

Movinor[®] Low Voltage

Synchronous Servomotors

T037 – T055 – T0886 – T098



Range of synchronous - motors

T motor range:

The brushless synchronous servomotors with conventional 6-pole stator are built and designed completely new. The modern concept of the magnetic circuit, winding and isolation creates torque reserves and increases the lifetime considerably. This concept offers a wide range of options, such as additional inertia. It is also possible to request special customizations for this motor range.

T motor range	Flange	Stall torque (Mo [Nm])			
T037-1-2-3	37 mm	0,1	0,2	0,3	
T055-1-2-3-4	55 mm	0,2	0,4	0,6	0,8
T086-1-2-3-4	86 mm	0,65	1,3	2,5	3,0
T098-1-2	98 mm	2,6	5,3		

N motor range:

This motor range with stators manufactured in pole winding technology is extremely compact. An optimized mechanical construction and stronger magnets result in an increase of power-density of 40% compared to the T motor range, depending on frame size and motor length. The choice of options is wide, however less than for the T motor range.

N motor range	Flange	Stall torque (Mo [Nm])			
N055-1-2-3-4	55 mm	0,28	0,54	0,75	0,95
N086-1	86 mm	1,15			

Legend of the present manual

Version	Reason
01-2021	New type code T & N range (former LN-LT motor range, see chapter 16)
02-2021	Registered trademark
01-2022	Type code: more elements & optimization of the manual layout
02-2022	Note about brake maintenance
03-2022	Specific chapter about brake maintenance, see chapter 3.3.7

Improvement of motors subject to technical alterations.

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Safety advices



- All operations on transport, assembly, setup and maintenance have to be done by skilled and qualified personnel. The qualified personnel must know and observe the following standards and guidelines:

DIN VDE 0105, IEC 364, accident prevention regulations



Improper conduct may cause serious injury to persons and lead to damage.

- Before mounting and putting into operation read carefully 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 earth of the motor frame 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 be live, when motor is not rotating. Do not remove or pull off plugs during operation or power supply. This can lead to 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 on it. Before touching the motor make sure a temperature down below 40° C.
- **Insulation class F**
- **Winding temperature (permanent) max. 150°C**

Symbols used in this manual

	
General warning	Danger by electricity
Significance: actual bodily harm and damage may occur if the respective precautions will not be taken.	Significance: death, grievous bodily harm or considerable damage may occur, if the respective precautions will not be taken.

2. Important Notes

- Synchronous servomotors within the Low Voltage range are precision motors. They are not foreseen to be connected directly to a three-phase power. 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 wind up drive elements without backlash strictly use the foreseen thread within the motor shaft and if possible warm up the drive elements. Only use suitable aids to wind up 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.
- When using toothed belts strictly observe the permissible radial forces. A too high radial load on the shaft will shorten live of the motor considerably.
- If possible avoid an axial load on the motor shaft. An axial load shortens live of the motor considerably.
- Setting the correct number of poles of the motor and the resolver to the power stage is absolutely necessary. A wrong setting can lead to the destruction of the motor and to overheating.

T motor range	Motor poles	Resolver poles
T037–T098	6	2

N motor range	Motor poles	Resolver poles
N055	6	2
N086	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:

$$\text{Heat sink length in mm} = 2,5 \times \text{size of flange in mm}$$

Example: heat sink for T055-2 motor = 2,5 x 55mm = 137,5mm. Result for the T055-motor series is a heat sink of 137,5mm x 137,5mm x 3,5mm.

3. In general

3.1. About this manual

This manual describes the synchronous servomotors of the Low Voltage range and it is directed towards specialist 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.

3.2. Use in accordance with the requirements

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 Low Voltage range are **exclusively** designed to be operated speed and / or torque controlled by suitable power stages.

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 built inside the motor winding has to be analyzed and observed.

3.3. Motor Construction

The synchronous servomotors in the Low Voltage range are brushless **permanent magnet** synchronous motors with sinusoidal back EMF.

In connection with the according power stages they are particularly suitable for high – quality servo applications, for example positioning, demanding high standards of dynamics and stability.

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

The motors have a 2-pole built-in resolver as feedback.

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

3.3.1. A-Side Shaft

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 number of rotations.

The crest value at 3000 rpm is shown in the chart below. In case of acting force at the middle of the free shaft end, FR can be above 10%.

The axial force FA is not allowed to exceed FR/3.

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

Motor type	F _{Rmax} [N]	F _{Amax} [N]	Motor type	F _{Rmax} [N]	F _{Amax} [N]
T037-1	89	17	N055-1	232	44
T037-2	91	17	N055-2	242	46
T037-3	93	17	N055-3	249	47
T055-1	232	44	N055-4	252	48
T055-2	242	46	N086-1	370	70
T055-3	249	47			
T055-4	252	48			
T086-1	370	70			
T086-2	393	75			
T086-3	422	80			
T086-4	431	82			
T098-1	638	121			
T098-2	676	128			

3.3.2. Flange

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

Please take into account that all motors were tested with heat sinks which are essential for a proper heat abstraction.

3.3.3. Protective classification

The standard protective classification for all motors is IP65 (IP54 for T037).

3.3.4. Protection system

The motor series Low Voltage are fitted with a PTC. The thermal protection has to be integrated in the control system of the power stage. The PTC is relatively sluggish in action to quick temperature changes.

Operated according to the rated data the flange temperature is not allowed to exceed 65°C.

3.3.5. Standard connections

Motor type	Resolver	Power
T037 & T098-2	Flying leads	Flying leads
T055-T086-T098-1-N055-N086	Plug	Plug

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

3.3.6. Brake

The motors have the option of an installed brake. The permanent-magnet brake is operated by 24 VDC and blocks the rotor in power off state.

The brake is to be understood as a standstill brake and it is not to be used for permanent slow down during production. When brake is disengaged the rotor can operate without time lag, the operation is free from backlash.

The brakes can be operated directly by the power stage (no personal safety!). In this case the erasing of the brake winding is effected without additional external wiring.

If the brake is not directly operated by the power stage an additional wiring (for example varistor) has to be carried out.

A personal-safe application of the brake needs an additional normally-open contact within the brake circuit and then also an erasing device for the brake (for example varistor).

3.3.7. Maintenance running-in of the brake

If the brake is only used as a holding brake without dynamic load, the braking torque may drop. A new run in (refreshment) must be done within the scope of maintenance. A maintenance interval of 4 weeks is recommended for normal industrial applications:

Motor	T037	T/N055	T/N086	T098
Slip time / s	0.5			
Idle time / s	0.5			
Speed / rpm	250	200	100	100
Switchings	5	5	5	5

3.4. Selection criteria

- Stall torque M_0 [Nm]
- Rated speed at nominal power load 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.

3.5. DC bus voltage U_{dc}

This voltage defines the intermediate circuit voltage of the servo amplifier. For the motor series described in this manual the indicated voltage is 48VDC.

3.6. Motor length

The length is specified for motors with resolver and 0° straight or 90° angled connectors towards rear.

