

# ACS



## AC Servo motors



**Product  
Manual**

03-08-E-V0705.doc

UL: 05-01-04



Planetary gearbox nP - Product-manual

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UL: 12-01



Plugs - Product Description

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UL: 12-02



Cables - Product Description

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Thanks for your confidence choosing our product.

These operating instructions present themselves as an overview of the technical data and features.

Please read the operating instructions before operating the product.

If you have any questions, please contact your nearest SSD Drives representative. Improper application of the product in combination with dangerous voltage can lead to injuries.

In addition, damage can also occur to motors or other products. Therefore please observe our safety precautions strictly.

### **Safety precautions**

We assume that, as an expert, you are familiar with the relevant safety regulations, especially in accordance with VDE 0100, VDE 0113, VDE 0160, EN 50178, the accident prevention regulations of the employers liability insurance company and the DIN regulations and that you are able to use and apply them. As well, relevant European Directives must be observed.

Depending on the kind of application, additional regulations e.g. UL, DIN are subject to be observed.

If our products are operated in connection with components from other manufacturers, their operating instructions are also subject to be observed strictly.

## 1.1 Description

By using high-energy magnetic materials it is possible to design small diameter disk motors. For this reason and due to a carefully optimized technical construction of the rotor, the motors have a low moment of inertia.

The stability of the magnetic material and the design of the magnetic field in the face of demagnetisation allow maximum currents of up to **3- 4 times the rated current**.

The high acceleration capacity of the low-inertia three-phase AC servo drives is the result of this.

Through the excitation of the permanent magnets, no heat losses due to current occur in the rotor.

With the three-phase AC-servomotors AC G heat losses due to current occur only in the stator, which then can be directly drawn off.

These favorable cooling conditions allow high-capacity windings.

Since all the current heat losses are drawn off directly via the surface, the motors are designed at low cost with the enclosure type providing protection in accordance with **IP xx** and they are thus very resistant to liquids and dirt.

The resolver is built into the B-side bearing bracket.

The signals of this integrated measuring system for the actual speed value, the rotor position and the indirect position are taken at the motor over a 12-pin connector.

Synchronous three-phase AC servo drives have a series of advantages over the DC drives:

- no electromechanical parts to wear out, therefore "maintenance-free".
- a low moment of inertia of the rotor due to power density, therefore high acceleration capacity.
- no commutation limit curve, therefore high acceleration moments, also in higher speed ranges.
- no losses in the rotor of the motor, therefore favorable thermic qualities and a high degree of protection due to the closed construction.

Three-phase AC servomotors built in the way described, are specifically more efficient (higher rated torque) than DC servomotors and also have a small moment of inertia. The size necessary for an application will, for this reason, be smaller with three-phase AC servos than with DC servos.

### **Important !**

- The motor series AC S is not attachment- or pin-compatible to our drives AC M... or AC R.

## 1.2 Type to the model

Marking	Standard						optional	
	a	b	c	d	e	f	g	h
Model:	AC	XX	XXXX	-X	/X	-X	XX	+ ...

Marking	Description
a	AC = three-phase
b	motor series: S = motor series, standard S(L) = optional with separate fan
c	xxxx = approx. rated torque in Ncm
d	2..6 = *1000 1/min (designation does not apply with motor/gearbox systems)
e	/0..3 = motor sizes (designation does not apply with motor/gearbox systems)
f	-3 = 325 V DC Intermediate circuit rated voltage -6 = 565 V DC Intermediate circuit rated voltage
g	Identification for options and custom features: XX = see chapter 1.3
h	+ ... = with attached gear-box: for short description for inserted gearbox models see gearbox documentation

### 1.2.1 Typical example

A typical example of an order corresponding to the model key would be:

Model: AC S0340-3/1-3

AC = three phase  
S = motor series  
0340 = rated torque in Ncm  
-3 = 3000 1/min.  
/1 = motor size  
-3 = 325V DC

## 1.3 Possible options (Marking: g)

Marking	Options			and Marking	Description	A C S
	BR	GW	IP 65			
GW		X			smooth motor shaft	●
BR	X				holding brake, 24V DC	●
65			X		degree of protection IP 65	□
BG	X	X				●
AI					absolute or incremental encoder preparation of attachment	●
BI	X			AI		●
PL					electrical connections via PG couplings and cable ends	●
KL					motor connections with terminal box	●
2P					2 <sup>nd</sup> featherkey way	●
6P			X	2P		●
90					flange receptacle for motor and resolver 90° angled	●
GP		X		PL		●
G6		X	X			●
MS					mech. custom designs	●
PU				PL	unpainted motor	●
PS		X		PU		●
SL					special finish	●
PL				SL	special finish plasma coated	●
HL				SL	special finish silver	●
GK		X			smooth motor shaft shortend	●
VA	X	X		PL		●
R6			X		rust-proof motor shaft	●
P6			X	PL		●
B6	X		X			●
F6			X		flange receptacle B-side	□
VI	X	X		AI		●
GI		X		AI		●
V6	X	X	X			●
L6		X	X	PL		●
BL	X		X	PL		●
B4	X				flange B 14	●
VR		X		PL+R6+AI		●
S6			X	PL+R6+2P		●
GZ		X			with Centre hole	●
N6		X	X		with special rotation speed about software (6000)	□
HW		X			with Hollow shaft	□
T6			X		for tropical climate	□
X6				F6 + 2P		□

- standard design
- optional
- not possible

		A
		C
		S
Degree of protection:	IP44	<input type="checkbox"/>
with mounted mating	IP54 (with separate fan)	<input checked="" type="checkbox"/>
connectors and built-on motor	IP56	<input checked="" type="checkbox"/>
Magnetic material:	NdFeB	<input type="checkbox"/>
	SE	<input checked="" type="checkbox"/>
Electrical connections:	straight flanged sockets	<input checked="" type="checkbox"/>
	terminal box	<input checked="" type="checkbox"/>
	rotatable 90° angled for moto-, resolver- and thermal connection-flanged sockets	<input checked="" type="checkbox"/>
	PG couplings with cable ends	<input checked="" type="checkbox"/>
Thermal protection of motor:	thermal detector PTC	<input checked="" type="checkbox"/>
Power:	In accordance with DIN VDE 0530 installation site: 1000 ASL T = 100K, Tu 40°C measured with attached cooling surface	<input checked="" type="checkbox"/>
Voltage:	325 V DC	<input checked="" type="checkbox"/>
	565 V DC	<input checked="" type="checkbox"/>
	other windings are possible.	<input checked="" type="checkbox"/>
Cooling:	IC 0041 surface cooling	<input checked="" type="checkbox"/>
	IC 0641 surface cooling with fan	<input checked="" type="checkbox"/>
Operating mode:	Continuous operation S1	<input checked="" type="checkbox"/>
Bearings:	Deep-groove ball bearings with permanent lubrication , lifetimer > 20.000 h	<input checked="" type="checkbox"/>
Motor shaft: (standard)	with fitting key in accordance with DIN 6885	<input checked="" type="checkbox"/>
Rotational accuracy:	N, in acc. with DIN ISO 2373	<input checked="" type="checkbox"/>
Number of pole pairs:	2	<input type="checkbox"/>
	3	<input checked="" type="checkbox"/>
Resolver type:	2 pole Eurotherm transmitter resolver	<input checked="" type="checkbox"/>
Insulation class	F (EN 60034 / VDE 0530), 155° C, heating 105° K	<input checked="" type="checkbox"/>
Varnish: (standard)	similar RAL 9005 (black)	<input checked="" type="checkbox"/>

- standard design
- optional
- not possible



## 3.1 Motor without separate fan Motor size 01 ... 3

AC-Servomotor Model:	size	Technical data					Static torque	Static current	max. Static torque	Moment of inertia included Resolver
		Nominal speed	Nominal power	Rated torque	Rated current with					
		$n_N$ ( $\text{min}^{-1}$ )	$P_N$ (KW)	$M_N$ (Nm)	325 V DC $I_{N325}$ (A)	565 V DC $I_{N565}$ (A)	$M_0$ (Nm)	$I_0$ (A)	$M_{0max}$ (Nm)	$J_M$ ( $\text{kgcm}^2$ )
AC S 0053-6/01-7	01	6000	0,33	0,53	-	0,95	0,97	1,52	3,50	0,54
AC S 0080-4/01-3	01	4000	0,34	0,81	1,34	-	0,97	1,52	3,50	0,54
AC S 0080-3/01-3	01	3000	0,27	0,87	1,42	-	0,97	1,52	3,50	0,54
AC S 0067-6/01-7	01	6000	0,42	0,67	-	1,23	1,34	2,09	5,20	0,54
AC S 0110-4/01-3	01	4000	0,44	1,06	1,77	-	1,34	2,10	5,20	0,54
AC S 0105-4/01-7	01	4000	0,44	1,06	-	1,77	1,34	2,09	5,20	0,54
AC S 0130-3/01-3	01	3000	0,38	1,20	1,95	-	1,34	2,10	5,20	0,54
AC S 0120-3/01-7	01	3000	0,38	1,20	-	1,01	1,34	1,09	5,20	0,54
AC S 0082-6/1-3	1	6000	0,52	0,82	2,54	-	2,15	5,75	8,00	1,85
AC S 0082-6/1-7	1	6000	0,52	0,82	-	1,68	2,15	3,79	8,00	1,85
AC S 0082-6/1-7	1	6000	0,52	0,82	-	1,29	2,15	2,92	8,00	1,85
AC S 0150-4/1-3	1	4000	0,67	1,59	2,94	-	2,15	3,79	8,00	1,85
AC S 0170-3/1-3	1	3000	0,56	1,78	2,49	-	2,15	2,92	8,00	1,85
AC S 0170-3/1-7	1	3000	0,56	1,78	-	1,47	2,15	1,73	8,00	1,85
AC S 0180-2/1-7	1	2000	0,41	1,95	-	1,06	2,15	1,15	8,00	1,85
AC S 0160-6/1-3	1	6000	1,01	1,60	4,79	325	4,20	11,06	16,00	3,53
AC S 0160-6/1-7	1	6000	1,01	1,60	-	3,16	4,20	7,30	16,00	3,53
AC S 0300-4/1-3	1	4000	1,30	3,10	5,62	-	4,20	7,30	16,00	3,53
AC S 0340-3/1-3	1	3000	1,09	3,48	4,79	-	4,20	5,62	16,00	3,53
AC S 0340-3/1-7	1	3000	1,09	3,48	-	2,83	4,20	3,32	16,00	3,53
AC S 0170-6/2-3	2	6000	1,07	1,70	5,53	-	6,90	18,39	20,80	8,20
AC S 0170-6/2-7	2	6000	1,07	1,70	-	3,65	6,90	12,14	20,80	8,20
AC S 0460-4/2-3	2	4000	1,74	4,15	7,70	-	6,90	12,14	20,80	8,20
AC S 0510-3/2-3	2	3000	1,60	5,08	7,10	-	6,90	9,34	20,80	8,20
AC S 0520-3/2-7	2	3000	1,60	5,08	-	4,19	6,90	5,52	20,80	8,20
AC S 0290-6/2-3	2	6000	1,82	2,90	8,93	-	10,00	26,42	32,00	12,30
AC S 0290-6/2-7	2	6000	1,82	2,90	-	5,89	10,00	17,44	32,00	12,30
AC S 0720-4/2-3	2	4000	3,01	7,19	13,03	-	10,00	17,44	32,00	12,30
AC S 0835-3/2-3	2	3000	2,62	8,35	11,48	-	10,00	13,42	32,00	12,30
AC S 0835-3/2-7	2	3000	2,62	8,35	-	6,78	10,00	7,93	32,00	12,30
AC S 0860-2/2-7	2	2000	1,88	8,97	-	4,81	10,00	5,29	32,00	12,30
AC S 1000-4/3-3	3	4000	4,45	10,62	19,15	-	14,60	25,50	44,00	30,00
AC S 1100-3/3-7	3	3000	3,77	12,00	-	9,72	14,62	11,60	44,00	30,00
AC S 1300-2/3-7	3	2000	2,72	13,00	-	6,97	14,62	7,73	44,00	30,00
AC S 1700-3/3-7	3	3000	4,99	15,88	-	12,82	21,54	16,97	68,00	46,00
AC S 1850-2/3-7	3	2000	3,80	18,14	-	9,67	21,54	11,32	68,00	46,00
AC S 2000-3/3-7	3	3000	6,10	19,41	-	15,65	28,00	22,00	92,00	62,00
AC S 2300-2/3-7	3	2000	4,79	22,88	-	12,16	28,00	14,67	92,00	62,00

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**Motor without separate fan Motor size 01 ... 3**

AC-Servomotor	size	Mass	Motor resistance	Motor inductance	Thermal time constant with IN	Torque constant	EMK-Konstante eff.
Model:		m	R <sub>ph/ph</sub>	L <sub>ph/ph</sub>	T <sub>thN</sub>	K <sub>T</sub>	K <sub>E</sub>
		(kg)	(Ω)	(mH)	(min)	(Nm/A)	(V/1000 min <sup>-1</sup> )
AC S 0053-6/01-7	01	2,38	20,00	57,50	15	0,677	50
AC S 0080-4/01-3	01	2,38	20,00	57,50	15	0,677	50
AC S 0080-3/01-3	01	2,38	20,00	57,50	15	0,677	50
AC S 0067-6/01-7	01	2,88	10,50	30,00	18	0,668	50
AC S 0110-4/01-3	01	2,88	10,50	30,00	18	0,668	50
AC S 0105-4/01-7	01	2,88	10,50	30,00	18	0,668	50
AC S 0130-3/01-3	01	2,88	10,50	30,00	18	0,668	50
AC S 0120-3/01-7	01	2,88	40,10	111,30	18	1,287	110
AC S 0082-6/1-3	1	5,24	2,00	6,27	28	0,386	33
AC S 0082-6/1-7	1	5,24	4,25	14,10	28	0,585	50
AC S 0082-6/1-7	1	5,24	7,80	25,07	28	0,760	65
AC S 0150-4/1-3	1	5,24	4,25	14,10	28	0,585	50
AC S 0170-3/1-3	1	5,24	7,80	25,07	28	0,760	65
AC S 0170-3/1-7	1	5,24	20,65	71,80	28	1,287	110
AC S 0180-2/1-7	1	5,24	43,38	159,00	28	1,929	165
AC S 0160-6/1-3	1	6,70	0,70	2,65	32	0,386	33
AC S 0160-6/1-7	1	6,70	1,35	5,65	32	0,585	50
AC S 0300-4/1-3	1	6,70	1,35	5,65	32	0,585	50
AC S 0340-3/1-3	1	6,70	2,35	10,37	32	0,760	65
AC S 0340-3/1-7	1	6,70	6,40	29,28	32	1,287	110
AC S 0170-6/2-3	2	11,90	0,32	1,65	31	0,386	33
AC S 0170-6/2-7	2	11,90	0,67	3,72	31	0,585	50
AC S 0460-4/2-3	2	11,90	0,67	3,72	31	0,585	50
AC S 0510-3/2-3	2	11,90	1,20	6,61	31	0,760	65
AC S 0520-3/2-7	2	11,90	3,24	18,00	31	1,287	110
AC S 0290-6/2-3	2	14,50	0,19	1,16	35	0,386	33
AC S 0290-6/2-7	2	14,50	0,41	2,37	35	0,585	50
AC S 0720-4/2-3	2	14,50	0,41	2,37	35	0,585	50
AC S 0835-3/2-3	2	14,50	0,74	4,44	35	0,760	65
AC S 0835-3/2-7	2	14,50	2,00	12,00	35	1,287	110
AC S 0860-2/2-7	2	14,50	4,48	25,90	35	1,929	165
AC S 1000-4/3-3	3	22,50	0,18	1,38	42	0,585	50
AC S 1100-3/3-7	3	22,50	0,90	7,40	42	1,287	110
AC S 1300-2/3-7	3	22,50	1,90	16,00	42	1,929	165
AC S 1700-3/3-7	3	25,30	0,57	6,00	47	1,287	110
AC S 1850-2/3-7	3	25,30	1,30	13,50	47	1,929	110
AC S 2000-3/3-7	3	28,00	0,38	4,40	52	1,287	110
AC S 2300-2/3-7	3	28,00	0,78	9,18	52	1,929	165

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## 3.2 Motor with separate fan Motor size 1.1 ... 3.1

