

Unical

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)

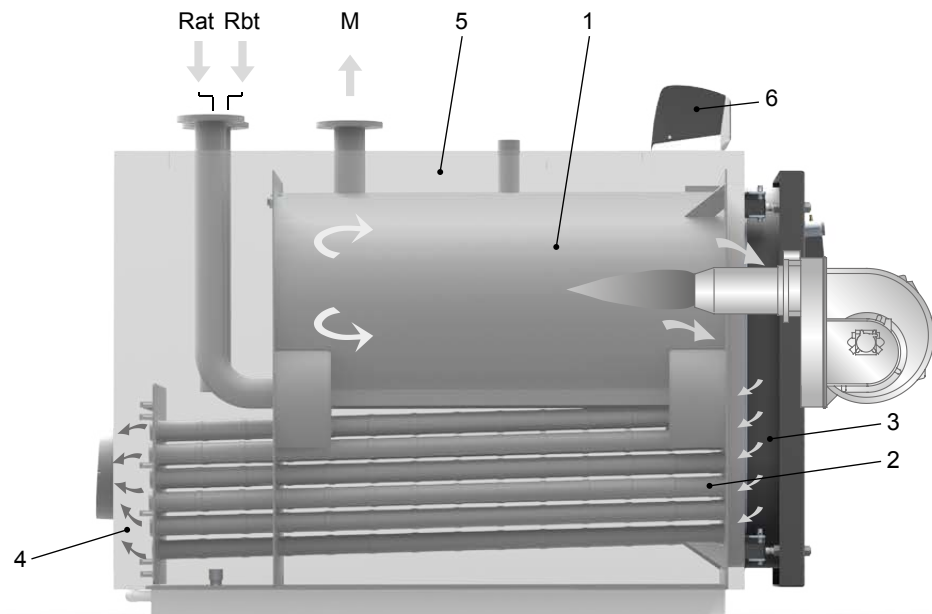
MODELS

69	100	(115) 150	(200) 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

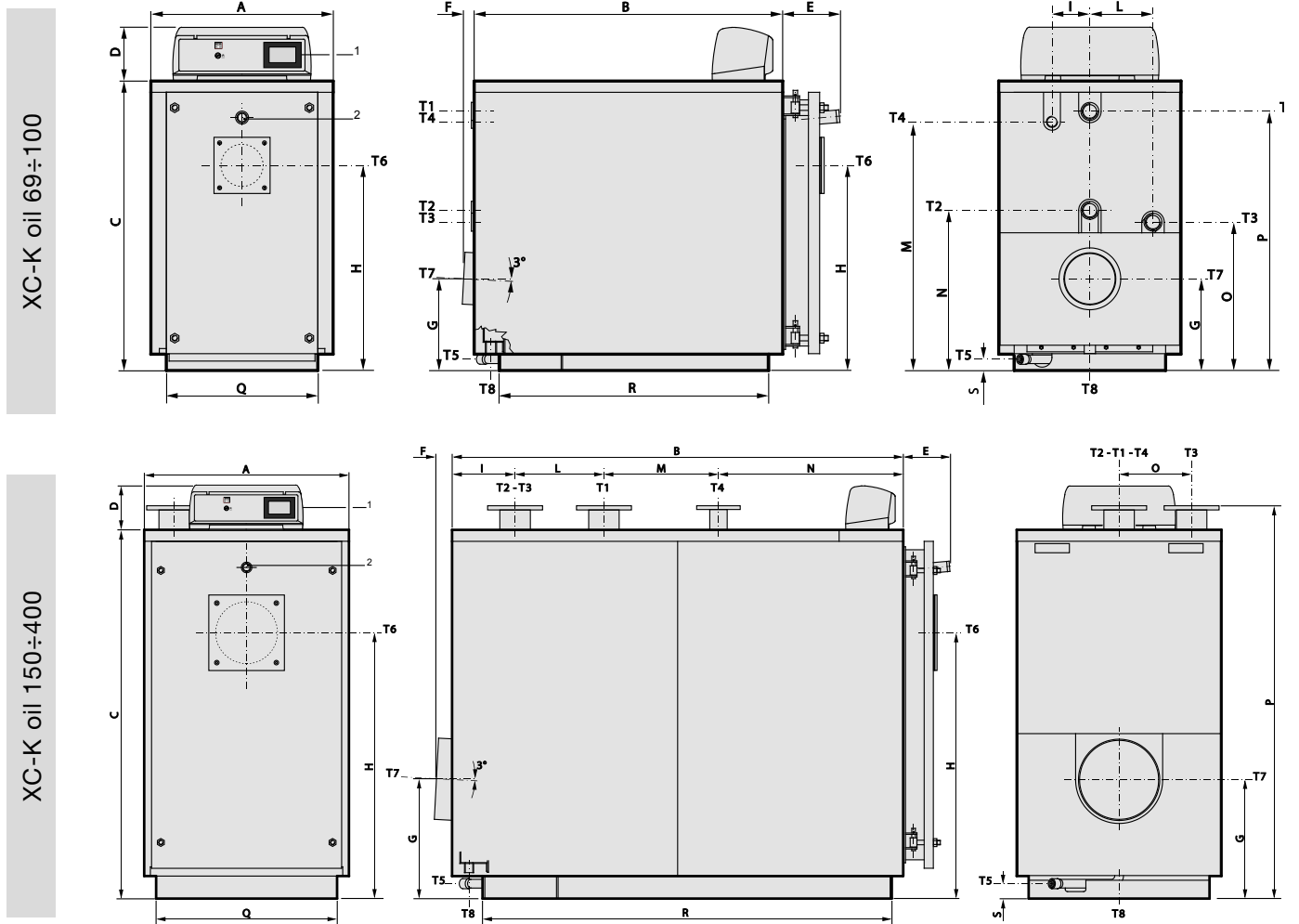
1. Furnace
 2. Smoke pipes with smoke diverters
 3. Door with flame sight glass
 4. Smoke chamber
 5. Body insulation
 6. Panel board
- M Flow
Rbt Low temperature return
Rat High temperature return
(Burner isn't supplied with)



