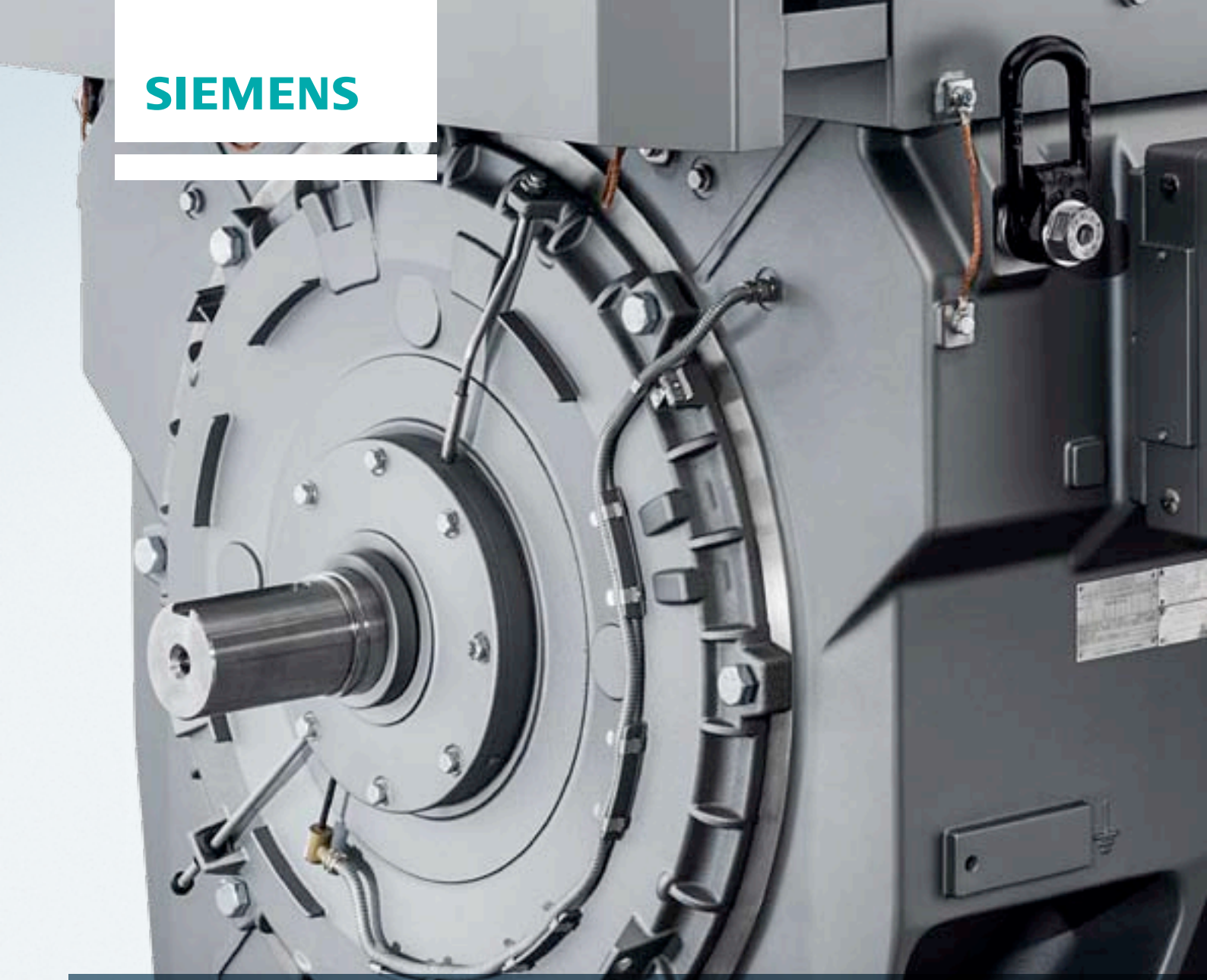
SIEMENS



Compact, flexible, highest reliability

SIMOTICS HV and SIMOTICS TN series H-compact PLUS

siemens.com/simotics

Answers for industry.

SIMOTICS HV and SIMOTICS TN series H-compact PLUS

First and foremost for any motor – you must be able to depend on it 100 percent. Or to put it another way, the highest degree of reliability is demanded. And it is precisely this aspect that distinguishes the SIMOTICS H-compact PLUS. Based on our extensive know-how we are offering you a family of high-voltage and low-voltage three-phase motors that sets standards – standards regarding reliability and flexibility, but at the same time an extremely compact design.