3.7. Basic type code for Movinor® Low Voltage

Field	1	2	3	4	5	6	7	8	9	10	11	12	13
Code	T	055	1	B	0	0	0	R01	B01	IP65	0	00	

- 1) **Motor type:** N, T
- 2) **Motor size:** 37, 55 & 86mm flange
- 3) **Torque & length size:** 1 for lower, 2 for second, etc.
- 4) **Winding (DC bus voltage):** B: 48VDC
- 5) **Shaft:** 0: standard without keyway
1: standard with keyway
- 6) **Front flange:** 0: standard
1: with shaft seal (IP-67 option)
- 7) **Brake:** 0: no
1: yes
2: no & inertia wheel (T range only)
3: yes & inertia wheel (T range only)
- 8) **Motor feedback:** N00: Sensorless
R01: resolver 2T (standard)
R02: resolver 2T safe mounting
H01: Singleturn Hiperface SEK34 (T037)
H02: Multiturn Hiperface SEL34 (T037)
H03: Singleturn Hiperface SEK37 (T & N055)
H04: Multiturn Hiperface SEL37 (T & N055)
H05: Singleturn Hiperface SKS36 (T & N055)

H06: Singleturn Hiperface SKS36S Safety (T & N055)
 H07: Multiturn Hiperface SKM36 (T & N055)
 H08: Multiturn Hiperface SKM36S SafetySKM36 (T & N055)
 H09: Singleturn Stegmann Hiperface SRS50 (T & N086, T098)
 H10: Singleturn Hiperface SRS50S Safety (T & N086, T098)
 H11: Multiturn Hiperface SRM50 (T & N086, T098)
 H12: Multiturn Hiperface SRM50S Safety (T & N086, T098)
 D01: Singleturn Hiperface-DSL EKS36 18-bit (all exp. T037)
 D02: Singleturn Hiperface-DSL EKS36 18-bit SIL2 (all exp. T037)
 D03: Multiturn Hiperface-DSL EKM36 18-bit (all exp. T037)
 D04: Multiturn Hiperface-DSL EKM36 18-bit SIL2 (all exp. T037)
 Q01: Incremental CFS50, 4096 (T & N086, T098)
 Q02: Incremental QM22, 2048 (T037)
 Q03: Incremental QM35, 6 pole, 2048 (all exp. T037)
 Q04: Incremental QM35, 6 pole, 8192 (all exp. T037)
 Q05: Incremental QM35, 10 pole, 2048 (all exp. T037)
 Q06: Incremental QM35, 10 pole, 8192 (all exp. T037)
 B01: BiSS-C AD34/1212AU..ONBVB 12-bit multiturns
 S01: SinCos incremental QR12 500ppr. without commutation signals

9) Connection, orientation: S: Straight
 F: Angled towards front
 B: Angled towards back
 R: Angled rotatable
 Y: Ytec rotatable double receptacle

Connection, pinout: 00: flying leads
 01: M23 resolver, Infranor standard
 02: M23 resolver, Mavilor FP compatible
 03: M23 Hiperface, Infranor standard
 04: M23 incremental, Infranor standard
 05: M23 Incremental, Mavilor FP compatible
 06: M23 Hiperface DSL, Infranor standard
 07: M23 sensorless, Infranor standard
 08: Ytec resolver, Infranor standard
 09: Ytec Hiperface, Infranor standard
 10: Ytec incremental, Infranor standard
 11: Ytec Hiperface, universal *
 12: Ytec incremental, universal *
 13: Ytec BiSS-C, Infranor standard
 14: M23 incremental, universal *
 15: M23 Hiperface, Mavilor FP compatible
 16: Ytec BiSS-C, universal *
 17: M23 BiSS-C, Infranor standard
 18: M23 BiSS-C, universal *
 19: M23 Hiperface, universal *
 20: Ytec SinCos incremental without commutation signals

*: various existings pinouts on the market

10) Protection: standard: IP-65 (IP-64 for T037),
 option: IP-67 (IP-65 for T037)

11) Thermal protection: 0: PTC (standard) / 1: PT1000 / 3: NTC UP72 T150

12) UL & specific option: 00: no UL-listed no specific option (standard)
 UL: UL-listed without additional specific option
 UX: UL-listed with additional specific option

0X: only additional specific option

13) Specific winding number: 4 digits winding number under selection list

'X' on each selection defines a customized option: any additional information or special configuration must be specified in plain text.

Additional configuration, specific options & execution on request!

Basic version of the motors

2 pole resolver feedback, PTC thermal protection, IP-65 (IP-64 for T037)

Connection: 90° rear side connectors INFRANOR wiring (flying leads for T037-T098-2)

Concentricity tolerance according to DIN 42955R

Standard motor phasing (according to the INFRANOR drives procedures):

- phases order: 240°
- resolver offset: 90°

4. Installation / Setup

4.1. Important notes

- Check the relation between power stage and motor. Compare rated voltage and nominal power of the appliances. The wiring has to be carried out in accordance to the circuit diagram shown in the installation/operation manual of the power stage.
- Pay attention to strong earth connection of power stage and motor.
- Route the power and control cables separately from each other. When using motor power cables with integrated brake wires, the brake wires should be shielded. The shield weave has to be put on both sides.
- Lay all circuits with sufficient cross section. Shields to be applied extensively (low-resistance) via metalized encased connectors resp. EMV – approved cable screw joints.



- Examine the keeping of 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 elimination in the surroundings and at the flange of the motor to not exceed the maximum permitted flange temperature of 65°C in S1-operation. If necessary use suitable heat sink.



Caution!

Never remove the electric connections of the motor during power supply.

Residual charges inside the capacitors of the power stage can still exist up to 5 minutes after the disconnection of the main supply.

Power and control connections can be live even if the motor stands idle.

4.2. In general

Before putting into operation respectively before installation 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.

4.3. 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.

4.4. Drive elements

The rotor of the motor has been electronically counterbalanced during production. Before winding up your drive elements onto the shaft end, please remove the corrosion prevention (if existing).

Absolutely use suitable aids for winding up or down the drive elements and take the advices of the drive element manufacturer into account to avoid damages.

***Our recommendation:** Use double conical tensioning devices.*



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

4.5. 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 power off during the installation time.

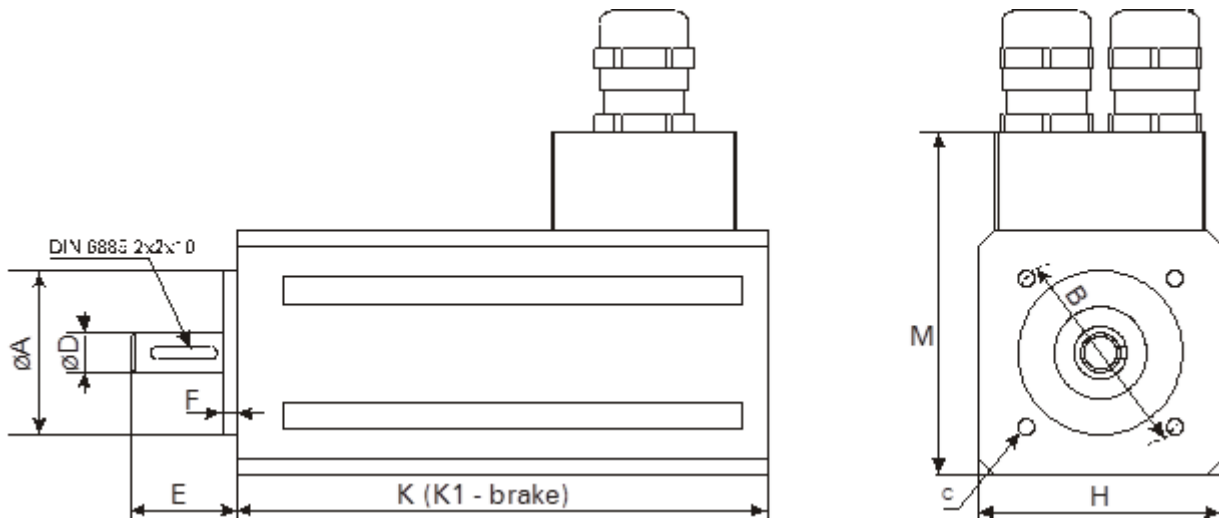
Observe the safety rules according to DIN VDE 0105.

