

1.1 Characteristics and technical data

Technical data 100 K values are specified in the Table.

Rated speed [RPM]	M ₀ [Nm]	M _{rated} [Nm]	M _{rated} ⁴⁾ [Nm]	Motor type 1FK6–	Motor current I ₀ ³⁾ [A]	Rated drive conv. curr. ³⁾ [A]	P _{calc} [kW]	Connector size	Cross-section ¹⁾ [mm ²]	Cable type 6FX□002– ⁵⁾
3000	3.2	2.6	2.3	042–6AF71	2.8	3	0.8	1.0	4 x 1.5	5□A01–1□□0
3000	6.0	4.0	3.6	060–6AF71	4.3	5	1.3	1.0	4 x 1.5	5□A01–1□□0
3000	11.0	6.0	5.4	063–6AF71	7.9	9	1.9	1.0	4 x 1.5	5□A01–1□□0
3000	8.0	6.8	6.1	080–6AF71	5.8	9	2.1	1.0	4 x 1.5	5□A01–1□□0
3000	16.0	10.5	9.5	083–6AF71	10.4	18	3.3	1.0	4 x 1.5	5□A01–1□□0
3000	18.0	12.0	10.8	100–8AF71	12.2	18	3.8	1.0	4 x 1.5	5□A01–1□□0
3000	27.0	15.5	14.0	101–8AF71	17.5	18	4.9	1.5	4 x 2.5	5□A31–1□□0
3000	36.0	16.5	14.9	103–8AF71	23.5	28	5.2	1.5	4 x 4	5□A41–1□□0
6000	1.1	0.8	– ⁶⁾	032–6AK71	1.7	3	0.5	1.0	4 x 1.5	5□A01–1□□0
6000	1.6	0.8	0.72	040–6AK71	2.8	3	0.5	1.0	4 x 1.5	5□A01–1□□0

without brake cable: w/out overall shield A
with overall shield C
with brake cable: w/out overall shield B
with overall shield D

Lengths²⁾
(examples) 5 m AF
10 m BA
15 m BF
18 m BJ
25 m CF

Power calculation

$$P_{calc} [kW] = \frac{M_{rated} \times n}{9550}$$

M [Nm]
n [RPM]

Cables are not included in the scope of supply of the motors, they must be separately ordered, actual value cables, refer to Chapter, Encoders (GE).

- 1) Dimensioned for I_{rms} (100 K); 40 °C ambient temperature; PVC insulated cable; brake connection 2 x 1 mm².
- 2) Cables are supplied in increments of a meter; length code, refer to Chapter AL S/4.3.
- 3) The specified values are RMS values
- 4) With absolute value encoder (due to the maximum encoder temperature)
- 5) 8 = Motion Connect 800, 5 = Motion Connect 500; Technical data, refer to Catalog NC Z
- 6) It is not possible to integrate an absolute value encoder

Technical data 1FK6 HD

For the high-dynamic performance, low-inertia motors, components are used which play a role in enhancing the flexibility and productivity for production machines:

- Higher accelerating torque with respect to standard motors as a result of the low rotor moment of inertia and the higher torque for the same shaft height
- Low, overall dimensions

100 K values are specified in the table.

Rated speed [RPM]	M ₀ [Nm]	M _{rated} [Nm]	M _{rated} ⁴⁾ [Nm]	Motor type 1FK6–	Motor current I ₀ ³⁾ [A]	Rated drive conv. current ³⁾ [A]	P _{calc} [kW]	Connec- tor size	Cross- section ¹⁾ [mm ²]	Cable type 6FX□002–5)
4500	3.1	2.6	2.3	043–7AH7	4.6	5	1.6	1	4 x 1.5	5□A01–1□□0
3000	4.0	3.5	3.2	044–7AF7	4.4	5	1.5	1	4 x 1.5	5□A01–1□□0
4500	4.0	3.0	2.7	044–7AH7	5.9	9	2.3	1	4 x 1.5	5□A01–1□□0
3000	6.4	5.4	4.9	061–7AF7	6.1	9	2.2	1	4 x 1.5	5□A01–1□□0
4500	6.4	4.3	3.9	061–7AH7	8.6	9	3.3	1	4 x 1.5	5□A01–1□□0
3000	12	8.0	7.2	064–7AF7	11.0	18	4.1	1	4 x 1.5	5□A01–1□□0

