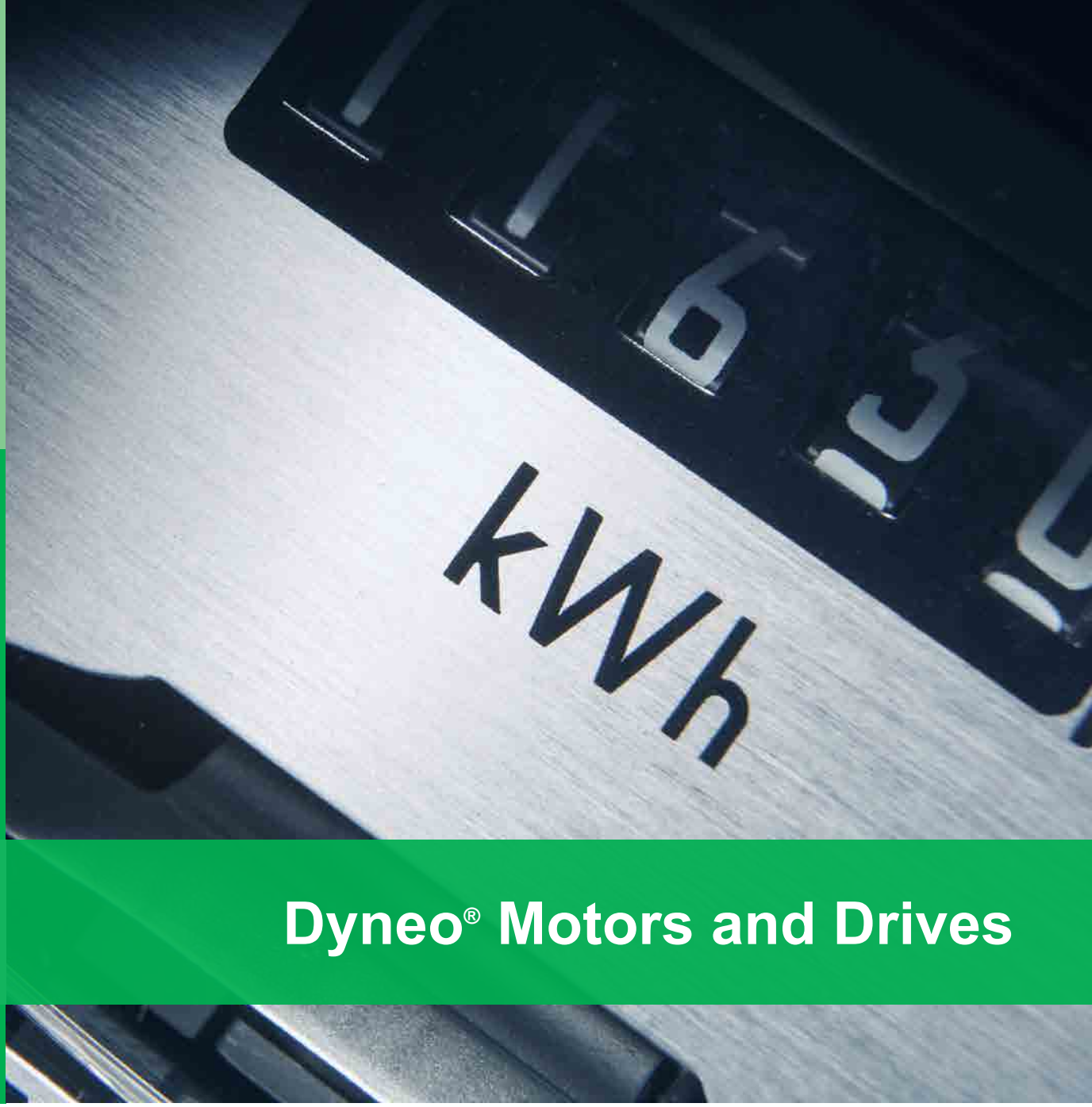


Dyneo® Motors and Drives

Powerdrive F300 variable speed drives
LSRPM permanent magnet synchronous motors
1.1 kW to 250 kW

LEROY-SOMER™

Nidec
All for dreams

Powerdrive F300 range
1.1 kW to 2.8 MW

Range of IP20 drives to be integrated in a wall-mounting or free-standing cabinet for ventilation, pumping and compression applications

Powerdrive F300 drives offer an excellent level of flexibility and performance, as well as functions dedicated to ventilation, pumping and compression applications.

This drive offers sensorless control of permanent magnet motors as well as the possibility of performing regulation functions as standard due to the onboard PLC.
The motor control algorithm has been validated with Dyneo® motors in order to obtain optimum performance.

Powerdrive F300 drives are designed for easy integration in cabinets.

DYNEO® MOTORS AND DRIVES
Powerdrive F300 variable speed drive/LSRPM permanent magnet synchronous motors

Dyneo® motors range
0.75 kW to 500 kW

Tried-and-tested technology

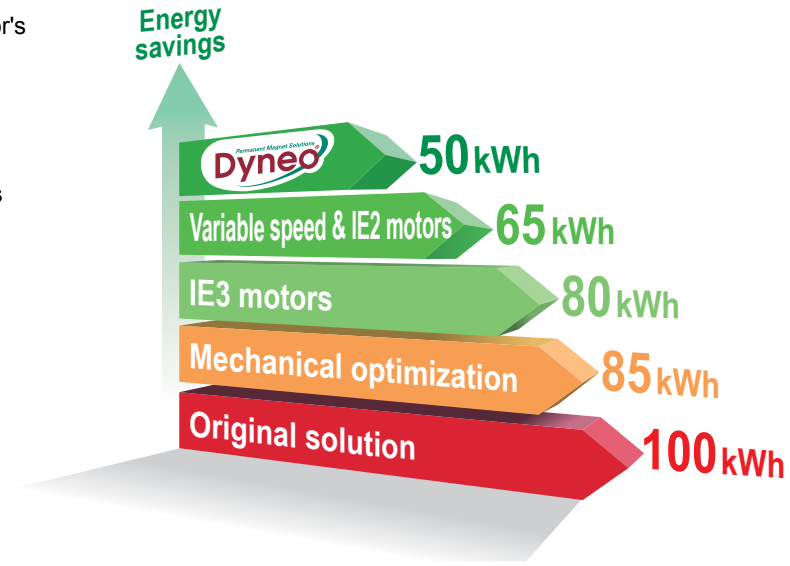
Alliance of magnet rotor technology and the induction motor's tried-and-tested mechanism.

Exceptional savings

On the purchase price
- Simplification through elimination of transmission devices (pulleys, belts, etc.): extended speed range
- Longer service life
- Reduction in the weight and dimensions of the driven machine: up to 3 frame sizes smaller

On energy bills
- High efficiency over the entire speed range

On maintenance
- Less stress on the mechanism



Performance
- Guaranteed torque over the entire speed range
- Optimized power with centrifugal torque operation

Modular system
- Adapts to any application when used in combination with a 3000 Range geared motor

Interchangeability

1500 range also available with an IEC mechanism equivalent to induction motors with the same power rating, to make it easier to update existing installations.

High-performance solutions

Nidec presents the Dyneo® range, a high-performance solution consisting of permanent magnet synchronous motors and variable speed drives.
Combined with Powerdrive F300 drives, LSRPM motors offer solutions suited to the industrial environment, producing optimum electrical and mechanical performance, that are ideal for saving energy and substantially cutting operating costs:

- Extended speed range
- High torque
- Premium efficiency
- Unrivalled compactness
- Motor control without sensor feedback

Add-ons or options for drives and motors can be included to satisfy particular demands.

Sensorless control

Fifteen years' experience of controlling permanent magnet motors and ongoing collaboration between our motors and drives development teams have allowed us to test different algorithms for total sensorless control of pumping, ventilation and compression applications.
The aim is to offer the user the benefit of the excellent performance of permanent magnet motors with the simplicity of induction motors.

Single manufacturer warranty

A motor and drive package produced by a single manufacturer ensures optimum performance obtained by using components designed to work together, with a global warranty from a single company.

Further information about the products described in this catalog is available in the corresponding technical documentation.

Express Availability!

Delivery times EX WORKS: 5 or 10 working days for a selection of drive systems

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The Powerdrive F300 offer

Programming and parameter-setting options

Powerdrive F300 Connect

KI-HOA Keypad RTC

Removable LCD screen with alphanumeric display and real-time clock

Remote Keypad

LCD screen with alphanumeric display and remote use option

FREE Software

Pre-programmed functions for ventilation and pumping applications

Smartcard

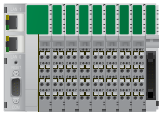
SD card with SD card adapter

Backup of parameters and PLC programs

Human-Machine Interface

Optional I/O

Remote I/O



SI-I/O

- 4 x analog I/O
- 9 x digital I/O
- 1 x STO

The Powerdrive F300 offer

Communications

- RS 485
  (Modbus RTU)

SI-PROFIBUS

SI-Ethernet

SI-DeviceNet

SI-CANopen

SI-PROFINET RT

Control modes

- Control of induction motors in open loop flux vector or V/F mode
- RFC (Rotor Flux Control) of induction motors in open loop mode (RFC-A)
- Control of permanent magnet motors in open loop mode (RFC-S)

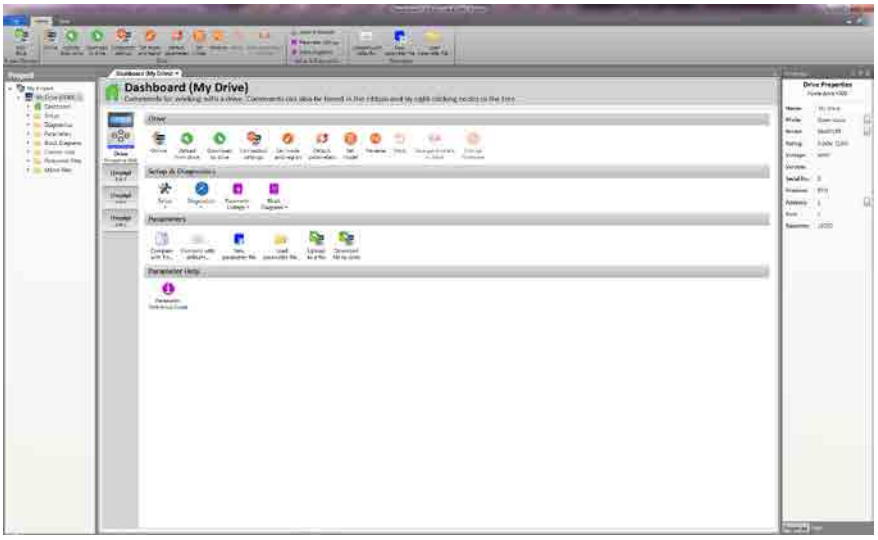
For more extensive information, refer to the Powerdrive F300 brochure.
The detailed characteristics of the products and options are described in the technical documents for the relevant products.

Powerdrive F300 drives

Powerdrive F300 is a range of variable speed drives designed for controlling induction or synchronous motors.
Nidec's Powerdrive F300-LSRPM solution can be used to make considerable energy savings and obtain a level of performance and functionality ideal for the fans, pumps and compressors sector.

Powerdrive F300 offers the option of using compact permanent magnet motor technology with high efficiency levels, while retaining motor control without sensor feedback (Sensorless mode) based on closed loop current regulation for remarkable performance.

For quick and easy commissioning of a Powerdrive F300/LSRPM motor and drive, use the Powerdrive F300 Connect parameter-setting software. Follow the instructions in the "Quick start" section described in the commissioning manual for the drive.



LSRPM motors

Description of motors

Description	Materials	Comments
Housing	LSRPM: Aluminum alloy	- With integral or screw-on feet, or without feet - 4 or 6 fixing holes for housings with feet - Lifting rings - Ground terminal with an optional jumper screw
Stator	Insulated low-carbon magnetic steel laminations Electroplated copper	- Low carbon content guarantees long-term lamination pack stability - Welded laminations - Optimized magnetic circuit - Insulation or coating system making it possible to withstand the sudden voltage variations caused by the high switching frequencies of IGBT transistor drives - Class F insulation - Thermal protection provided by PTC sensors (1 per phase, 2-wire output)
Rotor	Insulated low-carbon magnetic steel laminations Aluminum alloy Nd-Fe-B magnet	- Magnet fixing system, patented by Leroy-Somer - Rotor balanced dynamically with a half-key (H)
Shaft	Steel	
End shields	Cast iron	
Bearings and lubrication		- Ball bearings, C3 play - Preloaded NDE bearings - Greased for life up to frame size 200, regreasable in larger sizes - Insulated bearings depending on the range
Labyrinth seal **Lipseals**	Plastic or steel Synthetic rubber	- Lipseal or deflector at drive end for all flange mounted motors - Lipseal, deflector or labyrinth seal for foot mounted motors
Fan	Composite material or aluminum alloy or steel	- Bi-directional
Fan cover	Pressed steel	- Fitted, on request, with a drip cover for operation in vertical position, shaft end facing down
Terminal box	Aluminum alloy	- Fitted with a terminal block with 3 or 6 steel terminals as standard (brass as an option) - Pre-drilled terminal box without cable glands or with undrilled mounting plate (optional cable gland) - Ground terminal in each terminal box
Brake motor		FCR: synchronous motor and failsafe brake, from 0.25 kW to 11 kW FCPL: synchronous motor and failsafe brake, from 15 to 132 kW

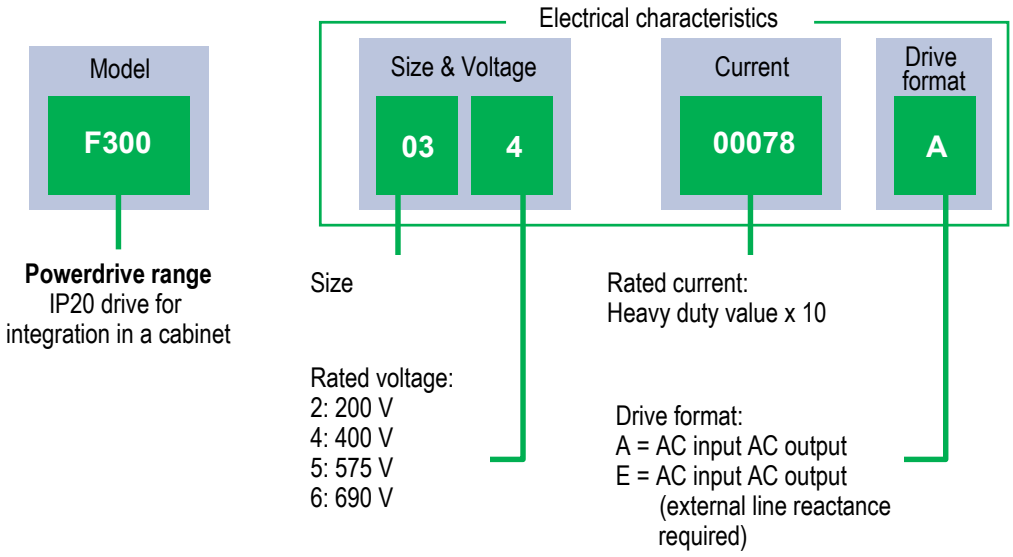
The motor rotor contains a powerful magnetic field. When the rotor is separated from the motor, its field can affect pacemakers or disturb digital devices such as watches, cell phones, etc.

Assembly or maintenance of the rotor must not be carried out by people with a pacemaker or any other implanted medical electronic device.

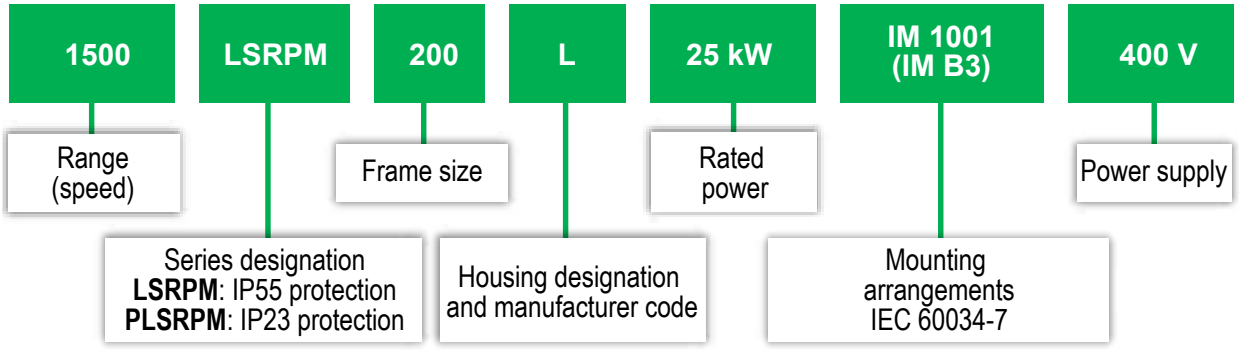
The assembled motor presents no risk.

Motor and drive designation

DRIVE



MOTOR



Control modes

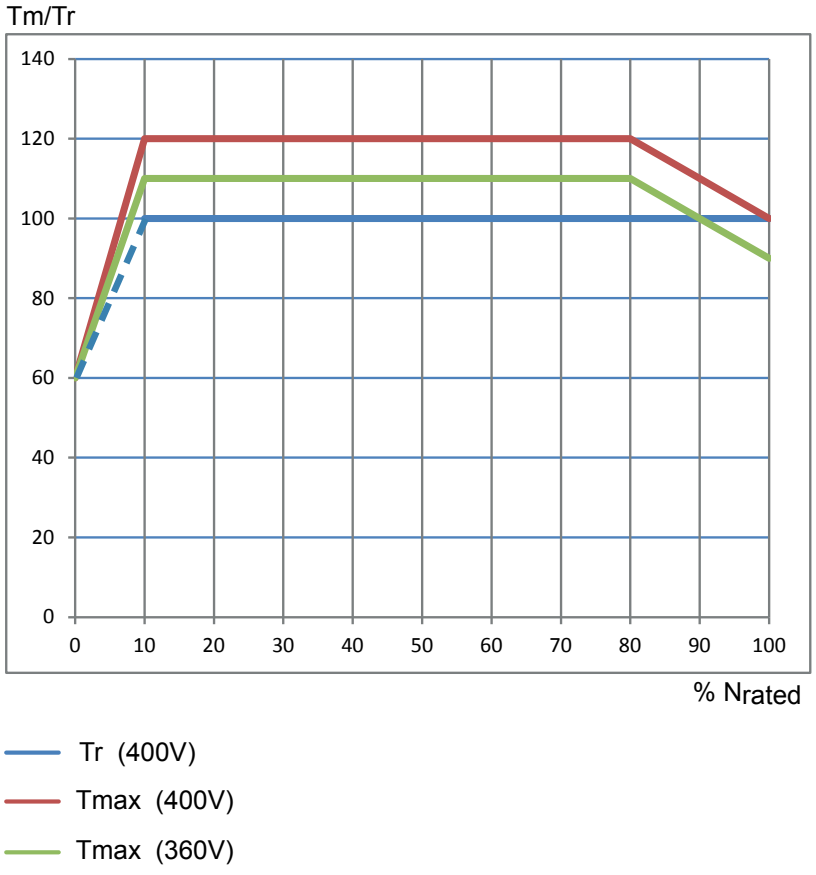
Powerdrive F300 offers several control modes, including RFC-S mode that can be used to control LSRPM permanent magnet motors without sensor feedback. This technology provides total control of ventilation, pumping and compression applications, while benefiting from a premium energy-efficient solution.

When using permanent magnet synchronous machines in sensorless mode, ensure that:

- The starting torque is less than 60% of Tnom
- The ratio between the load inertia and motor inertia is less than 30
- The machine's minimum speed is more than 400 rpm.

The diagram below shows the typical performance of an LSRPM and Powerdrive F300 Dyneo motor and drive package. For more detailed characteristics, see the compatibility tables in the Selection section.

LSRPM with Powerdrive F300



Selection method

Example:
A centrifugal pump requires torque of 350 N.m at 1,500 rpm in continuous duty (regulation from 600 to 1,500 rpm). The maximum torque is < 110% of T_r, and the starting torque is negligible.

Step 1: select the motor and drive

Select the motor and drive package according to the rated and maximum torque required by the application (Selection section).

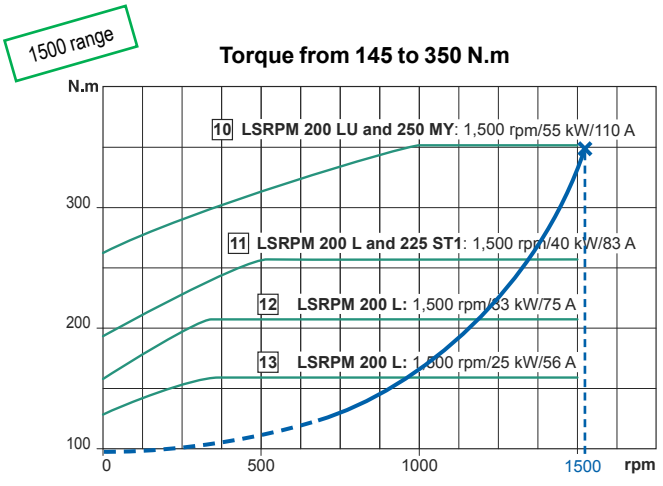
MOTOR				MOTOR AND DRIVE											MOTOR	
Type	Std. IEC mechanism (5)	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
1500 range																
LSRPM 200 LU	-	55	95.5	074-00940A	47.0	299.2	179.5	329.1	1.10	299.2	94 (110)	1.10	3.0	93.6	0.26	190
				074-01120A	55.0	350.1	210.1	389.3	1.11	350.1	110	1.12	3.0	93.6	0.26	190
				084-01550A	55.0	350.1	210.1	420.1	1.20	350.1	110	1.25	3.0	93.6	0.26	190
LSRPM 250 MY	yes	55	95.5	074-00940A	47.0	299.2	179.5	329.1	1.10	299.2	94 (110)	1.10	3.0	93.6	0.26	196
				074-01120A	55.0	350.1	210.1	389.3	1.11	350.1	110	1.12	3.0	93.6	0.26	196
				084-01550A	55.0	350.1	210.1	420.1	1.20	350.1	110	1.25	3.0	93.6	0.26	196

Selection:
Motor and drive package: 1500 LSRPM 200 LU 55 kW and Powerdrive F300/074-01120A

Note: If a short lead time is necessary, opt for Express Availability products, and select a 1500 LSRPM 250 MY 55 kW motor.

