INFRANOR

High Efficiency Synchronous Servomotors

MOVINOR LN

Our range of synchronous servomotors

Motor type	Flange	Continuous stall torque (Mo [Nm])				
LN055-1 /-2 /-3 /-4	55 mm	0,28	0,54	0,75	0,95	-
LN064/070-1 /-2 /-3 /-4 /-5	64/70mm	0,75	1,3	1,75	2,2	3,0
LN086-1 /-2 /-3 /-4	86 mm	1,15	2,05	3,5	4,8	-
LN098-1 /-2 /-3 /-4	98mm	5,1	7,5	9,6	11,3	-
LN142-1 /-2 /-3 /-4	142 mm	12,0	16,0	20,0	24,0	-
LN190-1 /-2 /-3 /-4	190 mm	18,0	24,0	30,0	38,0	-
LN191-1 /-2 /-3 /-4	190 mm	30,0	40,0	50,0	60,0	-

Legend of the present manual

Version	Reason
10-2019	some corrections and additional details

Improvement of motors subject to technical alterations.

1. Table of Contents

2. Safety Advices

- All operations on transport, assembly, start-up and maintenance have to be done by skilled and qualified personnel only. The qualified personnel must know and observe the following standards and guidelines:
  DIN VDE 0105, IEC 364, accident prevention regulations
  Deviant behaviour may cause serious injury to persons and may lead to damages.

- Before mounting and start-up carefully read the documents on hand. Follow the instructions for power supply (motor label and manual) and go by the rules of the technical data.

- Ensure a proper, low-impedance grounding of the motor housing with the PE-reference potential inside the switch cabinet, as otherwise personal safety is not assured.

- Take suitable steps, that unexpected false move will not lead to injury or damage.

- Power connection can also lead current, when motor is not rotating. Do not remove or pull off plugs during operation or power supply. This can lead to electric arcs which may hurt people or damage contacts.

- Surface temperatures of more than 100°C can arise on the motors. Take care do not stick or fasten any temperature sensitive parts to it. Possibly make provisions for precautions against touch.

Symbols used in this manual

General warning

Significance: actual bodily harm and damage may occur if the respektive precautions will not be taken.

Danger by electricity

Significance: death, grievous bodily harm or considerable damage may occur, if the respective precautions will not be taken.

3. Important Notes

- Synchronous servomotors are precision motors. They are not intended to be connected directly to a rotary current power supply system. They have to be operated only by a particular electronic power stage. A direct connection to main supply will lead to the destruction of the motor.

- To fit zero backlash drive elements strictly use the intended thread at the motor shaft and if possible warm up the drive elements. Only use suitable tools to fit the drive elements.

- Avoid strong punches to the motor flange and the motor shaft.

- Take care that the coupling is correctly aligned . Follow the advices of the coupling manufacturer. An eccentric weight produces intolerable vibrations and leads to the destruction of ball bearings and coupling.

- Take care that the coupling is correctly aligned . Follow the advices of the coupling manufacturer. A mismatch produces intolerable vibrations and leads to the destruction of ball bearings and coupling.

- Tuning in the correct number of motor- and resolver poles in the inverter is absolutely necessary. A wrong setting can lead to the destruction of the motor and to overheating.

Motor Series	Number of motor poles	Number of resolver poles
LN055	6	2
LN064 – LN191	10	2

- All torque data of the motors are measured with heat sink. Calculation of the 3,5 mm thick heat sink is based on the following formula:

Heat sink length in mm = 2,5 x size of flange in mm

- Example: heat sink for LN055-motor = 2,5 x 55mm = 137,5mm. Result for the LN055-motor series is a heat sink of 137,5mm x 137,5mm x 3,5mm.

- **Note about the LN064/070 range:** this special range is available in 2 versions, one with a 64mm flange and a 14x30mm shaft to offer a shaft stiffness similar to the LN086 range with a small size, and another with a 70mm flange and a 11x23mm shaft compatible with this standard size. **Please contact us before order!**

4. In General

4.1. About this manual

This manual describes the synchronous servomotors of the LN range and it is directed towards specialized staff having knowledge of electrical and mechanical engineering.

The servomotors are operated together with the corresponding servo drives. Therefore absolutely follow the documentation of the servo drive too.

If not stated in other unit all dimension to be understood in millimetre (mm).

4.2. Provisionary use

Synchronous-servomotors are specially designed to run machines with high requirements to dynamics.

It is only allowed to operate the motors taking into consideration the environmental conditions described in this documentation.

The servomotors of the LN range are **exclusively** designed to be operated speed and / or torque controlled by suitable inverters.

The motors are used as components built into machines and may only be put into operation as integrated part of the system.

If existing, a thermo-protective element fitted inside the motor winding has to be analysed and monitored.

4.3. Motor Construction

The synchronous servomotors of the LN range are brushless ***permanent magnet*** synchronous motors with sinusoidal back EMF.
In connection with the corresponding inverters they are particularly suitable for high – quality servo applications, for example positioning demanding high standards of dynamics and stableness.

The servomotors have Neodymium – permanent magnets at the rotor. A three-phase winding is put inside the stator, which in star connection is wired to an internal neutral point and which is being supplied by the inverter. The motor has no brushes, the sinusoidal commutation is electronically done by the corresponding inverter.

The motors have a 2-pole resolver as a standard feedback.

In case of **other feedback system** than resolver the length of the motor stated in this manual can change.

The motors are available without or with brake installed. Refitting of brakes is not possible.

4.3.1. Shaft A-side

The power transmission is effected by the cylindrical shaft-A end. Please take into consideration that high radial forces will occur when motors are driven via pinions or toothed belts. The values permitted at the shaft end depend on the speed.

The peak value at 3000 rpm is shown in the table on page 8. In case of acting force at the middle of the free shaft end, FR can be 10% higher.

Double conical gripping collets, probably combined with metal bellows couplings proved to be ideal coupling elements.

Maximum rated bearing load at shaft A-side (Basis N_n 3.000 rpm)

Motortype	FRmax [N]	FAmax [N]	Motortype	FRmax [N]	FAmax [N]
Without brake			**With brake**		
LN055-1	216	41	**LN055-1**	247	47
LN055-2	234	45	**LN055-2**	254	48
LN055-3	246	47	**LN055-3**	260	49
LN055-4	254	48	**LN055-4**	264	50
LN064/070-1	367	70	**LN064/070-1**	407	70
LN064/070-2	395	75	**LN064/070-2**	422	75
LN064/070-3	413	78	**LN064/070-3**	433	78
LN064/070-4	426	81	**LN064/070-4**	441	81
LN064/070-5	444	84	**LN064/070-5**	453	84
LN086-1	283	54	**LN086-1**	299	57
LN086-2	327	62	**LN086-2**	335	64
LN086-3	356	68	**LN086-3**	360	68
LN086-4	392	75	**LN086-4**	393	75
LN098-1	595	113	**LN098-1**	611	116
LN098-2	653	124	**LN098-2**	660	125
LN098-3	689	131	**LN098-3**	691	131
LN098-4	713	135	**LN098-4**	713	135
LN142-1	665	126	**LN142-1**	681	129
LN142-2	713	136	**LN142-2**	724	138
LN142-3	746	142	**LN142-3**	754	143
LN142-4	770	146	**LN142-4**	775	147
LN190-1	637	121	**LN190-1**	699	133
LN190-2	684	130	**LN190-2**	718	136
LN190-3	717	136	**LN190-3**	733	139
LN190-4	741	141	**LN190-4**	745	142
LN191-1	1214	231	**LN191-1**	1342	255
LN191-2	1291	245	**LN191-2**	1384	263
LN191-3	1346	256	**LN191-3**	1417	269
LN191-4	1388	264	**LN191-4**	1443	274

4.3.2. Flange

Flange sizes according to IEC-standards, fit j6, accuracy as per DIN 42955
Tolerance grade: **R**

4.3.3. Degree of protection (without oil seal)

Standard protection is:

LN055 – LN191	IP65

4.3.4. Thermo protection

The motor series LN are fitted with a PTC. The overload protection has to be integrated in the control system of the inverter. Operation with rated data and a flange temperature higher than 65°C is only allowed in exception. For that contact the manufacturer.

4.3.5. Connections

Motor series	Signal	Power	Standard
LN055 – LN191	Connector	Connector	90° rear side

The mating connectors are not included with the delivery. These, as well as completely assembled cables are available on request.

4.3.6. Holding Brake

The motors have the option of an installed brake. The permanent-magnet brake is operated by 24 VDC and blocks the rotor when being without voltage.

The brake is to be understood as a holding brake and it is not to be used for permanent slow down during production. When the brake is detached the rotor can operate without residual torque, the functioning is free from backlash.
The brakes can be operated directly by the inverter (no personnel safety !).
In this case the reset of the brake winding is effected without additional external wiring.

If the brake is not directly operated by the inverter an additional wiring (for example varistor) has to be carried out.
A personnel-safe application of the brake needs an additional contact within the brake circuit and then also a release device for the brake (for example varistor).

4.4. Selection criterion

- Stall torque M_0 [Nm]
- Rated speed at rated supply voltage n_n [min^{-1}]
- Inertia of motor and load J [$kgcm^2$]
- Effective moment (calculated) M_{rms} [Nm]

When calculating the required motors and power stages the static load **and** the dynamic load (acceleration/deceleration) have to be taken into consideration.

4.5. Supply Voltage U_{dc}

This voltage defines the DC intermediate circuit voltage. The following standard windings are available:

LN055 – LN142	320 VDC / 560 VDC	**LN190 – LN191**	560 VDC

Other windings are available on request. At the motor a supply voltage U_{dc} <560V results into Io-current that requires a verification of the cable ampacity.

4.6. Standard type codes for servomotors LN

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
L N	191	4	D	0	0	1	0 1	7	IP65	3	UL	EX	M5	FAN	Spec.

2: Motor size: 055, 064, 070, 086, 098, 142, 190, 191
3: Torque & length size: 1 for lower, 2 for second, etc.
4: Winding (DC bus voltage): C: 320V, D: 560V, E: 320V high speed, F: 560V high speed
5: Shaft: 0: with keyway, 1: without keyway (**standard**)
6: Front flange: 0: **standard**, 1: with shaft seal
7: Brake: 0: without brake (**standard**), 1: with brake, 2: with inertia wheel
3: : with brake + inertia wheel

8: Motor feedback:

01: resolver 2T (**standard**)	16: EQN 1325 multiturn EnDat 2.2 supply 3.6 to 14 V*
02: ERN 1185 SinCos with commutation signals*	17: Sensorless
03: ERN 1387 SinCos with commutation signals*	18: EKS36 singleturn 18-bit Hiperface DSL
04: ECN 1113 singleturn EnDat*	19: EKS36 singleturn 18-bit Hiperface DSL SIL2 Safety
05: ECN 1313 singleturn EnDat*	20: EKM36 multiturn 18-bit Hiperface DSL
06: EQN 1125 multiturn EnDat*	21: EKM36 multiturn 18-bit Hiperface DSL SIL2 Safety
07: EQN 1325 multiturn EnDat*	22: SKS36S Safety
08: SRS50 singleturn Hiperface	23: SKM36S Safety
09: SRM50 multiturn Hiperface	24: SRS50S Safety
10: SKS36 singleturn Hiperface	25: SRM50S Safety
11: SKM36 multiturn Hiperface	26: CFS50 incremental with commutation signals
12: CNS50 incremental 2048 & commutation signals (HES 60°)	
13: CNS50 incremental 4096 & commutation signals (HES 60°)	
14: Quantum QR12 incr. 1024 & commutation signals (HES 60°)	
15: CKS36 incr. 2048 & prog. Comm. signals up to 32 pole pairs	

* : The factory will not supply anymore the Heidenhain encoders! It will to the partners to supply this kind of encoders at the factory!

9: Electrical connections:

0: straight cable outputs	18: 90° rear side INFRANOR wiring resolver 17p
1: straight INFRANOR wiring resolver 12p	19: 90° front side INFRANOR wiring resolver 17p
2: 90° rear side INFRANOR wiring resolver 12p	20: 90° adjustable INFRANOR wiring resolver 17p
3: 90° front side INFRANOR wiring resolver 12p	21: straight INFRANOR DSL wiring
4: straight SIEMENS wiring	22: 90° rear side INFRANOR DSL wiring
5: 90° rear side SIEMENS wiring	23: 90° front side INFRANOR DSL wiring
6: 90° front side SIEMENS wiring	24: 90° adjustable INFRANOR DSL wiring
7: 90° adjustable INFRANOR wiring	25: straight INFRANOR wiring M17: 21x21mm base connectors!
8: 90° adjustable SIEMENS wiring	26: 90° rear side INFRANOR wiring M17
9: (reserved)	27: 90° front side INFRANOR wiring M17
10: straight Bosch Rexroth wiring	28: 90° adjustable INFRANOR wiring M17
11: 90° rear side Bosch Rexroth wiring	29: 90° front side cable outputs
12: 90° front side Bosch Rexroth wiring	30: 90° rear side cable output
13: straight for sensorless motor	31: 90° double-recept. rot. Ytec resolver INFRANOR wiring
14: 90° rear side for sensorless motor	32: 90° double-recept. rot. Ytec Hiperface INFRANOR wiring
15: 90° front side for sensorless motor	33: 90° double-recept. rot. Ytec Hiperface standard wiring
16: 90° adjustable for sensorless motor	
17: straight INFRANOR wiring resolver 17p	

10: Protection: IP65 (**standard**), IP67, IP40
11: Thermal sensor: 0: PTC (**standard**), 1:NTC, 2: KTY84-130, 3: PT1000
12: UL listed: UL
13: ATEX listed: EX
14: M5 air plug: M5 (on the rear cover)
15: FAN fan kit available for multiple motor sizes
16: Additional information as short as possible!
X for each field: customer specific

4.7. Further options and equipment

To operate servomotors you need connectors and servo cables. We supply both on request, either separate or completely assembled. We differentiate between **power cable** and **signal cable**, matching the most different systems. Servomotors with gear box – assembled to one unit – we gladly assist in dimensioning.

5. Installation / Start-up

5.1. Important notes

- Check the assignment between inverter and motor. Compare rated voltage and rated current of the devices. The wiring has to be carried out in accordance to the circuit diagram shown in the installation/operation manual of the inverter.
- Pay attention to proper grounding of inverter and motor.
- Place power and signal cables separately from each other. When using motor power cables with integrated brake wires, the brake wires should be shielded. The shielding braid has to be applied both-sided.
- Lay all circuits with sufficient cross section. Shields to be applied in great circle (low-resistance) via metalized connector housings resp. EMV – approved cable glands.

- Check the compliance with the permitted radial and axial load F_R and F_A. Using a toothed belt drive the minimum permitted diameter of the pinion for example results from the equation: $d_{min} \geq M_0/F_R \times 2$.
- Assure sufficient heat removal in the surroundings and at the flange of the motor to not exceed the maximum permitted flange temperature of 65^0C in S1-operation. If necessary reduce the motor rating.

Caution!
Never remove the electric connections of the motor during power supply.
Residual charges inside the capacitor of the inverter can still exist up to 5 minutes after the disconnection of the main supply.
Power and signal connections can lead voltage even if the motor stands idle.

5.2. In general

Before start-up respectively before mounting check the motors regarding damage in transit. Damages of any part of the motor as well as corrosion at the shaft or flange have to be reported immediately to us.
The rotor should be easily rotating by hand. Existing brakes to be electrically let off in advance.

5.3. Environmental conditions

With regard to the installation site of the motor please take into consideration the environmental conditions like ambient temperature: -20...+40°C, maximum mounting height: 1000m above sea level, relative humidity: 15...85%, non-condensing.

A power reduction might possibly be necessary in case of tolerances to the a.m. environmental conditions.
The motors are not suitable for outdoor installation or installation within aggressive or foreign substance afflicted atmosphere.

5.4. Drive elements

The rotor of the motor has been electronically counterbalanced during production. Before fitting your drive elements onto the shaft end, please remove the corrosion prevention (if existing).
Strictly use suitable tools for fitting or removing the drive elements and follow the advices of the drive element manufacturer to avoid damages.

Our recommendation: *Use double conical tensioning devices.*

Absolutely avoid strong pushes to the motor flange and the motor shaft during fitting or removing. This might lead to damages of the ball bearing or shaft

5.5. Power connections

The power connections have to be carried out by skilled electricians only. Before starting work make sure that the systems actually is and remains without current during the installation time.

Follow the safety rules according to DIN VDE 0105.

The cross-sectional area of the cable has to be layed out in accordance to the rated power of the motor. The environmental conditions, the way of laying and the local legal requirements have to be taken into consideration.

Strictly follow the advices of the inverter manufacturer to fulfil EMV-wiring conditions.

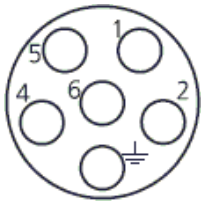
When using shielded cables take care of a great circle metallic shield connection on both sides of the cable.

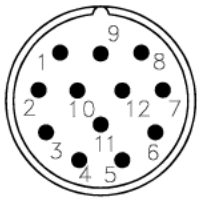
6. Standard terminal assignment

6.1. Motor LN – with resolver

Resolver connector = Intercontec Series 623, 1", 12 poles
Power connector = Intercontec Series 923, 1", 6 poles

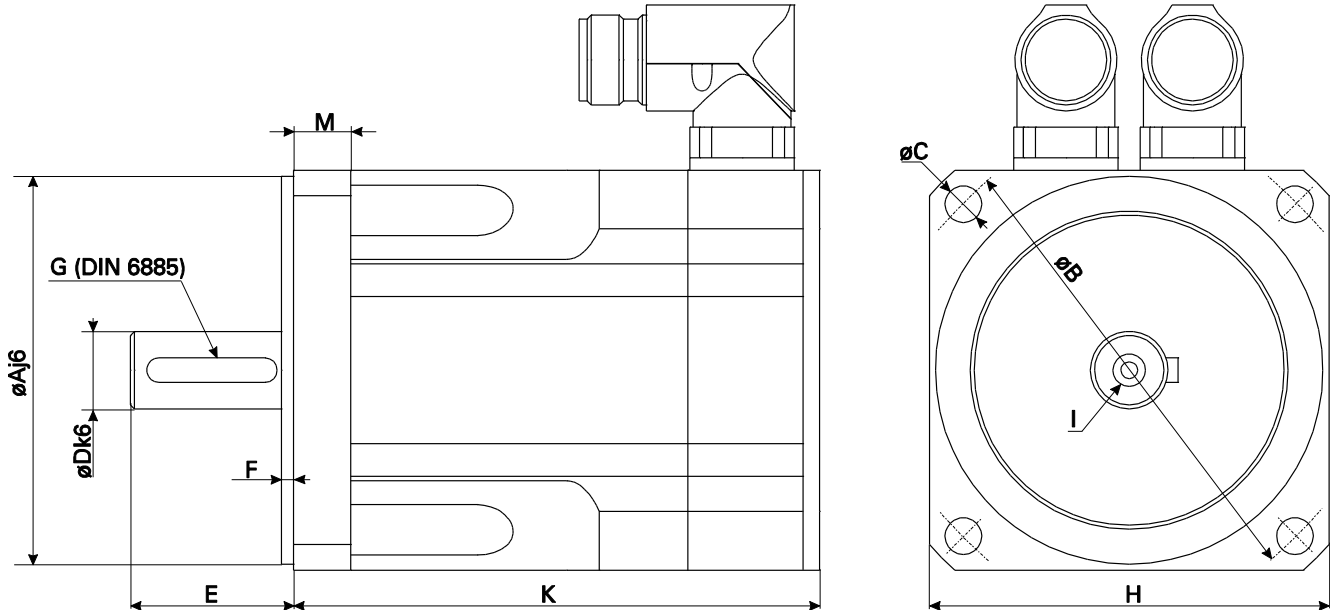
Power Connector				Resolver Connector			
	Pin		Description		Pin		Description
	2	=	Phase U		1	=	Sin - (S4)
	4	=	Phase V		2	=	Sin + (S2)
	1	=	Phase W		3	=	Cos - (S1)
	⏚	=	Earth / SL		4	=	Cos + (S3)
	5	=	Brake +		7	=	Ref + (R2)
	6	=	Brake -		8	=	Ref - (R1)
					5	=	Temp. sensor
					6	=	Temp. sensor





For the terminal assignment according to the different feedback options, please contact us!