AC-Servomotor Model:	size	Technical data					Static torque	Static current	max. Static torque	Moment of inertia included Resolver
		Nominal speed	Nominal power	Rated torque	Rated current with					
		$n_N$ ( $\text{min}^{-1}$ )	$P_N$ (KW)	$M_N$ (Nm)	325 V DC $I_{N325}$ (A)	565 V DC $I_{N565}$ (A)	$M_0$ (Nm)	$I_0$ (A)	$M_{0\text{max}}$ (Nm)	$J_M$ ( $\text{kgcm}^2$ )
AC SL 0115-6/1-7	1,1	6000	0,72	1,15	-	1,72	3,01	4,05	8,00	1,85
AC SL 0210-4/1-3	1,1	4000	0,93	2,23	4,03	-	3,01	5,26	8,00	1,85
AC SL 0250-3/1-3	1,1	3000	0,78	2,49	3,43	-	3,01	4,05	8,00	1,85
AC SL 0250-3/1-7	1,1	3000	0,78	2,49	-	2,02	3,01	2,39	8,00	1,85
AC SL 0270-2/1-3	1,1	2000	0,57	2,73	2,2	-	3,01	2,39	8,00	1,85
AC SL 0220-6/1-7	1,2	6000	1,41	2,24	-	3,28	5,88	7,83	16,00	3,53
AC SL 0430-4/1-3	1,2	4000	1,82	4,34	7,74	-	5,88	10,17	16,00	3,53
AC SL 0490-3/1-3	1,2	3000	1,53	4,87	6,62	-	5,88	7,83	16,00	3,53
AC SL 0490-3/1-7	1,2	3000	1,53	4,87	-	3,91	5,88	4,62	16,00	3,53
AC SL 0530-2/1-7	1,2	2000	1,11	5,32	-	2,83	5,88	3,08	16,00	3,53
AC SL 0420-6/2-7	2,1	6000	2,64	4,20	-	6,10	9,18	12,34	20,80	8,20
AC SL 0700-4/2-3	2,1	4000	2,95	7,04	12,64	-	9,18	16,03	20,80	8,20
AC SL 0780-3/2-3	2,1	3000	2,46	7,83	10,72	-	9,18	12,34	20,80	8,20
AC SL 0780-3/2-7	2,1	3000	2,46	7,83	-	6,33	9,18	7,29	20,80	8,20
AC SL 0840-2/2-7	2,1	2000	1,77	8,45	-	4,52	9,18	4,86	20,80	8,20
AC SL 0670-6/2-7	2,2	6000	4,21	6,70	-	9,54	13,40	17,89	32,00	12,30
AC SL 1120-4/2-3	2,2	4000	4,71	11,25	19,97	-	13,40	23,25	32,00	12,30
AC SL 1250-3/2-3	2,2	3000	3,92	12,47	16,90	-	13,40	17,89	32,00	12,30
AC SL 1120-3/2-7	2,2	3000	3,92	12,47	-	9,98	13,40	10,57	32,00	12,30
AC SL 1280-2/2-7	2,2	2000	2,69	12,85	-	6,83	13,40	7,05	32,00	12,30
AC SL 1270-6/3-7	3,1	6000	7,98	12,70	-	17,66	19,50	26,05	44,00	30,00
AC SL 1390-4/3-3	3,1	4000	7,06	16,85	29,79	-	19,50	33,85	44,00	30,00
AC SL 1810-3/3-3	3,1	3000	5,70	18,15	24,55	-	19,50	26,05	44,00	30,00
AC SL 1540-3/3-7	3,1	3000	5,70	18,15	-	14,50	19,50	15,39	44,00	30,00
AC SL 1880-2/3-7	3,1	2000	3,95	18,85	-	10,00	19,50	10,26	44,00	30,00
AC SL 2380-3/3-7	3,1	3000	7,46	23,76	-	18,95	27,50	21,61	68,00	46,00
AC SL 2570-2/3-7	3,1	2000	5,38	25,70	-	13,59	27,50	14,41	68,00	46,00
AC SL 2900-3/3-7	3,1	3000	9,07	28,86	-	22,99	34,90	27,36	92,00	62,00
AC SL 3480-2/3-7	3,1	2000	6,70	31,97	-	16,87	34,90	18,25	92,00	62,00

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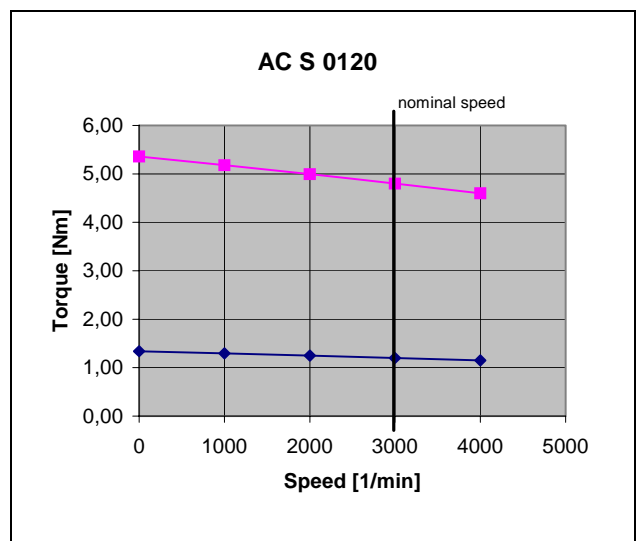
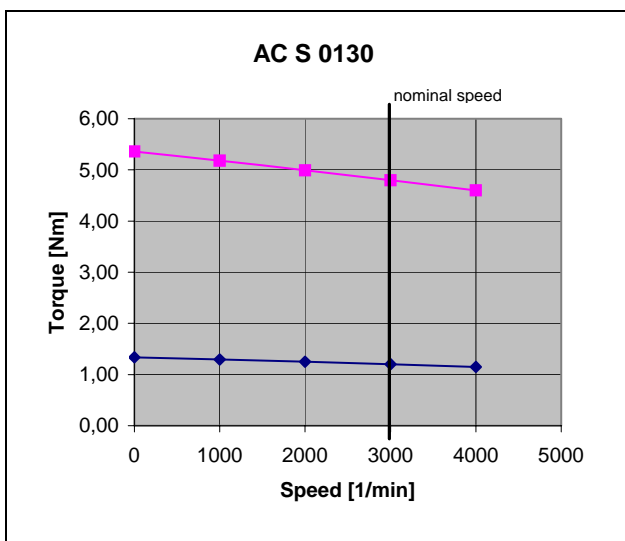
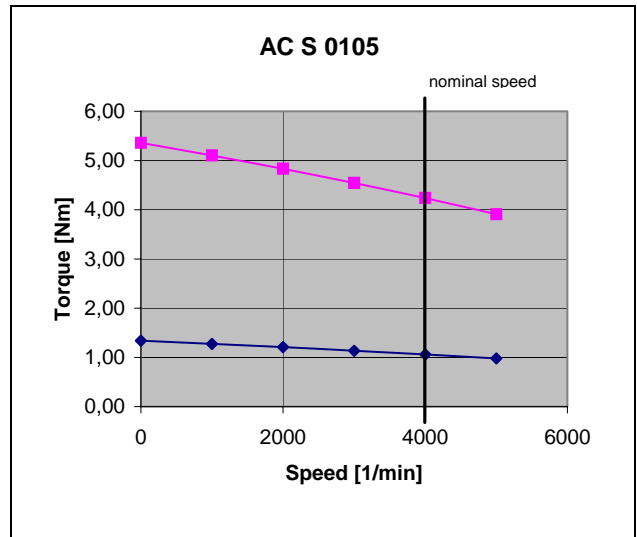
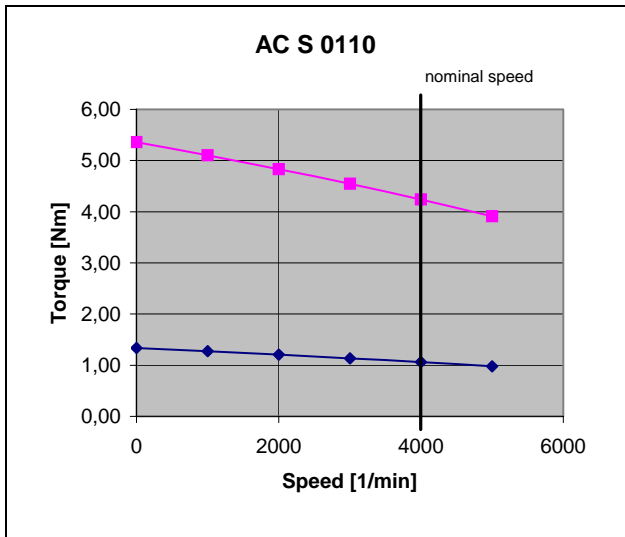
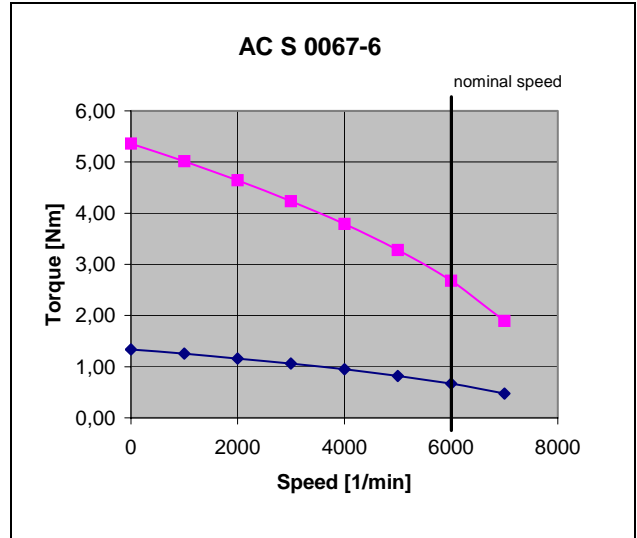
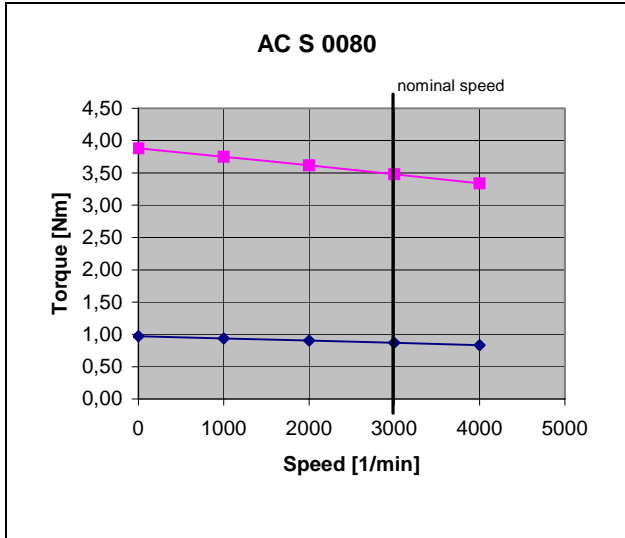
**Motor with separate fan Motor size 1.1 ... 3.1**

AC-Servomotor Model:	size	Mass	Motor resistance	Motor inductance	Thermal time constant with IN	Torque constant	EMK- constant eff.
		m (kg)	R <sub>ph/ph</sub> (Ω)	L <sub>ph/ph</sub> (mH)	T <sub>thN</sub> (min)	K <sub>T</sub> (Nm/A)	K <sub>E</sub> (V/1000 min <sup>-1</sup> )
AC SL 0115-6/1-7	1,1	7,14	7,80	25,07	12	0,76	65
AC SL 0210-4/1-3	1,1	7,14	4,25	14,10	12	0,59	50
AC SL 0250-3/1-3	1,1	7,14	7,80	25,07	12	0,76	65
AC SL 0250-3/1-7	1,1	7,14	20,65	71,80	12	1,29	110
AC SL 0270-2/1-3	1,1	7,14	20,65	71,80	12	1,29	110
AC SL 0220-6/1-7	1,2	8,60	2,35	10,37	16	0,76	65
AC SL 0430-4/1-3	1,2	8,60	1,35	5,65	16	0,59	50
AC SL 0490-3/1-3	1,2	8,60	2,35	10,37	16	0,76	65
AC SL 0490-3/1-7	1,2	8,60	6,40	29,28	16	1,29	110
AC SL 0530-2/1-7	1,2	8,60	15,55	68,00	16	1,93	165
AC SL 0420-6/2-7	2,1	14,50	1,20	6,61	13	0,76	65
AC SL 0700-4/2-3	2,1	14,50	0,67	3,72	13	0,59	50
AC SL 0780-3/2-3	2,1	14,50	1,20	6,61	13	0,76	65
AC SL 0780-3/2-7	2,1	14,50	3,24	18,00	13	1,29	110
AC SL 0840-2/2-7	2,1	14,50	7,40	41,32	13	1,93	165
AC SL 0670-6/2-7	2,2	17,10	0,74	4,44	17	0,76	65
AC SL 1120-4/2-3	2,2	17,10	0,41	2,37	17	0,59	50
AC SL 1250-3/2-3	2,2	17,10	0,74	4,44	17	0,76	65
AC SL 1120-3/2-7	2,2	17,10	2,00	12,00	17	1,29	110
AC SL 1280-2/2-7	2,2	17,10	4,48	25,90	17	1,93	165
AC SL 1270-6/3-7	3,1	26,90	0,32	2,56	20	0,76	65
AC SL 1390-4/3-3	3,1	26,90	0,18	1,38	20	0,59	50
AC SL 1810-3/3-3	3,1	26,90	0,32	2,56	20	0,76	46
AC SL 1540-3/3-7	3,1	26,90	0,90	7,40	20	1,29	110
AC SL 1880-2/3-7	3,1	26,90	1,90	16,00	20	1,93	165
AC SL 2380-3/3-7	3,1	29,70	0,57	6,00	23	1,29	110
AC SL 2570-2/3-7	3,1	29,70	1,30	13,50	23	1,93	165
AC SL 2900-3/3-7	3,1	32,40	0,38	4,40	25	1,29	110
AC SL 3480-2/3-7	3,1	32,40	0,78	9,18	25	1,93	165

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## 3.3 Torque-/Speed-Diagrams

