

professional

Unical

# MODULEX EXT

ENBLOC MODULATING GENERATOR



# 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 1500 kW / cascade installation up to 8 boilers																	
EMISSIONS	Class 6 NO <sub>x</sub>																	
SUPPLY	natural gas / LPG / and mixture of natural gas with 20% of Hydrogen (H <sub>2</sub> )																	
MODELS	100	116	150	200	250	300	350	440	550	660	770	900	1000	1100	1160	1200	1500	
THERMAL MODULES	n°	2	3	3	4	5	6	7	4	5	6	7	8	9	10	11	11	14
SEASONAL EFFICIENCY																		

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.

# 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 1:69
- 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 through BCM 2.0
- 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 GCV: < 30 mg/kWh
- Low NO<sub>x</sub> class 6 (EN 15502-1)
- H<sub>2</sub> 20% (Certified for operation with 20% of hydrogen in the natural gas)
- 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 1500 = 12000 kW)



# 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

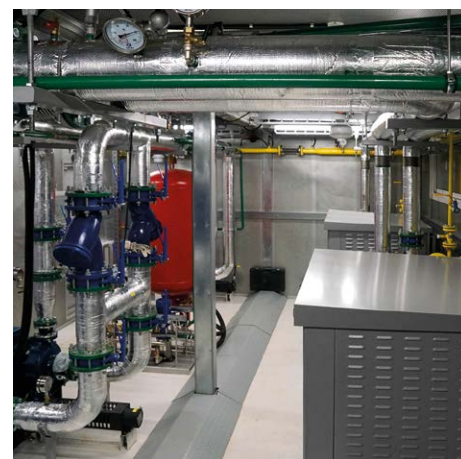
Ideal for solving situations in which the space of the boiler house is reduced or difficult to reach, thanks to an excellent weight-power ratio.

### VERY HIGH SELF-ADAPTATION CAPACITY

- instantaneous power adaptation, thanks to the very low water content
- very high modulation ratio, up to 1:69



INSTALLATION IN COLD CLIMATIC ZONES



### 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



INSTALLATION IN BOILER HOUSE

## 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.

# Main components

**Thermal element in cast aluminum / 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**” **FeCr alloy 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
  - Booster pump for a heating circuit
  - Cylinder charging pump
  - Connection for the boiler temperature sensor.



Detail of the HEAT EXCHANGER in Al/Si/Mg



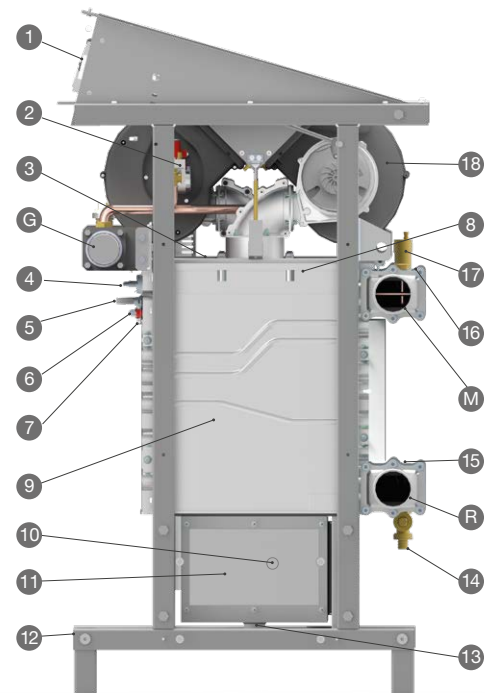
CROSS-SECTION OF THE PREMIX MULTI-BURNER



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



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

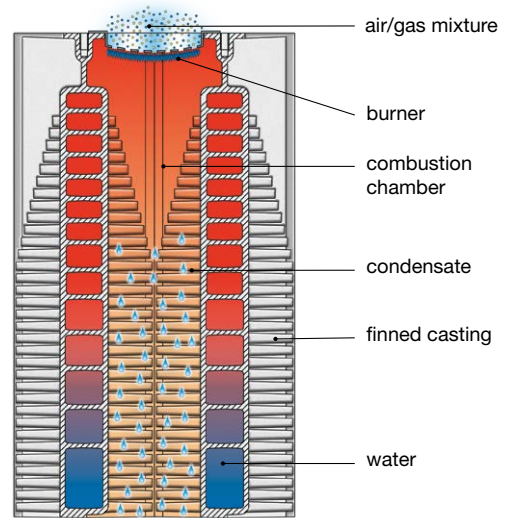
The basic element is formed by **two aluminium alloy castings** that, on the smoke side, have dense **fins**, with increasing height toward the smoke evacuation, placed in lower part of the casting, in order to increase its exchange surface (Unical patent).

