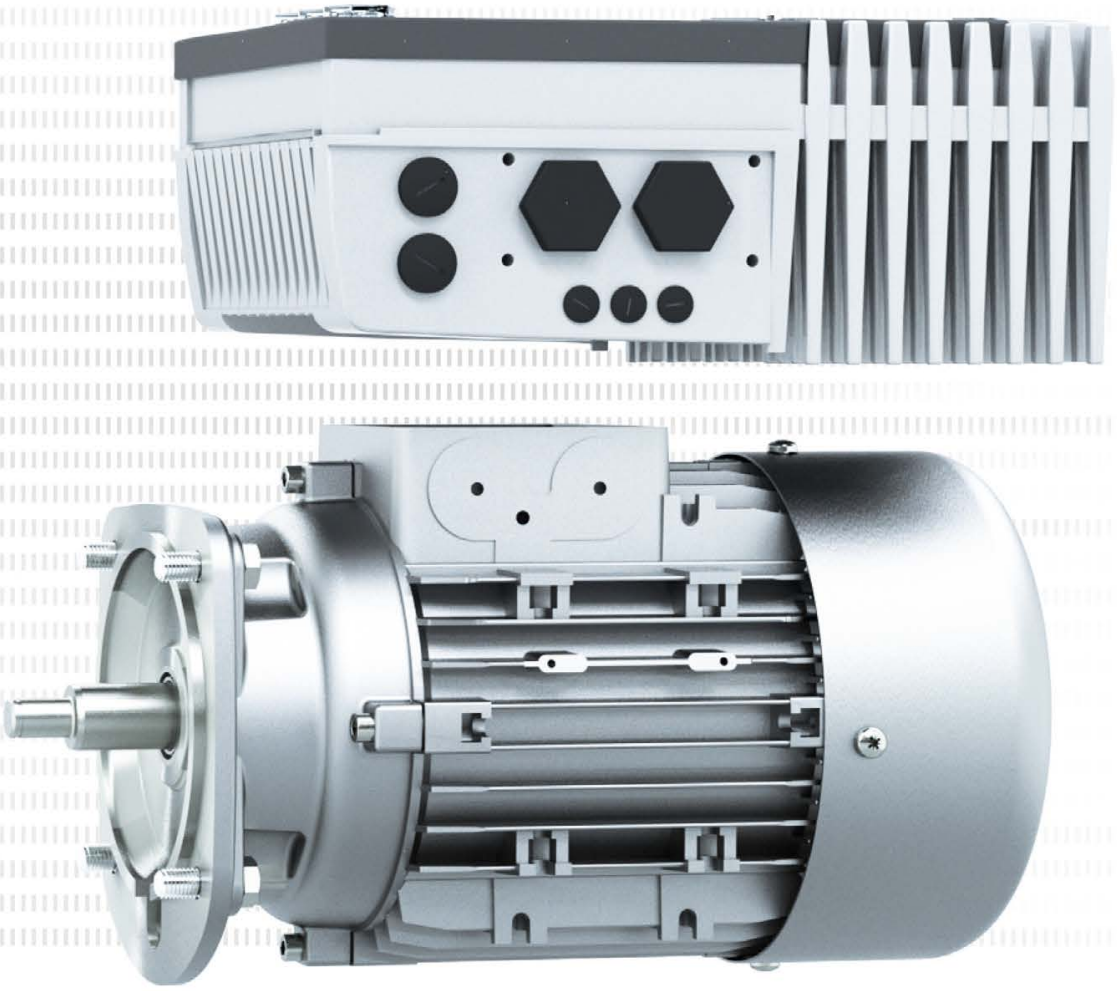

B 1091-1 – en

Motors in FI operation for Category 2D/3D

Planning guideline for B 1091

Intended use of three-phase asynchronous motors in frequency inverter operation

Compliance with the planning guide B1091-1 for the operating and installation instructions B1091, as well as with the operating instructions for the frequency inverter and the product overview G4014-1 is **essential for correct operation** and the fulfilment of any warranty claims. **Read the operating and installation instructions** before starting work with the motors and frequency inverters.

The operating instruction contains **important information about servicing.** It must therefore be kept in **close proximity to the motor**.

The three-phase asynchronous motors and frequency inverters are suitable for industrial and commercial systems for moving a wide variety of drive components and applications.

All details regarding technical data and permissible conditions at the installation site must be complied with.

Commissioning (implementation of the intended use) is not permitted until it has been ensured that the machine complies with the EMC directive 2014/30/EU and that the conformity of the end product meets the machine directive 2006/42/EEC (note EN 60204).

Documentation

Designation:	**B 1091-1**	Planning guideline
Part no.:	**6052102**	
Series:	Three-phase asynchronous motors in frequency inverter operation	
Motor series:	IE1, IE2, IE3	
Type of ignition protection:	Ex tb, Ex tc, Ex tD A21	
Motor types:	**Sizes 63 … 250**	
	4-pole	

Version list

Title, **Date**	**Order number** / Version / Internal code	**Remarks**
B 1091-1, February 2013	**6052102** / 0613	• First edition, based on B1091-1 DE / January 2013
B 1091-1, August 2013	**6052102** / 3213	• Layout revision and error correction
B 1091-1, February 2017	**6052102** / 0517	• Supplement 2D FI motors
B 1091-1, October 2017	**6052102** / 4317	• Change of document references from G4014 to G4014-1
B 1091-1, March 2021	**6052102** / 1221	• Supplement IE3 motors
B 1091-1, June 2022	**6052102** / 2422 34159	• General corrections • Supplement motor data IE3 motors with external fan
B 1091-1, December 2022	**6052102** / 5222 35174	• Supplement motor data (225RP/4, 225SP/4, 225MP/4)
B 1091-1, July 2023	**6052102** / 2723 35875	• Update of characteristic curves • Supplement motor data (250WP/4)

Table 1: Version list

Validity

This Planning Guideline for the operation and instructions B 1091 describes the planning requirements for NORD three-phase asynchronous motors supplied by frequency inverters for Zone 22 (Ex tc) and for Zone 21 (Ex tb).

Publisher

Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Straße 1 • 22941 Bargteheide, Germany • http://www.nord.com
Fon +49 (0) 45 32 / 289-0 • Fax +49 (0) 45 32 / 289-2253

Member of the NORD DRIVESYSTEMS Group

Table of Contents

1 Technical explanations

1.1 General

Category 2D and 3D motors supplied by NORD DRIVESYSTEMS comply with the standards EN 60079-0 and EN 60079-31. The insulation of the windings is designed for operation with frequency inverters. For operation with frequency inverters, the motors are always equipped with triple thermistors as per DIN 44082.

For variable speed drives, the thermistor is the most important protective element to ensure compliance with the maximum surface temperature, which is stated in the type plate of the motor.

As the thermistor only provides indirect temperature monitoring of some components of the motor, e.g. the motor shaft, it is necessary to observe all the specifications which are stated in this planning guideline.

The operating ranges stated in the Appendix have been checked in the course of extensive test runs and only these ranges are approved. Compliance with the stated procedures is therefore a prerequisite for the planning and commissioning of Device Group II regulated drive units in Zone 22 (non-conducting dust), as well as in Zone 21.

1.2 Overview

1.2.1 Necessary frequency inverter characteristics:

- Only frequency inverters with a vector regulation method which provides load-dependent terminal voltage adjustment in the low speed range may be used.
- The maximum output voltage of the frequency inverter must not be less than 91 % of the mains voltage.
- The frequency inverter must provide i^2*t monitoring which is adjustable to the nominal motor current.
- The pulse frequency of the output stage must be adjustable to 4 kHz or higher.
- If the inverter does not have an input for evaluation of the thermistor, evaluation must be carried out by a separate triggering device which switches off the inverter. Operation without evaluation of the thermistor is not permitted.
- Evaluation of the thermistor for motors with ignition protection type tb as well as tD A21 must be carried out with an external certified thermistor triggering device with an EU type test certificate. Evaluation of the thermistor via the thermistor evaluation input on the frequency inverter is not permitted. In case of a fault (excessive temperature) the motor and frequency inverter combination must be safely switched off via the external thermistor triggering device.
- The values stated in the tables refer to frequency inverters that are not directly mounted on the motor. For frequency inverters that are directly mounted on the motor reduced torques are to be used. These can be found in the G4014-1 documentation.

1.2.2 Category 3D motors according to EU Directive 2014/34/EU

For Category 3D motors as per EU Directive 2014/34/EU with the frequency inverter mounted on the motor, the following steps must be observed for the determination of the maximum permissible torque:

1. Determination of the maximum permissible torque on the basis of B1091-1

2. Determination of the maximum permissible torque for the required operating point according to G4014-1 on the basis of a NORD standard motor (not ATEX) of the same size and power rating.

3. The maximum permissible value must be obtained via the following comparison.
   a) If the value of the torque from document G4014-1 is larger than the torque value in the Planning Guideline B1091-1, the torque value from the Planning Guideline B1091-1 must be used.
   b) If the value of the torque from the Planning Guideline B1091-1 is larger than the value of the torque in document G4014-1, the value from document G4014-1 must be used.

1.3 Wiring

- No filters which come into the resonance range may be wired between the inverter and the motor. Overvoltages resulting from that scenario may damage the insulation of the wires or the motor.
- Only filters which are prescribed or approved by the supplier of the frequency inverter may be used.
- The wires used must have an insulation strength of at least 2,000 VDC.
- Additional mains or motor chokes reduce the output voltage of the frequency inverter and are not considered in this planning guideline. With chokes, the field weakening threshold shifts downwards and the field weakening increases.
- The maximum permissible length of the cable between motor and frequency inverter can be limited by the frequency inverter’s manufacturer. For NORD frequency inverters, please enquire for permissibility from a cable length of 30 m.

1.4 Commissioning

- Set the pulse frequency of the output stage to 4 - 6 kHz.
- Parameterise the vector control on the motor in use.
- i²*t monitoring is to be set to the nominal current of the motor.
- For NORD frequency inverters, please set parameter P535 in switch-off class 5 to the value 1 (100%).
- The maximum output frequency must be set depending on the application and and must not be above 100 Hz.
- Activate evaluation of the thermistor. An external, certified thermistor triggering device must be used for 2D motors (Ex tb, Ex tD A21).
- Check the thermistor monitoring by disconnecting the cable connected to the frequency inverter or to the connection of the external thermistor triggering device.

The type plate of the motor which is suitable for the application must be observed. An explanation of the details on the type plate can be found in the NORD Operating and Installation Instructions B1091.

The values for current, speed and torque which are stated in the tables are maximum values and must not be exceeded.

If the minimum voltage values which are stated on the motor type plate are not achieved, the motor must not be operated at the corresponding operating point.

NOTICE	**Damage to the gear unit – high speed**

The maximum permissible input speed of the gear unit must be complied with.

Exceeding the permissible speed may lead to overheating and damage of gear unit parts or even complete destruction of the gear unit.

For frequency inverter operation, the motor speed is to be limited according to the planning specifications.

1.5 Frequency inverter assignment and operating mode selection

The rated current of the frequency inverter must match the nominal motor current in order to achieve a sufficient measurement precision of the current sensing. The rated frequency inverter current should not be higher than 2 times the nominal motor current.

According to this planning guideline, multi-motor operation is not permitted as selective i²*t monitoring of a motor is no longer possible.

Please note the technical data in chapter 2 "Technical data (characteristic curve data)".

Depending on the application, the operating mode of the motor can be selected from one of the following three characteristic curves:

- 50 Hz characteristic curve: Nominal point 400 V / 50 Hz, 0 – 50 Hz no field weakening and 50 – 100 Hz field weakening.
- 87 Hz characteristic curve: Nominal point 400 V / 87 Hz, 0 – 87 Hz no field weakening and 87 – 100 Hz field weakening.