7. Series LN055 [Udc 320 V / 560 V]



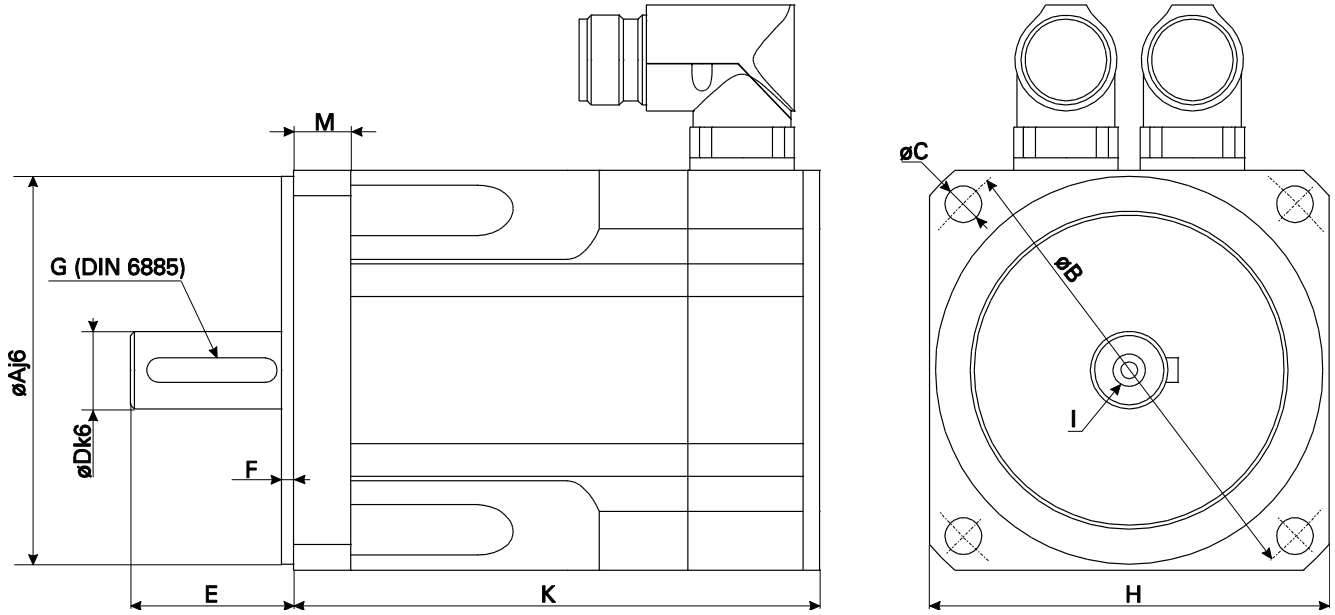
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN055-1	40	9	20	2.5	6	67	105	63	5.8	55	3x3x18	M3x7 (opt)
LN055-2	40	9	20	2.5	6	82	120	63	5.8	55	3x3x18	M3x7 (opt)
LN055-3	40	9	20	2.5	6	97	135	63	5.8	55	3x3x18	M3x7 (opt)
LN055-4	40	9	20	2.5	6	112	150	63	5.8	55	3x3x18	M3x7 (opt)

Winding Data			LN055-1		LN055-2		LN055-3		LN055-4	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	4500	4500	4500	4500	4500	4500	4500	4500
DC Bus Voltage	U_{dc}	V	320	560	320	560	320	560	320	560
Nominal AC Voltage	U_n	V	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	0,25	0,25	0,48	0,48	0,68	0,68	0,85	0,85
Rated AC Current	I_n	A	0,96	0,96	1,12	0,90	1,48	0,83	1,70	1,07
Stall Torque	M_o	Nm	0,28	0,28	0,54	0,54	0,75	0,75	0,95	0,95
Stall AC Current	I_o	A	0,97	0,97	1,17	0,93	1,54	0,86	1,82	1,15
Peak Torque	M_{max}	Nm	1,1	1,1	2,2	2,2	3,0	3,0	3,8	3,8
Peak Current	I_{max}	A	4,4	4,4	5,4	4,3	7,1	3,9	8,4	5,3
Max. Speed	n_{max}	min^{-1}	12000	12000	12000	12000	12000	12000	12000	12000
EMF Constant	K_E	V/1000	17,5	17,5	28,0	35,0	29,5	53,0	31,5	50,0
Torque Constant	K_T	Nm/A	0,29	0,29	0,46	0,58	0,49	0,88	0,52	0,83
Terminal Resistance Ph-Ph	R_{2ph}	Ω	28,3	28,3	25,9	41,1	17,0	54	13,1	33,6
Terminal Inductance Ph-Ph	L_{2ph}	mH	28,4	28,4	32,3	51	22,7	72	19,0	48,5
Number of poles motor	2p		6	6	6	6	6	6	6	6
Number of poles resolv.	Pres		2	2	2	2	2	2	2	2
Rated Power	P_n	W	118	118	226	226	320	320	400	400
Torque at I_{max}/U_n	M_z	Nm	1,1	1,1	2,1	2,1	3,0	3,0	3,8	3,8
Speed at I_{max}/U_n	n_z	min^{-1}	2540	6750	1520	3530	2050	1860	2230	2590
Max. Torque at n_n	M_x	Nm	0,81	1,1	1,1	1,8	1,6	1,5	2,0	2,4
El. Time Constant	T_{el}	ms	1,0	1,0	1,2	1,2	1,3	1,3	1,5	1,4
Mech. Time Constant	T_{mech}	ms	2,9	2,9	1,5	1,5	1,1	1,1	0,92	0,93
Therm. Time Constand	T_{th}	min	10,0	10,0	12,0	12,0	12,0	12,0	18,0	18,0
Rotor Inertia	J	kgcm2	0,05	0,05	0,07	0,07	0,09	0,09	0,11	0,11
Weight without brake		Kg	0,74	0,74	0,93	0,93	1,12	1,12	1,31	1,31
Weight with brake		Kg	0,99	0,99	1,18	1,18	1,37	1,37	1,56	1,56

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

8. Series LN064 [Udc 320 V / 560 V]



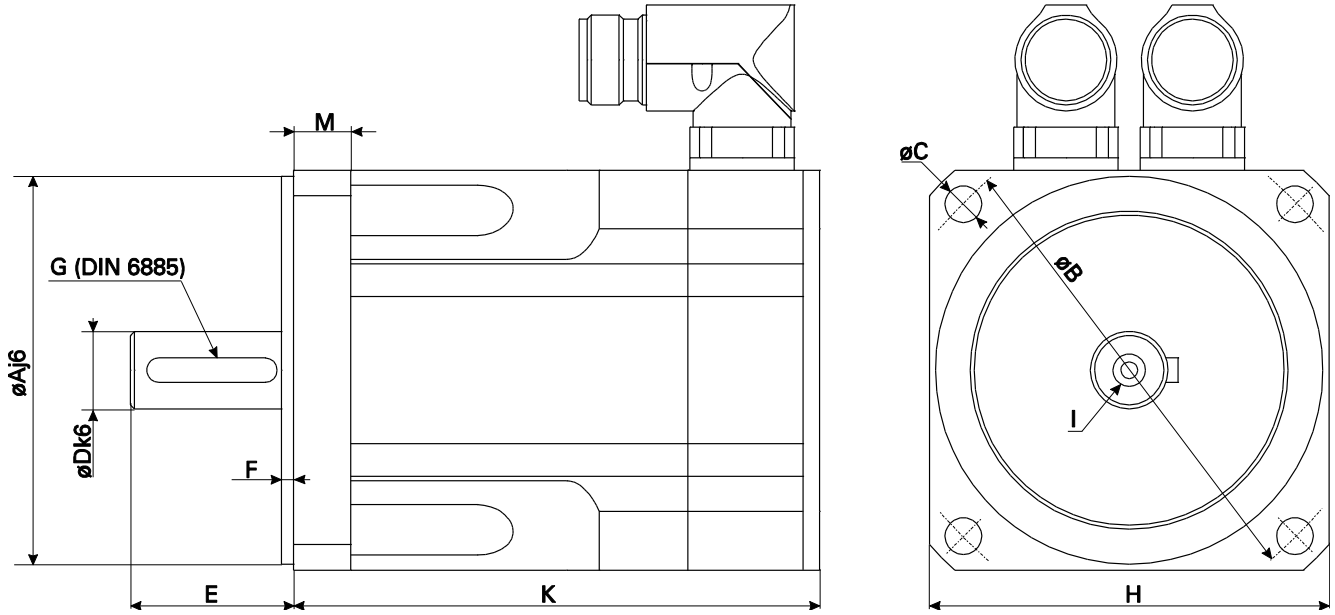
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN064-1	50	14	30	2.5	11	98	138	70	5.7	64	5x5x22	M4x14
LN064-2	50	14	30	2.5	11	116	156	70	5.7	64	5x5x22	M4x14
LN064-3	50	14	30	2.5	11	134	174	70	5.7	64	5x5x22	M4x14
LN064-4	50	14	30	2.5	11	152	192	70	5.7	64	5x5x22	M4x14
LN064-5	50	14	30	2.5	11	188	228	70	5.7	64	5x5x22	M4x14

Winding Data			LN064-1		LN064-2		LN064-3		LN064-4		LN064-5	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
DC Bus	U_{dc}	V	320	560	320	560	320	560	320	560	320	560
Mains	U_n	V	230	400	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	0,67	0,67	1,1	1,1	1,4	1,4	1,64	1,64	2,0	2,0
Rated Current	I_n	A	1,18	0,92	1,73	0,97	2,1	1,03	2,2	1,3	2,4	1,51
Stall Torque	M_o	Nm	0,75	0,75	1,3	1,3	1,75	1,75	2,2	2,2	3,0	3,0
Stall Current	I_o	A	1.15	0,89	1,77	0,99	2,2	1,11	2,7	1,49	3,1	1,91
Peak Torque	M_{max}	Nm	2,5	2,5	4,9	4,9	6,7	6,7	8,4	8,4	11,4	11,4
Peak Current	I_{max}	A	4,7	3,6	8,3	4,7	9,9	4,9	11,7	6,5	13,2	8,2
Max. Speed	n_{max}	min^{-1}	9560	7400	8500	4780	7980	3980	7650	4250	6420	3980
EMF cst.	K_E	V/1000	39,5	51,0	44,5	79,0	47,5	95,0	49.5	89,0	59,0	95,0
Torque cst.	K_T	Nm/A	0,65	0,84	0,74	1,31	0,79	1,57	0,82	1,47	0,98	1,57
R Ph-Ph	R_{2ph}	Ω	19,8	32,0	9,6	30,9	6,6	26,4	5,1	16,5	4,5	11,9
L Ph-Ph	L_{2ph}	mH	22,1	36,8	13,8	44,3	10,5	42,2	8,6	27,6	8,1	21,1
Mot. poles	2p		10	10	10	10	10	10	10	10	10	10
Res. poles	Pres		2	2	2	2	2	2	2	2	2	2
Rated Power	P_n	W	210	210	345	345	439	439	515	515	628	628
Tq. at I_{max}/U_n	M_z	Nm	2,4	2,4	4,9	4,9	6,6	6,6	8,2	8,2	11,2	11,2
Spd. at I_{max}/U_n	n_z	min^{-1}	2030	3260	1990	1870	2230	1790	2270	2150	1990	2180
Max. Tq. at n_n	M_x	Nm	1,9	2,4	3,5	3,3	4,8	3,3	5,9	5,5	5,3	6,9
El. Time cst.	T_{el}	ms	1,1	1,2	1,4	1,4	1,6	1,6	1,7	1,7	1,8	1,8
Mech. Time cst.	T_{mech}	ms	2,6	2,6	1,5	1,6	1,3	1,3	1,1	1,1	0,99	1,0
Therm. Time cst.	T_{th}	min	20,0	20,0	24,0	24,0	28,0	28,0	32,0	32,0	40,0	40,0
Rotor Inertia	J	kgcm2	0,33	0,33	0,5	0,5	0,68	0,68	0,85	0,85	1,2	1,2
Weight without brake		Kg	1,3	1,3	1,6	1,6	1,9	1,9	2,2	2,2	2,8	2,8
Weight with brake		Kg	1,8	1,8	2,1	2,1	2,4	2,4	2,7	2,7	3,3	3,3

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

9. Series LN070 [Udc 320 V / 560 V]



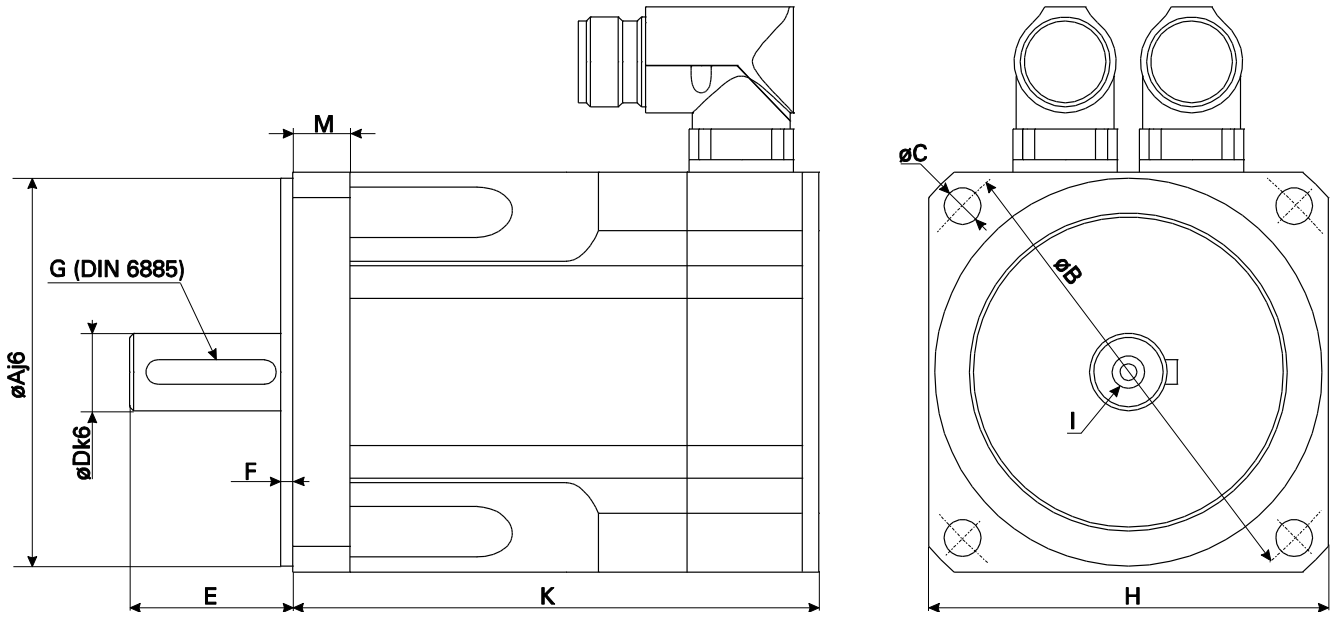
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN070-1	60	11	23	2.5	11	98	138	75	5.7	70	4x4x16	M4x14
LN070-2	60	11	23	2.5	11	116	156	75	5.7	70	4x4x16	M4x14
LN070-3	60	11	23	2.5	11	134	174	75	5.7	70	4x4x16	M4x14
LN070-4	60	11	23	2.5	11	152	192	75	5.7	70	4x4x16	M4x14
LN070-5	60	11	23	2.5	11	188	228	75	5.7	70	4x4x16	M4x14

Winding Data			LN070-1		LN070-2		LN070-3		LN070-4		LN070-5	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
DC Bus	U_{dc}	V	320	560	320	560	320	560	320	560	320	560
Mains	U_n	V	230	400	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	0,67	0,67	1,1	1,1	1,4	1,4	1,64	1,64	2,0	2,0
Rated Current	I_n	A	1,18	0,92	1,73	0,97	2,1	1,03	2,2	1,3	2,4	1,51
Stall Torque	M_o	Nm	0,75	0,75	1,3	1,3	1,75	1,75	2,2	2,2	3,0	3,0
Stall Current	I_o	A	1.15	0,89	1,77	0,99	2,2	1,11	2,7	1,49	3,1	1,91
Peak Torque	M_{max}	Nm	2,5	2,5	4,9	4,9	6,7	6,7	8,4	8,4	11,4	11,4
Peak Current	I_{max}	A	4,7	3,6	8,3	4,7	9,9	4,9	11,7	6,5	13,2	8,2
Max. Speed	n_{max}	min^{-1}	9560	7400	8500	4780	7980	3980	7650	4250	6420	3980
EMF cst.	K_E	V/1000	39,5	51,0	44,5	79,0	47,5	95,0	49.5	89,0	59,0	95,0
Torque cst.	K_T	Nm/A	0,65	0,84	0,74	1,31	0,79	1,57	0,82	1,47	0,98	1,57
R Ph-Ph	R_{2ph}	Ω	19,8	32,0	9,6	30,9	6,6	26,4	5,1	16,5	4,5	11,9
L Ph-Ph	L_{2ph}	mH	22,1	36,8	13,8	44,3	10,5	42,2	8,6	27,6	8,1	21,1
Mot. poles	2p		10	10	10	10	10	10	10	10	10	10
Res. poles	Pres		2	2	2	2	2	2	2	2	2	2
Rated Power	P_n	W	210	210	345	345	439	439	515	515	628	628
Tq. at I_{max}/U_n	M_z	Nm	2,4	2,4	4,9	4,9	6,6	6,6	8,2	8,2	11,2	11,2
Spd. at I_{max}/U_n	n_z	min^{-1}	2030	3260	1990	1870	2230	1790	2270	2150	1990	2180
Max. Tq. at n_n	M_x	Nm	1,9	2,4	3,5	3,3	4,8	3,3	5,9	5,5	5,3	6,9
El. Time cst.	T_{el}	ms	1,1	1,2	1,4	1,4	1,6	1,6	1,7	1,7	1,8	1,8
Mech. Time cst.	T_{mech}	ms	2,6	2,6	1,5	1,6	1,3	1,3	1,1	1,1	0,99	1,0
Therm. Time cst.	T_{th}	min	20,0	20,0	24,0	24,0	28,0	28,0	32,0	32,0	40,0	40,0
Rotor Inertia	J	kgcm2	0,33	0,33	0,5	0,5	0,68	0,68	0,85	0,85	1,2	1,2
Weight without brake		Kg	1,3	1,3	1,6	1,6	1,9	1,9	2,2	2,2	2,8	2,8
Weight with brake		Kg	1,8	1,8	2,1	2,1	2,4	2,4	2,7	2,7	3,3	3,3

