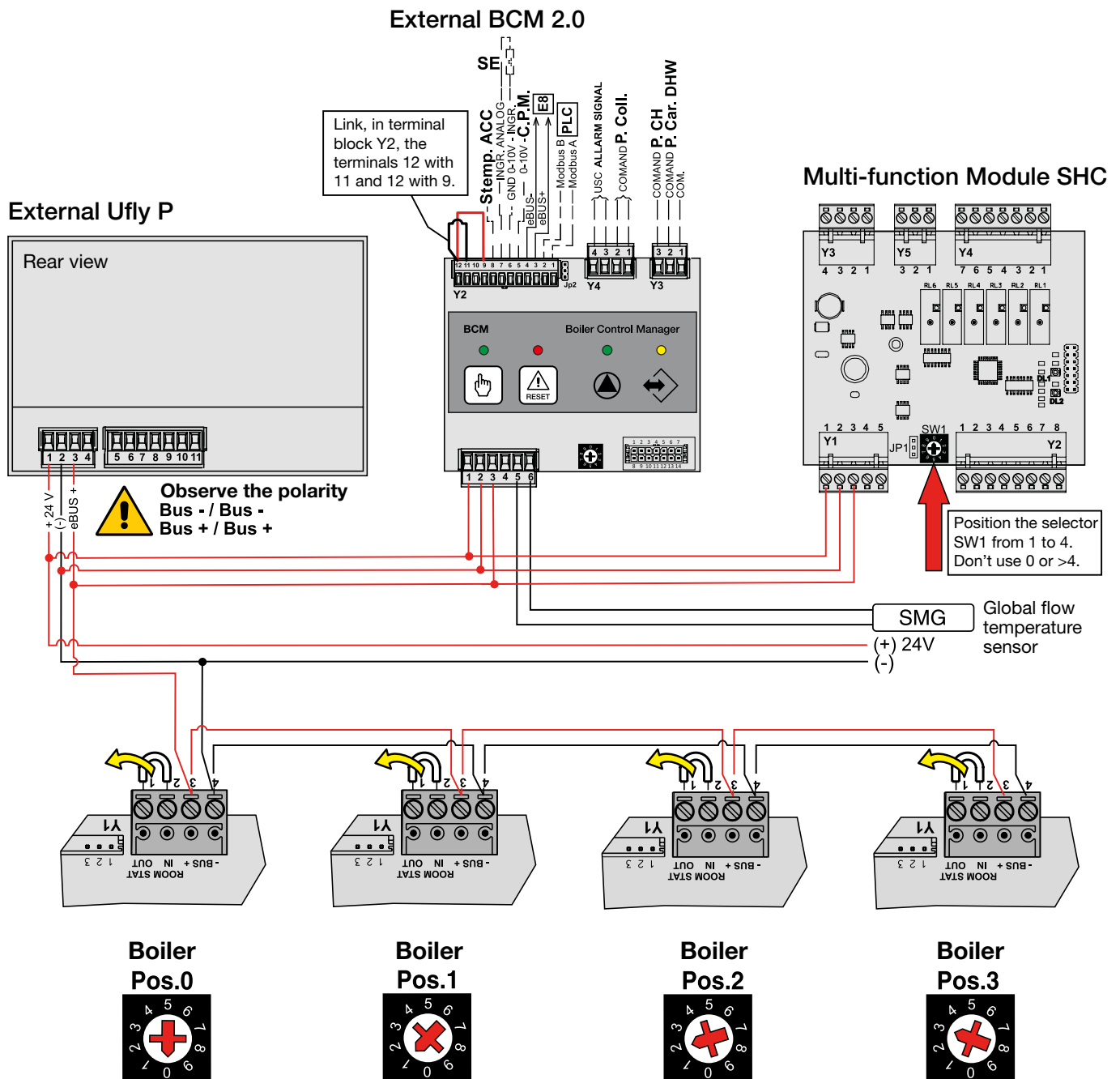
## THERMAL MODULE IN CASCADE

The thermal Module KON 115 is foreseen, thanks to a convenient and dedicated series of accessories, to be assembled in cascade. The combinations can be from 2 to 8 modules for a maximum of 800 kW.

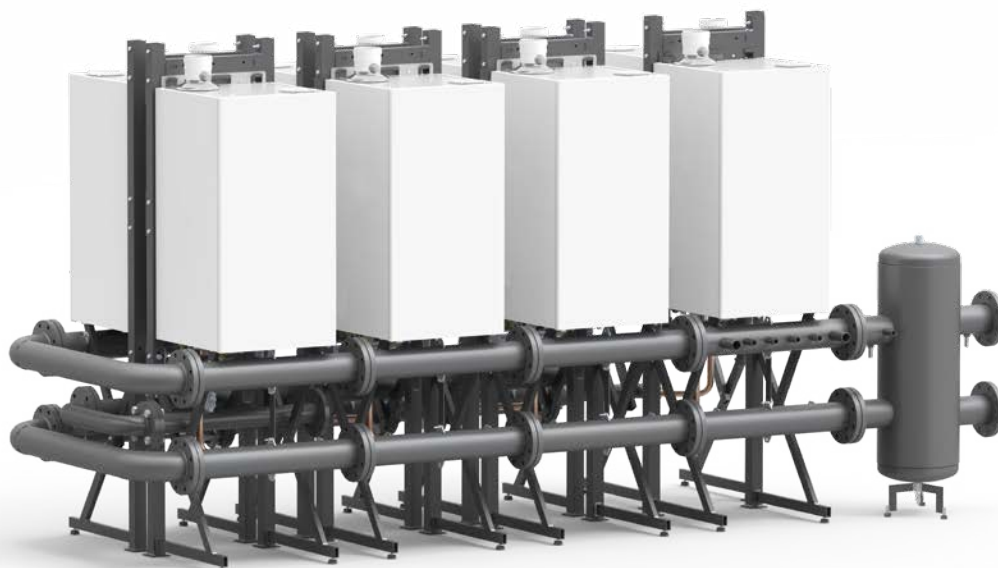
For the management of the battery it is necessary to use the **kit CONTROL MANAGER Ufly P** (supplied as an option). Here below the diagram showing the electrical connections for the battery.

For further information consult the manual on the site [www.unical.eu](http://www.unical.eu) in the section of the product.

### EXTERNAL CONTROL PANEL KIT CONTROL MANAGER Ufly P



## KON 115 IN BATTERY



Note: the boiler has a degree of electric isolation IPX5D and is certified also for outdoor installation in partially protected place, up to -15°C without need of additional protections; it is opportune, however, to insulate the external pipelines and protect from the atmospheric agents the kit according to its electric protection degree in outdoor installations; the same precautions are recommended for the condensate drains.

COMPOSITION OF BATTERY + PRIMARY RING	Q.TY of KON 100-115 IN BATTERY						
	2	3	4	5	6	7	8
KIT OF HYDRAULIC MANIFOLD FOR 2 MODULES	1						
KIT OF HYDRAULIC MANIFOLD FOR 3 MODULES		1					
KIT OF HYDRAULIC MANIFOLD FOR 4 MODULES			1				
KIT OF HYDRAULIC MANIFOLD FOR 5 MODULES				1			
KIT OF HYDRAULIC MANIFOLD FOR 6 MODULES					1		
KIT OF HYDRAULIC MANIFOLD FOR 7 MODULES						1	
KIT OF HYDRAULIC MANIFOLD FOR 8 MODULES							1
KIT OF ADDITIONAL SAFETY DEVICES	1	1	1	1	1	1	1
MIXING HEADER FOR 2 MODULES	1						
MIXING HEADER FOR 3 TO 8 MODULES		1	1	1	1	1	1
DIFFERENTIAL PRESSURE SWITCH	2	3	4	5	6	7	8
BOILER SUPPORT	2	3	4	5	6	7	8
KIT CONTROL MANAGER Ufly P made of: - cascade manager card BCM 2.0 - viewer / programmer Ufly P - power pack 24V - outdoor temperature sensor - D.H.W. temperature sensor	1	1	1	1	1	1	1
KIT OF GAS MANIFOLD for connection of a single boiler	1	1	1	1	1	1	1
KIT OF GAS MANIFOLD for connection of a cascade	1	2	3	4	5	6	7
U SHAPED GAS MANIFOLD				1	1	1	1

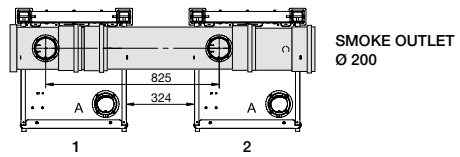
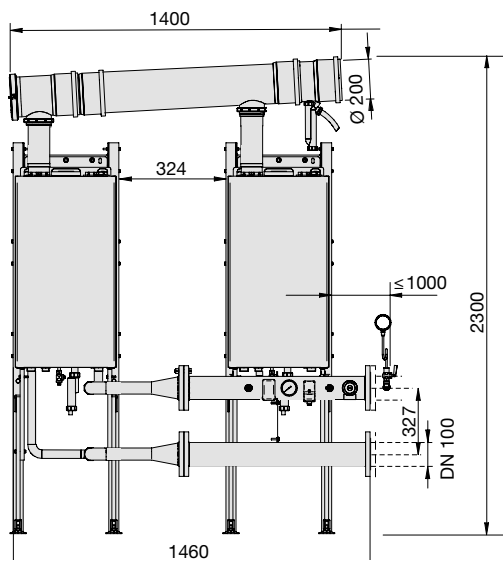
### Smoke evacuation

BASE KIT		1	1	1	1	1	1	1
SIPHON			1	2	2	3	6	5
OUTLET SIPHON		1	1	1	2	2	2	2
SINGLE SMOKE MANIFOLD					1	1	1	1
SMOKE PIPE EXTENSION Ø200 mm					3	2	1	

NOTE. There are 2 flue exhaust channels that flow with 2 separate couplings in a single flue. If you want to connect the 2 smoke channels together, it is necessary to have a thermo-technician that calculates them with a special union collector not supplied. For information, refer to the "Battery Mounting Instruction" document at [www.unical.eu](http://www.unical.eu).

Available in combination with **PLATE EXCHANGERS**

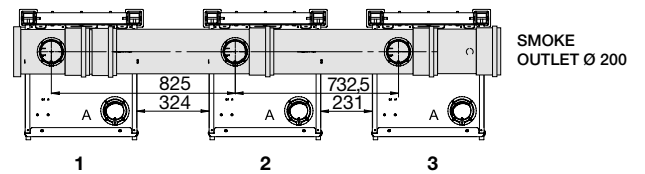
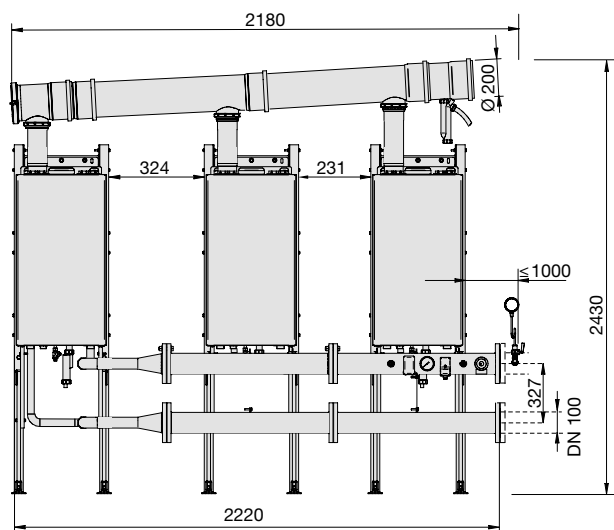
### DIMENSIONS OF A BATTERY OF TWO KON 100-115



Operational data		KON 100	KON 115
Minimum Input on N.C.V. Qmin	kW	20	20
Nominal Input on N.C.V. Qn	kW	199	230
Nominal Output (60/80°C) Pn	kW	197.6	223
Nominal Output (30/50°C) Pcond	kW	210	240.6

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

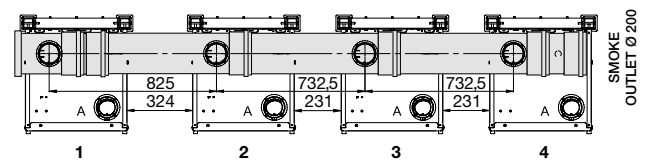
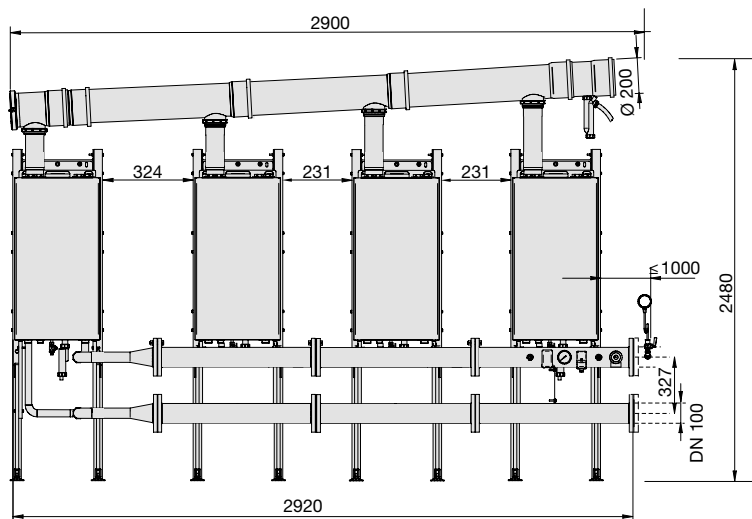
### DIMENSIONS OF A BATTERY OF THREE KON 100-115



Operational data		KON 100	KON 115
Minimum Input on N.C.V. Qmin	kW	20	20
Nominal Input on N.C.V. Qn	kW	298.5	345
Nominal Output (60/80°C) Pn	kW	296.4	334.5
Nominal Output (30/50°C) Pcond	kW	315	360.9

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

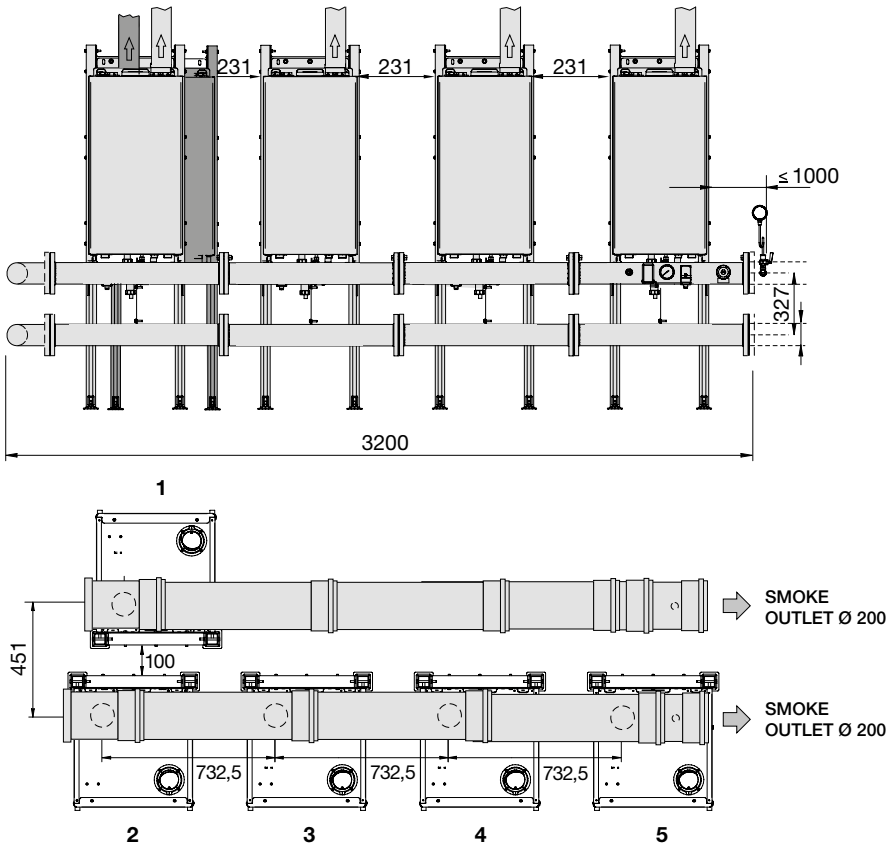
### DIMENSIONS OF A BATTERY OF FOUR KON 100-115



Operational data		KON 100	KON 115
Minimum Input on N.C.V. Qmin	kW	20	20
Nominal Input on N.C.V. Qn	kW	398	460
Nominal Output (60/80°C) Pn	kW	395.2	446
Nominal Output (30/50°C) Pcond	kW	420	481.2

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

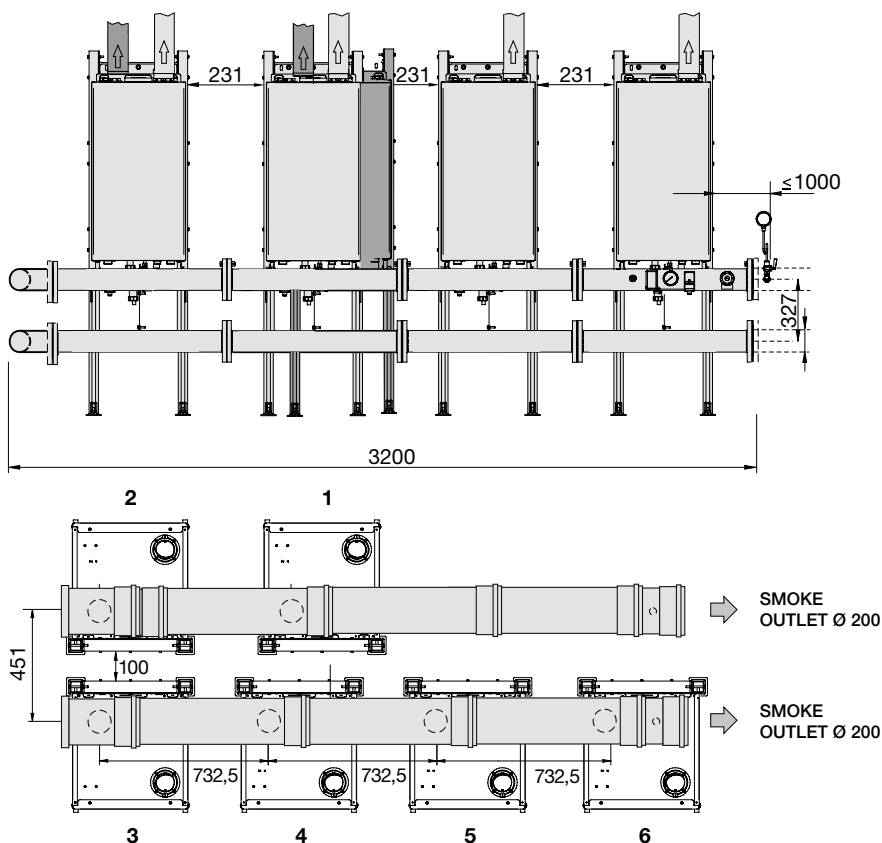
DIMENSIONS OF A BATTERY OF FIVE KON 100-115 (4+1 ON THE OPPOSITE SIDE)



Operational data		KON 100	KON 115
Minimum Input on N.C.V. Q <sub>min</sub>	kW	20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW	497.5	575
Nominal Output (60/80°C) P <sub>n</sub>	kW	494.0	557.5
Nominal Output (30/50°C) P <sub>cond</sub>	kW	525.0	601.5

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

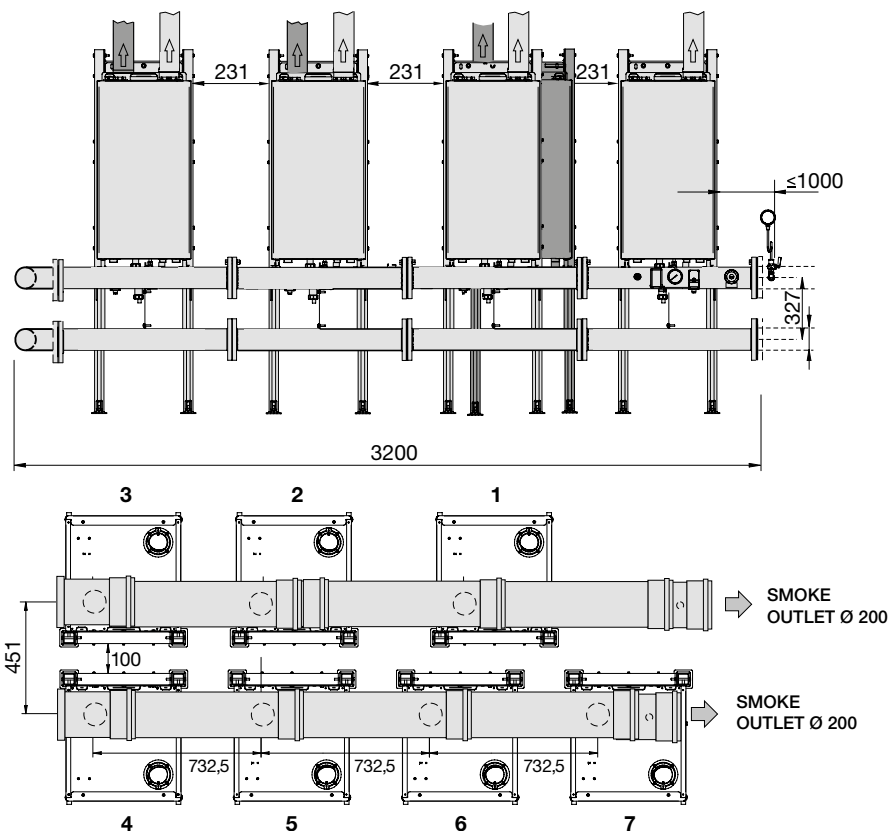
DIMENSIONS OF A BATTERY OF SIX KON 100-115 (4+2 ON THE OPPOSITE SIDE)



Operational data		KON 100	KON 115
Minimum Input on N.C.V. Q <sub>min</sub>	kW	20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW	597	690
Nominal Output (60/80°C) P <sub>n</sub>	kW	592.8	669
Nominal Output (30/50°C) P <sub>cond</sub>	kW	630.0	721.8

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

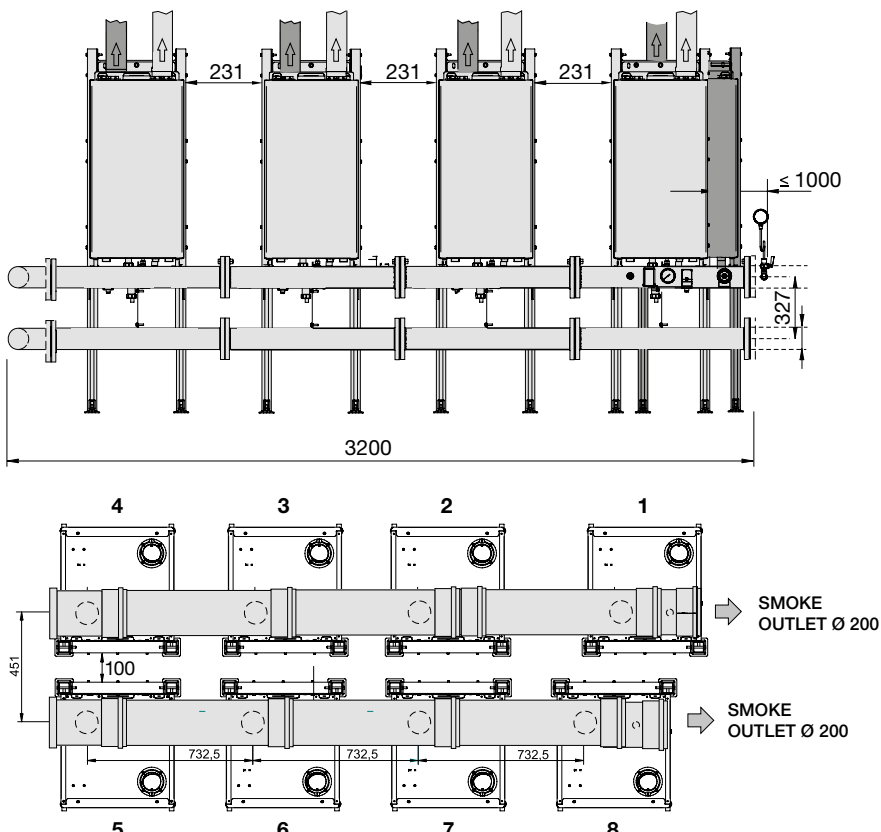
DIMENSIONS OF A BATTERY OF SEVEN KON 100-115 (4+3 ON THE OPPOSITE SIDE)



Operational data	KON 100	KON 115
Minimum Input on N.C.V. Q <sub>min</sub>	kW 20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW 696.5	805
Nominal Output (60/80°C) P <sub>n</sub>	kW 691.6	780.5
Nominal Output (30/50°C) P <sub>cond</sub>	kW 735.0	842.1

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

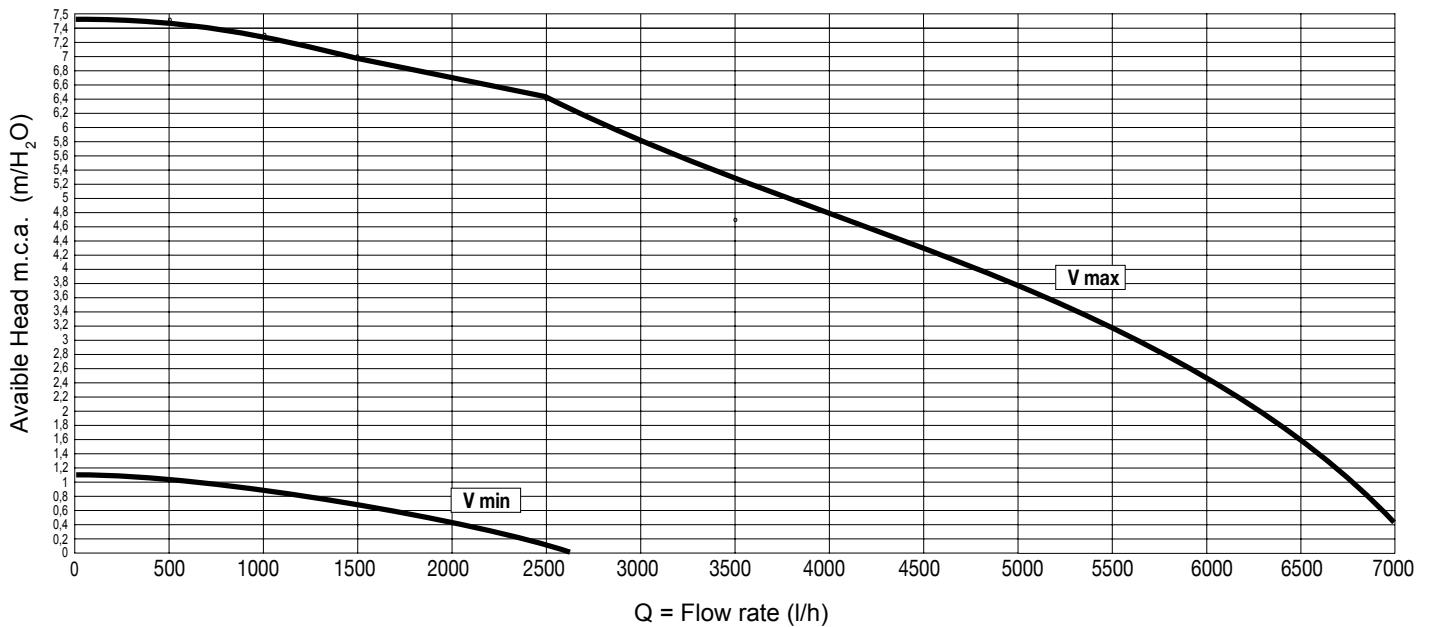
DIMENSIONS OF A BATTERY OF EIGHT KON 100-115 (4+4 ON THE OPPOSITE SIDE)



Operational data	KON 100	KON 115
Minimum Input on N.C.V. Q <sub>min</sub>	kW 20	20
Nominal Input on N.C.V. Q <sub>n</sub>	kW 796	920
Nominal Output (60/80°C) P <sub>n</sub>	kW 790.4	892
Nominal Output (30/50°C) P <sub>cond</sub>	kW 840	962.4

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



		KON 100	KON 115
Power supply	kW	99.5	115
Max flow rate demanded ( $\Delta t$ 15 K)	l/h	5700	6600
Nominal flow rate request ( $\Delta t$ 20 K)	l/h	4280	4950
Power supply in condensation (50/30)	kW	105	120,3
Max flow rate demanded ( $\Delta t$ 15 K)	l/h	6020	6897
Nominal flow rate request ( $\Delta t$ 20 K)	l/h	4520	5173

Approximate data

The  $\Delta t$  between supply and return boiler must never be less than 15 ° K.

Note:

The use of a mixing header fitted between the boiler circuit and the system circuit is always advisable. It becomes INDISPENSABLE if the system requires flow rates superior to the maximum permitted boiler flow rates, which is to say lower than 20 K.

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

		KON 100	KON 115
Appliance category		II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation Ratio		1:5.0	1:5.75
Nominal Heat Input on P.C.I. Q <sub>n</sub>	kW	99.5	115
Minimum Heat Input on P.C.I. Q <sub>min</sub>	kW	20	20
Nominal Output (Tr 60 / Tm 80 °C) P <sub>n</sub>	kW	98.8	111.5
Minimum Output (Tr 60 / Tm 80 °C) P <sub>n</sub> min	kW	19.2	19.2
Nominal Output (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	105	120.3
Minimum Output (Tr 30 / Tm 50 °C) P <sub>cond</sub> min	kW	21.75	21.75
Efficiency at max. output (Tr 60 / Tm 80°C)	%	98.81	97.1
Efficiency at min. output (Tr 60 / Tm 80°C)	%	95.90	95.90
Efficiency at max. output (Tr 30 / Tm 50°C)	%	105.03	104.6
Efficiency at min. output (Tr 30 / Tm 50°C)	%	108.77	108.77
Efficiency at 30% output (Tr 30°C)	%	109.3	107.27
Combustion efficiency with nominal load	%	98.05	97.7
Combustion efficiency with minimum load	%	98.28	98.28
Heat loss at casing with burner in operation (Q <sub>min</sub> )	%	2.30	2.69
Heat loss at casing with burner in operation (Q <sub>n</sub> )	%	0.1	0.7
Flue gas temperature t <sub>f-ta</sub> (min)(*)	°C	35.0	36.0
Flue gas temperature t <sub>f-ta</sub> (max)(*)	°C	39.4	46.6
Maximum allowable temperature	°C	100	100
Maximum operating temperature	°C	85	85
Flue gas mass flow rate (min)	kg/h	37.71	34.31
Flue gas mass flow rate (max)	kg/h	163.59	184.6
Excess λ air	%	25.53	23
Flue losses with burner in operation (min)	%	1.72	1.87
Flue losses with burner in operation (max)	%	1.95	2.29
Minimum heating circuit pressure	bar	0.5	0.5
Maximum heating circuit pressure	bar	6	6
Water content	l	9	9
Gas Consumption Natural (20 mbar) gas G 20 a Q <sub>n</sub>	m <sup>3</sup> /h	10.57	12.08
Gas Consumption Natural gas (20 mbar) G 20 a Q <sub>min</sub>	m <sup>3</sup> /h	2.11	2.11
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>n</sub>	m <sup>3</sup> /h	12.3	14.0
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>min</sub>	m <sup>3</sup> /h	2.46	2.46
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>n</sub>	kg/h	7.76	8.92
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>min</sub>	kg/h	1.55	1.55
Max. available pressure at the chimney base	Pa	150	150
Condensate production max	kg/h	8.46	8.46
<b>Emissions</b>			
CO at Minimum Heat Input with 0% of O <sub>2</sub>	mg/kWh	140	147
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	31	34
NO <sub>x</sub> Class		6	6
<b>Electrical Data</b>			
Voltage/Frequency electric power supply	V/Hz	230/50	230/50
Fuse on main supply	A (R)	4	4
Insulation degree	IP	X5D	X5D

Room Temperature = 20°C.

(\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)



Seasonal Efficiency  $\eta_{sp}$  according to Directive 2009/125/EC for Outputs < = 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K - P<sub>stby</sub> - See Erp Table

Standstill electrical consumption - P<sub>sb</sub> - See Erp Table

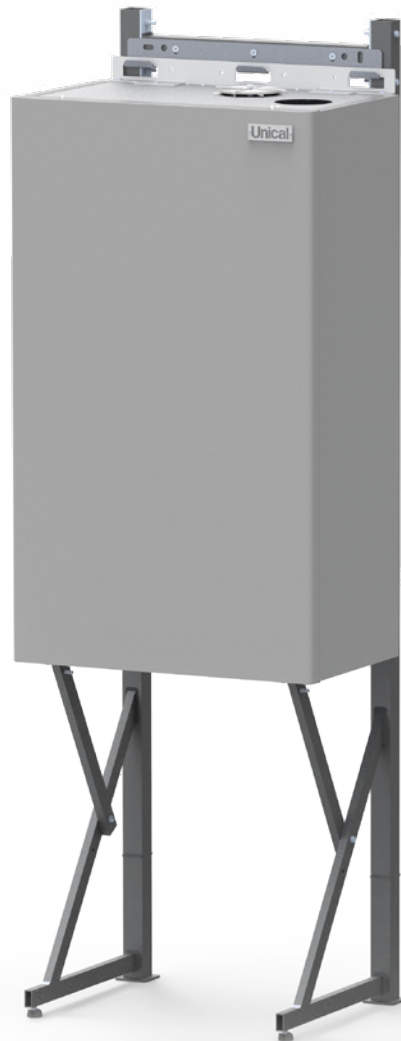
## DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

			KON 100	KON 115
NOMINAL HEAT OUTPUT	$P_n$	kW	99	112
SEASONAL SPACE HEATING ENERGY EFFICIENCY	$\eta_s$	%	94	92
<b>SEASONAL EFFICIENCY CLASS IN HEATING MODE</b>			<b>A</b>	<b>A</b>
<b>FOR CH ONLY AND COMBINATION BOILERS: USEFUL HEAT OUTPUT</b>				
USEFUL HEAT OUTPUT in high temperature regime (Tr 60 °C / Tm 80 °C)	$P_4$	kW	98.8	111.5
USEFUL EFFICIENCY AT NOM. HEAT OUTPUT in high-temperature regime (Tr 60°C / Tm 80°C)	$\eta_4$	%	89.0	87.4
USEFUL HEAT OUTPUT AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30°C)	$P_1$	kW	32.2	37
USEFUL EFFICIENCY AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30 °C)	$\eta_1$	%	98.5	96.7
RANGE-RATED BOILER: YES / NO			NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>				
AT FULL LOAD	$eI_{max}$	kW	0.289	0.314
AT PART LOAD	$eI_{min}$	kW	0.156	0.160
IN STAND-BY MODE	$P_{SB}$	kW	0.018	0.028
<b>OTHER ITEMS</b>				
STAND-BY HEAT LOSS	$P_{stby}$	kW	0.641	0.642
EMISSIONS OF NITROGEN OXIDES referred to NCV & (GCV)	$NO_x$	mg/kWh	43 (39)	47 (42)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	301	349
<b>FOR CH &amp; DHW PRODUCTION BOILERS</b>				
DECLARED LOAD PROFILE			-	-
ENERGY EFFICIENCY IN DHW PRODUCTION MODE	$\eta_{WH}$	%	-	-
DAILY ELECTRICITY CONSUMPTION	$Q_{elec}$	kWh	-	-
DAILY FUEL CONSUMPTION	$Q_{fuel}$	kWh	-	-
INSIDE SOUND POWER LEVEL	$L_{wa}$	dB(A)	-	-
<b>SEASONAL EFFICIENCY CLASS IN DHW PRODUCTION MODE</b>			-	-



# ALKON 140 EXT



**MODULATING CONDENSING BOILER with double premix low NOx burner  
and double heat exchanger EXPANDABLE IN BATTERY for indoor and outdoor installations (IPX5D)**

OUTPUT RANGE from 115 to 560 kW (in battery)

WORKING TEMPERATURE no limit on the return temperature

SUPPLY Natural Gas or LPG

MODELS 140 EXT

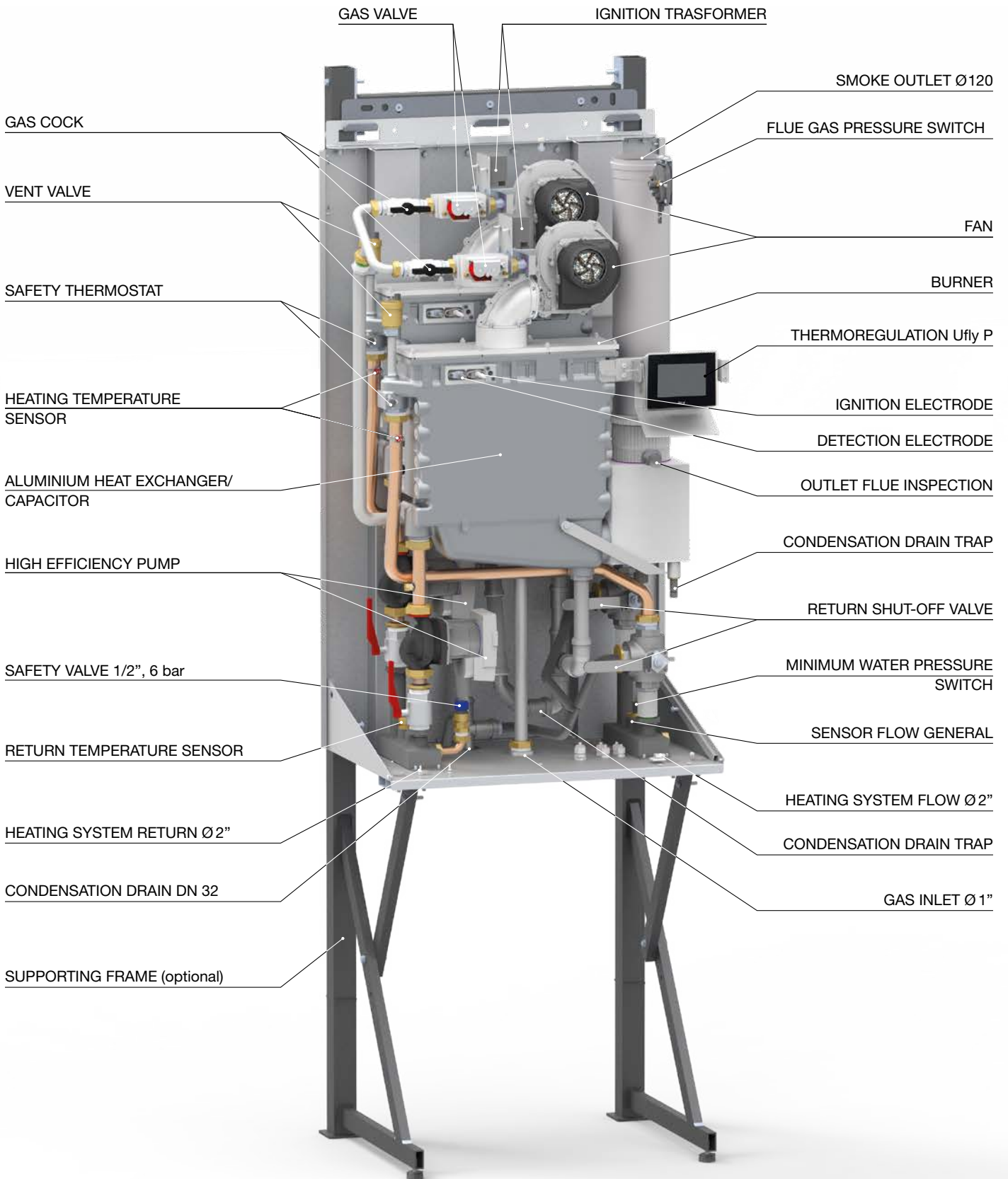
SEASONAL EFFICIENCY



**A**

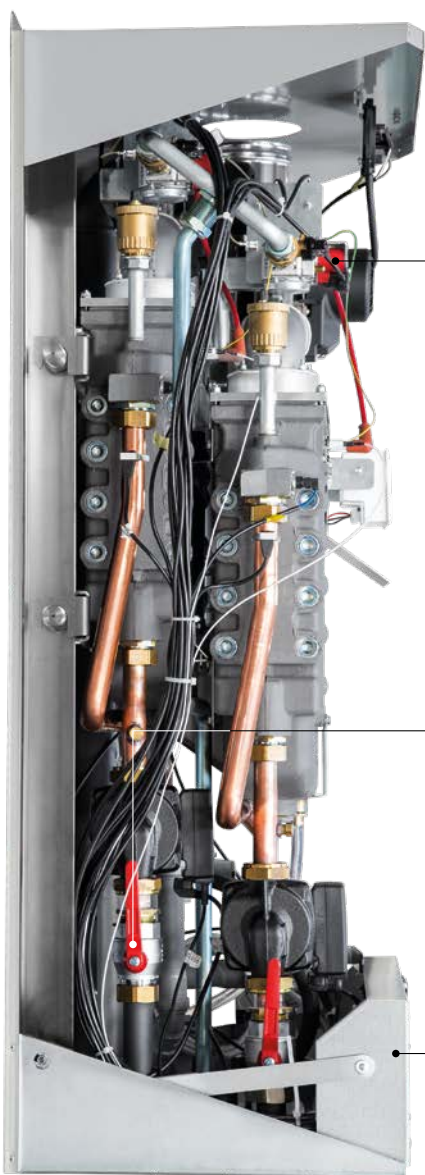
Wall hung with dedicated supporting kit  
**available in battery up to 4 units for a total of 560 kW**  
can be combined both with **MIXING HEADER** and with **PLATE HEAT EXCHANGERS**

MAIN COMPONENTS



## PRODUCT PLUS VALUES

- **Calibration possibility according to the thermal requirement of the system**  
(possible customization of the requested power)
- **2 complete interceptables THERMAL ELEMENTS**, operating also separately in case of necessity, controlled by the BMM (Burner Module Manager) electronic cards
- **2 LOW WATER CONTENT HEAT EXCHANGERS IN Al/Si/Mg alloy**, the best for:
  - 100% wet surfaces of the boiler body
  - for long time guaranteed efficiency, thanks to the absence of scaling
  - reliability, thanks to the optimized circulation that avoids thermal overloads (NTC control's sensors)
  - long lasting, fruit of the multi-year metallurgical Unical experience
- **2 LOW NOX PREMIX MODULATING BURNERS** in class 6, composed by:
  - 2 fans (40 Pa of manometric head) with electronically controlled speed
  - 2 safety gas valves with constant air-gas ratio
  - radiating flame surface in "metallic sponge" (guaranteed operation up to 13 mbar of natural gas pressure)
- **2 MODULATING PUMPS** (one for each thermal element) with antifreeze protection , antijamming and overrun circulation
- **MINIMUM WATER PRESSURE SWITCH**
- ready for the **ELECTRICAL CONNECTION** of the additional safety devices
- **OPTIONAL HYDRAULIC GROUPS** including:
  - Pipe for installation of safety devices and accessories
  - Differential pressure switch for the control of water circulation
  - Hydraulic connection system
  - Mixing header
- **COMPLETE OUTER CASING FOR OUTDOOR INSTALLATION** in electro-galvanized steel sheet with epoxy-polyester painting
- **CONVERSION KIT** from Nat. Gas to LPG, optional
- **EXPANDIBLE IN CASCADE** up to 1120 kW (8 boilers, 2 group of 4 boiler in cascade)
- **OPTIONAL ACCESSORIES** for cascade installation
- **Kit Gateway P for Ufly P remote connection (optional)**
- **Wall box kit for Ufly P.**



Pumps and gate valves



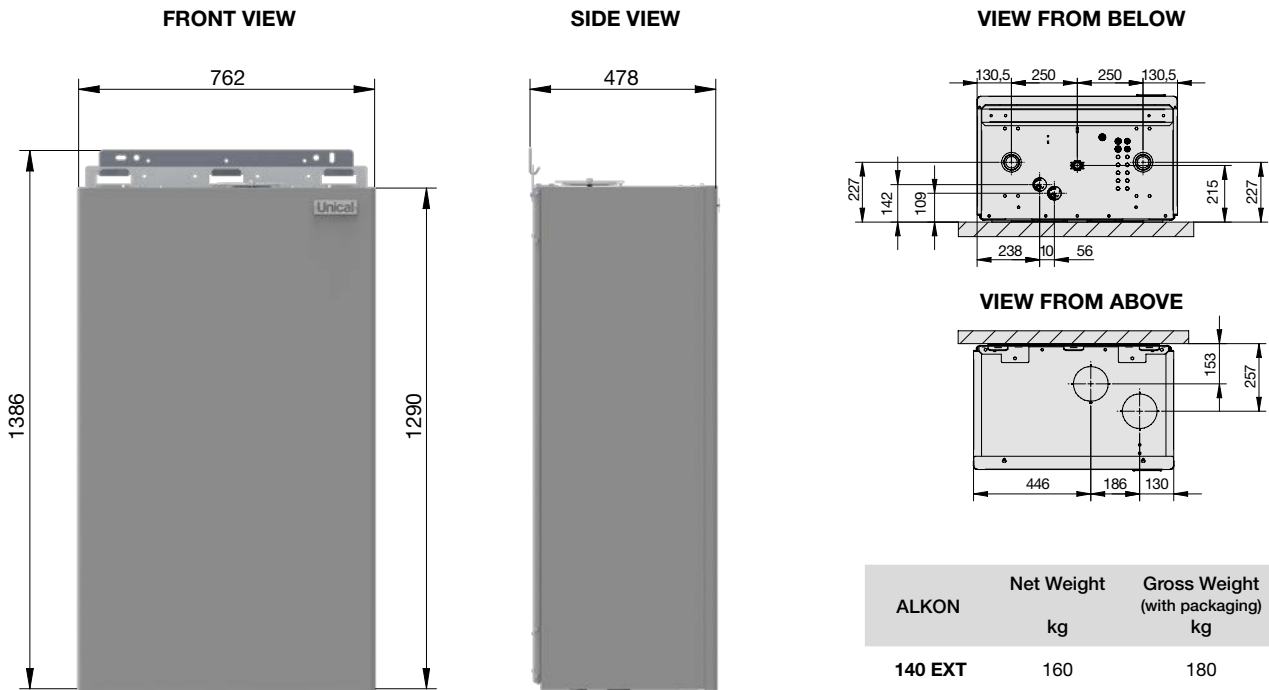
Group of: fan, modulating gas valve, premix burner



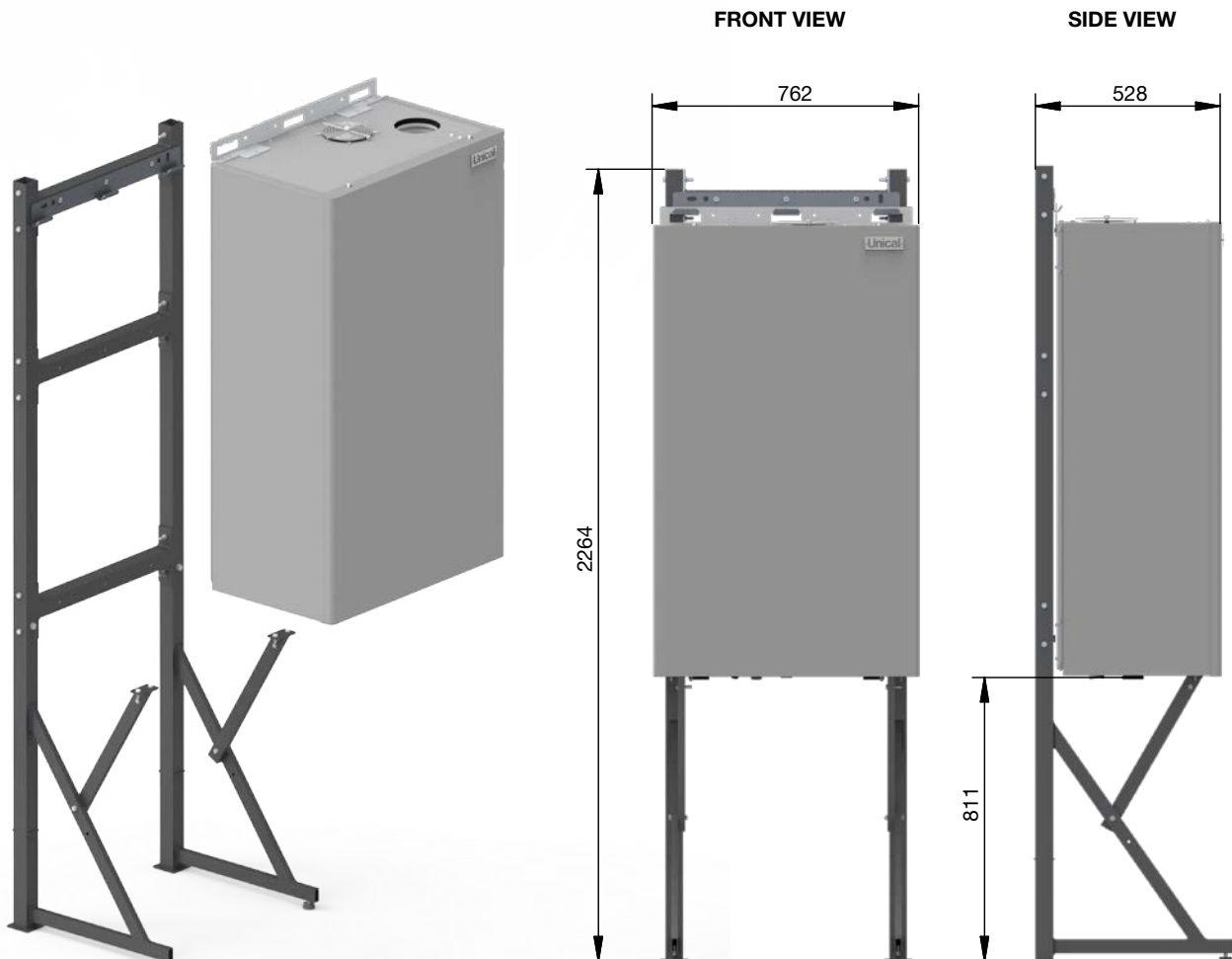
Assembly of the electronic PCBs for the management of the thermal elements and BCM 2.0

View that underlines the particular skew between the 2 thermal elements in order to facilitate the maintenance interventions

DIMENSIONS OF A SINGLE BOILER ALKON 140 EXT



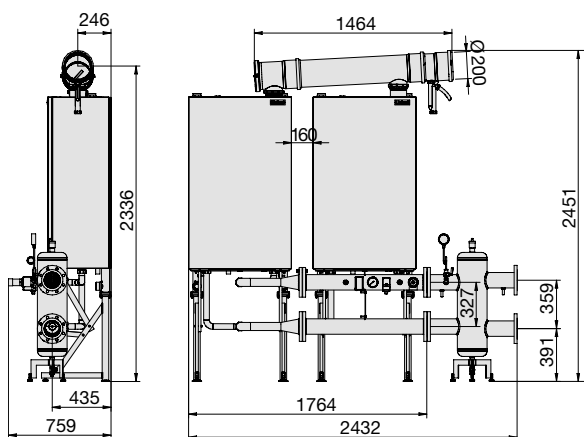
DIMENSIONS WITH SUPPORTING FRAME (optional)



## ALKON 140 EXT IN BATTERY

The ALKON 140 EXT is foreseen, thanks to an opportune and dedicated series of accessories, to be assembled in battery. The combinations can be in groups of 2 - 3 & 4 units, up to a maximum of 560 kW.

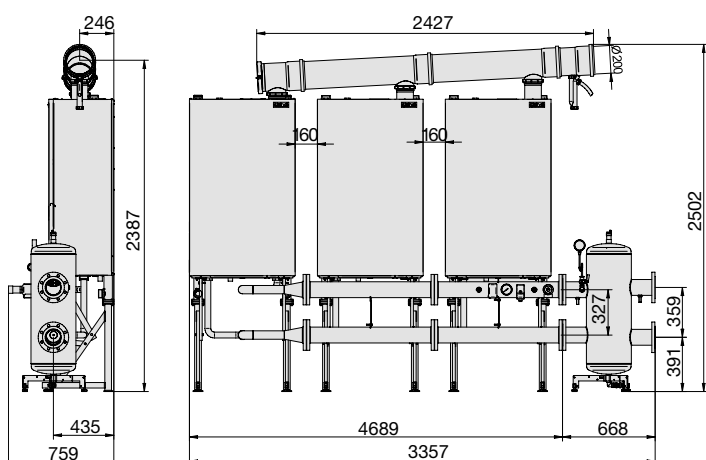
### DIMENSIONS OF TWO ALKON 140 EXT IN BATTERY



Operational data		ALKON 140 EXT
Minimum Input on N.C.V. Qmin	kW	11
Nominal Input on N.C.V. Qn	kW	270
Nominal Output (60/80°C) Pn	kW	263.20
Nominal Output (30/50°C) Pcond	kW	271.36
Setting temperature of the gas cut-off valve	°C	98 <sup>+0</sup> <sub>-5</sub>

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

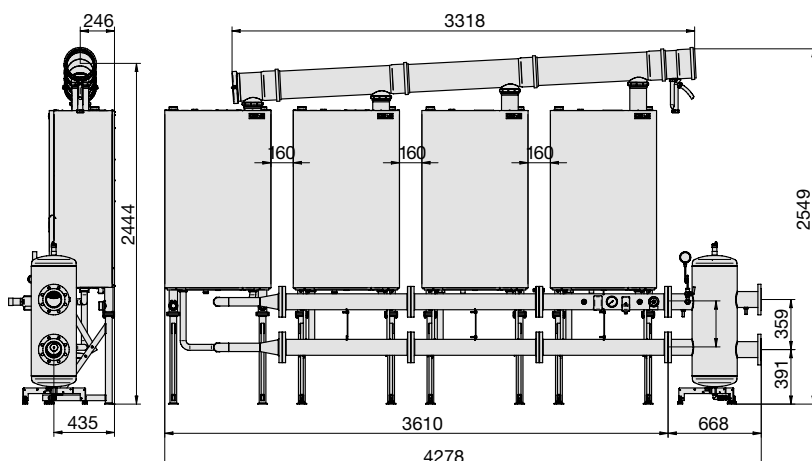
### DIMENSIONS OF THREE ALKON 140 EXT IN BATTERY



Operational data		ALKON 140 EXT
Minimum Input on N.C.V. Qmin	kW	11
Nominal Input on N.C.V. Qn	kW	405
Nominal Output (60/80°C) Pn	kW	394.8
Nominal Output (30/50°C) Pcond	kW	407.04
Setting temperature of the gas cut-off valve	°C	98 <sup>+0</sup> <sub>-5</sub>

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

### DIMENSIONS OF FOUR ALKON 140 EXT IN BATTERY



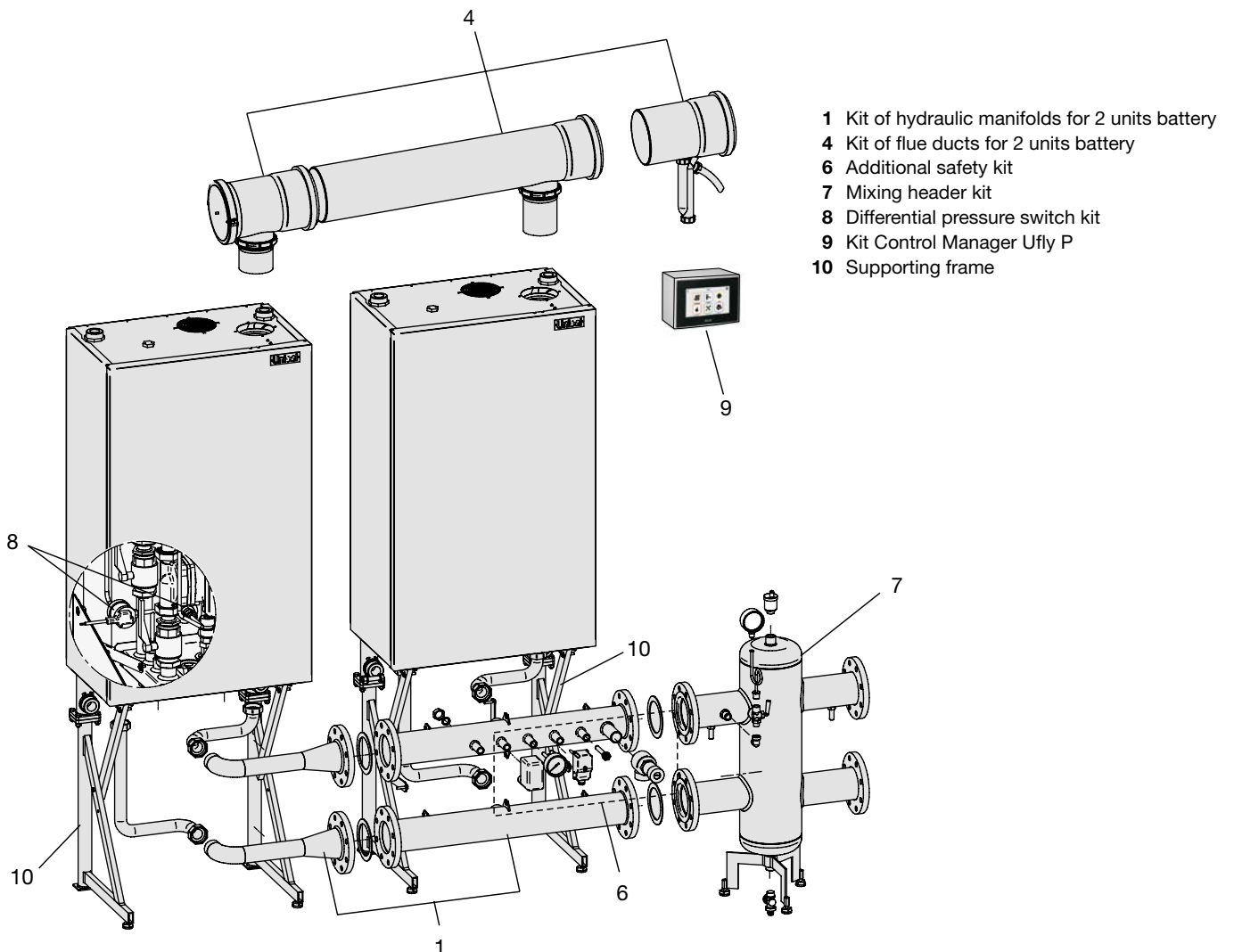
Operational data		ALKON 140 EXT
Minimum Input on N.C.V. Qmin	kW	11
Nominal Input on N.C.V. Qn	kW	540
Nominal Output (60/80°C) Pn	kW	526.40
Nominal Output (30/50°C) Pcond	kW	542.72
Setting temperature of the gas cut-off valve	°C	98 <sup>+0</sup> <sub>-5</sub>

Warning: The flue ducts in plastic material (PPS) are suitable only for Indoor installations.

ACCESSORY KITS FOR ALKON 140 EXT IN BATTERY

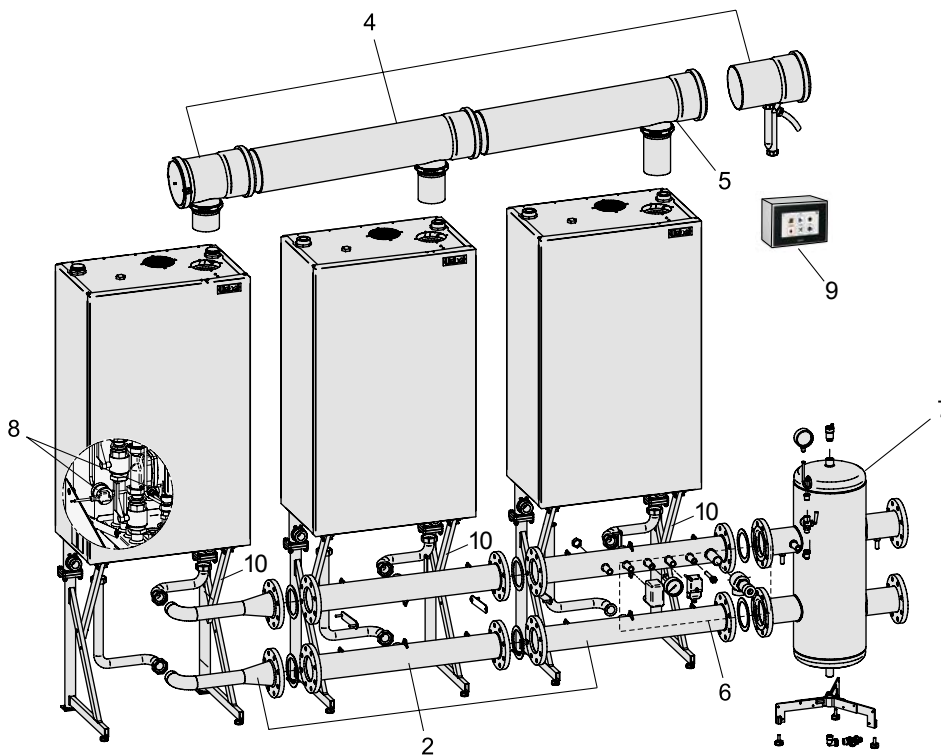
	No. of units	2x	3x	4x
1	Kit of hydraulic manifolds for 2 units battery	1		
2	Kit of hydraulic manifolds for 3 units battery		1	
3	Kit of hydraulic manifolds for 4 units battery			1
4	Kit of flue ducts for 2 units battery	1	1	1
5	Expansion kit of flue ducts for battery of 3 & 4 units		1	2
6	Additional safety kit	1	1	1
7	Mixing header kit	1	1	1
8	Differential pressure switch kit	2	3	4
9	Kit Control Manager Ufly P	1	1	1
10	Supporting frame	2	3	4

EXAMPLE OF 2 ALKON 140 EXT IN BATTERY



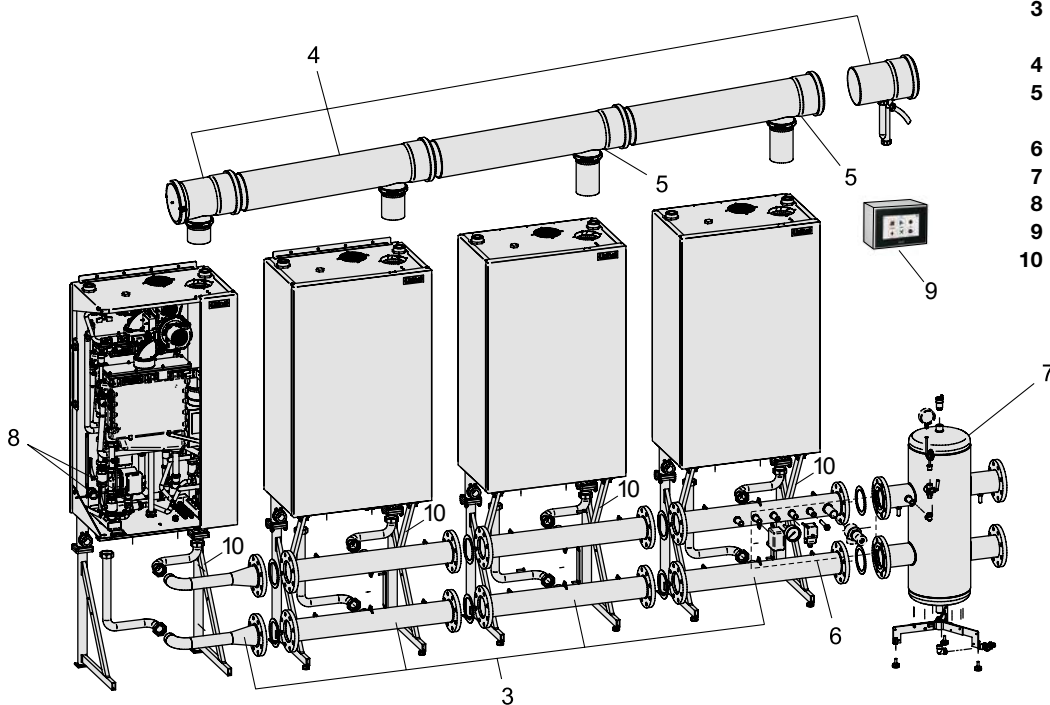
ACCESSORY KITS FOR ALKON 140 EXT IN BATTERY

EXAMPLE OF 3 ALKON 140 EXT IN BATTERY



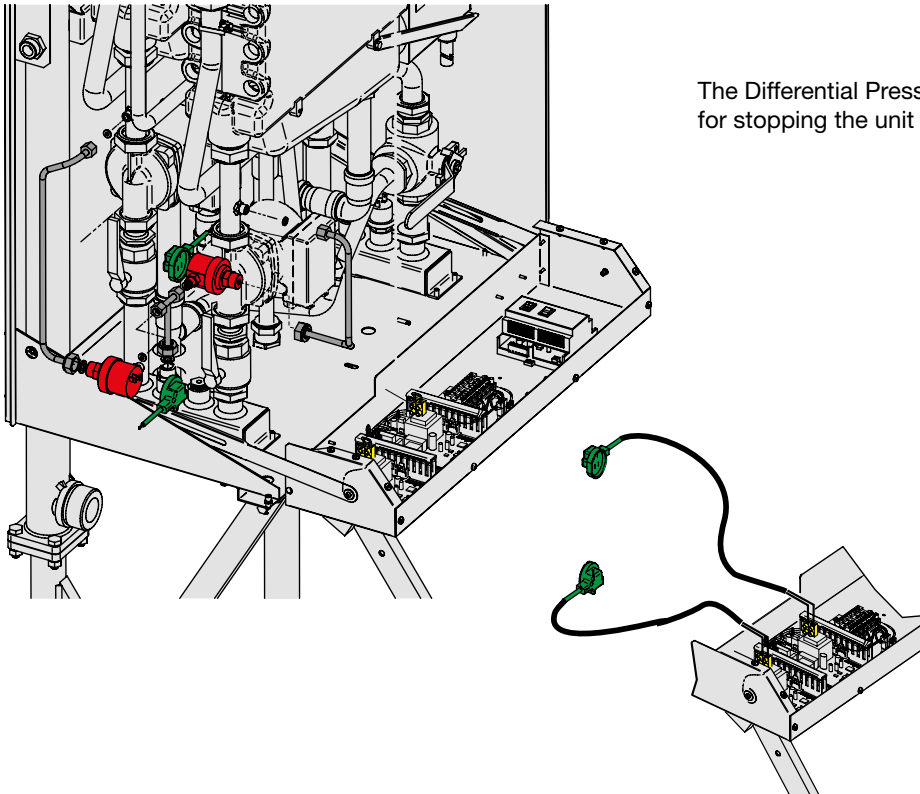
- 2 Kit of hydraulic manifolds for 3 units battery
- 4 Kit of flue ducts for 3 units battery
- 5 Expansion kit of flue ducts for battery of 3 & 4 units
- 6 Additional safety kit
- 7 Mixing header kit
- 8 Differential pressure switch kit
- 9 Kit Control Manager Ufly P
- 10 Supporting frame

EXAMPLE OF 4 ALKON 140 EXT IN BATTERY



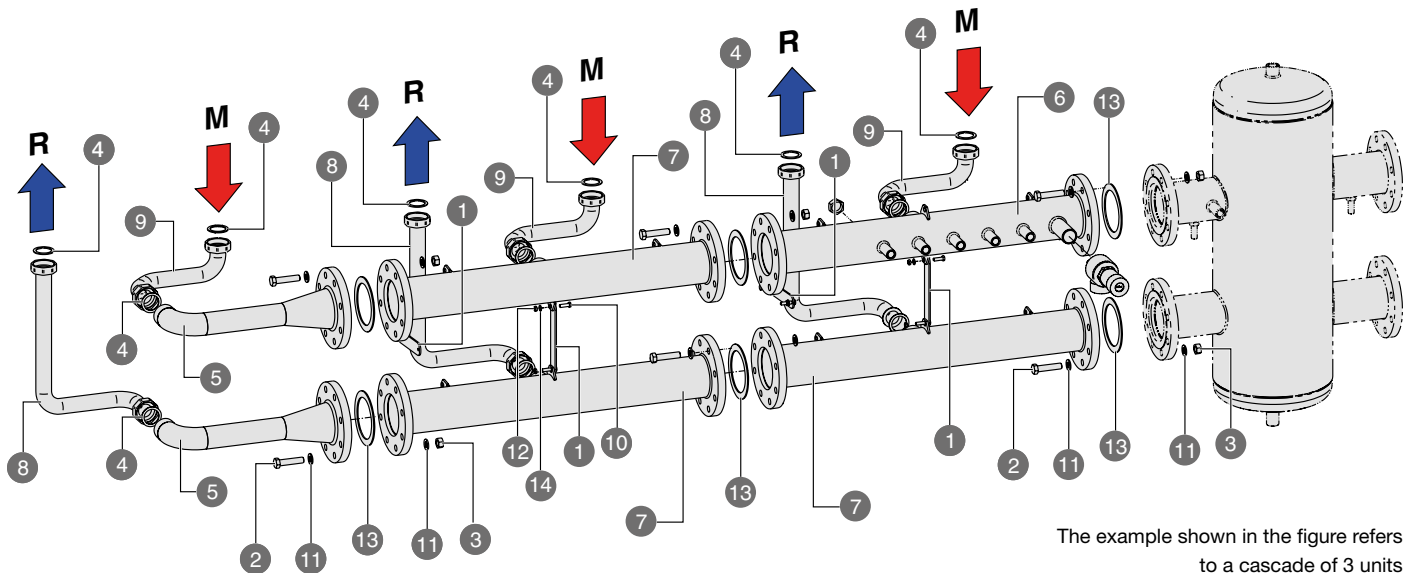
- 3 Kit of hydraulic manifolds for 4 units battery
- 4 Kit of flue ducts for 2 units battery
- 5 Expansion kit of flue ducts for battery of 3 & 4 units
- 6 Additional safety kit
- 7 Mixing header kit
- 8 Differential pressure switch kit
- 9 Kit Control Manager Ufly P
- 10 Supporting frame

DIFFERENTIAL PRESSURE SWITCH KIT



The Differential Pressure Switch kit is a safety device used for stopping the unit in case the pump is defective.

MOUNTING SCHEME OF HYDRAULIC MANIFOLDS



The example shown in the figure refers to a cascade of 3 units

Pos.	Description	No. of units		
		2x	3x	4x
1	Mounting bracket of the battery manifold	2	4	6
2	Screw M16	32	48	64
3	Nut M16	32	48	64
4	Gasket 2"	8	12	16
5	Return manifold of a single unit	2	2	2
6	Additional safety kit	1	1	1
7	Battery manifold	1	3	5

Pos.	Description	No. of units		
		2x	3x	4x
8	Return pipe between boiler & manifold	2	3	4
9	Flow pipe between boiler & manifold	2	3	4
10	Screw M10 x 40	4	6	8
11	Washer Ø 17 / 30	64	96	128
12	Nut M8	8	12	16
13	Gasket DN 100	4	6	8
14	Washer	8	12	16



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

		ALKON 140 EXT
Appliance category		II <sub>2H3P</sub>
Modulation Ratio		1:12.3
Nominal Heat Input on P.C.I. Qn	kW	135
Minimum Heat Input on P.C.I. Qmin	kW	11
Nominal Output (Tr 60 / Tm 80 °C) Pn	kW	131.60
Minimum Output (Tr 60 / Tm 80 °C) Pn min	kW	10.5
Nominal Output (Tr 30 / Tm 50 °C) Pcond	kW	136.1
Minimum Output (Tr 30 / Tm 50 °C) Pcond min	kW	11.5
Efficiency at max. output (Tr 60 / Tm 80°C)	%	97.48
Efficiency at min. output (Tr 60 / Tm 80°C)	%	95.1
Efficiency at max. output (Tr 30 / Tm 50°C)	%	100.8
Efficiency at min. output (Tr 30 / Tm 50°C)	%	104.3
Efficiency at 30% output (Tr 30°C)	%	108.3
Combustion efficiency with nominal load	%	97.5
Combustion efficiency with minimum load	%	98.35
Heat loss at casing with burner in operation (Qmin)	%	3.28
Heat loss at casing with burner in operation (Qn)	%	0.02
Flue gas temperature tf-ta (min)(*)	°C	33
Flue gas temperature tf-ta (max)(*)	°C	55
Maximum allowable temperature	°C	100
Maximum operating temperature	°C	85
Flue gas mass flow rate (min)	kg/h	12.58
Flue gas mass flow rate (max)	kg/h	153.03
Excess λ air	%	25.53
Flue losses with burner in operation (min)	%	1.65
Flue losses with burner in operation (max)	%	2.90
Minimum heating circuit pressure	bar	0.5
Maximum heating circuit pressure	bar	6
Max allowable pressure of the generator	bar	8
Water content	l	10
Gas Consumption Natural (20 mbar) gas G 20 a Qn	m <sup>3</sup> /h	14.27
Gas Consumption Natural gas (20 mbar) G 20 a Qmin	m <sup>3</sup> /h	1.16
Gas Consumption G25 (supply pressure 25 mbar) Qn	m <sup>3</sup> /h	16.60
Gas Consumption G25 (supply pressure 25 mbar) Qmin	m <sup>3</sup> /h	1.35
Gas Consumption G31 (supply pressure 37/50 mbar) Qn	kg/h	10.48
Gas Consumption G31 (supply pressure 37/50 mbar) Qmin	kg/h	0.85
Max. available pressure at the chimney base	Pa	40
Condensate production max	kg/h	21.8
<b>Emissions</b>		
CO at Minimum Heat Input with 0% of O <sub>2</sub>	mg/kWh	139
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	58
NO <sub>x</sub> Class		6
<b>Electrical Data</b>		
Voltage/Frequency electric power supply	V/Hz	230/50
Fuse on main supply	A (R)	4
Insulation degree	IP	X5D

Room Temperature = 20°C. (\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C).