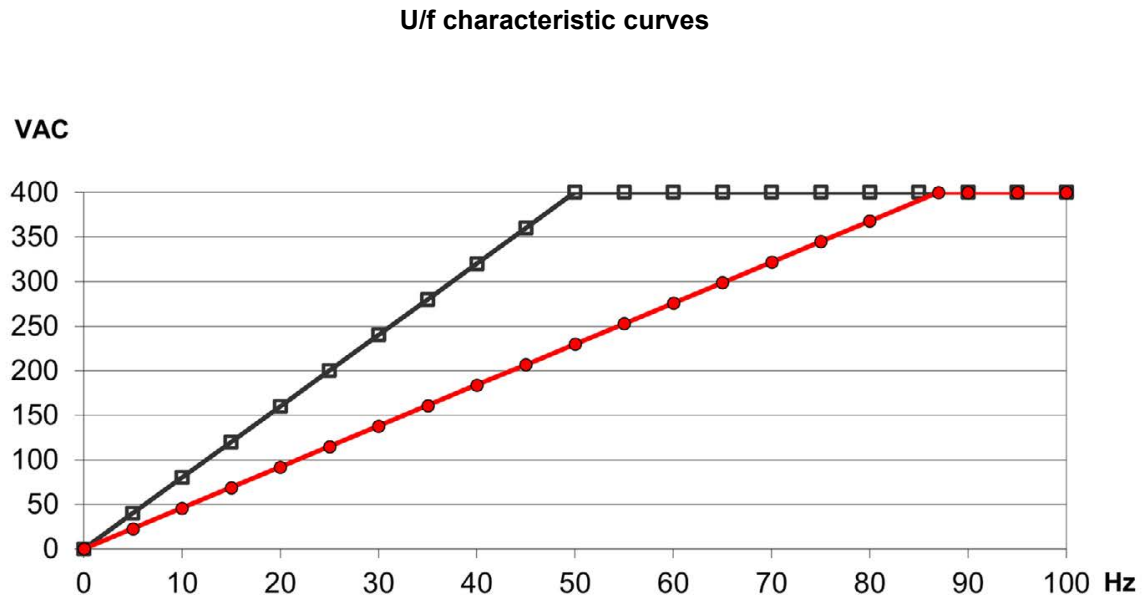

Figure 1: Selection of V/f characteristic curves

	Legend
	50 Hz characteristic curve
	87 Hz characteristic curve

1.6 Examples

1.6.1 1. Example: motor 100L/4 3D TF

Motor type plate details:

Nominal voltage	230 / 400 V Δ/Y
Nominal frequency:	50 Hz
Nominal power:	2.2 kW

50 Hz characteristic curve

Motor in star circuit (400 V / 50 Hz), **2,2 kW frequency inverter**

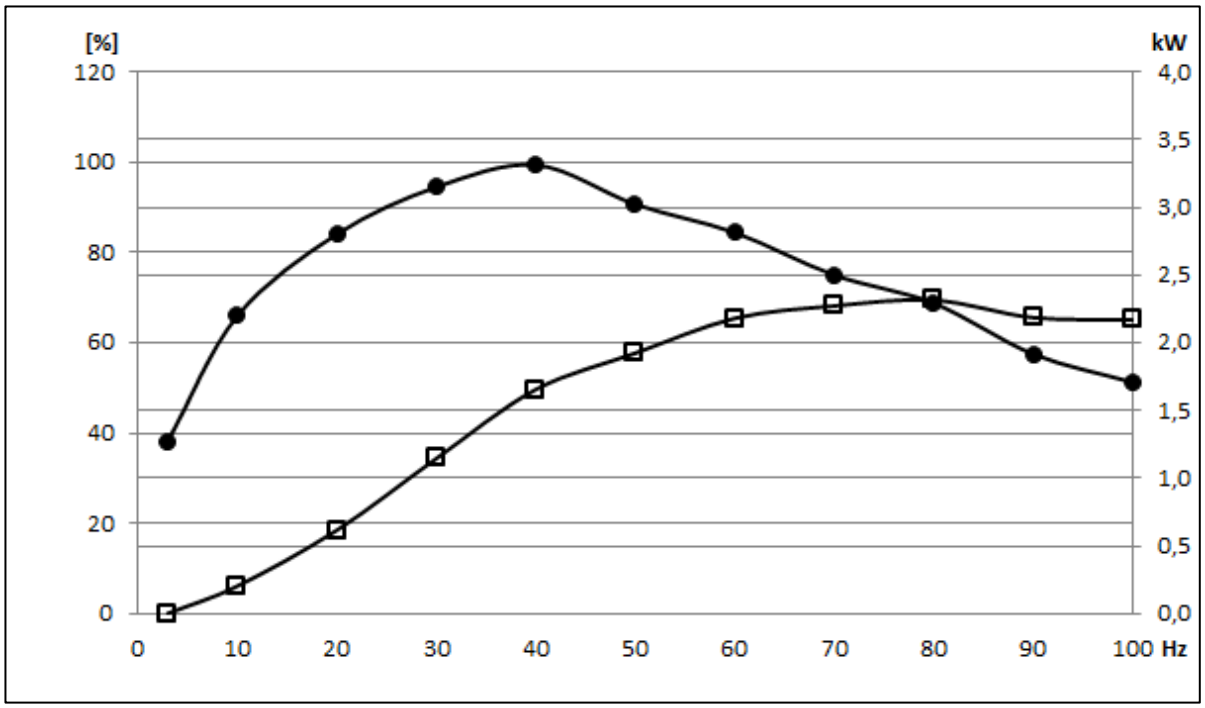

Figure 2: Motor 100L/4, 50 Hz characteristic curve

	Legend
⊟	Motor output power in [kW]
●	Torque in [%]

87 Hz characteristic curve

Motor in delta circuit (230 V / 50 Hz), **4,0 kW frequency inverter**

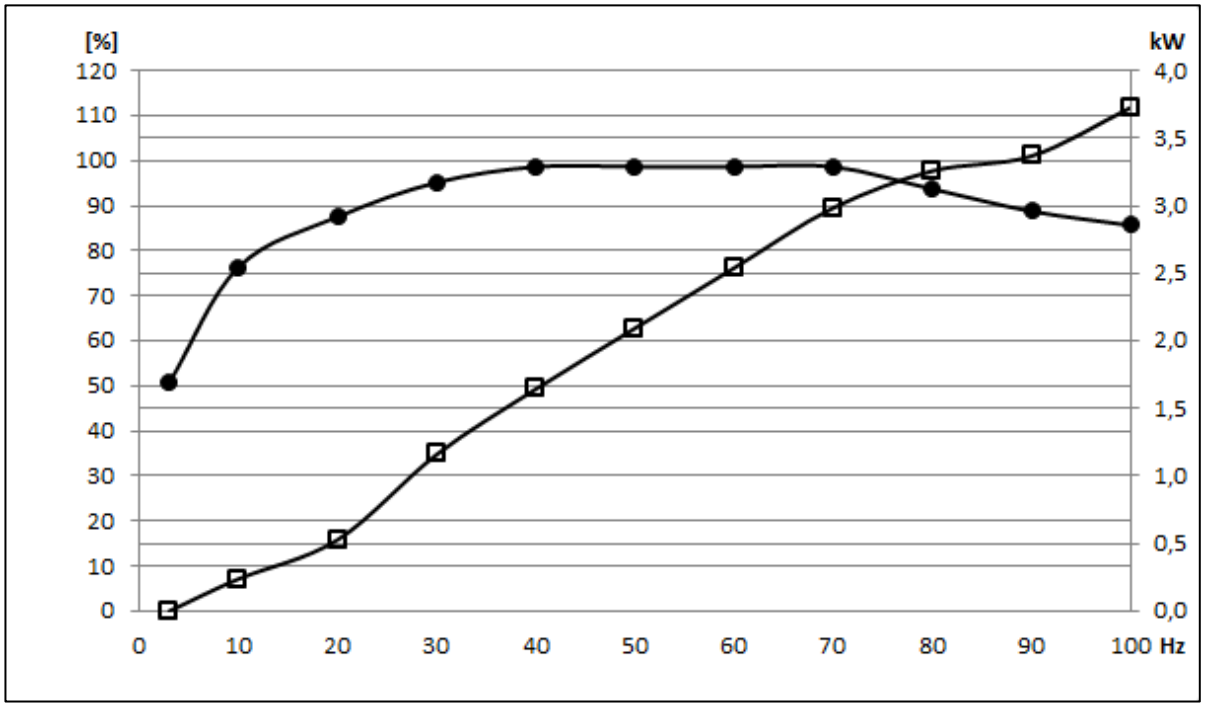

Figure 3: Motor 100L/4, 87 Hz characteristic curve

	Legend
	Motor output power in [kW]
	Torque in [%]

1.6.2 2. Example: motor 100L/4 3D TF

Motor type plate details:

Nominal voltage	400 / 690 V Δ/Y
Nominal frequency:	50 Hz
Nominal power:	2.2 kW

Due to the 400 / 690 V Δ/Y winding design, only the 50 Hz characteristic curve can be used on the frequency inverter in this case.

1.7 Motor data for frequency inverter parameterisation

Motor types: **IE1, IE2 and IE3 motors**

The legend below applies to all following tables in this chapter.

Legend							
f_N	Nominal frequency	I_N	Nominal current	P_N	Nominal power	**Circuit**	Δ/Y circuit
n_N	Nominal speed	U_N	Nominal voltage	**cos φ**	Power factor	R_{St}	Line resistance

1.7.1 Frequency inverter parameterisation data for IE1 motors

1.7.1.1 50 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
63S/4	2D/3D	50	1385	0,51	400	0,12	0,62	Y	68,35
63L/4	2D/3D	50	1368	0,65	400	0,18	0,66	Y	58,19
71S/4	2D/3D	50	1365	0,74	400	0,25	0,80	Y	39,76
71L/4	2D/3D	50	1385	1,05	400	0,37	0,76	Y	22,24
80S/4	3D	50	1385	1,51	400	0,55	0,75	Y	15,79
80L/4	3D	50	1395	2,03	400	0,75	0,75	Y	10,49
90S/4	3D	50	1410	2,76	400	1,1	0,76	Y	6,41
90L/4	3D	50	1390	3,53	400	1,5	0,78	Y	3,99
100L/4	3D	50	1415	5,0	400	2,2	0,78	Δ*	2,78
100LA/4	3D	50	1415	6,8	400	3,0	0,78	Δ*	5,12
112M/4	3D	50	1430	8,24	400	4,0	0,83	Δ*	3,47
132S/4	3D	50	1450	11,6	400	5,5	0,8	Δ*	2,14
132M/4	3D	50	1450	15,5	400	7,5	0,79	Δ*	1,42
132MA/4	3D	50	1445	18,8	400	9,2	0,82	Δ*	1,16

*) at 400/690V (at 230/400 V circuit type Y); RStY=RStΔ/3

1.7.1.2 87 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit (230/400V)	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
63S/4	2D/3D	50	1385	0,88	230	0,12	0,62	Δ	68,35
63L/4	2D/3D	50	1368	1,12	230	0,18	0,66	Δ	58,19
71S/4	2D/3D	50	1365	1,28	230	0,25	0,80	Δ	39,76
71L/4	2D/3D	50	1385	1,82	230	0,37	0,76	Δ	22,24
80S/4	3D	50	1385	2,62	230	0,55	0,75	Δ	15,79
80L/4	3D	50	1395	3,52	230	0,75	0,75	Δ	10,49
90S/4	3D	50	1410	4,78	230	1,1	0,76	Δ	6,41
90L/4	3D	50	1390	6,11	230	1,5	0,78	Δ	3,99
100L/4	3D	50	1415	8,65	230	2,2	0,78	Δ	2,78
100LA/4	3D	50	1415	11,76	230	3,0	0,78	Δ	1,71
112M/4	3D	50	1430	14,2	230	4,0	0,83	Δ	1,11
132S/4	3D	50	1450	20,0	230	5,5	0,8	Δ	0,72
132M/4 3D	3D	50	1450	26,8	230	7,5	0,79	Δ	0,46
132MA/4	3D	50	1455	32,6	230	9,2	0,829	Δ	0,39