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

10. Series LN086 [Udc 320 V / 560 V]



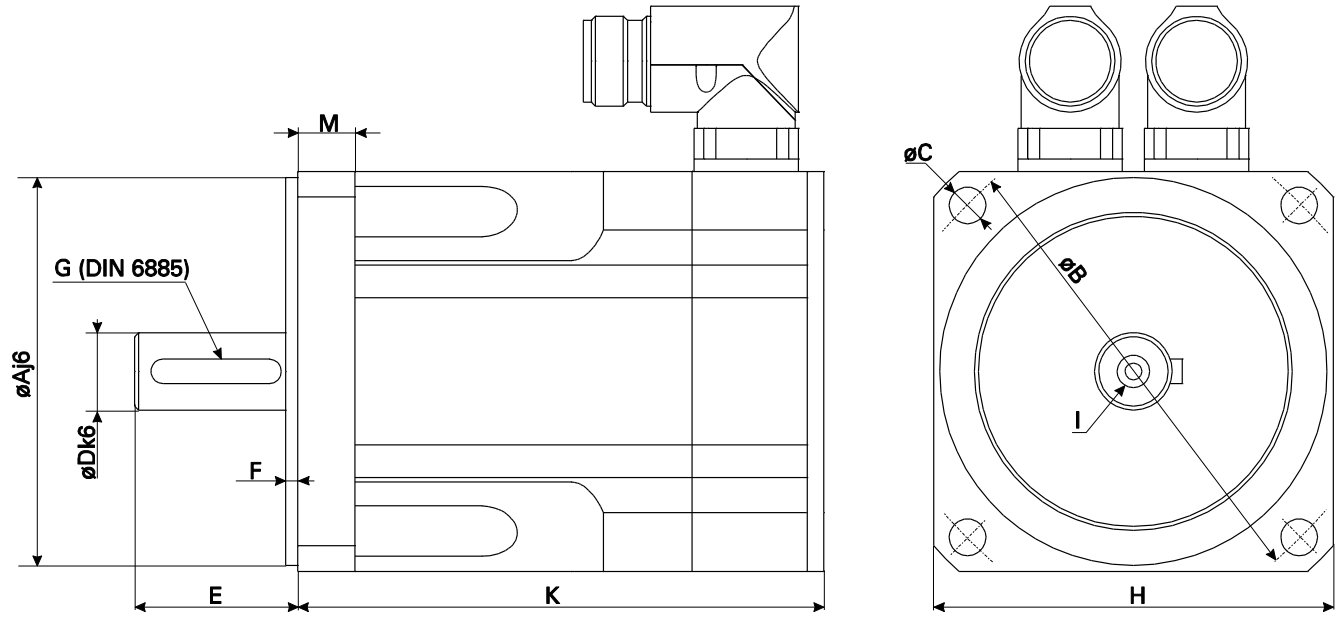
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN086-1	80	14	30	3.0	11	82	120	100	7.0	86	5x5x22	M4x10
LN086-2	80	14	30	3.0	11	100	138	100	7.0	86	5x5x22	M4x10
LN086-3	80	14	30	3.0	11	136	174	100	7.0	86	5x5x22	M4x10
LN086-4	80	14	30	3.0	11	172	210	100	7.0	86	5x5x22	M4x10

Winding Data			LN086-1		LN086-2		LN086-3		LN086-4	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000	3000	3000	3000	3000
DC Bus Voltage	U_{dc}	V	320	560	320	560	320	560	320	560
Nominal AC Voltage	U_n	V	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	1,13	1,13	1,90	1,90	3,0	3,0	3,7	3,7
Rated AC Current	I_n	A	2,3	1,26	3,1	1,72	4,3	2,4	4,5	2,6
Stall Torque	M_o	Nm	1,15	1,15	2,1	2,1	3,5	3,5	4,8	4,8
Stall AC Current	I_o	A	2,0	1,10	2,8	1,57	4,2	2,4	4,8	2,8
Peak Torque	M_{max}	Nm	3,5	3,5	6,2	6,2	10,5	10,5	14,4	14,4
Peak Current	I_{max}	A	9,2	5,0	12,7	7,2	19,4	10,9	17,3	10,1
Max. Speed	n_{max}	min^{-1}	12000	12000	12000	12000	12000	12000	12000	12000
EMF Constant	K_E	V/1000	34,5	63,0	44,5	79,0	50,0	89,0	60,0	103,0
Torque Constant	K_T	Nm/A	0,57	1,04	0,74	1,31	0,83	1,47	0,99	1,70
Therminal Resistance Ph-Ph	R_{2ph}	Ω	8,4	27,8	5,4	17,3	2,8	8,9	2,5	7,5
Therminal Inductance Ph-Ph	L_{2ph}	mH	18,0	59	13,3	42,4	8,1	25,5	7,5	22,7
Number of poles motor	2p		10	10	10	10	10	10	10	10
Number of poles resolv.	Pres		2	2	2	2	2	2	2	2
Rated Power	P_n	W	345	345	597	597	942	942	1162	1162
Torque at I_{max}/U_n	M_z	Nm	3,4	3,4	6,0	6,0	10,4	10,4	14,2	14,2
Speed at I_{max}/U_n	n_z	min^{-1}	1800	1680	1720	1630	1870	1800	2010	1990
Max. Torque at n_n	M_x	Nm	2,4	2,2	3,8	3,6	6,6	6,2	7,1	7,1
El. Time Constant	T_{el}	ms	2,1	2,1	2,5	2,5	2,9	2,9	3,0	3,0
Mech. Time Constant	T_{mech}	ms	1,4	1,4	0,95	0,96	0,74	0,74	0,67	0,68
Therm. Time Constand	T_{th}	min	21	21	23	23	27	27	30	30
Rotor Inertia	J	kgcm2	0,31	0,31	0,55	0,55	1,04	1,04	1,52	1,5
Weight without brake		Kg	1,5	1,5	2,0	2,0	2,9	2,9	3,8	3,8
Weight with brake		Kg	2,1	2,1	2,6	2,6	3,5	3,5	4,4	4,4

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

11. Series LN098 [Udc 320 V / 560 V]



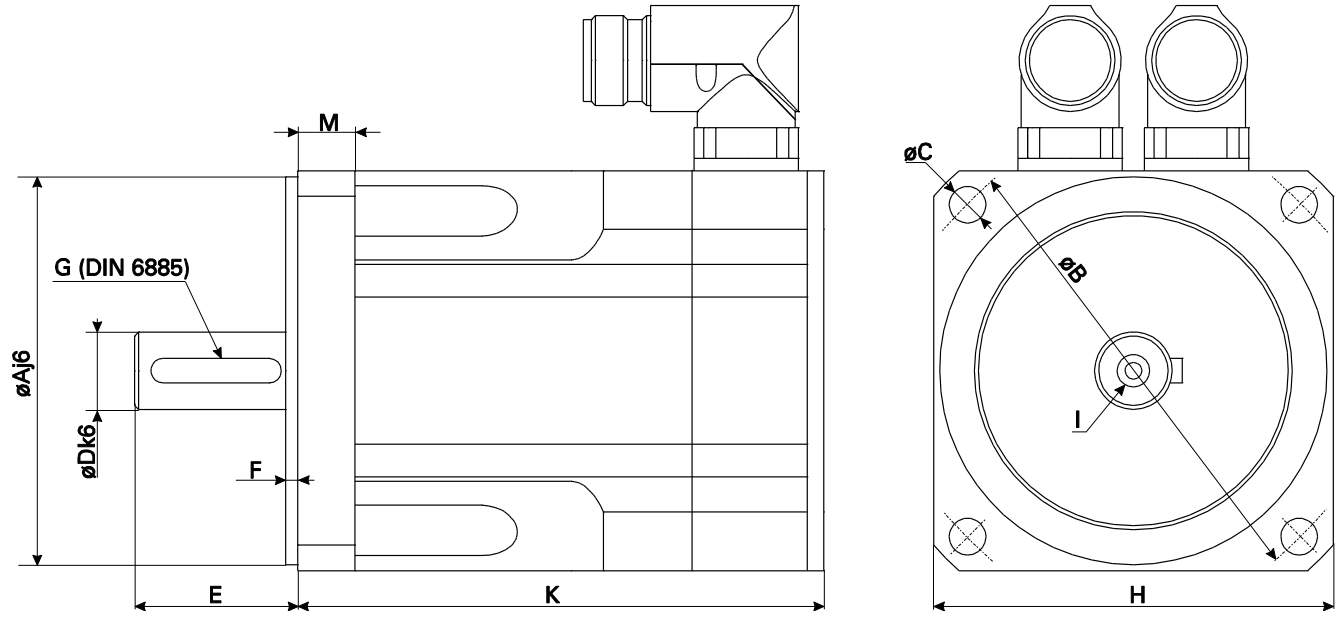
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN098-1	95	19	40	3.0	14	113	154	115	9.0	98	6x6x32	M5x14
LN098-2	95	19	40	3.0	14	143	184	115	9.0	98	6x6x32	M5x14
LN098-3	95	19	40	3.0	14	173	214	115	9.0	98	6x6x32	M5x14
LN098-4	95	19	40	3.0	14	203	244	115	9.0	98	6x6x32	M5x14

Winding Data			LN098-1		LN098-2		LN098-3		LN098-4	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000	3000	3000	3000	3000
DC Bus Voltage	U_{dc}	V	320	560	320	560	320	560	320	560
Nominal AC Voltage	U_n	V	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	4,2	4,2	6,1	6,1	7,7	7,7	8,8	8,8
Rated AC Current	I_n	A	7,0	3,9	8,8	5,1	10,8	6,0	10,7	6,9
Stall Torque	M_o	Nm	5,1	5,1	7,5	7,5	9,6	9,6	11,3	11,3
Stall AC Current	I_o	A	6,8	3,8	8,9	5,2	10,7	6,0	11,0	7,1
Peak Torque	M_{max}	Nm	15,3	15,3	23	23	29	29	34	34
Peak Current	I_{max}	A	31	17,4	41	24	49	27	41	27
Max. Speed	n_{max}	min^{-1}	9000	9000	9000	9000	9000	9000	9000	9000
EMF Constant	K_E	V/1000	45,5	81,0	51,0	87,0	54,0	97,0	62,0	96,0
Torque Constant	K_T	Nm/A	0,75	1,34	0,84	1,44	0,89	1,60	1,03	1,59
Therminal Resistance Ph-Ph	R_{2ph}	Ω	1,24	4,0	0,79	2,3	0,62	2,0	0,61	1,49
Therminal Inductance Ph-Ph	L_{2ph}	mH	6,8	21,7	4,8	13,5	3,6	11,9	3,8	9,1
Number of poles motor	2p		10	10	10	10	10	10	10	10
Number of poles resolv.	Pres		2	2	2	2	2	2	2	2
Rated Power	P_n	W	1320	1320	1915	1915	2418	2418	2763	2763
Torque at I_{max}/U_n	M_z	Nm	14,7	14,7	22	22	28	28	33	33
Speed at I_{max}/U_n	n_z	min^{-1}	1660	1590	1740	1750	1840	1750	1970	2210
Max. Torque at n_n	M_x	Nm	8,6	8,2	12,7	12,8	16,6	15,2	16,0	22
El. Time Constant	T_{el}	ms	5,5	5,5	6,1	5,9	5,8	6,0	6,2	6,1
Mech. Time Constant	T_{mech}	ms	0,77	0,78	0,63	0,62	0,60	0,60	0,57	0,58
Therm. Time Constand	T_{th}	min	25	25	30	30	35	35	40	40
Rotor Inertia	J	kgcm2	2,04	2,04	3,26	3,26	4,49	4,49	5,70	5,70
Weight without brake		Kg	3,9	3,9	5,2	5,2	6,5	6,5	7,8	7,8
Weight with brake		Kg	4,9	4,9	6,2	6,2	7,5	7,5	8,8	8,8

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

12. Series LN142 [Udc 320 V / 560 V]



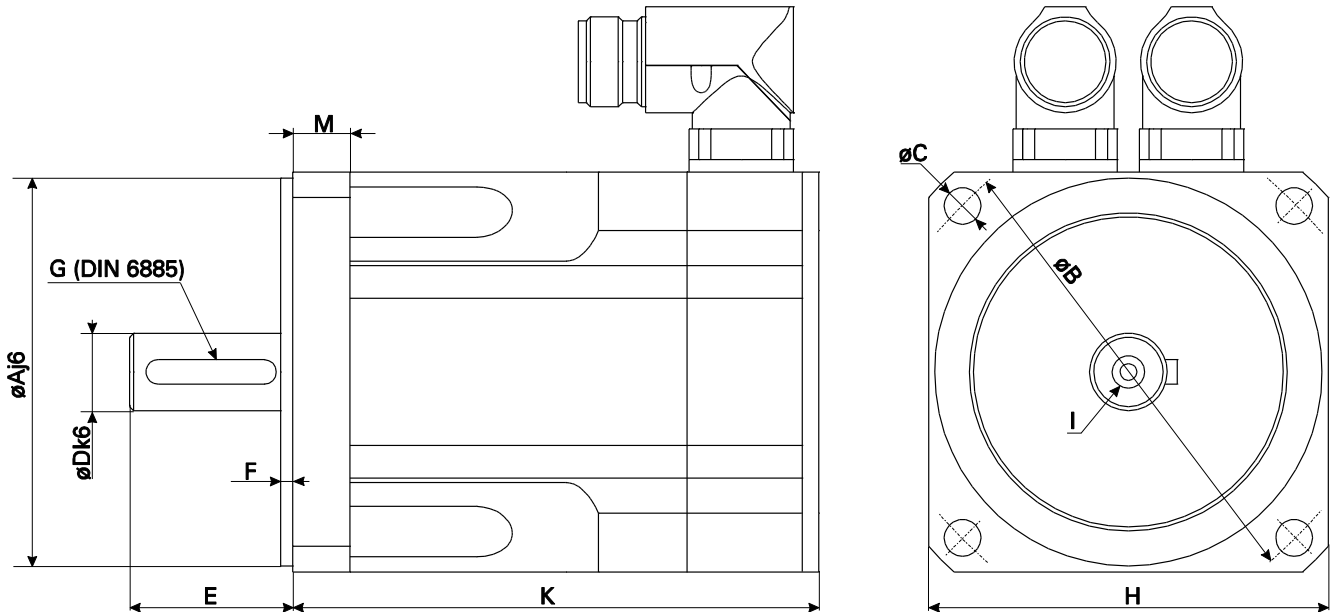
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN142-1	130	24	50	3.5	14	143.5	179.5	165	12.0	142	8x7x40	M8x20
LN142-2	130	24	50	3.5	14	173.5	209.5	165	12.0	142	8x7x40	M8x20
LN142-3	130	24	50	3.5	14	203.5	239.5	165	12.0	142	8x7x40	M8x20
LN142-4	130	24	50	3.5	14	233.5	269.5	165	12.0	142	8x7x40	M8x20

Winding Data			LN142-1		LN142-2		LN142-3		LN142-4	
			320 V.	560 V.	320 V.	560 V.	320 V.	560 V.	320 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000	3000	3000	2000	3000
DC Bus Voltage	U_{dc}	V	320	560	320	560	320	560	320	560
Nominal AC Voltage	U_n	V	230	400	230	400	230	400	230	400
Rated Torque	M_n	Nm	10,5	10,5	13,8	13,8	16,0	16,0	22,0	22,0
Rated AC Current	I_n	A	14,7	8,3	17,0	9,9	18,4	11,5	16,4	14,4
Stall Torque	M_o	Nm	12,0	12,0	16,0	16,0	20,0	20,0	24,0	24,0
Stall AC Current	I_o	A	14,2	8,0	17,3	10,1	18,6	11,6	15,4	14,0
Peak Torque	M_{max}	Nm	36	36	48	48	60	60	72	72
Peak Current	I_{max}	A	53	29	61	36	64	40	53	48
Max. Speed	n_{max}	min^{-1}	9000	9000	9000	9000	9000	9000	9000	9000
EMF Constant	K_E	V/1000	51,0	91,0	56,0	96,0	65,0	104,0	94,0	104,0
Torque Constant	K_T	Nm/A	0,84	1,51	0,93	1,59	1,08	1,72	1,55	1,72
Therminal Resistance Ph-Ph	R_{2ph}	Ω	0,42	1,33	0,30	0,88	0,28	0,72	0,45	0,56
Therminal Inductance Ph-Ph	L_{2ph}	mH	3,4	10,9	2,5	7,5	2,4	6,3	4,1	5,0
Number of poles motor	2p		10	10	10	10	10	10	10	10
Number of poles resolv.	Pres		2	2	2	2	2	2	2	2
Rated Power	P_n	W	3297	3297	4333	4333	5024	5024	4605	6279
Torque at I_{max}/U_n	M_z	Nm	36	36	48	48	59	59	71	71
Speed at I_{max}/U_n	n_z	min^{-1}	1920	1860	2110	2120	1980	2140	1370	2200
Max. Torque at n_n	M_x	Nm	22	20	29	29	23	33	33	41
El. Time Constant	T_{el}	ms	8,1	8,2	8,3	8,5	8,7	8,8	9,0	8,9
Mech. Time Constant	T_{mech}	ms	0,81	0,80	0,70	0,70	0,72	0,64	0,67	0,61
Therm. Time Constand	T_{th}	min	45	45	55	55	65	65	70	75
Rotor Inertia	J	kgcm2	7,90	7,90	11,50	11,50	17,10	17,10	21	21
Weight without brake		Kg	7,4	7,4	9,5	9,5	11,6	11,6	13,7	13,7
Weight with brake		Kg	9,0	9,0	11,1	11,1	13,2	13,2	15,3	15,3

