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SIMODRIVE
Three-phase AC drives

Description

Edition 08.89

1FT4 and 1FT5 300 V AC servomotors for the 6RA29 infeed/regenerative feedback unit

SIMODRIVE

1FT4 and 1FT5 300V AC servomotors for the 6RA29 infeed/regenerative feedback unit

Supplement to the 6RA29 description

Edition 08.89

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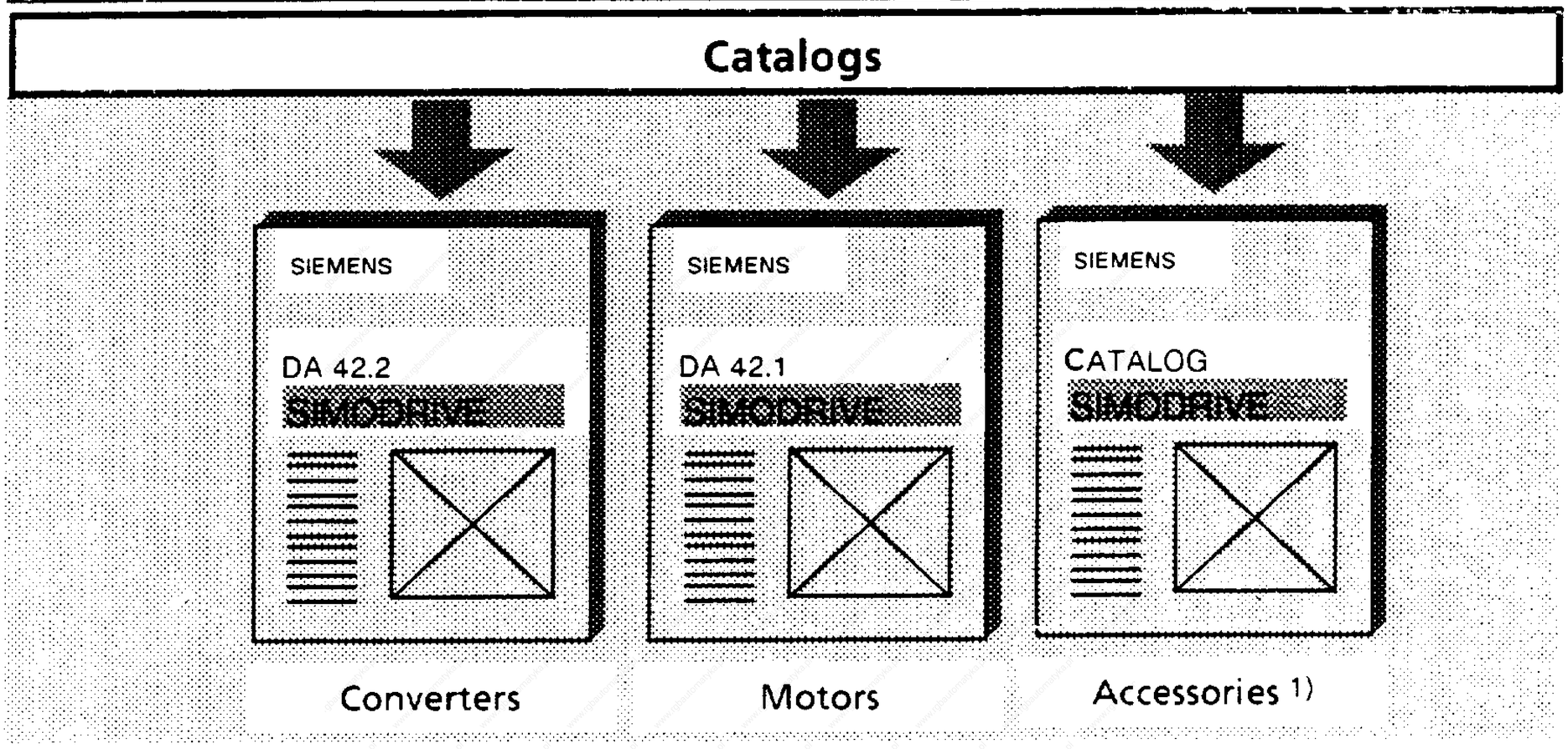
0 Preliminary information

The following text is part of the SIMODRIVE ® documentation. The documents are availabie individually. The associated Order Nos. are given in the literature reference of this Reference Manual. Contact your nearest Siemens office for more information.