DATA ACCORDING TO ErP DIRECTIVE

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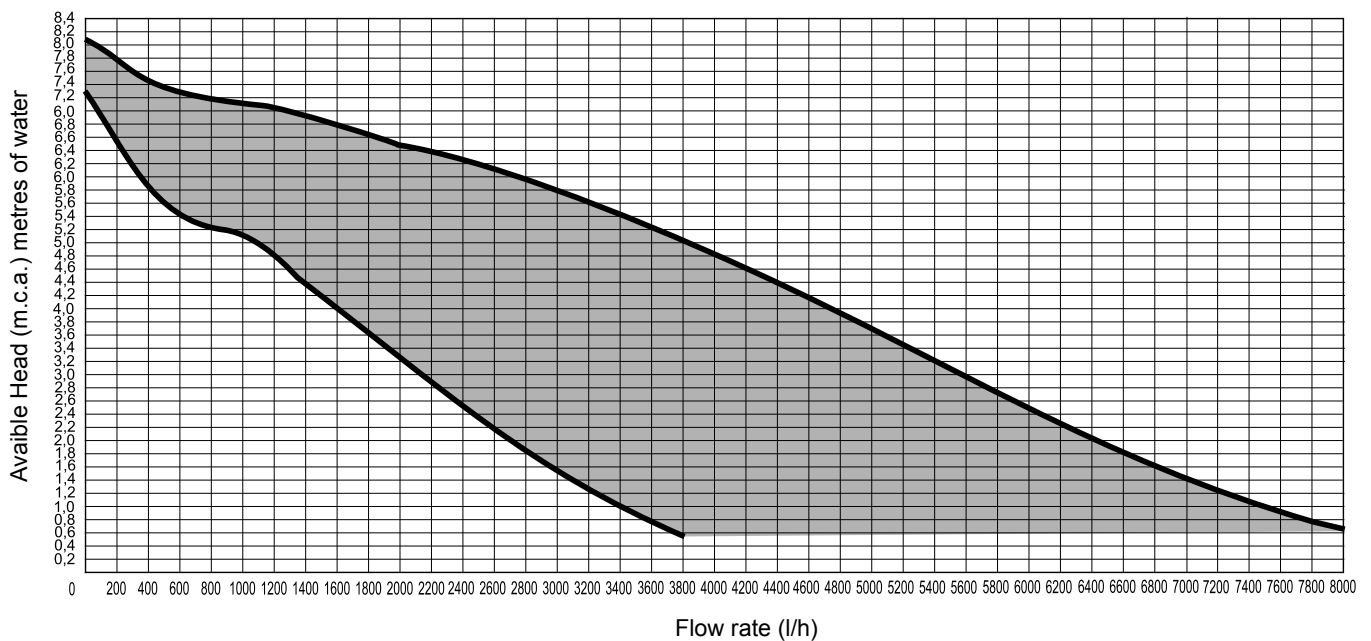
ALKON 140 EXT			
NOMINAL HEAT OUTPUT	$P_n$	kW	132
SEASONAL SPACE HEATING ENERGY EFFICIENCY	$\eta_s$	%	93
<b>SEASONAL EFFICIENCY CLASS IN HEATING MODE</b>			<b>A</b>
<b>FOR CH ONLY AND COMBINATION BOILERS: USEFUL HEAT OUTPUT</b>			
USEFUL HEAT OUTPUT in high temperature regime (Tr 60 °C / Tm 80 °C)	$P_4$	kW	71.2
USEFUL EFFICIENCY AT NOM. HEAT OUTPUT in high-temperature regime (Tr 60°C / Tm 80°C)	$\eta_4$	%	87.8
USEFUL HEAT OUTPUT AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30°C)	$P_1$	kW	23.7
USEFUL EFFICIENCY AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30 °C)	$\eta_1$	%	97.6
RANGE-RATED BOILER: YES / NO			SI
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>			
AT FULL LOAD	$e_{l_{max}}$	kW	0.474
AT PART LOAD	$e_{l_{min}}$	kW	0.159
IN STAND-BY MODE	$P_{SB}$	kW	0.007
<b>OTHER ITEMS</b>			
STAND-BY HEAT LOSS	$P_{stby}$	kW	2.68
EMISSIONS OF NITROGEN OXIDES referred to NCV & (GCV)	$NO_x$	mg/kWh	58 (52)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	653

DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



ALKON 140 EXT		
Power supply	kW	135
Max flow rate demanded l/h ( $\Delta t$ 15 K)	l/h	7545
Nominal flow rate request ( $\Delta t$ 20 K)	l/h	5659

# KONf 200-400




KONf 400

KONf 200

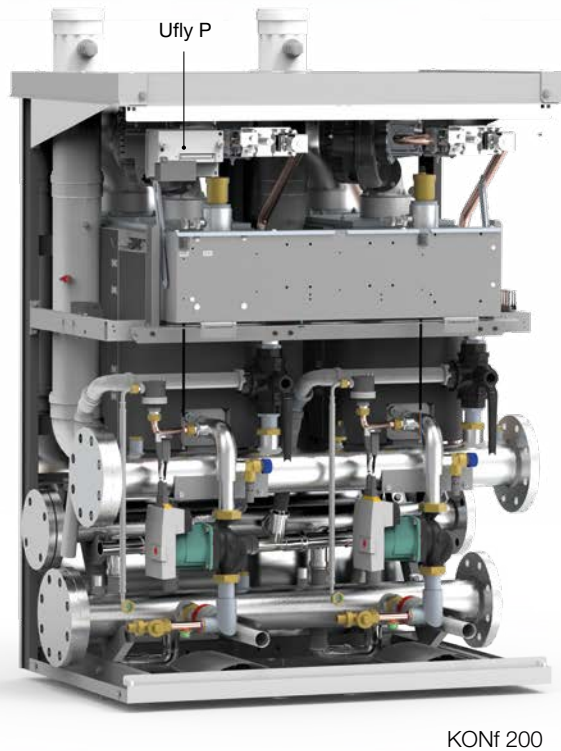
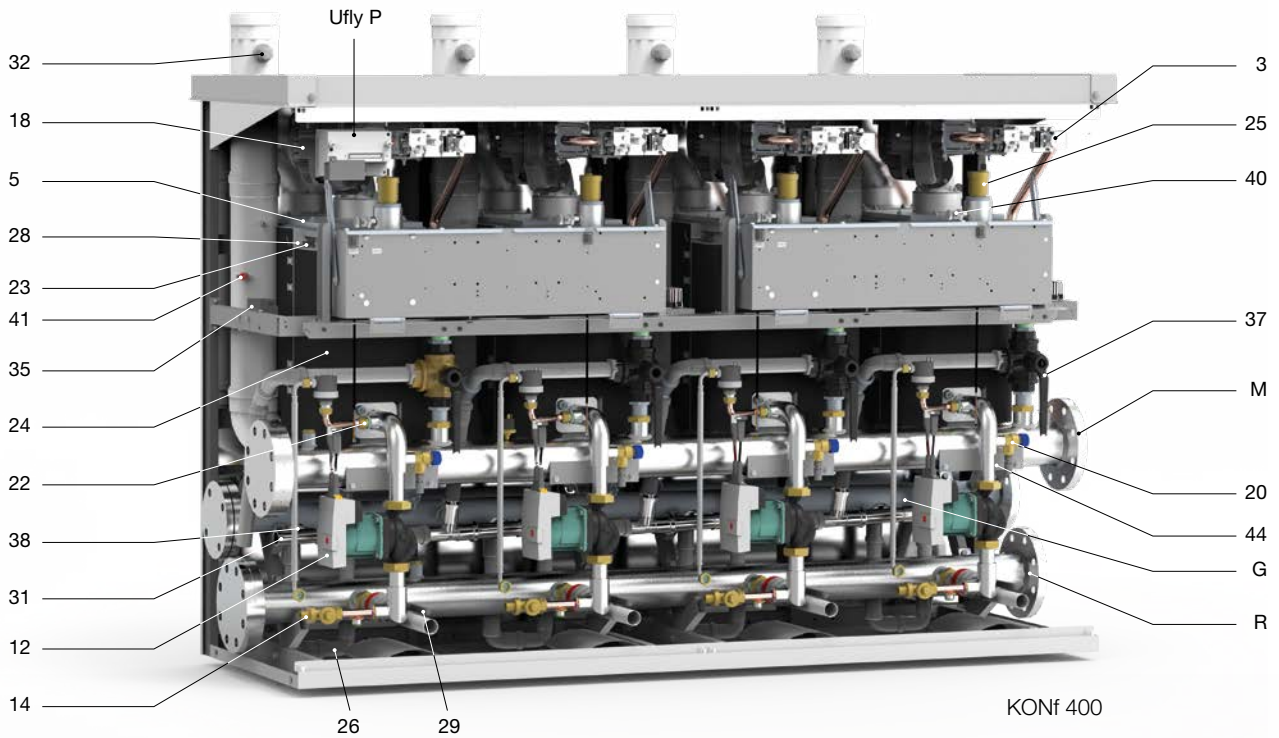


**FLOOR STANDING, MODULATING CONDENSING BOILER  
WITH LOW NO<sub>x</sub> PREMIX BURNER - FOR INDOOR & OUTDOOR INSTALLATION**

OUTPUT RANGE	from 200 to 400 kW	
WORKING TEMPERATURE	no limit on the return temperature	
SUPPLY	Natural Gas or LPG	
MODELS	KONf 200	KONf 400
SEASONAL EFFICIENCY	 <b>A</b>	

low water content - Heat exchanger in Aluminium / Silicium / Magnesium - IPX5D (for Outdoor installation)

MAIN COMPONENTS



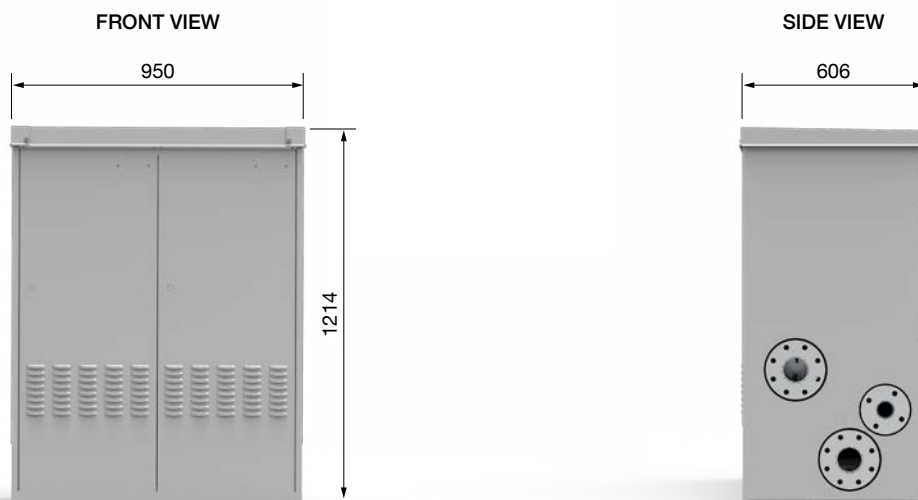
- |  |   |  |
|--|---|--|
| <b>3</b> Gas valve                             | <b>25</b> Vent valve                    | <b>40</b> Manual Vent valve            |
| <b>5</b> Burner                                | <b>26</b> Condensation drain trap       | <b>41</b> Smoke Thermostat             |
| <b>12</b> Modulating Pump                      | <b>28</b> Ignition electrode            | <b>44</b> Differential pressure switch |
| <b>14</b> Boiler drain valve                   | <b>29</b> Return shut-off (3 Way) valve | <b>G</b> Gas inle DN50                 |
| <b>18</b> Modulating Fan                       | <b>31</b> Condensation drain trap       | <b>M</b> Heating system flow DN80      |
| <b>20</b> Safety valve                         | <b>32</b> Outlet flue inspection        | <b>R</b> Heating system return DN80    |
| <b>22</b> Return temperature sensor            | <b>35</b> Ignition transformer          |  |
| <b>23</b> Flue gas collector safety thermostat | <b>37</b> Flow shut-off (3 Way) valve   |  |
| <b>24</b> Aluminium Heat Exchanger/Capacitor   | <b>38</b> Gas pressure switch           |  |

## PRODUCT PLUS VALUES

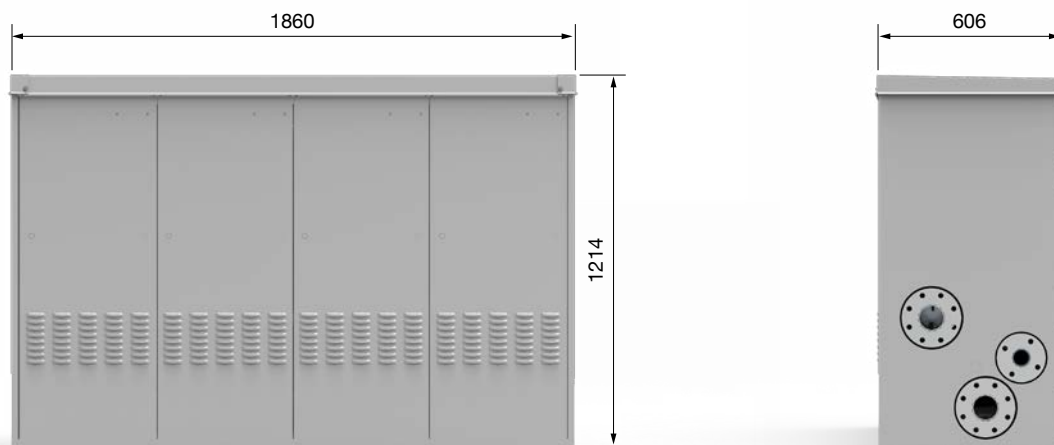
- Special containing cabinet for outdoor installation
  - Hydraulic connection flanges between more units, DN 80
  - Three way valve for hydraulic interception on the flow and outlet in atmosphere
  - Two way valve for hydraulic interception on the return with Flow-stop
  - Gas connection flange between more units, DN 50
  - Smokes evacuation duct 100 mm dia. with analysis sampling nipple
  - Cabinets front door with airing slots
  - Minimum feeding gas pressure: 15 mbar
  - Maximum allowable pressure at the chimney base: 150 Pa
  - Maximum allowable temperature: 100°C
  - Maximum working temperature: 90°C
  - Modulation ratio 1:10 (mod. 200 kW), 1:20 (mod. 400 kW)
  - Two or four primary heat exchangers in Al/Si/Mg alloy, according to the model, entirely irrigated, ultracompact with high water circulation
  - Digital electronic regulator Ufly P with function of: thermo-regulator and cascade controller and manager
  - Additional functions: diagnosis of operational parameters and errors, antifreeze, technical services, post-circulation and digital errors indication
  - BCM 2.0: with 0-10 Volt connection port for external control of the boiler temperature modulation
  - Very low polluting emissions, Low NOx, class 6 according to EN 15502-1
  - High efficiency modulating pumps (2x or 4x, according to the model) standard supplied
  - Minimum gas pressure switch
  - Minimum water pressure switch (2x or 4x, according to the model)
  - Safety level switch on condensate drain (2x or 4x, according to the model)
  - Isolation Protection IP X5D
  - Blind flange
- Options:
- Empty cabinet for housing of the additional safety devices
  - Multifunction module SHC for zones management
  - N. 3 additional control sensors (possibility of management up to a maximum of 4 SHC cards)
  - Additional safety devices kit (Kit INAIL)

## DIMENSIONS

### KONf 200



### KONf 400



## TECHNICAL DATA

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		KONf 200	KONf 400
Appliance category		II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation Ratio		1:10	1:20
Nominal Heat Input on P.C.I. Q <sub>n</sub>	kW	199	398
Minimum Heat Input on P.C.I. Q <sub>min</sub>	kW	20	20
Nominal Output (Tr 60 / Tm 80 °C) P <sub>n</sub>	kW	195	391
Minimum Output (Tr 60 / Tm 80 °C) P <sub>n</sub> min	kW	19.1	19.21
Nominal Output (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	206	413
Minimum Output (Tr 30 / Tm 50 °C) P <sub>cond</sub> min	kW	21.2	21.2
Efficiency at max. output (Tr 60 / Tm 80°C)	%	97.9	97.8
Efficiency at min. output (Tr 60 / Tm 80°C)	%	95.6	95.6
Efficiency at max. output (Tr 30 / Tm 50°C)	%	104	104
Efficiency at min. output (Tr 30 / Tm 50°C)	%	106	106
Efficiency at 30% output (Tr 30°C)	%	108.9	108
Combustion efficiency with nominal load	%	98.02	98.26
Combustion efficiency with minimum load	%	98.2	98.2
Heat loss at casing with burner in operation (Q <sub>min</sub> )	%	2.6	2.56
Heat loss at casing with burner in operation (Q <sub>n</sub> )	%	0.14	0.05
Flue gas temperature t <sub>f</sub> -t <sub>a</sub> (min)(*)	°C	34	34.5
Flue gas temperature t <sub>f</sub> -t <sub>a</sub> (max)(*)	°C	40	35.6
Maximum allowable temperature	°C	100	100
Maximum operating temperature	°C	85	85
Flue gas mass flow rate (min)	kg/h	34.31	34.31
Flue gas mass flow rate (max)	kg/h	319.57	639.14
Excess λ air	%	23	23
Flue losses with burner in operation (min)	%	1.8	1.8
Flue losses with burner in operation (max)	%	2.0	1.74
Minimum heating circuit pressure	bar	0.5	0.5
Maximum heating circuit pressure	bar	6	6
Water content	l	22	44
Gas Consumption Natural (20 mbar) gas G 20 a Q <sub>n</sub>	m <sup>3</sup> /h	21.04	42.1
Gas Consumption Natural gas (20 mbar) G 20 a Q <sub>min</sub>	m <sup>3</sup> /h	2.11	2.11
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>n</sub>	m <sup>3</sup> /h	24.5	49
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>min</sub>	m <sup>3</sup> /h	2.46	2.46
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>n</sub>	kg/h	15.5	31.0
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>min</sub>	kg/h	1.55	1.55
Max. available pressure at the chimney base	Pa	150	150
Condensate production max	kg/h	12.8	26.0
<b>Emissions</b>			
CO at Minimum Heat Input with 0% of O <sub>2</sub>	mg/kWh	153	156
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	68	70
NO <sub>x</sub> Class		6	6
<b>Electrical Data</b>			
Voltage/Frequency electric power supply	V/Hz	230/50	230/50
Fuse on main supply	A (R)	4	4
Insulation degree	IP	X5D	X5D

Room Temperature = 20°C - I dati presenti sono rilevati secondo UNI EN 15502-1

(\*) Temperature detected with appliance operation flow rate 80°C / ret. 60°C


Seasonal space heating energy 2009/125 CEE (<=400kW) η<sub>s</sub> - see ErP table

Stand-by heat loss ΔT 30°C - P<sub>stby</sub> - see ErP table

Consumption in stand-by - P<sub>sb</sub> - see ErP table

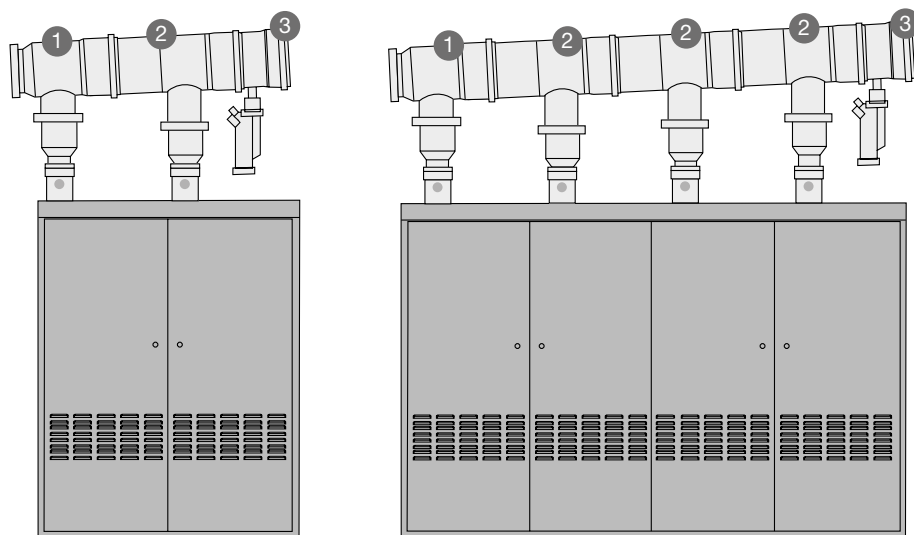
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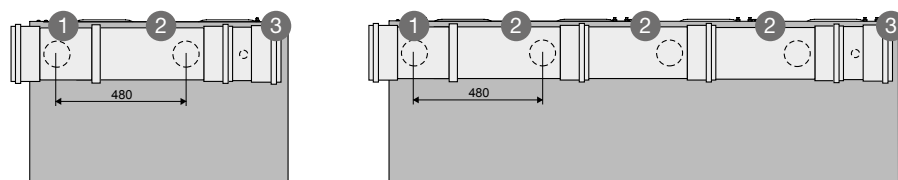
			KONf 200	KONf 400
NOMINAL HEAT OUTPUT	$P_n$	kW	195	388
SEASONAL SPACE HEATING ENERGY EFFICIENCY	$\eta_s$	%	93	92
<b>SEASONAL EFFICIENCY CLASS IN HEATING MODE</b>			<b>A</b>	<b>A</b>
<b>FOR CH ONLY AND COMBINATION BOILERS: USEFUL HEAT OUTPUT</b>				
USEFUL HEAT OUTPUT in high temperature regime (Tr 60 °C / Tm 80 °C)	$P_4$	kW	195	391
USEFUL EFFICIENCY AT NOM. HEAT OUTPUT in high-temperature regime (Tr 60°C / Tm 80°C)	$\eta_4$	%	88.2	88.5
USEFUL HEAT OUTPUT AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30°C)	$P_1$	kW	65.0	129.0
USEFUL EFFICIENCY AT 30% OF NOM. HEAT OUTPUT in low-temperature regime (Tr 30 °C)	$\eta_1$	%	98.1	97.3
RANGE-RATED BOILER: YES / NO			NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>				
AT FULL LOAD	$e_{l_{max}}$	kW	0.580	1.160
AT PART LOAD	$e_{l_{min}}$	kW	0.156	0.156
IN STAND-BY MODE	$P_{SB}$	kW	0.025	0.032
<b>OTHER ITEMS</b>				
STAND-BY HEAT LOSS	$P_{stby}$	kW	0.962	0.924
EMISSIONS OF NITROGEN OXIDES rif. PCI (PCS)	$NO_x$	mg/kWh	46 (41)	46 (41)
ANNUAL ELECTRICITY CONSUMPTION	$Q_{HE}$	GJ	606	1220





## SMOKE EVACUATION ACCESSORIES (Ø 200)

FRONTAL VIEW

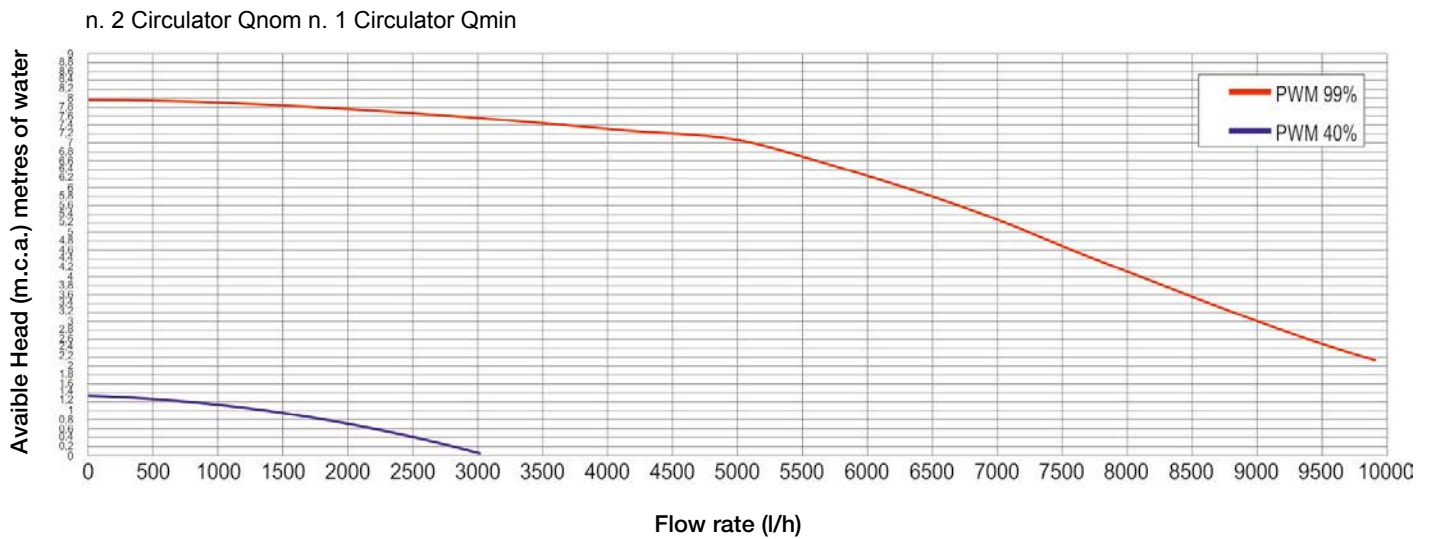
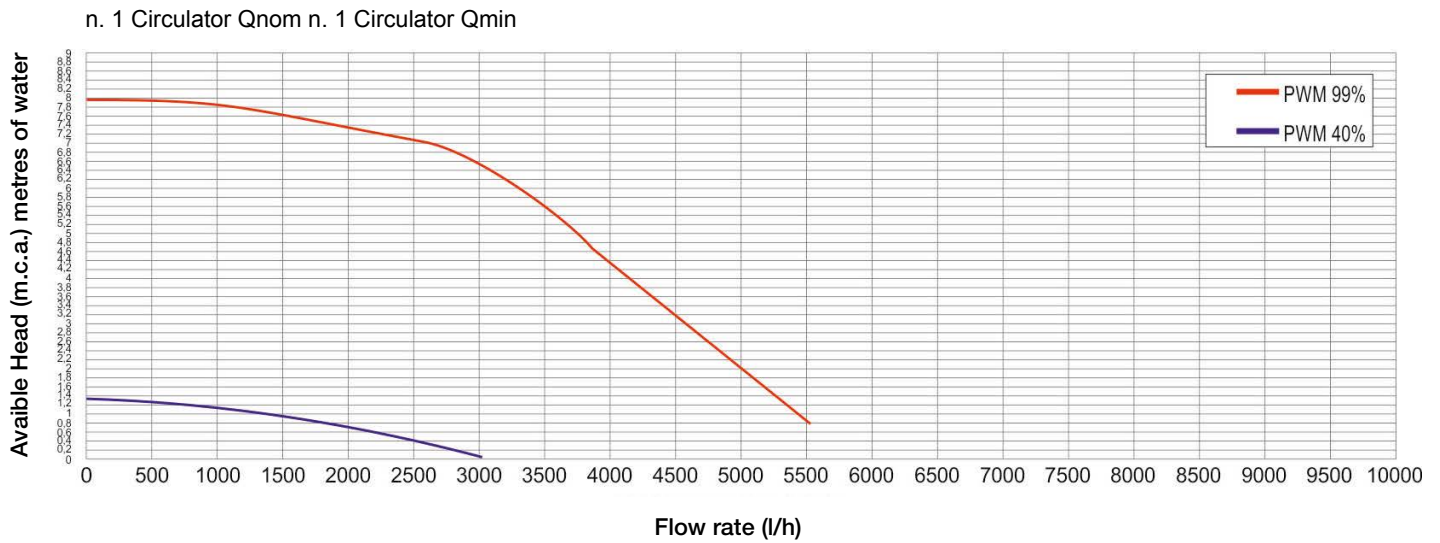


VIEW FROM ABOVE



- 1  SINGLE FLUE MANIFOLD
- 2  FLUE DUCT EXTENSION W/BOILER CONNECTION
- 3  SIPHON
-  FLUE DUCT EXTENSION

## DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



		KONf 200	KONf 400
Power supply	kW	199	398
Max flow rate demanded l/h ( $\Delta t$ 15 K)	l/h	11400	22818
Nominal flow rate request ( $\Delta t$ 20 K)	l/h	8860	17110
Power supply in condensation (50/30)	kW	210	420
Max flow rate demanded l/h ( $\Delta t$ 15 K)	l/h	12040	24080
Nominal flow rate request ( $\Delta t$ 20 K)	l/h	9030	18060

The  $\Delta t$  between supply and return boiler must never be less than 15 °K.

NOTE: The use of a mixing header fitted between the boiler circuit and the system circuit is always advisable.

It becomes **INDISPENSABLE** if the system requires flow rates superior to the maximum permitted boiler flow rates, which is to say lower than 15K.



















# MODULEX EXT



BREVETTO  
**Unical**  
PATENT

15 claims

## MODULAR GAS CONDENSING UNIT EQUIPPED WITH PRIMARY RING AND PREMIX MODULATING LOW NO<sub>x</sub> BURNERS CLASS 6

OUTPUT RANGE	from 100 to 1200 kW and in battery up to 8 units															
WORKING TEMPERATURE	no limit on the return temperature															
SUPPLY	Natural Gas or LPG															
MODELS	100	116	150	200	250	300	350	440	550	660	770	900	1000	1100	1160	1200
THERMAL MODULES n°	2	3	3	4	5	6	7	4	5	6	7	8	9	10	11	11
SEASONAL EFFICIENCY																
	A	A	A	A	A	A	A	*	*	*	*	*	*	*	*	*

Heat Exchanger in Aluminum / Silicon / Magnesium  
Low water content  
ready for outdoor installation (IPX5D)

It can be equipped with mixing header (hydraulic separator) or plate heat exchanger

\* Appliances not covered by Directive 2009/125/CE. The scope of the ERP Directive is up to 400 kW.

## MAIN COMPONENTS

**Thermal element in cast aluminium / silicon / magnesium**, consisting of combustion chamber with **total radiation burner**, **modulating fan**, **modulating gas valve**, flame ignition and control device (**BMM**), **NTC temperature control sensor** and its **own safety thermostat**.

- Adjacent cast aluminium alloy sections for optimal reduction of the heat losses
- Hydraulic connections among the adjacent sections without any hydraulic interception, realized through hydraulically balanced manifolds
- Integral insulation with anallergic synthetic wool, 50 mm thick
- **Total premix modulating burners** with fame surface in “**metallic sponge**” **FeCralloy fibre**. The premixing takes place in the fan, equipped **with integral non return valve**
- Suction / feeding system of the combustive air from boiler house completely filtered
- Covered by a casing in electro-coated steel panels, painted with epoxy-polyester powders and completely impermeable (IPX5D)
- **Thermoregulation Ufly P** inserted in the special disappearing panel board
- Standard supplied: **outer temperature sensor, boiler temperature sensor, flow temperature sensor and DHW storage tank temperature sensor**
- C.H. system loads up to 2 mixed circuits (up to 15 with optional expansion modules), loading of the DHW storage tank and of a solar system
- **D.H.W. production** through the temperature sensor for the control, in priority, of the storage tank loading pump or of the three way deviating valve (through Ufly P, BCM 2.0, SHC)
- Possibility of control of the power of each single thermal module
- **Automatic management of the delivered power**, of the temperature set-point and the 0-10 V signal to the modulating pump according to the parameters of the C.H. system (BCM 2.0)
- **Monitoring** of the operation state and the temperatures
- Management of the alarms
- Introduction of the parameters
- **ADDITIONAL FUNCTIONS OF BCM 2.0** (delivered in the supply):
  - Analogical outlet 0-10 V for the control of a modulating pump
  - Characteristics of the communication system of the BMS (Building Management System), through the BCM card, that constitutes physically the communication port, which communicates through the Modbus protocol. Hardware type: RS485 Modbus protocol
  - Emergency operation: anti black-out through BCM 2.0
  - Restoration (after 60 seconds) of the normal operation with “constant temperature Set-point” of 70°C (or otherwise selectable), at a maximum 50% power
  - Alarm Signalling Relay



Detail of the HEAT EXCHANGER in Al/Si/Mg



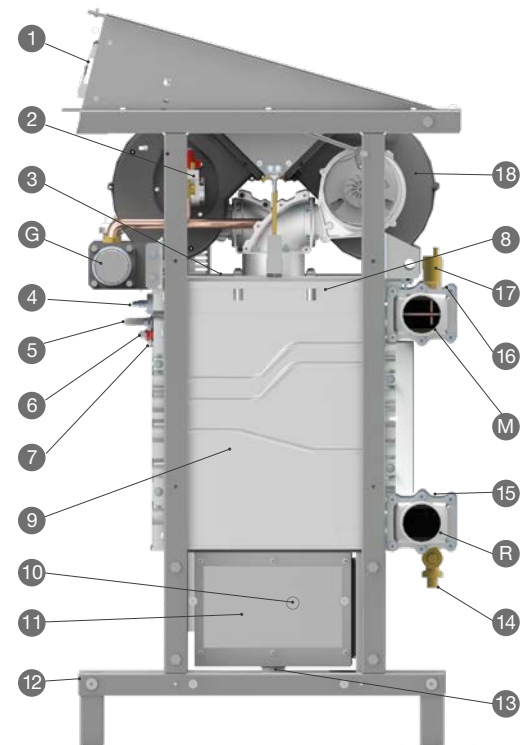
CROSS-SECTION OF THE PREMIX MULTI-BURNER



PREMIX BURNERS WORKING AT CONSTANT CO<sup>2</sup>



BUILT-IN NON RETURN SMOKE VALVES



Key:

- |  |   |
|--|---|
| 1 - Command panel Ufly P                   | 12 - Frame                                |
| 2 - Gas valve                              | 13 - Condensates drain connection         |
| 3 - Burner cover                           | 14 - Boiler drain cock                    |
| 4 - Ignition electrode                     | 15 - Global NTC return temperature sensor |
| 5 - Ionization electrode                   | 16 - Global NTC flow temperature sensor   |
| 6 - Local NTC temperature sensor           | 17 - Automatic air vent                   |
| 7 - Local limit thermostat                 | 18 - Fan                                  |
| 8 - Burner                                 | G - Gas pipe                              |
| 9 - Heat exchanger in aluminium alloy      | M - Central heating flow                  |
| 10 - Condensates level sensor              | R - Central heating return                |
| 11 - Condensates tray - chimney connection |   |

### PRE-ASSEMBLED THERMAL ELEMENTS IN Al/Si/Mg

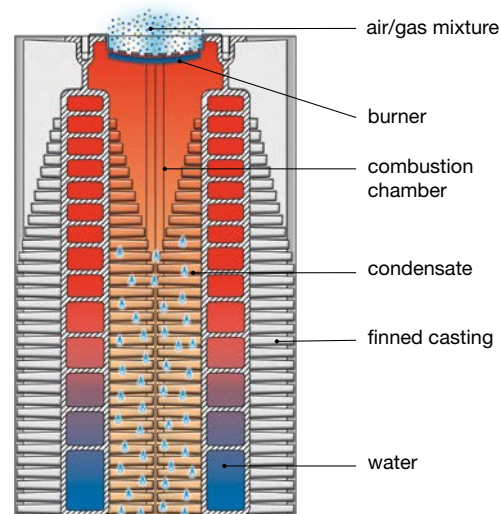
The basic element is formed by **two aluminium alloy castings** that, on the smoke side, have dense **fins**, with increasing height toward the smoke evacuation, placed in lower part of the casting, in order to increase its exchange surface (Unical patent).

Inside the castings there are the water channels that, always with more reduced section, zigzag cross the casting, granting an exceptional heat transfer from combustion gases to the water.

Every thermal element is equipped with:

- premix modulating radiation burner
- modulating gas valve
- electronic ignition and ionization
- NTC working temperature sensor
- safety thermostats
- flame sight glass.

The smoke and acidic condensate of the thermal elements are collected in a stainless steel tray.



### THE PREMIX

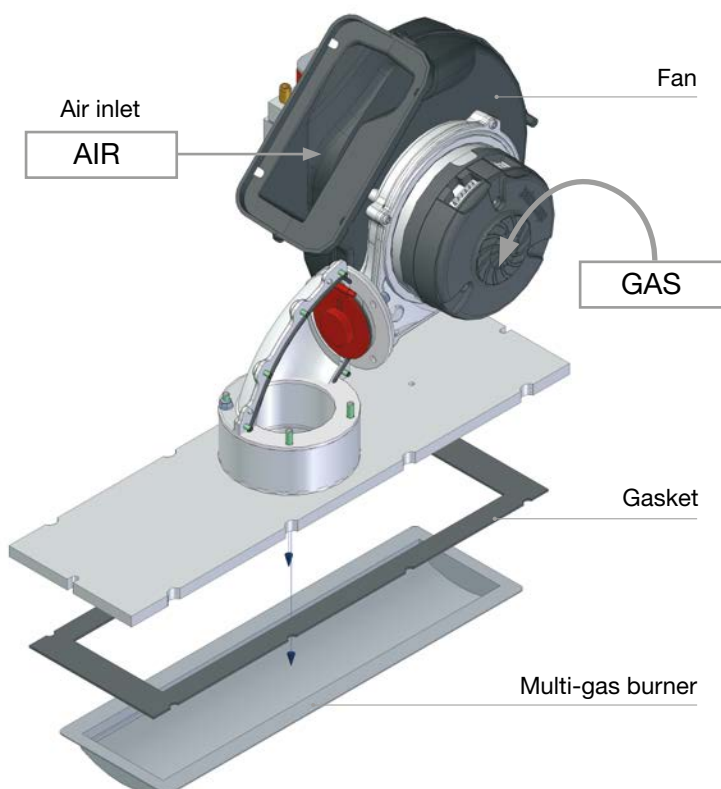
The very high performances of MODULEX EXT depend on the combustion generating unit

The combustion mixture is regulated in parts always proportionate air and gas to produce, through the multigas burner, the most efficient thermal energy transmission system, the "irradiated combustion".

The wide surface, on which the combustion happens, guarantees:

- **low combustion temperature**
  - **reduced turbulence**
- with the following **advantages**:
- **long lasting of the burner**
  - **high combustion silentness**
  - **reduced maintenance**
  - **very small production of pollutants**
  - **excellent combustion efficiency**
  - **rapid reaching of the dew point**
  - **limited "excess of air"**

**HIGH INTEGRATION:**  
The valve is directly fitted on the fan.  
Inside its volute the air/gas mixing takes place exactly calibrated.



## PRODUCT PLUS VALUES

### MAXIMUM SAVING AND SEASONAL EFFICIENCY

High efficiency thanks to:

- Certified efficiency up to 109% at the minimum modulated capacity (ex Dir. 92/42)
- Seasonal efficiency: + 30% if compared with the conventional boilers
- Modulation ratio: UP TO 1:54
- Modulating pump directly managed by the boiler to assure the maximum condensation at all regimes
- $\eta_s = 92\%$  (dir. ErP)

### TOTAL SAFETY

- High reliability due to MULTIBURNER composition and to the low number of parts in movement
- Emergency operation in case the Ufly P controller is out of service
- Working and safety temperature sensors on every casting section
- Pre-mixing in the fan with integrated non-return valve

### OPERATING ASSURANCE (MULTIBURNER)

The functional autonomy of the heating elements / combustion units, independent of each other, guarantees complete reliability of the unit which, in the event of faults on a heating element, always ensures the operation of the generator.

### SELF-ADAPTATION OF POWER

It drastically reduces the number of switching on and off of the generator (possible customization of the required power)

It follows:

- **Increased efficiency** and lower losses on the chimney due to the burner off
- **Longer life** of moving parts and ignition systems

### INSTANT ANSWER TO REQUEST CHANGES

The generator operates at reduced load, pushing itself to fractions below 30%.

MODULEX EXT adapts its power to these needs in real time, thanks to its low water content, and, being equipped with a modulating pump, reduces electrical consumption to a minimum.

### FLEXIBILITY OF INSTALLATION

- Outdoor installation: protection degree IPX5D
- compact, light, of easy connection:
  - reversible hydraulic and gas connections (up to the mod. 350 kW)
  - smoke evacuation: possible on 3 sides (for all the models)

### LOW ENVIRONMENTAL IMPACT

- Low NO<sub>x</sub> emissions, referred to NCV & (GCV): < 54 (49) mg/kWh
- Low NO<sub>x</sub> class 6 (EN 15502-1)
- Low acoustic impact
- Low chimney flue losses
- Totally premix, radiation, modulating burners, working at constant CO<sub>2</sub>

### EXCLUSIVE ELECTRONIC TECHNOLOGY

- Electronic management and thermal regulation completely automatic and pre-programmed (patented)
- Predisposition for telemanagement and telecontrol
- Possible cascade installation **up to 8 boilers** (8 x 1200 = 9600 kW)



MODULEX 1160

## MAXIMUM EFFICIENCY

### OPERATION PRINCIPLES

The particularity of the Thermoregulation Ufly P is that to maintain in operation the **greatest number of modules** at the smallest possible power (as shown in the examples).

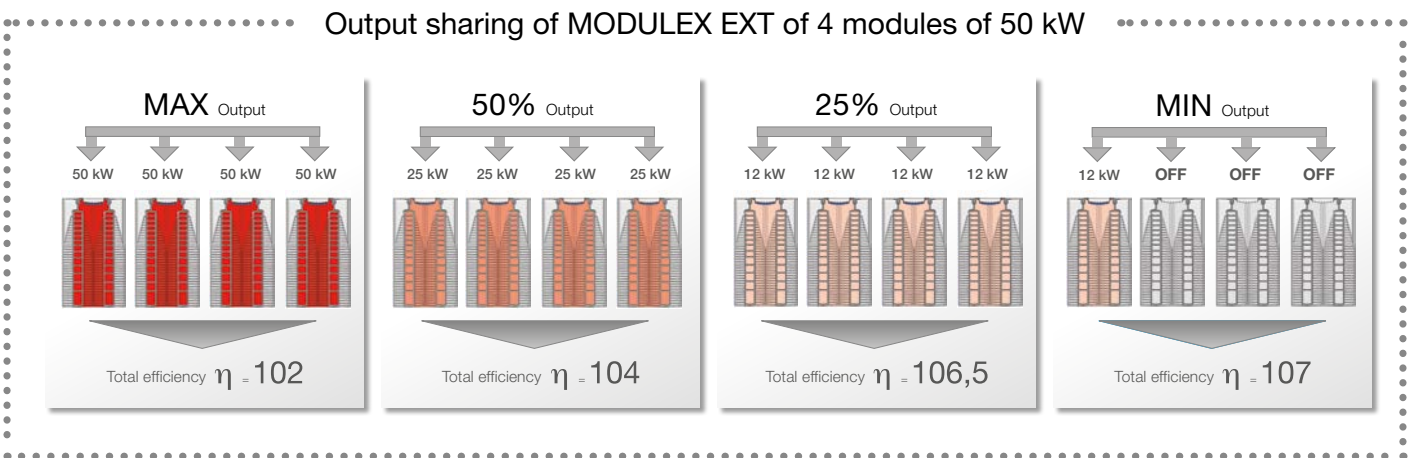
Exploiting this peculiarity will have always the system under the conditions of maximum possible efficiency, independently from the delivered power.

Always with the same principle, when the load is progressively reduced, the power of every module will also be adjusted and reduced in proportional measure.

Being the minimum power of each module 12 kW (for the models up to 350 kW), if the required output is less than the total amount of the minimum powers of the single modules ( $n^\circ$  of modules  $\times$  12 kW), only the modules necessary to the attainment of the required output will be maintained in operation power and disabled the others.

Besides, to assure an equal daily rotation of the modules, every 24 hours the lighting of the modules will be alternate so that every one operates for the same number of hours.

The same criterion is applied for the range 440-900 kW, but with modulation up to a minimum of 22 kW.

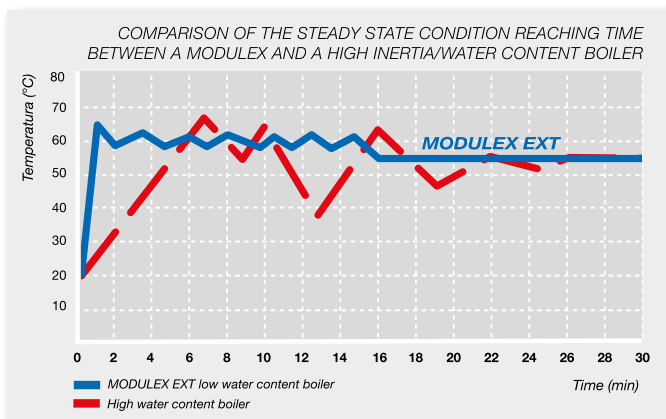


### Self-adaptation of power

This function allows to drastically reduce the number of switching ON and OFF of the boiler. (Possible customization of the requested output).

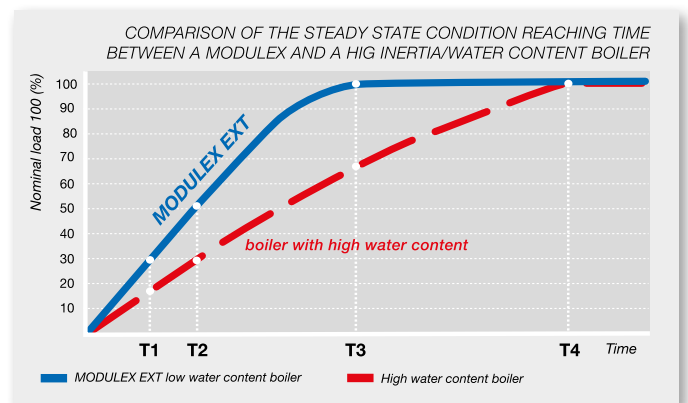
Advantages:

- Higher efficiency and lower flue losses when burner is OFF.
- Longer lasting of the parts in movement and of the ignition systems.



### Speed of response to changes in request

On average a boiler operates for satisfying the actual 50% of the thermal needs of the C.H. installation and descend also below 30%. MODULEX EXT adjusts in real time its output to these necessities, because it is not influenced by the thermal inertia, thanks to its low water content and, being equipped with modulating pump, it further reduces the electric consumptions.



After the time "T1" from the starting, MODULEX EXT succeeds in satisfying the 30% of the load unlike a traditional boiler that, in the same time, is just at 15%.  
 After the time "T2" MODULEX EXT is at 50% of the load, while the traditional one is at 30%.  
 After the time "T3" MODULEX EXT is at 100% of the load and the traditional one is only at 70%. This is an example of speed of a genial boiler!

## APPLICATION ON THE INSTALLATIONS

**Ideal for new installations or as replacement of obsolete generators** serving large-scale buildings, such as condominiums, industrial buildings, shopping centers, school buildings, hospitals, etc.



### MODULEX EXT

is the ideal solution for:

- applications on new installations
- substitutions for efficiency improvement

### REDUCED DIMENSIONS AND HIGH POWER

Ideal for solving situations in which the space of the boiler house is reduced or difficult to reach, thanks to an excellent weight-power ratio.

### VERY HIGH SELF-ADAPTATION CAPACITY

- instantaneous power adaptation, thanks to the very low water content
- very high modulation ratio, up to 1:54



INSTALLATION IN COLD CLIMATIC ZONES • SIBERIA



### INSTALLATION SPEED

It is supplied, together with the assembly kit, almost pre-built ... in a morning it can replace the faulty generator of a condominium.

### OPTIMIZED SYSTEM INTERFACE

(mixing header / stainless steel plate heat exchanger)

## OUTDOOR INSTALLATION

Approved for outdoor installation, even open sky, with IPX5D electric protection as standard and anti-freeze protection up to  $-15^{\circ}\text{C}$ .

## LOW NO<sub>x</sub> CLASS 6 (ACCORDING TO EN 15502-1)

“Ecological”, thanks to special total premixing, modulating, irradiation burners, at constant CO<sub>2</sub>, which allow low NO<sub>x</sub> emissions and low heat losses to the chimney.



OUTDOOR INSTALLATION • POLAND



INSTALLATION IN BOILER HOUSE • ITALY

## NOISELESSNESS

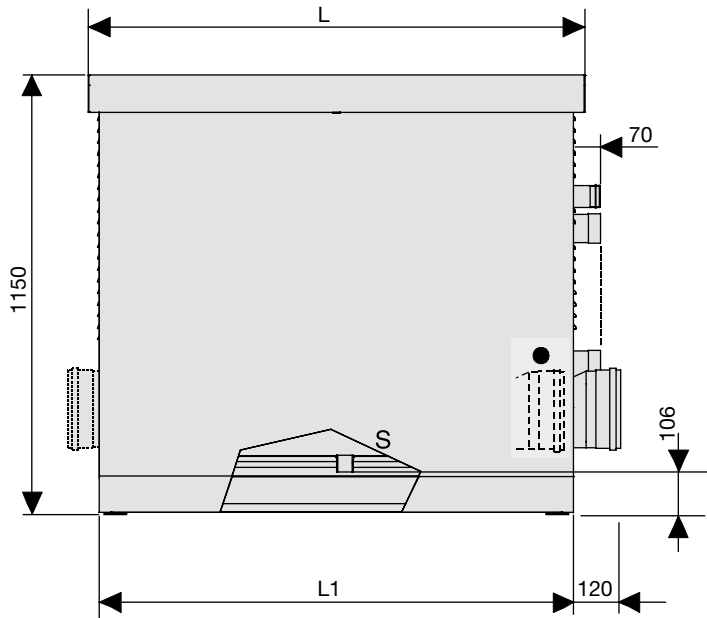
The particular configuration of the exchanger and the use of premix burners reduce the acoustic emissions even at full power, making it suitable for installation even in critical areas.

## COMPLETE WITH PLUG & PLAY ACCESSORIES

Hydraulic kits with INAIL safety devices, including mixing header or plate heat exchanger, both designed for optimal management of the system downstream of the boiler.

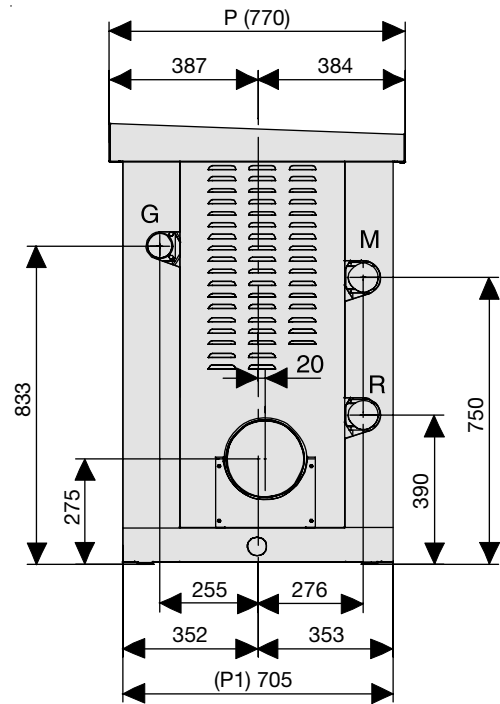
DIMENSIONS MODULEX EXT 100÷350

**FRONT VIEW**

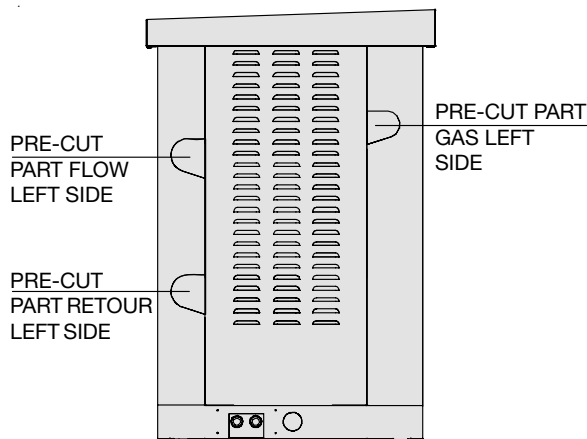


(\*) Modulex EXT 100 - 200 - 300 into the casing

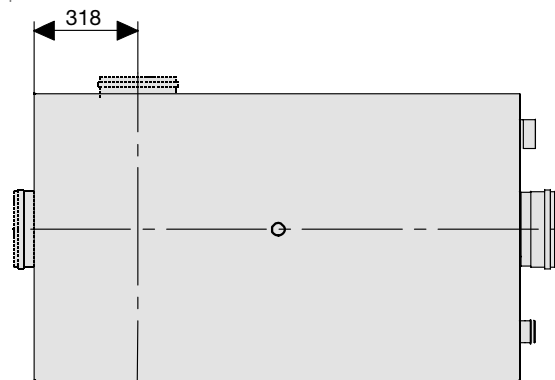
**RIGHT HAND SIDE VIEW**  
(Delivery condition for R.H. side connection)



**LEFT HAND SIDE VIEW**



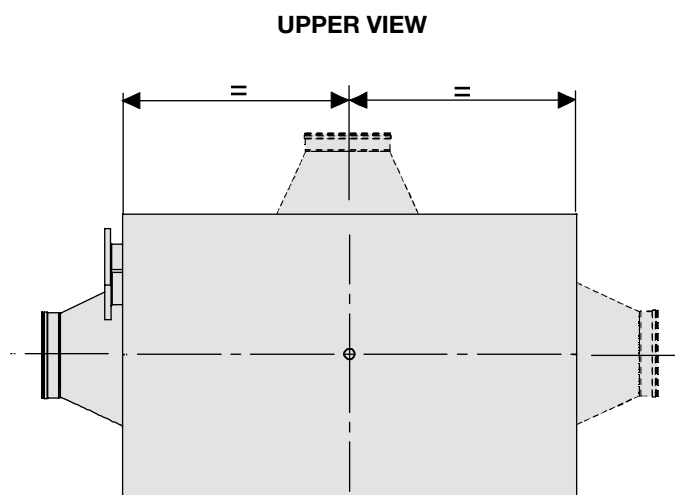
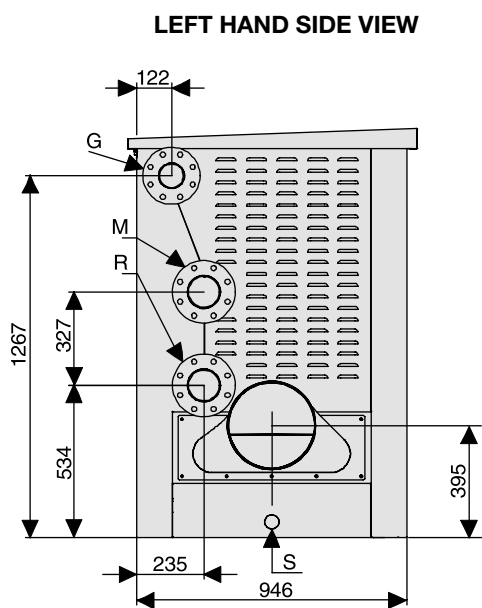
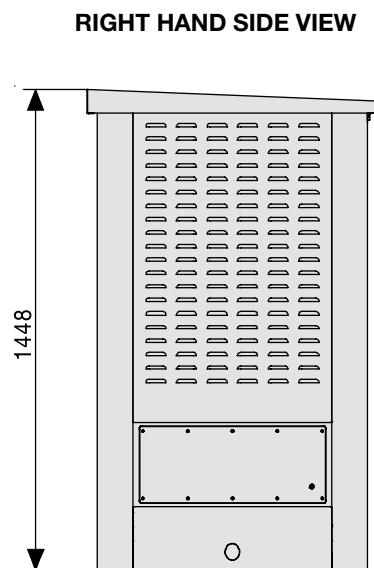
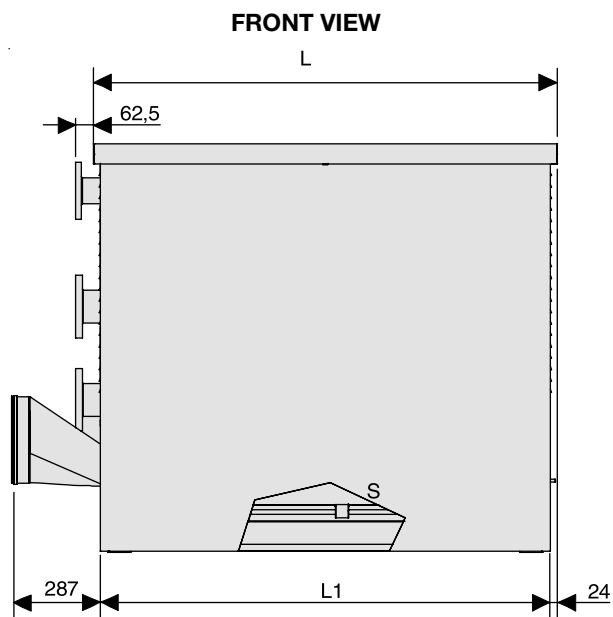
**UPPER VIEW**



MODULEX EXT		100	150	200	250	300	350
No. of Modules		2	3	4	5	6	7
Height	mm	1150	1150	1150	1150	1150	1150
Width "L"	mm	764	764	1032	1032	1300	1300
Width "L1"	mm	706	706	974	974	1242	1242
Depth "P"	mm	770	770	770	770	770	770
Depth "P1"	mm	705	705	705	705	705	705
<b>Connections</b>							
Gas	mm (inch)	50(2)	50(2)	50(2)	50(2)	50(2)	50(2)
C.H. system Flow M	mm (inch)	64 (2½)	64 (2½)	64 (2½)	64 (2½)	64 (2½)	64 (2½)
C.H. system Return R	mm (inch)	64 (2½)	64 (2½)	64 (2½)	64 (2½)	64 (2½)	64 (2½)
Chimney connection "D"	mm	150	150	150	200	200	200
Condensate drain diameter	mm	40	40	40	40	40	40
Gross Weight (with packaging)	kg	203	236	295	325	386	419



**DIMENSIONS MODULEX EXT 440÷900**



Smoke outlet:  
 Left side (standard condition)  
 Right side  
 Back side

MODULEX EXT		440	550	660	770	900
No. of Modules		4	5	6	7	8
Height	mm	1448	1448	1448	1448	1448
Width "L"	mm	1087	1355	1355	1623	1623
Width "L1"	mm	1039	1307	1307	1575	1575
Depth	mm	946	946	946	946	946
<b>Connections</b>						
Gas	mm (inch)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)
C.H. system Flow M	mm (inch)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)
C.H. system Return R	mm (inch)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)
Chimney connection	mm	250	250	300	300	300
Condensate drain diameter	mm	40	40	40	40	40
Gross Weight (with packaging)	kg	585	643	707	806	858

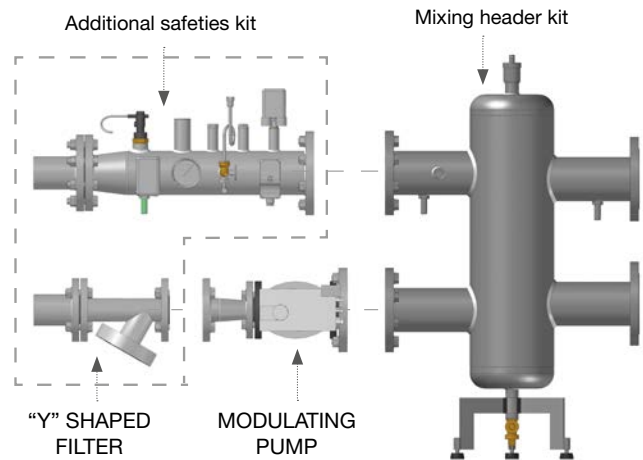
## PRIMARY RINGS WITH MIXING HEADER

### The PRIMARY RING with MIXING HEADER

is composed from:

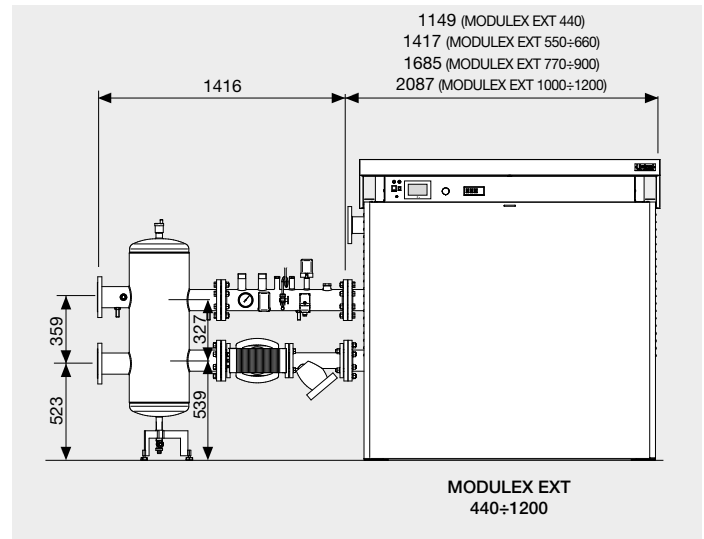
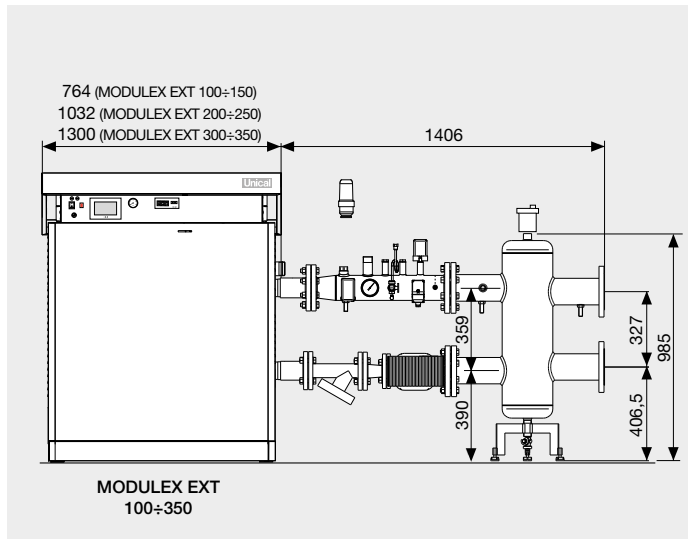
- MIXING HEADER KIT
- COMPLETE ADDITIONAL SAFETY DEVICES KIT
- MODULATING PUMP with electronic interface 0-10 V
- “Y” SHAPED FILTER
- BOLTS AND GASKETS

PRIMARY RINGS WITH MIXING HEADER combinations with MODULEX EXT	Maximum controlled power (kW)
100 ÷ 150	150
200 ÷ 250	250
300 ÷ 350	350
440 ÷ 770	756
900*	864
1000 ÷ 1200	certification in progress



\* On request, for larger outputs, other sizes are available. Some devices are not supplied because their size depends on the extension and type of the heating system.

### DIMENSIONS WITH MIXING HEADER:

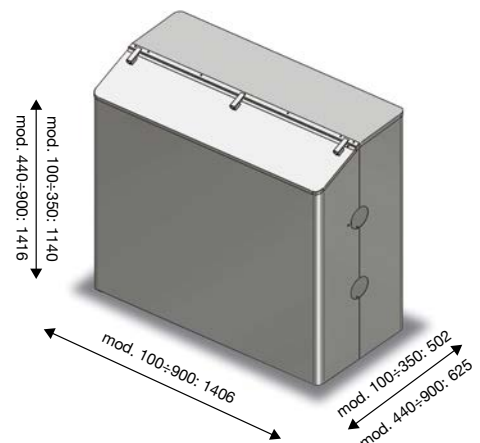


NOTE: Up to 350 kW the inversion (R.H. Side to L.H. Side) of the connections is possible.

### OGNITEMPO EXT (optional) for primary ring with MIXING HEADER

insulated protection case for outdoor installation according to the standards (IPX5D)

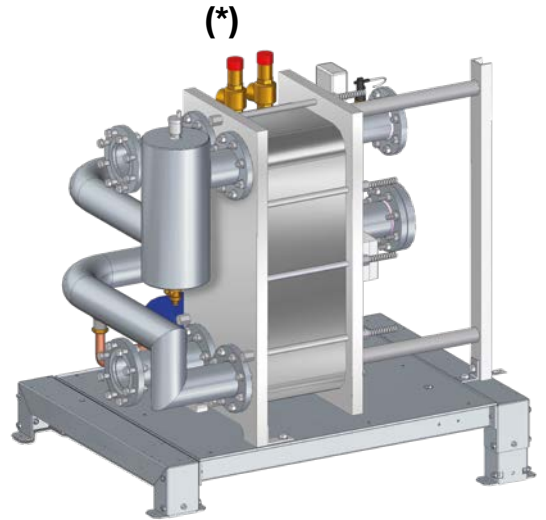
OGNITEMPO EXT protection casing for MIXING HEADER combinations with MODULEX EXT	Dimensions BOX W x D x H (mm)
100 ÷ 350	1406 x 502 x 1140
440 ÷ 900	1406 x 625 x 1416
1000 ÷ 1200	certification in progress



**The PRIMARY RING with PLATES HEAT EXCHANGER**

is composed from:

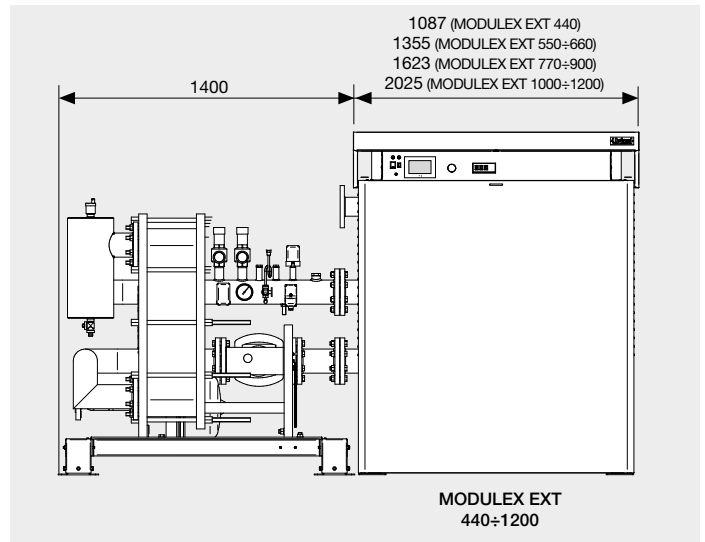
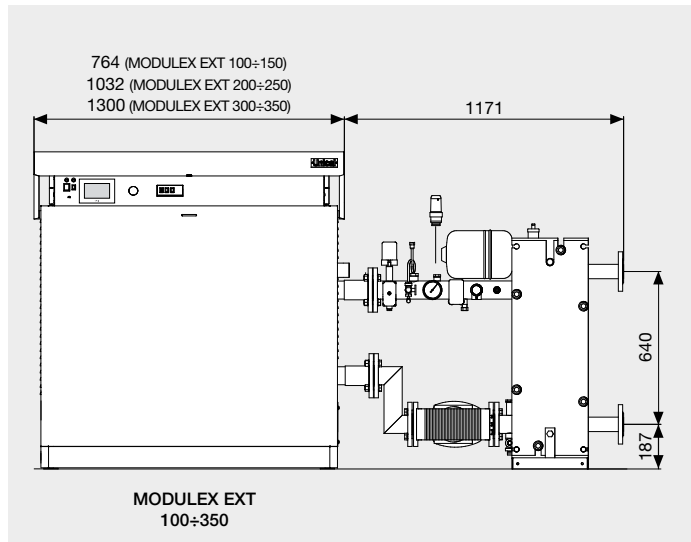
- PLATES HEAT EXCHANGER in specific stainless steel
- ADDITIONAL SAFETY DEVICES KIT
- MODULATING PUMP WILO STRATOS “CLASS A”
- EXPANSION VESSEL 8 liters (mod. 100÷350) 24 liters (mod. 440÷900)
- AUTOMATIC AIR VENT
- FLOW AND RETURN PIPES
- DRAIN COCK 3/4”
- FLANGES / ADAPTERS AND FITTINGS
- ADJUSTABLE SUPPORTING ELEMENTS
- SMALL PARTS AND GASKETS



(\*) two safety valves above 580 kW

PRIMARY RINGS WITH PLATES HEAT EXCHANGER combinations with MODULEX EXT	Maximum controlled power (kW)
100 ÷ 200	200
250 ÷ 350	350
440 ÷ 550	550
660	660
770	770
900	900
1000 ÷ 1200	certification in progress

**DIMENSIONS WITH PLATES HEAT EXCHANGER:**

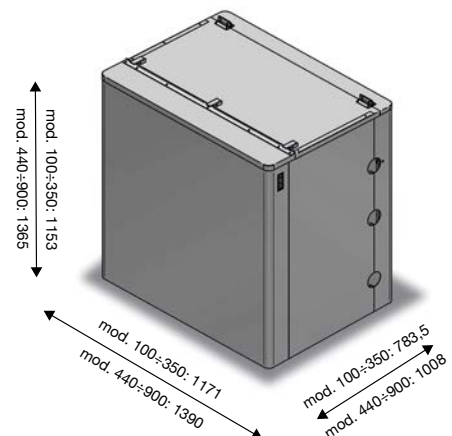


NOTE: Up to 350 kW the inversion (R.H. Side to L.H. Side) of the connections is possible.

**OGNITEMPO EXT for primary ring with PLATES HEAT EXCHANGER**

protection box for outdoor installation in conformity to the standards (IPX5D)

OGNITEMPO EXT protection casing for PLATES HEAT EXCHANGER combination with MODULEX EXT	Dimensions BOX W x D x H (mm)
100 ÷ 350	1171 x 783,5 x 1153
440 ÷ 900	1390 x 1008 x 1365
1000 ÷ 1200	certification in progress



## ACCESSORIES AND COMMISSIONING (optional)

### CONTROLLER FOR ADDITIONAL ZONES

- Kit **CONTROL MANAGER Ufly P** made of:  
cascade manager card BCM 2.0, viewer / programmer Ufly P, power pack 24V, outdoor temperature sensor, D.H.W. temperature sensor

Can be used for cascade management up to 8 modules

- **PT GATEWAY P** for Ufly P remote connection

- **PT 1000 TEMPERATURE SENSOR** for solar collectors control

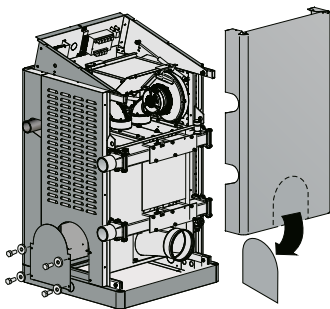
- **SHC MULTIFUNCTION MODULE (for zones management)**  
+ 3 control probes  
(it is possible to drive up to a maximum of 4 SHC cards).

- **NTC SENSOR FOR SHC MODULE**

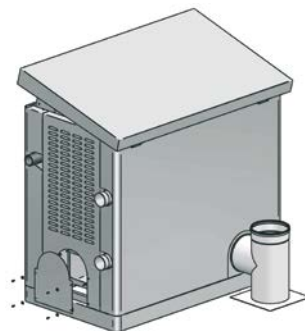


### SMOKES EVACUATION KIT

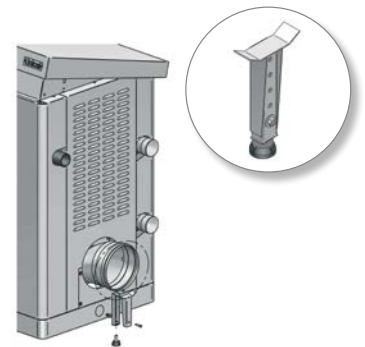
- CLOSING PANEL KIT FOR PRE-CUTTING for MODULEX EXT 100÷200
- REAR SMOKE OUTLET KIT for MODULEX EXT 250÷350
- SUPPORTING KIT FOR SMOKE TERMINAL
- C63 sealed room kit MODULEX 100-350
- C63 sealed room kit MODULEX 440-900



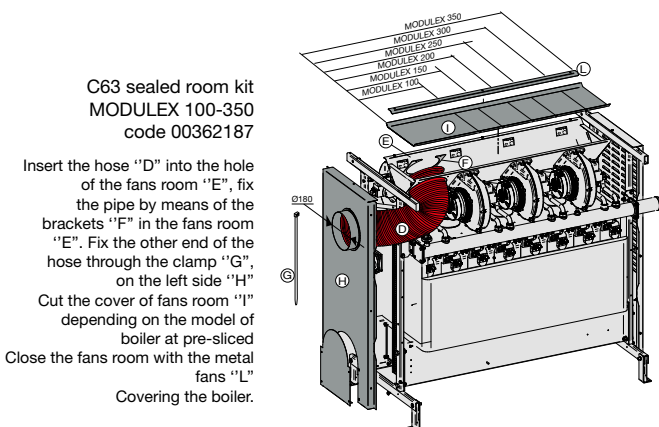
Closing panel kit for MODULEX EXT 100÷200



Rear smoke outlet kit for MODULEX EXT 250÷350



Supporting kit for smoke terminal

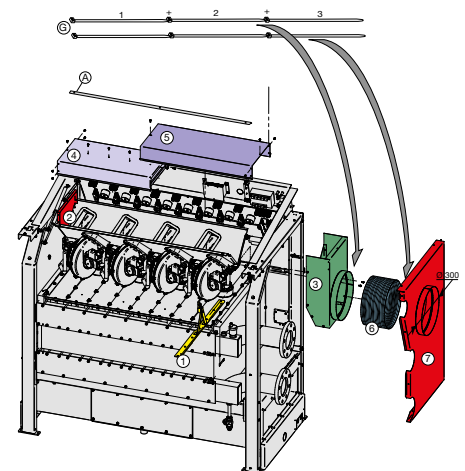


C63 sealed room kit  
MODULEX 100-350  
code 00362187

Insert the hose "D" into the hole of the fans room "E", fix the pipe by means of the brackets "F" in the fans room "E". Fix the other end of the hose through the clamp "G", on the left side "H".  
Cut the cover of fans room "I" depending on the model of boiler at pre-sliced  
Close the fans room with the metal fans "L"  
Covering the boiler.

C63 sealed room kit  
MODULEX 440-900  
code 00362188

Secure the mounting bracket smokebox "1", fix the closing "2", the smoke box end "3".  
Close the fan room through the telescopic cover "4 + 5" and lock the fans room with the closing bracket "A".  
Insert the hose into the hole "6" into the fans room and into the hole on the left side "7" with the ties "G".  
Mantle of the boiler.



### CONDENSARTE NEUTRALIZATION SYSTEMS

- CONDENSATE NEUTRALIZERS

KIT NH 300 - up to 300 kW

KIT NH 1500 (without pump) - up to 1500 kW

KIT NH 1500-P (with pump) - up to 1500 kW

Neutralizer salt Refill NH 25 kg

## TECHNICAL DATA MODULEX EXT 100÷350

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MODULEX EXT		100	150	200	250	300	350
Boiler category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation ratio		1:8.3	1:12.5	1:16.7	1:20.8	1:25	1:29
Rated heat output on P.C.I. Qn	kW	100	150	200	250	300	348
Minimum heat output on P.C.I. Qmin	kW	12	12	12	12	12	12
Rated useful power (Tr 60 / Tm 80 °C) Pn	kW	97.2	146.1	195.2	244.5	294	341.7
Minimum useful power (Tr 60 / Tm 80 °C) Pn min	kW	11.7	11.7	11.7	11.7	11.7	11.7
Rated useful power (Tr 30 / Tm 50 °C) Pcond	kW	100.1	150	200.4	251.3	302.7	354.6
Minimum useful power (Tr 30 / Tm 50 °C) Pcond min	kW	12.8	12.8	12.8	12.8	12.8	12.8
Rated power performance (Tr 60 / Tm 80°C)	%	97.2	97.4	97.6	97.8	98.0	98.2
Minimum power performance (Tr 60 / Tm 80°C)	%	97.16	97.16	97.16	97.16	97.16	97.16
Rated power performance (Tr 30 / Tm 50°C)	%	100.1	100.0	100.2	100.5	100.9	101.9
Minimum power performance (Tr 30 / Tm 50°C)	%	106.5	106.5	106.5	106.5	106.5	106.5
Performance at 30% of the load (Tr 30°C)		107.3	107.3	107.3	107.3	107.3	107.3
Combustion efficiency at nominal load	%	97.8	97.8	97.8	98.0	98.1	98.3
Combustion efficiency with reduced load	%	98.3	98.3	98.3	98.3	98.3	98.3
Casing heat loss with burner operating (Qmin)	%	1.2	1.2	1.2	1.2	1.2	1.2
Casing heat loss with burner operating (Qn)	%	0.6	0.4	0.2	0.2	0.1	0.1
Net flue gas temperature tf-ta (min)(*)	°C	33.4	33.4	33.4	33.4	33.4	33.4
Net flue gas temperature tf-ta (max)(*)	°C	44.2	45.1	46.5	47.3	48.2	49.1
Maximum permitted temperature	°C	100	100	100	100	100	100
Maximum operating temperature	°C	85	85	85	85	85	85
Flue gas mass flow rate (min)	kg/h	19.6	19.6	19.6	19.6	19.6	19.6
Flue gas mass flow rate (max)	kg/h	163	245	327	409	490	569
Excess air	%	25.5	25.5	25.5	25.5	25.5	25.5
Heat loss at chimney with burner on (min)	%	1.7	1.7	1.7	1.7	1.7	1.7
Heat loss at chimney with burner on (max)	%	2.2	2.2	2.2	2.2	1.9	1.7
Minimum heating circuit pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5
Maximum heating circuit pressure	bar	6	6	6	6	6	6
Water content	l	10.1	14.2	18.3	22.4	26.5	30.6
Methane gas consumption G20 (pow.sup. 20 mbar) at Qn	m <sup>3</sup> /h	10.6	15.9	21.1	26.4	31.7	36.8
Methane gas consumption G20 (pow.sup. 20 mbar) at Qmin	m <sup>3</sup> /h	1.3	1.3	1.3	1.3	1.3	1.3
Gas consumption G25 (pow.sup. 20/25 mbar) at Qn	m <sup>3</sup> /h	12.3	18.4	24.6	36.7	36.9	42.8
Gas consumption G25 (pow.sup. 20/25 mbar) at Qmin	m <sup>3</sup> /h	1.5	1.5	1.5	1.5	1.5	1.5
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	7.8	11.6	15.5	19.4	23.3	27
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	0.9	0.9	0.9	0.9	0.9	0.9
Chimney base maximum pressure available	Pa	100	100	100	100	100	100
Max condensate production	kg/h	15.3	23	30.6	38.3	45.9	53.6
<b>Emissions</b>							
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	83	83	83	83	83	83
NOx at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	77	77	77	77	77	77
NOx Class		6	6	6	6	6	6
(***) Sound pressure level	db (A)	52	52	52	52	52	52
<b>Electrical data</b>							
Power supply voltage/frequency	V/Hz	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50
Fuse on the power supply	A (R)	6.3 / 10	6.3 / 10	6.3 / 10	6.3 / 10	6.3 / 10	6.3 / 10
(**) Protection rating	IP	X5D	X5D	X5D	X5D	X5D	X5D

Room Temperature = 20°C

(\*) Temperature detected with appliance operation flow rate 80°C / ret. 60°C

Seasonal space heating energy 2009/125 CEE (<=400 kW)  $\eta_s$  - see ErP table

Stand-by heat loss  $\Delta T 30^\circ C$  -  $P_{stby}$  - see ErP table

Consumption in stand-by -  $P_{sb}$  - see ErP table

(\*\*) The protection IP is obtained with cap down (\*\*\*) 1 meter away in open field

TECHNICAL DATA MODULEX EXT 440÷1200

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MODULEX EXT		440	550	660	770	900	1000	1100	1160	1200
Boiler category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation ratio		1:19.6	1:24.5	1:29.4	1:34.3	1:39.2	1:44	1:49	1:54	1:54
Rated heat output on P.C.I. Qn	kW	432	540	648	756	864	972	1080	1158	1188
Minimum heat output on P.C.I. Qmin	kW	22	22	22	22	22	22	22	22	22
Rated useful power (Tr 60 / Tm 80 °C) Pn	kW	424.3	530.4	636.5	742.6	849.0	947	1052	1130	1157
Minimum useful power (Tr 60 / Tm 80 °C) Pn min	kW	20.6	20.6	20.6	20.6	20.6	20.7	20.7	20.7	20.7
Rated useful power (Tr 30 / Tm 50 °C) Pcond	kW	445.0	557.8	670.1	783.2	900.3	1015	1223	1130	1237
Minimum useful power (Tr 30 / Tm 50 °C) Pcond min	kW	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9	23.9
Rated power performance (Tr 60 / Tm 80°C)	%	98.2	98.2	98.2	98.2	98.2	97.4	97.4	97.6	97.6
Minimum power performance (Tr 60 / Tm 80°C)	%	93.5	93.5	93.5	93.5	93.5	93.9	93.9	93.9	93.9
Rated power performance (Tr 30 / Tm 50°C)	%	104	104	104	104	104	104	104	104	104
Minimum power performance (Tr 30 / Tm 50°C)	%	109	109	109	109	109	108.5	108.5	108.5	108.5
Performance at 30% of the load (Tr 30°C)		107.3	107.5	108.3	107.8	107.6	107.6	107.6	107.7	107.6
Combustion efficiency at nominal load	%	97.8	97.8	97.8	97.8	97.8	97.7	97.9	97.9	97.9
Combustion efficiency with reduced load	%	98.5	98.5	98.5	98.5	98.5	98.6	98.6	98.6	98.6
Casing heat loss with burner operating (Qmin)	%	5.04	5.04	5.04	5.04	5.04	4.4	4.4	4.4	4.4
Casing heat loss with burner operating (Qn)	%	0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.28	0.45
Net flue gas temperature tf-ta (min)(*)	°C	31	31	31	31	31	30	30	30	30
Net flue gas temperature tf-ta (max)(*)	°C	46.7	46.7	46.7	46.7	45.8	44	44	43.3	44
Maximum permitted temperature	°C	100	100	100	100	100	100	100	100	100
Maximum operating temperature	°C	85	85	85	85	85	90	90	90	90
Flue gas mass flow rate (min)	kg/h	25	25	25	25	25	36	36	36	36
Flue gas mass flow rate (max)	kg/h	693	866	1040	1213	1386	1590	1765	1893	1942
Excess air	%	24.25	24.25	24.25	24.25	24.25	26	26	26	26
Heat loss at chimney with burner on (min)	%	1.5	1.5	1.5	1.5	1.5	1.44	1.44	1.44	1.44
Heat loss at chimney with burner on (max)	%	2.58	2.53	2.51	2.58	2.58	2.15	2.15	2.15	2.15
Minimum heating circuit pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Maximum heating circuit pressure	bar	6	6	6	6	6	6	6	6	6
Water content	l	67	80	94	108	122	140	154	168	168
Methane gas consumption G20 (pow.sup. 20 mbar) at Qn	m³/h	45.68	57.10	68.52	79.94	91.36	102.8	114.2	122.4	125.6
Methane gas consumption G20 (pow.sup. 20 mbar) at Qmin	m³/h	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Gas consumption G25 (pow.sup. 20/25 mbar) at Qn	m³/h	53.13	66.41	79.69	92.97	106.25	119.5	132.8	142.4	146.1
Gas consumption G25 (pow.sup. 20/25 mbar) at Qmin	m³/h	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71	2.71
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	33.53	41.92	50.30	58.68	67.01	75.5	83.8	89.9	92.2
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Chimney base maximum pressure available	Pa	100	100	100	100	100	100	100	100	100
Max condensate production	kg/h	73.4	91.7	110	128.4	146.7	156	174	188	191
<b>Emissions</b>										
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	76.7	76.7	76.7	76.7	76.7	77	77	77	77
NOx at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	68.8	68.8	68.8	68.8	68.8	55	57	59	59
NOx Class		6	6	6	6	6	6	6	6	6
(***) Sound pressure level	db(A)	54	54	54	54	56	54	54	54	54
<b>Electrical data</b>										
Power supply voltage/frequency	V/Hz	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50	230 / 50
(**) Protection rating	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D	X5D

Room Temperature = 20°C

(\*) Temperature detected with appliance operation flow rate 80°C / ret. 60°C

Seasonal space heating energy 2009/125 CEE (<=400Kw) η<sub>s</sub> - see ErP table


Stand-by heat loss ΔT 30°C - P<sub>stby</sub> - see ErP table

Consumption in stand-by - P<sub>sb</sub> - see ErP table


(\*\*) The protection IP is obtained with cap down (\*\*\*) 1 meter away in open field

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MODULEX EXT			100	150	200	250	300	350
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	97	146	195	244	294	342
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	92	92	92	92	92	92
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>								
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	97.2	146.1	195.2	244.5	294.0	341.7
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	88	87.7	87.7	88.1	88.3	88.5
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	32.2	49.3	64.4	80.5	96.6	112
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	96.7	96.7	96.7	96.7	96.7	96.7
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>								
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.145	0.210	0.290	0.362	0.435	0.507
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0.040	0.040	0.040	0.040	0.040	0.040
STANDBY MODE	$P_{SB}$	kW	0.010	0.010	0.010	0.010	0.010	0.010
<b>OTHER ELEMENTS</b>								
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.787	0.94	0.98	1.10	1.15	1.39
NITROGEN OXIDES EMISSIONS referred to NCV & (GCV)	$NO_x$	mg/kWh	54 (49)	54 (49)	54 (49)	54 (49)	54 (49)	54 (49)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	306	459	612	766	920	1069

MODULEX EXT			440	550	660	770	900	1000	1100	1160	1200
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	424	530	636	743	849	947	1152	1130	1157
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	92	92	92	92	92	92	92	92	92
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			*	*	*	*	*	*	*	*	*
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>											
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	-	-	-	-	-	-	-	-	-
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	-	-	-	-	-	-	-	-	-
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	-	-	-	-	-	-	-	-	-
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	-	-	-	-	-	-	-	-	-
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO											
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>											
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.626	0.783	0.940	1.096	1.252	1.64	1.82	1.960	2.00
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054	0.054
STANDBY MODE	$P_{SB}$	kW	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
<b>OTHER ELEMENTS</b>											
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.2114	0.2114	0.2114	0.2114	0.2114	0.2	0.2	0.2114	0.2114
NITROGEN OXIDES EMISSIONS referred to NCV & (GCV)	$NO_x$	mg/kWh	54 (49)	54 (49)	54 (49)	54 (49)	54 (49)	(44)	(44)	(44)	(44)
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	1303	1633	1959	2286	2612	-	-	-	-

\* (Appliances not covered by Directive 2009/15 / EC)

## ADDITIONAL SAFETY AND CONTROL DEVICES according to the italian law

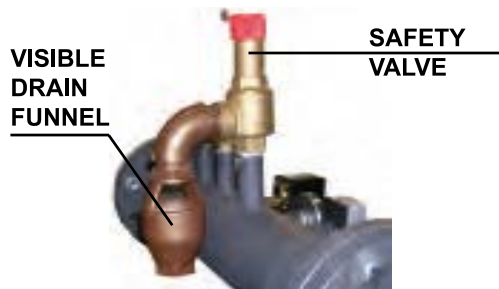
### CERTIFICATION OF THE ADDITIONAL SAFETY DEVICES:

#### DISPOSITIVI DI SICUREZZA

**1 On-off gas valve:** a device which has the function of cutting off the gas supply when the water temperature reaches the max. predetermined value. The sensible element has to be installed as nearest as possible to the generator (flow pipe) at a distance which has to be < 500 mm and must not be able to be cut-off. **Not supplied by Unical.**

**Pressure relief valve:** it has the function of discharging in the atmosphere the fluid contained in the generator when this has, for whatever motive, reached the maximum working pressure. **Not supplied by Unical.**

**2a Visible drain funnel. Not supplied by Unical.**



A pressure relief valve must be fitted on the flow pipe, within 0,5 m from the boiler. It must be dimensioned for the capacity of the boiler and must comply to the regulations in force,



#### WARNING!

Please remember that it is forbidden to interpose, between the boiler and the pressure relief valve, any type of cutting-off device. Moreover it is recommended to use cutting-off valves which do not exceed the maximum allowable operating pressure.