PRODUCT PLUS VALUES

- **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)
- **COMMAND AND CONTROL PANEL (optional)**
electronic type with Ufly P thermoregulation, which allows the management of the one-stage, two-stage or modulating burners.
- **PRESETTING FOR CASCADE OPERATION** up to 8 boilers, with master and slave panels
- 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.
- **DOUBLE INSULATION** of the boiler body
 - 1- Insulating mattress of the body (front)
 - 2- Insulating mattress of the body (rear)
 - 3- Insulating mattress of the body (upper)
- **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



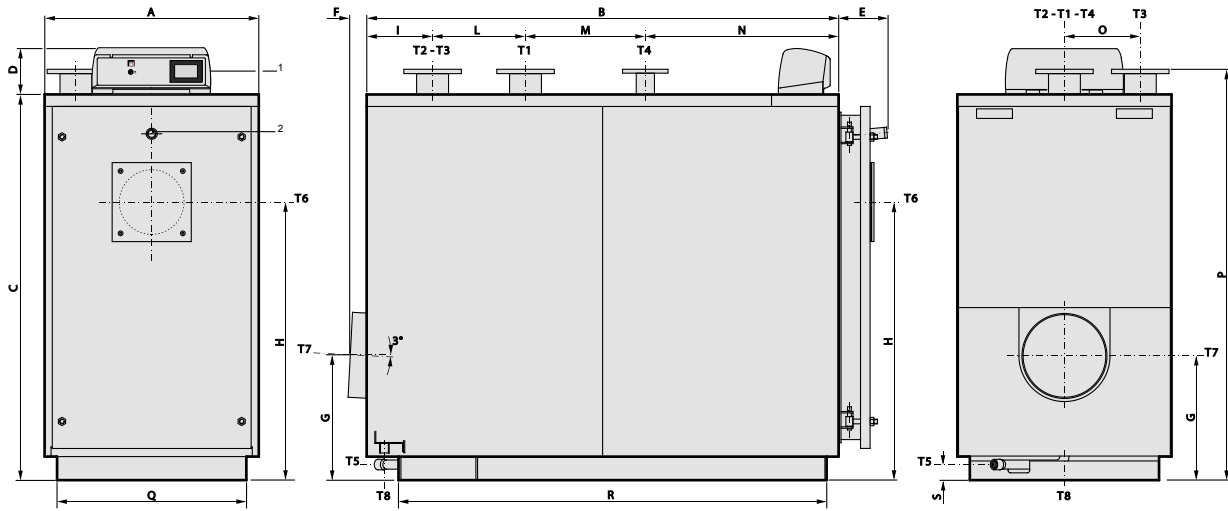
- 1 Panel board
- 2 Flame sight glass
- T1 C.H. flow
- T2 Low temperature C.H. return
- T3 High temperature C.H. return
- T4 Expansion vessel connection
- T5 Boiler drain
- T6 Burner connection
- T7 Chimney connection
- T8 Condensation drain