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

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

When using shielded cables, take care of an extensive metal shield connection on both sides of the cable.

5. Series T037 [U_{dc} 48 V]



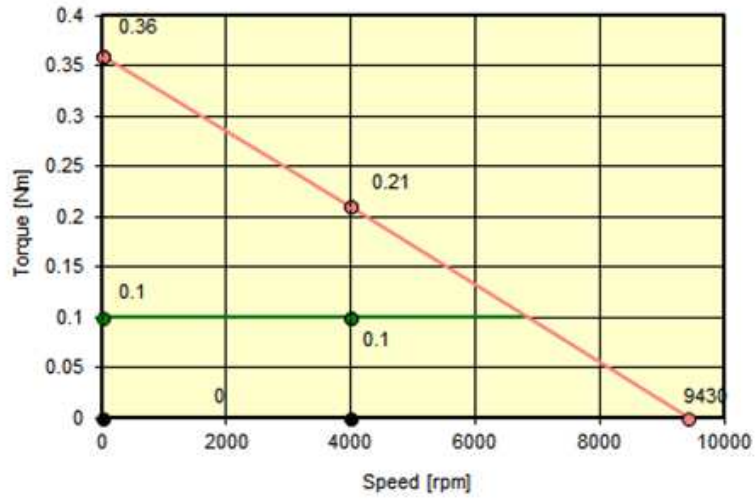
Dimensions

Type	A _{j6}	B	C	D _{h6}	E	F	H	K	K1	M
T037-1	25	32	M3x7	6	16	2	37	81	111	52
T037-2	25	32	M3x7	6	16	2	37	96	126	52
T037-3	25	32	M3x7	6	16	2	37	111	141	52

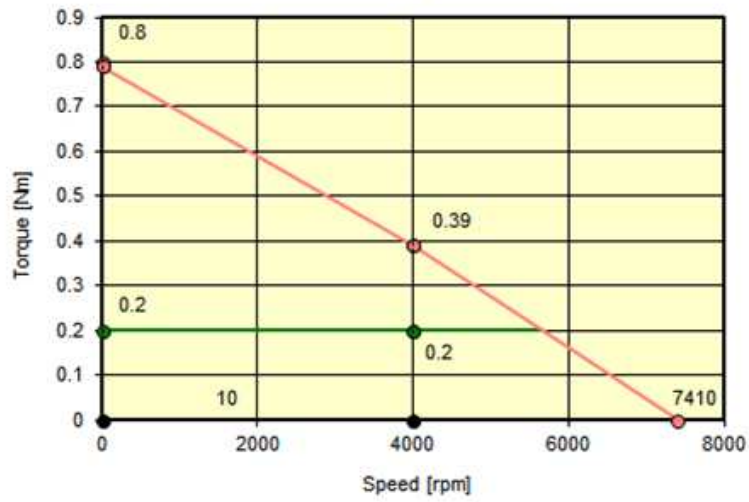
Data	Sym	Unit	T037-1-B	T037-2-B	T037-3-B
Rated Speed	N _n	min ⁻¹	4000		
DC Bus Voltage	U _{dc}	V	48,00		
Nominal AC Voltage	U _n	V	30,00	30,00	30,00
Motor Poles	P _{Mot}		6		
Resolver Poles	P _{Res}		2		
Rated Torque	M _n	Nm	0,10	0,20	0,29
Rated AC Current	I _n	A	2,10	3,20	3,80
Stall Torque	M _o	Nm	0,10	0,20	0,30
Stall AC Current	I _o	A	1,95	3,00	3,80
Peak Torque	M _{max}	Nm	0,36	0,80	1,20
Peak Current	I _{max}	A	7,40	12,90	16,20
EMF Constant	K _E	V/1000	3,10	4,00	4,80
Torque Constant	K _T	Nm/A	0,05	0,07	0,08
Nominal Power	P _n	kW	0,042	0,084	0,121
Phase-ph. resistance	R _{pp}	Ω	3,30	1,92	1,43
Phase-ph. inductance	L _{pp}	mH	0,59	0,44	0,40
Rotor Inertia	J _m	kgcm ²	0,06	0,08	0,10
Electrical time cst.	T _{el}	ms	0,18	0,23	0,28
Weight w/o brake		kg	0,370	0,450	0,530
Weight incl. brake		kg	0,450	0,530	0,610