1.7.2 Frequency inverter parameterisation data for IE2 motors

1.7.2.1 50 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
80SH/4	2D/3D	50	1415	1,38	400	0,55	0,7	Y	9,34
80LH/4	2D/3D	50	1410	1,8	400	0,75	0,75	Y	6,70
90SH/4	2D/3D	50	1430	2,46	400	1,1	0,8	Y	4,96
90LH/4	2D/3D	50	1420	3,38	400	1,5	0,79	Y	3,27
100LH/4	2D/3D	50	1445	4,76	400	2,2	0,79	Δ*	1,73
100AH/4	2D/3D	50	1420	6,4	400	3,0	0,77	Δ*	4,39
112MH/4	2D/3D	50	1440	8,12	400	4,0	0,83	Δ*	2,96
132SH/4	2D/3D	50	1455	10,82	400	5,5	0,83	Δ*	1,84
132MH/4	2D/3D	50	1455	15,08	400	7,5	0,8	Δ*	1,29
160MH/4	2D/3D	50	1465	20,5	400	11,0	0,85	Δ*	0,78
160LH/4	2D/3D	50	1465	27,5	400	15,0	0,87	Δ*	0,53
180MH/4	2D/3D	50	1475	34,9	400	18,5	0,84	Δ*	0,36
180LH/4	2D/3D	50	1475	40,8	400	22,0	0,86	Δ*	0,31

*) at 400/690V (at 230/400 V circuit type Y); RStY=RStΔ/3

1.7.2.2 87 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit (230/400V)	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
80SH/4	2D/3D	50	1415	2,39	230	0,55	0,7	Δ	9,34
80LH/4	2D/3D	50	1410	3,12	230	0,75	0,75	Δ	6,70
90SH/4	2D/3D	50	1430	4,26	230	1,1	0,8	Δ	4,96
90LH/4	2D/3D	50	1420	5,85	230	1,5	0,79	Δ	3,27
100LH/4	2D/3D	50	1445	8,25	230	2,2	0,79	Δ	1,73
100AH/4	2D/3D	50	1420	11,1	230	3,0	0,77	Δ	1,48
112MH/4	2D/3D	50	1440	14,1	230	4,0	0,83	Δ	1,00
132SH/4	2D/3D	50	1455	18,8	230	5,5	0,83	Δ	0,60
132MH/4	2D/3D	50	1455	26,2	230	7,5	0,8	Δ	0,42
160MH/4	2D/3D	50	1465	35,5	230	11,0	0,85	Δ	0,26
160LH/4	2D/3D	50	1465	48,0	230	15,0	0,87	Δ	0,17
180MH/4	2D/3D	50	1475	60,8	230	18,5	0,84	Δ	0,12
180LH/4	2D/3D	50	1475	71,0	230	22,0	0,86	Δ	0,10

1.7.3 Frequency inverter parameterisation data for IE3 motors

1.7.3.1 50 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
63SP	2D/3D	50	1342	0,41	400	0,12	0,70	Y	66,61
63LP	2D/3D	50	1373	0,58	400	0,18	0,66	Y	38,28
71SP	2D/3D	50	1408	0,7	400	0,25	0,73	Y	24,15
71LP	2D/3D	50	1397	0,93	400	0,37	0,78	Y	18,13
80SP	2D/3D	50	1402	1,42	400	0,55	0,75	Y	10,65
80LP	2D/3D	50	1414	1,78	400	0,75	0,75	Y	6,30
90SP	2D/3D	50	1429	2,45	400	1,1	0,79	Y	4,22
90LP	2D/3D	50	1414	3,24	400	1,5	0,81	Y	3,08
100LP	2D/3D	50	1460	4,5	400	2,2	0,81	Y	1,97
100AP	2D/3D	50	1454	6,25	400	3	0,81	Y	1,60
112MP	2D/3D	50	1440	7,94	400	4	0,84	Y*	0,90*
132SP	2D/3D	50	1465	11,24	400	5,5	0,79	Y*	0,497*
132MP	2D/3D	50	1458	15,49	400	7,5	0,79	Y*	0,367*
160SP	2D/3D	50	1474	16,95	400	9,2	0,86	Y*	0,307*
160MP	2D/3D	50	1467	20,39	400	11	0,85	Y*	0,27*
160LP	2D/3D	50	1467	27,5	400	15	0,87	Y*	0,178*
180MP	2D/3D	50	1480	34,8	400	18,5	0,83	Y*	0,103*
180LP	2D/3D	50	1475	40,83	400	22	0,85	Y*	0,10*
225RP	2D/3D	50	1485	55,4	400	30	0,84	Y*	0,06
225SP	2D/3D	50	1485	68,9	400	37	0,83	Y*	0,048
225MP	2D/3D	50	1485	82,2	400	45	0,84	Y*	0,038
250WP	2D/3D	50	1485	98,8	400	55	0,84	Y*	0,028

*) at 230/400 V (at 400/690 V circuit type Δ); $R_{StΔ}=R_{StY}$ x 3

1.7.3.2 87 Hz characteristic curve

Motor type	Category	f_N [Hz]	n_N [min^{-1}]	I_N [A]	U_N [V]	P_N [kW]	cos φ	Circuit (230/400V)	R_{St} [Ω]
Notice: A comma counts as a full stop and signifies a decimal place.									
63SP	2D/3D	50	1342	0,71	230	0,12	0,70	Δ	66,61
63LP	2D/3D	50	1373	1	230	0,18	0,66	Δ	38,28
71SP	2D/3D	50	1408	1,21	230	0,25	0,73	Δ	24,15
71LP	2D/3D	50	1397	1,61	230	0,37	0,78	Δ	18,13
80SP	2D/3D	50	1402	2,46	230	0,55	0,75	Δ	10,65
80LP	2D/3D	50	1414	3,08	230	0,75	0,75	Δ	6,30
90SP	2D/3D	50	1429	4,24	230	1,1	0,79	Δ	4,22
90LP	2D/3D	50	1414	5,61	230	1,5	0,81	Δ	3,08
100LP	2D/3D	50	1460	7,79	230	2,2	0,81	Δ	1,97
100AP	2D/3D	50	1454	10,83	230	3	0,81	Δ	1,60
112MP	2D/3D	50	1440	13,75	230	4	0,84	Δ	0,91
132SP	2D/3D	50	1465	19,47	230	5,5	0,79	Δ	0,487
132MP	2D/3D	50	1458	26,83	230	7,5	0,79	Δ	0,371
160SP	2D/3D	50	1474	29,36	230	9,2	0,86	Δ	0,30
160MP	2D/3D	50	1467	35,32	230	11	0,85	Δ	0,261
160LP	2D/3D	50	1467	47,63	230	15	0,87	Δ	0,167
180MP	2D/3D	50	1480	60,28	230	18,5	0,83	Δ	0,103
180LP	2D/3D	50	1475	70,72	230	22	0,85	Δ	0,097
225RP	2D/3D	50	1485	95	230	30	0,84	Δ	0,06
225SP	2D/3D	50	1485	119	230	37	0,83	Δ	0,048
225MP	2D/3D	50	1485	142	230	45	0,84	Δ	0,038
250WP	2D/3D	50	1485	171	230	55	0,84	Δ	0,028

2 Technical data (characteristic curve data)

Data:

Motor type:	**IE1, IE2 and IE3**		
Mains voltage:	**400 V**	Circuit:	see tables
Surface temperature:	**T125°C / T140°C**	Ambient temperature Tu:	**-20 °C to +40 °C**

2.1 Self-cooled motors

Information

Increased ambient temperature for category 3D motors IE1 and IE2

Operation is possible up to an ambient temperature of 60°C. The stated torques must then be reduced to 72%.

Information

Interpolation

Linear interpolation of data between adjacent frequencies is permissible.

The legend below applies to all following tables in this chapter.

Legend							
f_S	Stator frequency	**M**	Torque	**M**	Torque	**n**	Speed
[Hz]	in hertz	**[Nm]**	In Newton metres	**[%]**	in % of nominal torque	**[rpm]**	Speed in rpm
P	Motor power	**Us**	Motor voltage	**Is**	Motor current		
[kW]	in kilowatts	**[V]**	in volts	**[A]**	in amps		

2.1.1 IE1 motors

2.1.1.1 IE1 motors, 50 Hz nominal point for Category 2D and 3D

Motor type Voltage Circuit type (Y/Δ)	**3**	**20**	**40**	**60**	**100**	**f_s [Hz]**
Notice: A comma counts as a full stop and signifies a decimal place.						
	0,65	0,86	0,86	0,86	0,54	M [Nm]
63S/4	0	450	1073	1484	1805	n [min^{-1}]
	0	0,04	0,1	0,13	0,1	P [kW]
230/400V, 50 Hz	80	187	347	363	361	U_s [V]
Y	0,45	0,48	0,52	0,48	0,65	I_s [A]
	0,71	1,26	1,26	1,26	0,74	M [Nm]
63L/4	0	438	1060	1428	1886	n [min^{-1}]
	0	0,06	0,14	0,19	0,15	P [kW]
230/400V, 50 Hz	65	185	352	361	360	U_s [V]
Y	0,5	0,61	0,66	0,71	0,8	I_s [A]
	1,15	1,76	1,76	1,56	0,72	M [Nm]
71S/4	0	441	1059	1448	2469	n [min^{-1}]
	0	0,08	0,2	0,24	0,19	P [kW]
230/400V, 50 Hz	62	187	342	356	357	U_s [V]
Y	0,54	0,72	0,72	0,88	0,79	I_s [A]
	1,81	2,55	2,57	2,38	1,22	M [Nm]
71L/4	0	461	1069	1481	2312	n [min^{-1}]
	0	0,12	0,29	0,37	0,3	P [kW]
230/400V, 50 Hz	57	181	329	344	343	U_s [V]
Y	0,83	1,02	1,04	1,24	1,3	I_s [A]

2.1.1.2 IE1 motors, 50 Hz nominal point for Category 3D

Motor type — **For the circuit, please refer to 1.7**

Frequency inverter power and nominal current

Motor power in [kW] at 50 Hz (upper value) and 100 Hz (lower value)

Notice: A comma counts as a full stop and signifies a decimal place.