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

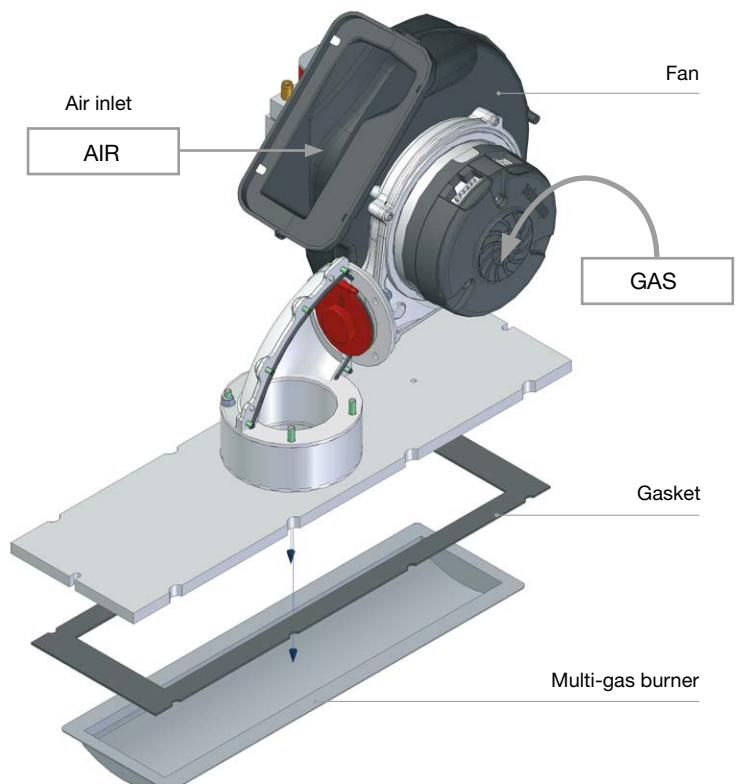
The very high performances of MODULEX EXT depend on the combustion generating unit

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.



# Kit CONTROL PANEL Ufly P (standard supplied)



## 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).

### Telemanagement

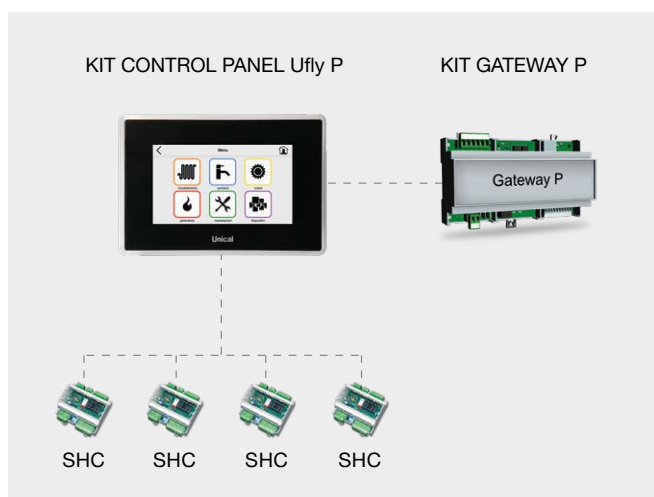
Alternatively, there are available 2 different communication protocols: **eBUS** and **Modbus**, intended for connection to different control devices.

- 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

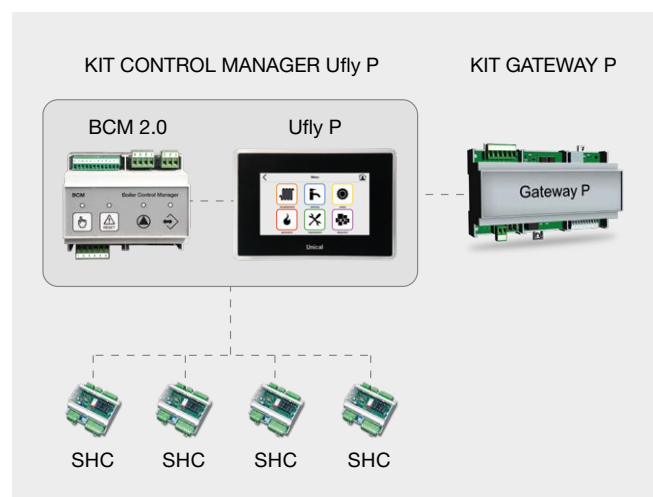
Included: Outdoor temperature sensor

Mounted: Flow temperature sensor, return temperature sensor.