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

13. Series LN190 [Udc 560 V]



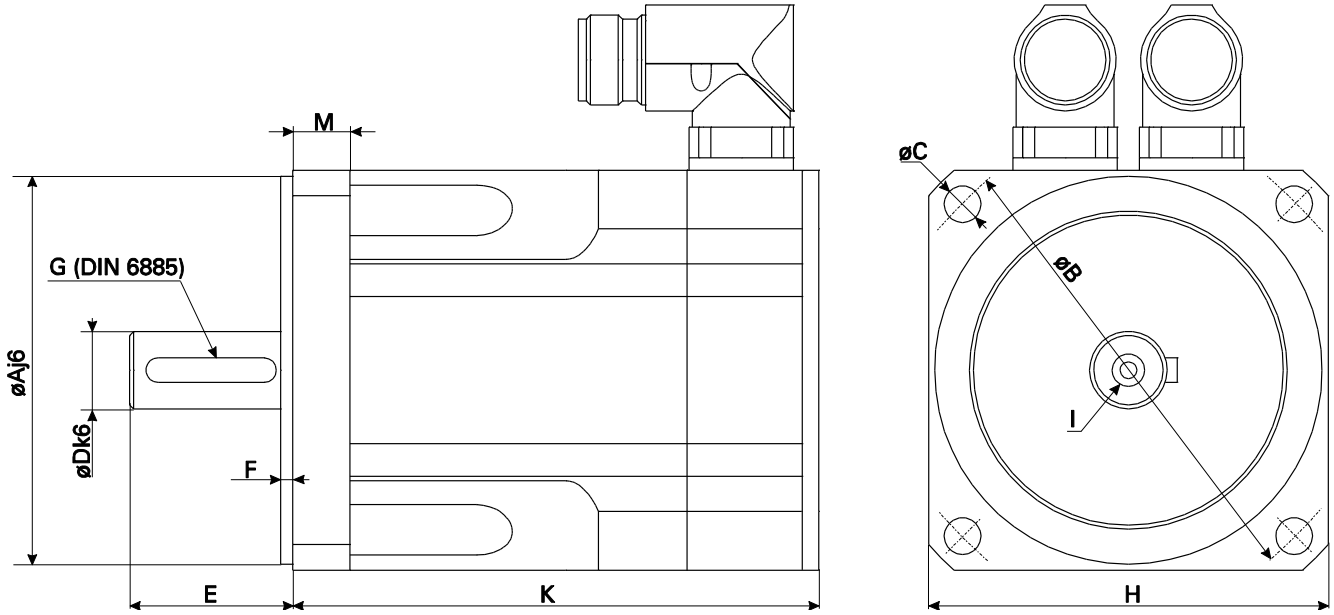
Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN190-1	180	24	50	3.5	12	158	222	215	13.0	190	8x7x40	M8x19
LN190-2	180	24	50	3.5	12	183	247	215	13.0	190	8x7x40	M8x19
LN190-3	180	24	50	3.5	12	208	272	215	13.0	190	8x7x40	M8x19
LN190-4	180	24	50	3.5	12	233	297	215	13.0	190	8x7x40	M8x19

Winding Data			LN190-1	LN190-2	LN190-3	LN190-4
			560 V.	560 V.	560 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	3000	3000
DC Bus Voltage	U_{dc}	V	560	560	560	560
Nominal AC Voltage	U_n	V	400	400	400	400
Rated Torque	M_n	Nm	13,0	17,0	21,0	25,0
Rated AC Current	I_n	A	11,0	13,8	16,2	19,7
Stall Torque	M_o	Nm	18,0	24,0	30,0	38,0
Stall AC Current	I_o	A	12,2	15,3	17,8	23,9
Peak Torque	M_{max}	Nm	51	72	90	114
Peak Current	I_{max}	A	45,4	60	64	93
Max. Speed	n_{max}	min^{-1}	6000	6000	6000	6000
EMF Constant	K_E	V/1000	89	95	102	96
Torque Constant	K_T	Nm/A	1,47	1,57	1,69	1,59
Therminal Resistance Ph-Ph	R_{2ph}	Ω	0,62	0,41	0,33	0,25
Therminal Inductance Ph-Ph	L_{2ph}	mH	7,2	5,5	4,7	3,5
Number of poles motor	2p		10	10	10	10
Number of poles resolv.	Pres		2	2	2	2
Rated Power	P_n	W	4816	5338	6593	7849
Torque at I_{max}/U_n	M_z	Nm	49,7	71	89	112
Speed at I_{max}/U_n	n_z	min^{-1}	1880	1860	1950	1880
Max. Torque at n_n	M_x	Nm	29,9	42,0	46,5	64
El. Time Constant	T_{el}	ms	11,6	13,4	14,2	14,0
Mech. Time Constant	T_{mech}	ms	0,92	0,74	0,66	0,69
Therm. Time Constand	T_{th}	min	42,0	47,0	52	57
Rotor Inertia	J	kgcm2	18,5	25,6	32,7	39,9
Weight without brake		Kg	10,0	12,8	15,5	18,3
Weight with brake		Kg	13,2	15,9	18,6	21,4

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

14. Series LN191 [Udc 560 V]



Dimensions with resolver feedback

Motor type	Aj6	Dk6	E	F	M	K	K1	B	C	H	G	I
LN191-1	180	28	58	4.0	15	181	245	215	15.0	190	8x7x40	M10x22
LN191-2	180	28	58	4.0	15	211	275	215	15.0	190	8x7x40	M10x22
LN191-3	180	28	58	4.0	15	241	305	215	15.0	190	8x7x40	M10x22
LN191-4	180	28	58	4.0	15	271	335	215	15.0	190	8x7x40	M10x22

Winding Data			LN191-1	LN191-2	LN191-3	LN191-4
			560 V.	560 V.	560 V.	560 V.
Rated Speed	n_n	min^{-1}	3000	3000	2000	2000
DC Bus Voltage	U_{dc}	V	560	560	560	560
Nominal AC Voltage	U_n	V	400	400	400	400
Rated Torque	M_n	Nm	23,0	25,0	40,4	44,0
Rated AC Current	I_n	A	15,5	20,1	21,8	19,7
Stall Torque	M_o	Nm	30,0	40,0	50,0	60,0
Stall AC Current	I_o	A	16,3	26,3	22,7	24,0
Peak Torque	M_{max}	Nm	85	120	150	180
Peak Current	I_{max}	A	58	90	79	82
Max. Speed	n_{max}	min^{-1}	6000	6000	6000	6000
EMF Constant	K_E	V/1000	111	92	133	151
Torque Constant	K_T	Nm/A	1,84	1,52	2,2	2,5
Therminal Resistance Ph-Ph	R_{2ph}	Ω	0,41	0,17	0,25	0,24
Therminal Inductance Ph-Ph	L_{2ph}	mH	6,4	3,1	4,9	5,1
Number of poles motor	2p		10	10	10	10
Number of poles resolv.	Prex		2	2	2	2
Rated Power	P_n	W	7221	7849	8456	9210
Torque at I_{max}/U_n	M_z	Nm	84	119	147	177
Speed at I_{max}/U_n	n_z	min^{-1}	1640	2160	1510	1380
Max. Torque at n_n	M_x	Nm	29,1	77	104	98
El. Time Constant	T_{el}	ms	15,6	18,2	19,6	21,2
Mech. Time Constant	T_{mech}	ms	1,04	0,88	0,79	0,71
Therm. Time Constand	T_{th}	min	80	90	100	108
Rotor Inertia	J	kgcm2	49,5	69	88	107
Weight without brake		Kg	16,5	21,5	26,5	31,5
Weight with brake		Kg	20,1	25,1	30,1	35,1

10% tolerance at Mo, Mn and Nn, values ascertained with heat sink.

15. Technical Data

15.1. Definitions

Continuous stall torque M_0 [Nm]

Thermic max. torque which can be supplied unlimitedly when motor is blocked, n=0 min-1, within nominal environmental conditions and heat sink at A-side.

Nominal torque M_n [Nm]

When motor absorbs rated current at rated speed, rated torque can be supplied
unlimitedly in S1 operation.

Stall current I_0 [A]

To supply the continuous stall torque during standstill, the motor takes the stall current. The indications refer to the sinusoidal effective current.

Nominal current I_n [A]

At ratedl speed n_n and supply of the rated torque the motor absorbs the rated current The indications refer to the sinusoidal effective current.

Peak current I_{max} [A]

The peak current (effective sinusoidal value) is the maximal allowed current for 5 sec. The peak current should not be higher than 3,5 times rated current.

Torque constant K_T [Nm/A]

This constant specifies which torque (Nm) the motor delivers at a current of 1 A effective current. ($M = I * K_T$).

Voltage constant K_E [V/1000min $^{-1}$]

This voltage constant defines the induced motor EMF, as an effective value between two motor phases per 1000 rpm.

Moment of Inertia J [kgcm^2]

Moment of inertia of the rotor only with Resolver – Feedback as basic-equipment. Internal or external attachments (such as holding brake, encoder systems, couplings or mechanical load) can change the mentioned values considerably. For the calculation of the dynamical motor situation it is therefore necessary to consider this moment of inertia in its totality.

16. Options Series LN

16.1. Permanent Magnet Holding Brake

Data	Unit	LN055	LN064/70/86	LN098	LN142	LN190	LN191
Torque	Nm	2	4,5	9	18	36	36
Power supply	VDC	24 (+ 6% - 10%)					
Nominal power	W	11	12	18	24	26	26
Moment of inertia	$Kgcm^2$	0,068	0,18	0,54	1,66	5,56	5,56
Weight	Kg	0,440	0,590	0,820	1,080	2,860	2,860

16.2. Keyway according to DIN 6885

Motor	LN055	LN064	LN070	LN086	LN098	LN142	LN190	LN191
Shaft	9x20	14x30	11x23	14x30	19x40	24x50	24x50	28x58
Keyway	3x3x14	5x5x22	4x4x16	5x5x22	6x6x32	7x8x40	7x8x40	7x8x40

Degree of protection IP 67

Protection against contact, penetration of dust. Motor within stated pressure and time conditions beneath water.

Special Shaft / Special Flange

On request

Various terminal assignments

See chapter 4.6

Various connectors solutions

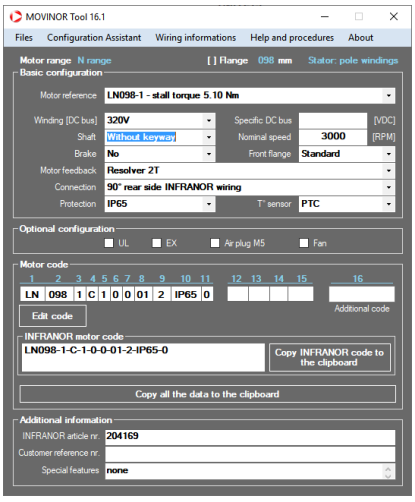
Straight, 90° angled or turnable, double-receptacle Ytec turnable, direct cable output (see chapter 4.6)

Feedback

Various systems on request (see chapter 4.6)
In case of **other feedback system** than resolver the length of the motor stated in this manual can change.

16.3. MOVINOR Configurator Tool

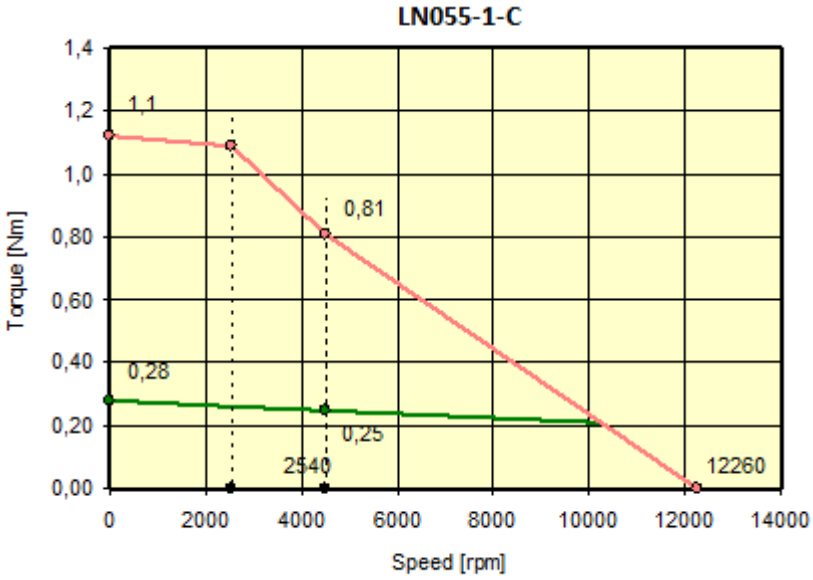
Software to generate the MOVINOR motor code according to the selected configuration:

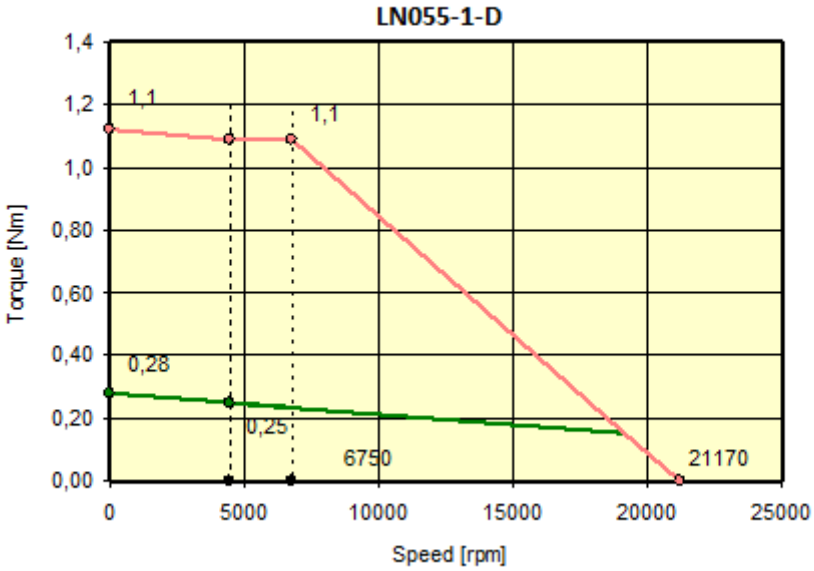


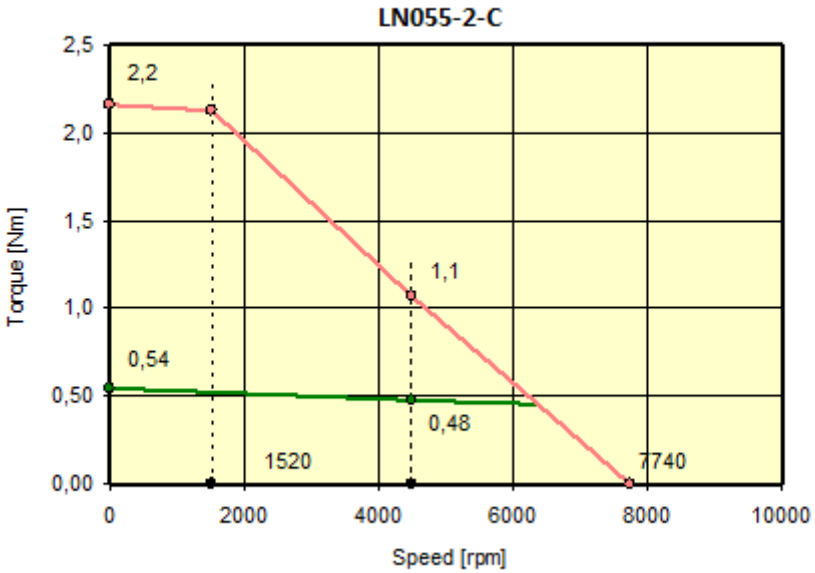
[Download here the MOVINOR Configurator Tool]

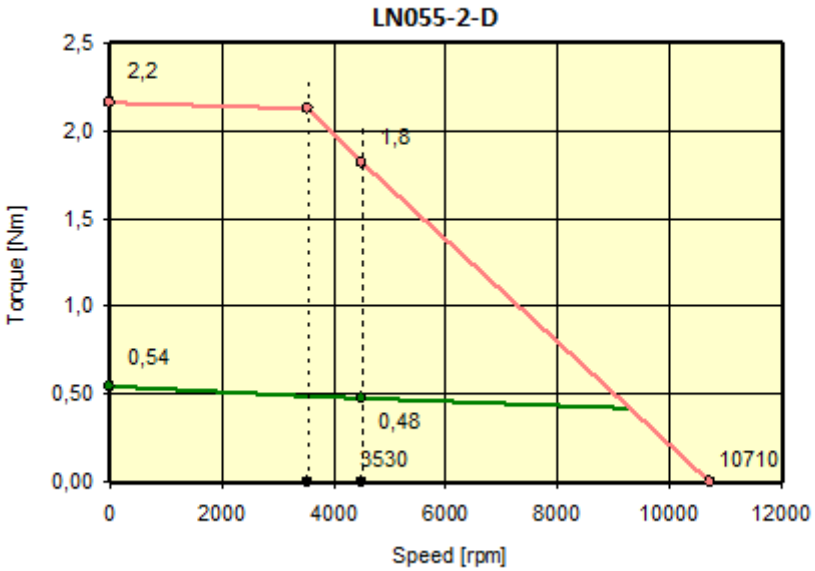
17. Torque & speed curves

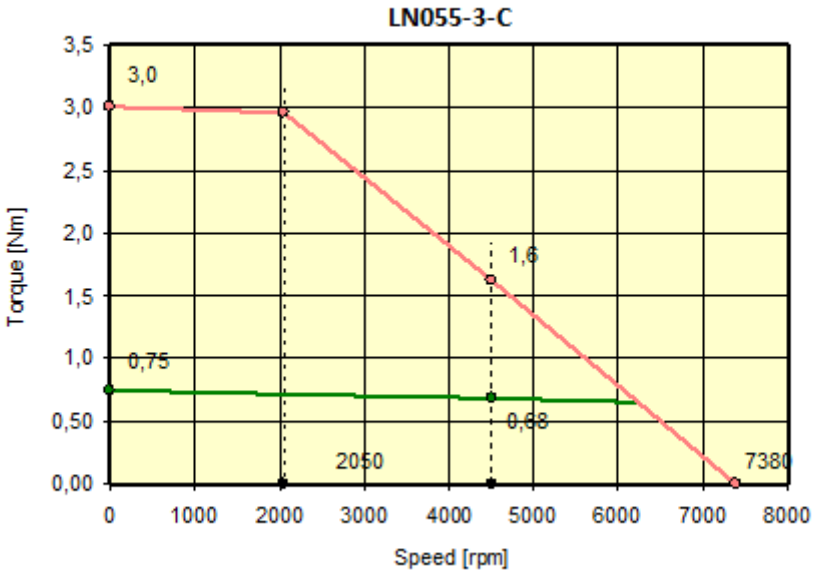
17.1. Serie LN055 [Udc 320 / 560V]