			3	10	20	30	40	50	60	70	80	90	100	f_s [Hz]
80S/4	0,55 kW	0,48	1,6	2,0	2,9	3,4	3,8	3,5	3,2	2,7	2,3	2,0	1,6	**M [Nm]**
	1,6 A		42	52	76	89	99	91	82	71	59	52	42	**M [%]**
		0,43	30	150	463	765	1.061	1.314	1.604	1.837	2.073	2.296	2.529	**n [min^{-1}]**
80L/4	0,75 kW	0,67	2,1	3,1	4,0	4,7	5,2	4,7	4,4	3,8	3,2	2,8	2,3	**M [Nm]**
	2,2 A		40	60	77	90	100	90	85	73	62	54	45	**M [%]**
		0,63	26	166	471	769	1.091	1377	1.614	1.864	2.108	2.348	2.564	**n [min^{-1}]**
90S/4	1,1 kW	1,01	3,5	5,4	6,6	7,3	7,6	7,0	6,4	5,6	5,1	4,3	3,9	**M [Nm]**
	3,0 A		46	71	87	96	100	92	84	73	68	57	51	**M [%]**
		1,06	10	207	503	800	1.032	1.379	1.626	1.875	2.096	2.372	2.606	**n [min^{-1}]**
90L/4	1,5 kW	1,31	4,3	5,8	7,8	9,0	9,5	9,0	8,3	7,2	6,5	5,6	4,9	**M [Nm]**
	3,7 A		42	56	76	87	92	87	80	70	63	54	47	**M [%]**
		1,37	0	196	495	790	1.091	1.388	1.654	1.909	2.173	2.437	2.695	**n [min^{-1}]**
100L/4	2,2 kW	1,92	5,5	9,5	12,1	13,6	14,3	13,1	12,2	10,8	9,9	8,3	7,4	**M [Nm]**
	5,5 A		38	66	84	95	99	91	84	75	69	58	51	**M [%]**
		2,17	0	207	488	805	1.106	1.408	1.715	2.010	2.234	2.523	2.807	**n [min^{-1}]**
100LA/4	3 kW	2,61	10,7	13,6	16,4	18,0	18,9	17,7	15,6	13,2	11,4	10,0	8,3	**M [Nm]**
	7,0 A		53	67	81	89	93	87	77	65	56	49	41	**M [%]**
T140°C		2,39	12	256	541	833	1.140	1.410	1.681	1.940	2.233	2.490	2.760	**n [min^{-1}]**
112M/4	4 kW	3,52	13,2	18,1	21,9	24,0	25,5	23,8	21,1	18,0	15,9	14,0	12,1	**M [Nm]**
	9,5 A		50	69	83	91	97	90	80	68	60	53	46	**M [%]**
		3,51	17	237	529	824	1.120	1.414	1.689	1.963	2.236	2.506	2.775	**n [min^{-1}]**
132S/4	5,5 kW	5,04	22,0	25,8	30,0	34,0	36,2	33,7	29,6	25,5	21,9	18,4	16,1	**M [Nm]**
	12,5 A		61	71	83	94	100	93	82	71	60	51	45	**M [%]**
		4,78	44	240	536	832	1.130	1.428	1.714	1.995	2.276	2.556	2.834	**n [min^{-1}]**
132M/4	7,5 kW	6,66	30,0	35,0	41,0	47,1	49,5	44,5	39,3	32,2	27,7	23,8	20,5	**M [Nm]**
	16,0 A		60	70	82	94	99	89	79	64	55	48	41	**M [%]**
		6,06	62	241	538	837	1.133	1.431	1.713	1.967	2.268	2.551	2.828	**n [min^{-1}]**

2.1.1.3 IE1 motors, 87 Hz nominal point for Category 2D and 3D

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**40**	**100**	**f_s [Hz]**
	0,65	0,86	0,86	0,86	M [Nm]
63S/4	0	450	1073	2741	n [min^{-1}]
	0	0,04	0,1	0,25	P [kW]
230/400V, 50 Hz	46	108	200	358	U_s [V]
Δ	0,78	0,82	0,89	0,81	I_s [A]
	0,71	1,26	1,26	1,26	M [Nm]
63L/4	0	438	1060	2719	n [min-1]
	0	0,06	0,14	0,36	P [kW]
230/400V, 50 Hz	38	107	203	361	Us [V]
Δ	0,87	1,06	1,15	1,1	Is [A]
	1,15	1,76	1,76	1,88	M [Nm]
71S/4	0	441	1059	2661	n [min^{-1}]
	0	0,08	0,2	0,52	P [kW]
230/400V, 50 Hz	36	108	198	356	U_s [V]
Δ	0,94	1,25	1,25	1,63	I_s [A]
	1,81	2,55	2,57	2,56	M [Nm]
71L/4	0	461	1069	2770	n [min-1]
	0	0,12	0,29	0,74	P [kW]
230/400V, 50 Hz	33	104	190	342	Us [V]
Δ	1,43	1,77	1,8	2,12	Is [A]

2.1.1.4 IE1 motors, 87 Hz nominal point for Category 3D

Motor type		For the circuit, please refer to 1.7												
		Frequency inverter power and nominal current												
		Motor power in [kW] at 50 Hz (upper value) and 100 Hz (lower value)												
			3	10	20	30	40	50	60	70	80	90	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

80S/4	**1,1 kW**	0,55	1,9	2,3	3,0	3,4	3,7	3,9	3,9	3,9	3,8	3,6	3,5	**M [Nm]**
	3,0 A	0.93	50	60	79	89	97	102	102	102	99	94	92	**M [%]**
		1,03	0	164	440	757	1.052	1.351	1.638	1.947	2.237	2.457	2.814	**n [min^{-1}]**
80L/4	**1,5 kW**	0,78	2,9	3,3	4,2	4,7	5,0	5,4	5,6	5,7	5,5	5,3	5,0	**M [Nm]**
	3,7 A	1,36	56	63	81	90	96	104	108	110	106	102	95	**M [%]**
		1,46	0	207	493	792	1.086	1.377	1.668	1.970	2.256	2.439	2.813	**n [min^{-1}]**
90S/4	**2,2 kW**	1,10	4,3	5,0	6,3	7,0	7,6	7,7	7,6	7,6	7,4	7,0	6,8	**M [Nm]**
	5,5 A	1,83	57	66	83	92	100	101	100	100	98	92	90	**M [%]**
		2,03	0	192	482	778	1.070	1.370	1.675	1.978	2.270	2.489	2.833	**n [min^{-1}]**
90L/4	**3 kW**	1,39	4,1	5,4	7,3	8,5	9,3	9,6	9,9	9,9	9,8	9,1	8,6	**M [Nm]**
	7,0 A	2,38	40	52	71	83	90	93	96	96	95	88	83	**M [%]**
		2,56	73	179	487	789	1.085	1.387	1.684	1.988	2.284	2.497	2.863	**n [min^{-1}]**
100L/4	**4 kW**	2,10	7,3	11,0	12,6	13,7	14,2	14,2	14,2	14,2	13,5	12,8	12,3	**M [Nm]**
	9,5 A	3,37	51	76	88	95	99	99	99	99	94	89	86	**M [%]**
		3,73	0	207	520	809	1.106	1.409	1.709	2.008	2.307	2.518	2.887	**n [min^{-1}]**
100LA/4	**5,5 kW**	2,98	11,3	14,1	17,2	18,6	19,6	19,8	20,2	20,0	18,8	18,0	17,6	**M [Nm]**
	12,5 A	4,72	56	69	85	92	96	97	99	98	93	89	86	**M [%]**
T140°C		5,27	7	229	524	819	1.116	1.413	1.713	2.014	2.304	2.505	2.869	**n [min^{-1}]**
112M/4	**7,5 kW**	4,01	12,4	18,6	22,6	24,7	26,2	26,9	26,9	26,0	25,1	23,8	22,4	**M [Nm]**
	16,0 A	6,50	47	71	86	94	99	102	102	98	95	90	85	**M [%]**
		6,79	34	244	535	830	1.126	1.425	1.725	2.024	2.325	2.609	2.890	**n [min^{-1}]**
132S/4	**11 kW**	5,75	20,7	25,9	31,0	34,9	36,7	38,2	38,5	38,3	36,8	34,3	29,7	**M [Nm]**
	24,0 A	9,14	57	71	86	96	101	105	106	106	102	95	82	**M [%]**
		9,06	49	241	541	839	1.139	1.437	1.737	2.037	2.335	2.544	2.918	**n [min^{-1}]**
132M/4	**15 kW**	7,55	20,0	31,0	40,0	45,0	47,7	50,3	50,5	50,0	48,9	45,5	39,0	**M [Nm]**
	31,0 A	12,1	40	62	80	90	95	101	101	100	98	91	78	**M [%]**
		11,91	18	244	541	837	1.137	1.434	1.734	2.034	2.332	2.540	2.916	**n [min^{-1}]**

2.1.2 IE2 motors

2.1.2.1 IE2 motors, 50 Hz nominal point for Category 2D and 3D

Motor type Voltage Circuit type (Y/Δ)	**3**	**20**	**40**	**60**	**100**	**f_s [Hz]**
	2,64	3,74	3,73	3,71	1,83	M [Nm]
80SH/4	15	516	1118	1628	2551	n [min^{-1}]
	0	0,2	0,44	0,63	0,49	P [kW]
230/400V, 50 Hz	38	174	328	368	352	U_s [V]
Y	1,11	1,4	1,41	1,61	1,75	I_s [A]
	3,33	4,92	5,08	4,84	2,51	M [Nm]
80LH/4	10	508	1105	1596	2549	n [min^{-1}]
	0	0,26	0,59	0,81	0,67	P [kW]
230/400V, 50 Hz	36	172	333	363	363	U_s [V]
Y	1,38	1,77	1,81	2,13	2,22	I_s [A]
	0,97	5,52	6,83	5,72	3,11	M [Nm]
90SH/4	76	540	1127	1676	2763	n [min^{-1}]
	0,01	0,31	0,81	1	0,9	P [kW]
230/400V, 50 Hz	29	168	332	361	362	U_s [V]
Y	1,29	2,06	2,36	2,43	2,49	I_s [A]
	5,99	9,75	10,22	10,07	5,43	M [Nm]
90LH/4	33	521	1115	1605	2603	n [min^{-1}]
	0,02	0,53	1,19	1,69	1,48	P [kW]
230/400V, 50 Hz	35	173	338	361	361	U_s [V]
Y	2,38	3,28	3,33	4,19	4,31	I_s [A]
	2,38	14,6	14,79	12,08	6,96	M [Nm]
100LH/4	80	545	1143	1704	2818	n [min^{-1}]
	0,02	0,83	1,77	2,16	2,05	P [kW]
230/400V, 50 Hz	27	171	334	360	361	U_s [V]
Y	2,8	4,84	4,82	4,89	4,9	I_s [A]
	9,8	19,31	20,19	18,21	10,14	M [Nm]
100AH/4	49	528	1122	1646	2690	n [min^{-1}]
	0,05	1,07	2,37	3,14	2,86	P [kW]
230/400V, 50 Hz	32	172	336	363	363	U_s [V]
Y	4,17	6,15	6,41	7,08	7,36	I_s [A]
	16,56	24,27	26,49	21,76	11,92	M [Nm]
112MH/4	47	543	1139	1683	2774	n [min^{-1}]
	0,08	1,38	3,16	3,83	3,46	P [kW]
230/400V, 50 Hz	33	170	338	349	349	U_s [V]
Y	5,78	7,63	8,31	9	9,2	I_s [A]

Motor type Voltage Circuit type (Y/Δ)	**3**	**20**	**40**	**60**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	26,8	36	36	30,9	15,86	M [Nm]
132SH/4	57	558	1158	1712	2827	n [min^{-1}]
	0,16	2,11	4,37	5,53	4,7	P [kW]
230/400V, 50 Hz	33	172	338	345	344	U_s [V]
Y	8,63	10,76	10,73	12,97	13,12	I_s [A]
	30,6	48,54	49,17	41,8	21,15	M [Nm]
132MH/4	62	559	1158	1720	2845	n [min^{-1}]
	0,2	2,84	5,96	7,53	6,3	P [kW]
230/400V, 50 Hz	31	169	337	350	341	U_s [V]
Y	10,94	15	15,6	16,9	16,9	I_s [A]
	28,8	56,57	60,9	53,3	27,5	M [Nm]
132LH/4	68	556	1151	1704	2830	n [min^{-1}]
	0,21	3,29	7,34	9,5	8,15	P [kW]
230/400V, 50 Hz	29	168	333	354	355	U_s [V]
Y	11,95	18,2	19,7	21	20,2	I_s [A]
	48,8	64,3	72	58,4	32,8	M [Nm]
160MH/4	67	564	1159	1739	2885	n [min^{-1}]
	0,34	3,8	8,75	10,6	9,9	P [kW]
230/400V, 50 Hz	30	155	308	351	352	U_s [V]
Y	15,2	19,5	21,9	22,7	23,4	I_s [A]
	66,9	97,3	97,3	85,3	48	M [Nm]
160LH/4 2D TF	65	566	1167	1735	2875	n [min^{-1}]
	0,46	5,78	11,9	15,5	14,5	P [kW]
230/400V, 50 Hz	28	167	336	350	350	U_s [V]
Y	21,1	27,8	27,8	32,2	33,2	I_s [A]
	79,9	121	120	102	51,7	M [Nm]
180MH/4	64	575	1176	1752	2908	n [min^{-1}]
	0,54	7,3	14,7	18,8	15,7	P [kW]
230/400V, 50 Hz	25	164	334	347	349	U_s [V]
Y	28,7	37,5	36,2	41,6	41,1	I_s [A]
	102	142	142	117	54,6	M [Nm]
180LH/4	68	573	1173	1749	2926	n [min^{-1}]
	0,73	8,54	17,5	21,6	16,7	P [kW]
230/400V, 50 Hz	28	166	325	341	342	U_s [V]
Y	32,3	40,6	40,8	47	41	I_s [A]

