



MANGAN INDUSTRIAL GROUP

TURBOEXPANDER-GENERATOR

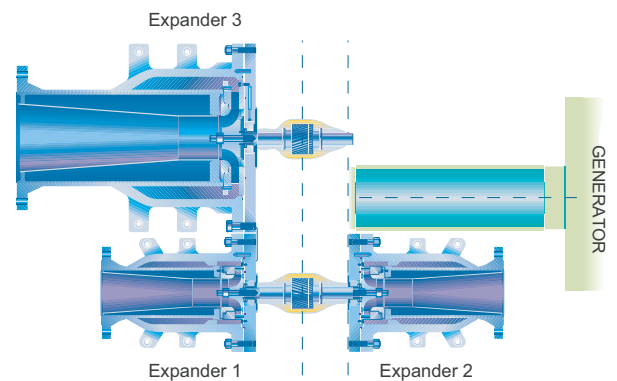
A turboexpander expands process fluid from the inlet pressure to the discharge pressure in two steps: first through variable inlet guide vanes and then through the radial wheel. As the accelerated process fluid moves from the inlet guide vanes to the expander wheel, kinetic energy is converted into useful mechanical energy – extracting energy from the process fluid and cooling it down. The mechanical energy is available to drive other process equipment – in this case, a generator. Our turboexpander-generator designs respond to specific industry needs for increased capacity, reduced costs and maximized reliability in a wide range of applications, including:

- Oil & Gas processing Natural Gas Liquids (NGL) plants, Liquefied Petroleum Gas (LPG) recovery; tail gas treatment; Gas-To-liquids (GTL); Integrated Gasification Combined Cycle (IGCC)
- Liquefaction and purification of gases on air treatment plants
- Petrochemicals: hydrogen, nitrogen and ammonia purification; ethylene production
- Pressure Let Down (PLD) on pipeline
- Geothermal power generation (e.g. Organic Rankine Cycle, Kalina and direct steam)
- Waste-heat recovery (WHR) and Combined Heat and Power (CHP)
- Ocean Thermal Energy Recovery (OTEC)

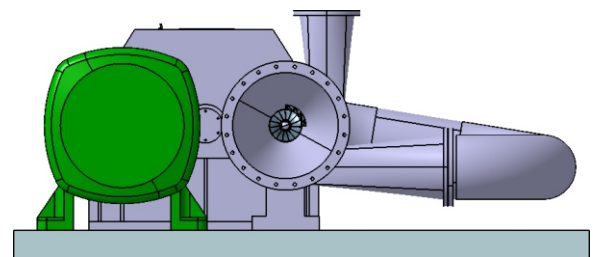
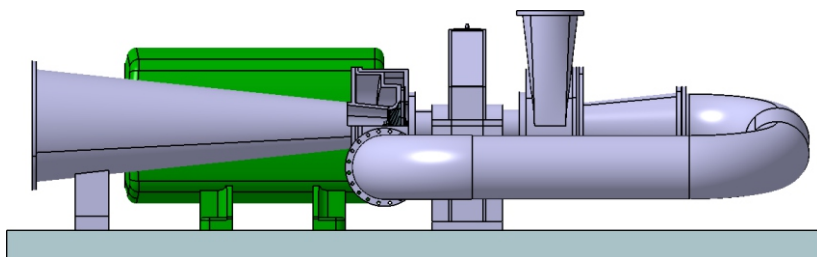


Turboexpander-generators

High pressure ratios or high flow rates require the multi-stage arrangement. Standard expander-gear designs can accommodate up to four expanders on a common integral gearbox.



Multi-stage expander mounted on a single integral gear.

