



Movinor[®] T

Reliable Synchronous Servomotors Range

T037 – T055 – T086 – T098
T142 – T190 – T191 – T240
Windings 320 VDC / 560 VDC





Range of synchronous - motors

Motor type	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	
T098-1-2-3	98 mm	2,6	5,3	7,5		
T142-1-2-3-4-5	142 mm	6,6	10,5	13,5	17,0	22,0
T190-1-2-3-4	190 mm	13,5	19,0	22,0	29,0	
T191-1-2-3	190 mm	27,0	32,0	40,0		
T240-1-2-3-4	240 mm	40,0	68,0	93,0	115,0	

There are separate manuals available for motors from Mo 0.03 up to 0,9 Nm with DC bus voltage of 24/48 V as well as for motors from Mo 0.95 up to 27.3 Nm for DC bus voltage of 320/560 V which will be supplied on request.

Legend of the present manual

Version	Reason
01-2021	New type code T range (former LT motor range, see chapter 17)
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
01-2023	Addition of brakes inertia, see chapter 14
02-2023	Correction of titles in the torque/speed curves page for the T086 range

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



Inproper 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 T037–T240 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.

Movinor® series	Motor poles	Resolver poles
T037–T240	6	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 T055-0040 x-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 T037–T240 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 T037–T240 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 analysed and observed.

3.3. Motor Construction

The synchronous servomotors in the T037–T240 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-delta 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 T037–T240 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.

Movinor® Motor	F _{Rmax} [N]	F _{Amax} [N]	Movinor® Motor	F _{Rmax} [N]	F _{Amax} [N]
T037-1	89	17	T142-3	748	142
T037-2	91	17	T142-4	772	147
T037-3	93	17	T142-5	790	150
T055-1	225	43	T190-1	708	135
T055-2	237	45	T190-2	743	141
T055-3	245	47	T190-3	756	144
T055-4	252	48	T190-4	794	151
T086-1	370	70	T191-1	1348	256
T086-2	393	75	T191-2	1370	260
T086-3	422	80	T191-3	1406	267
T086-4	431	82	T240-1	1702	323
T098-1	638	121	T240-2	1785	339
T098-2	676	128	T240-3	1775	337
T098-3	711	135	T240-4	1823	346
T142-1	693	132			
T142-2	733	139			

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 T037–T240 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. Connections

Movinor® series	Resolver	Power
T037	Flying leads	Flying leads
T055–T240	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 voltageless 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	T055	T086	T098	T142	T190	T191	T240
Slip time / s	0.5							
Idle time / s	0.5							
Speed / rpm	250	200	100	100	75	50	50	25
Switchings	5	5	5	5	5	3	3	3

3.4. Selection criterion

- 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 320VDC and 560VDC.

3.6. Motor length

The length is specified for motors with resolver and 0° straight or 90° angled connectors towards rear (except size 37 = cables as standard).

3.7. Type code for Movinor® motors T037–T240

1	2	3	4	5	6	7	8	9	10	11	12	13
T	055	2	W	0	0	0	R01	B01	IP65	0	UL	0137

- 1) **Motor type:**
 - T range
- 2) **Motor size:**
 - 037 to 240
- 3) **Torque & length size:**
 - 1 for lower, 2 for second, etc.
- 4) **Winding (DC bus voltage):**
 - C: 320V
 - D: 560V
 - W: under specific windings list
- 5) **Shaft:**
 - 0: standard without keyway
 - 1: standard with keyway
- 6) **Front flange:**
 - 0: standard
 - 1: with shaft seal
- 7) **Brake:**
 - 0: without brake
 - 1: with brake
 - 2: No & inertia wheel except the biggest model of each size
 - 3: Yes & inertia wheel except the biggest model of each size

8) Motor feedback:

- N00: Sensorless
- R01: Resolver 2T
- R02: Resolver 2t safe mounting
- H01: Singleturn Hiperface SEK34
- H02: Multiturn Hiperface SEL34
- H03: Singleturn Hiperface SEK37
- H04: Multiturn Hiperface SEL37
- H05: Singleturn Hiperface SKS36
- H06: Singleturn Hiperface SKS36S Safety
- H07: Multiturn Hiperface SKM36
- H08: Multiturn Hiperface SKM36S Safety
- H09: Singleturn Hiperface SRS50
- H10: Singleturn Hiperface SRS50S Safety
- H11: Multiturn Hiperface SRM50
- H12: Multiturn Hiperface SRM50S Safety
- D01: Singleturn Hiperface-DSL EKS36 18-bit
- D02: Singleturn Hiperface-DSL EKS36 18-bit SIL2 Safety
- D03: Multiturn Hiperface-DSL EKM36 18-bit
- D04: Multiturn Hiperface-DSL EKM36 18-bit SIL2 Safety
- Q01: Incremental CFS50, 4096
- Q02: Incremental QM22, 2048
- Q03: Incremental QM35, 6 pole, 2048
- Q04: Incremental QM35, 6 pole, 8192
- Q05: Incremental QM35, 10 pole, 2048
- Q06: Incremental QM35, 10 pole, 8192
- B01: BiSS-C AD34/1212AU..ONBVB 12-bit multitrans
- S01: SinCos incremental QR12 500ppr. without commutation signals

9) Connection:

- **Connectors orientation:**
- S: straight
- F: angled towards front (shaft)
- B: angled towards back (rear)
- R: angled rotatable
- Y: Ytec rotatable double receptacle

- **Pinout:**
- 00: flying leads
- 01: M23/M40 resolver, Infranor standard
- 02: M23/M40 resolver, Mavilor FP compatible
- 03: M23/M40 Hiperface, Infranor standard
- 04: M23/M40 incremental, Infranor standard
- 05: M23/M40 Incremental, Mavilor FP compatible
- 06: M23/M40 Hiperface DSL, Infranor standard
- 07: M23/M40 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/M40 incremental, universal *
- 15: M23/M40 Hiperface, Mavilor FP compatible
- 16: Ytec BiSS-C, universal *
- 17: M23/M40 BiSS-C, Infranor standard
- 18: M23/M40 BiSS-C, universal *
- 19: M23/M40 Hiperface, universal *
- 20: Ytec SinCos incremental without commutation signals

*: various existings pinouts on the market

10) Protection:

- 00: no UL-listed, no specific option (standard)
- IP64 (only LT037)
- IP65 (standard)
- IP67 (option)

11) Thermal protection:

- 0: standard: PTC
- 1: PT1000
- 2: NTC UP72 T150

12) UL listed and/or specific option:

- 00: no UL-listed, no specific option (standard)
- UL: UL-listed without specific option
- UX: UL-listed with specific option
- 0X: only specific option

13) Specific winding number:

- When the winding code has the value 'W' , the winding number is specified on this field.

Additional configuration, specific options & execution, other information:

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

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 compacitor of the power stage can still exist up to 5 minutes after the disconnection of the main supply.

Power and control connections can be life 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 voltageless during the installation time.

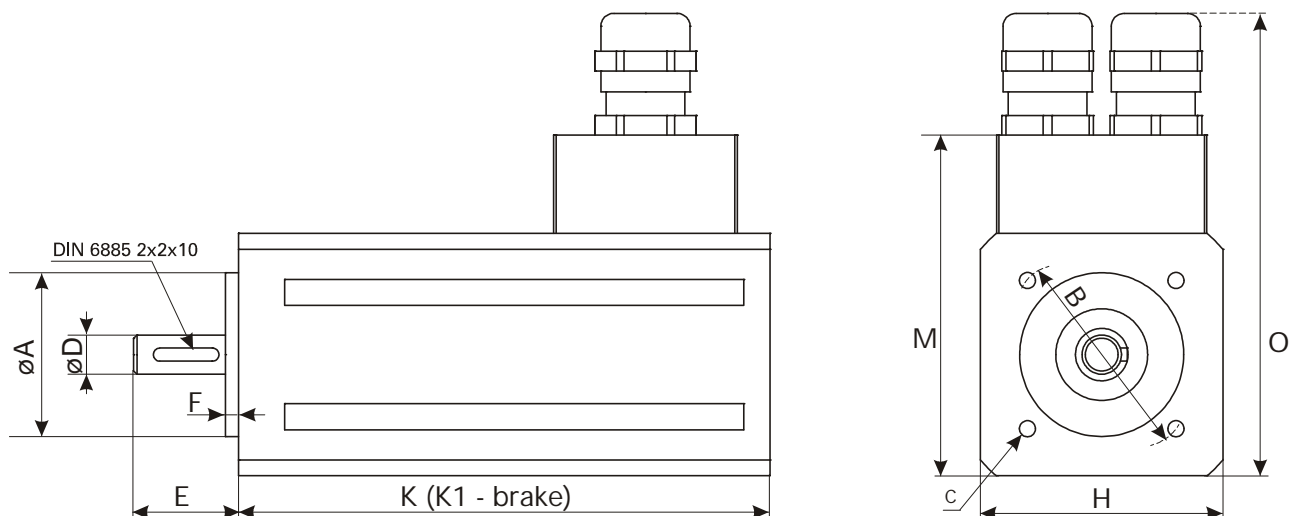
Observe the safety rules according to DIN VDE 0105.

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} 320 V]

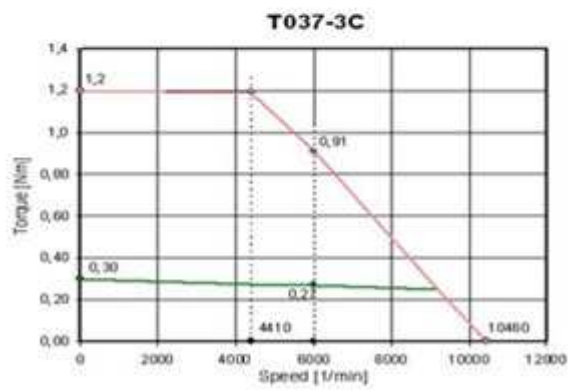
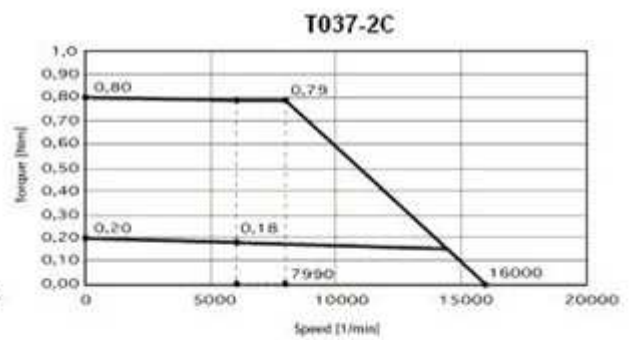
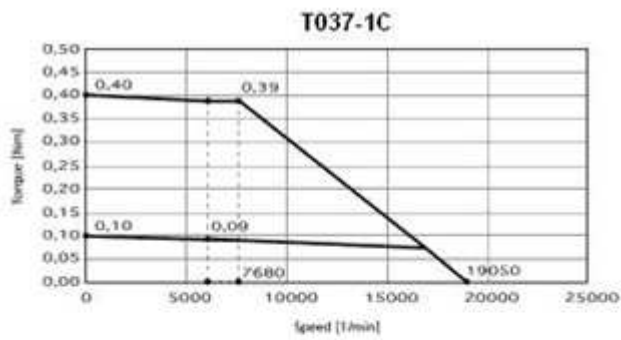