1FK6

without brake cable: without overall shield A
with overall shield C
with brake cable: without overall shield B
with overall shield D

Lengths²⁾
(examples) 5 m AF
10 m BA
15 m BF
18 m BJ
25 m CF

Power calculation

$$P_{calc} [kW] = \frac{M_{rated} \times n}{9550} \frac{M [Nm]}{n [RPM]}$$

Cables are not included in the scope of supply of the motors, they must be separately ordered, actual value cables, refer to Chapter, Geber (GE).

- 1) Dimensioned for I_{rms} (100 K); 40 °C ambient temperature; PVC insulated cable; brake connection 2 x 1 mm².
- 2) Cables are supplied in increments of a meter; length code, refer to Chapter AL S/4.3.
- 3) The specified values are RMS values
- 4) With absolute value encoder (due to the maximum encoder temperature)
- 5) 8 = Motion Connect 800, 5 = Motion Connect 500; Technical data, refer to Catalog NC Z

1.2 Functions and options

Armature short-circuit braking

Definition, refer to Chapter 3, General information on AC servomotors AL S.

Brake resistors

The optimum braking time is achieved by appropriately dimensioning the brake resistors. The braking torques which are obtained, are also listed in the tables. The data is valid for braking from rated speed. If the drive brakes from another speed, then the braking time **cannot** be linearly interpolated. However, the braking times either remain the same or are shorter.

The resistor ratings must be adapted to the particular I^2t load capability, refer to Chapter 3, General information on AC servomotors AL S.

Table 1-3 Resistor braking for 1FK6 shaft heights 36 to 100

Motor type	External brake resistor R_{opt} [Ω]	Average braking torque $M_{br rms}$ [Nm]	Max. braking torque $M_{br max}$ [Nm]	RMS braking current $I_{br rms}$ [A]
1FK6032–6AK71	0	1.6	2.3	6.1
	6.6	1.8		5.6
1FK6040–6AK71	0	2.0	3.1	9.6
	3.8	2.5		8.8
1FK6042–6AF71	0	8.0	6.5	9.9
	2.7	5.2		9.3
1FK6060–6AF71	0	6.5	9.9	12.7
	3.6	8.0		11.6
1FK6063–6AF71	0	10.8	19.8	26.0
	2.2	15.9		23.3
1FK6080–6AF71	0	7.1	12.9	16.7
	3.4	10.4		15.1
1FK6083–6AF71	0	11.8	26.0	31.0
	2.3	21.2		28.0
1FK6100–8AF71	0	14.1	31.0	38.0
	1.8	25.0		35.0
1FK6101–8AF71	0	18.7	47.0	56.0
	1.3	38.0		50.0
1FK6103–8AF71	0	23.3	65.0	77.0
	1.0	52.0		69.0
1FK6043–7AH71	0	0.7	2.1	5.5
	9.4	1.7		4.9
1FK6044–7AF71	0	1.0	2.5	5.2
	7.9	2.0		4.7
1FK6044–7AH71	0	0.8	2.4	7.0
	7.0	2.0		6.3
1FK6061–7AF71	0	0.9	3.7	6.4
	8.7	3.0		5.8
1FK6061–7AH71	0	0.7	3.8	9.4
	6.4	3.1		8.4
1FK6064–7AF71	0	1.6	7.0	12.0
	4.7	5.6		10.8

Holding brake

Function description, refer to Chapter 2.2, General information on AC servomotors AL S.

