LAFERTMOTORS

TECHNICAL CATALOGUE 2012

HIGH PERFORMANCE MOTORS
INTEGRAL DRIVE (HPI RANGE)
STAND ALONE MOTOR (HPS RANGE)

CONTENTS

GENERAL INFORMATION

MISSION

For 50 years the Lafert Group have been committing to continuous growth by being the global leading manufacturer of **Customised Engineered Electric Motors and Drives** with special focus on **Industrial Automation**, **Energy Saving** and **Renewables.**

The Group have developed an excellent ability to adapt the highest quality standards to any specific market demands providing solutions for several applications and OEM requests.

The Lafert Group's range of products is divided in 5 product sectors:

ENERGY EFFICIENT Motors, three-phase motors high efficiency, IE2 and premium efficiency, IE3


ENERGY EFFICIENT Motors

CUSTOMISED Motors, single-phase, three-phase and brake motors in special execution


CUSTOMISED Motors

HIGH PERFORMANCE Motors, permanent magnet synchronous motors and generators as well as the relevant drives


HIGH PERFORMANCE Motors

SERVO Motors & Drives, brushless servomotors and drives for industrial automation


SERVO Motors & Drives

LIFT Motors, permanent magnet synchronous gearless machines for elevators

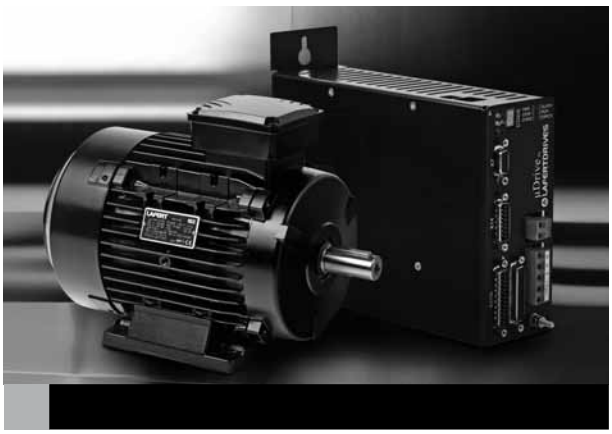

LIFT Motors

HIGH PERFORMANCE MOTORS

PERMANENT MAGNET SYNCHRONOUS MOTORS SIGNIFICANTLY REDUCE ENERGY COSTS

High Performance is a range of **PM synchronous motors** 0.37 kW to 22 kW, with variable speed and equipped with sensorless drives. By combining the technology of both brushless servo motors and AC motors, this range achieves the highest efficiency level **IE4 – Super Premium Efficiency** and is specifically designed for its energy saving potential and renewable energy applications.

Permanent magnet technology, very high efficiency, compact design, reduced weight, low operating temperature.



SERVO MOTORS & DRIVES

A MODERN AND COMPLETE RANGE FOR INDUSTRIAL AUTOMATION

The range of **Brushless Servo Motors** is one of the most complete available on the market, with nominal torques 0.30 Nm to 150 Nm. **Direct Drive Motors** cover torques 10 Nm to 500 Nm.
Thanks to its whole integrated manufacturing process, Lafert is one of the few independent manufacturers of servo motors and can supply a wide range of standard and tailor-made products for **Industrial Automation** giving **excellent flexibility** and high level of **cost efficiency.**

The family of **Servo Drives** is especially engineering for brushless servo motors and DC motors providing **particular versatility** and **adaptability** when designing automated industrial machines.
These products ensure high reliability and are subjected to strict tests in different loads and climatic conditions.

A separate catalogue is available.

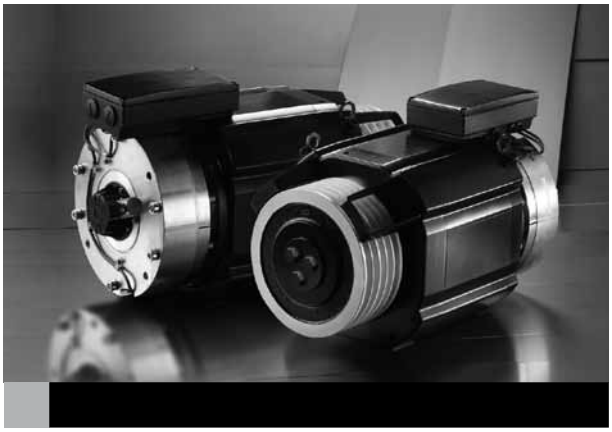
LIFT MOTORS

GEARLESS MACHINES FOR ELEVATORS

The **Lift** range allows the manufacturing of systems where the traction machine is inside the elevator shaft, so there is no need for a machine room, with obvious **space and cost savings** and a more **rational layout** of the all components.

Permanent Magnet Gearless Synchronous Machines with compact design, reduced energy consumption, low noise level, high comfort and requiring less maintenance. Motors with torque up to 660 Nm for systems with a capacity load up to 1,275 kg, machines with TÜV SÜD Certifications, in compliance with the Specifications EN 81-1 and Lifts Directive 95/16/EC.

A separate catalogue is available.



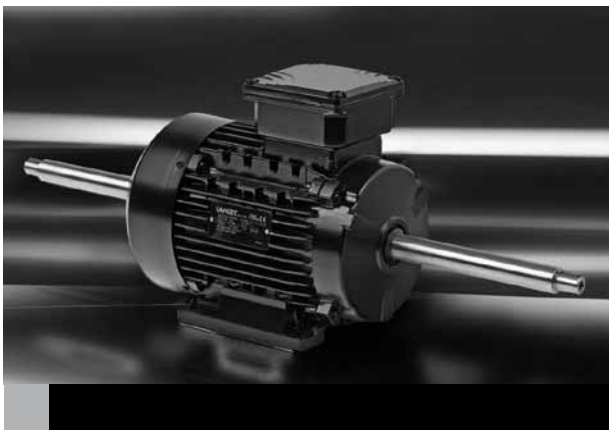
CUSTOMISED MOTORS

CUSTOMISATION, OUR CORE BUSINESS

A wide range of **Customised Motors** with **special execution**, in order to optimise electrical and mechanical design for particular markets or specific OEM requests.

Single-phase, Three-phase and Brake Motors manufactured ad hoc for non-standard applications according to **customer's demands**: customised flanges and shafts, special electrical design for each duty request, complete tailor-made design, AC or DC brake coil to fit any applications, solutions to special environmental conditions (Smoke and Heat Exhaust Ventilation, Dust Ignition for Zone 22, Non Sparking Exn).

A separate catalogue is available.



ENERGY EFFICIENT MOTORS

HIGH EFFICIENCY, ENERGY SAVING

The range of **Energy Efficient Motors** has been developed to meet the increasing demand for **increased energy efficiency and energy saving products** in Europe, North America and Australia after the introduction of directives imposing **higher minimum efficiency levels.**

IE2
IE3

High Efficiency and Premium Efficiency Three-phase Motors up to 200 kW meeting the requirements of IE2 and IE3 internationally efficiency levels in accordance with **IEC 60034-30;2008** and test method IEC 60034-2-1;2007.

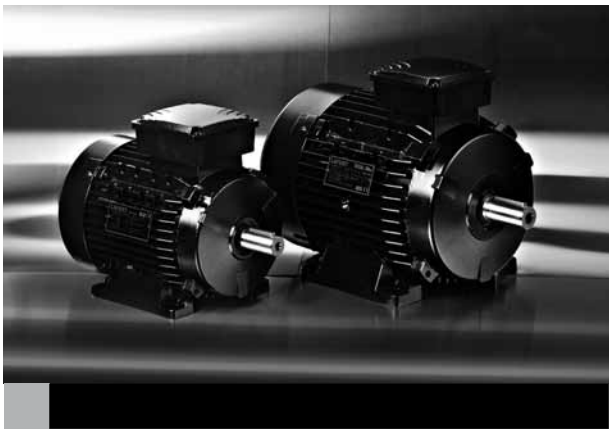
ENERGY
c US

Motors conforming to the higher efficiency standards for the North American market in accordance with **EPAct Regulation** (Energy Policy Act, 1992) and **EISA Directive** (Energy Independence and Security Act, 2007).
In addition these motors are verified by **UL Underwriters Laboratories Inc**..

c UL Energy Verified

The range of Energy Efficient Motors from Lafert is the first complete range of IE2 and IE3 motors available to worldwide Industry.

A separate catalogue is available.



PM SYNCHRONOUS MOTORS SIGNIFICANTLY REDUCE ENERGY COSTS

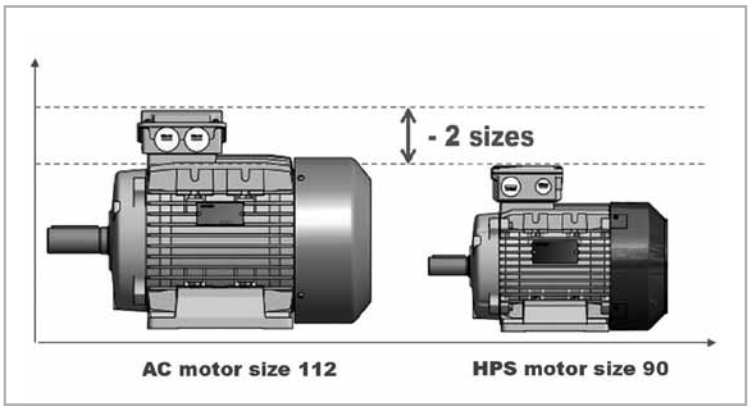
A new high-performance motor intended for the OEM market that offers **significant savings on running costs and space** requirements that can be engineered to match customer applications has been introduced by Lafert. Savings on operating costs are substantial since the motor's are far superior compared to standard AC induction motors enables **significant frame size reductions plus weight savings.**

The new Lafert High Performance motor combines the **technology of both brushless permanent magnet servo motors and conventional AC induction motors**. The ability to do this is facilitated by the fact the Lafert Group has both servo and AC induction motor knowhow in-house.