2.1.2.2 IE2 motors, 87 Hz nominal point for Category 2D and 3D

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**40**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	2,64	3,74	3,73	3,74	M [Nm]
80SH/4	15	516	1118	2840	n [min^{-1}]
	0	0,2	0,44	1,11	P [kW]
230/400V, 50 Hz	22	100	190	355	U_s [V]
Δ	1,92	2,42	2,44	2,77	I_s [A]
	3,33	4,92	5,08	5,1	M [Nm]
80LH/4	10	508	1105	2803	n [min-1]
	0	0,26	0,59	1,5	P [kW]
230/400V, 50 Hz	21	99	192	357	Us [V]
Δ	2,38	3,06	3,14	3,69	Is [A]
	0,97	5,52	6,83	5,96	M [Nm]
90SH/4	76	540	1127	2882	n [min^{-1}]
	0,01	0,31	0,81	1,8	P [kW]
230/400V, 50 Hz	17	97	192	358	U_s [V]
Δ	2,24	3,57	4,08	4,25	I_s [A]
	6	9,75	10,2	10,1	M [Nm]
90LH/4	33	521	1115	2822	n [min-1]
	0,02	0,53	1,19	2,98	P [kW]
230/400V, 50 Hz	20	100	195	357	Us [V]
Δ	4,13	5,68	5,77	7,08	Is [A]
	2,38	14,6	14,8	12,56	M [Nm]
100LH/4	80	545	1143	2905	n [min-1]
	0,02	0,83	1,77	3,82	P [kW]
230/400V, 50 Hz	16	99	193	359	Us [V]
Δ	4,85	8,39	8,35	8,5	Is [A]
	9,8	19,3	20,2	20,2	M [Nm]
100AH/4	49	528	1122	2840	n [min-1]
	0,05	1,07	2,37	6	P [kW]
230/400V, 50 Hz	18	99	194	357	Us [V]
Δ	7,22	10,6	11,1	13	Is [A]
	16,5	24,3	26,5	22,5	M [Nm]
112MH/4	47	543	1139	2884	n [min-1]
	0,08	1,38	3,16	6,8	P [kW]
230/400V, 50 Hz	19	98	195	341	Us [V]
Δ	10	13,2	14,4	15,8	Is [A]

Motor type Voltage Circuit type (Y/Δ)	3	20	40	100	f_s [Hz]
132SH/4	26,8	36,1	36,1	31	M [Nm]
	57	558	1158	2915	n [min^{-1}]
	0,16	2,11	4,37	9,46	P [kW]
230/400V, 50 Hz	19	99	195	338	U_s [V]
Δ	14,9	18,65	18,6	22,15	I_s [A]
132MH/4	30,6	48,5	49,17	39,5	M [Nm]
	62	559	1158	2921	n [min-1]
	0,2	2,84	5,96	12,1	P [kW]
230/400V, 50 Hz	18	98	195	332	Us [V]
Δ	18,95	26	27	28,4	Is [A]
132LH/4	28,8	56,6	60,9	48	M [Nm]
	68	556	1151	2927	n [min^{-1}]
	0,21	3,29	7,34	14,7	P [kW]
230/400V, 50 Hz	17	97	192	353	U_s [V]
Δ	20,7	31,5	34,1	31,5	I_s [A]
160MH/4	48,8	64,3	72,1	56,9	M [Nm]
	67	564	1159	2944	n [min-1]
	0,34	3,8	8,75	17,5	P [kW]
230/400V, 50 Hz	17	89	178	348	Us [V]
Δ	26,4	33,9	37,9	37,2	Is [A]
160LH/4	66,9	97,4	97,4	82,4	M [Nm]
	65	566	1167	2939	n [min-1]
	0,46	5,78	11,9	25,4	P [kW]
230/400V, 50 Hz	16	96	194	344	Us [V]
Δ	36,5	48,1	48,2	53,4	Is [A]
180MH/4	79,9	121	120	93,6	M [Nm]
	64	575	1176	2957	n [min-1]
	0,54	7,3	14,8	29	P [kW]
230/400V, 50 Hz	14	95	193	343	Us [V]
Δ	49,8	65,1	62,7	65,8	Is [A]
180LH/4	102	142	142,8	96,8	M [Nm]
	68	573	1173	2963	n [min-1]
	0,73	8,54	17,5	30	P [kW]
230/400V, 50 Hz	16	96	188	335	Us [V]
Δ	56	70,4	70,7	65,4	Is [A]

2.1.3 IE3 motors

2.1.3.1 IE3 motors, 50 Hz nominal point for Category 2D and 3D

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**50**	**70**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	0,38	0,83	0,84	0,79	0,49	M [Nm]
63SP/4	0	445	1290	1555	2035	n [min^{-1}]
	0	0,038	0,11	0,13	0,11	P [kW]
230/400V, 50 Hz	48	181	350	350	348	U_s [V]
Y	0,27	0,39	0,39	0,48	0,50	I_s [A]
	0,81	1,10	1,24	1,16	0,79	M [Nm]
63LP/4	0	484	1321	1682	2270	n [min^{-1}]
	0	0,056	0,17	0,21	0,19	P [kW]
230/400V, 50 Hz	50	174	350	349	349	U_s [V]
Y	0,46	0,54	0,56	0,66	0,69	I_s [A]
	0,73	1,69	1,70	1,54	1,00	M [Nm]
71SP/4	41	506	1368	1808	2521	n [min^{-1}]
	0	0,089	0,24	0,29	0,26	P [kW]
230/400V, 50 Hz	37	174	348	349	349	U_s [V]
Y	0,47	0,69	0,71	0,86	0,89	I_s [A]
	1,26	2,39	2,52	2,08	1,39	M [Nm]
71LP/4	10	496	1351	1810	2516	n [min^{-1}]
	0	0,12	0,36	0,39	0,37	P [kW]
230/400V, 50 Hz	38	174	354	352	351	U_s [V]
Y	0,61	0,89	0,97	1,11	1,16	I_s [A]
	0,94	3,30	3,83	2,71	1,60	M [Nm]
80SP/4	60	514	1351	1852	2557	n [min^{-1}]
	0,01	0,18	0,54	0,53	0,43	P [kW]
230/400V, 50 Hz	31	171	349	349	350	U_s [V]
Y	0,77	1,28	1,53	1,56	1,60	I_s [A]
	3,04	4,51	5,06	3,57	2,20	M [Nm]
80LP/4	20	520	1371	1880	2617	n [min^{-1}]
	0,006	0,25	0,73	0,70	0,60	P [kW]
230/400V, 50 Hz	34	168	350	346	349	U_s [V]
Y	1,29	1,65	1,92	1,96	2,01	I_s [A]

Motor type Voltage Circuit type (Y/Δ)	3	20	50	70	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

	2,51	7,34	7,37	6,12	4,03	M [Nm]
90SP/4	61	530	1400	1908	2689	n [min^{-1}]
	0,02	0,41	1,08	1,22	1,13	P [kW]
230/400V, 50 Hz	29	170	347	347	347	U_s [V]
Y	1,38	2,41	2,60	3,02	3,13	I_s [A]
	5,68	10,2	10,1	8,19	5,02	M [Nm]
90LP/4	34	514	1370	1861	2614	n [min^{-1}]
	0,02	0,55	1,45	1,60	1,37	P [kW]
230/400V, 50 Hz	33	172	348	351	351	U_s [V]
Y	2,19	3,12	3,53	4,01	4,07	I_s [A]
	5,81	14,1	14,4	10,9	6,97	M [Nm]
100LP/4	40	559	1441	2003	2844	n [min^{-1}]
	0,02	0,83	2,17	2,29	2,07	P [kW]
230/400V, 50 Hz	28	167	343	344	344	U_s [V]
Y	2,54	4,40	4,92	5,24	5,34	I_s [A]
	7,44	19,9	19,6	15,4	9,66	M [Nm]
100AP/4	50	549	1435	1985	2818	n [min^{-1}]
	0,04	1,14	2,95	3,21	2,85	P [kW]
230/400V, 50 Hz	25	164	349	349	350	U_s [V]
Y	3,46	6,19	6,63	7,34	7,31	I_s [A]
	11,5	25,2	25,7	18,7	11,9	M [Nm]
112MP/4	59	542	1412	1963	2783	n [min^{-1}]
	0,07	1,43	3,80	3,84	3,46	P [kW]
230/400V, 50 Hz	28	167	342	344	343	U_s [V]
Y	4,46	7,51	8,54	8,74	8,82	I_s [A]
	17,6	34,5	35,4	25,5	16,5	M [Nm]
132SP/4	69	565	1448	2020	2874	n [min^{-1}]
	0,13	2,04	5,37	5,38	4,95	P [kW]
230/400V, 50 Hz	27	166	343	343	342	U_s [V]
Y	6,98	10,9	12,0	12,1	12,1	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**50**	**70**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	27,7	47,0	49,1	35,8	22,9	M [Nm]
132MP/4	61	559	1435	1997	2838	n [min^{-1}]
	0,18	2,75	7,37	7,50	6,80	P [kW]
230/400V, 50 Hz	28	165	341	340	340	U_s [V]
Y	10,1	14,8	16,5	16,9	16,9	I_s [A]
	25,8	54,5	55,7	40,2	25,2	M [Nm]
160SP/4	66	570	1460	2044	2920	n [min^{-1}]
	0,18	3,25	8,52	8,61	7,71	P [kW]
230/400V, 50 Hz	24	161	343	345	344	U_s [V]
Y	10,1	16,0	18,1	18,6	18,5	I_s [A]
	40,3	68,8	67,8	49,5	-	M [Nm]
160MP/4	69	568	1453	2030	-	n [min^{-1}]
	0,29	4,09	10,3	10,5	-	P [kW]
230/400V, 50 Hz	28	165	337	339	-	U_s [V]
Y	13,4	19,6	21,9	22,1	-	I_s [A]
	52,7	88,1	88,4	64,3	42,2	M [Nm]
160LP/4	70	571	1455	2033	2896	n [min^{-1}]
	0,39	5,26	13,5	13,7	12,8	P [kW]
230/400V, 50 Hz	27	163	337	339	338	U_s [V]
Y	17,4	25,1	28,6	29,1	29,3	I_s [A]
	79,5	120	114	80,5	49,3	M [Nm]
180MP/4	76	580	1471	2056	2935	n [min^{-1}]
	0,63	7,26	17,5	17,3	15,2	P [kW]
230/400V, 50 Hz	27	164	335	335	336	U_s [V]
Y	25,7	35,3	38,0	38,2	36,5	I_s [A]
	82,8	141	133	93,0	56,6	M [Nm]
180LP/4	68	577	1471	2055	2927	n [min^{-1}]
	0,59	8,51	20,5	20,0	17,3	P [kW]
230/400V, 50 Hz	24	162	343	344	343	U_s [V]
Y	29,4	40,5	43,0	43,6	43,0	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**50**	**70**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	138	193	195	137	85	M [Nm]
225RP/4	76	585	1475	2062	2941	n [min^{-1}]
	1,09	11,8	30,1	29,6	26,1	P [kW]
230/400V, 50 Hz	27	164	338	338	337	U_s [V]
Y	43,6	55,1	63,8	64,5	63,5	I_s [A]
	162	237	215	167	89	M [Nm]
225SP/4	76	583	1475	2060	2953	n [min^{-1}]
	1,29	14,4	33,2	36	27,6	P [kW]
230/400V, 50 Hz	26	163	326	328	331	U_s [V]
Y	50,6	68,8	74,0	76,0	66,6	I_s [A]
	193	266	253	185	107	M [Nm]
225MP/4	77	584	1478	2067	2954	n [min^{-1}]
	1,56	16,3	39,2	40	33,2	P [kW]
230/400V, 50 Hz	26	162	325	327	327	U_s [V]
Y	60,7	76,4	83,0	85,0	77,8	I_s [A]
	234	321	308	216	-	M [Nm]
250WP/4	76	585	1488	2069	-	n [min^{-1}]
	1,86	19,7	48,0	46	-	P [kW]
230/400V, 50 Hz	24	160	327	329	-	U_s [V]
Y	76	91	101	100	-	I_s [A]