## TYPE CONFIGURATION OF A SINGLE BOILER

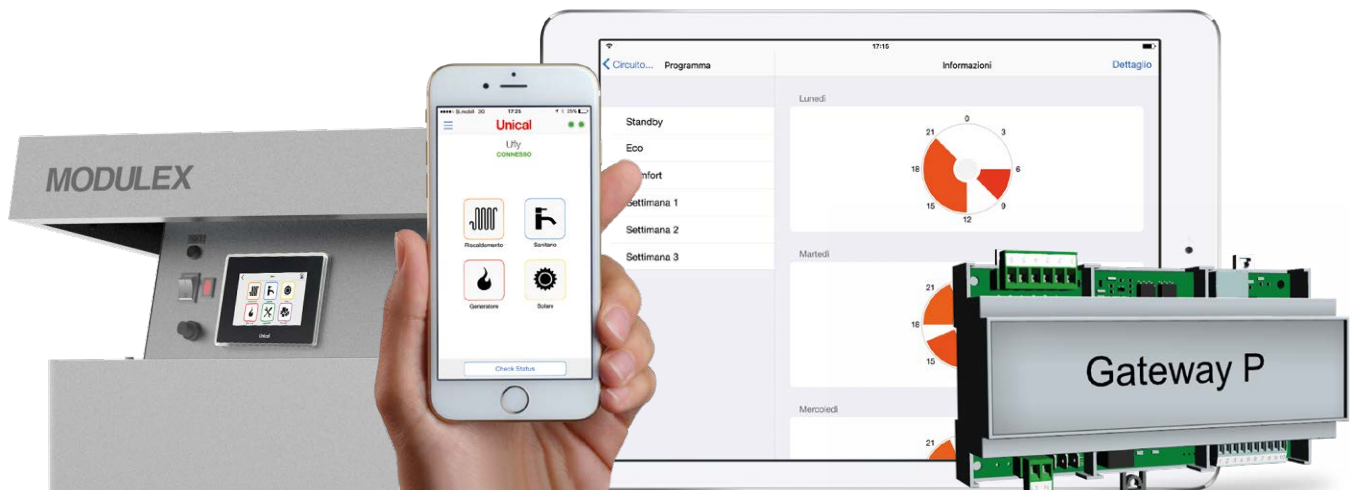


## TYPE CONFIGURATION OF BOILERS IN BATTERY





# Remote control



**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.

# 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.

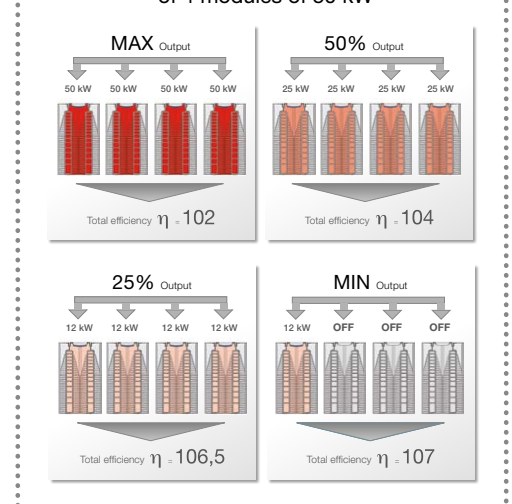
Always with the same principle, when the load is progressively reduced, the power of every module will also be adjusted and reduced in proportional measure.

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 440-1500 kW, but with modulation up to a minimum of 22 kW.

Output sharing of MODULEX EXT  
of 4 modules of 50 kW



# Primary rings with mixing header



## The PRIMARY RING with MIXING HEADER

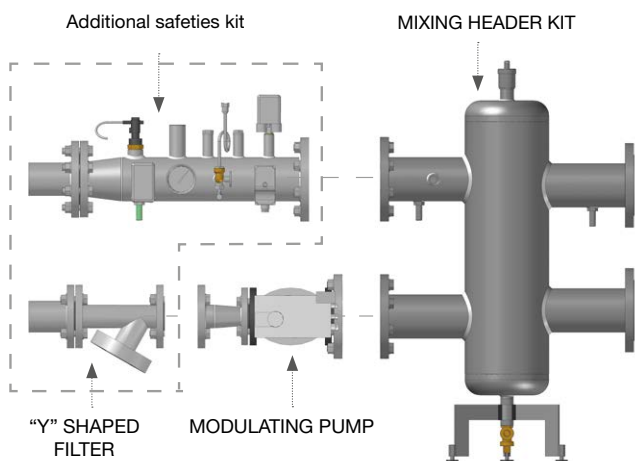
is composed from:

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

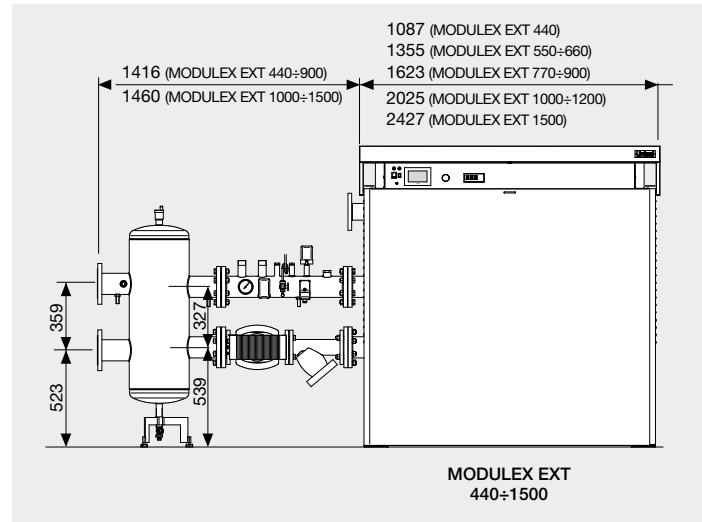
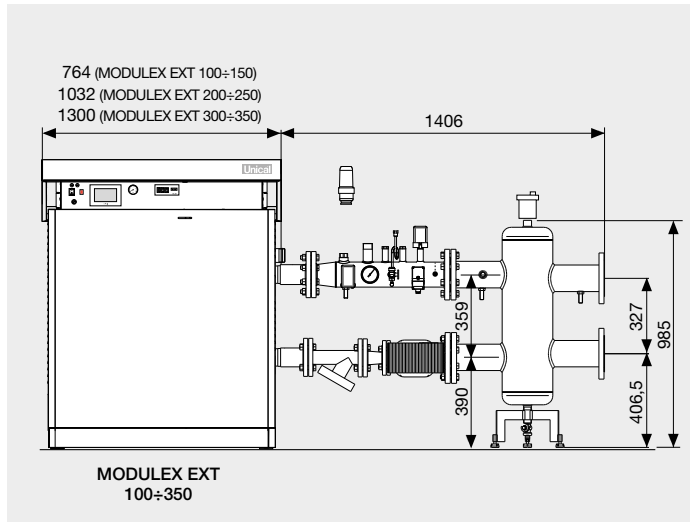
PRIMARY RINGS WITH MIXING HEADER combinations with MODULEX EXT	Maximum controlled power kW
100 ÷ 150	150
200 ÷ 250	250
300 ÷ 350	350
400 ÷ 770	756
900*	864
1000 ÷ 1500	1512

\* 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.

MODULEX EXT	Seasonal efficiency class in heating mode	Nominal input * kW	Thermal modules n°	Modulation ratio	Dimensions MODULEX EXT + Primary rings with mixing header W x D x H (mm)
100	A	12 ÷ 100	2	1:8	2170 x 770 x 1328
116	A	12 ÷ 116	3	1:9,7	2170 x 770 x 1328
150	A	12 ÷ 150	3	1:12	2170 x 770 x 1328
200	A	12 ÷ 200	4	1:16	2438 x 770 x 1328
250	A	12 ÷ 250	5	1:20	2438 x 770 x 1328
300	A	12 ÷ 300	6	1:24	2706 x 770 x 1328
350	A	12 ÷ 350	7	1:28	2706 x 770 x 1328
440	-	22 ÷ 432	4	1:19,6	2503 x 946 x 1617
550	-	22 ÷ 540	5	1:25	2771 x 946 x 1617
660	-	22 ÷ 648	6	1:29	2771 x 946 x 1617
770	-	22 ÷ 756	7	1:34	3039 x 946 x 1617
900	-	22 ÷ 864	8	1:39	3039 x 946 x 1617
1000	-	22 ÷ 972	9	1:44	3485 x 1002 x 1617
1100	-	22 ÷ 1080	10	1:49	3485 x 1002 x 1617
1160	-	22 ÷ 1158	11	1:54	3485 x 1002 x 1617
1200	-	22 ÷ 1188	11	1:54	3485 x 1002 x 1617
1500	-	22 ÷ 1512	14	1:69	3887 x 1030 x 1617