1) Order No. 48373025 FSZ Fürth ZSI

1 SIMODRIVE 610 PWM converter for the 300V feed system

1.1 General information

Standard SIMODRIVE 610 transistor PWM converters are also suitable for operation with a controlled 300 V DC link.

With the exception of the changes to the SIMODRIVE 610 PWM converter specified below, which are necessary for operation with the 6RA29 infeed/regenerative feedback unit, the technical specifications, as specified in the DA42 Technical description for AC feed drives, are still valid.

1.2 Changes

SIMODRIVE 610 transistor PWM converters are modified as follows for operation with the 6RA29 infeed/regenerative feedback unit:

- **Bridge rectifier**
  The uncontrolled bridge rectifier in the SIMODRIVE 610 PWM converter is removed.

- **DC link voltage limiting**
  The SIMODRIVE 610 PWM converter must be ordered without DC link voltage limiting. This applies to modules with Order codes G10 and G20.

- **Matching transformer**
  The 6RA29 infeed/regenerative feedback unit can be directly connected to 380V - 415V AC supplies. A matching transformer is not required.

- **DC link capacitors**
  SIMODRIVE 610 PWM converters, which are used for operation with 6RA29 infeed/regenerative feedback units, have matched capacitors.

- **Adaption of 1FT5 motors to SIMODRIVE 610 PWM converters**
  Other parameter settings for the current limit and the P-gain for the current controller are required when changing over to a 300V DC link voltage (refer to Section 2.3).

SIMODRIVE 610 transistor PWM converters with ***Order code V00*** have the described modifications, and can be routinely used with the 6RA29 infeed/regenerative feedback unit.

SIMODRIVE 610 transistor PWM converters ***without*** this Order code ***cannot*** be operated with the 6RA29 infeed/regenerative feedback unit.

1.3 Matching tables : 1FT4 motor - SIMODRIVE 610 PWM converter

Matching table for SIMODRIVE power modules **6SC6190- . . . (90 A / 180 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
1FT4	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts				I_{max} [A]	Contacts				K_P (I)
				2	3	4	5		6	7	8	9	
Standard-version servomotor													
101-0SK21	20	66	6000	o	o	o	o	180	o	x	o	o	2
102-0SG21	33	70	4000	o	o	o	o	180	o	o	x	o	4

Matching table for SIMODRIVE power modules **6SC6190- . . . (120 A / 240 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
1FT4	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts				I_{max} [A]	Contacts				K_P (I)
				2	3	4	5		6	7	8	9	
Standard-version servomotor													
102-0SK21	33	94	6000	o	o	o	o	240	x	x	o	o	2.5
104-0SG21	45	92	4000	o	o	o	o	240	o	o	x	o	4
-0SK21	44	120	6000	o	o	o	o	240	o	x	o	o	2

o = Contact in the OFF setting (basic setting)
x = Contact in the ON position

1.4 Matching tables: 1FT5 motor – SIMODRIVE 610 PWM converter

The matching tables are valid for the **6SC61□□-□□□** SIMODRIVE power modules with Order codes A... . The corresponding parameters can be set by means of switches S1, S2 and S3 on the parameter board.