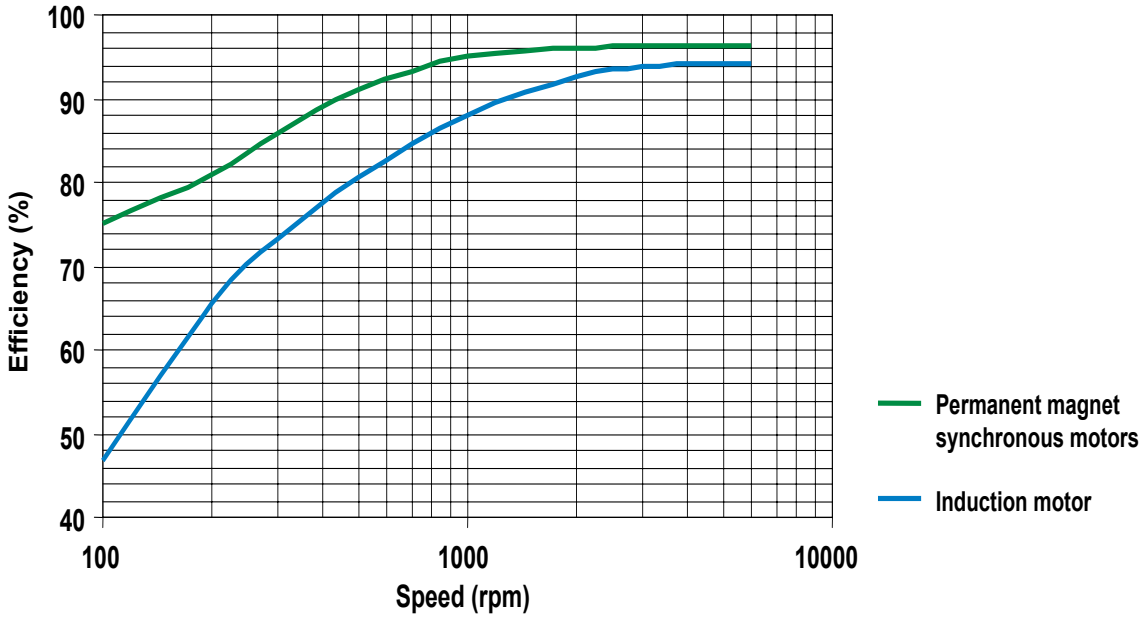
Step 2: check the selection

Using the motor thermal curve, check that the motor is suitable for the torque range required by the application.



Efficiency

The efficiency of Leroy-Somer permanent magnet synchronous motors is higher than that of induction motors and more stable over the entire selected speed range (see graph below).



Efficiency of permanent magnet synchronous motors

Apart from a few exceptions, synchronous motors cannot operate correctly on a traditional sinusoidal AC supply. They are practically always supplied via a drive. This catalog gives the efficiencies of motors and drives, controlled by Nidec drives.

Efficiency of induction motors supplied via drives

As a general rule, the efficiencies of induction motors given in the catalogs are values measured on a sinusoidal AC supply at the rated speed.
The voltage and current waveforms created by the drive are not sinusoidal. Supplying power via a drive therefore results in additional losses in the motor. These are estimated at 20% of the total losses, according to specifications 60034-17. These losses have a direct impact on the “displayed” efficiency of the motor.
In variable speed mode, this efficiency should therefore be corrected in accordance with the formula below.

$$\eta_2 = \eta_1/(1.2 - 0.2\,\eta_1)$$

η_2 = efficiency of induction motor obtained on a drive
η_1 = efficiency of induction motor supplied from the AC supply

Example of induction/synchronous motor efficiency: 200 kW application at 3,000 rpm
η_1: Efficiency of the 200 kW, 2-pole induction motor on 50 Hz AC supply = 96%
η_2: Estimated efficiency of the same induction motor supplied via a drive at 50 Hz
η_2 = 0.96/(1.2 - 0.2 x 0.96) = 0.9524 i.e. 95.24%

Efficiency of the equivalent synchronous motor = 97.3%

1500 range

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR				MOTOR AND DRIVE											MOTOR	
Type	Std. IEC mechanism (5)	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 90 SL	-	3	87.0	034-00062A	3.0	19.1	11.5	21.4	1.12	19.1	6	1.13	3.0	85.3	0.0032	14
				034-00077A	3.0	19.1	11.5	22.9	1.20	19.1	6	1.25	3.0	85.3	0.0032	14
LSRPM 100 L	-	4.5	90.0	034-00077A	4.0	25.6	15.4	28.0	1.09	25.6	7.7 (8.6)	1.09	3.0	88.2	0.006	19
				034-00104A	4.5	28.6	17.2	34.4	1.20	28.6	8.6	1.26	3.0	88.2	0.006	19
LSRPM 100 L	-	6	91.5	034-00104A	5.7	36.4	21.8	40.0	1.10	36.4	10.4 (10.9)	1.10	3.0	89.7	0.009	26
				034-00123A	6.0	38.2	22.9	45.5	1.19	38.2	10.9	1.24	3.0	89.7	0.009	26
LSRPM 132 M	yes	8.2	91.0	044-00185A	8.2	52.2	31.3	59.8	1.15	52.2	17.3	1.17	3.0	89.2	0.0165	40
LSRPM 132 M	yes	10.2	91.5	044-00185A	9.2	58.3	35.0	64.0	1.10	58.3	18.5 (20.6)	1.10	3.0	89.7	0.0231	44
				044-00240A	10.2	64.9	38.9	78.0	1.20	64.9	20.6	1.25	3.0	89.7	0.0231	44
LSRPM 132 M	-	12	92.0	044-00240A	12.0	76.4	45.8	84.9	1.11	76.4	23.6	1.12	3.0	90.2	0.0311	49
				054-00300A	12.0	76.4	45.8	91.7	1.20	76.4	23.6	1.25	3.0	90.2	0.0311	49
LSRPM 160 MP	-	15.6	92.5	054-00300A	15.6	99.3	59.6	109.2	1.10	99.3	30	1.10	3.0	90.6	0.0418	60
				064-00380A	15.6	99.3	59.6	119.2	1.20	99.3	30	1.25	3.0	90.6	0.0418	60
LSRPM 160 MP	-	19.2	93.0	064-00380A	19.2	122.2	73.3	136.6	1.12	122.2	37	1.13	3.0	91.1	0.0514	69
				064-00480A	19.2	122.2	73.3	146.5	1.20	122.2	37	1.25	3.0	91.1	0.0514	69
LSRPM 160 LR	-	22.8	93.5	064-00380A	20.1	128.2	76.9	141.0	1.10	128.2	38 (43)	1.10	3.0	91.6	0.0626	79
				064-00480A	22.8	145.1	87.1	171.8	1.18	145.1	43	1.23	3.0	91.6	0.0626	79
LSRPM 200 L	-	25	94.0	064-00630A	25.0	159.2	95.5	179.0	1.12	159.2	60.8	1.14	3.0	92.1	0.13	135
				074-00790A	25.0	159.2	95.5	191.0	1.20	159.2	60.8	1.25	3.0	92.1	0.13	135
LSRPM 200 L	yes	33	94.6	064-00630A	30.1	191.8	115.1	211.0	1.10	191.8	63 (69)	1.10	3.0	92.7	0.17	150
				074-00790A	33.0	210.1	126.1	252.0	1.20	210.1	69	1.25	3.0	92.7	0.17	150
LSRPM 200 L	-	40	95.2	074-00790A	38.1	242.6	145.6	266.9	1.10	242.6	79 (82.9)	1.10	3.0	93.3	0.2	165
				074-00940A	40.0	254.6	152.8	305.0	1.20	254.6	82.9	1.25	3.0	93.3	0.2	165
LSRPM 225 ST1	yes	40	95.2	074-00790A	38.1	242.6	145.6	266.9	1.10	242.6	79 (82.9)	1.10	3.0	93.3	0.205	170
				074-00940A	40.0	254.6	152.8	305.0	1.20	254.6	82.9	1.25	3.0	93.3	0.205	170
LSRPM 200 LU	-	55	95.5	074-00940A	47.0	299.2	179.5	329.1	1.10	299.2	94 (110)	1.10	3.0	93.6	0.26	190
				074-01120A	55.0	350.1	210.1	389.3	1.11	350.1	110	1.12	3.0	93.6	0.26	190
				084-01550A	55.0	350.1	210.1	420.1	1.20	350.1	110	1.25	3.0	93.6	0.26	190
LSRPM 250 MY	yes	55	95.5	074-00940A	47.0	299.2	179.5	329.1	1.10	299.2	94 (110)	1.10	3.0	93.6	0.26	196
				074-01120A	55.0	350.1	210.1	389.3	1.11	350.1	110	1.12	3.0	93.6	0.26	196
				084-01550A	55.0	350.1	210.1	420.1	1.20	350.1	110	1.25	3.0	93.6	0.26	196
LSRPM 225 MR1	-	70	95.7	084-01550A	70.0	445.6	267.4	518.9	1.16	445.6	142	1.20	3.0	93.8	0.32	223
LSRPM 250 ME	-	85	95.6	084-01550A	75.3	479.5	287.7	527.4	1.10	479.5	155 (174.9)	1.10	3.0	93.7	0.65	285
				084-01840A	85.0	541.1	324.7	614.3	1.14	541.1	174.9	1.16	3.0	93.7	0.65	285
				094-02210A	85.0	541.1	324.7	649.3	1.20	541.1	174.9	1.25	3.0	93.7	0.65	285
LSRPM 280 SCM	yes	85	95.6	084-01550A	75.3	479.5	287.7	527.4	1.10	479.5	155 (174.9)	1.10	3.0	93.7	0.72	290
				084-01840A	85.0	541.1	324.7	614.3	1.14	541.1	174.9	1.16	3.0	93.7	0.72	290
				094-02210A	85.0	541.1	324.7	649.3	1.20	541.1	174.9	1.25	3.0	93.7	0.72	290
LSRPM 280 SC	-	105	96.3	094-02210A	105.0	668.5	401.1	747.9	1.12	668.5	214.9	1.13	3.0	94.4	0.84	330
				094-02660A	105.0	668.5	401.1	802.1	1.20	668.5	214.9	1.25	3.0	94.4	0.84	330
LSRPM 280 SD	-	125	96.4	094-02210A	112.8	717.8	430.7	789.6	1.10	717.8	221 (245)	1.10	3.0	94.5	1	380
				094-02660A	125.0	795.8	477.5	923.2	1.16	795.8	245	1.19	3.0	94.5	1	380
LSRPM 315 SN	yes	125	96.4	094-02210A	112.8	717.8	430.7	789.6	1.10	717.8	221 (245)	1.10	3.0	94.5	1.1	385
				094-02660A	125.0	795.8	477.5	923.2	1.16	795.8	245	1.19	3.0	94.5	1.1	385
LSRPM 280 MK1	-	145	96.3	094-02660A	135.6	863.2	517.9	974.6	1.13	863.2	255 (272.7)	1.15	3.0	94.4	1.8	568
				104-03200E	145.0	923.1	553.9	1 107.8	1.20	923.1	272.7	1.25	3.0	94.4	1.8	568
LSRPM 315 MP1	yes	145	96.3	094-02660A	135.6	863.2	517.9	974.6	1.13	863.2	255 (272.7)	1.15	3.0	94.4	1.9	575
				104-03200E	145.0	923.1	553.9	1 107.8	1.20	923.1	272.7	1.25	3.0	94.4	1.9	575
LSRPM 315 SP1	yes	175	96.5	104-03200E	160.0	1 018.6	611.2	1 120.5	1.10	1 018.6	320 (350)	1.10	3.0	94.6	2.24	635
				104-03610E	175.0	1 114.1	668.5	1 248.8	1.12	1 114.1	350	1.13	3.0	94.6	2.24	635
				114-04370E	175.0	1 114.1	668.5	1 336.9	1.20	1 114.1	350	1.25	3.0	94.6	2.24	635
LSRPM 315 MR1	yes	220	96.7	104-03610E	191.4	1 218.4	731.0	1 340.2	1.10	1 218.4	361 (415)	1.10	3.0	94.8	2.7	715
				114-04370E	220.0	1 400.6	840.4	1 591.8	1.14	1 400.6	415	1.16	3.0	94.8	2.7	715
LSRPM 315 MR1	yes	250	96.9	114-04870E	234.7	1,494.1	896.5	1,643.5	1.10	1,494.1	460 (490)	1.10	3.0	95.0	2.9	715

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.
(5) Motors with standard IEC mechanical dimensions (frame size, shaft extension)

1800 range

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 132 M	9.8	92.0	044-00185A	9.2	48.6	29.2	53.4	1.10	48.6	18.5 (19.8)	1.10	3.0	90.2	0.0165	40
			044-00240A	9.8	52.0	31.2	62.5	1.20	52.0	19.8	1.25	3.0	90.2	0.0165	40
LSRPM 132 M	12.3	92.5	044-00240A	12.0	63.4	38.0	69.7	1.10	63.4	24 (24.7)	1.10	3.0	90.6	0.0231	44
			054-00300A	12.3	65.3	39.2	78.4	1.20	65.3	24.7	1.25	3.0	90.6	0.0231	44
LSRPM 132 M	14.4	93.0	054-00300A	14.4	76.4	45.8	87.8	1.15	76.4	28	1.18	3.0	91.1	0.0311	49
LSRPM 160 MP	18.7	93.5	064-00380A	18.7	99.2	59.5	112.9	1.14	99.2	36	1.16	3.0	91.6	0.0418	60
			064-00480A	18.7	99.2	59.5	119.0	1.20	99.2	36	1.25	3.0	91.6	0.0418	60
LSRPM 160 MP	23	94.0	064-00380A	20.4	108.1	64.9	118.9	1.10	108.1	38 (42.9)	1.10	3.0	92.1	0.0514	69
			064-00480A	23.0	122.0	73.2	144.7	1.19	122.0	42.9	1.23	3.0	92.1	0.0514	69
LSRPM 160 LR	27.3	94.0	064-00480A	25.2	133.7	80.2	147.1	1.10	133.7	48 (52)	1.10	3.0	92.1	0.0626	79
			064-00630A	27.3	144.8	86.9	173.8	1.20	144.8	52	1.25	3.0	92.1	0.0626	79
LSRPM 200 L	33	94.0	074-00790A	32.5	172.3	103.4	189.5	1.10	172.3	79 (80.3)	1.10	3.0	92.1	0.13	135
			074-00940A	33.0	175.1	105.1	210.2	1.20	175.1	80.3	1.25	3.0	92.1	0.13	135
LSRPM 200 L	40	94.8	074-00790A	37.2	197.2	118.3	216.9	1.10	197.2	79 (85)	1.10	3.0	92.9	0.17	150
			074-00940A	40.0	212.2	127.3	249.5	1.18	212.2	85	1.22	3.0	92.9	0.17	150
LSRPM 200 L	55	95.7	074-01120A	49.8	264.0	158.4	290.4	1.10	264.0	112 (123.8)	1.10	3.0	93.8	0.2	165
			084-01550A	55.0	291.8	175.1	350.2	1.20	291.8	123.8	1.25	3.0	93.8	0.2	165
LSRPM 225 ST1	70	96.1	084-01550A	70.0	371.4	222.8	426.0	1.15	371.4	145.1	1.18	3.0	94.2	0.26	193
LSRPM 225 MR1	85	96.0	084-01550A	76.6	406.3	243.8	446.9	1.10	406.3	155 (172)	1.10	3.0	94.1	0.32	223
			084-01840A	85.0	450.9	270.5	517.7	1.15	450.9	172	1.18	3.0	94.1	0.32	223
LSRPM 250 ME	100	96.1	094-02210A	100.0	530.5	318.3	608.5	1.15	530.5	206.9	1.17	3.0	94.2	0.65	285
LSRPM 280 SC	125	96.3	094-02210A	111.4	590.9	354.5	650.0	1.10	590.9	221 (248)	1.10	3.0	94.4	0.84	330
			094-02660A	125.0	663.1	397.9	762.7	1.15	663.1	248	1.18	3.0	94.4	0.84	330
LSRPM 280 SD	150	96.4	094-02660A	129.7	687.9	412.7	776.7	1.13	687.9	255 (295)	1.15	3.0	94.5	1	380
			104-03200E	150.0	795.8	477.5	922.6	1.16	795.8	295	1.19	3.0	94.5	1	380
LSRPM 280 MK1	175	96.5	104-03200E	169.7	900.3	540.2	990.3	1.10	900.3	320 (330)	1.10	3.0	94.6	1.8	568
			104-03610E	175.0	928.4	557.0	1,082.8	1.17	928.4	330	1.20	3.0	94.6	1.8	568
LSRPM 315 SP1	195	96.7	104-03610E	190.2	1,009.3	605.6	1,110.2	1.10	1,009.3	361 (370)	1.10	3.0	94.8	2.24	635
			114-04370E	195.0	1,034.5	620.7	1,241.4	1.20	1,034.5	370	1.25	3.0	94.8	2.24	635
LSRPM 315 MR1	230	96.9	114-04370E	230.0	1,220.2	732.1	1,365.6	1.12	1,220.2	425	1.13	3.0	95.0	2.7	720

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

2400 range

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 90 SL	4.8	90.5	**034-00104A**	4.8	19.1	11.5	22.4	1.17	19.1	9.4	1.21	4.0	88.7	0.0032	14
LSRPM 100 L	7.2	92.0	**034-00123A**	6.6	26.3	15.8	28.9	1.10	26.3	12.3 (13.4)	1.10	4.0	90.2	0.006	19
			044-00185A	7.2	28.6	17.2	34.4	1.20	28.6	13.4	1.25	4.0	90.2	0.006	19
LSRPM 100 L	9.5	93.0	**044-00185A**	9.5	37.8	22.7	42.7	1.13	37.8	17.7	1.15	4.0	91.1	0.009	26
			044-00240A	9.5	37.8	22.7	45.3	1.20	37.8	17.7	1.25	4.0	91.1	0.009	26
LSRPM 132 M	13.1	92.5	**064-00380A**	13.1	52.1	31.3	62.5	1.20	52.1	27.2	1.25	8.0	90.6	0.0165	40
LSRPM 132 M	16.3	93.0	**064-00380A**	16.3	64.9	38.9	77.8	1.20	64.9	32.1	1.25	8.0	91.1	0.0231	44
LSRPM 132 M	19.2	93.5	**064-00380A**	19.2	76.4	45.8	85.3	1.12	76.4	37.1	1.13	8.0	91.6	0.0311	49
			064-00480A	19.2	76.4	45.8	91.7	1.20	76.4	37.1	1.25	8.0	91.6	0.0311	49
LSRPM 160 MP	25	94.0	**064-00480A**	21.8	86.8	52.1	106.7	1.23	86.8	41 (47)	1.29	8.0	92.1	0.0418	60
			074-00790A	25.0	99.5	59.7	119.5	1.20	99.5	47	1.25	8.0	92.1	0.0418	60
LSRPM 160 MP	31	94.5	**074-00790A**	31.0	123.3	74.0	148.0	1.20	123.3	58	1.25	8.0	92.6	0.0514	69
LSRPM 160 LR	36	94.5	**074-00790A**	36.0	143.2	85.9	171.8	1.20	143.2	69	1.25	8.0	92.6	0.0626	79
LSRPM 200 L	50	95.4	**074-00940A**	42.7	170.0	102.0	187.0	1.10	170.0	94 (110)	1.10	4.0	93.5	0.17	150
			074-01120A	50.0	198.9	119.3	221.2	1.11	198.9	110	1.12	4.0	93.5	0.17	150
			084-01550A	50.0	198.9	119.3	238.7	1.20	198.9	110	1.25	4.0	93.5	0.17	150
LSRPM 200 L1	65	95.9	**084-01550A**	65.0	258.6	155.2	309.3	1.20	258.6	137	1.24	4.0	94.0	0.2	168
LSRPM 200 L1	80	96.6	**084-01550A**	75.6	301.0	180.6	331.1	1.10	301.0	155 (163.9)	1.10	4.0	94.7	0.24	183
			084-01840A	80.0	318.3	191.0	378.4	1.19	318.3	163.9	1.23	4.0	94.7	0.24	183
LSRPM 225 MR1	100	96.9	**084-01840A**	91.4	363.5	218.1	399.8	1.10	363.5	184 (201.4)	1.10	4.0	95.0	0.3	218
			094-02210A	100.0	397.9	238.7	465.1	1.17	397.9	201.4	1.21	4.0	95.0	0.3	218
LSRPM 250 SE	125	97.2	**094-02210A**	115.2	458.4	275.0	504.2	1.10	458.4	221 (239.8)	1.10	4.0	95.3	0.65	285
			094-02660A	120.4	479.1	287.5	581.0	1.21	479.1	231 (239.8)	1.27	4.0	95.3	0.65	285
			104-03200E	125.0	497.4	298.4	597.0	1.20	497.4	239.8	1.25	4.0	95.3	0.65	285
LSRPM 250 ME	150	97.3	**104-03200E**	150.0	596.8	358.1	704.8	1.18	596.8	287.6	1.22	4.0	95.4	0.75	310
LSRPM 280 SD1	190	97.5	**104-03200E**	168.4	670.0	402.0	737.0	1.10	670.0	320 (361.1)	1.10	4.0	95.6	1	383
			104-03610E	178.4	709.7	425.8	812.3	1.14	709.7	339 (361.1)	1.17	4.0	95.6	1	383
			114-04370E	190.0	756.0	453.6	907.2	1.20	756.0	361.1	1.25	4.0	95.6	1	383
LSRPM 280 MK1	230	97.4	**114-04370E**	222.5	885.2	531.1	1 006.0	1.14	885.2	415 (429)	1.16	4.0	95.5	1.9	591