Dimensions

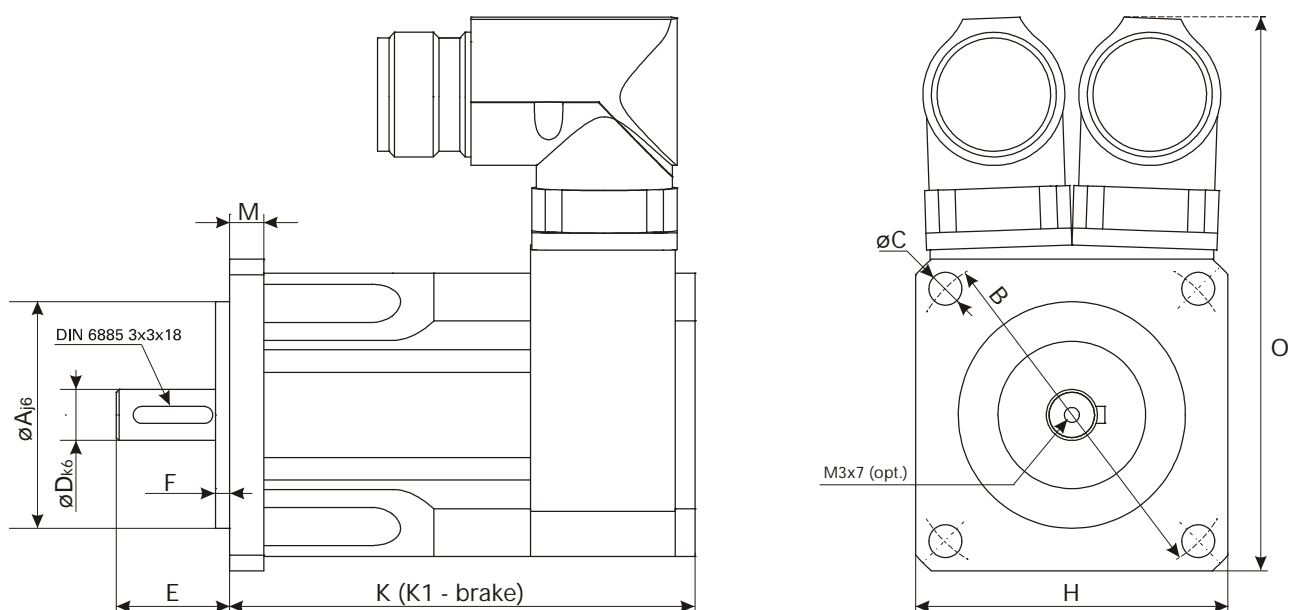
Type	A _{j6}	B	C	D _{h6}	E	F	H	K	K1	M	O
T037-1	25	32	M3x7	6	16	2	37	81	111	52	71
T037-2	25	32	M3x7	6	16	2	37	96	126	52	71
T037-3	25	32	M3x7	6	16	2	37	111	141	52	71

Data	Sym	Unit	T037-1C	T037-2C	T037-3C
Rated Speed	N _n	min ⁻¹	6000		
DC Bus Voltage	U _{dc}	V	320		
Nominal AC Voltage	U _n	V	200		
Motor Poles	P _{Mot}		6		
Resolver Poles	P _{Res}		2		
Rated Torque	M _n	Nm	0,09	0,18	0,27
Rated AC Current	I _n	A	0,53	0,86	0,89
Stall Torque	M _o	Nm	0,10	0,20	0,30
Stall AC Current	I _o	A	0,59	0,95	0,95
Peak Torque	M _{max}	Nm	0,40	0,80	1,20
Peak Current	I _{max}	A	2,35	3,8	4,1A
EMF Constant	K _E	V/1000	10,5	12,5	19,5
Torque Constant	K _T	Nm/A	0,17	0,21	0,31
Nominal Power	P _n	W	63	126	169
Phase-ph. resistance	R _{pp}	Ω	38,9	18,9	22,9
Phase-ph. inductance	L _{pp}	mH	9,2	4,5	6,5
Rotor Inertia	J _m	kgcm ²	0,06	0,08	0,10
Electrical time cst.	T _{el}	ms	0,24	0,24	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.



6. Series T055 [U_{dc} 320 / 560 V]

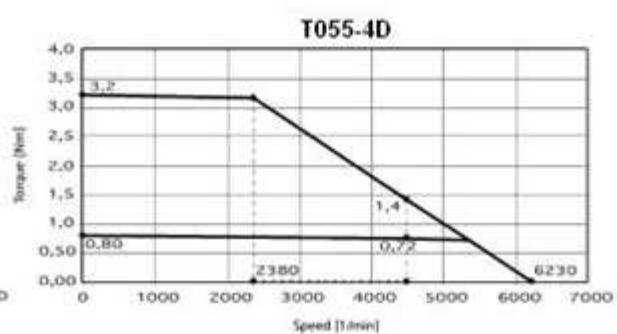
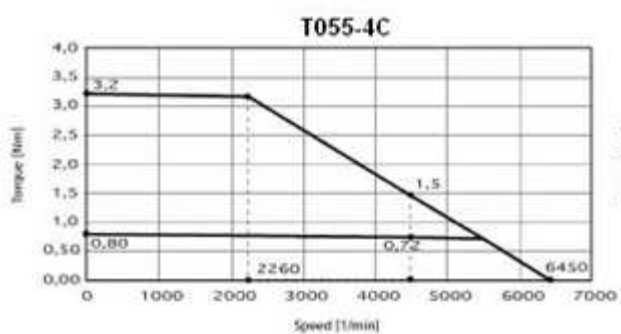
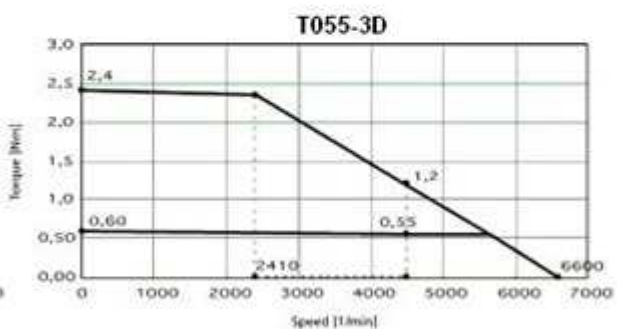
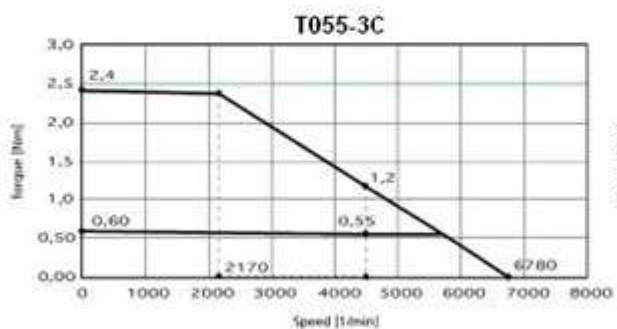
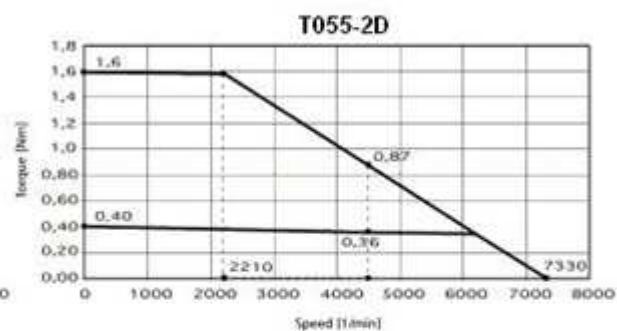
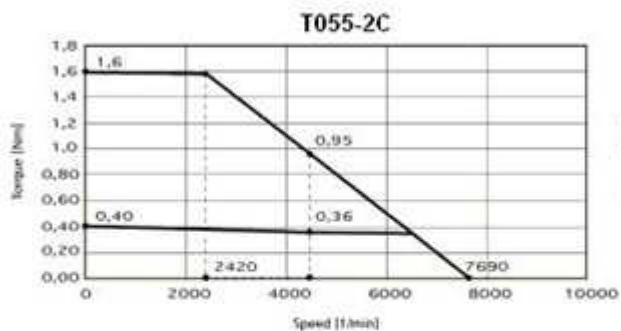
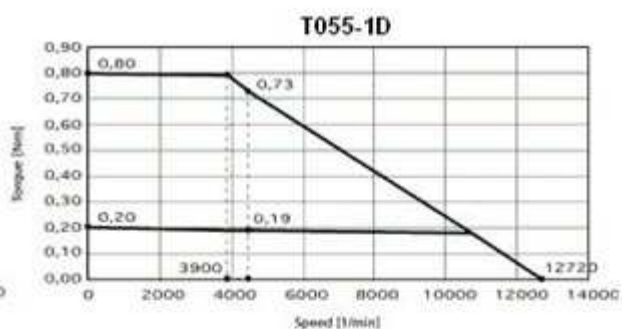
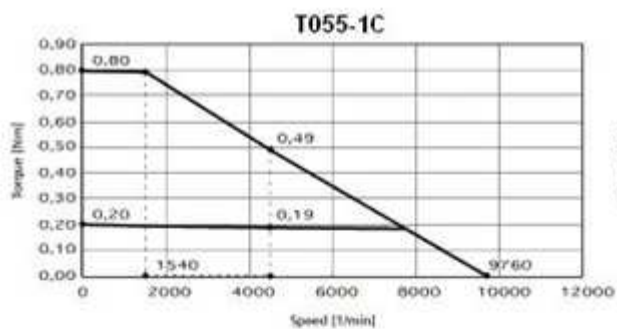