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

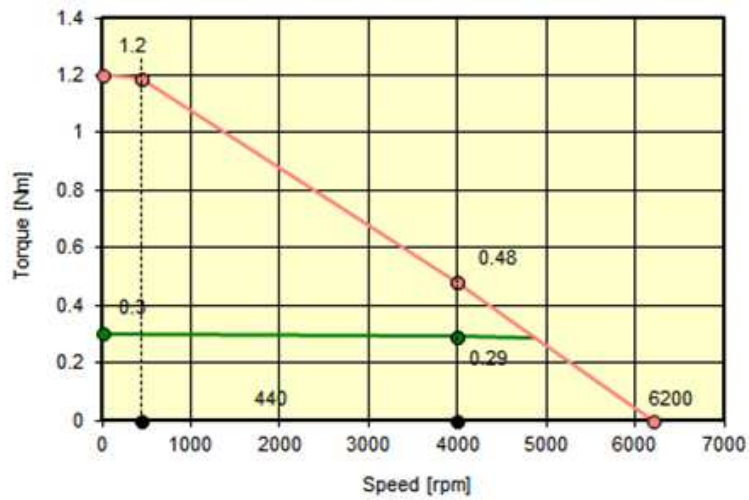
**Torque/speed curves
T037-1-B**



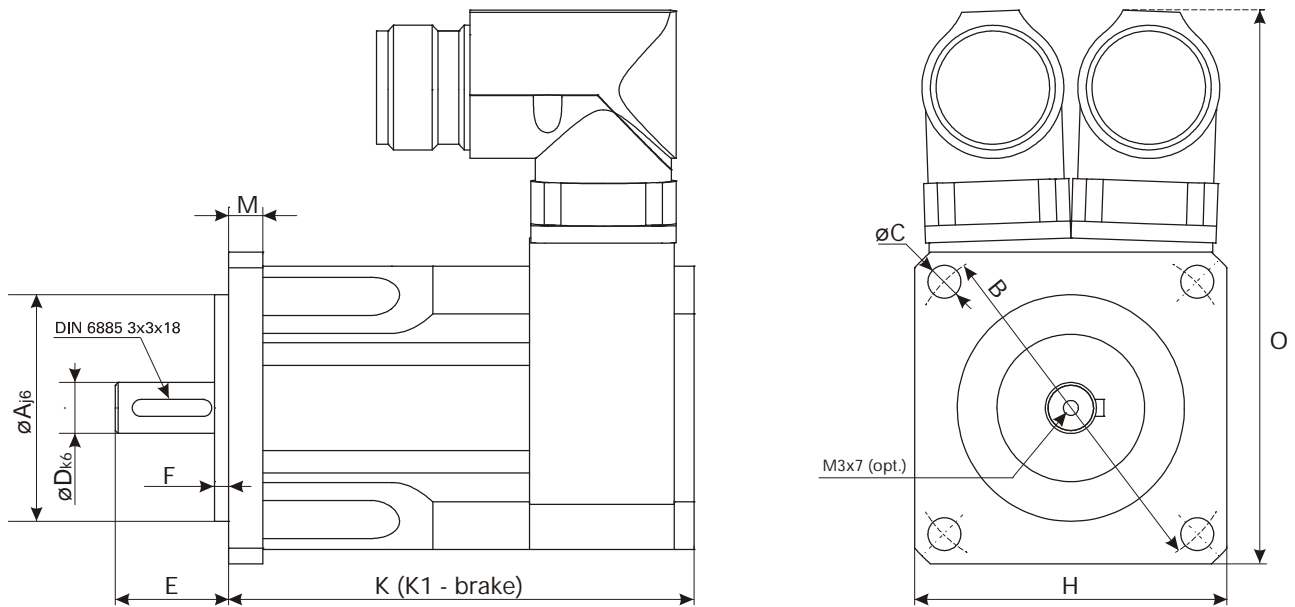
**Torque/speed curves
T037-2-B**



**Torque/speed curves
T037-3-B**



6. Series T055 [U_{dc} 48 V]

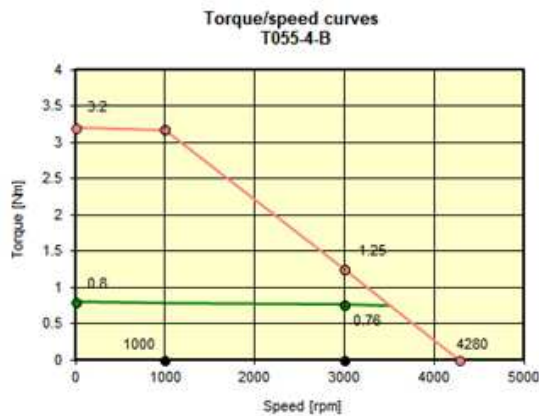
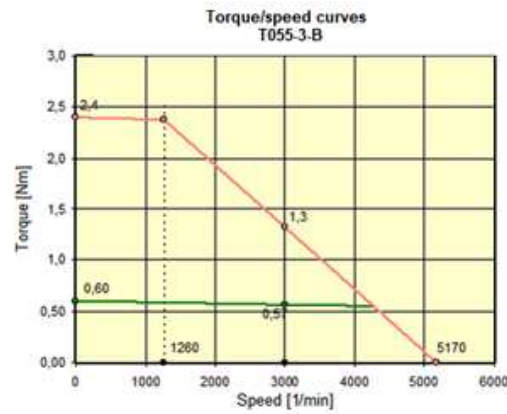
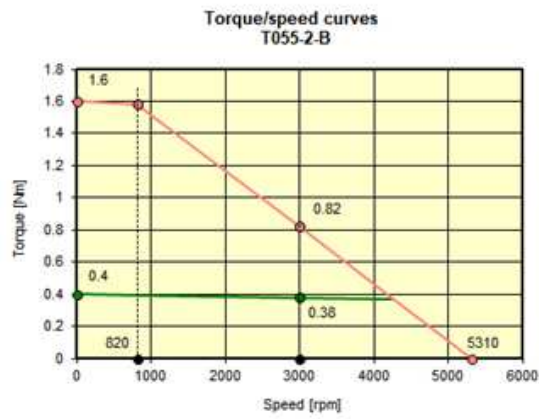
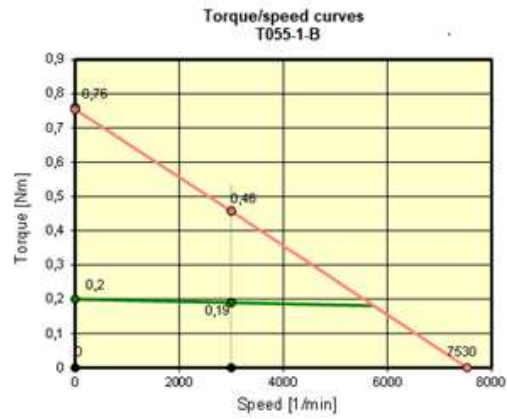


Dimensions

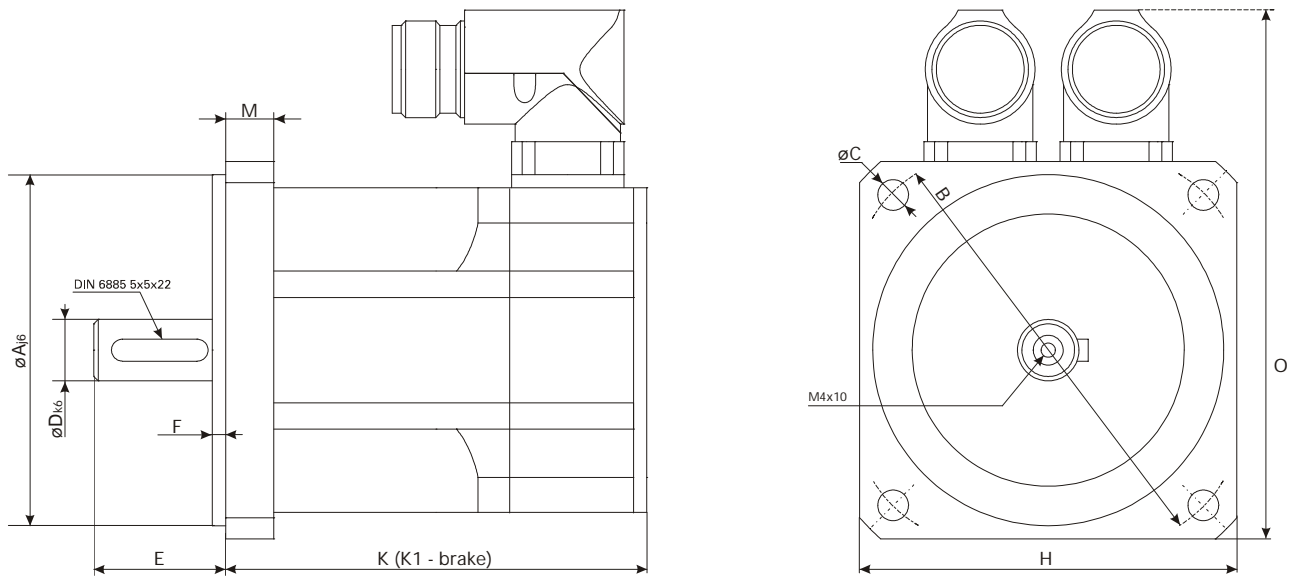
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T055-1	40	63	5,8	9	24	2,5	55	98	131	7	97
T055-2	40	63	5,8	9	24	2,5	55	113	146	7	97
T055-3	40	63	5,8	9	24	2,5	55	128	161	7	97
T055-4	40	63	5,8	9	24	2,5	55	143	176	7	97

Data	Sym	Unit	T055-1-B	T055-2-B	T055-3-B	T055-4-B
Rated Speed	N _n	min ⁻¹	3000			
DC Bus Voltage	U _{dc}	V	48,00			
Nominal AC Voltage	U _n	V	30,00	30,00	30,00	30,00
Motor Poles	P _{Mot}		6			
Resolver Poles	P _{Res}		2			
Rated Torque	M _n	Nm	0,19	0,38	0,57	0,76
Rated AC Current	I _n	A	3,20	4,30	6,20	6,90
Stall Torque	M _o	Nm	0,20	0,40	0,60	0,80
Stall AC Current	I _o	A	3,10	4,30	6,30	6,90
Peak Torque	M _{max}	Nm	0,76	1,6	2,4	3,2
Peak Current	I _{max}	A	12,60	18,60	27,00	30,00
EMF Constant	K _E	V/1000	3,90	5,60	5,80	7,00
Torque Constant	K _T	Nm/A	0,06	0,09	0,10	0,12
Nominal Power	P _n	kW	0,060	0,120	0,179	0,238
Phase-phase resistance	R _{pp}	Ω	1,96	1,12	0,67	0,63
Phase-phase inductance	L _{pp}	mH	1,19	0,95	0,64	0,65
Rotor Inertia	J _m	kgcm ²	0,06	0,08	0,11	0,13
Electrical Time Constant	T _{el}	ms	0,61	0,85	0,96	1,00
Weight w/o brake		kg	0,90	1,06	1,21	1,36
Weight incl. brake		kg	1,05	1,21	1,36	1,51