#### WARNING!

In correspondence to the heating pressure relief valve foresee the installation of a discharge pipe with a funnel and a siphon which lead to an adequate drainage. The drainage has to be controllable by sight. If this precaution is not made, an eventual intervention of the pressure relief valve could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any injury and/or damage.

### PROTECTIVE DEVICES

**10 Overheat thermostat:** it has the function of shutting down the generator if the safety thermostat fitted in the boiler malfunctions. It must be calibrated to a value of < 100°C, which **MUST** not be changed.

**15 Minimum pressure switch:** it has the function of shutting down the generator in case of low pressure (can be calibrated from 0.5 to 1.7 bar). It must be able to be reset manually.

**16 Additional plug G1”:**

**18 Safety pressure switch:** it has the function of shutting down the generator if it reaches the maximum working pressure (can be calibrated from 1 to 5 bar).

### CONTROL DEVICES

**13 (Pressure Indicator - not provided by Unical) with (12) and shock tube (11) tap-port gauge:** Indicates the actual pressure existing in the generator must be calibrated in “bar”, having the full scale of the maximum pressure related operation and be provided with a three-way valve with manometer control

**14 Thermometer:** it indicates the effective water temperature contained in the generator. It must be graduated in degrees Celsius with a temperature scale not exceeding 120°C.

**17 Inspection pocket:** approved for inserting the control thermometer

**19 Plug G1 ¼”:** for the safety valves connection

**3 Calibrated expansion vessel:** it permits the absorption of the increase in volume of the system's water following an increase in temperature; The pressure must not exceed the safety valve set pressure. **Not supplied by Unical.**

**8 Y filter**

**7 Modulating pump (Not supplied in kit ISPELS)**

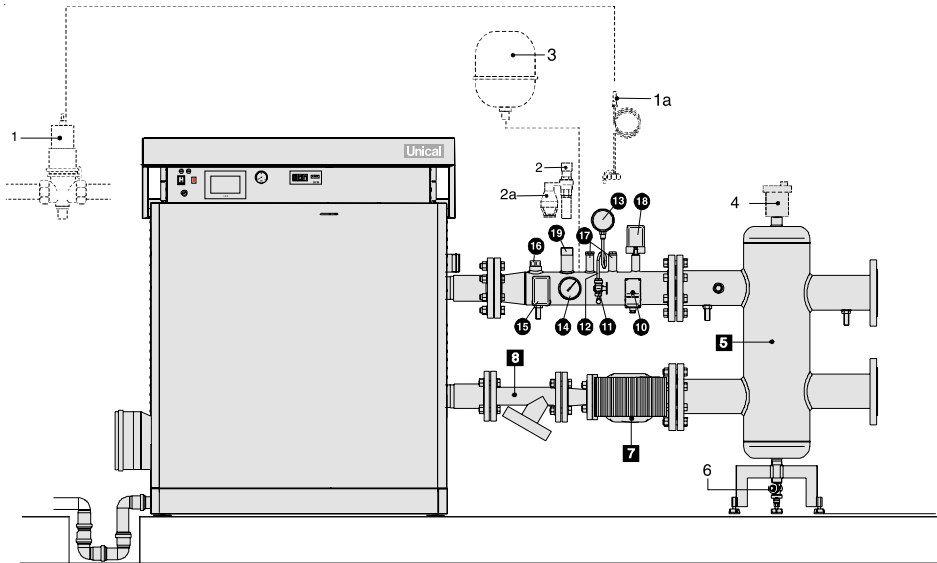
**5 Mixing bottle (Not supplied in kit ISPELS)**

**4 Automatic air vent. Not supplied by Unical**

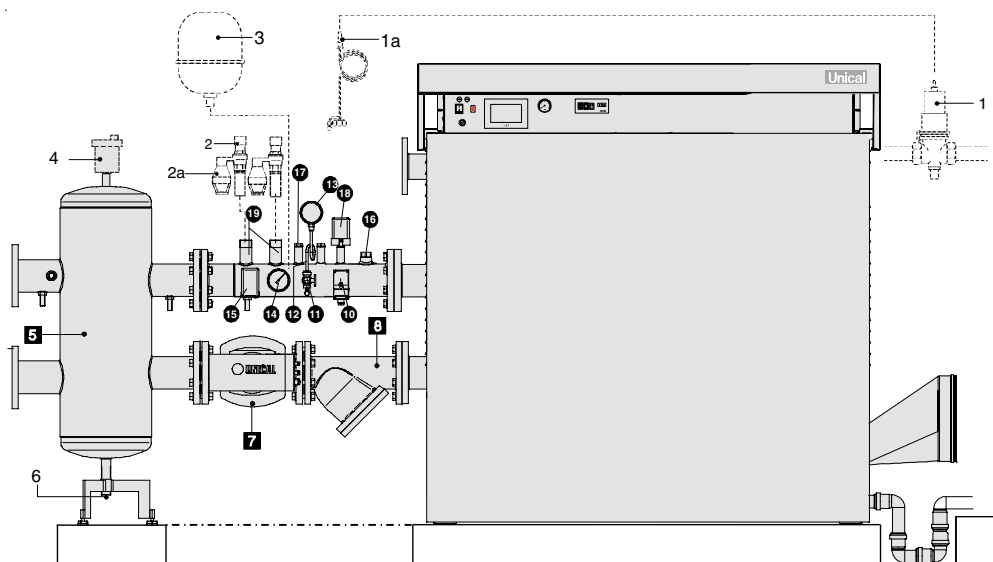
**6 Drain cock. Not supplied by Unical.**



ADDITIONAL SAFETY, PROTECTION AND CONTROL DEVICES

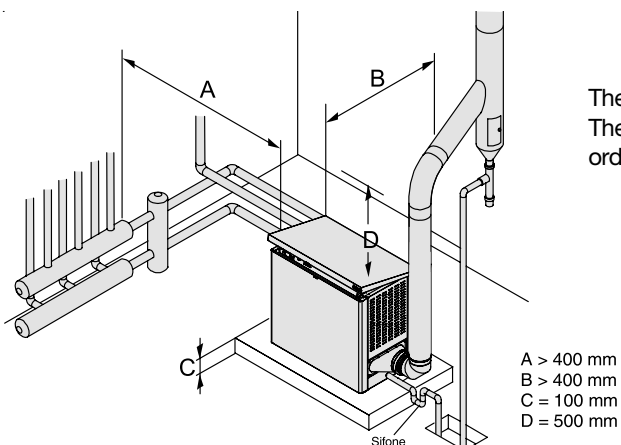


MODULEX EXT 100÷350



MODULEX EXT 440÷900

POSITIONING IN THE BOILER HOUSE



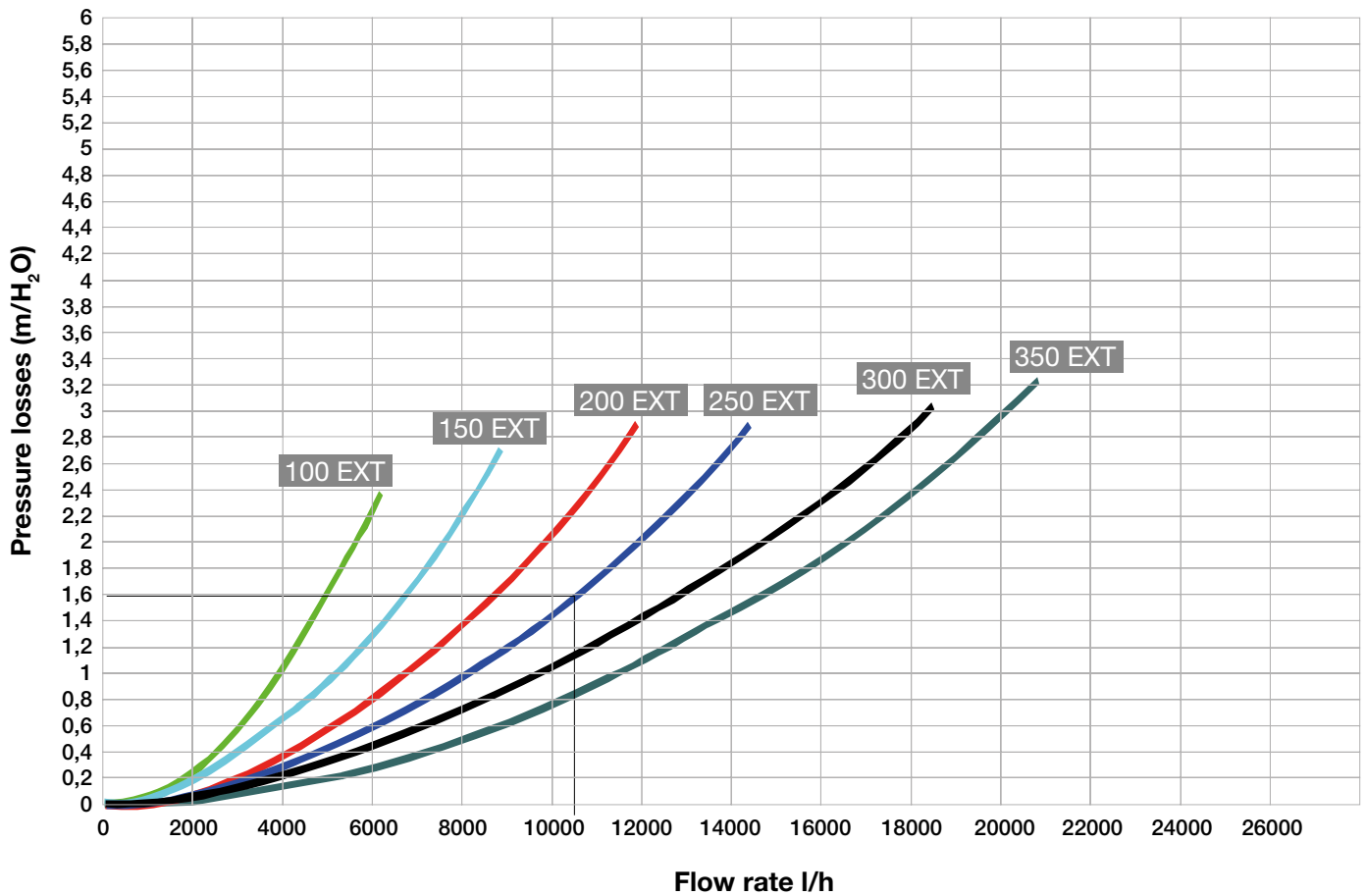
The installation has to comply with the rules in force  
 The positioning has to guarantee the operations of  
 ordinary and extraordinary maintenance and cleaning.

PRIMARY RING PUMP SIZING (MODULEX EXT 100÷350)

The boiler pump must have a delivery head which can ensure the water flow rate as shown in the diagram “Water pressure losses”. The following table gives an indication of the pump’s flow rate in function of the  $\Delta t$  of the primary circuit if the installation has a mixing header. The size of the pumps must be determined by installers or technical engineers according to

boiler data and system design. The water side resistance curve of the boiler is shown in the following diagram. The pump is not an integral part of the boiler. It is recommended to choose a pump with the rate and delivery head at about 2/3 of its characteristic heating curve.

Output in kW	100	150	200	250	300	350
Maximum flow rate in l/h ( $\Delta t=15K$ )	5573	8376	11192	14018	16856	19712
Nominal requested flow rate in l/h ( $\Delta t=20K$ )	4180	6282	8394	10514	12642	14784



**EXAMPLE:**

For a  $\Delta T$  of 20 K in a MODULEX 250 the maximum requested water flow rate is 10514 l/h. From the graph of the pressure losses of the boiler we get that the pump has to guarantee a manometric head of at least 1.6 m of W.C.

**NOTE:**

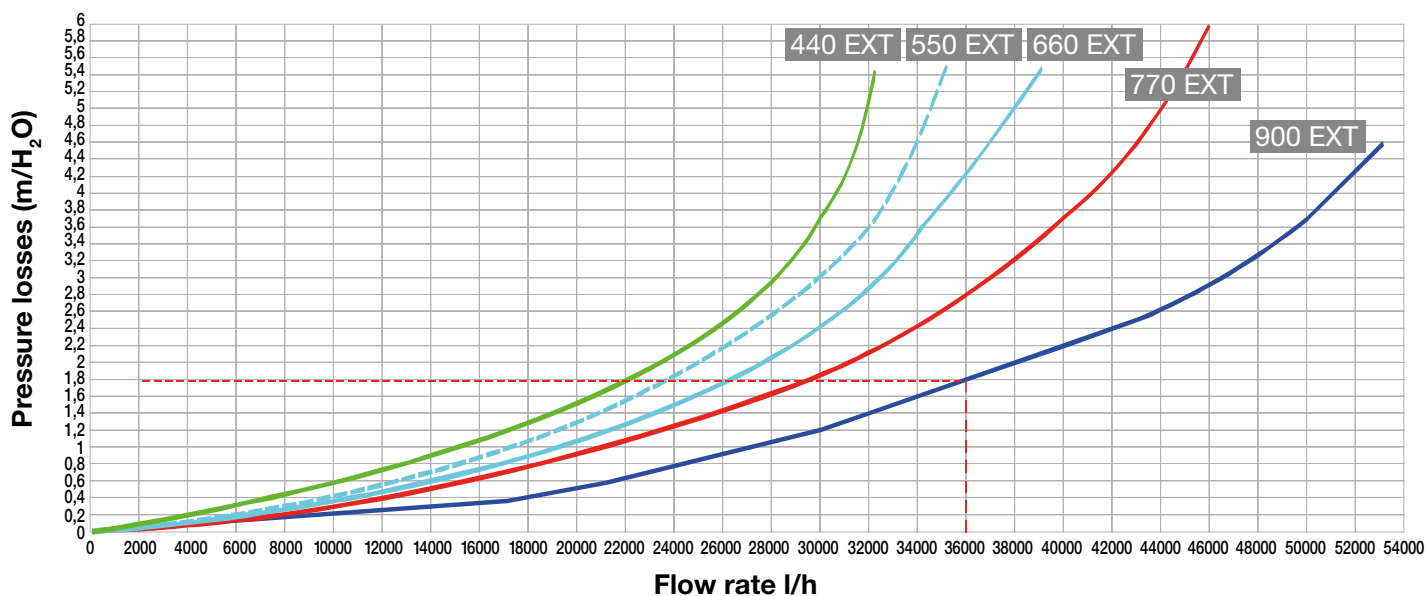
The mixing header, between the circuit boiler and the C.H. circuit is always advisable; it becomes NECESSARY if the C.H. system requires flow rates higher than the maximum flow rate allowed in the boiler, i.e. with  $\Delta T$  smaller than 15K.

## PRIMARY RING PUMP SIZING (MODULEX EXT 440÷900)

Output in kW	440	550	660	770	900
Maximum flow rate in l/h ( $\Delta t=15K$ )	24326	30404	36487	42570	48647
Nominal requested flow rate in l/h ( $\Delta t=20K$ )	18243	22804	27365	31926	36487

**NOTE:**

The mixing header, between the boiler circuit and the C.H. circuit is always advisable; it becomes NECESSARY if the C.H. system requires flow rates higher than the maximum flow rate allowed in the boiler, i.e. with  $\Delta T$  smaller than 15K.

**EXAMPLE:**

For a  $\Delta T$  of 20 K in a MODULEX 900 the maximum requested water flow rate is 36289 l/h.

From the graph of the pressure losses of the boiler we get that the pump has to guarantee a manometric head of at least 1.8 m of W.C.

## CONNECTION TO THE CHIMNEY

Model	Modules	Ø Flue socket
100	2	150
150	3	150
200	4	150
250	5	200
300	6	200
350	7	200

Model	Modules	Ø Flue socket
440	4	250
550	5	250
660	6	300
770	7	300
900	8	300

## CHIMNEY REQUIREMENTS

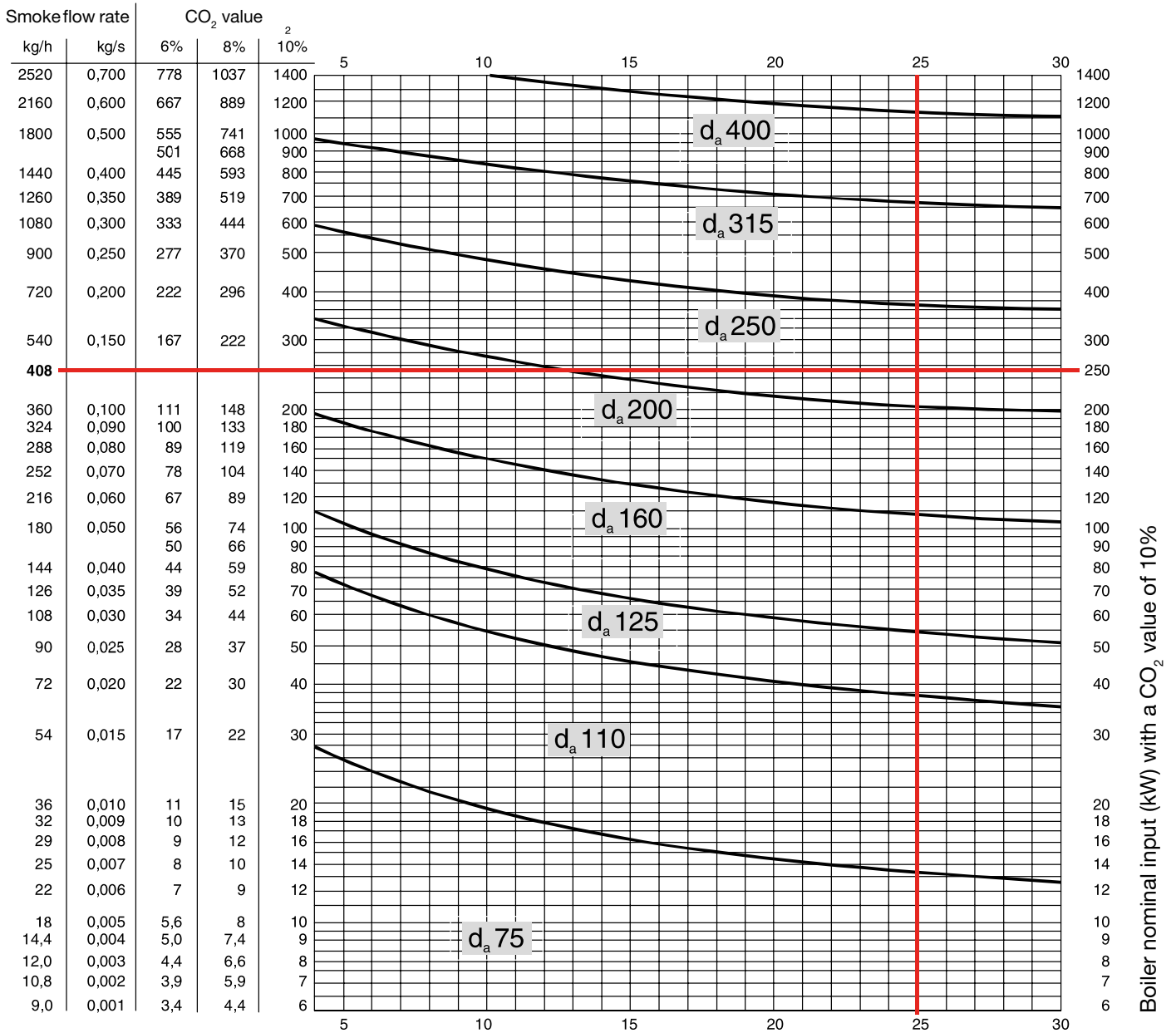
In the condensing boilers the smoke temperature reaches around 90°C. The chimney has to comply with the relevant requirements as stated by the standards. Particularly the resistance and the impermeability to the condensates and to the frost. Other standards to be complied with are:

EN 13384-1-2. The chimney must be realized with materials belonging to the class of construction W1 (EN 1443), normally in stainless steel or certified plastic material. Antifreeze protection: if the condensate needs to be neutralized it is up to the installer to foresee a suitable antifreeze protection.

CHIMNEY SIZING (indicative values) according to DIN 4705

**Chimney sizing according to DIN 4705**

**Smoke temperature 40°C**  
**Available pressure 40 Pa**



**Flue gas mass flow rate**

Modulex	Flue gas mass flow rate (max)
modello	kg/h
100	163.4
116	189.6
150	245.2
200	326.9
250	408.6
300	490.3
350	572.0

**Example:**

MODULEX 250  
Flue gas mass flow rate: 408.6 kg/h  
Chimney height: 25 m  
Chimney connection Ø: 250 mm

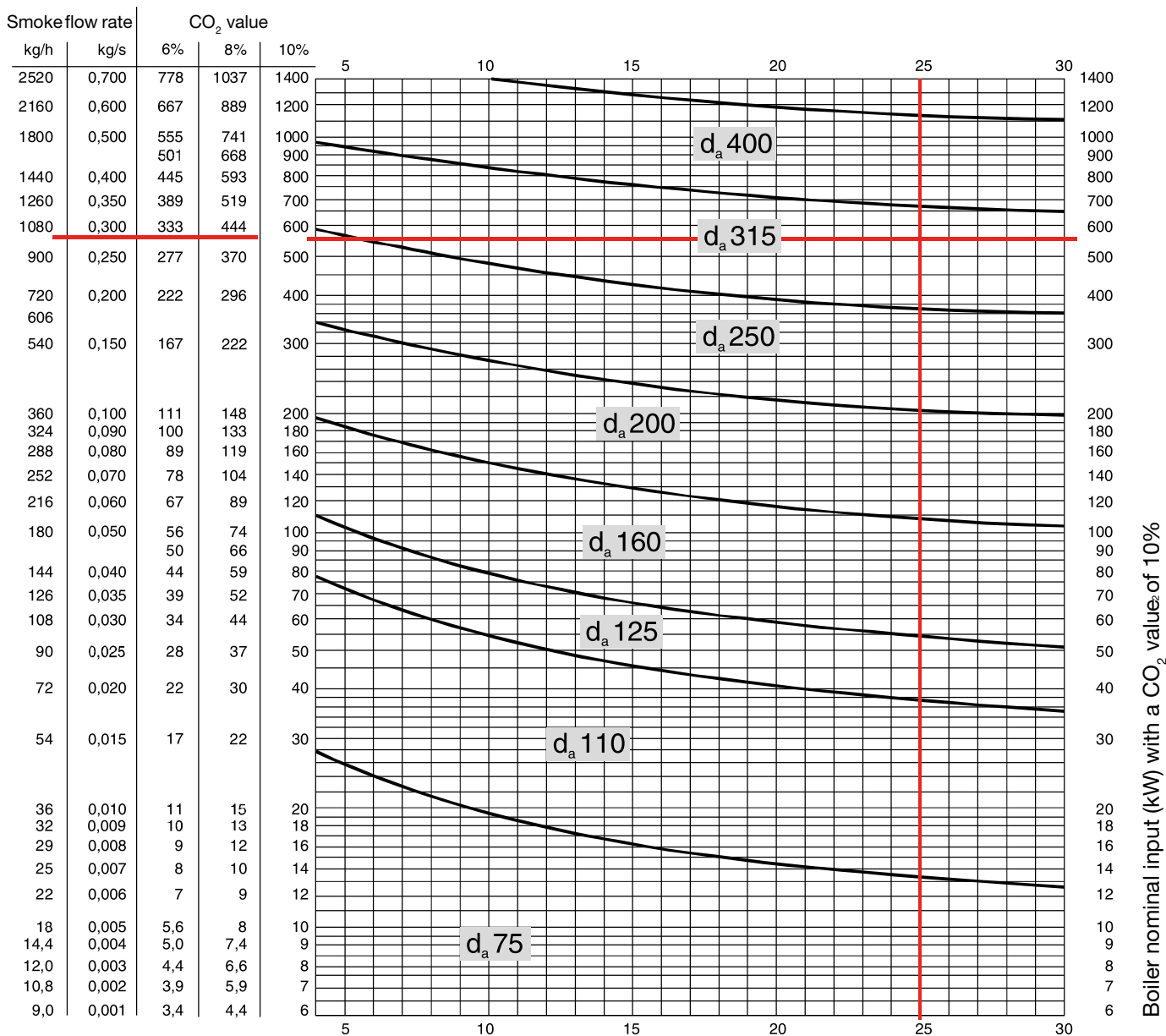
**NOTE:**

The diagram supplies only indicatives values.

CHIMNEY SIZING (indicative values) according to DIN 4705

**Chimney sizing according to DIN 4705**

**Smoke temperature 40°C**  
**Available pressure 40 Pa**



Boiler nominal input (kW) with a CO<sub>2</sub> value of 10%

**Flue gas mass flow rate**

Modulex	Flue gas mass flow rate (max)
modello	kg/h
440	693
550	866
660	1040
770	1213
900	1386

**Example:**

MODULEX 660  
Flue gas mass flow rate: 1040 kg/h  
Chimney height: 25 m  
Chimney connection Ø: 315 mm

**NOTE:**

The diagram supplies only indicatives values.

## CONDENSATE DRAIN

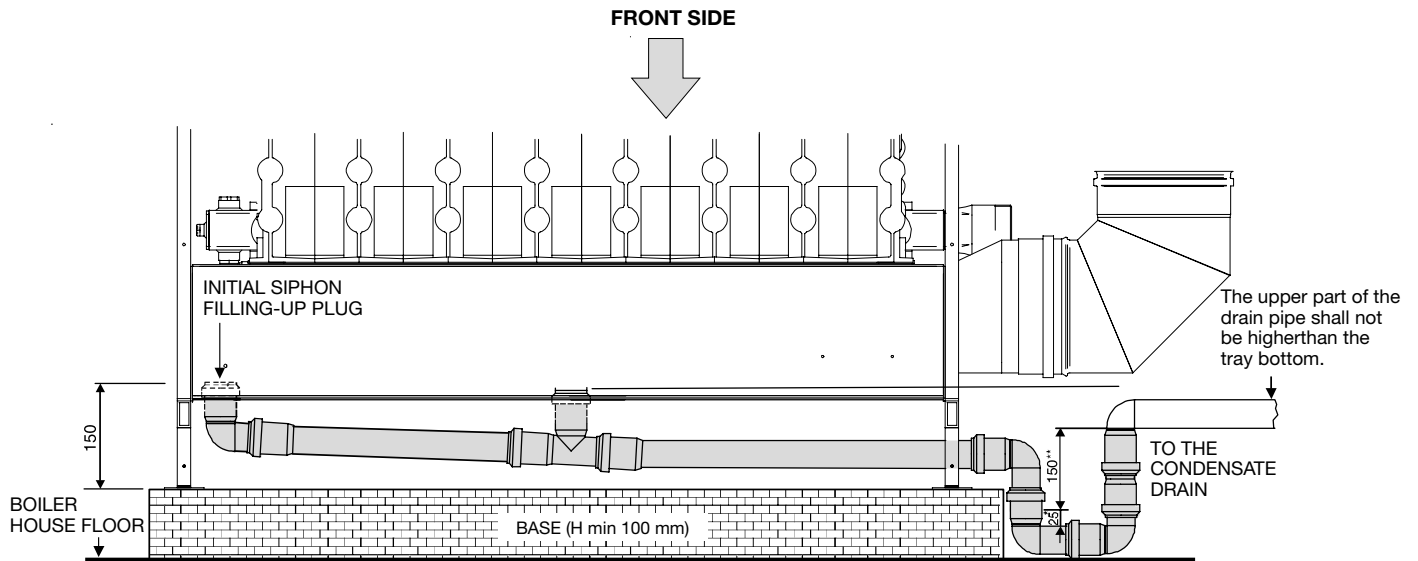
The Standards regulate also the way to evacuate the condensates. Particularly the run of the condensates evacuation.

Materials suitable for the condensate evacuation:

PE: Polyethylene

PPI: Polypropylene

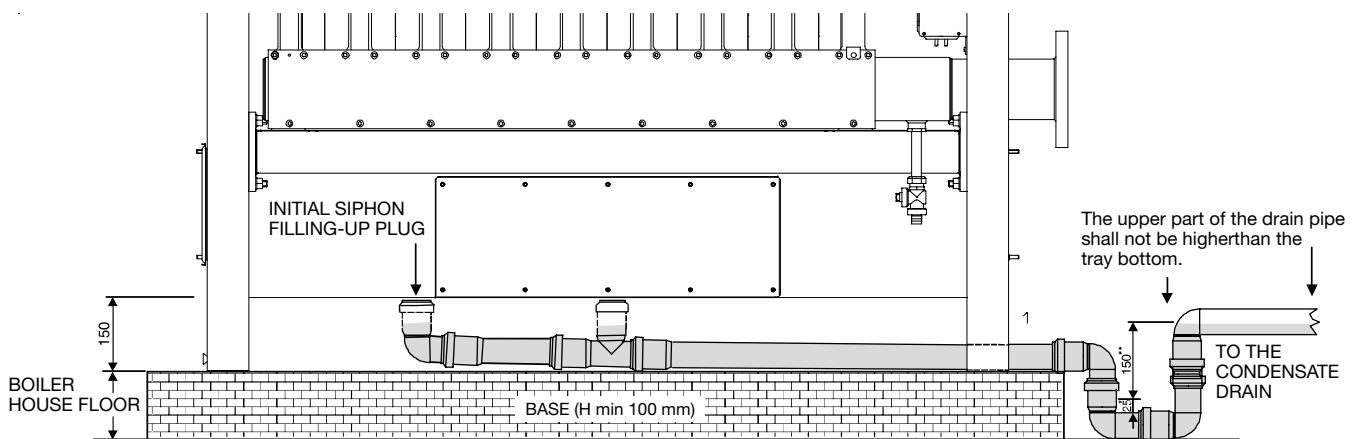
### MODULEX EXT 100÷350



\* Min. height of the condensate column, with all fans operating at max. speed, requested by the EN standards.

\*\* Min. height of the condensate column, with all fans operating at max. speed. In the case it is not possible to create a 100 mm basement, install the boiler on the floor and foresee a min. 100 mm well to lodge the siphon.

### MODULEX EXT 440÷900

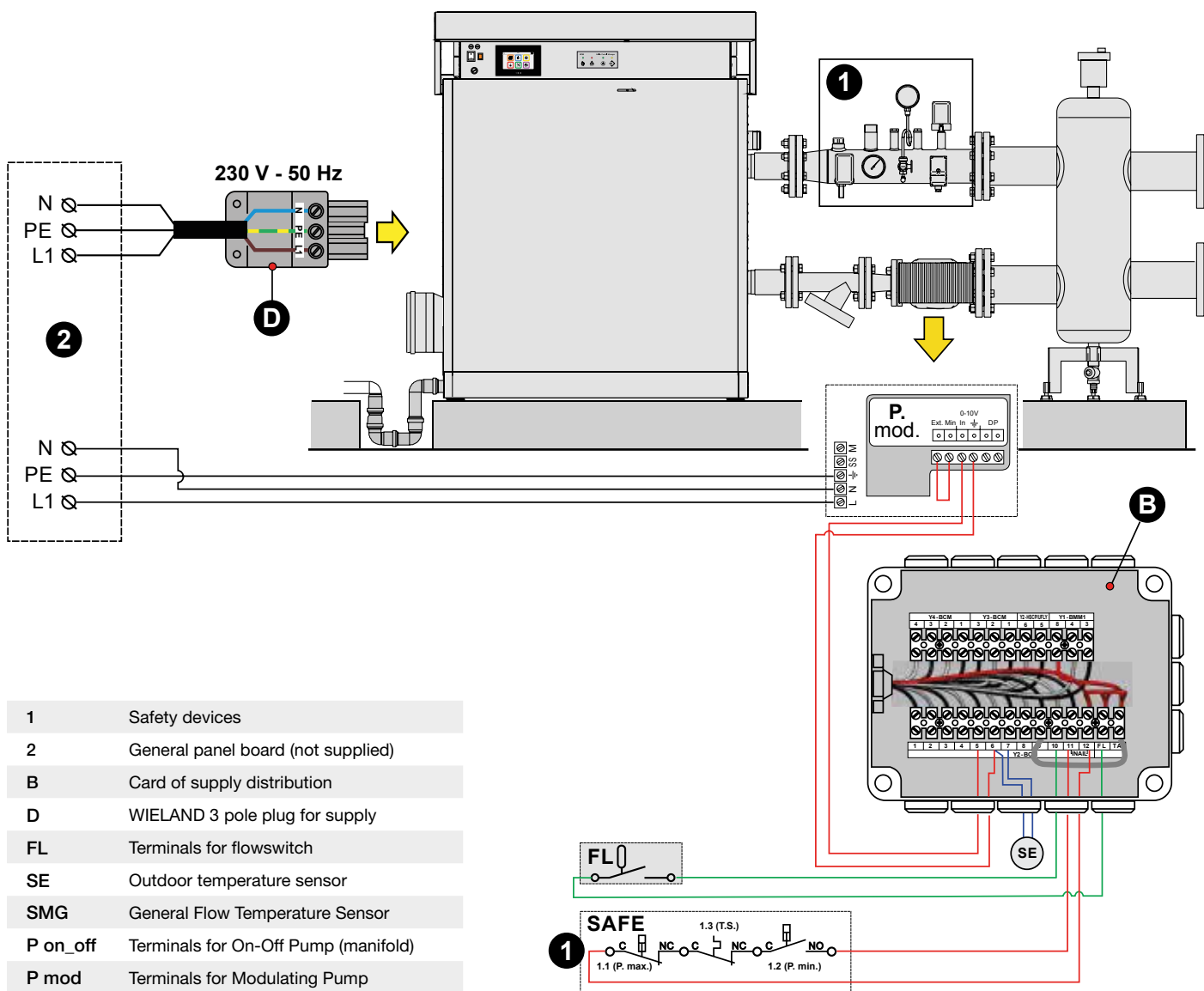


\* Min. height of the condensate column, with all fans operating at max. speed, requested by the EN standards.

\*\* Min. height of the condensate column, with all fans operating at max. speed. In the case it is not possible to create a 100 mm basement, install the boiler on the floor and foresee a min. 100 mm well to lodge the siphon.

BASIC SCHEMES OF SYSTEM OPERATION

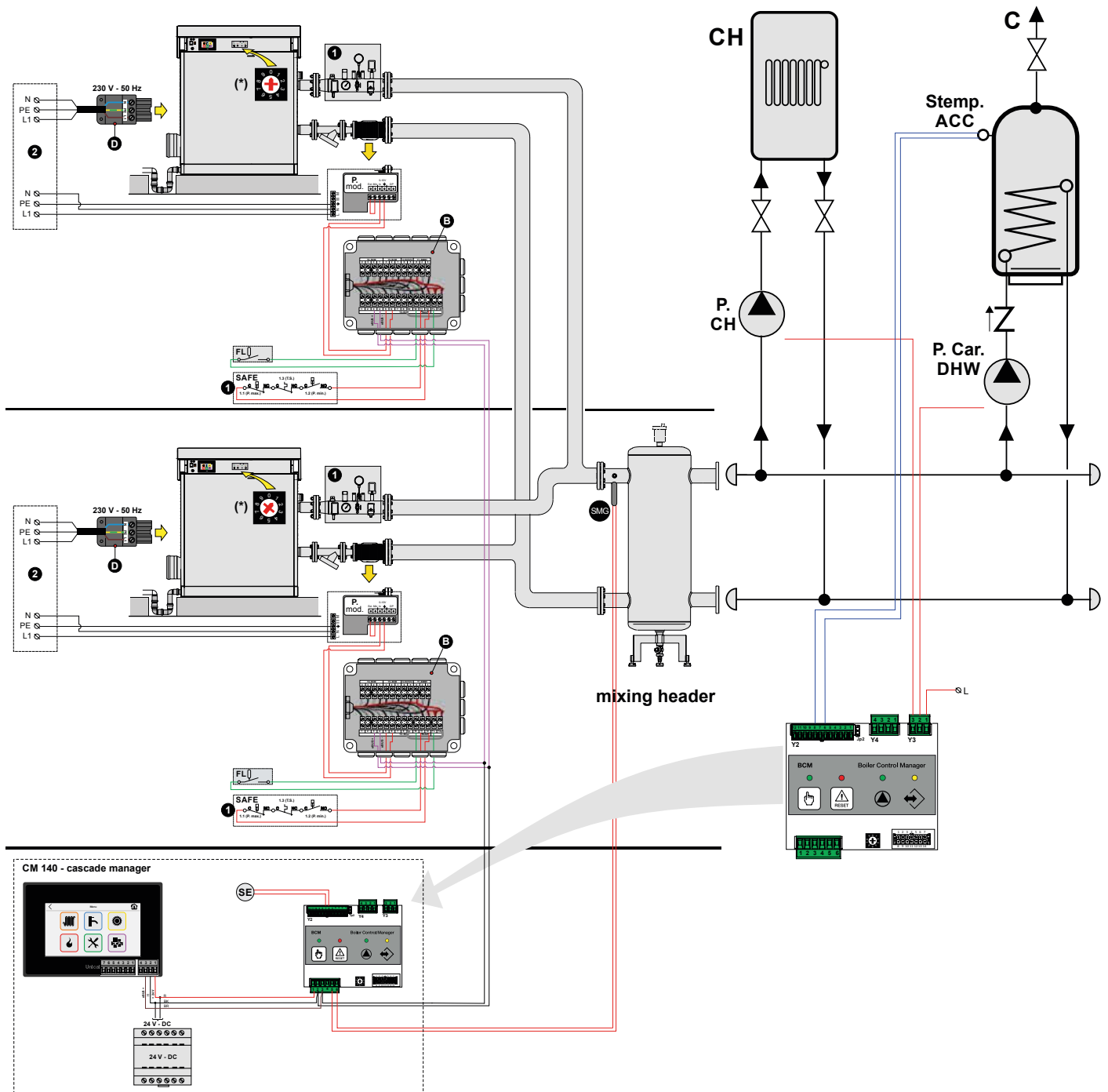
Electrical Supply, INAIL Devices, Modulating Pump, Outer Temperature Sensor, Flowswitch



- 1 Safety devices
- 2 General panel board (not supplied)
- B Card of supply distribution
- D WIELAND 3 pole plug for supply
- FL Terminals for flowswitch
- SE Outdoor temperature sensor
- SMG General Flow Temperature Sensor
- P on\_off Terminals for On-Off Pump (manifold)
- P mod Terminals for Modulating Pump

BASIC SCHEMES OF SYSTEM OPERATION

2 MODULEX EXT in battery, managed by cascade manager, with a direct zona + D.H.W. production

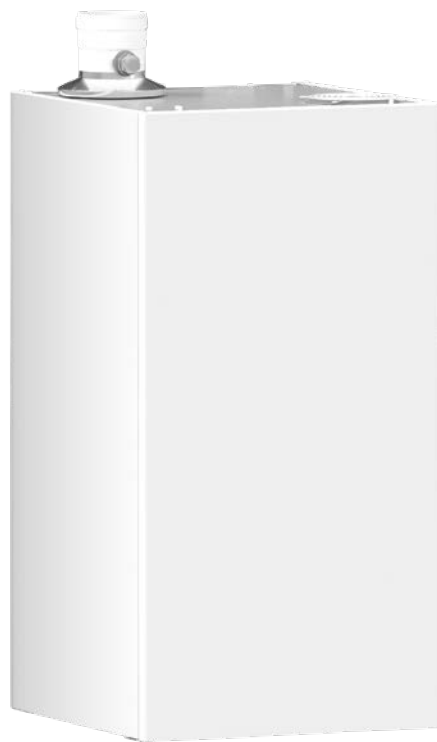




# KON SWP (for swimming pool)



KON SWP 50-70



KON SWP 100-115





KON SWP 50-70



KON SWP 100-115



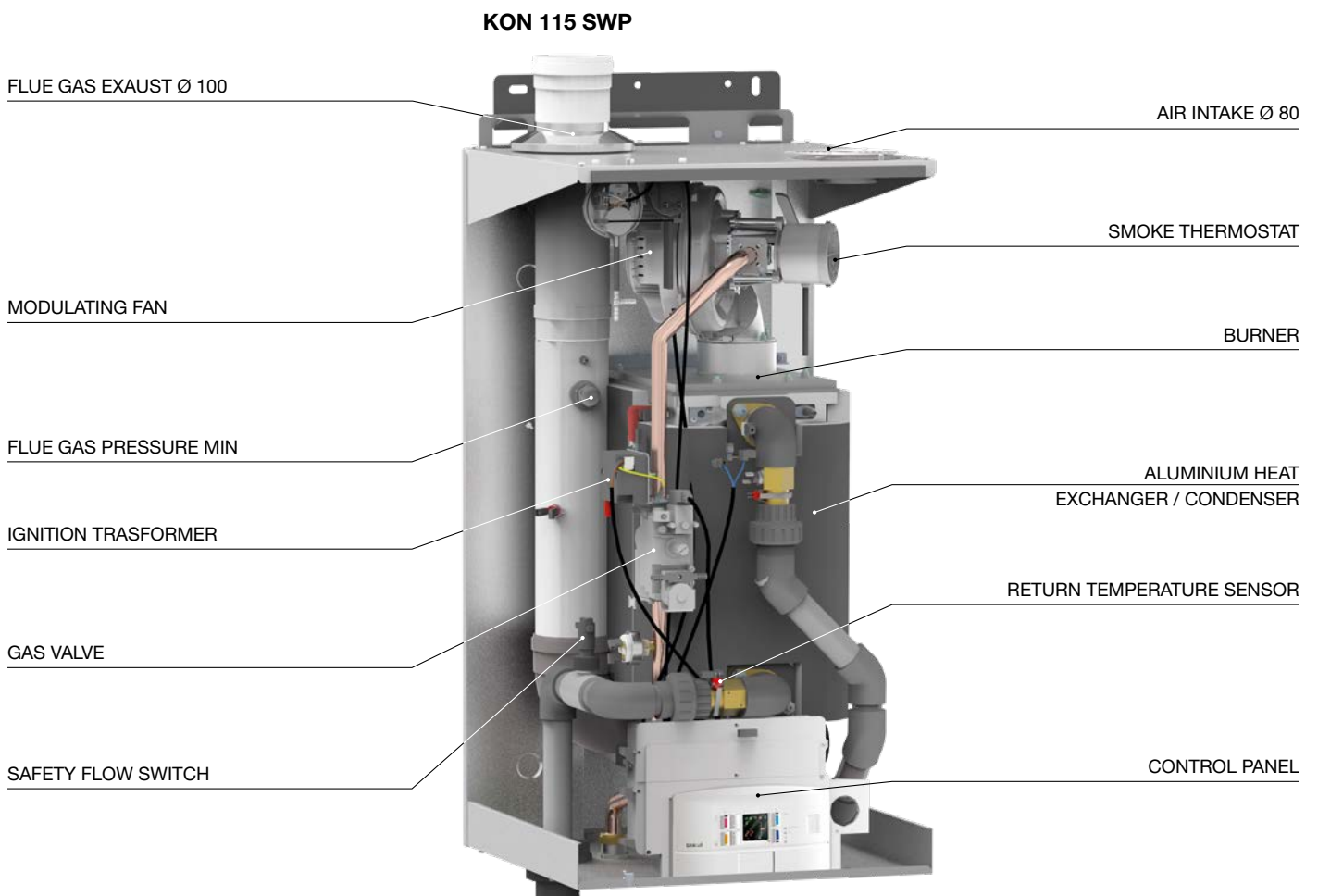
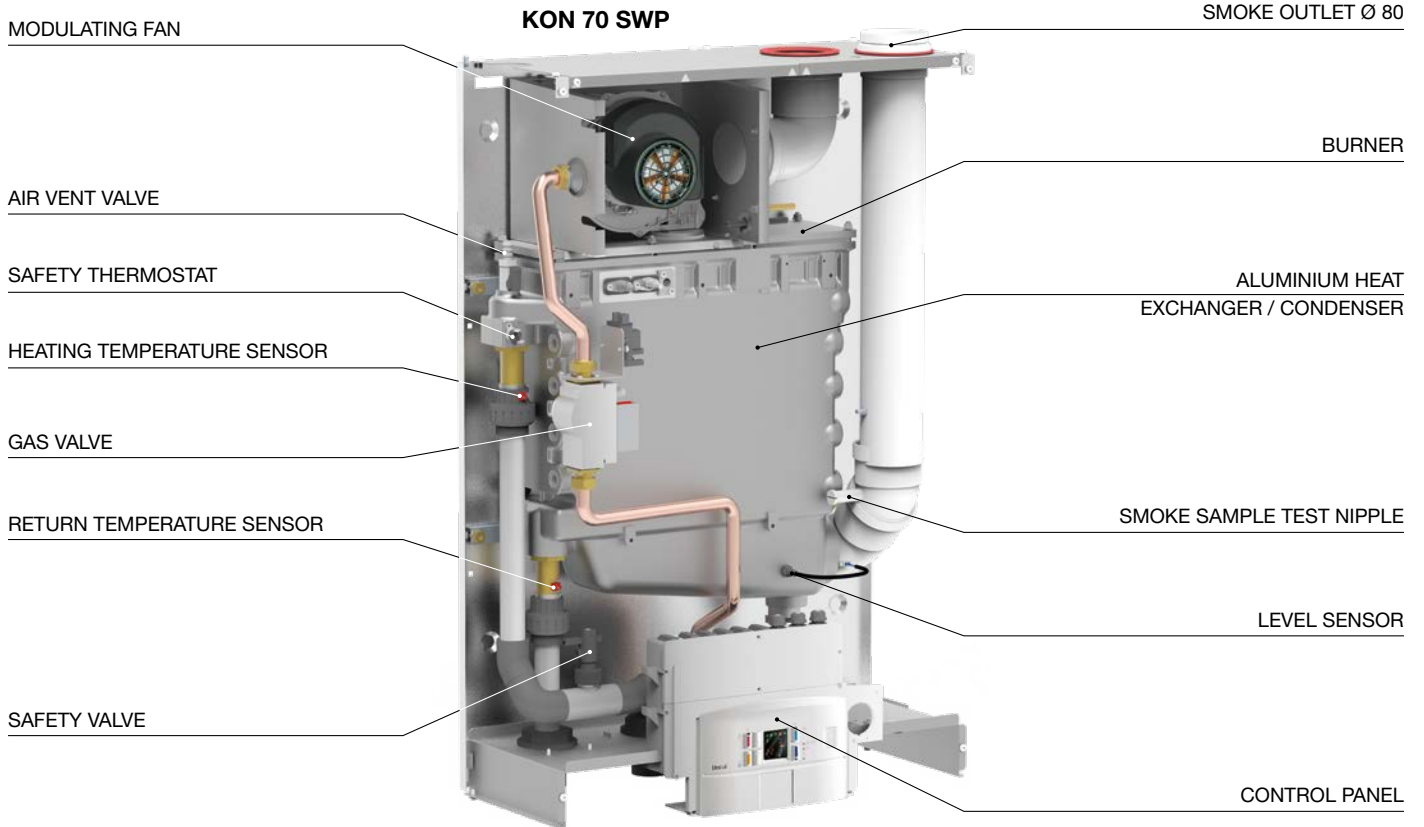
**CONDENSING, MODULATING, WALL HUNG BOILERS, LOW NO<sub>x</sub>, CLASS 6, SUITABLE FOR DIRECTEXCHANGE HEATING, BOTH WITH CHLORINATED AND SALTED WATER.**

OUTPUT RANGE	from 50 to 920 kW (in battery)			
WORKING TEMPERATURE	naturale gas o LPG			
MODELS	50 SWP	70 SWP	100 SWP	115 SWP
SEASONAL EFFICIENCY	 <b>A</b>	 <b>A</b>	 <b>A</b>	 <b>A</b>
SWIMMING POOL VOLUME(*)	from 115 to 1280 m <sup>3</sup>			
WATER TEMPERATURE	up to 40 °C			

**it can be installed in battery (up to 8 for a total of 920 kW)  
supporting frame (optional) for mod. 100-115 SWP**

(\*) Data referred to partially protected swimming pool - Δt 15° - 36h

MAIN COMPONENTS



PRODUCT PLUS VALUES

■ EASY CONNECTION

it is possible to install KON SWP directly on an existing plant without changing anything.

■ USE OF THE SWIMMING POOL RECIRCULATION PUMP

no extra pump needed for the circulation; thanks to a manual by-pass the circulating pump of the swimming pool water is also used for the heating system in order to calibrate the flow rate of the heating installation.

■ THE TITANIUM PLATE HEAT EXCHANGER IS NOT REQUIRED

the swimming pool water (chlorinated or salted) enters directly into KON SWP without further components.

■ LOW TEMPERATURE FUNCTIONING

KON SWP works directly at the swimming pool temperature 28-30 °C, maximizing the efficiency thanks to the condensation technology.

■ SUITABLE COMPONENTS FOR BOTH CHLORINATED AND SALTED WATER

the KON SWP exchanger is coated with a special nano-technological treatment, 10<sup>-9</sup>, for the water side protection.

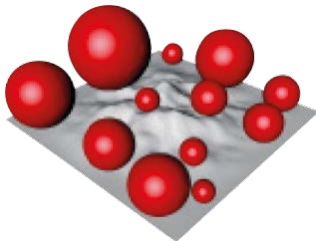
■ GREAT COST SAVINGS

both for the construction and the maintenance of the plant, in addition to reduced energy consumption, thanks to the high efficiency of KON SWP.

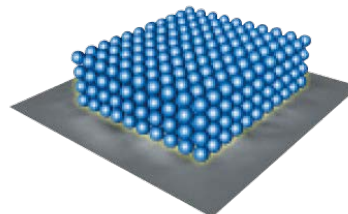
NANOTECHNOLOGY 10<sup>-9</sup> (high corrosion resistance)



Unical has submitted its exchangers to a **special treatment**, using a siliceous material reduced with nano technologies. The most innovative of the technologies available today compared to the traditional ones. Thanks to **the intelligent self-organizing arrangement**, the optimal coating can be produced in a targeted manner.

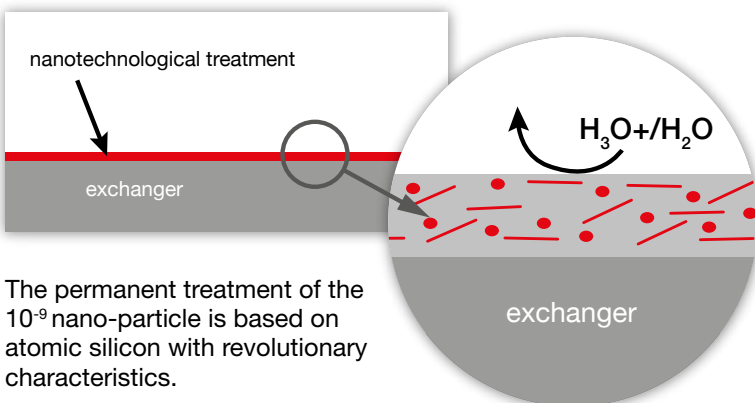


**Traditional coating:**  
the individual coating particles are randomly arranged.  
The coating is unstable and the surface is not completely protected.



**Coating 10<sup>-9</sup>:**  
the particles are arranged in multiple self-organizing thin layers, providing a complete and highly stable protection.

ADVANTAGES on the water side:

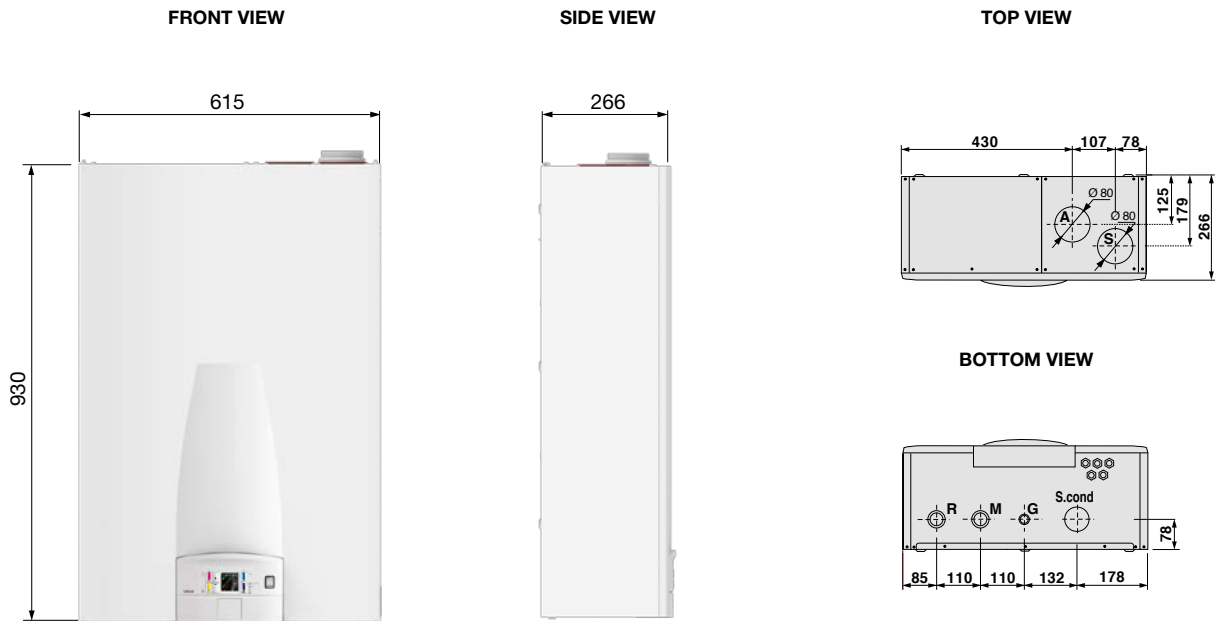


- High resistance to:
  - abrasion
  - high temperature
  - chemical aggression
- Very high thermal conductivity
- Easy cleaning

The permanent treatment of the 10<sup>-9</sup> nano-particle is based on atomic silicon with revolutionary characteristics.

DIMENSIONS KON SWP

KON 50-70 SWP



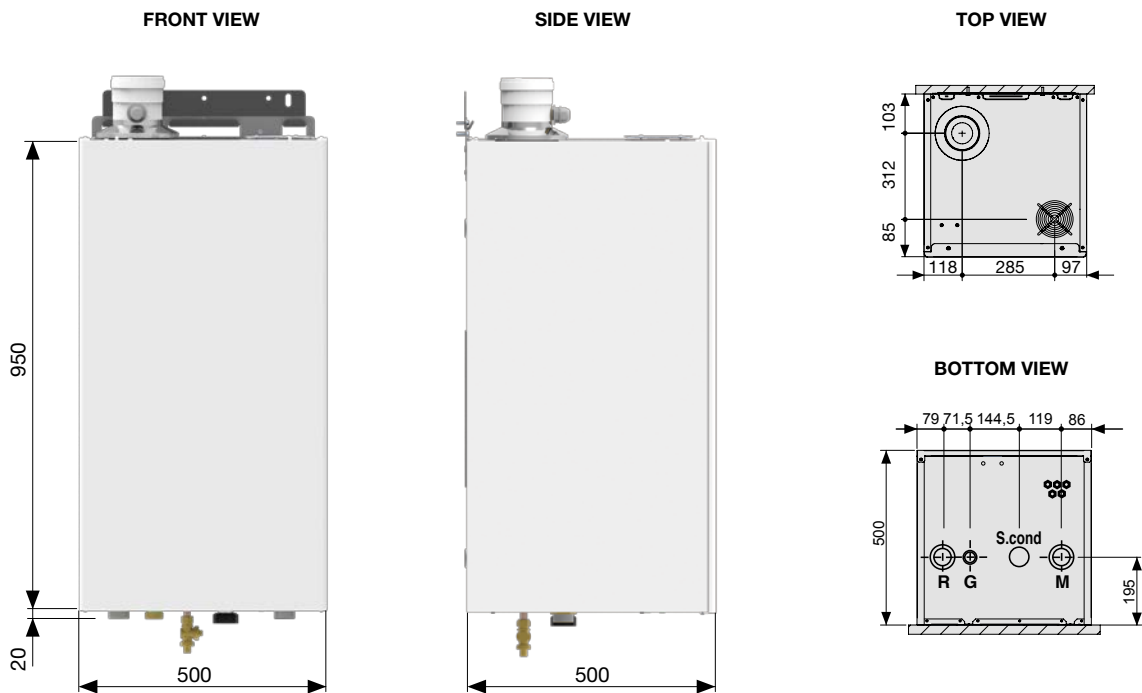
Caption:

- M** - Heating system flow (G1" for mod. 50, G1¼" for mod. 70)
- R** - Heating system return (G1" for mod. 50, G1¼" for mod. 70)

- Scond** - Condensation drain
- A** - Air suction
- S** - Exhaust smoke

KON SWP	Net Weight kg	Gross Weight (with packaging) kg
50-70	50	55

KON 100-115 SWP



Caption:

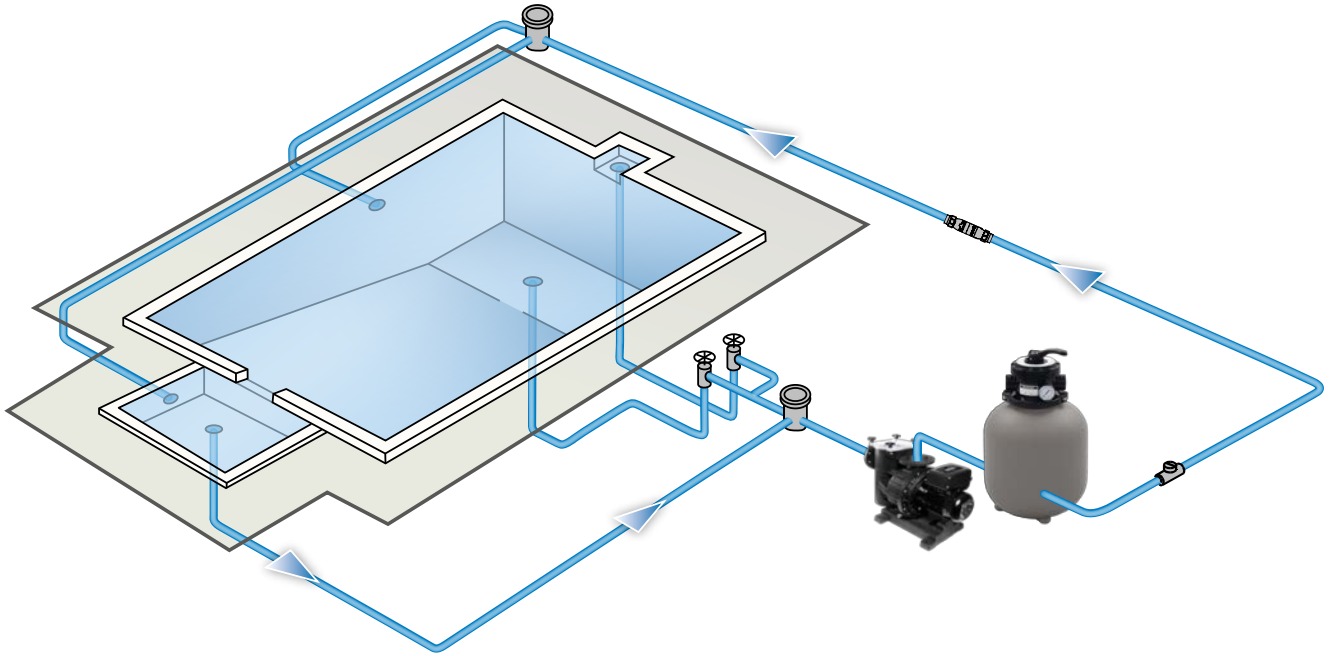
- G** - G1" Gas inlet
- M** - Heating system flow G1 ¼"
- R** - Heating system return G1 ¼"
- Rs** - Drain cock

- Scond** - Condensation drain Ø 32
- S** - Exhaust smoke Ø 100
- A** - Air suction Ø 80-100

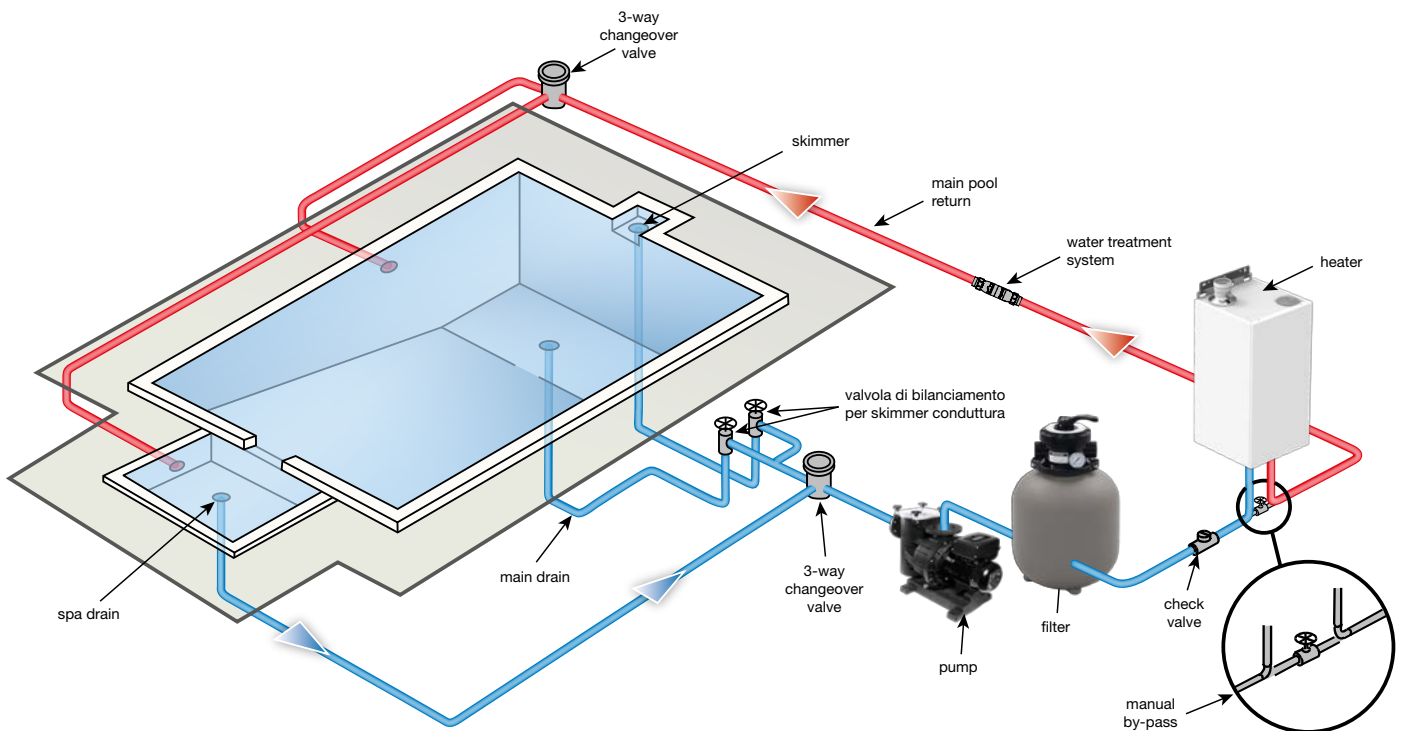
KON SWP	Net Weight kg	Gross Weight (with packaging) kg
100-115	81	96

ASSEMBLY DIAGRAMS

PLANT WITHOUT SWIMMING POOL HEATER



SWIMMING POOL PLANT HEATED WITH KON SWP



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

KON SWP		50	70	100	115
Appliance category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation Ratio		1:3.5	1:5	1:4.4	1:5.1
Nominal Heat Input on P.C.I. Q <sub>n</sub>	kW	48.5	69.5	100	115
Minimum Heat Input on P.C.I. Q <sub>min</sub>	kW	14	14	22.5	22.5
Nominal Output (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	49.4	70.7	105	120.3
Minimum Output (Tr 30 / Tm 50 °C) P <sub>cond min</sub>	kW	14.6	15.1	24.5	24.5
Efficiency at nom. output (Tr 30 / Tm 50°C)	%	101.82	101.72	105.0	105.0
Efficiency at min. output (Tr 30 / Tm 50°C)	%	104.55	107.58	108.8	108.8
Combustion efficiency with nominal load	%	98.5	98.5	98.5	98.5
Combustion efficiency with minimum load	%	99.1	99.1	99.1	99.1
Flue gas temperature tf-ta (min) (*)	°C	18	18	18	18
Flue gas temperature tf-ta (max) (*)	°C	30	30	30	30
Maximum allowable temperature	°C	50	50	50	50
Maximum operating temperature	°C	40	40	40	40
Flue gas mass flow rate (min)	kg/h	6.4	6.4	10.3	10.3
Flue gas mass flow rate (max)	kg/h	22.0	31.6	46.7	53.8
Air excess	%	25.53	25.53	29.5	29.5
Flue losses with burner in operation (min)	%	0.9	0.91	0.91	0.91
Flue losses with burner in operation (max)	%	1.5	1.5	1.54	1.54
Minimum heating circuit pressure	bar (kPa)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)
Maximum heating circuit pressure	bar (kPa)	3 (300)	3 (300)	3 (300)	3 (300)
Water content	l	3.9	3.9	9	9
Gas Consumption Natural (20 mbar) gas G 20 a Q <sub>n</sub>	m <sup>3</sup> /h	5.13	7.35	10.57	12.16
Gas Consumption Natural gas (20 mbar) G 20 a Q <sub>min</sub>	m <sup>3</sup> /h	1.48	1.48	2.31	2.38
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>n</sub>	m <sup>3</sup> /h	5.96	8.55	12.3	14.14
Gas Consumption G25 (supply pressure 25 mbar) Q <sub>min</sub>	m <sup>3</sup> /h	1.72	1.72	2.77	2.77
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>n</sub>	kg/h	3.76	5.39	7.76	8.93
Gas Consumption G31 (supply pressure 37/50 mbar) Q <sub>min</sub>	kg/h	1.09	1.09	1.75	1.75
Max. available pressure at the chimney base	Pa	40	40	100	100
Condensate production max	kg/h	8	11	9	12
<b>Emissions</b>					
CO at Maximum Heat Input with 0% of O <sub>2</sub>	mg/kWh	71.3	82	140	141
NO <sub>x</sub> at Nominal Heat Input with 0% of O <sub>2</sub>	mg/kWh	49	49	31	41
NO <sub>x</sub> Class		6	6	6	6
<b>Electrical Data</b>					
Voltage/Frequency electric power supply	V/Hz	230/50	230/50	230/50	230/50
Fuse on main supply	A (R)	6	6	4AF 250V	4AF 250V
Insulation degree	IP	X4D	X4D	X5D	X5D

Room Temperature = 20°C

(\*) Temperatures detected with the unit in operation Tr 50 / Tm 20°C)

Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs < = 400 kW.

# SPK



SPK 150÷600











SPK 1000



BREVETTO  
**Unical**  
PATENT

smoke pipes

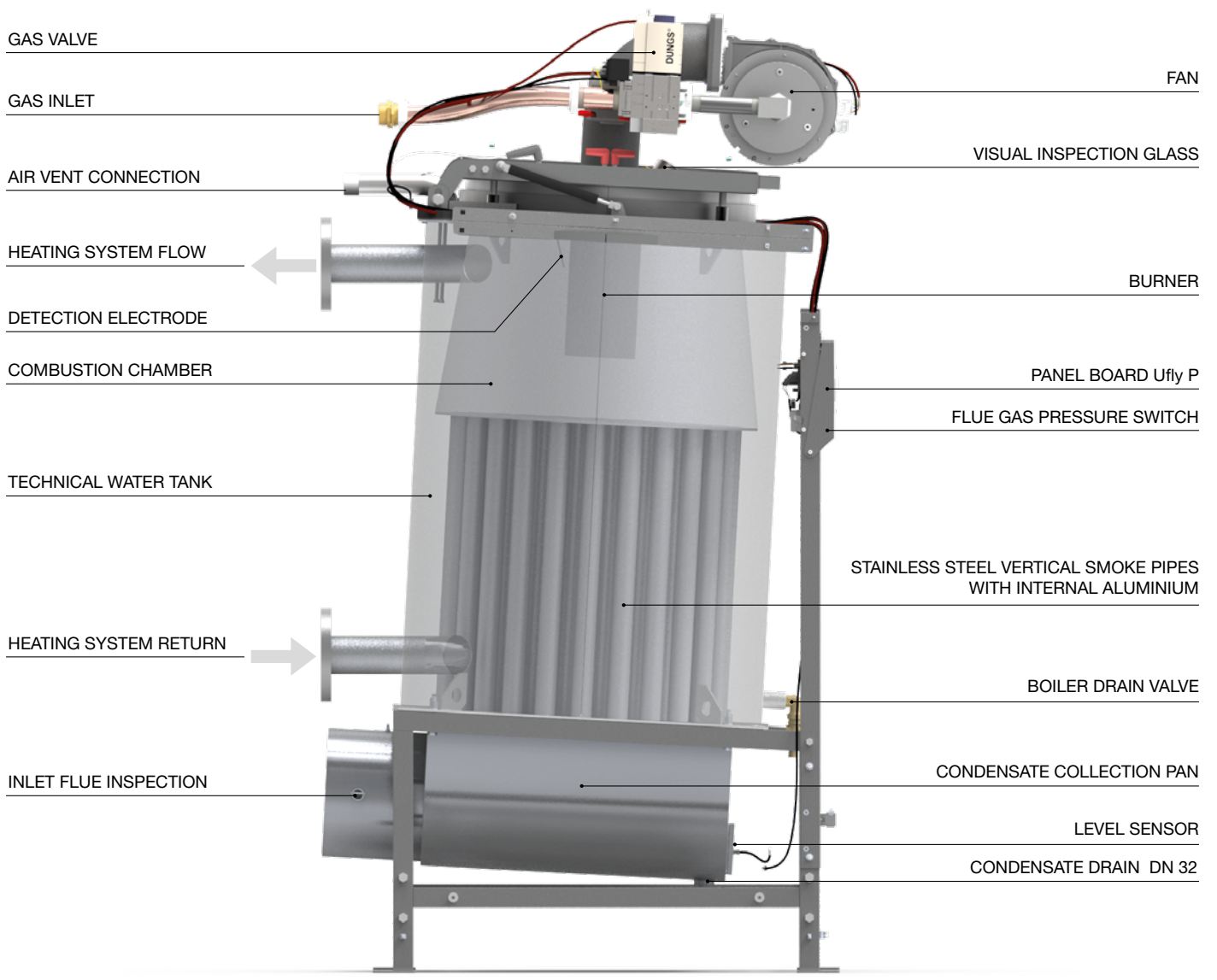
## VERY LOW TEMPERATURE CONDENSING BOILER Low NOx Class 6

OUTPUT RANGE	from 150 to 1000 kW							
OPERATION TEMPERATURE	no limit on the return temperature							
SUPPLY	Natural Gas or LPG							
MODELS	150	230	300	348	400	500	600	1000
SEASONAL EFFICIENCY	 <b>A</b>	 <b>A</b>	 <b>A</b>	 <b>A</b>	 <b>A</b>	 <b>*</b>	 <b>*</b>	 <b>*</b>

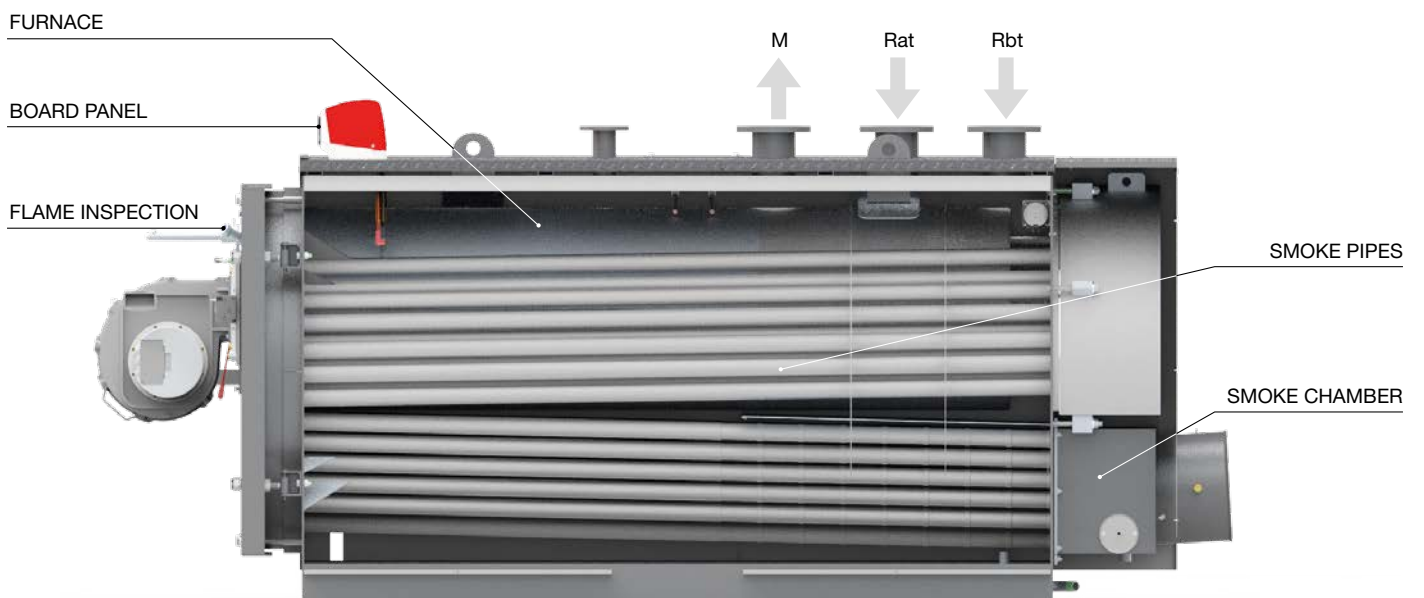
large water content, boiler body completely in stainless steel, with two return connections  
wide modulation premix burner, no circulation pump is required

\* Appliances not covered by Directive 2009/125/CE. The scope of the ERP Directive is up to 400 kW.