2.1.3.2 IE3 motors, 87 Hz nominal point for Category 2D and 3D

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**87**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	0,38	0,83	0,84	0,84	M [Nm]
63SP/4	0	445	2428	2740	n [min^{-1}]
	0	0,04	0,21	0,24	P [kW]
230/400V, 50 Hz	28	105	351	351	U_s [V]
Δ	0,47	0,67	0,67	0,70	I_s [A]
	0,81	1,10	1,24	1,24	M [Nm]
63LP/4	0	484	2446	2769	n [min^{-1}]
	0	0,06	0,32	0,36	P [kW]
230/400V, 50 Hz	29	101	351	351	U_s [V]
Δ	0,80	0,94	0,98	1,01	I_s [A]
	0,73	1,69	1,69	1,70	M [Nm]
71SP/4	41	506	2483	2816	n [min^{-1}]
	0	0,09	0,44	0,50	P [kW]
230/400V, 50 Hz	21	101	348	346	U_s [V]
Δ	0,81	1,19	1,24	1,34	I_s [A]
	1,26	2,39	2,53	2,51	M [Nm]
71LP/4	10	496	2470	2793	n [min^{-1}]
	0	0,12	0,65	0,73	P [kW]
230/400V, 50 Hz	22	101	350	349	U_s [V]
Δ	1,06	1,54	1,67	1,84	I_s [A]
	0,94	3,30	3,69	3,64	M [Nm]
80SP/4	60	514	2475	2805	n [min^{-1}]
	0	0,18	0,96	1,07	P [kW]
230/400V, 50 Hz	18	99	348	348	U_s [V]
Δ	1,34	2,21	2,55	2,82	I_s [A]
	3,04	4,51	5,08	4,66	M [Nm]
80LP/4	20	520	2478	2830	n [min^{-1}]
	0	0,25	1,32	1,38	P [kW]
230/400V, 50 Hz	19	97	347	347	U_s [V]
Δ	2,23	2,86	3,39	3,50	I_s [A]

Motor type Voltage Circuit type (Y/Δ)	3	20	87	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

	2,51	7,34	7,35	7,35	M [Nm]
90SP/4	61	530	2512	2859	n [min^{-1}]
	0,02	0,41	1,93	2,20	P [kW]
230/400V, 50 Hz	17	98	346	345	U_s [V]
Δ	2,38	4,17	4,50	5,12	I_s [A]
	5,68	10,2	10,1	10,1	M [Nm]
90LP/4	34	514	2483	2816	n [min^{-1}]
	0,02	0,55	2,63	2,99	P [kW]
230/400V, 50 Hz	19	99	346	348	U_s [V]
Δ	3,79	5,40	6,05	6,87	I_s [A]
	5,81	14,1	14,4	13,4	M [Nm]
100LP/4	40	559	2550	2923	n [min^{-1}]
	0,02	0,83	3,84	4,11	P [kW]
230/400V, 50 Hz	16	97	341	342	U_s [V]
Δ	4,39	7,62	8,57	9,08	I_s [A]
	7,44	19,9	19,6	19,3	M [Nm]
100AP/4	50	549	2547	2909	n [min^{-1}]
	0,04	1,14	5,24	5,88	P [kW]
230/400V, 50 Hz	15	95	345	346	U_s [V]
Δ	6,00	10,7	11,4	12,7	I_s [A]
	11,5	25,2	25,8	22,5	M [Nm]
112MP/4	59	542	2520	2893	n [min^{-1}]
	0,07	1,43	6,81	6,83	P [kW]
230/400V, 50 Hz	16	97	339	341	U_s [V]
Δ	7,73	13,0	15,0	15,0	I_s [A]
	17,6	34,5	33,0	29,3	M [Nm]
132SP/4	69	565	2560	2940	n [min^{-1}]
	0,13	2,04	8,84	9,01	P [kW]
230/400V, 50 Hz	16	96	339	340	U_s [V]
Δ	12,1	18,9	19,9	20,0	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**87**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	27,7	47,0	45,2	40,5	M [Nm]
132MP/4	61	559	2550	2926	n [min^{-1}]
	0,18	2,75	12,1	12,4	P [kW]
230/400V, 50 Hz	16	95	336	335	U_s [V]
Δ	17,5	25,6	26,8	27,2	I_s [A]
	25,8	54,5	51,9	45,0	M [Nm]
160SP/4	66	570	2582	2962	n [min^{-1}]
	0,18	3,25	14,0	14,0	P [kW]
230/400V, 50 Hz	14	93	339	340	U_s [V]
Δ	17,5	27,7	30,1	30,2	I_s [A]
	40,3	68,8	61,0	-	M [Nm]
160MP/4	69	568	2567	-	n [min^{-1}]
	0,29	4,09	16,4	-	P [kW]
230/400V, 50 Hz	16	95	332	-	U_s [V]
Δ	23,1	34,0	34,7	-	I_s [A]
	52,7	88,1	82,2	71,4	M [Nm]
160LP/4	70	571	2566	2949	n [min^{-1}]
	0,39	5,26	22,1	22,1	P [kW]
230/400V, 50 Hz	16	94	331	332	U_s [V]
Δ	30,1	43,6	46,9	46,7	I_s [A]
	79,5	120	98,0	84,4	M [Nm]
180MP/4	76	580	2584	2969	n [min^{-1}]
	0,63	7,26	26,5	26,3	P [kW]
230/400V, 50 Hz	16	95	328	329	U_s [V]
Δ	44,6	61,1	58,1	57,4	I_s [A]
	82,8	141	116	95,3	M [Nm]
180LP/4	68	577	2585	2972	n [min^{-1}]
	0,59	8,51	31,4	29,7	P [kW]
230/400V, 50 Hz	14	93	333	334	U_s [V]
Δ	50,9	70,1	67,8	64,0	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**87**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	138	193	178	150	M [Nm]
225RP/4	76	585	2586	2973	n [min^{-1}]
	1,09	11,8	48,2	46,7	P [kW]
230/400V, 50 Hz	15	95	330	332	U_s [V]
Δ	75,6	95,4	104	100	I_s [A]
	162	237	155	135	M [Nm]
225SP/4	76	583	2595	2981	n [min^{-1}]
	1,29	14,40	42,1	42,2	P [kW]
230/400V, 50 Hz	15	94	320	322	U_s [V]
Δ	87,6	119	95	95,4	I_s [A]
	193	266	210	181	M [Nm]
225MP/4	77	584	2591	2978	n [min^{-1}]
	1,56	16,3	57	56,4	P [kW]
230/400V, 50 Hz	15	94	317	317	U_s [V]
Δ	105	132	125	125	I_s [A]
	234	321	282	-	M [Nm]
250WP/4	76	585	2589	-	n [min^{-1}]
	1,86	19,6	76	-	P [kW]
230/400V, 50 Hz	14	93	316	-	U_s [V]
Δ	131	158	167	-	I_s [A]

2.2 Motors with external fan

Information

Interpolation

Linear interpolation of data between adjacent frequencies is permissible.

The legend below applies to all following tables in this chapter.

Legend							
fs	Stator frequency	**M**	Torque	**M**	Torque	**n**	Speed
[Hz]	in hertz	**[Nm]**	In Newton metres	**[%]**	in % of nominal torque	**[rpm]**	Speed in rpm
P	Motor power	**Us**	Motor voltage	**Is**	Motor current		
[kW]	in kilowatts	**[V]**	in volts	**[A]**	in amps		

2.2.1 IE1 and IE2 motors with external fan, 50 Hz-nominal point, category 3D

Motor type		For the circuit, please refer to 1.7												
		Frequency inverter power and nominal current												
		Motor power in [kW] at 50 Hz (upper value) and 100 Hz (lower value)												
			3	10	20	30	40	50	60	70	80	90	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

63S/4	0,55 kW	0,11	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,7	0,6	0,4	M [Nm]
	1,6 A		94	94	94	94	94	94	92	90	82	66	50	M [%]
		0,09	10	150	375	690	1.010	1.320	1.381	1.441	1.641	1.840	1.932	n [min-1]
63L/4	0,55 KW	0,17	1,3	1,3	1,3	1,3	1,3	1,3	1,2	1,2	1,1	0,9	0,8	M [Nm]
	1,6 A		96	96	96	96	96	96	93	91	83	73	61	M [%]
		0,18	0	142	419	696	990	1.282	1.458	1.633	1.787	1.941	2.151	n [min-1]
71S/4	0,55 kW	0,23	1,7	1,7	1,7	1,7	1,7	1,6	1,5	1,4	1,2	1,1	0,9	M [Nm]
	1,6 A		100	100	100	100	100	92	87	81	72	61	53	M [%]
		0,23	10	150	437	733	1.032	1.364	1.537	1.710	1.939	2.168	2.388	n [min-1]
71L/4	0,55 kW	0,33	2,4	2,4	2,4	2,4	2,4	2,4	2,2	1,9	1,6	1,4	1,3	M [Nm]
	1,6 A		92	92	92	92	92	92	83	73	62	55	48	M [%]
		0,33	0	128	427	734	1.042	1.339	1.594	1.843	2.092	2.326	2.490	n [min-1]
80S/4	0,55 kW	0,48	3,5	3,5	3,5	3,5	3,5	3,5	3,2	2,7	2,3	2,0	1,6	M [Nm]
	1,6 A		91	91	91	91	91	91	82	71	59	52	42	M [%]
		0,43	30	150	463	765	1.061	1.314	1.604	1.837	2.073	2.296	2.529	n [min-1]
80L/4	0,75 kW	0,67	4,7	4,7	4,7	4,7	4,7	4,7	4,4	3,8	3,2	2,8	2,3	M [Nm]
	2,2 A		90	90	90	90	90	90	85	73	62	54	45	M [%]
		0,63	26	166	471	769	1.091	1.377	1.614	1.864	2.108	2.348	2.564	n [min-1]
90S/4	1,1 kW	1,01	7,0	7,0	7,0	7,0	7,0	7,0	6,4	5,6	5,1	4,3	3,9	M [Nm]
	3,0 A		92	92	92	92	92	92	84	73	68	57	51	M [%]
		1,06	10	207	503	800	1.032	1.379	1.626	1.875	2.096	2.372	2.606	n [min-1]
90L/4	1,5 kW	1,31	9,0	9,0	9,0	9,0	9,0	9,0	8,3	7,2	6,5	5,6	4,9	M [Nm]
	3,7 A		87	87	87	87	87	87	80	70	63	54	47	M [%]
		1,37	0	196	495	790	1.091	1.388	1.654	1.909	2.173	2.437	2.695	n [min-1]
100L/4	2,2 kW	1,92	13,1	13,1	13,1	13,1	13,1	13,1	12,2	10,8	9,9	8,3	7,4	M [Nm]
	5,5 A		91	91	91	91	91	91	84	75	69	58	51	M [%]
		2,17	0	207	488	805	1.106	1.408	1.715	2.010	2.234	2.523	2.807	n [min-1]
100LA/4	3 kW	2,68	20,3	20,3	20,3	20,3	20,3	18,2	16,1	13,9	12,1	10,1	9,0	M [Nm]
	7,0 A		100	100	100	100	100	90	79	69	59	50	44	M [%]
T140°C		2,59	11	172	488	804	1.105	1.406	1.673	1.940	2.214	2.488	2.753	n [min-1]
112M/4	4 kW	3,57	26,4	26,4	26,4	26,4	26,4	24,0	21,2	18,6	16,0	13,8	12,1	M [Nm]
	9,5 A		100	100	100	100	100	91	80	70	61	52	46	M [%]
		3,53	2	224	402	827	1.123	1.418	1.691	1.967	2.242	2.519	2.793	n [min-1]
132S/4	5,5 kW	4,88	35,2	36,4	36,4	36,4	35,8	32,3	28,3	23,4	19,5	17,3	14,2	M [Nm]
	12,5 A		97	100	100	100	98	89	78	64	54	47	39	M [%]
		4,28	26	250	551	851	1.153	1.444	1.725	2.010	2.299	2.585	2.876	n [min-1]
132M/4	7,5 kW	6,83	47,0	49,6	49,6	49,6	49,6	45,2	38,6	31,3	27,1	23,1	20,0	M [Nm]
	16,0 A		95	100	100	100	100	91	78	63	55	47	40	M [%]
		6,03	27	249	551	851	1.151	1.442	1.727	2.011	2.302	2.585	2.875	n [min-1]
132MA/4	11 kW	8,19	57,2	60,8	60,8	60,8	60,8	54,5	46,8	38,8	32,9	28,9	25,1	M [Nm]
	24,0 A		94	100	100	100	100	90	77	64	54	48	41	M [%]
T140°C		7,52	18	238	539	840	1.140	1.435	1.720	2.008	2.298	2.580	2.866	n [min-1]