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 90 SL	5.8	91.5	**034-00104A**	5.4	17.3	10.4	19.0	1.10	17.3	10.4 (11.1)	1.10	4.0	89.7	0.0032	14
			034-00123A	5.8	18.5	11.1	21.7	1.17	18.5	11.1	1.22	4.0	89.7	0.0032	14
LSRPM 100 L	8.7	93.0	**044-00185A**	8.7	27.7	16.6	33.2	1.20	27.7	16.2	1.25	4.0	91.1	0.006	19
LSRPM 100 L	11.6	93.5	**044-00185A**	10.2	32.5	19.5	35.7	1.10	32.5	18.5 (21)	1.10	4.0	91.6	0.009	26
			044-00240A	11.6	36.9	22.1	44.2	1.20	36.9	21	1.25	4.0	91.6	0.009	26
LSRPM 132 M	15.8	93.0	**064-00380A**	15.8	50.3	30.2	60.4	1.20	50.3	31.8	1.25	8.0	91.1	0.0165	40
LSRPM 132 M	19.7	93.5	**064-00380A**	19.7	62.7	37.6	69.0	1.10	62.7	38	1.10	8.0	91.6	0.0231	44
			064-00480A	19.7	62.7	37.6	75.2	1.20	62.7	38	1.25	8.0	91.6	0.0231	44
LSRPM 132 M	23	94.0	**064-00480A**	21.4	68.2	40.9	83.8	1.23	68.2	41 (44)	1.29	8.0	92.1	0.0311	49
			074-00790A	23.0	73.2	43.9	87.8	1.20	73.2	44	1.25	8.0	92.1	0.0311	49
LSRPM 160 MP	30	94.5	**074-00790A**	30.0	95.5	57.3	114.5	1.20	95.5	57	1.25	8.0	92.6	0.0418	60
LSRPM 160 MP	37	95.0	**074-00790A**	37.0	117.8	70.7	141.4	1.20	117.8	67.8	1.25	8.0	93.1	0.0514	69
LSRPM 160 LR	44	95.0	**074-00790A**	42.4	135.0	81.0	148.5	1.10	135.0	79 (82)	1.10	8.0	93.1	0.0626	79
			074-00940A	43.3	137.7	82.6	167.5	1.22	137.7	80.6 (82)	1.27	8.0	93.1	0.0626	79
			084-01550A	44.0	140.1	84.1	168.1	1.20	140.1	82	1.25	8.0	93.1	0.0626	79
LSRPM 200 L	50	95.2	**074-01120A**	48.4	154.1	92.5	169.5	1.10	154.1	112 (115.7)	1.10	4.0	93.3	0.13	135
			084-01550A	50.0	159.2	95.5	191.0	1.20	159.2	115.7	1.25	4.0	93.3	0.13	135
LSRPM 200 L1	65	96.0	**084-01550A**	65.0	206.9	124.1	248.3	1.20	206.9	136	1.25	4.0	94.1	0.17	153
LSRPM 200 L1	85	96.5	**084-01550A**	77.5	246.7	148.0	271.4	1.10	246.7	155 (170)	1.10	4.0	94.6	0.22	178
			084-01840A	85.0	270.6	162.4	313.2	1.16	270.6	170	1.19	4.0	94.6	0.22	178
LSRPM 225 ST2	110	96.6	**094-02210A**	110.0	350.1	210.1	387.7	1.11	350.1	218.5	1.11	4.0	94.7	0.24	195
			094-02660A	110.0	350.1	210.1	420.1	1.20	350.1	218.5	1.25	4.0	94.7	0.24	195
LSRPM 250 SE	145	97.1	**104-03200E**	145.0	461.5	276.9	548.0	1.19	461.5	285.5	1.23	4.0	95.2	0.57	265
LSRPM 250 ME1	170	97.2	**104-03200E**	158.0	502.9	301.7	553.2	1.10	502.9	320 (344.3)	1.10	4.0	95.3	0.65	288
			104-03610E	167.4	532.8	319.7	609.8	1.14	532.8	339 (344.3)	1.17	4.0	95.3	0.65	288
			114-04370E	170.0	541.1	324.7	649.3	1.20	541.1	344.3	1.25	4.0	95.3	0.65	288
LSRPM 280 SD1	200	97.3	**104-03610E**	185.8	591.3	354.8	676.8	1.14	591.3	339 (365)	1.17	4.0	95.4	0.84	333
			114-04370E	200.0	636.6	382.0	763.9	1.20	636.6	365	1.25	4.0	95.4	0.84	333
LSRPM 280 SD1	220	97.4	**114-04370E**	220.0	700.3	420.2	820.1	1.17	700.3	397.5	1.21	4.0	95.5	1	383

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 132 M	17.6	94.5	**064-00380A**	17.6	46.7	28.0	55.7	1.19	46.7	33.7	1.24	8.0	92.6	0.0165	40
LSRPM 132 M	22	94.5	**064-00380A**	20.3	53.9	32.3	59.3	1.10	53.9	38 (41.2)	1.10	8.0	92.6	0.0231	44
			064-00480A	21.9	58.1	34.9	70.0	1.20	58.1	41 (41.2)	1.26	8.0	92.6	0.0231	44
LSRPM 132 M	26	95.0	**074-00790A**	26.0	69.0	41.4	82.8	1.20	69.0	48	1.25	8.0	93.1	0.0311	49
LSRPM 160 MP	34	95.0	**074-00790A**	34.0	90.2	54.1	108.3	1.20	90.2	63	1.25	8.0	93.1	0.0418	60
LSRPM 160 MP	41	95.5	**074-00790A**	41.0	108.8	65.3	121.6	1.12	108.8	77	1.13	8.0	93.6	0.0514	69
			074-00940A	41.0	108.8	65.3	130.5	1.20	108.8	77	1.25	8.0	93.6	0.0514	69
LSRPM 160 LR	49	95.5	**084-01550A**	49.0	130.0	78.0	156.1	1.20	130.0	91	1.25	8.0	93.6	0.0626	79
LSRPM 200 L1	70	96.0	**084-01550A**	70.0	185.7	111.4	222.5	1.20	185.7	136.7	1.25	4.0	94.1	0.17	153
LSRPM 200 L1	85	96.4	**084-01550A**	81.4	215.9	129.5	237.5	1.10	215.9	155 (161.9)	1.10	4.0	94.5	0.22	178
			084-01840A	85.0	225.5	135.3	270.6	1.20	225.5	161.9	1.25	4.0	94.5	0.22	178
LSRPM 200 LU2	115	96.8	**094-02210A**	109.8	291.2	174.7	320.3	1.10	291.2	221 (231.5)	1.10	4.0	94.9	0.26	195
			094-02660A	114.7	304.3	182.6	365.8	1.20	304.3	231 (231.5)	1.25	4.0	94.9	0.26	195
LSRPM 225 SG	132	96.8	**094-02660A**	122.0	323.5	194.1	392.3	1.21	323.5	231 (250)	1.27	4.0	94.9	0.54	250
			104-03200E	132.0	350.1	210.1	420.1	1.20	350.1	250	1.25	4.0	94.9	0.54	250
LSRPM 250 SE1	165	96.9	**104-03200E**	160.0	424.4	254.6	466.8	1.10	424.4	320 (330)	1.10	4.0	95.0	0.57	268
			104-03610E	165.0	437.7	262.6	510.5	1.17	437.7	330	1.20	4.0	95.0	0.57	268
LSRPM 250 SE1	190	97.1	**104-03610E**	179.0	474.9	284.9	543.6	1.14	474.9	339 (359.8)	1.17	4.0	95.2	0.65	288
			114-04370E	190.0	504.0	302.4	604.9	1.20	504.0	359.8	1.25	4.0	95.2	0.65	288
LSRPM 280 SD1	240	97.1	**114-04370E**	232.3	616.1	369.7	700.2	1.14	616.1	415 (428.8)	1.16	4.0	95.2	1	383

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

4500 range

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 132 M	18.6	94.5	**064-00380A**	18.6	39.5	23.7	45.8	1.16	39.5	35	1.19	8.0	92.6	0.0165	40
LSRPM 132 M	23	94.5	**064-00380A**	19.8	42.1	25.3	46.3	1.10	42.1	38 (44)	1.10	8.0	92.6	0.0231	44
			064-00480A	21.4	45.5	27.3	55.9	1.23	45.5	41 (44)	1.29	8.0	92.6	0.0231	44
			074-00790A	23.0	48.8	29.3	58.6	1.20	48.8	44	1.25	8.0	92.6	0.0231	44
LSRPM 132 M	27	95.0	**074-00790A**	27.0	57.3	34.4	68.8	1.20	57.3	51	1.25	8.0	93.1	0.0311	49
LSRPM 160 MP	35	95.0	**074-00790A**	35.0	74.3	44.6	89.2	1.20	74.3	67	1.25	8.0	93.1	0.0418	60
LSRPM 160 MP	44	95.5	**074-00790A**	42.9	91.1	54.7	100.2	1.10	91.1	79 (81)	1.10	8.0	93.6	0.0514	69
			074-00940A	43.8	92.9	55.7	111.9	1.20	92.9	80.6 (81)	1.26	8.0	93.6	0.0514	69
LSRPM 160 LR	52	95.5	**084-01550A**	52.0	110.3	66.2	132.3	1.20	110.3	97	1.25	8.0	93.6	0.0626	79
LSRPM 200 L1	65	95.3	**084-01550A**	60.5	128.3	77.0	158.1	1.23	128.3	132 (141.9)	1.29	8.0	93.4	0.13	138
			084-01840A	65.0	137.9	82.7	165.5	1.20	137.9	141.9	1.25	8.0	93.4	0.13	138
LSRPM 200 L1	80	95.7	**094-02210A**	74.1	157.2	94.3	201.2	1.28	157.2	159 (171.7)	1.35	8.0	93.8	0.15	148
			104-03200E	80.0	169.8	101.9	203.7	1.20	169.8	171.7	1.25	8.0	93.8	0.15	148
LSRPM 200 L1	100	96.2	**104-03200E**	100.0	212.2	127.3	254.6	1.20	212.2	200	1.25	8.0	94.3	0.2	168
LSRPM 200 L2	120	96.4	**104-03200E**	120.0	254.6	152.8	305.5	1.20	254.6	230	1.25	8.0	94.5	0.24	185
LSRPM 200 LU2	135	96.5	**114-04370E**	135.0	286.5	171.9	343.8	1.20	286.5	260.4	1.25	8.0	94.6	0.26	195
LSRPM 225 SR2	150	96.6	**114-04370E**	145.1	307.9	184.7	379.5	1.23	307.9	272 (281.2)	1.29	8.0	94.7	0.32	230

(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

Class F - DT80K - S1 Self-Cooled - Altitude 1,000 m max - Ambient temperature 40°C max

Power supply upstream from the 400 V drive

Drive limit
Motor limit

MOTOR			MOTOR AND DRIVE											MOTOR	
Type	Rated power Pr (kW)	Efficiency IEC 60034-2-1 η 4/4	Type of Powerdrive F300	Available power Pa (kW)	Rated torque Tr (N.m)	Starting torque 60% Tr (N.m)	Maximum torque Tmax (N.m) (1)	Maximum torque/ Rated torque Tmax/Tr	Maximum torque at rated speed (N.m) (2)	Rated current Ir (A) (3)	Maximum current/ Rated current Imax/Ir	Switching frequency Fs (kHz) (4)	Motor and drive efficiency η 4/4	Moment of inertia J (kg.m²)	Weight IM B3 (kg)
LSRPM 132 M	18.6	94.0	**064-00380A**	18.6	32.3	19.4	37.5	1.16	32.3	35	1.19	8.0	92.1	0.0165	40
			064-00380A	19.9	34.5	20.7	37.9	1.10	34.5	38 (44)	1.10	8.0	92.1	0.0231	44
LSRPM 132 M	23	94.0	**064-00480A**	21.4	37.2	22.3	45.7	1.23	37.2	41 (44)	1.29	8.0	92.1	0.0231	44
			074-00790A	23.0	39.9	23.9	47.9	1.20	39.9	44	1.25	8.0	92.1	0.0231	44
LSRPM 132 M	27	94.5	**074-00790A**	27.0	46.9	28.1	56.3	1.20	46.9	52	1.25	8.0	92.6	0.0311	49
LSRPM 160 MP	35	94.5	**074-00790A**	35.0	60.8	36.5	73.0	1.20	60.8	67	1.25	8.0	92.6	0.0418	60
LSRPM 160 MP	44	95.0	**074-00790A**	42.4	73.6	44.2	81.0	1.10	73.6	79 (82)	1.10	8.0	93.1	0.0514	69
			074-00940A	43.3	75.1	45.1	91.4	1.22	75.1	80.6 (82)	1.27	8.0	93.1	0.0514	69
LSRPM 160 LR	52	95.0	**084-01550A**	52.0	90.3	54.2	108.3	1.20	90.3	97	1.25	8.0	93.1	0.0626	79
LSRPM 200 L1	70	95.2	**084-01550A**	65.7	114.1	68.5	140.6	1.23	114.1	132 (140.6)	1.29	8.0	93.3	0.13	138
			084-01840A	70.0	121.5	72.9	145.8	1.20	121.5	140.6	1.25	8.0	93.3	0.13	138
LSRPM 200 L1	85	95.4	**094-02210A**	79.5	138.0	82.8	175.1	1.27	138.0	159 (170)	1.34	8.0	93.5	0.15	148
			104-03200E	85.0	147.6	88.6	177.1	1.20	147.6	170	1.25	8.0	93.5	0.15	148
LSRPM 200 L1	100	95.8	**104-03200E**	100.0	173.6	104.2	208.3	1.20	173.6	210	1.25	8.0	93.9	0.17	153
LSRPM 200 L2	140	96.6	**114-04370E**	128.8	223.7	134.2	288.0	1.29	223.7	272 (295.6)	1.36	8.0	94.7	0.22	180

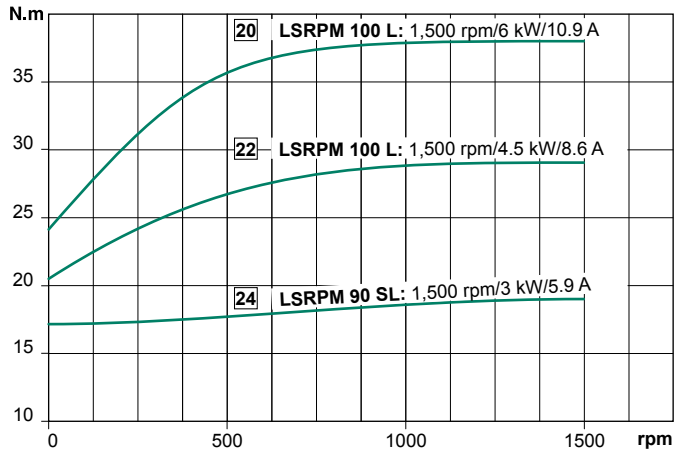
(1) See the Maximum torque curve in the Introduction, Control modes section.
(2) The maximum torque decreases from 80% of the rated speed to the value indicated at the rated speed.
(3) Motor and drive rated current. If the motor rated current is higher, its value is indicated in brackets. The motor rated current must be entered in the drive.
(4) Minimum switching frequency. This value must be entered in the drive. Automatic changing of the switching frequency must be disabled.

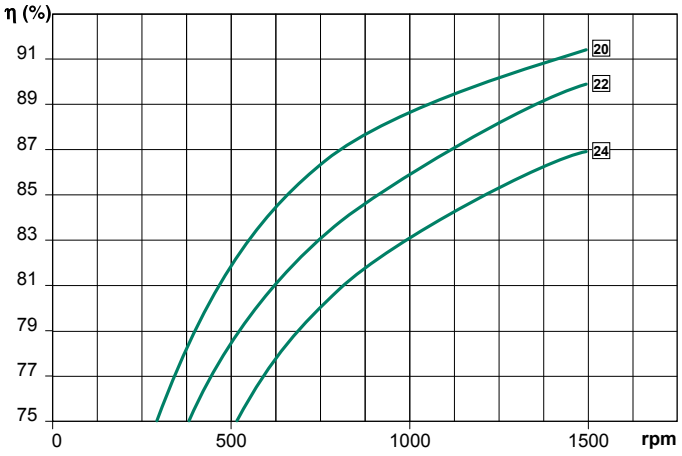
Notes

1500 range - 0 to 1,500 rpm

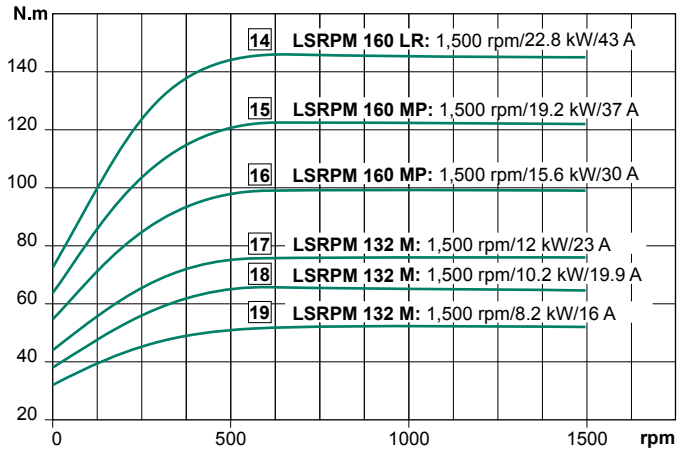
Thermal torque (S1 duty without forced ventilation) and efficiency curves