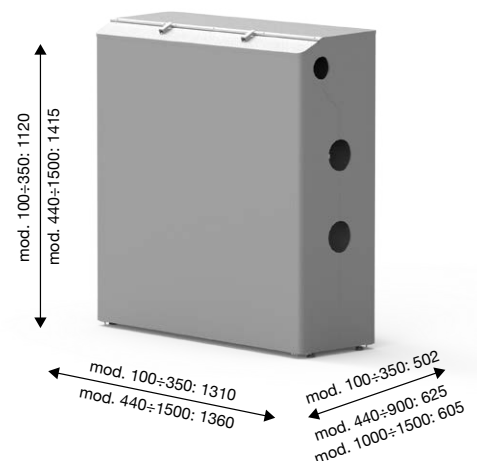
\* in condensation regime

Possibility of calibration according to the thermal needs of the system. The scope of the ERP Directive is up to 400 kW.

## 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 L x P x H (mm)
100 ÷ 350	1310 x 502 x 1120
440 ÷ 900	1360 x 625 x 1415
1000 ÷ 1500	1360 x 605 x 1415



# Primary rings with plates heat exchanger

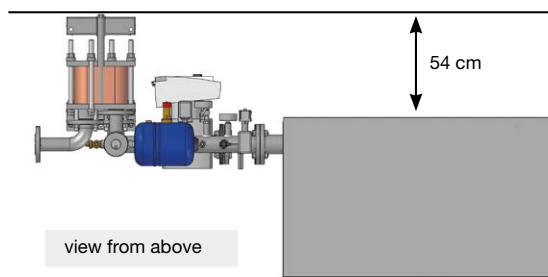
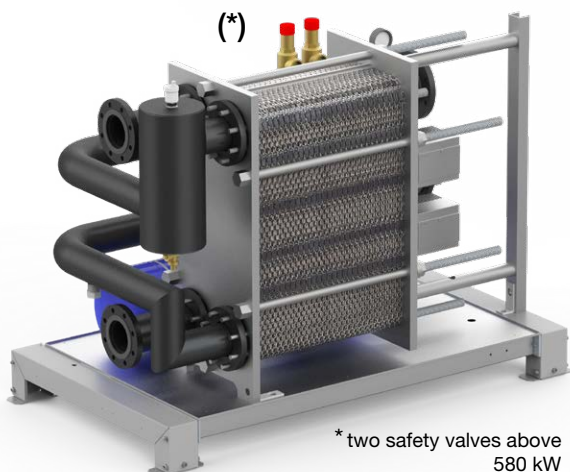


## The PRIMARY RING with PLATES HEAT EXCHANGER

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÷1500)
- AUTOMATIC AIR VENT
- FLOW AND RETURN PIPES
- DRAIN COCK 3/4"
- FLANGES / ADAPTERS AND FITTINGS
- ADJUSTABLE SUPPORTING ELEMENTS
- SMALL PARTS AND GASKETS