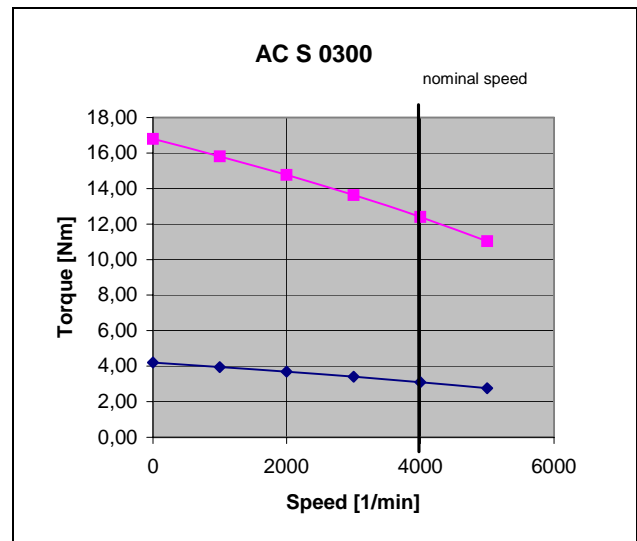
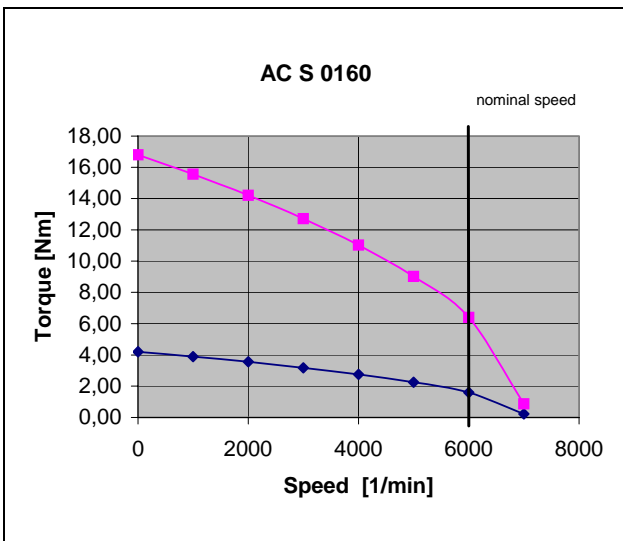
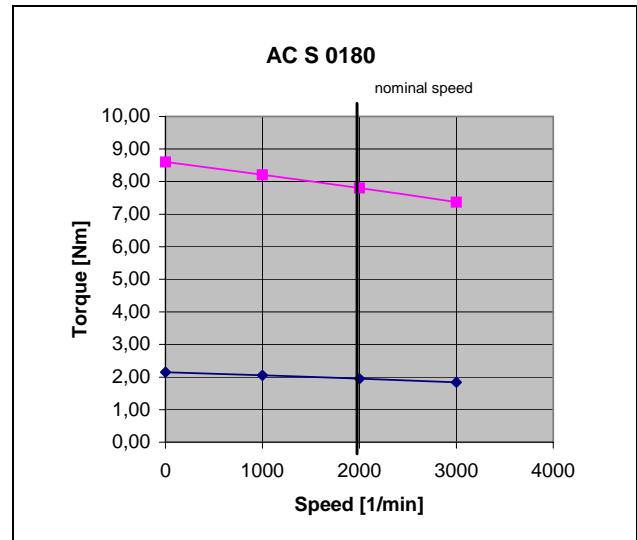
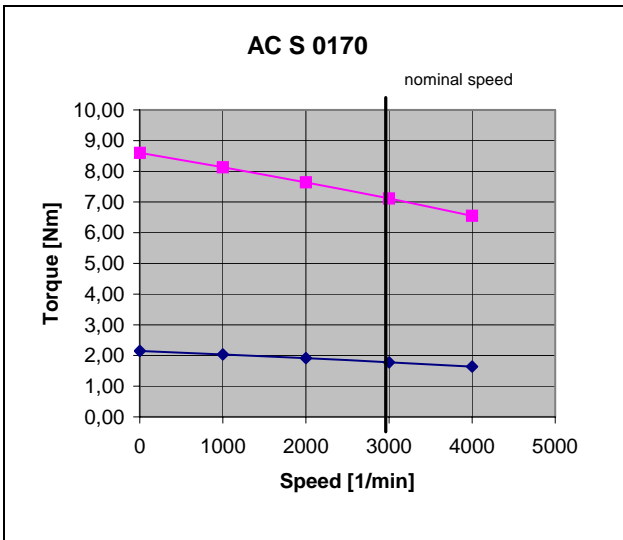
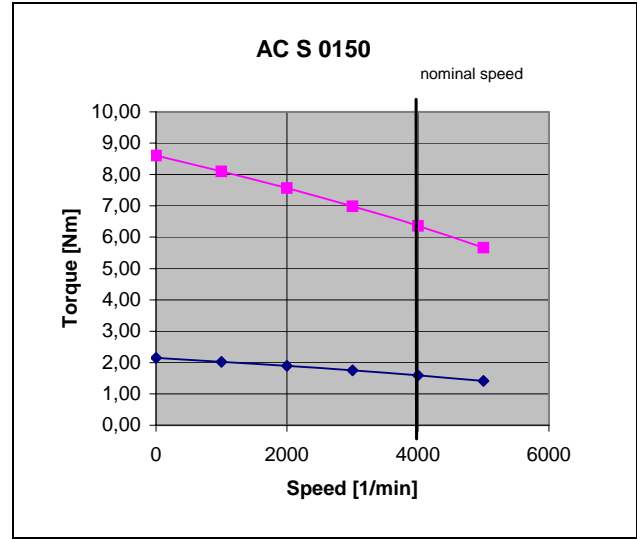
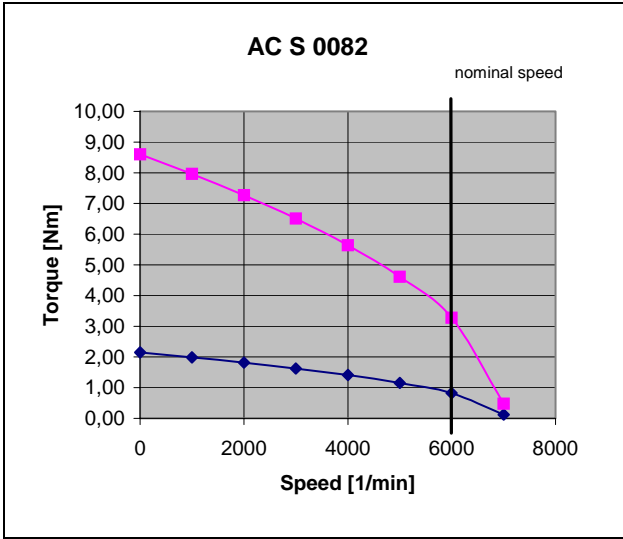
### 3.3.1 Motor size 01 to 3 without separate fan



■ — ■ Peak torque     
 ◆ — ◆ — ◆ Continuous torque

Torque-/Speed-Diagrams

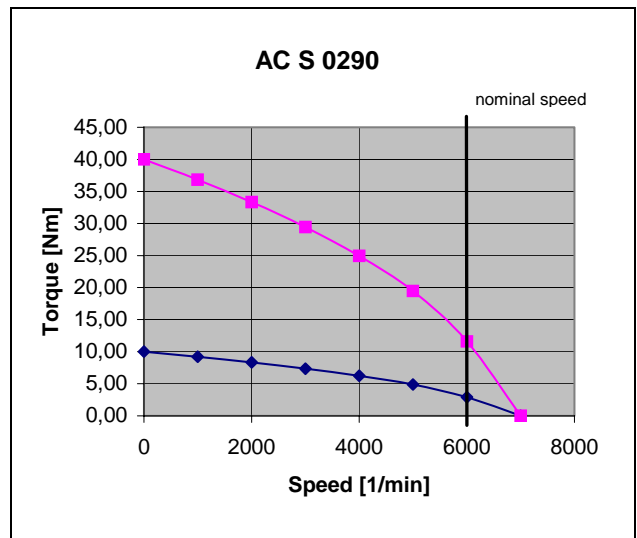
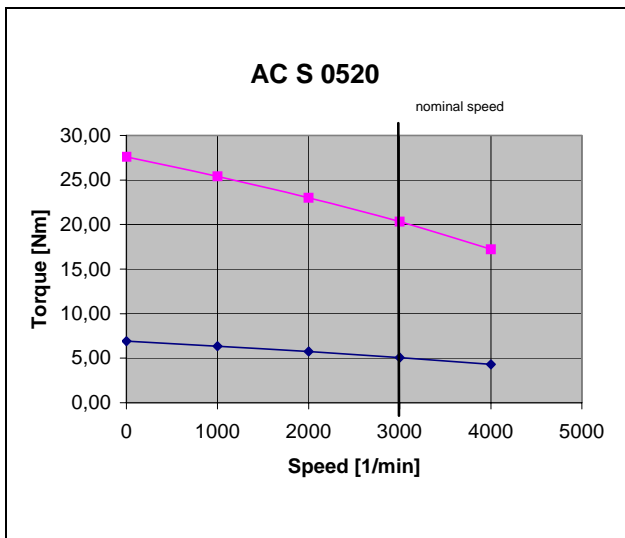
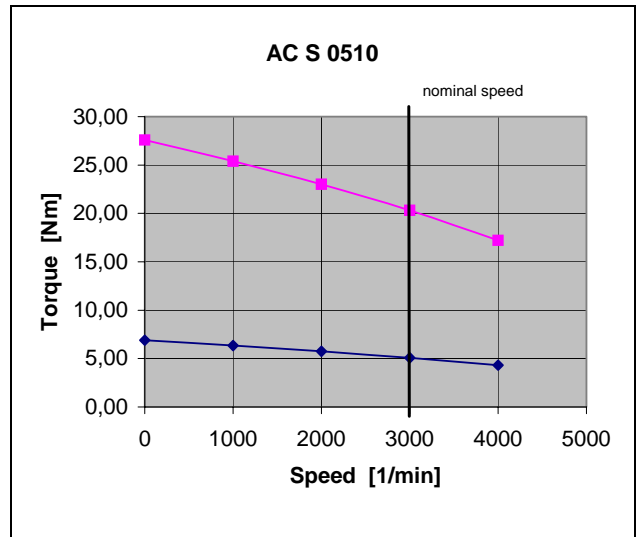
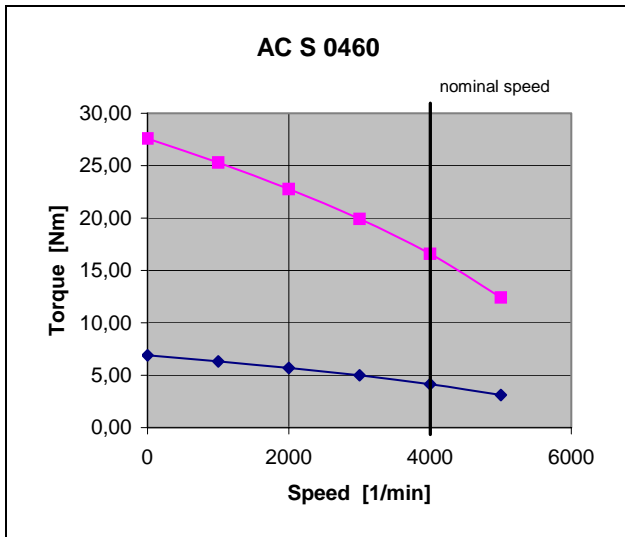
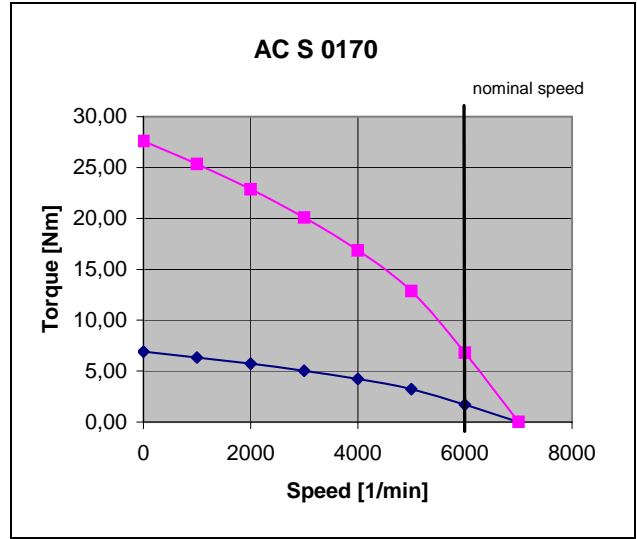
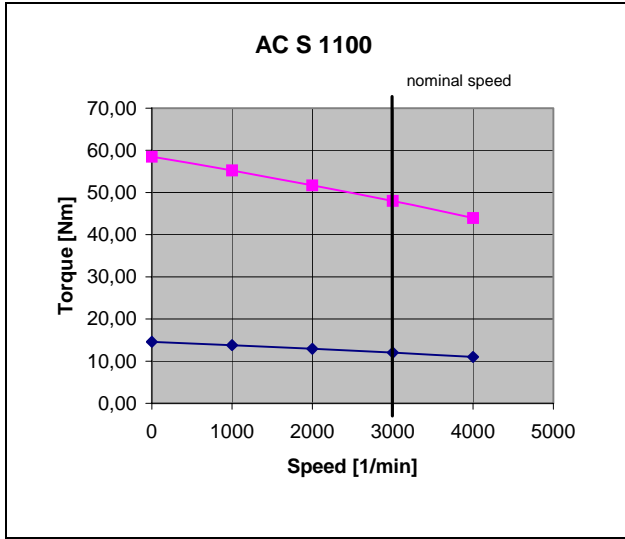
Motor size 01 to 3 without separate fan



■ ■ ■ Peak torque      ◆ ◆ ◆ Continuous torque

## Torque-/Speed-Diagrams

Motor size 01 to 3 without separate fan

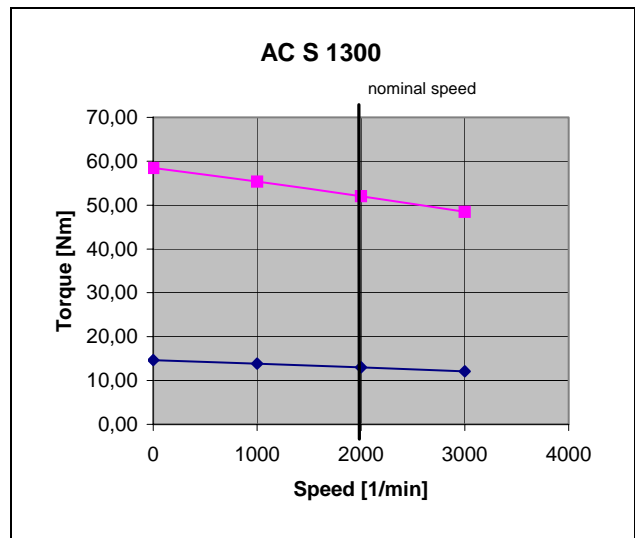
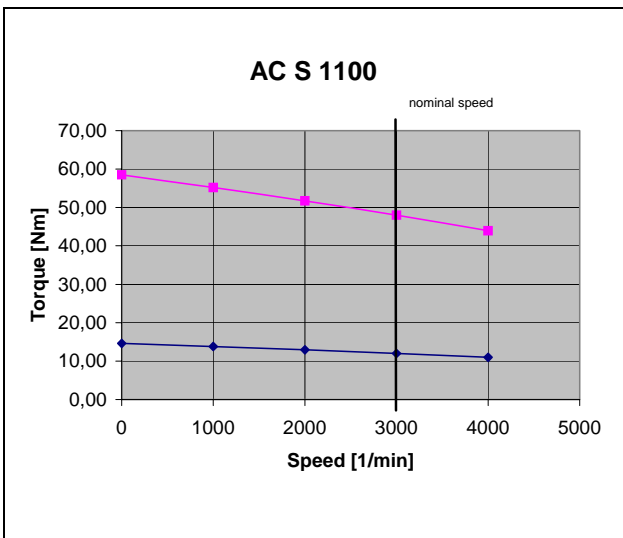
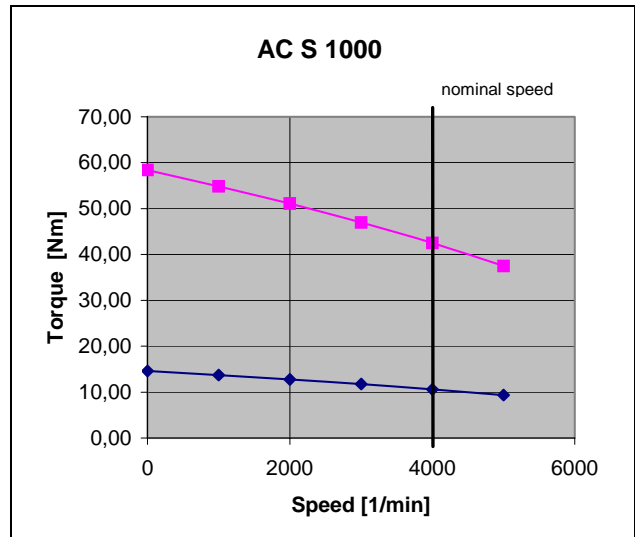
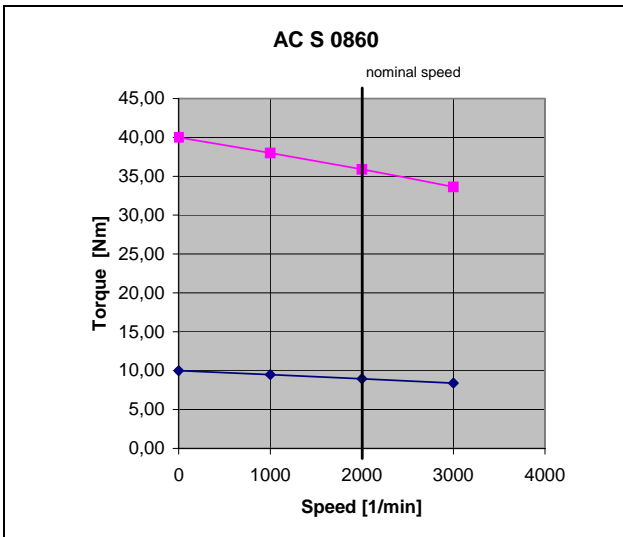
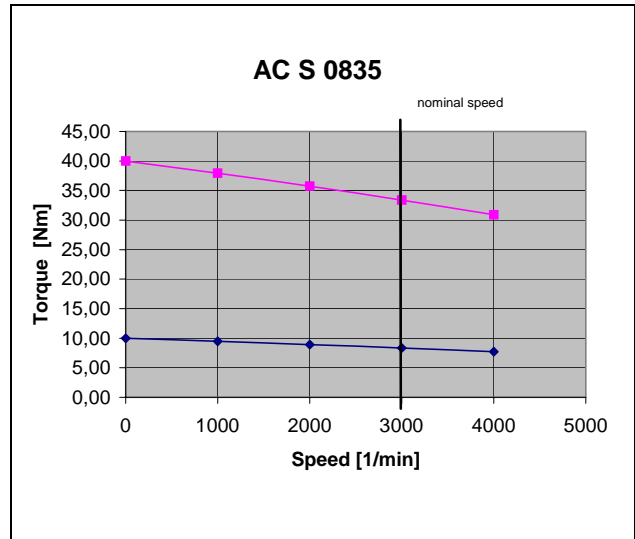
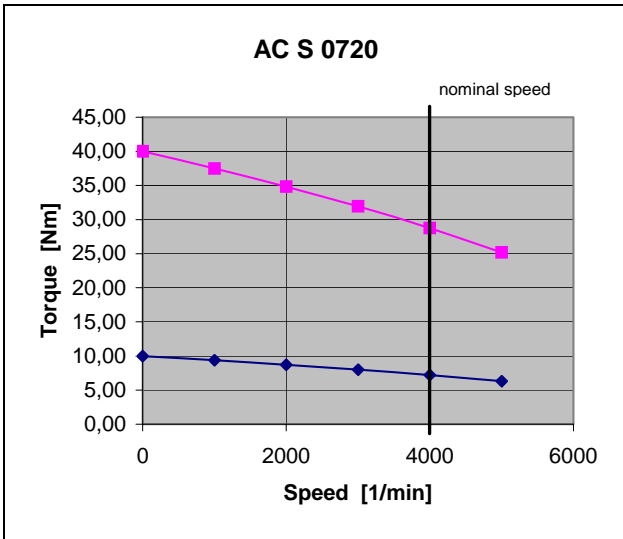