H-compact PLUS has extremely low envelope dimensions and weights for the corresponding power ratings due to the:

- high utilization of the active parts
- innovative ventilation and cooling systems with low noise level
- state-of-the-art motor design techniques

This is the reason that our drive solutions save valuable space therefore reducing the costs of the complete plant. The motor foundation costs are also reduced and with it mounting and installation costs.

At home in the process industry

With power ratings up to 11.7 MW (IEC) and 18,000 HP (ANEMA) and with shaft heights up to 710 mm, H-compact PLUS is at home everywhere in the process industry – where it distinguishes itself is it's reliability, low maintenance and efficiency.

Some of the sectors where H-compact PLUS is used:

- Oil & Gas
- Petrochemical
- Chemical
- Mining
- Water/wastewater
- Marine
- Cement
- Metals
- Power generation

Typical applications include:

- Pumps
- Compressors
- Blowers / fans
- Extruders
- Mixers, crushers
- Conveyor belts
- Main ship's drives
- Rolling Mills

Leading-edge technology for the highest availability.

The reason our SIMOTICS H-compact PLUS motors offer the highest degree of reliability with minimum maintenance costs: Frame, bearings, active parts, ventilation and cooling system are perfectly harmonized. With the second generation of H-compact PLUS, the efficiency and the power density have been further increased and the noise level has been reduced.

Proven concepts for disturbance-free operation

H-compact PLUS motors have the MICALASTIC insulating system that has proven itself over many years in high-rating, high-voltage motors – and that worldwide. An important component of this insulating system is the VPI technique (Vacuum Pressure Impregnation) that is harmonized with the insulation design. This insulation technique fulfills every requirements regarding:

- Motors can either be fed directly from the line supply or a drive
- High switching and reversing strength due to the high stiffness of the winding overhangs
- Excellent corona shielding

In conjunction with the extraordinary mechanical strength and thermal endurance, these factors ensure an extremely long winding lifetime And all of this even under tough environmental conditions.

Long lifetime and reliability

The bearings of our H-compact PLUS motors are precisely aligned to the speed, load and other operating conditions. Most of the motors are equipped as standard with roller bearings. They can also be equipped with sleeve bearings if the application demands it. The bearings are well sealed to make the motors insensitive to external environmental effects – therefore playing a role in achieving the high degree of availability and in turn the productivity of the overall plant or system. The low maintenance costs also have a positive impact on the operating costs. The anti-condensation heating provided as standard, prevents moisture condensation forming on the components when the motor cools down therefore extending its lifetime.

Highest vibration quality

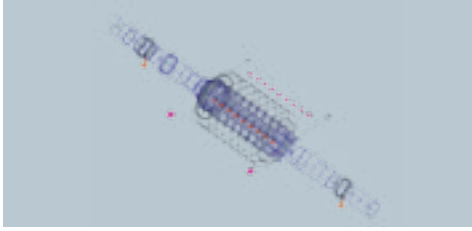
An innovative production process in conjunction with high-precision balancing guarantees the highest vibration quality. This is the reason why our H-compact PLUS motors not only fulfill IEC and NEMA Standards but in most cases they even exceed them. This applies both for constant-speed as well as variable-speed operation – and over the complete speed control range that in some instances extends up to 4800 rpm.

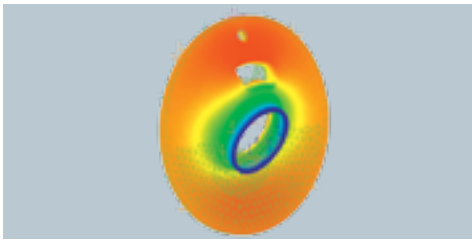
Continuous monitoring

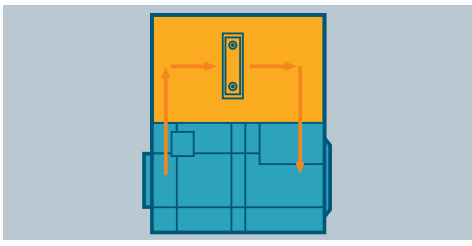
Even the most sophisticated motor can be subject to stresses in operation for which it was originally not designed. Sensors and monitoring devices can continually record and signal electrical, thermal and mechanical operating data. As monitoring equipment the motors have as standard six slot resistance thermometers PT100 and shock pulse measuring nipple (SPM) for roller bearings.

