
E-RATIONAL ORC-1000

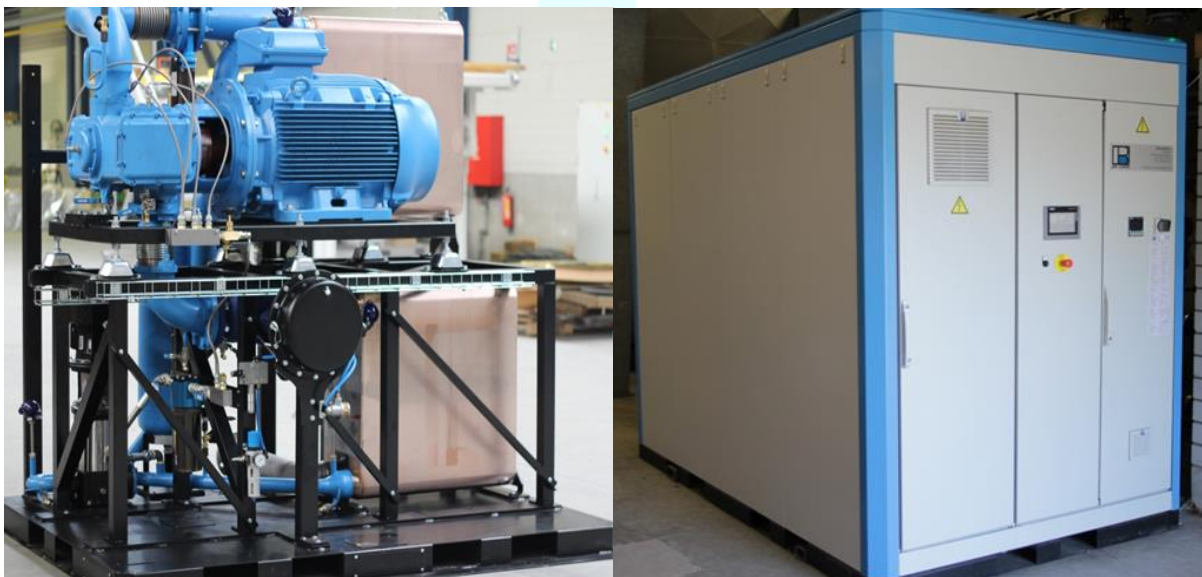
BEP Europe (Burke E. Porter, www.bepco.com) - through its Energy & Infrastructure Division – “E-Rational” (www.e-rational.net) is delivering a cost-effective solution to convert low temperature heat into clean energy power without emissions. Our state-of-the-art **Organic Rankine Cycle (ORC)** technology combined with the usage of industrial grade components makes E-Rational’s ORCs user-friendly, robust and economically viable.

E-Rational’s ORC machine has been designed for a maximized combined uptime and efficiency with a minimized operational and maintenance cost. This resulted in a skid-mounted modular machine, CE-compliant, with plug-and-play connections for easy installation.

The ORC-1000 machine absorbs up to 1,000 kW (3.4 MMBTU/h) thermal heat in a temperature range between 80°C and 150°C (176 F – 302 F). The ORC units are heat powered by hot water, thermal oil or low pressure steam coming from:

- ✓ Waste heat flows from industrial processes, e.g. cooling cycles from chemical plants, glass-, steel- & food- industry, power plants, etc ...
- ✓ Unused heat in District Heating networks
- ✓ Biomass furnaces and CHP/COGEN or biogas installations
- ✓ Geothermal wells

Depending on the operating conditions, E-Rational’s ORC-1000 series are offered with different types of expander-generator sets with typical outputs ranging from 55 kWe to 132 kWe.



ORC-1000		Skid mounted modular Organic Rankine Cycle machine	
Generator type	Asynchronous, 2 pole, 3 phase, 400V, 50-60 Hz		
Generator Power Range	55kWe - 70kWe - 90kWe - 110kWe - 132kWe		
Expander	E-Rational (single screw, radial inflow)		
Heat Exchangers	Plate heat exchangers		
Applied EG-Norms:	<ul style="list-style-type: none"> ✓ Machine directive 2006/42/EG ✓ EMC Directive 2004/108 EG ✓ Low voltage directive 2006/95/EG ✓ Pressure Equipment Directive 97/23/EG 		
Electrical Enclosures	IP55		
Control system	PLC, Web Based Remote Monitoring		
Dimensions (L x W x H)	2,933 mm x 1,856 mm x 2,530 mm	9'6" x 6'1" x 7'5"	
Operating Mass (kg)	±3,800 kg	±8,378 Lbs	
Operating Conditions (ambient temperature)	-20°C to +50°C	-4 F to 122 F	
Temperature Heat input	80°C – 150°C	176 F – 302 F	
Maximum heat input	1,000 kWth	3.4 MMBTU/h	
Heat source	<ul style="list-style-type: none"> ✓ Hot water ✓ Thermal oil ✓ Low Pressure steam 		
ORC working Fluid (depending on conditions)	<ul style="list-style-type: none"> ✓ Honeywell r245fa® ✓ Solkatherm SES36® 		
Hydraulic connection heat source	2 Flanges DN150 PN16		
Hydraulic connection cooling	2 Flanges DN150 PN16		
Cooling system	<ul style="list-style-type: none"> ✓ Cold water ✓ Cooling tower ✓ Air cooler 		
Housing	Suited for indoor installation		
Noise level	<70 dB at 10 m		
Emissions	<ul style="list-style-type: none"> ✓ No Emission ✓ No fuel consumption 		

TYPICAL PERFORMANCES

HEAT SOURCE: Hot water 1,000 kWth - 43m³/h (3.4 MMBTU/h - 189 GPM)
COOLING: Cold water

Temperature heat source	Gross power production		
	Cold water out 20°C (68 F)	Cold water out 30°C (86 F)	
90°C	194 F	76 kWe	65 kWe
100°C	212 F	85 kWe	74 kWe
110°C	230 F	93 kWe	83 kWe
120°C	248 F	115 kWe	104 kWe
130°C	266 F	124 kWe	113 kWe
140°C	284 F	132 kWe	130 kWe

HEAT SOURCE: Low Pressure Steam 1,000 kWth - 1.54 Tons/h - 0.43 kg/s (3.4 MMBTU/h - 3,359 Lbs/h)
COOLING: Cold water out 20°C (68°F)

Steam Pressure		Saturated Steam Temperature		Gross power production
1.5 bara	21.76 psi	111°C	232 F	100 kWe
2.0 bara	29.01 psi	120°C	248 F	109 kWe
2.8 bara	40.61 psi	131°C	268 F	118 kWe
4.0 bara	58.02 psi	143°C	289 F	132 kWe

E-Rational is a division of BEP Europe N.V.