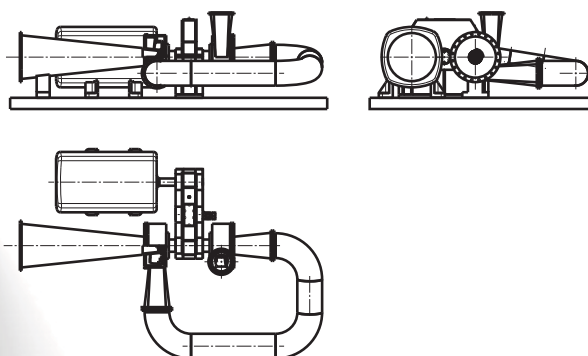
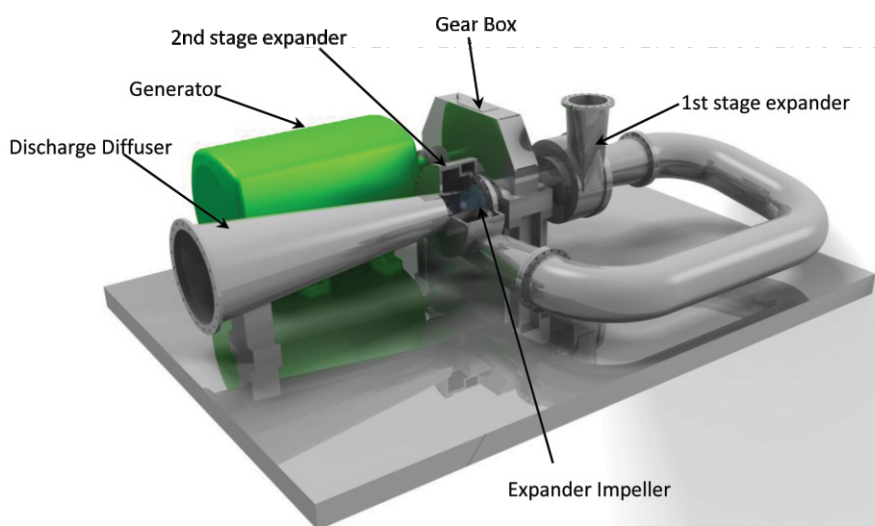




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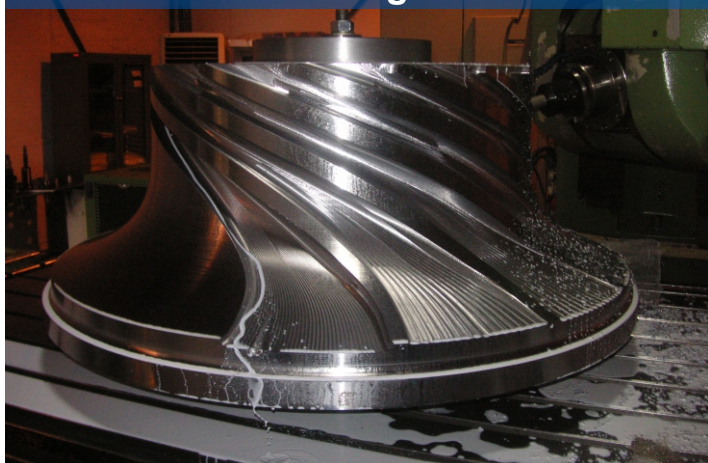
TURBOEXPANDER-GENERATOR

Different parts of a Two-Stage Expander-Generator



The majority of applications for turboexpanders require the expander to be coupled to an electrical generator. There are two basic choices: with the generator mounted directly on the turbine shaft; or connection through speed reducing gears. An integral gearing option provides the additional benefit of multi-staging, allowing multiple expander stages to be mounted on a single gearbox. In most cases the turboexpander- generator unit can be completely skid-mounted to simplify transportation and reduce installation costs

Technologies for extreme challenges



Expander-Generator Frame Size Distribution							
Frame	Shaft power	Expander outlet flow max.	Available casing ratings				
	(kW)		150	300	600	900	1500
20	1600	4000		●	●	●	●
25	2000	5500		●	●	●	●
30	4800	9000	●	●	●	●	●
40	6500	16000	●	●	●	●	
50	10000	25000	●	●	●	●	

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