Technical Specs for ULH-Series ORC Modules

General Specifications	ZE-30-ULH	ZE-40-ULH	ZE-50-ULH	ZE-100-ULH
Thermal power input	350 kW_T	450 kW_T	550 kW_T	1100 kW_T
Electric power output	30 kW_E	40 kW_E	50 kW_E	100 kW_E
System efficiency	8,50 %	8,90 %	9.10 %	9.00%
Working fluid	Environment-friendly, non-flammable hydrofluorocarbon mixture			
Vector fluid	Hot water			
Vector fluid input temperature	≥94°C			
Vector fluid output temperature	86°C			
Vector fluid nominal flowrate	10,20 kg/s	13,40 kg/s	16.42 kg/s	32,84 kg/s
Skid dimensions (L x W x H)	3.3m x 1.4m x 2.1m		4.0m x 1.3m x 2.5m	5.5m x 2.5m x 3.2m
Weight (including working fluid)	~ 3100 Kg		~ 4500 Kg	~ 6500 Kg
Condenser				
Type	Brazed plates heat exchanger in AISI 316 stainless and 99.9% copper			
Dissipated thermal power	310 kW_T	390 kW_T	470 kW_T	1000 kW_T
Water input temperature	26°C			
Water output temperature	31°C			
Water circuit nominal flowrate	14,81 kg/s	18,65 kg/s	22,46 kg/s	47,70 kg/s
Generator				
Type	Synchronous, with permanent magnets, water cooled			
Power output	30 kW_E	40 kW_E	50 kW_E	100 kW_E
Rotational speed	15 000 rpm (12...18 Krpm)			
Output Voltage	533 VAC			
Required water cooling power	5 kWT			
Cooling water temperature	< 40°C			
Cooling water nominal flow rate	10 l/min			
Inverter				
Type	IGBT, mains-synchronized, water cooled, equipped with braking chopper.			
Power Output	30 kW_E	40 kW_E	50 kW_E	100 kW_E
Output Voltage	400 V AC +5% tol.			
Output Frequency	50 Hz +0.5% tol.			
Environmental temperature	<40 °C			
Braking Chopper	Built-in, on resistors			
Turbine				
Type	Radial, fixed nozzles, directly coupled to generator			
Working fluid input temperature	85°C			
Working fluid output temperature	~ 60°C			
Stage pressure	PS4,42 (tested up to 10 bar)			
Turbine Body material	CNC Machined steel			
Impeller material	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 (opt.)			
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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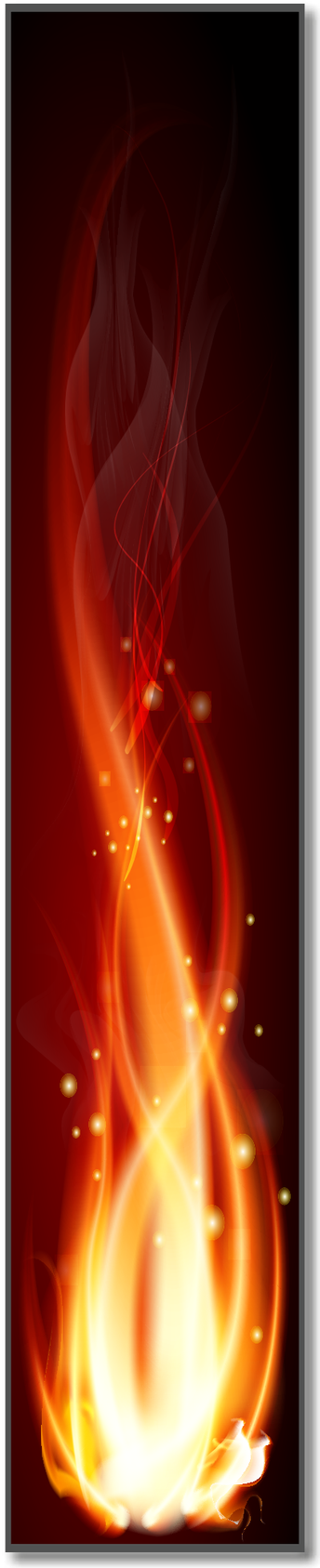
WE TRANSFORM ENERGY



Organic Rankine Cycle Energy Production Modules

ULH SERIES

ULH-Series ORC Systems by Zuccato Energia

ULH systems by Zuccato Energia are skid-mounted turbine systems designed to recover waste heat from other industrial processes and convert it into electric power using the Low-Temperature Organic Rankine Cycle (LT-ORC). Thanks to a special working fluid operating in a closed loop without atmospheric emissions and using smart engineering solutions, these system allow sensible increases in efficiency as well as several advantages :

