look beyond  guarda oltre
### Evolution

<table>
<thead>
<tr>
<th>Model</th>
<th>FS 981</th>
<th>488 GTB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>1922</td>
<td>2015</td>
</tr>
<tr>
<td>Power [HP]</td>
<td>530</td>
<td>670</td>
</tr>
<tr>
<td>Max speed [km/h]</td>
<td>40</td>
<td>360</td>
</tr>
<tr>
<td>Length [mm]</td>
<td>9,160</td>
<td>4,568</td>
</tr>
<tr>
<td>Weight [kg]</td>
<td>47,200</td>
<td>1,475</td>
</tr>
<tr>
<td>Engine made of</td>
<td>Steel</td>
<td>Aluminum</td>
</tr>
<tr>
<td>Model</td>
<td>ELLPREX 500</td>
<td>MODULEX 550</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------------------------------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Year</td>
<td>1950</td>
<td>1998</td>
</tr>
<tr>
<td>Boiler type</td>
<td>Reverse flame high water cont.</td>
<td>Low water content</td>
</tr>
<tr>
<td>Outdoor installation</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Heat exchanger made of</td>
<td>Steel</td>
<td>Aluminum alloy</td>
</tr>
<tr>
<td>Efficiency [LCV at 80/60°C] %</td>
<td>80</td>
<td>&gt; 97</td>
</tr>
<tr>
<td>Operational footprint [sqm]</td>
<td><strong>6.2</strong> (3.1x2)</td>
<td><strong>1.28</strong> (1.35 x 0.95)</td>
</tr>
<tr>
<td>Operational weight [kg]</td>
<td>1,510</td>
<td>723</td>
</tr>
</tbody>
</table>
How it’s made

- Air Filter
- Modulating Fan
- Gas valve and Premix
- Smoke non return valve
- Burner’s head
- Heat exchanger
- Chimney / stack
- Gas fuel
- Flow
- Return
A combustion chamber with burner, fan, gas valve and ignition device is called “module”.

MODULE
(CASTED Al-Si-Mg)
A boiler can be made of up to 8 modules.

Capacities from 50 kW up to 900 kW
Smart installations
Advantages:
- Easier plant design
- Short chimney (plastic too).
- Reduced piping

No need of boiler room:
- Save valuable space
- Reduced safety requirements

Just beside chillers
Indoor / Space saving

Steel Boiler
- 500 kW
- Area: 8 sqm
- Door opened

Aluminum Boiler
- 500 kW
- Area: 1.9 sqm

Tube replacement
Indoor / Space saving

Steel Boiler 500 kW

Area: 8 sqm

Tube replacement

Door opened

Aluminum Boiler 500 kW

Area: 1.9 sqm
Minimum gap allowed between boilers is 40 cm only

Boiler room above is 3.5 MW in 20 m² (5x4 m)
Containerized installation
Aluminum boilers are assembled, not welded.

Any lower limit to narrow passages and doorways
Reliability and modularity
Many plants are designed with some boilers on duty and one as backup

- In case of boiler failure.
- In case of pick load demand.
- Etc.
If there is a failure in one or more modules, the other ones will keep on working.

- Up to 8 independent modules in one boiler.
- The boiler’s capacity is usually calculated according plant’s max load.
- With a failure of one module out of 4, it’s granted 75% of its capacity.
- This is not possible in boilers with one burner only.
A. Emergency operation in case of breakdown to the thermo-controller E8, with activation of the heat request at constant setpoint with maximum capacity of 50%

B. Reset burner lockout

C. Remote alarm relay

D. ModBUS integrated
With several burners in one boiler is possible to achieve a turn-down ratio impossible for single-burner models.

Turn-down modulation ratio up to 1:39

The less fuel used, the less CO$_2$ and NOx emissions
Modulation up to 1:39
With the cascade installation, the boiler output range can be widened well over 900 kW, so multiplying output and modulation in order to satisfy any design demand.

Example of cascade installation, 2 x 880 kW, 16 modules of 110 kW each.

Including (non mandatory) extra safeties and mixing header.

Turn down **1:80** (1760 kW down to 22 kW)
GREEN BUILDING
- Emission <35 ppm (NOx),
- Acoustic <50 db (A)

RELIABILITY
- Built-in backup (several independent modules)
- 50% of capacity in Manual mode
- BMS and Remote alarm integrated

NEW INSTALLATION OPTIONS
- Outdoor / rooftop installation
- Compact solutions – up to 80% space saving
- Plastic chimney (flue gas temp = 46° + ambient temperature)

HIGH EFFICIENCY
- Up to 109% (LCV) – 98% (HCV)
- Up to 1:39 turn down modulation
Well, so far sounds great, but what about costs?

4 Nos 800 kW 3 pass carbon steel boilers
3 on duty, 1 stand-by
Cascade control
Modulating gas burner
Total turn-down: 1:10
Space required: abt. 70 sqm

3 Nos aluminium boilers 880 kW each
3 x 8 = 24 modules
Cascade control
Premix modulating gas burner
Total turn-down: 1:120
Space required: abt. 15 sqm

SAME LEVEL COST
references referenze
Pentagon - USA
Apple store 5th Avenue - New York
Porsche - GERMANY
Pope’s apartment – VATICAN (ITALY)
Crown Plaza Casino Hotel - AUSTRALIA
His Highness Prince Ali - Jordan
National library - Alexandria of Egypt
- EMIRATES: Megaproject 5 star resort – Abu Dhabi.
- AUSTRALIA: Hospital "AUSTIN" - Melbourne.
- AUSTRALIA: University of Victoria.
- IRAN: Shopping mall - Teheran
- GERMANY: Worverk factory
- LATVIA: Ministry of Defence
- NEW ZEALAND: Olympic swimming pool Wellington
- RUSSIA: KRASNODAR Palace
Unical AG S.p.A. is an Italian company leader in the energy Sector, was founded in 1972.

Turnover: 72 millions Euro (2017)

Power work: abt. 300 employees. 30 people are dedicated in R&D area, thanks to this, we can satisfy the customers with customized solutions, especially for industrial products.

Market: Unical is present in more than 20 countries and has important commercial partnership and direct importers.
Our ranges

Domestic products:
from 12 to 35 kW

Commercial products:
from 35 to 7000 kW

Biomass products:
from 7 to 250 kW

Industrial products:
from 70 to 17000 kW
CASTELDARIO (MN)
- 4,500 m².
- Administrative & commercial offices
- Renewable energies

CARBONARA PO (MN)
- 18,000 m².
- Biomass, hot water and industrial boiler.

CAORSO (PC)
- 18,000 m².
- Assembled boilers

ZERBIO DI CAORSO (PC)
- 2,500 m².
- Spare parts store

Absolutely Made in Italy
thanks for your attention