



Pipeline API Motors – Special Service, Special Attention

Pipeline two-pole motors, critical to the continual flow of oil to refineries or docks, often operate in the worst of conditions:

- They are typically operated by a variable-speed controller and cannot have a critical speed within the typical 1400 to 4000 RPM speed range of the motor.
- Operating environments can range from sub-zero to Sahara-like conditions with either very high or very low moisture levels.
- Regular maintenance for these motors is often limited due to their remote locations.



Using the API 541 standard as a base, Siemens engineers offer a unique solution for optimum performance and service life. Additional engineering innovations from Siemens include:

- Development of a rigid shaft design utilizing a larger shaft diameter to eliminate the need to “block out” a speed range.
- A redesign of the rotor to create more air flow through the motor’s core area.
- Minimized noise levels to no more than 85 dB(A) with the 6500 horsepower, two-pole design.



Service Around the Corner or Around the World
Professional technical assistance is readily available through your local Siemens sales office. In addition to providing a complete line of spare parts, Siemens can provide troubleshooting support, preventive maintenance services and repair and upgrades at our highly qualified Norwood, Ohio, service center. Contact your local Siemens sales office for details.

Siemens Motors and Drives – Performance-Matched Systems
Performance-matched variable-speed motors and drives from Siemens make perfect sense. They are designed to work in harmony for ease of selection and start up, as well as long-term reliability and exceptional performance.

Whether your application requires variable torque or constant torque capability in general purpose or severe duty environments, there is a Siemens motor / drive system ready to go to work for you.

Siemens IEC Motors – Worldwide Production for Global Applications
Siemens produces a complete line of IEC motors built in our European factories. The H-Compact line of motors utilizes torsionally rigid, robust frame design, manufactured from cast iron with external and internal cooling ribs. The H-Compact line has output up to 3,000 kW.

The H-Compact Plus is available in shaft heights 450 mm, 500 mm, 560 mm, and 630 mm. It utilizes a modular cooling concept and is built using a cast iron frame with fabricated steel heat-exchangers. The H-Compact Plus is available with outputs up to 7,500 kW.

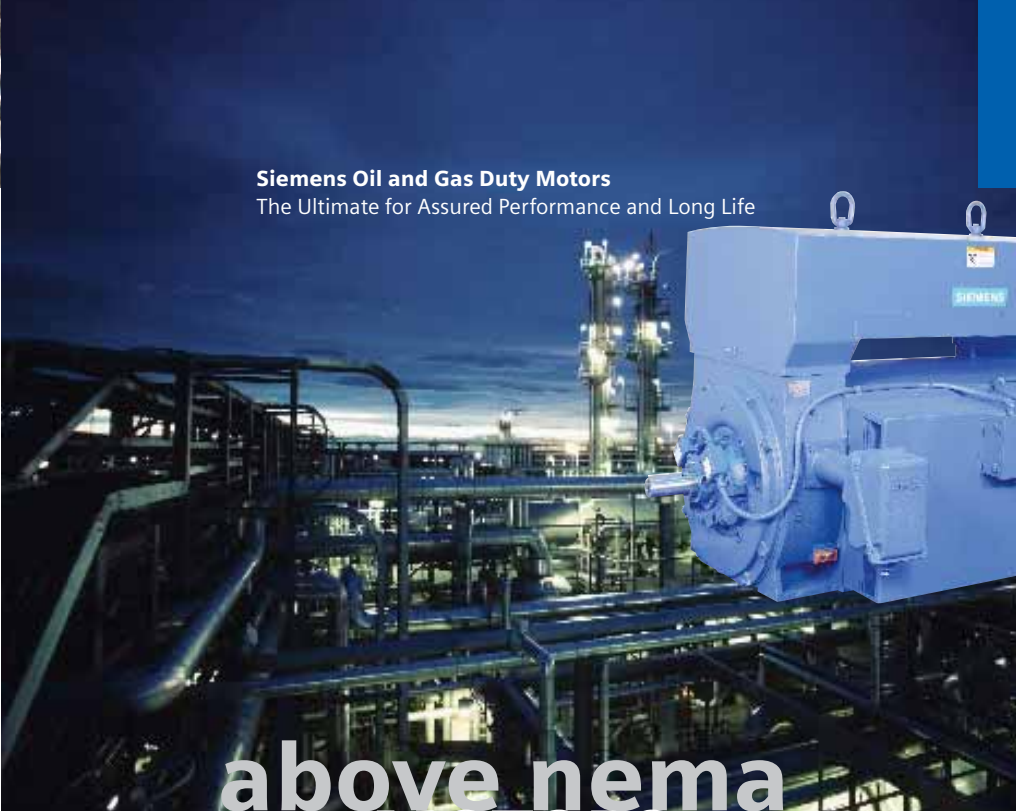
The H-Modyn, built in Berlin, Germany, features a high-density and compact design that provides a smaller overall package with an optimized cooling design for exceptional efficiencies. It is available as induction and synchronous and has an output capability beyond 50,000 kW.