■ ■ ■ Peak torque

◆ ◆ ◆ Continuous torque

Torque-/Speed-Diagrams

Motor size 01 to 3 without separate fan

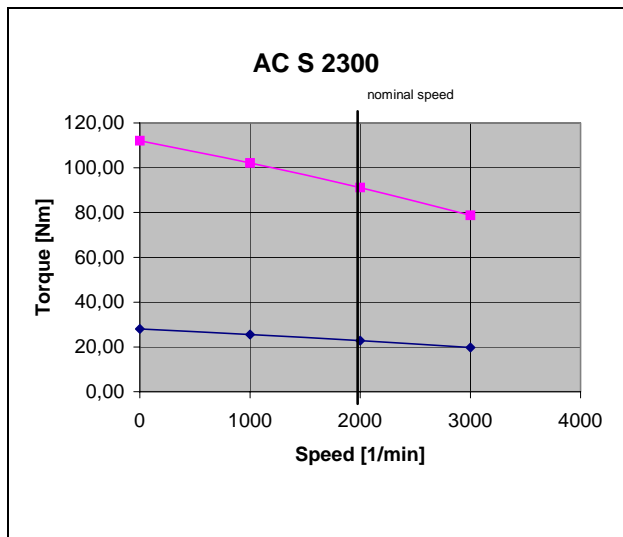
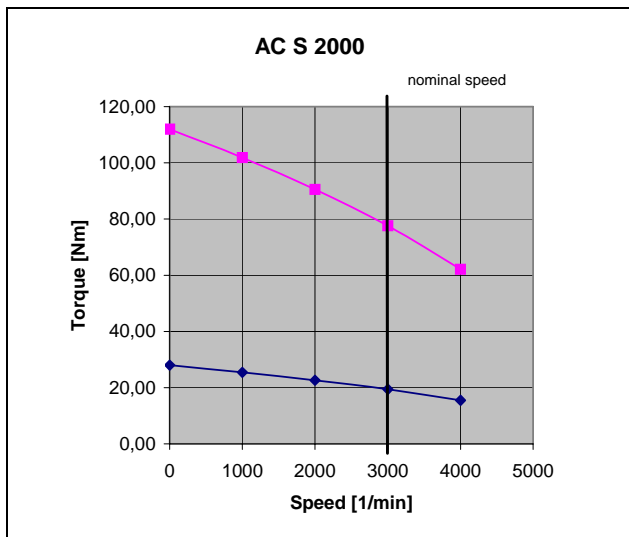
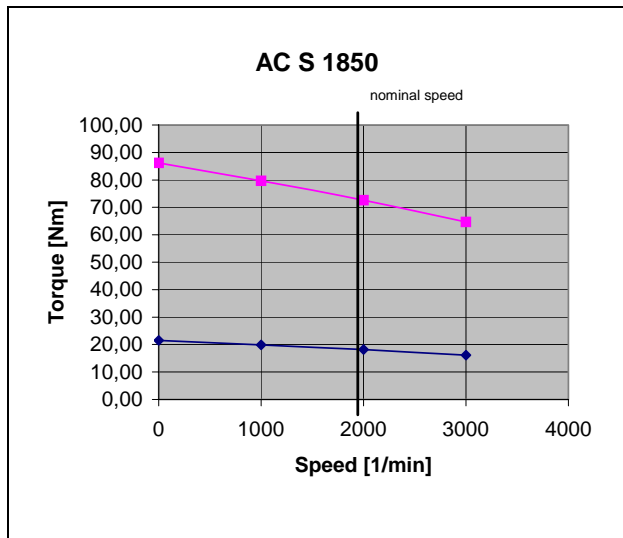
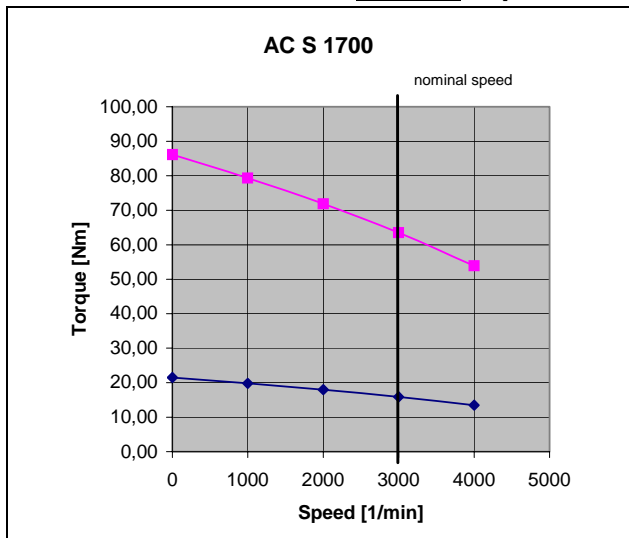


■ ■ ■ Peak torque      ◆ ◆ ◆ Continuous torque



## Torque-/Speed-Diagrams

Motor size 01 to 3 without separate fan

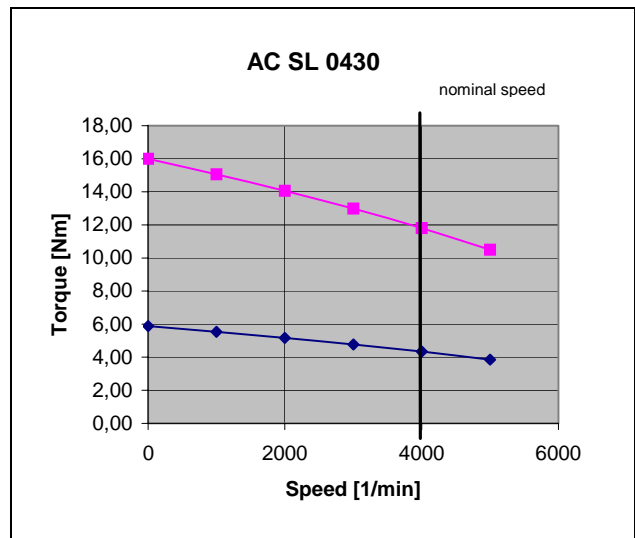
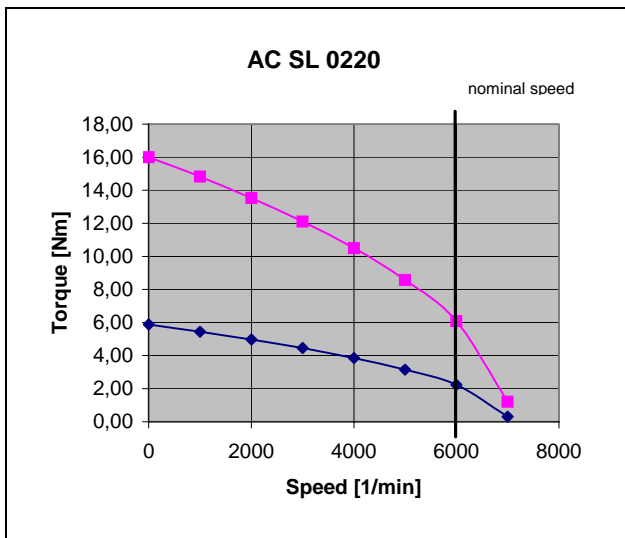
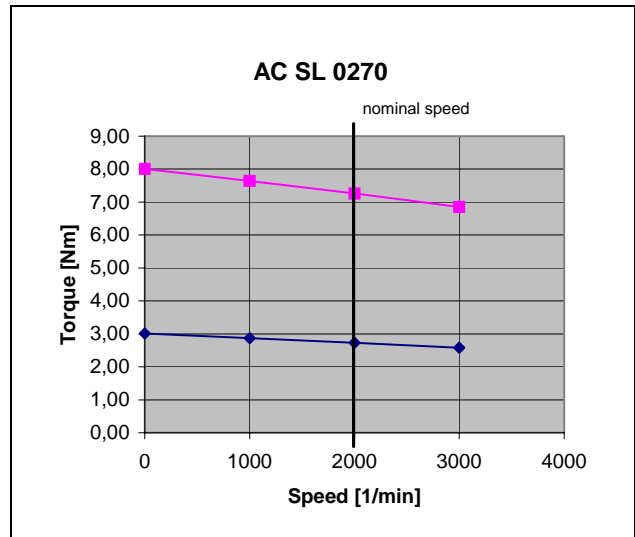
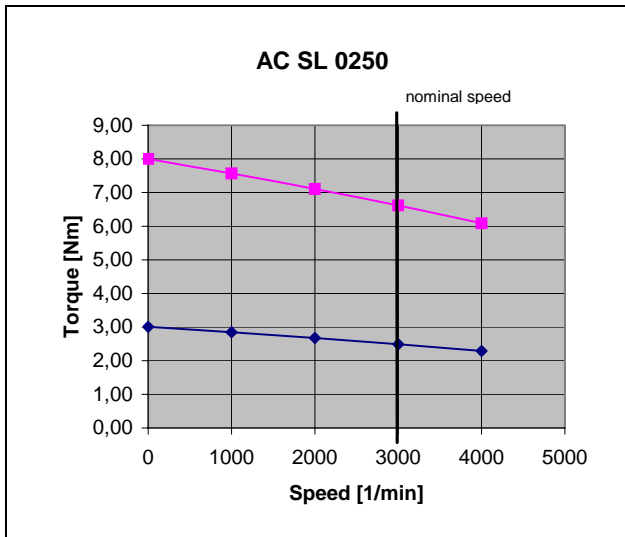
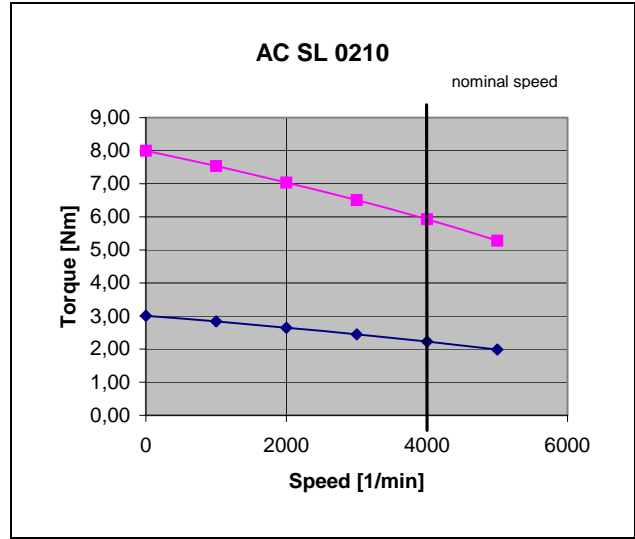
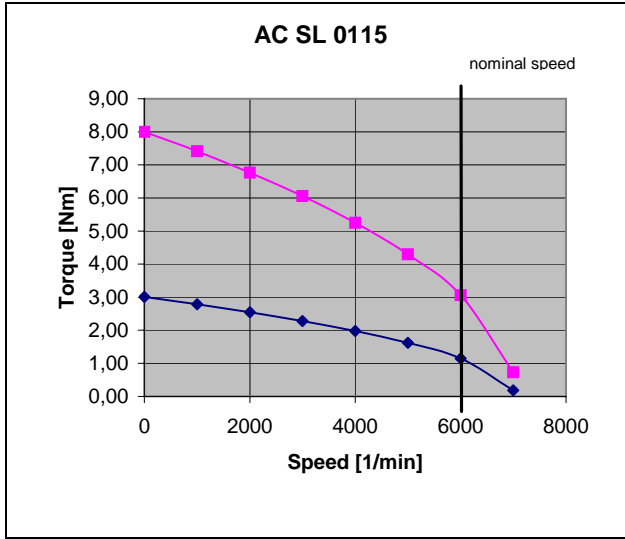


—■—■—■— Peak torque

—◆—◆—◆— Continuous torque

Torque-/Speed-Diagrams

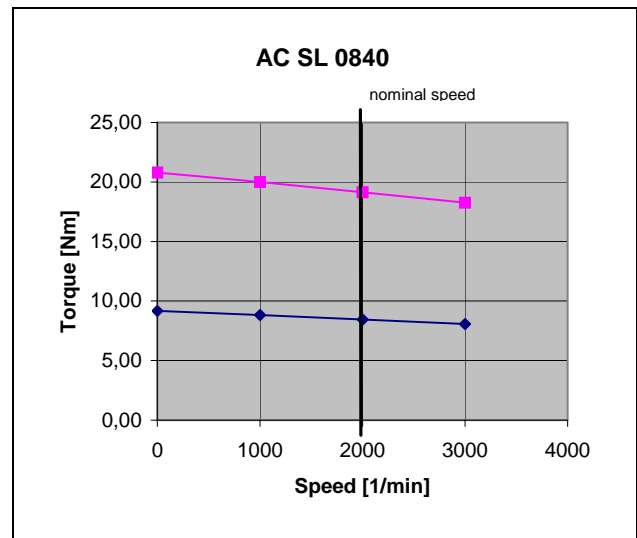
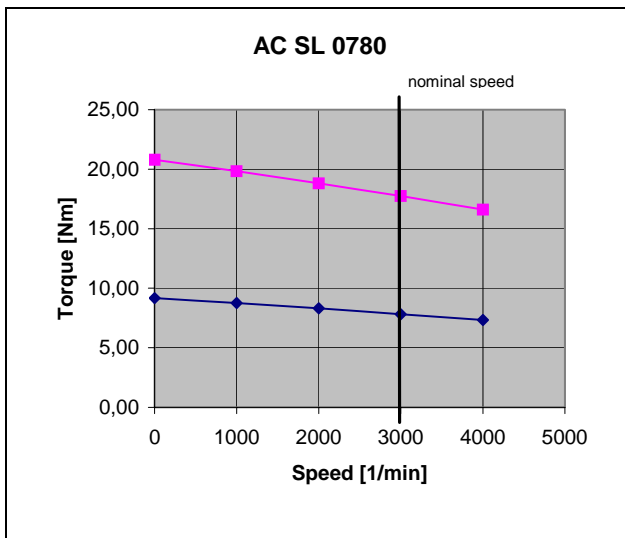
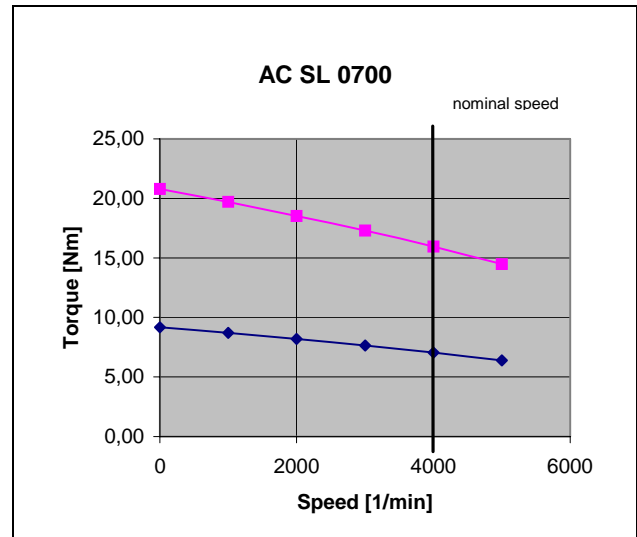
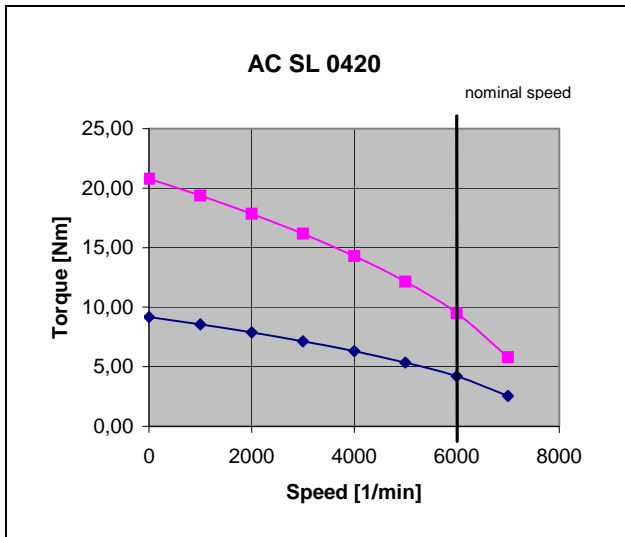
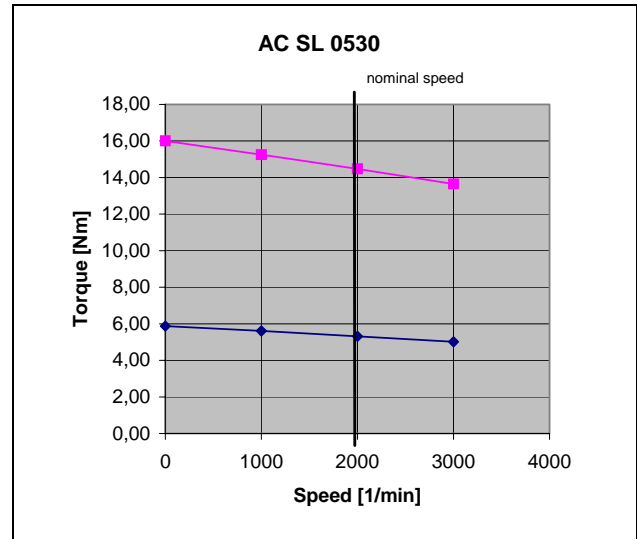
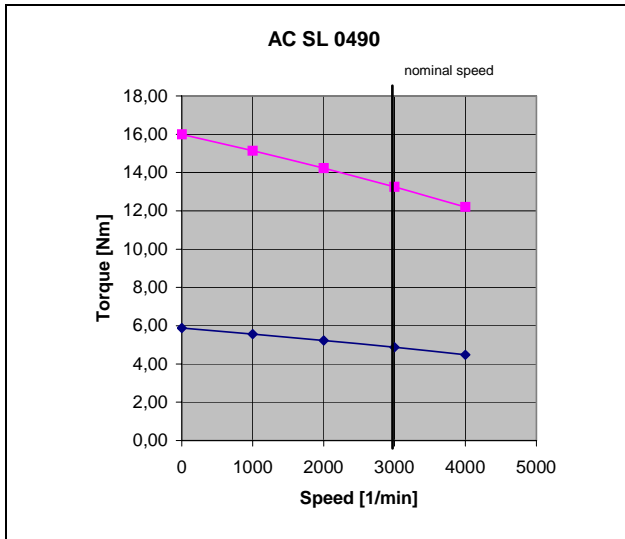
3.3.2 Motor size 1.1 to 3.1 with separate fan