Dimensions

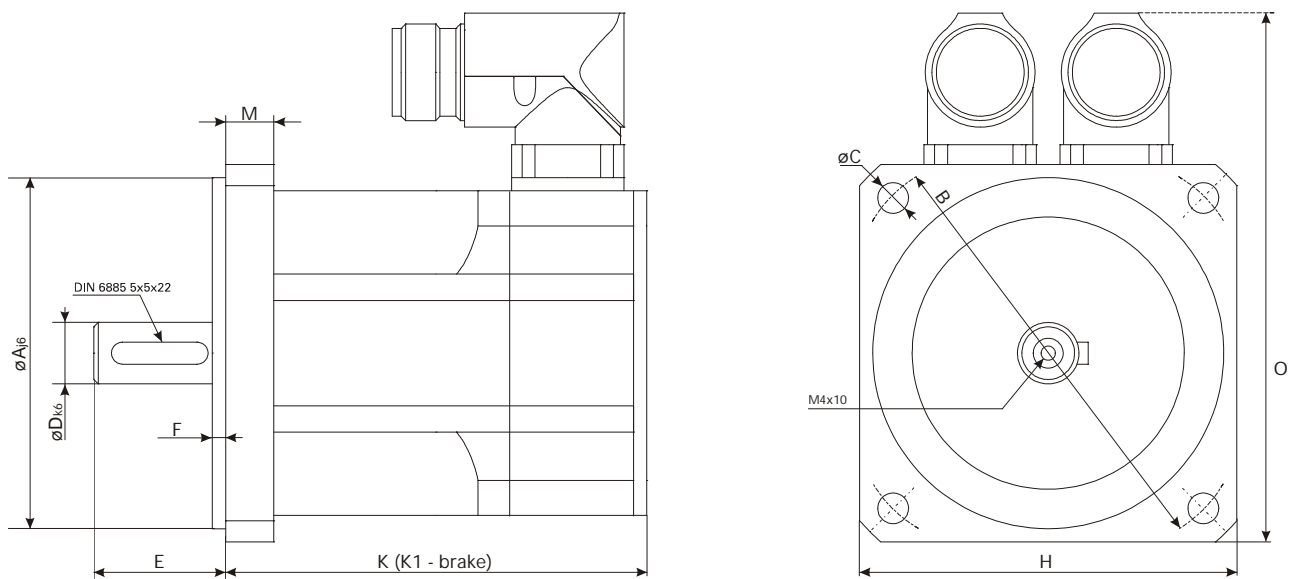
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T055-1	40	63	5,8	9	24	2,5	55	98	131	7	97
T055-2	40	63	5,8	9	24	2,5	55	113	146	7	97
T055-3	40	63	5,8	9	24	2,5	55	128	161	7	97
T055-4	40	63	5,8	9	24	2,5	55	143	176	7	97

Data	Sym	Unit	T055-1	T055-2	T055-3	T055-4				
Rated Speed	N _n	min ⁻¹	4500							
DC Bus Voltage	U _{dc}	V	320 / 560							
Nominal AC Voltage	U _n	V	200 / 330							
Motor Poles	P _{Mot}		6							
Resolver Poles	P _{Res}		2							
Rated Torque	M _n	Nm	0,19	0,36	0,55	0,72				
Rated AC Current	I _n	A	0,56	0,45	0,84	0,49	1,12	0,66	1,41	0,82
Stall Torque	M _o	Nm	0,2	0,40	0,6	0,80				
Stall AC Current	I _o	A	0,59	0,48	0,93	0,54	1,22	0,72	1,56	0,91
Peak Torque	M _{max}	Nm	0,8	1,6	2,4	3,2				
Peak Current	I _{max}	A	2,35	1,9	3,72	2,16	4,9	2,9	6,3	3,6
EMF Constant	K _E	V/1000	20,5	25,5	26,0	45,0	30,0	50,0	31,0	53,0
Torque Constant	K _T	Nm/A	0,34	0,42	0,43	0,74	0,49	0,83	0,51	0,88
Nominal Power	P _n	W	90	170	260	340				
Phase-phase resistance	R _{pp}	Ω	54,0	84,0	26,3	77,0	19,9	51,0	14,6	38,4
Phase-phase inductance	L _{pp}	mH	32,0	50,0	21,4	62,0	17,2	45,5	14,4	39,7
Rotor Inertia	J _m	kgcm ²	0,06	0,08	0,11	0,13				
Electrical Time Constant	T _{el}	ms	0,59	0,59	0,82	0,80	0,87	0,90	0,98	1,00
Weight w/o brake		kg	0,9	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} 320 / 560 V]

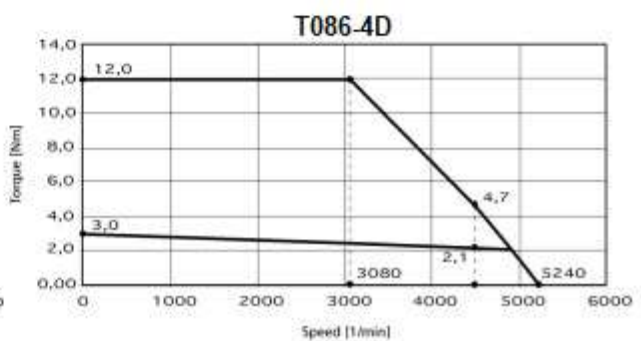
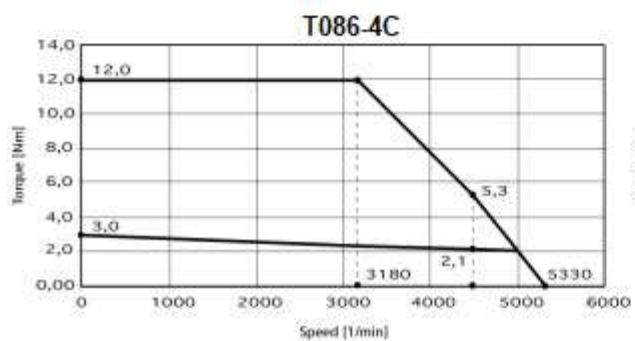
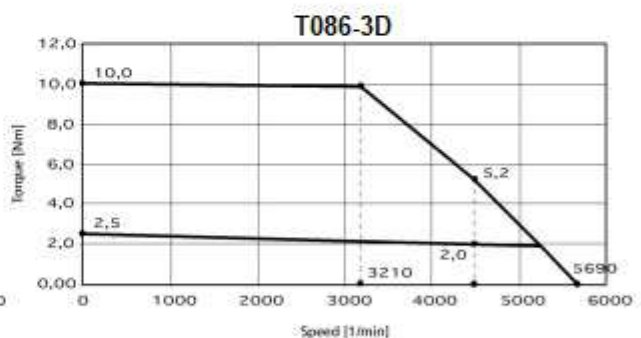
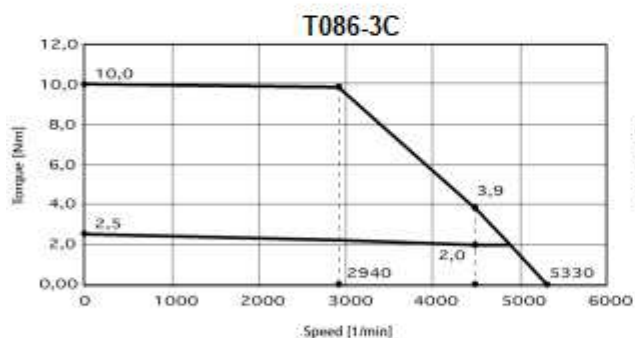
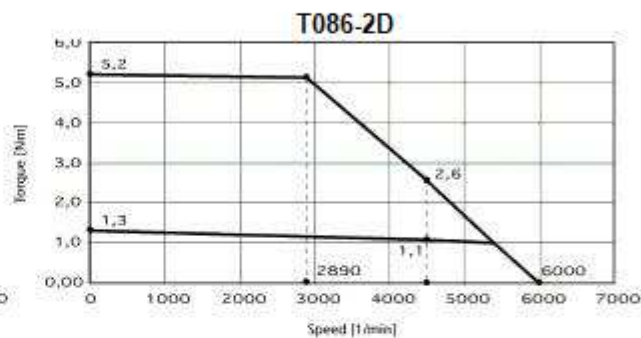
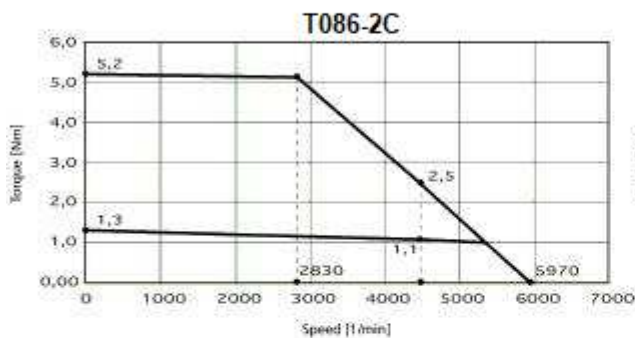
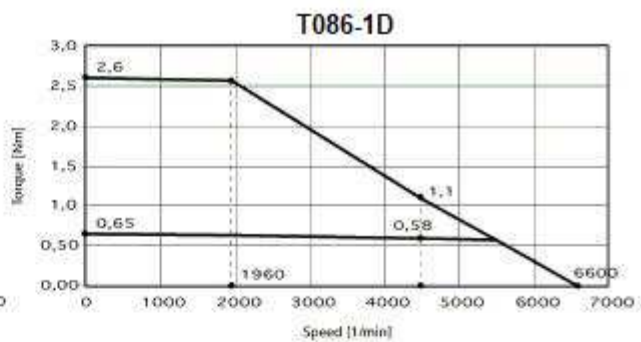
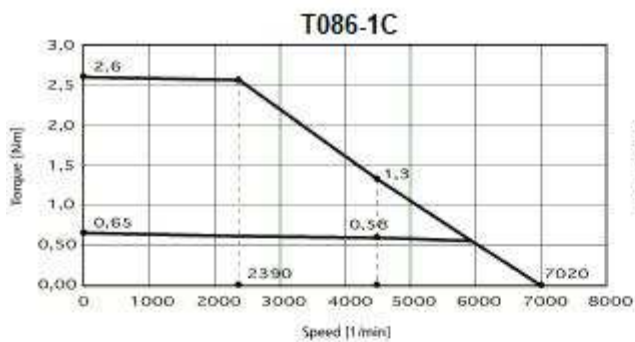


Dimensions

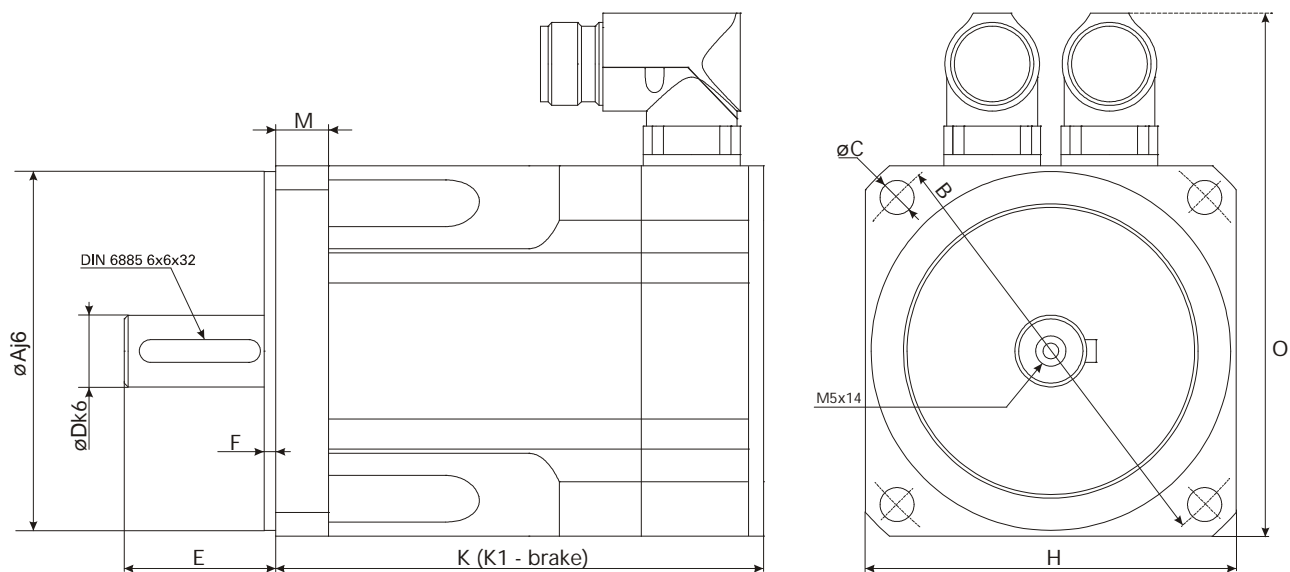
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T086-1	80	100	7	14	30	3	88	109	142	11	120
T086-2	80	100	7	14	30	3	88	127	160	11	120
T086-3	80	100	7	14	30	3	88	163	196	11	120
T086-4	80	100	7	14	30	3	88	181	214	11	120