2.2.2 IE1 and IE2 motors with external fan, 87 Hz-nominal point, category 3D

Motor type		For the circuit, please refer to 1.7												
		Frequency inverter power and nominal current												
		Motor power in [kW] at 50 Hz (upper value) and 100 Hz (lower value)												
↓	↓	↓	3	10	20	30	40	50	60	70	80	90	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

	0,55 kW	0,12	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,9	0,8	0,8	0,8	M [Nm]
63S/4	1,6 A	0,20	100	100	100	100	100	100	100	100	96	92	90	M [%]
		0,22	20	152	369	688	1.007	1.310	1.612	1.914	2.213	2.419	2.763	n [min-1]
	0,55 KW	0,18	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,2	1,2	M [Nm]
63L/4	1,6 A	0,30	100	100	100	100	100	100	100	100	96	92	90	M [%]
		0,33	20	175	407	715	1.002	1.306	1.610	1.909	2.207	2.415	2.713	n [min-1]
	0,55 kW	0,25	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,7	1,6	1,6	M [Nm]
71S/4	1,6 A	0,41	100	100	100	100	100	100	100	100	97	92	92	M [%]
		0,47	100	146	442	734	1.031	1.364	1.663	1.962	2.260	2.460	2.818	n [min-1]
	0,75 kW	0,35	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,4	2,3	M [Nm]
71L/4	2,2 A	0,61	95	95	95	95	95	95	95	95	95	92	90	M [%]
		0,69	0	188	488	782	1.077	1.350	1.633	1.941	2.245	2.457	2.797	n [min-1]
	1,1 kW	0,54	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,6	3,5	M [Nm]
80S/4	3,0 A	0,93	99	99	99	99	99	99	99	99	99	94	92	M [%]
		1,03	0	164	440	757	1.052	1.351	1.638	1.947	2.237	2.457	2.814	n [min-1]
	1,5 kW	0,79	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,5	5,3	5,0	M [Nm]
80L/4	3,7 A	1,36	106	106	106	106	106	106	106	106	106	102	95	M [%]
		1,46	0	207	493	792	1.086	1.377	1.668	1.970	2.256	2.439	2.813	n [min-1]
	2,2 kW	1,07	7,4	7,4	7,4	7,4	7,4	7,4	7,4	7,4	7,4	7,0	6,8	M [Nm]
90S/4	5,5 A	1,83	98	98	98	98	98	98	98	98	98	92	90	M [%]
		2,03	0	192	482	778	1.070	1.370	1.675	1.978	2.270	2.489	2.833	n [min-1]
	3 kW	1,42	9,8	9,8	9,8	9,8	9,8	9,8	9,8	9,8	9,8	9,1	8,6	M [Nm]
90L/4	7,0 A	2,38	95	95	95	95	95	95	95	95	95	88	83	M [%]
		2,56	73	179	487	789	1.085	1.387	1.684	1.988	2.284	2.497	2.863	n [min-1]
	4 kW	1,99	13,5	13,5	13,5	13,5	13,5	13,5	13,5	13,5	13,5	12,8	12,3	M [Nm]
100L/4	9,5 A	3,37	94	94	94	94	94	94	94	94	94	89	86	M [%]
		3,73	0	207	520	809	1.106	1.409	1.709	2.008	2.307	2.518	2.887	n [min-1]
100LA/4	5,5 kW	3,02	20,3	20,3	20,3	20,3	20,3	20,3	20,3	20,3	19,3	18,5	17,3	M [Nm]
	12,5 A	4,87	100	100	100	100	100	100	100	100	95	91	85	M [%]
T140°C		5,21	51	211	516	820	1.120	1.419	1.718	2.016	2.263	2.510	2.877	n [min-1]
	7,5 kW	3,92	21,1	26,4	26,4	26,4	26,4	26,4	26,4	26,4	26,3	26,1	21,6	M [Nm]
112M/4	16,0 A	6,87	80	100	100	100	100	100	100	100	100	99	82	M [%]
		6,54	15	213	518	820	1.119	1.419	1.719	2.016	2.312	2.517	2.896	n [min-1]
	11 kW	5,52	33,5	36,4	36,4	36,4	36,4	36,4	33,8	31,7	28,7	25,3	20,5	M [Nm]
132S/4	24,0 A	6,79	92	100	100	100	100	100	93	87	79	70	56	M [%]
		6,27	15	240	545	848	1.150	1.450	1.755	2.057	2.357	2.566	2.921	n [min-1]
	15 kW	7,40	46,9	49,6	49,6	49,6	49,6	48,7	47,0	45,3	41,6	39,0	33,8	M [Nm]
132M/4	31,0 A	10,47	95	100	100	100	100	98	95	91	84	79	68	M [%]
		10,43	19	244	547	849	1.151	1.452	1.757	2.054	2.356	2.562	2.944	n [min-1]
132MA/4	18 kW	9,01	51,9	60,8	60,8	60,8	59,7	59,6	56,4	53,9	50,4	45,6	42,6	M [Nm]
	38,0 A	12,20	85	100	100	100	98	98	93	89	83	75	70	M [%]
T140°C		13,09	17	234	540	840	1.143	1.443	1.746	2.049	2.349	2.556	2.934	n [min-1]

2.2.3 IE3 motors with external fan

2.2.3.1 IE3 motors with external fan, 50 Hz nominal point for Category 3D

Motor type Voltage Circuit type (Y/Δ)	3	20	50	70	100	f_s [Hz]
Notice: A comma counts as a full stop and signifies a decimal place.						
	0,86	0,85	0,86	0,68	0,39	M [Nm]
63SP/4	6	444	1251	1583	2184	n [min^{-1}]
	0	0,04	0,11	0,11	0,09	P [kW]
230/400V, 50 Hz	88	186	348	348	348	U_s [V]
Y	0,54	0,43	0,44	0,48	0,47	I_s [A]
	1,25	1,24	1,24	1,07	0,62	M [Nm]
63LP/4	2	466	1302	1679	2372	n [min^{-1}]
	0	0,06	0,17	0,19	0,15	P [kW]
230/400V, 50 Hz	64	179	348	348	347	U_s [V]
Y	0,65	0,59	0,60	0,67	0,63	I_s [A]
	1,69	1,69	1,69	1,60	0,98	M [Nm]
71SP/4	10	509	1369	1789	2550	n [min^{-1}]
	0,0	0,09	0,24	0,30	0,26	P [kW]
230/400V, 50 Hz	50	175	348	349	349	U_s [V]
Y	0,71	0,72	0,74	0,91	0,87	I_s [A]
	2,52	2,52	2,52	2,05	1,32	M [Nm]
71LP/4	12	490	1341	1794	2547	n [min^{-1}]
	0	0,13	0,35	0,39	0,35	P [kW]
230/400V, 50 Hz	52	174	350	348	347	U_s [V]
Y	0,93	0,94	0,99	1,12	1,08	I_s [A]
	3,71	3,70	3,71	2,86	1,69	M [Nm]
80SP/4	8	503	1355	1833	2572	n [min^{-1}]
	0	0,19	0,53	0,55	0,46	P [kW]
230/400V, 50 Hz	46	174	347	347	347	U_s [V]
Y	1,34	1,41	1,54	1,65	1,60	I_s [A]
	5,06	5,07	5,07	3,81	2,30	M [Nm]
80LP/4	14	513	1365	1869	2647	n [min^{-1}]
	0	0,27	0,72	0,75	0,64	P [kW]
230/400V, 50 Hz	41	169	342	342	342	U_s [V]
Y	1,76	1,80	1,94	2,05	1,96	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**50**	**70**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	7,33	7,35	7,35	6,17	3,93	M [Nm]
90SP/4	17	534	1404	1908	2723	n [min^{-1}]
	0	0,41	1,08	1,23	1,12	P [kW]
230/400V, 50 Hz	39	169	346	347	348	U_s [V]
Y	2,49	2,43	2,62	3,05	2,93	I_s [A]
	10,1	10,1	10,2	8,14	4,94	M [Nm]
90LP/4	14	515	1373	1860	2646	n [min^{-1}]
	0	0,55	1,46	1,59	1,37	P [kW]
230/400V, 50 Hz	40	167	346	348	349	U_s [V]
Y	3,27	3,24	3,54	4,06	3,90	I_s [A]
	14,3	14,3	14,3	11,6	7,22	M [Nm]
100LP/4	47	563	1444	1999	2854	n [min^{-1}]
	0,07	0,85	2,17	2,43	2,16	P [kW]
230/400V, 50 Hz	38	168	343	349	350	U_s [V]
Y	4,63	4,55	4,97	5,58	5,32	I_s [A]
	19,6	19,6	19,6	15,2	8,99	M [Nm]
100AP/4	36	556	1431	1977	2821	n [min^{-1}]
	0,07	1,14	2,94	3,15	2,66	P [kW]
230/400V, 50 Hz	41	170	343	345	345	U_s [V]
Y	6,48	6,22	6,83	7,50	7,06	I_s [A]
	26,6	26,5	26,6	19,0	12,3	M [Nm]
112MP/4	28	542	1407	1958	2794	n [min^{-1}]
	0,08	1,51	3,91	3,89	3,59	P [kW]
230/400V, 50 Hz	37	169	343	343	342	U_s [V]
Y	8,04	8,02	8,96	9,01	8,65	I_s [A]
	35,9	35,9	33,7	23,6	15,1	M [Nm]
132SP/4	54	565	1451	2029	2899	n [min^{-1}]
	0,20	2,12	5,12	5,02	4,57	P [kW]
230/400V, 50 Hz	33	166	342	342	342	U_s [V]
Y	11,3	11,3	11,5	11,1	10,4	I_s [A]