By combining these technologies, substantial efficiency advantages over conventional AC induction motors, including **IE4***, are achieved. The efficiency is superior across the whole speed range.

As with the brushless, permanent magnet servo motors, the rotor of the Lafert HP motor has no losses. Also, stator currents are lower, consequently generating lower losses due to low current demand (Joule effect), the benefit is limited temperature rise for both the windings and bearings. These limited temperature rises can in the right design eliminate the need for a cooling fan and its related losses. Ultimately, the sum of these minimised heat contributions provides higher running speeds and extended bearing life.

The enhanced performance characteristics of the HP motor also permit Lafert to offer smaller frame size solutions and weight savings of around 50%.



**Pending approval by IEC*

All these combined features enable engineers to achieve compact efficient motor solutions, particularly for such applications involving pumps, fans and compressors that are substantially more compact, lighter in weight and less expensive to run.

And all these benefits are provided from one development source due to Lafert's in-house technology and the ability to harness the best from proven components such as the **AC induction motor's standard stator and the surface-mounted permanent magnet rotor from the brushless servo motor.**

The High Performance motor can be used with a standard servo drive when fitted with an appropriate transducer but, ideally, it should be used in conjunction with a sensorless drive to maximise the motors performance and superior efficiencies for the specific application.

Lafert can deliver **drives controlling stand-alone PM motors** *(HPS range)* or **drives integrated into the PM motors** *(HPI range).*

RANGE OF PRODUCTS

A range of solutions to meet specific demand:

- Integral construction (HPI range) or stand-alone drive (HPS range)
- Sensorless control or with speed transducer
- Serial isolated RS485 (eventually for "Cascade" connection) or serial isolated CANBus

BRIEF DESCRIPTION

The following features of our HP Motors may vary depending on series and type:

- Admissible environmental temperature: from -15 °C up to +40 °C, with altitudes 1000 m above sea level
- Mounting: IM B3, B5, B14, B34, B35
- Flange concentricity degree "N"; balancing: vibration "N"; dynamic balancing with half key
- Shaft designed according to the standard version with key (also available without key)
- Available speeds: 1500, 1800, 3000, 3600, 4500 rpm
- Drive operating voltage: 230 or 400 Vac
- Insulation class: "F"; temperature rise to class B (TEFC execution)
- IP55 degree of protection for the whole range
- On-Off PTO switch for thermal protection (NTC and PTC are available)
- Optional feedback by choice: resolver, encoder, tacho and Hall sensors (several combinations may be added to this list)
- Reduced dimensions
- Rare earth permanent magnets

DEFINITIONS

- **Rated torque (Mn):** Torque available on the shaft continuously (service S1) with rated speed and with a winding current equivalent to the rated current.
- **Peak torque (Mpk):** Torque available on the shaft discontinuously, with a winding current equivalent to the peak current.
- **Rated current (In):** Current supplied to the motor continuously at a rated speed, required to develop rated torque.
- **Peak current (Ipk):** Current supplied to the motor discontinuously within a wide range of speed, required to develop peak torque (not to be exceeded to avoid magnet demagnetization).
- **Voltage constant (Ke):** Ratio between voltage induced by the rotor rotation (RMS value for sinusoidal motor, peak value for trapezoidal motor) at a certain number of revolutions and angular speed ($\omega=2 \times \pi \times n/60$ where n is the speed expressed in rpm) measured in rad/sec.
- **Torque constant (Kt):** Ratio between torque on the shaft and the current RMS value for sinusoidal motors, peak value for trapezoidal motors (equivalent to the voltage constant of a trapezoidal motor and to that of a sinusoidal motor multiplied by $\sqrt{3}$).
- **Back electromotive force (B.E.M.F):** Voltage induced by the rotor rotation (RMS value for sinusoidal motor, peak value for trapezoidal motor) at a certain number of revolutions.

QUALITY SYSTEM CERTIFICATE

The strictness of our quality control assures the flawless operation and reliability of our products. Our quality is confirmed by the **Certificate ISO 9001** awarded by CERMET, a certification body authorized by ACCREDIA.

SAFETY STANDARDS

Our motors comply with the requirements of the International Standard **IEC 60034** for rotating electrical machines as well as with the following European Directives: **Low Voltage Directive** (LV) 2006/95/EC, **Electromagnetic Compatibility Directive** (EMC) 2004/108/EC.

All products comply with the requirements of the **Directive Machines** (MD) 2006/42/EC. In accordance with this Directive, induction motors are components and intended solely for integration into other machines. Commissioning is forbidden until conformity of the end-product with this Directive is proved.

CE The CE marking was applied for the first time in 1995.

When operating the motor, the observance of the Regulation EN 60204-1 and safety instructions indicated in our Operating Instructions must be complied with.

c UL us Motors complied with many other international standards are available on request: Motors approved by UL Underwriters Laboratories Inc.

The HPS motors comply with the relevant standards and regulations, especially:

ELECTRICAL	General stipulations for electrical machines	IEC 60034-1
	Terminal markings and direction of rotation of rotating electrical machines	IEC 60034-8
	Selection of energy-efficient motors including variable speed applications-application guide	IEC/ST 60034-31
	Insulating materials	IEC 60085
MECHANICAL	Dimensions and output ratings	IEC 60072
	Mounting dimensions and relationship frame sizes-output ratings, IM B3, IM B5, IM B14	IEC 60072
	Cylindrical shaft ends for electric motors	IEC 60072
	Degrees of protection	IEC 60034-5
	Methods of cooling	IEC 60034-6
	Mounting arrangements	IEC 60034-7
	Mechanical vibration	IEC 60034-14
	Mounting flanges	DIN 42948
	Tolerances of mounting and shaft extensions	DIN 42955
	Classification of environmental conditions	IEC 60721-2-1
	Mechanical vibration; balancing	ISO 8821

COMPLIANCE WITH EMC DIRECTIVE

In the great majority of cases, the HPI Drive is used by professionals of the trade as a complex component forming part of a larger appliance, system or installation. It must be noted that the responsibility for the final EMC properties of the appliance, system or installation rests with the installer.

EMC GENERAL STANDARDS

The product standards are stated in **EN 61800-3** (IEC 61800-3): adjustable speed electrical power drive systems-Part 3. EMC product standard including specific test methods.

The HPI Motors comply with:

EN 61800-3, unrestricted distribution[1)]
EN 61800-3, restricted distribution
Residential, commercial and light industrial environment: EN 61000-6-3[2)], EN 61000-6-1
Industrial environment: EN 61000-6-2, EN 61000-6-4

1) Emission levels stated by EN 61800-3 unrestricted distribution are only fulfilled by HPI Motors with class B-1 filter.

2) Emission levels stated by EN 61000-6-3 are only fulfilled by HPI Motors with class B-1 optional filter.

EMC IMMUNITY

If there are problems with low frequency interference (ground loops), screened cable used for bus, standard bus, control cables and signal interface can be left open at one end.

BASIC STANDARDS

EMISSIONS

EN 55011: Limits and methods of measuring radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

EN 55022: Limits and methods of measuring radio disturbance characteristics of information technology equipment

EN 61000-3-2: Limits for harmonic current emissions (equipment input current ≤16 A)

EN 61000-3-12: Limits for harmonic current emissions (equipment input current >16 A)

EN 61000-6-4: Electromagnetic compatibility (EMC)-Part 6-4, Generic standards-Emission standard for industrial environments

EN 61000-6-3[1]: Residential, commercial and light industrial environment

1) Emission levels stated by EN 61000-6-3 are only fulfilled by HPI Motors with class B-1 optional filter.