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



7. Series T086 [U_{dc} 48 V]

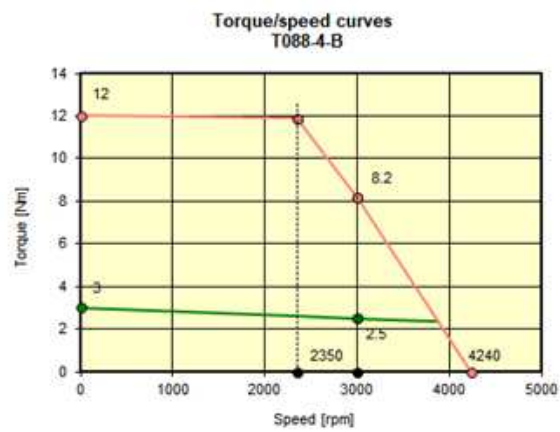
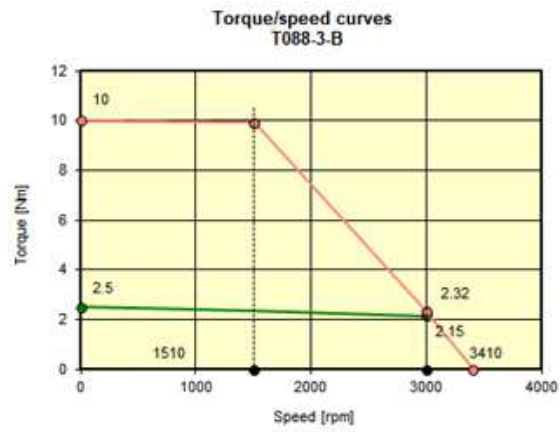
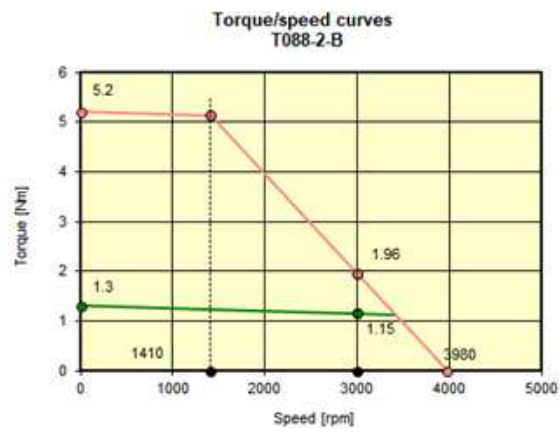
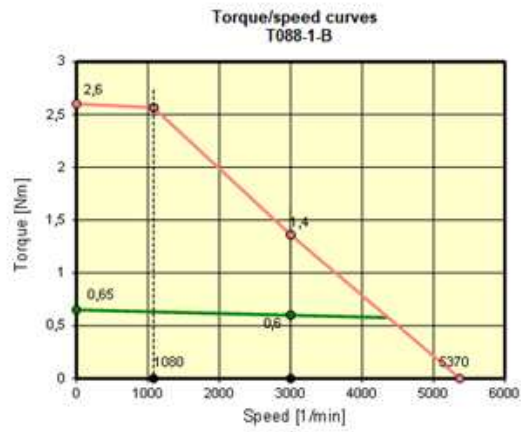


Dimensions

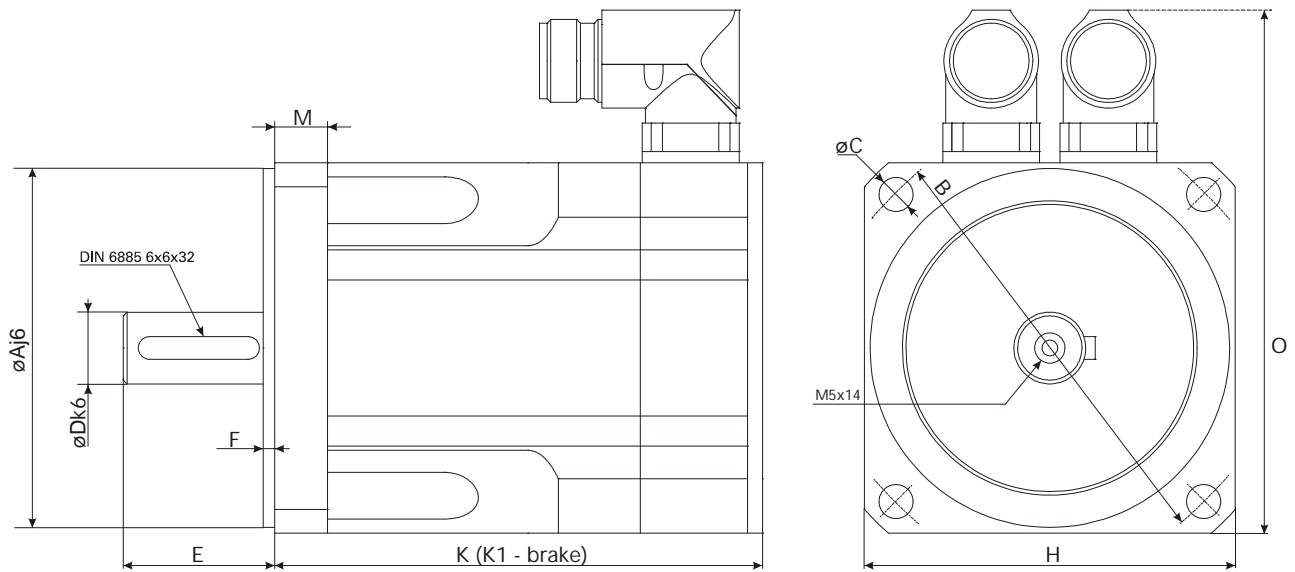
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T086-1	80	100	7	14	30	3	86	109	142	11	120
T086-2	80	100	7	14	30	3	86	127	160	11	120
T086-3	80	100	7	14	30	3	86	163	196	11	120
T086-4	80	100	7	14	30	3	86	181	214	11	120

Data	Sym	Unit	T086-1-B	T086-2-B	T086-3-B	T086-4-B
Rated Speed	N _n	min ⁻¹	3000			
DC Bus Voltage	U _{dc}	V	48,00			
Nominal AC Voltage	U _n	V	30,00	30,00	32,00	30,00
Motor Poles	P _{Mot}		6			
Resolver Poles	P _{Res}		2			
Rated Torque	M _n	Nm	0,60	1,15	2,2	2,5
Rated AC Current	I _n	A	7,00	9,90	14,50	22,40
Stall Torque	M _o	Nm	0,65	1,30	2,5	3,0
Stall AC Current	I _o	A	7,10	10,50	16,20	25,70
Peak Torque	M _{max}	Nm	2,60	5,20	10,00	12,00
Peak Current	I _{max}	A	31,00	45,00	70,00	111,00
EMF Constant	K _E	V/1000	5,50	7,50	9,40	7,10
Torque Constant	K _T	Nm/A	0,09	0,12	0,15	0,12
Nominal Power	P _n	kW	0,188	0,361	0,691	0,785
Phase-phase resistance	R _{pp}	Ω	0,63	0,32	0,18	0,08
Phase-phase inductance	L _{pp}	mH	0,73	0,54	0,40	0,17
Rotor Inertia	J _m	kgcm ²	0,50	0,65	1,40	1,50
Electrical Time Constant	T _{el}	ms	1,20	1,70	2,20	2,10
Weight w/o brake		kg	1,75	2,25	3,20	3,65
Weight incl. brake		kg	2,22	2,72	3,67	4,12

10% tolerance at M_o, M_n und N_n. values ascertained with heat sink.