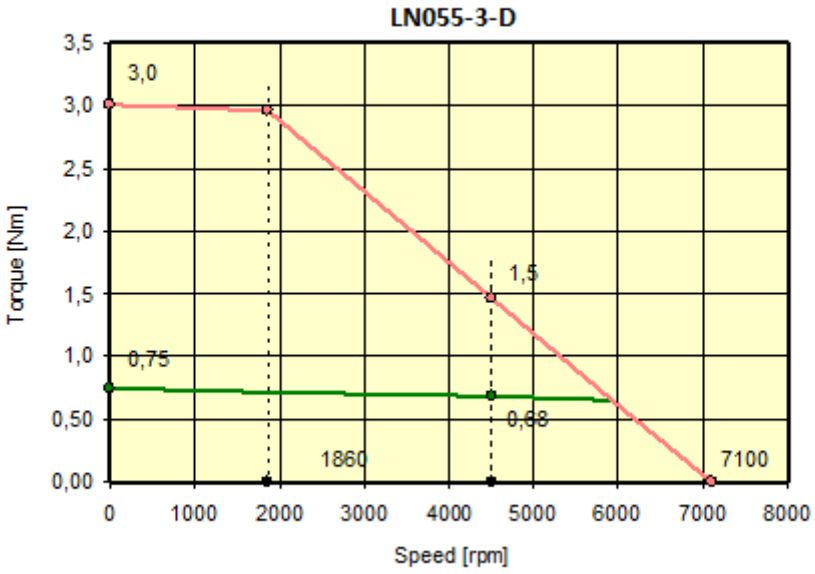


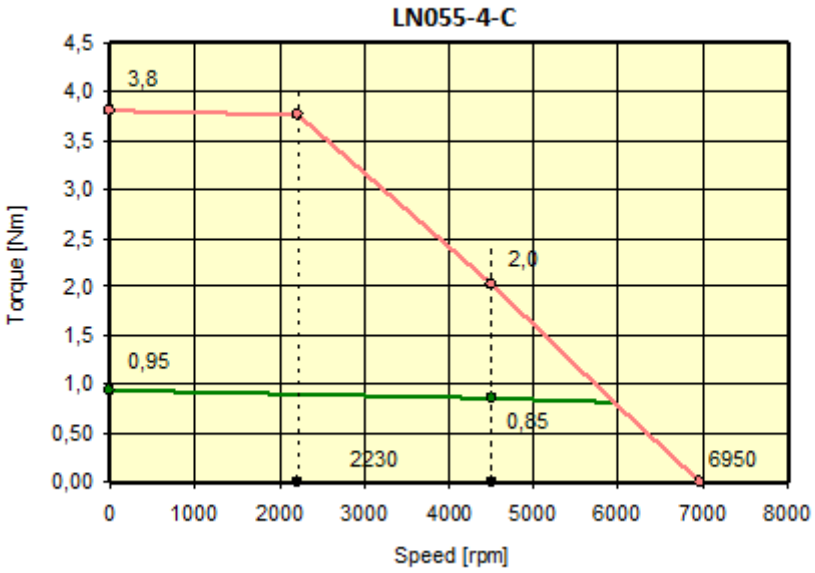


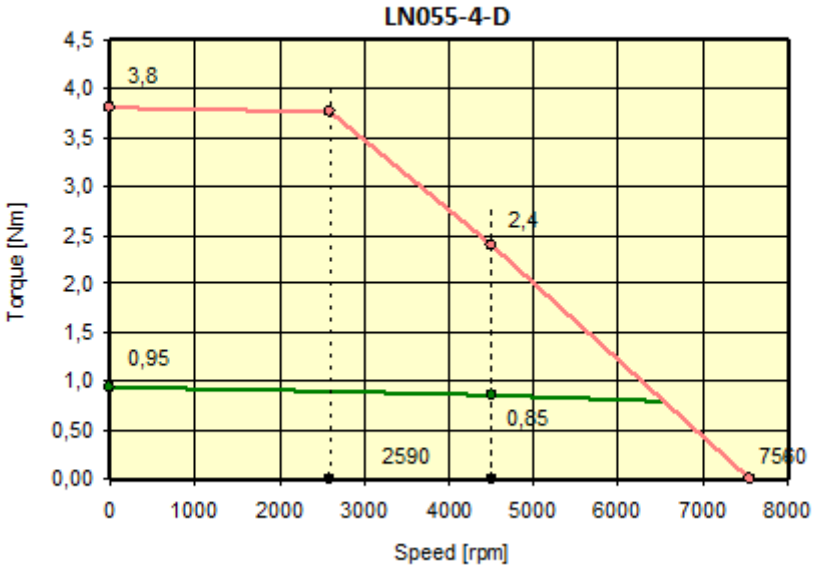

LN055-2-C
Torque [Nm]
Speed [rpm]
2,5
2,0
1,5
1,0
0,50
0,00
0
2000
4000
6000
8000
10000
2,2
1,1
0,54
0,48
1520
7740


LN055-2-D
Torque [Nm]
Speed [rpm]
2,5
2,0
1,5
1,0
0,50
0,00
0
2000
4000
6000
8000
10000
12000
2,2
1,8
0,54
0,48
3530
10710

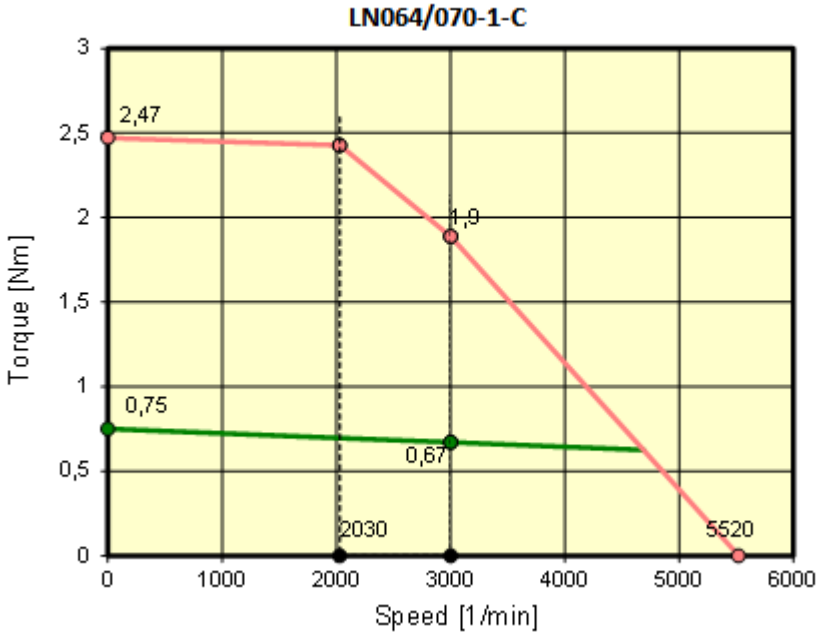

LN055-3-C
Torque [Nm]
Speed [rpm]
3,0
1,6
0,75
0,68
2050
7380
3,5
3,0
2,5
2,0
1,5
1,0
0,50
0,00
0
1000
2000
3000
4000
5000
6000
7000
8000

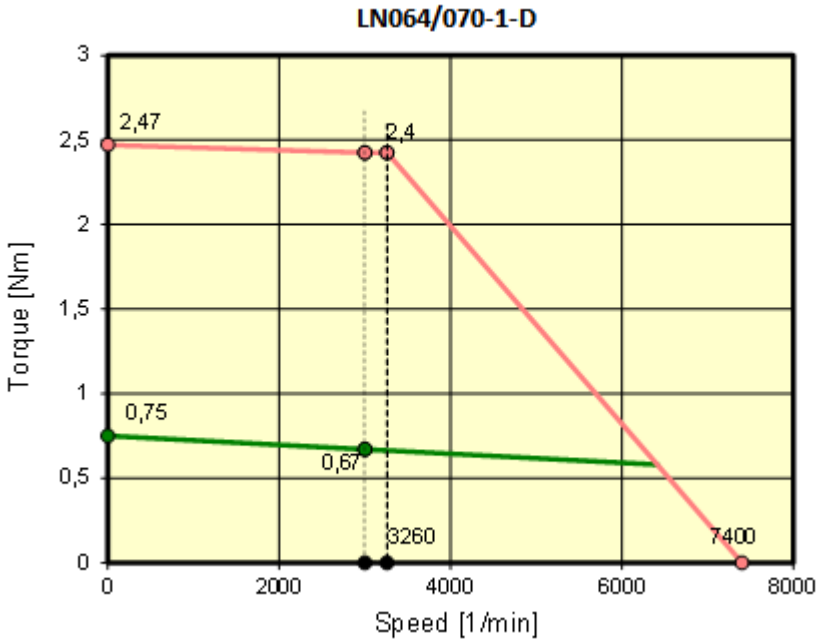

LN055-3-D
Torque [Nm]
Speed [rpm]
3,0
1,5
0,75
0,68
1860
7100
3,5
3,0
2,5
2,0
1,5
1,0
0,50
0,00
0
1000
2000
3000
4000
5000
6000
7000
8000

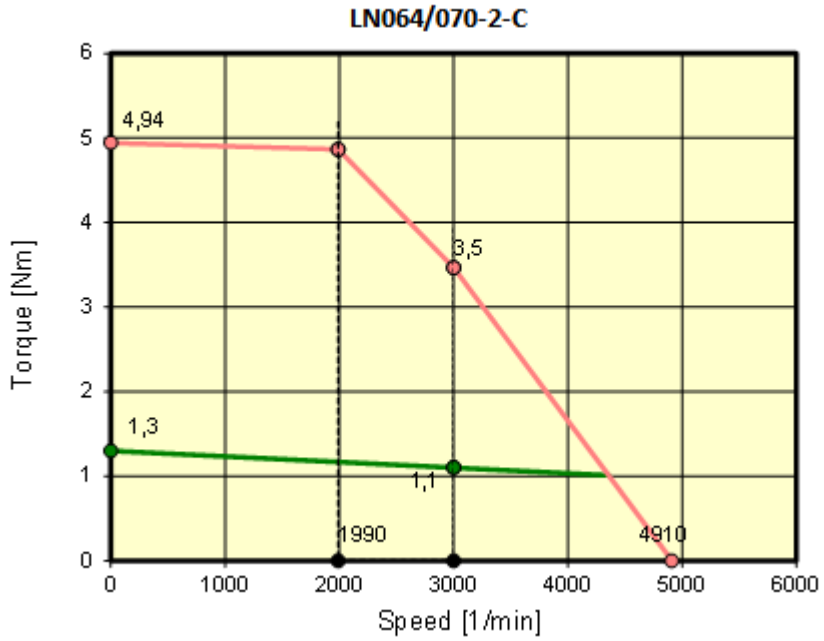

LN055-4-C
Torque [Nm]
Speed [rpm]
3,8
2,0
0,95
0,85
2230
6950
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,50
0,00
0
1000
2000
3000
4000
5000
6000
7000
8000

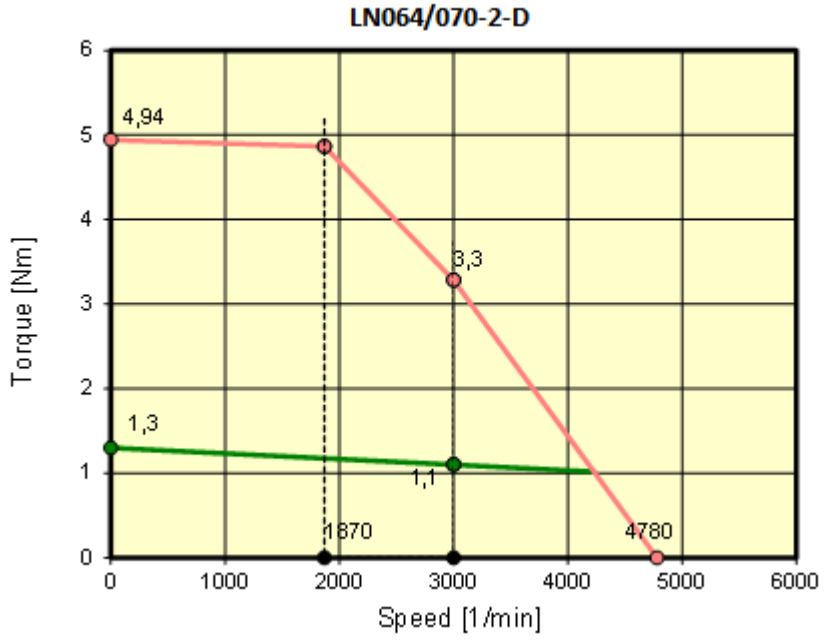

LN055-4-D
Torque [Nm]
Speed [rpm]
3,8
2,4
0,95
0,85
2590
7560
4,5
4,0
3,5
3,0
2,5
2,0
1,5
1,0
0,50
0,00
0
1000
2000
3000
4000
5000
6000
7000
8000

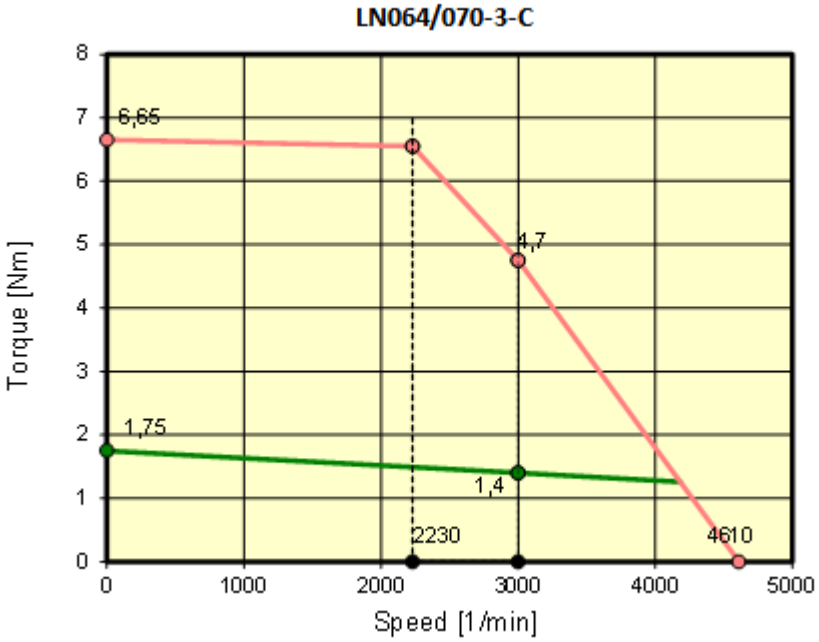
17.2. Serie LN064/070 [Udc 320 / 560V]

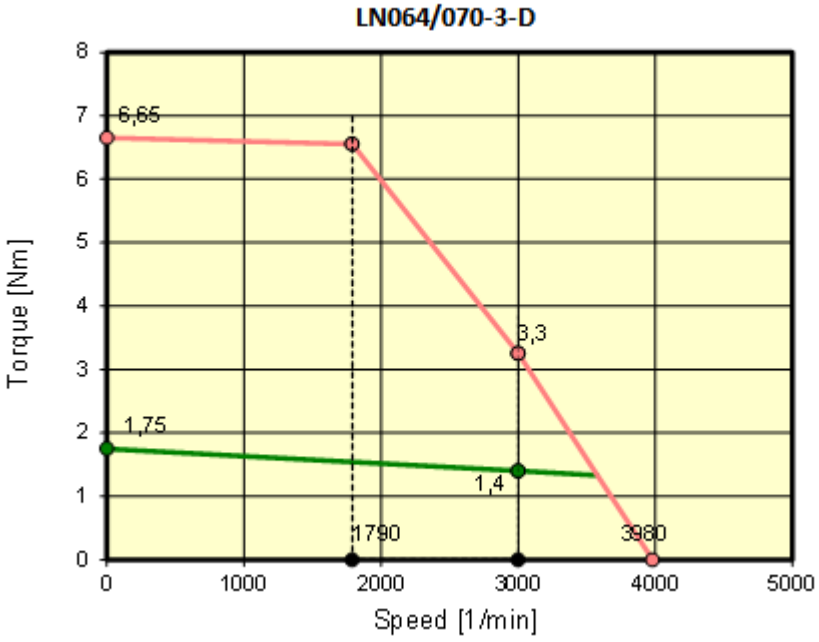


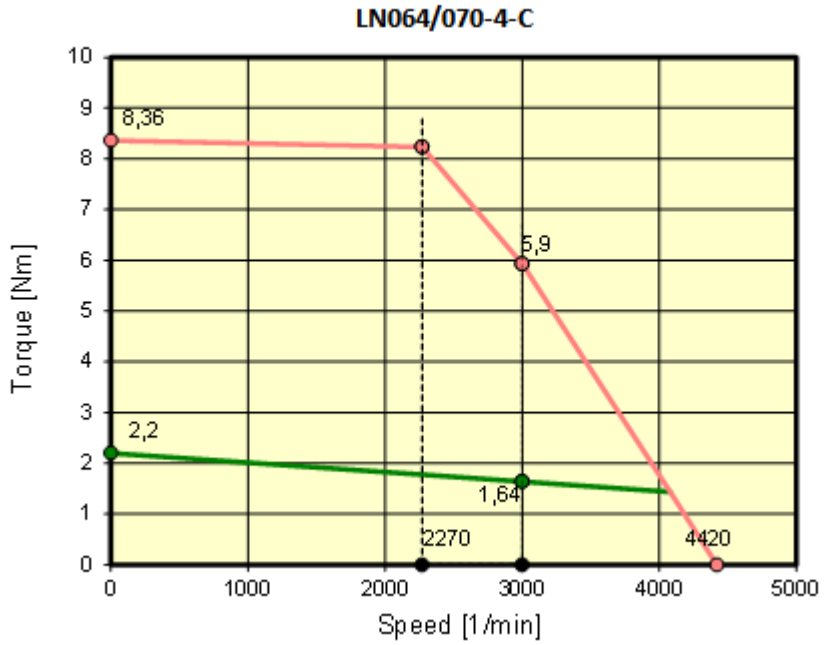


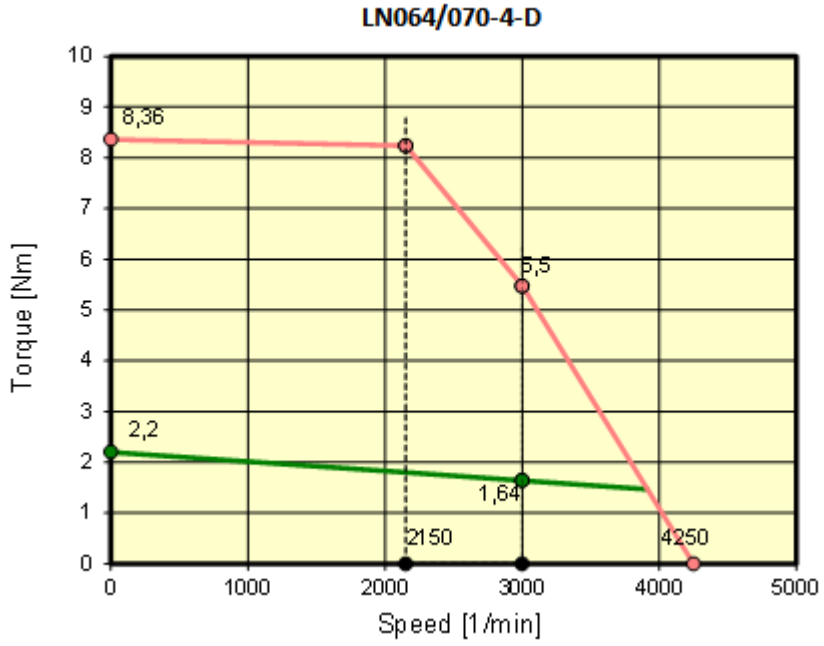

LN064/070-2-C
Torque [Nm]
Speed [1/min]
4,94
3,5
1,3
1,1
1990
4910
0
1000
2000
3000
4000
5000
6000
1
2
3
4
5
6