IMMUNITY

EN 61000-2-4 (IEC 61000-2-4): Compatibility levels Simulation of voltage and frequency fluctuations, harmonics and commutation notches on the power line

EN 61000-4-2 (IEC 61000-4-2): Electrostatic discharge (ESD) Simulation of electrostatic discharge

EN 61000-4-4 (IEC 61000-4-4): Fast transients, burst 5/50 nS Simulation of transients caused by switching of contactors, relays or similar devices

EN 61000-4-5 (IEC 61000-4-5): Surges 1.2/50 µS. Simulation of transients caused by e.g. lightning that strikes near an installation

EN 61000-4-3 (IEC 61000-4-3): Radio-frequency electromagnetic field. Amplitude modulated. Simulation of interference caused by radio transmission equipment

EN 61000-4-6 (IEC 61000-4-6): RF common mode. Simulation of the effect from radio-transmitting equipment connected to connection cables

ENV 50204: Radio-frequency electromagnetic field. Pulse modulated. Simulation of interference caused by GSM mobile phones. General aspects of EMC emissions for high frequency shielding, screened cables used for CanBus or RS485, standard bus, control cables and signal interface must in general be connected to the enclosure at both ends

EN 61000-6-2: Electromagnetic compatibility (EMC)-Part 6-2: Generic standards-Immunity for industrial environments

EN 61000-6-1: Residential, commercial and light industrial environment

VIBRATION AND SHOCK

HPI Motors have been tested according to a procedure based on the following standards:

IEC 60068-2-6: Vibration (sinusoidal) - 1970
IEC 60068-2-34: Random vibration broad-band- general requirements
IEC 60068-2-35: Random vibration broad-band- high reproducibility
IEC 60068-2-36: Random vibration broad-band- medium reproducibility

HPI Motors comply with requirements that correspond to conditions in the standards mentioned above.

AIR HUMIDITY

HPI Motors have been designed to meet the IEC 60068-2-3 standard, EN 50178 item 9.4.2.2/DIN 40040, class E, at 40°C.
Cyclic damp heat according to IEC 60068-2-30, 40°C.

AGGRESSIVE ENVIRONMENTS

In common with all electronic equipment, a HPI drive contains a large number of mechanical and electronic components, all of which are vulnerable to environmental effects to some extent.
Therefore the HPI drive should not be installed in environments with airborne liquids, particles or gases capable of affecting and damaging the electronic components.

Failure to take the necessary protective measures increases the risk of stoppages, thus reducing the life of the drive. Damp and moisture can be carried through the air and condense in the drive. In addition to this, damp and moisture may cause corrosion of components and metal parts.
Steam, oil and salt water may cause corrosion of components and metal parts.
In environments with high temperatures and humidity, corrosive gases such as sulphur, nitrogen and chlorine compounds will cause chemical processes on the drive converter components.
Such chemical reactions will rapidly affect and damage the electronic components.

Mounting HPI drive in aggressive environments will increase the risk of stoppages and furthermore considerably reduce the life of electronic converter.

Before the installation, the ambient air should be checked for damp and moisture, particles and gases. This may be done by observing existing installations in this environment. Typical indicators of harmful airborne damp and moisture are water or oil on metal parts, or corrosion of metal parts.
Excessive dust particle levels are often found on installation cabinets and existing electrical installations.
One indicator of aggressive airborne gases is blackening of copper rails and cable ends on existing installations.

ELECTRICAL TOLERANCES

For industrial motors to **EN 60034-1**, certain tolerances must be allowed on guaranteed values, taking into consideration the necessary tolerances for the manufacture of such motors and the materials used. The standard includes the following remarks:

1- It is not intended that guarantees necessarily have to be given for all or any of the items involved. Quotations including guaranteed values subject to tolerances should say so, and the tolerances should be in accordance with the table.
2- Attention is drawn to the different interpretation of the term guarantee. In some countries a distinction is made between guaranteed values and typical or declared values.
3- Where a tolerance is stated in only one direction, the value is not limited in the other direction.

Values for	Tolerance
Efficiency (η) (by indirect determination)	- 0.15 (1 - η) at $P_N \leq 150$ kW - 0.1 (1 - η) at $P_N > 150$ kW
Power factor (cos φ)	$\frac{1 - \cos \varphi}{6}$, minimum 0.02, maximum 0.07
Rated current with rated torque and revolutions (measurement in S1 duty cycle at rated speed with $\vartheta_{amb} \leq 40$ °C and altitude ≤1000 m above sea level)	In +/- 5%
Back electromotive force: Bemf	Bemf +/- 5%
Peak torque (M_K)	- 10 % of the guaranteed value (after allowing for this tolerance, M_K/M_N not less than 1.6)
Moment of inertia (J)	± 10 % of the guaranteed value

MECHANICAL TOLERANCES

According to **IEC 60072-1**, the following tolerances on mechanical dimensions of electric motors are permitted:

Parameter	Code	Tolerance	
Shaft height	H	- up to 132	-0.5 mm
Diameter of shaft end[1)]	D	- from 11 to 28 mm - from 38 to 48 mm	j6 k6
Hub key width	F		h9
Flange spigot	N	- up to 132 - over size 132	j6 h6

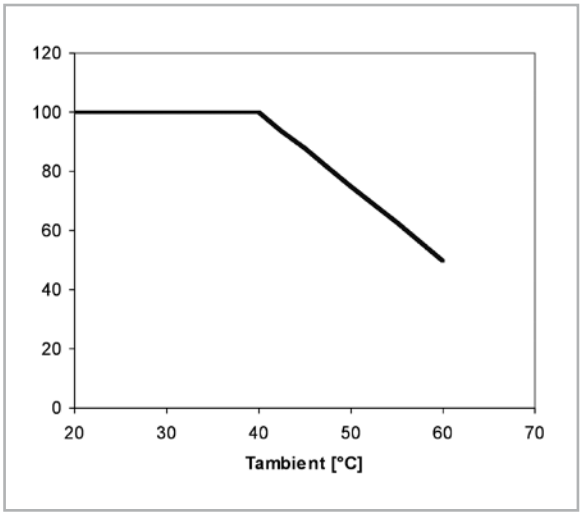
1) Centerings holes in shaft extension to DIN 332 part 2

THERMAL PROTECTION AND DERATING

The HPI Motors are thermally protected in case limits are exceeded (140°C), another protection is provided throught the drive.

DERATING FOR AMBIENT TEMPERATURE

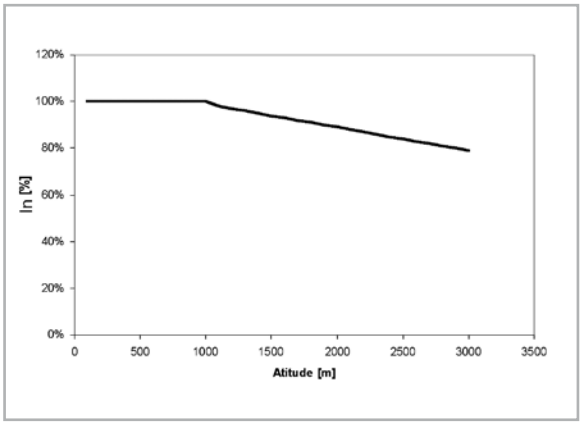
The ambient temperature (TAMAX) is the maximum temperature allowed. If HPI Motor is operated at temperatures above 40 °C, a derating of the continuous output current is necessary.



DERATING FOR AIR PRESSURE

Below 1000 m altitude no derating is necessary. Above 1000 m the ambient temperature (TA) or max. rated output current (IN) must be derated in accordance with the following diagram.

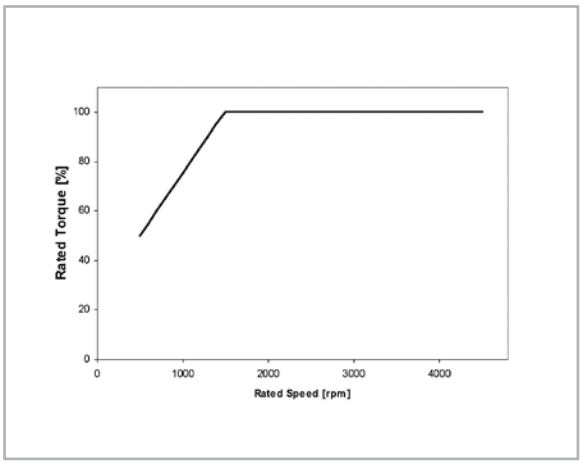
See the below diagram for derating of output current versus altitude at TA = max. 40°C



DERATING FOR RUNNING AT LOW SPEED

When a centrifugal pump or a fan is controlled by a HPI Motor, it is not necessary to reduce the output at low speed because the load characteristic of the centrifugal pumps/ fans, automatically ensures the necessary reduction.

HPI motors running constant load torque applications continuously at low speed must be derated (see diagram) or an independent fan must be used.



EFFICIENCY

The efficiency varies with the speed and torque.
Refer to HPI and HPS efficiency and torque curves.

GALVANIC ISOLATION (PELV)

Galvanic (ensured) isolation is obtained by fulfilling requirements concerning higher isolation and by providing the relevant clearpage/clearance distances. These requirements are described in the EN 50178 standard.

In HPI Series all control terminals are supplied from or in connection with extra low voltage (PELV).