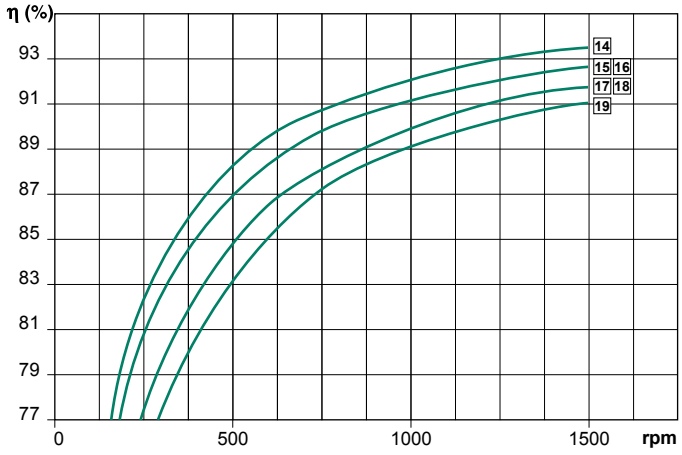
Torque from 0 to 38 N.m



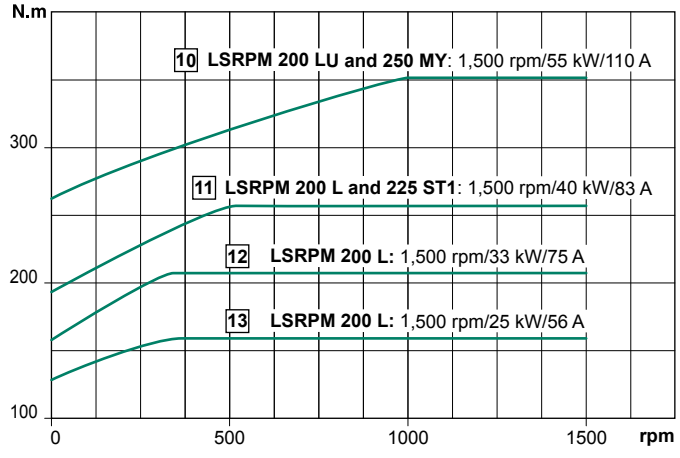


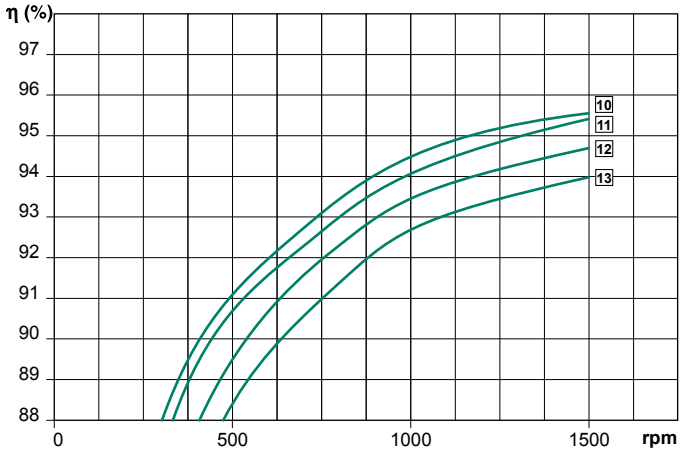
Torque from 38 to 145 N.m





Torque from 145 to 350 N.m



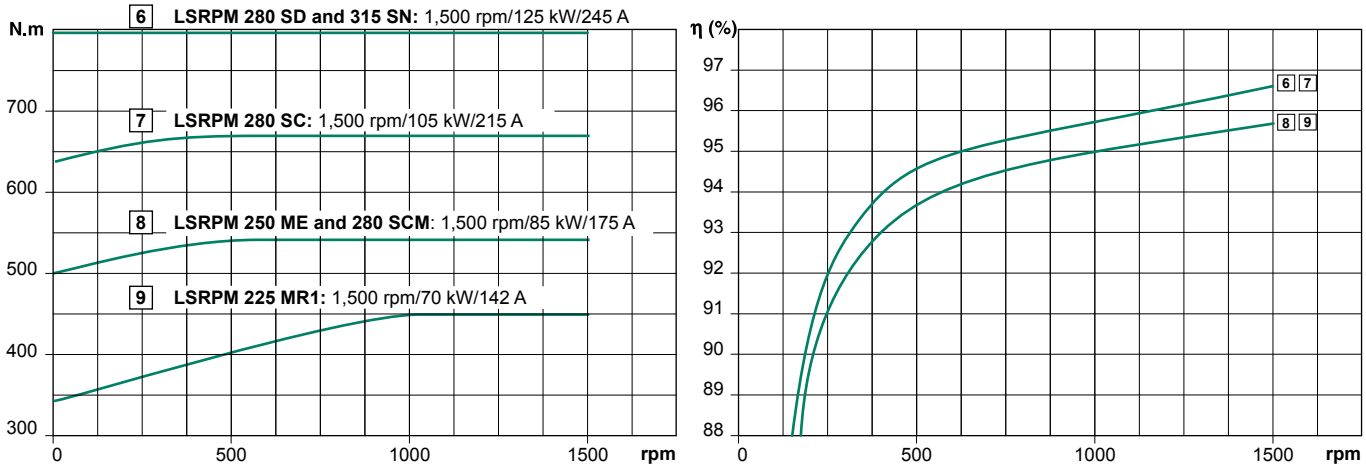


Performance

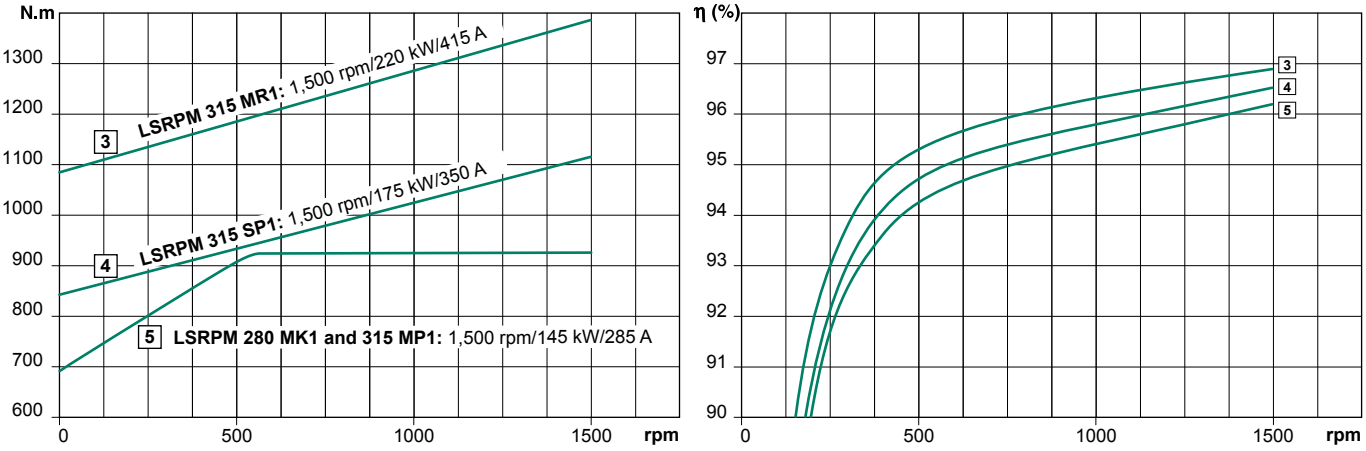
1500 range - 0 to 1,500 rpm

Thermal torque (S1 duty without forced ventilation) and efficiency curves

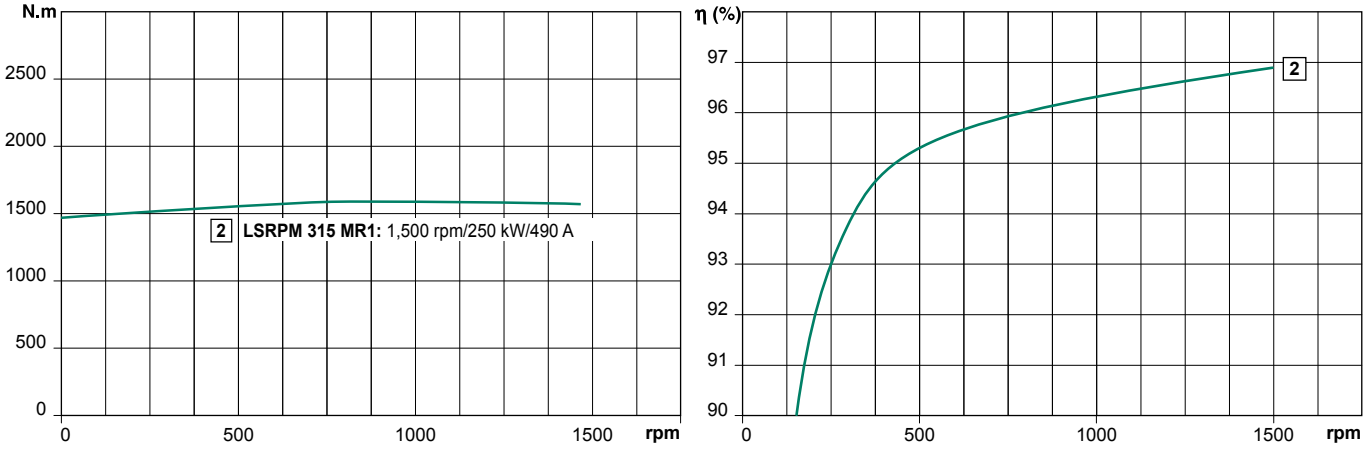
Torque from 350 to 800 N.m



Torque from 800 to 1,400 N.m



Torque from 1,400 to 1,700 N.m

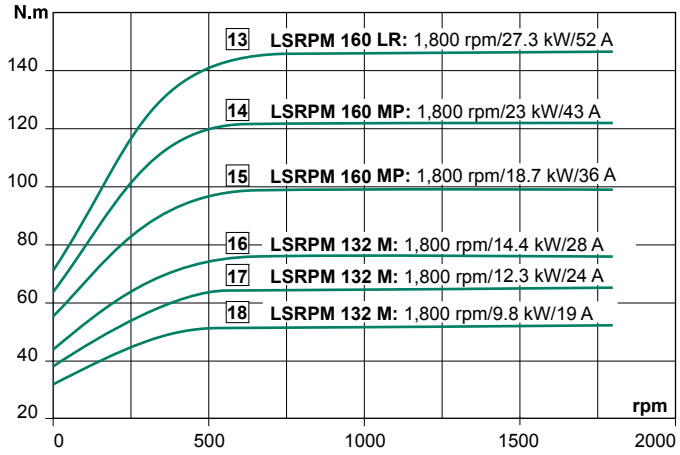


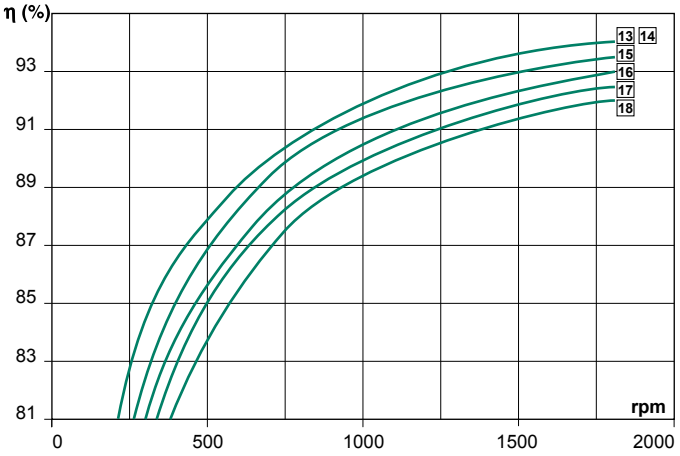
LSRPM motors with a higher output power are also available (documentation ref. 5006).

1800 range - 0 to 1,800 rpm

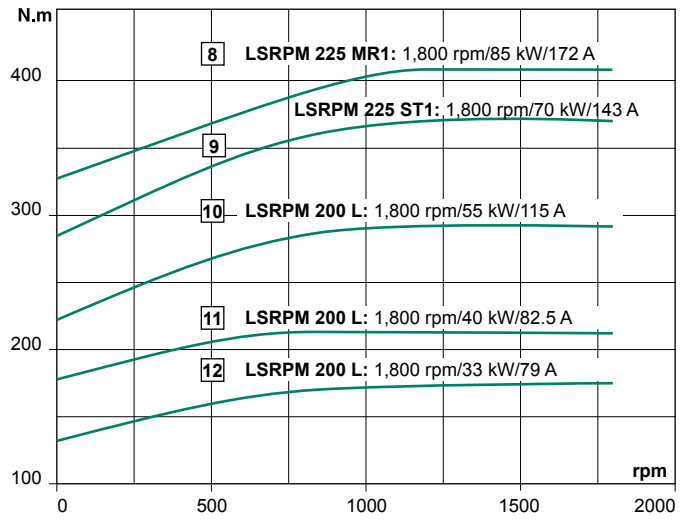
Thermal torque (S1 duty without forced ventilation) and efficiency curves

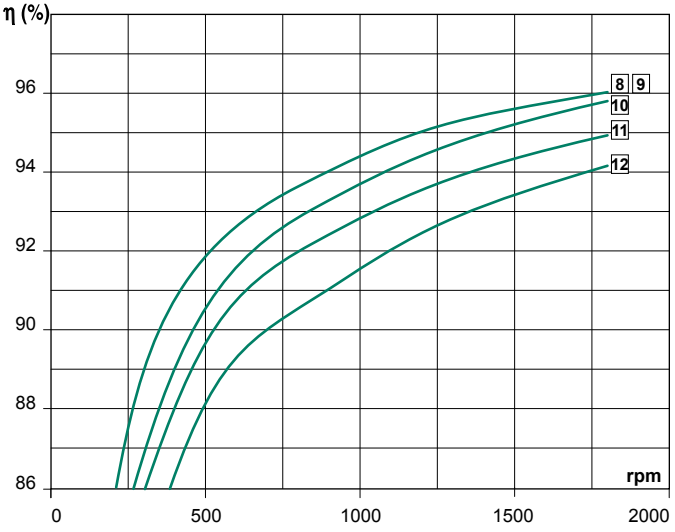
Torque from 0 to 145 N.m





Torque from 145 to 450 N.m



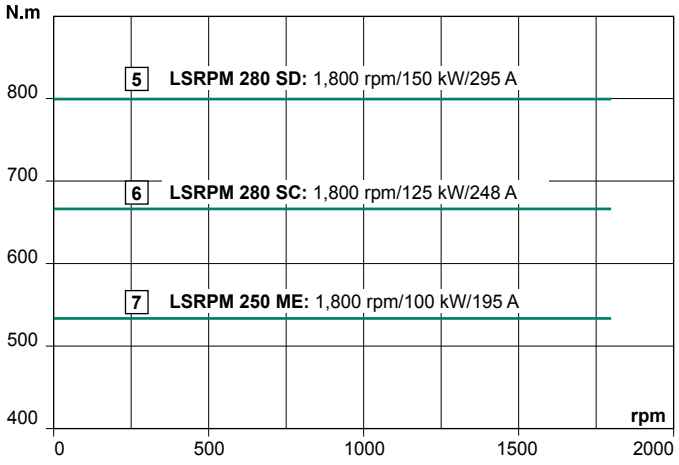


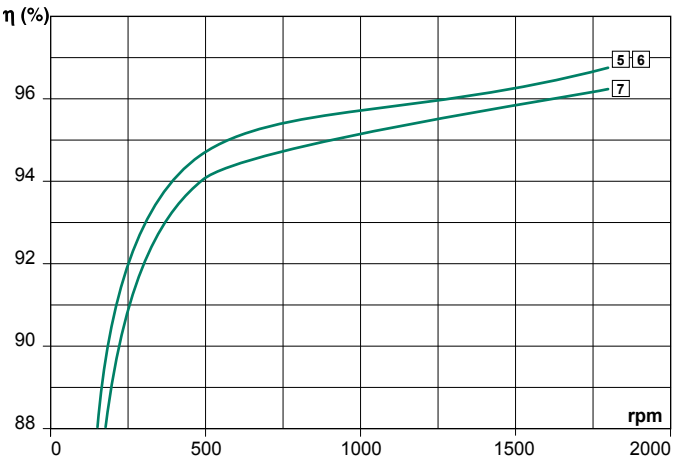
Performance

1800 range - 0 to 1,800 rpm

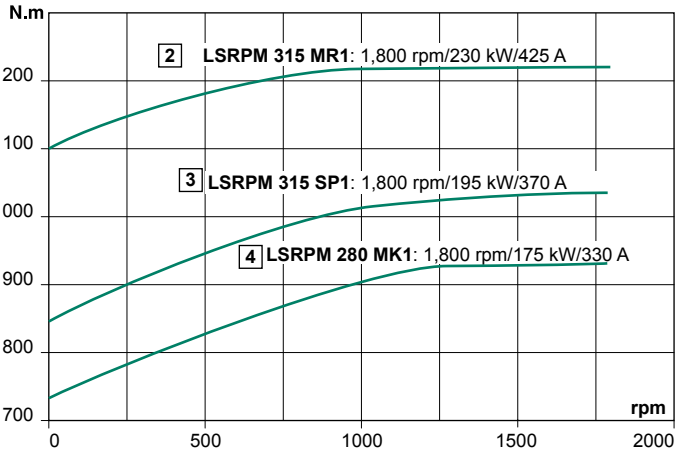
Thermal torque (S1 duty without forced ventilation) and efficiency curves

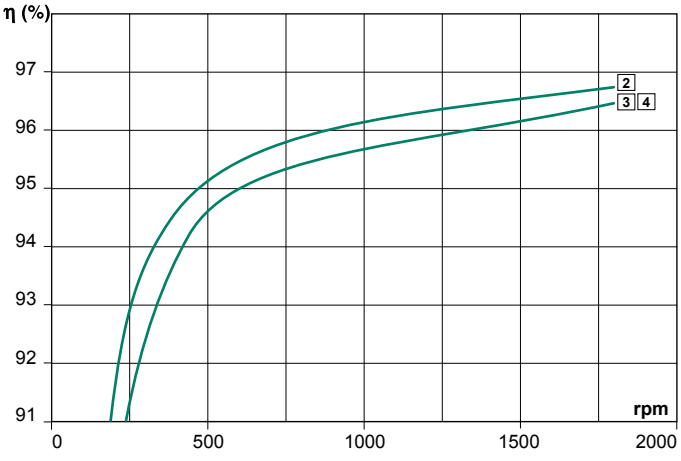
Torque from 450 to 800 N.m





Torque from 800 to 1,220 N.m



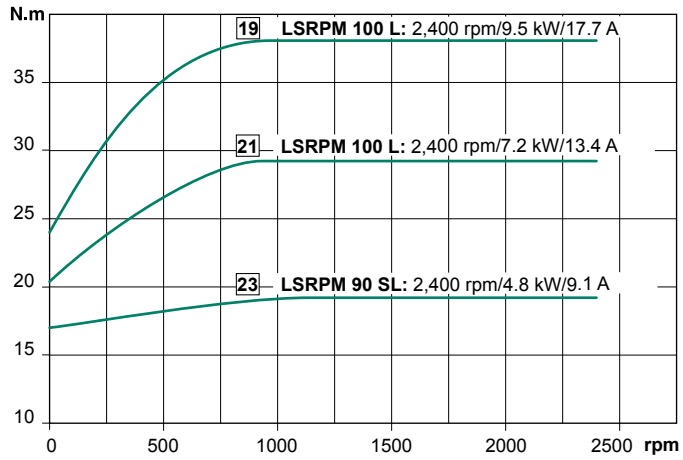


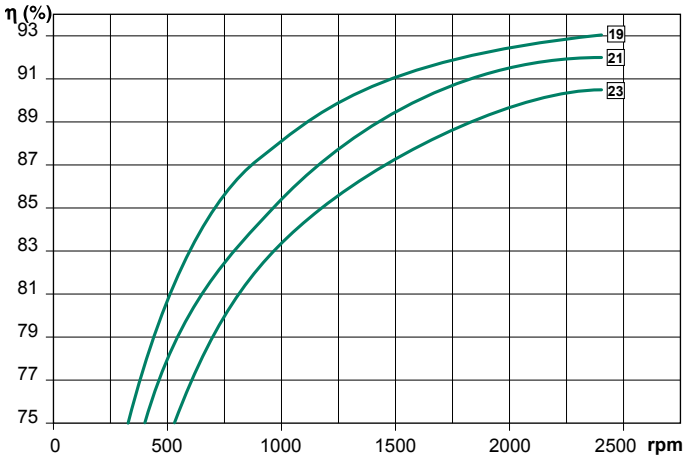
LSRPM motors with a higher output power are also available (documentation ref. 5006).

2400 range - 0 to 2,400 rpm

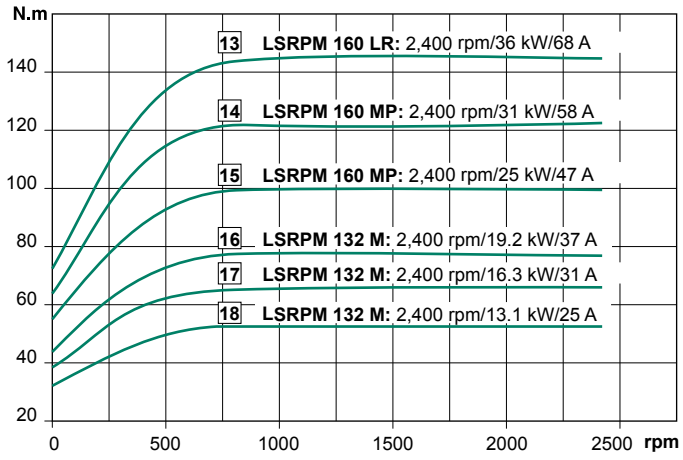
Thermal torque (S1 duty without forced ventilation) and efficiency curves

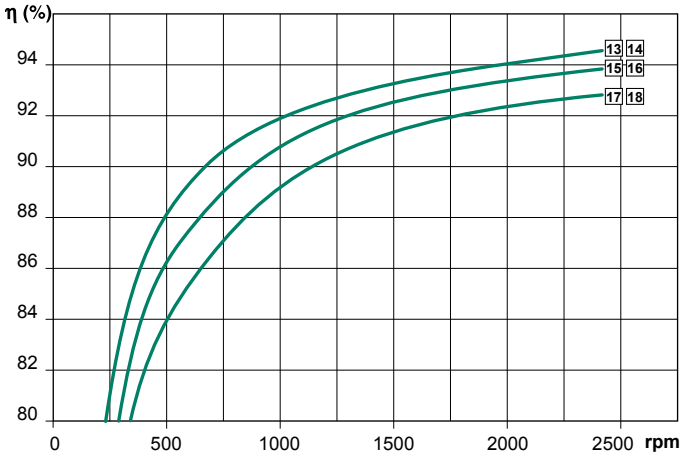
Torque from 0 to 38 N.m



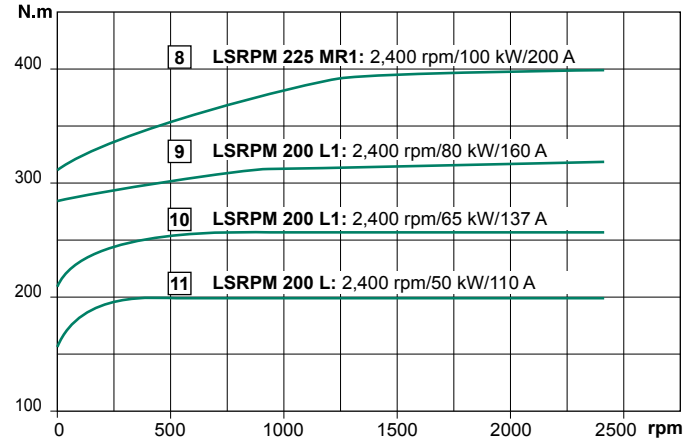


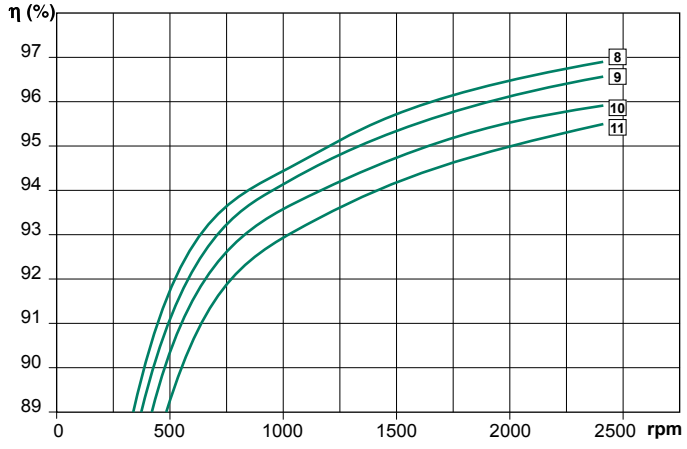
Torque from 38 to 145 N.m





Torque from 145 to 400 N.m

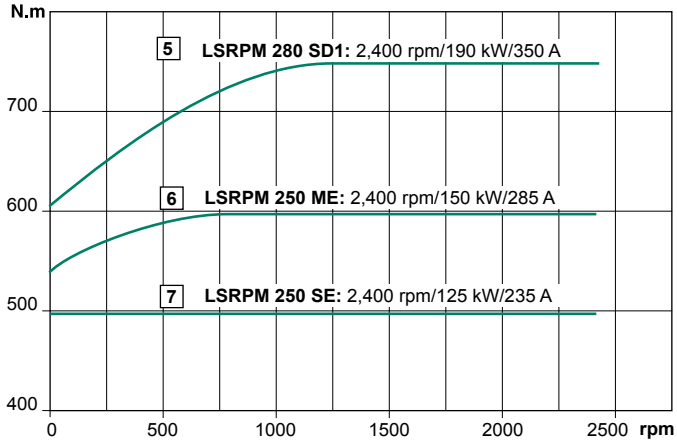


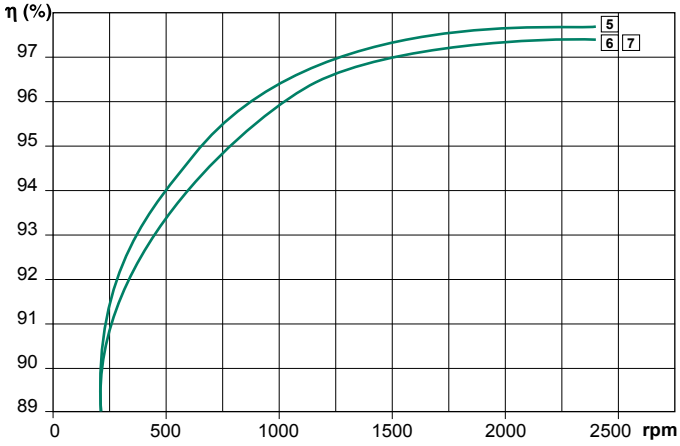


2400 range - 0 to 2,400 rpm

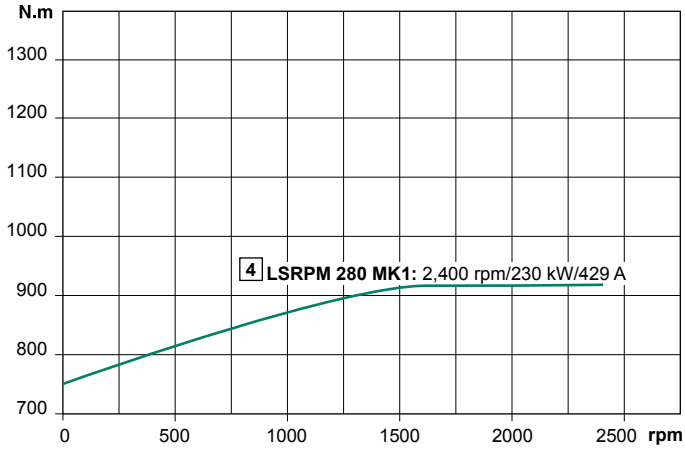
Thermal torque (S1 duty without forced ventilation) and efficiency curves

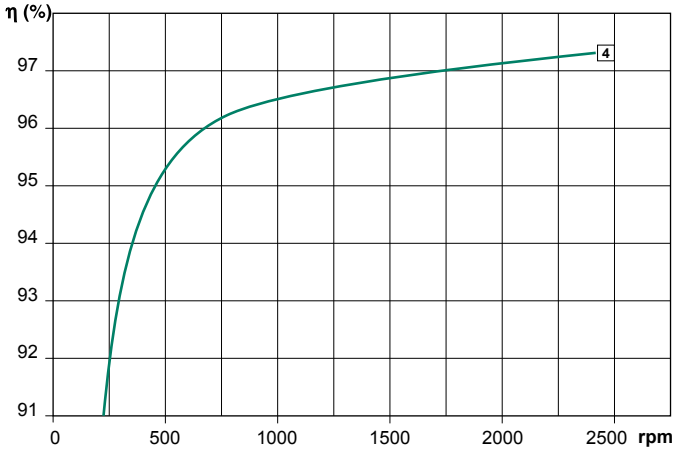
Torque from 400 to 755 N.m





Torque from 755 to 1,000 N.m



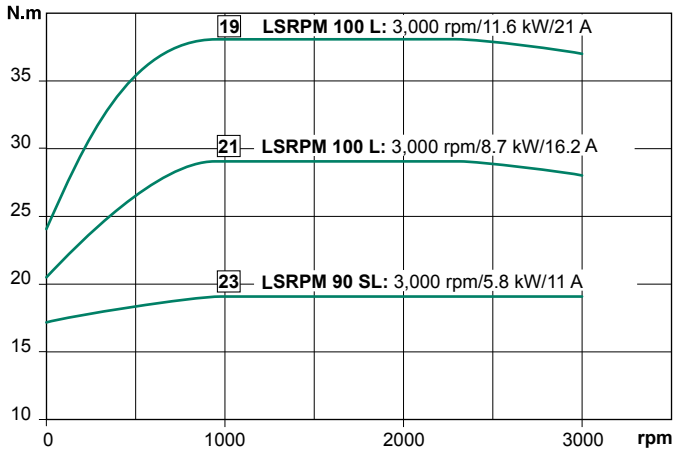


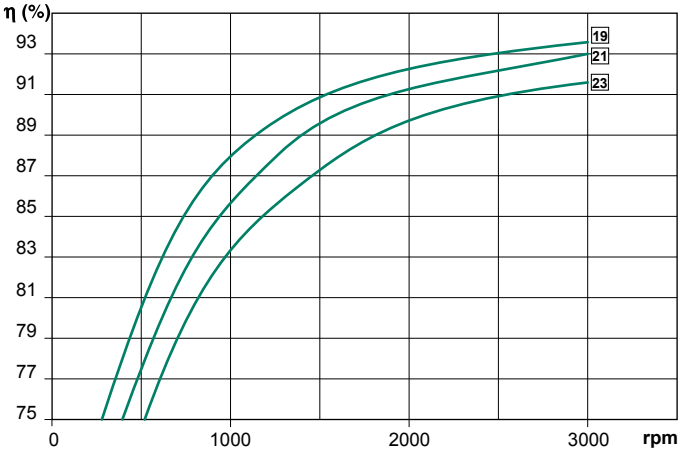
LSRPM motors with a higher output power are also available (documentation ref. 5006).

