



POWER+ GENERATOR

MODEL: S-ORC 75

Single-engine waste heat recovery and small distributed biomass

PRODUCT OVERVIEW

Scope's S-ORC 75 is the family's distributed waste-heat module, sized for a single low-grade heat source in the 0.6 MWth thermal-input class. The S-ORC 75 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid. The radial-inflow turbine architecture allows for high cycle efficiency across a wide range of inlet thermal conditions. This unit is engineered for retrofit onto a single reciprocating engine, a small biomass boiler, or a single wellhead-class heat source — making it the entry-point for distributed onsite power generation, fleet pilots, and CHP integration where the heat source is one identifiable piece of equipment.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 75 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 15-38 GPM (0.9-2.4 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 24-53 GPM (1.5-3.3 L/s)
Thermal Input: 1.4 - 2.4 MMBTU/hr (407-698 kW)	Working Fluid: R245fa, 200 lbs (90 kg)	Thermal Output: 1.2 - 2.1 MMBTU/hr (353-605 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 5,800 lbs Dimensions: 6.0' x 8.0' x 7.0' (W*L*H) (1.8m x 2.4m x 2.1m)	Ambient Temperature Range: 32-104°F (0 – 40°C)

**Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.*

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> • Reciprocating engine jacket water (90-105°C, single-engine) • Reciprocating engine exhaust gas (300-450°C via interface HX) • Small biomass boiler hot water loop (95-130°C) • Pyrolysis / biochar process flue gas • Single thermal oxidizer (low duty) • Geothermal / co-produced water (single low-flow well) 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> • Single gas-engine waste heat recovery (jacket water + exhaust integration, 1-2 MW shaft class engines such as Waukesha L7044, Caterpillar G3516) • Single wellhead reciprocating engine retrofit (oilfield gas-fired prime movers) • Small biomass boilers (animal bedding, woody biomass at 1.5-2.5 MWth firing rate) • Single-unit pyrolysis / biochar facility flue gas • Distributed dairy / food processing CHP • Pilot deployment for fleet validation 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 12.9% Expander η_{is}: ~78% design point</p> <p>CLEAN ENERGY OUTPUT Up to 75 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 75

DESIGN ATTRIBUTES & ENGINEERING DETAIL

DESIGN ATTRIBUTES	PRODUCT HIGHLIGHTS
<ul style="list-style-type: none"> // Built to ASME and CE Standards // Two-stage Radial-Inflow Turbine Expander // Grid-tied Induction Generator (PMG option) // Proprietary PLC and HMI Controls // Sound Pressure (@1 Meter): 85-89 dBA (size-dependent) // Power Factor: output-dependent >0.9 lagging // Outdoor Rated, IP54 enclosure // Design Life: 25 years // Low-GWP Working Fluid (R245fa, GWP 1030) // Recuperated cycle for improved η_{th} 	<ul style="list-style-type: none"> // Zero direct emissions during operation // Zero-carbon power when paired with renewable heat // Skid-mount, plug-and-play installation // Remote monitoring via VPN // Low routine maintenance // Minimal footprint vs. equivalent steam Rankine // Qualifies for IRA and state-level incentives // Grid protection relay input // IEEE 1547-2018 compliant grid-tie // Black-start optional on certain configurations

DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	75 kW	At design conditions, 60 Hz
Gross Electrical Output	79 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	12.89%	R245fa subcritical, recuperated
Heat Input (Q _{in})	0.58 MWth (1.99 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	0.50 MWth (1.72 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	2.53 kg/s (20.1 lb/s)	R245fa
HTF Mass Flow (water)	1.40 kg/s (25 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
Condensing Pressure	~30 psi (2.1 bar)	R245fa at 35°C saturation
Expander Isentropic Efficiency	~78%	RIT design point, size-scaled

EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 75 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

FOR ENGINEERING SUPPORT, SITE INTEGRATION STUDIES, OR ORDERING:

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POWER+ GENERATOR

MODEL: S-ORC 250

Gas gathering compressor stations and mid-scale industrial process WHR

PRODUCT OVERVIEW

Scope's S-ORC 250 targets the mid-scale waste-heat opportunity in the 2 MWth thermal-input class — the size range where a midstream gas gathering compressor station, a paired engine installation, or a mid-sized industrial process makes onsite power generation strongly economic. The S-ORC 250 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid for low-to-medium temperature heat sources. The unit is engineered for stable load-following operation as heat source duty varies through the day, and it pairs naturally with NOV-style centrifuge separation loads in midstream produced-water treatment applications where Scope's recovered power directly offsets the electrical demand of the water-handling equipment.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 250 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 47-118 GPM (3.0-7.4 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 77-165 GPM (4.8-10.4 L/s)
Thermal Input: 4.4 - 7.6 MMBTU/hr (1298-2225 kW)	Working Fluid: R245fa, 550 lbs (250 kg)	Thermal Output: 3.8 - 6.5 MMBTU/hr (1117-1915 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 12,500 lbs Dimensions: 8.0' x 12.0' x 8.0' (W*L*H) (2.4m x 3.7m x 2.4m)	Ambient Temperature Range: 32-104°F (0 – 40°C)

**Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.*

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> • Aggregated reciprocating engine jacket water (multi-engine pad) • Reciprocating engine exhaust gas (multi-engine, via shared HX) • Mid-scale biomass boilers and steam systems • Gas compressor cooling water and discharge cooling • Industrial process hot-water and low-pressure steam returns • Geothermal brine / co-produced water from multi-well pads 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> • Gas gathering compressor station heat recovery (3-5 MW gas engine pad) • Two- or three-engine reciprocating compressor pads (Permian, Eagle Ford, Bakken) • Midstream produced-water treatment stations powering centrifuge separation • Mid-scale biomass boilers (3-6 MWth firing rate) • Industrial process heat — paper mill, dairy, food processing • Geothermal co-produced water from multi-well pads 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 13.5% Expander η_{is}: ~82% design point</p> <p>CLEAN ENERGY OUTPUT Up to 250 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 250

DESIGN ATTRIBUTES & ENGINEERING DETAIL

DESIGN ATTRIBUTES	PRODUCT HIGHLIGHTS
<ul style="list-style-type: none"> // Built to ASME and CE Standards // Two-stage Radial-Inflow Turbine Expander // Grid-tied Induction Generator (PMG option) // Proprietary PLC and HMI Controls // Sound Pressure (@1 Meter): 85-89 dBA (size-dependent) // Power Factor: output-dependent >0.9 lagging // Outdoor Rated, IP54 enclosure // Design Life: 25 years // Low-GWP Working Fluid (R245fa, GWP 1030) // Recuperated cycle for improved η_{th} 	<ul style="list-style-type: none"> // Zero direct emissions during operation // Zero-carbon power when paired with renewable heat // Skid-mount, plug-and-play installation // Remote monitoring via VPN // Low routine maintenance // Minimal footprint vs. equivalent steam Rankine // Qualifies for IRA and state-level incentives // Grid protection relay input // IEEE 1547-2018 compliant grid-tie // Black-start optional on certain configurations

DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	250 kW	At design conditions, 60 Hz
Gross Electrical Output	262 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	13.48%	R245fa subcritical, recuperated
Heat Input (Q _{in})	1.85 MWth (6.33 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	1.60 MWth (5.44 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	8.00 kg/s (63.5 lb/s)	R245fa
HTF Mass Flow (water)	4.40 kg/s (79 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
Condensing Pressure	~30 psi (2.1 bar)	R245fa at 35°C saturation
Expander Isentropic Efficiency	~82%	RIT design point, size-scaled

EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 250 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