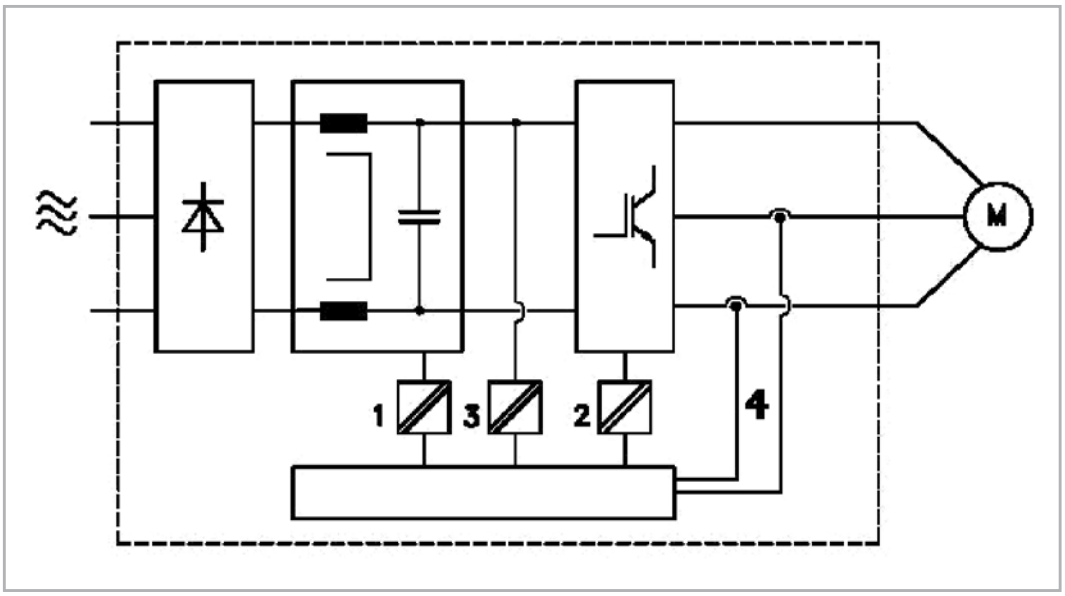
The components that make up the electrical isolation, as described below, also comply with the requirements concerning higher isolation and the relevant test as described in EN 50178. The galvanic isolation can be shown in three locations (see drawing below), namely:

1. Power supply (SMPS) including signal isolation of VDCbus, indicating the intermediate voltage.

2. Gate drive that runs the IGBTs (opto couplers)

3. DCbus Voltage transducer (opto couplers)

4. Current transducers (Hall Effect-Based Current Sensor).



EARTH LEAKAGE CURRENT

Earth leakage current is primarily caused by the capacitance between motor phases and the motor frame. The RFI filter contributes additional leakage current, as the filter circuit is connected to earth through capacitors (Cy).

The size of the leakage current to the ground depends on the following factors, in order of priority:
1 - Switching PWM frequency
2 - Motor grounded on site or not

The leakage current is of importance to safety during handling/operation of the drive if (by mistake) the drive has not been earthed.

OVER VOLTAGE PROTECTION

The voltage in the intermediate circuit is increased when the motor acts as a generator. This occurs in two cases:

1 - The load generates energy.
2 - During deceleration ("ramp-down") if the moment of inertia is high, the load is low and the ramp-down time is too short for the energy to be dissipated as a loss in the HPI frequency converter, the motor and the installation.

The drive turns off to protect the IGBT transistors and the intermediate circuit capacitors when a certain voltage level is reached on DCbus.

MAINS SUPPLY INTERFERENCE/HARMONICS

A HPI integral drive takes up a non-sinusoidal current from mains. A non-sinusoidal current can be transformed by means of a Fourier analysis and split up into sine wave currents with different frequencies, i.e. different harmonic currents IN with 50 Hz as the basic frequency.

Some of the harmonic currents might disturb communication equipment connected to the same transformer or cause resonance in connection with power-factor correction batteries.
To ensure low, harmonic currents, for the residential and commercial environments, an optional harmonic filter is necessary.

DEGREES OF PROTECTION

Degrees of mechanical protection for machines are designated in accordance with **IEC 60034-5** by the letters **IP** and two characteristic numerals.

First numeral: Protection against contact and ingress of foreign bodies

IP	Description
0	No special protection
1	Protection against solid foreign bodies larger than 50 mm (Example: inadvertent contact with the hand)
2	Protection against solid foreign bodies larger than 12 mm (Example: inadvertent contact with the fingers)
3	Protection against solid foreign bodies larger than 2.5 mm (Example: Wires, tools)
4	Protection against solid foreign bodies larger than 1 mm (Example: Wires, bands)
5	Protection against dust (harmful deposits of dust)
6	Complete protection against dust

Second numeral: Protection against ingress of water

IP	Description
0	No special protection
1	Protection against vertically falling water drops (condensation)
2	Protection against dropping water when inclined by up to 15°
3	Protection against waterspray at up to 60° from vertical
4	Protection against water splashed from any direction
5	Protection against water projected by a nozzle from any direction
6	Protection against heavy seas or water projected in powerful jets

BEARING LUBRICATION AND MAINTENANCE

All motors have bearings type 2ZC3 with grease suitable for high and low temperature and permanent lubrication.
Grease type WT (asonic GHY 72) or LHT 23 (multemp) or ens: suitable for low and high temperature (-40; 140 °C)

COOLING

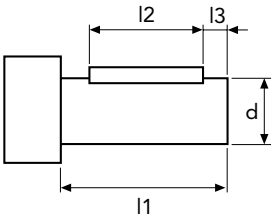
TEFC execution as standard.
Surface cooling, independent of the direction of rotation.

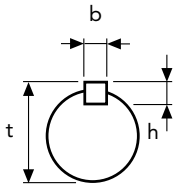
VIBRATION

The amplitude of vibration in electric motors is governed by EN 60034-14 ***Mechanical vibration of rotating electrical machines with shaft heights 56 and larger - methods of measurement and limits.***
Standard motors are designed to vibration grade A (normal). Vibration grade B is available at extra cost.

Rotors are at present dynamically balanced with **half** key fitted as per DIN ISO 8821. Other balancing only on request.
The motors are identified as follows:

"H" or "blank" means balanced with ***half key***
"F" means balanced with ***full key***
"N" means ***no key***





POSITION AND DIMENSIONS OF KEY

Frame size	d x l1	b x h	l2	l3	t
71	14 x 30	5 x 5	20	5	16
90	24 x 50	8 x 7	40	6	27
112	28 x 60	8 x 7	50	6	31
132	38 x 80	10 x 8	70	5	41

Dimensions in mm.
For larger shafts in special design the dimensions l2 and l3 are maintained.

NAMEPLATE EXAMPLE - HPS RANGE

NAMEPLATE EXAMPLE - HPI RANGE

HPI - INTEGRAL DRIVE

DRIVE SPECIFICATIONS

MAIN SUPPLY (L1 L2 L3)

Supply Frequency	48 - 62Hz
Supply Voltage	3 x 380/480V ± 10%
Max. Imbalance of supply voltage	± 2% of rated supply
Switching on supply voltage	Once every 2 minutes

OUTPUT RATINGS

Output Current	100% Drive Rated Power continuously
Overload Capacity	150% for 60 secs

CONTROL SPECIFICATION

Control Method	Sensorless AC Vector Control
Max PWM Frequency	12kHz
Frequency range	up to 400 Hz
Resolution on output frequency	0.1%
Current/speed sampling time	83µs

DIGITAL INPUTS

Programmable digital inputs	4
Voltage level	0-24V_{dc} (user selectable npn or pnp)

PULSE INPUT

Programmable pulse input	1
Voltage level	0:24V_{dc}
Max frequency	10kHz

ANALOG INPUT

Programmable analog voltage input	1
Voltage Level	0:10V_{dc}
Input Resistance Rin	10KΩ
Resolution	12bit
Programmable analog current inputs	1
Current Range	0:20mA
Input Resistance Rin	500Ω
Resolution	12bit

RELAY OUTPUT

Programmable relay output	1 (n.o. n.c. com)
Max terminal load	250Vac 2A 500VA

BUS COMUNICATION

RS485 or Canbus	For cascade mode
RS485	Serial comunication
Canbus	Can-Open

EXTERNALS

Enclosure	IP55
Vibration test	EC 60068-2-6
Max relatively umidity	95% (IEC 60068-2-3)
Operating ambient temperature	0:40°C
Storage ambient temperature	- 25°C:60°C
Min. ambient temperature at full operation	0°C
Altitude	0 - 3000m, derate 1% per 100m above 1000m

COMPLIANCE WITH STANDARDS

EN 61800-3:2004	Adjustable speed electrical power drive systems. EMC requirements
IEC 61800-5-1	Adjustable speed electrical drive systems - part 5-1: safety requirements - electrical, thermal and energy
EN 60204-1	Safety of machinery - electrical EMC equipment of machines - part 1: general rules