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For details about typical performance data, technical information or dimensional information, contact your local Siemens sales representative, call **1-800-964-4114**, or go to our web site **www.sea.siemens.com/motors**

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Siemens Oil and Gas Duty Motors
The Ultimate for Assured Performance and Long Life

above nema
MOTORS

SIEMENS



Innovative Solutions to Roughneck Conditions

Large motors used in oil and gas applications must survive some of the worst conditions known to man, including the abuses of man. Yet, these motors must operate precisely as designed for decades to ensure the optimum production and processing of petroleum and liquefied natural gas.

In the last 30 years, Siemens has emerged as an industry leader in the design, manufacture and application of motors for oil and gas processing applications because we know how to combine innovative designs for precise motor operation – with roughneck durability for applications, no matter if they are upstream, midstream or downstream.

Upstream – Siemens Rig Duty motors offer the durability and reliable performance needed to keep onshore or offshore wells producing day after day and year after year. From variable-speed pump motors that match pump performance with varying flow rates, to minimum vibration Compressor Duty motors for operating compressors for oil or gas re-injection processes, there is no better choice than Siemens.

Midstream – Ensuring a consistent flow of oil from wellheads, tankers and storage facilities through pipelines to maximize refinery throughput is critical to keeping profits in the black. This is why companies around the world depend on the low vibration, high reliability, low noise and assured variable-speed performance offered by Siemens Pipeline Duty motors.

And, like oil producers and refiners, processors of LNG (liquefied natural gas) depend on Siemens Compressor Duty motors for the reliable powering of refrigerant and reciprocating compressors. Special designs have been developed for these motors that include larger than normal shaft diameters required by reciprocating compressor manufacturers.

Downstream – If there is an important oil industry standard to meet, Siemens will meet or exceed it. This commitment is evident in our long-standing ability to meet the API standards including the new API 547 First Edition standards for severe duty motors and the recently revised API 541 4th Edition standards for critical duty motors. But Siemens goes beyond these important standards by custom tailoring our API Duty motors to the exact needs of refiners.

Petrochemical processors have come to depend on the extensive engineering and application knowledge offered by Siemens to solve specific application issues. High efficient rotor designs, reduced vibration and noise levels, extended maintenance schedules and more are but a few ways Siemens uses technology and experience to solve the toughest problems.



Siemens Oil and Gas Duty Motor Features

The following features are commonly included in Siemens oil and gas duty motors and are but a sample of the value we offer.

Copper Rotors – The ultimate in energy efficiency and low vibration

- Induction brazing of end-connectors to ensure the highest quality braze
- Phosphorous-free brazing materials
- Full-length shims with center swaging to minimize vibration
- Stress-relieved forged-steel shafts on all two-pole motors

Aluminum Rotors – Engineered and manufactured for severe duty applications

- Compressed, stacked, high-grade steel laminations
- High-pressure injection of molten aluminum
- Stress-relieved, forged-steel shafts on all two-pole motors
- Machine-finished rotor core after aluminum injection

Stators – A complete system engineered for maximum durability

- C5 core plate electrical steel
- Indexed lamination stacking to ensure superior buildup of core
- Fully sealed insulation system with latest VPI technology (Class F)
- Heavy-duty bracing of stator coils and end-turns

Balance & Vibration – Innovative processes to ensure low vibration levels

- Precision balancing procedures to limit residual unbalance
- Dynamically balanced in high-speed balancing machines
- Rotor assemblies balanced at rated speed
- Maximum 0.10 ips on housing / 1.5 mils on shaft