XC-K oil	CONNECTIONS							Weight kg
	T1 - T2 ISO 7/1 UNI2276PN6	T3 ISO 7/1 UNI2276PN6	T4 ISO 7/1	T5 ISO 7/1	T6 Ø	T7 Øi	T8 Øe	
69	Rp 2	Rp 2	Rp ¼	Rp ¼	150	182	40	365
100	Rp 2	Rp 2	Rp ¼	Rp ¾	150	182	40	365
(115) 150	DN 65	DN 65	Rp 1½	Rp ¾	180	202	40	525
(200) 230	DN 80	DN 80	Rp 2	Rp 1	180	252	40	660
300	DN 80	DN 80	Rp 2	Rp 1	180	252	40	800
350	DN 100	DN 100	Rp 2	Rp 1	220	302	40	1007
400	DN 100	DN 100	Rp 2	Rp 1	220	302	40	1137

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
(115) 150	720	1450	1132	190	205	48	374	790	255	320	250	625	255	1248*	610	1311	45
(200) 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

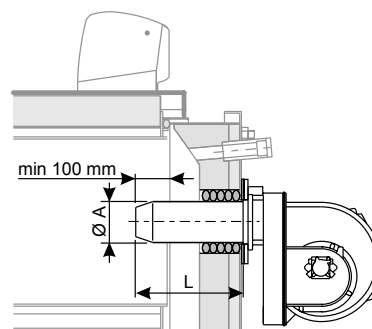
XC-K oil	CONNECTIONS							Weight kg
	T1 - T2	T3	T4	T5	T6 Ø	T7 Øi	T8 Øe	
	UNI2276PN6	UNI2276PN6	UNI2276PN6	ISO 7/1	mm	mm	mm	
500	DN 125	DN 125	DN 65	Rp 1	270	352	40	1376
650	DN 125	DN 125	DN 65	Rp 1	270	352	40	1613
850	DN 150	DN 150	DN 80	Rp 1 ½	320	402	40	2158
1000	DN 150	DN 150	DN 80	Rp 1 ½	320	402	40	2443
1300	DN 200	DN 200	DN 100	Rp 1 ½	320	452	40	3458
1550	DN 200	DN 200	DN 100	Rp 1 ½	320	452	40	3765

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.

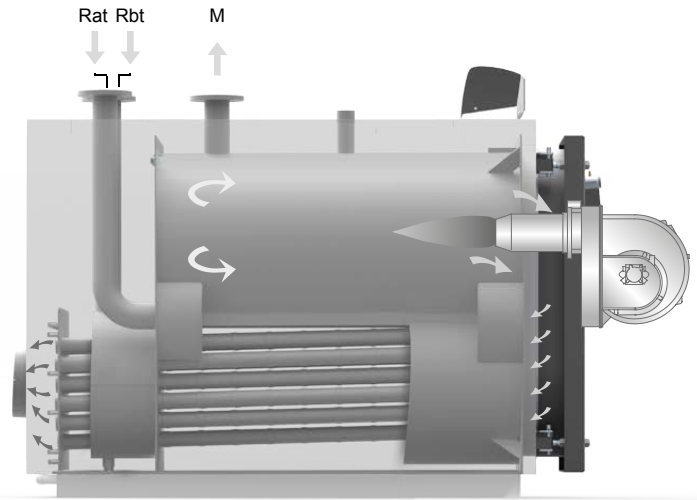
BURNER BLAST TUBE DIMENSIONS

BOILER TYPE	øA mm	L mm
XC-K oil 69÷100	150	310
XC-K oil (115) 150	180	310
XC-K oil (200) 230÷300	180	340
XC-K oil 350÷400	220	380
XC-K oil 500÷650	270	400
XC-K oil 850÷1000	320	410
XC-K oil 1300÷1550	320	420