Motor type Voltage Circuit type (Y/Δ)	3	20	50	70	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

	49,2	49,2	49,1	32,8	20,2	M [Nm]
132MP/4	42	562	1449	2026	2893	n [min^{-1}]
	0,22	2,89	7,46	6,95	6,13	P [kW]
230/400V, 50 Hz	33	166	344	345	345	U_s [V]
Y	15,6	15,5	16,5	15,4	14,5	I_s [A]
	45,1	59,8	54,5	37,1	23,4	M [Nm]
160SP/4	24	571	1468	2052	2931	n [min^{-1}]
	0,11	3,58	8,38	7,96	7,18	P [kW]
230/400V, 50 Hz	27	161	343	345	346	U_s [V]
Y	19,6	17,5	17,8	17,0	16,2	I_s [A]
	49,9	71,8	69,1	48,0	30,6	M [Nm]
160MP/4	4	564	1457	2039	2917	n [min^{-1}]
	0,02	4,24	10,5	10,2	9,34	P [kW]
230/400V, 50 Hz	27	162	340	343	344	U_s [V]
Y	24,0	23,6	22,5	21,8	20,7	I_s [A]
	74,9	98,7	91,3	64,4	42,0	M [Nm]
160LP/4	13	571	1461	2042	2918	n [min^{-1}]
	0,10	5,90	14,0	13,8	12,8	P [kW]
230/400V, 50 Hz	26	160	341	342	343	U_s [V]
Y	31,7	27,9	29,4	28,6	27,5	I_s [A]
	119	120	111	77,5	47,1	M [Nm]
180MP/4	72	586	1478	2070	2958	n [min^{-1}]
	0,90	7,39	17,1	16,8	14,6	P [kW]
230/400V, 50 Hz	30	164	343	343	343	U_s [V]
Y	36,5	36,3	37,1	35,9	33,2	I_s [A]
	109	142	133	89,6	53,1	M [Nm]
180LP/4	27	575	1468	2054	2948	n [min^{-1}]
	0,31	8,58	20,4	19,3	16,4	P [kW]
230/400V, 50 Hz	25	162	340	339	340	U_s [V]
Y	49,0	41,9	43,7	42,1	36,8	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**50**	**70**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	193	193	193	133	81	M [Nm]
225RP/4	74	585	1476	2067	2950	n [min^{-1}]
	1,50	11,8	29,8	28,9	25	P [kW]
230/400V, 50 Hz	29	164	332	331	333	U_s [V]
Y	58,6	55	63,8	63	58,6	I_s [A]
	238	238	225	158	92	M [Nm]
225SP/4	74	584	1476	2065	2957	n [min^{-1}]
	1,84	14,6	34,8	34,3	28,6	P [kW]
230/400V, 50 Hz	30	165	337	338	338	U_s [V]
Y	68,3	68,1	73,6	72,7	62,9	I_s [A]
	289	289	259	182	115,0	M [Nm]
225MP/4	72	585	1477	2066	2950	n [min^{-1}]
	2,18	17,7	40,1	39,3	35,5	P [kW]
230/400V, 50 Hz	29	164	325	327	328	U_s [V]
Y	89,1	86,6	86,3	85,5	81,5	I_s [A]
	319	354	314	214	-	M [Nm]
250WP/4	62	584	1477	2068	-	n [min^{-1}]
	2	21	48	46	-	P [kW]
230/400V, 50 Hz	25	159	329	327	-	U_s [V]
Y	111	100	103	99	-	I_s [A]

2.2.3.2 IE3 motors with external fan, 87 Hz nominal point for Category 3D

Motor type Voltage Circuit type (Y/Δ)	3	20	87	100	f_s [Hz]

Notice: A comma counts as a full stop and signifies a decimal place.

	0,86	0,85	0,86	0,86	M [Nm]
63SP/4	6	444	2390	2686	n [min^{-1}]
	0	0,04	0,21	0,24	P [kW]
230/400V, 50 Hz	51	108	348	349	U_s [V]
Δ	0,94	0,74	0,76	0,78	I_s [A]
	1,25	1,24	1,25	1,24	M [Nm]
63LP/4	2	466	2428	2735	n [min^{-1}]
	0	0,06	0,32	0,35	P [kW]
230/400V, 50 Hz	37	103	349	349	U_s [V]
Δ	1,12	1,03	1,04	1,08	I_s [A]
	1,69	1,69	1,69	1,69	M [Nm]
71SP/4	10	509	2483	2822	n [min^{-1}]
	0	0,09	0,44	0,50	P [kW]
230/400V, 50 Hz	29	101	350	349	U_s [V]
Δ	1,22	1,25	1,27	1,34	I_s [A]
	2,52	2,52	2,51	2,50	M [Nm]
71LP/4	12	490	2457	2787	n [min^{-1}]
	0	0,13	0,65	0,73	P [kW]
230/400V, 50 Hz	30	101	348	347	U_s [V]
Δ	1,60	1,63	1,69	1,83	I_s [A]
	3,71	3,70	3,71	3,62	M [Nm]
80SP/4	8	503	2477	2814	n [min^{-1}]
	0	0,19	0,96	1,07	P [kW]
230/400V, 50 Hz	26	100	346	346	U_s [V]
Δ	2,33	2,44	2,50	2,73	I_s [A]
	5,06	5,07	5,07	4,57	M [Nm]
80LP/4	14	513	2479	2836	n [min^{-1}]
	0	0,27	1,32	1,36	P [kW]
230/400V, 50 Hz	24	97	341	340	U_s [V]
Δ	3,05	3,12	3,33	3,38	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**87**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	7,33	7,35	7,35	7,30	M [Nm]
90SP/4	17	534	2511	2864	n [min^{-1}]
	0	0,41	1,93	2,19	P [kW]
230/400V, 50 Hz	22	97	345	346	U_s [V]
Δ	4,31	4,21	4,51	4,95	I_s [A]
	10,1	10,1	10,1	9,8	M [Nm]
90LP/4	14	515	2481	2829	n [min^{-1}]
	0,01	0,55	2,63	2,92	P [kW]
230/400V, 50 Hz	23	96	342	347	U_s [V]
Δ	5,66	5,60	6,10	6,61	I_s [A]
	14,3	14,3	14,3	13,3	M [Nm]
100LP/4	47	563	2556	2929	n [min^{-1}]
	0,07	0,85	3,84	4,08	P [kW]
230/400V, 50 Hz	22	97	345	347	U_s [V]
Δ	8,01	7,88	8,49	8,86	I_s [A]
	19,6	19,6	18,4	16,0	M [Nm]
100AP/4	36	556	2546	2927	n [min^{-1}]
	0,07	1,14	4,90	4,90	P [kW]
230/400V, 50 Hz	24	98	341	343	U_s [V]
Δ	11,2	10,8	11,2	10,9	I_s [A]
	26,6	26,5	25,1	21,7	M [Nm]
112MP/4	28	542	2522	2898	n [min^{-1}]
	0,08	1,51	6,64	6,58	P [kW]
230/400V, 50 Hz	21	98	338	339	U_s [V]
Δ	13,9	13,9	14,7	14,4	I_s [A]
	35,9	35,9	27,8	24,2	M [Nm]
132SP/4	54	565	2569	2952	n [min^{-1}]
	0,20	2,12	7,47	7,47	P [kW]
230/400V, 50 Hz	19	96	338	338	U_s [V]
Δ	19,5	19,6	17,2	16,7	I_s [A]

Motor type Voltage Circuit type (Y/Δ)	3	20	87	100	f_s [Hz]
Notice: A comma counts as a full stop and signifies a decimal place.					
	49,2	49,2	37,3	32,5	M [Nm]
132MP/4	42	562	2577	2958	n [min^{-1}]
	0,22	2,89	10,1	10,1	P [kW]
230/400V, 50 Hz	19	96	341	339	U_s [V]
Δ	27,1	26,9	23,0	22,5	I_s [A]
	45,1	59,8	43,0	37,0	M [Nm]
160SP/4	24	571	2586	2972	n [min^{-1}]
	0,11	3,58	11,6	11,5	P [kW]
230/400V, 50 Hz	15	93	340	340	U_s [V]
Δ	33,9	30,3	25,4	24,8	I_s [A]
	49,9	71,8	50,5	43,9	M [Nm]
160MP/4	4	564	2584	2968	n [min^{-1}]
	0,02	4,24	13,7	13,6	P [kW]
230/400V, 50 Hz	15	94	336	337	U_s [V]
Δ	41,5	40,8	29,7	29,0	I_s [A]
	74,9	98,7	78,4	67,9	M [Nm]
160LP/4	13	571	2581	2964	n [min^{-1}]
	0,10	5,90	21,2	21,1	P [kW]
230/400V, 50 Hz	15	92	340	341	U_s [V]
Δ	54,9	48,4	43,8	43,0	I_s [A]
	119,5	120	86,4	72,5	M [Nm]
180MP/4	72	586	2599	2988	n [min^{-1}]
	0,90	7,39	23,5	22,7	P [kW]
230/400V, 50 Hz	17	95	338	339	U_s [V]
Δ	63,3	62,9	53,1	50,3	I_s [A]
	109,5	142	95	78,6	M [Nm]
180LP/4	27	575	2588	2985	n [min^{-1}]
	0,31	8,58	25,8	24,6	P [kW]
230/400V, 50 Hz	15	93	335	336	U_s [V]
Δ	85,0	72,5	56,9	53,1	I_s [A]

Motor type **Voltage** **Circuit type (Y/Δ)**	**3**	**20**	**87**	**100**	**f_s [Hz]**

Notice: A comma counts as a full stop and signifies a decimal place.

	193	193	167	140	M [Nm]
225RP/4	74	585	2588	2976	n [min^{-1}]
	1,49	11,8	45,4	43,8	P [kW]
230/400V, 50 Hz	17	94	323	326	U_s [V]
Δ	101,5	95,3	98,6	94,7	I_s [A]
	238	238	175	145	M [Nm]
225SP/4	74	584	2592	2980	n [min^{-1}]
	1,84	14,6	47,6	45,3	P [kW]
230/400V, 50 Hz	17	95	331	333	U_s [V]
Δ	118,3	118,0	102,1	95,3	I_s [A]
	289	289	202	174	M [Nm]
225MP/4	72	585	2592	2979	n [min^{-1}]
	2,18	17,7	54,9	54,2	P [kW]
230/400V, 50 Hz	17	95	318	320	U_s [V]
Δ	154,4	150,0	120,5	117,5	I_s [A]
	320	354	241	-	M [Nm]
250WP/4	62	584	2593	-	n [min^{-1}]
	2	21	65	-	P [kW]
230/400V, 50 Hz	14	92	324	-	U_s [V]
Δ	192	173	141	-	I_s [A]

3 Appendix

Abbreviations

2D	Category 2D
3D	Category 3D (non-conducting dust)

ATEX:	**AT**mosphères **EX**plosible	**IE1**	Efficiency as per IE1
DIN	Deutsche Industrie Norm	**IE2**	Efficiency as per IE2
EN	European standard	**IE3**	Efficiency as per IE3
FI	Frequency inverter	**U/f**	Voltage/frequency characteristic curve

Headquarters
Getriebebau NORD GmbH & Co. KG
Getriebebau-Nord-Str. 1
22941 Bargteheide, Deutschland
T: +49 45 32 / 289 0
F: +49 45 32 / 289 22 53
info@nord.com

6052102 / 2723