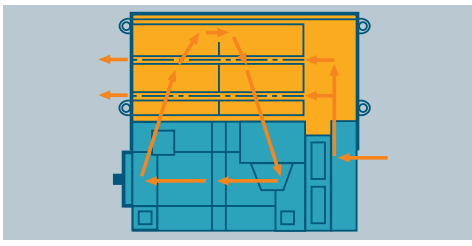
Even more flexible but always matching.

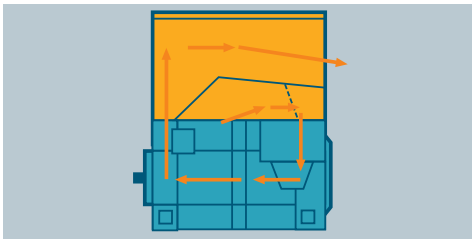
With H-compact PLUS we offer modular motors with different cooling types and types of protection. These flexible concepts make it possible, to adapt the motors in an optimal way to the required applications with the high technical competence of our engineering. The new H-compact PLUS series 1R.6/1S.6. facilitate maximum flexibility as a result of the extended range of options. Extremely specific requirements in the corresponding power range can be covered using the customized motors from the Vario PLUS series.











This also means that applications under extreme environmental conditions, e.g. with extremely low temperatures down to -50° C and offshore applications can be addressed.

Air-to-water cooler: 1RN4/1RN6 motor

Independent of the ambient conditions the top-mounted air-to-water heat exchangers always guarantee the highest cooling power – with minimum thermal dissipation to the immediate environment.

Air-to-air cooler: 1RQ4/1RQ6 motor

The alternative solution if cooling water is not available and the ambient conditions are difficult: H-compact PLUS with top-mounted air-to-air heat exchanger. A shaft-mounted fan at the non-drive end ensures an optimum cooling airflow. A separately-driven fan is also possible for this concept.

Open cooling/weather-protected: 1RA4/1RA6/1RP6 motor

The cooling air is drawn in from the surroundings, routed through the inside of the motor and discharged – for efficient cooling without heat exchanger.

State-of-the-art design techniques

Using state-of-the-art design and engineering techniques we flexibly serve sector- and application-specific requirements and can optimally adapt H-compact PLUS to the particular application.

These selection/dimensioning techniques allows us to optimize the parameters for the particular application, and when required, carry out innovative calculations, for instance a drive train analysis.

Reduce operating costs with constant and variable speed.

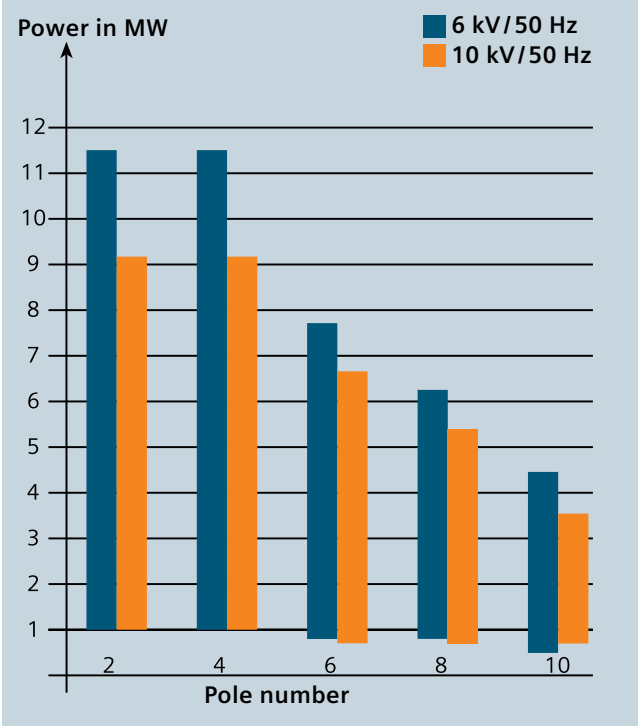
Operated at constant speed the good electrical performance values – efficiency and power factor – reduce energy consumption and therefore costs. Variable-speed operation with inverters results in significant additional energy saving potential. When fed from a drive converter the motor speed – and therefore the power consumption – can always be precisely adapted to the actual plant or system requirements. The result – energy savings of up to 60%, in extreme cases even up to 70%.