TYPE AND SHAPE OF FURNACE

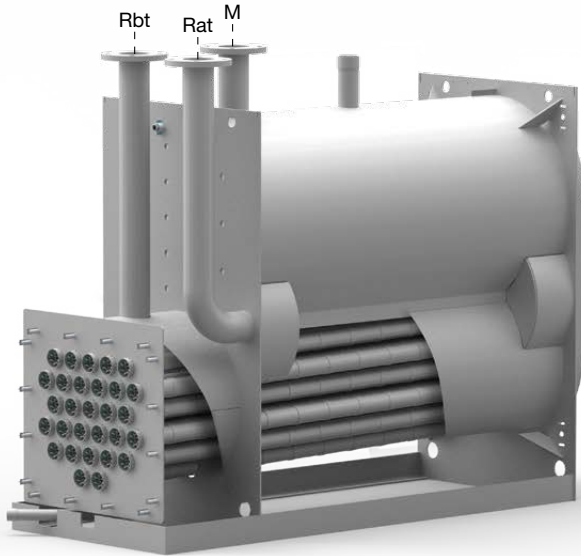
XC-K oil boilers are equipped with a blind cylindrical furnace, in which the central flame of the burner is reversed peripherally towards the front. When the combustion gases have reached the front part, they are sent through the door into the tubes of the third pass to reach the rear flue gas chamber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

PARTICOLARE FASCIAME



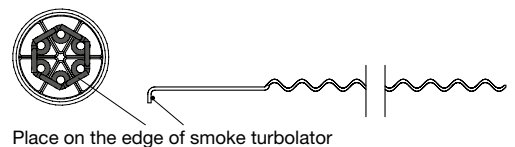
SPECIAL SMOKE PIPES (patented)

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



Smoking section tubes with placed turbulators



Note: Smoke turbulator are long as flue pipe.



TECHNICAL DATA


ELECTRICAL, HYDRAULIC, INSTALLATION DIAGRAMS AND CONTROLLERS can be unloaded from the web site www.unical.eu at the page of the product

XC-K oil (oil Fired)		69	100	115	150	200	230	300	350	400	500	650	850	1000	1300	1550
Nominal heat output (80°-60°C)	kW	66	86	112.5	134	196	202	278	327	385	482	626	789	963	1252	1492
Nominal heat output (50°-30°C)	kW	69	90	117.3	140	204	210	290	340	400	500	650	820	1000	1300	1550
Nominal Heat input	kW	67	88	115	137	200	206	284	333	392	491	637	804	980	1275	1520
Heat efficiency full load (80°-60°C)	%	97.8	97.8	97.8	97.8	97.9	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	102	102
Heat efficiency partial load 30% (retourn 30°C)	%	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
Boiler capacity	l	140	140	260	260	305	305	332	544	515	625	664	1107	1157	1936	1904
Flue gas temperature 80°C - 60°C (Tf - Ta)	°C	36	36	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	22	22
Max temperature allowable	°C	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
CO ₂ 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	13.1	13.1
Flue gas mass	kg/h	97	132	172.2	206	299	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	98.4	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	99.0	99.0
Heat loss at shell 80-60°C	%	0.6	0.6	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	0.5	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	1.6	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	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	0.05	0.05
Maximum operating pressure boiler	bar	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Maximum condensation production	l/h	5.5	5.5	7.2	8.6	12.5	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	11.8	16.0	25.0	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	8.2	11.2	17.5	13.0	25.0	29.7	37.0	43.1	50.6	52.7	62.8	70.3	75.3
Head losses H ₂ O Δt 15	kPa	1.3	1.5	3.0	3.8	2.0	2.5	3.2	2.0	2.9	3.0	3.7	3.5	4.0	3.9	5.5
CO (0% O ₂)	mg/kWh	3.1	3.2	6.4	4.7	6.4	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	115	150	200	230	300	350	400	500	650	850	1000	1300	1550
Nominal heat output (80°-60°C)	kW	66	86	112	134	196	202	279	327	385	482	626	790	963	1252	1493
Nominal heat output (50°-30°C)	kW	72	94	123	147	204	220	304	357	420	525	682	860	1049	1364	1626
Nominal Heat input	kW	67	88	115	137	200	206	284	333	392	491	637	804	980	1275	1520
Heat efficiency full load (80°-60°C)	%	97.8	97.8	97.8	97.8	97.9	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	102	107	107	107	107	107	107	107	107	107	107
Heat efficiency partial load 30% (retourn 30°C)	%	109	109	109	109	104	109	109	109	109	109	109	109	109	109	109
Boiler capacity	l	140	140	260	260	305	305	332	544	515	625	664	1107	1157	1936	1904
Flue gas temperature 80°C - 60°C (Tf - Ta)	°C	34	34	34	34	36	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	22	22
Max temperature allowable	°C	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
CO ₂ content	%	10.3	10.3	10.3	10.3	13.1	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	166	198	299	296	409	480	565	707	918	1158	1412	1835	2188
Combustion Efficiency 80°C-60°C	%	98.4	98.4	98.4	98.4	98.4	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	99.0	99.0
Heat loss at shell 80-60°C	%	0.6	0.6	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	0.5	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	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	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	0.05	0.05
Maximum operating pressure boiler	bar	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Maximum condensation production	l/h	11.4	14.9	19.5	23.2	12.5	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	11.4	15.0	25.0	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	8.0	11.0	17.5	13.0	24.8	29.5	36.7	42.7	50.1	56.7	62.4	69.9	74.9
Head losses H ₂ O Δt 15	kPa	1.3	1.5	3.0	3.8	2.0	2.5	3.2	2.0	2.9	3.0	3.7	3.5	4.0	3.9	5.5
CO (0% O ₂)	mg/kWh	3.1	3.2	2.0	4.7	6.4	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

