

Unical



XC-K

LARGE WATER CONTENT, STAINLESS STEEL, CONDENSING BOILER, 124 TO 2160 kW

- 12 MODELS FROM 124 to 2160 kW
- PRESSURIZED, for GASEOUS FUEL
- LARGE WATER CONTENT
- TWO RETURN CONNECTIONS (high and low temperature)
- POSSIBILITY OF CASCADE OPERATION UP TO 8 x XC-K
- EFFICIENCY UP TO 109%
- SPECIAL MULTI-FIN SMOKE PIPES IN STAINLESS STEEL AISI 316 L, with Al/Si/Mg alloy inserts (Unical patent)
- SUITABLE FOR MODULATING PRESSURE JET BURNERS, MAINLY LOW NO_x



Unical widens the range of condensing boilers and introduces the XC-K range. **The large water content condensing boiler, in stainless steel,** for modulating pressure jet burners.

XC-K finds application in all those cases in which, for installation reasons, it is necessary to use a large water content condensing boiler.

PRESSURIZED CONDENSING BOILER

RANGE	from 124 (116 input) to 2160 kW
EFFICIENCY CLASS according to 92/42/CE Directive	★★★★CE
OPERATION TEMPERATURE	without any limitation on the return
TO BE OPERATED	with natural gas or LPG fired burners
MODELS	124 - 200 - 290 - 400 - 480 - 570 - 700 - 900 - 1140 - 1420 - 1820 - 2160

Tuning between technology and environment

MODELS	Nominal input (kW)	Nominal output in COND. (kW)	Number of special pipes	Efficiency at full load in COND. %	Efficiency at part load in COND. %	Maximum condensate production (l/h)	Dimensions (mm - W x L x H)
XC-K 124	115,9	124	19	107	109	19,7	650x1342x1222
XC-K 200	186,9	200	21	107	109	31,7	720x1703x1322
XC-K 290	271	290	25	107	109	45,9	790x1755x1472
XC-K 400	373,8	400	29	107	109	63,3	790x2055x1472
XC-K 480	448,6	480	34	107	109	75,9	854x2107x1662
XC-K 570	532,7	570	39	107	109	90,3	854x2277x1662
XC-K 700	654,2	700	44	107	109	110,7	894x2327x1802
XC-K 900	841,1	900	50	107	109	142,3	894x2697x1802
XC-K 1140	1065,4	1140	58	107	109	180,3	1064x2734x1992
XC-K 1420	1327,1	1420	66	107	109	224,6	1064x3114x1992
XC-K 1820	1700,9	1820	84	107	109	287,7	1204x3420x2242
XC-K 2160	2018,7	2160	93	107	109	341,6	1204x3645x2242

The XC-K range is constituted by a strong outer vessel, inside which it is present, in the upper part, a blind cylindrical furnace, in which the central burner flame reverses peripherally toward the front.

From here, the combustion gases are carried, through the special workmanship of the door insulation, in the pipes of the third pass, to reach the rear smoke chamber, where the drain of the condensates takes also place, for going then to the chimney.

The tube bundle, horizontally placed in the lower part of the body, is composed of **stainless steel pipes in AISI 316 L and special multi-fin inserts in Al/Si/Mg alloy**, particularly effective in

the transfer of the heat to the water, favouring the condensation of the smokes.

The **tube bundle is slightly tilted** toward the smoke chamber for: natural outflow of the condensates, absence of wet acidic deposits and cleaning, for gravity, of the exchange surfaces.

The driven run of the combustion gases allows to exploit at the most the thermal exchange surfaces and to, uniformly, balance the stresses on the materials, both thermal that mechanical.

The **two connections of high/low return temperature** exploit an original position to reduce its hydraulic interferences, exalting the efficiency.