Matching table for SIMODRIVE power modules: **6SC6103- . . . (3 A / 6 A)**

Servomotor				PWM converter								
				Current limit					Current controller			
				Contacts					Contacts			
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_p (I)
Standard-version servomotor													
020-0AC2	0.15	0.43	2000	o	x	o	x	1.8	o	x	o	o	2.0
-0AF2		0.56	3000	o	o	o	x	2.2	x	o	o	o	1.0
-0AH2		0.63	4500	o	x	x	o	2.5	x	o	o	o	1.0
-0AK2		0.68	6000	x	o	x	o	2.8	x	o	o	o	1.0
022-0AC2	0.27	0.69	2000	x	o	x	o	2.8	o	x	o	o	2.0
-0AF2		0.90	3000	x	x	o	o	3.7	x	o	o	o	1.0
-0AH2		1.05	4500	o	x	o	o	4.1	x	o	o	o	1.0
-0AK2		1.20	6000	x	o	o	o	5.1	x	o	o	o	1.0
024-0AC2	0.4	0.91	2000	x	x	o	o	3.7	o	x	o	o	2.0
-0AF2		1.20	3000	x	o	o	o	5.1	o	x	o	o	2.0
-0AH2		1.45	4500	o	o	o	o	6.0	x	o	o	o	1.0
-0AK2		1.60	6000	o	o	o	o	6.0	x	o	o	o	1.0
032-0AC2	0.25	0.60	2000	o	x	x	o	2.4	x	x	o	o	2.5
-0AF2		0.75	3000	o	o	x	o	3.0	o	x	o	o	2.0
-0AH2		0.95	4500	x	x	o	o	3.7	x	o	o	o	1.0
-0AK2		1.10	6000	o	x	o	o	4.1	x	o	o	o	1.0
034-0AC2	0.5	1.0	2000	o	x	o	o	4.1	x	x	o	o	2.5
-0AF2		1.3	3000	x	o	o	o	5.2	o	x	o	o	2.0
-0AH2		1.7	4500	o	o	o	o	6.0	o	x	o	o	2.0
-0AK2		2.1	6000	o	o	o	o	6.0	x	o	o	o	1.0
036-0AC2	0.75	1.4	2000	x	o	o	o	6.0	x	x	o	o	2.5
-0AF2		1.8	3000	o	o	o	o	6.0	o	x	o	o	2.0
-0AH2		2.4	4500	o	o	o	o	6.0	x	o	o	o	1.0
-0AK2		3.1	6000	o	o	o	o	6.0	x	o	o	o	0.5
042-0AC2	0.6	1.1	2000	o	x	o	o	4.1	o	o	x	o	4.0
-0AF2		1.4	3000	x	o	o	o	5.1	o	x	o	o	2.0
-0AH2		1.9	4500	o	o	o	o	6.0	o	x	o	o	2.0
-0AK2		2.5	6000	o	o	o	o	6.0	x	o	o	o	1.0
044-0AC2	1.2	1.9	2000	o	o	o	o	6.0	x	x	o	o	2.5
-0AF2		2.7	3000	o	o	o	o	6.0	x	o	o	o	1.0
046-0AC2	2.0	2.5	2000	o	o	o	o	6	x	x	o	o	2.5
062-0AC2	2.2	2.8	2000	o	o	o	o	6	o	x	x	o	5.5
-0AF2		3.5	3000	o	o	o	o	6	o	o	x	o	4.0

Matching table for SIMODRIVE power modules: 6SC6108- . . . (8 A / 16 A)