Variable-speed operation also allows processes to be far more precisely controlled with shorter response times than when using mechanical actuators such as throttles. Soft starting and stopping using continuous speed control reduces the level of stress on the mechanical system of the plant – and in turn also the operating costs.

SIMOTICS H-compact PLUS can be used to implement cost-saving variable-speed drive systems but at the same time offering a high degree of availability. SIMOTICS H-compact PLUS motors are optimized for use in low-voltage as well as medium-voltage drive systems. These motors can be operated over wide speed control ranges as a result of their special dimensioning. Medium-voltage SINAMICS Perfect Harmony and SINAMICS GM150 drives are the system partners on the drive side. Low-voltage SIMOTICS TN motors are available up to 4 MW, and are designed for operation with the following converter modells: SINAMICS G150, G130, S150 and S120.

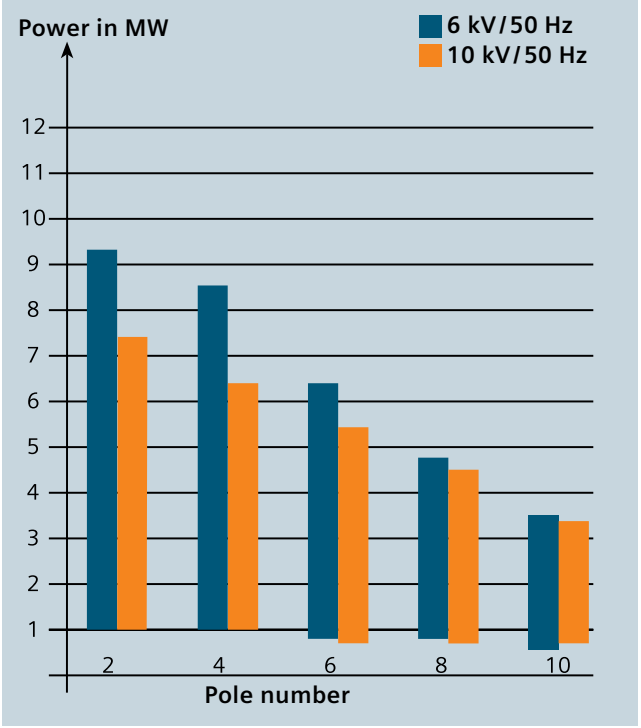
Technical features and power ranges

1RA4 / 1RN4 / 1RA6 / 1RN6 / 1RP6 series



Cooling: Air to water, open cooling, weather-protected

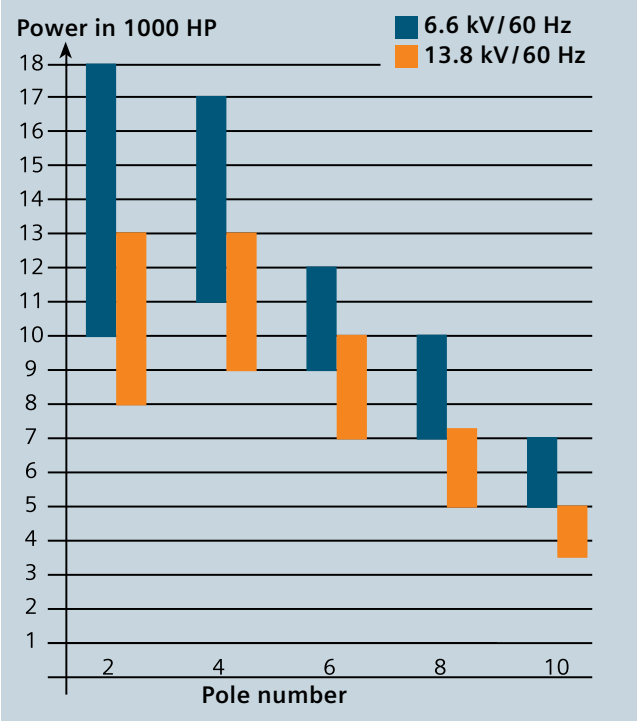
1RQ4 / 1RQ6 series



Cooling: Air to air

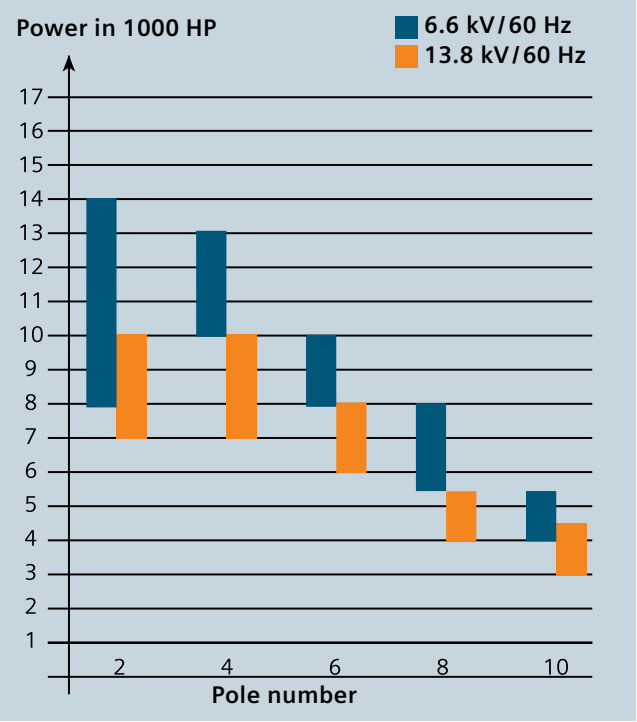
Technical features for the standard versions			
	1RA4 / 1RA6 / 1RP6 motors open cooling	1RN4/1RN6 motors air-to water cooler	Typ 1RQ4 / 1RQ6 motors air-to-air cooler
Voltage	690 V – 13.8 kV		
Frequency	50 / 60 Hz		
Pole number	2 – 12		
Speed	Constant speed (when connected to the line supply) / variable speed when fed from a drive up to max. 4800 rpm		
Shaft height	450 / 500 / 560 / 630 / 710 mm		
Type of construction	Horizontal IM B3 (IM 1001)/vertical IM V1 (IM 3011)		
Protection/cooling IEC	IP 23 / IP W24 / IC 01	IP55 / IC 81 W	IP55 / IC 611
Protection/cooling ANEMA	Weather-Protected II	Totally Enclosed Water-to-Air Cooled (TEWAC)	Totally Enclosed Air-to-Air Cooled (TEAAC)
Frame AH 450 / 500 / 560	Gray cast iron	Gray cast iron	Gray cast iron
Frame SH 630/710	Steel	Steel	Steel
Rotor cage	Copper		
Isolation	MICALASTIC VPI insulation system		
Explosion protection	Non-sparking EX n/pressurized enclosure Ex p/Class I, division 2 Certificate for China (CQST), Russia (GOST-R, Rostechnadsor), India (CCOE) and IEC Ex available on request		