Data	Sym	Unit	T086-1		T086-2		T086-3		T086-4	
Rated Speed	N _n	min ⁻¹	4500							
DC Bus Voltage	U _{dc}	V	320 / 560							
Nominal AC Voltage	U _n	V	200 / 330							
Motor Poles	P _{Mot}		6							
Resolver Poles	P _{Res}		2							
Rated Torque	M _n	Nm	0,58		1,1		2,0		2,1	
Rated AC Current	I _n	A	1,23	0,7	2,0	1,21	3,22	2,1	3,4	2,02
Stall Torque	M _o	Nm	0,65		1,3		2,5		3,0	
Stall AC Current	I _o	A	1,38	0,78	2,36	1,43	4,03	2,6	4,84	2,9
Peak Torque	M _{max}	Nm	2,6		5,2		10,0		12,0	
Peak Current	I _{max}	A	5,5	3,1	9,45	5,7	16,1	10,4	19,35	11,5
EMF Constant	K _E	V/1000	28,5	50,0	33,5	55,0	37,5	58,0	37,5	63,0
Torque Constant	K _T	Nm/A	0,47	0,83	0,55	0,91	0,62	0,96	0,62	1,04
Nominal Power	P _n	W	220		495		940		990	
Phase-phase resistance	R _{pp}	Ω	15,6	50,0	6,5	17,0	3,0	7,0	2,1	6,0
Phase-phase inductance	L _{pp}	mH	20,0	62,0	11,1	29,9	6,0	15,4	5,0	14,2
Rotor Inertia	J _m	kgcm ²	0,50		0,65		1,4		1,5	
Electrical Time Constant	T _{el}	ms	1,3	1,2	1,7	1,8	2,0	2,2	2,4	2,3
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} 320 / 560 V]

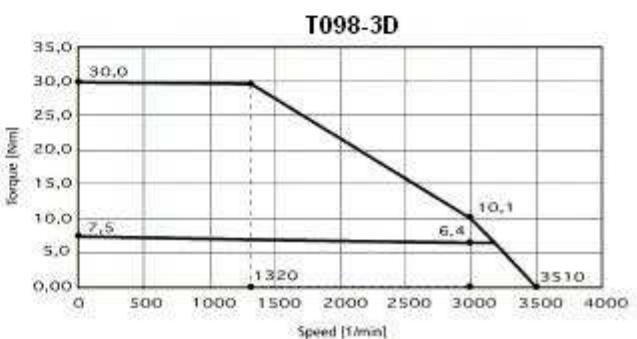
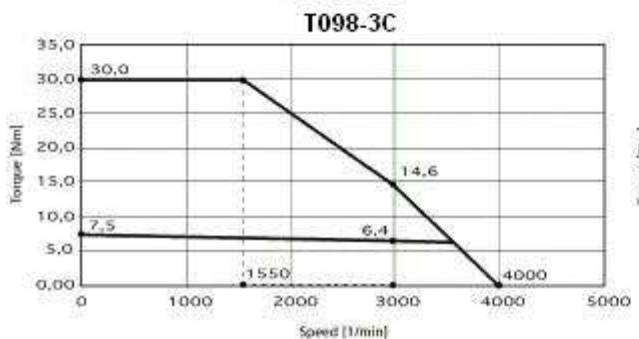
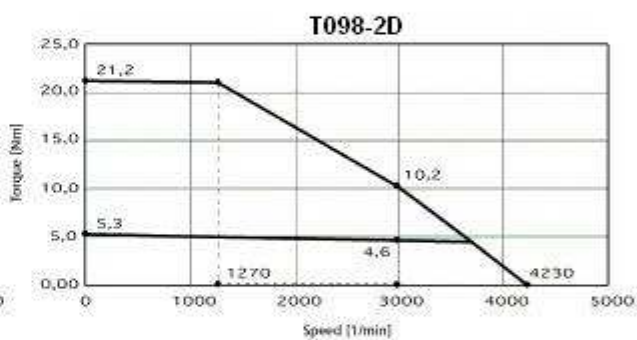
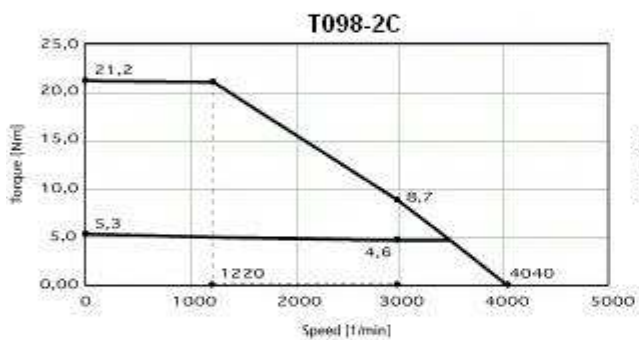
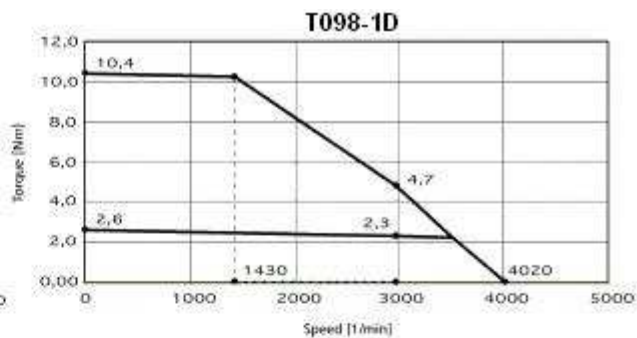
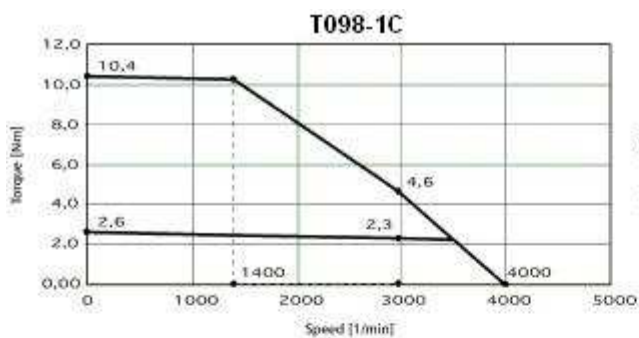


Dimensions

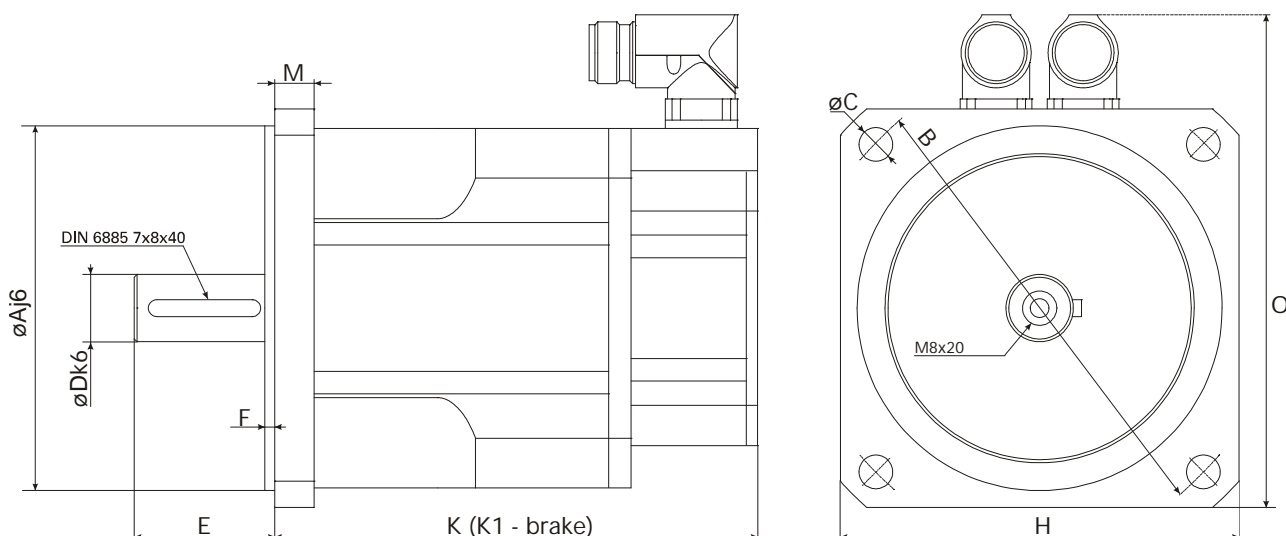
Type	A _{J6}	B	C	D _{K6}	E	F	H	K	K1	M	O (turn. conn.)
T098-1	95	115	9	19	40	3	98	146	178	14	137
T098-2	95	115	9	19	40	3	98	176	208	14	137
T098-3	95	115	9	19	40	3	98	221	253	14	137

Data	Sym	Unit	T098-1		T098-2		T098-3	
Rated Speed	N _n	min ⁻¹	3000					
DC Bus Voltage	U _{dc}	V	320 / 560					
Nominal AC Voltage	U _n	V	200 / 330					
Motor Poles	P _{Mot}		6					
Resolver Poles	P _{Res}		2					
Rated Torque	M _n	Nm	2,3		4,6		6,4	
Rated AC Current	I _n	A	2,77	1,7	5,6	3,56	7,7	4,1
Stall Torque	M _o	Nm	2,6		5,3		7,5	
Stall AC Current	I _o	A	3,1	1,92	6,46	4,1	9,04	4,8
Peak Torque	M _{max}	Nm	10,4		21,2		30,0	
Peak Current	I _{max}	A	12,5	7,64	25,85	16,4	36,1	19,35
EMF Constant	K _E	V/1000	50,0	82,0	49,5	78,0	50,0	94,0
Torque Constant	K _T	Nm/A	0,83	1,36	0,82	1,29	0,83	1,55
Nominal Power	P _n	W	720		1440		2010	
Phase-phase resistance	R _{pp}	Ω	3,6	9,6	1,66	4,2	0,87	3,0
Phase-phase inductance	L _{pp}	mH	15,9	41,5	9,8	24,0	5,6	19,2
Rotor Inertia	J _m	kgcm ²	1,9		2,7		4,2	
Electrical Time Constant	T _{el}	ms	4,4	4,3	5,9	5,7	6,4	6,4
Weight w/o brake		kg	4,5		5,6		7,7	
Weight incl. brake		kg	5,32		6,42		8,52	