MAIN COMPONENTS



SPK 230+600

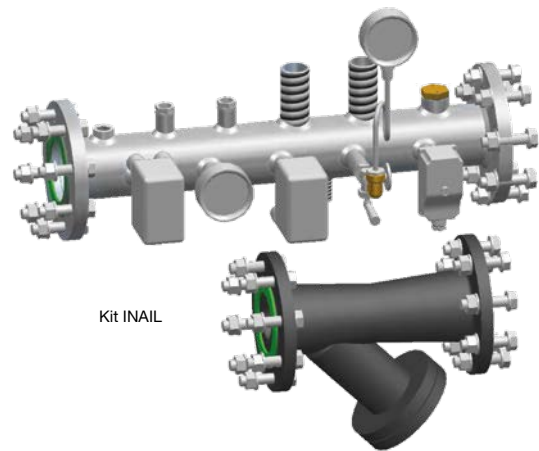


SPK 1000

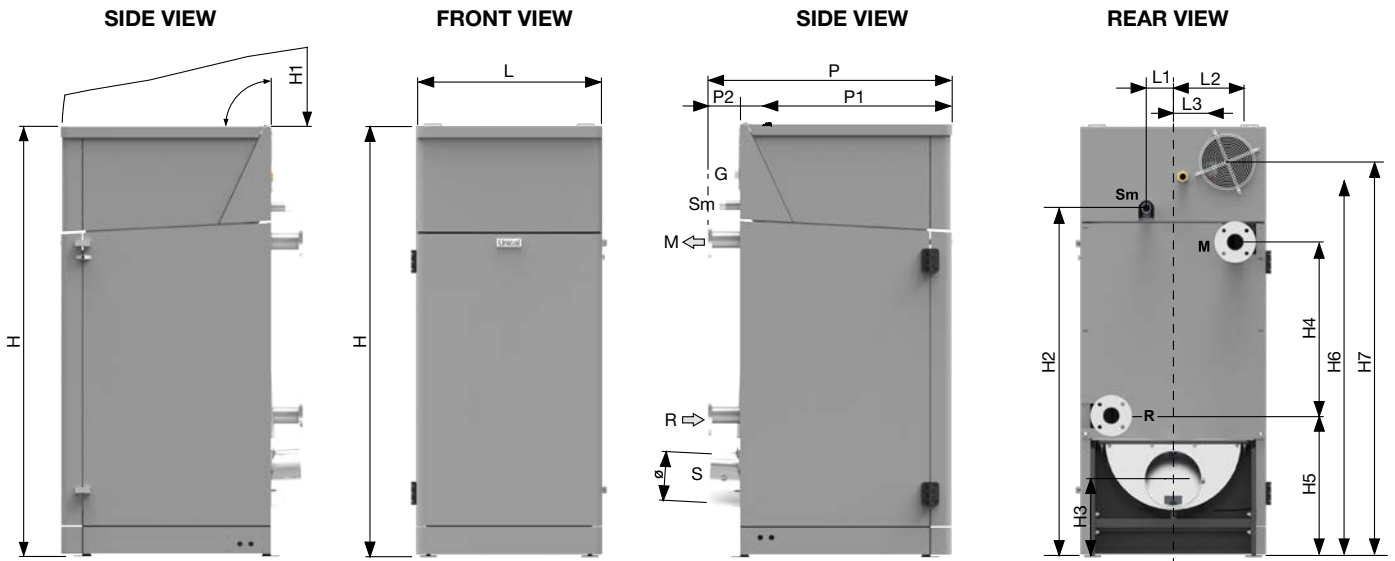


## PRODUCT PLUS VALUES

- **GENERATOR WITH ZERO FLOW (without recirculation)**  
designed with geometries suitable to allow a natural circulation (inside the boiler).  
No minimum temperature limit on the return.  
Minimum circulation pump not required.
- **THERMAL ELEMENT WITH VERTICAL DEVELOPMENT, LARGE WATER CONTENT (HORIZONTAL FOR SPK 1000)** entirely in stainless steel AISI 316L, complete with premix modulating burner, with safety devices, silenced with thermal protection shield.  
The parts not in contact with flame or fumes in AISI 304.
- **VERTICAL CYLINDRICAL COMBUSTION CHAMBER (HORIZONTAL FOR SPK 1000)**  
with passing bottom
- **SPECIAL SMOKE PIPES (Unical patent)**  
in stainless steel, with multifin inserts in Al / Si / Mg with very high thermal conductivity, specially designed to improve condensate drainage and optimize heat exchange.
- **HYDRAULIC FLOW AND RETURN CONNECTIONS (DOUBLE RETURN FOR SPK 1000)** they are positioned so as not to interfere with the semi-cylindrical smoke chamber below, which also acts as a condensate collector, equipped with condensate level switch and smoke pressure control.
- **LOW NO<sub>x</sub> MODULATING PREMIX BURNER**
- **MAXIMUM CERTIFIED EFFICIENCY**
- **MODULATION RATIO**  
up to 1:4,3 (up to 1:2 for SPK 1000)
- **SEASONAL EFFICIENCY +30%**  
in comparison with the conventional boilers
- **ELECTRONIC PANEL BOARD Ufly P + 1 SHC**  
for command and control, with proportional regulation
- **BCM 2.0 for boiler management**
- **SHC module**
- **SMOKE NON-RETURN VALVE**  
reduces sensible heat losses and increases operational safety
- **EASY OPENING OF THE COMBUSTION CHAMBER DOOR**  
thanks to two pneumatic cylinders and hinges on the rear side
- **PRESSURE AVAILABLE**  
at the exhaust fumes **100 Pa**
- **MODULATING PUMP (optional)**  
managed directly by the boiler to ensure maximum condensation at all regimes
- **KIT INAIL with safety devices and return filter (optional)**
- **POSSIBILITY OF CALIBRATION according to the thermal needs of the system**  
(possible customization of the requested power)
- **COMBUSTION CHAMBER DOOR**  
insulated with super-light recyclable cement, with opening assisted by pneumatic shock absorbers
- **EXTERNAL CASING**  
with 50 mm thick rock wool insulation



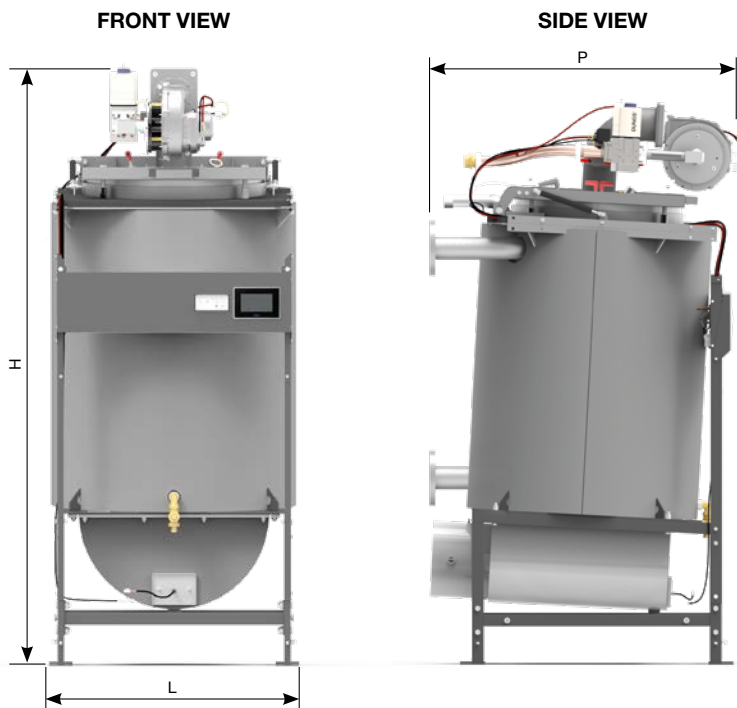
DIMENSIONS SPK 150÷600



SPK	Depth mm			Width mm				Height mm							Weight kg	
	P	P1	P2	L	L1	L2	L3	H	H1	H2	H3	H4	H5	H6		H7
150	944	788	156	666	120	288	81	1809	65.6	1467	323.5	743	571	1579	1679	347-60*
230	1092	954	141	846	120	277	43	1917	65.6	1557	356	775	630	1697	1768	399-80*
300	1181	1036	144	910	100	303	200	1946	65.6	1618	353	790	635	1741	1796	459-90*
348	1276	1152	124	996	100	326	200	2130	65.6	1712	390	820	698	1794	1974	610-106*
400	1276	1152	124	996	100	326	200	2130	65.6	1712	390	820	698	1794	1974	610-106*
500	1276	1152	124	996	100	326	200	2130	65.6	1712	390	820	698	1794	1974	610-106*
600	1398	1256	142	1096	200	388	220	2206	65.6	1753	390	810	763	1863	2052	755-120*

\*weight casing

DIMENSIONS TO INSERT THE BOILER IN THE BOILER ROOM



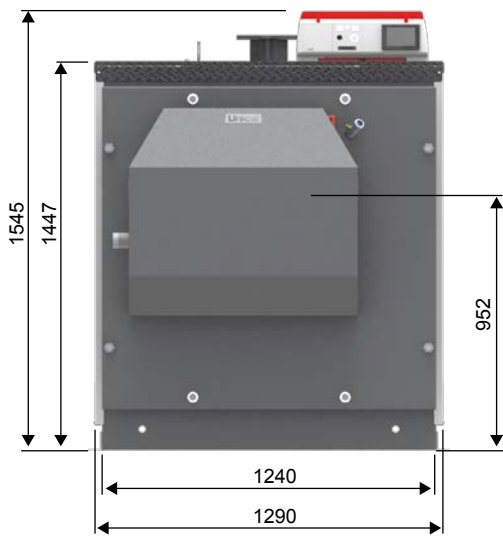
Boiler dimensions without its casing (mm)

SPK	P	L	H
150	917	655	1785
230	1027	795	1895
300	1134	845	1910
348	1258	965	2075
400	1258	965	2075
500	1258	965	2075
600	1313	1065	2186

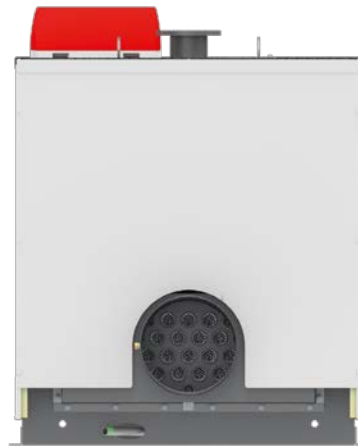
For more information, visit [www.unical.eu](http://www.unical.eu)

DIMENSIONI SPK 1000

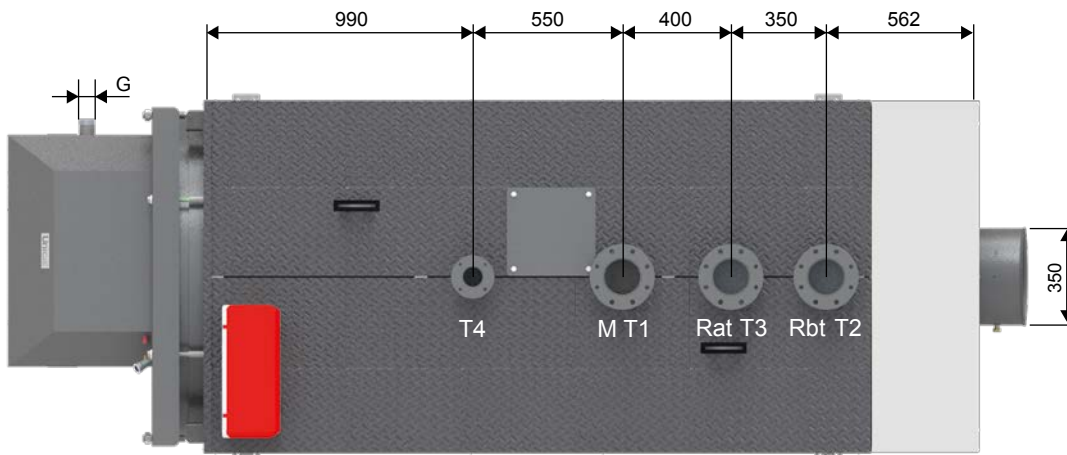
FRONT VIEW



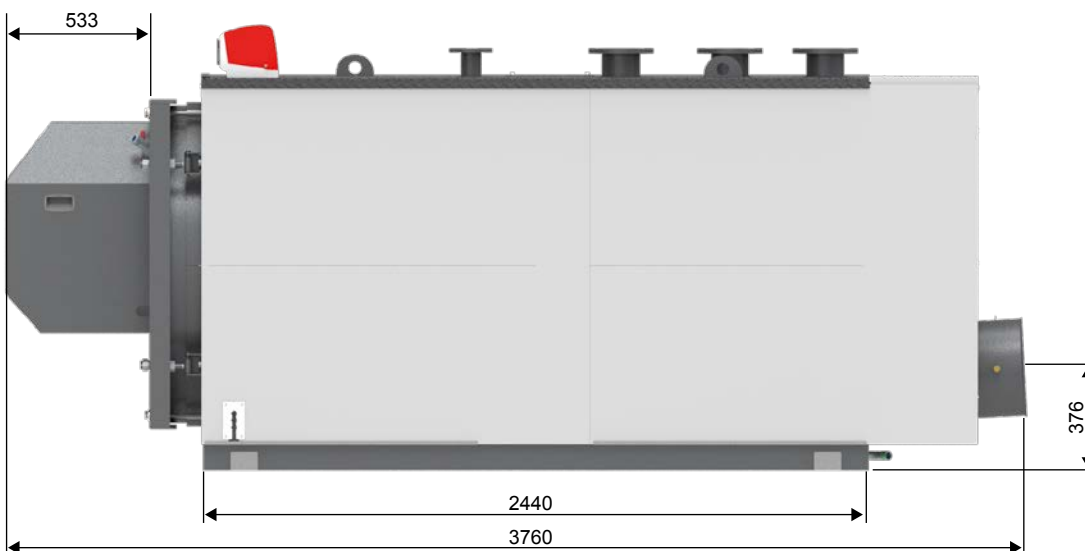
REAR VIEW



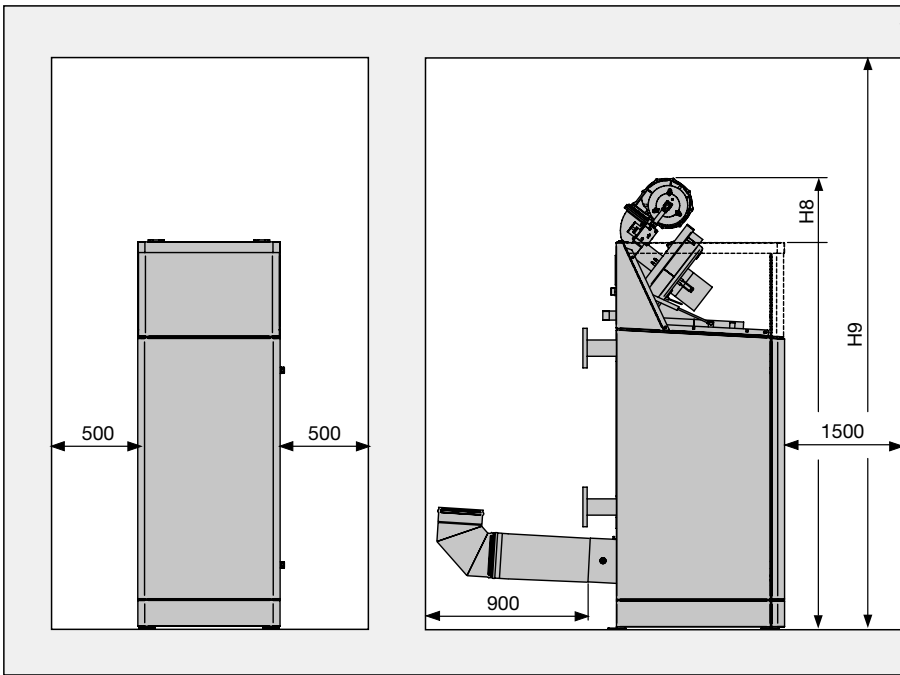
VIEW FROM ABOVE



SIDE VIEW



POSITIONING IN THE BOILER ROOM - SPK 150÷600



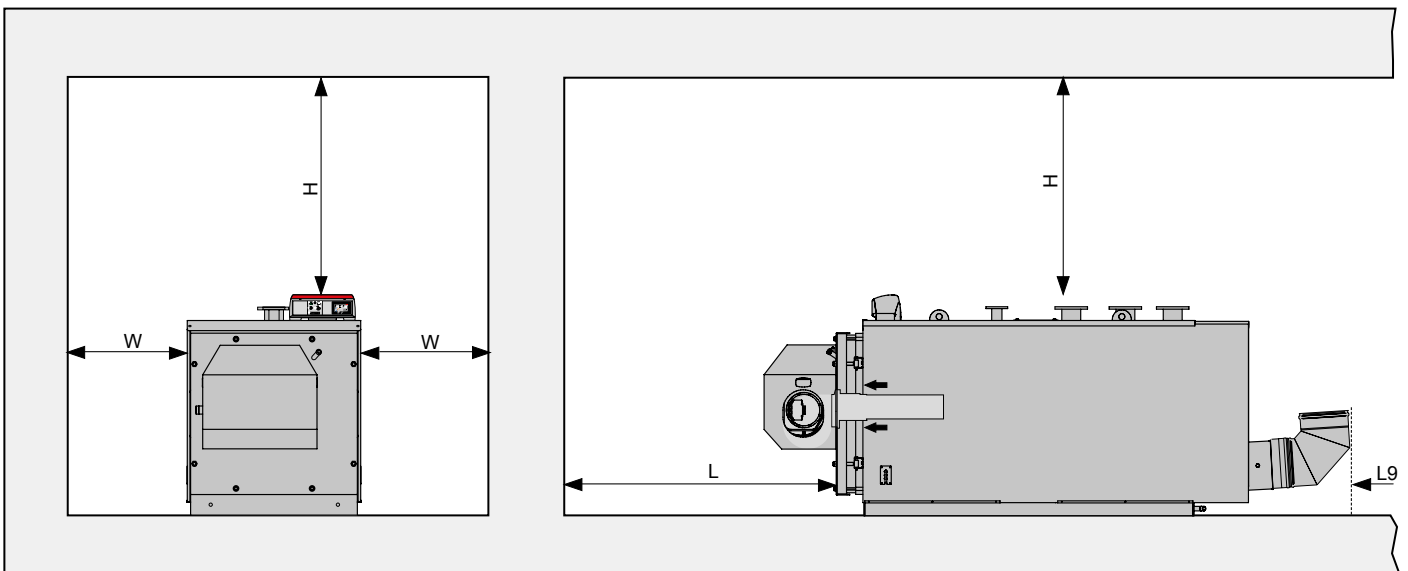
In the installation consider overall opening height.

Clearance (mm)

SPK	H8*	H9
150	2109	2300
230	2147	2500
300	2366	2500
348	2690	3000
400	2690	3000
500	2690	3000
600	2770	3000

\* Space for combustion chamber opening

POSITIONING IN THE BOILER ROOM - SPK 1000

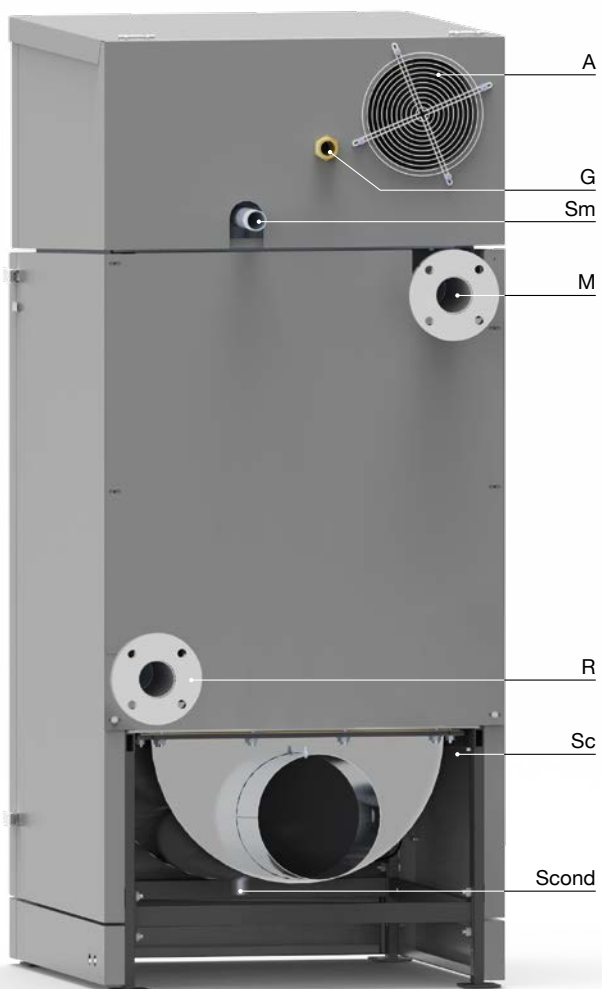


Clearance (mm)

SPK	W	L	L9	H
1000	2000	3800	1000	1500

The distance is recommended to allow both the opening of the door and the assembly /disassembly of the burner.

## CONNECTIONS



- G** Gas Inlet
- M** Flow
- R** Return
- A** Air intake
- S** Flue gas exhaust
- Sm** Air vent connection
- Sc** Boiler drain
- Sccond** Condensation drain



**(\*) FLUE SOCKET ADAPTER (optional)**  
 Ø 200 - Ø 150 (SPK 150)  
 for adaption to existing chimneys Ø150

SPK	G inch	M PN16	R PN16	A Ø mm	S Ø mm	Sm inch	Sc Ø mm
150	1"	DN 65	DN 65	150	200 (*)	1"	DN 40
230	1" ¼	DN 65	DN 65	250	250	1" ¼	DN 40
300	1" ¼	DN 80	DN 80	250	250	1" ¼	DN 40
348	1" ½	DN 80	DN 80	250	300	1" ½	DN 40
400	1" ½	DN 80	DN 80	250	300	1" ½	DN 40
500	1" ½	DN 80	DN 80	250	300	1" ½	DN 40
600	1" ½	DN 100	DN 100	250	300	1" ½	DN 40
1000*	2"	DN 125	DN 125	NA	350	DN 65	DN 40

SPK	G inch	M PN6	R PN6	A Ø mm	S Ø mm	Sm inch	Sc Ø mm
1000*	2"	DN 125	DN 125	NA	350	DN 65	DN 40

\* R = Rbt = DN 125 (double return)



## FURNACE AND HYDRODYNAMIC STRUCTURE

- Vertical furnace
- Truncated cone shaped combustion chamber
- Construction in stainless AISI 316 L
- Sized for premix burner

Model	Combustion chamber volume m <sup>3</sup>
<b>SPK 150</b>	0.06
<b>SPK 230</b>	0.11
<b>SPK 300</b>	0.135
<b>SPK 348</b>	0.216
<b>SPK 400</b>	0.216
<b>SPK 500</b>	0.220
<b>SPK 600</b>	0.240
<b>SPK 1000</b>	0.75



The thermal exchange with the installation is guaranteed by specific return manifold placed in such position to guarantee the maximum efficiency of the heat exchanger.

Both, the large diameter manifold and the large water content guarantee the maximum water circulation with the minimum pressure losses. The water, through the forced circulation, surrounds completely the stainless steel heat exchanger (combustion chamber and smoke pipes) and, heated, is pushed towards the flow connection.

The special design of the heat exchanger allows the complete shut down of the boiler, with zero water circulation, without the need of recirculation pumps. This guarantees the reduction of the installation costs and the electrical running consumption.

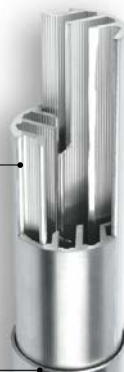
## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration

Multi-radial aluminium fins

External pipe in stainless steel AISI 316L



BREVETTO  
**Unical**  
PATENT

## LOW NO<sub>x</sub> PREMIX BURNER

The delivered output depends on the rpm of the fan serving the gas valve. The flame control is managed directly by the electronic PCB of the burner, endowed of BMM (=Burner Module Manager).

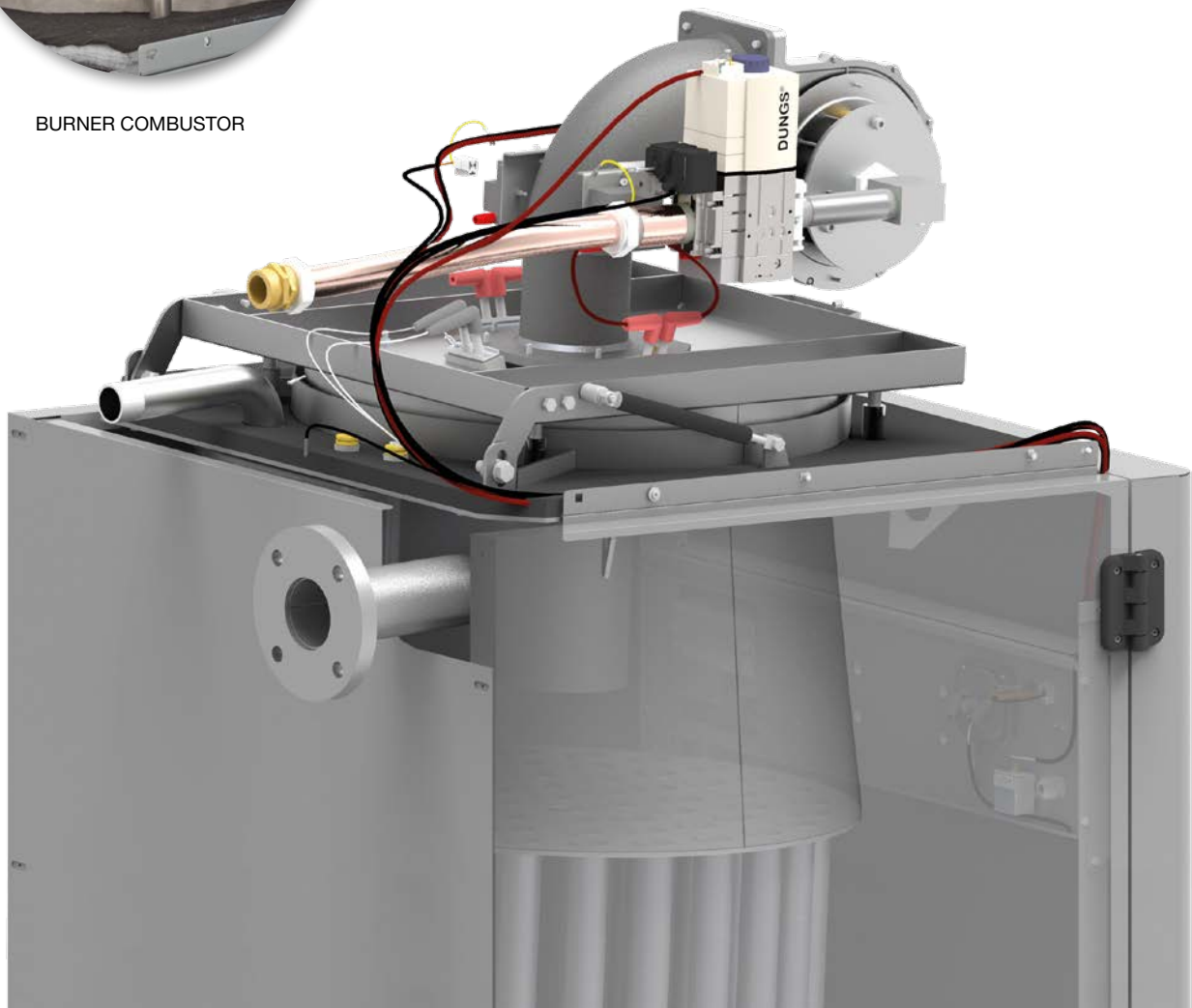
The opening of the gas valve is generated by "Venturi effect" in the VOLUTE of the fan and the air-gas mixing happens in its inside, before being sent in the combustion chamber (premix). The combustion happens on the surface of the special cylindrical burner in FeCr alloy fibre.

The wide flame surface guarantees:

- low combustion temperature
- reduced turbulence with the following advantages:
- higher transferred energy if compared with a traditional burner with the same flame temperature
- absolute working safety for the absence of turbulences
- low pollution thanks to the complete oxidation of the natural gas molecules
- optimum combustion efficiency: maximum CO<sub>2</sub> = 9.3%
- fast achievement of the condensation conditions, since 54°C
- optimization of the efficiency thanks to the low smoke temperature and the low "air excess"
- minimum **NO<sub>x</sub> emissions, Class 6** (see table of technical data).



BURNER COMBUSTOR



## CONTROL PANEL



THERMOREGULATION Ufly P (std. supplied)

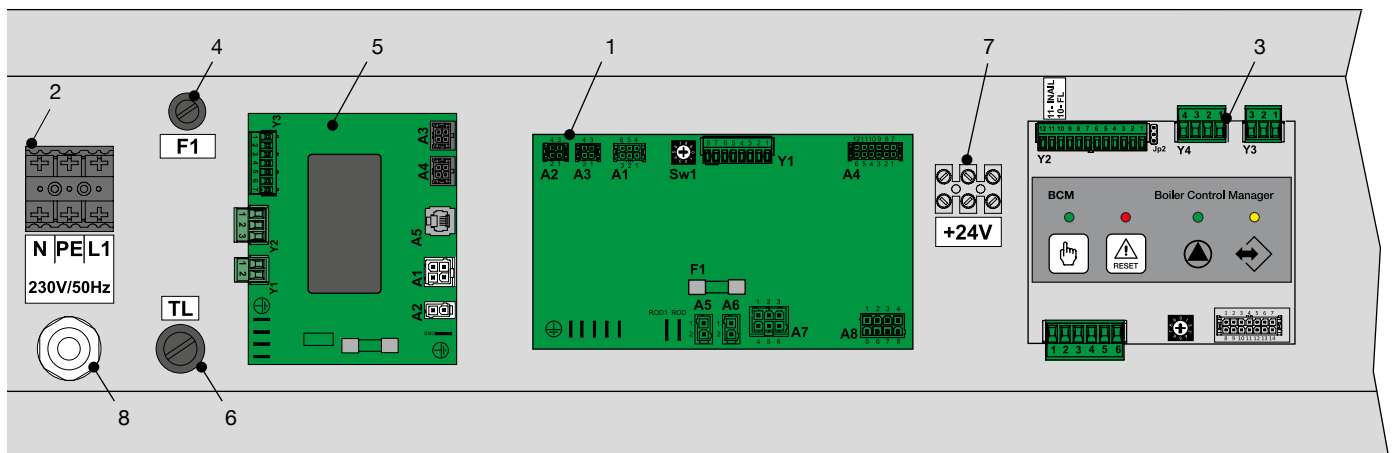


KIT GATEWAY P (optional)  
for Ufly P remote connection

BCM 2.0 Boiler Cascade Manager (std. supplied)



## BASIC ELECTRICAL CONNECTIONS



1. PCB for management of the burner
2. Terminal strip for electrical supply 230 V
3. Boiler controller BCM
4. Fuse 4-6.3 A on electrical supply

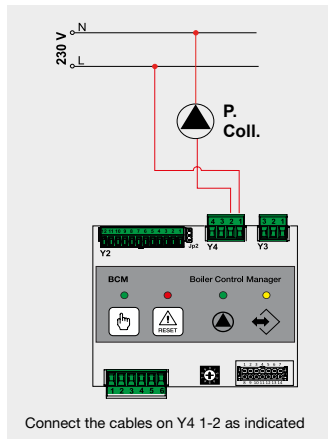
5. PCB for supply
6. Limit thermostat with manual reset
7. Additional terminal strip for +24V BCM
8. Cable clamp for supply cable



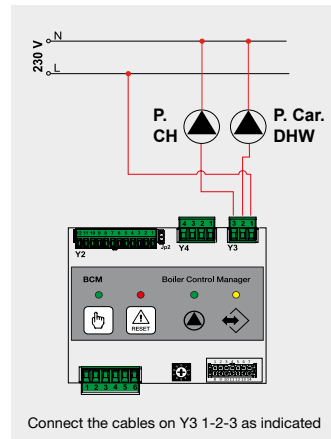
## BASIC ELECTRICAL CONNECTIONS

The boiler is supplied with the predisposition to manage a direct flow and DHW tank.  
If Stemp ACC is connected, automatically will be activated the DHW service, which will have the priority on the pumps shown in the below figures.

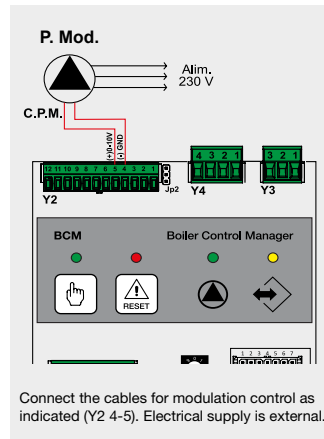
If the management of additional services is required (DHW tanks, mixed zones, solar system, etc.) it will be necessary to buy multifunction **SHC** to be connected to the local bus for the complete management through the thermoregulation **Ufly P**.



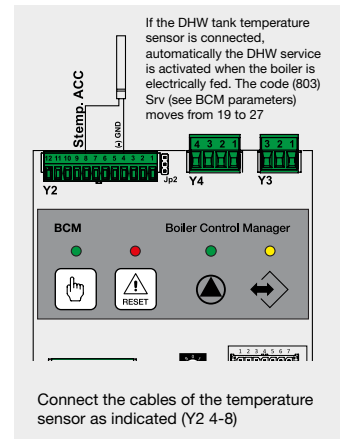
**P. Coll - Optional manifold pump (Primary ring)**



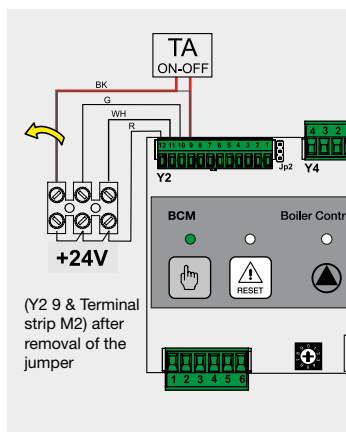
**P. CH – Central Heating Pump (Heating circuit)  
P. Car DHW – DHW tank loading pump**



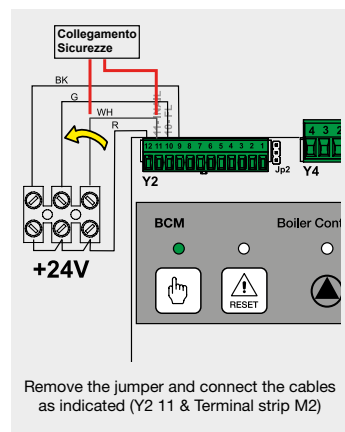
**P. Mod – Modulating Pump (optional)**



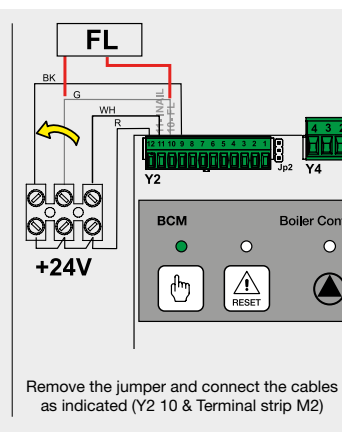
**Stemp ACC – DHW tank temperature sensor (optional)**



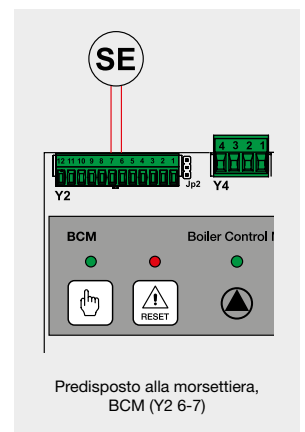
**Parameter TA (optional)**



**Additional safety connection**



**Connection of Flow switch FL**



**Connection of Outer sensor (optional)**

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

SPK		150	230	300	348	400	500	600	1000
Boiler category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	I <sub>2H</sub>
Modulation ratio		1:4.0	1:4.3	1:4.3	1:3.9	1:4.2	1:3.9	1:4.4	1:2
Rated heat output on P.C.I. Q <sub>n</sub>	kW	140	214	280	348	380	450	550	940
Minimum heat output on P.C.I. Q <sub>min</sub>	kW	35	50	65	90	90	115	125	470
Rated useful power (Tr 60 / Tm 80 °C) P <sub>n</sub>	kW	136.36	209.29	274.54	341.42	373.01	441.95	540.32	923.2
Minimum useful power (Tr 60 / Tm 80 °C) P <sub>n</sub> min	kW	32.52	48.25	63.57	87.67	87.80	111.09	118.53	460.1
Rated useful power (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	145.88	226.84	292.88	363.31	399.00	472.05	581.19	1006
Minimum useful power (Tr 30 / Tm 50 °C) P <sub>cond</sub> min	kW	36.54	54.60	70.01	99.09	97.20	124.09	135.88	508
Rated power performance (Tr 60 / Tm 80°C)	%	97.4	97.8	98.05	98.11	98.16	98.21	98.24	98.2
Minimum power performance (Tr 60 / Tm 80°C)	%	92.92	96.5	97.8	97.41	97.55	96.6	94.82	97.9
Rated power performance (Tr 30 / Tm 50°C)	%	104.2	106	104.6	104.4	105	104.9	105.67	107
Minimum power performance (Tr 30 / Tm 50°C)	%	104.4	109.2	107.7	110.1	108	107.9	108.7	108.1
Performance at 30% of the load (Tr 30°C)	%	107.7	107.2	108.9	108.4	108.8	108.9	106.5	108
Combustion efficiency at nominal load	%	97.8	97.9	98.2	98.2	98.2	98.2	98.3	98.4
Combustion efficiency with reduced load	%	98.38	98.32	98.40	98.34	98.31	98.43	98.42	98.7
Casing heat loss with burner operating (Q <sub>min</sub> )	%	5.46	1.82	0.60	0.93	0.76	1.83	3.60	0.81
Casing heat loss with burner operating (Q <sub>n</sub> )	%	0.4	0.1	0.1	0.1	0.1	0.03	0.04	0.19
Net flue gas temperature tf-ta (min)(*)	°C	32.3	33.6	32	33.2	33.7	31.3	31.5	25.1
Net flue gas temperature tf-ta (max)(*)	°C	44.2	42.7	36.7	35.6	35.4	35.5	34.3	31.0
Maximum permitted temperature	°C	100	100	100	100	100	100	100	100
Maximum operating temperature	°C	90	90	90	90	90	90	90	95
Flue gas mass flow rate (min)	kg/h	57	82	106	147	147	188	204	790
Flue gas mass flow rate (max)	kg/h	229	350	458	569	621	735	899	1581
Excess air	%	25.53	25.53	25.53	25.53	25.53	25.53	25.53	29.54
Heat loss at chimney with burner on (min)	%	1.62	1.68	1.60	1.66	1.69	1.57	1.58	1.29
Heat loss at chimney with burner on (max)	%	2.21	2.14	1.84	1.78	1.77	1.78	1.72	1.60
Minimum heating circuit pressure	bar	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
Maximum heating circuit pressure	bar	6	6	6	6	6	6	6	6
Boiler maximum allowable working pressure	bar	8	8	8	8	8	8	8	8
Water content	l	153	210	270	340	340	340	425	1413
Methane gas consumption G <sub>20</sub> (pow.sup. 20 mbar) at Q <sub>n</sub>	m <sup>3</sup> /h	14.80	22.63	29.61	36.80	40.18	47.58	58.15	99.4
Methane gas consumption G <sub>20</sub> (pow.sup. 20 mbar) at Q <sub>min</sub>	m <sup>3</sup> /h	3.70	5.29	6.87	9.52	9.52	12.16	13.22	49.7
Propane gas consumption (pow. sup. 37/50 mbar) at Q <sub>n</sub>	kg/h	10.87	16.61	21.73	27.01	29.50	34.93	42.69	-
Propane gas consumption (pow. sup. 37/50 mbar) at Q <sub>min</sub>	kg/h	2.72	3.88	5.05	9.70	6.99	8.93	8.70	-
Chimney base maximum pressure available	Pa	100	100	100	100	100	100	100	100
Max condensate production	kg/h	11.5	13.7	15.8	29.1	28.5	28.8	31.0	158
<b>Emissions</b>									
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	13.73	18.05	28.08	25.27	18.25	22.46	22.1	2
NO <sub>x</sub> at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	54	43	53	49	50	48	50	46
NO <sub>x</sub> Class		6	6	6	6	6	6	6	6
<b>Electrical data</b>									
Power supply voltage/frequency	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Fuse on the power supply	A (R)	6	6	6	6	6	6	6	6
Protection rating	IP	X4D	X4D	X4D	X4D	X4D	X4D	X4D	20

Room Temperature = 20°C. (\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)


Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs < = 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K - P<sub>stdby</sub> - See Erp Table

Standstill electrical consumption - P<sub>std</sub> - See Erp Table

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

SPK			150	230	300	348	400	500	600	1000
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	136	209	274	341	371	442	540	923
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	93	92	94	93	94	94	92	92
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	*	*	*
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>										
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	136.3	209.3	274.5	341.4	373.0	441.9	540.3	923,2
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	87.8	88.1	88.3	88.4	88.4	88.5	88.5	88,5
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	45.2	68.8	91.5	113.2	124.0	147.1	175.7	304,6
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	97.0	96.6	98.1	97.7	98.0	98.2	96.0	97,3
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>										
WITH A FULL LOAD	$el_{max}$	kW	0.190	0.195	0.210	0.270	0.425	0.555	0.590	2,120
WITH A PARTIAL LOAD	$el_{min}$	kW	0.042	0.040	0.032	0.036	0.051	0.053	0.088	1,060
STANDBY MODE	$P_{SB}$	kW	0.005	0.005	0.005	0.005	0.005	0.004	0.007	0,005
<b>OTHER ELEMENTS</b>										
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.32	0.39	0.34	0.95	0.95	0.95	1.34	2.15
NITROGEN OXIDES EMISSIONS referred to NCV & (GCV)	$NO_x$	mg/kWh	59 (53)	56 (51)	59 (53)	54 (49)	55 (50)	53 (48)	56 (50)	40
$NO_x$ CLASS			6	6	6	6	6	6	6	6
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	424	653	844	1054	1148	1358	1694	

\* Appliances not covered by Directive 2009/125/CE.

## DETERMINATION OF THE PRIMARY CIRCUIT PUMP

	SPK 150	SPK 230	SPK 300	SPK 348-400	SPK 500	SPK 600	SPK 1000
Maximum flow rate in l/h ( $\Delta t=8K$ )	14.655	22.495	29.426	39.883	47.300	57.405	-
Maximum flow rate in l/h ( $\Delta t=15K$ )	7.816	11.997	15.695	21.303	25.606	30.616	52.900
Requested rated output in l/h ( $\Delta t=20K$ )	5.862	8.998	11.772	15.997	19.203	22.962	39.700

NOTE: The pumps must be determined by the installer or designer according to the boiler and system data. The pump is not an integral part of the boiler. (See the installation manual)

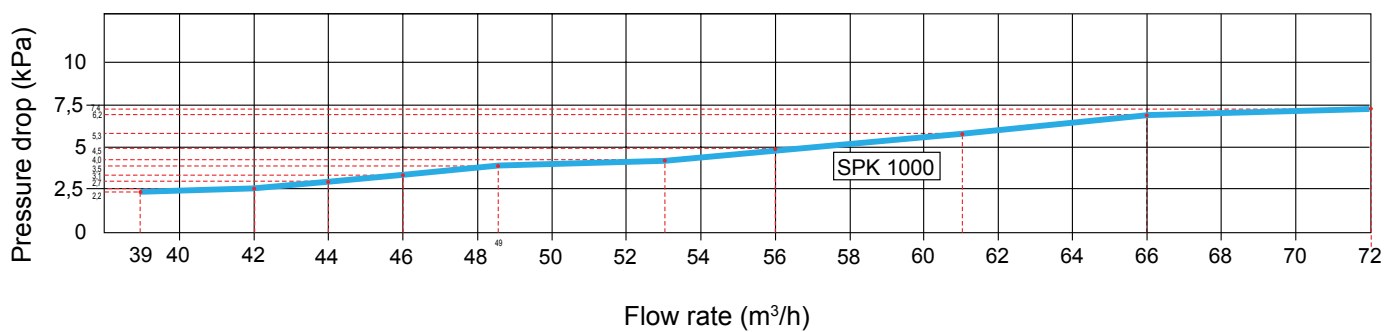
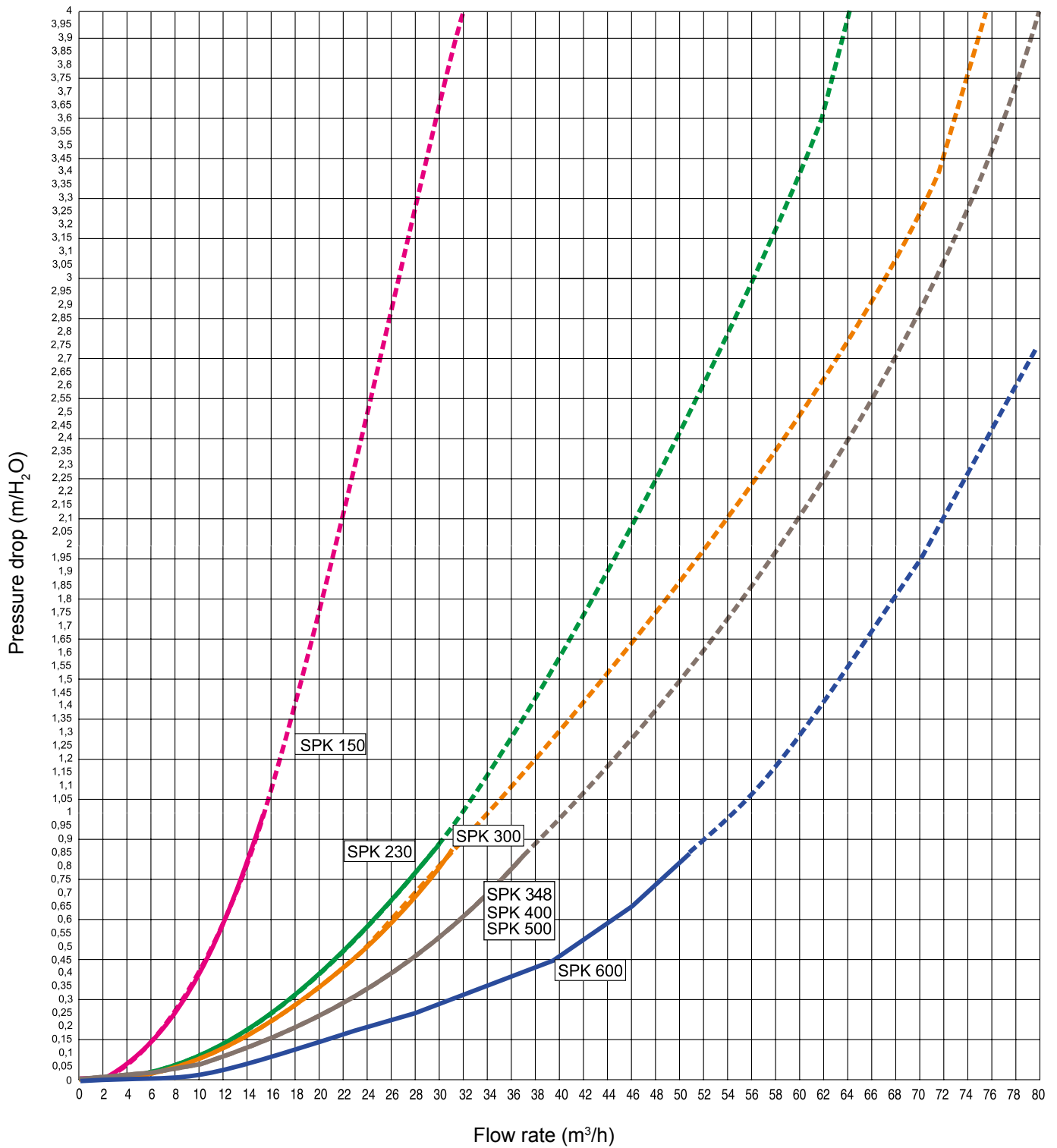
MODULATING PUMP



TWIN MODULATING PUMP



# WATER SIDE PRESSURE DROPS DIAGRAM



# MULTIINOX 116



BREVETTO  
**Unical**  
PATENT

smoke pipes

## VERY LOW TEMPERATURE CONDENSING UNIT Low NOx Class 6

OUTPUT RANGE

115 kW

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

Natural Gas or LPG

MODELS

MULTIINOX 116

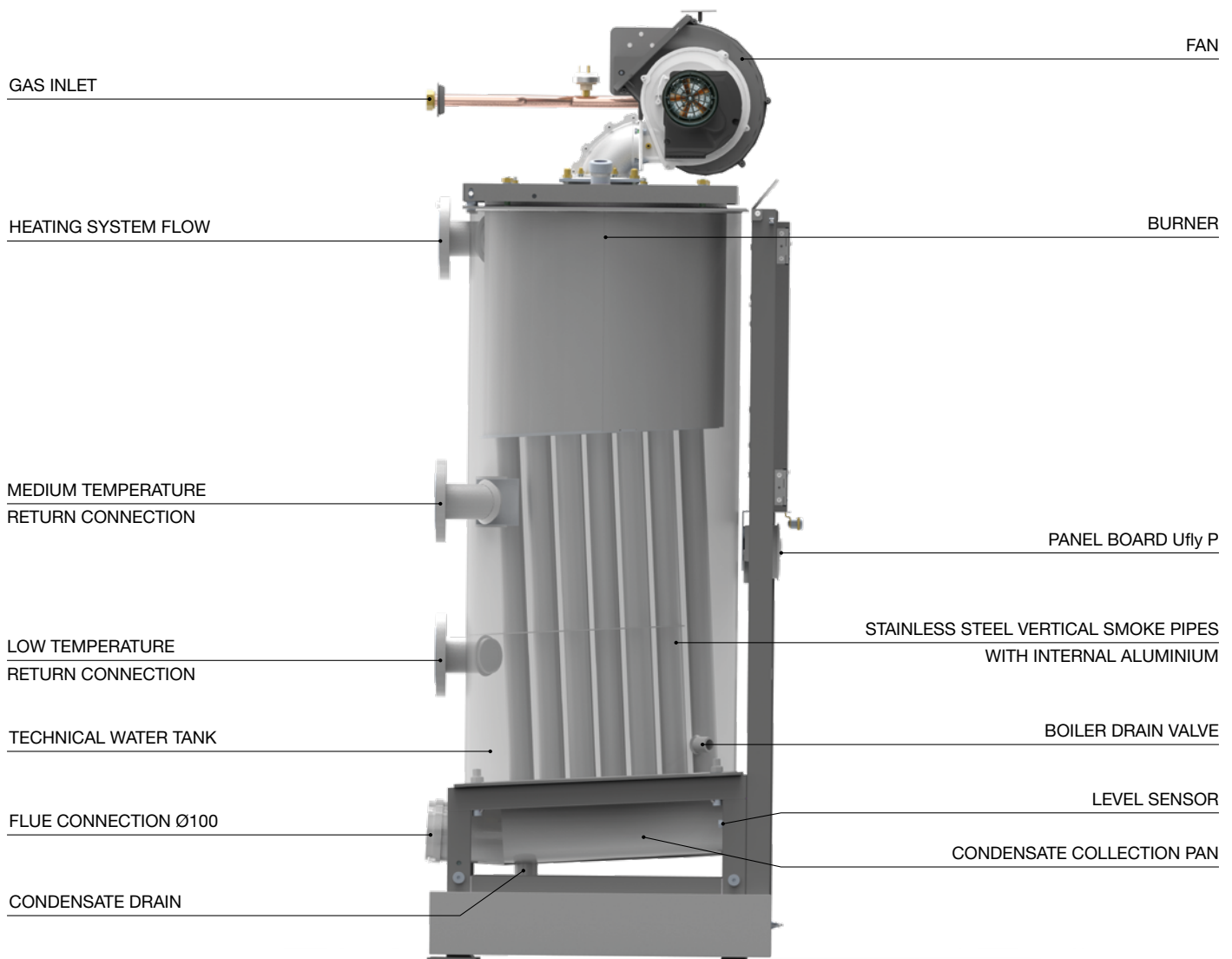
SEASONAL EFFICIENCY



**A**

large water content  
boiler body completely in stainless steel, with two return connections  
wide modulation premix burner Low NOx Class 6

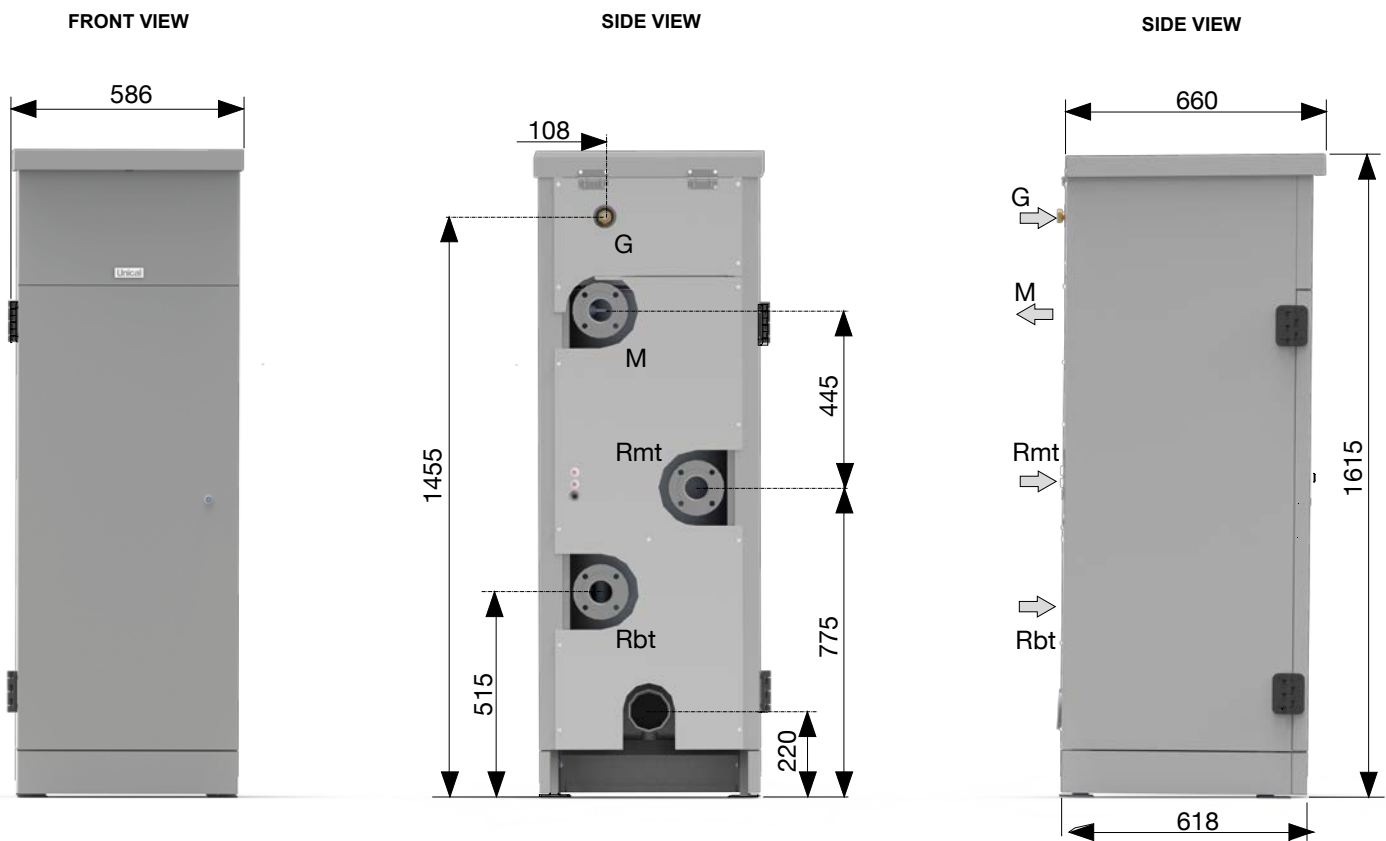
## MAIN COMPONENTS



## PRODUCT PLUS VALUES

- **MAXIMUM CERTIFIED EFFICIENCY**  
up to 107% to the minimum modulated output
- **MODULATION RATIO**  
up to 1:3,8
- **LARGE WATER CONTENT**  
capacity 80 liters
- **THERMAL ELEMENT WITH VERTICAL DEVELOPMENT** entirely in stainless steel AISI 316L  
complete of premix modulating burner
- **SPECIAL SMOKE PIPES (Unical patent)**  
in stainless steel, with multifin inserts in Al / Si / Mg with very high thermal conductivity, specially designed to improve condensate drainage and optimize heat exchange.
- **CYLINDRICAL COMBUSTION CHAMBER**  
with passing bottom
- **SMOKE NON RETURN VALVE**
- **ELECTRONIC CONTROLLING SYSTEM Ufly P**  
with proportional regulation
- **SEASONAL EFFICIENCY + 30%**  
higher than the conventional boilers
- **MODULATING PUMP (optional)**  
directly managed by the boiler, to assure the maximum condensation at all working regimes
- **MANOMETRIC HEAD**  
available to the smokes outlet: + 70 Pa
- **COMPACT DIMENSIONS**  
height 1615 mm  
width 586 mm  
depth 618 mm

DIMENSIONS



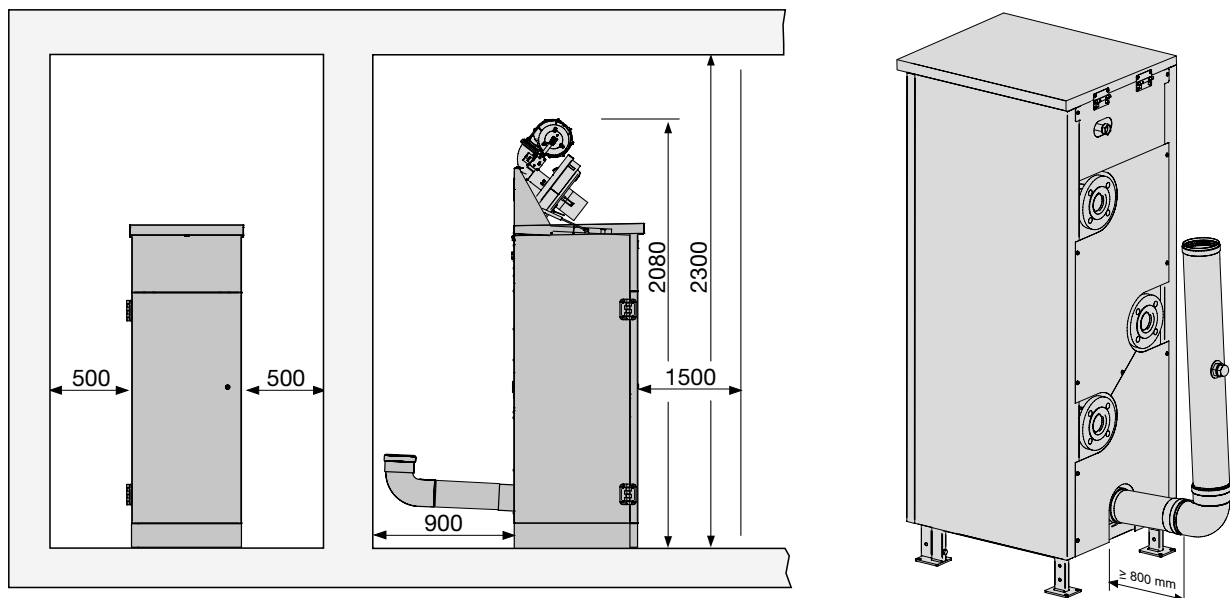
Legenda:

- G** - Gas inlet G 3/4"
- M** - Central Heating Flow G 2" DN50

- Rmt** - Central Heating middle temp. Return G 2" DN50
- Rbt** - Central Heating low temp. Return G 2" DN50

MULTIINOX	Net Weight kg	Gross Weight (with packaging) kg
116	210	236

POSITIONING IN THE BOILER ROOM



## TYPE AND SHAPE OF THE FURNACE

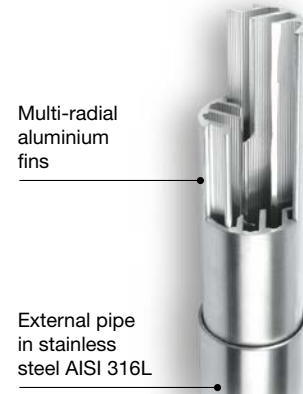
- Vertical furnace
- Construction in stainless AISI 316 L
- Sized for premix burner



## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

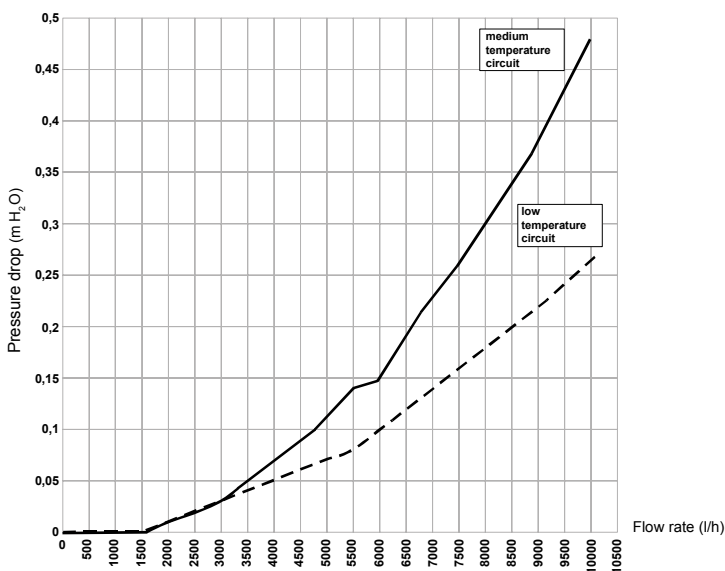
- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration



## FEATURES OF THE DOOR

- The combustion chamber door is in carbon steel with insulation in super light recyclable concrete and is endowed with pneumatic cushion.
- Casing is insulated with fabric-finished mineral wool, 50 mm thick.

## DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



<b>MULTIINOX</b>	<b>116</b>
Max flow rate demanded l/h (Δt 15 K)	6506
Nominal flow rate request (Δt 20 K)	4880

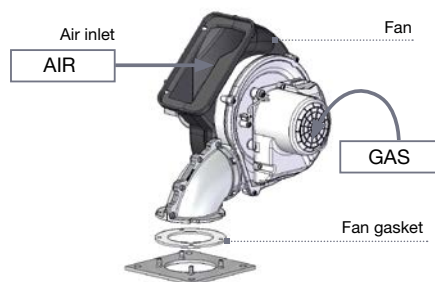


## TYPE OF BURNER



### CONFIGURATION:

The modulating gas valve is fitted directly on the fan. Inside its volute happens the air-gas mixing exactly calibrated.



The delivered output depends on the rpm of the fan serving the gas valve. The flame control is managed directly by the electronic PCB of the burner, endowed of **BMM (Burner Module Manager)**.

The opening of the gas valve is generated by "Venturi effect" in the VOLUTE of the fan and the air-gas mixing happens in its inside, before being sent in the combustion chamber (premix).

The combustion happens on the surface of the special cylindrical burner in FeCr alloy fibre.


The wide flame surface guarantees:

- low combustion temperature
- reduced turbulence with the following advantages:

- higher transferred energy if compared with a traditional burner with the same flame temperature
- absolute working safety for the absence of turbulences
- low pollution thanks to the complete oxidation of the natural gas molecules
  - optimum combustion efficiency: maximum CO<sub>2</sub> = 9,1%
  - fast achievement of the condensation conditions, since 54°C
  - optimization of the efficiency thanks to the low smoke temperature and the low "air excess"
  - minimum NOx emissions, up to 62 mg/kWh (weighed value according to EN 297-A3).

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

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MULTIINOX			116
EFFECTIVE NOMINAL OUTPUT	P <sub>n</sub>	kW	113
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	η <sub>s</sub>	%	93
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			<b>A</b>
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>			
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	P <sub>4</sub>	kW	113
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	η <sub>4</sub>	%	88.3
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	P <sub>1</sub>	kW	38
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	η <sub>1</sub>	%	98.2
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>			
WITH A FULL LOAD	e <sub>l,max</sub>	kW	0.160
WITH A PARTIAL LOAD	e <sub>l,min</sub>	kW	0.035
STANDBY MODE	P <sub>SB</sub>	kW	0.009
<b>OTHER ELEMENTS</b>			
HEAT DISPERSION ON STANDBY	P <sub>stby</sub>	kW	0.308
NITROGEN OXIDES EMISSIONS referred to NCV & (GCV)	NO <sub>x</sub>	mg/kWh	51 (46)
CONSUMPTION OF ANNUAL ELECTRICITY	Q <sub>HE</sub>	GJ	348

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MULTIINOX		116
Boiler category		II <sub>2H3P</sub>
Modulation ratio		1:3.8
Rated heat output on P.C.I. Q <sub>n</sub>	kW	115
Minimum heat output on P.C.I. Q <sub>min</sub>	kW	30
Rated useful power (Tr 60 / Tm 80 °C) P <sub>n</sub>	kW	112.7
Minimum useful power (Tr 60 / Tm 80 °C) P <sub>n min</sub>	kW	30.7
Rated useful power (Tr 30 / Tm 50 °C) P <sub>cond</sub>	kW	119.5
Minimum useful power (Tr 30 / Tm 50 °C) P <sub>cond min</sub>	kW	32.2
Rated power performance (Tr 60 / Tm 80°C)	%	98
Minimum power performance (Tr 60 / Tm 80°C)	%	102.4
Rated power performance (Tr 30 / Tm 50°C)	%	103.9
Minimum power performance (Tr 30 / Tm 50°C)	%	107.6
Performance at 30% of the load (Tr 30°C)	%	109
Combustion efficiency at nominal load	%	98.1
Combustion efficiency with reduced load	%	98.5
Casing heat loss with burner operating (Q <sub>n</sub> )	%	0.1
Net flue gas temperature tf-ta (min)(*)	°C	30
Net flue gas temperature tf-ta (max)(*)	°C	38
Maximum permitted temperature	°C	100
Maximum operating temperature	°C	80
Flue gas mass flow rate (min)	kg/h	49
Flue gas mass flow rate (max)	kg/h	190
Excess air	%	26.8
Heat loss at chimney with burner on (min)	%	1.50
Heat loss at chimney with burner on (max)	%	1.90
Minimum heating circuit pressure	bar	0.5
Maximum heating circuit pressure	bar	6
Boiler maximum allowable working pressure	bar	8
Water content	l	80
Methane gas consumption G20 (pow.sup. 20 mbar) at Q <sub>n</sub>	m <sup>3</sup> /h	12.16
Methane gas consumption G20 (pow.sup. 20 mbar) at Q <sub>min</sub>	m <sup>3</sup> /h	3.17
Gas consumption G25 (pow.sup. 20/25 mbar) at Q <sub>n</sub>	m <sup>3</sup> /h	14.14
Gas consumption G25 (pow.sup. 20/25 mbar) at Q <sub>min</sub>	m <sup>3</sup> /h	3.69
Propane gas consumption (pow. sup. 37/50 mbar) at Q <sub>n</sub>	kg/h	8.93
Propane gas consumption (pow. sup. 37/50 mbar) at Q <sub>min</sub>	kg/h	2.33
Chimney base maximum pressure available	Pa	70
Max condensate production	kg/h	18.5
<b>Emissions</b>		
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	28
NO <sub>x</sub> at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	62
NO <sub>x</sub> Class		6
<b>Electrical data</b>		
Power supply voltage/frequency	V/Hz	230/50
Fuse on the power supply	A (R)	6.3
Protection rating	IP	X4D

Room Temperature = 20°C.

(\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)

Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs < = 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K – P<sub>stby</sub> – See Erp Table

Standstill electrical consumption – P<sub>sb</sub> – See Erp Table

# MULTIINOX 250÷1000



BREVETTO  
**Unical**  
PATENT

smoke pipes

## LARGE WATER CONTENT, CONDENSING MODULAR BOILER

OUTPUT RANGE

from 250 to 1000 kW

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

Natural Gas or LPG

MODELS

250

375

500

625

750

875

1000

Boiler body entirely in stainless steel - large water content - two return connections  
wide modulation ratio premix burners - predisposed for outdoor installation IPX5D

## MAIN COMPONENTS

**MULTINOX** is a modular gas boiler constituted by a whole of large water content condensing modules in stainless steel AISI 316L, and complete of modulating premix burners, suitable for both, indoor and outdoor installation.

**MULTINOX** can be assembled in battery, in order to create a modular heat generator, so that to increase its total capacity.

The construction satisfies completely the prescriptions given in the EN 303-1.

The components of the pressure vessel parts, such plates and pipes, are built in stainless steel AISI 316L, according to the tables EURONORM 25 and EURONORM 28. The welders and the WPS (Welding Procedure Specifications) are approved by Notified Bodies.

The outer shell of the each module is covered by a mineral wool mattress, 80 mm thick, protected, at its turn, by a tearing resistant foil.

Each module is constituted from:

- downward reversed furnace with direct flame.
- tube bundle composed of patented progressive pipes in stainless steel AISI 316L with, inside, multi-fin inserts in Al/Si/Mg, that assures: functional outflow of the condensates, absence of wet acidic deposits, self cleaning for gravity of the exchange surfaces.
- two C.H. Return collectors, for high and low temperature, that can be connected on both, front and rear part the modules group
- smoke chamber in stainless steel with connexion for condensate evacuation and level control.
- combustion chamber doors with shock absorbing closing system
- the control panel board with Master thermoregulator (HSCP), inside the casing
- Premix modulating burners down ward oriented

- two 1/2" connections for bulb holders with inside diameter of 15 mm (able to accept 3 bulbs each).
- casing side panels provided with holes for cable glands (for lodging the electrical supply and other auxiliary devices cable).
- Safeties: each module is equipped with its own safety valve set at 5.4 bar.
- Air / gas mixing at constant  $CO_2$  on the whole range of modulation (modulation ratio, of every single module, of 1:4)
- Global modulation ratio up to 1:31

Easy handling with forklift, transpallet or with crane through the upper hooks.

**The logic of operation foresees the optimization of the operation in this way:**

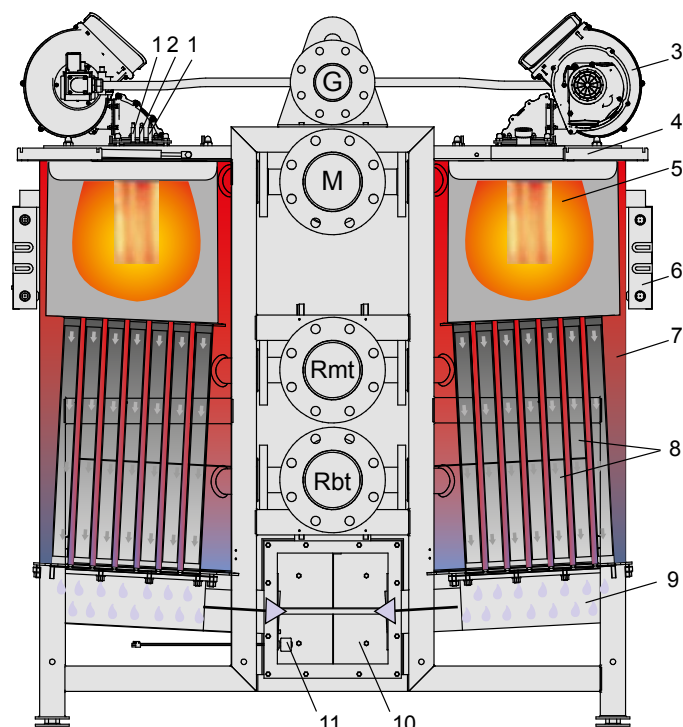
- Distribution of the power on the largest possible number of modules in order to work at the smallest possible output (down up to 30 kW) for the obtainment of the maximum efficiency.
- Automatic system of distribution of the working hours among the different modules in order to guarantee an homogeneous exploitation (optimal).

**Optional accessories:**

- Multifunction PCBs of zones management
- Modulating pumps
- Complete additional safety devices kit
- Modules preassembled in factory
- Transportation: the boilers up to the model 500 are sent pre-assembled in groups of 2 - 3 or 4 modules; for the models from 625 to 1000 they are sent in 2 groups: one of 4 modules and one group with the remaining modules. The casing is always sent packaged separately.
- Different way of delivery can be agreed at the order stage.

Key:

- 1 - Ionization electrodes (2x)
- 2 - Ignition electrode
- 3 - Fan
- 4 - Combustion chamber door
- 5 - Chamber of combustion
- 6 - Electrical junction box
- 7 - Boiler water
- 8 - Smoke pipes in stainless steel with inside aluminum profiles
- 9 - Bacinella raccogli condensata
- 10 - Smoke chamber
- 11 - Condensate level sensor
- M - C.H. Flow
- Rmt - C.H. Return Medium Temperature
- Rbt - C.H. Return Low Temperature



## PRODUCT PLUS VALUES

■ **WIDE RANGE**

7 condensing gas models,  
with outputs from 250 to 1000 kW

■ **FOR DIRECT OUTDOOR INSTALLATION (IPX5D)**■ **MAXIMUM EFFICIENCY**

up to 106.2% at the minimum modulated output

■ **HIGH MODULATION RATIO 1:31**

up to 1:31

■ **LARGE WATER CONTENT THERMAL ELEMENTS**

90 liters each

■ **VERTICAL THERMAL ELEMENTS ENTIRELY IN STAINLESS STEEL AISI 316L** complete with premix modulating burners and all safety devices■ **SPECIAL SMOKE PIPES (Unical patent)**

in stainless steel with multifin, high thermal conductivity aluminium alloy (Al/Si/Mg) inserts, on purpose designed to improve the condensates evacuation and to optimize the water circulation.

■ **CYLINDRICAL COMBUSTION CHAMBER**

with passing flame

■ **SMOKE NON RETURN VALVE**■ **STANDARDIZED HYDRAULIC MANIFOLDS** without interceptions between the elements and hydraulically balanced■ **ELECTRONIC CONTROL PANEL BOARD**

**Ufly P** with proportional regulation of one/all thermal elements

■ **SEASONAL EFFICIENCY + 30%**

in comparison to the conventional boilers

■ **MODULATING PUMP (optional)**

directly managed by the panel board to assure the maximum condensation at all regimes

■ **COMPACT DIMENSIONS**

height 1740 mm

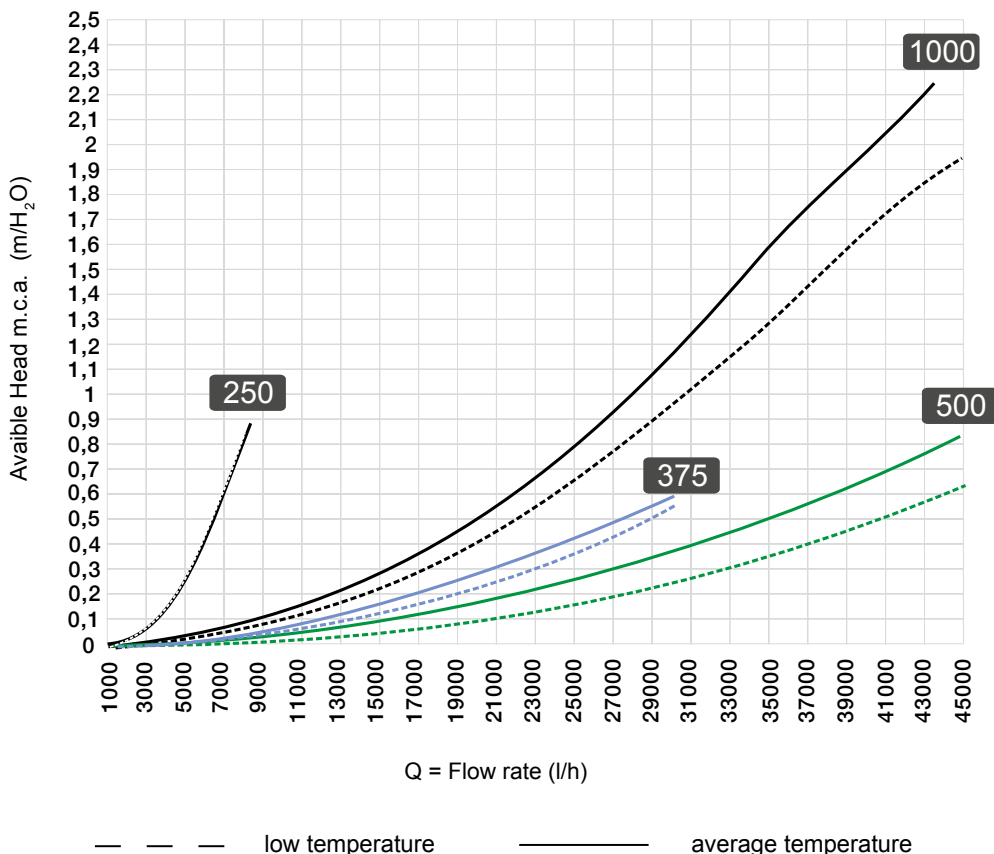
width 1675 mm

depth 870 to 2830 mm

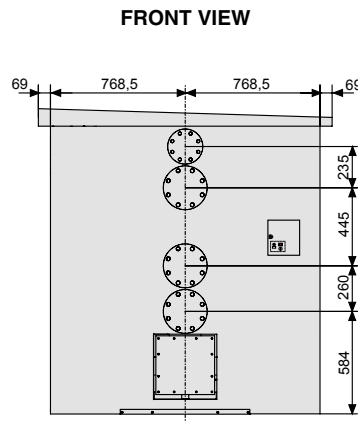
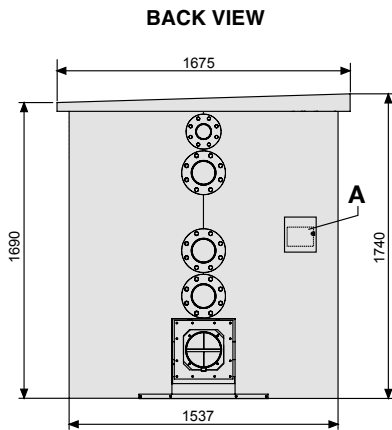
■ **FOR IN BATTERY MOUNTING**

to constitute complex THERMAL MODULES and to increase the total output

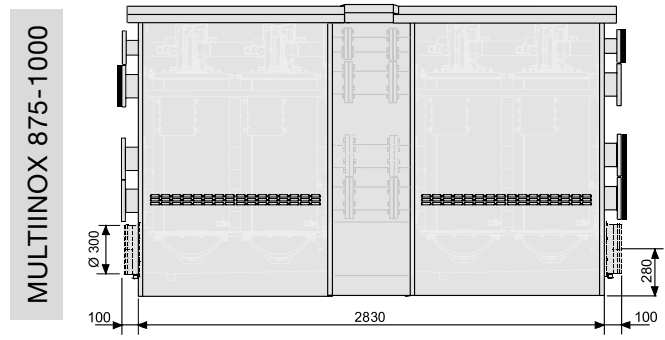
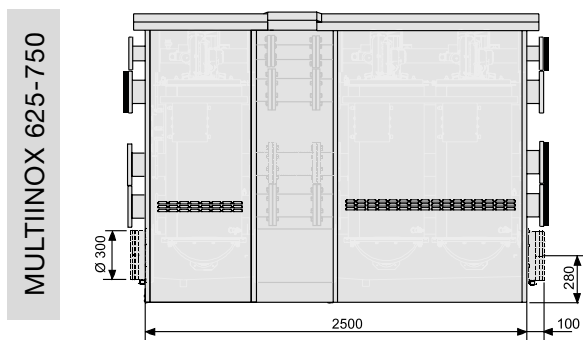
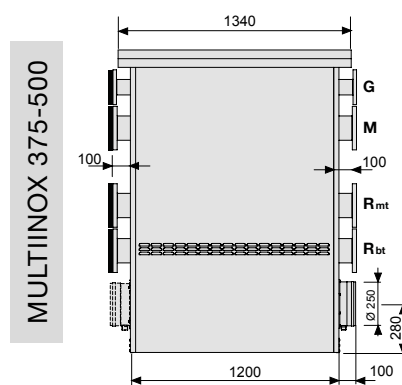
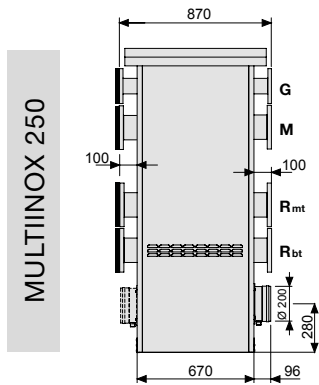
## DIAGRAM OF FLOW RATE/PRESSURE AVAILABLE FOR INSTALLATION



DIMENSIONS



SIDE VIEW



MULTINOX		250	375	500	625	750	875	1000
<b>Dimensions</b>		<b>(M)</b>	<b>(M)</b>	<b>(M)</b>	<b>(M+S)</b>	<b>(M+S)</b>	<b>(M+S)</b>	<b>(M+S)</b>
Modules Number		2	3	4	2+3	2+4	4+3	4+4
Height	mm	1740	1740	1740	1740	1740	1740	1740
Total depth	mm	670	1200	1200	2500	2500	2830	2830
Width "L"	mm	1675	1675	1675	1675	1675	1675	1675
<b>Connections dimensions</b>								
Gas connection G	DN mm (inch)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)	80 (3)
C.H. Flow M	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
C.H. Return Rmt (middle temp.)	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
I return plant Rbt (low temp.)	DN mm (inch)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)	125 (5)
Smoke manifold	mm	300	300	300	300	300	300	300
Chimney connection	mm	200	250	250	300	300	350	350
Condensate evacuation	mm	40	40	40	40	40	40	40
Net weight	kg	625	977	1250	1602	1875	2227	2500

## TYPE AND SHAPE OF FURNACE

The thermal modules MULTIINOX are endowed with a truncated cone shaped furnace in which the flame develops.