-  **High technology and low polluting emissions**
-  **Respect of the environment and economic saving**
-  **High energy recovery**

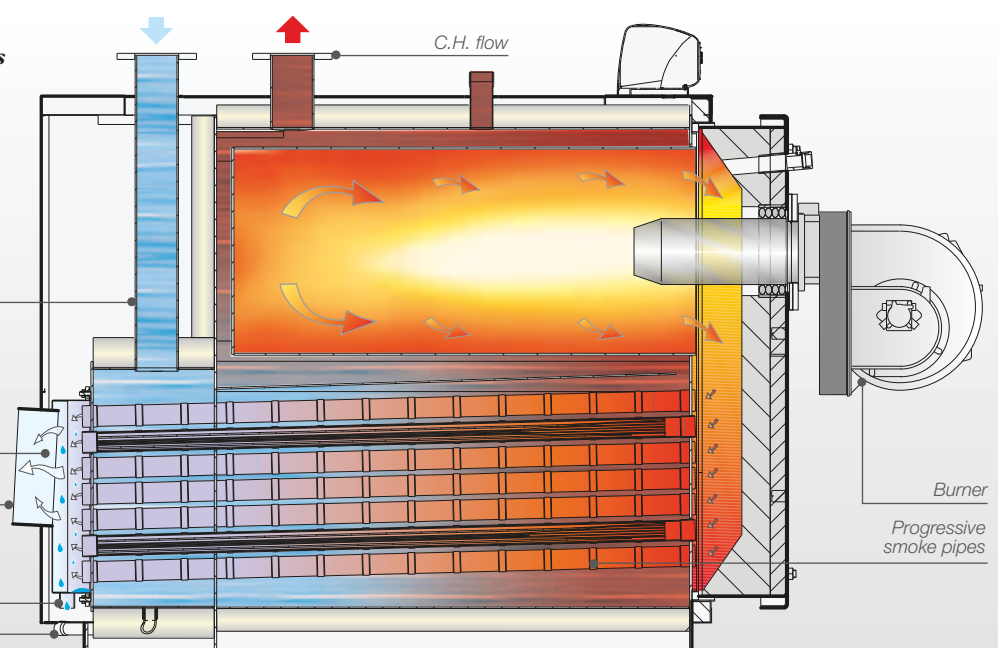
High temperature
C.H. return
Low temperature
C.H. return

Smoke chamber

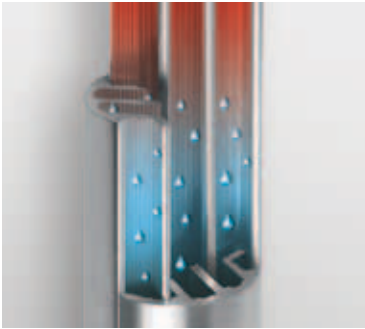
Chimney connection

Condensate evacuation

Boiler drain



XC-K, strong points



■ VERY HIGH QUALITY OF THE EMPLOYED METALS

Outer shell in high resistance carbon steel: smoke chamber in stainless steel AISI 316L

■ PROGRESSIVE SMOKE PIPES (Unical patent)

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 PANEL BOARD MASTERMODUL (optional)

Certified and equipped with:

- Expandable electronic controller E8
- Burner manager with modulating operation

■ Prearrangement for cascade operation with CASCATAMODUL panel board (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%

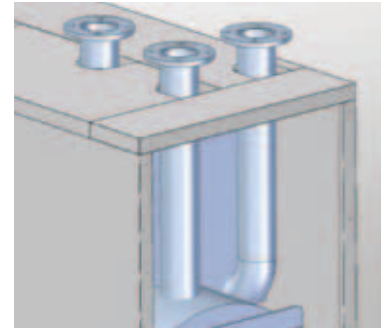
at 30% part load

■ SIMPLIFIED INSTALLATION

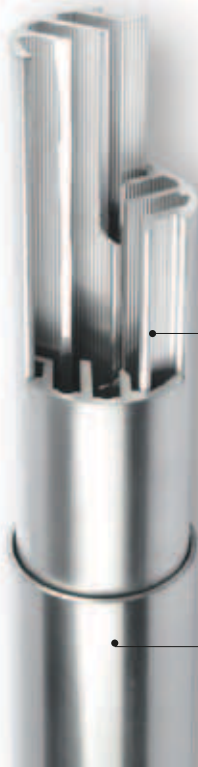
- Single smoke evacuation
- No hydraulic interface between boiler and C.H. system

■ 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



Progressive smoke pipes



Unical
PATENT

Multi-radial
aluminium fins

External pipe in stainless
steel AISI 316L
External pipe of 57 mm
diameter, that contains an
aluminium multi-fin extruded
portion, assuring a very high
heat exchange and
resisting to the condensate.

