Technical Specs for LT-Series ORC Modules

General Specifications	ZE-75-LT	ZE-100-LT	ZE-150-LT	ZE-175-LT	ZE-200-LT	ZE-500-LT
Thermal power input	550 kW_T	770 kW_T	1100 kW_T	1280 kW_T	1500 kW_T	3500 kW_T
Electric power output	75 kW_E	100 kW_E	150 kW_E	175 kW_E	200 kW_E	561 kW_E
System efficiency	13.60 %	13.50 %	13.60 %	13.60 %	13.30 %	16.00 %
Working fluid	Environment-friendly, non-flammable hydrofluorocarbon mixture					
Vector fluid	Overheated water					
Vector fluid input temperature	≥160°C					
Vector fluid output temperature	145°C		140°C		145°C	
Vector fluid nominal flowrate	8.49 kg/s	11.91 kg/s	13.14 kg/s	14.88 kg/s	23.17 kg/s	54.03 kg/s
Skid dimensions (L x W x H)	4.1 x 2.0 x 2.7 m	5.5 x 2.3 x 3.2 m			5.6 x 2.3 x 2.5 m	10.5 x 4.5 x 4.6 m
Weight (including working fluid)	~ 4000 Kg	~ 6500 Kg			~ 6200 Kg	~ 21.5 t
Condenser						
Type	Brazed plates heat exchanger in AISI 316 stainless and 99.9% copper					Brazed Plate / Shell &Tube
Dissipated thermal power	471 kW_T	653 kW_T	940 kW_T	1075 kW_T	1280 kW_T	2909 kW_T
Cooling water temperature (in/out)	32°C IN / 40°C OUT	26°C IN / 36°C OUT				28°C IN / 38°C OUT
Cooling water nominal flowrate	14.07 kg/s	15.60 kg/s	22.46 kg/s	25.69 kg/s	30.62 kg/s	69.41 kg/s
Generator						
Type	Synchronous, with permanent magnets, water cooled, directly coupled to turbine shaft					
Power output	75 kW_E	100 kW_E	150 kW_E	180 kW_E	200 kW_E	561 kW_E
Rotational speed	15 000 rpm (12...18 Krpm)					9500 rpm (9...10 Krpm)
Output Voltage	503-577 VAC @ 500Hz					
Required water cooling power	15 kWT					
Cooling water temperature	< 40°C					
Cooling water nominal flow rate	30 l/min					
Additional cooling (opt.)	Working fluid injection					
Inverter						
Type	IGBT, mains-synchronized					
Cooling	Air Cooled					Water Cooled
Power Output	75 kW_E	100 kW_E	150 kW_E	175 kW_E	200 kW_E	550 kW_E
Output Voltage	400 V AC +5% tol.					
Output Frequency	50 Hz +0.5% tol.					
Max Operational environment temperature	<40 °C					
Braking Chopper	Built-in onboard resistor bank				Included external resistor bank (s)	
Turbine						
Type	Single-stage radial inflow custom-designed turbine with fixed nozzles, directly coupled to generator					
Working fluid temperature (in/out)	145°C IN / ~100°C OUT					
Stage pressure	PS16 (tested up to 24 bar)					
Turbine Body material	CNC machined, nickel plated steel					
Impeller material	Aeronautic aluminium alloy					
Speed Control	Feedback loop on DC Bus voltage					
Impeller Seal	Sealed labyrinth on impeller back					
Generator Seal	Sealed axial labyrinth on generator interface (optional)					
Environmental Seal	Static and O-ring seals					
Working Fluid						
Working temperature range	60°C < T <165 °C					
Condensation Temperature	≤ 33 °C					
Operational pressure	≤ 20 bar					
Toxicity / Biodegradability / Ozone layer impact	Non Toxic / 100% biodegradable / “ozone friendly”					