Table 1-4 Technical data of the holding brakes used with 1FK6 motors

Motor type	Brake type	Holding torque M_4 [Nm]		Dyn. torque M_{1m} [Nm]	DC current	Power drain	Opening time	Closing time	Moment of inertia, brake	Highest switching power ¹⁾²⁾
		20 °C	120 °C	120 °C	[A]	[W]	[ms]	[ms]	[10 ⁻⁴ kgm ²]	[J]
1FK6032	EBD 0.13BS	1.5	1.1	0.8	0.4	9.5	30	10	0.08	13
1FK604□	EBD 0.3B	3.9	3.2	2.1	0.6	13.5	35	10	0.2	68
1FK606□	EBD 0.8B	12	10	7	0.7	15.6	55	15	0.6	318
1FK608□	EBD 1.4BV	22	18	8	0.9	21	150	30	2.6	535
1FK6100	EBD 2 BY	28	20	12	0.9	22.3	100	30	8.6	1135
1FK6101 1FK6103	EBD 3.8B	50	36	17	0.9	22.3	180	25	10.3	1233

1) per emergency stop with $n = 3000/\text{min}$.

2) $\omega = 1/2 \cdot J_{\text{tot}} \cdot \omega^2$; J_{tot} [kgm²]; ω [1/s]; ω [W];

Basic braking characteristics

Refer to Chapter 2, General information on AC servomotors AL S.

M_{1m}	[Nm]	=	Average dynamic torque defined by the slip time t_3
M_4	[Nm]	=	Torque which is transmitted, taking into account the max. solenoid temperature, friction value fluctuations and production tolerances.

Forced ventilation

Not available

Connector outlet direction

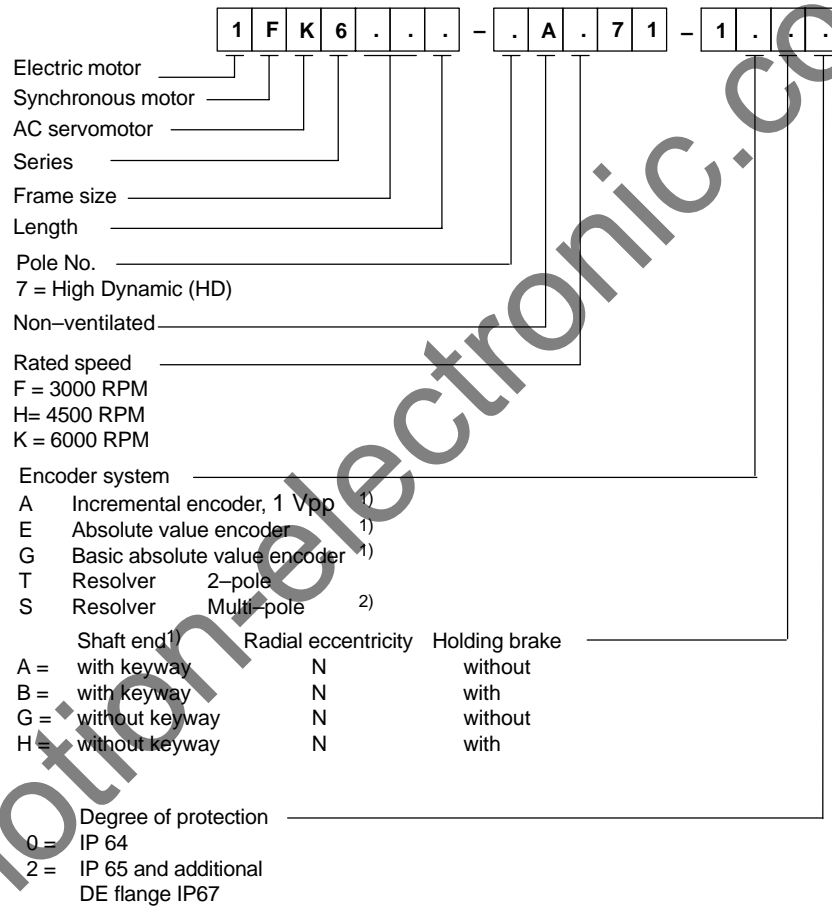
The customer can rotate the connector (refer to the dimension drawing)