8. Series T098 [U_{dc} 48 V]



Dimensions

Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.) *
T098-1	95	115	9	19	40	3	98	146	178	14	137
T098-2	95	115	9	19	40	3	98	176	208	14	(flying leads)

Data	Sym	Unit	T098-1-B	T098-2-B
Rated Speed	N _n	min ⁻¹	3000	
DC Bus Voltage	U _{dc}	V	48,00	
Nominal AC Voltage	U _n	V	30,00	30,00
Motor Poles	P _{Mot}		6	
Resolver Poles	P _{Res}		2	
Rated Torque	M _n	Nm	2,30	4,60
Rated AC Current	I _n	A	18,40	34,00
Stall Torque	M _o	Nm	2,60	5,30
Stall AC Current	I _o	A	19,30	37,30
Peak Torque	M _{max}	Nm	10,40	21,00
Peak Current	I _{max}	A	116,00	224,00
EMF Constant	K _E	V/1000	8,20	8,60
Torque Constant	K _T	Nm/A	0,13	0,14
Nominal Power	P _n	kW	0,722	1,444
Phase-phase resistance	R _{pp}	Ω	0,10	0,06
Phase-phase inductance	L _{pp}	mH	0,41	0,30
Rotor Inertia	J _m	kgcm ²	1,90	2,70
Electrical Time Constant	T _{el}	ms	4,10	5,40
Weight w/o brake		kg	4,50	5,60
Weight incl. brake		kg	5,32	6,42

10% tolerance at M_o, M_n und N_n. values ascertained with heat sink.

*: for T098-1-B only

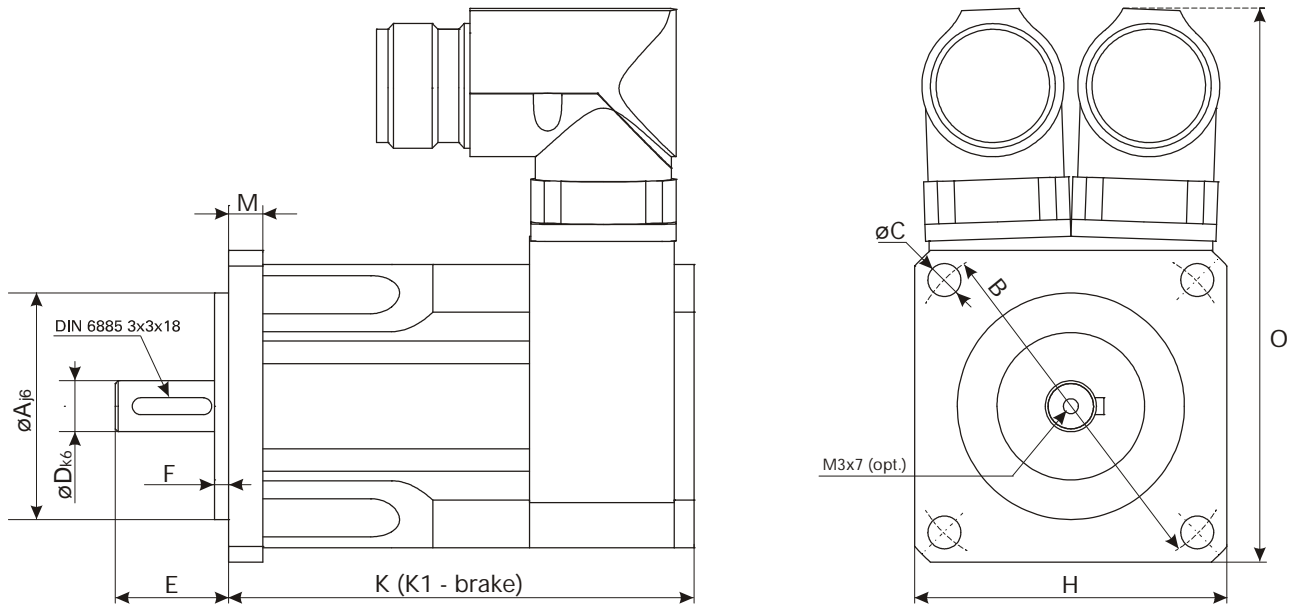
Torque/speed curves
T098-1-B



Torque/speed curves
T098-2-B



9. Series N055 [U_{dc} 48 V]



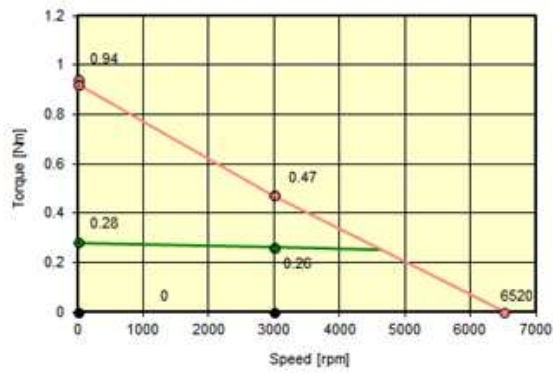
Dimensions

Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
N055-1	40	63	5,8	9	24	2,5	55	67	105	7	97
N055-2	40	63	5,8	9	24	2,5	55	82	120	7	97
N055-3	40	63	5,8	9	24	2,5	55	97	135	7	97
N055-4	40	63	5,8	9	24	2,5	55	112	150	7	97

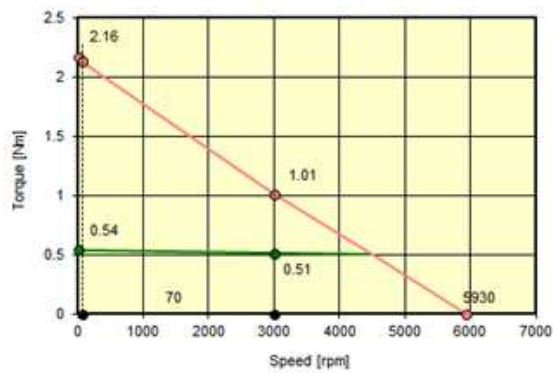
Data	Sym	Unit	N055-1-B	N055-2-B	N055-3-B	N055-4-B
Rated Speed	N _n	min ⁻¹	3000			
DC Bus Voltage	U _{dc}	V	48,00			
Nominal AC Voltage	U _n	V	33,00	33,00	32,00	33,00
Motor Poles	P _{Mot}		6			
Resolver Poles	P _{Res}		2			
Rated Torque	M _n	Nm	0,26	0,51	0,71	0,91
Rated AC Current	I _n	A	3,50	6,00	7,70	7,30
Stall Torque	M _o	Nm	0,28	0,54	0,75	0,95
Stall AC Current	I _o	A	3,50	6,00	7,70	7,30
Peak Torque	M _{max}	Nm	0,94	2,20	3,00	3,80
Peak Current	I _{max}	A	12,60	28,00	36,00	33,00
EMF Constant	K _E	V/1000	4,90	5,50	5,90	7,80
Torque Constant	K _T	Nm/A	0,08	0,09	0,10	0,13
Nominal Power	P _n	kW	0,082	0,160	0,223	0,286
Phase-phase resistance	R _{pp}	Ω	1,93	0,99	0,66	0,85
Phase-phase inductance	L _{pp}	mH	2,20	1,20	0,90	1,18
Rotor Inertia	J _m	kgcm ²	0,05	0,07	0,09	0,11
Electrical Time Constant	T _{el}	ms	1,10	1,20	1,40	1,40
Weight w/o brake		kg	0,74	0,93	1,12	1,31
Weight incl. brake		kg	0,99	1,18	1,37	1,56