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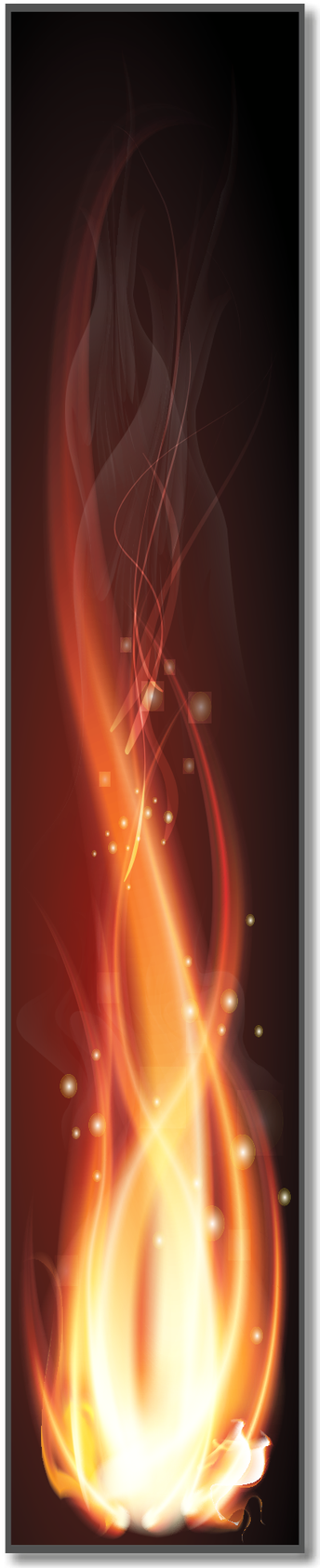
WE TRANSFORM ENERGY



Organic Rankine Cycle Energy Production Modules

LT SERIES

LT-Series ORC Systems by Zuccato Energia

LT systems by Zuccato Energia are skid-mounted turbine systems designed to convert heat into electric power in small-scale power plants by implementing the Low-Temperature Organic Rankine Cycle (LT-ORC). Using a special working fluid operating in a closed loop without atmospheric emissions and smart engineering solutions, these system allow sensible increases in efficiency as well as several advantages over steam systems:

Low Operational Temperature makes our systems capable of exploiting even “low grade” heat sources.

High Condensation Temperature that simplifies engineering requirements

Low Operational Temperature means more safety, less legal red tape, and lower plant cost;

No Atmospheric Emissions as the Rankine cycle operates in a closed loop make it easier to comply with local environmental constraints.

Hot Water Connection Loop avoids the liabilities inherent in the use of diathermal oil loops

Low Noise Levels means no hearing protection required, and less problems in residential installations.

Direct Turbine-Generator Coupling does away with the efficiency losses inherent in gearboxes.

Ceramic Bearings ensure a long, non-stop operational life

Custom Designed Inverters for each model guarantee top performance and efficiency.

All of this and more gives our systems a **very high thermal efficiency** which in optimum conditions leads to very respectable heat input vs power output ratios.

Technology that grants
Very High Efficiency
with top conversion efficiencies for plants in this power range

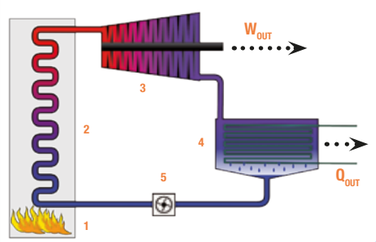
Tecnology that’s
Widely Tested
In more than 15 plants operating in Italy and abroad

Tecnology that’s
Sustainable
Thanks to “eco-friendly” materials and fluids

A full range
from 75 to 550 kW_E
using overheated water as vector fluid

The simplicity of a Closed Cycle
without atmospheric emissions

In an ORC the working fluid is heated in a primary heat exchanger (2), where it evaporates into a gas which expands spinning the impeller of a turbogenerator (3) which produces electricity. The working fluid then goes into a second heat exchanger (4) where it is cools condensing back in its liquid form which is pumped back (5) in the primary heat exchanger, thus closing the cycle. Excess heat released in the condensation stage can then be used for other purposes suche as environmental heating, fuel preheating and such (Combined Heat and Power production, CHP).



An unique working fluid for unparalleled versatility

The special working fluid used in all Zuccato Energia ORC systems is the key component that made developing these high-tech solutions possible. It has the following excellent features:

Wide Working Range (60-165°C) which allows to exploit heat sources which were thought unexploitable before, such as hot springs and engine cooling systems.

High Condensation Temperature allows plant designers to choose between evaporative cooling towers or dry coolers.

Totally dry in all of its phases, so no cavitation and no turbine blade erosion.

Non-toxic, non-flammable, 100% biodegradable and ozone-friendly”: any accidental dispersion is neither dangerous to people nor for the environment.

No topping-up required as it works in a closed loop.

No filtering / reconditioning required reduces plant complexity.

100% Made In Italy
Adaptable and customizable to your needs