PROGRAMMING

Keypad	Yes
PC	Yes

HPI - INTEGRAL DRIVE
1500 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P_n kW	M_n Nm	M_{pk} Nm	I_n Arms	I_{pk} Arms	η %	I_{in} Arms	I_{in} Arms	K_t Nm/A	Kg
1500 min^{-1}											
HPI71 1500 12	1500	0.55	3.5	5.3	1.2	1.8	81.1%	1.3	1.0	3	7.3
HPI71 1500 16	1500	0.75	4.8	7.2	1.6	2.4	81.8%	1.7	1.4	3	7.9
HPI71 1500 23	1500	1.1	7	10.5	2.3	3.5	83.3%	2.5	2.0	3	8.7
HPI71 1500 32	1500	1.5	9.6	14.4	3.2	4.8	84.1%	3.4	2.7	3	9.5
HPI90 1500 32	1500	1.5	9.6	14.4	3.2	4.8	87.6%	3.4	2.7	3	13.5
HPI90 1500 47	1500	2.2	14.0	21.0	4.7	7.0	88.3%	4.9	3.9	3	15.5
HPI90 1500 64	1500	3.0	19.1	28.7	6.4	9.6	88.6%	6.6	5.2	3	17.5
HPI90 1500 85	1500	4.0	25.5	38.3	8.5	12.7	89.0%	8.8	7.0	3	20.5
HPI112 1500 85	1500	4.0	25.5	38.3	8.5	12.7	89.0%	8.7	6.9	3	28.5
HPI112 1500 117	1500	5.5	35.0	52.5	11.7	17.5	89.1%	11.9	9.4	3	31.5
HPI112 1500 159	1500	7.5	47.8	71.7	15.9	23.9	89.5%	16.2	12.8	3	35.5
HPI112 1500 233	1500	11.0	70.0	105.0	23.3	35.0	91.0%	23.6	18.7	3	38.5
HPI132 1500 233	1500	11.0	70.0	105.0	23.3	35.0	91.1%	23.3	18.5	3	57.5
HPI132 1500 318	1500	15.0	95.5	143.7	31.8	47.8	91.3%	31.8	25.2	3	64.5
HPI132 1500 393	1500	18.5	117.8	176.7	39.3	58.9	91.5%	39.2	31.1	3	71.5

HPI - INTEGRAL DRIVE
1800 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P_n kW	M_n Nm	M_{pk} Nm	I_n Arms	I_{pk} Arms	η %	I_{in} Arms	I_{in} Arms	K_t Nm/A	Kg
1800 min^{-1}											
HPI71 1800 12	1800	0.55	2.9	4.4	1.2	1.7	83.3%	1.3	1.0	2.5	7.3
HPI71 1800 16	1800	0.75	4.0	6.0	1.6	2.4	84.9%	1.7	1.4	2.5	7.9
HPI71 1800 23	1800	1.1	5.8	8.8	2.3	3.5	85.3%	2.5	2.0	2.5	8.7
HPI71 1800 32	1800	1.5	8.0	11.9	3.2	4.8	85.8%	3.4	2.7	2.5	9.5
HPI90 1800 32	1800	1.5	8.0	11.9	3.2	4.8	87.5%	3.4	2.7	2.5	13.5
HPI90 1800 46	1800	2.2	11.7	17.5	4.6	7.0	87.9%	4.9	3.9	2.5	15.5
HPI90 1800 63	1800	3.0	15.9	23.9	6.3	9.5	88.3%	6.6	5.2	2.5	17.5
HPI90 1800 84	1800	4.0	21.2	31.8	8.4	12.7	88.6%	8.8	7.0	2.5	20.5
HPI112 1800 84	1800	4.0	21.2	31.8	8.4	12.7	89.0%	8.7	6.9	2.5	28.5
HPI112 1800 116	1800	5.5	29.2	43.8	11.6	17.4	89.0%	11.9	9.4	2.5	31.5
HPI112 1800 158	1800	7.5	39.8	59.7	15.8	23.8	89.6%	16.2	12.8	2.5	35.5
HPI112 1800 232	1800	11.0	58.4	87.5	23.2	34.9	90.0%	23.6	18.7	2.5	38.5
HPI132 1800 232	1800	11.0	58.4	87.5	23.2	34.9	91.2%	23.3	18.5	2.5	57.5
HPI132 1800 317	1800	15.0	79.6	119.4	31.7	47.5	91.5%	31.8	25.2	2.5	64.5
HPI132 1800 391	1800	18.5	98.1	147.2	39.1	58.6	91.6%	39.2	31.1	2.5	71.5

HPI - INTEGRAL DRIVE
3000 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P_n kW	M_n Nm	M_{pk} Nm	I_n Arms	I_{pk} Arms	η %	I_{in} Arms	I_{in} Arms	K_t Nm/A	 Kg
3000 min^{-1}											
HPI71 3000 16	3000	0.75	2.4	3.6	1.6	2.4	85.5%	1.7	1.3	1.5	7.3
HPI71 3000 23	3000	1.10	3.5	5.3	2.3	3.5	86.9%	2.4	1.9	1.5	7.9
HPI71 3000 32	3000	1.50	4.8	7.2	3.2	4.8	87.4%	3.3	2.6	1.5	8.5
HPI71 3000 47	3000	2.20	7.0	10.5	4.7	7.0	87.7%	4.8	3.8	1.5	9.1
HPI90 3000 47	3000	2.20	7.0	10.5	4.7	7.0	86.9%	4.8	3.8	1.5	13.5
HPI90 3000 64	3000	3.00	9.6	14.4	6.4	9.6	88.4%	6.4	5.1	1.5	15.5
HPI90 3000 85	3000	4.00	12.7	19.1	8.5	12.7	88.9%	8.5	6.8	1.5	17.5
HPI90 3000 117	3000	5.50	17.5	26.3	11.7	17.5	89.4%	11.7	9.3	1.5	19.5
HPI112 3000 117	3000	5.50	17.5	26.3	11.7	17.5	88.4%	11.9	9.4	1.5	28.5
HPI112 3000 159	3000	7.50	23.9	35.9	15.9	23.9	90.0%	15.9	12.5	1.5	31.5
HPI112 3000 233	3000	11.00	35.0	52.5	23.3	35.0	90.3%	23.2	18.4	1.5	35.5
HPI112 3000 318	3000	15.00	47.8	71.7	31.8	47.8	90.5%	31.5	25.0	1.5	38.5
HPI132 3000 318	3000	15.00	47.8	71.7	31.8	47.8	90.2%	32.1	25.4	1.5	57.5
HPI132 3000 393	3000	18.50	58.9	88.4	39.3	58.9	90.8%	38.8	30.7	1.5	64.5
HPI132 3000 467	3000	22.00	70.0	105.0	46.7	70.0	91.1%	46.1	36.5	1.5	71.5

HPI - INTEGRAL DRIVE
3600 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

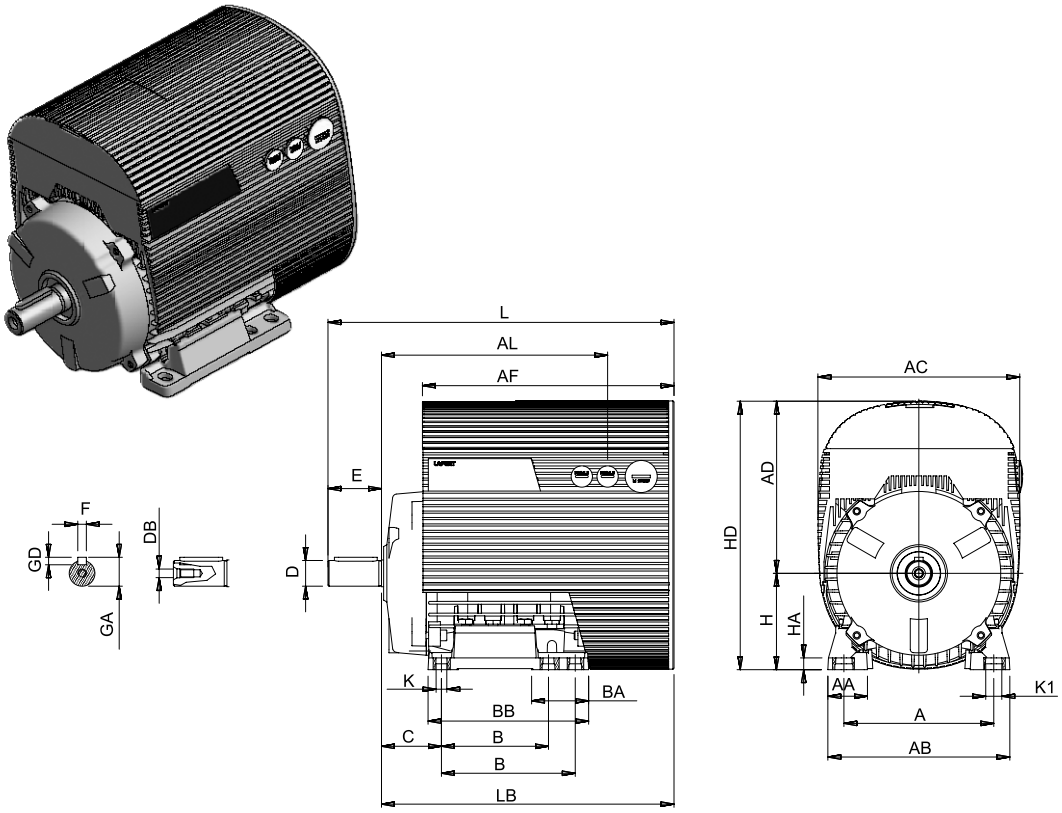
Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P_n kW	M_n Nm	M_{pk} Nm	I_n Arms	I_{pk} Arms	η %	I_{in} Arms	I_{in} Arms	K_t Nm/A	Kg
3600 min^{-1}											
HPI71 3600 16	3600	0.75	2.0	3.0	1.6	2.4	86.4%	1.7	1.3	1.26	7.3
HPI71 3600 23	3600	1.1	2.9	4.4	2.3	3.5	87.2%	2.4	1.9	1.26	7.9
HPI71 3600 32	3600	1.5	4.0	6.0	3.2	4.8	97.9%	3.3	2.6	1.26	8.5
HPI71 3600 46	3600	2.2	5.8	8.8	4.6	7.0	88.1%	4.8	3.8	1.26	9.1
HPI90 3600 46	3600	2.2	5.8	8.8	4.6	7.0	88.1%	4.8	3.8	1.26	13.5
HPI90 3600 63	3600	3.0	8.0	11.9	6.3	9.5	88.7%	6.4	5.1	1.26	15.5
HPI90 3600 84	3600	4.0	10.6	15.9	8.4	12.7	89.2%	8.5	6.8	1.26	17.5
HPI90 3600 116	3600	5.5	14.6	21.9	11.6	17.4	89.7%	11.7	9.3	1.26	19.5
HPI112 3600 116	3600	5.5	14.6	21.9	11.6	17.4	89.5%	11.9	9.4	1.26	28.5
HPI112 3600 158	3600	7.5	19.9	29.8	15.8	23.8	90.1%	15.9	12.5	1.26	31.5
HPI112 3600 232	3600	11.0	29.2	43.8	23.2	34.9	90.5%	23.2	18.4	1.26	35.5
HPI112 3600 317	3600	15.0	39.8	59.7	31.7	47.5	90.7%	31.5	25.0	1.26	38.5
HPI132 3600 317	3600	15.0	39.8	59.7	31.7	47.5	90.5%	32.1	25.4	1.26	57.5
HPI132 3600 391	3600	18.5	49.1	73.6	39.1	58.6	90.9%	38.8	30.7	1.26	64.5
HPI132 3600 465	3600	22.0	58.4	87.5	46.5	69.7	91.1%	46.1	36.5	1.26	71.5