■ Peak torque      ◆ Continuous torque

## Torque-/Speed-Diagrams

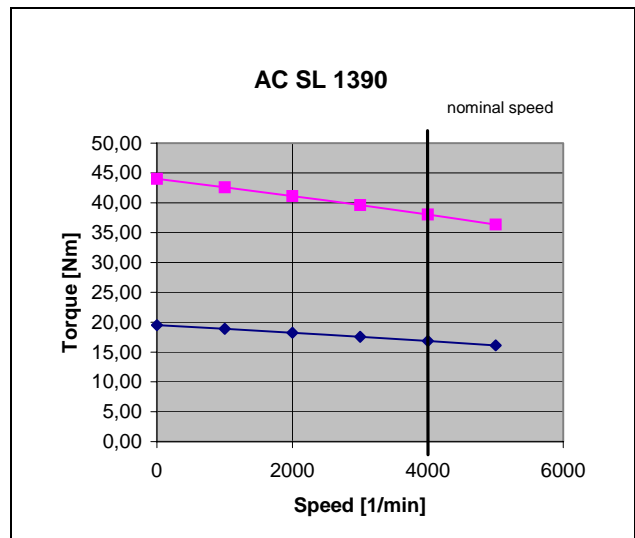
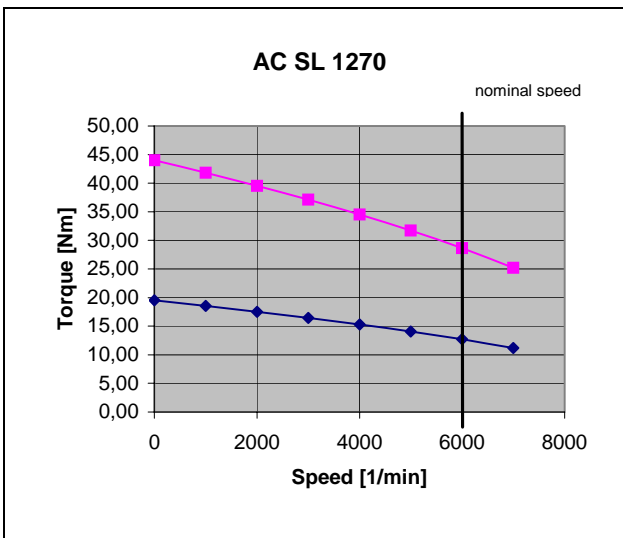
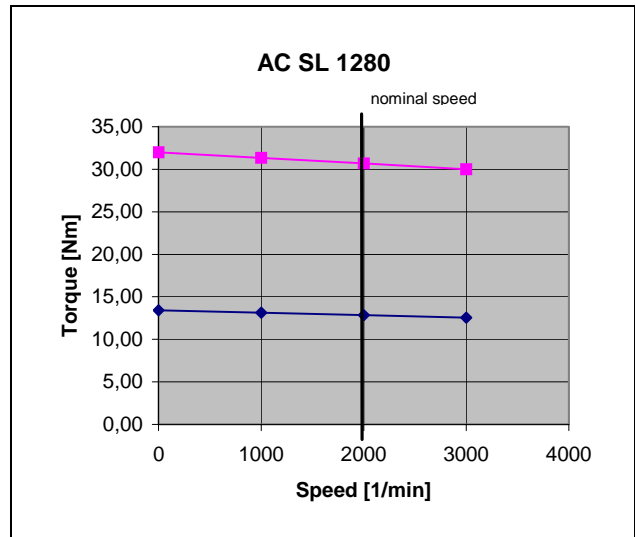
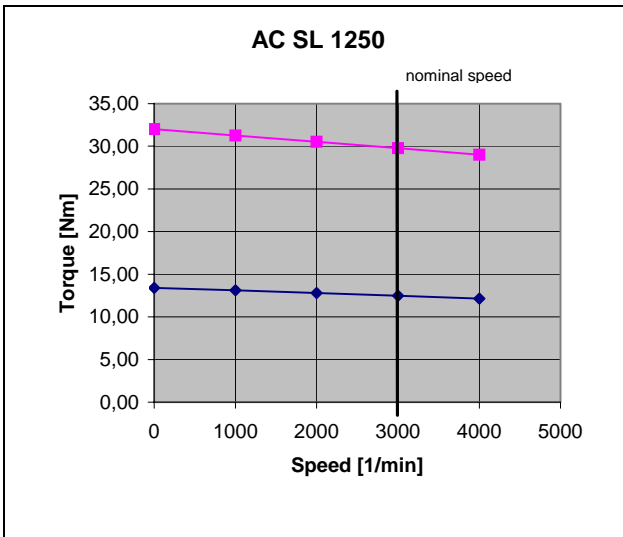
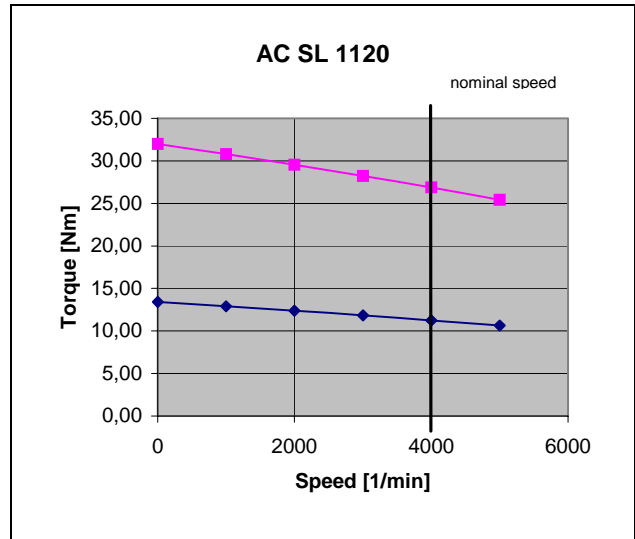
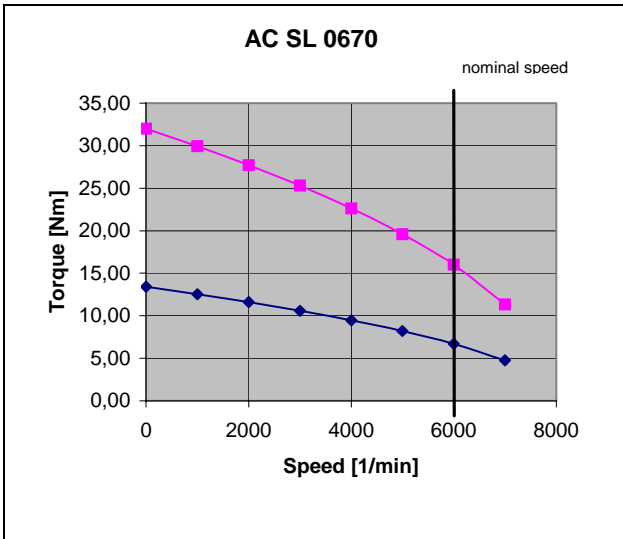
Motor size 1.1 to 3.1 with separate fan



■—■—■ Peak torque     
 ◆—◆—◆ Continuous torque

Torque-/Speed-Diagrams

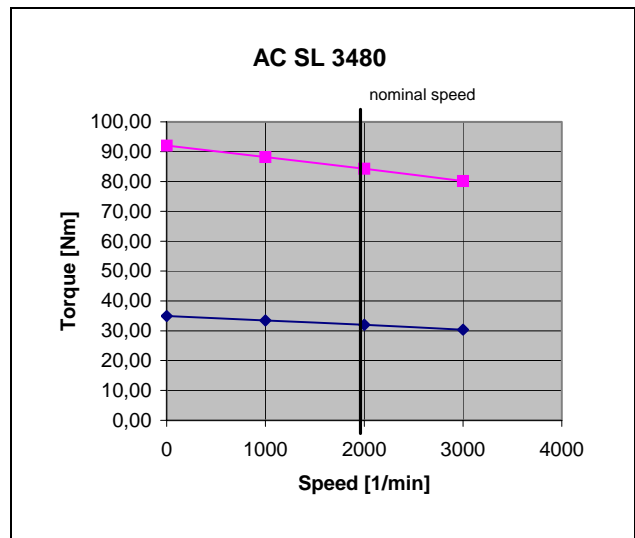
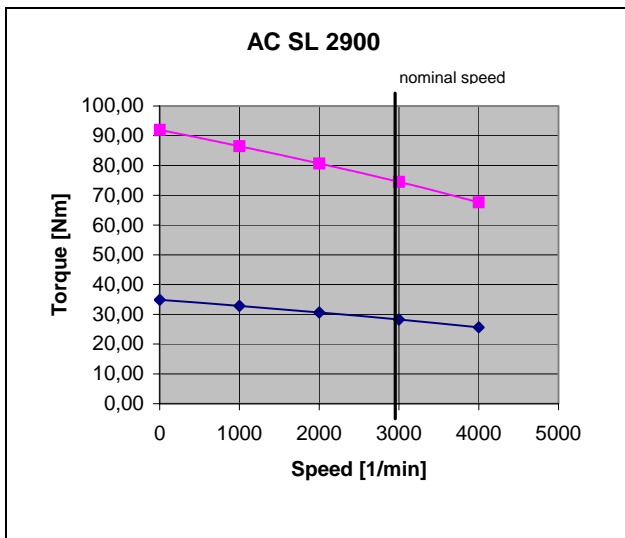
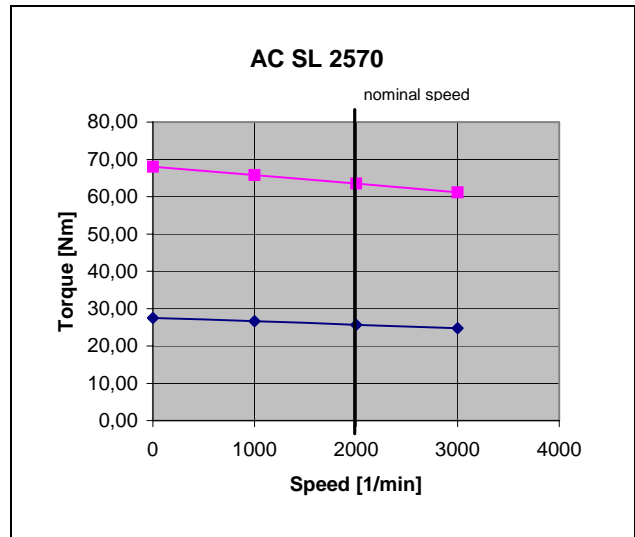
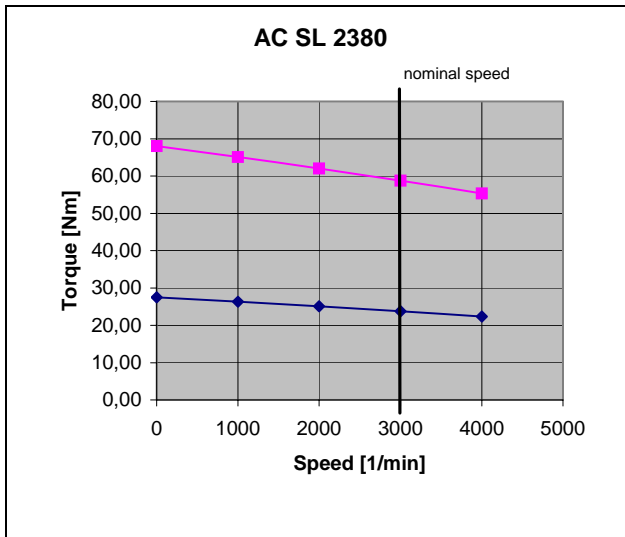
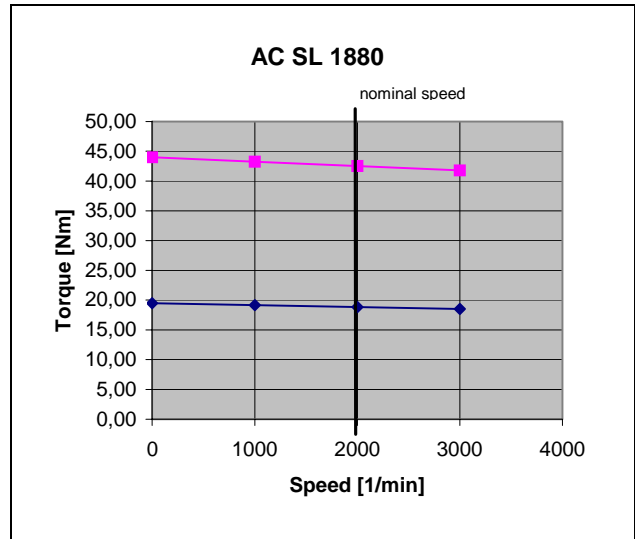
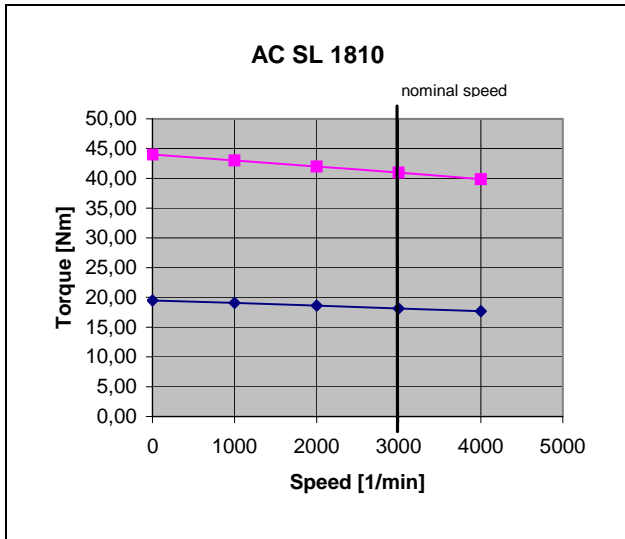
Motor size 1.1 to 3.1 with separate fan