Bearings & Lubrication – Cool-running for optimum performance and long life

- Sleeve bearings feature split housings for ease of inspection
- Two solid brass oil rings per bearing for superior oil delivery
- Finely finished shaft, journal and bearing babbits to ensure optimum performance
- Both bearings insulated from shaft currents

Enclosures – Wide selection for use in any environment

- Weather-protected, totally enclosed or water-cooled enclosures are available as required
- Louvers over openings for weather-protected motors
- Mounting surface machined to 250 micro-inches
- Spot-faced mounting holes on cast iron frames
- Air gap measurement holes
- Vertical jacking screws
- Low temperature space heaters with separate conduit box

- Grounding pads
- Critical speeds 15% removed from operating speed
- Both bearings insulated from shaft currents
- 300 Series stainless steel external hardware throughout
- Threaded and plugged drains (for enclosed motors)
- Provisions for filters & differential pressure switch (WPII enclosures)
- Oversized terminal box for cable connections
- NEMA 4x auxiliary boxes

Testing – Performance verification to assure long-term durability

- Siemens standard routine testing on all motors
- High-potential testing of stator-mounted devices
- Polarization index
- No-load bearing run and bearing inspection

ISO 9001 Quality Assurance

- Quality designed and manufactured into each motor.

Application-Matched Modifications

Rotors

- Special shaft steel for low temperature applications
- Epoxy coating for additional corrosion protection
- Ultrasonic inspection of welds
- Material certification of shaft



Stators

- Thermal protection, PT100 RTDs
- Anti-abrasion protection

Balance & Vibration

- Non-contacting probes for measuring shaft vibration
- Key phasor

Bearings & Lubrication

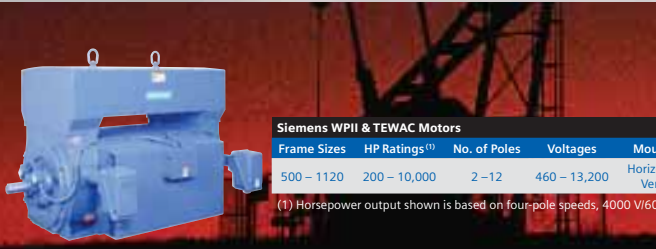
- Thermal protection, PT100 RTDs
- Oil sump heaters
- Provisions only for flood lubrication
- Constant level oilers

Enclosures & Terminal Boxes

- Differential pressure switch on WPII motors
- Filters (stainless or galvanized steel) for WPII motors
- Low noise options
- Harsh & severe duty paint systems
- Surge protection equipment
- Current transformers for differential protection

Testing & Inspections

- Shop inspection
- Residual unbalance
- Vibration recording
- Noise testing
- Complete (temperature rise) testing



Siemens WPII & TEWAC Motors

Frame Sizes	HP Ratings ⁽¹⁾	No. of Poles	Voltages	Mounting	Frame Construction
500 – 1120	200 – 10,000	2 – 12	460 – 13,200	Horizontal & Vertical	Cast Iron (1120 is Fab. Steel)

(1) Horsepower output shown is based on four-pole speeds, 4000 V/60 Hz.



Siemens TEFC Motors

Frame Sizes	HP Ratings ⁽¹⁾	No. of Poles	Voltages	Mounting	Frame Construction
500 – 580	250 – 1,250	2 – 12	460 – 6,600	Hor. & Vertical	Cast Iron
708 – 880	1,250 – 2,500	2 – 12	2,300 – 11,000	Horizontal	Cast Iron

(1) Horsepower output shown is based on four-pole speeds, 4000 V/60 Hz.



Siemens TEAAC Motors

Frame Sizes	HP Ratings ⁽¹⁾	No. of Poles	Voltages	Mounting	Frame Construction
580 – 1120	450 – 7000	2 – 16	460 – 13,200	Horizontal & Vertical	Cast Iron (1120 is Fab. Steel)

(1) Horsepower output shown is based on four-pole speeds, 4000 V/60 Hz.

Siemens
Above NEMA Motors:
Designed, Built &
Tested in the USA