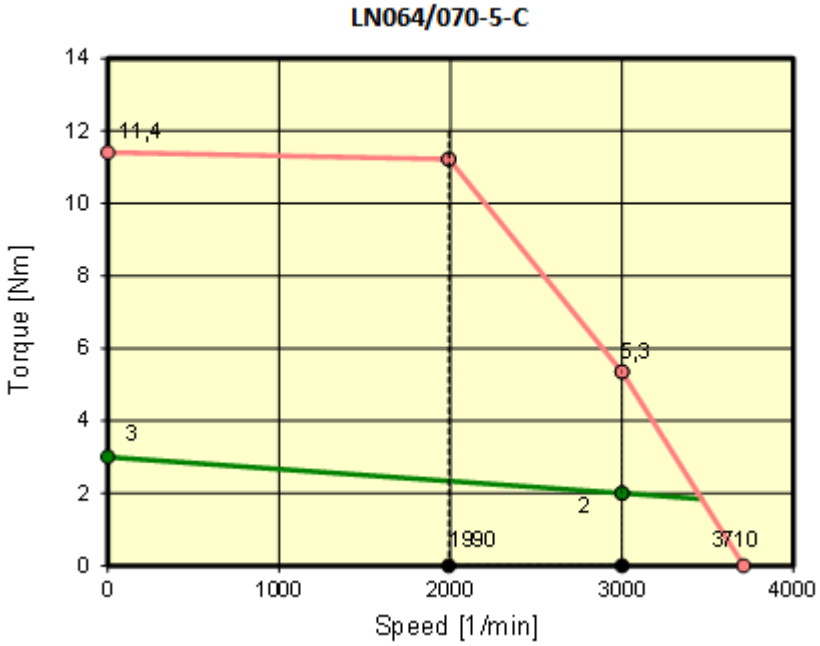

LN064/070-2-D
Torque [Nm]
Speed [1/min]
4,94
3,3
1,3
1,1
1870
4780
0
1000
2000
3000
4000
5000
6000
1
2
3
4
5
6

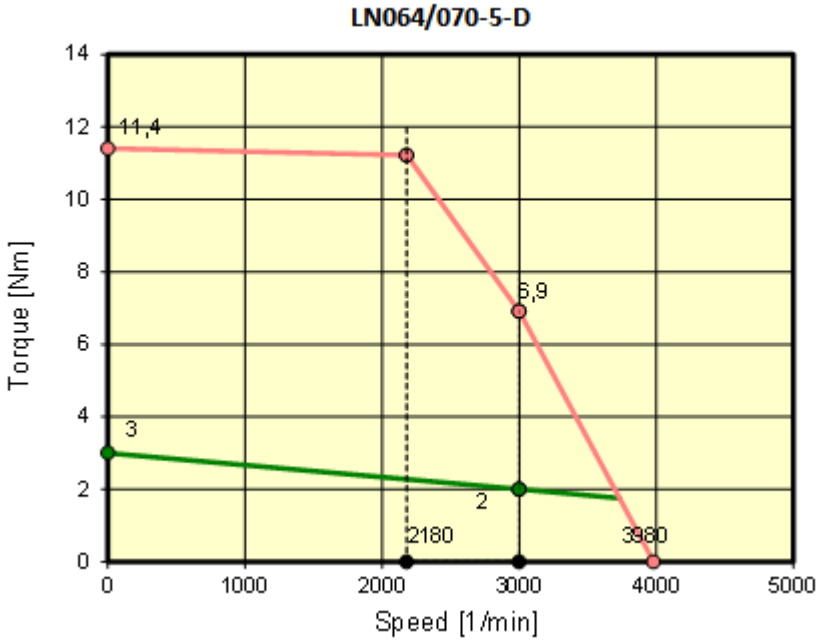

LN064/070-3-C
Torque [Nm]
Speed [1/min]
6,65
4,7
1,75
1,4
2230
4610
0
1000
2000
3000
4000
5000
1
2
3
4
5
6
7
8


LN064/070-3-D
Torque [Nm]
Speed [1/min]
6,65
3,3
1,75
1,4
1790
3980
0
1000
2000
3000
4000
5000
1
2
3
4
5
6
7
8

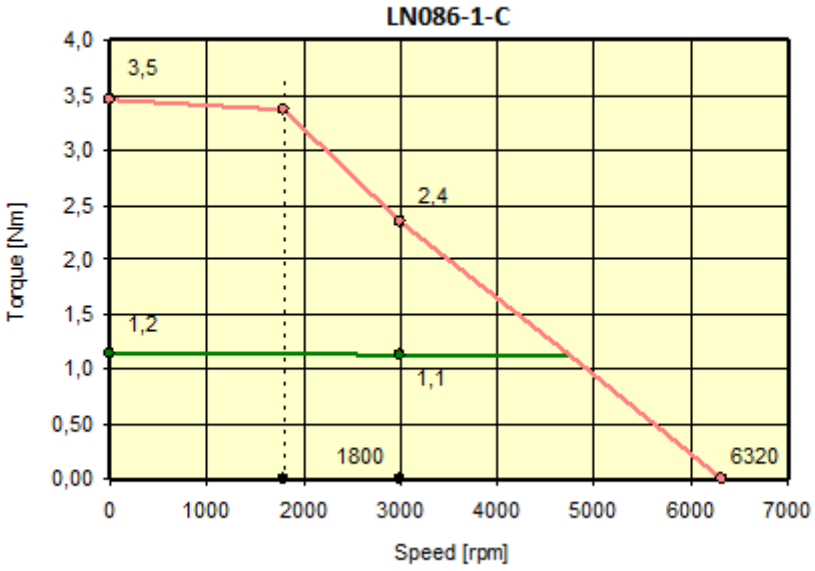

LN064/070-4-C
Torque [Nm]
Speed [1/min]
8,36
5,9
2,2
1,64
2270
4420
0
1000
2000
3000
4000
5000
1
2
3
4
5
6
7
8
9
10

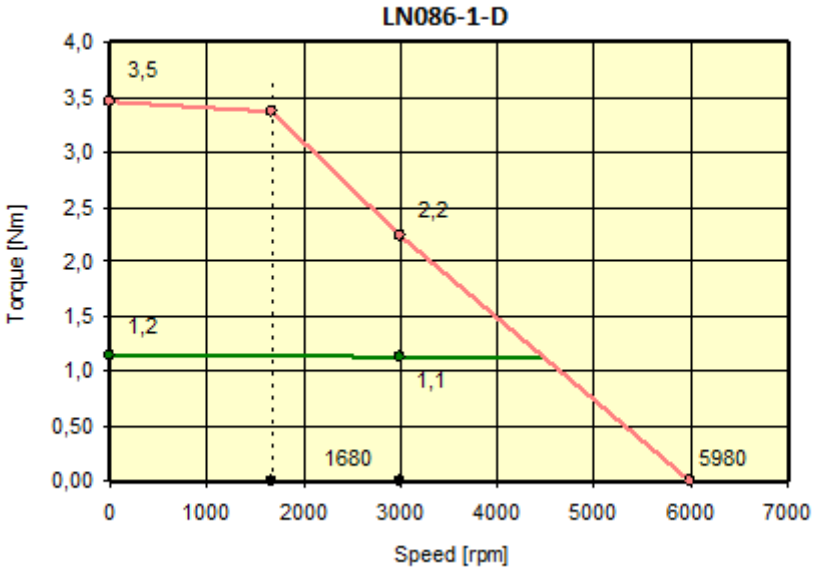

LN064/070-4-D
Torque [Nm]
Speed [1/min]
8,36
5,5
2,2
1,64
2150
4250
0
1000
2000
3000
4000
5000
1
2
3
4
5
6
7
8
9
10

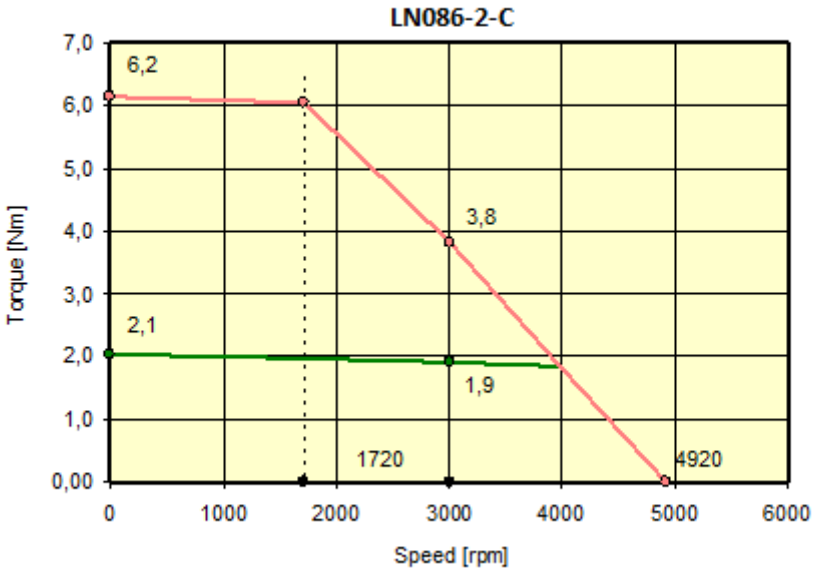

LN064/070-5-C
Torque [Nm]
Speed [1/min]
11,4
5,3
3
2
1990
3710
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000

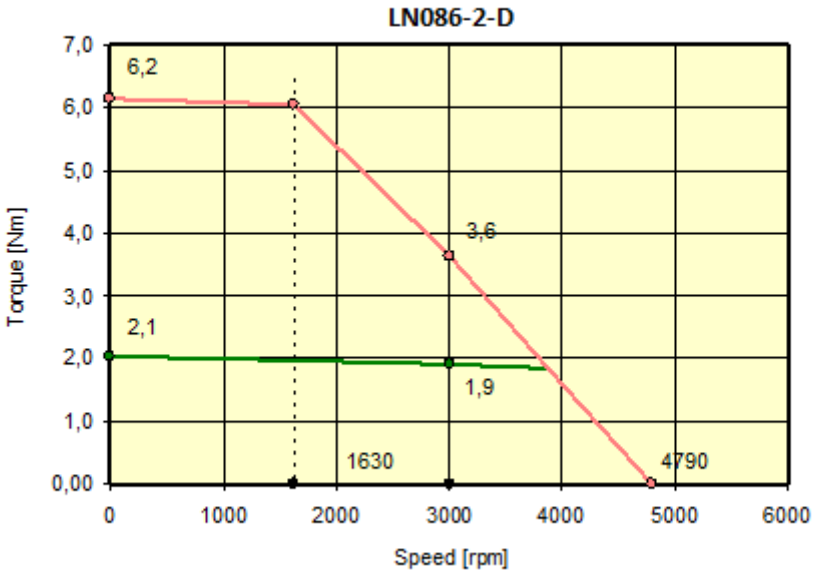

LN064/070-5-D
Torque [Nm]
Speed [1/min]
11,4
6,9
3
2
2180
3980
0
2
4
6
8
10
12
14
0
1000
2000
3000
4000
5000

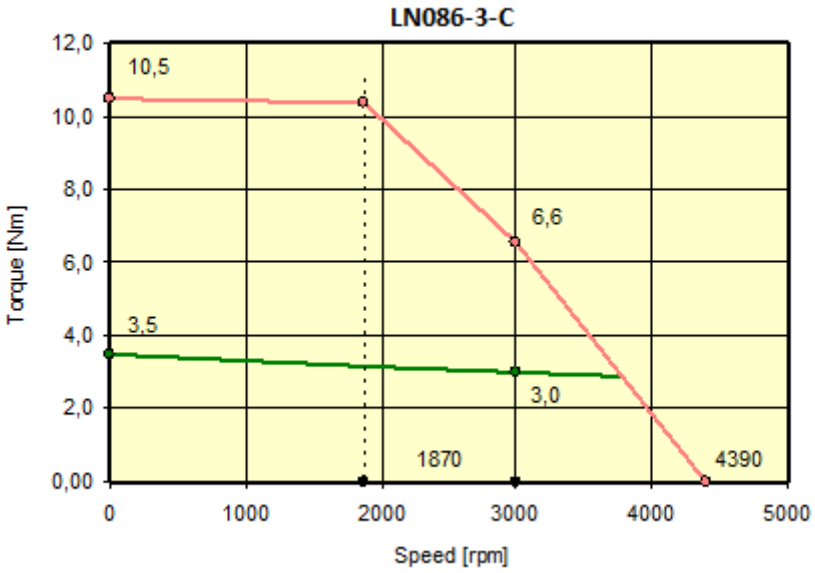
17.3. Serie LN086 [Udc 320 / 560V]

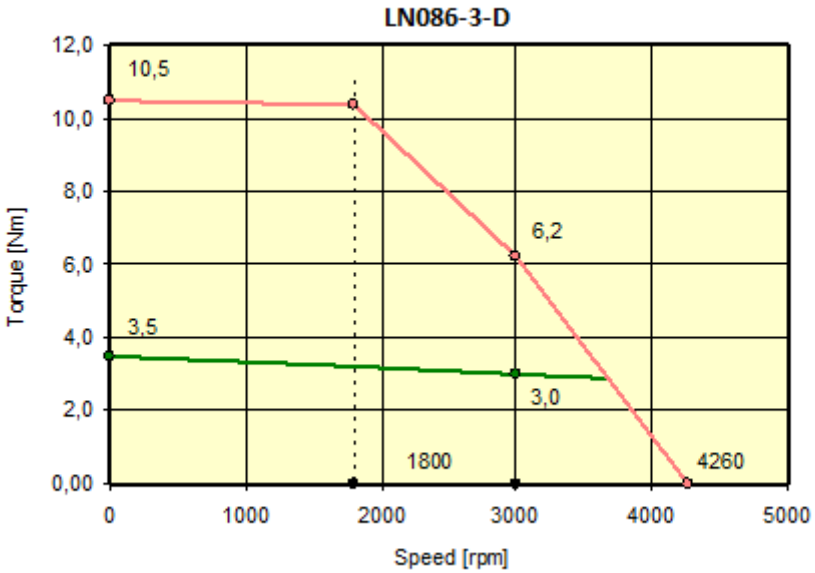


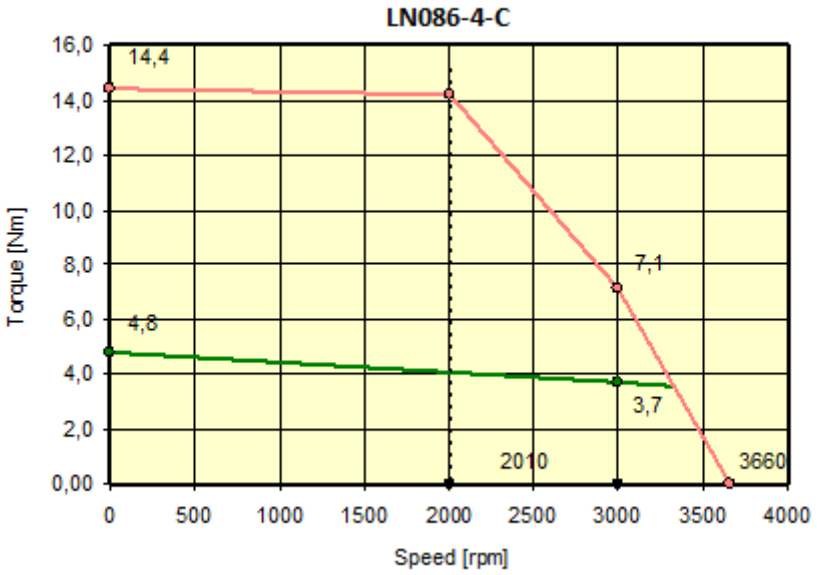


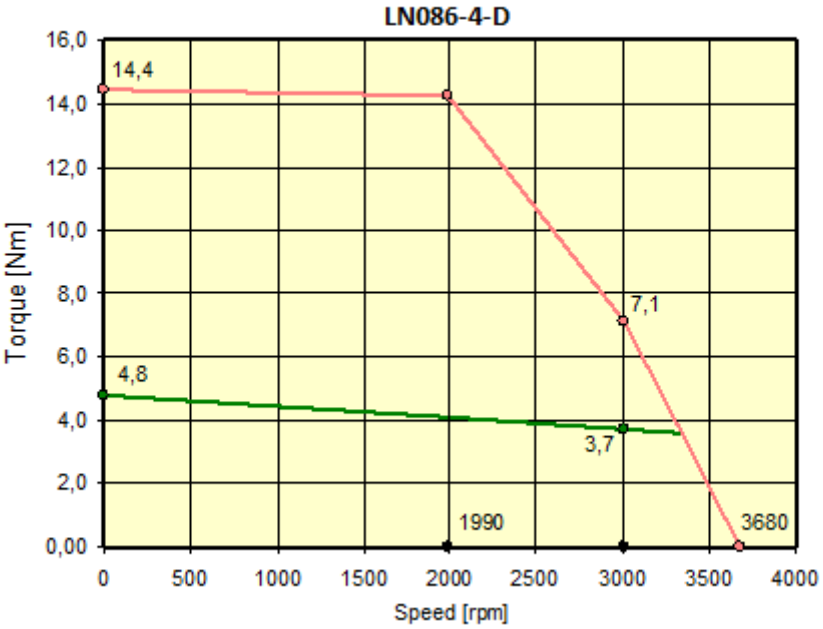

LN086-2-C
Torque [Nm]
Speed [rpm]
6,2
3,8
2,1
1,9
1720
4920
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,00
0
1000
2000
3000
4000
5000
6000


LN086-2-D
Torque [Nm]
Speed [rpm]
6,2
3,6
2,1
1,9
1630
4790
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,00
0
1000
2000
3000
4000
5000
6000

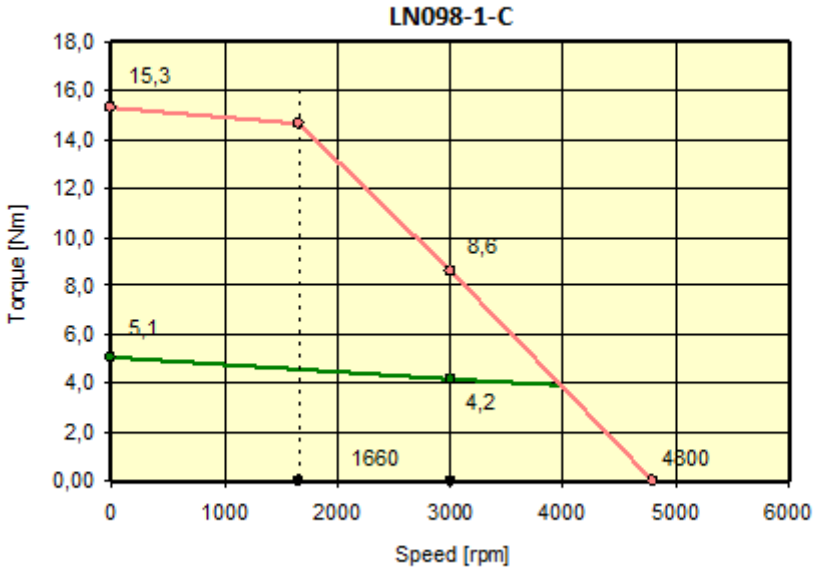

LN086-3-C
12,0
10,0
8,0
6,0
4,0
2,0
0,00
Torque [Nm]
10,5
6,6
3,5
3,0
1870
4390
0
1000
2000
3000
4000
5000
Speed [rpm]