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POWER+ GENERATOR

MODEL: S-ORC 500

Mainline compressor stations, refinery process WHR, and geothermal clusters

PRODUCT OVERVIEW

Scope's S-ORC 500 is the family's industrial-process module, sized for a 3.7 MWth thermal-input class which matches the heat duty of a mainline gas compressor station, a small gas turbine WHR application, or a clustered geothermal well group. The S-ORC 500 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid. At this size the economics of waste-heat-to-power become strongly favorable for capital-intensive operations — the unit pays back through electrical offset of plant parasitic loads while reducing thermal discharge to the environment. The S-ORC 500 is also the family's bridge unit between distributed (sub-MWe) installations and centralized industrial-scale (MWe-class) installations.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 500 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 90-225 GPM (5.7-14.2 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 146-315 GPM (9.2-19.9 L/s)
Thermal Input: 8.8 - 15.0 MMBTU/hr (2568-4402 kW)	Working Fluid: R245fa, 1,000 lbs (455 kg)	Thermal Output: 7.5 - 12.9 MMBTU/hr (2206-3782 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 22,000 lbs Dimensions: 10.0' x 18.0' x 9.0' (W*L*H) (3.0m x 5.5m x 2.7m)	Ambient Temperature Range: 32-104°F (0 – 40°C)

*Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> Gas turbine exhaust (small GT, 3-5 MW class, via WHRU) Refinery process streams (FCC catalyst cooling, hydrotreater quench) Cement kiln preheater bypass gas Large industrial reciprocating engine bank (4-6 engines aggregated) Geothermal brine from multi-well cluster Industrial saturated and superheated process steam returns 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> Mainline gas compressor stations (single Solar Centaur or comparable GT-driver class) Refinery and petrochemical process WHR (FCC, hydrotreating residual heat) Large biomass-fired CHP plants (district heating offset) Multi-well geothermal binary cycle deployment Cement kiln preheater bypass heat recovery (small-cement-plant retrofit) Midstream produced-water treatment hub serving multiple operators 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 13.6% Expander η_{is}: ~83% design point</p> <p>CLEAN ENERGY OUTPUT Up to 500 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 500

DESIGN ATTRIBUTES & ENGINEERING DETAIL

DESIGN ATTRIBUTES	PRODUCT HIGHLIGHTS
<ul style="list-style-type: none"> // Built to ASME and CE Standards // Two-stage Radial-Inflow Turbine Expander // Grid-tied Induction Generator (PMG option) // Proprietary PLC and HMI Controls // Sound Pressure (@1 Meter): 85-89 dBA (size-dependent) // Power Factor: output-dependent >0.9 lagging // Outdoor Rated, IP54 enclosure // Design Life: 25 years // Low-GWP Working Fluid (R245fa, GWP 1030) // Recuperated cycle for improved η_{th} 	<ul style="list-style-type: none"> // Zero direct emissions during operation // Zero-carbon power when paired with renewable heat // Skid-mount, plug-and-play installation // Remote monitoring via VPN // Low routine maintenance // Minimal footprint vs. equivalent steam Rankine // Qualifies for IRA and state-level incentives // Grid protection relay input // IEEE 1547-2018 compliant grid-tie // Black-start optional on certain configurations

DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	500 kW	At design conditions, 60 Hz
Gross Electrical Output	525 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	13.63%	R245fa subcritical, recuperated
Heat Input (Q _{in})	3.67 MWth (12.52 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	3.15 MWth (10.75 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	15.80 kg/s (125.4 lb/s)	R245fa
HTF Mass Flow (water)	8.40 kg/s (150 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
Condensing Pressure	~30 psi (2.1 bar)	R245fa at 35°C saturation
Expander Isentropic Efficiency	~83%	RIT design point, size-scaled

EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 500 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

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POWER+ GENERATOR

MODEL: S-ORC 1000

Pipeline gas turbines, large industrial CHP, and midstream produced-water hubs

PRODUCT OVERVIEW

Scope's S-ORC 1000 is the family's industrial-scale workhorse, sized for a 7.3 MWth thermal-input class which matches the exhaust duty of a typical pipeline-class gas turbine (Solar Mars-class), a large biomass-fired CHP plant, or a midstream water-treatment hub. The S-ORC 1000 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid. At 1 MWe net output, the unit delivers utility-scale economics from a single ORC module — making it the natural choice for projects where a single high-duty heat source needs to be converted to power without the complexity of multi-unit cascades. The S-ORC 1000 also serves as the prime-mover scale for integrated Scope midstream-water-and-power infrastructure stations.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 1000 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 177-442 GPM (11.2-27.9 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 287-619 GPM (18.1-39.1 L/s)
Thermal Input: 17.3 - 29.7 MMBTU/hr (5081-8710 kW)	Working Fluid: R245fa, 1,900 lbs (860 kg)	Thermal Output: 14.9 - 25.5 MMBTU/hr (4357-7470 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 40,000 lbs Dimensions: 12.0' x 24.0' x 10.0' (W*L*H) (3.7m x 7.3m x 3.0m)	Ambient Temperature Range: 32-104°F (0 – 40°C)

**Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.*

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> • Pipeline-class gas turbine exhaust (Solar Mars, GE LM2500 family, via WHRU) • Large biomass boiler hot-water and steam systems • Cement clinker cooler exhaust and preheater bypass • Glass furnace regenerator exhaust • Steel mill reheat furnace exhaust • High-enthalpy geothermal brine (single high-flow well) 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> • Pipeline gas turbine compressor stations (Solar Mars or comparable, 10-15 MW driver class) • Large biomass-fired CHP and district energy plants (10-20 MWth firing class) • Integrated midstream produced-water treatment + power-generation hub (single-station scale) • Cement plant preheater / clinker cooler heat recovery • Glass furnace and steel-mill reheat-furnace exhaust • Large geothermal binary cycle (single well or paired wells with high enthalpy) 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 13.8% Expander η_{is}: ~84% design point</p> <p>CLEAN ENERGY OUTPUT Up to 1,000 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 1000

DESIGN ATTRIBUTES & ENGINEERING DETAIL

DESIGN ATTRIBUTES	PRODUCT HIGHLIGHTS
<ul style="list-style-type: none"> // Built to ASME and CE Standards // Two-stage Radial-Inflow Turbine Expander // Grid-tied Induction Generator (PMG option) // Proprietary PLC and HMI Controls // Sound Pressure (@1 Meter): 85-89 dBA (size-dependent) // Power Factor: output-dependent >0.9 lagging // Outdoor Rated, IP54 enclosure // Design Life: 25 years // Low-GWP Working Fluid (R245fa, GWP 1030) // Recuperated cycle for improved η_{th} 	<ul style="list-style-type: none"> // Zero direct emissions during operation // Zero-carbon power when paired with renewable heat // Skid-mount, plug-and-play installation // Remote monitoring via VPN // Low routine maintenance // Minimal footprint vs. equivalent steam Rankine // Qualifies for IRA and state-level incentives // Grid protection relay input // IEEE 1547-2018 compliant grid-tie // Black-start optional on certain configurations

DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	1,000 kW	At design conditions, 60 Hz
Gross Electrical Output	1,050 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	13.78%	R245fa subcritical, recuperated
Heat Input (Q _{in})	7.26 MWth (24.77 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	6.22 MWth (21.24 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	31.21 kg/s (247.8 lb/s)	R245fa
HTF Mass Flow (water)	16.50 kg/s (295 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
Condensing Pressure	~30 psi (2.1 bar)	R245fa at 35°C saturation
Expander Isentropic Efficiency	~84%	RIT design point, size-scaled

EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 1000 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

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POWER+ GENERATOR

MODEL: S-ORC 3000

Multi-basin midstream water hubs, large industrial CHP, and gas turbine exhaust trains

PRODUCT OVERVIEW

Scope's S-ORC 3000 targets large-industrial and utility-bridging waste-heat applications at the 21 MWth thermal-input class — installations where a single very-large heat source or an aggregated multi-source manifold makes ORC the right technology choice over conventional steam Rankine. The S-ORC 3000 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid. At 3 MWe, the module operates in the size class where Scope's integrated midstream platform — combining waste-heat-to-power with produced-water treatment infrastructure — delivers its strongest economics, powering centrifuge separation, water injection compression, and pad-level electrical loads from recovered heat.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 3000 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 511-1279 GPM (32.3-80.7 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 831-1790 GPM (52.4-112.9 L/s)
Thermal Input: 50.9 - 87.3 MMBTU/hr (14928-25591 kW)	Working Fluid: R245fa, 5,500 lbs (2,495 kg)	Thermal Output: 43.5 - 74.6 MMBTU/hr (12757-21870 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 95,000 lbs Dimensions: Skid-mount, contact factory (modular ISO containers)	Ambient Temperature Range: 32-104°F (0 – 40°C)

**Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.*

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> • Large pipeline-class gas turbine exhaust (LM6000, Mars 100, via large WHRU) • Aggregated industrial reciprocating engine fleet exhaust • Combined cement preheater + clinker cooler exhaust • Glass furnace regenerator and ferroalloy furnace exhaust • Large biomass boiler superheated steam returns • Multi-well geothermal field manifold (brine collection from 5+ wells) 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> • Multi-basin midstream produced-water treatment hubs (co-op service across multiple E&P; operators) • Large gas turbine exhaust trains (GE LM6000-class, 30-40 MW driver) • Utility-scale biomass CHP plants (30+ MWth firing rate) • Glass furnace and ferroalloy industry waste-heat recovery • Large cement plant integrated WHR (preheater + clinker cooler combined) • Industrial CHP plants with high-temperature process flue gas 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 14.1% Expander η_{is}: ~86% design point</p> <p>CLEAN ENERGY OUTPUT Up to 3,000 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 3000

DESIGN ATTRIBUTES & ENGINEERING DETAIL

DESIGN ATTRIBUTES	PRODUCT HIGHLIGHTS
<ul style="list-style-type: none"> // Built to ASME and CE Standards // Two-stage Radial-Inflow Turbine Expander // Grid-tied Induction Generator (PMG option) // Proprietary PLC and HMI Controls // Sound Pressure (@1 Meter): 85-89 dBA (size-dependent) // Power Factor: output-dependent >0.9 lagging // Outdoor Rated, IP54 enclosure // Design Life: 25 years // Low-GWP Working Fluid (R245fa, GWP 1030) // Recuperated cycle for improved η_{th} 	<ul style="list-style-type: none"> // Zero direct emissions during operation // Zero-carbon power when paired with renewable heat // Skid-mount, plug-and-play installation // Remote monitoring via VPN // Low routine maintenance // Minimal footprint vs. equivalent steam Rankine // Qualifies for IRA and state-level incentives // Grid protection relay input // IEEE 1547-2018 compliant grid-tie // Black-start optional on certain configurations

DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	3,000 kW	At design conditions, 60 Hz
Gross Electrical Output	3,150 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	14.07%	R245fa subcritical, recuperated
Heat Input (Q _{in})	21.33 MWth (72.76 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	18.22 MWth (62.18 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	91.37 kg/s (725.5 lb/s)	R245fa
HTF Mass Flow (water)	47.70 kg/s (852 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
Condensing Pressure	~30 psi (2.1 bar)	R245fa at 35°C saturation
Expander Isentropic Efficiency	~86%	RIT design point, size-scaled

EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 3000 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

FOR ENGINEERING SUPPORT, SITE INTEGRATION STUDIES, OR ORDERING:

Scope Technology & Manufacturing | 14531 FM 529 E, Suite 160, Houston, TX 77095 | www.scopemfg.com



POWER+ GENERATOR

MODEL: S-ORC 5000

Utility-scale waste heat, integrated midstream complexes, and large geothermal fields

PRODUCT OVERVIEW

Scope's S-ORC 5000 is the family's utility-scale module, sized for a 35 MWth thermal-input class which matches the exhaust duty of a large industrial gas turbine, an integrated midstream-and-water complex, or a large geothermal binary plant. The S-ORC 5000 employs a two-stage Radial-Inflow Turbine (RIT) expander coupled to a grid-tie generator, with R245fa as the working fluid. At 5 MWe net output, the unit competes with conventional small steam Rankine plants on a CAPEX-per-kW basis while offering substantially lower water consumption, faster startup, and unmanned operation. This is the size class where Scope's integrated platform — heat-to-power + produced water treatment + injection-ready conditioning — operates as full-service midstream infrastructure rather than a single-purpose WHR module.