The smoke pipes, placed in the tube bundle, favour:

- exceptional thermal exchange
- functional outflow of the condensate
- absence of wet acidic deposits
- washout, for gravity, of the smooth exchange surfaces
- greater duration.

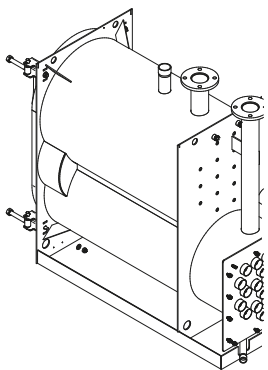
They are circular section pipes, in **stainless steel AISI 316L**, containing in all their length, a **series of multi-radial aluminium fins**.

The aluminium, with the same surface, has a lower weight than the steel, thus reducing the mechanical stresses of the structure. The two elements are armoured and assembled in just one piece.

To make easy the cold starts, the initial portion of the pipes has a “progressive density” of the aluminium fins and opportune longitudinal break-drawn cuts. Everything is **UNICAL Patented** to protect the originality of the study. The smoke temperature is meaningful of the exchange quality of the tube bundle: in fact, at the entrance the smoke temperature is about 750 to 850 °C, but, after only 50 cm, the temperature goes down to 60 °C.

Hydrodynamic structure of the outer shell

- The water run is driven and braked inside the body
- The low smoke side resistance, 50 daPa on average (= ca. 50 mm H₂O) guarantees an excellent operational silentsness and the possibility to work in combination with the most common burners in order to have an easy smoke evacuation.



Classical structure of flame inversion type and third smoke pass.

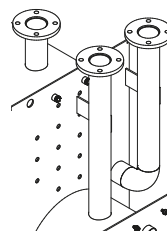
“S” type shape, tested for long time, with the pipes far away from the lowest part, in order to avoid incrustations due to the immersion of the smoke pipes in the coldest zone.

Maximization of the thermal exchange, mainly in the “low temperature” return.

The outer shell is insulated with a mineral wool mattress, 100 mm thick, protected by an anti tearing fabric.

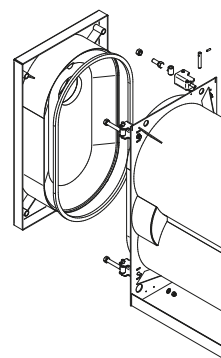
“Smart hidraulic connection”

The other particularity, to favour the increase of the XC-K efficiency, is the complete differentiation of the connection points of *the two C.H. returns of high and low temperature*.



- The high temperature return, generally warmer, concerns the median part of the upper outer shell, in contact with the furnace cylinder (hotter)
- The low temperature return is connected in the lowest part, where the tube bundle is present, to mostly cool it down and to favour the condensation effect.

Characteristics of the door



The insulation of the door is in recyclable super light cement:

- high insulating power
- lighter and more resistant than the conventional products

Closing of the door with precise adjustability:

- selfcentering
- reversible (with opening to the right or to the left)
- adjustable: in vertical, transversal and axial direction.

Power and flexibility of use



Electronic panel board MASTERMODUL

- The electronic panel board **MASTERMODUL** (Part N. 37892), endowed with **E8 controller and manager of the burner with modulating operation**, resolves brightly the more and more complex demands of the users. The temperature sensors (boiler sensor, outer sensor, flow sensor and D.H.W. storage tank sensor) standard supplied manage automatically the central heating installation.
- The availability of the hourly and weekly programmer and the presetting of programs already planned, widens and facilitates the customization operations.

In case of cascade installations, for the second and subsequent boilers, the electronic panel board **CASCATAMODUL** (Part N. 37900) shall be used. Thanks to this and to a simple "Bus" cable, the XC-K boilers will operate in completely automatic way, alternating them self or working together for the satisfaction of the exact heat request of the C.H. installation.

In this way the burner modulation capacity and the boiler condensation capacity, are **fully exploited for the maximum energetic saving!**

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.



Number of burner ignitions

It stabilizes the number of ignitions of each burner.



Burner run hours

It stabilizes the run hours of each burner.



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.



Antilegion

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.