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

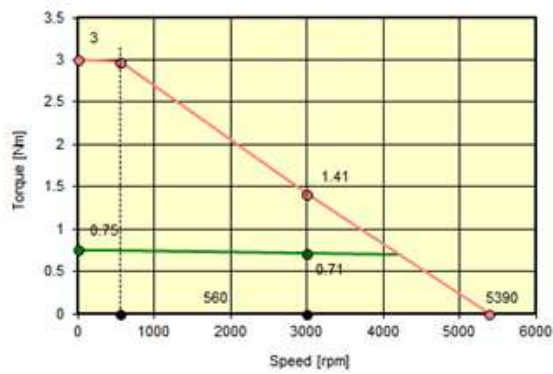
Torque/speed curves
N055-1-B



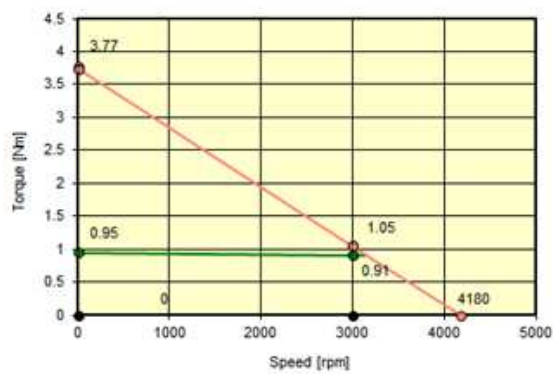
Torque/speed curves
N055-2-B



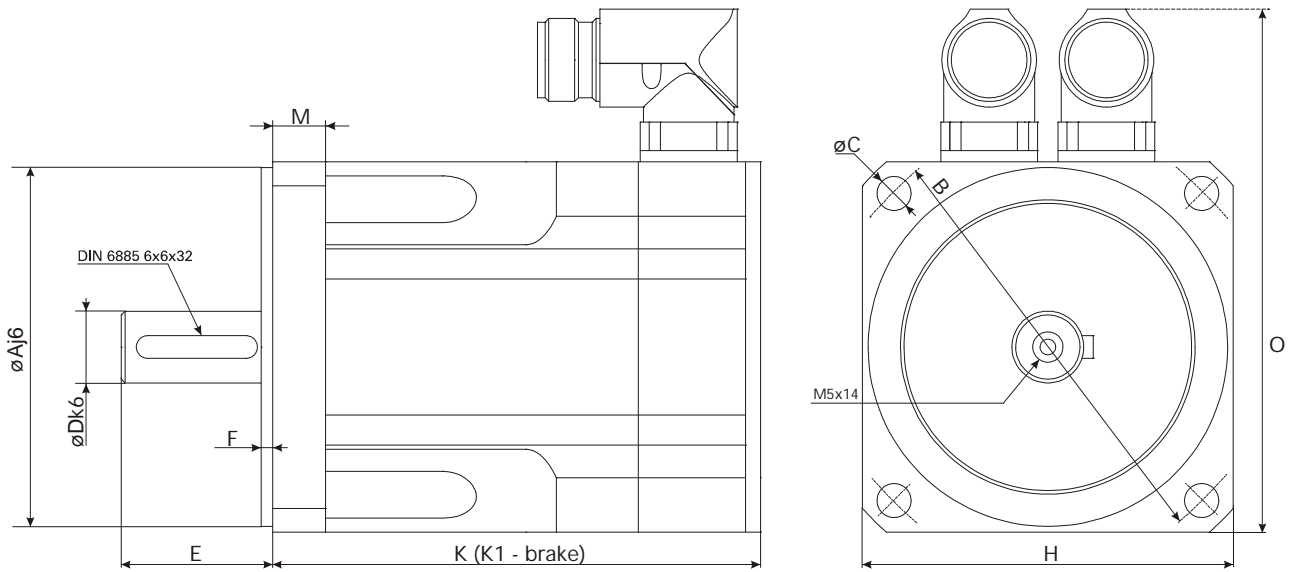
Torque/speed curves
N055-3-B



Torque/speed curves
N055-4-B



10. Series N086 [U_{dc} 48 V]

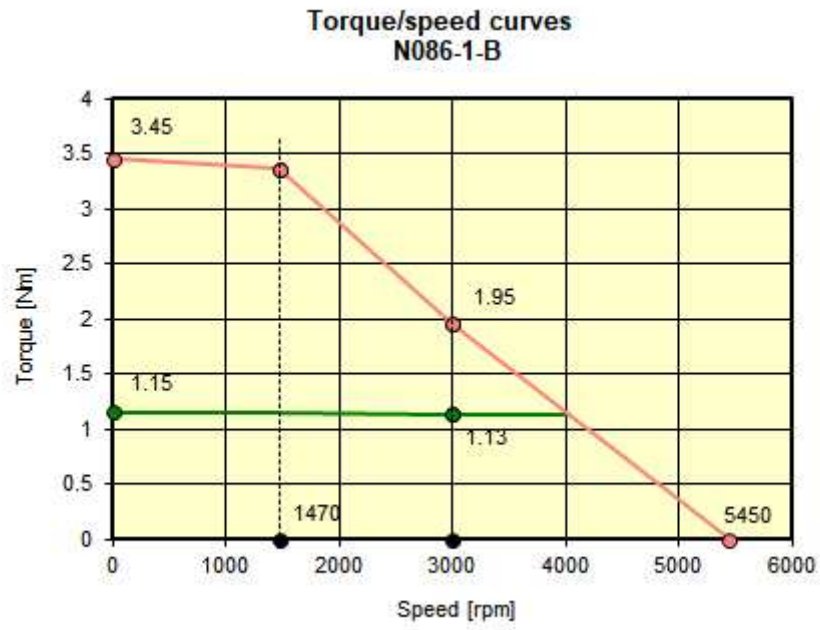


Dimensions

Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
N086-1	80	100	7,0	14	30	3,0	86	82	120	11	120

Data	Sym	Unit	N086-1-B
Rated Speed	N _n	min ⁻¹	3000
DC Bus Voltage	U _{dc}	V	48,00
Nominal AC Voltage	U _n	V	34,00
Motor Poles	P _{Mot}		10
Resolver Poles	P _{Res}		2
Rated Torque	M _n	Nm	1,13
Rated AC Current	I _n	A	12,90
Stall Torque	M _o	Nm	1,15
Stall AC Current	I _o	A	11,30
Peak Torque	M _{max}	Nm	3,50
Peak Current	I _{max}	A	50,00
EMF Constant	K _E	V/1000	6,20
Torque Constant	K _T	Nm/A	0,10
Nominal Power	P _n	kW	0,355
Phase-phase resistance	R _{pp}	Ω	0,27
Phase-phase inductance	L _{pp}	mH	0,60
Rotor Inertia	J _m	kgcm ²	0,31
Electrical Time Constant	T _{el}	ms	2,20
Weight w/o brake		kg	1,50
Weight incl. brake		kg	2,10

10% tolerance at M_o, M_n und N_n. values ascertained with heat sink.



11. Connector occupancy

11.1. Movinor® T055/88/98-1 – N055/86: INFRANOR wiring



Motor plug T055/88/98 – N055/86
 Motor plug T055/88/98 – N055/86 **DSL**
 Motor plug T055/88/98 – N055/86 **SENSORLESS**
 Resolver / Hiperface plug
 Incremental encoder plug

= Intercontec M23, Size 1, 6 pol.
 = Intercontec M23, Size 1, 8 pol.
 = Intercontec M23, Size 1, 8 pol.
 = Intercontec M23 12-pol.
 = Intercontec M23 17-pol.