Temperature Range: 150-280°F (65-138°C)	Max Power Output: 5000 kW @ 60Hz	Temperature Delta from Hot Inlet: 144°F (80°C)
Flow Rate: 834-2085 GPM (52.6-131.6 L/s)	Utility Connection: 3-Phase 380-500V / 50, 60 Hz	Flow Rate: 1355-2920 GPM (85.5-184.2 L/s)
Thermal Input: 84.0 - 144.0 MMBTU/hr (24626-42217 kW)	Working Fluid: R245fa, 9,000 lbs (4,080 kg)	Thermal Output: 71.7 - 122.9 MMBTU/hr (21009-36016 kW)
Higher Temps or non water/glycol fluids possible with interface heat exchanger	Weight: 140,000 lbs Dimensions: Multi-skid, contact factory (modular ISO containers)	Ambient Temperature Range: 32-104°F (0 – 40°C)

**Thermal input requirements increase with elevated ambient temperatures / heat sink conditions. **Temperature delta between inlet hot and cold water.*

<p>BEST HEAT SOURCES ⁺</p> <ul style="list-style-type: none"> • Large industrial gas turbine exhaust (LM6000, Frame 6B, via utility WHRU) • Refinery FCC main-fractionator overhead vapor (steam-generation equivalent) • Large industrial flue gas (cement, glass, steel reheat at scale) • Utility-scale biomass and waste-to-energy boiler exhaust • Large multi-well geothermal brine manifold (10+ wells, high enthalpy) • Aggregated midstream pad heat: engine fleet + compressor cooling + dehydration regen 	<p>BEST APPLICATIONS</p> <ul style="list-style-type: none"> • Integrated midstream complexes (heat recovery + produced-water treatment + injection conditioning) • Large industrial gas turbine exhaust trains (LM6000, Frame 6, Frame 7 driver class) • Utility-scale biomass plants and waste-to-energy facilities • Large geothermal fields with high-enthalpy brine production • Refinery and petrochemical FCC main-fractionator overhead and quench duty • Multi-basin E&P; operator co-op water infrastructure (Permian-scale) 	<p>CYCLE & OUTPUT</p> <p>Recuperated ORC with two-stage Radial-Inflow Turbine</p> <p>Heat Source → Evaporator → RIT Expander → Recuperator → Condenser → Feed Pump → Recuperator → back to Evaporator</p> <p>Working Fluid: R245fa (subcritical) T_{max}: 275°F (135°C) P_{max}: 174 psi (12 bar) Cycle η_{th}: 14.2% Expander η_{is}: ~87% design point</p> <p>CLEAN ENERGY OUTPUT Up to 5,000 kW emissions-free electrical power</p>
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⁺ Heat sources that are not water or glycol mixture will require an interface heat exchanger and hot water loop. Higher-temperature thermal-oil and direct-steam interface configurations available on request.



POWER+ GENERATOR / MODEL: S-ORC 5000

DESIGN ATTRIBUTES & ENGINEERING DETAIL

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DESIGN-POINT ENGINEERING DATA

Parameter	Value	Notes
Net Electrical Output	5,000 kW	At design conditions, 60 Hz
Gross Electrical Output	5,250 kW (approx.)	5% parasitic load assumed
Cycle Net Thermal Efficiency	14.21%	R245fa subcritical, recuperated
Heat Input (Q _{in})	35.18 MWth (120.04 MMBtu/hr)	Evaporator + economizer
Heat Rejected (Q _{out})	30.01 MWth (102.40 MMBtu/hr)	Condenser to heat sink
Working Fluid Mass Flow	150.47 kg/s (1194.7 lb/s)	R245fa
HTF Mass Flow (water)	77.80 kg/s (1390 GPM)	180→100°C ΔT
Turbine Inlet Temperature	275°F (135°C)	Below R245fa critical (T _c =154°C)
Turbine Inlet Pressure	174 psi (12 bar)	Subcritical operation
Condensing Temperature	95°F (35°C)	10K terminal ΔT from ambient
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EXPANDER ARCHITECTURE NOTE. The Scope S-ORC 5000 uses a two-stage radial-inflow turbine (RIT) expander integrated with a grid-tie induction generator on a common skid. R245fa working fluid is chosen for its match to low-to-medium temperature heat sources (90-150°C heat source class) and its established compatibility with HVAC-derived components for ORC service. The cycle operates subcritical, respecting the R245fa critical temperature of 154°C with a typical 19K margin at design point. The RIT architecture is selected for cycle efficiency optimization at this temperature class; reverse-compressor and screw-expander alternatives are available on request for cost-optimized configurations at the smaller sizes (75-500 kWe class).

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