



Electrification solutions for Oil and Gas Downstream

Electric motors and drive systems for compression process optimization

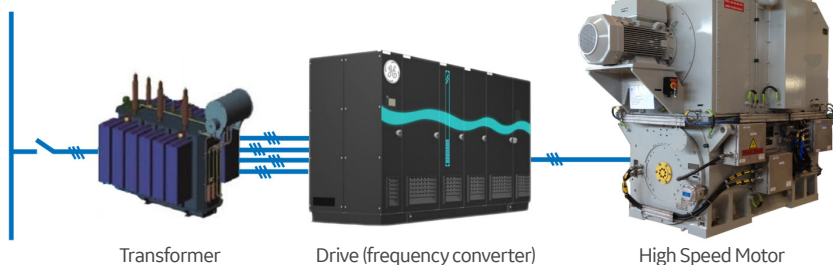
POWERING MACHINES UP TO 100MW

Oil & Gas companies are tightening their grip on costs, and evaluating new ways to improve efficiency. In the downstream segment of the oil and gas industry—refineries, petrochemical and fertilizer plants—compressor trains are an important area for achieving potential process optimization. For processes that don't develop heat or only partially generate steam, like recycle hydrogen, feed gas, and in some instances wet gas applications, or plants located in areas where the power grid is stable, the use of electric motors can represent a better choice vs. steam turbine solutions. The recent advancement of electrification has made it possible and practical for electric motors and drive systems to be an option for powering standalone machines up to 100MW and integrated ones up to 35MW.

150+ GE HIGH SPEED SYSTEMS INSTALLED WITH CUMULATED 4.5 MILLION OPERATION HOURS

A smaller footprint and less necessary auxiliaries make it possible to preserve the plant layout in more constrained environments and allow a smooth plant integration, resulting in savings for the associated infrastructure cost. GE's Variable Speed Drive Systems (VSDS) feature a unique combination of Voltage Source Inverter (VSI) and a high-speed motor to help increase reliability and availability of your systems.

Key components



VARIABLE FREQUENCY DRIVE (VSI)

MV7 range: reliable, scalable and modular

Features

- 1 to 100MW, up to 13,8kV
- Standard drive with high performance control
- Power factor >0.95 helps to eliminate reactive power injected to the grid

Benefits

- No torque pulsation on the shaft line
- No harmonics filter needed due to minimum harmonics level on the network
- Reduced noise and vibrations on the motor, allowing extended life cycle and reduced maintenance

HIGH SPEED INDUCTION MOTOR

Efficient, compact, cost-effective

Features

- Variable frequency standalone motor directly coupled to a compressor without gearbox
- 2 pole design, up to 18,000rpm (highest in class)
- Water to air cooled motor or TEPV motor
- Several rotor diameters
- Magnetic or sleeve bearings
- Copper cage
- Certified Exp according to ATEX
- Shaftless Rotor/ Patented rotor design

Benefits

- No critical speed: reduced vibrations
- Laminated rotor reduces Eddy currents
- IEC 60034 & IEC 60079 compliant
- Proven track records: 120+ high speed motors installed globally

ELECTRIFICATION CONSULTING

With falling oil prices, and increasing costs, it is more critical than ever that industrial operators adopt innovative ways to reduce CAPEX and OPEX.

GE experts can help you make informed decisions that continue to deliver across the lifetime of your project.

- Support in the **economic evaluation**: high level estimations of value in technology selection
- **Site survey**: existing field data capture & hardware audit, to understand the technical and environmental constraints and determine the opportunities
- **Documentation analysis**: current operating profile review and analysis (existing compressor, consumption, operating costs, etc.)
- **Replacement studies**: configuration proposals
- **Estimations**: OPEX estimations and value demonstration (maintenance costs, efficiency savings, emissions, availability and reliability value, spares needed, etc.)
- **Business plan**: commercial offer (report out and implementation roadmap)

TECHNOLOGY COMPARISON

	STEAM TURBINE	ELECTRIC VSDS	BENEFITS OF THE ELECTRIC SOLUTION
DRIVER EFFICIENCY	50-80%	>95%	▶ High efficiency
SPEED RANGE	50-105%	0-105%	▶ Full flexibility available
DYNAMIC RESPONSE	Load Step capability depends on temperature	Almost immediate	▶ Full flexibility available in terms of power demand
STARTING TIME	> 15 min and depends on temperature	< 1 minute	▶ Minimum startup time requirement/Very high starting and operating reliability and availability
INRUSH CURRENT DURING START-UP	Not applicable	Inrush current = nominal current	
ENVIRONMENTAL IMPACT	CO ₂ /NOX emissions (boiler)	Not applicable	▶ Emission-free/Fit with environmental restrictions
NOISE LEVEL	Usually >100dB(A) May require noise enclosure	Usually between 85 and 90dB(A)	▶ Low noise
FOOTPRINT	Large (lube oil coolers, ventilation ducts, exhaust silencers, noise enclosure if any)	Small in hazardous area, medium in electrical room	▶ Minimum space requirement
INSTALLATION & COMMISSIONING	Complex auxiliary pipework and electrical & instrumentation tie-in	Limited to electrical & instrumentation tie-in	▶ Reduced pipework requirement
REQUIRED MAINTENANCE	1-yearly periodic inspection (few days without shutdown) + shutdown every 5 years	1-yearly periodic inspection (few days without shutdown) + shutdown every 5-6 years	▶ Minimum maintenance period over life cycle
MAINTENANCE COST	Minimal parts replacement required	Minimal parts replacement required	▶ Minimum maintenance cost
POWER REQUIREMENTS	Low voltage (415V)	High voltage (>3kV)	▶ Suitable for most areas, incl. with limited power availability

CONTACT US

www.gepowerconversion.com/sales-contact

OUR CENTERS OF EXCELLENCE FOR THE OIL & GAS INDUSTRY:

DRIVE SYSTEMS:

GE Energy Power Conversion France SAS
18 Avenue du Quebec, F-91140 Villebon-sur-Yvette

ROTATING MACHINES:

GE Energy Power Conversion France SAS
442 Rue de la Rompure, F-54250 Champigneulle

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GEA32683 - Steam Turbine Replacement