3000 range - 0 to 3,000 rpm

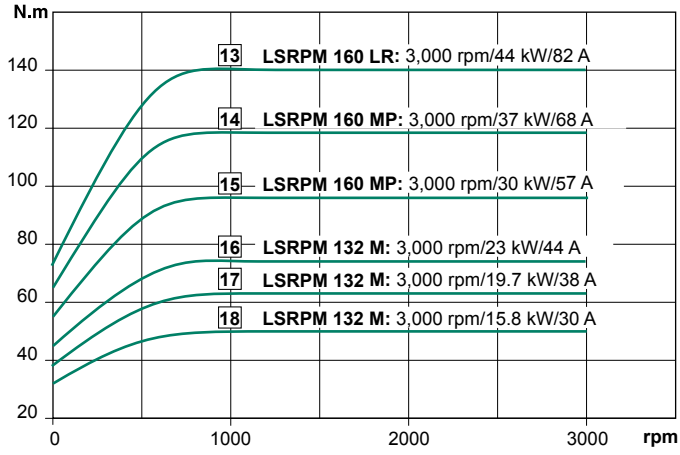
Thermal torque (S1 duty without forced ventilation) and efficiency curves

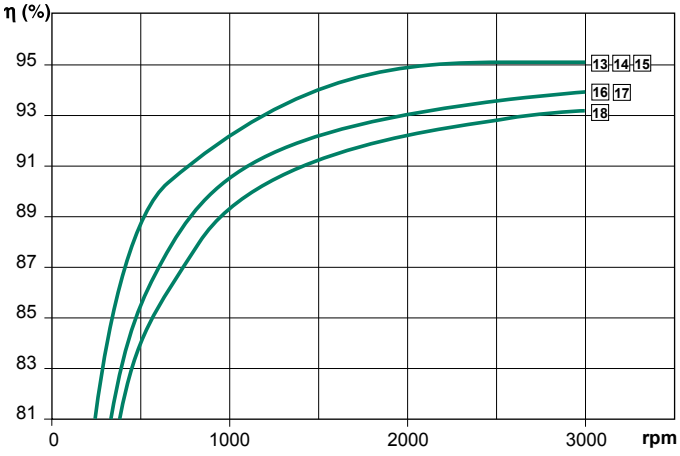
Torque from 0 to 37 N.m





Torque from 37 to 140 N.m

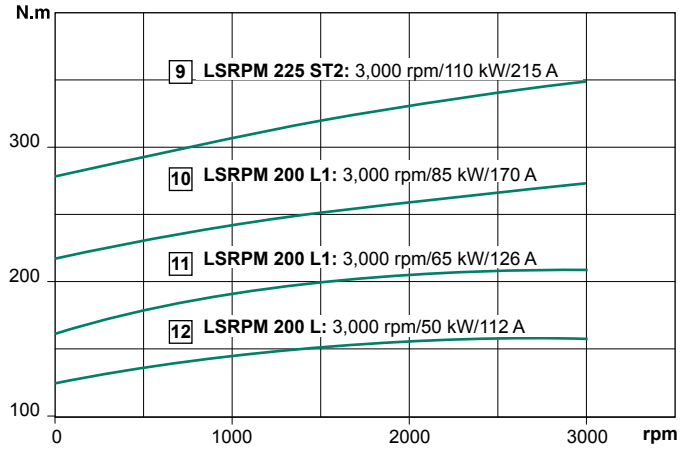


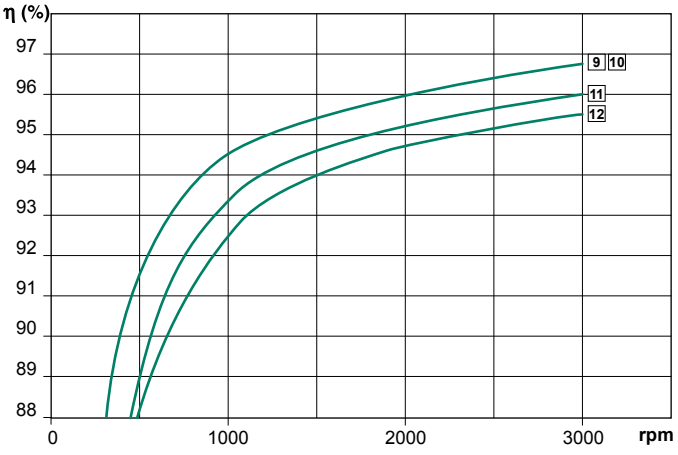


3000 range - 0 to 3,000 rpm

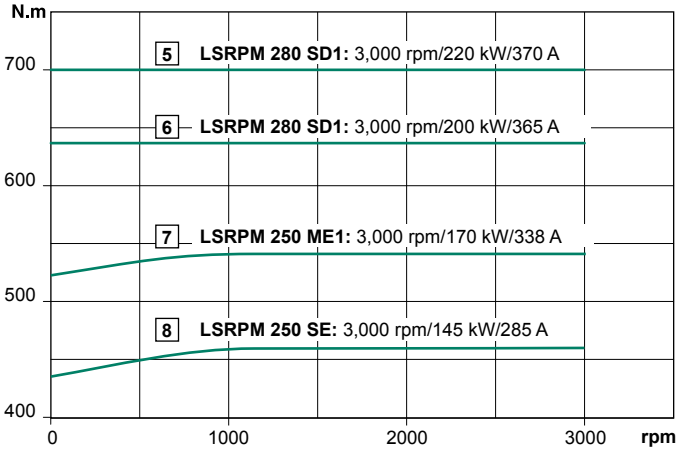
Thermal torque (S1 duty without forced ventilation) and efficiency curves

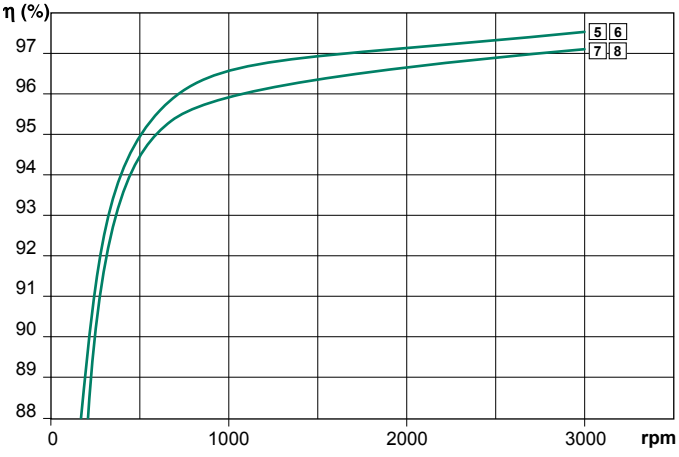
Torque from 140 to 350 N.m





Torque from 350 to 700 N.m





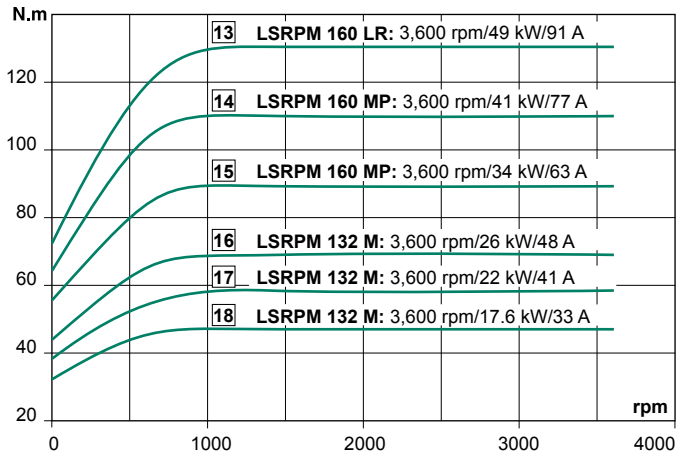
LSRPM motors with a higher output power are also available (documentation ref. 5006).

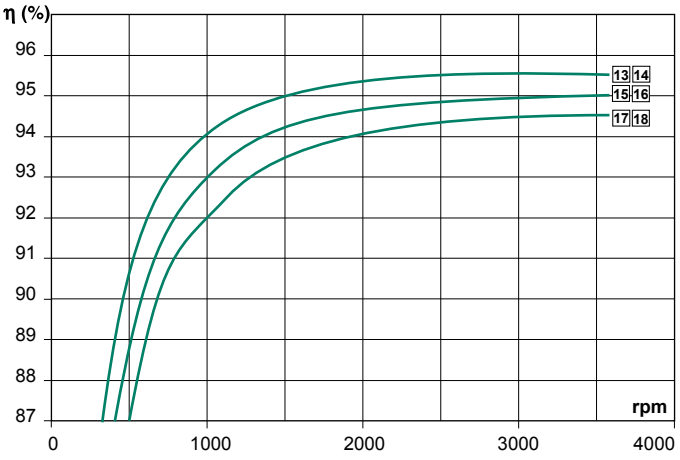
Performance

3600 range - 0 to 3,600 rpm

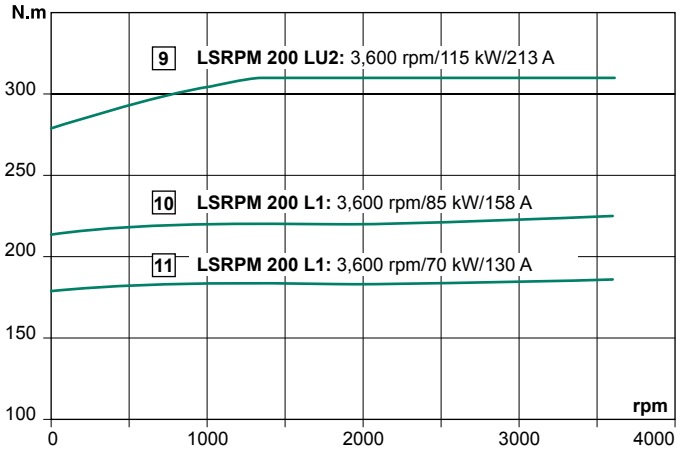
Thermal torque (S1 duty without forced ventilation) and efficiency curves

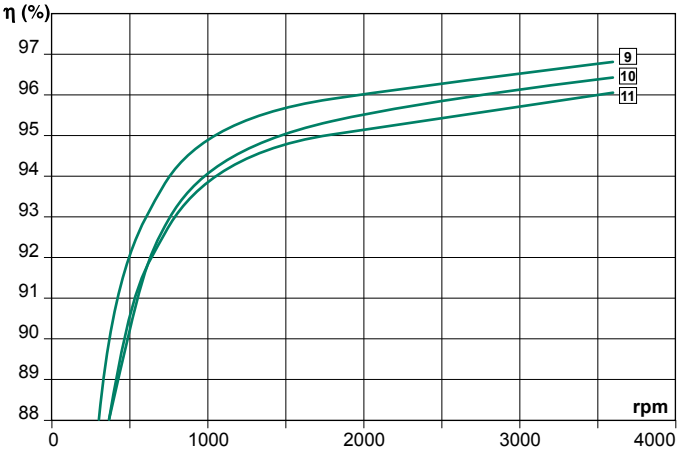
Torque from 0 to 130 N.m



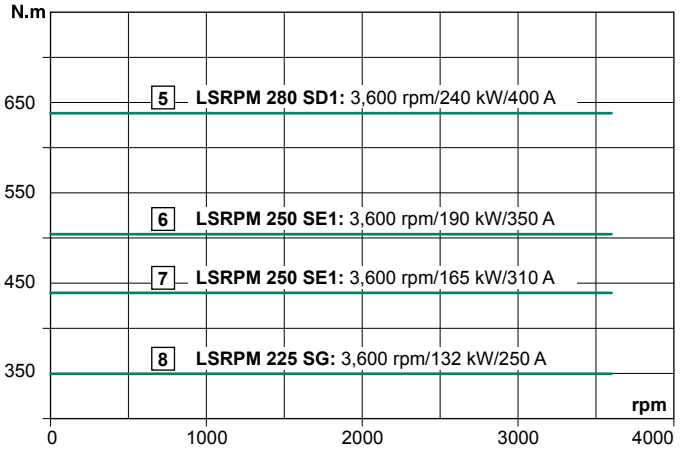


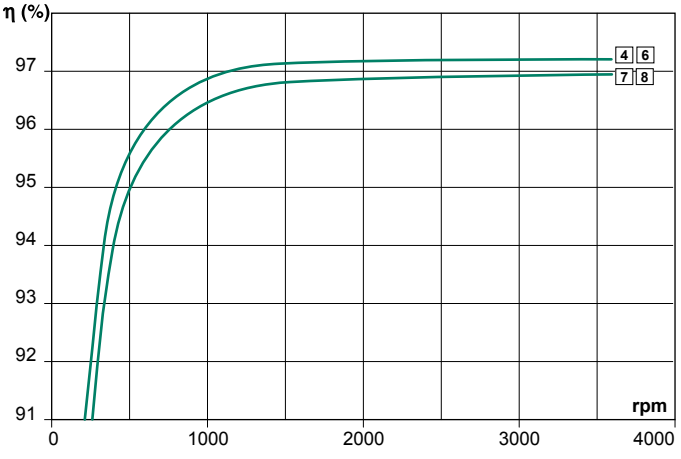
Torque from 130 to 305 N.m





Torque from 305 to 715 N.m





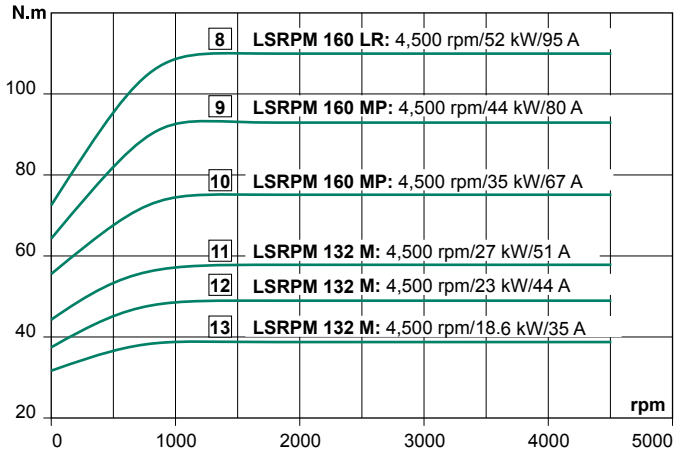
LSRPM motors with a higher output power are also available (documentation ref. 5006).

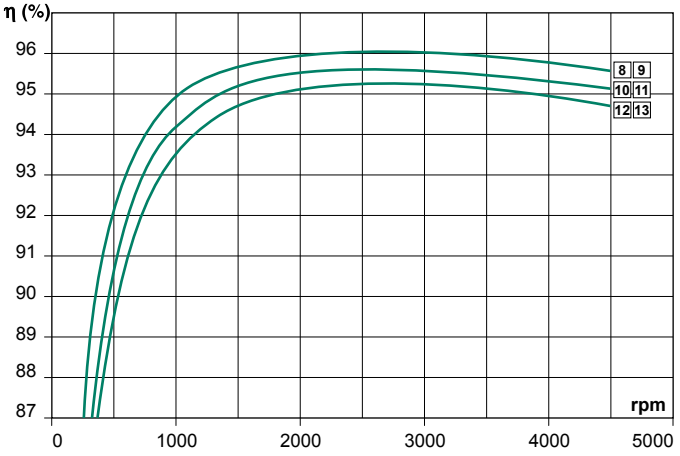
Performance

4500 range - 0 to 4,500 rpm

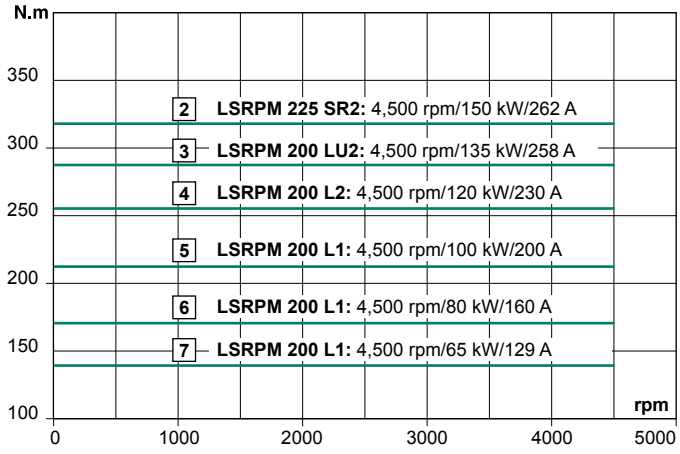
Thermal torque (S1 duty without forced ventilation) and efficiency curves

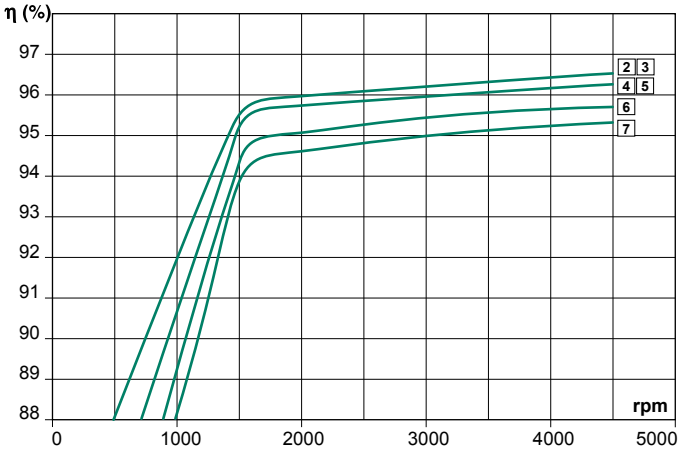
Torque from 0 to 110 N.m





Torque from 110 to 360 N.m



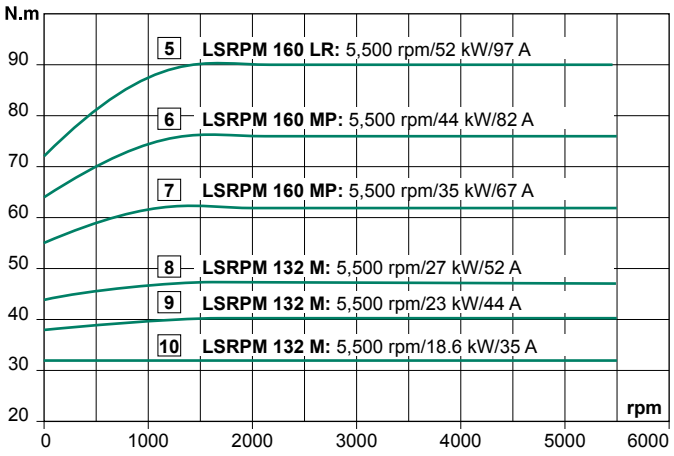


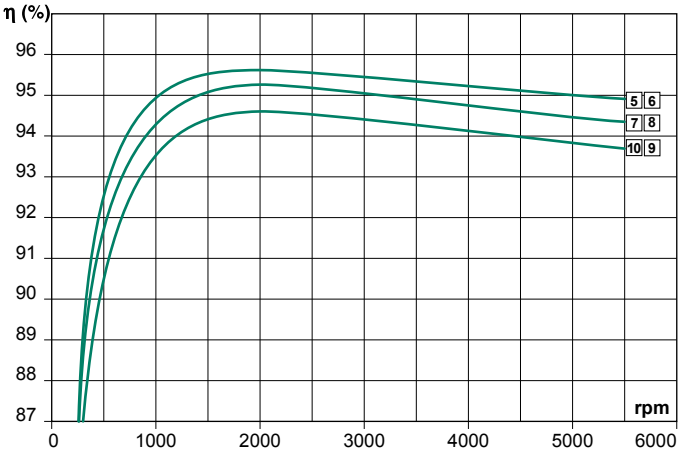
LSRPM motors with a higher output power are also available (documentation ref. 5006).

5500 range - 0 to 5,500 rpm

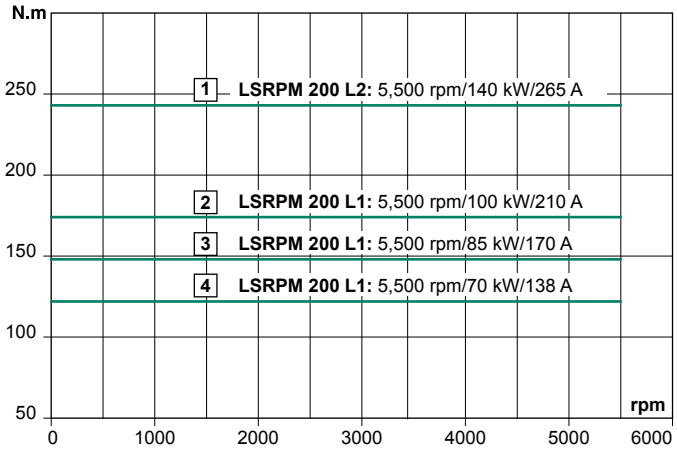
Thermal torque (S1 duty without forced ventilation) and efficiency curves

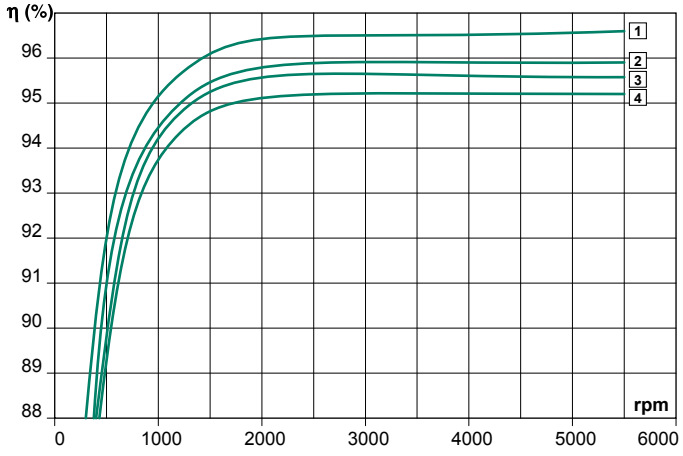
Torque from 0 to 90 N.m





Torque from 90 to 240 N.m

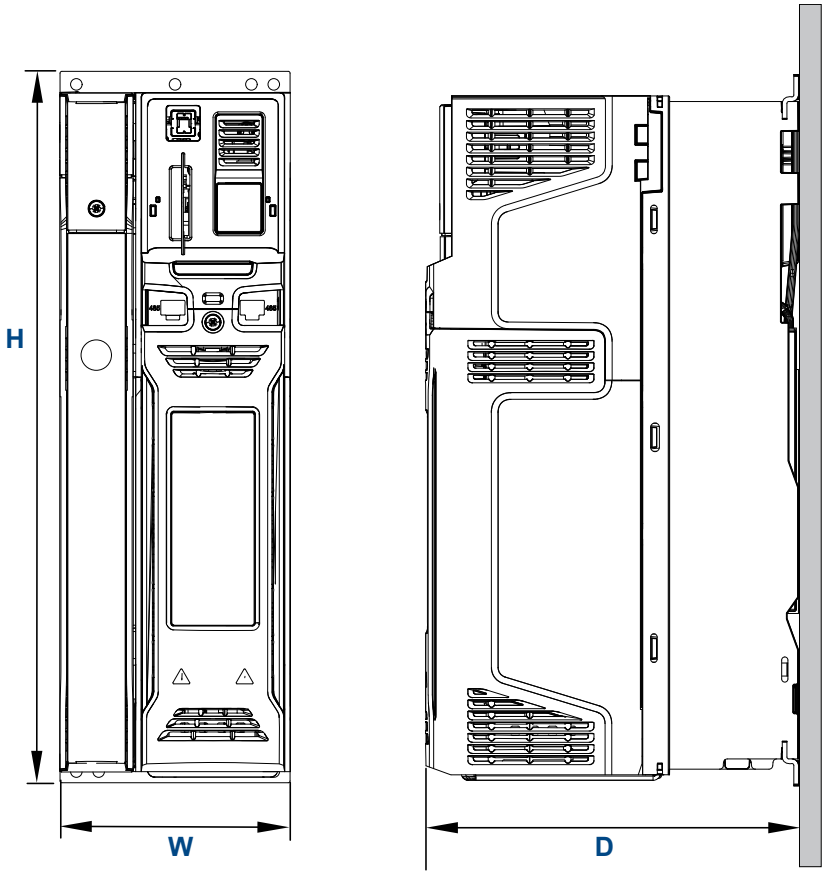




LSRPM motors with a higher output power are also available (documentation ref. 5006).