■ ■ ■ Peak torque      ◆ ◆ ◆ Continuous torque

## Torque-/Speed-Diagrams

Motor size 1.1 to 3.1 with separate fan

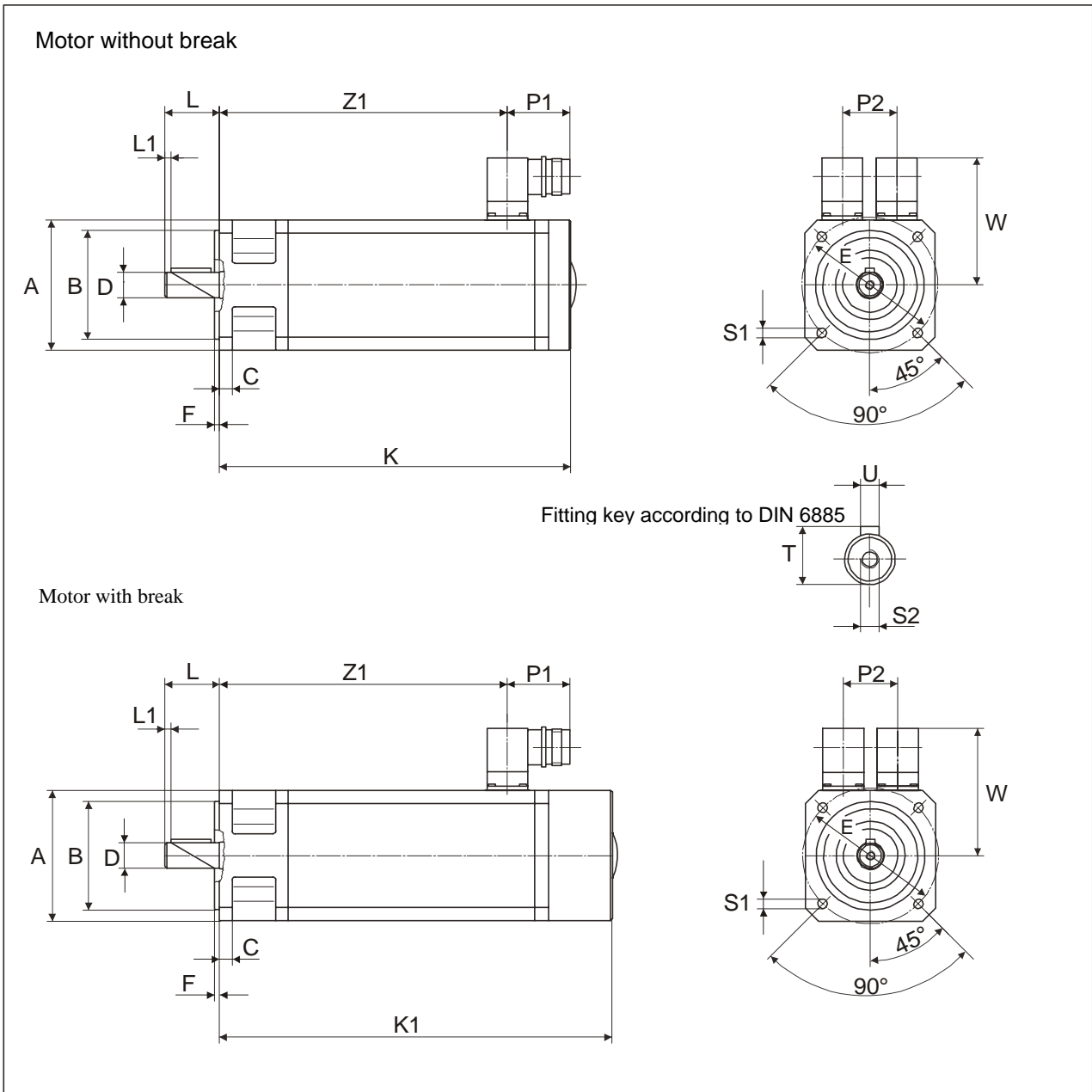


■ ■ ■ Peak torque

◆ ◆ ◆ Continuous torque

4.1 **Standard design Motor size 0**

4.1.1 **Motor- and signal connector with plug design**

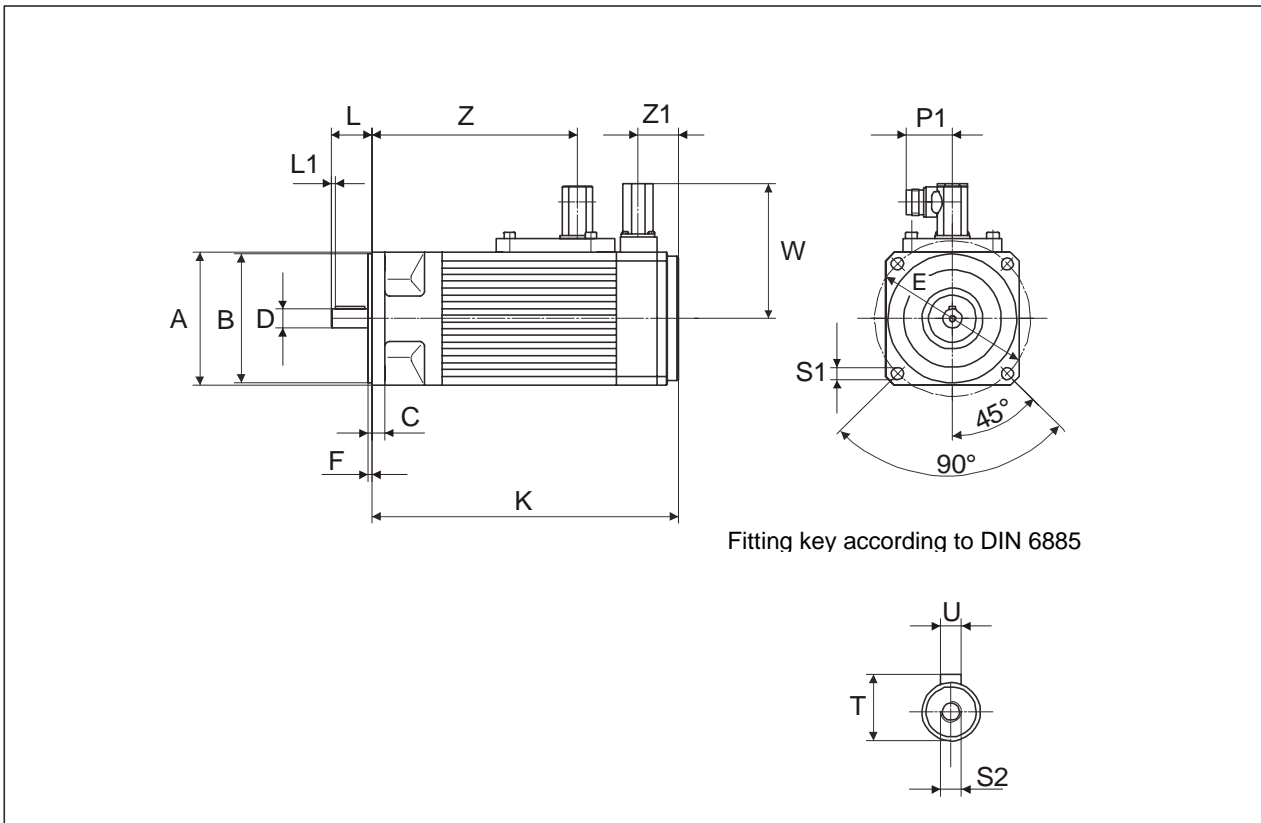


AC S size	A □	B (j6)	C	D (k6)	E Ø	F	K	K1	L	L1	P1	P2	S1 Ø	S2	T	U	W	Z
0.1	72	60	7	14	75	3	175	200	30	3	39,2	30	6,5	M5	16,0	5x5x22	75	142
0.2	72	60	7	14	75	3	192	217	30	3	39,2	30	6,5	M5	16,0	5x5x22	75	159

All specifications in "mm"

## 4.2 Standard design Motor size 1...3

### 4.2.1 Motor- and signal connector with plug design

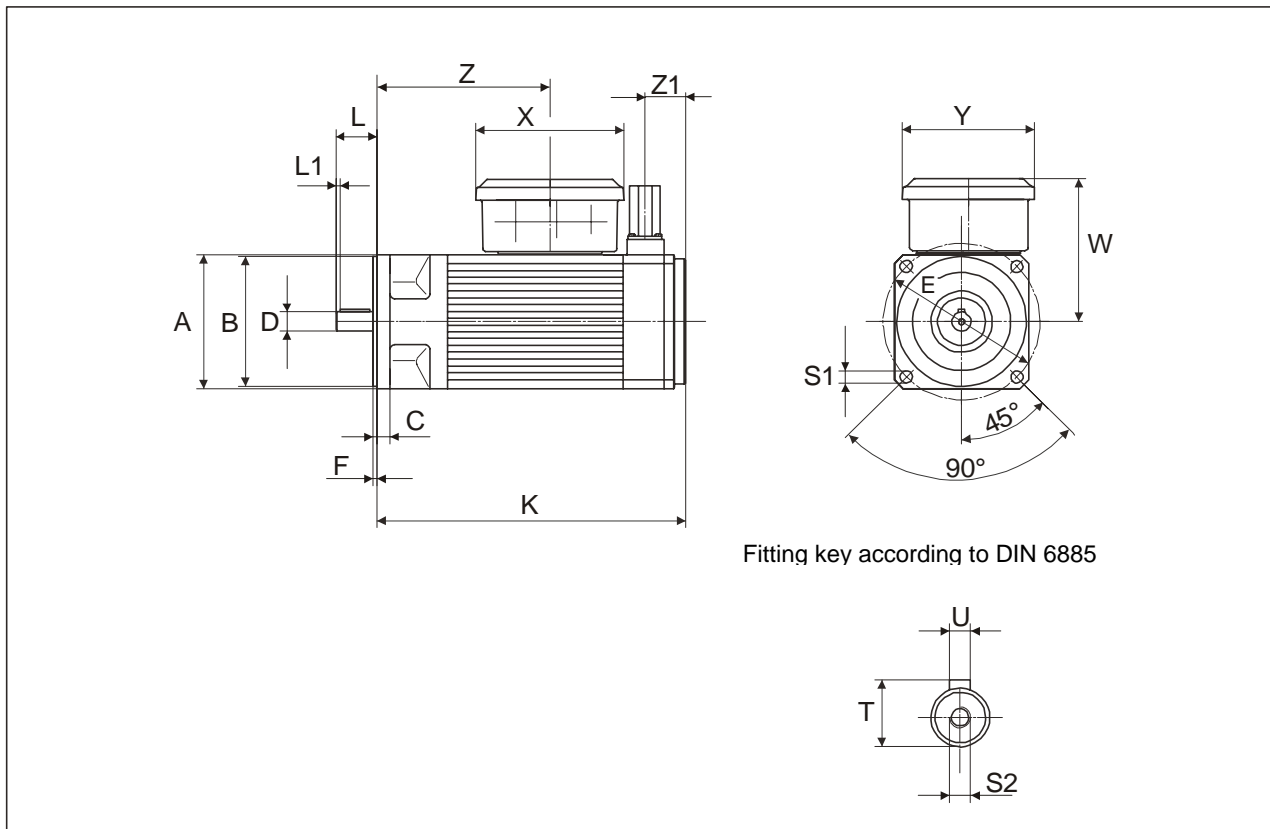


ACS size	A	B (j6)	C	D (k6)	E Ø	F	K	L	L1	S1 Ø	S2	T	U	W	Z	Z1
1.1	98	95	10	14	115	3,0	227	30	3	9	M5	16,0	5x5x22	99,5	149	30
1.2	98	95	10	19	115	3,0	262	40	3	9	M6	21,5	6x6x32	99,5	184	30
2.1	115	110	9	19	130	3,5	280	40	3	9	M6	21,5	6x6x32	108,0	201	32
2.2	115	110	9	24	130	3,5	315	50	3	9	M8	27,0	8x7x40	108,0	236	32
3.1	145	130	10	24	165	3,5	345	50	3	11	M8	27,0	8x7x40	123,0	265	33
3.2	145	130	10	24	165	3,5	395	50	3	11	M8	27,0	8x7x40	123,0	315	33
3.3	145	130	10	32	165	3,5	445	58	3	11	M12	35,0	10x8x50	123,0	359	33

All specifications in "mm"

### 4.3 Special design Motor size 1...3

#### 4.3.1 Motor connections via terminal box and resolver connection via plug connector



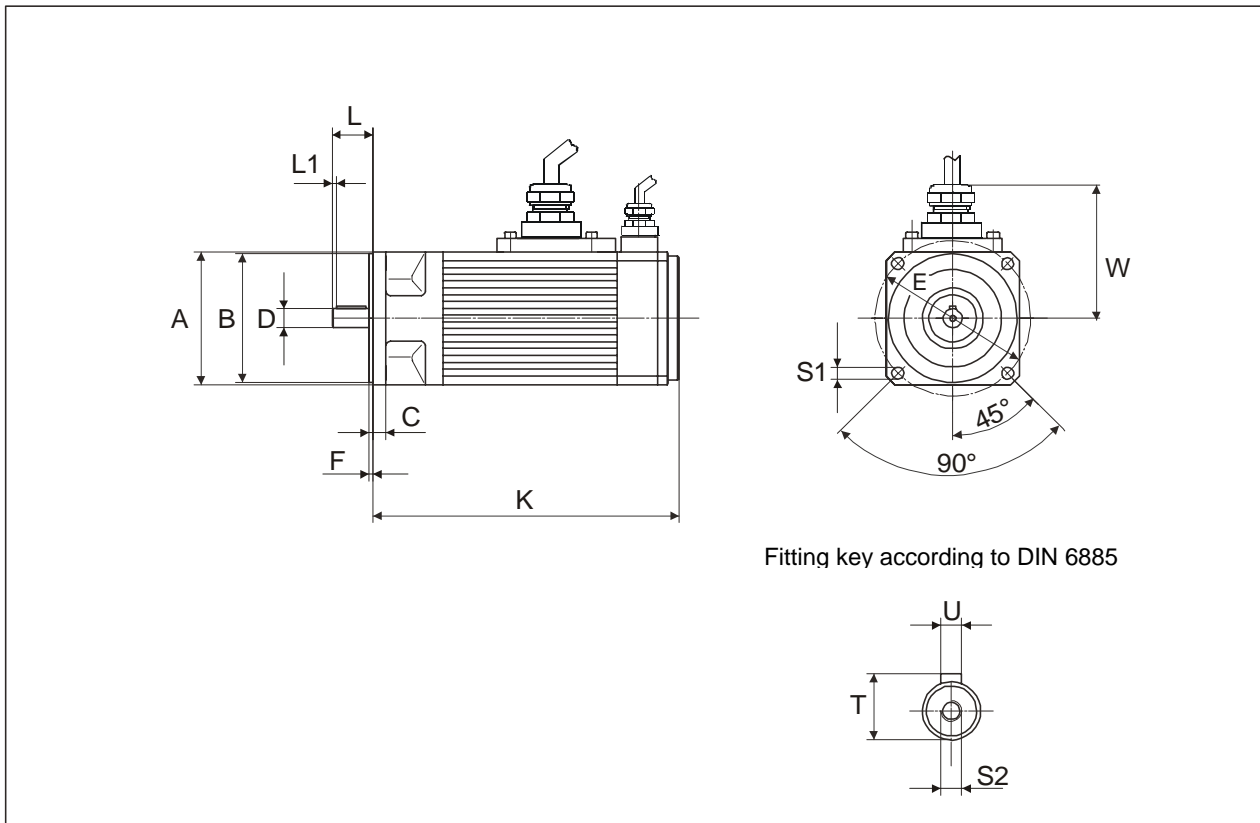
AC S size	A □	B (j6)	C	D (k6)	E ∅	F	K	L	L1	S1 ∅	S2	T	U	W	X	Y	Z	Z1
1.1	98	95	10	14	115	3,0	227	30	3	9	M5	16,0	5x5x22	105	109	105	129	30
1.2	98	95	10	19	115	3,0	262	40	3	9	M6	21,5	6x6x32	105	109	105	164	30
2.1	115	110	9	19	130	3,5	280	40	3	9	M6	21,5	6x6x32	115	120	119	176	32
2.2	115	110	9	24	130	3,5	315	50	3	9	M8	27,0	8x7x40	115	120	119	211	32
3.1	145	130	10	24	165	3,5	345	50	3	11	M8	27,0	8x7x40	130	120	119	240	33
3.2	145	130	10	24	165	3,5	395	50	3	11	M8	27,0	8x7x40	130	120	119	290	33
3.3	145	130	10	32	165	3,5	445	58	3	11	M12	35,0	10x8x50	130	120	119	340	33

All specifications in "mm"