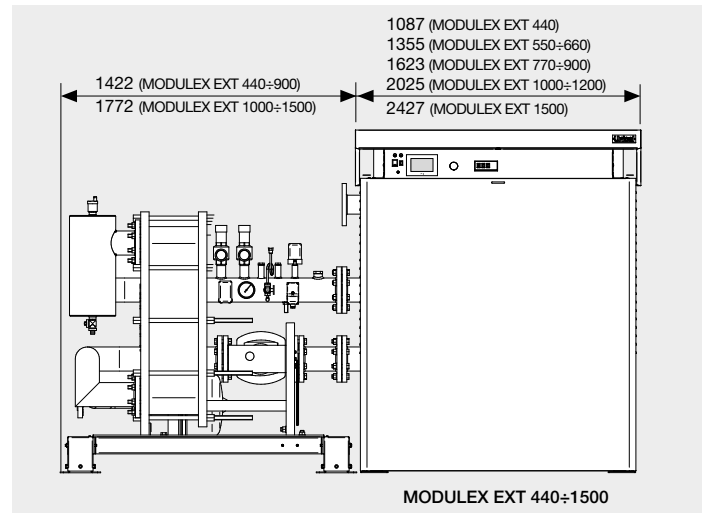
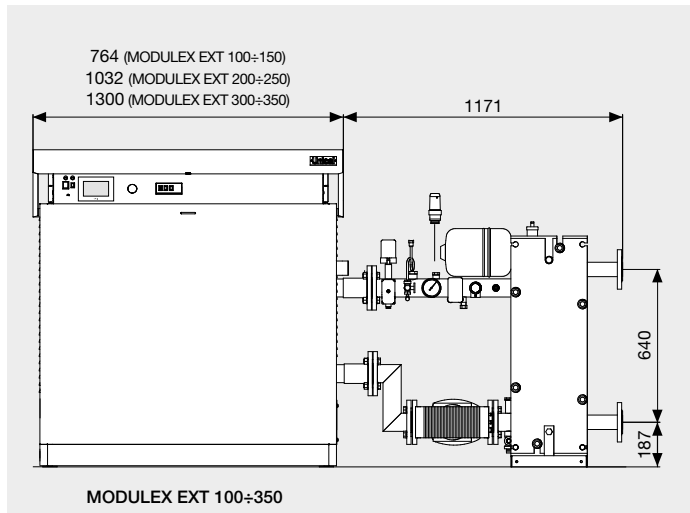
PRIMARY RINGS WITH PLATES HEAT EXCHANGER combinations with MODULEX EXT	Maximum controlled power kW
100 ÷ 200	200
250 ÷ 350	350
440 ÷ 550	550
660	660
770	770
900	900
1000 ÷ 1500	1512



Up to 350 kW: possibility of reversing the primary ring position (54 cm rear depth)



## DIMENSIONS WITH PLATES HEAT EXCHANGER



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

MODULEX EXT	Seasonal efficiency class in heating mode	Nominal input * kW	Thermal modules n°	Modulation ratio	Dimensions MODULEX EXT + Primary rings with mixing header W x D x H (mm)
100	A	12 ÷ 100	2	1:8	1935 x 770 x 1328
116	A	12 ÷ 116	3	1:9,7	1935 x 770 x 1328
150	A	12 ÷ 150	3	1:12	1935 x 770 x 1328
200	A	12 ÷ 200	4	1:16	2203 x 770 x 1328
250	A	12 ÷ 250	5	1:20	2203 x 770 x 1328
300	A	12 ÷ 300	6	1:24	2471 x 770 x 1328
350	A	12 ÷ 350	7	1:28	2471 x 770 x 1328
440	-	22 ÷ 432	4	1:19,6	2509 x 1103 x 1617
550	-	22 ÷ 540	5	1:25	2777 x 1103 x 1617
660	-	22 ÷ 648	6	1:29	2777 x 1103 x 1617
770	-	22 ÷ 756	7	1:34	3045 x 1103 x 1617
900	-	22 ÷ 864	8	1:39	3045 x 1103 x 1617
1000	-	22 ÷ 972	9	1:44	3797 x 1110 x 1617
1100	-	22 ÷ 1080	10	1:49	3797 x 1110 x 1617
1160	-	22 ÷ 1158	11	1:54	3797 x 1110 x 1617
1200	-	22 ÷ 1188	11	1:54	3797 x 1110 x 1617
1500	-	22 ÷ 1512	14	1:69	4199 x 1110 x 1617

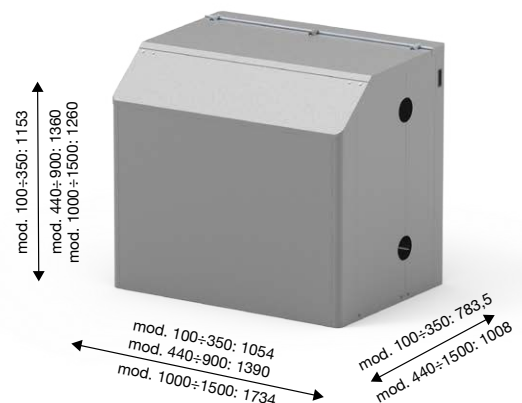
\* in condensation regime

Possibility of calibration according to the thermal needs of the system. The scope of the ERP Directive is up to 400 kW.