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Standard-version servomotor													
022-0AF2	0.27	0.90	3000	x	x	x	x	3.7	x	o	o	o	1.0
-0AH2		1.05	4500	o	x	x	x	3.8	x	o	o	o	1.0
-0AK2		1.20	6000	x	x	o	x	4.8	x	o	o	o	1.0
024-0AC2	0.4	0.91	2000	x	x	x	x	3.7	o	x	o	o	2.0
-0AF2		1.20	3000	o	x	o	x	4.8	o	x	o	o	2.0
-0AH2		1.45	4500	o	o	o	x	5.8	x	o	o	o	1.0
-0AK2		1.60	6000	x	x	x	o	6.2	x	o	o	o	1.0
032-0AH2	0.25	0.95	4500	x	x	x	x	3.7	x	o	o	o	1.0
-0AK2		1.10	6000	x	x	o	x	4.3	x	o	o	o	1.0
034-0AC2	0.5	1.0	2000	o	x	x	x	3.8	x	x	o	o	2.5
-0AF2		1.3	3000	o	x	o	x	4.8	o	x	o	o	2.0
0AH2		1.7	4500	o	x	x	o	6.6	o	x	o	o	2.0
-0AK2		2.1	6000	o	o	x	o	8.0	x	o	o	o	1.0
036-0AC2	0.75	1.4	2000	x	o	o	x	5.4	x	x	o	o	2.5
-0AF2		1.8	3000	o	x	x	o	6.6	o	x	o	o	2.0
-0AH2		2.4	4500	o	o	o	o	8.0	x	o	o	o	1.0
-0AK2		3.1	6000	o	x	o	o	10.9	x	o	o	o	1.0
042-0AC2	0.6	1.1	2000	x	x	o	x	4.3	o	o	x	o	4.0
-0AF2		1.4	3000	o	x	o	x	4.8	o	x	o	o	2.0
-0AH2		1.9	4500	x	o	x	o	7.4	o	x	o	o	2.0
-0AK2		2.5	6000	x	x	o	o	9.8	x	o	o	o	1.0
044-0AC2	1.2	1.9	2000	x	o	x	o	7.4	o	o	x	o	4.0
-0AF2		2.7	3000	o	x	o	o	10.9	x	x	o	o	2.5
-0AH2		3.5	4500	x	o	o	o	13.6	o	x	o	o	2.0
-0AK2		4.8	6000	o	o	o	o	16.0	x	o	o	o	1.0
046-0AC2	2.0	2.5	2000	x	x	o	o	9.8	o	o	x	o	4.0
-0AF2		3.6	3000	x	o	o	o	13.6	x	x	o	o	2.5
-0AH2		5.4	4500	o	o	o	o	16.0	x	o	o	o	1.0
-0AK2		6.7	6000	o	o	o	o	16.0	x	o	o	o	1.0
062-0AC2	2.2	2.8	2000	o	x	o	o	10.8	o	o	x	x	9.5
-0AF2		3.5	3000	x	o	o	o	13.6	o	x	o	x	7.5
-0AG2		5.4	4000	o	o	o	o	16.0	o	o	x	o	4.0
-0AK2		7.1	6000	o	o	o	o	16.0	o	x	o	o	2.0
064-0AC2	4.5	5.8	2000	o	o	o	o	16.0	x	o	o	x	6.5
-0AF2		7.2	3000	o	o	o	o	16.0	o	o	x	o	4.0
-0AG2		10.7	4000	o	o	o	o	16.0	o	x	o	o	2.0
-0AK2		14.1	6000	o	o	o	o	16.0	x	o	o	o	1.0
066-0AC2	6.5	8.4	2000	o	o	o	o	16.0	o	o	x	o	4.0
-0AF2		10.3	3000	o	o	o	o	16.0	x	x	o	o	2.5

Matching table for SIMODRIVE power modules: **6SC6120- . . . (20 A / 40 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Standard-version servomotor													
036-0AH2	0.75	2.4	4500	o	x	x	x	9.6	o	o	o	o	1.0
-0AK2		3.1	6000	o	x	o	x	12	x	o	o	o	1.0
042-0AK2	0.6	2.5	6000	o	x	x	x	9.6	x	o	o	o	1.0
044-0AF2	1.2	2.7	3000	x	x	o	x	10.8	x	x	o	o	2.5
-0AH2		3.5	4500	x	o	o	x	13.6	o	x	o	o	2.0
-0AK2		4.8	6000	x	o	x	o	18.4	x	o	o	o	1.0
046-0AC2	2.0	2.5	2000	o	x	x	x	9.6	o	o	x	o	4.0
-0AF2		3.6	3000	o	o	o	x	14.4	x	x	o	o	2.5
-0AH2		5.4	4500	o	o	x	o	20.0	x	o	o	o	1.0
-0AK2		6.7	6000	x	x	o	o	24.4	x	o	o	o	1.0
062-0AC2	2.2	2.8	2000	o	o	x	x	10.8	o	o	x	x	9.5
-0AF2		3.5	3000	x	o	o	x	13.6	o	x	o	x	7.5
-0AG2		5.4	4000	o	o	x	o	20	x	o	x	o	4.5
-0AK2		7.1	6000	o	x	o	o	27	o	o	x	o	4.0
064-0AC2	4.5	5.8	2000	o	o	x	o	20	x	x	o	x	8.0
-0AF2		7.2	3000	o	x	o	o	27	x	o	o	x	6.5
-0AG2		10.7	4000	o	o	o	o	40	x	o	x	o	4.5
-0AK2		14.1	6000	o	o	o	o	40	x	x	o	o	2.5
066-0AC2	6.5	8.4	2000	o	x	o	o	27	x	o	o	x	6.5
-0AF2		10.3	3000	o	o	o	o	40	x	o	o	x	6.5
-0AG2		15.8	4000	o	o	o	o	40	x	x	o	o	2.5
-0AK2		21.7	6000	o	o	o	o	40	o	x	o	o	2.0
072-0AC2	10	12.3	2000	o	o	o	o	40	o	o	x	x	9.5
-0AF2		15.7	3000	o	o	o	o	40	x	x	x	o	6.0
-0AG2		23.3	4000	o	o	o	o	40	x	x	o	o	2.5