HPI - INTEGRAL DRIVE
4500 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Rated speed	Rated power	Rated torque	Peak torque	Motor Rated current	Motor Peak current	Efficiency HPI	Rated input current 380 Vac	Rated input current 480 Vac	Torque constant	Weight HPI
	n 1/min	P_n kW	M_n Nm	M_{pk} Nm	I_n Arms	I_{pk} Arms	η %	I_{in} Arms	I_{in} Arms	K_t Nm/A	Kg
4500 min^{-1}											
HPI71 4500 23	4500	1.1	2.3	7.0	2.3	3.5	86.4%	2.4	1.9	1	7.3
HPI71 4500 32	4500	1.5	3.2	3.5	3.2	4.8	87.3%	3.3	2.6	1	7.9
HPI71 4500 47	4500	2.2	4.7	6.8	4.7	7.0	88.1%	4.8	3.8	1	8.7
HPI71 4500 64	4500	3.0	6.4	7.1	6.4	9.6	88.2%	6.5	5.1	1	9.5
HPI90 4500 64	4500	3.0	6.4	9.6	6.4	9.6	88.2%	6.4	5.1	1	13.5
HPI90 4500 85	4500	4.0	8.5	9.6	8.5	12.7	88.7%	8.5	6.8	1	15.5
HPI90 4500 117	4500	5.5	11.7	12.7	11.7	17.5	89.4%	11.7	9.3	1	17.5
HPI90 4500 159	4500	7.5	15.9	17.5	15.9	23.9	89.8%	15.9	12.6	1	20.5

HPI FRAME SIZE 71 - 90 - 112 - 132 IM B3
ALUMINIUM ALLOY FRAME



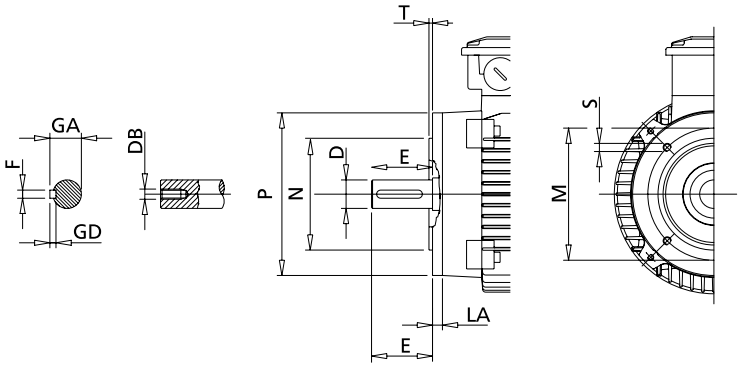
IEC	H	A	B	C	K[1)]	AB	BB	AD[2)]	HD[2)]	AC	HA
71	71	112	90	45	7	144	109	140	211	160	9
90S	90	140	100	56	10	170	150	183	273	196	11
90L	90	140	125	56	10	170	150	183	273	196	11
112	112	190	140	70	12.5	220	175	228	340	246	15
132	132	216	178	89	12	256	218	243	375	280	17

IEC	K[1]	L	LB	AL	AF	BA	AA	D	E	F	GD	GA	DB [3)]
71	17	280	250	200	200	22	30	14	30	5	5	16	M5
90S	15	369	319	254	280	28/53	37	24	50	8	7	27	M8
90L	15	369	319	254	280	28/53	37	24	50	8	7	27	M8
112	19	457	397	332	350	46	48	28	60	8	7	31	M10
132	20	545	465	380	415	45	59	38	80	10	8	41	M12

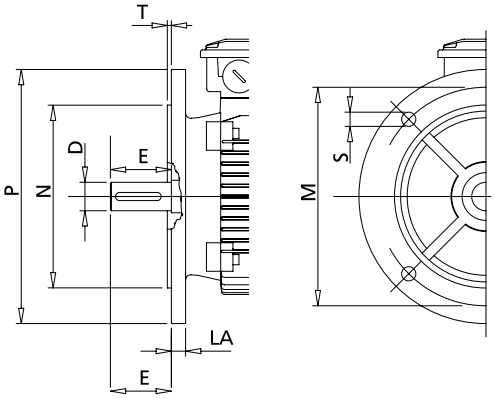
1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

HPI FRAME SIZE 71 - 90 - 112 - 132 IM B14, IM B5
ALUMINIUM ALLOY FRAME

IM B14

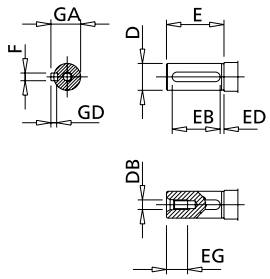


IM B5



	SMALL FLANGE B14						LARGE FLANGE B14						FLANGE B5					
IEC	**P**	**N**	**LA**	**M**	**T**	**S[1)]**	**P**	**N**	**LA**	**M**	**T**	**S[1)]**	**M**	**N**	**P**	**T**	**LA**	**S[1)]**
71	105	70	11	85	2.5	M6	140	95	8	115	2.5	M8	130	110	160	3.5	10	M8
90S-L	140	95	10	115	3	M8	160	110	9	130	3.5	M8	165	130	200	3.5	12	M10
112	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
132	200	130	30	165	3.5	M10	250	180	12	215	4	M12	265	230	300	4	14	M12

1) Clearence hole for screw



IEC	D	E	F h9	GD	GA	DB[1)]	EG	EB	ED
71	14 j6	30	5	5	16	M5	12.5	20	4
90S-L	24 j6	50	8	7	27	M8	19	40	4
112	28 j6	60	8	7	31	M10	22	50	4
132	38 k6	80	10	8	41	M12	28	70	5

1) Centering holes in shaft extension to DIN 332 part 2

HPS - STAND ALONE MOTOR

HPS - STAND ALONE MOTOR
1500 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant speed	BEMF at rated	Rated current	Efficiency HPS	Weight
		n 1/min	P_n kW	M_n Nm	M_{pk} Nm	K_e Vs	K_t Nm/A	E_n Vrs	I_n Arms	η %	Kg
1500 min^{-1}											
HPS71 1500 12	**71**	1500	0.55	3.5	10.5	1.73	3	272	1.2	86.0%	4.8
HPS71 1500 16	**71**	1500	0.75	4.8	14.4	1.73	3	272	1.6	87.0%	5.4
HPS71 1500 23	**71**	1500	1.1	7.0	21.0	1.73	3	272	2.3	87.8%	6.2
HPS71 1500 32	**71**	1500	1.5	9.6	28.8	1.73	3	272	3.2	88.5%	7.0
HPS90 1500 32	**S-L**	1500	1.5	9.6	28.7	1.73	3	272	3.2	91.0%	10.0
HPS90 1500 47	**S-L**	1500	2.2	14.0	42.0	1.73	3	272	4.7	91.5%	12.0
HPS90 1500 64	**S-L**	1500	3.0	19.1	57.3	1.73	3	272	6.4	92.0%	14.0
HPS90 1500 85	**S-L**	1500	4.0	25.5	76.4	1.73	3	272	8.5	92.3%	17.0
HPS112 1500 85	**M**	1500	4.0	25.5	76.4	1.73	3	272	8.5	92.4%	23.0
HPS112 1500 117	**M**	1500	5.5	35.0	105.1	1.73	3	272	11.7	92.5%	26.0
HPS112 1500 159	**M**	1500	7.5	47.8	143.3	1.73	3	272	15.9	93.1%	30.0
HPS112 1500 233	**M**	1500	11.0	70.0	210.1	1.73	3	272	23.3	93.8%	33.0
HPS132 1500 233	**XL**	1500	11.0	70.0	210.1	1.73	3	272	23.3	94.0%	51.0
HPS132 1500 318	**XXL**	1500	15.0	95.5	286.5	1.73	3	272	31.8	94.4%	58.0
HPS132 1500 393	**XXL**	1500	18.5	117.8	353.4	1.73	3	272	39.3	94.8%	65.0