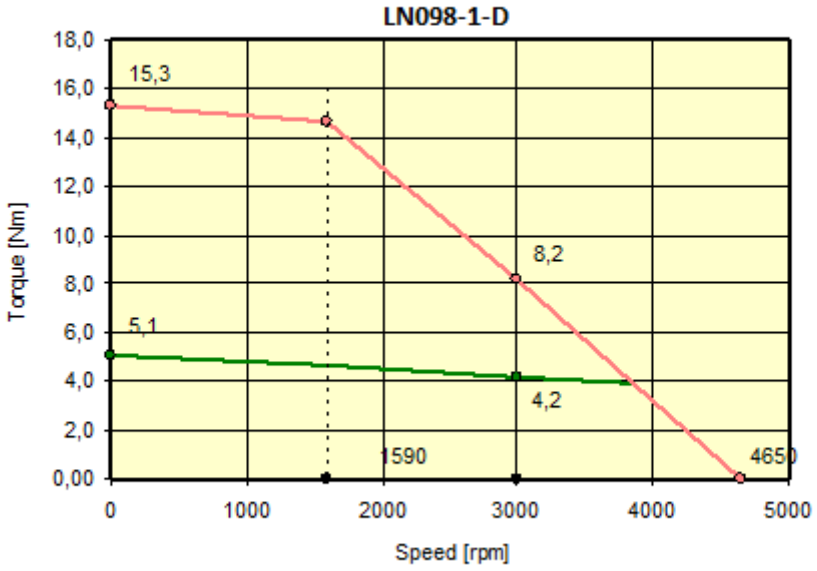

LN086-3-D
12,0
10,0
8,0
6,0
4,0
2,0
0,00
Torque [Nm]
10,5
6,2
3,5
3,0
1800
4260
0
1000
2000
3000
4000
5000
Speed [rpm]

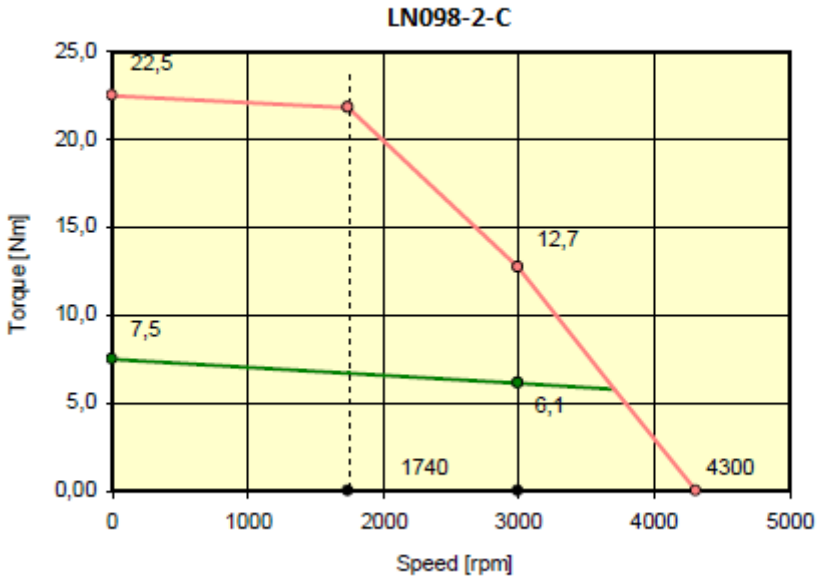

LN086-4-C
Torque [Nm]
16,0
14,0
12,0
10,0
8,0
6,0
4,0
2,0
0,00
14,4
7,1
4,8
3,7
2010
3660
0
500
1000
1500
2000
2500
3000
3500
4000
Speed [rpm]

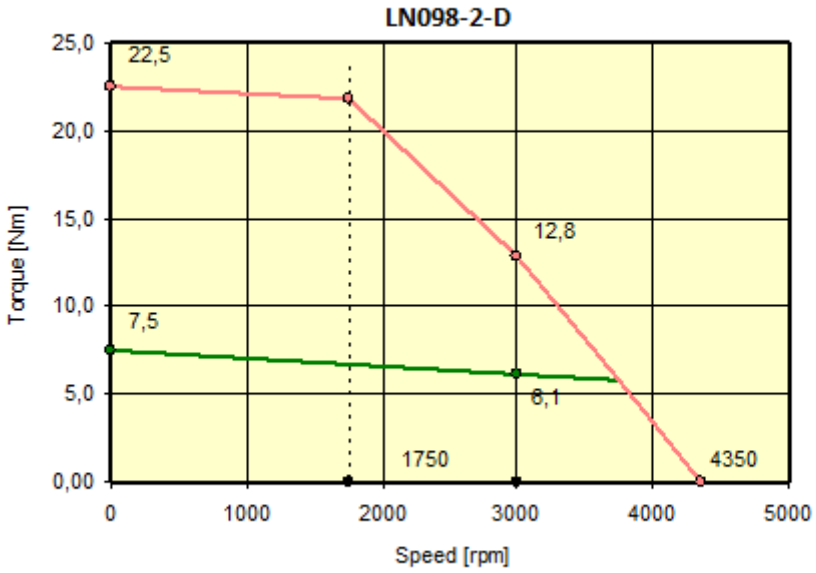

LN086-4-D
Torque [Nm]
16,0
14,0
12,0
10,0
8,0
6,0
4,0
2,0
0,00
14,4
7,1
4,8
3,7
1990
3680
0
500
1000
1500
2000
2500
3000
3500
4000
Speed [rpm]

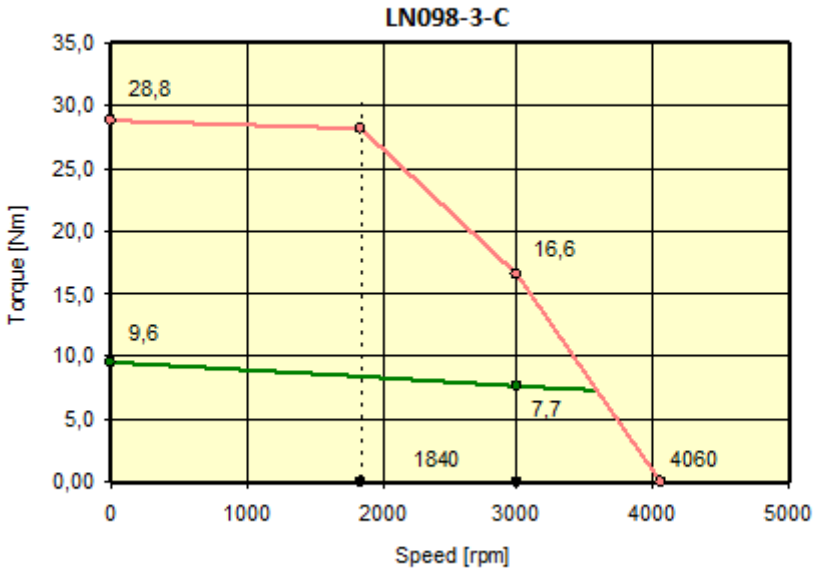
17.4. Serie LN098 [Udc 320 / 560V]

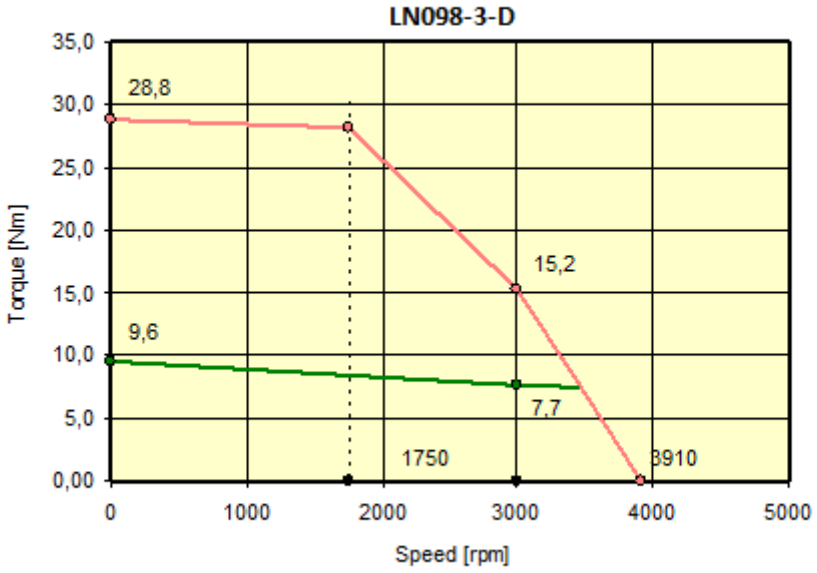


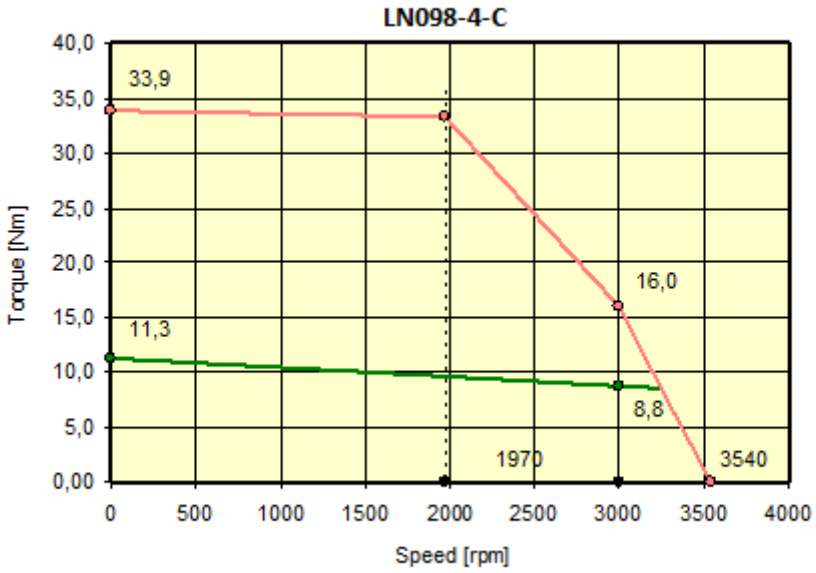


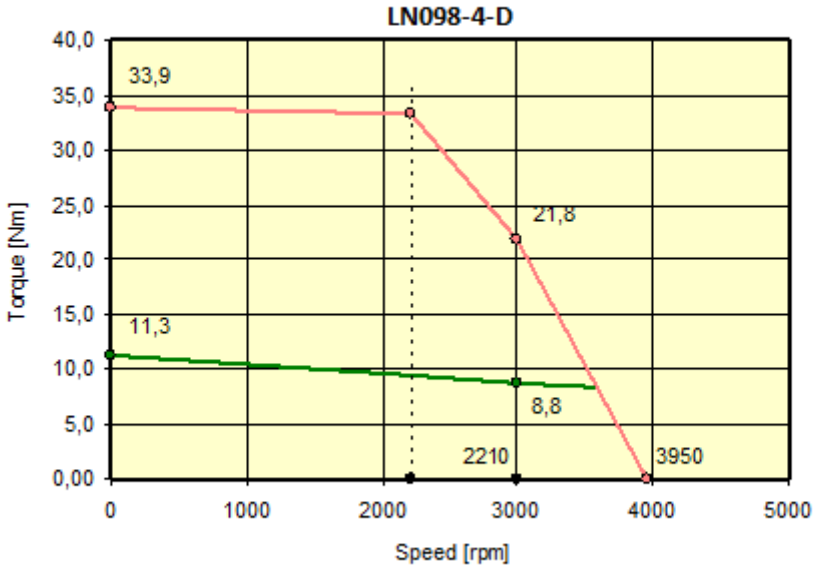

LN098-2-C
25,0
20,0
15,0
10,0
5,0
0,00
Torque [Nm]
22,5
12,7
7,5
6,1
1740
4300
0
1000
2000
3000
4000
5000
Speed [rpm]


LN098-2-D
25,0
20,0
15,0
10,0
5,0
0,00
Torque [Nm]
22,5
12,8
7,5
6,1
1750
4350
0
1000
2000
3000
4000
5000
Speed [rpm]

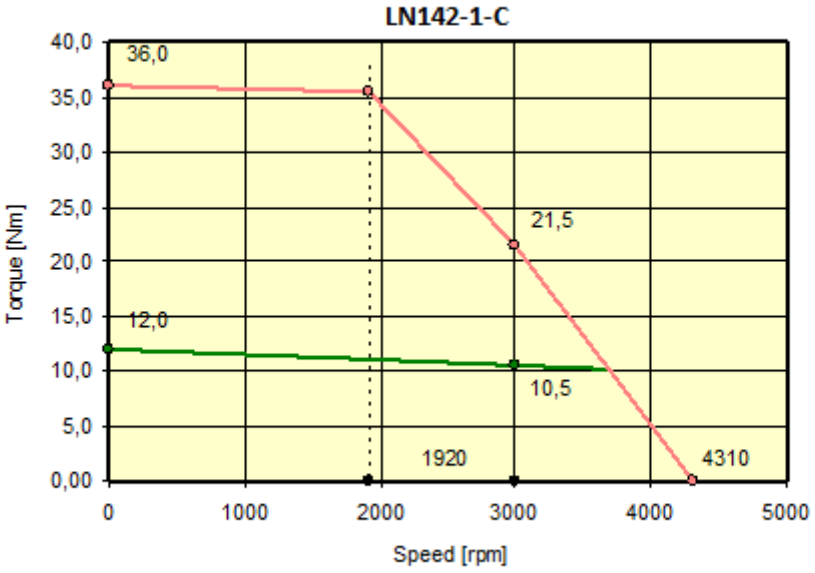

LN098-3-C
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,00
Torque [Nm]
28,8
16,6
9,6
7,7
1840
4060
0
1000
2000
3000
4000
5000
Speed [rpm]

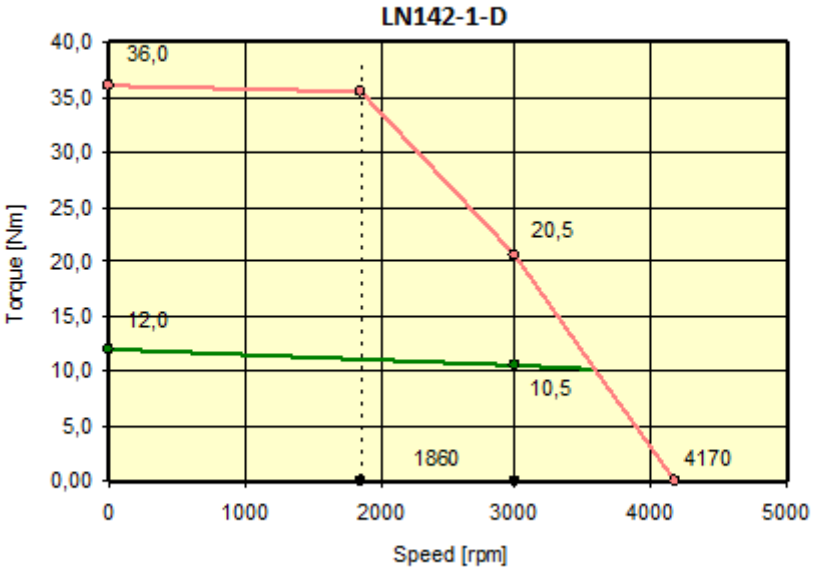

LN098-3-D
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,00
Torque [Nm]
28,8
15,2
9,6
7,7
1750
3910
0
1000
2000
3000
4000
5000
Speed [rpm]

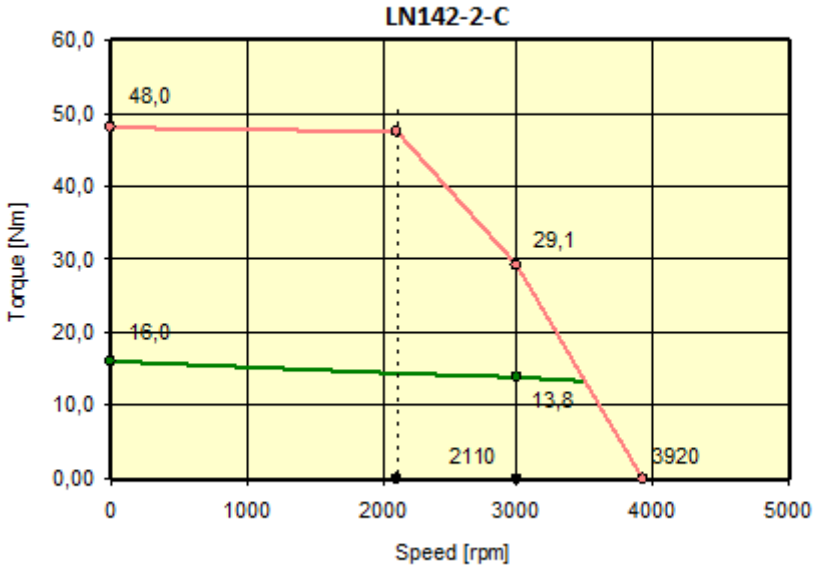

LN098-4-C
Torque [Nm]
Speed [rpm]
33,9
16,0
11,3
8,8
1970
3540
40,0
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,00
0
500
1000
1500
2000
2500
3000
3500
4000

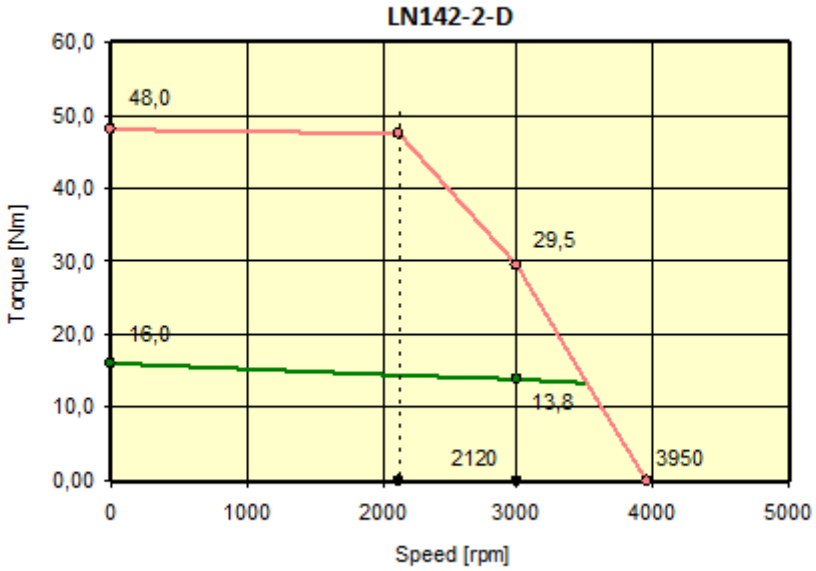

LN098-4-D
Torque [Nm]
Speed [rpm]
33,9
21,8
11,3
8,8
2210
3950
40,0
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,00
0
1000
2000
3000
4000
5000

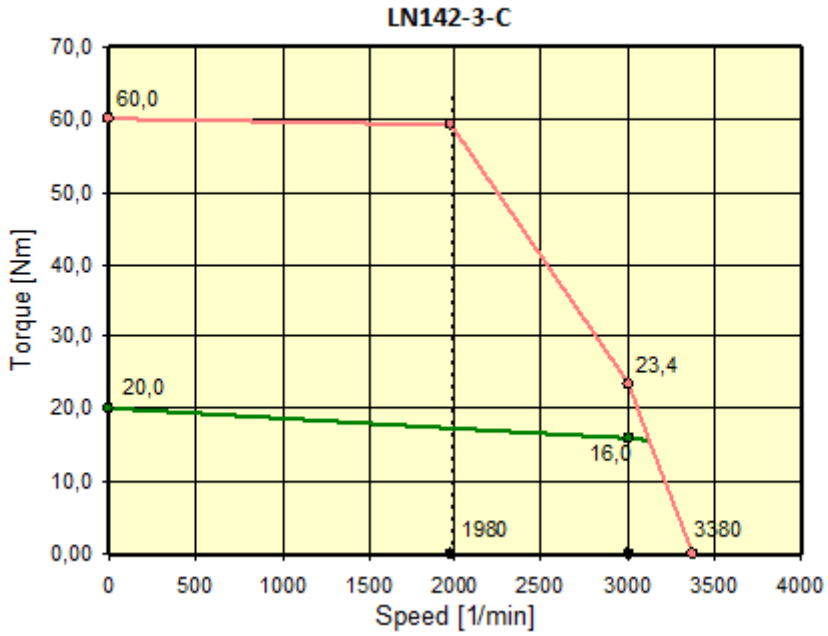
17.5. Serie LN142 [Udc 320 / 560V]