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



9. Series T142 [U_{dc} 320 / 560 V]

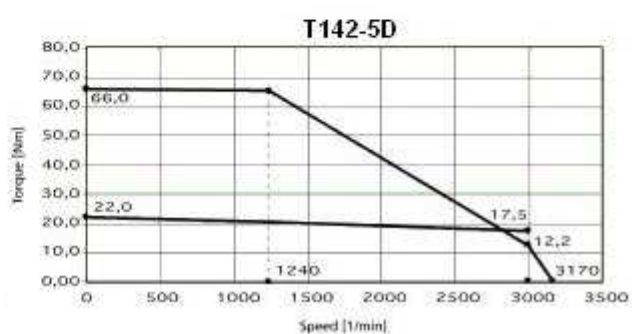
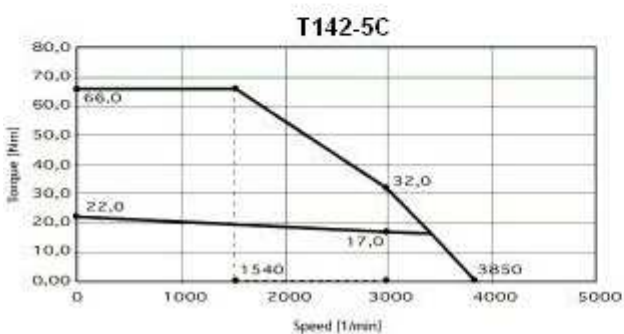
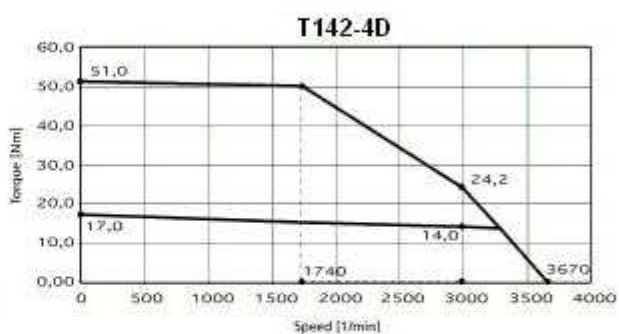
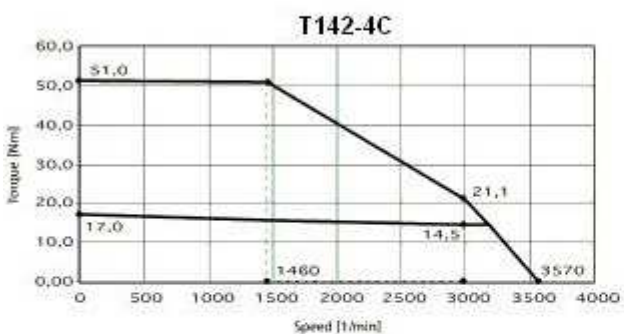
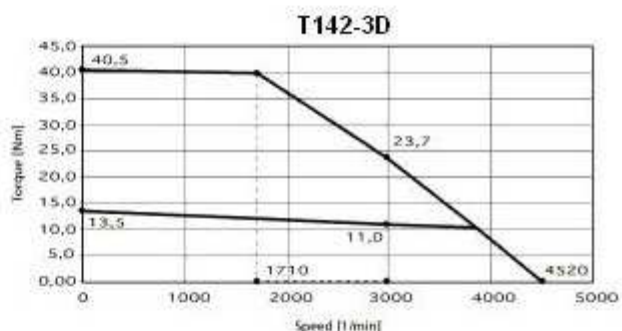
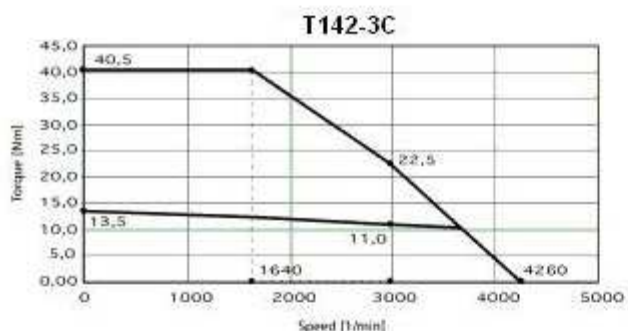
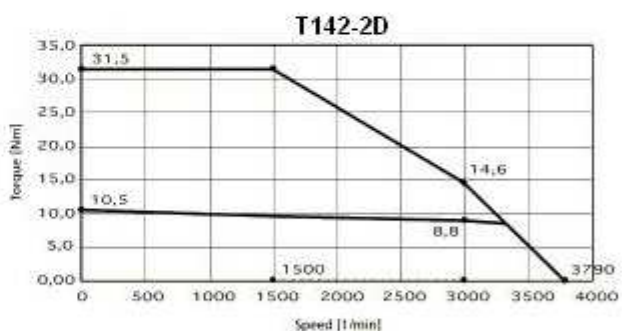
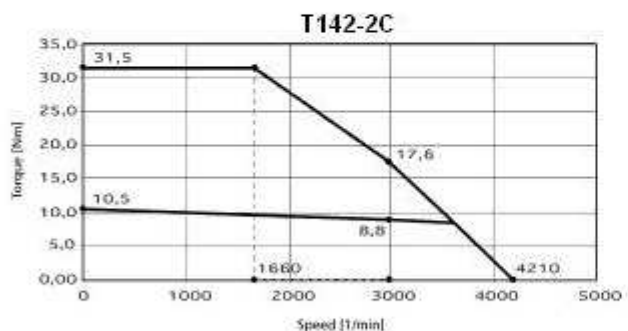
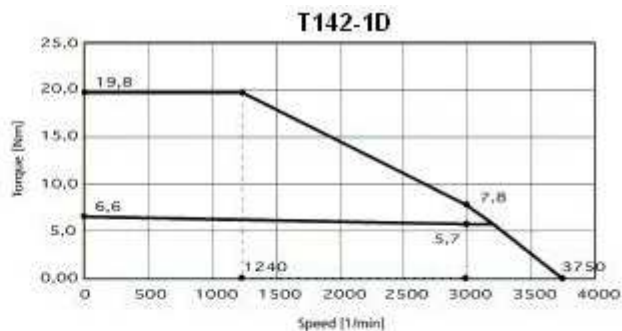
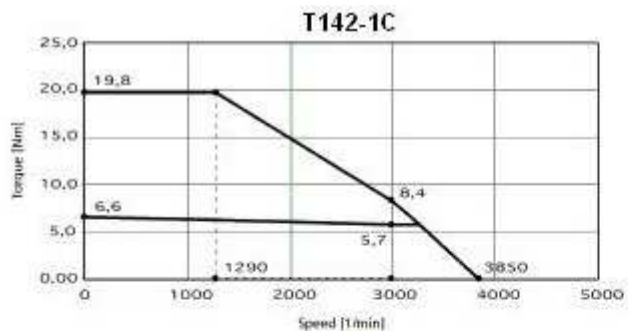


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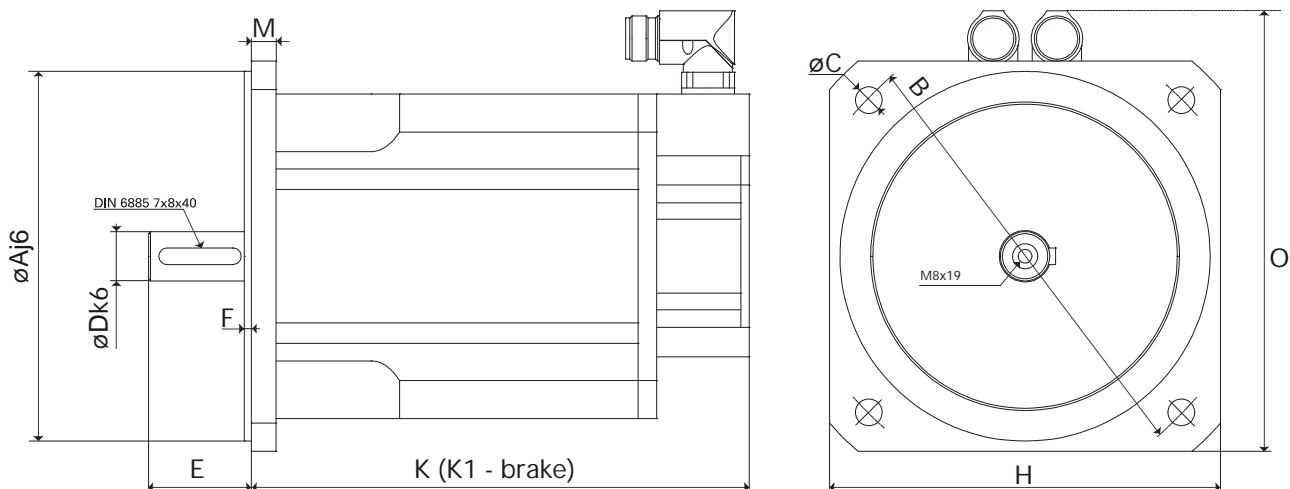
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O
T142-1	130	165	12	24	50	3,5	142	185	228	14	174
T142-2	130	165	12	24	50	3,5	142	219	262	14	174
T142-3	130	165	12	24	50	3,5	142	236	279	14	174
T142-4	130	165	12	24	50	3,5	142	270	313	14	174
T142-5	130	165	12	24	50	3,5	142	304	347	14	174