HPS - STAND ALONE MOTOR
1800 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant speed	BEMF at rated	Rated current	Efficiency HPS	Weight
		n 1/min	P_n kW	M_n Nm	M_{pk} Nm	K_e Vs	K_t Nm/A	E_n Vrs	I_n Arms	η %	Kg
1800 min^{-1}											
HPS71 1800 12	**71**	1800	0.55	2.9	8.8	1.45	2.5	272	1.2	87.7%	4.8
HPS71 1800 16	**71**	1800	0.75	4.0	11.9	1.45	2.5	272	1.6	88.4%	5.4
HPS71 1800 23	**71**	1800	1.1	5.8	17.5	1.45	2.5	272	2.3	88.9%	6.2
HPS71 1800 32	**71**	1800	1.5	8.0	23.9	1.45	2.5	272	3.2	89.4%	7
HPS90 1800 32	**S-L**	1800	1.5	8.0	23.9	1.45	2.5	272	3.2	91.2%	10
HPS90 1800 46	**S-L**	1800	2.2	11.7	35.0	1.45	2.5	272	4.6	91.6%	12
HPS90 1800 64	**S-L**	1800	3.0	15.9	47.7	1.45	2.5	272	6.3	92.1%	14
HPS90 1800 84	**S-L**	1800	4.0	21.2	63.7	1.45	2.5	272	8.4	92.4%	17
HPS112 1800 84	**M**	1800	4.0	21.2	63.7	1.45	2.5	272	8.4	92.5%	23
HPS112 1800 116	**M**	1800	5.5	29.2	87.5	1.45	2.5	272	11.6	92.6%	26
HPS112 1800 158	**M**	1800	7.5	39.8	119.4	1.45	2.5	272	15.8	93.3%	30
HPS112 1800 232	**XL**	1800	11.0	58.4	175.1	1.45	2.5	272	23.2	94.0%	33
HPS132 1800 232	**M**	1800	11.0	58.4	175.1	1.45	2.5	272	23.2	94.2%	51
HPS132 1800 317	**XXL**	1800	15.0	79.6	238.7	1.45	2.5	272	31.7	94.6%	58
HPS132 1800 391	**XXL**	1800	18.5	98.1	294.4	1.45	2.5	272	39.1	94.9%	65

HPS - STAND ALONE MOTOR
3000 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant speed	BEMF at rated	Rated current	Efficiency HPS	Weight
		n 1/min	P_n kW	M_n Nm	M_{pk} Nm	K_e Vs	K_t Nm/A	E_n Vrs	I_n Arms	η %	Kg
3000 min^{-1}											
HPS71 3000 16	**71**	3000	0.75	2.4	7.2	0.87	1.5	272	1.6	89.7%	4.8
HPS71 3000 23	**71**	3000	1.1	3.5	10.5	0.87	1.5	272	2.3	90.5%	5.4
HPS71 3000 32	**71**	3000	1.5	4.8	14.3	0.87	1.5	272	3.2	91.2%	6
HPS71 3000 47	**71**	3000	2.2	7.0	21.0	0.87	1.5	272	4.7	91.4%	6.6
HPS90 3000 47	**S-L**	3000	2.2	7.0	21.0	0.87	1.5	272	4.7	91.5%	10
HPS90 3000 64	**S-L**	3000	3.0	9.6	28.7	0.87	1.5	272	6.4	92.1%	12
HPS90 3000 85	**S-L**	3000	4.0	12.7	38.2	0.87	1.5	272	8.5	92.6%	14
HPS90 3000 117	**S-L**	3000	5.5	17.5	52.5	0.87	1.5	272	11.7	93.1%	16
HPS112 3000 117	**M**	3000	5.5	17.5	52.5	0.87	1.5	272	11.7	92.9%	23
HPS112 3000 159	**M**	3000	7.5	23.9	71.6	0.87	1.5	272	15.9	93.7%	26
HPS112 3000 233	**M**	3000	11.0	35.0	105.1	0.87	1.5	272	23.3	94.1%	30
HPS112 3000 318	**M**	3000	15.0	47.8	143.3	0.87	1.5	272	31.8	94.2%	33
HPS132 3000 318	**M**	3000	15.0	47.8	143.3	0.87	1.5	272	31.8	93.8%	51
HPS132 3000 393	**XL**	3000	18.5	58.9	176.7	0.87	1.5	272	39.3	94.6%	58
HPS132 3000 467	**XXL**	3000	22.0	70.0	210.1	0.87	1.5	272	46.7	94.9%	65
HPS132 3000 636	**XXL**	3000	30.0	95.4	286.0	0.87	1.5	272	63.6	95.0%	72

HPS - STAND ALONE MOTOR
3600 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

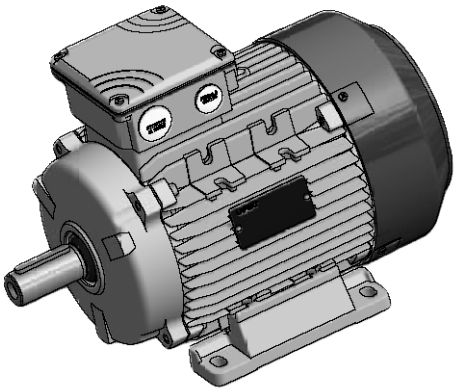
Type	Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant speed	BEMF at rated	Rated current	Efficiency HPS	Weight
		n 1/min	P_n kW	M_n Nm	M_{pk} Nm	K_e Vs	K_t Nm/A	E_n Vrs	I_n Arms	η %	Kg
3600 min^{-1}											
HPS71 3600 16	**71**	3600	0.75	2.0	6.0	0.73	1.26	272	1.6	90.0%	4.8
HPS71 3600 23	**71**	3600	1.1	2.9	8.8	0.73	1.26	272	2.3	90.9%	5.4
HPS71 3600 32	**71**	3600	1.5	4.0	11.9	0.73	1.26	272	3.2	91.6%	6
HPS71 3600 46	**71**	3600	2.2	5.8	17.5	0.73	1.26	272	4.6	91.8%	6.6
HPS90 3600 46	**S-L**	3600	2.2	5.8	17.5	0.73	1.26	272	4.6	91.7%	10
HPS90 3600 63	**S-L**	3600	3.0	8.0	23.9	0.73	1.26	272	6.3	92.4%	12
HPS90 3600 84	**S-L**	3600	4.0	10.6	31.8	0.73	1.26	272	8.4	92.8%	14
HPS90 3600 116	**S-L**	3600	5.5	14.6	43.8	0.73	1.26	272	11.6	93.3%	16
HPS112 3600 116	**M**	3600	5.5	14.6	43.8	0.73	1.26	272	11.6	93.2%	23
HPS112 3600 158	**M**	3600	7.5	19.9	59.7	0.73	1.26	272	15.8	93.9%	26
HPS112 3600 232	**M**	3600	11.0	29.2	87.5	0.73	1.26	272	23.2	94.3%	30
HPS112 3600 317	**M**	3600	15.0	39.8	119.4	0.73	1.26	272	31.7	94.5%	33
HPS132 3600 317	**M**	3600	15.0	39.8	119.4	0.73	1.26	272	31.7	94.2%	51
HPS132 3600 391	**XL**	3600	18.5	49.1	147.2	0.73	1.26	272	39.1	94.6%	58
HPS132 3600 465	**XXL**	3600	22.0	58.4	175.1	0.73	1.26	272	46.5	95.0%	65
HPS132 3600 634	**XXL**	3600	30.0	79.6	238.7	0.73	1.26	272	63.4	95.1%	72

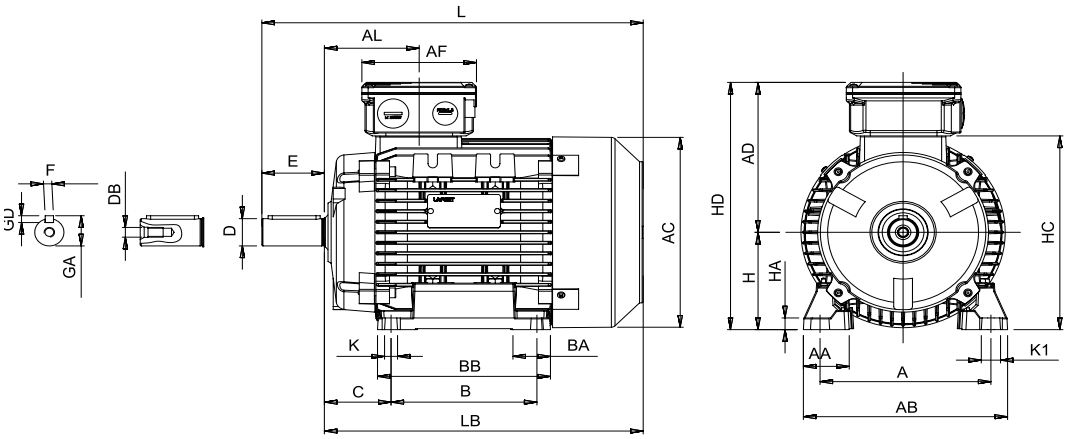
HPS - STAND ALONE MOTOR
4500 MIN $^{-1}$