The smokes are carried downward and are distributed in the multifinned pipes slightly tilted to favor a better thermal exchange with the boiler water.

The combustion gases are collected in the underlying smoke chamber and from here are sent to the chimney.

During the burner operation, within the operation field of the boiler, the combustion chamber is always under positive pressure.

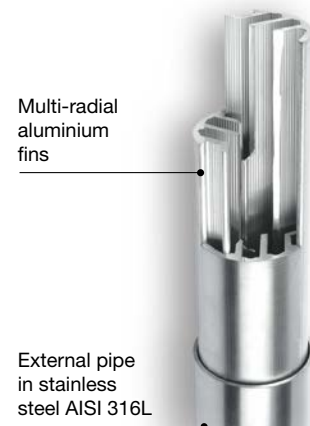
- Boiler body with vertical bundle vertical integrally in stainless steel.
- Smoke pipes of diameter 42.4 mm in stainless steel, with self-cleaning multifin inserts in aluminum/silicon/magnesium.

## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration

BREVETTO  
**Unical**  
PATENT



## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MULTIINOX			250	375	500	625	750	875	1000
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	227	340					
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	92	93					
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>		<b>A</b>	<b>A</b>	*	*	*	*	*	*
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>									
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	226.6	340.2					
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	89	89					
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	74.0	110.8					
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	97	97					
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO					
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>									
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.313	0.470	0.626	0.782	0.939	1.095	1.252
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0.035	0.035	0.035	0.035	0.035	0.035	0.035
STANDBY MODE	$P_{SB}$	kW	0.010	0.010	0.010	0.010	0.010	0.010	0.010
<b>OTHER ELEMENTS</b>									
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.460	0.690					
NITROGEN OXIDES EMISSIONS referred to NCV & (GCV)	$NO_x$	mg/kWh	59 (53)	60 (54)					
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	706	1059					

\* (Appliances not covered by Directive 2009/15 / EC)

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

MULTIINOX		250	375	500	625	750	875	1000
Modell (M+S = Master + Slave)		(M)	(M)	(M)	(M+S)	(M+S)	(M+S)	(M+S)
Number of thermal modules		2	3	4	2+3	2+4	4+3	4+4
Boiler category		II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>	II <sub>2H3P</sub>
Modulation ratio		1:7.76	1:11.5	1:15	1:19	1:23	1:27	1:31
Rated heat output on P.C.I. Qn	kW	230	345	460	575	690	805	920
Minimum heat output on P.C.I. Qmin	kW	30	30	30	30	30	30	30
Rated useful power (Tr 60 / Tm 80 °C) Pn	kW	226.6	340.2	453.2	568.9	681.9	796.3	913.5
Minimum useful power (Tr 60 / Tm 80 °C) Pn min	kW	31.3	31.3	31.3	31.3	31.3	31.3	31.3
Rated useful power (Tr 30 / Tm 50 °C) Pcond	kW	257.6	353.3	471.0	588.2	706.6	822.7	934.7
Minimum useful power (Tr 30 / Tm 50 °C) Pcond min	kW	31.85	31.85	31.85	31.85	31.85	31.85	31.85
Rated power performance (Tr 60 / Tm 80°C)	%	98.5	98.6	98.5	98.95	98.8	98.9	99.3
Minimum power performance (Tr 60 / Tm 80°C)	%	104.2	104.2	104.2	104.2	104.2	104.2	104.2
Rated power performance (Tr 30 / Tm 50°C)	%	103.9	102.4	102.4	102.3	102.4	102.2	102.6
Minimum power performance (Tr 30 / Tm 50°C)	%	106.2	106.2	106.2	106.2	106.2	106.2	106.2
Performance at 30% of the load (Tr 30°C)	%	107.7	107.7	107.7	107.7	107.7	107.7	107.7
Combustion efficiency at nominal load	%	98.0	98.0	98.0	98.0	98.0	98.0	98.0
Combustion efficiency with reduced load	%	98.5	98.5	98.5	98.5	98.5	98.5	98.5
Heat loss at chimney with burner on	%	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat loss at chimney with burner off	%	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta (min)(*)	°C	30.9	30.9	30.9	30.9	30.9	30.9	30.9
Net flue gas temperature tf-ta (max)(*)	°C	38.2	38.2	38.2	38.2	38.2	38.2	38.2
Maximum permitted temperature	°C	100	100	100	100	100	100	100
Maximum operating temperature	°C	80	80	80	80	80	80	80
Flue gas mass flow rate (min)	kg/h	49.1	49.1	49.1	49.1	49.1	49.1	49.1
Flue gas mass flow rate (max)	kg/h	260.7	391.1	521.4	651.8	782.2	912.5	1042.9
Excess air	%	25.59	25.59	25.59	25.59	25.59	25.59	25.59
Heat loss at chimney with burner on (min)	%	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Heat loss at chimney with burner on (max)	%	1.91	1.91	1.91	1.91	1.91	1.91	1.91
Minimum heating circuit pressure	bar (kPa)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)	0.5 (50)
Maximum heating circuit pressure	bar (kPa)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)	6 (600)
Water content	l	208	301	401	509	570	702	802
Methane gas consumption G20 (pow.sup. 20 mbar) at Qn	m <sup>3</sup> /h	24.3	36.5	48.6	60.8	73	85.1	97.3
Methane gas consumption G20 (pow.sup. 20 mbar) at Qmin	m <sup>3</sup> /h	3.17	3.17	3.17	3.17	3.17	3.17	3.17
Gas consumption G25 (pow.sup. 20/25 mbar) at Qn	m <sup>3</sup> /h	28.3	42.4	56.6	70.7	84.9	99.0	113.1
Gas consumption G25 (pow.sup. 20/25 mbar) at Qmin	m <sup>3</sup> /h	3.69	3.69	3.69	3.69	3.69	3.69	3.69
Propane gas consumption (pow. sup. 37/50 mbar) at Qn	kg/h	17.9	26.8	35.7	44.6	56.3	62.5	71.4
Propane gas consumption (pow. sup. 37/50 mbar) at Qmin	kg/h	2.33	2.33	2.33	2.33	2.33	2.33	2.33
Chimney base maximum pressure available	Pa	70	70	70	70	70	70	70
Max condensate production	kg/h	37	56	74	93	111	130	148
<b>Emissions</b>								
CO at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	32	32	32	32	32	32	32
NO <sub>x</sub> at maximum heat output with 0% of O <sub>2</sub>	mg/kWh	71	72	73	73	73	73	73
NO <sub>x</sub> Class		6	6	6	6	6	6	6
<b>Electrical data</b>								
Power supply voltage/frequency	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Fuse on the power supply	A (F)	6.3	6.3	6.3	6.3	6.3	6.3	6.3
Protection rating	IP	X5D	X5D	X5D	X5D	X5D	X5D	X5D

Room Temperature = 20°C (\*) Temperatures detected with the unit in operation (Tr 60 / Tm 80°C)

Seasonal Efficiency  $\eta_s$  according to Directive 2009/125/EC for Outputs < = 400 kW. See Erp Table

Standstill heat losses at  $\Delta t$  30K – P<sub>stby</sub> – See Erp Table

Standstill electrical consumption – P<sub>sb</sub> – See Erp Table



# XC-K oil (oil/gas)



BREVETTO  
**Unical**  
PATENT

smoke pipes

## VERY LOW TEMPERATURE, CONDENSING, PRESSURIZED BOILER

OUTPUT RANGE

From 69 kW Output (67 kW Input) to 1550 kW Output (1520 kW Input)

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

Pressure jet oil burner, in version two stage, two stage progressive and modulating, biodiesel or dual fuel (gas / oil)

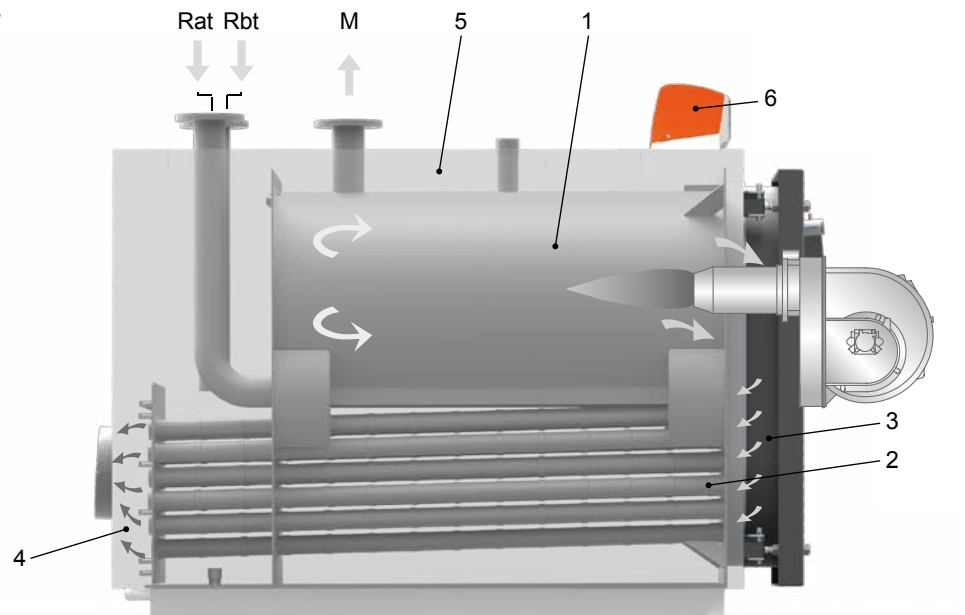
MODELS

69	100	150	230	300	350	400
500	650	850	1000	1300	1550	-

Large water content  
special smoke pipes in AISI 316L, with inserts and turbulators in AISI 304

## MAIN COMPONENTS

1. Furnace
  2. Smoke pipes with smoke diverters
  3. Door with flame sight glass
  4. Smoke chamber
  5. Body insulation
  6. Panel board
- M Flow  
Rbt Low temperature return  
Rat High temperature return  
(Burner isn't supplied with)

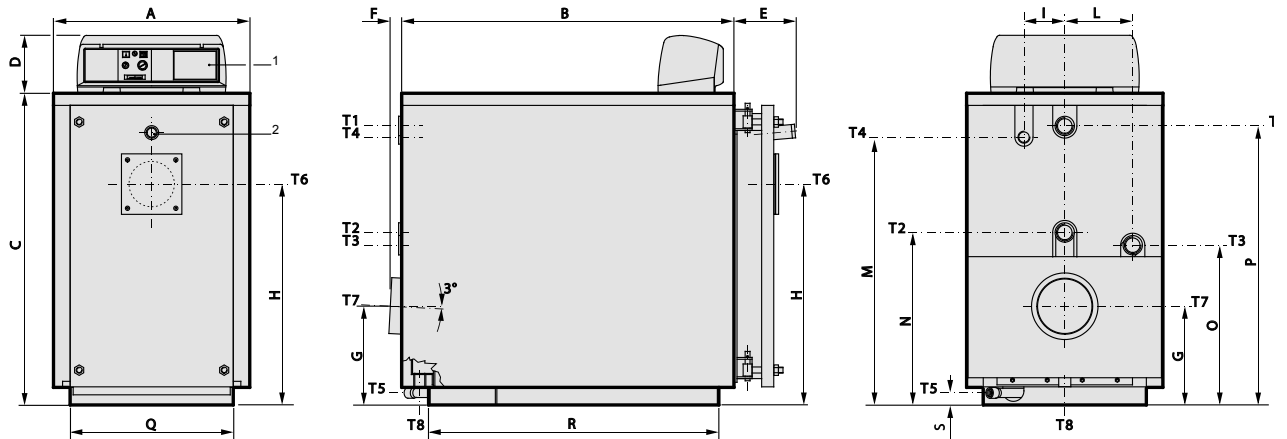


## PLUS PRODOTTO

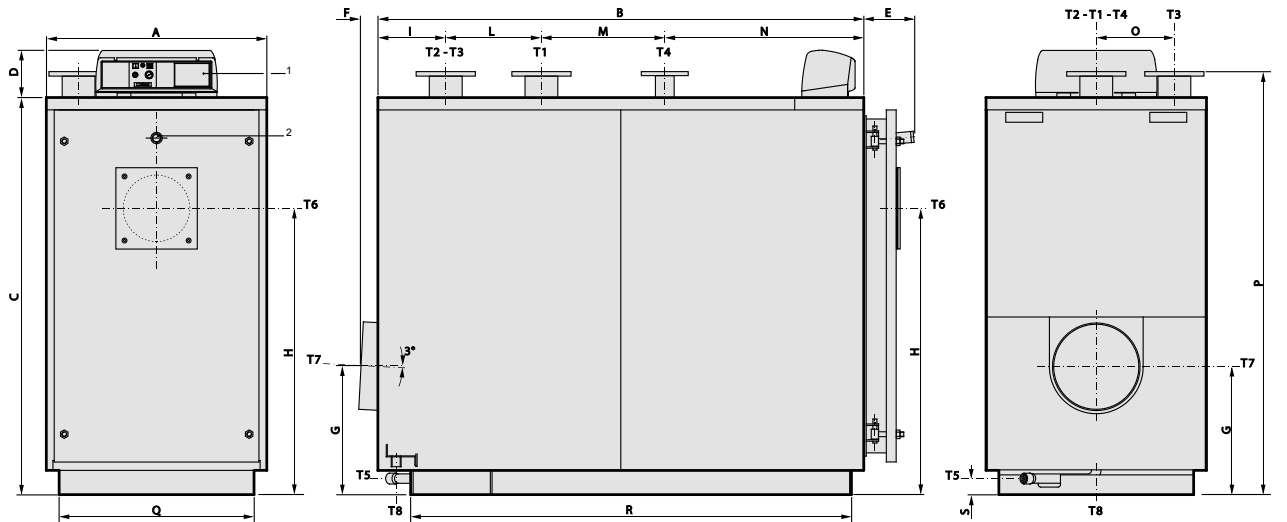
- **EFFICIENCY**  
102% at full load  
104% at part load in condensation mode
- **COMBUSTION CHAMBER** in stainless steel AISI 316L, entirely water cooled, above the tube bundle, so that the assembly could form a structure apt to favour the thermal exchange and the evacuation of the condensate.
- **WATER RUN**  
guided and braked inside the body
- **Special “progressive” and PATENTED SMOKE PIPES** in stainless steel AISI 316L with, inside, 6 special sectorial pipes and turbulators in AISI 304, that guarantee a very high heat exchange and resistance to the condensate.  
Tube bundle slightly inclined towards the smoke chamber in order:
  - to let the condensate to be collected over there
  - to avoid the acidic wet deposits remain in the pipes
  - to clean, thanks to the gravity, the exchange surfaces
- **OPTIMUM QUIETNESS** of operation thanks to the low counter-pressure in the smoke side
- **FRONT DOOR IN STEEL** with insulation in special superlight refractory cement (able to reduce more than 30% the heat losses by radiation)
- C.H. Flow connection placed on the rear upper part and two return connections, for low and high temperature, in the lower part. For models 69 and 100 the Flow and Return connections are towards the back side; for models 250 to 1550 Flow and Return connections are towards the upper side (as shown in the picture)
- The high temperature return connection is placed so that it doesn't interfere with the low temperature return connection
- The low temperature return connection is placed on the extension of the lower outer shell to that it can exploit at the maximum the heat recover
- **ADJUSTABLE DOOR**  
with reversible opening (from RH side or from LH side: standard execution with the hinges on the LH side)
- **CONTROL PANEL BOARD**  
with electronic thermoregulation E8, that allows the control of modulating burners
- **PRESETTING FOR CASCADE OPERATION** up to 8 boilers, with an additional optional E8
- Easy installation of the burner through burner supporting plate, pre-drilled on request
- Two bulb holders 1/2", with internal dia. 15 mm for temperature sensors and thermostat bulbs (3 bulbs each)
- **REAR SMOKE CHAMBER** in stainless steel AISI 304, with connection for condensate drain
- **VERY STRONG INSULATION** of the boiler body in fabric-finish mineral wool, 100 mm thick
- **CONSTRUCTION** according to EN 303-1
- **CLEANING AND SERVICING** made easy by the self-drain of the condensate in the smoke pipes, inclined towards the smoke chamber
- **LIFTING HOOKS** for transport and handling
- Option: Acidic condensate inhibitor, specific for oil

DIMENSIONS XC-K oil 69÷400

XC-K oil 69÷100



XC-K oil 150÷400



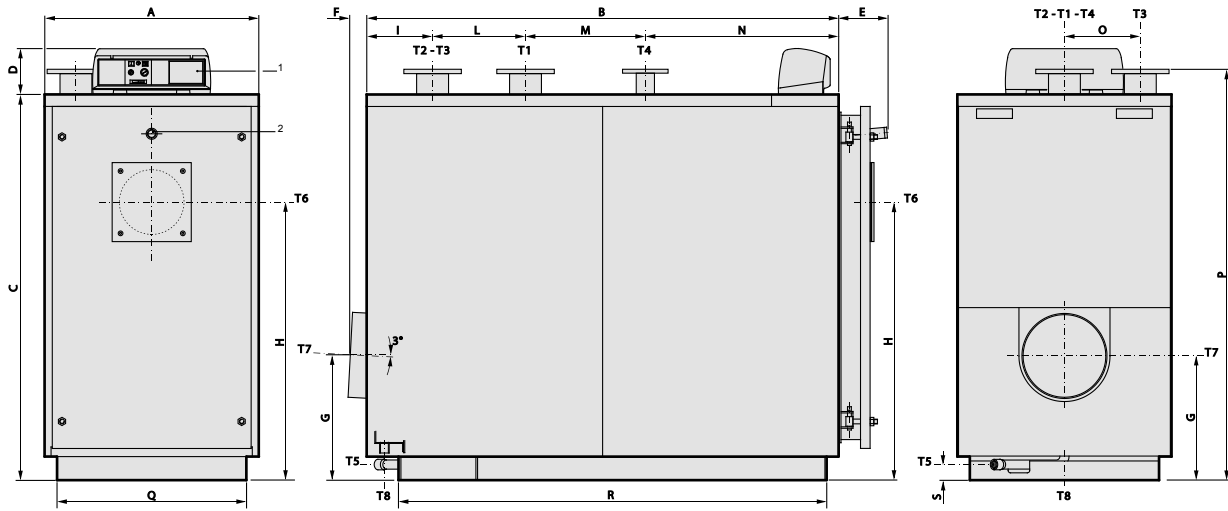
- 1 Panel board
- 2 Flame sight glass
- T1 C.H. flow
- T2 Low temperature C.H. return
- T3 High temperature C.H. return
- T4 Expansion vessel connection
- T5 Boiler drain
- T6 Burner connection
- T7 Chimney connection
- T8 Condensation drain

XC-K oil	Max Temperature allowable	Boiler capacity	Maximum operating pressure boiler	Weight	CONNECTIONS						
					T1 - T2	T3	T4	T5	T6	T7	T8
					ISO 7/1 UNI2276 PN6	ISO 7/1 UNI2276 PN6	ISO 7/1	ISO 7/1	Ø	Øi	Øe
°C	l	bar	kg					mm	mm	mm	
69	100	140	6	365	Rp 2	Rp 2	Rp 1/4	Rp 1/4	150	182	40
100	100	140	6	365	Rp 2	Rp 2	Rp 1/4	Rp 3/4	150	182	40
150	100	260	6	525	DN 65	DN 65	Rp 1 1/2	Rp 3/4	180	202	40
230	100	305	6	660	DN 80	DN 80	Rp 2	Rp 1	180	252	40
300	100	332	6	800	DN 80	DN 80	Rp 2	Rp 1	180	252	40
350	100	544	6	1007	DN 100	DN 100	Rp 2	Rp 1	220	302	40
400	100	515	6	1137	DN 100	DN 100	Rp 2	Rp 1	220	302	40

XC-K oil	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
69	650	1100	1032	190	205	37	329	730	135	225	885	570	528	922	540	961	40
100	650	1100	1032	190	205	37	329	730	135	225	885	570	528	922	540	961	40
150	720	1450	1132	190	205	48	374	790	255	320	250	625	255	1248*	610	1311	45
230	790	1465	1282	190	235	55	402	900	231	359	250	625	275	1385*	680	1314	60
300	790	1755	1282	190	235	65	402	900	271	379	450	655	275	1385*	680	1614	60
350	854	1770	1472	190	270	67	494	1062	306	358	500	606	306	1585*	750	1606	65
400	854	1940	1472	190	270	67	494	1062	306	358	500	776	306	1585*	750	1776	65

(\*) Minimum dimensions for boiler room access.

DIMENSIONS XC-K oil 500÷1550



- 1** Panel board
- 2** Flame sight glass
- T1** C.H. flow
- T2** Low temperature C.H. return
- T3** High temperature C.H. return
- T4** Expansion vessel connection
- T5** Boiler drain
- T6** Burner connection
- T7** Chimney connection
- T8** Condensation drain

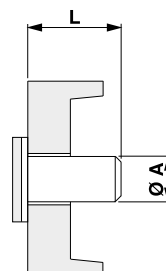
XC-K oil	Max Temperature allowable °C	Boiler capacity l	Maximum operating pressure boiler bar	Weight kg	CONNECTIONS						
					T1 - T2	T3	T4	T5	T6 Ø	T7 Øi	T8 Øe
					UNI2276 PN6	UNI2276 PN6	UNI2276 PN6	ISO 7/1	mm	mm	mm
500	100	625	6	1376	DN 125	DN 125	DN 65	Rp 1	270	352	40
650	100	664	6	1613	DN 125	DN 125	DN 65	Rp 1	270	352	40
850	100	1107	6	2158	DN 150	DN 150	DN 80	Rp 1½	320	402	40
1000	100	1157	6	2443	DN 150	DN 150	DN 80	Rp 1½	320	402	40
1300	100	1936	6	3458	DN 200	DN 200	DN 100	Rp 1½	320	452	40
1550	100	1904	6	3765	DN 200	DN 200	DN 100	Rp 1½	320	452	40

XC-K oil	A	B	C	D	E	F	G	H	I	L	M	N	O	P*	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
500	894	1970	1612	190	292	65	523	1161	275	388	500	807	316	1715	790	1787	65
650	894	2340	1612	190	292	65	523	1161	405	388	500	1047	316	1715	790	2157	65
850	1064	2360	1802	190	317	57	551	1287	289	624	900	547	390	1911	960	2157	55
1000	1064	2740	1802	190	317	57	552	1287	459	624	900	757	390	1911	960	2537	55
1300	1204	2980	2052	190	387	53	681	1493	372	563	785	1260	432	2165	1100	2752	95
1550	1204	3204	2052	190	387	54	681	1493	371	563	1010	1260	432	2165	1100	2977	95

(\*) Minimum dimensions for boiler room access.

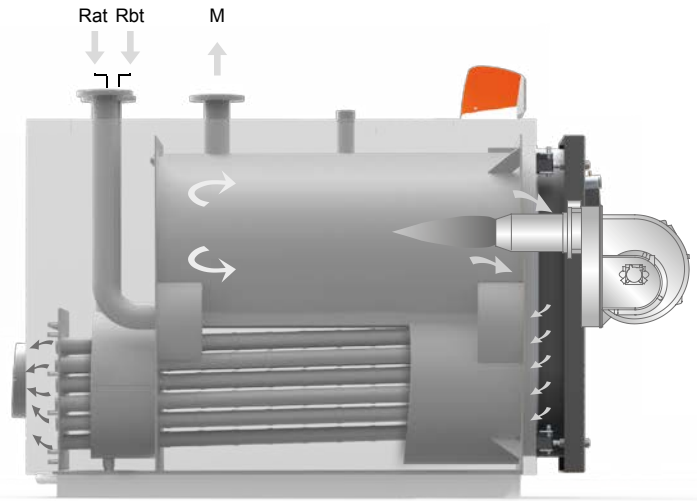
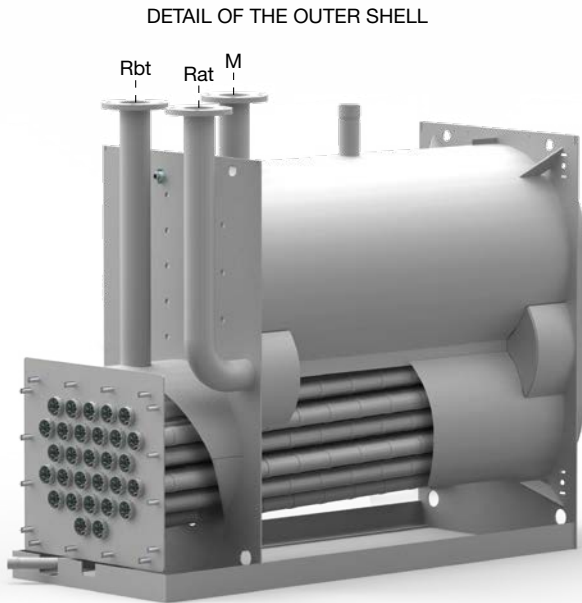
BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm
XC-K oil 69÷100	150	230
XC-K oil 150	180	230
XC-K oil 230÷300	180	270
XC-K oil 350÷400	220	300
XC-K oil 500÷650	270	320
XC-K oil 850÷1000	320	350
XC-K oil 1300÷1550	320	420



## TYPE AND SHAPE OF FURNACE

XC-K oil boilers are equipped with a blind cylindrical furnace, in which the central flame of the burner is reversed peripherally towards the front. When the combustion gases have reached the front part, they are sent through the door into the tubes of the third pass to reach the rear flue gas chamber and then the chimney.



M Flow  
Rbt Low temperature return  
Rat High temperature return

The combustion chamber is always pressurised while the burner is operating, within the power range of the boiler.

The chimney must be calculated so that no positive pressure is detected at its base.

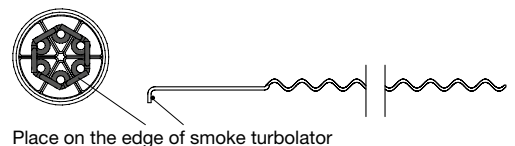
## SPECIAL SMOKE PIPES (patented)

Smoke pipes made in stainless steel AISI 316L, completely rolled on the six internal 60° sectorial pipes in AISI 304, with turbulators in AISI 304, assuring very high thermal exchange and resistance to the acidic condensate.

- The tube bundle is slightly inclined towards the smoke chamber, in order:
  - to let the condensate to be collected over there
  - to avoid the acidic wet deposits remain in the pipes
  - to clean, thanks to the gravity, the exchange surfaces.



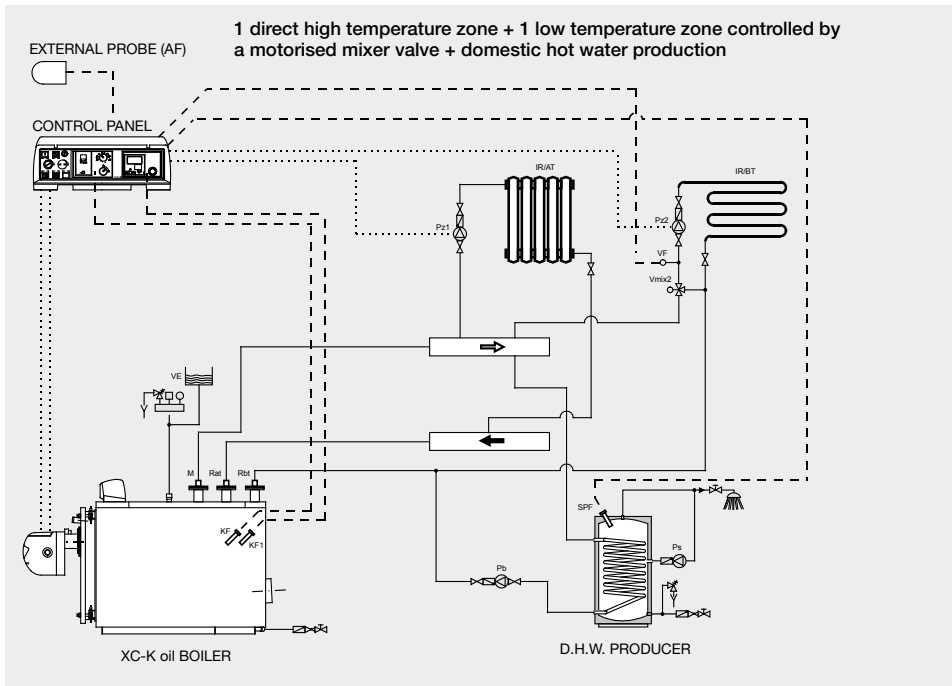
Smoking section tubes with placed turbulators



Note: Smoke turbulator are long as flue pipe

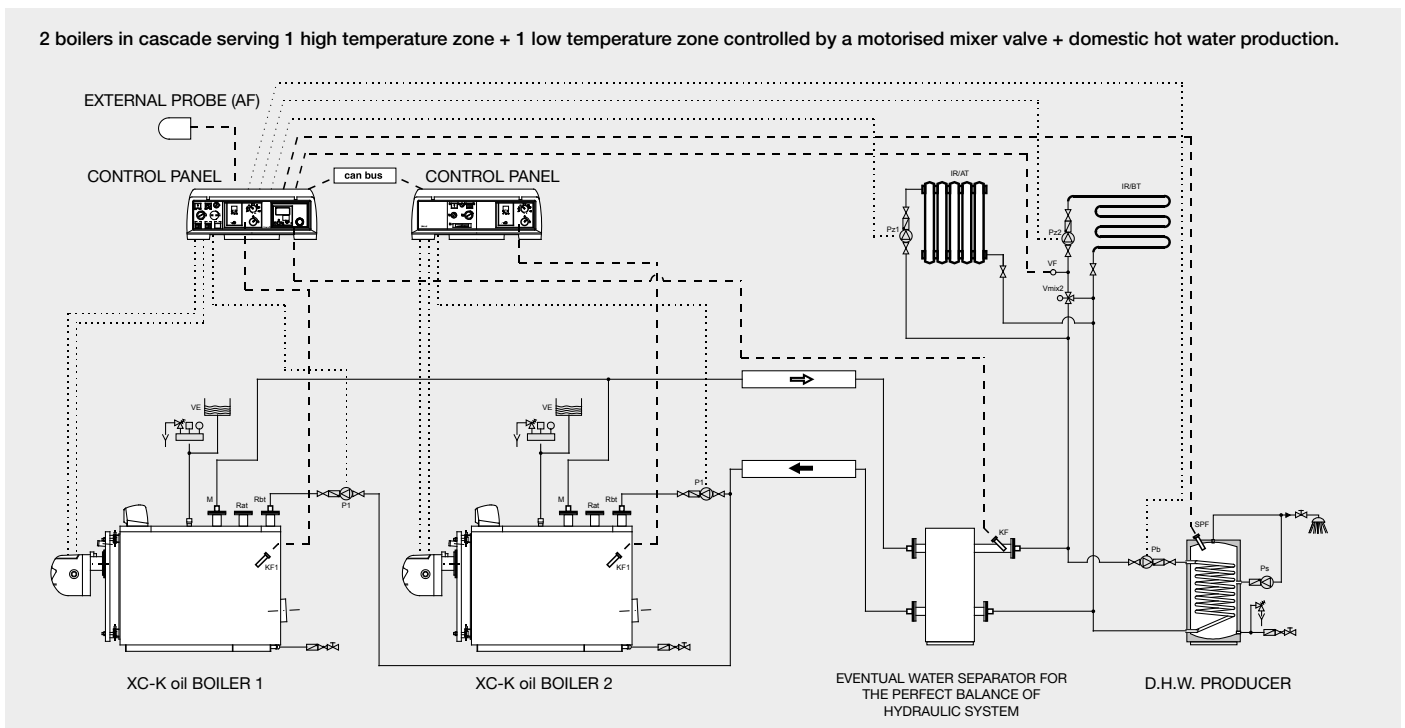


## BASIC SCHEMES OF SYSTEM OPERATION



- Key:
- M** flow
  - Rat** HIGH temperature return
  - Rbt** LOW temperature return
  - Vmix2** zone mixer valve (motorised)
  - Pz1** HIGH TEMPERATURE zone heating system pump
  - Pz2** LOW TEMPERATURE zone heating system pump
  - VE** expansion vessel
  - IR/AT** HIGH TEMPERATURE heating system distribution
  - IR/BT** LOW TEMPERATURE heating system distribution
  - Ps** DHW recirculation pump
  - Pb** DHW production charge pump
  - SPF** storage tank probe
  - KF** E8.5064 heat control boiler probe
  - KF 1** Lago Basic 0201 RV 1 heat control boiler probe
  - VF** flow probe
  - AF** external probe

## BASIC SCHEMES OF SYSTEM OPERATION WITH BOILERS IN BATTERY



- Key:
- M** flow
  - Rat** HIGH temperature return (NOT USED)
  - Rbt** LOW temperature return
  - Vmix2** zone mixer valve (motorised)
  - Pz1** HIGH TEMPERATURE zone heating system pump
  - Pz2** LOW TEMPERATURE zone heating system pump
  - VE** expansion vessel
  - IR/AT** HIGH TEMPERATURE heating system distribution
  - IR/BT** LOW TEMPERATURE heating system distribution
  - Ps** DHW recirculation pump
  - P1** circulation pump
  - Pb** DHW production charge pump
  - SPF** storage tank probe
  - KF** E8.5064 heat control boiler probe
  - KF 1** Lago Basic 0201 RV 1 heat control boiler probe
  - VF** flow probe
  - AF** external probe

Note: the references of these and further schemes are better described in the installation manuals that can be unloaded from the web site [www.unical.eu](http://www.unical.eu)

## TECHNICAL DATA


**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

XC-K oil (oil Fired)		69	100	150	230	300	350	400	500	650	850	1000	1300	1550
Nominal heat output (80°-60°C)	kW	66	86	134	202	278	327	385	482	626	789	963	1252	1492
Nominal heat output (50°-30°C)	kW	69	90	140	210	290	340	400	500	650	820	1000	1300	1550
Nominal Heat input	kW	67	88	137	206	284	333	392	491	637	804	980	1275	1520
Heat efficiency full load (80°-60°C)	%	97.8	97.8	97.8	97.9	97.9	98.0	98.2	98.2	98.2	98.2	98.2	98.2	98.2
Heat efficiency full load (50°-30°C)	%	102.5	102	102	102	102	102	102	102	102	102	102	102	102
Heat efficiency partial load 30% (retourn 30°C)	%	104	104	104	104	104	104	104	104	104	104	104	104	104
Flue gas temperature 80°C - 60°C (Tf - Ta)	°C	36	36	36	35	35	35	33	33	33	33	33	33	33
Flue gas temperature 50°C-30°C (Tf - Ta)	°C	22	22	22	22	22	22	22	22	22	22	22	22	22
CO <sub>2</sub> content	%	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1
Flue gas mass	kg/h	97	132	206	308	426	499	587	735	954	1204	1468	1908	2275
Combustion Efficiency 80°C-60°C	%	98.4	98.4	98.4	98.4	98.4	98.4	98.5	98.5	98.5	98.5	98.5	98.5	98.5
Combustion Efficiency 50°C-30°C	%	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
Heat loss at shell 80-60°C	%	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heat loss at shell 50-30°C	%	0.5	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Heat loss at chimney with burner ON 80-60°C	%	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Heat loss at chimney with burner ON 50-30°C	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Heat loss at chimney with burner OFF	%	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Maximum condensation production	l/h	5.5	5.5	8.6	12.8	17.7	20.8	24.4	30.6	39.7	50.1	61.1	79.5	94.7
Maximum boiler pressure from standard	mm c.a.	8.4	8.4	16.0	25.7	33.4	37.2	41.1	47.9	56.2	63.5	69.9	78.1	83.7
Boiler pressure	mm c.a.	5.8	5.8	11.2	13.0	25.0	29.7	37.0	43.1	50.6	52.7	62.8	70.3	75.3
Head losses H <sub>2</sub> O Δt 15	kPa	1.3	1.5	3.8	2.5	3.2	2.0	2.9	3.0	3.7	3.5	4.0	3.9	5.5
CO (0% O <sub>2</sub> )	mg/kWh	3.1	3.2	4.7	3.1	4.7	4.7	4.7	3.1	4.7	4.7	4.7	4.7	4.7


XC-K oil (gas Fired)		69	100	150	230	300	350	400	500	650	850	1000	1300	1550
Nominal heat output (80°-60°C)	kW	66	86	134	202	279	327	385	482	626	790	963	1252	1493
Nominal heat output (50°-30°C)	kW	72	94	147	220	304	357	420	525	682	860	1049	1364	1626
Nominal Heat input	kW	67	88	137	206	284	333	392	491	637	804	980	1275	1520
Heat efficiency full load (80°-60°C)	%	97.8	97.8	97.8	97.9	98.0	98.1	98.2	98.2	98.2	98.2	98.2	98.2	98.2
Heat efficiency full load (50°-30°C)	%	107	107	107	107	107	107	107	107	107	107	107	107	107
Heat efficiency partial load 30% (retourn 30°C)	%	109	109	109	109	109	109	109	109	109	109	109	109	109
Flue gas temperature 80°C - 60°C (Tf - Ta)	°C	34	34	34	34	32	31	31	31	31	31	31	31	31
Flue gas temperature 50°C-30°C (Tf - Ta)	°C	22	22	22	22	22	22	22	22	22	22	22	22	22
CO <sub>2</sub> content	%	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Flue gas mass	kg/h	97	127	198	296	409	480	565	707	918	1158	1412	1835	2188
Combustion Efficiency 80°C-60°C	%	98.4	98.4	98.4	98.4	98.5	98.5	98.5	98.5	98.5	98.5	98.5	98.5	98.5
Combustion Efficiency 50°C-30°C	%	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
Heat loss at shell 80-60°C	%	0.6	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Heat loss at shell 50-30°C	%	0.5	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Heat loss at chimney with burner ON 80-60°C	%	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Heat loss at chimney with burner ON 50-30°C	%	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Heat loss at chimney with burner OFF	%	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Maximum condensation production	l/h	11.4	14.9	23.2	34.8	48.1	56.4	66.3	83.0	107.8	136.0	165.9	215.6	257.1
Maximum boiler pressure from standard	mm c.a.	8.4	8.4	15.0	23.4	30.0	33.3	36.7	41.2	51.4	61.1	69.4	80.4	87.8
Boiler pressure	mm c.a.	5.8	5.8	11.0	13.0	24.8	29.5	36.7	42.7	50.1	56.7	62.4	69.9	74.9
Head losses H <sub>2</sub> O Δt 15	kPa	1.3	1.5	3.8	2.5	3.2	2.0	2.9	3.0	3.7	3.5	4.0	3.9	5.5
CO (0% O <sub>2</sub> )	mg/kWh	3.1	3.2	4.7	3.1	4.7	4.7	4.7	3.1	4.7	4.7	4.7	4.7	4.7

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

XC-K oil (oil fired)			69	100	150	230	300	350	400
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	66	86	134	202	278	327	385
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	93	93	93	93	93	93	93
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>				<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>									
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	66	86	134	202	278	327	385
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	91.3	91.3	91.3	91.4	91.4	91.5	91.7
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	20.9	27.5	42.8	64.23	88.7	104	122.4
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	93.7	93.7	93.7	93.7	93.7	93.7	93.7
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>									
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.390	0.390	0.470	0.600	0.600	0.600	1.400
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0	0	0	0	0	0	0
STANDBY MODE	$P_{SB}$	kW	0.050	0.050	0.050	0.050	0.050	0.050	0.050
<b>OTHER ELEMENTS</b>									
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.0335	0.0440	0.0690	0.1030	0.1420	0.1670	0.1960
NITROGEN OXIDES EMISSIONS	$NO_x$	mg/kWh	114	114	114	114	114	114	114

The models with an Output higher than 400 kW are not covered by the Directive 2009/125/CE

XC-K oil (gas fired)			69	100	150	230	300	350	400
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	66	86	134	202	279	327	385
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	94	94	94	94	94	94	94
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>				<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>									
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	66	86	134	202	279	327	385
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	88.1	88.1	88.1	88.2	88.3	88.4	88.5
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	21.9	28.9	44.9	67.3	93.0	109.0	128.2
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	98.2	98.2	98.2	98.2	98.2	98.2	98.2
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>									
WITH A FULL LOAD	$e_{l_{max}}$	kW	0.350	0.350	0.350	0.530	0.600	0.600	0.700
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	0	0	0	0	0	0	0
STANDBY MODE	$P_{SB}$	kW	0.050	0.050	0.050	0.050	0.050	0.050	0.050
<b>OTHER ELEMENTS</b>									
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0.0335	0.0440	0.0690	0.1030	0.1420	0.1670	0.1960
NITROGEN OXIDES EMISSIONS	$NO_x$	mg/kWh	64	64	64	64	64	64	64

The models with an Output higher than 400 kW are not covered by the Directive 2009/125/CE



# XC-K



BREVETTO  
**Unical**  
PATENT

smoke pipes

## CONDENSING STEEL BOILER

OUTPUT RANGE

from 124 kW (116 kW input) to 2160 kW

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

Natural Gas or LPG fed pressure jet burners

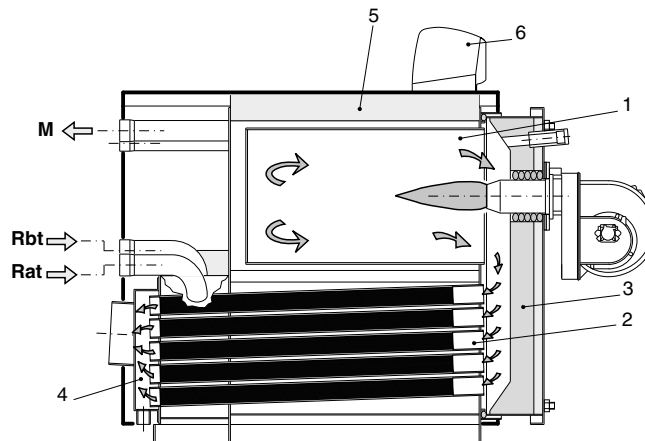
MODELS

124	200	290	400	480	570
700	900	1140	1420	1820	2160

large water content  
special smoke pipes in stainless steel AISI 316L with aluminium profiles

## MAIN COMPONENTS

1. Furnace
  2. Smoke pipes with smoke diverters
  3. Door with flame sight glass
  4. Smoke chamber
  5. Body insulation
  6. Board panel
- M Flow  
Rbt Low temperature return  
Rat High temperature return



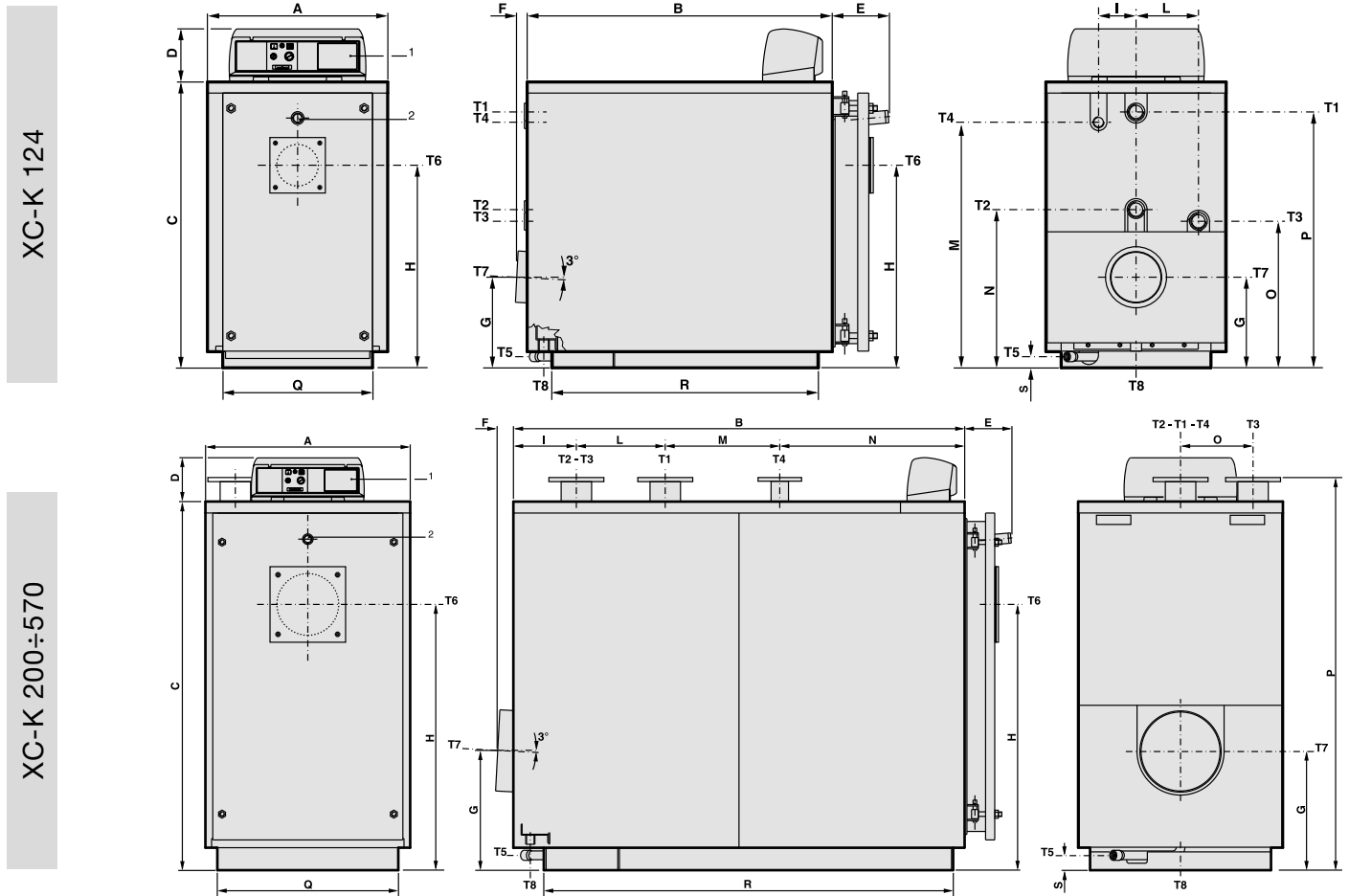
## TECHNICAL DATA

XC-K		124	200	290	400	480	570	700	900	1140	1420	1820	2160
NOMINAL INPUT	kW	115.9	186.9	271	373.8	448.6	532.7	654.2	841.1	1065.4	1327.1	1700.9	2018.7
NOMINAL OUTPUT 50/30°C	kW	124	200	290	400	480	570	700	900	1140	1420	1820	2160
NOMINAL OUTPUT 80/60°C	kW	112.8	182.7	265.6	367.1	440.7	523.3	642.6	826.2	1046.6	1303.6	1670.8	1983
EFFICIENCY AT NOMINAL LOAD in cond.	%	107	107	107	107	107	107	107	107	107	107	107	107
EFFICIENCY AT PART LOAD in cond.	%	109	109	109	109	109	109	109	109	109	109	109	109
EFFICIENCY AT NOMINAL LOAD in std.	%	97.3	97.8	98.2	98.2	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3
HEAT LOSSES THROUGH THE CASING (80/60°C)	%	0.76	0.38	0.23	0.17	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
MAX. CONDENSATE PRODUCTION	l/h	19.7	31.7	45.9	63.3	75.9	90.3	110.7	142.3	180.3	224.6	287.7	341.6
MASSIVE SMOKE FLOW RATE	kg/h	166.9	269.1	390.2	538.9	645.9	767	941.9	1211.1	1534	1910.8	2449	2906.6
MAX. NET SMOKE TEMP. tf-ta (80/60°C)	°C	44	43	40	37	37	37	37	37	37	37	37	37
MAX. NET SMOKE TEMP. tf-ta (50/30°C)	°C	22	22	22	22	22	22	22	22	22	22	22	22
CO <sub>2</sub> CONTENT	%	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
WEIGHT	kg	365	525	660	800	1007	1137	1376	1613	2158	2443	3458	3765

## PRODUCT PLUS VALUES

- VERY HIGH QUALITY OF THE EMPLOYED METALS**  
 Outer shell in high resistance carbon steel: smoke chamber in stainless steel AISI 316L
- PROGRESSIVE SMOKE PIPES (patented)**  
 With very high thermal exchange, stainless steel special progressive pipes, armoured on the outside, with inside multi-fin aluminium turbulators
- SELF-CLEANING OF THE TUBE BUNDLE**  
 thanks to the natural washout that the condensate produces for gravity
- ELECTRONIC BOARD MASTERMODUL (optional)**  
 Certified and equipped with:
  - Expandable electronic controller E8
  - Burner manager with modulating operation
- Prearrangement for cascade operation with CASCATAMODUL board panel (optional)**  
 Up to 8 off XC-K, managed by E8
- LEAST THERMAL LOSSES**  
 XC-K is insulated with a layer of 100 mm of thermal and acoustic mineral wool insulation material. Carbon steel door with thermal insulation in light cement
- MAXIMIZATION OF THE THERMAL EXCHANGE**  
 Outer shell with reversed flame structure: in the blind cylindrical furnace the first two passes of the combustion gases are completed; subsequently they take the particular tube bundle used for the third pass.
- VERY HIGH SAVING AND SEASONAL EFFICIENCY**  
 Thanks to the adoption of fan assisted modulating burners and to the hydraulic connection prearranged for two return connections (high / low temperature)
- CERTIFIED EFFICIENCY 109%**  
 at 30% part load
- SIMPLIFIED INSTALLATION**
  - Single smoke evacuation
  - No hydraulic interface between boiler and C.H. system
- WIDE RANGE OF REGULATION ACCESSORIES**
  - Zones expansion via E8.1124 controller
  - Temperature sensor for mixed zone flow connection
  - Sensor PT 1000 for management of solar panels with E8
  - Condensate neutralizers

DIMENSIONS XC-K 124÷570



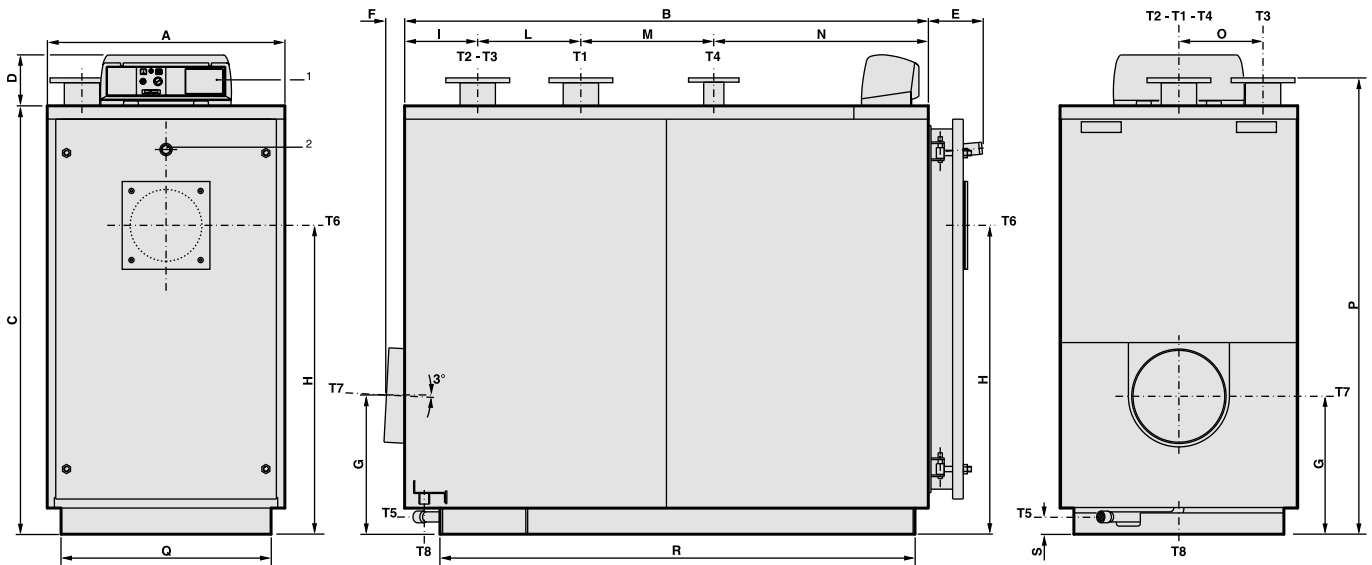
- 1 Panel board
- 2 Flame sight glass
- T1 C.H. flow
- T2 Low temperature C.H. return
- T3 High temperature C.H. return
- T4 Expansion vessel connection
- T5 Boiler drain
- T6 Burner connection
- T7 Chimney connection
- T8 Condensation drain

XC-K	Nominal output (80°-60°C)	Nominal output (50°-30°C)	Nominal input	Boiler capacity	Water pressure drops(**)	Flue gas pressure drop	Maximum boiler working pressure	Weight	CONNECTIONS						
									T1 T2	T3	T4	T5	T6 Ø	T7 Øi	T8 Øe
	kW	kW	kW	l	kPa	daPa	bar	kg	UNI 2276 PN6	UNI 2276 PN6	UNI 2276 PN6	ISO 7/1	mm	mm	mm
124	112.8	124	115.9	140	1.5	9.8	6	365	Rp 2	Rp 2	Rp 1¼	Rp ¾	150	182	40
200	182.7	200	186.9	260	3.8	18.6	6	525	DN 65	DN 65	Rp 1½	Rp ¾	180	202	40
290	265.6	290	271	305	2.5	25.4	6	660	DN 80	DN 80	Rp 2	Rp 1	180	252	40
400	367.1	400	373.8	332	3.2	32.3	6	800	DN 80	DN 80	Rp 2	Rp 1	180	252	40
480	440.7	480	448.6	544	2	34.3	6	1007	DN 100	DN 100	Rp 2	Rp 1	220	302	40
570	523.3	570	532.7	515	2.9	39.2	6	1137	DN 100	DN 100	Rp 2	Rp 1	220	302	40

XC-K	A	B	C	D	E	F	G	H	I	L	M	N	O	P*	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
124	650	1100	1032	190	205	37	329	730	135	225	885	570	528	922	540	961	40
200	720	1450	1132	190	205	48	374	790	255	320	250	625	255	1248	610	1311	45
290	790	1465	1282	190	235	55	402	900	231	359	250	625	275	1385	680	1314	60
400	790	1755	1282	190	235	65	402	900	271	379	450	655	275	1385	680	1614	60
480	854	1770	1472	190	270	67	494	1062	306	358	500	606	306	1585	750	1606	65
570	854	1940	1472	190	270	67	494	1062	306	358	500	776	306	1585	750	1776	65

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

DIMENSIONS XC-K 700÷2160



- 1 Panel board
- 2 Flame sight glass
- T1 C.H. flow
- T2 Low temperature C.H. return
- T3 High temperature C.H. return
- T4 Expansion vessel connection
- T5 Boiler drain
- T6 Burner connection
- T7 Chimney connection
- T8 Condensation drain

XC-K	Nominal output (80°-60°C)	Nominal output (50°-30°C)	Nominal input	Boiler capacity	Water pressure drops(**)	Flue gas pressure drop	Maximum boiler working pressure	Weight	CONNECTIONS						
									T1 T2	T3	T4	T5	T6 Ø	T7 Øi	T8 Øe
	kW	kW	kW	l	kPa	daPa	bar	kg	UNI 2276 PN6	UNI 2276 PN6	UNI 2276 PN6	ISO 7/1	mm	mm	mm
700	642.6	700	654.2	625	3	46	6	1376	DN 125	DN 125	DN 65	Rp 1	270	352	40
900	826.2	900	841.1	664	3.7	58.8	6	1613	DN 125	DN 125	DN 65	Rp 1	270	352	40
1140	1046.6	1140	1065.4	1107	3.5	73.5	6	2158	DN 150	DN 150	DN 80	Rp 1½	320	402	40
1420	1303.6	1420	1327.1	1157	4	88.2	6	2443	DN 150	DN 150	DN 80	Rp 1½	320	402	40
1820	1670.8	1820	1700.9	1936	3.9	90.2	6	3458	DN 200	DN 200	DN 100	Rp 1½	320	452	40
2160	1983	2160	2018.7	1904	5.5	98	6	3765	DN 200	DN 200	DN 100	Rp 1½	320	452	40

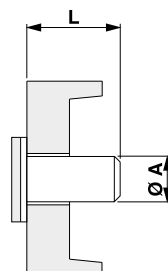
XC-K	A	B	C	D	E	F	G	H	I	L	M	N	O	P*	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
700	894	1970	1612	190	292	65	523	1161	275	388	500	807	316	1715	790	1787	65
900	894	2340	1612	190	292	65	523	1161	405	388	500	1047	316	1715	790	2157	65
1140	1064	2360	1802	190	317	57	551	1287	289	624	900	547	390	1911	960	2157	55
1420	1064	2740	1802	190	317	57	552	1287	459	624	900	757	390	1911	960	2537	55
1820	1204	2980	2052	190	387	53	681	1493	372	563	785	1260	432	2165	1100	2752	95
2160	1204	3204	2052	190	387	54	681	1493	371	563	1010	1260	432	2165	1100	2977	95

(\*) Minimum dimensions for boiler room access.

(\*\*) Pressure drops corresponding to a thermal variation of 15K.

BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm
XC-K 124	150	230
XC-K 200	180	230
XC-K 290÷400	180	270
XC-K 480÷570	220	300
XC-K 700÷900	270	320
XC-K 1140÷1420	320	350
XC-K 1820÷2160	320	420



## TYPE AND SHAPE OF FURNACE

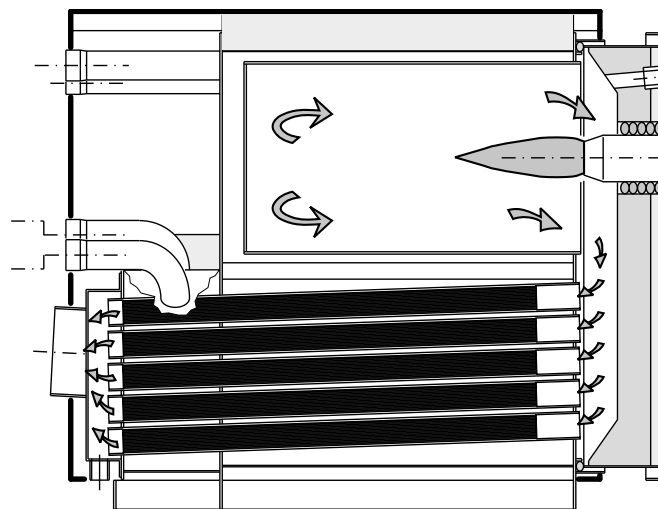
XC-K boilers are equipped with a blind cylindrical furnace, in which the central flame of the burner is reversed peripherally towards the front.

When the combustion gases have reached the front part, they are sent through the door into the tubes of the third pass to reach the rear flue gas chamber and then the chimney.

The combustion chamber is always pressurised while the burner is operating within the power range of the boiler.

For the value of this pressure, see the tables on page 297-298, in the column "Flue gas pressure drop".

The chimney must be calculated so that no positive pressure is detected at its base.



## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration



BREVETTO  
**Unical**  
PATENT

Multi-radial  
aluminium  
fins

External pipe  
in stainless  
steel AISI 316L




## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

XC-K (Gas fired)		124	200	290	400	480	570	700	900	1140	1420	1820	2160
Nominal heat output (80°-60°C)	kW	112.8	182.7	265.6	367.1	440.7	523.3	642.6	826.2	1046.6	1303.6	1670.8	1983
Nominal heat output (50°-30°C)	kW	124	200	290	400	480	570	700	900	1140	1420	1820	2160
Nominal heat input	kW	115.9	186.9	271	373.8	448.6	532.7	654.2	841.1	1065.4	1327.1	1700.9	2018.7
Heat efficiency at nominal load (80°-60°C)	%	97.3	97.72	98.2	98.2	98.23	98.23	98.23	98.23	98.23	98.23	98.23	98.23
Heat efficiency at nominal load (50°-30°C)	%	107	107	107	107	107	107	107	107	107	107	107	107
Heat efficiency at 30% load	%	109	109	109	109	109	109	109	109	109	109	109	109
Combustion efficiency (80°-60°C)	%	98.06	98.1	98.23	98.37	98.37	98.37	98.37	98.37	98.37	98.37	98.37	98.37
Combustion efficiency (50°-30°C)	%	99	99	99	99	99	99	99	99	99	99	99	99
Heat loss at shell (80°-60°C)	%	0.76	0.38	0.23	0.17	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Heat loss at shell (50°-30°C)	%	0.68	0.34	0.21	0.15	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Heat loss at chimney with burner on (80°-60°C)	%	1.94	1.90	1.77	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
Heat loss at chimney with burner on (50°-30°C)	%	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03
Heat loss at chimney with burner off	%	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Flue gas temperature tf-ta (80°-60°C)	°C	44	43	40	37	37	37	37	37	37	37	37	37
Flue gas temperature tf-ta (50°-30°C)	°C	22	22	22	22	22	22	22	22	22	22	22	22
CO <sub>2</sub> content	%	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Flue gas mass flow rate (min.-max)	kg/h	166.9	269.1	390.2	538.3	645.9	767	941.9	1211.1	1534	1910.8	2449	2906.6
Maximum condensation production (natural gas)	l/h	19.61	31.62	45.85	63.24	75.89	90.12	110.68	142.3	180.24	224.52	287.76	341.52

## TECHNICAL DATA ACCORDING TO ErP DIRECTIVE

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

XC-K (Gas fired)			124	200	290	400
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	113	189	266	367
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	94	94	94	94
<b>SEASON EFFICIENCY CLASS TO DISCHARGE</b>			<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>
<b>FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT</b>						
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	$P_4$	kW	112,8	182,6	265,6	367,1
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	87,7	88,04	88,3	88,5
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	97,9	61,1	88,6	122,2
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	98,2	98,2	98,2	98,2
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>						
WITH A FULL LOAD	$e_{l_{max}}$	kW	0,35	0,53	0,7	0,6
WITH A PARTIAL LOAD	$e_{l_{min}}$	kW	57	55	55	55
STANDBY MODE	$P_{SB}$	kW	0,050	0,050	0,050	0,050
<b>OTHER ELEMENTS</b>						
HEAT DISPERSION ON STANDBY	$P_{stby}$	kW	0,058	0,093	0,136	0,187
NITROGEN OXIDES EMISSIONS	$NO_x$	mg/kWh	51	51	51	51

The models with an Output higher than 400 kW are not covered by the Directive 2009/125/CE

# XC-K 3 (oil/gas)



BREVETTO  
**Unical**  
PATENT

smoke pipes

## PRESSURIZED CONDENSING BOILER LOW NO<sub>x</sub> WITH THREE REAL SMOKE PASS

OUTPUT RANGE

from 1000 to 3000 kW

OPERATION TEMPERATURE

no limit on the return temperature

SUPPLY

pressure jet burners  
for Nat. gas - LPG - oil

MODELS

1000

1250

1500

1750

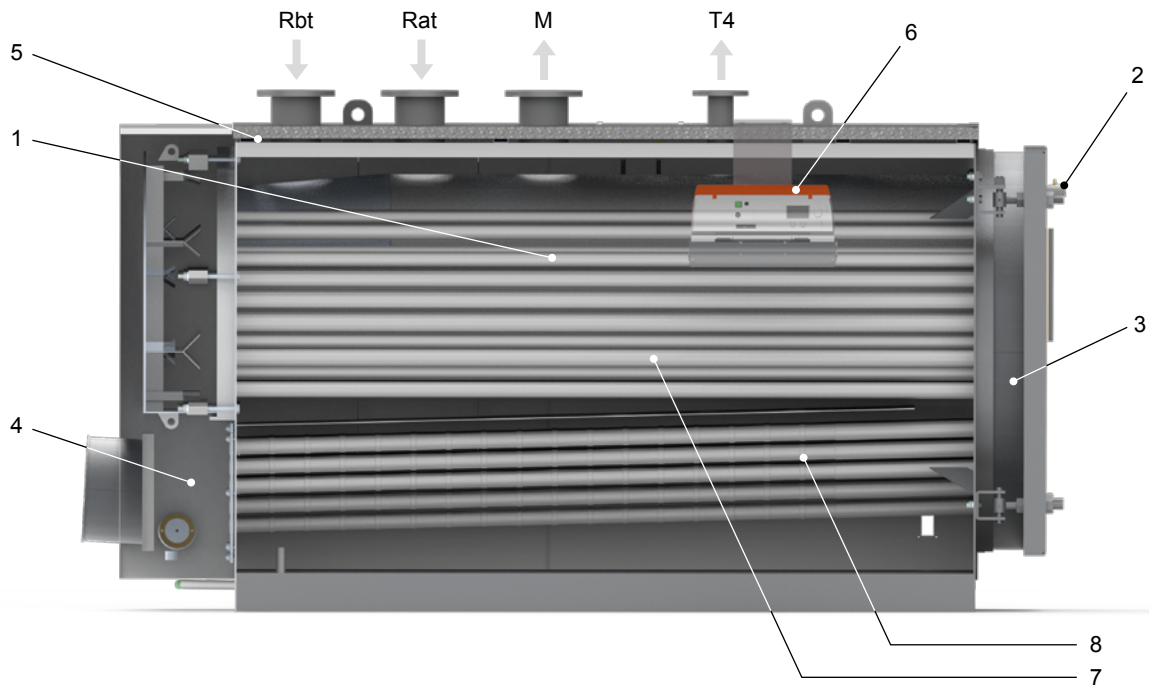
2000

2500

3000

Outer shell in high resistance carbon steel – large water content – two return connections  
three effective smoke passes, with passing flame, and front and rear tube plates in stainless steel AISI 316 L.

## MAIN COMPONENTS



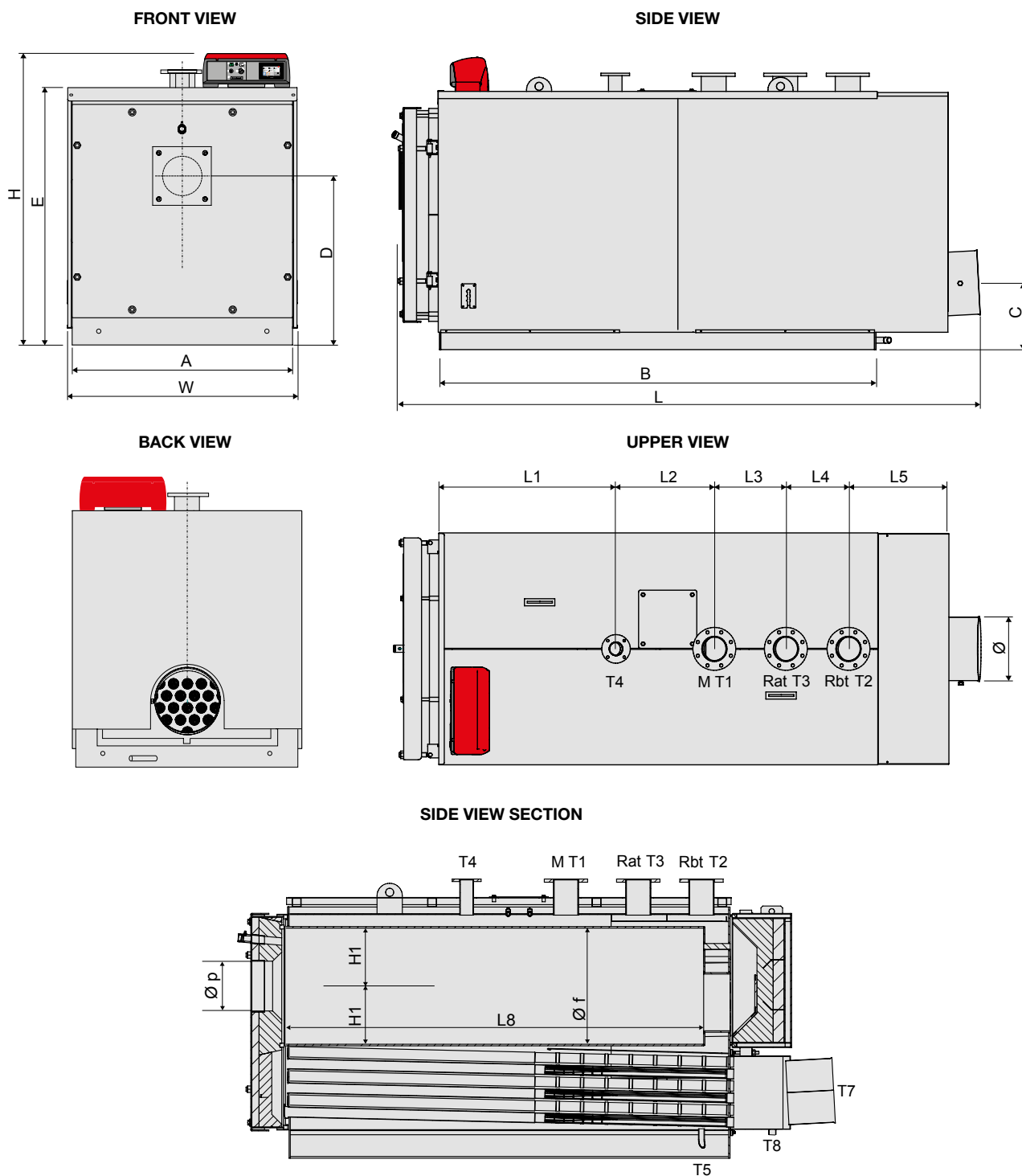
- |    |                             |     |                              |
|----|-----------------------------|-----|------------------------------|
| 1. | Furnace                     | 8.  | Smoke tubes 3 Turn           |
| 2. | Flame sight glass           | M   | Flow                         |
| 3. | Door with flame sight glass | Rbt | Low temperature return       |
| 4. | Smoke chamber               | Rat | High temperature return      |
| 5. | Body insulation             | T4  | Expansion vessel             |
| 6. | Panel board                 |     | (Burner isn't supplied with) |
| 7. | Smoke tubes 2 Turn          |     |                              |

## PRODUCT PLUS VALUES

- **PASSING FLAME AND FRONT AND REAR TUBE PLATES IN AISI 316 L STAINLESS STEEL**
- **SMOKE CHAMBER IN AISI 304 STAINLESS STEEL**  
with condensate drain connection
- **SECOND AND THIRD SMOKE PASS WITH PIPES OF THE SAME SIZE**
- **STAINLESS STEEL SMOKE PIPES**  
containing extruded profiles in Al/Si/Mg with a **nanotechnological treatment** which makes resistant to the acidic condensates from diesel fuel
- **EXTERNAL CIRCULAR SHELL IN CARBON STEEL**
- **LOW NOX EMISSION**  
in combination with low NOx burners
- **POSSIBILITY OF ASSEMBLY IN BOILER HOUSE**
- **SUITABLE FOR TWO STAGE PRESSURE JET AND TWO STAGE PROGRESSIVE MODULATING BURNERS**
- **TWO RETURN CONNECTIONS**
- **CONTROL PANEL WITH MASTERMODUL CONTROLLER**, designed for cascade management of up to 8 boilers
- **ADJUSTABLE DOOR WITH DOUBLE OPENING FOR INSPECTION OF THE 2ND AND 3RD SMOKE PASS**
- **REAR DOOR OF THE INVERSION CHAMBER BETWEEN 1ST AND 2ND SMOKE PASS**
- **QUIET OPERATION**



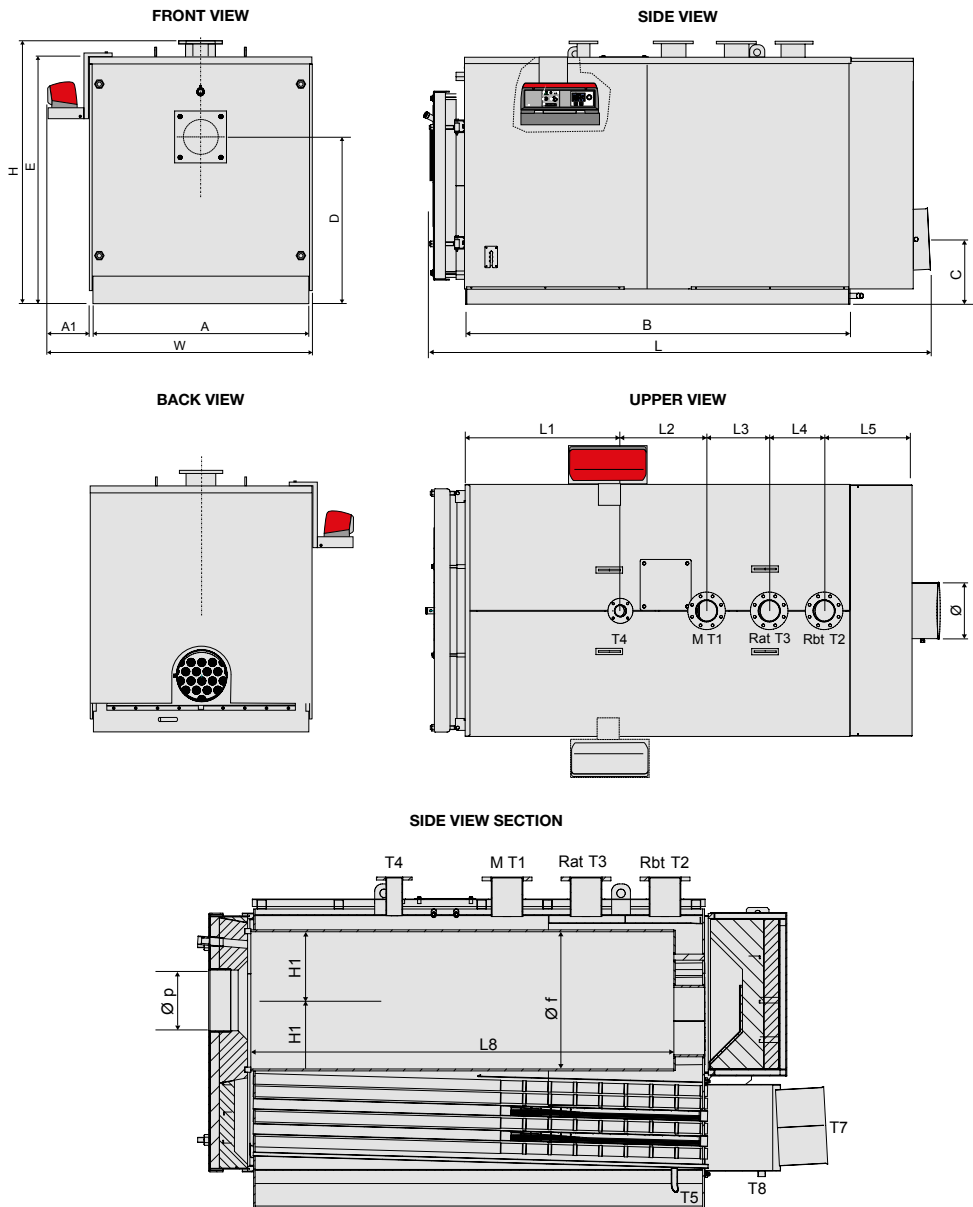
DIMENSIONS XC-K 3 1000



XC-K 3	L	B	L1	L2	L3	L4	L5	L8	W	A	H	H1	C	D	E	Ø	Ø f
1000	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1000	3760	2440	990	550	400	350	562	2310	1290	1240	1630	320	376	952	1447	350	640

XC-K 3	T1 (M)	T2 (R)	T3 (R)	T4	T5 (Sc)	T6	T7 (S)	T8 (Scnd)
	PN6	PN6	PN6	PN6	inch	mm	mm	mm
1000	DN 125	DN 125	DN 125	DN 65	G 1"	270	350	40

DIMENSIONS XC-K 3 1250÷3000

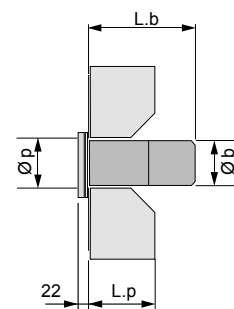


XC-K 3	L	B	L1	L2	L3	L4	L5	L8	W	A	A1	H	H1	C	D	E	Ø	Ø f
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1250	3293	2399	748	600	420	420	697	2250	1792	1495	297	1760	297	365	1104	1643	400	730
1500	3643	2749	1098	600	420	420	697	2250	1792	1495	297	1760	297	365	1104	1643	400	730
1750	3622	2650	804	600	420	550	817	2500	1932	1580	302	1922	405	471	1218	1809	450	810
2000	3970	2998	1151	600	420	550	817	2842	1932	1580	302	1922	405	471	1218	1809	450	810
2500	4332	3272	960	805	580	610	809	2845	2369	1980	329	2457	463	621	1619	2253	550	926
3000	4738	3678	1366	805	580	610	795	3250	2369	1980	329	2457	463	621	1619	2253	550	926

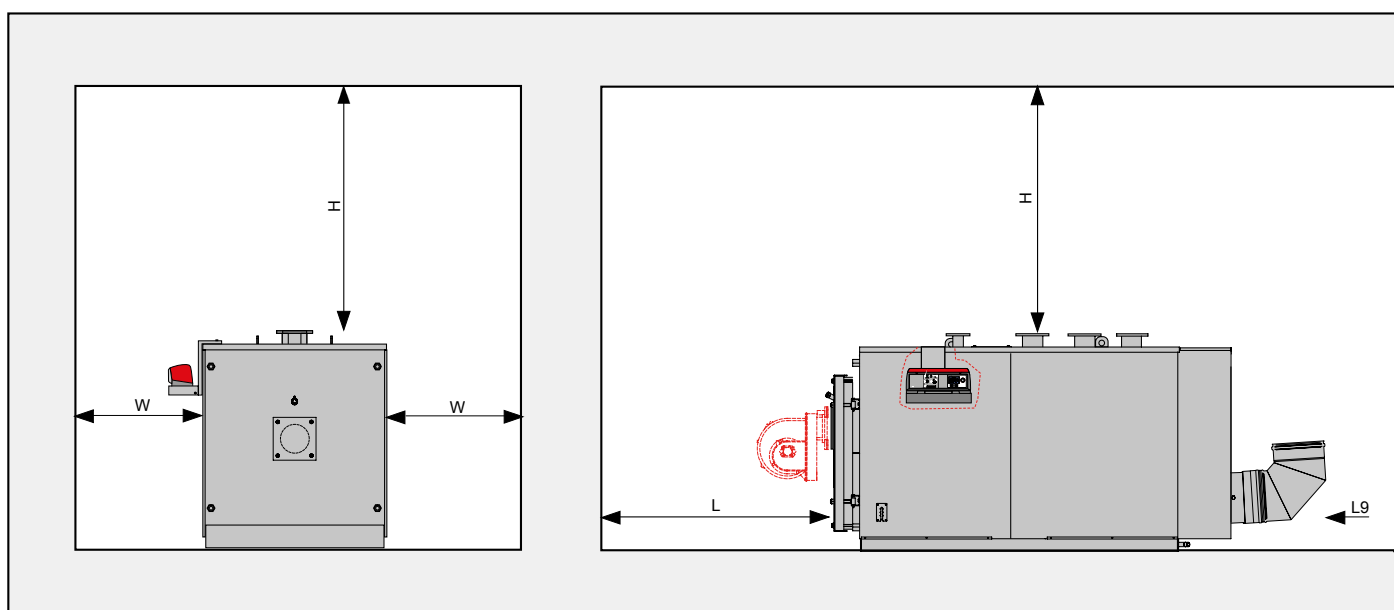
XC-K 3	T1 (M)	T2 (R)	T3 (R)	T4	T5 (Sc)	T6 (ø p)	T7 (S)	T8 (Scand)	Weight
	PN6	PN6	PN6	PN6	inch	mm	mm	mm	kg
1250	DN 150	DN 150	DN 150	DN 80	G 1"	320	400	40	3200
1500	DN 150	DN 150	DN 150	DN 80	G 1"	320	400	40	3500
1750	DN 200	DN 200	DN 200	DN 100	G 1"	320	450	40	4200
2000	DN 200	DN 200	DN 200	DN 100	G 1"	320	450	40	4600
2500	DN 250	DN 250	DN 250	DN 125	G 1"	380	550	40	7400
3000	DN 250	DN 250	DN 250	DN 125	G 1"	380	550	40	8250

## BURNER BLAST TUBE DIMENSIONS

MODEL	Length Burner dimension		Door drilling	
	Ø b mm	L.b mm	Ø p mm	L.p mm
XC-K 3 1000	250	300	270	171
XC-K 3 1250	300	350	320	207
XC-K 3 1500	300	350	320	207
XC-K 3 1750	300	390	320	278
XC-K 3 2000	300	390	320	278
XC-K 3 2500	360	400	380	310
XC-K 3 3000	360	400	380	310



## POSITIONING IN BOILER ROOM



### Clearance (mm)

XC-K 3	W	L	L9	H
1000	1300	3700	1000	1500
1250	1300	3200	1000	1500
1500	1300	3200	1000	1500
1750	1300	3600	1000	1500
2000	1300	3600	1000	1500
2500	1300	4300	1000	1500
3000	1300	4700	1000	1500

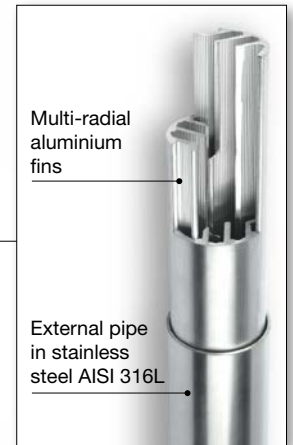
The distance is recommended for normal maintenance and cleaning operations.