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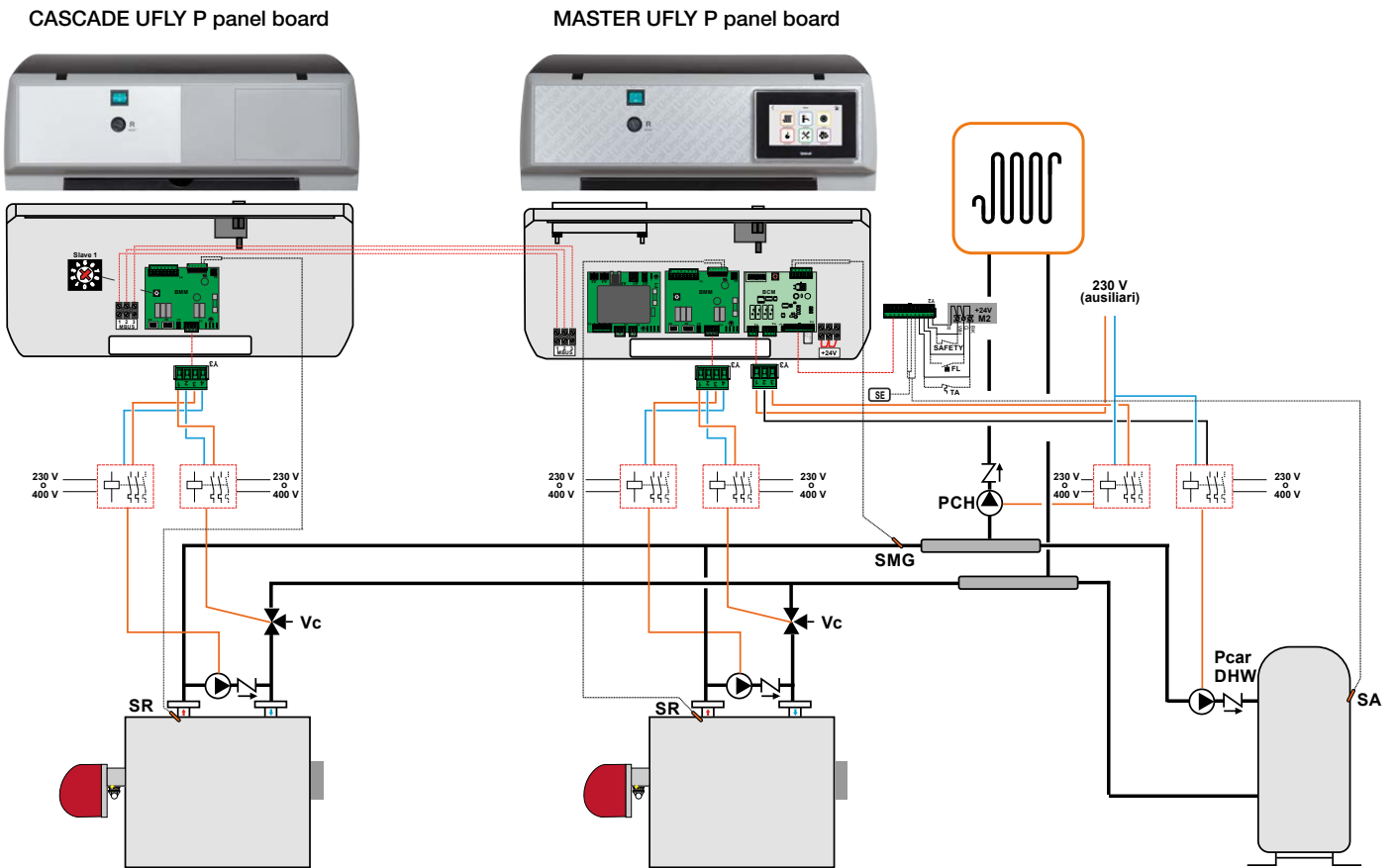
XC-K oil (oil fired)			69	100	115	150	200	230	300	350	400
EFFECTIVE NOMINAL OUTPUT	P_n	kW	66	86	113	134	196	202	278	326	385
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	η_s	%	93	93	93	93	93	93	93	93	93
SEASON EFFICIENCY CLASS TO DISCHARGE			A	A	A	A	A	A	A	A	A
FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT											
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	P_4	kW	65.5	86	112.5	134	195.8	202	278	326.3	385
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	η_4	%	91.9	91.9	91.9	91.9	91.9	92.0	92.2	92.2	92.3
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	P_1	kW	20.9	27.5	35.5	42.7	62.4	64.3	88.6	104	122.3
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	η_1	%	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7	97.7
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO	NO	NO	NO
AUXILIARY ELECTRICITY CONSUMPTION											
WITH A FULL LOAD	el_{max}	kW	0.390	0.390	0.550	0.470	0.550	0.600	0.600	0.600	1.400
WITH A PARTIAL LOAD	el_{min}	kW	0	0	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	0.050	0.050
OTHER ELEMENTS											
HEAT DISPERSION ON STANDBY	P_{stby}	kW	0.0335	0.0440	0.069	0.0690	0.1030	0.1030	0.1420	0.1670	0.1960
NITROGEN OXIDES EMISSIONS referred to GCV	NO_x	mg/kWh	106	106	72	106	72	106	106	106	106