## Special design Motor size 1...3

### 4.3.2 Motor- and resolver connections via PG-coupling and cable ends

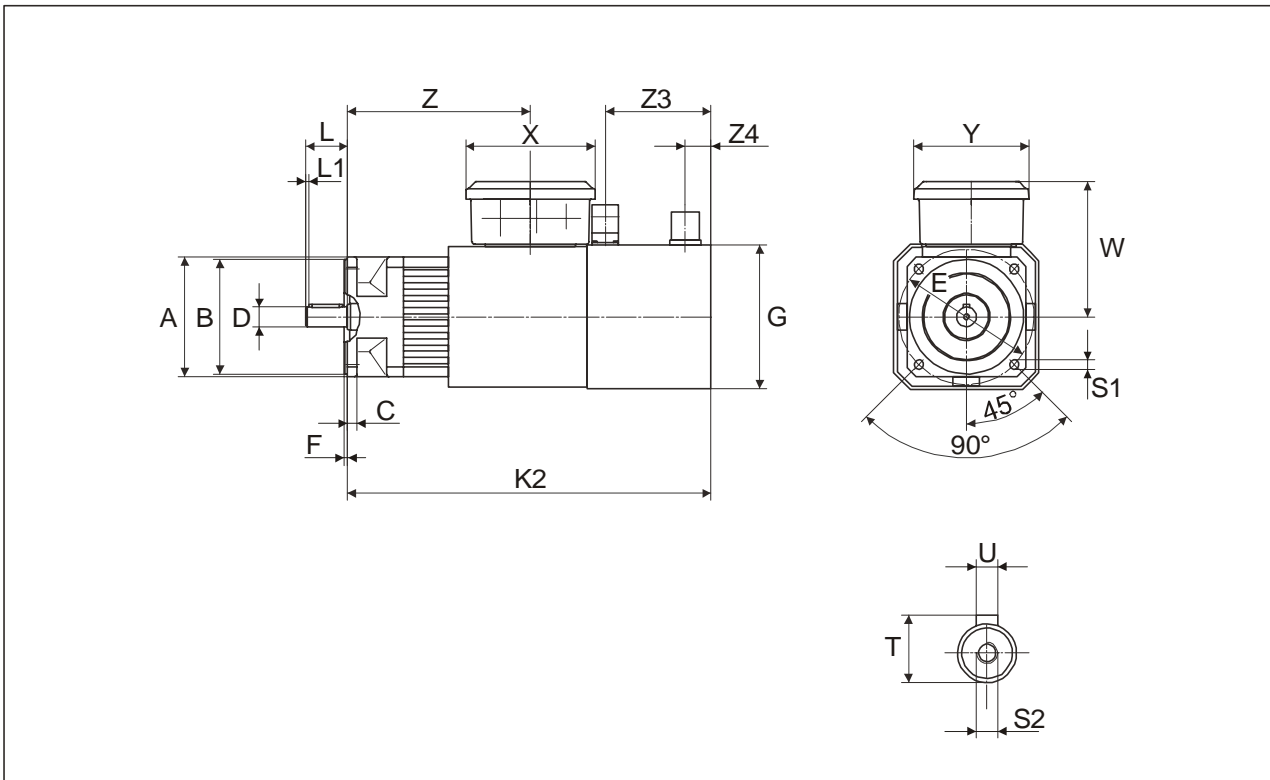


ACS size	A □	B (j6)	C	D (k6)	E ∅	F	K	L	L1	S1 ∅	S2	T	U	W
1.1	98	95	8	14	115	3,0	227	30	3	9	M5	16,0	5x5x22	89,0
1.2	98	95	8	19	115	3,0	262	40	3	9	M6	21,5	6x6x32	89,0
2.1	115	110	9	19	130	3,5	280	40	3	9	M6	21,5	6x6x32	97,5
2.2	115	110	9	24	130	3,5	315	50	3	9	M8	27,0	8x7x40	97,5
3.1	145	130	10	24	165	3,5	345	50	3	11	M8	27,0	8x7x40	112,5
3.2	145	130	10	24	165	3,5	395	50	3	11	M8	27,0	8x7x40	112,5
3.3	145	130	10	32	165	3,5	445	58	3	11	M12	35,0	10x8x50	112,5

All specifications in "mm"

4.4 Motor with separate fan Motor size 1...3

4.4.1 Motor connections via terminal box and resolver connection via plug



connector

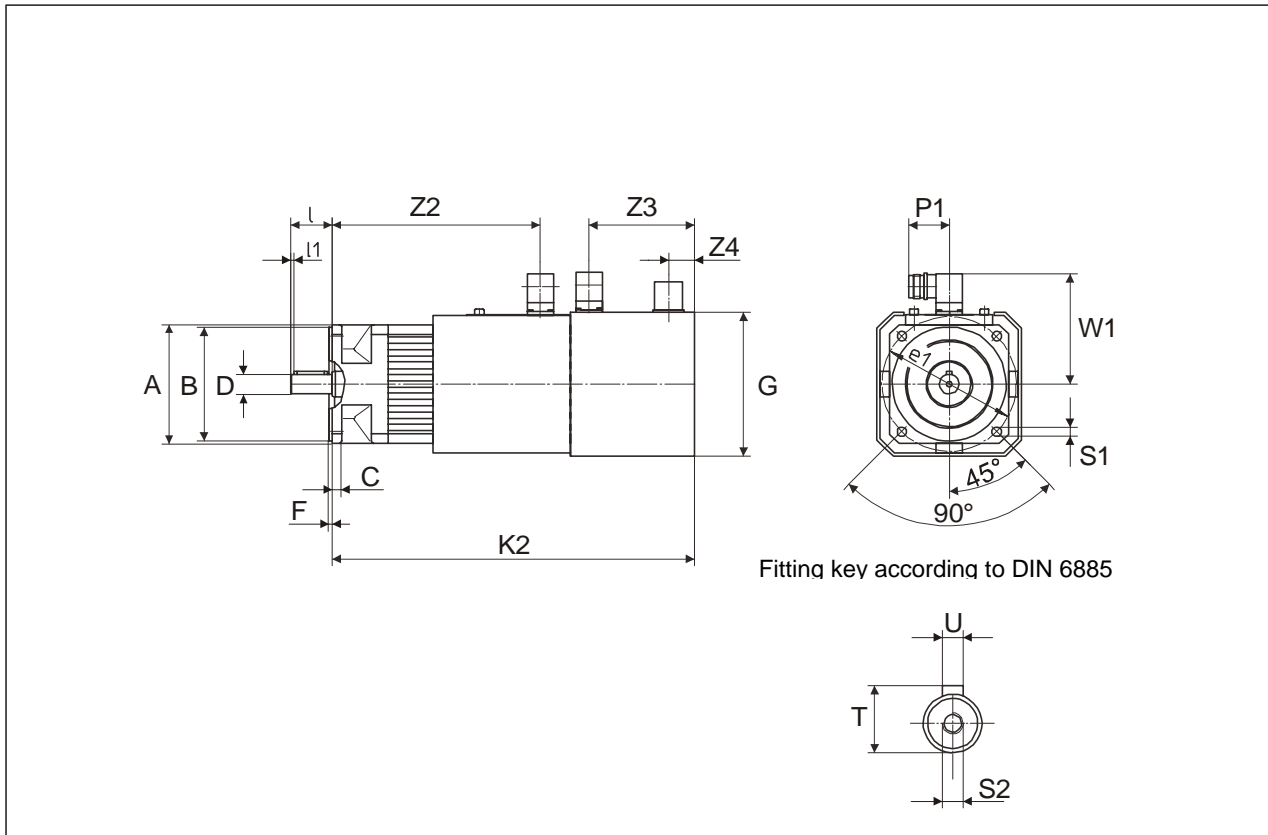
AC SL size	A □	B (j6)	C	D (k6 )	E ∅	F	G	K2	L	L1	S1 ∅	S2	T	U	W	X	Y	Z	Z3	Z4
1.1	98	95	10	14	115	3,0	121	280	30	3	9	M5	16,0	5x5x22	115	109	105	129	83	25
1.2	98	95	10	19	115	3,0	121	315	40	3	9	M6	21,5	6x6x32	115	109	105	164	83	25
2.1	115	110	9	19	130	3,5	138	350	40	3	9	M6	21,5	6x6x32	125	120	119	176	100	25
2.2	115	110	9	24	130	3,5	138	385	50	3	9	M8	27,0	8x7x40	125	120	119	211	100	25
3.1	145	130	10	24	165	3,5	168	449	50	3	11	M8	27,0	8x7x40	140	120	119	240	135	40
3.2	145	130	10	24	165	3,5	168	499	50	3	11	M8	27,0	8x7x40	140	120	119	290	135	40
3.3	145	130	10	32	165	3,5	168	549	58	3	11	M12	35,0	10x8x50	140	120	119	340	135	40

Fitting key according to DIN 6885

All specifications in "mm"

## Motor with separate fan Motor size 1...3

### 4.4.2 Motor- and signal connector with plug design



AC SL size	A	B (j6)	C	D (k6)	E Ø	F	G	K2	L	L1	P1	S1 Ø	S2	T	U	W1	Z2	Z3	Z4
1.1	98	95	10	14	115	3,0	121	280	30	3	39,2	9	M5	16,0	5x5x22	99,5	149	83	25
1.2	98	95	10	19	115	3,0	121	315	40	3	39,2	9	M6	21,5	6x6x32	99,5	184	83	25
2.1	115	110	9	19	130	3,5	138	350	40	3	39,2	9	M6	21,5	6x6x32	108,0	201	100	25
2.2	115	110	9	24	130	3,5	138	385	50	3	39,2	9	M8	27,0	8x7x40	108,0	236	100	25
3.1	145	130	10	24	165	3,5	168	449	50	3	39,2	11	M8	27,0	8x7x40	123,0	265	135	40
3.2	145	130	10	24	165	3,5	168	499	50	3	39,2	11	M8	27,0	8x7x40	123,0	315	135	40
3.3	145	130	10	32	165	3,5	168	549	58	3	39,2	11	M12	35,0	10x8x50	123,0	359	135	40

All specifications in "mm"

5.1 Connector

Connector

motor side

SSD Drives - motor size 0...3

Type: AC S

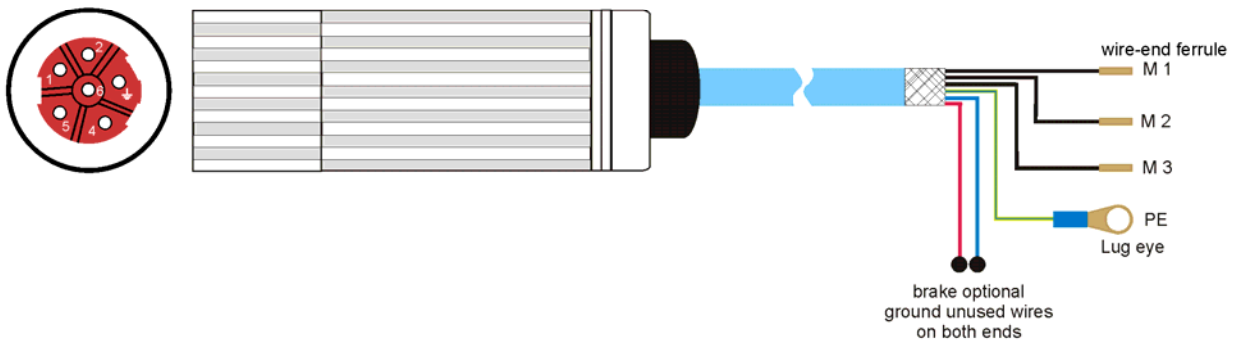
not for AC S 1000-4, AC SL 1540-3  
AC SL 1390-4, AC SL 1270-6, AC SL 1390-4  
AC SL 1810-3, AC SL 2900-3

reulator side

SSD Drives - Servo drives

Type: 631/635 and 637/637+ / 637f  
in the compact enclosure

view solder / crimp connector - side



S MB DnSn BG 0/2 ST.0103.0002	K MB BG x/x-B KA.0003.xxxx		terminal strip
PIN - Nr.	colour	function	PIN - Nr.
1	black 1	motor connection	M1
	<sup>1)</sup> yellow/green	protective earth	PE
2	black 2	motor connection	M2
6	black 3	motor connection	M3
4	red	brake +24V DC <sup>2)</sup>	Connection not on terminal
5	blue	brake 0V DC <sup>2)</sup>	
case	<sup>1)</sup>	case	case

<sup>1)</sup> motor mating plug  
the screen is connected to  
the groundpin and also  
extensively to the case.

<sup>2)</sup> **Attention ! Security and insulation:**  
The brake must be insulated for secure division (PELV). Otherwise,  
the insulation class of the drive becomes reduced or the effort  
of an additional galvanic separation is required.

Attention Cable cross-section see chapter 5.6

				Maßstab / scale:		Typ / model:		
						KK MBx Sn1.K		
Bear. 24.10.01 DL Gep. 26.10.01 EH Norm				Bezeichnung / designation: Blue motor cable (compact enclosure) for SSD Drives standard motors and servo drives				
02 SSD Drives 01 637f 21.07.03 DL				Zeichnungsnummer / drawing No: Z-MK.1691.xxxx				Blatt sheet 1
Zust	Änderung	Datum	Name	Ursprung	Dateiname / File name: Z-MK.1691.xxxx_E.cdr			

## 5.2 X50 – connector

### X50 - connector

**motor side**

SSD Drives - motor size 0...3

Type: AC S

not for AC S 1000-4, AC SL 1540-3  
 AC SL 1390-4, AC SL 1270-6, AC SL 1390-4  
 AC SL 1810-3, AC SL 2900-3

**regulator side**

SSD Drives - servo drives

Type: 635 and 637/637+/637f  
 in Rack

**view solder / crimp connector - side**

S MB DnSn BG 0/2 ST.0103.0002	K MB BG x/x - B KA.0003.xxxx		* X50 connector strip
PIN - Nr.	colour	function	PIN - Nr.
1	black 1	motor connection	10
⏏	<sup>1)</sup> yellow/green	ground connection	12
2	black 2	motor connection	14
6	schwarz 3	motor connection	16
4	red	brake +24V DC <sup>2)</sup>	18
5	blue	brake 0V DC <sup>2)</sup>	20
case	<sup>1)</sup>	screen	-

<sup>1)</sup> motor mating plug  
the screen is connected to the groundpin and also extensively to the case.

**⚠ Attention ! Security and insulation:**  
 The brake must be insulated for secure division (PELV). Otherwise, the insulation class of the drive becomes reduced or the effort of an additional galvanic separation is required.

<sup>\*</sup> not in the scope of delivery

**Attention Cable cross-section see chapter 5.6**

			Maßstab / scale:		
			Typ / model: KK MBx Sn1.R		
Bear. 24.10.01 DL			Bezeichnung / designation: Blue motor cable (plugs/terminal strip) for SSD Drives standard motors and servo drives		
Gep. 26.10.01 EH					
Norm					
02	SSD Drives		Zeichnungsnummer / drawing No: Z-MK.0091.xxxx		
01	637f	21.07.03 DL	Dateiname / File name: Z-MK.0091.xxxx_E.cdr		
Zust	Anderung	Datum Name Ursprung			