Data	Sym	Unit	T142-1	T142-2	T142-3	T142-4	T142-5					
Rated Speed	N _n	min ⁻¹	3000									
DC Bus Voltage	U _{dc}	V	320 / 560									
Nominal AC Voltage	U _n	V	200 / 330									
Motor Poles	P _{Mot}		6									
Resolver Poles	P _{Res}		2									
Rated Torque	M _n	Nm	5,7	8,8	11,0	14,0	17,5					
Rated AC Current	I _n	A	6,6	3,9	11,1	6,1	14,1	9,1	15,0	9,7	19,8	10,2
Stall Torque	M ₀	Nm	6,6	10,5	13,5	17,0	22,0					
Stall AC Current	I ₀	A	7,7	4,5	13,3	7,3	17,3	11,2	18,3	11,4	25,6	12,8
Peak Torque	M _{max}	Nm	19,8	32,0	41,0	51,0	66,0					
Peak Current	I _{max}	A	23	13,5	40,5	22,2	52,5	33,9	54,8	34,2	76,7	38,4
EMF Constant	K _E	V/1000	52,0	88,0	47,5	87,0	47,0	73,0	56,0	90,0	52,0	104,0
Torque Constant	K _T	Nm/A	0,86	1,46	0,79	1,44	0,78	1,21	0,93	1,49	0,86	1,72
Nominal Power	P _n	W	1790	2760	3450	4550	5500					
Phase-phase resistance	R _{pp}	Ω	1,44	4,2	0,51	1,70	0,38	0,95	0,36	0,95	0,24	0,95
Phase-phase inductance	L _{pp}	mH	9,6	27,8	4,6	15,2	3,6	9,0	3,8	10,0	2,6	10,5
Rotor Inertia	J _m	kgcm ²	4,0	6,2	7,3	9,5	11,7					
Electrical Time Constant	T _{el}	ms	6,7	9,0	9,5	10,6	10,8	11,1				
Weight w/o brake		kg	7,5	10,0	11,2	13,7	16,2					
Weight incl. brake		kg	9,3	11,8	13,0	15,5	18,0					

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



10. Series T190 [U_{dc} 320 / 560 V]

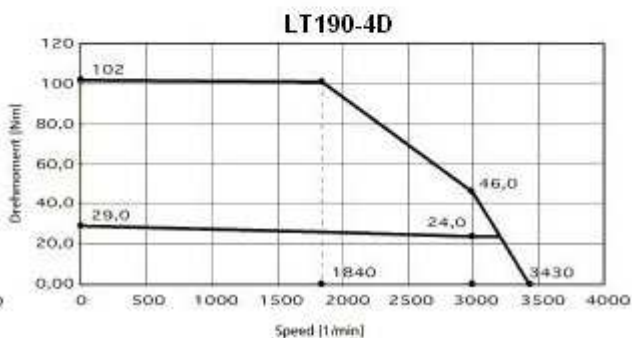
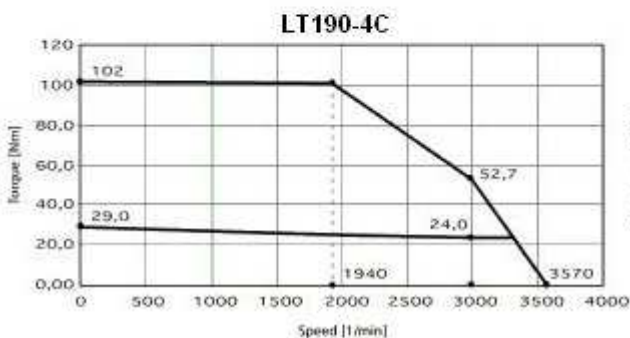
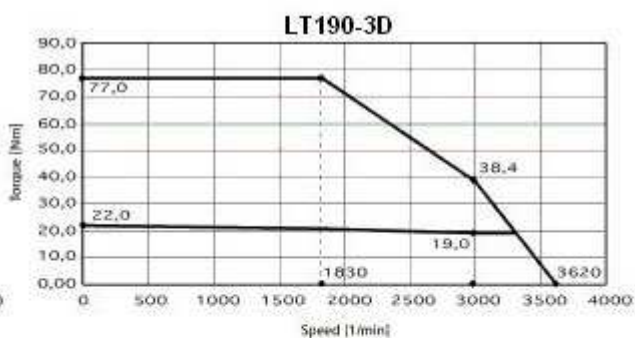
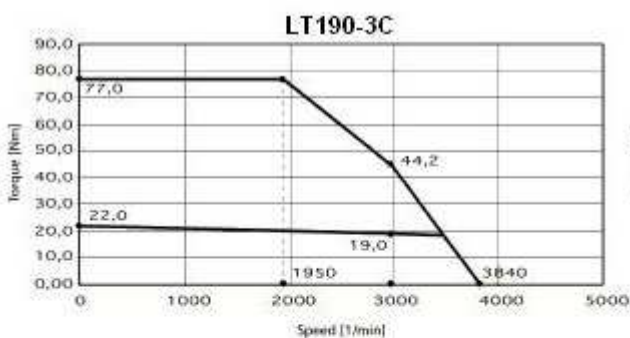
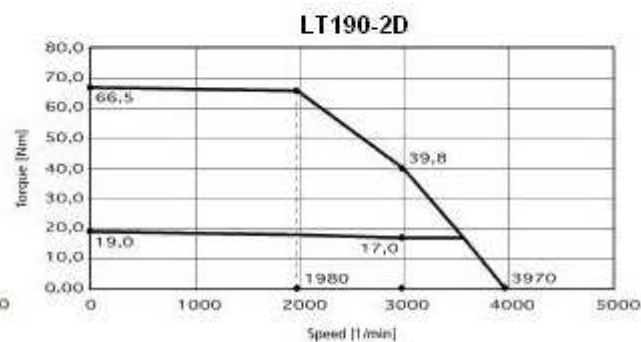
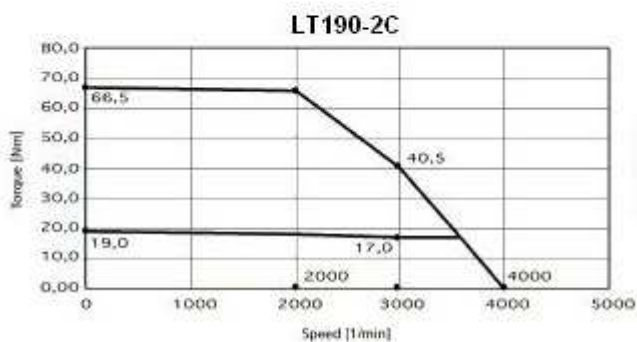
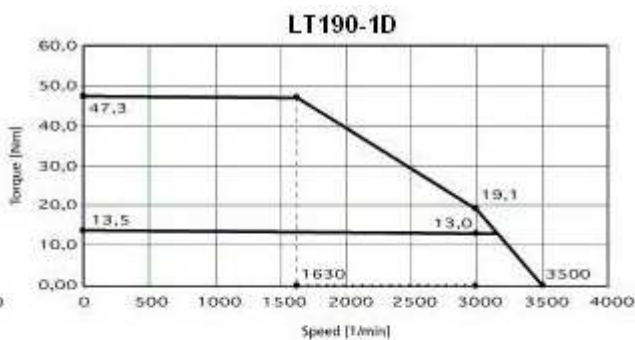
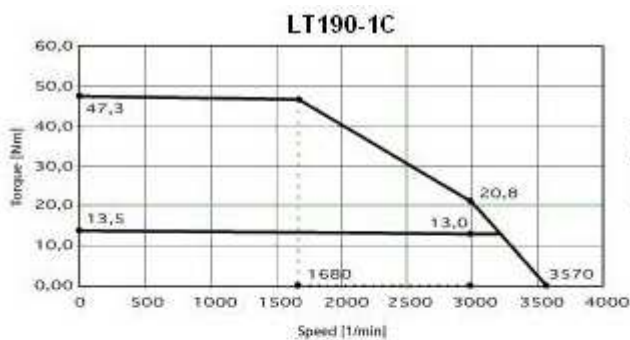


Dimensions

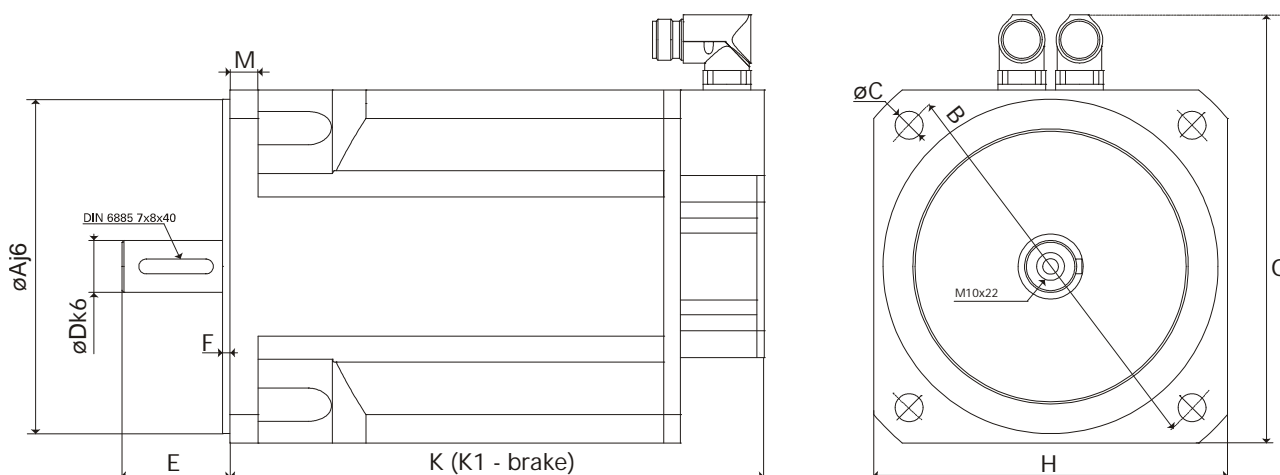
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T190-1	180	215	12	24	50	3,5	190	201	254	12	213
T190-2	180	215	12	24	50	3,5	190	235	288	12	213
T190-3	180	215	12	24	50	3,5	190	250	303	12	213
T190-4	180	215	12	24	50	3,5	190	310	363	12	213

Data	Sym	Unit	T190-1	T190-2	T190-3	T190-4				
Rated Speed	N _n	min ⁻¹	3000							
DC Bus Voltage	U _{dc}	V	320 / 560							
Nominal AC Voltage	U _n	V	200 / 330							
Motor Poles	P _{Mot}		6							
Resolver Poles	P _{Res}		2							
Rated Torque	M _n	Nm	13,0	17,0	19,0	24,0				
Rated AC Current	I _n	A	14,0	7,9	20,5	12,4	22,1	12,6	25,8	14,7
Stall Torque	M _o	Nm	13,5	19,0	22,0	29,0				
Stall AC Current	I _o	A	14,5	8,2	22,9	13,9	25,6	14,6	31,2	17,2
Peak Torque	M _{max}	Nm	47,0	67,0	77,0	87				
Peak Current	I _{max}	A	50,5	28,5	80,7	48,9	89,5	51	109,7	73
EMF Constant	K _E	V/1000	56,0	100,0	50,0	83,0	52,0	91,0	56,0	105,0
Torque Constant	K _T	Nm/A	0,93	1,65	0,83	1,37	0,86	1,51	0,93	1,69
Nominal Power	P _n	W	4080	5340	5970	7540				
Phase-phase resistance	R _{pp}	Ω	0,34	1,10	0,15	0,42	0,13	0,41	0,09	0,31
Phase-phase inductance	L _{pp}	mH	4,2	13,5	2,3	6,3	2,1	6,4	1,7	5,6
Rotor Inertia	J _m	kgcm ²	13,1	18,7	22,0	32,8				
Electrical Time Constant	T _{el}	ms	12,4	12,3	15,3	15,0	16,2	15,6	18,9	18,1
Weight w/o brake		kg	13,1	18,2	20,3	26,7				
Weight incl. brake		kg	15,96	21,06	23,16	29,56				