Drive dimensions

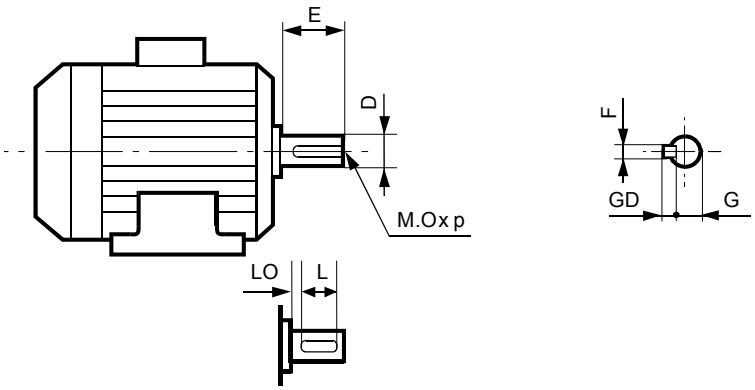
Powerdrive F300



Drive type	Dimensions and weight			
Powerdrive F300	H	W	D	Weight
	(mm)	(mm)	(mm)	(kg)
Size 03	382	83	200	4.5
Size 04	391	124	200	6.5
Size 05	391	143	202	7.4
Size 06	389	210	227	14
Size 07	557	270	280	28
Size 08	803	310	290	52
Size 9A	1108	310	290	66.5
Size 10E	1069	310	290	46
Size 11E	1242	310	312	63

Shaft extensions

Dimensions in millimeters



Type	Main shaft extensions								
	1500 to 5500 range								
	F	GD	D	G	E	O	p	L	LO
LSRPM 90 SL	8	7	28j6	24	60	10	22	50	6
LSRPM 100 L	10	8	32k6	27	80	12	28	63	8.5
LSRPM 132 M	10	8	38k6	33	80	12	28	63	7
LSRPM 160 MP/LR	14	9	48k6	42.5	110	16	36	98	6
LSRPM 200 L/L1/L2/LU/LU2	16	10	55m6	49	110	20	42	97	13
LSRPM 225 ST1/ST2/SR2/SG/MR1	18	11	60m6	53	140	20	42	126	14
LSRPM 250 SE/SE1/ME/ME1/MY	18	11	65m6	58	140	20	42	126	14
LSRPM 280 SC/SD/SD1	20	12	70m6	62.5	140	20	42	125	15
LSRPM 280 MK1/SCM	20	12	75m6	67.5	140	20	42	125	15
LSRPM 315 SP1/SN	22	14	80m6	71	170	20	42	155	15
LSRPM 315 MR1/MP1/SR1	22	14	85m6	76	170	20	42	155	15

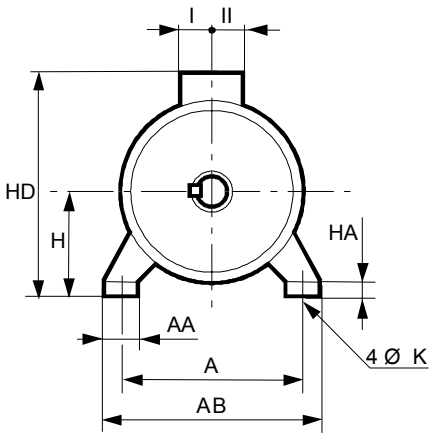
DYNEO® MOTORS AND DRIVES

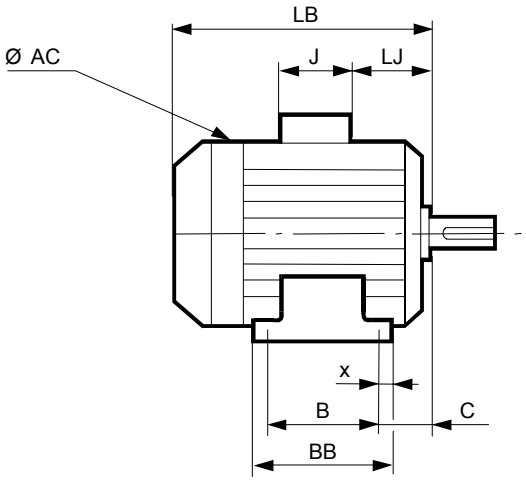
Powerdrive F300 variable speed drive/LSRPM permanent magnet synchronous motors

Motor dimensions

Foot mounted IM B3 (IM 1001)

Dimensions in millimeters



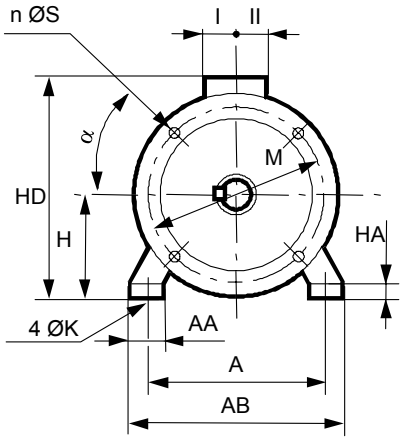


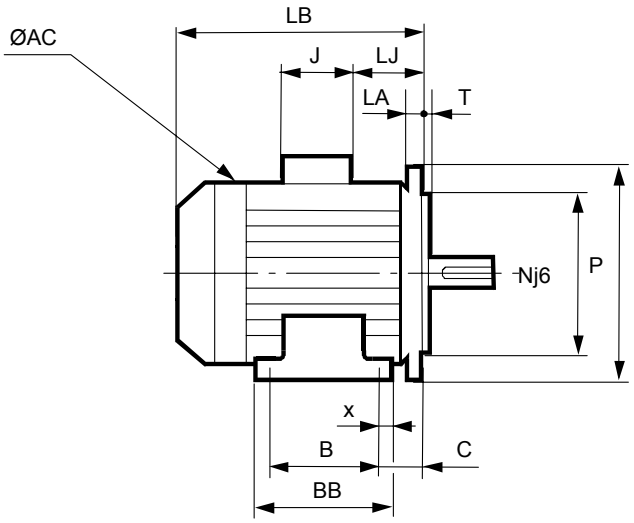
	Main dimensions																
Type	**A**	**AB**	**B**	**BB**	**C**	**X**	**AA**	**K**	**HA**	**H**	**AC**	**HD**	**LB**	**LJ**	**J**	**I**	**II**
LSRPM 90 SL	140	172	100	166	56	29	39	10	11	90	200	245	329	14	160	55	55
LSRPM 100 L	160	196	140	167	63	13	40	13	13	100	236	260	376	15	160	55	55
LSRPM 132 M	216	250	178	211	89	16	50	12	15	132	280	341	461	23	194	79	78
LSRPM 160 MP	254	294	254	298	108	22	64	14	25	160	310	391	555	53	186	112	95
LSRPM 160 LR	254	294	254	298	108	22	64	14	25	160	310	391	571	53	186	112	95
LSRPM 200 L	318	388	305	375	133	35	103	18.5	36	200	390	476	621	77	186	112	98
LSRPM 200 L1	318	388	305	375	133	35	103	18.5	36	200	390	510	621	55	231	119	141
LSRPM 200 L2	318	388	305	375	133	35	103	18.5	36	200	390	564	621	59	292	151	181
LSRPM 200 LU	318	388	305	375	133	35	103	18.5	36	200	390	476	669	77	186	112	98
LSRPM 200 LU2	318	388	305	375	133	35	103	18.5	36	200	390	564	669	59	292	151	181
LSRPM 225 ST1	356	431	286	386	149	50	127	18.5	36	225	390	535	627	61	231	119	141
LSRPM 225 ST2	356	431	286	386	149	50	127	18.5	36	225	390	589	627	66	292	151	181
LSRPM 225 SR2	356	431	286	386	149	50	127	18.5	36	225	390	589	676	66	292	151	181
LSRPM 225 MR1	356	431	311	386	149	50	127	18.5	36	225	390	535	676	68	231	119	141
LSRPM 225 SG	356	420	286	375	149	30	65	18.5	33	225	479	630	810	68	292	151	181
LSRPM 250 MY	406	470	349	449	168	70	150	24	47	250	390	560	627	61	231	119	141
LSRPM 250 SE	406	470	311	420	168	35	90	24	36	250	479	655	810	68	292	151	181
LSRPM 250 SE1	406	470	311	420	168	35	90	24	36	250	479	744	810	4	420	180	235
LSRPM 250 ME	406	470	349	420	168	35	90	24	36	250	479	655	810	68	292	151	181
LSRPM 250 ME1	406	470	349	420	168	35	90	24	36	250	479	744	810	4	420	180	235
LSRPM 280 SC	457	520	368	478	190	35	90	24	35	280	479	685	810	68	292	148	180
LSRPM 280 SCM	457	520	368	478	190	35	90	24	35	280	479	685	810	68	292	151	181
LSRPM 280 SD	457	520	368	478	190	35	90	24	35	280	479	685	870	68	292	148	180
LSRPM 280 SD1	457	520	368	478	190	35	90	24	35	280	479	774	870	4	420	180	235
LSRPM 280 MK1	457	533	419	495	190	40	85	24	35	280	586	835	921	35	420	180	235
LSRPM 315 SN	508	594	406	537	216	40	140	28	50	315	479	720	870	68	292	151	181
LSRPM 315 SP1	508	594	406	537	216	40	114	28	70	315	586	870	947	61	420	180	235
LSRPM 315 SR1	508	594	406	537	216	40	114	28	70	315	586	870	1017	62	420	180	235
LSRPM 315 MP1	508	594	457	537	216	40	114	28	70	315	586	870	947	61	420	180	235
LSRPM 315 MR1	508	594	457	537	216	40	114	28	70	315	586	870	1017	61	420	180	235

Motor dimensions

Foot and flange mounted IM B35 (IM 2001)

Dimensions in millimeters





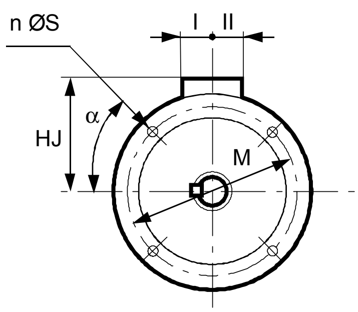
Type	Main dimensions																	
	A	AB	B	BB	C	X	AA	K	HA	H	AC	HD	LB	LJ	J	I	II	Sym.
LSRPM 90 SL	140	172	100	166	56	29	39	10	11	90	200	245	351	14	160	55	55	FF165
LSRPM 100 L	160	196	140	167	63	13	40	13	13	100	236	260	376	15	160	55	55	FF215
LSRPM 132 M	216	250	178	211	89	16	50	12	15	132	280	341	461	23	194	79	78	FF265
LSRPM 160 MP	254	294	254	298	108	22	64	14	25	160	310	391	555	53	186	112	95	FF300
LSRPM 160 LR	254	294	254	298	108	22	64	14	25	160	310	391	571	53	186	112	95	FF300
LSRPM 200 L	318	388	305	375	133	35	103	18.5	36	200	390	476	621	77	186	112	98	FF350
LSRPM 200 L1	318	388	305	375	133	35	103	18.5	36	200	390	510	621	55	231	119	141	FF350
LSRPM 200 L2	318	388	305	375	133	35	103	18.5	36	200	390	571	621	59	292	148	180	FF350
LSRPM 200 LU	318	388	305	375	133	35	103	18.5	36	200	390	476	669	77	186	112	98	FF350
LSRPM 200 LU2	318	388	305	375	133	35	103	18.5	36	200	390	571	669	59	292	148	180	FF350
LSRPM 225 ST1	356	431	286	386	149	50	127	18.5	36	225	390	535	627	62	231	119	141	FF400
LSRPM 225 ST2	356	431	286	386	149	50	127	18.5	36	225	390	596	627	66	292	148	180	FF400
LSRPM 225 SR2	356	431	286	386	149	50	127	18.5	36	225	390	596	676	66	292	148	180	FF400
LSRPM 225 MR1	356	431	311	386	149	50	127	18.5	36	225	390	535	676	68	231	119	141	FF400
LSRPM 225 SG	356	420	286	375	149	50	65	18.5	30	225	479	629	810	68	292	148	180	FF400
LSRPM 250 MY	406	470	349	449	168	70	150	24	47	250	390	560	628	61	231	119	142	FF500
LSRPM 250 SE	406	470	311	420	168	35	90	24	36	250	479	655	810	68	292	148	180	FF500
LSRPM 250 SE1	406	470	311	420	168	35	90	24	36	250	479	744	810	4	420	180	235	FF500
LSRPM 250 ME	406	470	349	420	168	35	90	24	36	250	479	655	810	68	292	148	180	FF500
LSRPM 250 ME1	406	470	349	420	168	35	90	24	36	250	479	744	810	4	420	180	235	FF500
LSRPM 280 SC	457	520	368	478	190	35	90	24	35	280	479	685	810	68	292	148	180	FF500
LSRPM 280 SCM	457	520	368	478	190	35	90	24	35	280	479	686	810	68	292	151	181	FF500
LSRPM 280 SD	457	520	368	478	190	35	90	24	35	280	479	685	870	68	292	148	180	FF500
LSRPM 280 SD1	457	520	368	478	190	35	90	24	35	280	479	774	870	4	420	180	235	FF500
LSRPM 280 MK1	457	520	419	495	190	40	85	24	35	280	586	834	921	35	420	180	235	FF500
LSRPM 315 SN	508	594	406	537	216	40	140	28	50	315	479	721	870	68	292	151	181	FF600
LSRPM 315 SP1	508	594	406	537	216	40	114	28	70	315	586	870	947	61	420	180	235	FF600
LSRPM 315 SR1	508	594	406	537	216	40	114	28	70	315	586	867	1017	62	418	180	235	FF600
LSRPM 315 MP1	508	594	457	537	216	40	114	28	70	315	586	867	947	62	418	180	235	FF600
LSRPM 315 MR1	508	594	457	537	216	40	114	28	70	315	586	870	1017	61	420	180	235	FF600

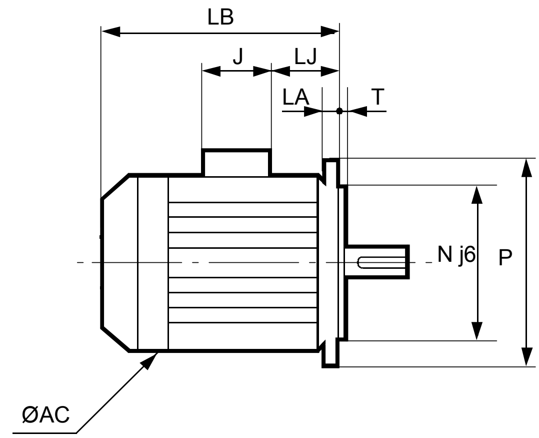
Powerdrive F300 variable speed drive/LSRPM permanent magnet synchronous motors

Motor dimensions

Flange mounted IM B5 (IM 3001)* IM V1 (IM 3011)

Dimensions in millimeters





Type	Main dimensions						
	AC	LB	HJ	LJ	J	I	II
LSRPM 90 SL	200	351	155	34	160	55	55
LSRPM 100 L	200	376	160	15	160	55	55
LSRPM 132 M	264	461	209	23	194	79	78
LSRPM 160 MP	264	555	231	53	186	112	95
LSRPM 160 LR	264	571	231	53	186	112	95
LSRPM 200 L	390	621	276	77	186	112	98
LSRPM 200 L1	390	621	310	55	231	119	141
LSRPM 200 L2	390	621	364	59	292	148	180
LSRPM 200 LU	390	669	276	77	186	112	98
LSRPM 200 LU2	390	669	364	59	292	148	180
LSRPM 225 ST1	390	627	310	61.5	231	119	141
LSRPM 225 ST2	390	627	364	-	292	148	180
LSRPM 225 SR2	390	676	364	-	292	148	180
LSRPM 225 MR1	390	535	276	61.5	231	119	141
LSRPM 225 SG	479	810	405	68	292	148	180
LSRPM 250 MY	390	627.5	310	61	231	119	142
LSRPM 250 SE	479	810	405	68	292	148	180
LSRPM 250 SE1	479	810	494	4	420	180	235
LSRPM 250 ME	479	810	405	68	292	148	180
LSRPM 250 ME1	479	810	494	4	420	180	235
LSRPM 280 SC	479	810	405	68	292	148	180
LSRPM 280 SCM	479	810	405	67.5	292	151	181
LSRPM 280 SD	479	870	405	68	292	148	180
LSRPM 280 SD1	479	870	494	4	420	180	235
LSRPM 280 MK1	586	921	555	35	420	180	235
LSRPM 315 SN	479	870	405	67.5	292	151	181
LSRPM 315 SP1	586	947	554	61	420	180	235
LSRPM 315 SR1	586	1017	555	61.5	418	180	235
LSRPM 315 MP1	586	947	555	61.5	418	180	235
LSRPM 315 MR1	586	1017	555	61	420	180	235

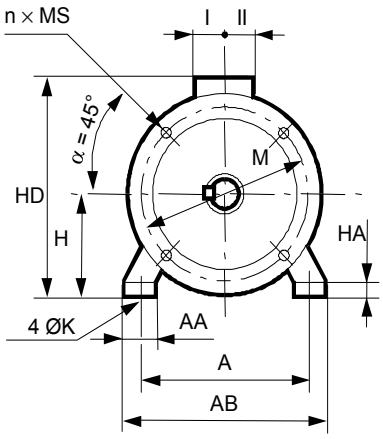
IEC symbol	Flange dimensions							
	M	N	P	T	n	α	S	LA
FF165	165	130	200	3.5	4	45	12	10
FF215	215	180	250	4	4	45	14.5	12
FF265	265	230	300	4	4	45	14.5	14
FF300	300	250	350	5	4	45	18.5	14
FF300	300	250	350	5	4	45	18.5	14
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF350	350	300	400	5	4	45	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	15
FF400	400	350	450	5	8	22.5	18.5	15
FF400	400	350	450	5	8	22.5	18.5	16
FF400	400	350	450	5	8	22.5	18.5	16
FF500	500	450	550	5	8	22.5	18.5	18
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	5	8	22.5	18.5	22
FF500	500	450	550	6	8	22.5	18.5	18
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22
FF600	600	550	660	6	8	22.5	24	22

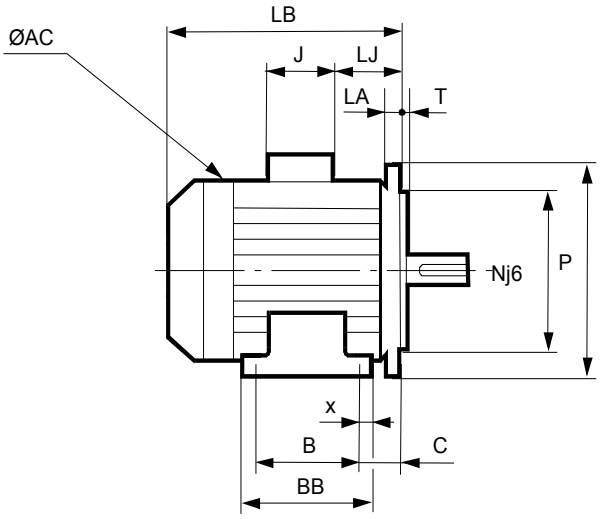
* For a frame size above 250 mm for IM 3001 use, please consult Leroy-Somer.

Dimensions of shaft extensions identical to those for foot mounted motors.

Foot and face mounted IM B34 (IM 2101)

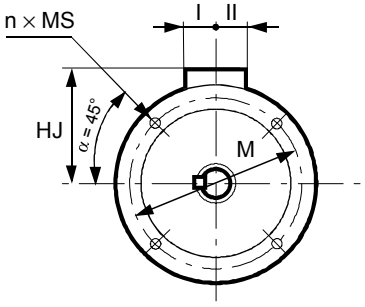
Dimensions in millimeters

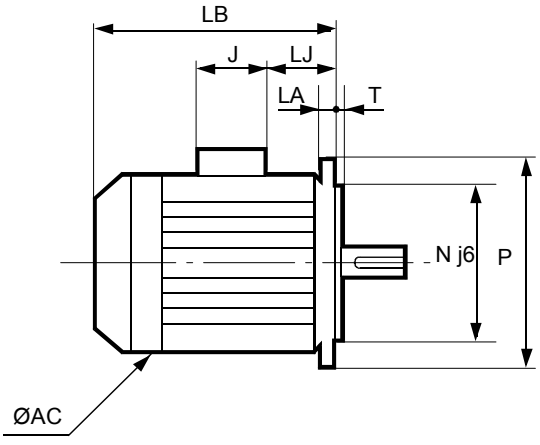




Type	Main dimensions																	
	A	AB	B	BB	C	X	AA	K	HA	H	AC	HD	LB	LJ	J	I	II	Sym.
LSRPM 90 SL	140	172	100	166	56	29	39	10	11	90	200	245	329	14	160	55	55	FT115
LSRPM 100 L	160	196	140	167	63	13	40	13	13	100	236	260	376	15	160	55	55	FT130
LSRPM 132 M	216	250	178	211	89	16	50	12	15	132	264	341	461	23	194	79	78	FT215

Face mounted IM B14 (IM 3601)





Type	Main dimensions						
	AC	LB	HJ	LJ	J	I	II
LSRPM 90 SL	200	329	155	14	160	55	55
LSRPM 100 L	236	376	160	15	160	55	55
LSRPM 132 M	264	461	209	23	194	79	78

IEC symbol	Faceplate dimensions					
	M	N	P	T	n	MS
FT115	115	95	140	3	4	M8
FT130	130	110	160	3.5	4	M8
FT215	215	180	250	4	4	M12

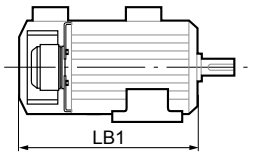
Dimensions of shaft extensions identical to those for foot mounted motors.