1FK6

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Order Designations

Order designation



1FK6

1) not for shaft height 36
2) encoder pole number corresponds to that of the motor



3.1 Speed-torque diagrams

Table 3-5 Standard motor 1FK6063

1FK6063				
Technical data	Code	Units	-6AF7	
Engineering data				
Rated speed	n_{rated}	RPM	3000	
Rated torque	M_{rated} (100 K)	Nm	6.0	
Rated current	I_{rated}	A	4.7	
Stall torque	M_0 (60 K)	Nm	9.1	
Stall torque	M_0 (100 K)	Nm	11.0	
Stall current	I_0 (60 K)	A	6.3	
Stall current	I_0 (100 K)	A	7.9	
Moment of inertia (with brake)	J_{mot}	10^{-4} kgm ²	16.7	
Moment of inertia (without brake)	J_{mot}	10^{-4} kgm ²	16.1	
Limit data				
Max. speed	n_{max}	RPM	5300	
Max. torque	M_{max}	Nm	36	
Peak current	I_{max}	A	28	
Limiting torque	M_{limit}	Nm	35	
Limiting current	I_{limit}	A	28	
Physical constants				
Torque constant	k_T	Nm/A	1.39	
Voltage constant	k_E	V/1000 RPM	92	
Winding resistance	R_{ph}	Ohm	0.83	
Three-phase inductance	L_D	mH	6.5	
Electrical time constant	T_{el}	ms	7.8	
Mechanical time constant	T_{mech}	ms	2.1	
Thermal time constant	T_{th}	min	35	
Thermal resistance	R_{th}	W/K	0.15	
Weight with brake	m	kg	13.8	
Weight without brake	m	kg	13.2	