5.3 X30 - Resolver connector

Resolver connection

motor side

SSD Drives - motor size 0...3

Type: AC S

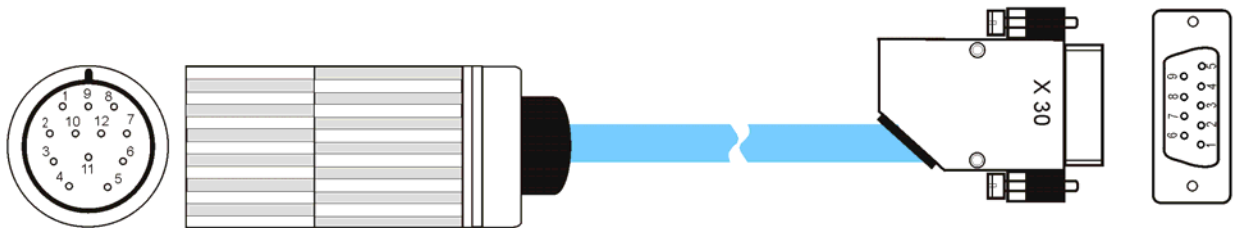
regulator side

SSD Drives - servo drives

Type: 631/635 and 637/637+/637f

view solderside

view solderside

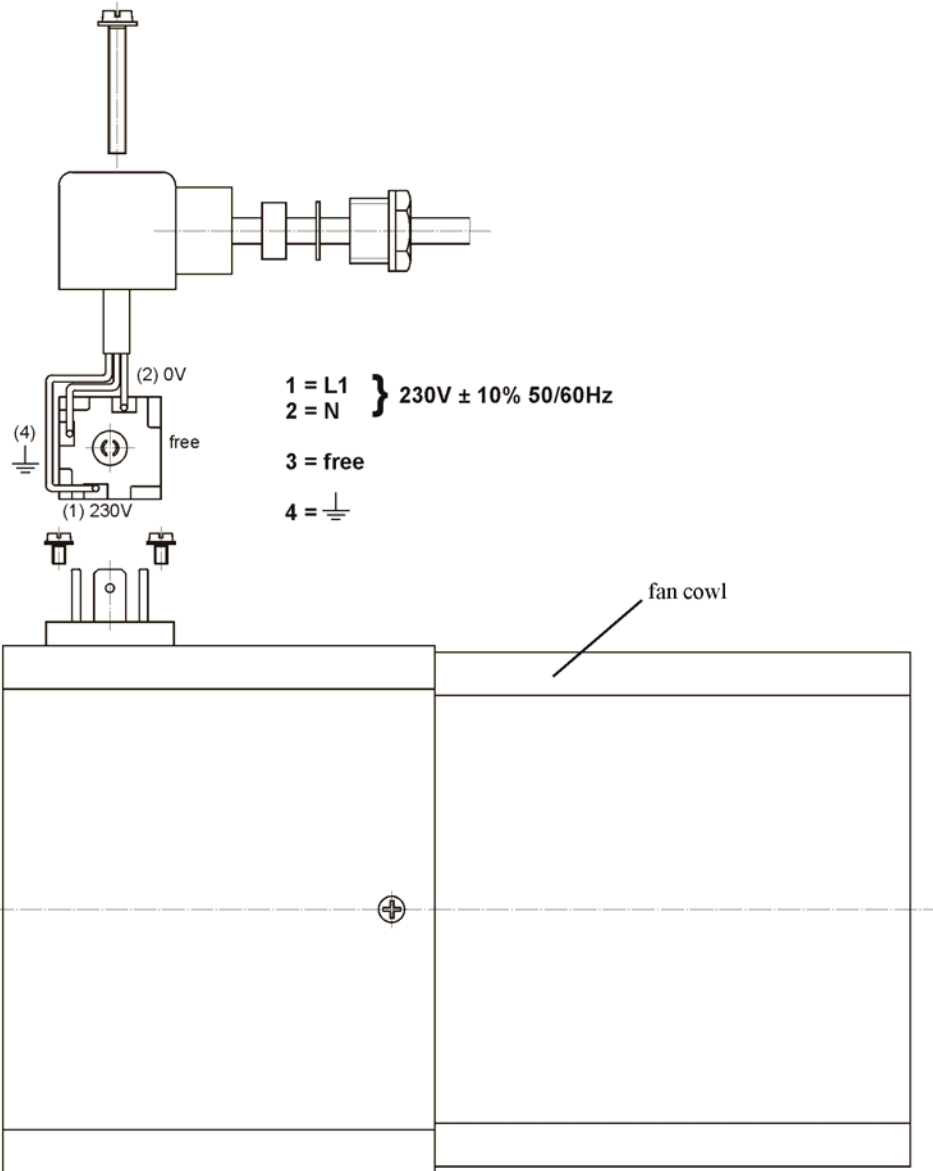


SIR ST.0200.0001	KIR-B KA.0003.6301		SUB - D 09 S/M ST.1002.2001
PIN - Nr.	colour	function	PIN - Nr.
1	white	sin +	4
2	brown	sin -	8
3	yellow	cos -	7
4	green	cos +	3
5	red	PTC optional	1) <sup>1)</sup> 2
6	blue	PTC optional	1) <sup>1)</sup> 6
7	gray	carrier +	5
8	pink	carrier -	9
case		screen	1 and case

1) **Attention ! Security and insulation:**  
The temperature sensor in the motor winding must be insulated for secure division (PELV). Otherwise, the insulation class of the drive becomes reduced or the effort of an additional galvanic separation is required.

				Maßstab / scale:			
				Typ / model:		KK RT S-xx.x/B	
			Bear.	24.10.01	DL	Bezeichnung / designation: Blue resolver cable for SSD Drives standard motors and servo drives	
			Gep.	26.10.01	EH		
			Norm				
02	SSD Drives					Zeichnungsnummer / drawing No: Z-RK.6600.xxxx	
01	637f	21.07.03	DL			Blatt sheet 1	
Zust.	Änderung	Datum	Name	Ursprung	Dateiname / File name: Z-RK.6600.xxxx_E.cdr		

## 5.4 Fan - connector



						Maßstab / scale:			
						Typ / model:			
				Bear.	24.10.01	DL	Bezeichnung / designation: Fan connection for SSD Drives motor AC <u>SL</u>		
				Gep.	26.10.01	EH			
				Norm					
				Zeichnungsnummer / drawing No:				Blatt sheet	
				Z-LÜ.AN.AC_SL_E				1	
Zust	Anderung	Datum	Name	Ursprung		Dateiname / File name: Z-LÜ.AN.AC_SL_E.cdr			

## 5.5 Cabling instructions

### Important rules when operating servo regulators and servomotors:

1. A radio interference suppression level cannot be maintained without an interference suppression filter at the line input. Moreover, line filter increase the immunity of the system to interference.
2. The cable between the power electronics and the motor must be shielded as YCY. A SY shield is not suitable. The shield support for the power cable (motor cable) must be on both ends. We recommend using SSD Drives motor cables K M BG xx – B!
3. Metal parts in the switching cabinet must be connected with each other having large areas of contact and must carry high frequencies very well. Avoid anodized, yellow-passivized and painted surfaces which can have very high resistance values based on the frequency! Make sure that the metals lie close together in the chemical circuit voltage class! Use the good conductivity and the large surface of the galvanized mounting plate as earth potential!
4. Relays, contactors and solenoid valves build into the same circuit must be connected with spark-suppressing combinations or components limiting over voltage, respectively. This applies also if these parts are not mounted in the same cabinet as the servo regulator.
5. The shield for the analog signal lines must be installed on one end and, if possible, in the switching cabinet. Ensure a connection which provides extensive contact and which is low-resistant! The shield for the digital signal lines must be installed on both ends, must have extensive contact and must be low resistance. An additional equalizer is to be laid parallel when there are potential differences. It is necessary to use plugs with metal enclosures with separable connections.
6. Avoid unnecessary extra loops on all connecting cables. All measures regarding filtering and shielding can be short circuited on them with high frequency. Connect unused litz wires in cables on both ends to the equipment ground conductor.
7. Unshielded cables of a circuit, the conductors going out and returning, should be twisted due to symmetrical interferences.
8. Separate physically "live" and "dead" wires even in the planning phase. Give special attention to the motor cables. The area of the common terminal strip-line input and motor output is especially endangered.
9. Relays, contactors and solenoid valves. The cables should be laid in the switching cabinet as close as possible to the ground; wires hanging freely in the air are preferred EMC victims as well as active and passive aerials.
10. When operating with more than one line component in a common network, EMC problems are to be expected. From the start, the installation planner must integrate in his concept high frequency emitted interference as well as the electromagnetic susceptibility of the components to one another and take measures against it.
11. It is absolutely necessary to run cable shields completely up to the connectors. The connection of the cable shields to ground must be in the near field of the servo regulator (10 - 50 cm). Sensitive measuring leads should be removed as far as possible from this area; this applies also when they are shielded!
12. It is mandatory to run the motor cables in a separate cable channel and to lay flexible cable shielding also when these are shielded. This channel must be separated by at least 30 - 40 cm from the channel for the signal lines.



## 5.6 Plug designation

### 5.6.1 Mating plugs for motor- and brake connections

Motor model	Plug designation
all	S MB DnSn BG 0/2
except AC S 1000-4/3-3  AC SL 1540-3/3-7 AC SL 1390-4/3-3 AC SL 1270-6/3-7 AC SL 1390-4/3-3 AC SL 1810-3/3-3 AC SL 2900-3/3-7	S MB S BG 2/3

### 5.6.2 Mating plugs for resolver- and thermal connection

Size	Plug designation
all	SIR

### 5.6.3 Cable cross-section

Motor model	cable cross-section (mm <sup>2</sup> )
all	1,5
except AC S 0720-4/2-3 AC S 0290-6/3-7 AC S 1700-3/3-7 AC S 2000-3/3-7  AC SL 0700-4/2-3 AC SL 1120-4/2-3 AC SL 1250-4/2-3 AC SL 1540-3/3-7 AC SL 2380-3/3-7 AC SL 3480-2/3-7	2,5
except AC S 1000-4/3-3  AC SL 1540-3/3-7 AC SL 1390-4/3-3 AC SL 1270-6/3-7 AC SL 1390-4/3-3 AC SL 1810-3/3-3 AC SL 2900-3/3-7	4,0

## optional

Holding brake	Motor size	Holding torque	Braking current	Moment of inertia	Release time	application time	weight
Model:	BG	M <sub>BrH</sub>	I <sub>Br</sub>	J <sub>Br</sub>	t <sub>LBr</sub>	t <sub>EBr</sub>	m <sub>Br</sub>
	(-)	(Nm)	(A)	(kg cm <sup>2</sup> )	(ms)	(ms)	(Kg)
BR S BG 0	0	4,0	0,65	0,18	35	2	0,33
BR S BG 1	1	8,0	0,98	0,70	40	2	0,55
BR S BG 2	2	15,0	1,30	1,86	50	3	0,98
BR S BG 3	3	32,0	1,40	6,50	90	3	1,65

Supply voltage:  $U_S = 24 \text{ V DC, } \pm 10\% \text{ acc. VDE 0580}$

For protection against switching surges use of a varistor type S14 K35 (or equivalent), connected in parallel with the brake coil, is recommended.

Holding brakes are integrated on A- side;  
therefore the motor length is not changed at size 1 - 3, see dimension K.  
the motor length is changed at size 0, see dimension K1

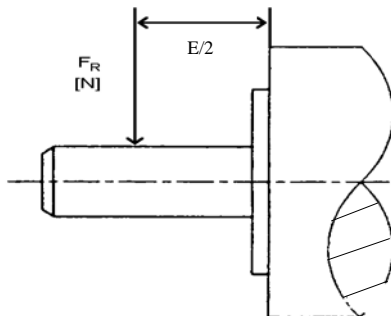
**The inserted brake is not characterized for the general slowing-down the drives, but is merely a standstill and/or holding brake.**

Therefore, it must become guaranteed by the customer, that the drive stands, before that brake comes in. Should that brake not only become employed in the case of standing drives, so it's generally the wear and therefore the holding torque of the brake depending on:

- the speed of the drive with which the brake will be switched
- the load moment of inertia on the drive
- environmental conditions as temperature, and so forth.
- the number of braking and so forth

## 7.1 Radial shaft load

### 7.1.1 Representation of the definition



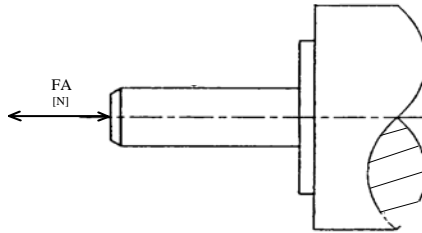
### 7.1.2 Technical dates of the max. radial shaft load FR (N)

motor-size	nominal speed	max. radial shaft load
(-)	$n_N$ (1/min)	FR (N)
0	3000	420
1	2000	660
	3000	580
	4000	530
	6000	460
2	2000	880
	3000	770
	4000	700
	6000	610
3	2000	1500
	3000	1350
	4000	1230
	5000	1140
	6000	1070

The specifications refers to 20000 hours of operation !

## 7.2 Axial shaft load

### 7.2.1 Representation of the definition



### 7.2.2 Technical dates of the max. axial shaft load FA (N)

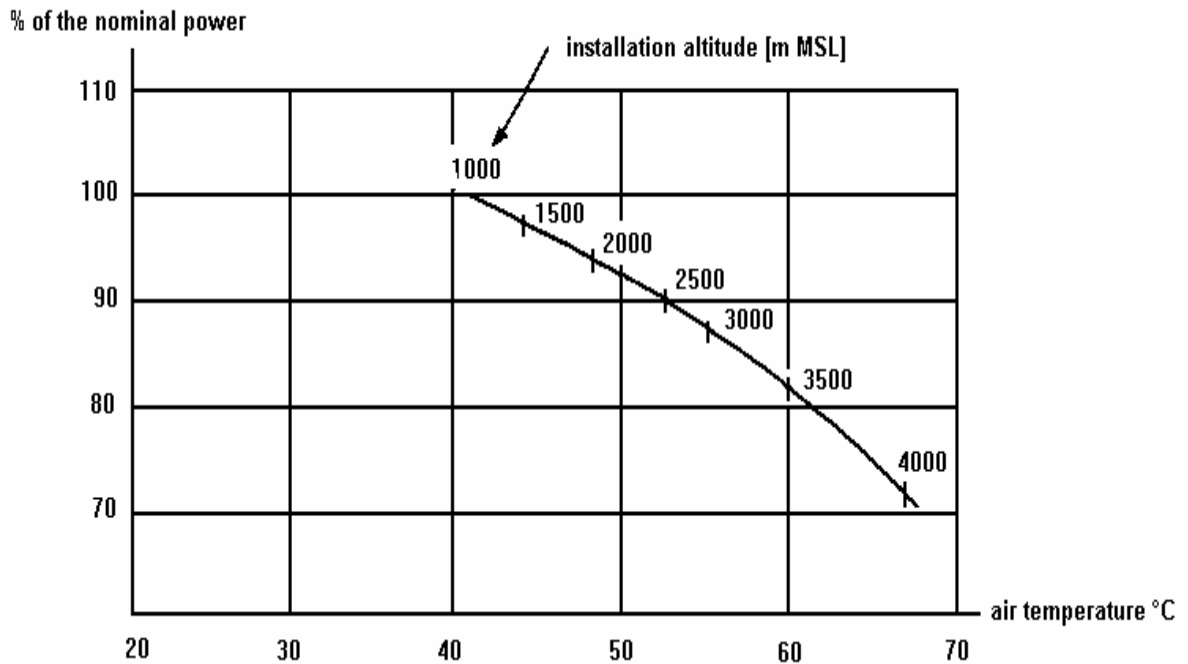
motor-size	nominal speed	max. axial shaft load
(-)	$n_N$ (1/min)	FA (N)
0	3000	130
1	2000	200
	3000	180
	4000	160
	6000	140
2	2000	280
	3000	240
	4000	220
	6000	190
3	2000	480
	3000	420
	4000	380
	5000	350
	6000	330

The specifications refers to 20000 hours of operation !

When selecting an adequate motor the following is to be considered:

Workload (power), operating mode, starting, braking and by-passing processes, additional moment of inertia, moment curve of the operating machine, speed control if necessary, net ratios, coolant temperature, installation altitude etc.

The nominal power is the power which is mechanically available at the shaft, if the installation site is not situated above 1000 m MSL, the air temperature does not exceed 40° C, and the net ratios are normal. With deviating conditions concerning installation altitude and air temperature, the permissible power must be corrected corresponding to the following graph.



Check the air temperature and the installation altitude separately. Should there be different air temperatures and installation altitude at the same time, the factors for the permissible power must be multiplied.

## 9.1 Manufacturer's Declaration



### Standard Specifications and Certifications

#### Manufacturer's Declaration

In accordance with the EC – MACHINERY DIRECTIVE 89/392/EEC  
Annex II B approximation of the regulation of the member states for machinery.

The following Products

AC – Servo - motors of series **AC S**

in standard design are components to be incorporated into machinery and may not be operated alone. The complete machinery or installation using this equipment may only be put into service when the safety considerations of the Directive 89/3892/EEC are fully adhered to.

The above mentioned products are in accordance with the relevant clauses from the following standards.

**Basic directives:**

- EN 60034 / VDE 0530
- IEC 34 – 1,5,6,8,9,14 / IEC 72 / IEC 85
- VDE 0100, VDE 0110, VDE 0530-1
- EC – MACHINERY DIRECTIVE 89/392/EEC
- EC – LOW VOLTAGE DIRECTIVE 73/23/EEC

CE – Label

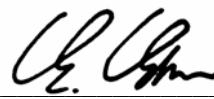
as standard on the name plate.

Issuer:

SSD Drives GmbH  
Im Sand 14  
76669 Bad Schönborn

Bad Schönborn, 25.07.2005

Legally binding signature



ppa. Erich Ehlen  
Plant Manager

This declaration does not include any assertion of properties. The references for safety and protection (operating instruction) are to observe in every case keep.

### 9.2 UL Approval

Since 1996 AC S motors can be supplied with UL certification as "Recognized Component Class 155(F) motor insulation system".

UL approval is registered with Underwriters Laboratories USA under UL File Number E182088 (N), Class OBJY2, Component-Systems, Electrical Insulation. UL certification is needed mainly for the sales of motors and gear motors on the US market. However, in many countries UL approval is considered a special mark of quality.

### 9.3 Conformity with other standards or regulations

On request

Version	Modification	Chapter	Date	Name	Comment
V04.29EH99	changed chapter changed chapter new chapter new chapter text addition	1.2 / 1.3 2 / 3 2.2, 2.3, 2.4 4.3, 5.4, 7, 9 6	22.07.1999	K. Stadler	Dokumentation im Eurotherm-Format
V0501	Completely revision separation German / English	all	30.10.2001	N. Dreilich	
V0603	Technical data Speed-Diagrams Connector assignment	3 5	21.07.2003	N. Dreilich	refresh refresh 637f complete
V0705	SSD Drives	-	25.07.2005	N. Dreilich	SSD - Logos



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