Management of up to 15 mixed circuits

controlled by the outdoor sensor



0-10 volt signal

the great flexibility of the E8 also permits the MODULEX EXT 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..

Energy sources control



Integration with renewable energy sources

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

Optional panel boards

MASTERMODUL panel board Part N. 37892
MASTERTWOSTAGE panel board Part N. 38778

The panel boards MASTERMODUL and MASTERTWOSTAGE are equipped with:

- E8 controller
- LAGO controller for burner operation
- Outer temperature sensor
- Boiler temperature sensor
- D.H.W. tank temperature sensor
- Flow temperature sensor
- Primary circuit temperature sensor



CASCATAMODUL panel board Part N. 37900
CASCATATWOSTAGE panel board Part N. 37901

The panel boards CASCATAMODUL and CASCATATWOSTAGE are equipped with:

- LAGO controller for burner operation
- Primary circuit temperature sensor



For boiler XC-K in combination with
MODULATING BURNERS

SINGLE
 BOILER

1 panel MASTERMODUL (Pt. N. 37892)



2 BOILERS
 XC-K
 IN CASCADE

1 panel MASTERMODUL (Pt. N. 37892)



+

1 panel CASCATAMODUL (Pt. N. 37900)



(n) BOILERS
 XC-K
 IN CASCADE
 (max. 8 boilers)

1 panel MASTERMODUL (Pt. N. 37892)



+

(n-1) panel CASCATAMODUL (Pt. N. 37900)



For boiler XC-K in combination with
TWO STAGE BURNERS

SINGLE
 BOILER

1 panel MASTERTWOSTAGE (Pt. N. 38778)



2 BOILERS
 XC-K
 IN CASCADE

1 panel MASTERTWOSTAGE (Pt. N. 38778)



+

1 panel CASCATATWOSTAGE (Pt. N. 37901)



(n) BOILERS
 XC-K
 IN CASCADE
 (max. 8 boilers)

1 panel MASTERTWOSTAGE (Pt. N. 38778)



+

(n-1) panel CASCATATWOSTAGE (Pt. N. 37901)



Technical data



- The construction fully complies with the requirements stated in EN 303: Pt. 1
- The components of the pressure vessel parts, such as steel plates and pipes, in contact with the smokes, are in stainless steel AISI 316 L and all the other pressure vessel parts are manufactured in certified carbon steel, according to the Tables EURONORM 25 and EURONORM 28.
- The welders and welding procedures are approved by authorized Notified Bodies.
- The upper part of the outer vessel is equipped with lifting hooks.

XC-K		124	200	290	400	480	570	700	900	1140	1420	1820	2160
Outputs													
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													
EFFICIENCY CATEGORY (Eu.Directive 92/42/CEE)		★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★	★★★★
EFFICIENCY AT NOMINAL LOAD in condensation	%	107	107	107	107	107	107	107	107	107	107	107	107
EFFICIENCY AT PART LOAD in condensation	%	109	109	109	109	109	109	109	109	109	109	109	109
EFFICIENCY AT NOMINAL LOAD in std. condition	%	97,3	97,8	98,2	98,2	98,3	98,3	98,3	98,3	98,3	98,3	98,3	98,3
Hydraulic and Combustion Performances													
CO ₂ 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
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
SMOKE SIDE PRESSURE LOSSES	daPa	9,8	18,6	25,4	32,3	34,3	39,2	46	58,8	73,5	88,2	90,2	98
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
HEAT LOSSES THROUGH THE CASING (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
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 TEMPERATURE <i>tf-ta</i> (80/60°C)	°C	44	43	40	37	37	37	37	37	37	37	37	37
MAX. NET SMOKE TEMPERATURE <i>tf-ta</i> (50/30°C)	°C	22	22	22	22	22	22	22	22	22	22	22	22
BOILER WATER CONTENT	l	140	260	305	332	544	515	625	664	1107	1157	1936	1904
WATER SIDE PRESSURE LOSSES **)	kPa	1,5	3,8	2,5	3,2	2	2,9	3	3,7	3,5	4	3,9	5,5
MAX. WORKING PRESSURE	bar	6	6	6	6	6	6	6	6	6	6	6	6

**) Pressure losses for a water flow rate corresponding to a Δt of 15K