SPECIAL SMOKE PIPES (patented)

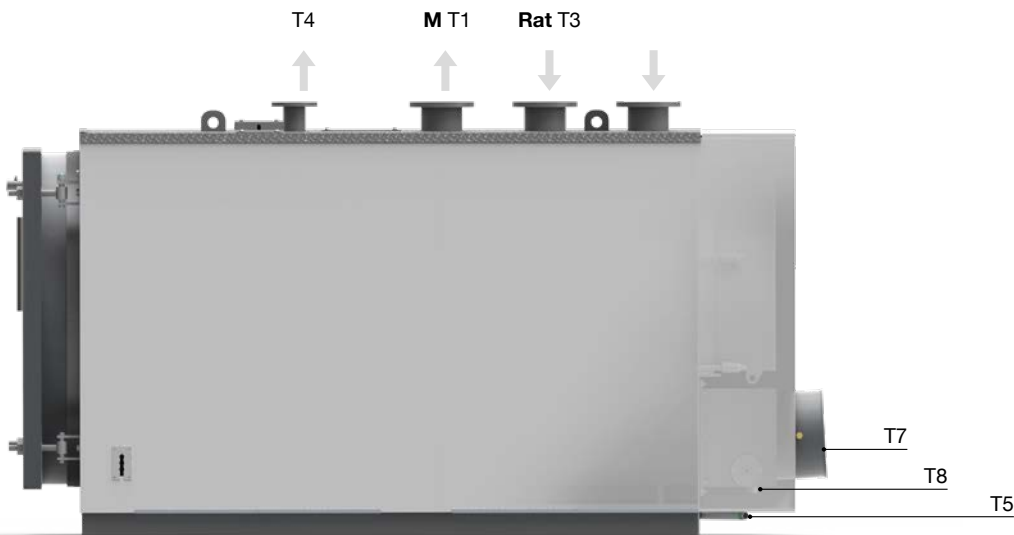


SMOKE PIPES:

- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration
- Nanotechnological treatment (for oil version)



CONNECTION

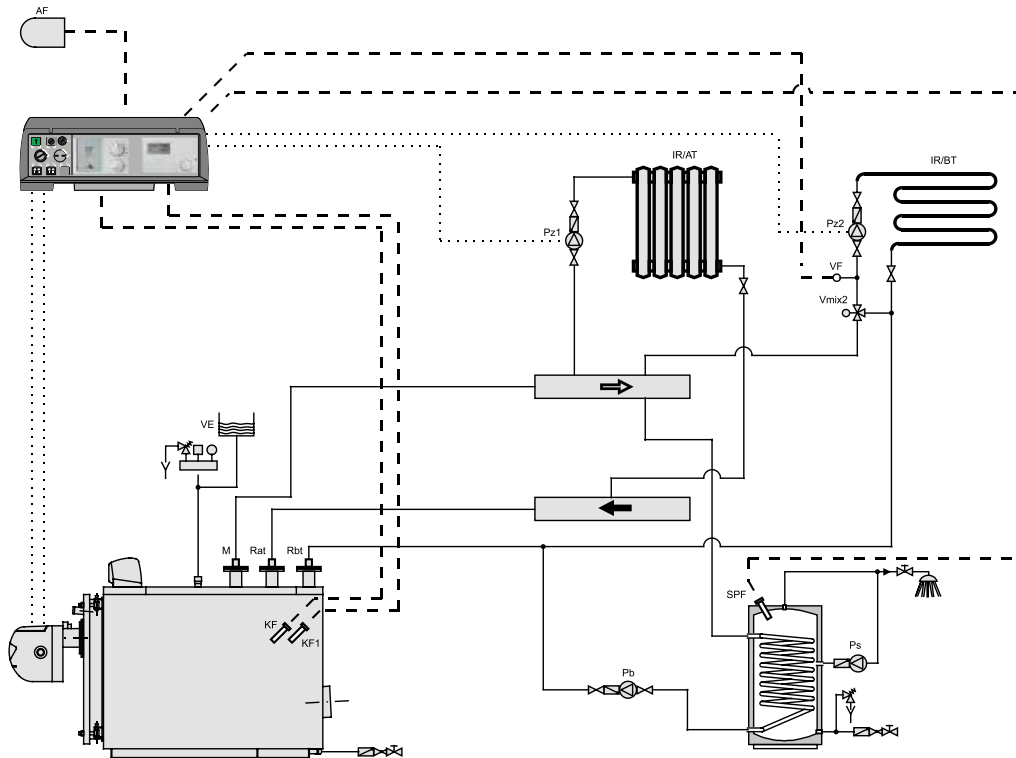


XC-K 3	CONNECTIONS					
	M (T1) DN	R (T2-T3) at/bt DN	T4 DN	T5 inch	T7 Ø mm	T8 Ø mm
1000	DN 125	DN 125	DN 65	G 1"	350	DN 40
1250	DN 150	DN 150	DN 80	G 1"	400	DN 40
1500	DN 150	DN 150	DN 80	G 1"	400	DN 40
1750	DN 200	DN 200	DN 100	G 1"	450	DN 40
2000	DN 200	DN 200	DN 100	G 1"	450	DN 40
2500	DN 250	DN 250	DN 125	G 1"	550	DN 40
3000	DN 250	DN 250	DN 125	G 1"	550	DN 40

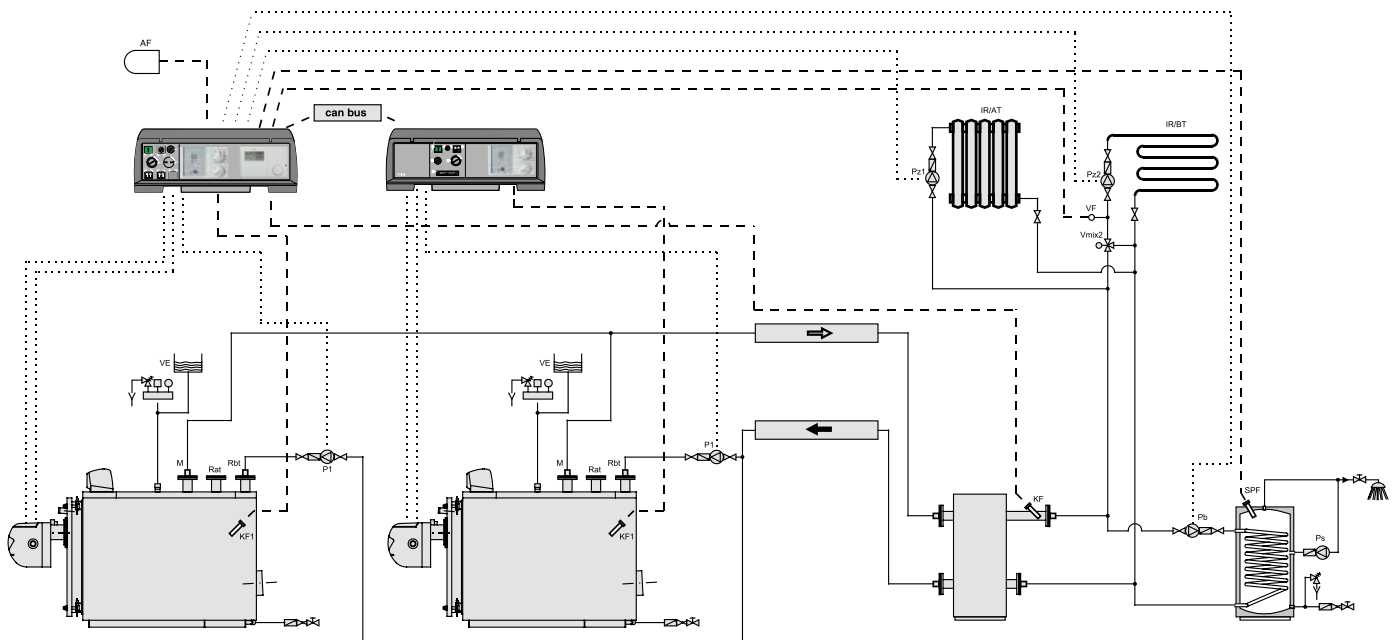
- M** Flow
- Rat** High temperature return
- Rbt** Low temperature return
- T4** Expansion vessel
- T5** Drain Boiler
- T7** Flue gas exhaust
- T8** Condensation drain

## BASIC SCHEMES OF SYSTEM OPERATION

### HYDRAULIC AND ELECTRIC SYSTEM CONNECTION WITH PANEL BOARD



### HYDRAULIC AND ELECTRIC SYSTEM CONNECTION WITH BOILERS IN CASCADE PANEL BOARD



- |              |   |              |  |            |                                      |
|--------------|---|--------------|--|------------|--------------------------------------|
| <b>M</b>     | Flow                                      | <b>VE</b>    | expansion vessel                             | <b>SPF</b> | storage tank probe                   |
| <b>Rat</b>   | HIGH temperature return                   | <b>IR/AT</b> | HIGH TEMPERATURE heating system distribution | <b>KF</b>  | heat control boiler probe E8         |
| <b>Rbt</b>   | LOW temperature return                    | <b>IR/BT</b> | LOW TEMPERATURE heating system distribution  | <b>KF</b>  | heat control boiler probe Lago Basic |
| <b>Rmix2</b> | zone mixer valve (motorised)              | <b>Ps</b>    | DHW recirculation pump                       | <b>VF</b>  | flow probe                           |
| <b>Pz1</b>   | HIGH TEMPERATURE zone heating system pump | <b>P1</b>    | circulation pump                             | <b>AF</b>  | external probe                       |
| <b>Pz2</b>   | LOW TEMPERATURE zone heating system pump  | <b>Pb</b>    | DHW production charge pump                   |            |                                      |

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

XC-K 3		1000	1250	1500	1750	2000	2500	3000
Nominal heat output (80-60°C)	kW	918	1136	1376	1606	1835	2294	2753
Nominal heat output (50°-30°C)	kW	1000	1238	1500	1750	2000	2500	3000
Nominal Heat input	kW	935	1157	1402	1636	1869	2236	2804
Combustion Efficiency full load (80°-60°C)	%	98,2	98,2	98,2	98,2	98,2	98,2	98,2
Heat efficiency full load (50°-30°C)	%	107,0	107,0	107,0	107,0	107,0	107,0	107,0
Heat efficiency partial load 30% (retourn 30°C)	%	109,0	109,0	109,0	109,0	109,0	109,0	109,0
Flue gas temperature 80°C-60°C (Tflue - Tamb.)	°C	33	33	33	33	33	33	33
Flue gas temperature 50°C-30°C (Tflue - Tamb.)	°C	20	20	20	20	20	20	20
CO <sub>2</sub> content	%	10,3	10,3	10,3	10,3	10,3	10,3	10,3
Flue gas mass	kg/h	1346,2	1682,0	2018,4	2354,9	2691,3	3364,1	4036,9
Combustion Efficiency (80°-60°C)	%	98,5	98,5	98,5	98,5	98,5	98,5	98,5
Combustion Efficiency (50°-30°C)	%	99,1	99,1	99,1	99,1	99,1	99,1	99,1
Heat loss at shell (80°-60°C)	%	0,30	0,29	0,28	0,27	0,27	0,27	0,27
Heat loss at shell (50°-30°C)	%	0,24	0,23	0,22	0,22	0,22	0,22	0,22
Heat loss at chimney with burner ON (80°-60°C)	%	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Heat loss at chimney with burner ON (50°-30°C)	%	0,9	0,9	0,9	0,9	0,9	0,9	0,9
Heat loss at chimney with burner OFF	%	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Maximum condensation production	l/h	158,2	197,6	237,2	276,7	316,2	395,3	474,3
Maximum boiler back pressure (as standard)	mm/H <sub>2</sub> O	67,4	-	-	-	-	-	-
Boiler back pressure (Smoke side pressure lost)	mm/H <sub>2</sub> O	65,0	70,0	85,0	85,0	95,0	86,0	95,0
Head losses H <sub>2</sub> O Δt 15	kPa	4,0	3,2	4,5	3,8	5,0	6,0	7,5
Water boiler content	l	1413	1500	2090	2375	2632	5160	5710
Max working pressure	bar	6	6	6	6	6	6	6
Max operating temperature	°C	100	100	100	100	100	100	100

# INOXIA GJ



smoke pipes

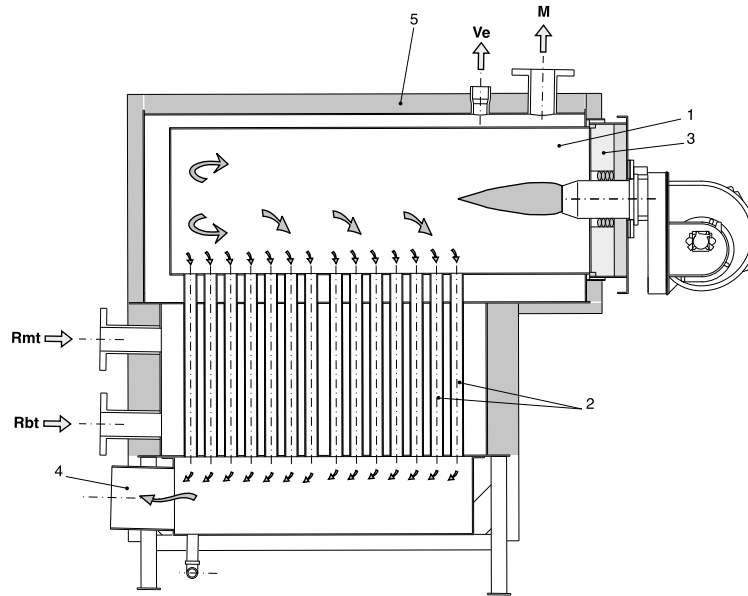
## PRESSURIZED CONDENSING BOILER

OUTPUT RANGE	from 150 to 1000 kW			
OPERATION TEMPERATURE	No low limitation on the return temperature			
SUPPLY	pressure jet burners for Nat. gas or LPG			
MODELS	150	200	270	350
	450	600	800	1000

Boiler body entirely in stainless steel - large water content - two return connections

## MAIN COMPONENTS

- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1. Furnace                          | -- Tool panel (not visible)          |
| 2. Smoke pipe with smoke deflectors | M System delivery                    |
| 3. Door with Flame inspection       | Rbt System return low Temperature    |
| 4. Smokebox                         | Rmt System return medium temperature |
| 5. Insulation body                  | Ve Expansion tank                    |



## TECHNICAL DATA

INOXIA GJ		150	200	270	350	450	600	800	1000
NOMINAL INPUT ON N.C.W.	kW	140	186	253	327	420	560	746	934
NOMINAL OUTPUT in condens. (Tm 30/Tr 50°C)	kW	150	200	270	350	450	600	800	1000
NOMINAL OUTPUT (Tm 80/Tr 60°C)	kW	136.5	181.5	247.5	320.5	412.5	550	732.8	917.5
EFFICIENCY AT NOMINAL LOAD. in condens.	%	107.1	107.5	107.1	107	107.1	107.1	107.2	107
EFFICIENCY AT PART LOAD in condens.	%	109	109	109	109	109	109	109	109
EFFICIENCY AT NOMINAL LOAD. without condens.	%	97.5	97.5	97.8	98	98.2	98.2	98.2	98.2
CASING HEAT LOSSES	%	0.15	0.15	0.1	0.1	0.09	0.09	0.07	0.07
CO <sub>2</sub>	%	10.2	10.2	10.5	10.5	10.5	10.5	10.5	10.5
MAX. CONDENSATE PRODUCTION	l/h	20.9	27.7	37.7	48.8	62.7	83.6	111.3	139.4
PRESSURE AVAILABLE AT THE CHIMNEY BASE *	mm H <sub>2</sub> O	5	5	5	5	5	5	5	5
SMOKE SIDE PRESSURE LOSSES	mm c.a.	10	15	14	23	18	32	30	45
WATER SIDE PRESSURE LOSSES with Δt 15K	m c.a.	0.27	0.45	0.35	0.55	0.3	0.5	0.37	0.6
SMOKE MASS FLOW RATE	kg/h	203.3	270.1	353.8	463.1	594.8	793.1	1056.5	1322.7
MAX. SMOKE TEMPERATURE (T 80/60°C)	°C	48	46	44	40	36	36	36	36
MAX. SMOKE TEMPERATURE (T 50/30°C)	°C	20	20	20	20	20	20	20	20
MAX. WORKING PRESSURE	bar	5	5	5	5	5	5	5	5
WATER CONTENT	l	248	248	380	380	533	533	907	907
C.H. FLOW / Low & High Temperature RETURN T1/T2/T3	EN 1092-1 PN16	65	65	80	80	100	100	125	125
EXPANSION VESSEL CONNECTION	T4 ISO 7/1 EN 1092-1 PN16	1 ½	1 ½	2	2	65	65	80	80
BOILER DRAIN	T5 ISO 7/1	¾	¾	¾	¾	1	1	1	1
CHIMNEY CONNECTION	T6 Ø mm	180	180	200	200	250	250	300	300
MAX. BURNER BLAST TUBE DIA.	T7 Ø mm	180	180	180	180	210	210	270	270
CONDENSATE EVACUATION	T8 Ø mm	40	40	40	40	40	40	40	40
NET WEIGHT	kg	480	480	675	675	1090	1090	1650	1650

\* In combination with the most commune burners.



## PRODUCT PLUS VALUES



■ **VERY HIGH QUALITY OF THE EMPLOYED METALS**

Boiler totally in stainless steel: combustion chamber in AISI 316 L, outer shell in AISI 304.

■ **HIGHLY EFFICIENT VERTICAL PIPES (Unical Patent)**

Progressive, armoured, vertical pipes in Stainless Steel 316 L on the outside and with inside aluminium fins.

■ **A SPECIAL PLATE**

conveniently perforated, positioned between the furnace, where is the entrance of the smoke pipes and the underlying body, develops the double important function of:

- important increase of the heat exchange of the pipes, avoiding short hydraulic circuits;
- sensitive increase of the mechanical resistance of the assembly.

■ **SELF CLEANING OF TUBE BUNDLES**

thanks to the natural scouring that the condensates produce for gravity.

■ **ELECTRONIC PANEL BOARD MASTERMODUL (optional)**

Certified and equipped with:

- Expandable electronic regulator E8
- Modulating burner controller

■ **Predisposition for cascade operation with panel board CASCATAMODUL (optional)**

Up to 8 INOXIA GJ managed by E8.

■ **MINIMIZATION OF THE THERMICAL DISPERSIONS**

The INOXIA GJ boilers have a thermal and acoustic insulating layer of 100 mm in linen mineral wool. In addition, the door is insulated with refractory material resisting to 1400°C.

■ **MAXIMIZATION OF THE THERMAL EXCHANGE**

The outer shell is in reversed L shaped. The assembly forms a simple structure, countersigned by a horizontal initial part where the burner flame develops. Through an entrance obtained on the bottom the outflow of the smokes refolds to 90 degrees in low.

■ **ELEVATED SAVING AND SEASONAL EFFICIENCY**

With the adoption of modulating pressure jet burners with modulation ratio over than 1:6 and the hydraulic connection predisposed for two C.H. returns (high/low temperature).

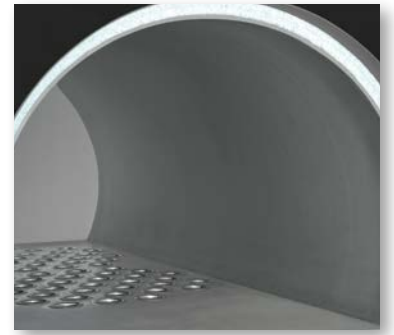
■ **EFFICIENCY OF 109% at partial load**

■ **SIMPLIFIED INSTALLATION**

- Just one smokes connection with the manometric head necessary for the evacuation of the smokes under all weather conditions.
- None hydraulic interface between boiler and C.H. installation.

■ **WIDE RANGE OF REGULATION ACCESSORIES**

- Zones expansion regulator E8.1124
- Mixed flow temperature sensor
- Sensor PT 1000 for management of solar collectors with E8.



## THE QUALITY IN THE DETAILS

Flanged connection for the C.H. flow PN16

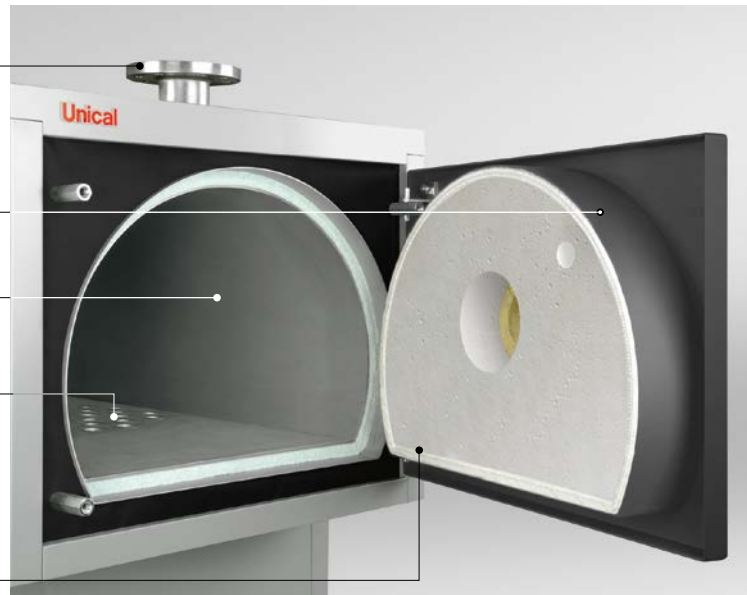
Door complete with flame sight glass  
Adjustable, with double opening  
(to the right or to the left hand side).

Furnace in stainless steel AISI 316 L

Progressive vertical bimetallic pipes



Door insulation in ecological ceramic fiber  
30 % reduction of the radiation heat dispersions.



Isolation thickness 100 mm  
Radiation losses < 0,5%.

Central Heating H.T. return PN16

Central Heating L.T. return PN16

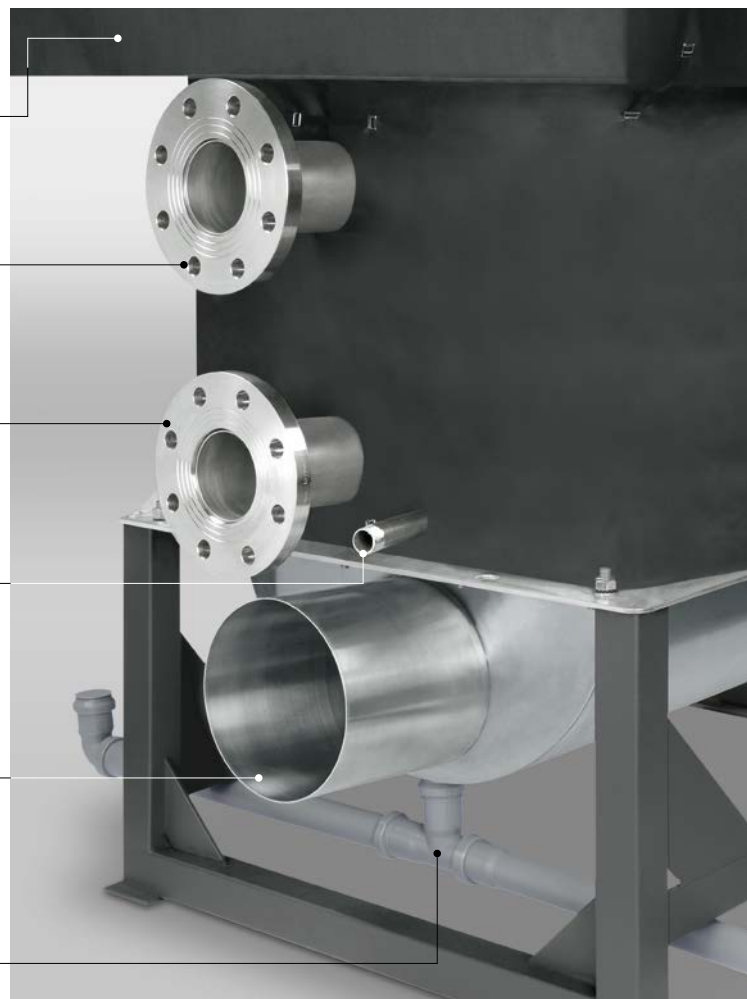
Boiler drain connection

Smoke chamber

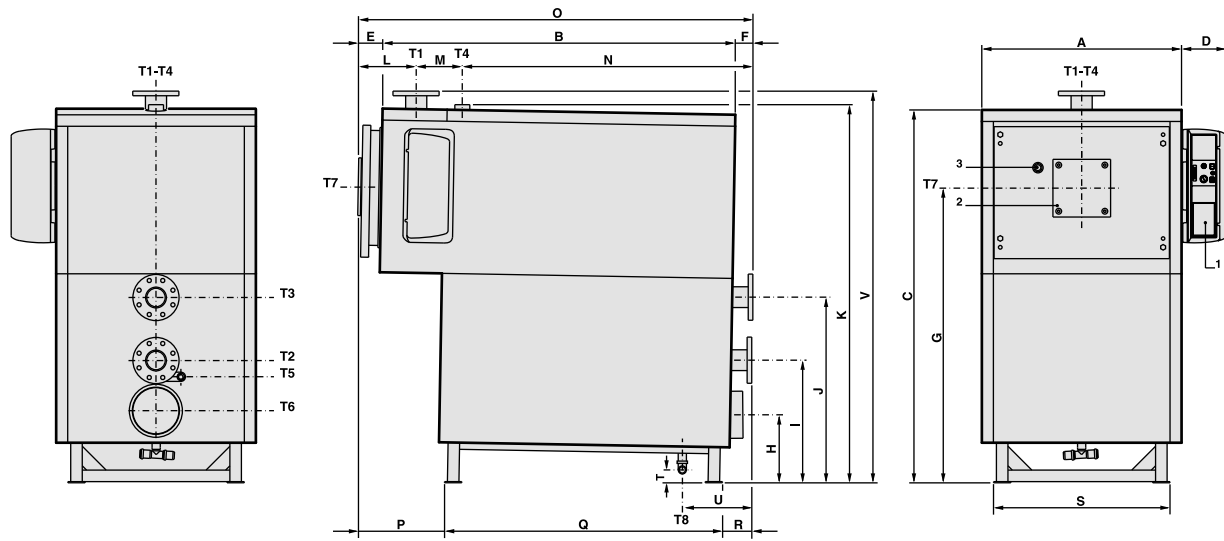
in stainless steel. It carries to the chimney the  
combustion products.

Drain of condensates

It allows the complete disposal of the condensates  
produced by the combustion.



DIMENSIONS



- 1 Control panel
- 2 Burner flange
- 3 Flame inspection
- T1 Heating flow
- T2 Low-temperature heating return
- T3 Medium temperature heating return
- T4 Expansion tank connection
- T5 Boiler drain
- T6 Chimney connection
- T7 Burner connection
- T8 Drain condense

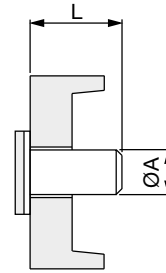
INOXIA GJ	Nominal output (80°-60°C)	Nominal output (50°-30°C)	Nominal input	Boiler capacity	Water pressure drops(**)	Flue gas pressure drop	Maximum boiler working pressure	Weight	CONNECTIONS							
									T1	T2	T3	T4	T5	T6	T7	T8
									UNI 2278 PN16		ISO 7/1 UNI 2276 PN6		ISO 7/1	Øi	Øi	Øe
150	135	150	140	248	0,27	10	5	480	65			1½	¾	180	180	40
200	180	200	186	248	0,45	26	5	480	65			1½	¾	180	180	40
270	244	270	253	380	0,35	14	5	675	80			2	¾	200	180	40
350	316	350	327	380	0,55	23	5	675	80			2	¾	200	180	40
450	406	450	420	533	0,30	18	5	1090	100			65	1	250	210	40
600	541	600	560	533	0,50	32	5	1090	100			65	1	250	210	40
800	720	800	746	907	0,37	30	5	1650	125			80	1	300	270	40
1000	902	1000	934	907	0,60	45	5	1650	125			80	1	300	270	40

INOXIA GJ	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S(*)	T	U	V(*)
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
150	766	1295	1558	190	112	75	1243	283	489	719	1545	278	200	1004	1482	299	1005	178	665	85	328	1645
200	766	1295	1558	190	112	75	1243	283	489	719	1545	278	200	1004	1482	299	1005	178	665	85	328	1645
270	866	1530	1649	190	112	91	1309	300	536	809	1635	287	220	1226	1733	353	1205	175	765	85	355	1745
350	866	1530	1649	190	112	91	1309	300	536	809	1635	287	220	1226	1733	353	1205	175	765	85	355	1745
450	896	1952	1790	190	125	66	1415	328	590	845	1893	312	320	1511	2143	288	1666	189	795	85	400	1893
600	896	1952	1790	190	125	66	1415	328	590	845	1893	312	320	1511	2143	288	1666	189	795	85	400	1893
800	1076	2250	2075	190	140	78	1629	345	655	940	2178	341	340	1787	2468	364	1866	238	975	85	490	2178
1000	1076	2250	2075	190	140	78	1629	345	655	940	2178	341	340	1787	2468	364	1866	238	975	85	490	2178

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

## BURNER BLAST TUBE DIMENSIONS

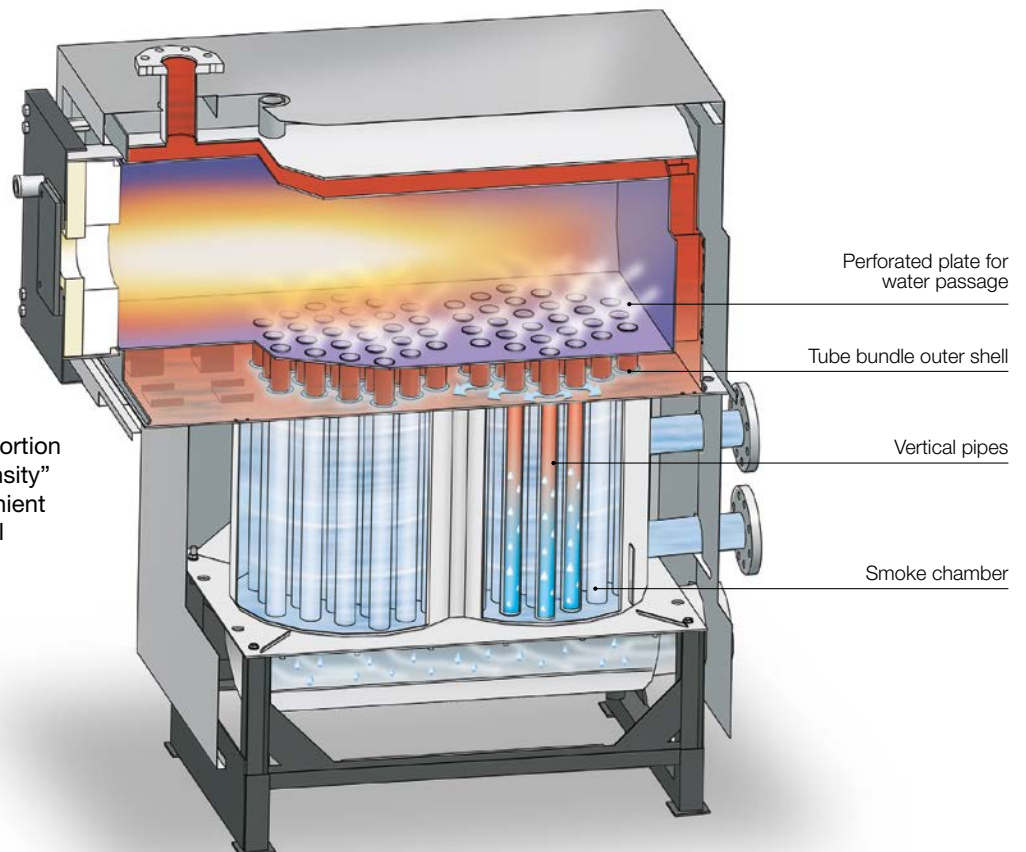
BOILER TYPE	$\varnothing A$ mm	L mm
INOXIA GJ 150÷350	180	280
INOXIA GJ 450÷600	210	320
INOXIA GJ 800÷1000	270	350



## TYPE AND SHAPE OF FURNACE

- Horizontal furnace
- Stainless steel AISI 316 L

To favor the cold starts, the initial portion of the pipes has a “progressive density” of the aluminum inserts and convenient cuts to allow a different longitudinal expansion.



## SPECIAL SMOKE PIPES (patented)

### SMOKE PIPES:

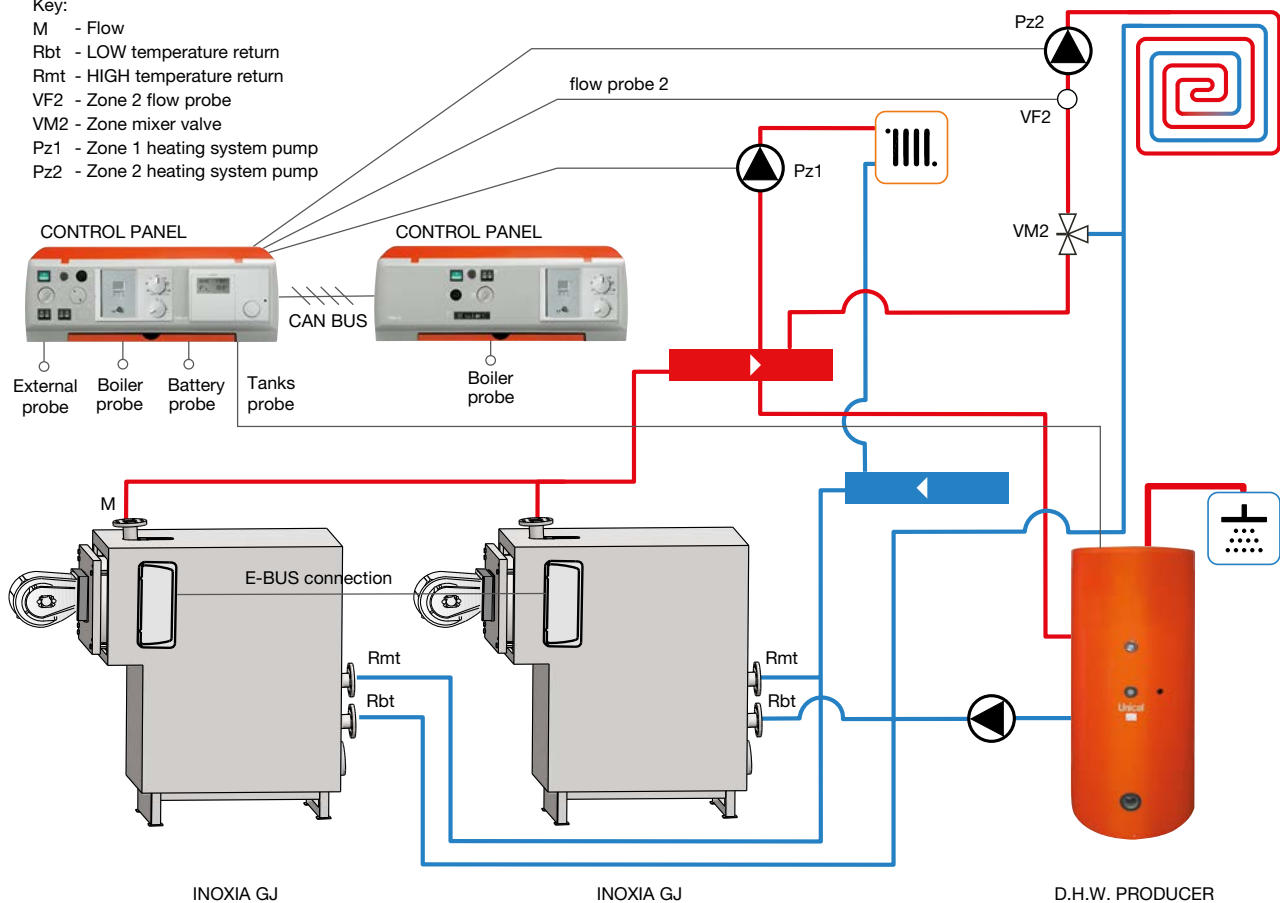
- Exceptional thermal exchange
- Functional outflow of the condensate
- Absence of wet acidic deposits
- Washout, for gravity, of the smooth exchange surfaces
- Greater duration



## BASIC SCHEMES OF SYSTEM OPERATION WITH 2 INOXIA GJ



- Key:
- M - Flow
  - Rbt - LOW temperature return
  - Rmt - HIGH temperature return
  - VF2 - Zone 2 flow probe
  - VM2 - Zone mixer valve
  - Pz1 - Zone 1 heating system pump
  - Pz2 - Zone 2 heating system pump



Note: the references of these and further schemes are better described in the installation manuals that can be unloaded from the web site [www.unical.eu](http://www.unical.eu)

## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Gas operation		INOXIA GJ 150	INOXIA GJ 200	INOXIA GJ 270	INOXIA GJ 350
Heat output nominal (80°-60°C)	kW	136.5	181.5	247.5	320.5
Heat output nominal (50°-30°C)	kW	150	200	271	350
Thermal power of the hearth	kW	140	186	253	327
Efficiency at nominal load (80°-60°C)	%	97.5	97.5	97.8	98
Efficiency at nominal load (50°-30°C)	%	107.1	107.5	107.1	107
Heat efficiency at 30% load	%	109	109	109	109
Combustion efficiency (80°-60°C)	%	97.7	97.8	97.9	98.1
Combustion efficiency (50°-30°C)	%	99.1	99.1	99.1	99.1
Losses to the mantle (80°-60°C)	%	0.23	0.25	0.14	0.14
Losses to the mantle (50°-30°C)	%	0.16	0.17	0.10	0.10
Losses with burner on (80°C)	%	2.27	2.17	2.03	1.85
Losses with burner on (30°C)	%	0.95	0.95	0.92	0.92
Losses with burner off	%	0.10	0.11	0.10	0.10
Flue gas temperature tf-ta (80°-60°C)	°C	48	46	44	40
Flue gas temperature tf-ta (50°-30°C)	°C	20	20	20	20
CO <sub>2</sub> content	%	10.2	10.2	10.5	10.5
Flue gas mass flow	kg/h	203.3	270.1	353.8	463.1
Condensate production max. (natural gas)	l/h	20.9	27.7	37.7	48.8

Gas operation		INOXIA GJ 450	INOXIA GJ 600	INOXIA GJ 800	INOXIA GJ 1000
Heat output nominal (80°-60°C)	kW	412.5	550	732.8	917.5
Heat output nominal (50°-30°C)	kW	450	600	800	1000
Thermal power of the hearth	kW	420	560	746	934
Efficiency at nominal load (80°-60°C)	%	98.2	98.2	98.2	98.2
Efficiency at nominal load (50°-30°C)	%	107.1	107.1	107.2	107
Heat efficiency at 30% load	%	109	109	109	109
Combustion efficiency (80°-60°C)	%	98.3	98.3	98.3	98.3
Combustion efficiency (50°-30°C)	%	99.1	99.1	99.1	99.1
Losses to the mantle (80°-60°C)	%	0.12	0.12	0.11	0.10
Losses to the mantle (50°-30°C)	%	0.09	0.09	0.07	0.07
Losses with burner on (80°C)	%	1.66	1.66	1.66	1.66
Losses with burner on (30°C)	%	0.92	0.92	0.92	0.92
Losses with burner off	%	0.10	0.10	0.10	0.10
Flue gas temperature tf-ta (80°-60°C)	°C	36	36	36	36
Flue gas temperature tf-ta (50°-30°C)	°C	20	20	20	20
CO <sub>2</sub> content	%	10.5	10.5	10.5	10.5
Flue gas mass flow	kg/h	594.8	793.1	1056.5	1322.7
Condensate production max. (natural gas)	l/h	62.7	83.6	111.3	139.4

# MODAL

(The product can be sold only outside the UE)



BREVETTO  
**Unical**  
PATENT

smoke pipes

## PRESSURIZED STEEL BOILER WITH REVERSED FLAME

OUTPUT RANGE

from 64 to 291 kW

WORKING TEMPERATURE

minimum return temperature higher than 50°C

OPERATION WITH

gas or oil fired pressure jet burners

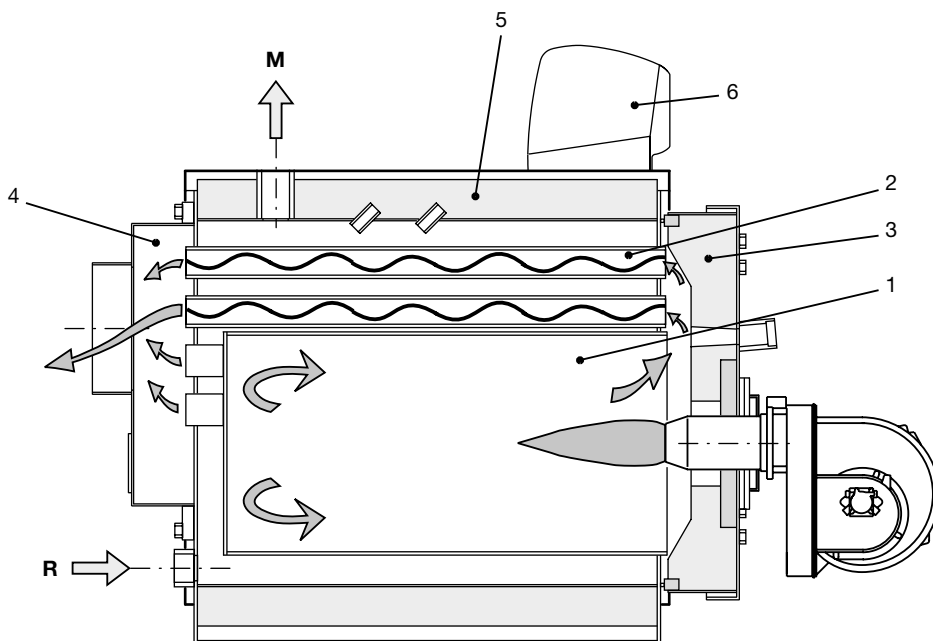
MODELS

64	76	93	105	116
140	163	186	233	291

Decentralization of tube bundle for high resistance to the condensate

## MAIN COMPONENTS

1. Furnace
2. Smoke pipes with smoke diverters
3. Door with flame control warning light
4. Smoke chamber
5. Body insulation
6. Panel board



## TECHNICAL DATA

MODAL		64	76	93	105	116	140	163	186	233	291
NOMINAL OUTPUT	kW	64	76	93	105	116	140	163	186	233	291
NOMINAL INPUT	kW	71	84	102	115	128	155	180	206	258	322
WATER EFFICIENCY AT NOMINAL LOAD	%	90.1	90.4	91.1	91.3	90.6	90.3	90.5	90.3	90.3	90.4
BOILER CAPACITY	l	86	86	86	126	126	126	151	151	203	247
WATER PRESSURE DROPS*	m w.c.	0.10	0.13	0.16	0.10	0.10	0.14	0.20	0.25	0.22	0.30
FLUE GAS PRESSURE DROP	mm w.c.	1.5	1.8	2.5	3	3	5	8	14	18	22
MAXIMUM BOILER WORKING PRESSURE**	bar	6	6	6	6	6	6	6	6	6	6
WEIGHT	kg	195	195	195	280	280	280	318	318	420	480

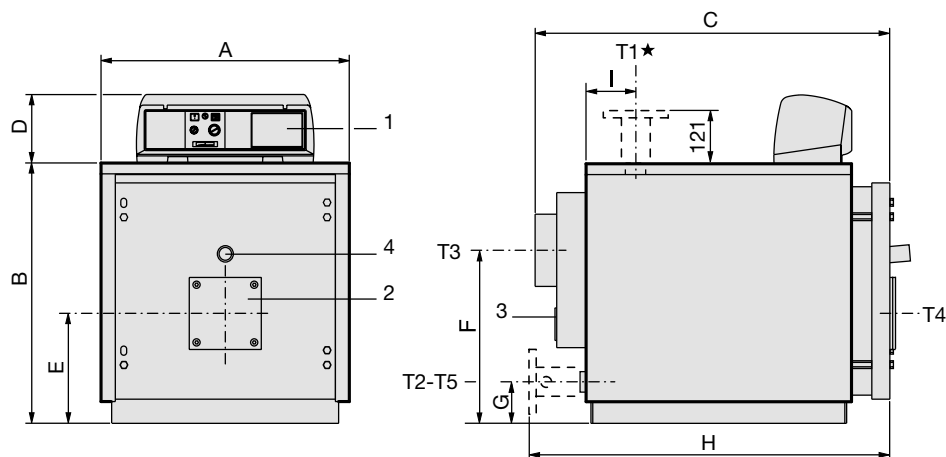
\*Pressure drops corresponding to a thermal variation of 15K. \*\*On request, available up to 10 bar.

## PRODUCT PLUS VALUES

- **COMPACT DIMENSIONS**  
simplifies the transport and the positioning in boiler house
- **THERMAL EXCHANGE OPTIMISATION**  
by driven water passage into the boiler
- **TUBE BUNDLE POSITIONING**  
decentralized upwards, above the furnace, with drastic reduction of the possible condensation
- **SMOKE PIPES OF HIGH THICKNESS**  
with anti-condensing effect
- **TURBULATORS**  
for the thermal exchange optimisation into the smoke pipes
- **BOTTOM OF THE FURNACE**  
reinforced with U profiles for greater mechanical resistance
- **INTERNAL DOOR INSULATION**  
in light refractory concrete
- **FRONT DOOR**  
with self-centering locking
- **EXTERNAL CASING**  
inclusive of 60 mm rock wool insulation
- **PANEL BOARD**  
suitable for electronic control



## DIMENSIONS



- 1 Board panel
- 2 Burner connection plate
- 3 Cleaning door
- 4 Sight glass
- T1 C.H. flow
- T2 C.H. return
- T3 Flue connection
- T4 Burner axis
- T5 Boiler drain

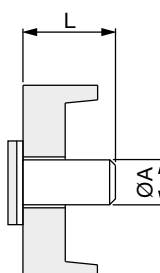
MODAL	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS			
								T1 - T2 ISO 7/1 UNI2278 PN16	T3 Øe mm	T4 Øi mm	T5 Øi ISO 7/1
64	64	71	86	0.10	1.5	6	212	Rp 1½	200	130	Rp ¾
76	76	84	86	0.13	1.8	6	212	Rp 1½	200	130	Rp ¾
93	93	102	86	0.16	2.5	6	212	Rp 1½	200	130	Rp ¾
105	105	115	126	0.10	3	6	309	Rp 2	200	180	Rp ¾
116	116	128	126	0.10	3	6	309	Rp 2	200	180	Rp ¾
140	140	155	126	0.14	5	6	309	Rp 2	200	180	Rp ¾
163	163	180	151	0.20	8	6	349	Rp 2	200	180	Rp ¾
186	186	206	151	0.25	14	6	349	Rp 2	200	180	Rp ¾
233	233	258	203	0.22	18	6	485	DN 65*	250	180	Rp ¾
291	291	322	247	0.30	22	6	555	DN 65*	250	180	Rp ¾

MODAL	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
64	690	722	990	190	305	480	115	--	147
76	690	722	990	190	305	480	115	--	147
93	690	722	990	190	305	480	115	--	147
105	760	812	1205	190	350	500	130	--	157
116	760	812	1205	190	350	500	130	--	157
140	760	812	1205	190	350	500	130	--	157
163	760	812	1385	190	350	500	130	--	157
186	760	812	1385	190	350	500	130	--	258
233	860	937	1437	190	421	580	165	1482	258
291	860	937	1687	190	421	580	165	1732	258

(\*) In the MODAL 233 and MODAL 291 models, connections T1 and T2 are flanged.  
 (\*\*) Pressure drops corresponding to a thermal variation of 15K.

## BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm
MODAL 64÷93	130	150
MODAL 105÷140	180	170
MODAL 163÷186	180	170
MODAL 233÷291	180	170



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Gas fired		MODAL 64	MODAL 76	MODAL 93	MODAL 105	MODAL 116
Nominal output	kW	64.0	76.0	93.0	105.0	116.0
Nominal input	kW	71.0	84.0	102.0	115.0	128.0
Water efficiency at full load (100%)	%	90.1	90.4	91.1	91.3	90.6
Water efficiency at part load (30%)	%	85.4	85.6	85.9	86	86.1
Efficiency class (ex dir. 92/42 CEE)		1	1	1	1	1
Combustion efficiency at nominal load (100%)	%	90.6	91	91.6	91.8	91.1
Casing heat losses (80°-60°C)	%	0.5	0.5	0.5	0.5	0.4
Chimney losses with burner on	%	9.3	8.9	8.3	8.1	8.9
Chimney losses with burner off	%	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta	°C	187.0	180.4	169.2	167.3	182.3
CO <sub>2</sub> content	%	9.5	9.6	9.7	9.8	9.8
Flue gas mass flow rate	kg/h	109.0	128.5	154.7	172.9	192.4

Gas fired		MODAL 140	MODAL 163	MODAL 186	MODAL 233	MODAL 291
Nominal output	kW	140.0	163.0	186.0	233.0	291.0
Nominal input	kW	155.0	180.0	206.0	258.0	322.0
Water efficiency at full load (100%)	%	90.3	90.5	90.2	90.3	90.3
Water efficiency at part load (30%)	%	86.4	86.6	86.8	87.1	87.3
Efficiency class (ex dir. 92/42 CEE)		1	1	1	1	1
Combustion efficiency at nominal load (100%)	%	90.8	91.2	91	91	90.8
Casing heat losses (80°-60°C)	%	0.5	0.6	0.7	0.7	0.5
Chimney losses with burner on	%	9.1	8.7	8.9	8.9	9.1
Chimney losses with burner off	%	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta	°C	187.9	179.5	184.2	183.2	187.0
CO <sub>2</sub> content	%	9.8	9.8	9.8	9.8	9.8
Flue gas mass flow rate	kg/h	233.0	270.6	309.6	387.8	484.0

Oil fire		MODAL 64	MODAL 76	MODAL 93	MODAL 105	MODAL 116
Nominal output	kW	64.0	76.0	93.0	105.0	116.0
Nominal input	kW	71.0	84.0	102.0	115.0	128.0
Water efficiency at full load (100%)	%	90.1	90.4	91.1	91.3	90.6
Water efficiency at part load (30%)	%	85.4	85.6	85.9	86	86.1
Efficiency class (ex dir. 92/42 CEE)		1	1	1	1	1
Combustion efficiency at nominal load (100%)	%	90.6	91	91.6	91.7	91.1
Casing heat losses (80°-60°C)	%	0.5	0.5	0.4	0.4	0.4
Chimney losses with burner on	%	9.3	8.9	8.3	8.2	8.9
Chimney losses with burner off	%	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta	°C	200.0	193.0	181.0	179.0	195.0
CO <sub>2</sub> content	%	12.4	12.5	12.6	12.7	12.8
Flue gas mass flow rate	kg/h	111.4	131.6	158.6	177.4	196

Oil fire		MODAL 140	MODAL 163	MODAL 186	MODAL 233	MODAL 291
Nominal output	kW	140.0	163.0	186.0	233.0	291.0
Nominal input	kW	155.0	180.0	206.0	258.0	322.0
Water efficiency at full load (100%)	%	90.3	90.5	90.2	90.3	90.3
Water efficiency at part load (30%)	%	86.4	86.6	86.8	87.1	87.3
Efficiency class (ex dir. 92/42 CEE)		1	1	1	1	1
Combustion efficiency at nominal load (100%)	%	90.8	91.2	91	91	90.8
Casing heat losses (80°-60°C)	%	0.5	0.6	0.7	0.7	0.5
Chimney losses with burner on	%	9.1	8.7	8.9	8.9	9.1
Chimney losses with burner off	%	0.2	0.2	0.2	0.2	0.2
Net flue gas temperature tf-ta	°C	201.0	192.0	197.0	196.0	200.0
CO <sub>2</sub> content	%	12.8	12.8	12.8	12.8	12.8
Flue gas mass flow rate	kg/h	237.4	275.6	315.4	395.1	493.1

# ELLPREX

(The models with an output smaller than 400 kW can be sold only outside de UE - agg. 01/2019)



BREVETTO  
**Unical**  
PATENT

smoke pipes

## PRESSURIZED STEEL BOILER WITH REVERSED FLAME

OUTPUT RANGE

from 340 to 7000 kW

WORKING TEMPERATURE

minimum return temperature 55°C

OPERATION WITH

gas or oil fired pressure jet burners

MODELS

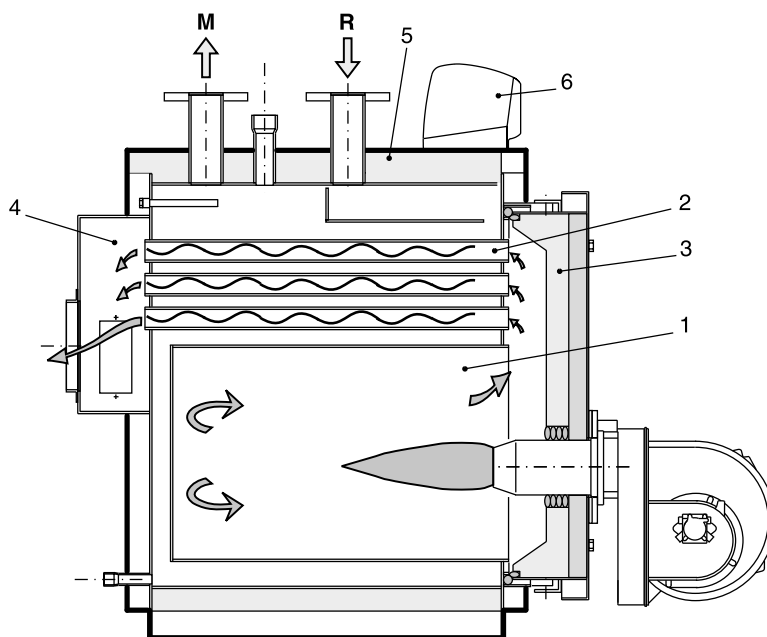
340	420	510	630	760	870	970	1100	1320	1570	1850
2200	2650	3000	3500	4000	4500	5000	5500	6000	6500	7000

CERTIFICATION IN OUTPUT RANGE

(in the order, it's possible to request a specific output within the certified range)

## MAIN COMPONENTS

1. Furnace
2. Smoke pipes with smoke diverters
3. Door with flame control warning light
4. Smoke chamber
5. Body insulation
6. Panel board



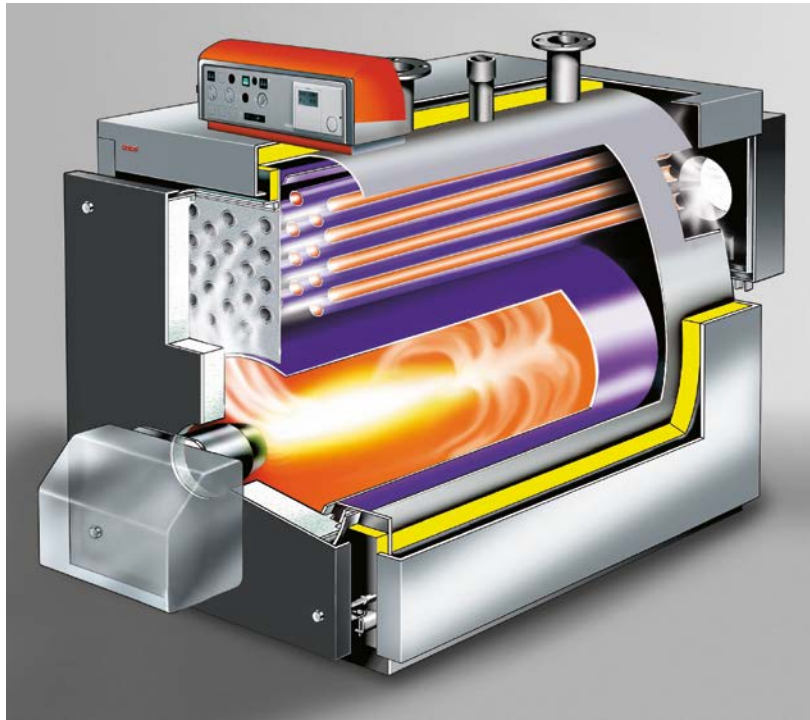
## TECHNICAL DATA

Model	Heat output	Heat input	Boiler capacity	Water side	Flue gas	Max. boiler operating pressure	Combustion chamber	Weight
	min/max	min/max		pressure drops	pressure drops			
	kW	kW	l	m w.c.	mm w.c.	bar	m <sup>3</sup>	kg
<b>ELLPREX 340</b>	255÷340	277÷371	298	0.16÷0.28	17÷34	6	0.226	629
<b>ELLPREX 420</b>	315÷420	342÷459	398	0.09÷0.17	16÷29	6	0.288	849
<b>ELLPREX 510</b>	385÷510	418÷557	462	0.14÷0.25	24÷43	6	0.337	972
<b>ELLPREX 630</b>	480÷630	520÷688	565	0.21÷0.38	32÷55	6	0.416	1102
<b>ELLPREX 760</b>	580÷760	630÷830	671	0.15÷0.26	29÷51	6	0.513	1372
<b>ELLPREX 870</b>	660÷870	715÷950	753	0.19÷0.33	33÷57	6	0.584	1482
<b>ELLPREX 970</b>	750÷970	815÷1060	836	0.24÷0.41	29÷49	6	0.656	1588
<b>ELLPREX 1100</b>	860÷1100	935÷1200	1040	0.18÷0.30	32÷52	6	0.748	1821
<b>ELLPREX 1320</b>	1000÷1320	1087÷1442	1242	0.20÷0.35	38÷67	6	0.869	2030
<b>ELLPREX 1570</b>	1200÷1570	1304÷1715	1418	0.19÷0.33	35÷60	6	1.087	2780
<b>ELLPREX 1850</b>	1400÷1850	1520÷2020	1617	0.26÷0.45	42÷73	6	1.303	3280
<b>ELLPREX 2200</b>	1700÷2200	1845÷2400	2086	0.21÷0.34	39÷65	6	1.650	4145
<b>ELLPREX 2650</b>	2000÷2650	2170÷2890	2324	0.28÷0.48	43÷76	6	1.866	4465
<b>ELLPREX 3000</b>	2300÷3000	2492÷3280	2667	0.36÷0.62	35÷60	6	2.313	5110
<b>ELLPREX 3500</b>	2700÷3500	2930÷3825	4142	0.54÷0.84	47÷74	6	2.601	6700
<b>ELLPREX 4000</b>	3200÷4000	3478÷4371	4455	0.54÷0.85	60÷80	6	3.126	7500
<b>ELLPREX 4500</b>	3420÷4500	3638.3÷4838.7	6012	0.70÷0.85	51÷88	6	4.151	7750
<b>ELLPREX 5000</b>	3800÷5000	4064.2÷5421.8	6012	0.80÷1.05	65÷110	6	4.151	7750
<b>ELLPREX 5500</b>	4180÷5500	4446.8÷5914	7058	0.95÷1.15	60÷100	6	4.838	9300
<b>ELLPREX 6000</b>	4870÷6000	4877÷6506.2	7058	1.00÷1.35	68÷120	6	4.838	9300
<b>ELLPREX 6500</b>	4940÷6500	5255.3÷6989.2	7909	1.05÷1.50	61÷105	6	6.832	12600
<b>ELLPREX 7000</b>	5320÷7000	5689.8÷7590.5	7909	1.10÷1.75	69÷120	6	6.832	12600

Pressure drops corresponding to a thermal variation of 15K.

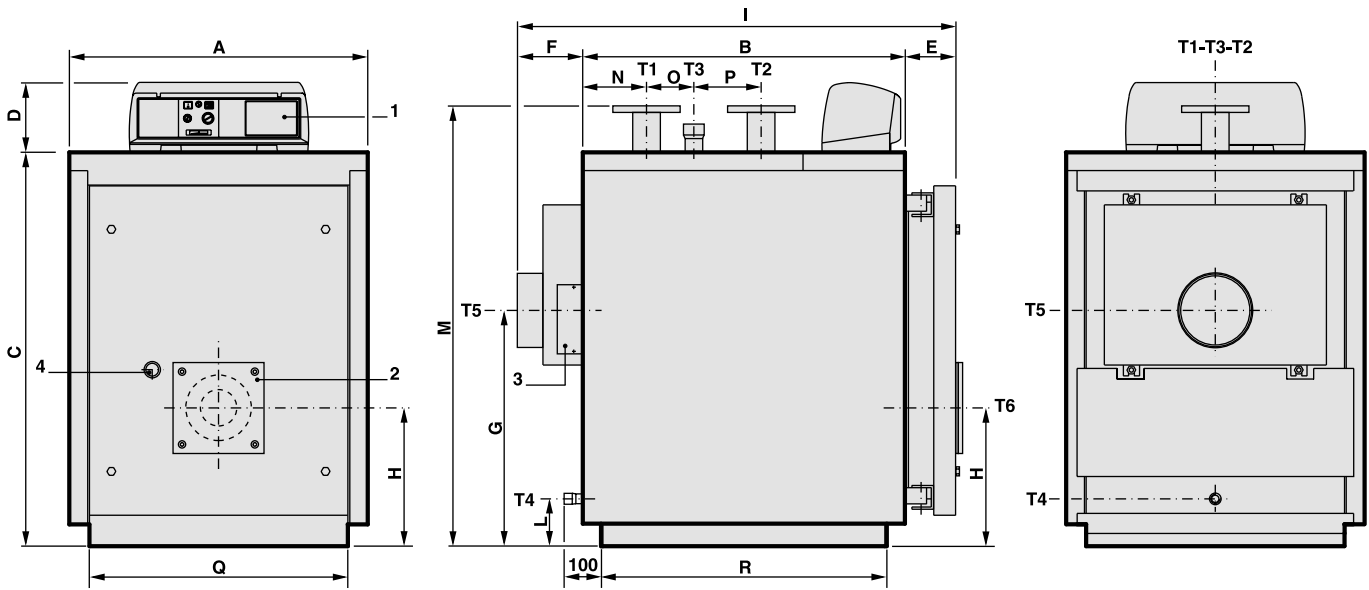
On special order the boilers from model ELLPREX 1100 to ELLPREX 7000 can be manufactured for a max. working pressure up to 10 bar.

## PRODUCT PLUS VALUES



- **FLEXIBILITY OF USE**
- **THERMAL EXCHANGE OPTIMISATION**  
by driven water passage into the boiler
- **THE ELLIPTIC SHELL SHAPE (up to 970 kW)**  
has interesting advantages:
  - smaller dimensions (for easier transport and positioning)
  - smoke pipes positioning above the furnace with drastic reduction of the possible condensation
- **SMOKE PIPES OF HIGH THICKNESS**  
with anti-condensing effect
- **TURBOLATORS**  
for the thermal exchange optimisation into the smoke pipes
- **CYLINDRICAL FLOATING FURNACE**  
anti thermo-mechanic stress from 760 kW
- **BOTTOM OF THE FURNACE WITH DISSIPATION PLATES**  
for greater performance and greater mechanical resistance
- **FRONT DOOR**  
with self centering locking
- **INTERNAL DOOR INSULATION**  
in light refractory concrete
- **EXTERNAL CASING**  
inclusive of 80 mm rock wool insulation
- **THERMOSTATIC OR ELECTRONIC CONTROL PANELS**
- **FACILITATED TRANSPORT**  
thanks to the upper hooks and strong base plates

DIMENSIONS ELLPREX 340÷970



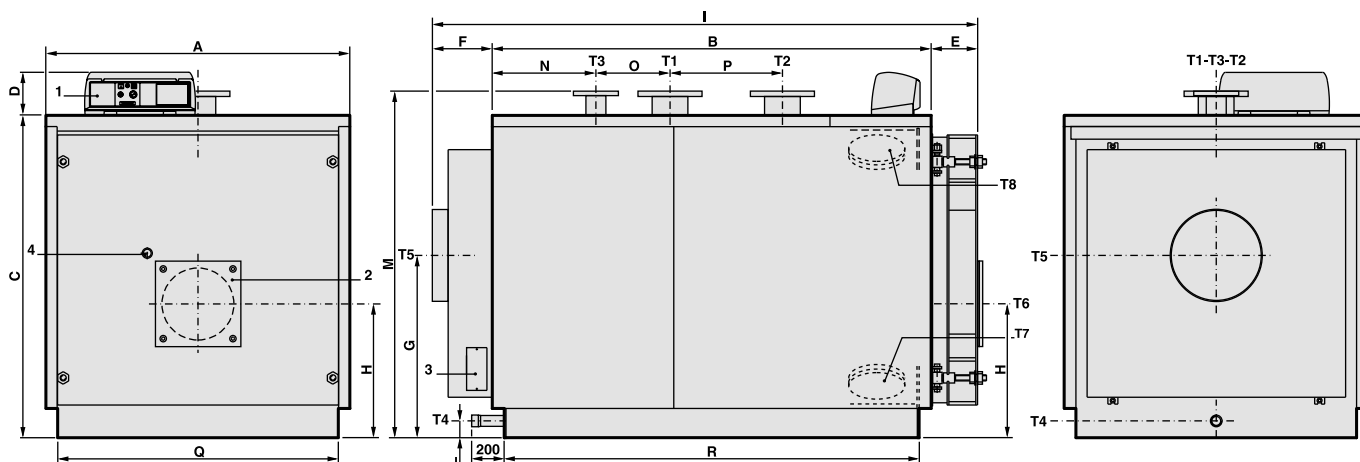
- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light
- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection

ELLPREX	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3 ISO 7/1	T4 ISO 7/1	T5 Øi	T6 Ø
								UNI2278 PN16	UNI2278 PN16	ISO 7/1	mm	mm
340	255÷340	277÷371	298	0.16÷0.28	17÷34	6	629	DN 80	Rp 2	Rp ¾	250	220
420	315÷420	342÷459	398	0.09÷0.17	16÷29	6	796	DN 100	Rp 2	Rp ¾	250	220
510	385÷510	418÷557	462	0.14÷0.25	24÷43	6	919	DN 100	Rp 2	Rp ¾	250	220
630	480÷630	520÷688	565	0.21÷0.38	32÷55	6	1049	DN 100	Rp 2	Rp ¾	300	220
760	580÷760	630÷830	671	0.15÷0.26	29÷51	6	1341	DN 125	DN 65	Rp 1¼	350	270
870	660÷870	715÷950	753	0.19÷0.33	33÷57	6	1447	DN 125	DN 65	Rp 1¼	350	270
970	750÷970	815÷1060	836	0.24÷0.41	29÷49	6	1553	DN 125	DN 65	Rp 1¼	350	270

ELLPREX	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
340	860	1210	1182	190	139	190	708	400	1541	130	1310	215	340	250	750	1112
420	890	1275	1352	190	139	190	748	440	1606	125	1485	255	285	315	780	1177
510	890	1470	1352	190	139	190	748	440	1801	125	1485	255	480	315	780	1372
630	890	1780	1352	190	139	190	748	440	2113	125	1485	255	790	315	780	1682
760	1122	1605	1432	190	195	190	765	480	1989	125	1540	298	435	440	1020	1504
870	1122	1800	1432	190	195	190	765	480	2184	125	1540	298	630	440	1020	1699
970	1122	1995	1432	190	195	190	765	480	2379	125	1540	298	825	440	1020	1894

(\*) Minimum dimensions for boiler room access.  
 (\*\*) Pressure drops corresponding to a thermal variation of 15K.

## DIMENSIONS ELLPREX 1100÷2650



- |                                      |                                       |                              |
|--------------------------------------|---------------------------------------|------------------------------|
| <b>1</b> Panel board                 | <b>T1</b> Heating flow                | <b>T5</b> Chimney connection |
| <b>2</b> Burner connection flange    | <b>T2</b> Heating return              | <b>T6</b> Burner connection  |
| <b>3</b> Smoke chamber cleaning door | <b>T3</b> Expansion vessel connection | <b>T7</b> Boiler air bleed   |
| <b>4</b> Flame control warning light | <b>T4</b> Boiler drain                | <b>T8</b> Inspection door    |

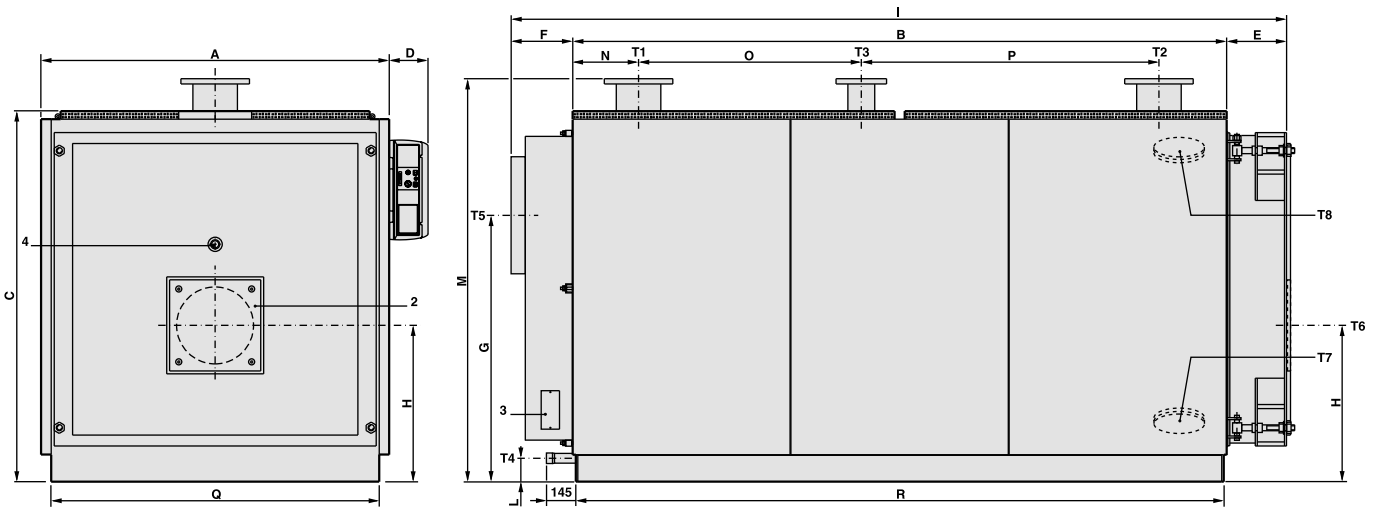
ELLPREX	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
								UNI2278PN16	UNI2278PN16	ISO 7/1	mm	mm
<b>1100</b>	860÷1100	935÷1200	1040	0.18÷0.30	32÷52	6	1821	DN 150	DN 80	Rp 1½	400	320
<b>1320</b>	1000÷1320	1087÷1442	1242	0.20÷0.35	38÷67	6	2030	DN 150	DN 80	Rp 1½	400	320
<b>1570</b>	1200÷1570	1304÷1715	1418	0.19÷0.33	35÷60	6	2780	DN 175	DN 100	Rp 1½	450	320
<b>1850</b>	1400÷1850	1520÷2020	1617	0.26÷0.45	42÷73	6	3280	DN 175	DN 100	Rp 1½	450	320
<b>2200</b>	1700÷2200	1845÷2400	2086	0.21÷0.34	39÷65	6	4145	DN 200	DN 125	Rp 1½	520	380
<b>2650</b>	2000÷2650	2170÷2890	2324	0.28÷0.48	43÷76	6	4465	DN 200	DN 125	Rp 1½	520	380

ELLPREX	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
<b>1100</b>	1352	1952	1432	190	207	187	810	595	2346	180	1540	461	330	500	1250	1846
<b>1320</b>	1352	2292	1432	190	207	187	810	595	2686	180	1540	461	670	500	1250	2186
<b>1570</b>	1462	2282	1542	190	227	272	880	640	2781	75	1650	561	510	550	1360	2176
<b>1850</b>	1462	2652	1542	190	227	272	880	640	3151	75	1650	561	880	550	1360	2546
<b>2200</b>	1622	2692	1702	190	259	274	950	690	3225	75	1810	661	670	700	1520	2590
<b>2650</b>	1622	3014	1702	190	258	273	950	690	3545	75	1810	662	990	700	1520	2910

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

On special order the boilers from model 1100 to 7000 can be manufactured for a max. working pressure up to 10 bar.