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



11. Series T191 [U_{dc} 320 / 560 V]

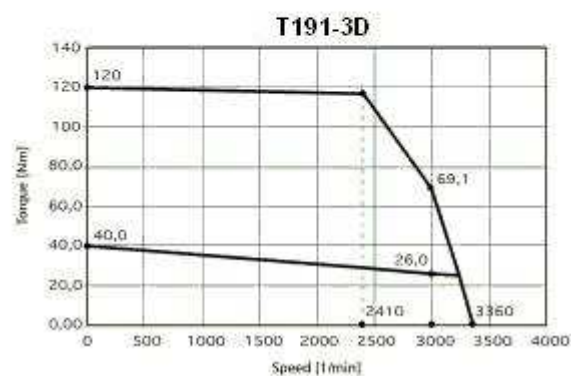
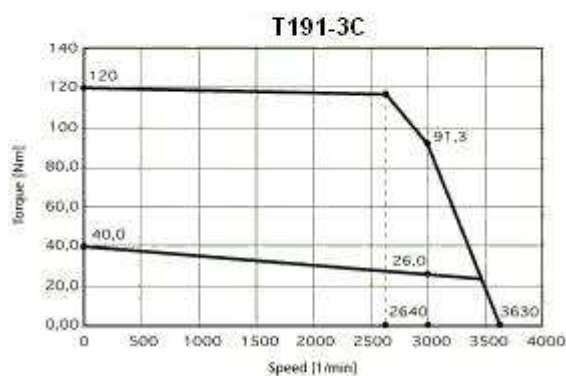
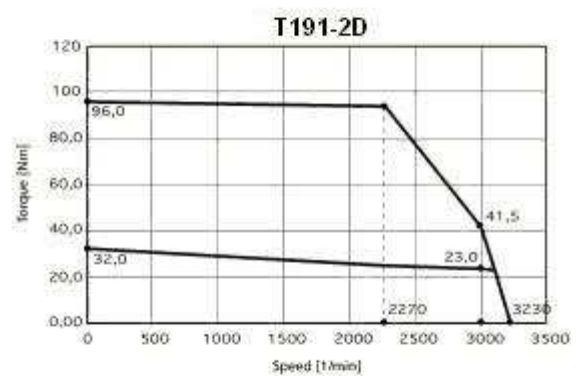
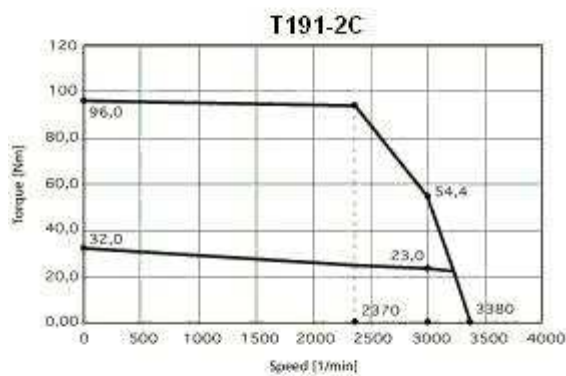
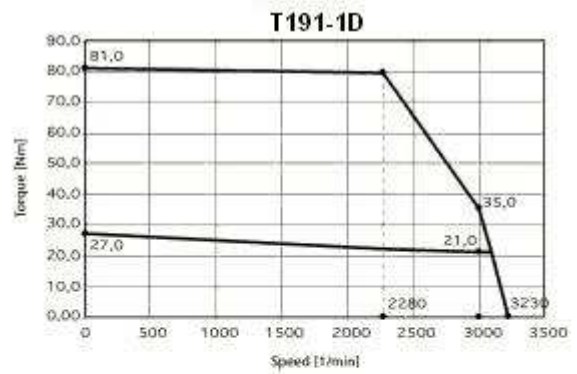
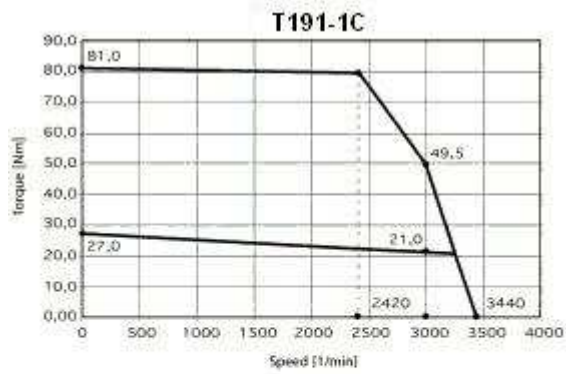


Dimensions

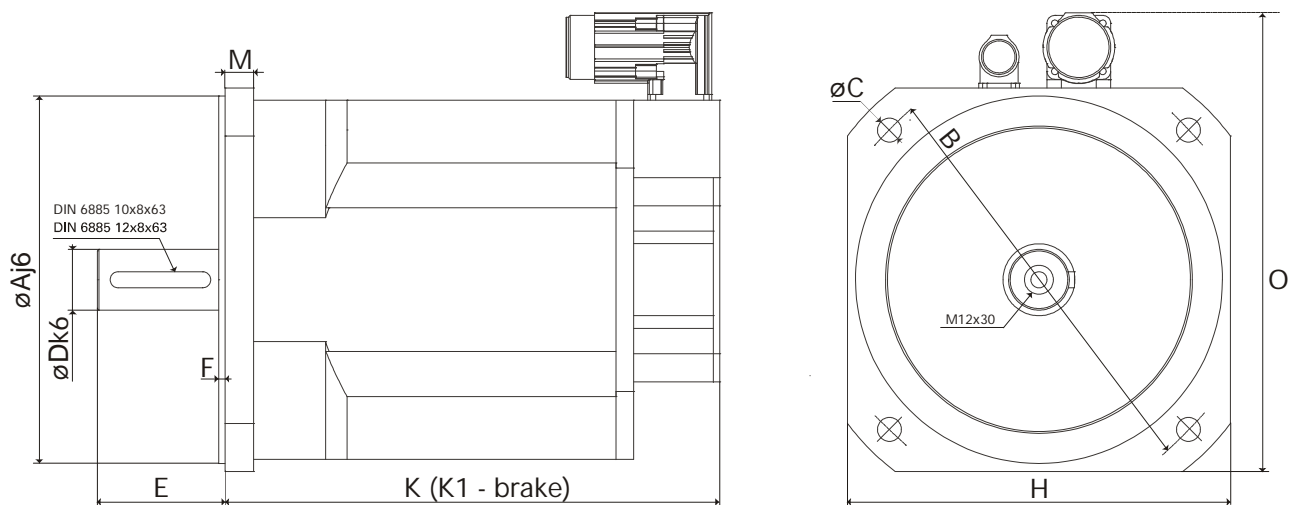
Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O (turn. conn.)
T191-1	180	215	14	28	58	4	190	242	296	15	229
T191-2	180	215	14	28	58	4	190	257	311	15	229
T191-3	180	215	14	28	58	4	190	287	341	15	229

Data	Sym	Unit	T191-1	T191-2	T191-3			
Rated Speed	N _n	min ⁻¹	3000					
DC Bus Voltage	U _{dc}	V	320 / 560					
Nominal AC Voltage	U _n	V	200 / 330					
Motor Poles	P _{Mot}		6					
Resolver Poles	P _{Res}		2					
Rated Torque	M _n	Nm	21,0	23,0	26,0			
Rated AC Current	I _n	A	21,9	12,4	23,5	15,0	28,6	16,0
Stall Torque	M _o	Nm	27,0	19,0	40,0			
Stall AC Current	I _o	A	28,1	15,8	32,7	18,9	44,0	24,7
Peak Torque	M _{max}	Nm	81,0	96,0	120,0			
Peak Current	I _{max}	A	84,4	47,9	98,0	74,0	131,9	74,1
EMF Constant	K _E	V/1000	58	102	59	107	55	98
Torque Constant	K _T	Nm/A	0,96	1,69	0,98	1,69	0,91	1,62
Nominal Power	P _n	W	6600	7160	8170			
Phase-phase resistance	R _{pp}	Ω	0,15	0,43	0,12	0,35	0,07	0,23
Phase-phase inductance	L _{pp}	mH	1,40	4,4	1,29	6,3	0,80	2,7
Rotor Inertia	J _m	kgcm ²	36,1	39,2	45,5			
Electrical Time Constant	T _{el}	ms	9,3	10,2	18,0	11,4	11,7	
Weight w/o brake		kg	23,5	26,0	31,5			
Weight incl. brake		kg	26,4	28,9	34,4			

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



12. Series T240 [U_{dc} 560 V]

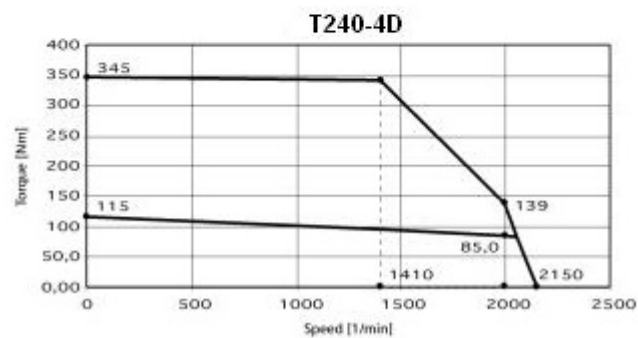
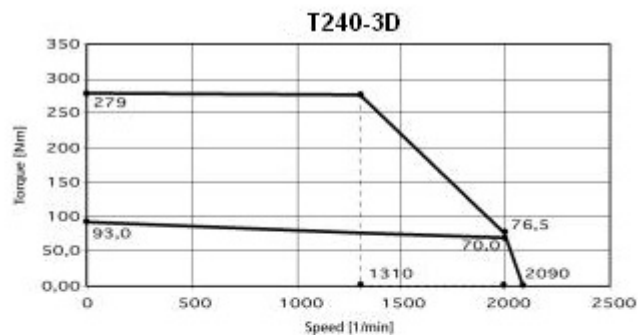
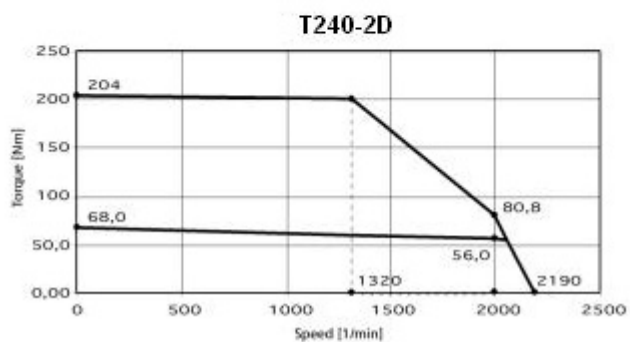
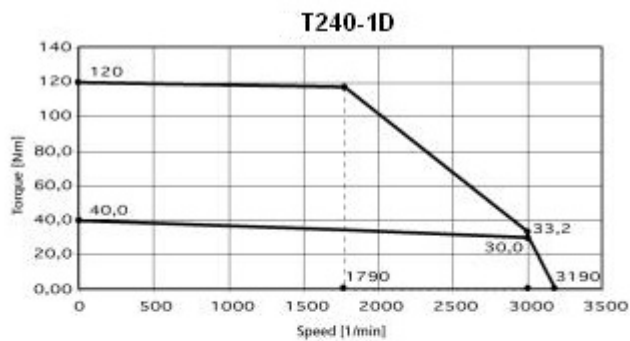