Standards	IEC / NEMA / API		

1RA4 / 1RN4 / 1RN6 / 1RP6 series



Cooling: Air to water, open cooling, drip proof, weather-protected II

1RQ4 / 1RQ6 series



Cooling: Air to air

Close to you – worldwide. With extensive service.

Just as important as the optimum motor: the optimum partner – from the very beginning. We are one of the world's leading electrical and electronic engineering companies and we are there to support you in over 170 countries worldwide.

Our competent personnel support you locally around the world – from initially helping you to select the optimum drive concept to providing you with reliable technical service.

With Siemens everything runs smoothly –

and you always have a personal contact partner. Just ask us, we will take care of you.

Our hotline:
+49 (0) 180 / 505 02 22

First class from A to Z

With our sophisticated logistics and production control systems we can flexibly address your individual demands and requirements. Our first priority is to always provide you with highest quality. This is the reason that we take extreme care in selecting our suppliers.

Quality testing and assurance means that all incoming products undergo thorough testing and evaluation. Upon request Siemens can also conduct any customer-specific testing that is required or necessary to ensure product qualification and customer satisfaction. For production monitoring we also use a sophisticated tracking system that allows us to immediately intervene if the situation demands it. Before any product is shipped from our factories we put products through rigorous testing to ensure that only perfect products are sent out.

In our new system test facilities in Nuremberg (Germany) and Norwood (USA) – the most advance test centers in the world – the interaction between all of the drive components is intensively tested under real conditions. The result – maximum reliability and therefore the highest degree of availability.

More information:
www.siemens.com/simotics

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Subject to change 03/13
Order no.: E20001-A280-P530-X-7600
Dispo 21503
WÜ/45443 GD.LD.XX.LDHM.52.3.01
WS 03132.0
Printed in Germany