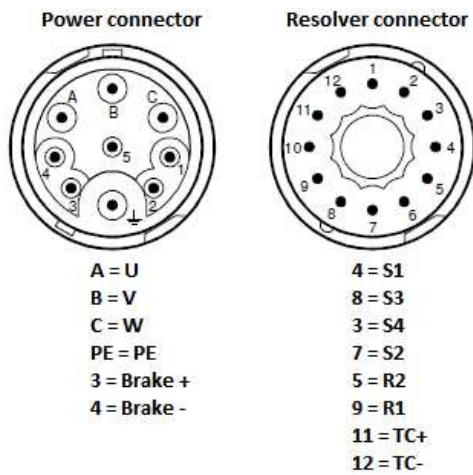
Power standard		Power DSL		Power sensorless	
Pin	Signal	Pin	Signal	Pin	Signal
1	Phase W	1	Phase U	1	Phase U
2	Phase U	3	Phase V	3	Phase V
4	Phase V	4	Phase W	4	Phase W
--	earth / SL	--	earth / SL	--	earth / SL
5	Brake +	A	Brake +	A	Brake +
6	Brake -	B	Brake -	B	Brake -
		C	DSL+	C	Therm. sensor
		D	DSL-	D	Therm. sensor

Encoder Hiperface SRS-SRM50 & SKS-SKM36		Encoder incremental CKS36	
Pin	Signal	Pin	Signal
1	Us (7 – 12Vdc)	1	Us (5Vdc)
2	GND	2	n.c.
3	RefSin	3	GND
4	RefCos	4	Com.signal U
5	DATA+ RS485	5	Com.signal U/
6	DATA- RS485	6	Com.signal V
7	Sin+	7	Com.signal V/
8	Cos+	8	Com.signal W
9	Temp. sensor	9	Com.signal W/
10	Temp. sensor	10	Channel A
Resolver		11	Channel A/
Pin	Signal	12	Channel B
1	Sin + (S2)	13	Channel B/
2	Sin - (S4)	14	Index Z
3	Cos + (S1)	15	Index Z/
4	Cos - (S3)	16	Temp. sensor
7	Ref + (R2)	17	Temp. sensor
8	Ref - (R1)		
5	Thermo / PTC +		
6	Thermo / PTC -		

11.2. Movinor® T037 & T098-2 cable output

Motor			Resolver		
1	=	Phase U	Yellow	=	Cos +
2	=	Phase V	Green	=	Cos -
3	=	Phase W	Brown	=	Sin +
4	=	Brake +	White	=	Sin -
5	=	Brake -	Pink	=	Ref +
green/yellow	=	Earth / SL	Grey	=	Ref -
			Red	=	Thermo / PTC +
			Blue	=	Thermo / PTC -

11.3. 90° rotatable Ytec double-receptacle option (also for T037)



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

12. Options

Permanent Magnet Brake

Data	Sym	Unit	T037	T055/N055	T086/N086	T098
Braking torque	M _{Br}	Nm	0,4	2,0	4,5	9,0
Nominal voltage	U _{BR}	VDC	24 (+ 6% - 10%)			
Nominal power	P _{BR}	W	8	11	12	18

Keyway according to DIN 6885

Motor	T037	T055/N055	T086/N086	T098
shaft	6x16	9x24	14x30	19x40
keyway	2x2x10	3x3x18	5x5x22	6x6x32

Degree of protection IP-67 (IP-65 for T037)

Special shaft / special flange

Counter plugs and converted cables

Counter plug for motor connection Intercontec M23, size 1, 6 & 8 poles

Counter plug for resolver connection Intercontec M23, 12 poles

Various converted cables on request.

Angle connectors

Directed to either A or B-side, or turnable

Motor Feedback - various feedback systems on request

Additional rotor inertia – available for the T motor range

13. Technical Data

13.1. Definition

Continuous stall torque M_0 [Nm]

Thermal max. torque which can be delivered indefinitely when motor stands idle, $n=0$ min⁻¹, within nominal environmental conditions.

Nominal torque M_n [Nm]

When motor takes nominal current at nominal speed, rated torque can be delivered indefinitely 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 nominal speed n_n and supply of the nominal the motor takes the nominal 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 nominal current.

Torque constant K_T [Nm/A]

The torque constant is the relationship between torque and current. This defines how much Nm torque is produced with 1A current.

Voltage constant K_E [V/1000min⁻¹]

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

Rotor Moment of Inertia J [kgcm²]

14. Recommended servo drive



INFRANOR XtrapulsEasy 60VDC

The 24 to 60 VDC positioner XtrapulsEasy is a performing, very compact and easy-to-use drive. Thanks to its cost-effectiveness and its optimized functions, it is extremely useful and practical for embedded applications where price is a determining factor. Also in daughter-board version.

Functions

- Very compact servo drive
- CANopen® DS301, DS402
- Resolver or incremental encoder feedback
- Sensorless

Tools

- Project manager
- Commissioning wizard
- Multiaxis configuration and diagnostic

Power stage

- IGBT power stage, 24-60VDC
- Rated current: 13, 25 & 35 Arms
- Maximum current: 45, 60 Arms and 120 Arms

Interfaces

- RS 232, CANopen®
- Digital and analog I/Os

Safety

- Safe Torque Off (STO) SIL 1

15. Former Movinor® type code LN-LT

From May 17, 2021, the new Movinor® motors type code will be applied. Below, the old type code for information:

Field	1	2	3	4	5	6	7	8	9	10	11
Code	LT	055	1	B	0	0	0	01	2	IP-65	0

- 1) Motor type: LN, LT
- 2) Motor size: 37, 55 & 86mm flange
- 3) Torque & length size: 1 for lower, 2 for second, etc.
- 4) Winding (DC bus voltage): B: 48VDC
- 5) Shaft: 0: standard with keyway
1: standard without keyway
- 6) Front flange: 0: standard
1: with shaft seal (IP-67 option)
- 7) Brake: 0: no
1: yes
2: no & inertia wheel (LT range only)
3: yes & inertia wheel (LT range only)
- 8) Motor feedback: 01: resolver 2T (standard)
08: SRS 50 singleturn Hiperface (size 86mm)
09: SRM 50 multiturn Hiperface (size 86mm)
10: SKS36 singleturn Hiperface® (size 55 & 86mm)
11: SKM36 multiturn Hiperface® (size 55 & 86mm)
15: CKS36 incremental 2048 (size 55 & 86mm)
17: sensorless
18: EKS36 singleturn 18-bit Hiperface DSL (size 55 & 86mm)
19: EKS36 singleturn 18-bit Hiperface DSL SIL2 (size 55 & 86mm)
20: EKM36 multiturn 18-bit Hiperface DSL (size 55 & 86mm)
21: EKM36 multiturn 18-bit Hiperface DSL SIL2 (size 55 & 86mm)
- 9) Electrical connection: 0: cable outputs
1: 0° radial connectors INFRANOR wiring
2: 90° rear side connectors INFRANOR wiring
3: 90° front side connectors INFRANOR wiring
7: adjustable connectors INFRANOR wiring
31: 90° rotatable Ytec double-receptacle (also for LT037)
- 10) Protection: standard: IP-65 (IP-64 for LT037),
option: IP-67 (IP-65 for LT037)
- 11) Thermal protection: - 0: PTC (standard) / 1: NTC / 3: PT1000

04.11.2022 - Subject to modifications