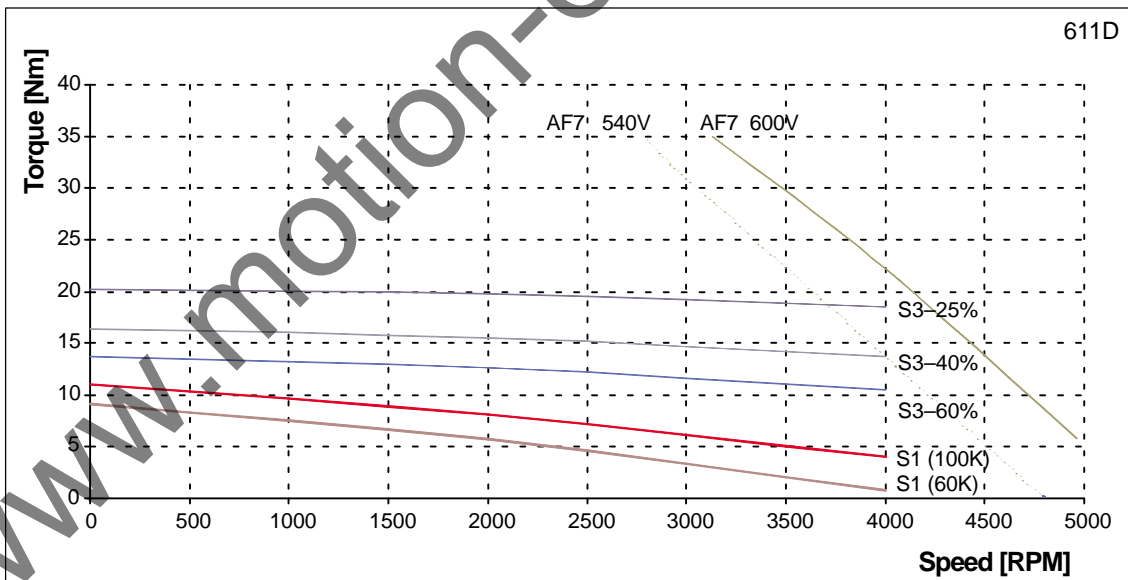


Fig. 3-5 Speed-torque diagram 1FK6063

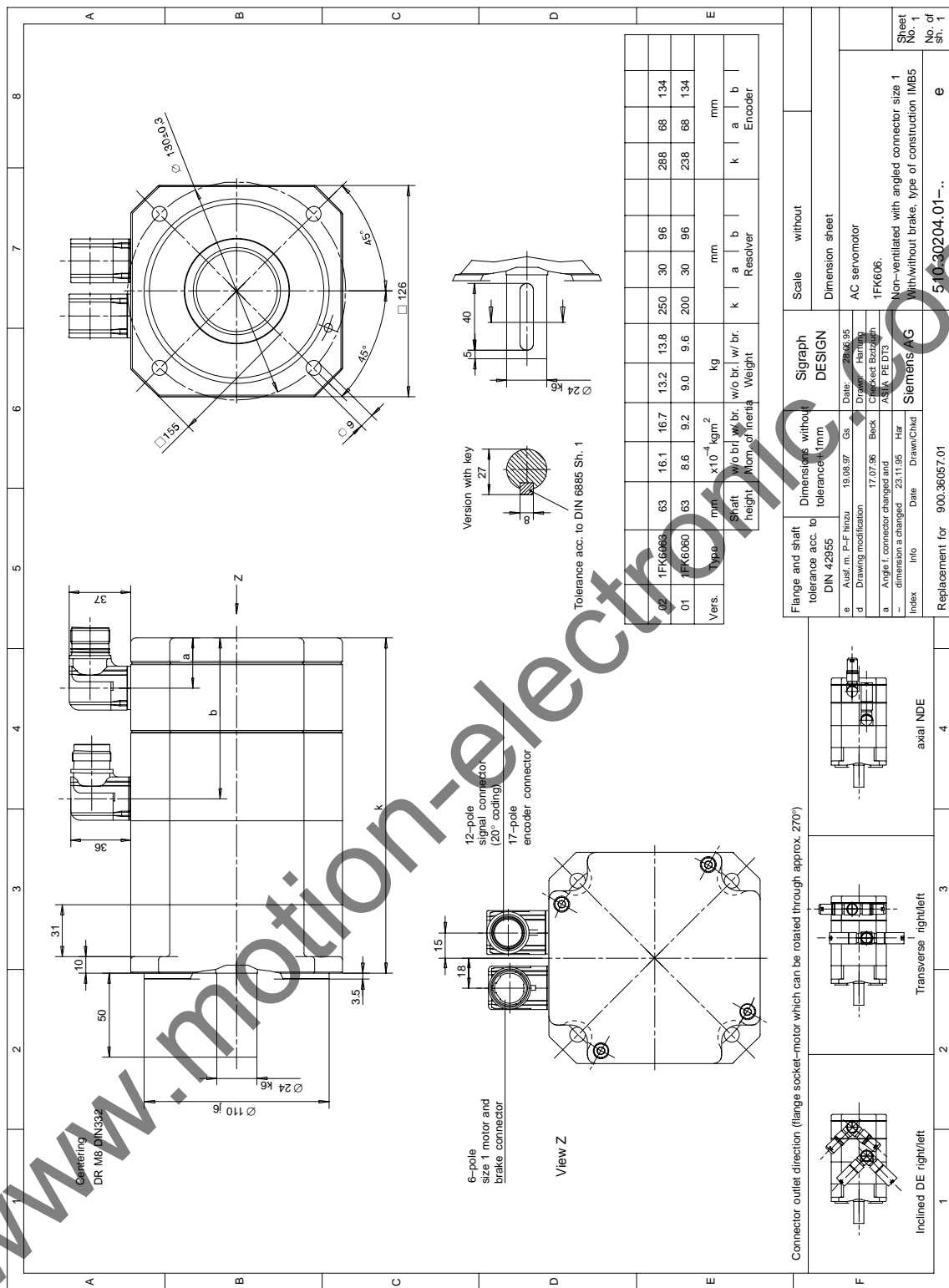


Fig. 4-4 1FK6060 □ non-ventilated with angled connector, size 1

1FK6

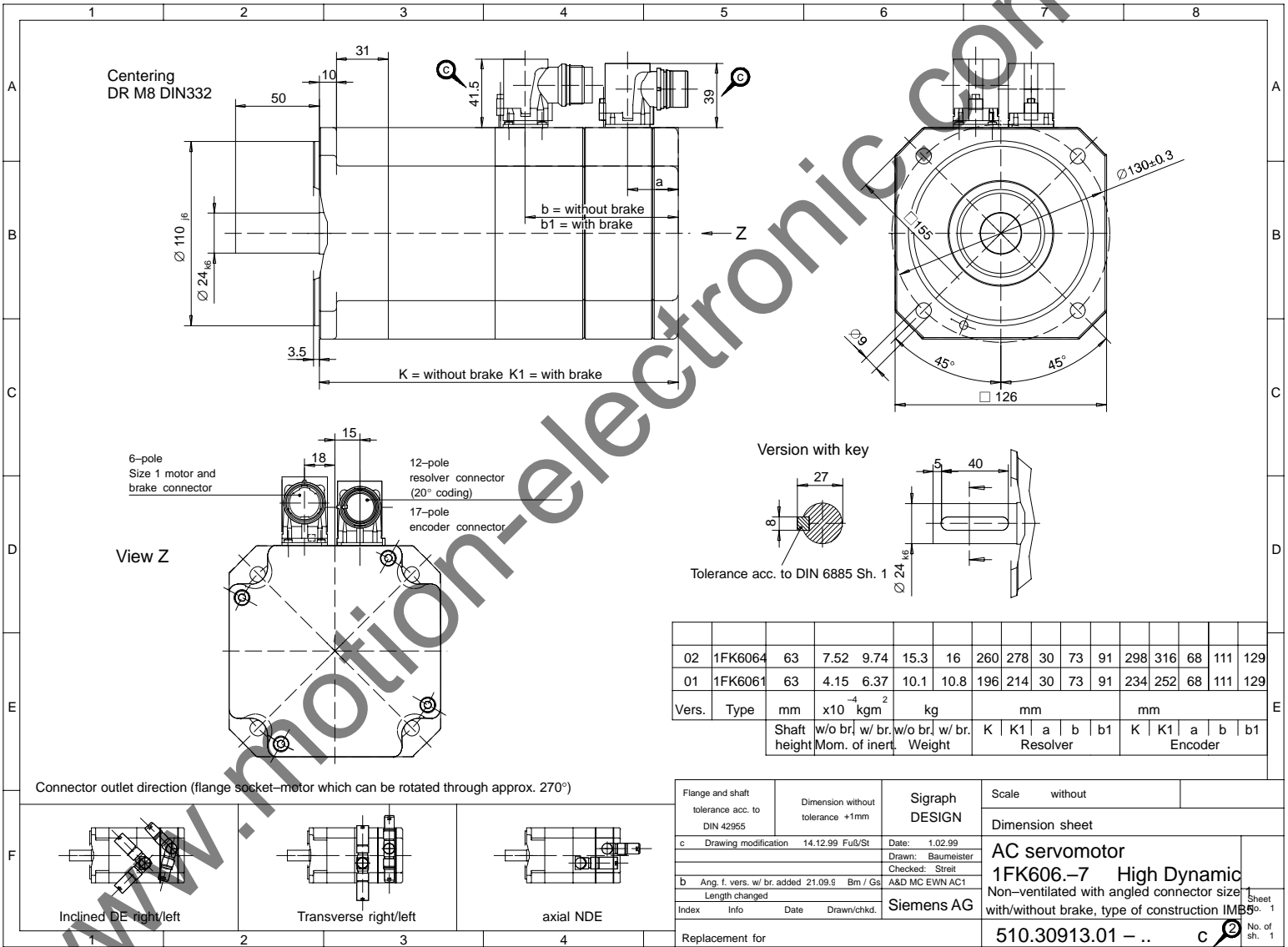


Fig. 4-5 1FK606-7 non-ventilated with angled connector, size 1