o = Contact in the OFF position (basic setting)
x = Contact in the ON position

Matching table for SIMODRIVE power modules: **6SC6120- . . . (20 A / 40 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts 2	3	4	5	I_{max} [A]	Contacts 6	7	8	9	K_P (I)
Short-version servomotor													
070-0AC2	2.2	2.8	2000	o	o	x	x	10.4	o	o	x	x	9.5
-0AF2		3.5	3000	x	o	o	x	13.6	o	x	o	x	7.5
-0AG2		5.4	4000	o	o	x	o	20	x	x	x	o	6.0
-0AK2		7.1	6000	o	x	o	o	27	o	o	x	o	4.0
071-0AC2	4.5	5.8	2000	o	o	x	o	20	o	o	x	x	9.5
-0AF2		7.2	3000	o	x	o	o	27	o	x	o	x	7.5
-0AG2		10.7	4000	o	o	o	o	40	o	x	x	o	5.5
-0AK2		14.1	6000	o	o	o	o	40	o	x	o	o	2.0
073-0AC2	7	8.5	2000	x	o	o	o	34	o	o	x	x	9.5
-0AF2		11.1	3000	o	o	o	o	40	x	o	o	x	6.5
-0AG2		16.3	4000	o	o	o	o	40	x	x	o	o	2.5
-0AK2		24.1	6000	o	o	o	o	40	o	x	o	o	2.0
100-0AC2	10	12.4	2000	o	o	o	o	40	x	o	o	x	6.5
-0AF2		15.4	3000	o	o	o	o	40	o	o	x	o	4.0
-0AG2		23.1	4000	o	o	o	o	40	o	x	o	o	2.0

Matching table for SIMODRIVE power modules: 6SC6130- . . . (30 A / 60 A)

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Standard-version servomotor													
062-0AF2	2.2	3.5	3000	x	x	x	x	13.6	o	x	o	x	7.5
-0AG2		5.4	4000	o	o	o	x	21.6	o	x	x	o	5.5
-0AK2		7.1	6000	o	x	x	o	24.6	o	o	x	o	4.0
064-0AC2	4.5	5.8	2000	o	o	o	x	21.6	x	x	o	x	8.0
-0AF2		7.2	3000	x	o	x	o	30.0	o	x	o	x	7.5
-0AG2		10.7	4000	o	x	o	o	40.8	x	o	x	o	4.5
-0AK2		14.1	6000	x	o	o	o	51.0	x	x	o	o	2.5
066-0AC2	6.5	8.4	2000	o	o	x	o	30.0	o	x	o	x	7.5
-0AF2		10.3	3000	o	x	o	o	40.8	x	o	o	x	6.5
-0AG2		15.8	4000	o	o	o	o	60.0	x	o	x	o	4.5
-0AK2		21.7	6000	o	o	o	o	60.0	x	x	o	o	2.5
072-0AC2	10	12.3	2000	o	x	o	o	40.8	o	o	x	x	9.5
-0AF2		15.7	3000	o	o	o	o	60.0	o	o	x	x	9.5
-0AG2		23.3	4000	o	o	o	o	60.0	o	o	x	o	4.0
-0AK2		33.3	6000	o	o	o	o	60.0	o	x	o	o	2.0
074-0AC2	14	17.1	2000	o	o	o	o	60.0	x	x	o	x	8.0
-0AF2		22.6	3000	o	o	o	o	60.0	o	x	x	o	5.5
-0AG2		32.7	4000	o	o	o	o	60.0	x	x	o	o	2.5
076-0AC2	18	22.5	2000	o	o	o	o	60.0	o	x	x	o	5.5
-0AF2		28.6	3000	o	o	o	o	60.0	o	o	x	o	4.0
102-0AA2	27	16.4	1200	o	o	o	o	60.0	x	x	x	x	11.5
-0AC2		31.9	2000	o	o	o	o	60.0	x	x	o	o	2.5
104-0AA2	37	22.6	1200	o	o	o	o	60.0	x	x	o	x	8.0
106-0AA2	45	27.0	1200	o	o	o	o	60.0	x	o	o	x	6.5
108-0AA2	55	32.8	1200	o	o	o	o	60.0	o	x	x	o	5.5