Dimensions

Type	A _{j6}	B	C	D _{k6}	E	F	H	K	K1	M	O
T240-1	230	265	14,5	38	80	4	240	311	379	18	287
T240-2	230	265	14,5	38	80	4	240	379	447	18	287
T240-3	230	265	14,5	42	110	4	240	447	515	18	287
T240-4	230	265	14,5	42	110	4	240	515	583	18	287

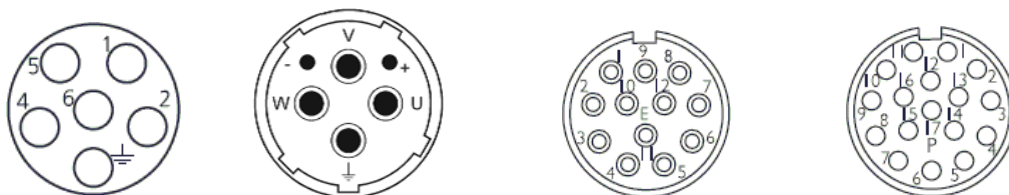
Data	Sym	Unit	T240-1	T240-2	T240-3	T240-4
Rated Speed	N _n	min ⁻¹	3000	2000		
DC Bus Voltage	U _{dc}	V	560			
Nominal AC Voltage	U _n	V	350			
Motor Poles	P _{Mot}		6			
Resolver Poles	P _{Res}		2			
Rated Torque	M _n	Nm	30,0	56,0	70,0	85,0
Rated AC Current	I _n	A	16,3	20,7	25,0	31,5
Stall Torque	M _o	Nm	40,0	68,0	93,0	115,0
Stall AC Current	I _o	A	21,7	25,2	33,2	42,6
Peak Torque	M _{max}	Nm	120	204	279	345
Peak Current	I _{max}	A	65,2	75,6	99,6	127,8
EMF Constant	K _E	V/1000	111,0	162,0	170,0	165,0
Torque Constant	K _T	Nm/A	1,84	2,7	2,8	2,7
Nominal Power	P _n	W	9420	11730	14660	17800
Phase-phase resistance	R _{pp}	Ω	0,25	0,24	0,15	0,11
Phase-phase inductance	L _{pp}	mH	5,7	6,3	4,8	3,4
Rotor Inertia	J _m	kgcm ²	76	114	153	190
Electrical Time Constant	T _{el}	ms	23,0	26,0	32,0	31,0
Weight w/o brake		kg	41	56	73	89
Weight incl. brake		kg	50,5	65,5	92,5	98,5

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



13. Connector occupancy

13.1. Movinor® T055–T240 : INFRANOR standard wiring



Motor plug T055 – T191-1
 Motor plug T191-2/3 – T240
 Resolver / Hiperface plug
 Incremental encoder plug

= Intercontec 923, Size 1, 6 pole
 = Intercontec 940, Size 1,5, 6 pole
 = Intercontec 623 12 pole
 = Intercontec 623 17 pole

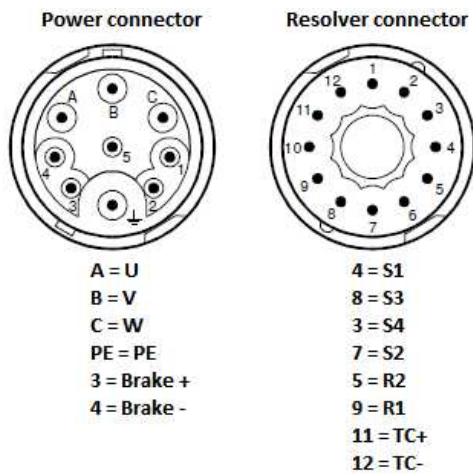
Motor T055 – T191-1			Motor LT0191-2/3 – T240		
Conductor	Pin	Description	Conductor	Pin	Description
3	1	= Phase W	1	U	= Phase U
1	2	= Phase U	2	V	= Phase V
2	4	= Phase V	3	W	= Phase W
gn/ye	--	= earth / SL	gn/ye	--	= earth / SL
5	5	= Brake +	5	+	= Brake +
6	6	= Brake -	6	-	= Brake -
				1	= n.c.
				2	= n.c.

Encoder Hiperface SRS-SRM50			Encoder incremental CNS50		
Conductor	Pin	Description	Conductor	Pin	Description
	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/
Conductor	Pin	Description		12	= Channel B
yellow	1	= Sin + (S2)		13	= Channel B/
blue	2	= Sin - (S4)		14	= Index Z
red	3	= Cos + (S1)		15	= Index Z/
black	4	= Cos - (S3)		16	= Temp. sensor
white-black	7	= Ref + (R2)		17	= Temp. sensor
white-red	8	= Ref - (R1)			
blue sky	5	= Thermo / PTC +			
white	6	= Thermo / PTC -			

13.2. Movinor® T037 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 -

13.3. Movinor® T037 90° rotatable Ytec double-receptacle option



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

14. Options

Permanent Magnet Brake

Data	Sym	Unit	T037	T055	T086	T098	T142	T190	T191	T240
Braking torque	M _{Br}	Nm	0,4	2,0	4,5	9,0	18,0	36,0	36,0	145,0
Nominal voltage	U _{BR}	VDC	24 (+ 6% - 10%)							
Nominal power	P _{BR}	W	8	11	12	18	24	26	26	50
Moment of inertia	J _{BR}	Kgcm ²	0,013	0,068	0,18	0,54	1,66	5,56	5,56	53

Keyway according to DIN 6885

Motor	T037	T055	T086	T098	T142	T190	T191	T240
shaft	6x16	9x24	14x30	19x40	24x50	24x50	28x58	38x80 42x110
keyway	2x2x10	3x3x18	5x5x22	6x6x32	7x8x40	7x8x40	7x8x40	10x8x63 12x8x63

Degree of protection IP 67

Special shaft / special flange

Angle connectors

Directed to either A or B-side, or turnable

Motor Feedback - various feedback systems on request

Additional inertia – additional rotor inertia on request

Frame size	Additional inertia [kg*cm ²]	
	With brake	Withtout brake *
T037	0.2	0.23
T055	0.8	0.84
T086	5.1	5.12
T098	14	14.98
T142	55	55.24
T190	170	169
T191	341	300
T240	690	500

* Remark: For the longest motor of each frame size with brake, additional inertia is not possible

15. Technical Data

15.1. 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]

16. Former Movinor® type code LT

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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LT	055	1	C	0	0	0	01	2	IP65	0	UL	EX	M5	Spec.

- 2: Motor size:** 37, 55, 86, 98, 140, 190 & 240mm
3: Torque & length size: 1 for lower, 2 for second, etc.
4: Winding (DC bus voltage): C: 320V, D: 560V
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)	18: EKS36 singleturn 18-bit Hiperface DSL
02: ERN 1185 SinCos with commutation signals	19: EKS36 singleturn 18-bit Hiperface DSL SIL2 Safety
03: ERN 1387 SinCos with commutation signals	20: EKM36 multeturn 18-bit Hiperface DSL
04: ECN 1113 singleturn EnDat	21: EKM36 multeturn 18-bit Hiperface DSL SIL2 Safety
05: ECN 1313 singleturn EnDat	22: SKS36S Safety
06: EQN 1125 multeturn EnDat	23: SKM36S Safety
07: EQN 1325 multeturn EnDat	24: SRS50S Safety
08: SRS50 singleturn Hiperface	25: SRM50S Safety
09: SRM50 multeturn Hiperface	26: CFS50 incremental with commutation signals
10: SKS36 singleturn Hiperface	27: SEK37 singleturn Hiperface
11: SKM36 multeturn Hiperface	28: SEL37 multeturn Hiperface
12: CNS50 incremental 2048 & commutation signals (HES 60°)	29: Quantum QM35 incremental up to 8192ppr
13: CNS50 incremental 4096 & commutation signals (HES 60°)	30: SEK34 singleturn Hiperface
14: not attributed	31: SEL34 multeturn Hiperface
15: CKS36 incr. 2048 & prog. Comm. signals up to 32 pole pairs	32: Hengstler AD34/1212AU.ONBIB
16: EQN 1325 multeturn EnDat 2.2 supply 3.6 to 14 V*	33: Quantum QR12 SinCos 500ppr
17: Sensorless	

9: Electrical connections:

0: straight cable outputs	18: M23/M40 17 pole angled towards rear INFRANOR resolver
1: M23/M40 straight INFRANOR	19: M23/M40 17 pole angled towards shaft INFRANOR resolver
2: M23/M40 angled towards rear INFRANOR	20: M23/M40 17 pole angled rotatable INFRANOR resolver*
3: M23/M40 angled towards shaft INFRANOR	21: M23/M40 straight INFRANOR DSL
4: M23/M40 straight SIEMENS	22: M23/M40 angled towards rear INFRANOR DSL
5: M23/M40 angled towards rear SIEMENS	23: M23/M40 angled towards shaft INFRANOR DSL
6: M23/M40 angled towards shaft SIEMENS	24: M23/M40 angled rotatable INFRANOR DSL
7: M23/M40 angled rotatable INFRANOR	25: not attributed
8: M23/M40 angled rotatable SIEMENS	26: not attributed
9: M23/M40 angled towards shaft incr. ABZ/UVW universal	27: not attributed
10: M23/M40 straight Bosch Rexroth	28: M17 angled rotatable INFRANOR
11: M23/M40 angled towards rear Bosch Rexroth	29: angled towards shaft cable outputs
12: M23/M40 angled towards shaft Bosch Rexroth	30: angled towards rear cable output
13: M23/M40 straight INFRANOR sensorless	31: Y-tec angled rotatable resolver INFRANOR
14: M23/M40 angled towards rear INFRANOR sensorless	32: Y-tec angled rotatable Hiperface INFRANOR
15: M23/M40 angled towards shaft INFRANOR sensorless	33: Y-tec angled rotatable Hiperface universal
16: M23/M40 angled rotatable INFRANOR sensorless	34: Y-tec angled rotatable BISS-B universal
17: M23/M40 17 pole straight INFRANOR resolver	35: Y-tec angled rotatable QR12 SinCos no UVW signals

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

07.11.2023 - Subject to modifications