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

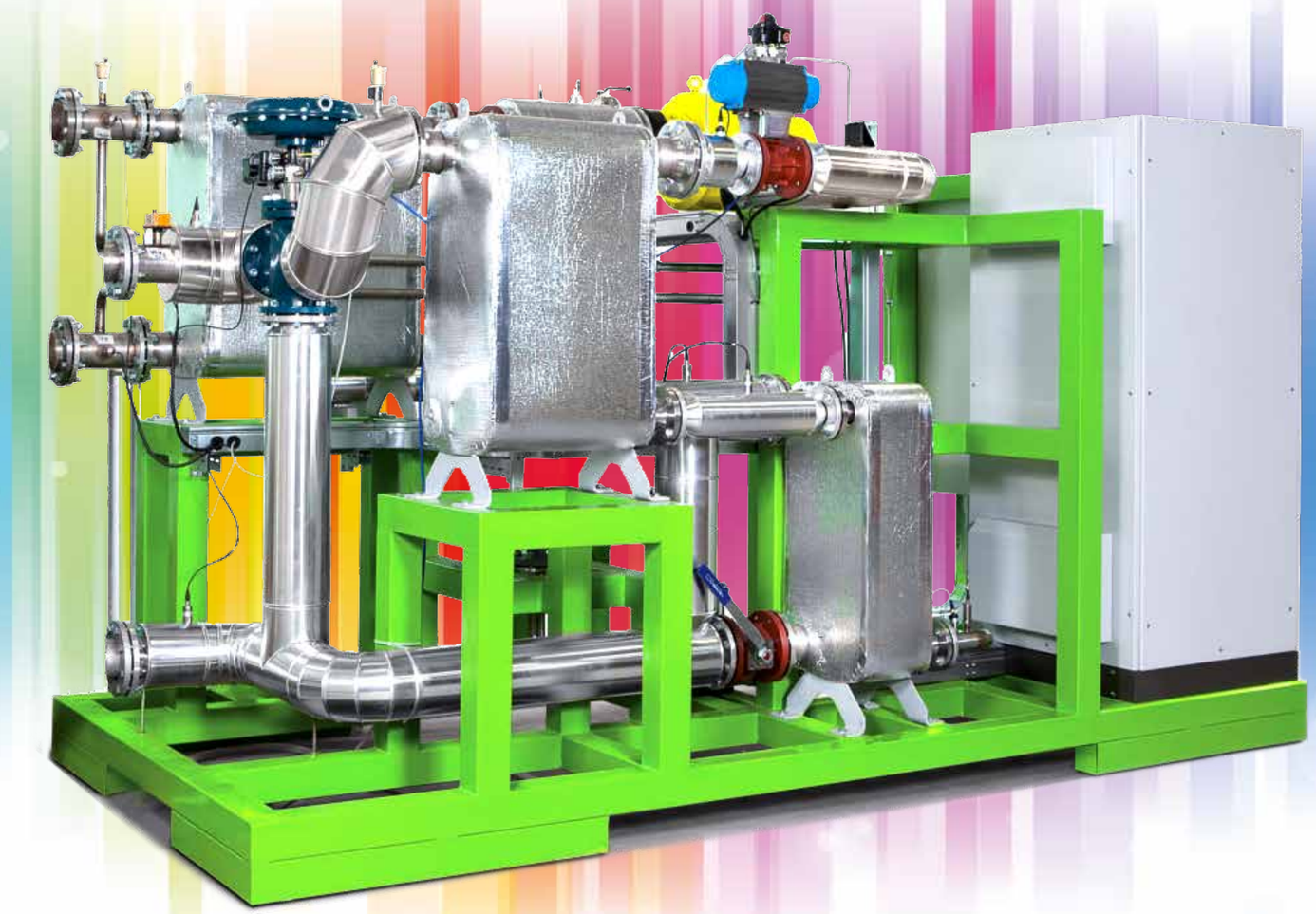
Low Noise Levels means no hearing protection required, and less problems in residential installations.

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

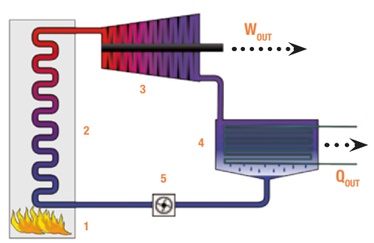
Tecnology that’s
Widely Tested
In more than 30 plants in Europe, USA, and Asia

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

A full range
from 30 to 100 kW_E
using hot 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