Motors with options

Dimensions in millimeters

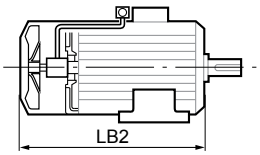
Forced ventilation unit

B3 & B5



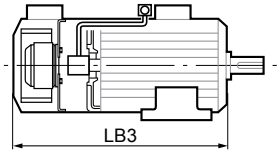
Incremental encoder

B3 & B5



Forced ventilation unit and incremental encoder

B3 & B5

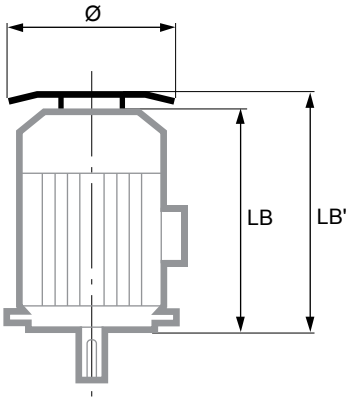


Type	LB1	LB2	LB3
LSRPM 90 SL	-	329	383
LSRPM 100 L	-	376	431
LSRPM 132 M	-	461	499
LSRPM 160 MP	-	555	710
LSRPM 160 LR	-	571	730
LSRPM 200 L/L1/L2	802	674	802
LSRPM 200 LU/LU2	847	723	847
LSRPM 225 ST1/ST2	808	680	808
LSRPM 225 SR2	854	730	854
LSRPM 225 MR1	854	730	854
LSRPM 225 SG	1012	860	1012
LSRPM 250 MY	808	680	808
LSRPM 250 SE/SE1	1012	860	1012
LSRPM 250 ME/ME1	1012	860	1012
LSRPM 280 SC/SCM	1012	860	1012
LSRPM 280 SD/SD1	1072	920	1072
LSRPM 280 MK1	1111	965	1111
LSRPM 315 SP1/MP1	1181	991	1181
LSRPM 315 SN	1072	920	1072
LSRPM 315 MR1/SR1	1251	1061	1251

Note: Dimensions of motors with single-turn and multi-turn absolute encoders will be supplied on request.

Drip cover for operation in vertical position, shaft end facing down

Motor type	LB'	Ø
LSRPM 90 SL	LB + 20	185
LSRPM 100 L	LB + 20	185
LSRPM 132 M	LB + 30	240
LSRPM 160 MP/LR	LB + 30	236
LSRPM 200 L/L1/L2/LU/LU2	LB + 36.5	350
LSRPM 225 ST1/ST2/MR1/SR2	LB + 36.5	350
LSRPM 225 SG	LB + 55	350
LSRPM 250 MY	LB + 36.5	350
LSRPM 250 SE/SE1	LB + 55	350
LSRPM 280 SCM/SC/SD/SD1	LB + 55	350
LSRPM 280 MK1	LB + 76.5	505
LSRPM 315 SN	LB + 55	350
LSRPM 315 SP1/MP1/MR1/SR1	LB + 76.5	505



General

Influence of the AC supply

Each industrial power supply has its own intrinsic characteristics (short-circuit capability, voltage value and fluctuation, phase imbalance, etc.) and supplies equipment some of which can distort its voltage either permanently or temporarily (notches, voltage dips, overvoltage, etc.). The quality of the AC supply has an impact on the performance and reliability of electronic equipment, especially variable speed drives.
Nidec drives are designed to operate with the AC supplies typically found on industrial sites throughout the world. However, for each installation, it is important to know the characteristics of the AC supply so that you can take corrective steps in the event of abnormal conditions.

Transient overvoltages

There are numerous sources of overvoltages on an electrical installation:
- Connection/disconnection of banks of power factor correction capacitors
- High-power thyristor-controlled equipment (oven, DC drive, etc.)
- Overhead power supply

Connection/disconnection of a bank of cos φ correction capacitors
Connecting power factor correction capacitors in parallel on the drive power supply line when the drive is running can generate transient overvoltages that are likely to trip the drive safety devices, or even damage it in extreme cases.
If banks of power factor correction capacitors are used on the power supply line, make sure that:
- The threshold between steps is low enough to avoid causing overvoltage on the line
- The capacitors are not permanently connected

Presence of commutation notches on the line
When high-power thyristor-controlled equipment is connected on the same line as the drive, it is essential to ensure that the harmonics generated by the commutation notches do not excessively distort the AC voltage and do not create voltage peaks with amplitude higher than 1.6 x line Vrms. If this is the case, it is essential to take corrective measures to guarantee the line supply quality.

Unbalanced power supply

In the same way as can be seen on an electric motor, the line voltage imbalance of a drive can have consequences on its operation. Please refer to the drive installation manual.

Equipotential bonding

The equipotential earth bonding of some industrial sites is not always observed. This lack of equipotentiality leads to leakage currents that flow via the earth cables (green/yellow), the machine frame, the pipework, etc., and also via the electrical equipment. In some extreme cases, these currents can trip the drive.
It is essential that the earth network is designed and implemented by the installation supervisor so that its impedance is as low as possible, so as to distribute the fault currents and high-frequency currents without them passing through electrical equipment.

Metal grounds must be mechanically connected to each other with the largest possible electrical contact area.

Under no circumstances can earth connections designed to protect people, by linking metal grounds to earth via a cable, serve as a substitute for equipotential bonding (see IEC 61000-5-2).

The immunity and radio-frequency emission level are directly linked to the quality of the equipotential bonding.

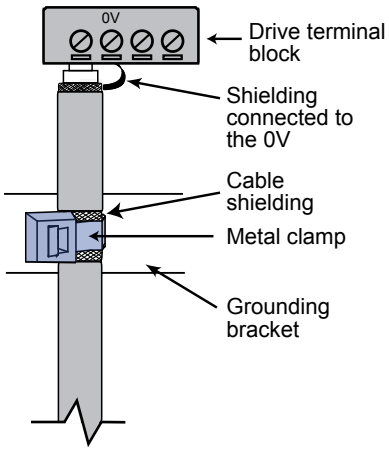
Good wiring practice

Connecting the control cables

If the control wiring needs to be routed outside the drive cabinet, it must be shielded and fixed to the drive by means of the grounding bracket. Remove the outer insulation from the cable to ensure that the shielding is in direct contact with the metal clamp collars on the bracket (360° contact).
Leave the shielding intact as close as possible to the terminals.

Connect the drive analog inputs with shielded cables.
Connect the shielding to the drive end 0V.

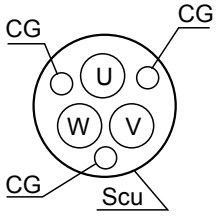
Connecting a control cable to the drive



Power cable

It is the responsibility of the user and/or the installation company to connect the motor and drive system in accordance with the current legislation and regulations in the country of use. This is particularly important as concerns cable size and connection of earths and grounds.
The following information is given for guidance only, and should never be used as a substitute for the current standards, nor does it relieve the installation company of their responsibility. For more information, please refer to technical specification IEC 60034-25.
To ensure the safety of personnel, the size of the earthing cables should be determined individually in accordance with local regulations.

For compliance with standard EN 61800-3, the power conductors between drive and motor must be shielded. Use a special variable speed cable: shielded with low stray capacity and with 3 protective earth (PE) conductors arranged at 120° (diagram below). There is no need to shield the drive power supply cables.



The motor and drive wiring must be symmetrical (U,V,W at the motor end must correspond to U,V,W at the drive end) with the cable shielding grounded at both the drive end and motor end over 360°.
In the second industrial environment (if an HV/LV transformer belongs to the user), the shielded motor power supply cable can be replaced with a 3-core + earth cable placed in a fully-enclosed metal conduit (metal cable duct for example). This metal conduit should be mechanically connected to the electrical cabinet and the structure supporting the motor. **If the conduit consists of several pieces, these should be interconnected by braids to ensure ground continuity**. The cables must be fixed securely at the bottom of the conduit.

The motor earth terminal (PE) must be connected directly to the drive earth terminal. A separate protective earth (PE) conductor is mandatory if the conductivity of the cable shielding is less than 50% of the conductivity of the phase conductor.

Typical motor and drive installation

The following information is given for guidance only, and should never be used as a substitute for the current standards, nor does it relieve the installation company of their responsibility.
Depending on the installation, more optional elements can be added:

Switch-fuse: a padlockable breaking device must be installed to isolate the installation if operator intervention becomes necessary. This device must provide protection against overheating and short-circuits. The fuse rating is stated in the drive documentation. The switch-fuse can be replaced with a circuit-breaker (with appropriate breaking capacity).

RFI filter: Its role is to reduce the drive electromagnetic emissions, and thus comply with EMC standards. Our drives are, as standard, equipped with an internal RFI filter. Some environments require the addition of an external filter. Please consult the drive documentation to find out the drive conformance levels, with and without an external RFI filter.

Drive power supply cables: These cables do not necessarily need shielding. Their cross-section is recommended in the drive documentation, however, it can be adapted according to the type of cable, installation method, the cable length (voltage drop), etc. See below “Sizing the power cables”.

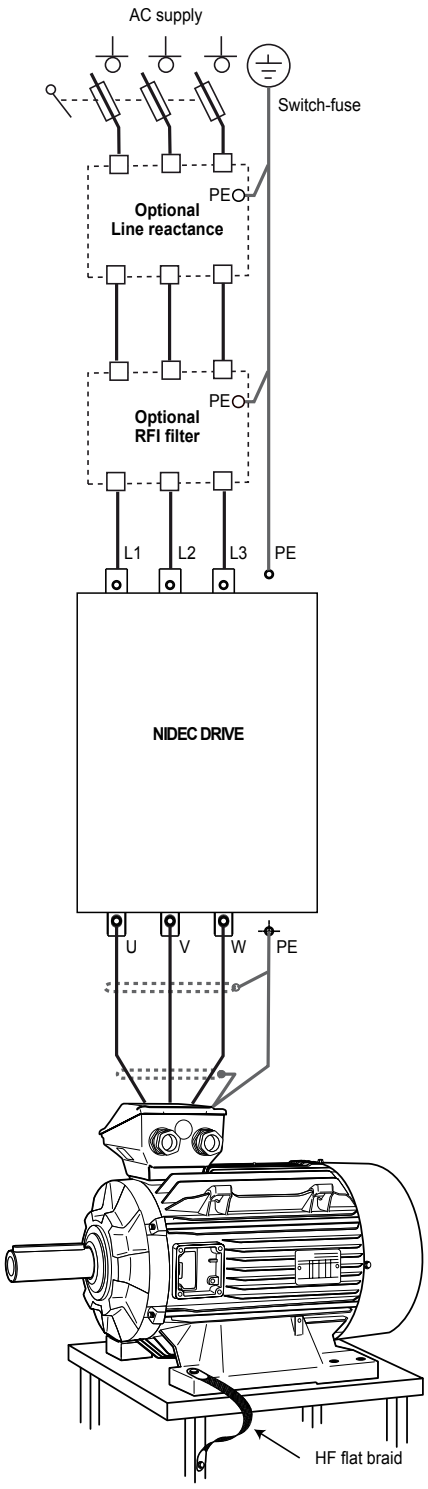
Line reactance: Its role is to reduce the risk of damage to drives following phase imbalance or significant disturbance on the AC supply. The line reactance can also reduce low-frequency harmonics.

Motor power supply cables: These cables must be shielded to ensure EMC conformance of the installation. The cable shielding must be connected over 360° at both ends. At the motor end, special EMC cable glands are available as an option. The cable cross-section is recommended in the drive documentation, however, it can be adapted according to the type of cable, installation method, the cable length (voltage drop), etc. See below “Sizing the power cables”.

Sizing the power cables: The drive and motor power supply cables must be sized according to the applicable standard, and according to the design current stated in the drive documentation.
The different factors to be taken into account are:
- The installation method: in a conduit, a cable tray, suspended, etc.
- The type of conductor: copper or aluminum

Once the cable cross-section has been determined, check the voltage drop at the motor terminals. A significant voltage drop results in increased current and additional losses in the motor (temperature rise).

Equipotential bonding between the frame, motor, drive, transformer and ground carried out in accordance with good practice will significantly help reduce the voltage on the shaft and the motor casing, resulting in fewer high-frequency leakage currents. Premature breakage of bearings and auxiliary equipment, such as encoders, should also be avoided wherever possible.



Reinforced insulation

Motors fitted with insulated bearings are specified on page 49

Standard motors are compatible with power supplies with the following characteristics:
• U rms = 480 V max.
• Value of voltage peaks generated at the terminals: 1500 V max.
However, they can be supplied under more severe conditions if additional protection is provided.

Reinforced winding insulation

The main effect connected with supplying power via an electronic drive is overheating of the motor due to the non-sinusoidal shape of the signal. In addition, this can result in accelerated aging of the winding through the voltage peaks generated at each pulse in the power supply signal (see Figure 1).
For peak values greater than 1500 V, a super-insulation option for the winding is available over the entire range.

Reinforced insulation of the mechanism

Supplying power via a drive can affect the mechanism and lead to premature wear of the bearings.
This is because, in any motor, a shaft voltage exists with respect to earth. This voltage, due to electromechanical dissymmetries, creates a potential difference between the rotor and the stator. This effect can generate electrical discharges between balls and slip-rings and lead to a reduction in bearing life.
If power is supplied via a PWM drive, a second effect is added: high-frequency currents generated by the IGBT output bridges of the drives. These currents “attempt” to spread towards the drive and therefore flow through the stator and via earth where the link between the casing, machine frame and earth is correctly made.

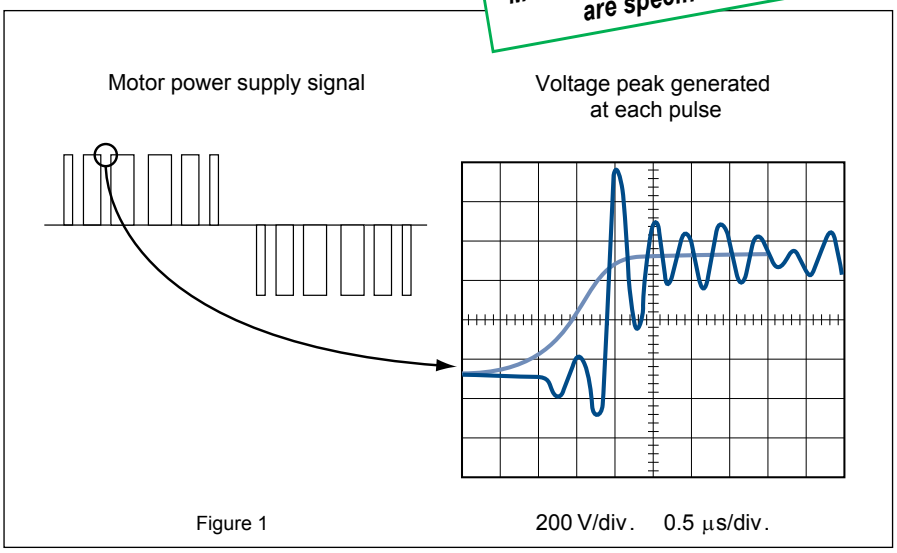
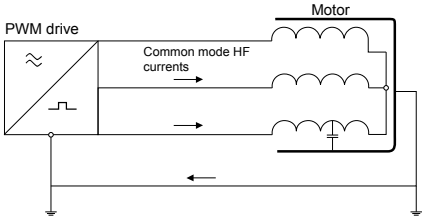


Figure 1



Otherwise, it will flow via the least resistive path: end shields/bearings/shaft/machine coupled to the motor. In these situations, therefore, protection for the bearings must be provided.
For this reason, an “insulated bearing” option is available over the entire range from a frame size of 200.

Insulated bearing characteristics

The outer races of the bearings are coated with a layer of electrically insulating ceramic.

The dimensions and tolerances of these bearings are identical to the standard ones used and can therefore be fitted instead, with no modifications to the motors. The breakdown voltage is 500 V.
To find out which type of bearings are fitted as standard, see the “Bearings and lubrication” section.

Recommended winding protection

AC voltage	Cable length	Frame size	Winding protection
≤ 480 V	≤ 20 m	All frame sizes	Standard*
	> 20 m and < 100 m	< 315	Standard*
		≥ 315	RIS**
> 480 V and ≤ 690 V	≤ 20 m	< 250	Standard*
		≥ 250	RIS**
	> 20 m and < 100 m	< 250	RIS**
		≥ 250	RIS**

** Standard insulation = 1,500 V peak and 3,500 V/µs*

*** RIS: Reinforced insulation system.*

Forced ventilation unit

To maintain the rated torque over the entire speed range, a forced ventilation unit may be necessary.

Characteristics of forced ventilation units
(please consult Leroy-Somer for motors ≥ 225 SG in speed ranges ≥ 2,400 rpm)

Motor type	Supply voltage[1] FV	FV consumption		Ingress protection[2] FV
		P (W)	I (A)	
LSRPM 90 to 132	single-phase 230 or 400 V	100	0.43/0.25	IP 55
LSRPM 160	three-phase 230/400 V 50 Hz 265/460 V 60 Hz	48 57	0.25/0.14 0.22/0.13	IP 55
LSRPM 250 MY LSRPM 200 to 225 except LSRPM 225 SG	three-phase 230/400 V 50 Hz 254/460 V 60 Hz	150	0.94/0.55	IP 55
LSRPM 225 SG LSRPM 315 SN LSRPM 250 and 280 except LSRPM 280 MK/250 MY	three-phase 230/400 V 50Hz 254/460 V 60 Hz	200	1.4/0.8	IP55
LSRPM 280 MK1 LSRPM 315 except LSRPM 315 SN	three-phase 230/400 V 50Hz 254/460 V 60 Hz	750	3.6/2.1	IP55

1. ± 10% for voltage, ± 2% for frequency.

2. Ingress protection of the forced ventilation unit installed on the motor.

The motors are self-cooled as standard

Cable glands

To guarantee protection of the installation in accordance with EMC directive 2004/108/EC, there must be ground continuity between the cable and the motor ground. An optional **cable gland with anchorage on shielded cable** is therefore available over the entire range.

The motors are supplied with pre-drilled and tapped terminal boxes or an undrilled mounting plate for mounting cable glands
see page 50

Type and cable size of cable glands

Cable gland type	Cable size	
	Min. cable Ø (mm) W	Max. cable Ø (mm) A
ISO 16	6	11
ISO 20	7.5	13
ISO 25	12.5	18
ISO 32	17.5	25
ISO 40	24.5	33.5
ISO 50	33	43
ISO 63	42.5	55

Thermal protection

The motors are fitted with PTC sensors as standard

Motors are protected by the variable speed drive, placed between the isolating switch and the motor.
The drive provides total protection of the motor against overloads.

Dyneo motors are fitted with PTC sensors in the winding as standard. As an option, specific thermal protection sensors can be selected from the table below.

It must be emphasized that under no circumstances can these sensors be used to carry out direct regulation of the motor operating cycles.

Fitting thermal protection

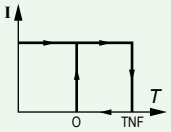
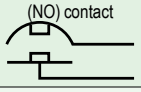
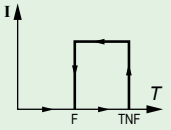
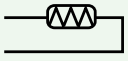
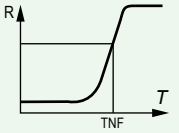
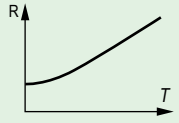
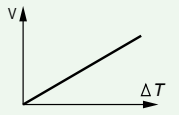
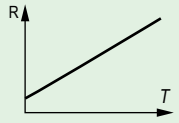
- PTO or PTF, in the control circuits
- PTC, with relay, in the control circuits
- PT 100 or thermocouples, with reading equipment or recorder, in the installation control panels for continuous surveillance

Motor thermal sensors must be connected in order to maintain optimum motor protection.

Alarm and early warning

All protective equipment can be backed up by another type of protection (with different NRTs). The first device will then act as an early warning (light or sound signals given without shutting down the power circuits), and the second device will be the alarm (shutting down the power circuits).

Built-in indirect thermal protection

Type	Operating principle	Operating curve	Breaking capacity (A)	Protection provided	Mounting Number of devices*
Normally closed thermal protection **PTO**	Bimetallic strip, indirectly heated, with normally closed (NC) contact 		2.5 A at 250 V with cos φ 0.4	general surveillance for non-transient overloads	Mounted in control circuit 2 or 3 in series
Normally open thermal protection **PTF**	Bimetallic strip, indirectly heated, with normally open (NO) contact 		2.5 A at 250 V with cos φ 0.4	general surveillance for non-transient overloads	Mounted in control circuit 2 or 3 in parallel
Positive temperature coefficient thermistor **PTC**	Variable non-linear resistor with indirect heating 		0	general surveillance for transient overloads	Mounted with associated relay in control circuit 3 in series
Temperature sensor **KTY**	Resistance depends on the winding temperature		0	High accuracy continuous surveillance of key hot spots	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Thermocouples ***T*** (*T* < 150°C) Copper Constantan ***K*** (*T* < 1000°C) Copper cupro-nickel	Peltier effect		0	Continuous surveillance of hot spots at regular intervals	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot
Platinum temperature sensor **PT 100**	Linear variable resistor, indirectly heated		0	High accuracy continuous surveillance of key hot spots	Mounted in control panels with associated reading equipment (or recorder) 1 per hot spot

- NRT: nominal running temperature
- The NRTs are chosen according to the position of the sensor in the motor and the temperature rise class.
- Standard KTY = 84/130

** The number of devices relates to the winding protection.*

Definition of “Index of Protection” (IP/IK)

In standard configuration the motors are IP 55/IK 08 for LSRPM

Ingress protection of electrical equipment enclosures
In accordance with IEC 60034-5 - EN 60034-5 (IP) - IEC 62262 (IK)

1st number: Protection against solid objects			2nd number: Protection against liquids			3rd number: Mechanical protection		
IP	Tests	Definition	IP	Tests	Definition	IK	Tests	Definition
0		No protection	0		No protection	00		No protection
1	Ø 50 mm	Protected against solid objects larger than 50 mm (e.g. accidental contact with the hand)	1		Protected against water drops falling vertically (condensation)	01	150 g, 10 cm	Impact energy: 0.15 J
2	Ø 12 mm	Protected against solid objects larger than 12 mm (e.g. a finger)	2	15°	Protected against water drops falling at up to 15° from the vertical	02	200 g, 10 cm	Impact energy: 0.20 J
3	Ø 2.5 mm	Protected against solid objects larger than 2.5 mm (e.g. tools, wires)	3	60°	Protected against rain falling at up to 60° from the vertical	03	250 g, 15 cm	Impact energy: 0.37 J
4	Ø 1 mm	Protected against solid objects larger than 1 mm (e.g. thin tools, small wires)	4		Protected against projected water from all directions	04	250 g, 20 cm	Impact energy: 0.50 J
5		Protected against dust (no deposits of harmful material)	5		Projected against jets of water from all directions from a hose	05	350 g, 20 cm	Impact energy: 0.70 J
6		Protected against any dust penetration	6		Protected against projected water comparable to big waves	06	250 g, 40 cm	Impact energy: 1 J
			7	0.15m, 1m	Protected against the effects of immersion between 0.15 and 1 m	07	0,5 kg, 40 cm	Impact energy: 2 J
			8 . . m	..m	Protected against prolonged effects of immersion under pressure	08	1,25 kg, 40 cm	Impact energy: 5 J
						09	2,5 kg, 40 cm	Impact energy: 10 J
						10	5 kg, 40 cm	Impact energy: 20 J

Example:

Example of an IP55 machine

IP : Index of protection

5. : Machine protected against dust and accidental contact.
Test result: no dust enters in harmful quantities, no risk of direct contact with rotating parts. The test will last for 2 hours.