DIMENSIONS ELLPREX 3000÷4000



- 1 Panel board
- 2 Burner fixing plate
- 3 Smoke chamber cleaning door
- 4 Sight glass

- T1 C.H. flow
- T2 C.H. return
- T3 Expansion vessel connection
- T4 Boiler drain

- T5 Flue socket
- T6 Burner connection
- T7 Sludge drain
- T8 Inspection door

ELLPREX	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
								UNI2278PN16	UNI2278PN16	ISO 7/1	mm	mm
3000	2300÷3000	2492÷3280	2667	0.36÷0.62	35÷60	6	5110	DN 200	DN 125	Rp 1½	570	380
3500	2700÷3500	2930÷3825	4142	0.54÷0.84	47÷74	6	6700	DN 200	DN 125	Rp 1½	620	400
4000	3040÷4000	3297÷4371	4455	0.54÷0.85	60÷80	6	7500	DN 250	DN 125	Rp 1½	620	400

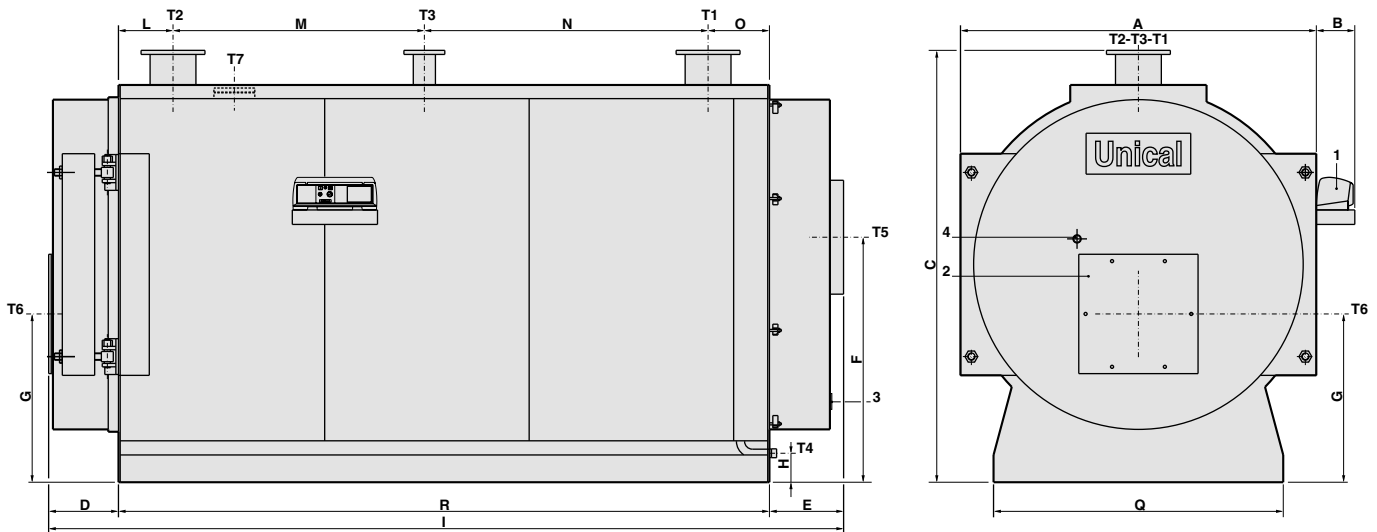
ELLPREX	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
3000	1720	3230	1830	190	295	310	1315	772	3835	115	1990	325	1100	1470	1620	3200
3500	1970	3194	2090	190	325	360	1535	915	3879	144	2271	377	1060	1420	1870	3164
4000	1970	3594	2090	190	325	360	1535	915	4279	144	2271	777	1060	1420	1870	3564

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

On special order the boilers from model ELLPREX 1100 to ELLPREX 7000 can be manufactured for a max. working pressure up to 10 bar.



## DIMENSIONS ELLPREX 4500÷7000



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light
- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Inspection door

ELLPREX	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Ø
								UNI2278PN16	UNI2278PN16	ISO 7/1	mm	mm	mm
4500	3420÷4500	3638.3÷4838.7	6012	0.70÷0.85	51÷88	6	8310	DN 250	DN 125	Rp 1½	660	500	133
5000	3800÷5000	4064.2÷5421.8	6012	0.80÷1.05	65÷110	6	8310	DN 250	DN 125	Rp 1½	660	500	133
5500	4180÷5500	4446.8÷5914	7058	0.95÷1.15	60÷100	6	9300	DN 250	DN 125	Rp 1½	660	500	133
6000	4560÷6000	4877÷6506.2	7058	1.00÷1.35	68÷120	6	9300	DN 250	DN 125	Rp 1½	660	500	133
6500	4940÷6500	5255.3÷6989.2	7909	1.05÷1.50	61÷105	6	12600	DN 250	DN 125	Rp 1½	720	500	133
7000	5320÷7000	5689.8÷7590.5	7909	1.10÷1.75	69÷120	6	12600	DN 250	DN 125	Rp 1½	720	500	133

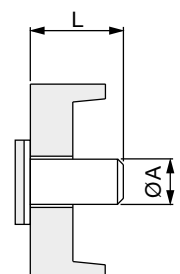
ELLPREX	A	B	C*	D	E	F	G	H	I	L	M	N	O	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
4500	2088	226	2533	417	445	1437	987	170	4682	320	1475	1665	360	1700	3820
5000	2088	226	2533	417	445	1437	987	170	4682	320	1475	1665	360	1700	3820
5500	2214	240	2653	437	465	1550	1007	167	4872	320	1475	1815	360	1700	3970
6000	2214	240	2653	437	465	1550	1007	167	4872	320	1475	1815	360	1700	3970
6500	2380	240	2860	509	595	1650	1100	224	5484	325	2920	670	465	1850	4380
7000	2380	240	2860	509	595	1650	1100	224	5484	325	2920	670	465	1850	4380

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

On special order the boilers from model ELLPREX 1100 to ELLPREX 7000 can be manufactured for a max. working pressure up to 10 bar.

## BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm	BOILER TYPE	øA mm	L mm
ELLPREX 340÷630	220	250	ELLPREX 3000	380	400
ELLPREX 760÷970	270	270	ELLPREX 3500÷4000	400	400
ELLPREX 1100÷1320	320	300	ELLPREX 4500÷6000	500	520
ELLPREX 1570÷1850	320	320	ELLPREX 6500÷7000	500	630
ELLPREX 2200÷2650	380	350			



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Oil fired		ELL 340	ELL 420	ELL 510	ELL 630	ELL 760	ELL 870	ELL 970	ELL 1100
Nominal heat output	kW	255±340	315±420	385±510	480±630	580±760	660±870	750±970	860±1100
Thermal output of furnace	kW	277±371	342±459	418±557	520±688	630±830	715±950	815±1060	935±1200
Heat efficiency at nominal load (100%)	%	92±91.6	92.1±91.5	92.1±91.5	92.3±91.5	92±91.5	91.5±91.5	92±91.5	91.9±91.6
Heat efficiency at 30% load	%	93.6±93.6	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9
Combustion efficiency at nominal load (100%)	%	92.8±92.5	92.7±92.4	92.7±92.4	92.6±92	92.3±92.1	92.1±92.1	92.5±91.9	92.3±92
Heat loss at casing (min.-max.)	%	0.8±0.8	0.6±0.9	0.6±0.9	0.3±0.4	0.2±0.5	0.5±0.5	0.4±0.4	0.4±0.3
Heat loss at chimney with burner on (min.-max.)	%	7.1±7.4	7.2±7.5	7.3±7.5	7.3±7.9	7.6±7.8	7.8±7.8	7.4±8	7.6±7.9
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2
Flue gas temperature tf-ta (min.-max.)	°C	156±164	158±166	160±165	162±175	168±173	158±172	164±177	167±175
CO <sub>2</sub> content	%	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8
Flue gas mass flow rate (min.-max)	kg/h	424±568	523±702	640±852	796±1053	964±1271	1094±1454	1248±1632	1431±1837
Oil fired		ELL 1320	ELL 1570	ELL 1850	ELL 2200	ELL 2650	ELL 3000	ELL 3500	ELL 4000
Nominal heat output	kW	1000±1320	1200±1570	1400±1850	1700±2200	2000±2650	2300±3000	2700±3500	3040±4000
Thermal output of furnace	kW	1087±1442	1304±1715	1520±2020	1845±2400	2170±2890	2492±3280	2930±3825	3297±4371
Heat efficiency at nominal load (100%)	%	92±91.5	92±91.5	92.1±91.5	92.1±91.6	92.1±91.7	92.3±91.4	92.1±91.4	92.2±91.5
Heat efficiency at 30% load	%	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9
Combustion efficiency at nominal load (100%)	%	92.2±91.8	92.2±91.9	92.4±91.8	92.4±91.9	92.4±92	92.4±91.7	92.4±91.7	92.4±91.8
Heat loss at casing (min.-max.)	%	0.2±0.2	0.2±0.3	0.3±0.3	0.3±0.3	0.3±0.3	0.1±0.3	0.3±0.3	0.2±0.3
Heat loss at chimney with burner on (min.-max.)	%	7.7±8.1	7.7±8	7.5±8.1	7.5±8	7.5±7.9	7.5±8.2	7.5±8.2	7.5±8.1
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2
Flue gas temperature tf-ta (min.-max.)	°C	170±179	170±177	165±178	165±176	165±175	165±180	165±180	165±179
CO <sub>2</sub> content	%	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8
Flue gas mass flow rate (min.-max)	kg/h	1664±2208	1996±2626	2327±3093	2825±3675	3322±4425	3816±5022	4486±5861	5048±6693
Oil fired		ELL 4500	ELL 5000	ELL 5500	ELL 6000	ELL 6500	ELL 7000		
Nominal heat output	kW	3420±4500	3800±5000	4180±5500	4560±6000	4940±6500	5320±7000		
Thermal output of furnace	kW	3638.3±4838.7	4064.2±5421.8	4446.8±5914	4877±6506.2	5255.3±6989.2	5689.8±7590.5		
Heat efficiency at nominal load (100%)	%	94.0±93.0	93.5±92.22	94.0±93.0	93.5±92.22	94.0±93.0	93.5±92.22		
Heat efficiency at 30% load	%	94.66±93.65	94.15±92.87	94.66±93.65	94.15±92.87	94.66±93.65	94.15±92.87		
Combustion efficiency at nominal load (100%)	%	94.53±93.48	94.07±92.84	94.53±93.48	94.07±92.84	94.53±93.48	94.07±92.84		
Heat loss at casing (min.-max.)	%	0.53±0.48	0.57±0.62	0.53±0.48	0.57±0.62	0.53±0.48	0.57±0.62		
Heat loss at chimney with burner on (min.-max.)	%	5.47±6.52	5.93±7.16	5.47±6.52	5.93±7.16	5.47±6.52	5.93±7.16		
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2		
Flue gas temperature tf-ta (min.-max.)	°C	120±143	130±157	120±143	130±157	120±143	130±157		
CO <sub>2</sub> content	%	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8	12.8±12.8		
Flue gas mass flow rate (min.-max)	kg/h	5571.4±7409.6	6223.5±8302.5	6809.4±9056.1	7468.2±9963.0	8047.5±10702.7	8712.9±11623.5		
Gas fired		ELL 340	ELL 420	ELL 510	ELL 630	ELL 760	ELL 870	ELL 970	ELL 1100
Nominal heat output	kW	255±340	315±420	385±510	480±630	580±760	660±870	750±970	860±1100
Thermal output of furnace	kW	277±371	342±459	418±557	520±688	630±830	715±950	815±1060	935±1200
Heat efficiency at nominal load (100%)	%	92±91.6	92.1±91.5	92.1±91.5	92.3±91.5	92±91.5	91.5±91.5	92±91.5	91.9±91.6
Heat efficiency at 30% load	%	93.6±93.6	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9
Combustion efficiency at nominal load (100%)	%	92.9±92.5	92.8±92.4	92.7±92.4	92.6±92	92.3±92.1	92.8±92.1	92.5±91.9	91.4±92
Heat loss at casing (min.-max.)	%	0.8±0.8	0.7±0.9	0.6±0.9	0.3±0.4	0.2±0.5	0.5±0.6	0.5±0.4	0.4±0.3
Heat loss at chimney with burner on (min.-max.)	%	7.1±7.4	7.1±7.5	7.2±7.5	7.3±7.9	7.6±7.8	7.1±7.8	7.4±8	7.6±7.9
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2
Flue gas temperature tf-ta (min.-max.)	°C	145±152	147±154	149±153	151±163	156±161	147±160	152±165	155±163
CO <sub>2</sub> content	%	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8
Flue gas mass flow rate (min.-max)	kg/h	416±557	514±689	628±837	781±1034	947±1247	1074±1428	1225±1593	1405±1803
Gas fired		ELL 1320	ELL 1570	ELL 1850	ELL 2200	ELL 2650	ELL 3000	ELL 3500	ELL 4000
Nominal heat output	kW	1000±1320	1200±1570	1400±1850	1700±2200	2000±2650	2300±3000	2700±3500	3040±4000
Thermal output of furnace	kW	1087±1442	1304±1715	1520±2020	1845±2400	2170±2890	2492±3280	2930±3825	3297±4371
Heat efficiency at nominal load (100%)	%	92±91.5	92±91.5	92.1±91.5	92.1±91.6	92.1±91.7	92.3±91.4	92.1±91.4	92.2±91.5
Heat efficiency at 30% load	%	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9	93.9±93.9
Combustion efficiency at nominal load (100%)	%	92.2±91.8	92.2±91.9	92.4±91.8	92.4±91.9	92.4±92	92.4±91.7	92.4±91.7	92.4±91.8
Heat loss at casing (min.-max.)	%	0.2±0.3	0.2±0.4	0.3±0.3	0.3±0.3	0.3±0.3	0.2±0.3	0.3±0.3	0.2±0.3
Heat loss at chimney with burner on (min.-max.)	%	7.7±8.1	7.7±8	7.5±8.1	7.5±8	7.5±7.9	7.5±8.1	7.5±8.1	7.5±8.1
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2
Flue gas temperature tf-ta (min.-max.)	°C	158±166	158±165	153±166	153±164	153±163	153±167	153±167	153±166
CO <sub>2</sub> content	%	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8
Flue gas mass flow rate (min.-max)	kg/h	1633±2167	1960±2577	2284±3036	2773±3607	3261±4344	3745±4930	4404±5754	4955±6570
Gas fired		ELL 4500	ELL 5000	ELL 5500	ELL 6000	ELL 6500	ELL 7000		
Nominal heat output	kW	3420±4500	3800±5000	4180±5500	4560±6000	4940±6500	5320±7000		
Thermal output of furnace	kW	3638.3±4838.7	4064.2±5421.8	4446.8±5914	4877±6506.2	5255.3±6989.2	5689.8±7590.5		
Heat efficiency at nominal load (100%)	%	94.0±93.0	93.5±92.22	94.0±93.0	93.5±92.22	94.0±93.0	93.5±92.22		
Heat efficiency at 30% load	%	94.66±93.65	94.15±92.87	94.66±93.65	94.15±92.87	94.66±93.65	94.15±92.87		
Combustion efficiency at nominal load (100%)	%	94.54±93.51	94.05±92.83	94.54±93.46	94.05±92.83	94.54±93.46	94.05±92.83		
Heat loss at casing (min.-max.)	%	0.54±0.51	0.55±0.61	0.54±0.46	0.55±0.61	0.54±0.46	0.55±0.61		
Heat loss at chimney with burner on (min.-max.)	%	5.46±6.49	5.95±7.17	5.46±6.54	5.95±7.17	5.46±6.54	5.95±7.17		
Heat loss at chimney with burner off (min.-max.)	%	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2	0.2±0.2		
Flue gas temperature tf-ta (min.-max.)	°C	112±133	122±147	112±134	122±147	112±134	122±147		
CO <sub>2</sub> content	%	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8	9.8±9.8		
Flue gas mass flow rate (min.-max)	kg/h	5468.9±7273.3	6109.0±8149.8	6684.2±8889.5	7330.8±9779.7	7899.5±10505.8	8552.6±11409.7		

# TRISTAR 2S

(The models with an output smaller than 400 kW can be sold only outside de UE - agg. 01/2019)



BREVETTO  
**Unical**  
PATENT

multi-fin pipes

## PRESSURIZED CARBON STEEL BOILER WITH REVERSED FLAME FURNACE

OUTPUT RANGE

from 80 to 6100 kW

OPERATION TEMPERATURE

minimum return temperature 55°C

SUPPLY

Natural Gas or LPG fed pressure jet burners

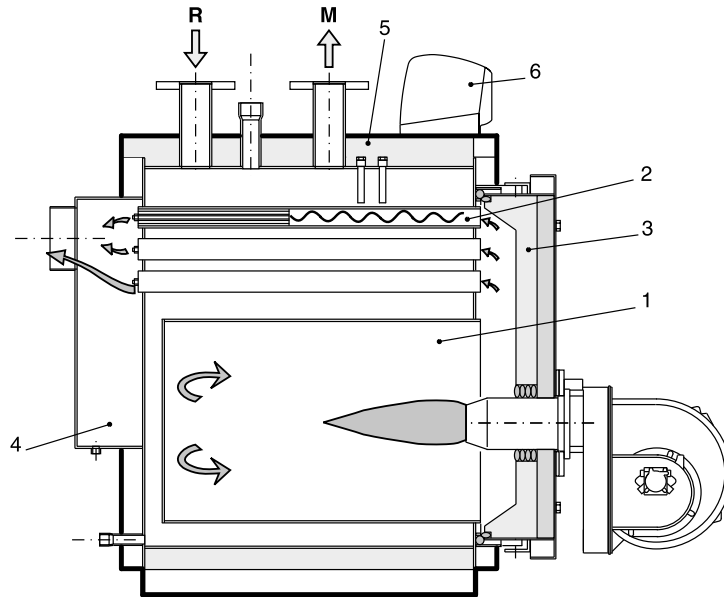
MODELS

80	120	160	200	250	300	370	450	560	680	780	870	1000	1180
1400	1650	2000	2350	2700	3100	3500	3900	4400	4800	5200	5700	6100	-

Certified in OUTPUT RANGE  
Special patented smoke pipes with aluminium profiles – Floating furnace

## MAIN COMPONENTS

1. Furnace
2. Special smoke pipes EASY STREAM PIPE with turbulators
3. Door with flame control warning light
4. Smoke chamber
5. Body insulation
6. Panel board

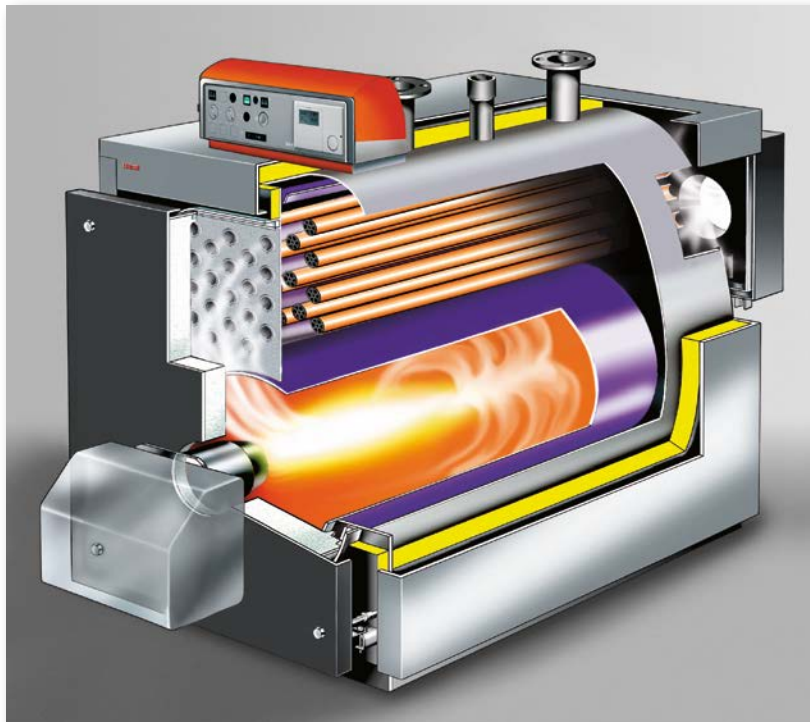


## TECHNICAL DATA

MODEL	Heat output	Heat input	Boiler capacity	Water side	Flue gas pressure	Max. boiler operating pressure	Weight
	min/max	min/max		pressure drops	pressure drops		
	kW	kW	l	m w.c.	mm w.c.	bar	kg
TRISTAR 2S 80	60÷80	63.3÷85.2	86	0.08÷0.15	3.8÷6.8	6	221
TRISTAR 2S 120	90÷120	94.6÷127.4	126	0.06÷0.11	6.1÷10.8	6	325
TRISTAR 2S 160	120÷160	125.8÷169.4	151	0.11÷0.20	8.9÷15.8	6	366
TRISTAR 2S 200	150÷200	157÷211.3	203	0.10÷0.17	11.1÷19.7	6	505
TRISTAR 2S 250	187.5÷250	195.8÷263.6	247	0.12÷0.22	13.3÷23.6	6	583
TRISTAR 2S 300	225÷300	234.6÷315.8	298	0.12÷0.22	15.9÷28.4	6	665
TRISTAR 2S 370	277.5÷370	288.8÷388.7	398	0.08÷0.14	18.1÷32.2	6	845
TRISTAR 2S 450	337.5÷450	351÷472.4	462	0.11÷0.20	20.2÷35.8	6	986
TRISTAR 2S 560	420÷560	436.8÷587.9	565	0.17÷0.30	23.7÷42.1	6	1119
TRISTAR 2S 680	510÷680	530.4÷713.9	671	0.12÷0.21	27.8÷49.4	6	1435
TRISTAR 2S 780	585÷780	608.4÷818.9	753	0.15÷0.27	30.7÷54.4	6	1557
TRISTAR 2S 870	652.5÷870	678.6÷913.4	836	0.19÷0.33	33÷58.6	6	1656
TRISTAR 2S 1000	750÷1000	780÷1049.8	1040	0.11÷0.19	35.9÷63.9	6	1970
TRISTAR 2S 1180	885÷1180	920.4÷1238.8	1242	0.15÷0.26	38.6÷68.6	6	2175
TRISTAR 2S 1400	1050÷1400	1092÷1469.8	1418	0.15÷0.26	42.1÷74.9	6	2975
TRISTAR 2S 1650	1237.5÷1650	1287÷1732.3	1617	0.20÷0.36	45.5÷80.9	6	3465
TRISTAR 2S 2000	1500÷2000	1560÷2099.7	2086	0.16÷0.38	40.5÷72	6	4390
TRISTAR 2S 2350	1762.5÷2350	1833÷2467.1	2324	0.21÷0.38	43.2÷76.9	6	4700
TRISTAR 2S 2700	2025÷2700	2106÷2834.6	2667	0.28÷0.50	45.6÷81	6	5370
TRISTAR 2S 3100	2325÷3100	2418.1÷3254.5	4142	0.37÷0.66	43.3÷76.9	6	6990
TRISTAR 2S 3500	2625÷3500	2730.1÷3674.5	4455	0.37÷0.65	50.4÷89.5	6	7790
TRISTAR 2S 3900	2925÷3900	3042.1÷4094.4	6012	0.28÷0.50	44.4÷78.6	6	8630
TRISTAR 2S 4400	3300÷4400	3432.1÷4619.3	6012	0.35÷0.63	56.6÷100.5	6	8630
TRISTAR 2S 4800	3600÷4800	3744.1÷5039.3	7058	0.42÷0.75	50.5÷92.2	6	9675
TRISTAR 2S 5200	3900÷5200	4056.1÷5459.2	7058	0.50÷0.88	59.3÷105.4	6	9675
TRISTAR 2S 5700	4275÷5700	4446.1÷5984.1	7909	0.59÷1.05	49.5÷90.5	6	13060
TRISTAR 2S 6100	4575÷6100	4758.1÷6404.1	7909	0.68÷1.21	56.7÷100.7	6	13060

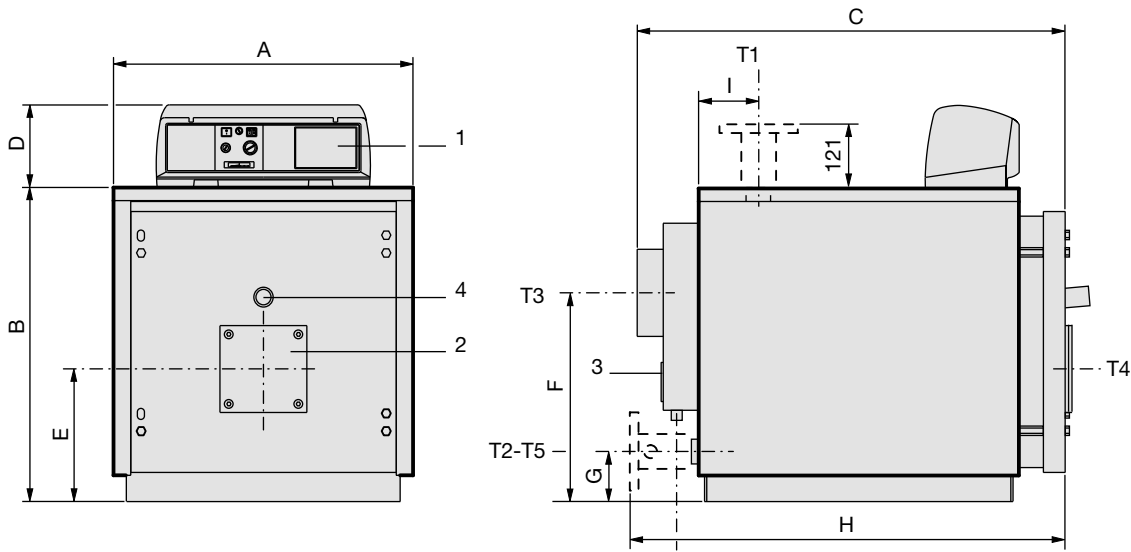
On special order the boilers from model 1000 to 6100 can be manufactured for a max. working pressure up to 10 bar.

## PRODUCT PLUS VALUES



- **CERTIFICATION IN OUTPUT RANGE**
- **OUTER SHELL OF ELLIPTIC SHAPE**  
(up to the model 870 kW) that creates the following advantages:
  - small dimensions in width
  - positioning of most of the tube bundle above the furnace, with drastic reduction of the possible formation of condensate
- **FLOATING FURNACE** from model 680 and on, in order to reduce the mechanical stress due to the different dilatations of the furnace, smoke pipes and outer shell.
- **FURNACE BOTTOM** with heat recovering plates welded on the water side for efficiency increase and as stiffeners of the bottom it self.
- **MULTI-FIN, PATENTED, BIMETALLIC PIPES**  
with high efficiency
- **OPTIMIZATION OF THE HEAT EXCHANGE**  
thanks to:
  - special helical turbulators in the front part of the smoke pipes
  - guided water way inside the boiler
- **FRONT DOOR**  
with self-centring closing, adjustable in vertical / axial and transversal way, with bolts separated from the hinges to avoid mechanical stresses
- **INTERNAL DOOR INSULATION**  
in recyclable super light concrete
- **OUTER PROTECTING CASING**  
in steel sheet panels, with insulating mattress in mineral wool protected with anti-tearing fabric foil, rounded directly on the boiler body. Thickness of 50 - 60 - 80 - 100 mm according to the output.
- **SMOKE CHAMBER**  
with condensate drain connection
- **BOARD PANEL**  
thermostatic type (std) or electronic type (optional)
- **EASY HANDLING**  
thanks to the upper hooks and strong base longitudinal members
- **AVAILABLE IN LOOSEN PARTS VERSION**  
to be assembled in the boiler house (up to 870 kW).

DIMENSIONS TRISTAR 2S 80÷250



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light

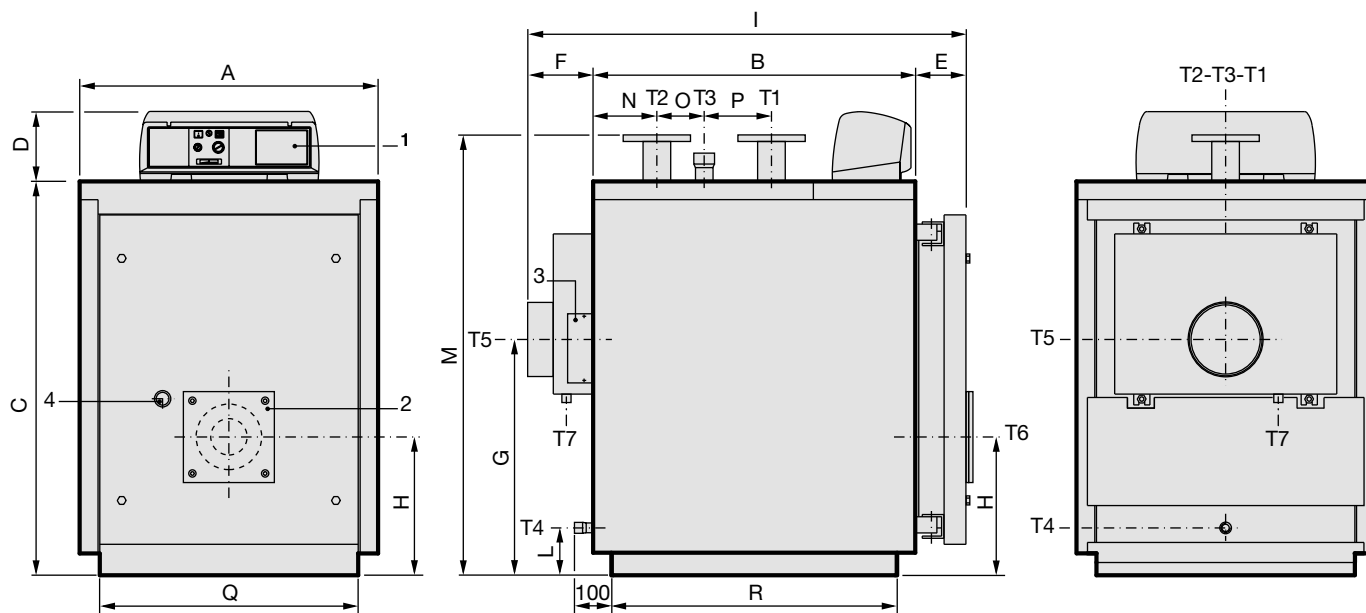
- T1 Heating flow
- T2 Heating return
- T3 Chimney connection
- T4 Burner connection

- T5 Boiler drain
- T6 Condensation drain

TRISTAR 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3 Øe	T4 Øi	T5	T6 Øe
								UNI228 UNI2278PN16	mm	mm	UNI228	mm
80	60÷80	63.3÷85.2	86	0.08÷0.15	3.8÷6.8	6	221	G 1½	200	130	G ¾	40
120	90÷120	94.6÷127.4	126	0.06÷0.11	6.1÷10.8	6	325	G 2	200	180	G ¾	40
160	120÷160	125.8÷169.4	151	0.11÷0.20	8.9÷15.8	6	366	G 2	200	180	G ¾	40
200	150÷200	157÷211.3	203	0.10÷0.17	11.1÷19.7	6	505	DN 65	250	180	G ¾	40
250	187.5÷250	195.8÷263.6	247	0.12÷0.22	13.3÷23.6	6	583	DN 65	250	180	G ¾	40

TRISTAR 2S	A	B	C	D	E	F	G	H	I
	mm	mm	mm	mm	mm	mm	mm	mm	mm
80	690	722	995	190	305	480	115	--	147
120	760	812	1210	190	350	500	130	--	157
160	760	812	1390	190	350	500	130	--	157
200	860	937	1442	190	421	580	165	1487	258
250	860	937	1692	190	421	580	165	1737	258

DIMENSIONS TRISTAR 2S 300÷870



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warning light
- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

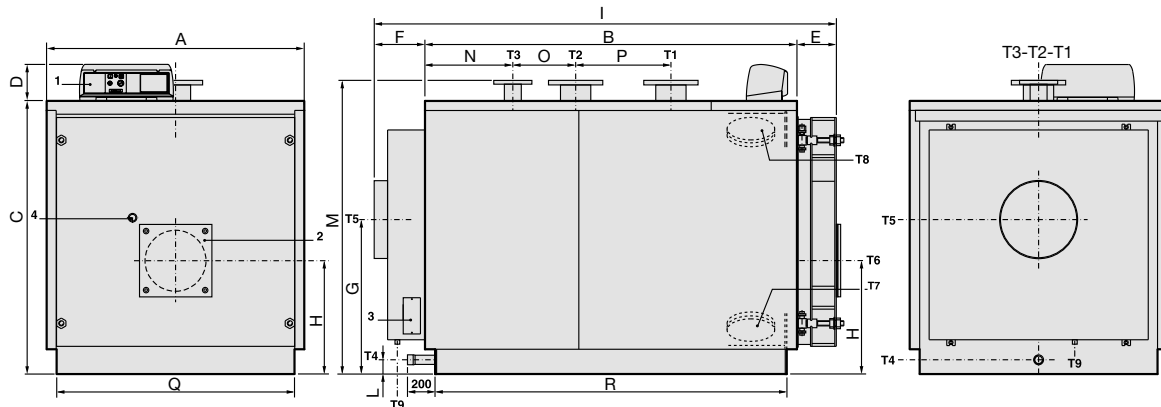
TRISTAR 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Øe
								UNI2278 PN16	UNI2278 PN16 UNI228	UNI228	mm	mm	mm
300	225÷300	234.6÷315.8	298	0.12÷0.22	15.9÷28.4	6	665	DN 80	G 2	G ¾	250	220	40
370	277.5÷370	288.8÷388.7	398	0.08÷0.14	18.1÷32.2	6	845	DN 100	G 2	G ¾	250	220	40
450	337.5÷450	351÷472.4	462	0.11÷0.20	20.2÷35.8	6	986	DN 100	G 2	G ¾	250	220	40
560	420÷560	436.8÷587.9	565	0.17÷0.30	23.7÷42.1	6	1119	DN 100	G 2	G ¾	300	220	40
680	510÷680	530.4÷713.9	671	0.12÷0.21	27.8÷49.4	6	1435	DN 125	DN 65	G 1¼	350	270	40
780	585÷780	608.4÷818.9	753	0.15÷0.27	30.7÷54.5	6	1557	DN 125	DN 65	G 1¼	350	270	40
870	652.5÷870	678.6÷913.4	836	0.19÷0.33	33÷58.6	6	1656	DN 125	DN 65	G 1¼	350	270	40

TRISTAR 2S	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
300	860	1210	1182	190	140	191	708	400	1541	130	1310	215	340	250	750	1112	100
370	890	1275	1352	190	140	191	748	440	1606	125	1485	255	285	315	780	1177	100
450	890	1470	1352	190	140	191	748	440	1801	125	1485	255	480	315	780	1372	100
560	890	1780	1352	190	141	192	748	440	2113	125	1485	255	790	315	780	1684	100
680	1122	1605	1432	190	195	190	765	480	1989	125	1540	298	435	440	1020	1504	200
780	1122	1800	1432	190	195	190	765	480	2184	125	1540	298	630	440	1020	1699	200
870	1122	1995	1432	190	195	190	765	480	2379	125	1540	298	825	440	1020	1894	200

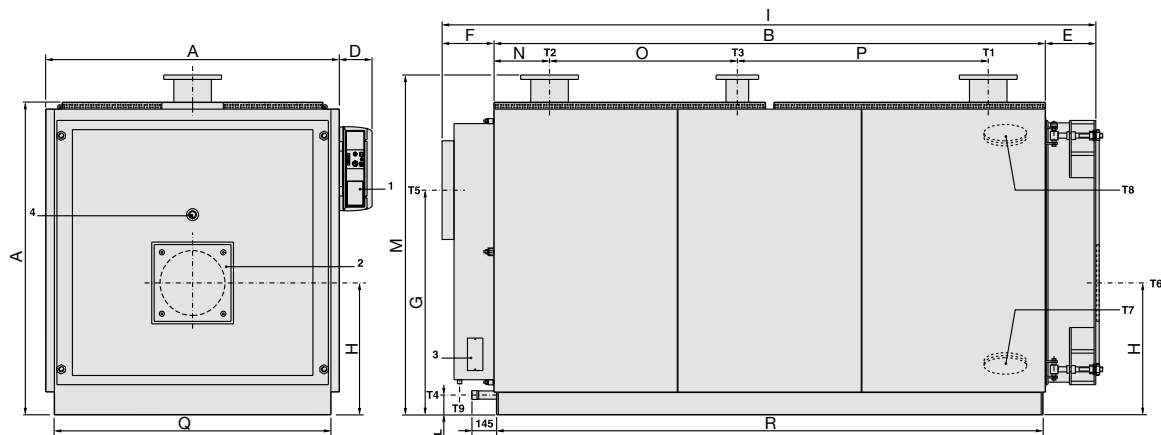
(\*) Minimum dimensions for boiler room access.  
 (\*\*) Pressure drops corresponding to a thermal variation of 15K.

DIMENSIONS TRISTAR 2S 1000÷3500

TRISTAR 2S 1000÷2350



TRISTAR 2S 2700÷3500



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame sight glass
- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

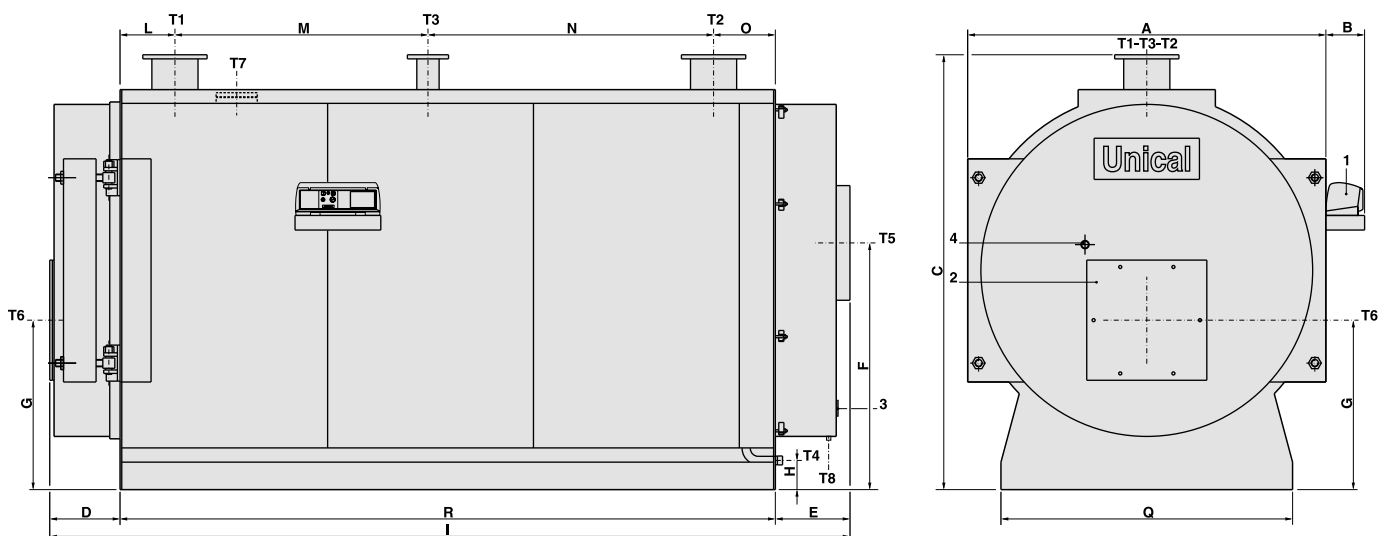
TRISTAR 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T9 Øe
1000	750÷1000	780÷1049.8	1040	0.11÷0.19	35.9÷63.9	6	1970	UNI2278 PN16	UNI2278 PN16	UNI228	400	320	40
1180	885÷1180	920.4÷1238.8	1242	0.15÷0.26	38.6÷68.6	6	2175	DN 150	DN 80	G 1½	400	320	40
1400	1050÷1400	1092÷1469.8	1418	0.15÷0.26	42.1÷74.9	6	2975	DN 175	DN 100	G 1½	450	320	40
1650	1237.5÷1650	1287÷1732.3	1617	0.20÷0.36	45.5÷80.9	6	3465	DN 175	DN 100	G 1½	450	320	40
2000	1500÷2000	1560÷2099.7	2086	0.16÷0.28	40.5÷72	6	4390	DN 200	DN 125	G 1½	520	380	40
2350	1762.5÷2350	1833÷2467.1	2324	0.21÷0.38	43.2÷76.9	6	4700	DN 200	DN 125	G 1½	520	380	40
2700	2025÷2700	2106÷2834.6	2667	0.28÷0.50	45.6÷81	6	5370	DN 200	DN 125	G 1½	570	380	-
3100	2325÷3100	2418.1÷3254.5	4142	0.37÷0.66	43.3÷76.9	6	6990	DN 200	DN 125	G 1½	620	400	-
3500	2625÷3500	2730.1÷3674.5	4455	0.37÷0.65	50.4÷89.5	6	7790	DN 250	DN 125	G 1½	620	400	-

TRISTAR 2S	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1000	1352	1952	1432	190	207	187	810	595	2346	180	1540	461	330	500	1250	1846
1180	1352	2292	1432	190	207	187	810	595	2686	180	1540	461	670	500	1250	2186
1400	1462	2282	1542	190	227	272	880	640	2781	75	1650	561	510	550	1360	2176
1650	1462	2652	1542	190	227	272	880	640	3151	75	1650	561	880	550	1360	2546
2000	1622	2692	1702	190	259	274	950	690	3225	75	1810	661	670	700	1520	2590
2350	1622	3014	1702	190	258	273	950	690	3545	75	1810	662	990	700	1520	2910
2700	1720	3230	1830	190	295	310	1315	772	3835	115	1990	325	1100	1470	1620	3200
3100	1970	3194	2090	190	325	360	1535	915	3879	144	2271	377	1060	1420	1870	3164
3500	1970	3594	2090	190	325	360	1535	915	4279	144	2271	777	1060	1420	1870	3564

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.



## DIMENSIONS TRISTAR 2S 3900÷6100



- |                               |                                |                       |
|-------------------------------|--------------------------------|-----------------------|
| 1 Panel board                 | T1 Heating flow                | T5 Chimney connection |
| 2 Burner connection flange    | T2 Heating return              | T6 Burner connection  |
| 3 Smoke chamber cleaning door | T3 Expansion vessel connection | T7 Inspection door    |
| 4 Flame sight glass           | T4 Boiler drain                | T8 Condensation drain |

TRISTAR 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS						
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Ø	T8 Øe
3900	2925÷3900	3042.1÷4094.4	6012	0.28÷0.50	44.4÷78.6	6	8630	UNI2278 PN16 DN 250	UNI2278 PN16 DN 125	ISO 7/1 Rp 1½	660	500	133	40
4400	3300÷4400	3432.1÷4619.3	6012	0.35÷0.63	56.6÷100.5	6	8630	DN 250	DN 125	Rp 1½	660	500	133	40
4800	3600÷4800	3744.1÷5039.3	7058	0.42÷0.75	50.5÷92.2	6	9675	DN 250	DN 125	Rp 1½	660	500	133	40
5200	3900÷5200	4056.1÷5459.2	7058	0.50÷0.88	59.3÷105.4	6	9675	DN 250	DN 125	Rp 1½	660	500	133	40
5700	4275÷5700	4446.1÷5984.1	7909	0.59÷1.05	49.5÷90.5	6	13060	DN 250	DN 125	Rp 1½	720	500	133	40
6100	4575÷6100	4758.1÷6404.1	7909	0.68÷1.21	56.7÷100.7	6	13060	DN 250	DN 125	Rp 1½	720	500	133	40

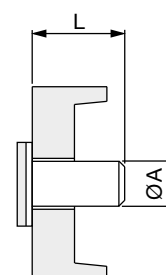
TRISTAR 2S	A	B	C*	D	E	F	G	H	I	L	M	N	O	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
3900	2088	226	2533	417	485	1437	987	170	4738	323	1475	1665	363	1700	3826
4400	2088	226	2533	417	485	1437	987	170	4738	323	1475	1665	363	1700	3826
4800	2214	240	2653	437	515	1550	1007	167	4928	323	1475	1815	363	1700	3976
5200	2214	240	2653	437	515	1550	1007	167	4928	323	1475	1815	363	1700	3976
5700	2380	240	2860	509	595	1650	1100	224	5484	325	2920	670	465	1850	4380
6100	2380	240	2860	509	595	1650	1100	224	5484	325	2920	670	465	1850	4380

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal variation of 15K.

On special order the boilers from model TRISTAR 2S 1000 to TRISTAR 2S 6100 can be manufactured for a max. working pressure up to 10 bar.

## BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm	BOILER TYPE	øA mm	L mm
TRISTAR 80 2S	130	150	TRISTAR 2000÷2350 2S	380	350
TRISTAR 120÷250 2S	180	170	TRISTAR 2700 2S	380	400
TRISTAR 300÷560 2S	220	250	TRISTAR 3100÷3500 2S	400	400
TRISTAR 680÷870 2S	270	270	TRISTAR 3900÷5200 2S	500	250
TRISTAR 1000÷1180 2S	320	300	TRISTAR 5700÷6100 2S	500	630
TRISTAR 1400÷1650 2S	320	320			



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Gas-fired		TST 80 2S	TST 120 2S	TST 160 2S	TST 200 2S	TST 250 2S	TST 300 2S	TST 370 2S
Nominal heat output	kW	60÷80	90÷120	120÷160	150÷200	187.5÷250	225÷300	277.5÷370
Thermal output of furnace	kW	63.3÷85.2	94.6÷127.4	125.8÷169.4	157÷211.3	195.8÷263.6	234.6÷315.8	288.8÷388.7
Heat efficiency at nominal load (100%)	%	94.7÷93.8	95.1÷94.2	95.4÷94.5	95.5÷94.6	95.7÷94.8	95.9÷95	96.1÷95.2
Heat efficiency at 30% load	%	94.9÷94.0	95.3÷94.4	95.6÷94.7	95.7÷94.8	95.9÷95	96.1÷95.2	96.3÷95.4
Combustion efficiency at nominal load (100%)	%	95.4÷94.6	95.7÷94.9	95.9÷95.1	96.1÷95.2	96.2÷95.4	96.4÷95.5	96.3÷95.4
Heat loss at casing (min.-max.)	%	0.6÷0.7	0.6÷0.6	0.5÷0.6	0.5÷0.6	0.5÷0.6	0.5÷0.5	0.2÷0.2
Heat loss at chimney with burner on (min.-max.)	%	4.6÷5.4	4.3÷5.1	4.1÷4.9	3.9÷4.8	3.7÷4.6	3.6÷4.5	3.7÷4.6
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	94.9÷111.7	88.6÷105.7	84.4÷101.5	80.8÷97.9	77.2÷94.3	74.5÷91.9	76.6÷94.9
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	95÷128	142÷191	189÷255	236÷318	294÷396	353÷475	434÷584

Gas-fired		TST 450 2S	TST 560 2S	TST 680 2S	TST 780 2S	TST 870 2S	TST 1000 2S	TST 1180 2S
Nominal heat output	kW	337.5÷450	420÷560	510÷680	585÷780	652.5÷870	750÷1000	885÷1180
Thermal output of furnace	kW	351÷472.4	436.8÷587.9	530.4÷713.9	608.4÷818.9	678.6÷913.4	780÷1049.8	920.4÷1238.8
Heat efficiency at nominal load (100%)	%	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2
Heat efficiency at 30% load	%	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4
Combustion efficiency at nominal load (100%)	%	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5
Heat loss at casing (min.-max.)	%	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	528÷710	657÷884	797÷1073	914÷1231	1020.1÷1372.9	1172÷1578	1383÷1862

Gas-fired		TST 1400 2S	TST 1650 2S	TST 2000 2S	TST 2350 2S	TST 2700 2S	TST 3100 2S	TST 3500 2S
Nominal heat output	kW	1050÷1400	1237.5÷1650	1500÷2000	1762.5÷2350	2025÷2700	2325÷3100	2625÷3500
Thermal output of furnace	kW	1092÷1469.8	1287÷1732.3	1560÷2099.7	1833÷2467.1	2106÷2834.6	2418.1÷3254.5	2730.1÷3674.5
Heat efficiency at nominal load (100%)	%	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2
Heat efficiency at 30% load	%	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4
Combustion efficiency at nominal load (100%)	%	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5
Heat loss at casing (min.-max.)	%	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	1641÷22095	1935÷2609	2345÷3156	2755÷3708	3166÷4261	3635÷4892	4104÷5523

Gas-fired		TST 3900 2S	TST 4400 2S	TST 4800 2S	TST 5200 2S	TST 5700 2S	TST 6100 2S
Nominal heat output	kW	2925÷3900	3300÷4400	3600÷4800	3900÷5200	4275÷5700	4575÷6100
Thermal output of furnace	kW	3042.1÷4094.4	3432.1÷4619.3	3744.1÷5039.3	4056.1÷5459.2	4446.1÷5984.1	4758.1÷6404.1
Heat efficiency at nominal load (100%)	%	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2	96.1÷95.2
Heat efficiency at 30% load	%	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4	96.3÷95.4
Combustion efficiency at nominal load (100%)	%	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5	96.3÷95.5
Heat loss at casing (min.-max.)	%	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2	0.2÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5	3.7÷4.5
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4	75.4÷93.4
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	4573÷6154	5159÷6943	5628÷7575	6097÷8206	6683÷8995	7152÷9626

# TRIOPREX N

(The models with an output smaller than 400 kW can be sold only outside de UE - agg. 01/2019)



**THREE PASS, PRESSURIZED, CARBON STEEL BOILER, WITH PASSING THROUGH FURNACE AND SMOOTH SMOKE PIPES WITH HELICOIDAL TURBULATORS**

OUTPUT RANGE

from 55 to 1900 kW

OPERATION TEMPERATURE

minimum allowed return temperature in the boiler  
36°C for light oil operation – 46°C for gas operation

SUPPLY

for natural gas / LPG – light oil pressure jet burners,  
of single, two stage or modulating type, also Low NOx

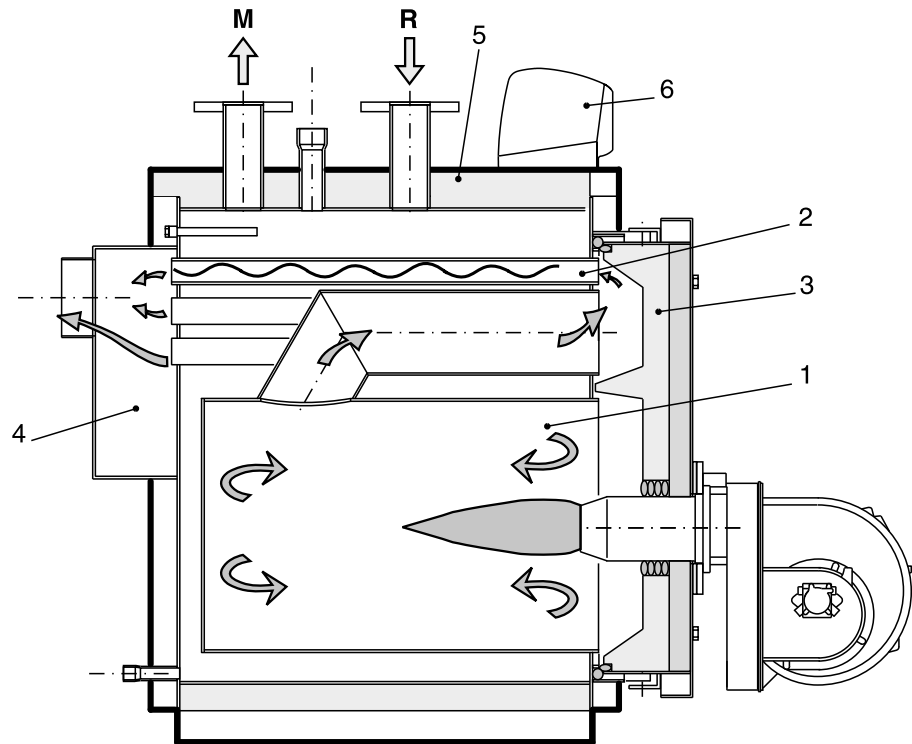
MODELS

65	85	110	150	185	225	300	380
500	630	730	840	1100	1320	1600	1900

Certified in OUTPUT RANGE

## MAIN COMPONENTS

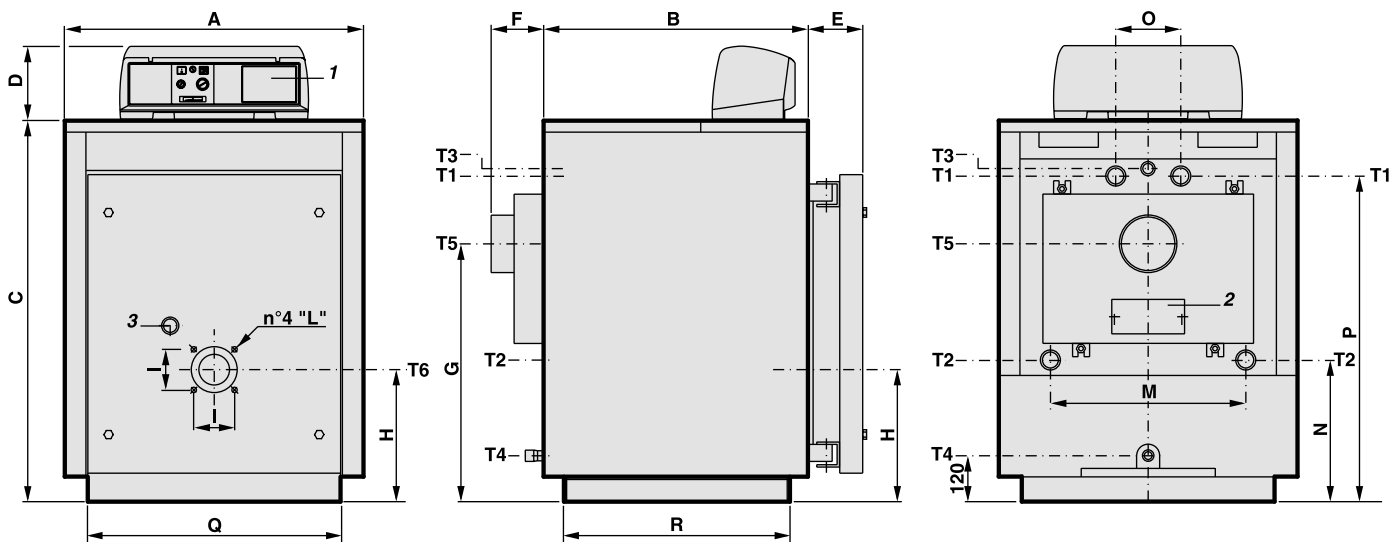
1. Furnace
2. Smoke pipes with turbulators
3. Door with flame control warning light
4. Smoke chamber
5. Body insulation
6. Panel board



## PRODUCT PLUS VALUES

- **THREE REAL SMOKE PIPES**
- **OVAL SHAPE SHELL DESIGN**  
(up to 730 kW model)  
for space saving installation
- **OPTIMIZATION OF THE HEAT EXCHANGE**  
thanks to the guided run of the water inside the boiler
- **SMOKE PIPES WITH LARGE THICKNESS**  
with anti condensing effect
- **HELICAL TURBULATORS**  
for the optimization of the heat exchange in the smoke pipes
- **INSULATED SMOKE CHAMBER**  
with double wall inside to reduce the thermal and sound losses
- **DOOR INSULATED WITH SUPER LIGHT CONCRE**
- **CASING INSULATION**  
through a glass wool mattress, with anti-tearing protection.  
Insulation thickness 80 mm up to TXN 85 and 100 mm for the remaining models
- **TWO REAR BULB HOLDERS**  
15 mm dia., for temperature sensors
- **DEDICATED PANEL BOARDS**  
with thermostatic or electronic regulations

DIMENSIONS TRIOPREX N 65÷85



- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 C.H. flow
- T2 C.H. return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Flue connection
- T6 Max. burner blast tube dia.

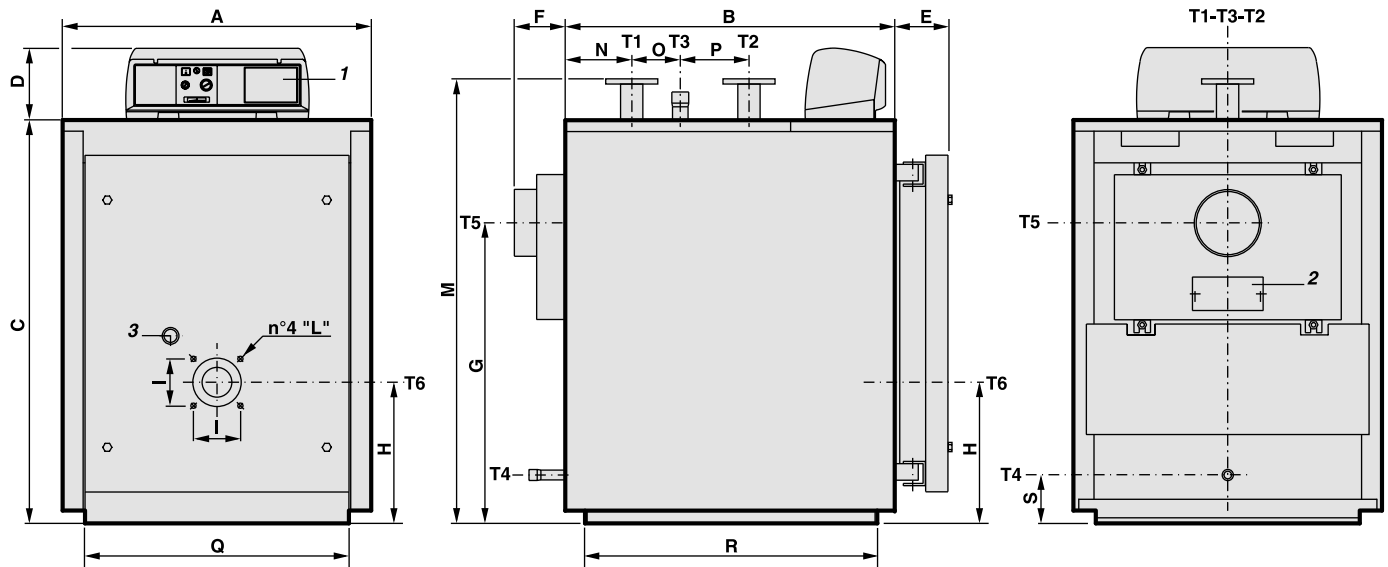
TRIOPREX N	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
65	55÷65	59.8÷71	131	0.04÷0.06	3÷4	6	307	ISO 7/1 Rp 1½	ISO 7/1 Rp 1	ISO 7/1 Rp ¾	150	132
85	72÷85	78.3÷93	187	0.05÷0.07	4.5÷6	6	348	ISO 7/1 Rp 1½	ISO 7/1 Rp 1	ISO 7/1 Rp ¾	150	132

TRIOPREX N	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
65	740	690	950	190	140	145	660	345	120	M 8	470	310	190	846	660	590
85	740	950	950	190	140	145	660	345	120	M 8	470	310	190	846	660	850

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

DIMENSIONS TRIOPREX N 110÷380



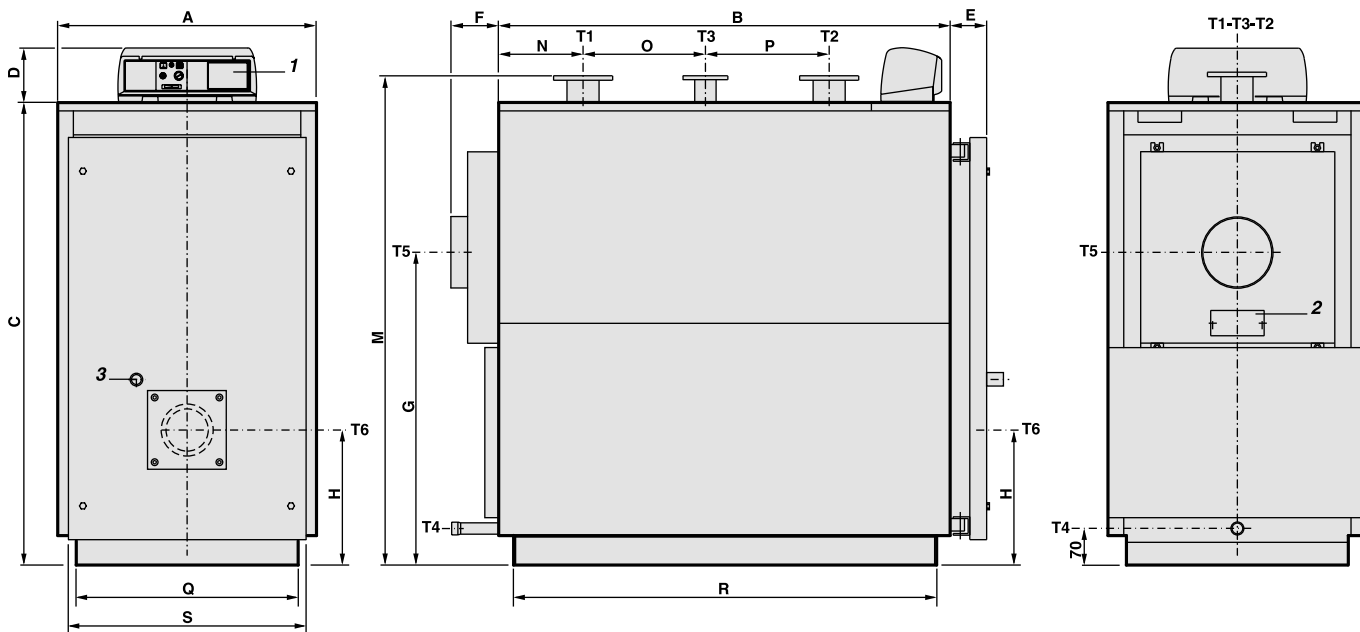
- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 C.H. flow
- T2 C.H. return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Flue connection
- T6 Max. burner blast tube dia.

TRIOPREX N	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
110	93÷110	101÷120	204	0.06÷0.08	5.5÷7.5	6	426	UNI2278 PN16 DN 50	ISO 7/1 Rp ¼	ISO 7/1 Rp ¾	180	132
150	127÷150	137.7÷163	270	0.08÷0.10	12÷16	6	503	DN 50	Rp ¼	Rp ¾	180	132
185	157÷185	170÷202	285	0.10÷0.18	9÷12	6	564	DN 65	Rp ½	Rp ¾	180	180
225	191÷225	207÷245	322	0.17÷0.20	12.5÷17.5	6	621	DN 65	Rp ½	Rp ¾	180	180
300	255÷300	276÷327	408	0.22÷0.35	9÷12	6	812	DN 80	Rp 2	Rp ¾	225	180
380	323÷380	350÷414	475	0.32÷0.53	15÷21	6	906	DN 80	Rp 2	Rp ¾	225	180

TRIOPREX N	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
110	820	885	1082	190	140	145	748	380	120	M 8	1210	175	130	185	710	786
150	820	1145	1082	190	140	145	748	380	120	M 8	1210	175	390	185	710	1046
185	860	1080	1182	190	140	145	828	400	-	-	1310	215	210	250	750	981
225	860	1210	1182	190	140	145	828	400	-	-	1310	215	340	250	750	1111
300	890	1275	1352	190	140	145	928	440	-	-	1485	255	285	315	780	1177
380	890	1470	1352	190	140	145	928	440	-	-	1485	255	480	315	780	1372

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

DIMENSIONS TRIOPREX N 500÷730



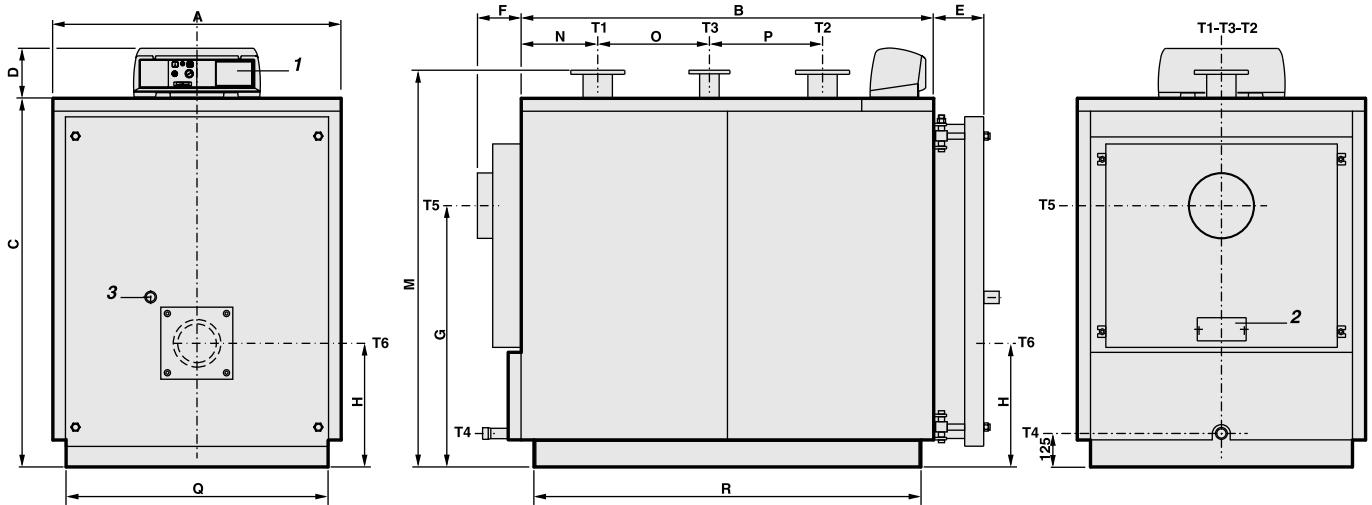
- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 C.H. flow
- T2 C.H. return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Flue connection
- T6 Max. burner blast tube dia.

TRIOPREX N	Nominal output	Nominal input	Boiler capacity	Water pressure drops(**)	Flue gas pressure drop	Maximum boiler working pressure	Weight	CONNECTIONS									
	kW	kW						l	m w.c.	mm w.c.	bar	kg	T1 T2	T3	T4	T5 Øi	T6 Ø
	UNI 2278 PN16	UNI 2278 PN16						ISO 7/1	mm	mm							
500	425÷500	460÷545	656	0.10÷0.15	25÷35	6	1198	DN 100	DN 65	Rp 1	250	220					
630	535÷630	579÷686	737	0.16÷0.23	32÷45	6	1304	DN 100	DN 65	Rp 1	250	220					
730	620÷730	671÷795	807	0.23÷0.33	35÷49	6	1431	DN 100	DN 65	Rp 1	250	220					

TRIOPREX N	A	B	C	D	E	F	G	H	M*	N	O	P	Q*	R*	S*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
500	920	1605	1645	190	135	195	1110	480	1735	298	435	440	790	1505	860
630	920	1800	1645	190	135	195	1110	480	1735	298	630	440	790	1790	860
730	920	1995	1645	190	135	195	1110	480	1735	298	825	440	790	1895	860

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

DIMENSIONS TRIOPREX N 840



- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 C.H. flow
- T2 C.H. return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Flue connection
- T6 Max. burner blast tube dia.

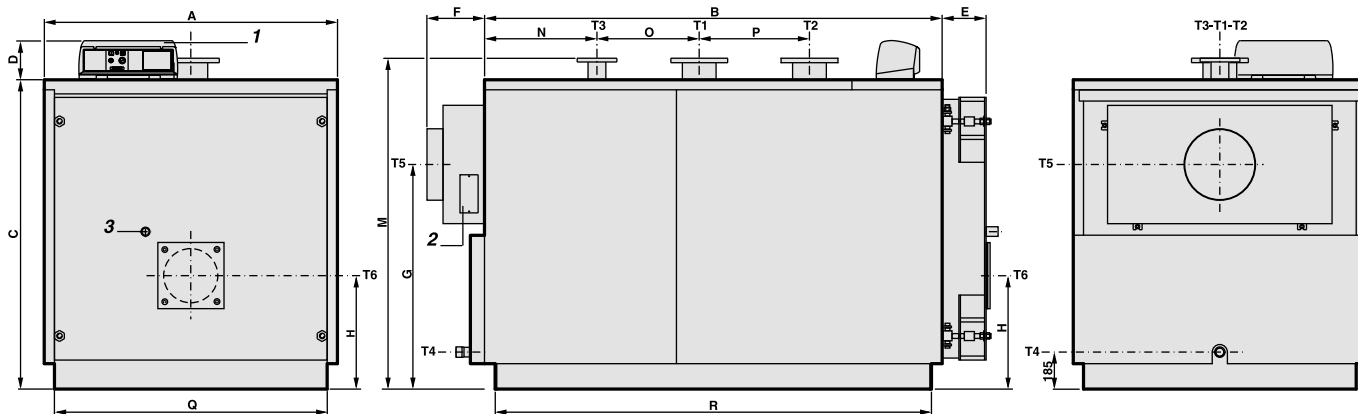
TRIOPREX N	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
840	714÷840	772÷915	932	0.35÷0.52	42÷58	6	1581	UNI 2278 PN16 DN 100	UNI 2278 PN16 DN 65	ISO 7/1 Rp ¼	mm 250	mm 270

TRIOPREX N	A	B	C	D	E	F	G	H	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
840	1122	2115	1432	190	195	195	1025	480	1540	298	945	440	1020	2014

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.



## DIMENSIONS TRIOPREX N 1100÷1900



- 1** Panel board
- 2** Smoke chamber cleaning door
- 3** Flame sight glass
- T1** C.H. flow
- T2** C.H. return
- T3** Expansion vessel connection
- T4** Boiler drain
- T5** Flue connection
- T6** Max. burner blast tube dia.