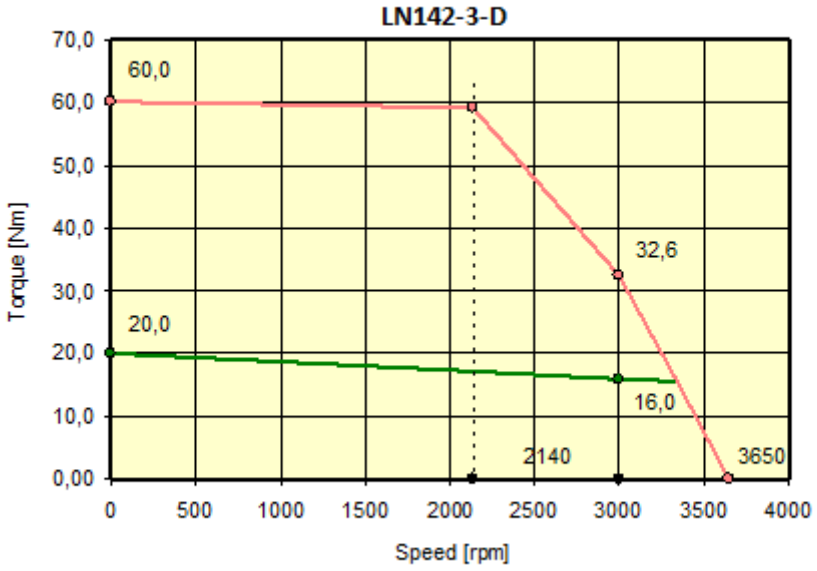


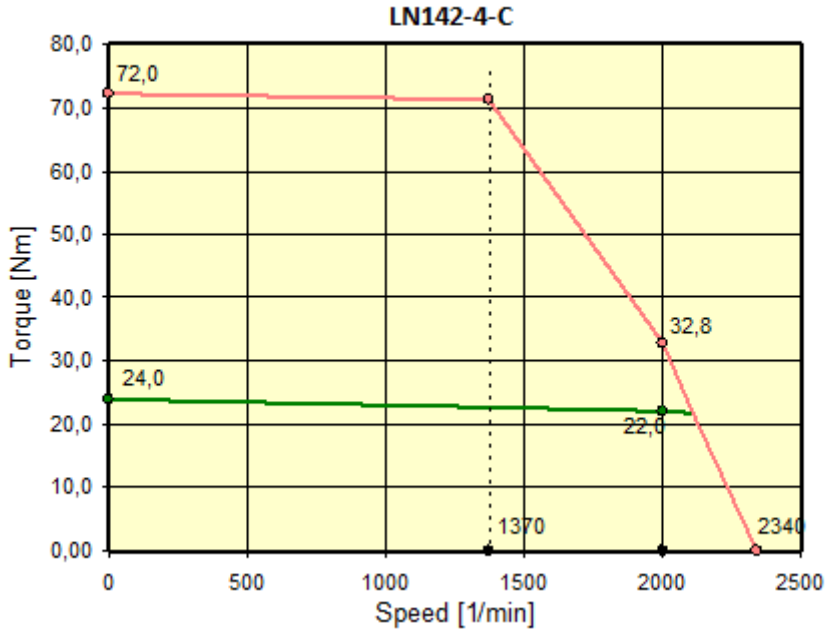



LN142-2-C
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
48,0
29,1
16,0
13,8
2110
3920
0
1000
2000
3000
4000
5000
Speed [rpm]


LN142-2-D
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
48,0
29,5
16,0
13,8
2120
3950
0
1000
2000
3000
4000
5000
Speed [rpm]

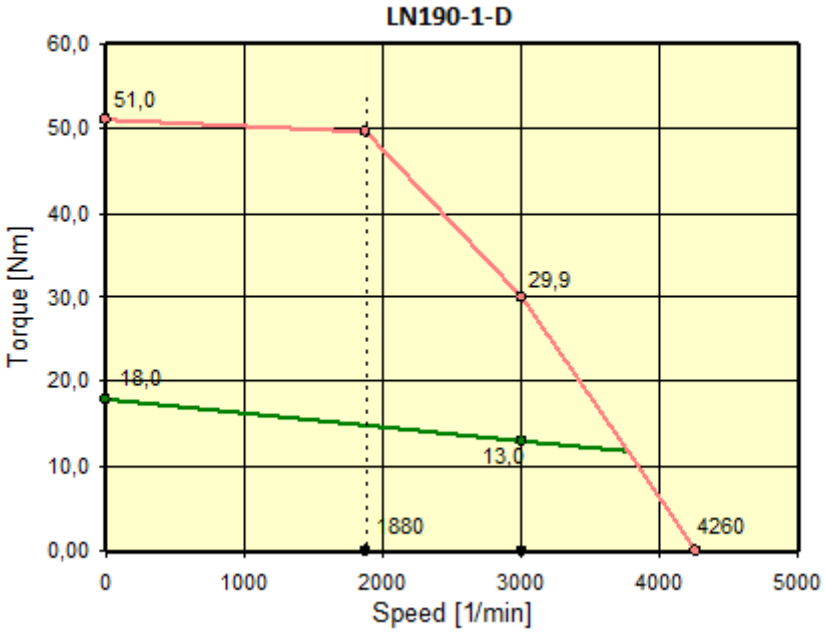

LN142-3-C
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
60,0
20,0
23,4
16,0
1980
3380
0
500
1000
1500
2000
2500
3000
3500
4000
Speed [1/min]

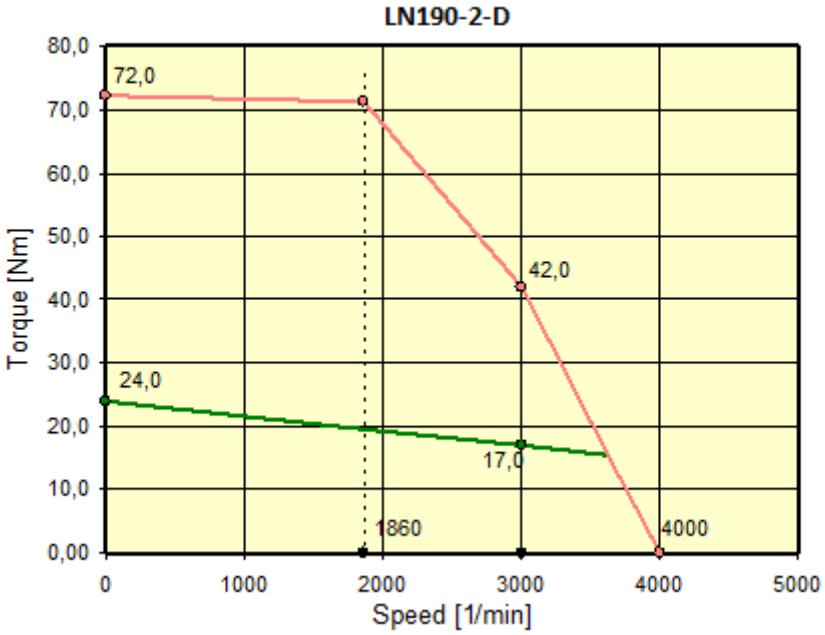

LN142-3-D
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
60,0
20,0
32,6
16,0
2140
3650
0
500
1000
1500
2000
2500
3000
3500
4000
Speed [rpm]

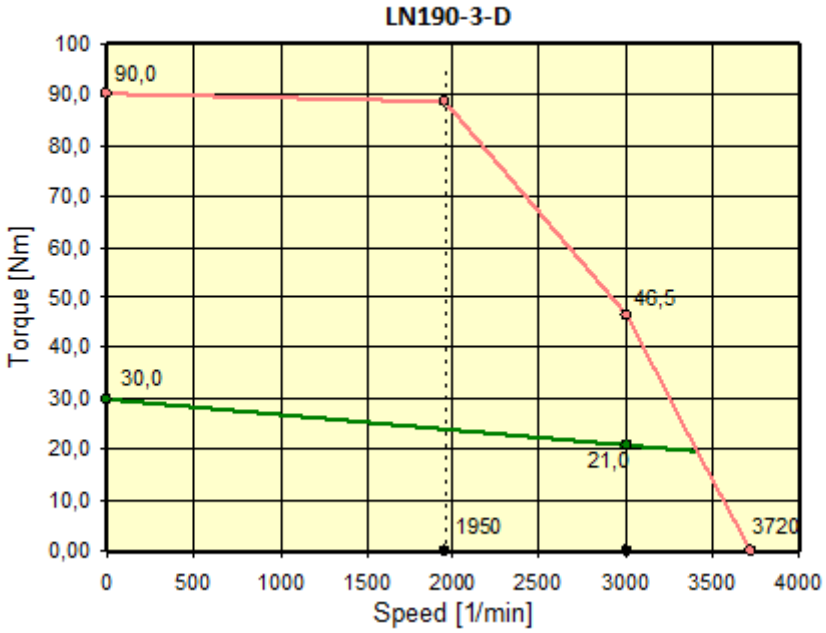

LN142-4-C
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
72,0
32,8
24,0
22,0
1370
2340
0
500
1000
1500
2000
2500
Speed [1/min]

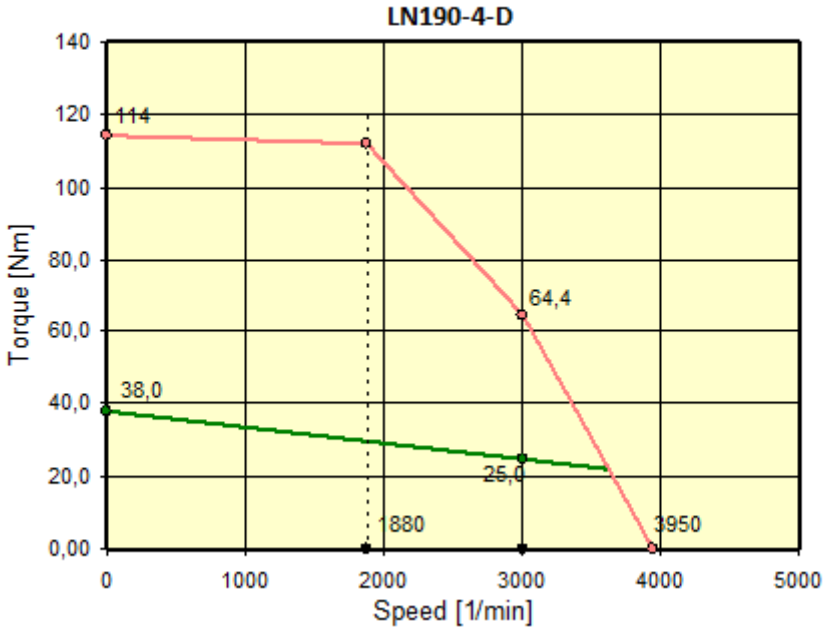

LN142-4-D
80,0
70,0
60,0
50,0
40,0
30,0
20,0
10,0
0,00
Torque [Nm]
72,0
41,0
24,0
20,0
2200
3650
0
500
1000
1500
2000
2500
3000
3500
4000
Speed [rpm]

17.6. Serie LN190 [Udc 560V]

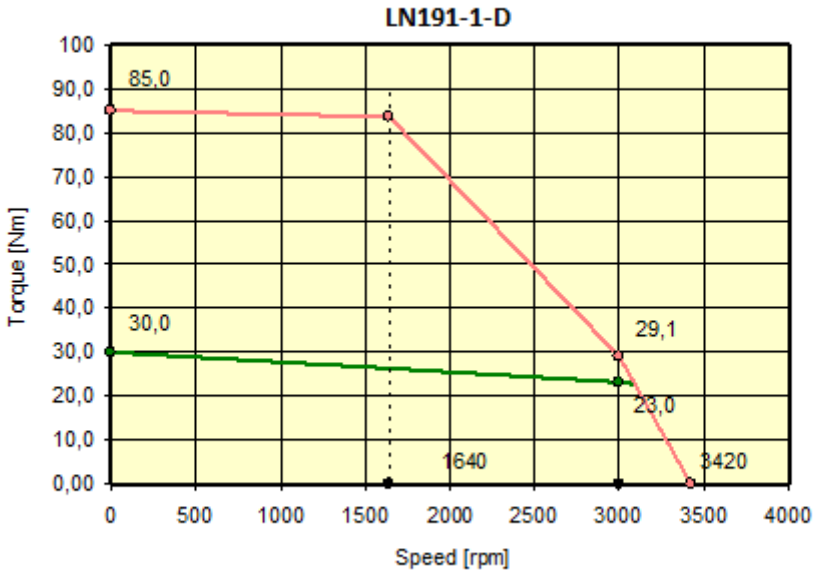


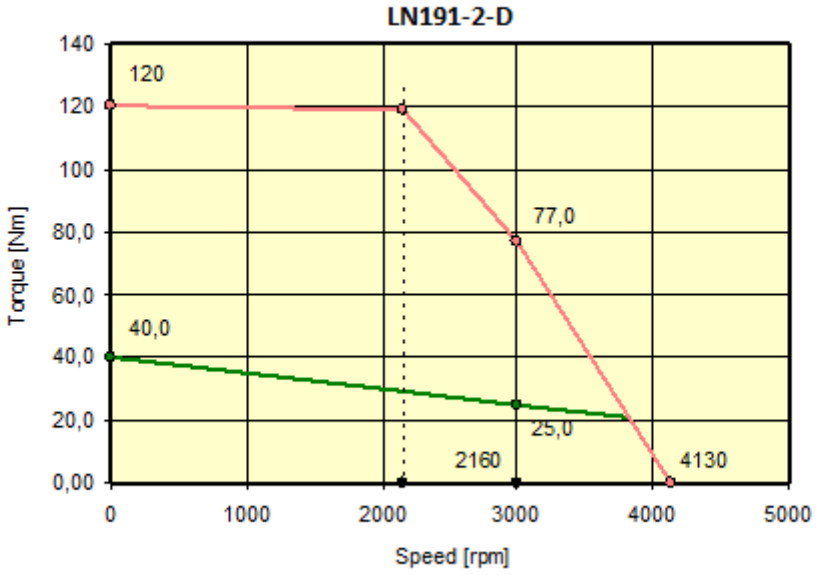


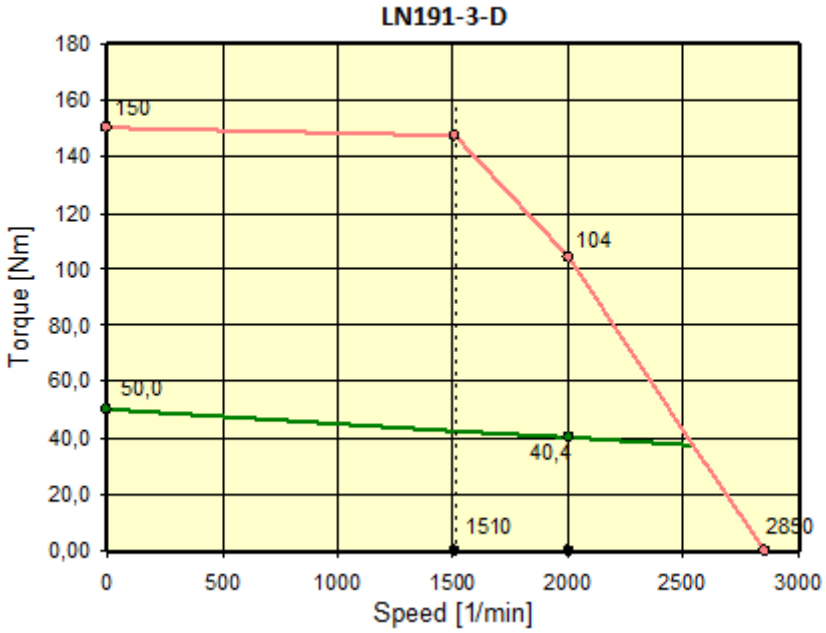

LN190-3-D
Torque [Nm]
Speed [1/min]
90,0
46,5
30,0
21,0
1950
3720

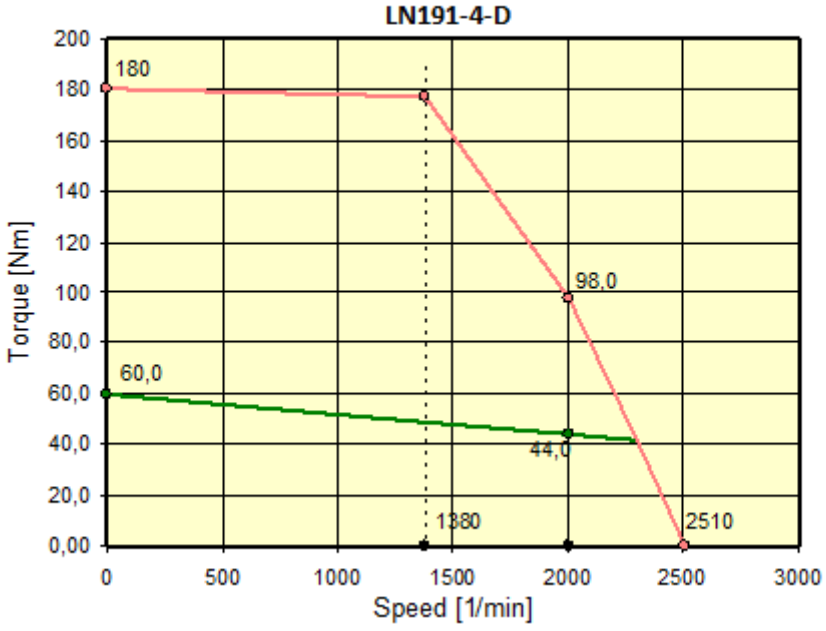

LN190-4-D
Torque [Nm]
Speed [1/min]
114
64,4
38,0
25,0
1880
3950

17.7. Serie LN191 [Udc 560V]






LN191-3-D
Torque [Nm]
Speed [1/min]
150
104
50,0
40,4
1510
2850
180
160
140
120
100
80,0
60,0
40,0
20,0
0,00
0
500
1000
1500
2000
2500
3000


LN191-4-D
Torque [Nm]
Speed [1/min]
180
98,0
60,0
44,0
1380
2510
200
180
160
140
120
100
80,0
60,0
40,0
20,0
0,00
0
500
1000
1500
2000
2500
3000

Contact

INFRANOR SA
Althardstrasse 158
CH-8105 Regensdorf
Phone +41 44 308 50 00
Fax +41 44 308 50 09

www.infranor.ch
info.ch@infranor.com

INFRANOR SA
Aux Champs Carroz 7
CH-1169 Yens
Phone +41 44 308 50 05

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