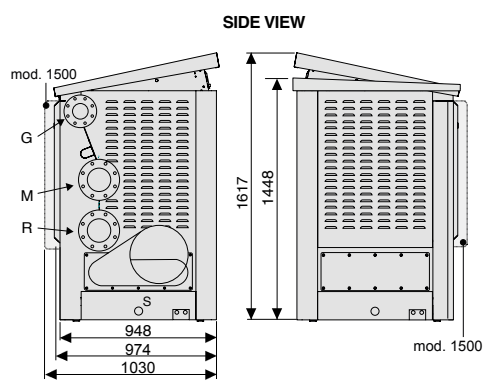
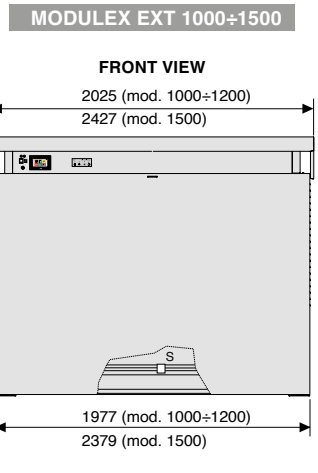
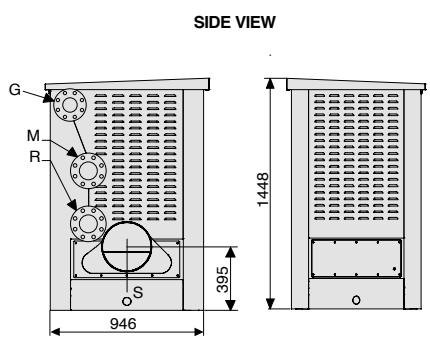
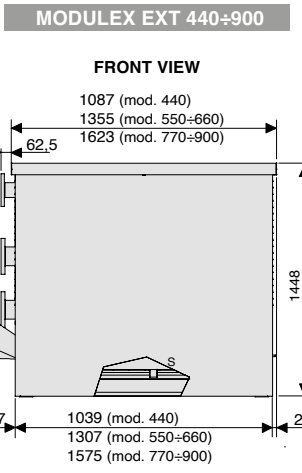
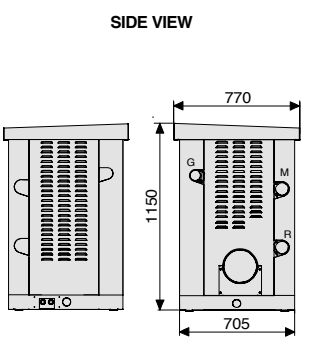
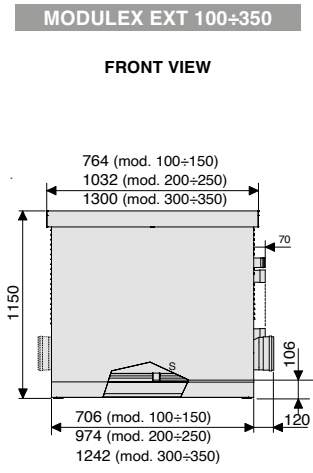
## OGNITEMPO EXT (optional) for primary ring with PLATES HEAT EXCHANGER

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	1054 x 783,5 x 1153
440 ÷ 900	1390 x 1008 x 1360
1000 ÷ 1500	1734 x 1008 x 1260