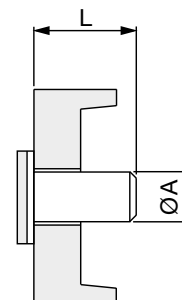
TRIOPREX N	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS				
								T1 T2	T3	T4	T5 Øi	T6 Ø
								UNI 2278 PN16	UNI 2278 PN16	ISO 7/1	mm	mm
<b>1100</b>	935÷1100	1012÷1198	1580	0.15÷0.21	45÷62	6	2444	DN 150	DN 80	Rp ½	350	270
<b>1320</b>	1122÷1320	1214÷1438	1791	0.21÷0.30	61÷85	6	2965	DN 150	DN 80	Rp ½	350	270
<b>1600</b>	1360÷1600	1470÷1743	2297	0.20÷0.28	40÷55	6	3685	DN 175	DN 100	Rp ½	400	285
<b>1900</b>	1615÷1900	1745÷2070	2496	0.27÷0.39	52÷73	6	4089	DN 175	DN 100	Rp ½	400	285

TRIOPREX N	A	B	C	D	E	F	G	H	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
<b>1100</b>	1462	2282	1542	190	230	290	1120	565	1650	561	510	550	1360	2176
<b>1320</b>	1462	2652	1542	190	230	290	1120	565	1650	561	880	550	1360	2546
<b>1600</b>	1622	2692	1702	190	230	290	1245	605	1810	661	670	700	1520	2590
<b>1900</b>	1622	3014	1702	190	230	290	1245	605	1810	662	990	700	1520	2910

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

## BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm	BOILER TYPE	øA mm	L mm
TRIOPREX N 65÷85	132	180	TRIOPREX N 500÷730	220	230
TRIOPREX N 110÷150	132	180	TRIOPREX N 840	270	280
TRIOPREX N 185÷225	180	180	TRIOPREX N 1100÷1320	270	320
TRIOPREX N 300÷380	180	200	TRIOPREX N 1600÷1900	285	350



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Oil-fired		TX N 65	TX N 85	TX N 110	TX N 150	TX N 185	TX N 225	TX N 300	TX N 380
Nominal heat output	kW	55÷65	72÷85	93÷110	127÷50	157÷185	191÷225	255÷300	323÷380
Thermal output of furnace	kW	60÷71	78÷93	101÷120	138÷163	170÷202	207÷245	276÷326.2	350÷412.3
Water efficiency at nominal load (100%)	%	91.6÷91.5	92.3÷91.4	92÷91.6	92÷92	92.3÷91.5	92.2÷91.8	92.3÷91.9	92.2÷92.1
Water efficiency at 30% load	%	91.4÷90.7	91.2÷90.6	91.2÷90.7	91.5÷91	91.3÷91	91.7÷91.2	91.6÷91.3	92.0÷91.5
Combustion efficiency at nominal load (100%)	%	93.3÷92.8	93.1÷92.8	93.5÷92.8	93.1÷92.6	93.5÷92.8	93.3÷92.8	93.3÷92.8	93.8÷92.8
Heat loss at casing (min.-max.)	%	1.6÷1.2	0.8÷1.4	1.4÷1.2	1÷0.6	1.2÷1.3	1.0÷1.0	0.9÷0.9	1.5÷0.7
Heat loss at chimney with burner on (min.-max.)	%	6.7÷7.2	6.9÷7.1	6.4÷7.1	6.9÷7.3	6.4÷7.1	6.7÷7.1	6.7÷7.1	6.2÷7.1
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	142÷152	147÷157	142÷157	152÷162	142÷157	147÷157	147÷157	137÷157
CO <sub>2</sub> content	%	12.2÷12.2	12.3÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8
Flue gas mass flow rate (min.-max)	kg/h	96.2÷113.9	124.1÷142.4	154.6÷183.7	211.3÷249.6	260.6÷309.3	316.9÷375.1	422.6÷499.5	535.9÷631.3

Oil-fired		TX N 500	TX N 630	TX N 730	TX N 840	TX N 1100	TX N 1320	TX N 1600	TX N 1900
Nominal heat output	kW	425÷500	535÷630	620÷730	714÷840	935÷1100	1122÷1320	1360÷1600	1615÷1900
Thermal output of furnace	kW	460÷545	579÷686	671÷795	772÷915	1012÷1198	1214÷1438	1470÷1743	1745÷2070
Water efficiency at nominal load (100%)	%	92.3÷91.7	92.4÷91.8	92.4÷91.8	92.4÷91.8	92.3÷91.8	92.4÷91.7	92.5÷91.8	92.5÷91.7
Water efficiency at 30% load	%	91.8÷91.5	92.0÷91.4	91.8÷91.4	91.9÷91.5	92.1÷91.6	92.2÷91.6	91.9÷91.6	92.0÷91.5
Combustion efficiency at nominal load (100%)	%	93.3÷92.6	93.4÷92.6	93.2÷92.6	93.1÷92.4	93.1÷92.4	93.2÷92.4	93.2÷92.4	93.2÷92.4
Heat loss at casing (min.-max.)	%	0.9÷0.9	1.0÷0.7	0.8÷0.8	0.6÷0.6	0.7÷0.6	0.7÷0.6	0.6÷0.6	0.6÷0.6
Heat loss at chimney with burner on (min.-max.)	%	6.7÷7.3	6.6÷7.4	6.7÷7.3	6.9÷7.6	6.9÷7.6	6.8÷7.6	6.8÷7.6	6.8÷7.6
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	147÷162	145÷163	148÷162	152÷167	152÷167	150÷167	150÷167	150÷167
CO <sub>2</sub> content	%	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8	12.8÷12.8
Flue gas mass flow rate (min.-max)	kg/h	704.4÷834.5	886.6÷1050.4	1027.5÷1217.3	1182.1÷1401.1	1549.6÷1834.5	1859÷2202	2251÷2669	2672.1÷3169.8

Gas-fired		TX N 65	TX N 85	TX N 110	TX N 150	TX N 185	TX N 225	TX N 300	TX N 380
Nominal heat output	kW	55÷65	72÷85	93÷110	127÷50	157÷185	191÷225	255÷300	323÷380
Thermal output of furnace	kW	60÷71	78÷93	101÷120	138÷163	170÷202	207÷245	276÷326.2	350÷412.3
Water efficiency at nominal load (100%)	%	91.6÷91.5	92.3÷91.4	92÷91.6	92÷92	92.3÷91.5	92.2÷91.8	92.3÷91.9	92.2÷92.1
Water efficiency at 30% load	%	91.4÷90.7	91.2÷90.6	91.2÷90.7	91.5÷91	91.3÷91	91.7÷91.2	91.6÷91.3	92.0÷91.5
Combustion efficiency at nominal load (100%)	%	93.4÷92.9	93.2÷92.7	93.4÷92.7	92.9÷92.4	93.4÷92.2	93.2÷92.7	93.2÷92.7	93.7÷92.7
Heat loss at casing (min.-max.)	%	1.7÷1.3	0.8÷1.2	1.3÷1.0	0.9÷0.4	1.0÷1.1	0.9÷0.8	0.7÷0.7	1.3÷0.5
Heat loss at chimney with burner on (min.-max.)	%	6.5÷7.0	6.8÷7.3	6.5÷7.3	7.0÷7.5	6.8÷7.3	6.8÷7.3	6.8÷7.3	6.3÷7.3
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	135÷145	140÷150	135÷150	145÷155	135÷150	140÷150	140÷150	130÷150
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	90.2÷106.7	117.2÷139.8	151.8÷180.4	207.4÷245	255.5÷303.6	311.2÷368.3	414.9÷490.3	526.1÷619.7

Gas-fired		TX N 500	TX N 630	TX N 730	TX N 840	TX N 1100	TX N 1320	TX N 1600	TX N 1900
Nominal heat output	kW	425÷500	535÷630	620÷730	714÷840	935÷1100	1122÷1320	1360÷1600	1615÷1900
Thermal output of furnace	kW	460÷545	579÷686	671÷795	772÷915	1012÷1198	1214÷1438	1470÷1743	1745÷2070
Water efficiency at nominal load (100%)	%	92.3÷91.7	92.4÷91.8	92.4÷91.8	92.4÷91.8	92.3÷91.8	92.4÷91.7	92.5÷91.8	92.5÷91.7
Water efficiency at 30% load	%	91.8÷91.5	92.0÷91.4	91.8÷91.4	91.9÷91.5	92.1÷91.6	92.2÷91.6	91.9÷91.6	92.0÷91.5
Combustion efficiency at nominal load (100%)	%	93.2÷92.4	93.43÷92.4	93.1÷92.4	92.9÷92.2	92.9÷92.2	93.0÷92.2	93.0÷92.2	93.0÷92.2
Heat loss at casing (min.-max.)	%	0.7÷0.6	0.8÷0.5	0.7÷0.6	0.4÷0.3	0.5÷0.3	0.6÷0.4	0.5÷0.4	0.4÷0.4
Heat loss at chimney with burner on (min.-max.)	%	6.8÷7.5	6.7÷7.6	6.8÷7.5	7.0÷7.8	7.0÷7.8	6.9÷7.8	6.9÷7.8	6.9÷7.8
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	140÷155	138÷156	141÷155	145÷160	145÷160	143÷160	143÷160	143÷160
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	691.4÷819.2	870.3÷1031.2	1008.6÷1195	1160.4÷1375.4	1521.2÷1800.8	1824.8÷2161.5	2209.6÷2620	2623÷3111.5

# TRISTAR 3G

(The models with an output smaller than 400 kW can be sold only outside de UE - agg. 01/2019)



BREVETTO  
**Unical**  
PATENT

smoke pipes

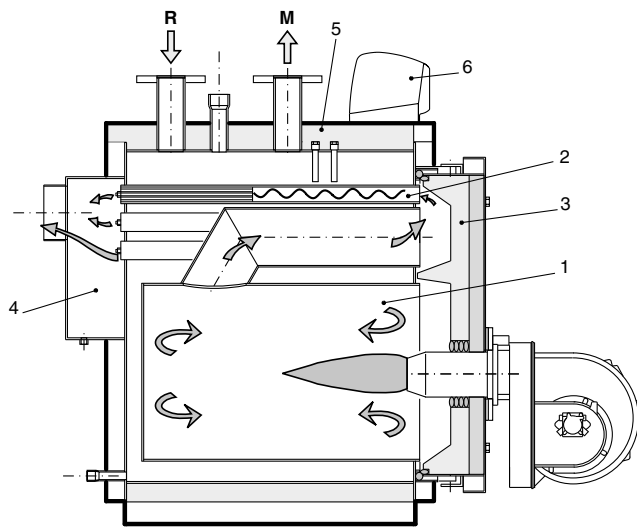
## PRESSURIZED CARBON STEEL BOILER WITH THREE REAL SMOKE PASS

OUTPUT RANGE	from 65 to 3000 kW									
OPERATION TEMPERATURE	minimum return temperature 50°C									
SUPPLY	Natural Gas or LPG fed pressure jet, two stage or modulating burners The models 2300 - 2650 - 3000 can be fed also with light oil									
MODELS	65 <sup>2S</sup>	85 <sup>2S</sup>	110 <sup>2S</sup>	150 <sup>2S</sup>	185 <sup>2S</sup>	225 <sup>2S</sup>	300 <sup>2S</sup>	380 <sup>2S</sup>	500 <sup>2S</sup>	630 <sup>2S</sup>
	730 <sup>2S</sup>	840 <sup>2S</sup>	1100 <sup>2S</sup>	1320 <sup>2S</sup>	1600 <sup>2S</sup>	1900 <sup>2S</sup>	-	2300	2650	3000

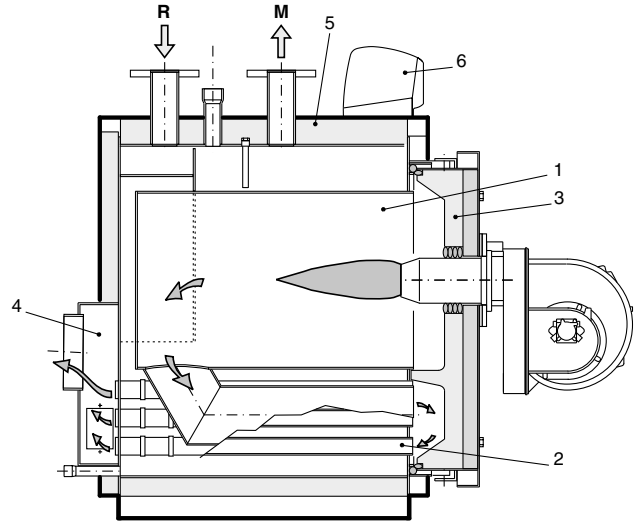
Certified in OUTPUT RANGE  
Special patented smoke pipes with aluminium profiles – Floating furnace

MAIN COMPONENTS

Mod. 65÷1900



Mod. 2300÷3000



- 1. Furnace
- 2. Smoke pipes with smoke diverters
- 3. Door with flame sight glass
- 4. Smoke chamber
- 5. Body insulation
- 6. Panel board

TECHNICAL DATA

MODEL	Heat output	Heat input	Efficiency at	Efficiency at	Boiler capacity	Water side pressure drops	Flue gas pressure drops	Max. boiler operating pressure	Flue gas temperature	Combustion chamber	Weight			
	min/max	min/max	full load (100%)	part load (30%)								kW	kW	%
<b>TST 3G 65 2S</b>	55÷65	58.2÷69.2	94.4÷93.9	94.6÷94.1	131	0.04÷0.06	4.6÷6.4	6	85÷100	0.060	315			
<b>TST 3G 85 2S</b>	72÷85	76.1÷90.3	94.6÷94.1	94.8÷94.3	187	0.05÷0.07	5.4÷7.5	6	84÷99	0.088	355			
<b>TST 3G 110 2S</b>	93÷109	98.1÷115.6	94.8÷94.3	95÷94.5	204	0.06÷0.08	7÷9.7	6	83÷98	0.130	435			
<b>TST 3G 150 2S</b>	127÷150	133.6÷158.6	95÷94.5	95.2÷94.5	270	0.08÷0.10	11.2÷15.6	6	82÷97	0.139	515			
<b>TST 3G 185 2S</b>	157÷185	164.9÷195.3	95.2÷94.7	95.2÷94.7	285	0.10÷0.18	14÷19.4	6	80÷95	0.155	580			
<b>TST 3G 225 2S</b>	191÷225	200.2÷237.1	95.4÷94.9	95.4÷94.9	322	0.17÷0.20	16.6÷23.1	6	76÷91	0.176	640			
<b>TST 3G 300 2S</b>	255÷300	265.9÷314.4	95.9÷95.4	95.6÷95.1	408	0.22÷0.35	20.5÷28.4	6	75÷90	0.239	840			
<b>TST 3G 380 2S</b>	323÷380	336.8÷398.3	95.9÷95.4	96.1÷95.6	475	0.32÷0.53	23.6÷32.7	6	75÷90	0.280	935			
<b>TST 3G 500 2S</b>	425÷500	443.1÷524.1	95.9÷95.4	96.1÷95.6	656	0.10÷0.15	27.3÷37.8	6	75÷90	0.389	1260			
<b>TST 3G 630 2S</b>	535÷630	557.8÷660.3	95.9÷95.4	96.1÷95.6	737	0.16÷0.23	33.5÷46.5	6	75÷90	0.443	1375			
<b>TST 3G 730 2S</b>	620÷730	646.5÷765.2	95.9÷95.4	96.1÷95.6	807	0.23÷0.33	37.5÷52	6	75÷90	0.498	1510			
<b>TST 3G 840 2S</b>	714÷840	744.5÷880.5	95.9÷95.4	96.1÷95.6	932	0.35÷0.52	41.4÷57.3	6	75÷90	0.542	1650			
<b>TST 3G 1100 2S</b>	935÷1100	974.9÷1153	95.9÷95.4	96.1÷95.6	1580	0.15÷0.21	48.8÷67.5	6	75÷90	0.753	2530			
<b>TST 3G 1320 2S</b>	1122÷1320	1169.9÷1383.6	95.9÷95.4	96.1÷95.6	1791	0.21÷0.30	53.7÷74.3	6	75÷90	0.889	3065			
<b>TST 3G 1600 2S</b>	1360÷1600	1418.1÷1677.1	95.9÷95.4	96.1÷95.6	2297	0.20÷0.28	58.9÷81.6	6	75÷90	1.116	4005			
<b>TST 3G 1900 2S</b>	1615÷1900	1684÷1991.5	95.9÷95.4	96.1÷95.6	2496	0.27÷0.39	63.6÷88.1	6	75÷90	1.261	4230			
<b>TST 3G 2300</b>	1725÷2300	1798.7÷2410.8	95.9÷95.4	96.1÷95.6	2875	0.20÷0.35	45÷80	6	75÷90	1.558	5350			
<b>TST 3G 2650</b>	1987.5÷2650	2072.4÷2777.7	95.9÷95.4	96.1÷95.6	4320	0.19÷0.33	41.3÷73.5	6	75÷90	1.796	7070			
<b>TST 3G 3000</b>	2250÷3000	2346.1÷3144.5	95.9÷95.4	96.1÷95.6	4817	0.26÷0.45	50.6÷90	6	75÷90	2.037	7600			

On special order the boilers from model TRISTAR 3G 2S 1100 to TRISTAR 3G 3000 can be manufactured for a max. working pressure up to 10 bar.

## PRODUCT PLUS VALUES

- **UTILISATION FLEXIBILITY**  
thanks to the certification in ranged output
- **REDUCED NO<sub>x</sub> EMISSIONS: < 100 mg/kWh**  
thanks to the reduction of the specific thermal load
- **ELLIPTIC SHAPE OF THE OUTER SHELL**  
(up to mod. 840 kW): reduced width making easier access through the doors
- **OTTIMIZZAZIONE SCAMBIO TERMICO**  
through driven and braked run of the water within the boiler
- **SMOKE PIPES EASY STREAM PIPE Ø 1 1/2"**
- **FLOATING CYLINDRICAL FURNACE** without thermomechanical stresses from 500 kW to 3000 kW
- **FURNACE BOTTOM**  
with stiffening and heat dissipating plates
- **FRONT DOOR**  
with self centering closing system
- **INSIDE DOOR INSULATION**  
in special ceramic fibre up to 300 kW and in refractory concrete over 300 kW
- **HELICOIDAL STEEL TURBOLATORS**
- **BOILER BODY INSULATION** with a 80 mm thick tearing resistant mineral wool mattress up to 85 kW and 100 mm over 85 kW
- **CONTROL PANEL BOARD**  
of thermomechanical or electronic type
- **POSSIBLE INSTALLATION**  
of one/two/three stage or modulating oil or gas pressure jet burners
- **EASY HANDLING**  
thanks to the upper hooks and the strong I profiles of the base



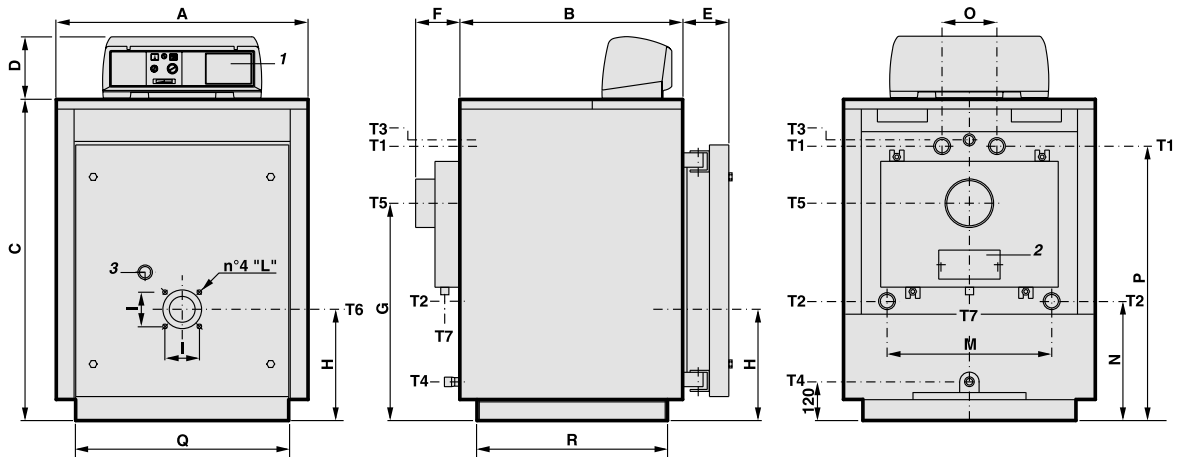
## SPECIAL SMOKE PIPES (patented)

The pipes of the third smoke pass are decisive for the attainment of the **maximum efficiency**. The new patented technology has allowed to insert special aluminium multi-fin structures inside the thick steel pipes. In this way are born the new "EASY STREAM Pipes" of 1 1/2" diameter.

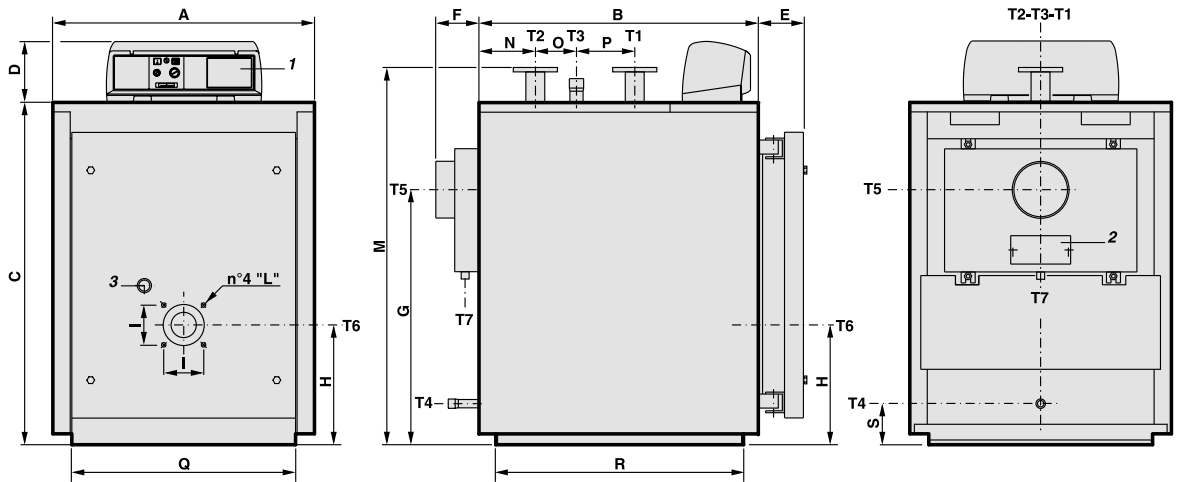


DIMENSIONS TRISTAR 3G 2S 65÷380

TRISTAR 3G 2S 65÷85



TRISTAR 3G 2S 110÷380



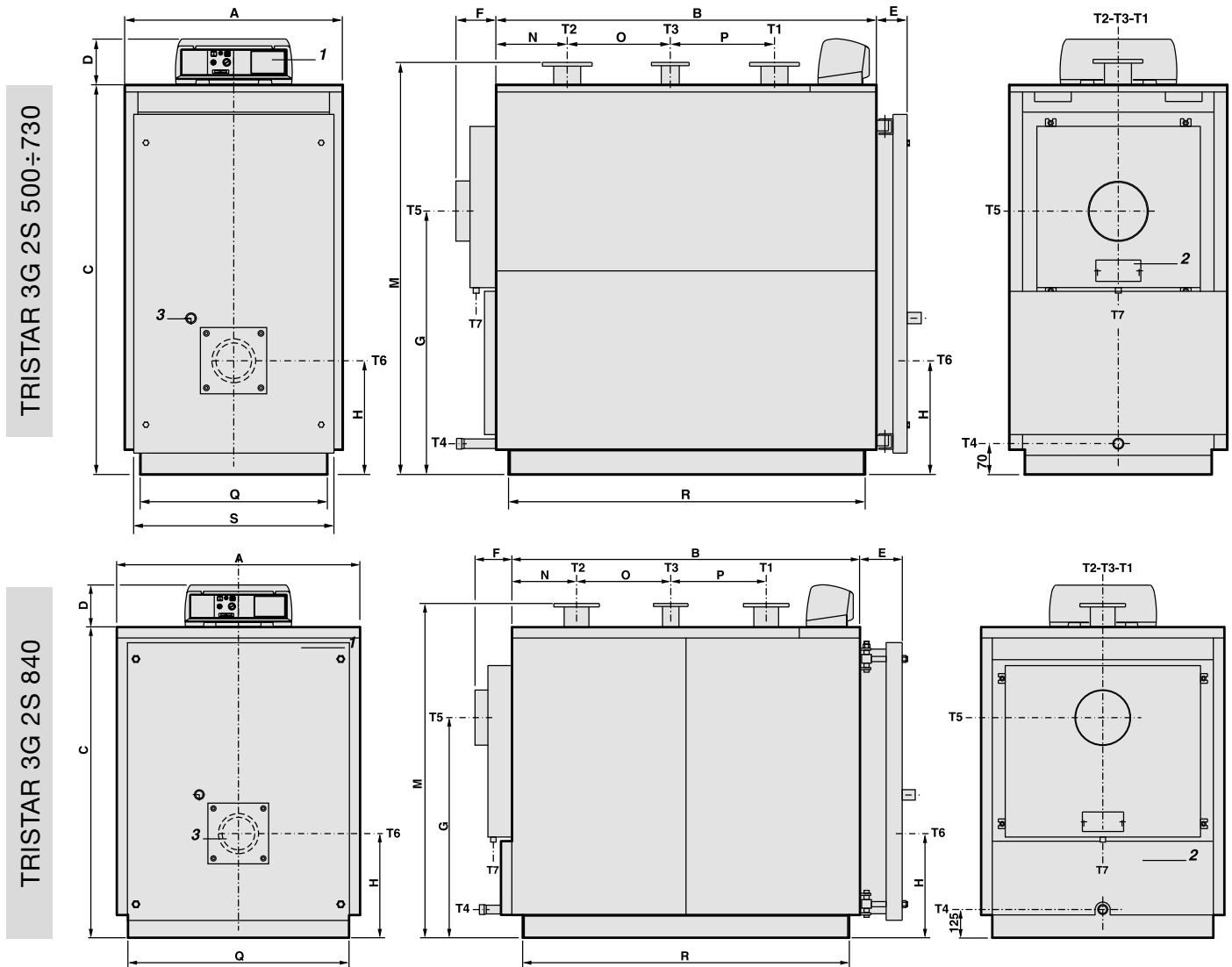
- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 Central Heating flow
- T2 Central Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

TRISTAR 3G 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Øe
								ISO 7/1 UNI 2278 PN16	ISO 7/1	ISO 7/1	mm	mm	mm
65	55÷65	58.2÷69.2	131	0.04÷0.06	4.6÷6.4	6	315	Rp 1½	Rp 1	Rp ¾	150	132	40
85	72÷85	76.1÷90.3	187	0.05÷0.07	5.4÷7.5	6	355	Rp 1½	Rp 1	Rp ¾	150	132	40
110	93÷109	98.1÷115.6	204	0.06÷0.08	7÷9.7	6	435	DN 50	Rp 1¼	Rp ¾	180	132	40
150	127÷150	133.6÷158.6	270	0.08÷0.10	11.2÷15.6	6	515	DN 50	Rp 1¼	Rp ¾	180	132	40
185	157÷185	164.9÷195.3	285	0.10÷0.18	14÷19.4	6	580	DN 65	Rp 1½	Rp ¾	180	180	40
225	191÷225	200.2÷237.1	322	0.17÷0.20	16.6÷23.1	6	640	DN 65	Rp 1½	Rp ¾	180	180	40
300	255÷300	265.9÷314.4	408	0.22÷0.35	20.5÷28.4	6	840	DN 80	Rp 2	Rp ¾	225	180	40
380	323÷380	336.8÷398.3	475	0.32÷0.53	23.6÷32.7	6	935	DN 80	Rp 2	Rp ¾	225	180	40

TRISTAR 3G 2S	A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q*	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
65	740	690	950	190	140	145	660	345	120	M8	470	310	190	846	660	590	--
85	740	950	950	190	140	145	660	345	120	M8	470	310	190	846	660	850	--
110	820	885	1082	190	140	145	748	380	120	M 8	1210	175	130	185	710	786	130
150	820	1145	1082	190	140	145	748	380	120	M 8	1210	175	390	185	710	1046	130
185	860	1080	1182	190	140	145	828	400	--	--	1310	215	210	250	750	981	130
225	860	1210	1182	190	140	145	828	400	--	--	1310	215	340	250	750	1111	130
300	890	1275	1352	190	140	145	928	440	--	--	1485	255	285	315	780	1177	125
380	890	1470	1352	190	140	145	928	440	--	--	1485	255	480	315	780	1372	125

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

DIMENSIONS TRISTAR 3G 2S 500÷840



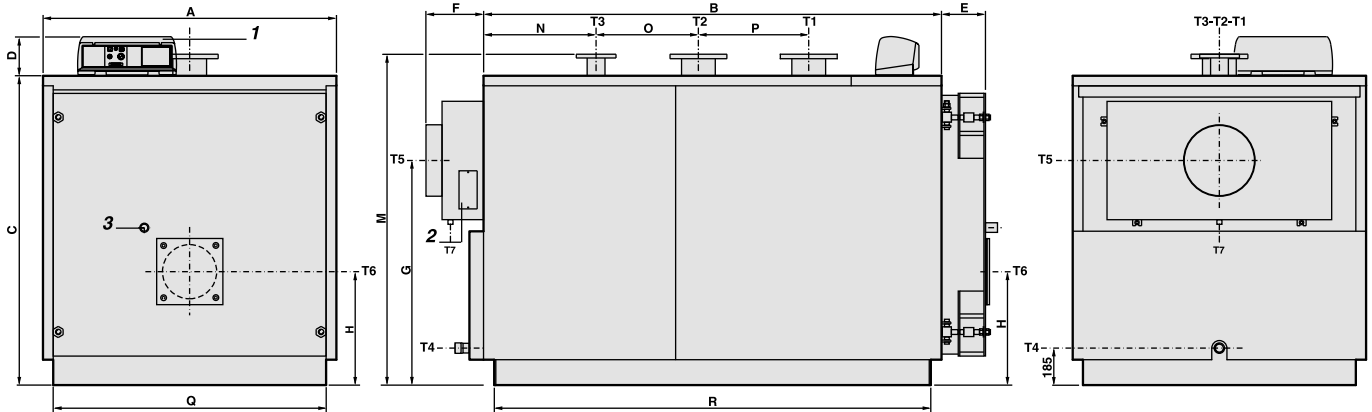
- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 Central Heating flow
- T2 Central Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

TRISTAR 3G 2S	Nominal output	Nominal input	Boiler capacity	Water pressure drops(**)	Flue gas pressure drop	Maximum boiler working pressure	Weight	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Øe
								UNI 2278 PN16	UNI 2278 PN16	ISO 7/1	mm	mm	mm
500	425÷500	443.1÷524.1	656	0.10÷0.15	27.3÷37.8	6	1260	DN 100	DN 65	Rp 1	250	220	40
630	535÷630	557.8÷660.3	737	0.16÷0.23	33.5÷46.5	6	1375	DN 100	DN 65	Rp 1	250	220	40
730	620÷730	646.5÷765.2	807	0.23÷0.33	37.5÷52	6	1510	DN 100	DN 65	Rp 1	250	220	40
840	714÷840	744.5÷880.5	932	0.35÷0.52	41.4÷57.3	6	1650	DN 100	DN 65	Rp 1¼	250	270	40

TRISTAR 3G 2S	A	B	C	D	E	F	G	H	M*	N	O	P	Q*	R*	S*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
500	920	1605	1645	190	135	195	1110	480	1735	298	435	440	790	1505	860
630	920	1800	1645	190	135	195	1110	480	1735	298	630	440	790	1790	860
730	920	1995	1645	190	135	195	1110	480	1735	298	825	440	790	1895	860
840	1122	2115	1432	190	195	195	1025	480	1540	298	945	440	1020	2014	--

(\*) Minimum dimensions for boiler room access. (\*\*) Pressure drops corresponding to a thermal drop of 15K.

DIMENSIONS TRISTAR 3G 2S 1100÷1900



- 1 Panel board
- 2 Smoke chamber cleaning door
- 3 Flame sight glass
- T1 Central Heating flow
- T2 Central Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

TRISTAR 3G 2S	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Øe
								UNI 2278 PN16	UNI 2278 PN16	ISO 7/1	mm	mm	mm
1100	935±1100	974.9±1153	1580	0.15÷0.21	48.8÷67.5	6	2530	DN 150	DN 80	Rp 1½	350	270	40
1320	1122±1320	1169.9±1383.6	1791	0.21÷0.30	53.7÷74.3	6	3065	DN 150	DN 80	Rp 1½	350	270	40
1600	1360±1600	1418.1±1677.1	2297	0.20÷0.28	58.9÷81.6	6	4005	DN 175	DN 100	Rp 1½	400	285	40
1900	1615±1900	1684±1991.5	2496	0.27÷0.39	63.6÷88.1	6	4230	DN 175	DN 100	Rp 1½	400	285	40

TRISTAR 3G 2S	A	B	C	D	E	F	G	H	M*	N	O	P	Q*	R*
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
1100	1462	2282	1542	190	230	290	1120	565	1650	561	510	550	1360	2176
1320	1462	2652	1542	190	230	290	1120	565	1650	561	880	550	1360	2546
1600	1622	2692	1702	190	260	290	1245	605	1810	661	670	700	1520	2590
1900	1622	3014	1702	190	260	290	1245	605	1810	662	990	700	1520	2910

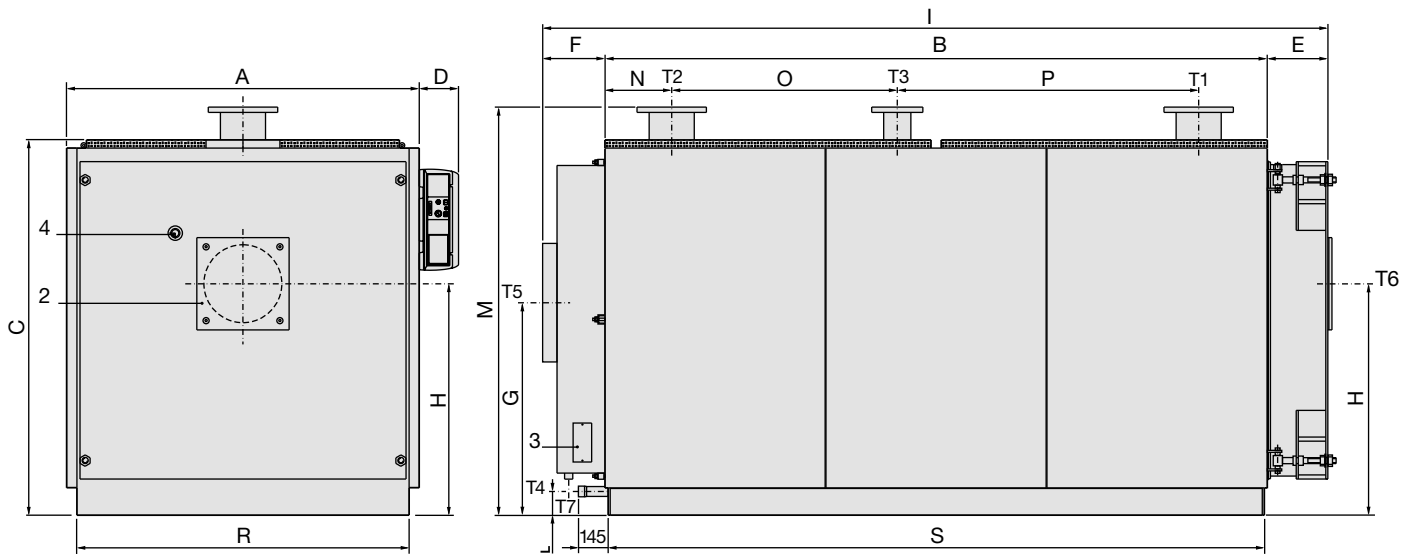
(\*) Minimum dimensions for boiler room access.

(\*\*) Pressure drops corresponding to a thermal drop of 15K.

On special order the boilers from model 1100 to 3000 can be manufactured for a max. working pressure up to 10 bar.



DIMENSIONI TRISTAR 3G 2300÷3000



- 1 Panel board
- 2 Burner connection flange
- 3 Smoke chamber cleaning door
- 4 Flame control warming light
- T1 Heating flow
- T2 Heating return
- T3 Expansion vessel connection
- T4 Boiler drain
- T5 Chimney connection
- T6 Burner connection
- T7 Condensation drain

TRISTAR 3G	Nominal output kW	Nominal input kW	Boiler capacity l	Water pressure drops(**) m w.c.	Flue gas pressure drop mm w.c.	Maximum boiler working pressure bar	Weight kg	CONNECTIONS					
								T1 T2	T3	T4	T5 Øi	T6 Ø	T7 Øe
2300	1725÷2300	1798.7÷2410.8	2875	0.20÷0.35	45÷80	6	5350	UNI 2278 PN16	UNI 2278 PN16	ISO 7/1	mm	mm	mm
2650	1987.5÷2650	2072.4÷2777.7	4320	0.19÷0.33	41.3÷73.5	6	7070	DN 200	DN 125	Rp 1½	620	380	40
3000	2250÷3000	2346.1÷3144.5	4817	0.26÷0.45	50.6÷90	6	7600	DN 200	DN 125	Rp 1½	620	380	40

TRISTAR 3G	A	B	C	D	E	F	G	H	I	L	M*	N	O	P	R*	S
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2300	1720	3230	1830	190	295	310	1315	1225	3835	115	1990	325	1100	1470	1620	3200
2650	1970	3194	2090	190	325	360	1535	1450	3879	144	2271	377	1060	1420	1870	3164
3000	1970	3594	2090	190	325	360	1535	1450	4279	144	2271	777	1060	1420	1870	3564

(\*) Minimum dimensions for boiler room access.

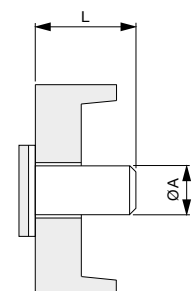
(\*\*) Pressure drops corresponding to a thermal drop of 15K.

On special order the boilers from model 1100 to 3000 can be manufactured for a max. working pressure up to 10 bar.

BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm
TRISTAR 3G 65÷85 2S	132	180
TRISTAR 3G 110÷150 2S	132	180
TRISTAR 3G 185÷225 2S	180	180
TRISTAR 3G 300÷380 2S	180	200
TRISTAR 3G 500÷730 2S	220	230

BOILER TYPE	øA mm	L mm
TRISTAR 3G 840 2S	270	280
TRISTAR 3G 1100÷1320 2S	270	320
TRISTAR 3G 1600÷1900 2S	285	350
TRISTAR 3G 2300 2S	320	350
TRISTAR 3G 2650÷3000 2S	380	400



## TECHNICAL DATA

**ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site [www.unical.eu](http://www.unical.eu) at the page of the product**

Gas-fired		TST 3G 65 2S	TST 3G 85 2S	TST 3G 110 2S	TST 3G 150 2S	TST 3G 185 2S
Nominal heat output	kW	55÷65	72÷85	93÷109	127÷150	157÷185
Nominal heat input	kW	58.2÷69.2	76.1÷90.3	98.1÷115.6	133.6÷158.6	164.9÷195.3
Heat efficiency at nominal load (100%)	%	94.4÷93.9	94.6÷94.1	94.8÷94.3	95÷94.5	95.2÷94.7
Heat efficiency at 30% load	%	94.6÷94.1	94.8÷94.3	95÷94.5	95.2÷94.7	95.4÷94.9
Combustion efficiency at nominal load (100%)	%	95.9÷95.1	95.9÷95.2	96÷95.2	96÷95.3	96.1÷95.4
Heat loss at casing (min.- max.)	%	1.4÷1.2	1.3÷1.1	1.2÷0.9	0.9÷0.7	0.8÷0.6
Heat loss at chimney with burner on (min.-max.)	%	4.1÷4.9	4.1÷4.8	4÷4.8	4÷4.7	3.9÷4.6
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	85÷100	84÷99	83÷98	82÷97	80÷95
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	87.6÷104	114.5÷135.8	147.5÷173.8	200.8÷238.5	247.8÷293.5

Gas-fired		TST 3G 225 2S	TST 3G 300 2S	TST 3G 380 2S	TST 3G 500 2S	TST 3G 630 2S
Nominal heat output	kW	191÷225	255÷300	323÷380	425÷500	535÷630
Nominal heat input	kW	200.2÷237.1	265.9÷314.4	336.8÷398.3	443.1÷524.1	557.8÷660.3
Heat efficiency at nominal load (100%)	%	95.4÷94.9	95.9÷95.4	95.9÷95.4	95.9÷95.4	95.9÷95.4
Heat efficiency at 30% load	%	95.6÷95.1	96.1÷95.6	96.1÷95.6	96.1÷95.6	96.1÷95.6
Combustion efficiency at nominal load (100%)	%	96.3÷95.6	96.3÷95.6	96.3÷95.6	96.3÷95.6	96.3÷95.6
Heat loss at casing (min.- max.)	%	0.9÷0.7	0.4÷0.2	0.4÷0.2	0.4÷0.2	0.4÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.4	3.7÷4.4	3.7÷4.4	3.7÷4.4	3.7÷4.4
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	76÷91	75÷90	75÷90	75÷90	75÷90
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	300.9÷356.4	399.7÷472.7	506.3÷598.7	666.1÷787.8	838.5÷992.6

Gas-fired		TST 3G 730 2S	TST 3G 840 2S	TST 3G 1100 2S	TST 3G 1320 2S	TST 3G 1600 2S
Nominal heat output	kW	620÷730	714÷840	935÷1100	1122÷1320	1360÷1600
Nominal heat input	kW	646.5÷765.2	744.5÷880.5	974.9÷1153	1169.9÷1383.6	1418.1÷1677.1
Heat efficiency at nominal load (100%)	%	95.9÷95.4	95.9÷95.4	95.9÷95.4	95.9÷95.4	95.9÷95.4
Heat efficiency at 30% load	%	96.1÷95.6	96.1÷95.6	96.1÷95.6	96.1÷95.6	96.1÷95.6
Combustion efficiency at nominal load (100%)	%	96.3÷95.6	96.3÷95.6	96.3÷95.6	96.3÷95.6	96.3÷95.6
Heat loss at casing (min.- max.)	%	0.4÷0.2	0.4÷0.2	0.4÷0.2	0.4÷0.2	0.4÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.4	3.7÷4.4	3.7÷4.4	3.7÷4.4	3.7÷4.4
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	75÷90	75÷90	75÷90	75÷90	75÷90
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	971.7÷1150.2	1119.1÷1323.5	1465.5÷1733.1	1758.6÷2079.7	2131.6÷2520.9

Gas-fired		TST 3G 1900 2S	TST 3G 2300	TST 3G 2650	TST 3G 3000
Nominal heat output	kW	1615÷1900	1725÷2300	1987.5÷2650	2250÷3000
Nominal heat input	kW	1684÷1991.5	1798.7÷2410.8	2072.4÷2777.7	2346.1÷3144.5
Heat efficiency at nominal load (100%)	%	95.9÷95.4	95.9÷95.4	95.9÷95.4	95.9÷95.4
Heat efficiency at 30% load	%	96.1÷95.6	96.1÷95.6	96.1÷95.6	96.1÷95.6
Combustion efficiency at nominal load (100%)	%	96.3÷95.6	96.3÷95.6	96.3÷95.6	96.3÷95.6
Heat loss at casing (min.- max.)	%	0.4÷0.2	0.4÷0.2	0.4÷0.2	0.4÷0.2
Heat loss at chimney with burner on (min.-max.)	%	3.7÷4.4	3.7÷4.4	3.7÷4.4	3.7÷4.4
Heat loss at chimney with burner off (min.-max.)	%	0.1÷0.1	0.1÷0.1	0.1÷0.1	0.1÷0.1
Flue gas temperature tf-ta (min.-max.)	°C	75÷90	75÷90	75÷90	75÷90
CO <sub>2</sub> content	%	9.8÷9.8	9.8÷9.8	9.8÷9.8	9.8÷9.8
Flue gas mass flow rate (min.-max)	kg/h	2531.3÷2993.5	2703.7÷3623.8	3115.1÷4175.2	3526.5÷4726.7

# SANICAL



## D.H.W. COIL TYPE STORAGE TANK

RANGE

from 150 to 1000 liters

Hard PU insulation 50 mm thick for models up to 600 litres and 100 mm soft for 800 and 1000 liters

MODELS

SC 150

SC 200

SC 300

SC 400

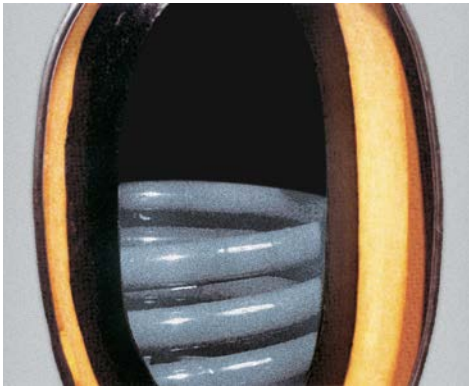
SC 500

SC 600

SC 800

SC 1000

## MAIN COMPONENTS



Detail of the helicoidal exchange coil

- Carbon Steel tank
- Internal treatment: 2 layer enamelling
- Ellipse shaped coil cross-section with wide exchange surface
- Hard PU insulation 50 mm thick for models up to 600 litres and 100 mm soft for 800 and 1000 liters
- Inspection flange equipped with magnesium anode, thermostat, thermometer and recirculation connection
- It can be integrated in all type of intallations, included the solar ones

### Optional:

Panel board with:

- On / Off switch
- working thermostat for the control of the loading pump
- thermometer

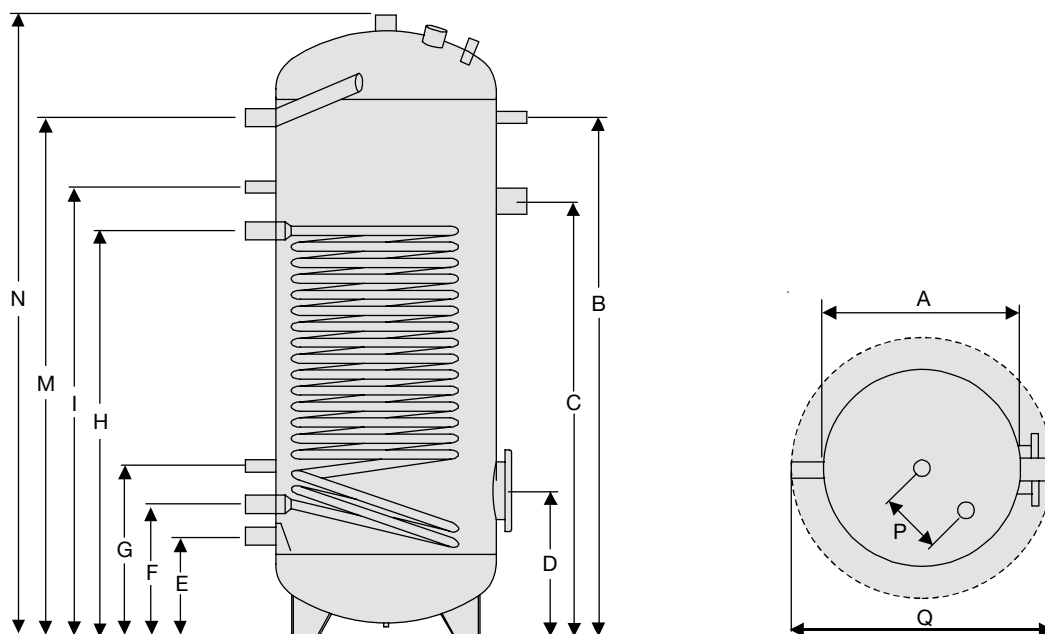
## TECHNICAL DATA

SANICAL SC		150	200	300	400
Total capacity	l	168	212	291	423
Insulation in rigid injected PU.	mm	50	50	50	50
Insulation in flexible injected PU.	mm	-	-	-	-
Diameter of tank with insulation of 50 mm of injected PU	mm	600	600	600	750
Diameter of tank with insulation of 100 mm of flexible PU	mm	-	-	-	-
Lower heat exchanger	m <sup>2</sup>	1.0	1.5	1.8	1.9
Power absorbed	kW	24	36	44	46
Flow rate necessary to the heat exchanger	m <sup>3</sup> /h	1.0	1.6	1.9	2.0
Production of D.H.W. $\Delta t = 25$ K (cold water inlet at 15°C - hot water outlet at 40°C)	l/h	600	900	1100	1109
Pressure losses	mbar	12	40	70	80
Flange	Ø mm	180/120	180/120	180/120	180/120
Weight (empty)	kg	70	90	115	140
Maximum working pressure in the sanitary water side	bar	10	10	10	10
Maximum working pressure in the coil side	bar	6	6	6	6
Maximum temperature in the sanitary water side	°C	95	95	95	95

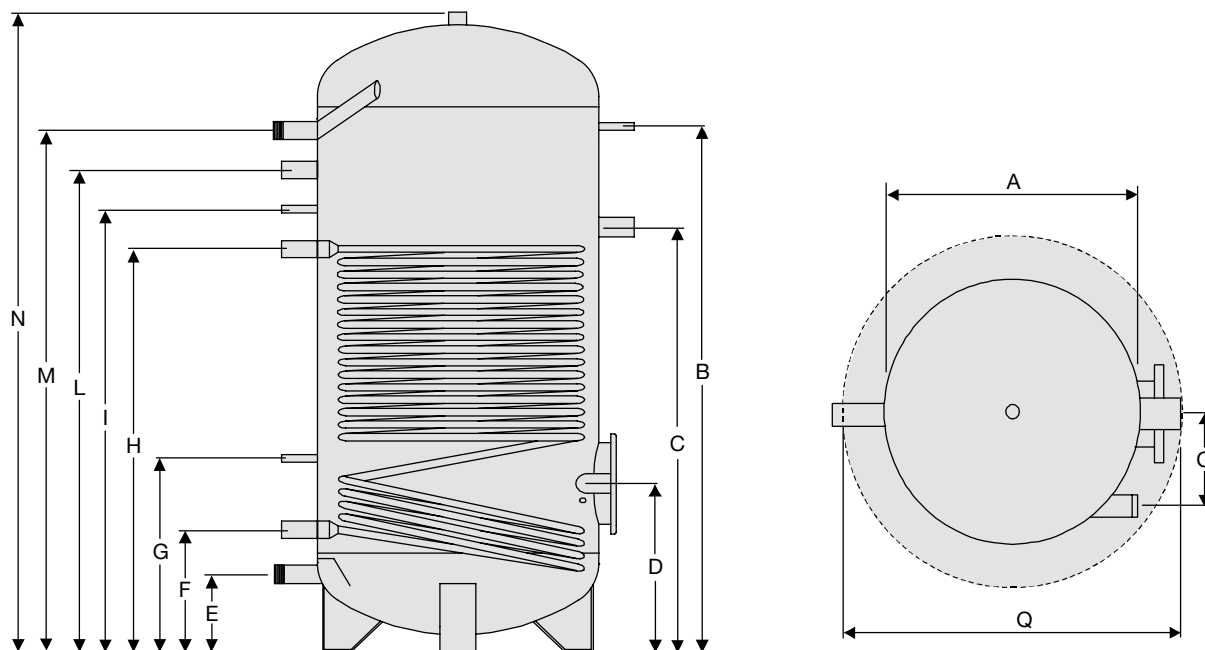
SANICAL SC		500	600	800	1000
Total capacity	l	500	589	765	888
Insulation in rigid injected PU.	mm	50	50	-	-
Insulation in flexible injected PU.	mm	-	-	100	100
Diameter of tank with insulation of 50 mm of injected PU	mm	750	750	-	-
Diameter of tank with insulation of 100 mm of flexible PU	mm	-	-	990	990
Lower heat exchanger	m <sup>2</sup>	2.2	2.5	2.7	3.5
Power absorbed	kW	55	63	68	88
Flow rate necessary to the heat exchanger	m <sup>3</sup> /h	2.4	2.7	2.9	3.8
Production of D.H.W. $\Delta t = 25$ K (cold water inlet at 15°C - hot water outlet at 40°C)	l/h	1400	1500	1700	2100
Pressure losses	mbar	131	192	240	518
Flange	Ø mm	180/120	180/120	180/120	290/220
Weight (empty)	kg	155	190	215	245
Maximum working pressure in the sanitary water side	bar	10	10	10	10
Maximum working pressure in the coil side	bar	6	6	6	6
Maximum temperature in the sanitary water side	°C	95	95	95	95

## DIMENSIONS

### SANICAL SC 150 - 200 - 300 - 400 - 500 - 600



### SANICAL SC 800 - 1000



SANICAL		A	B	C	D	E	F	G	H	I	L	M	N	O	P	Q
150	mm	500	775	655	330	220	300	385	620	-	-	765	990	-	150	600
200	mm	500	1005	810	320	220	290	375	750	835	-	975	1215	-	150	600
300	mm	500	1390	955	320	220	290	375	890	1165	-	1390	1615	-	150	600
400	mm	650	1195	835	365	265	345	440	795	960	-	1185	1460	-	150	750
500	mm	650	1425	960	365	265	345	440	880	1170	-	1415	1690	-	150	750
600	mm	650	1695	1065	365	265	345	440	985	1340	-	1685	1960	-	150	750
800	mm	790	1465	1135	435	210	345	560	1035	1145	1275	1435	1780	200	-	990
1000	mm	790	1720	1350	440	210	350	555	1235	1395	1535	1700	2030	200	-	990

# PELLEXIA 116-160-250



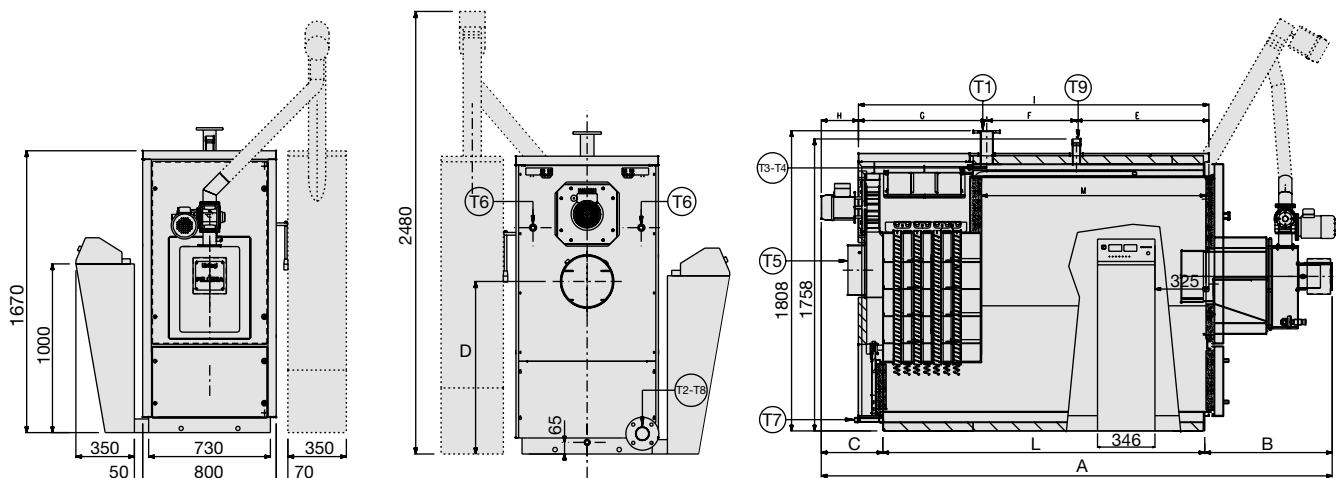
**PELLET FIRED BOILER, COMPLETE WITH MODULATING BURNER,  
safety rotary valve and pneumatic cleaning system**

OUTPUT RANGE	from 106 to 225.3 kW		
OPERATION TEMPERATURE	maximum 85°C		
SUPPLY FUEL	Pellet certified according to ISO 17225-2:2014		
MODELS	116	160	250
ENERGETIC CLASS	Class 5 (according to EN 303-5:2012)		

**Burner with fan controlled by inverter and positioned on the suction side,  
with pneumatic cleaning system**

- Automatic pellet feeding
  - Burner with fan on the suction side, with automatic ignition system
  - Combustion with flame modulation and fan controlled by electronic system inverter assisted
  - Heat exchanger with vertical smoke pipes, with semiautomatic cleaning through steel scrapers
  - Thermal insulation with thick mattress (80 mm) of mineral wool
  - Combustion chamber door lined in refractory material 100 mm thick
  - Smoke chamber with cleaning / inspection opening
  - Front and rear door giving quick access to the base of the heat exchanger for ashes removal
  - Burner automatic cleaning kit with compressed air tank (50 litres)
  - Safety rotary feeding valve against back fire
  - Safety heat exchanger ready for connection of thermal discharge valve
  - Panel board, reading desk style, placeable at will
- Options:
- Service pellet reservoir
  - Ready for combination with automatic system for pellet transportation and loading

## DIMENSIONI



T1 – C.H. flow  
T2 – C.H. return

T3 – Bulb holder  
T4 – Bulb holder

T5 – Flue connection  
T6 – Safety heat exchanger connections

T7 – Boiler drain  
T8 – Return temperature sensor connection

T9 – Expansion vessel connection

PELLEXIA	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm	L mm	M mm	T1 DN	T2 DN	T3 mm	T4 mm	T5 Ø mm	T6 mm	T7 mm	T8 mm	T9 mm
116	2430	380	371	968	698	440	713	224	1851	1679	1150	65	65	G ½	G ½	300	G ¾	G ¾	G ½	G 1 ½
160	2780	730	371	968	698	440	713	224	1851	1679	1150	65	65	G ½	G ½	300	G ¾	G ¾	G ½	G 1 ½
250	3140	780	421	968	798	540	773	274	2111	1939	1350	65	65	G ½	G ½	300	G ¾	G ¾	G ½	G 1 ½

## TECHNICAL DATA

PELLEXIA		116	160	250
NOMINAL OUTPUT min./max.	kW	32.45/106	44.85/143.81	225.3
NOMINAL INPUT min./max.	kW	34.8/115.5	48.05/159	72.6/250
EFFICIENCY	%	93.27/91.7	93.35/90.43	93.30/90.13
MAX. WORKING PRESSURE	bar	3	3	3
MAX. WORKING TEMPERATURE	°C	85	85	85
VOLUME OF THE PELLET STORAGE BIN	l	200	200	200
MAX. WEIGHT OF THE PELLET IN THE BIN (*)	kg	120	120	120
PELLET CONSUMPTION min./max.	Kg/h	7.0/23.2	9.6/31.8	14.5/50.0
BOILER WATER CONTENT	l	430	430	580
BOILER DRY WEIGHT	kg	1475	1475	1626
BOILER CLASS ACCORDING TO EN 303-5:2012		5	5	5
PRESSURE IN COMBUSTION CHAMBER		Negative		

(\*) The quantity of pellet stored in the bin depends on the pellet density.

Values obtained with pellet, certified EN PLUS according to the Standard ISO 17225-2:2014

# AIREX 150-200



## WOOD LOGS FIRED BOILER WITH PYROLYTIC COMBUSTION AND FAN ON THE SUCTION SIDE

OUTPUT RANGE

from 149.3 to 199.7 kW

RETURN TEMPERATURE

return temperature > 55°C

SUPPLY

wood logs

MODELS

150

200

ENERGETIC CLASSIFICATION

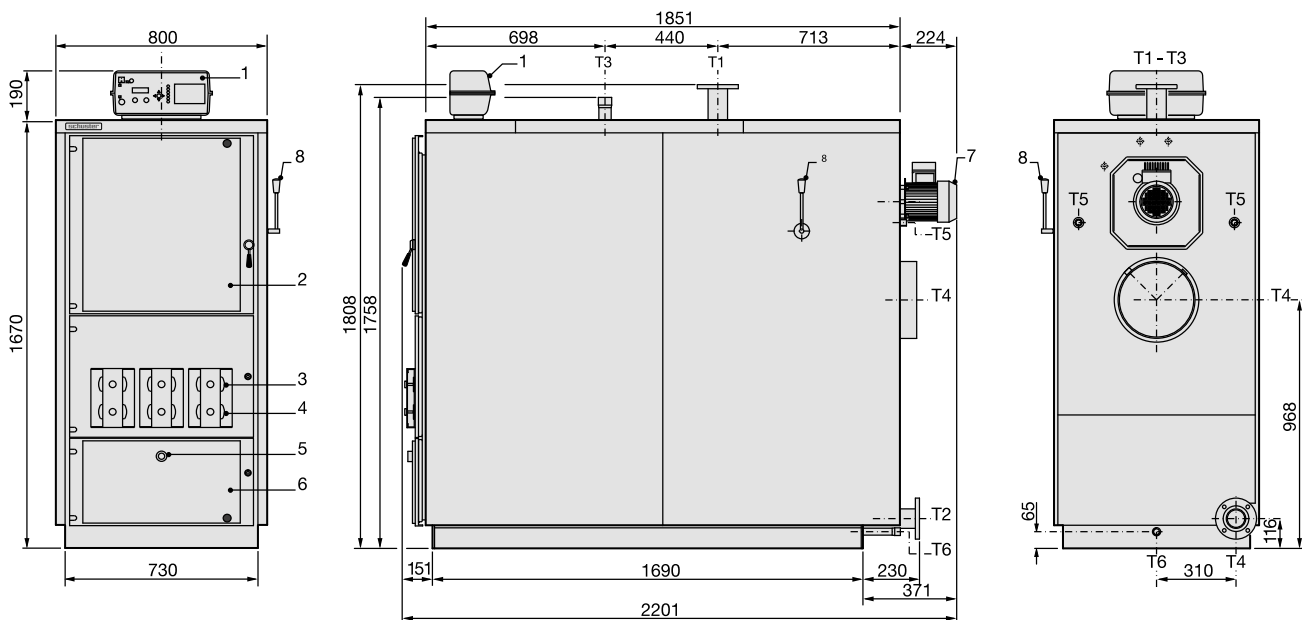
Class 5 (according to EN 303-5:2012)

boiler body in carbon steel – smoke circuit with reversed flame  
modulating fan on the suction side, controlled by inverter



- Boiler body in carbon steel with combustion chamber under negative pressure
  - Inverted flame combustion through refractory stone burner, with grate in thermal steel
  - Efficiency: certified to be higher than 89%
  - Four stage modulating fan, for the wood gasification, set in the suction side
  - Built-in anti-condensation system with modulating thermostatic valves (UNICAL Patent)
  - Access, for loading and inspection,
  - Primary and secondary air regulation through three series of air adjustment valves set on the intermediate door
  - Combustion chamber partially lined and catalyst in refractory concrete
  - Vertical smoke pipes endowed with manual operated mechanical cleaning system
  - Safety heat exchanger for overheating prevention, made of a steel coil plunged directly in the boiler water.
  - Casing insulation through mineral wool panels 80 mm thick
  - Electronic panel board for operation and control, with:
  - Electronic PCB with microprocessor and alphanumeric LCD, keyboard and pilot lamps for indication and activation of servo mechanisms.
- Optional:  
- Recirculation pump

## DIMENSIONS



- 1 - Panel board
- 2 - Wood storage door
- 3 - Primary air adjuster
- 4 - Secondary air adjuster
- 5 - Flame sight glass

- 6 - Combustion chamber door
- 7 - Fan with inverter
- 8 - Lever for cleaning system activation
- T1 - C.H. flow EN 1092-1 DN 65 PN 16
- T2 - C.H. return EN 1092-1 DN 65 PN 16

- T3 - Expansion vessel connection ISO 7/1 Rp1/2"
- T4 - Chimney connection Øe 300 mm
- T5 - Safety heat exchanger connections ISO 7/1 R3/4"
- T6 - Boiler drain ISO 7/1 R3/4"

## TECHNICAL DATA

AIREX		150	200
NOMINAL OUTPUT (*)	kW	149.3	199.7
NOMINAL INPUT	kW	166.8	223.4
BOILER WATER CONTENT	l	430	493
WATER SIDE PRESSURE LOSSES (**)	m w.c.	0.39	0.39
MAX. WORKING PRESSURE	bar	3	3
WOOD LOGS STORAGE VOLUME	l	495	580
WOOD LOADING OPENING	mm	514x594	514x594
WOOD LOGS LENGTH	cm	100	120
CO 10% O <sub>2</sub>	mg/Nm <sup>3</sup>	687	690
NOx 10% O <sub>2</sub>	mg/Nm <sup>3</sup>	232	249
DUST 10% O <sub>2</sub>	mg/Nm <sup>3</sup>	25	43
ELECTRICAL SUPPLY	V/W	230/250	230/250
DRY WEIGHT	kg	1475	1626

(\*) Output obtained with good quality wood, having an humidity of 15%. (\*\*) Pressure losses for a flow rate corresponding to a Δt of 15 K.

Ufly P



**New and powerful interface for the simplified management of professional boilers**

**Ufly P** can be inserted in the control panel, equipped with backlit TFT touch screen Display. The thermoregulation functions allow the hourly weekly scheduling up to a maximum of 12 heating circuits completely independent and of a Domestic Hot Water storage tank (by means of optional SHC cards).

**Time programming**

- 3 time slots within the day with a different temperature that can be associated with each one of them.
- Storing up to 5 daily programs for the heating and up to 3 daily programs for Domestic Hot Water.
- Weekly programming: up to 3 programs for the heating and as many for the Domestic Hot Water; with association to a daily program.
- Additional functions: holiday, absence, extension of operating hours, automatic, summer, continuous heating, reduced, antifreeze, heating curves, installation status info, chimney sweeper function.
- Anti-legionella function.

**Ufly P** checks the **BMM** (Burner Module Manager) for the management of the single thermal element. The regulation of the heating zones and, more generally, of all types of loads, is done through **optional multifunction cards**, called **SHC** (Slave Heating Controller) for the circuits CH, DHW and the auxiliary resources (timed relays, solar accumulators).

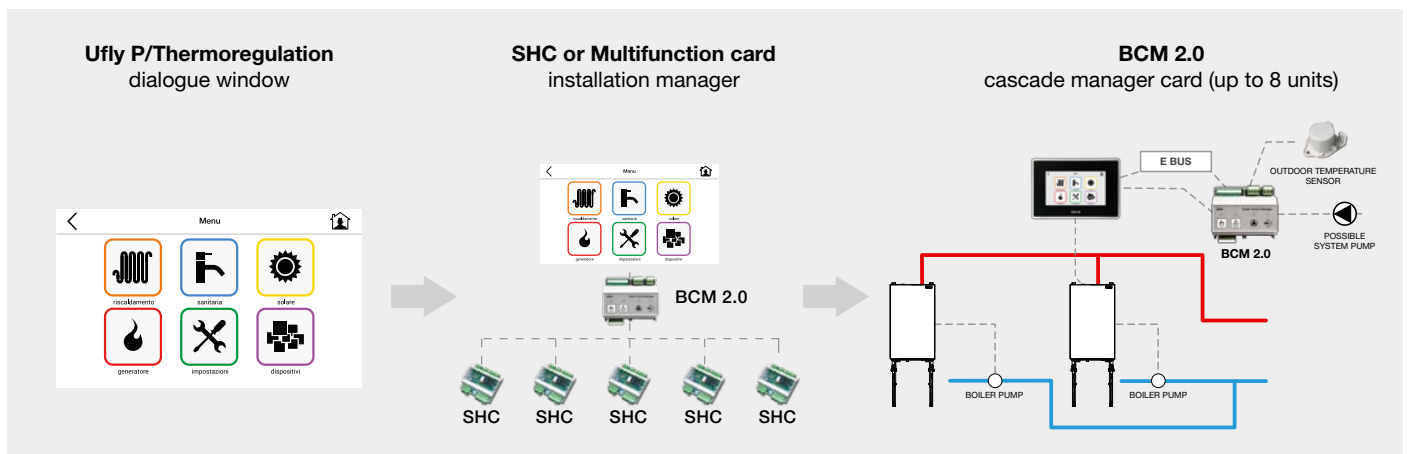
**Telemangement**

Alternatively, there are available 2 different communication protocols: **eBUS** and **Modbus**, intended for connection to different control devices.

- Acquisition of operational information of all the connected devices
- Parameters Setting / Changing of each module
- Diagnostic management: alarm Acquisition and Reset
- Gateway: allows the conversion of the Modbus / eBUS protocol to access all resources connected to the local eBUS

Included: Outdoor temperature sensor

Mounted: Flow temperature sensor, return temperature sensor.



## KIT CONTROL PANEL Ufly P

Can be used for single boilers.

**Composed by:**

- Viewer / Programmer Ufly P
- Outdoor temperature sensor

Standard supplied for:

- ALKON 140 EXT
- KONf 200-400
- MODULEX EXT
- MULTIINOX 116
- MULTIINOX 250÷1000
- SPK 150÷1000

Optional for:

- ALKON 50C
- ALKON 70C
- KONf 115
- KON 115



Ufly P



Outdoor temp. sensor

## KIT CONTROL MANAGER Ufly P

Required to manage systems with up to 8 battery boilers.

**Composed by:**

- Viewer / Programmer Ufly P
- Cascade manager card BCM 2.0
- Power pack 24 V
- Outdoor temperature sensor
- D.H.W. temperature sensor

Optional for cascade /tele-management of:

- ALKON 50 C / 70 C
- ALKON 140 EXT
- KONf 115 / KON 115
- MULTIINOX 250÷1000
- MULTIINOX 116
- SPK 150÷1000



Ufly P



BCM 2.0



Power Pack



Outdoor temp. sensor



D.H.W. temp. sensor

## GATEWAY P

**Ufly P is also an APP** to conventionally manage, from your device (tablet and smartphone), via WIFI / LAN, programming, remote control and real-time notifications of any blockages or anomalies of the boiler, which can be connected via **“Gateway P”** (optional).

**GATEWAY P:** Remote control management for the Professional Unical Boilers.

Main functions

- LAN or WIFI connection
- APP for smart phone and tablet
- Remote managements of the heating circuits time program
- Alarm notification on the mobile device
- Visualisation of the status of boiler
- Series of free Software tool for monitoring and setting
- eBUS, Modbus RTU, connection
- 230/24 V power adapter for the other device installed (ex. SHC multifunctional module)



## APP Ufly

**Ufly APP** allows the Unical heating system to be controlled remotely from smartphone or tablet. It allows you to programme and control your heating system from a distance by connecting the system to the home network and thanks to the pairing system integrated to the APP and UFLY P you can create a perpetual connection between your devices and the boilers.

Details of the main functions of the Ufly APP:

- **HEATING and DOMESTIC HOT WATER**  
Daily and Weekly Programming the heating system circuits and domestic hot water
- **BOILER**  
You can check the status of the boiler by verifying whether it is activated for the heating system or for the domestic hot water system, in addition to other useful information related to the system.
- **SOLAR**  
You can view the status of the solar heating system, if installed, and turn it on or off.

### ■ ERROR STATUS

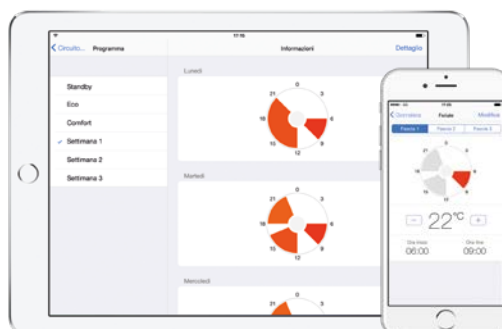
You can view the history of the errors generated by the system and RESET the system which will resolve the problem directly by simply restarting the system itself in the case of critical errors.

### ■ NOTIFICATIONS

If a problem occurs in the system, you will be immediately notified

with a push notification and, if the failure is not immediately resolved by **RESETTING**, you can contact the Technical Assistance and report the displayed error.

**The APP** is available in the following languages: Italian, English, Spanish, French, Russian, Polish, Turkish and Romanian.



BCM 2.0



BCM 2.0 is able to operate:

- as a signal boiler controller.  
This enables control of basic services of the heating system and includes system safety devices
- as Cascade Manager.  
This enables control of the complex structure up to 8 heat generators.

**FUNCTIONS:**

**CASCADE MANAGER**

- eBUS communication interface with modules SHC BMM, Ufly P
- Cascade management with maximum 8 boilers
- Global flow temperature detection
- ON/OFF inputs for global protection:
  - FL minimum water flow
  - Global safety devices
- 0-10 v CPM voltage output for modulating control of the collector pump.
- CONFIG. TA ON/OFF enabling input for heat generator.
- Relay output for fixed speed pump or to indicate the status of the boiler (request or standby)

**D.H.W. MANAGEMENT**

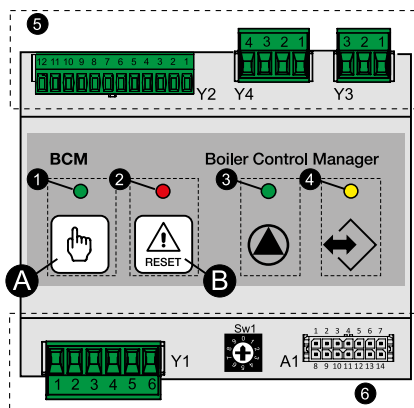
- S.temp ACC DHW storage tank temperature sensor
- DHW output relay P.Car CONTROL for storage tank loading pump

**CH MANAGEMENT**

- ON/OFF input for CH request
- P.CH relay output CONTROL for direct flow

**REMOTE CONTROL**













- eBUS communication interface for HCM at a higher level
- Modbus communication interface to integrate into an automation system in the building.
- Voltage interface input with commercial heating controller.
- Relay contact output to indicate a boiler alarm.
- ON/OFF input to reset alarm



- A** MANUAL request button
- 1** OFF: MANUAL request NOT active  
ON: MANUAL request active
- B** RELEASE button
- 2** ON: FAULT detected  
FLASH.: ANTIFREEZE protection activation  
OFF: funzionamento normale
- 3** ON: CH heating operation or antifreeze protection active  
FLASH.: DHW request operation  
OFF: Standby
- 4** ON: BCM communication with local and BCM remote controls (cascade)  
FLASH.: BCM communication with local HSCP or SHC controls  
OFF: No communication with controls (manual A request)
- 5** LOCAL CONNECTORS to manage the boiler/cascade
- 6** HOST CONNECTORS to manage remote system

Note: for more information, please visit [www.unical.eu](http://www.unical.eu)



PANELS BOARD for XC-K






<b>MASTERMODUL panel board</b> <b>MASTERTWOSTAGE panel board</b>	For boiler XC-K in combination with <b>MODULATING BURNERS</b>	For boiler XC-K in combination with <b>TWO STAGE BURNERS</b>
 <p>The panel boards MASTERMODUL and MASTERTWOSTAGE are equipped with:</p> <ul style="list-style-type: none"> <li>• E8 controller</li> <li>• LAGO controller for burner operation</li> <li>• Outer temperature sensor</li> <li>• Boiler temperature sensor</li> <li>• D.H.W. tank temperature sensor</li> <li>• Flow temperature sensor</li> <li>• Primary circuit temperature sensor</li> </ul>	<p>SINGLE BOILER</p> <p>1 PANEL MASTERMODUL</p> 	<p>SINGLE BOILER</p> <p>1 PANEL MASTERTWOSTAGE</p> 
 <p>The panel boards CASCATAMODUL and CASCATATWOSTAGE are equipped with:</p> <ul style="list-style-type: none"> <li>• LAGO controller for burner operation</li> <li>• Primary circuit temperature sensor</li> </ul>	<p>2 BOILERS XC-K IN CASCADE</p> <p>1 PANEL MASTERMODUL</p>  <p>+</p> <p>1 PANEL CASCATAMODUL</p> 	<p>2 BOILERS XC-K IN CASCADE</p> <p>1 PANEL MASTERTWOSTAGE</p>  <p>+</p> <p>1 PANEL CASCATATWOSTAGE</p> 
	<p>(n) BOILERS XC-K IN CASCADE (max 8 boilers)</p> <p>1 PANEL MASTERMODUL</p>  <p>+</p> <p>(n-1) PANEL CASCATAMODUL</p> 	<p>(n) BOILERS XC-K IN CASCADE (max 8 boilers)</p> <p>1 PANEL MASTERTWOSTAGE</p>  <p>+</p> <p>(n-1) PANEL CASCATATWOSTAGE</p> 

Note: available on request

**PANEL MASTERMODUL AT HIGH TEMPERATURE - PANNEL MASTERTWOSTAGE AT HIGH TEMPERATURE**




PANELS BOARD for INOXIA GJ

<b>MASTERMODUL panel board</b>	<b>CASCATAMODUL panel board</b>
 <p>The panel board MASTERMODUL is equipped with:</p> <ul style="list-style-type: none"> <li>• E8.5064 controller</li> <li>• LAGO BASIC controller for burner</li> <li>• Outer temperature sensor</li> <li>• Boiler temperature sensor</li> <li>• DHW tank temperature sensor</li> <li>• CH flow temperature sensor</li> <li>• Primary ring temperature sensor</li> <li>• A series of switches</li> <li>• Safety thermostat</li> </ul>	 <p>The panel board CASCATAMODUL is equipped with:</p> <ul style="list-style-type: none"> <li>• LAGO BASIC controller for burner</li> <li>• Boiler temperature sensor</li> <li>• A series of switches</li> <li>• Safety thermostat</li> </ul>






<b>SINGLE boiler</b>	1 MASTERMODUL panel	
<b>2 INOXIA GJ in cascade</b>	1 MASTERMODUL panel 1 CASCATAMODUL panel	 + 
<b>(n) INOXIA GJ in cascade (max 8 boilers)</b>	1 MASTERMODUL panel (n-1) CASCATAMODUL panels	 + (n-1) x 

For the cascade operation get in touch with the Pre-Sale Office.

PANELS BOARD for TRISTAR 2S

<p><b>STANDARD panel board</b></p>	<p><b>MASTERMODUL panel board MASTERBISTADIO panel board</b></p>	<p><b>CASCATAMODUL panel board CASCATABISTADIO panel board</b></p>
		
<p>The standard control panel is equipped with:</p> <ul style="list-style-type: none"> <li>• series of switches</li> <li>• thermometer</li> <li>• safety thermostat</li> <li>• dual-stage burner thermostat</li> <li>• minimum temperature thermostat (pump system)</li> </ul>	<p>The MASTERMODUL and MASTERBISTADIO HIGH-TEMPERATURE panels are equipped with:</p> <ul style="list-style-type: none"> <li>• E8 controller</li> <li>• LAGO burner controller</li> <li>• external sensor</li> <li>• boiler sensor</li> <li>• D.H.W. storage tank sensor</li> <li>• C.H. flow sensor</li> <li>• primary circuit sensor</li> <li>• series of switches</li> <li>• safety thermostat</li> </ul>	<p>CASCATAMODUL and CASCATABISTADIO panels are equipped with:</p> <ul style="list-style-type: none"> <li>• LAGO burner controller</li> <li>• boiler sensor</li> <li>• series of switches</li> <li>• safety thermostat</li> </ul>

For TRISTAR 2S boilers coupled with **MODULATING BURNERS and TWO-STAGE BURNERS**

	Which panel to order?	
<b>SINGLE boiler</b>	1 MASTER panel	
<b>2 TRISTAR 2S in cascade</b>	1 MASTER panel 1 CASCATA panel	 + 
<b>(n) TRISTAR 2S in cascade (max 8 boilers)</b>	1 MASTER panel (n-1) CASCATA panels	 + (n-1) x 

For the cascade operation and for panel board with 110°C safety thermostat get in touch with the Pre-Sale Office.

PANELS BOARD for ELLPREX - TRISTAR 3G 2S (standard supplied)

<p><b>STANDARD panel board</b></p>	<p><b>with THERMOREGULATION E9</b></p>
	

NOTE: It is not possible to ask for panel board combinations different than the proposed ones.

E8



## SYSTEM OPTIMIZATION



### BOILER HEATING OPTIMIZATION

The heating controller, on the basis of the timer/heating programme set by the user, once the system's characteristics have been evaluated, will activate the function for automatically bringing forward the heating ignition time so as to ensure that the set temperature is reached at the time requested by the user.



### FAST SET TEMPERATURE

This is obtained by calculating the optimum ignition start-up time. This calculation can be carried out taking into consideration the outdoor temperature or the room temperature.



### OVERHEATING PROTECTION

The boiler's safety temperature is controlled via the pump's overrun time in order to get rid of any thermal inertia.



### SELF-ADAPTION

Through the elaboration of data transmitted by the room sensor, this function adjusts the boiler's output to the building's characteristics, ensuring a constant monitoring of the indoor temperature on the basis of the variation of the outdoor temperature, keeping in consideration the building's thermal inertia and the contribution of "free" heat (solar radiation, internal heat sources etc).



### SLOPE OFFSET (HEATING SLOPE DISTANCE)

The boiler temperature that is required for a mixed circuit is calculated by adding to the calculated temperature setting for the heating circuit temperature the heating slope distance. The heating slope distance compensates for sensor tolerances and heat loss up to the mixer.



### NUMBER OF BURNER IGNITIONS

It stabilizes the number of ignitions of each burner.



### BURNER RUN HOURS

It stabilizes the run hours of each burner.



### VALVE OPENING TIME

Based on the characteristics of the servomotor.



### FROST PROTECTION MODE

The frost protection operation mode prevents the CH system from freezing by automatically switching heating operation on. In the frost protection mode, the room temperature for all the heating circuits is set to 5°C and the storage tank sensor frost protection is activated when the temperature drops below 10°C.

## DHW CONTROL



### DOMESTIC HOT WATER PRODUCTION

There are many programmes which control the domestic hot water production. You can choose from the maximum of comfort to the maximum fuel saving. In order to permit the storage cylinder to supply hot water rapidly, the heating controller brings the boiler's temperature to the maximum set value.



### ANTI Legion

Every 20th heating start-up or once a week on Saturday at 01:00 hrs, the storage tank is heated up to 60°C. This function will eliminate any eventual pathogens which have formed in the DHW.



### DHW OPTIMIZATION (LOADING PUMP)

The DHW loading pump is switched on only if the boiler temperature exceeds by 5°C the storage tank temperature. It is deactivated when the boiler temperature drops below the storage tank temperature or if the storage tank temperature is higher than the nominal temperature.

## SETTING



### PROGRAMME SETTING

The heating programmes can be set daily or weekly, with more than one On-Off firing times or temperature reductions during the arch of the day.



### MULTIPLE ZONE CONTROL

With the same heating control device you can control 2 independent circuits with different characteristics, though having ensured all the described functions, including the deep sliding temperature function.



### 0-10 VOLT SIGNAL

the great flexibility of the E8 also permits the boiler set point to be controlled by an external control signal. This will enable, having at disposal an even more complex system, to exploit all the heating control's functions..



### MANAGEMENT OF UP TO 15 MIXED CIRCUITS

controlled by the outdoor sensor.

## ENERGY SOURCES CONTROL



### INTEGRATION WITH RENEWABLE ENERGY SOURCES

As for example: solar systems and/or solid fuel fired boilers.



E9



### SYSTEM OPTIMIZATION



#### BOILER HEATING OPTIMIZATION

The heating controller, on the basis of the timer/heating programme set by the user, once the system's characteristics have been evaluated, will activate the function for automatically bringing forward the heating ignition time so as to ensure that the set temperature is reached at the time requested by the user.



#### FAST SET TEMPERATURE

This is obtained by calculating the optimum ignition start-up time. This calculation can be carried out taking into consideration the outdoor temperature or the room temperature.



#### OVERHEATING PROTECTION

The boiler's safety temperature is controlled via the pump's overrun time in order to get rid of any thermal inertia.



#### SELF-ADAPTION

Through the elaboration of data transmitted by the room sensor, this function adjusts the boiler's output to the building's characteristics, ensuring a constant monitoring of the indoor temperature on the basis of the variation of the outdoor temperature, keeping in consideration the building's thermal inertia and the contribution of "free" heat (solar radiation, internal heat sources etc).



#### SLOPE OFFSET (HEATING SLOPE DISTANCE)

The boiler temperature that is required for a mixed circuit is calculated by adding to the calculated temperature setting for the heating circuit temperature the heating slope distance. The heating slope distance compensates for sensor tolerances and heat loss up to the mixer.



#### VALVE OPENING TIME

Based on the characteristics of the servomotor.



#### FROST PROTECTION MODE

The frost protection operation mode prevents the CH system from freezing by automatically switching heating operation on. In the frost protection mode, the room temperature for all the heating circuits is set to 5°C and the storage tank sensor frost protection is activated when the temperature drops below 10°C.

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With the same heating control device you can control 2 independent circuits with different characteristics, though having ensured all the described functions, including the deep sliding temperature function.

### ENERGY SOURCES CONTROL



#### INTEGRATION WITH RENEWABLE ENERGY SOURCES

As for example: solar systems and/or solid fuel fired boilers.

At Unical, we see certifications as more than just a piece of paper needed to comply with legislation. We often obtain certification well ahead of our competitors to demonstrate our serious commitment to continuous improvement in quality and safety in all areas of our company, as well as our compliance with all applicable laws and standards.

Just like our products, our company too is a model of correctness and professionalism, with production and management procedures to guarantee our customers the highest level of service from all areas of manufacturing and sales.

Unical is an industry leader in procedures for health and safety in the workplace, especially considering the delicate nature of our products. Protection of the environment is another important issue. We are committed to improving the working and extended environments, reducing waste, recycling packaging, eliminating

unnecessary paperwork and doing everything we can to improve the quality of life. Unical has always undertaken constant research into reducing emissions and improving efficiency.

We are rightly proud of our leadership in this area, and are committed to maximising quality on all markets, though many of our competitors are less interested in the conformity of their products to foreign legislation, and consider this too difficult or complicated.

To prove the point, on the 19 January 1993, Unical was the first manufacturer to obtain CE marking for the whole of Europe, just as great is the satisfaction, after having worked with determination and commitment, to have obtained, first in Europe, the CTDTP authorization from UL, valid for the American and Canadian market.



Unical was the first company in Europe authorised to use the CE mark for boilers (January 1993)

- **UNI EN ISO 9001:2015**      Quality Management System
- **UNI EN ISO 14001:2015**      Environment Management System
- **UNI EN ISO 45001:2018**      Management system of health and safety at workplace
- **Organization, management and control model**      Legislative Decree 231/2001
- **ASME Stamp H**      Prestigious certification for UNITED STATES and CANADA
- **EAC**      Russia - Belarus - Kazakhstan
- **GASKEUR SV-HR 107**      Holland
- **HR TOP**      Belgium
- **SELO**      China



Quality system of the testing laboratory according to the Standard ISO / IEC 17025: 2018

Quality system for the production of pressure equipment MODULE D (PED)



UL CTDPA authorization for the Caorso Laboratory



SELO Certification for the construction of boilers and pressure vessels according with the "Chinese Manufacturing System"



AWARD RUSSIA Acknowledgment to Unical for the introduction of the breakthrough technology in Russia



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**Unical**