TEMPERATURE RISE TO CLASS B

Type	Size	Rated speed	Rated power	Rated torque	Peak torque	Voltage constant	Torque constant speed	BEMF at rated	Rated current	Efficiency HPS	Weight
		n 1/min	P_n kW	M_n Nm	M_{pk} Nm	K_e Vs	K_t Nm/A	E_n Vrs	I_n Arms	η %	Kg
4500 min^{-1}											
HPS71 4500 23	**71**	500	1.1	2.3	7.0	0.58	1	272	2.3	90.0%	4.8
HPS71 4500 32	**71**	4500	1.5	3.2	9.6	0.58	1	272	3.2	91.0%	5.4
HPS71 4500 47	**71**	4500	2.2	4.7	14.0	0.58	1	272	4.7	91.8%	6.2
HPS71 4500 64	**71**	4500	3.0	6.4	19.1	0.58	1	272	6.4	91.9%	7
HPS90 4500 64	**S-L**	4500	3.0	6.4	19.1	0.58	1	272	6.4	91.8%	10
HPS90 4500 85	**S-L**	4500	4.0	8.5	25.5	0.58	1	272	8.5	92.4%	12
HPS90 4500 117	**S-L**	4500	5.5	11.7	35.0	0.58	1	272	11.7	93.0%	14
HPS90 4500 159	**S-L**	4500	7.5	15.9	47.8	0.58	1	272	15.9	93.5%	17

HPS FRAME SIZE 71 - 90 - 112 IM B3
ALUMINIUM ALLOY FRAME



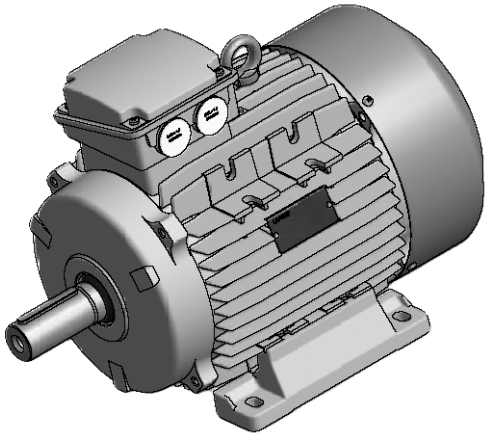


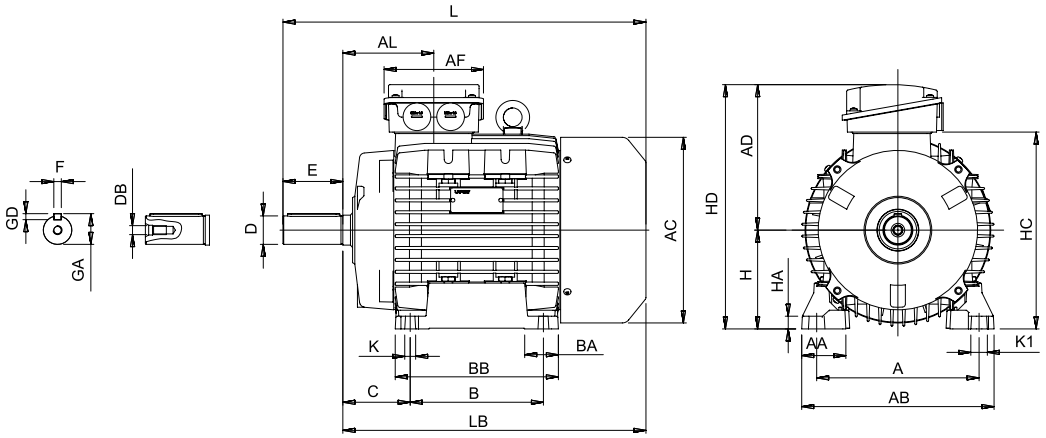
IEC	H	A	B	C	K[1]	AB	BB	AD[2]	HD[2]	AC	HC	HA
71	71	112	90	45	7	144	109	112	183	142	142	9
90S	90	140	100	56	10	170	150	148	238	180	181	11
90L	90	140	125	56	10	170	150	148	238	180	181	11
112M	112	190	140	70	12.5	220	175	171	283	225	226	15
112XL	112	190	140	70	12.5	220	175	171	283	225	226	15

IEC	K1	L	LB	AL	AF	BA	AA	D/DA	E/EA	F/FA	GD	GA/GC	DB [3]
71	17	245	215	75	93	22	30	14	30	5	5	16	M5
90S	15	317	267	85	110	28/53	37	24	50	8	7	27	M8
90L	15	317	267	85	110	28/53	37	24	50	8	7	27	M8
112M	19	388	328	92	110	46	48	28	60	8	7	31	M10
112XL	19	410	350	92	110	46	48	28	60	8	7	31	M10

1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

HPS FRAME SIZE 132 IM B3
ALUMINIUM ALLOY FRAME





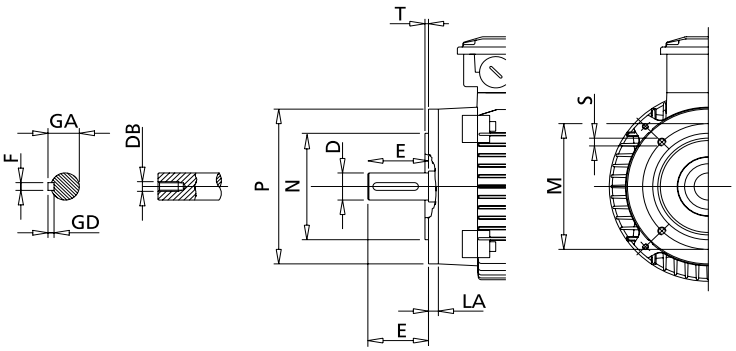
IEC	H	A	B	C	K[1)]	AB	BB	AD[2)]	HD[2)]	AC	HC	HA
132M	132	216	178	89	12	256	218	195	327	248	261	17
132XL	132	216	178	89	12	256	218	195	327	248	261	17
132XXL	132	216	178	89	12	256	218	195	327	248	261	17

IEC	K1	L	LB	AL	AF	BA	AA	D/DA	E/EA	F/FA	GD	GA/GC	DB [3)]
132M	20	482	402	120	133	45	59	38	80	10	8	41	M12
132XL	20	505	425	120	133	45	59	38	80	10	8	41	M12
132XXL	20	556	476	120	133	45	59	38	80	10	8	41	M12

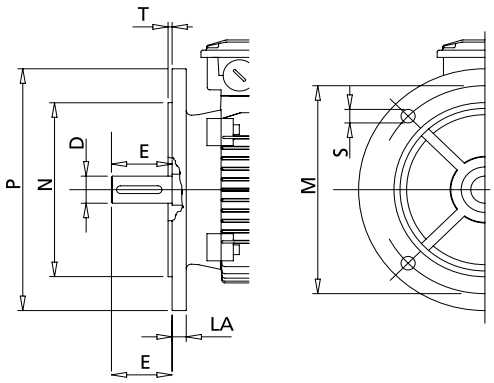
1) Clearance hole for screw
2) Maximum dimension
3) Centering holes in shaft extensions to DIN 332 part 2

HPS FRAME SIZE 71 - 90 - 112 - 132 IM B14, IM B5
ALUMINIUM ALLOY FRAME

IM B14

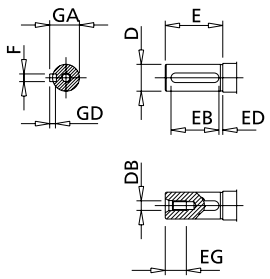


IM B5



SMALL FLANGE B14							LARGE FLANGE B14						FLANGE B5					
IEC	**P**	**N**	**LA**	**M**	**T**	**S[1)]**	**P**	**N**	**LA**	**M**	**T**	**S[1)]**	**M**	**N**	**P**	**T**	**LA**	**S[1)]**
71	105	70	11	85	2.5	M6	140	95	8	115	2.5	M8	130	110	160	3.5	10	M8
90S-L	140	95	10	115	3	M8	160	110	9	130	3.5	M8	165	130	200	3.5	12	M10
112M-XL	160	110	10	130	3.5	M8	200	130	12	165	3.5	M10	215	180	250	4	14	M12
132M-XL-XXL	200	130	30	165	3.5	M10	250	180	12	215	4	M12	265	230	300	4	14	M12

1) Clearence hole for screw



IEC	D	E	F h9	GD	GA	DB	EG	EB	ED
71	14 j6	30	5	5	16	M5	12.5	20	4
90S-L	24 j6	50	8	7	27	M8	19	40	4
112M-XL	28 j6	60	8	7	31	M10	22	50	4
132M-XL-XXL	38 k6	80	10	8	41	M12	28	70	5

1) Centering holes in shaft extension to DIN 332 part 2

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