# Dimensions and 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

MODULEX EXT		100	116	150	200	250	300	350	440	550	660	770	900	1000	1100	1160	1200	1500	
NOMINAL INPUT on N.C.V.	kW	100	116	150	200	250	300	348	432	540	648	756	864	972	1080	1158	1188	1512	
MODULATION RATIO		1:8,3	1:9,7	1:12,5	1:16,7	1:20,8	1:25	1:29	1:19,6	1:24,5	1:29,4	1:34,3	1:39,2	1:44	1:49	1:53	1:54	1:69	
Nominal input on N.C.V. Qn with mixture of 80% NG + 20% H <sub>2</sub>	kW	91,3	105,9	137	182,6	228,3	273,9	319,6	392,8	491	589,2	687,4	785,6	883,8	982	1053,8	1080,2	1374,8	
Minimum input on N.C.V. Qmin with mixture of 80% NG + 20% H <sub>2</sub>	kW	10,8	10,8	10,8	10,8	10,8	10,8	10,8	20,4	20,4	20,4	20,4	20,4	20,4	20,4	20,4	20,4	20,4	
NOMINAL OUTPUT in cond. 30°/50°C	kW	100,1	116	150	200,4	251,3	302,7	354,6	445	557,8	670,1	783,2	900,3	1015	1130	1202	1237	1574	
MINIMAL INPUT in cond. 30°/50°C	kW	12,8	12,8	12,8	12,8	12,8	12,8	12,8	23,9	23,9	23,9	23,9	23,9	23,9	23,9	23,9	23,9	23,9	
NOMINAL OUTPUT in std. conditions 60°/80°C	kW	97,2	112,9	146,1	195,2	244,5	294	341,7	424,3	530,4	636,5	742,6	849,0	947	1052	1130	1157	1473	
WATER EFFICIENCY at nom. load in condensation	%	100,1	100	100	100,2	100,5	100,9	101,9	104	104	104	104	104	104	104	104	104	104	
WATER EFFICIENCY at part load in condensation	%	106,5	106,5	106,5	106,5	106,5	106,5	106,5	109	109	109	109	109	108,5	108,5	108,5	108,5	108,5	
MAX. CONDENSATE PRODUCTION	kg/h	15,3	17,7	23	30,6	38,3	45,9	53,6	73,4	91,7	110	128,4	146,7	156	174	188	191	191	
NO <sub>x</sub> CLASS		6																	
SOUND PRESSURE LEVEL (*)	dB(A)	52	52	52	52	52	52	52	54	54	54	54	56	54	54	54	54	54	
WATER CONTENT	l	10,1	14,2	14,2	18,3	22,4	26,5	30,6	67	80	94	108	122	140	154	168	168	215	
Min.-Max WATER PRESSURE	bar	0,5 - 6																	
CHIMNEY BASE maximum pressure available	Pa	100																	
CHIMNEY CONNECTION	mm	150	150	150	150	200	200	200	250	250	300	300	300	350	350	350	350	350	
GAS CONNECTION G	mm (inch)	50 (2)						80 (3)											
C.H. FLOW / RETURN F / R	mm (inch)	64 (2½)						100 (4)						125 (5)					
PROTECTION DEGREE (obtained with cap down)	IP	X5D																	
GROSS WEIGHT (WITH PACKAGING)	kg	203	236	236	295	325	386	419	585	643	707	806	858	980	1020	1120	1120	1400	


(\*) 1 meter away in open field

# 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>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)	$\eta_4$	%	87.49	87.67	87.85	88.03	88.21	88.38
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	$el_{max}$	kW	0.240	0.360	0.451	0.542	0.633	0.724
WITH A PARTIAL LOAD	$el_{min}$	kW	0.040	0.040	0.040	0.040	0.040	0.040
STANDBY MODE	$P_{SB}$	kW	0.019	0.019	0.019	0.019	0.019	0.019
<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 GCV	$NO_x$	mg/kWh	30	30	30	30	30	30
$NO_x$ CLASS			6	6	6	6	6	6
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	306	459	612	766	920	1069

MODULEX EXT			440	550	660	770	900	1000	1100	1160	1200	1500
EFFECTIVE NOMINAL OUTPUT	$P_n$	kW	424	530	636	743	849	947	1152	1130	1157	1473
SEASONAL ENERGY EFFICIENCY TO HEAT THE ROOM	$\eta_s$	%	92	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	-	-	-	-	-	947.5	1052	1129.8	1157.1	1473
RATED HEAT OUTPUT EFFICIENCY with high temperature capacity (Tr 60 °C / Tm 80 °C)	$\eta_4$	%	-	-	-	-	-	87.8	87.8	87.9	87.8	87.8
USEFUL POWER AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$P_1$	kW	-	-	-	-	-	313.8	348.7	374.5	383.3	488.1
PERFORMANCE AT 30% OF THE RATED HEAT OUTPUT with low temperature capacity (Tr 30 °C)	$\eta_1$	%	-	-	-	-	-	97.0	97.0	97.0	96.9	96.9
BOILER WITH OUTPUT RANGE ADJUSTMENT: YES / NO			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>AUXILIARY ELECTRICITY CONSUMPTION</b>												
WITH A FULL LOAD	$el_{max}$	kW	0.626	0.783	0.940	1.096	1.252	1.64	1.82	1.960	2.00	2.54
WITH A PARTIAL LOAD	$el_{min}$	kW	0.054	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	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	0.2114
NITROGEN OXIDES EMISSIONS referred to GCV	$NO_x$	mg/kWh	27	27	27	27	27	26	26	26	25	28
CONSUMPTION OF ANNUAL ELECTRICITY	$Q_{HE}$	GJ	1303	1633	1959	2286	2612	2954	3278	3519	3609	4592

\* Appliances not covered by Directive 2009/15/CE