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	115	150	200	230	300	350	400
EFFECTIVE NOMINAL OUTPUT	P_n	kW	66	86	112	134	196	202	278	326	385
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	η_s	%	93	93	93	93	93	93	93	93	93
SEASON EFFICIENCY CLASS TO DISCHARGE			A	A	A	A	A	A	A	A	A
FOR BOILERS TO HEAT THE ROOM AND MIXED BOILERS: USEFUL HEAT OUTPUT											
USEFUL HEAT OUTPUT with high temperature capacity (Tr 60 °C / Tm 80 °C)	P_4	kW	65.5	86	112	134	195.8	202	278.3	326.7	385
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	η_4	%	88.1	88.1	88.1	88.1	88.2	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	37.6	44.9	65.4	67.3	93.0	109.0	128.2
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	η_1	%	98.2	98.2	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	NO	NO
AUXILIARY ELECTRICITY CONSUMPTION											
WITH A FULL LOAD	el_{max}	kW	0.350	0.350	0.350	0.350	0.350	0.530	0.600	0.600	0.700
WITH A PARTIAL LOAD	el_{min}	kW	0	0	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	0.050	0.050
OTHER ELEMENTS											
HEAT DISPERSION ON STANDBY	P_{stby}	kW	0.0335	0.0440	0.0690	0.0690	0.1030	0.1030	0.1420	0.1670	0.1960
NITROGEN OXIDES EMISSIONS referred to GCV	NO_x	mg/kWh	55	55	53	55	52	55	55	55	55

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

BASIC SCHEME OF SYSTEM OPERATION



SMG	Global Flow sensor
SR	Heating sensor
PRC	Boiler recirculation pump (connect to BMM)
SA	DHW storage temperature sensor
P.car DHW	Cylinder charging pump (connect on BCM)
P. CH	Heating circuit pump (connect to BCM)
PCL	2-way valve Boiler

For condensing boilers, no boiler recirculation pump (PRC) is required.