.5 : Machine protected against jets of water from all directions from hoses at 3 m distance with a flow rate of 12.5 l/min at 0.3 bar.
The test will last for 3 minutes.
Test result: no damage from water projected onto the machine.

External finish

Surface protection is defined in standard ISO 12944. This standard defines the expected life of a paint system until the first major application of maintenance paint. Durability is not guaranteed.
Standard EN ISO 12944 is divided into 8 parts. Part 2 discusses the classification of environments.
Leroy-Somer motors are protected with a range of surface finishes.
Surfaces receive appropriate special treatments, as shown below.

Preparation of surfaces

SURFACE	PARTS	TREATMENT
Cast iron	*End shields*	*Shot blasting + Primer*
Steel	*Accessories*	*Phosphate treatment + Primer*
	Terminal boxes - Fan covers	*Electrostatic painting or Epoxy powder*
Aluminum alloy	*Housings - Terminal boxes*	*Shot blasting*

Classification of environments

Leroy-Somer paint systems according to category.

ATMOSPHERIC CORROSIVITY CATEGORIES	CORROSIVITY CATEGORY* ACC. TO ISO 12944-2	Durability class	ISO 6270 Water condensation Number of hours	ISO 9227 Neutral saline mist Number of hours	LS form	Leroy-Somer system equivalent
Average	C3	Limited	48	120	100	Ia
		Average	120	240	101b	IIa
		High	240	480	132b	IIb
High	C4	Limited	120	240	-	-
		Average	240	480	102c	IIIa
		High	480	720	106b	IIIb**
Very high (Industry)	C5-I	Limited	240	480	165	IVb**
		Average	480	720	140b	Ve**
		High	720	1440	-	-
Very high (Marine)	C5-M	Limited	240	480	-	-
		Average	480	720	-	-
		High	720	1440	161b	161b**

Standard for LSRPM aluminum and PLSRPM steel motors

** Values given for information only since the substrates vary in nature whereas the standard only takes account of steel substrates.*
*** Assessment of degree of rusting in accordance with standard ISO 4628 (rust over 1 to 0.5% of the surface).*

Standard paint color reference of LSRPM-PLSRPM motors:

RAL 3005

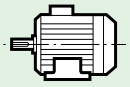
Mounting arrangements

Mountings and positions (IEC standard 60034-7)

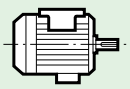
Foot mounted motors

• all frame sizes

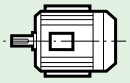
IM 1001 (IM B3)
- Horizontal shaft
- Feet on floor



IM 1071 (IM B8)
- Horizontal shaft
- Feet on top

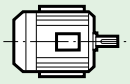


IM 1051 (IM B6)
- Horizontal shaft
- Wall mounted with feet on left when viewed from drive end

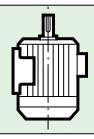


IM 1011 (IM V5)
- Vertical shaft facing down
- Feet on wall

IM 1061 (IM B7)
- Horizontal shaft
- Wall mounted with feet on right when viewed from drive end



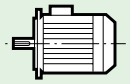
IM 1031 (IM V6)
- Vertical shaft facing up
- Feet on wall



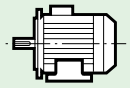
(FF) flange mounted motors

• all frame sizes
(except IM 3001 limited to frame size 225 mm)

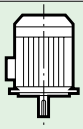
IM 3001 (IM B5)
- Horizontal shaft



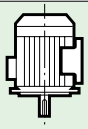
IM 2001 (IM B35)
- Horizontal shaft
- Feet on floor



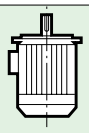
IM 3011 (IM V1)
- Vertical shaft facing down



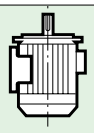
IM 2011 (IM V15)
- Vertical shaft facing down
- Feet on wall



IM 3031 (IM V3)
- Vertical shaft facing up



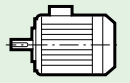
IM 2031 (IM V36)
- Vertical shaft facing up
- Feet on wall



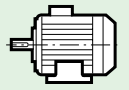
(FT) face mounted motors

• all frame sizes ≤ 132 mm

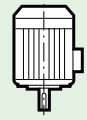
IM 3601 (IM B14)
- Horizontal shaft



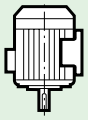
IM 2101 (IM B34)
- Horizontal shaft
- Feet on floor



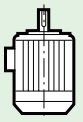
IM 3611 (IM V18)
- Vertical shaft facing down



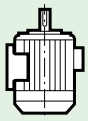
IM 2111 (IM V58)
- Vertical shaft facing down
- Feet on wall



IM 3631 (IM V19)
- Vertical shaft facing up



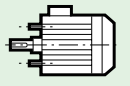
IM 2131 (IM V69)
- Vertical shaft facing up
- Feet on wall



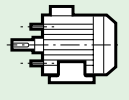
Motors without drive end shield

Caution: The protection (IP) specified on the IM B9 and IM B15 motor nameplates is provided by the customer when the motor is assembled

IM 9101 (IM B9)
- Threaded tie rods
- Horizontal shaft



IM 1201 (IM B15)
- Foot mounted with threaded tie rods
- Horizontal shaft



Frame size (mm)	Mounting positions											
	IM 1001	IM 1051	IM 1061	IM 1071	IM 1011	IM 1031	IM 3001	IM 3011	IM 3031	IM 2001	IM 2011	IM 2031
≤ 200	●	●	●	●	●	●	●	●	●	●	●	●
225 and 250	●	●	●	●	●	●	■	●	●	●	●	●
≥ 280	●	■	■	■	■	■	■	●	●	●	●	■

● : possible positions
■ : please consult Leroy-Somer specifying the coupling method and the axial and radial loads if applicable

Bearings and lubrication

Type of grease

When the bearings are not greased for life, the type of grease is indicated on the nameplate.
Avoid mixing greases and adhere to the quantities stated

Permanently greased bearings

Under normal operating conditions, the service life (L10h) of the lubricant is 25,000 hours for a machine installed horizontally and for temperatures less than 25°C.

Bearings with grease nipples

The bearings are lubricated in the factory
The end shields are fitted with bearings lubricated by Técalémit grease nipples.

The frequency of lubrication and the quantity and quality of grease are given on the nameplates. Refer to these to ensure correct bearing lubrication.

Even in the event of prolonged storage or downtime, the interval between two greasing operations must never exceed 2 years.

Permissible loads

Permissible loads: Motors in the 1500 to 2400 series are designed to operate with direct or indirect coupling: permissible loads on request.
Motors in the 3000 and 5500 series are designed to operate with direct coupling. For other cases, please consult Leroy-Somer.

CAUTION: Transmission via belt pulleys is only authorized up to series 2400.

Precautions

For the 3000 and 5500 series, a running-in period is necessary. Please refer to installation and maintenance manual reference 4155.

Bearings fitted as standard

Voltage	Speed (rpm)	Power (kW)	NDE bearing	DE bearing
< 460 V	1500 ≤ N ≤ 2400	< 160	Standard	Standard
		≥ 160	Insulated outer ring	
	2400 < N ≤ 3600	< 145	Standard	Standard
		145 ≤ P < 325	Insulated outer ring	
		≥ 325		Insulated outer ring
	3600 < N ≤ 4500	< 55	Standard	Standard
		≥ 55	Insulated outer ring	Insulated outer ring
	N > 4500	< 55	Standard	Standard
		≥ 55	Insulated ceramic balls	Insulated ceramic balls
≥ 460 V	≥ 1500	< 55	Standard	Standard
		≥ 55	Insulated ceramic balls	Standard + ground ring

Lubrication (standard)

Frame size	Speed (rpm)	Lubrication type	Grease
< 225	All	Permanently greased bearings	ENS, WT or BQ 72-72
≥ 225	N ≤ 3600	Bearings with grease nipples	Polyrex EM 103
	N > 3600	Bearings with grease nipples	BQ 72-72

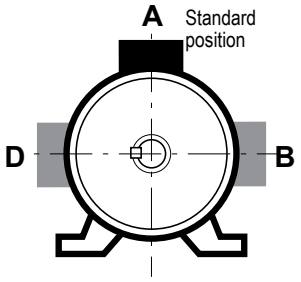
Connection

Terminal box

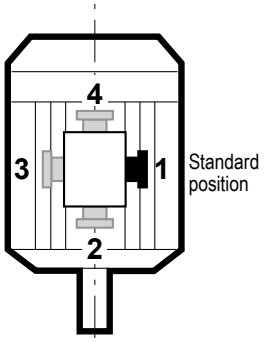
Placed as standard on the top of the motor near the drive end, the terminal box has IP55 protection.

The standard position of the cable gland baseplate is on the right, seen from the drive end, position A1.

▼ *Terminal box positions in relation to the drive end*



▼ *Cable gland positions in relation to the drive end*



Only positions 1 and 3 are possible

Dimensions of motor connection terminals

Motors with frame size ≤ 160

Frame size	Speed (rpm)	Terminals
90	all	M5
100 and 132	all	M6
160	N ≤ 2400	M6
	N > 2400	M8

Motors with frame size ≥ 200

Motor current (A)	Terminals
≤ 63	M6
63 < I ≤ 125	M10
200 < I ≤ 320	M12
I > 320	M16

Terminal box drilling for cable glands

Motor type	Power + auxiliaries	
	Number of drill holes	Drill hole diameter
LSRPM 90 SL	2	ISO M25x1.5 + 1xM16
LSRPM 100 L		
LSRPM 132 M		ISO M40x1.5 + 1xM16
LSRPM 160 LR/MP		ISO M50x1.5 + 1xM16 for speed ≤ 2,400 rpm: ISO M40x1.5 + 1xM16
LSRPM 200 L/LU	3	2xM40 + 1xM16
LSRPM 200 L1		2xM50 + 1xM16
LSRPM 200 L2/LU2		2xM63 + 1xM16
LSRPM 225 ST1/MR1, LSRPM 250 MY		2xM50 + 1xM16
LSRPM 225 SG/ST2/SR2		2xM63 + 1xM16
LSRPM 250 SE/ME		2xM63 + 1xM16
LSRPM 250 SE1/ME1		Removable undrilled mounting plate
LSRPM 280 SD/SC/SCM		2xM63 + 1xM16
LSRPM 280 SD1/MK1	0	Removable undrilled mounting plate
LSRPM 315 SP1/MR1/SN/MP1/SR1		

Motor vibration levels

Maximum vibration magnitude limits (rms values) in terms of displacement, speed and acceleration for a frame size H (IEC 60034-14)

The machines in this catalogue are in vibration class:
- level A as standard
- level B as option for n ≤ 3600 rpm

and half-key balancing (H)

Vibration level	Frame size H (mm)								
	90 < H ≤ 132			132 < H ≤ 280			H > 280		
	Displacement µm	Speed mm/s	Acceleration m/s²	Displacement µm	Speed mm/s	Acceleration m/s²	Displacement µm	Speed mm/s	Acceleration m/s²
A	25	1.6	2.5	35	2.2	3.5	45	2.8	4.4
B	11	0.7	1.1	18	1.1	1.7	29	1.8	2.8

Dyneo motors are balanced with a half-key in accordance with standard ISO 8821. Any coupling element (pulley, coupling sleeve, slip-ring, etc.) must therefore be balanced accordingly.

Quality assurance

Leroy-Somer's quality management system is based on:

- Control of procedures right from the initial sales offering until delivery to the customer, including design, manufacturing start-up and production

- A total quality policy based on making continuous progress in improving operational procedures, involving all departments in the company in order to give customer satisfaction as regards delivery times, conformity and cost

- Indicators used to monitor procedural performance

- Corrective actions and advancements with tools such as FMECA, QFD, MAVP, MSP/MSQ and Hoshin type improvement workshops on flows, process re-engineering, plus Lean Manufacturing and Lean Office

- Annual surveys, opinion polls and regular visits to customers in order to ascertain and detect their expectations.

Personnel are trained and take part in the analyses and the actions for continuously improving the procedures.

Leroy-Somer has entrusted the certification of its expertise to various international organizations.
Certification is granted by independent professional auditors, and recognizes the high standards of the **company's quality assurance procedures.** All activities resulting in the final version of the machine have therefore received official **ISO 9001: 2008 certification from the DNV**. Similarly, our environmental approach has enabled us to obtain ISO 14001: 2004 certification.
Products for particular applications or those designed to operate in specific environments are also approved or certified by the following organizations: LCIE, DNV, INERIS, EFECTIS, UL, BSRIA, TUV, GOST, which check their technical performance against the various standards or recommendations.

Standards and approvals

List of standards quoted in this document

Our motors comply with the standards quoted in this catalogue

Reference		International standards
IEC 60034-1	EN 60034-1	Rotating electrical machines: rating and performance.
IEC 60034-2-1		Rotating electrical machines: methods for determining losses and efficiency from tests (measured additional losses)
IEC 60034-5	EN 60034-5	Rotating electrical machines: classification of degrees of protection provided by casings of rotating machines
IEC 60034-6	EN 60034-6	Rotating electrical machines (except traction): methods of cooling
IEC 60034-7	EN 60034-7	Rotating electrical machines (except traction): symbols for mounting positions and assembly layouts
IEC 60034-8		Rotating electrical machines: terminal markings and direction of rotation
IEC 60034-9	EN 60034-9	Rotating electrical machines: noise limits
IEC 60034-12	EN 60034-12	Starting characteristics for single-speed, three-phase cage induction motors for supply voltages less than or equal to 660 V.
IEC 60034-14	EN 60034-14	Rotating electrical machines: mechanical vibrations of certain machines with a frame size above or equal to 56 mm. Measurement, evaluation and limits of vibration severity
IEC 60034-17		Cage induction motors when fed from converters - Application guide
IEC 60034-30-1		Rotating electrical machines: efficiency classes of single-speed, three-phase cage induction motors (Code IE)
IEC 60038		IEC standard voltages
IEC 60072-1		Dimensions and output powers for rotating electrical machines: designation of casings between 56 and 400 and flanges between 55 and 1080
IEC 60085		Evaluation and thermal classification of electrical insulation
IEC 60721-2-1		Classification of environmental conditions appearing in nature. Temperature and humidity
IEC 60892		Effects of unbalanced voltages on the performance of three-phase cage induction motors
IEC 61000-2-10/11 and 2-2		Electromagnetic compatibility (EMC): environment.
IEC guide 106		Guidelines on the specification of environmental conditions for the determination of operating characteristics of equipment
ISO 281		Bearings - Dynamic load ratings and nominal bearing life
ISO 1680	EN 21680	Acoustics - Test code for the measurement of airborne noise emitted by rotating electrical machinery: a method for establishing an expert opinion for free field conditions over a reflective surface
ISO 8821		Mechanical vibration - Balancing. Shaft and fitment key convention
	EN 50102	Degree of protection provided by electrical enclosures against extreme mechanical impacts
ISO 12944-2		Corrosion protection

Standards and approvals

Approvals

Certain countries recommend or insist on approval from national organizations.
Approved products must carry the recognized mark on their nameplates.

Country	Acronym	Organization
USA	**UL**	Underwriters Laboratories
CANADA	**CSA**	Canadian Standards Association
etc.		

Approvals for Leroy-Somer motors (versions derived from standard construction):

Country	Acronym	Certification No.	Application
CANADA	**CSA**	LR 57 008	Standard adapted range (see “Supply voltage” section)
USA	**UL or** ЯU	E 68554 SA 6704 E 206450	Impregnation systems Stator/rotor assemblies for sealed units Complete motors up to 160 size
USA + Canada	cЯUus	E 68554	Impregnation systems
SAUDI ARABIA	**SASO**		Standard range
FRANCE	**LCIE** **INERIS**	Various nos.	Sealing, shocks, safety

For approved special products, see the relevant documents.

International and national standard equivalents

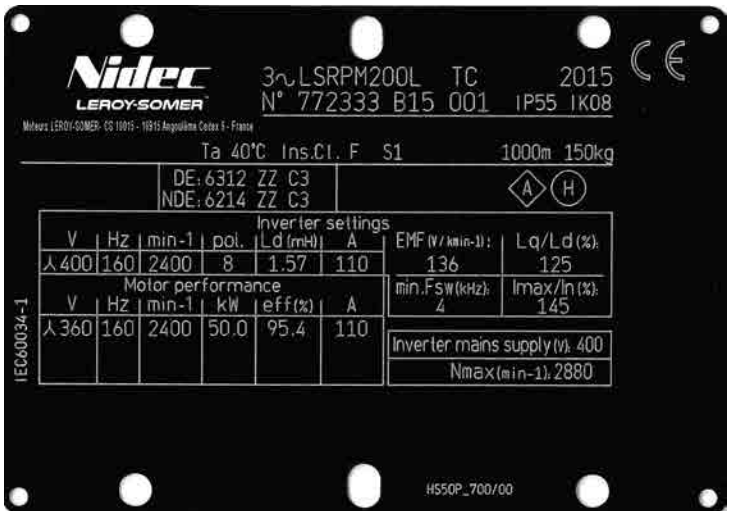
International reference standards		National standards				
IEC	Title (summary)	FRANCE	GERMANY	UK	ITALY	SWITZERLAND
60034-1	Ratings and performance	NFEN 60034-1 NFC 51-120 NFC 51-200	DIN/VDE O530	BS 4999	CEI 2.3.VI.	SEV ASE 3009
60034-5	Classification of degrees of protection	NFEN 60034-5	DIN/EN 60034-5	BS EN 60034-5	UNEL B 1781	
60034-6	Methods of cooling	NFEN 60034-6	DIN/EN 60034-6	BS EN 60034-6		
60034-7	Mounting arrangements and assembly layouts	NFEN 60034-7	DIN/EN 60034-7	BS EN 60034-7		
60034-8	Terminal markings and direction of rotation	NFC 51 118	DIN/VDE 0530 Teil 8	BS 4999-108		
60034-9	Noise limits	NFEN 60034-9	DIN/EN 60034-9	BS EN 60034-9		
60034-12	Starting characteristics for single-speed motors for supply voltages ≤ 660 V	NFEN 60034-12	DIN/EN 60034-12	BS EN 60034-12		SEV ASE 3009-12
60034-14	Mechanical vibrations of machines with frame size ≥ 56 mm	NFEN 60034-14	DIN/EN 60034-14	BS EN 60034-14		
60072-1	Dimensions and output powers for machines of between 56 and 400 frame and flanges of between 55 and 1080	NFC 51 104 NFC 51 105	DIN 748 (~) DIN 42672 DIN 42673 DIN 42631 DIN 42676 DIN 42677	BS 4999		
60085	Evaluation and thermal classification of electrical insulation	NFC 26206	DIN/EN 60085	BS 2757		SEV ASE 3584

Note: DIN 748 tolerances do not conform to IEC 60072-1.

Nameplates

Identification

As soon as you receive the motor, check that the nameplate on the machine conforms to your order.



Definition of symbols used on nameplates:

Legal mark of conformity of product to the requirements of European Directives

3 ~ : Three-phase AC motor
LSRPM : Series
200 : Frame size
L : Housing designation and manufacturer code
TC : Impregnation index

Motor

772333 : Motor serial number
B : Month of production
15 : Year of production
001 : Batch number
IP55 IK08 : Protection index
Ins. cl. F : Insulation class F
Ta 40°C : Ambient operating temperature
S : Duty
% : Operating factor
1000m : Maximum altitude without derating
kg : Weight

RI : Insulated bearing
DE : Drive end bearing
NDE : Non drive end bearing
12 g : Amount of grease at each regreasing
2200 h : Regreasing interval (in hours) for the ambient temperature (Ta)
QUIET BQ 72-72 : Type of grease

: Vibration level

: Balancing mode

Inverter settings : Parameters to be entered in the drive

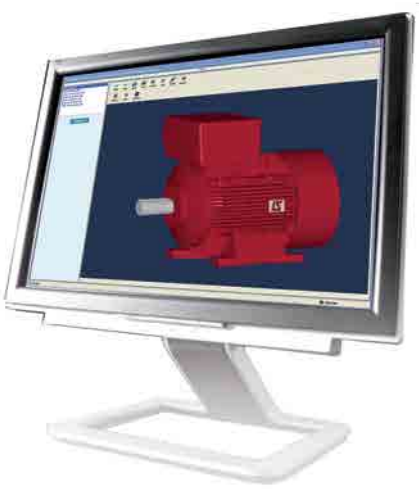
EMF (V / kmin^{-1}) : Electromotive force
Lq/Ld % : Cogging ratio
min.Fsw (kHz) : Minimum switching frequency
Imax/In % : Maximum current ratio/Rated current
V : Voltage
Hz : Supply frequency
min^{-1} : Revolutions per minute
pol. : Number of poles
Ld (mH) : Transient inductance
A : Rated current

Motor performance : Motor characteristics

V : Voltage
Hz : Supply frequency
min^{-1} : Revolutions per minute
kW : Rated power
Eff % : Efficiency
A : Rated current

Inverter mains supply (V) : Drive AC supply voltage
Nmax (min^{-1}) : Maximum speed

Configurator



The Leroy-Somer configurator can be used to choose the most suitable motors and drives and provides the technical specifications and corresponding drawings.

- Help with product selection
- Print-outs of technical specifications
- Print-outs of 2D and 3D CAD files
- The equivalent of 400 catalogs in 16 languages

To register online:
www.leroy-somer.com/fr/solutions_et_services/systemes_entrainement/configurateur

Notes

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Notes

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