Matching table for SIMODRIVE power modules: 6SC6130- . . . (30 A / 60 A)

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Short-version servomotor													
070-0AC2	3	3.7	2000	o	x	x	x	14.4	x	x	x	x	11.5
-0AF2		4.7	3000	x	x	o	x	17.4	o	o	x	x	9.5
-0AG2		6.9	4000	o	x	x	o	24.6	o	x	o	x	7.5
-0AK2		10.4	6000	o	x	o	o	40.8	o	x	x	o	5.5
071-0AC2	4.5	5.4	2000	x	o	o	x	20.4	o	o	x	x	9.5
-0AF2		7.0	3000	o	x	x	o	24.6	x	o	o	x	6.5
-0AG2		10.5	4000	o	x	o	o	40.8	o	x	x	o	5.5
-0AK2		1.8	6000	o	o	o	o	60	x	x	o	o	2.5
073-0AC2	7	8.5	2000	o	o	x	o	30	o	o	x	x	9.5
-0AF2		11.1	3000	o	x	o	o	40.8	o	x	o	x	7.5
-0AG2		16.3	4000	o	o	o	o	60	x	o	x	o	4.5
-0AK2		24.1	6000	o	o	o	o	60	x	x	o	o	2.5
100-0AC2	10	12.4	2000	o	x	o	o	40.8	x	o	o	x	6.5
-0AF2		15.4	3000	o	o	o	o	60	x	x	x	o	6
-0AG2		23.1	4000	o	o	o	o	60	x	x	o	o	2.5
-0AK2		28.1	6000	o	o	o	o	60	o	x	o	o	2
101-0AC2	15	17.4	2000	o	o	o	o	60	x	x	x	o	6
-0AF2		22.9	3000	o	o	o	o	60	o	o	x	o	4
-0AG2		33.6	4000	o	o	o	o	60	o	x	o	o	2

Matching table for SIMODRIVE power modules: **6SC6140- . . . (40 A / 80 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Standard-version servomotor													
062-0AG2	2.2	5.4	4000	o	o	x	x	20.8	x	o	x	o	4.5
-0AK2		7.1	6000	x	o	o	x	27.2	o	o	x	o	4.0
064-0AC2	4.5	5.8	2000	x	x	o	x	23.2	o	o	x	x	9.5
-0AF2		7.2	3000	o	o	o	x	28.8	o	x	o	x	7.5
-0AG2		10.7	4000	o	o	x	o	40.0	x	o	x	o	4.0
-0AK2		14.1	6000	o	x	o	o	54.4	o	o	x	o	2.0
066-0AC2	6.5	8.4	2000	o	x	x	o	32.8	x	x	o	x	8.0
-0AF2		10.3	3000	o	o	x	o	40.0	x	o	o	x	6.5
-0AG2		15.8	4000	o	x	o	o	54.4	o	o	x	o	4.0
-0AK2		21.7	6000	o	x	o	o	54.4	o	x	o	o	2.0
072-0AC2	10	12.3	2000	x	x	o	o	48.8	x	x	x	x	11.5
-0AF2		15.7	3000	o	x	o	o	54.4	x	x	o	x	8.0
-0AG2		23.3	4000	x	o	o	o	68.0	x	o	x	o	4.5
-0AK2		33.3	6000	o	o	o	o	80.0	x	x	o	o	2.5
074-0AC2	14	17.1	2000	x	o	o	o	68.0	o	o	x	x	9.5
-0AF2		22.6	3000	o	o	o	o	80.0	x	o	o	x	6.5
-0AG2		32.7	4000	o	o	o	o	80.0	x	x	o	o	2.5
-0AK2		46.7	6000	o	o	o	o	80.0	o	x	o	o	2.0
076-0AC2	18	22.5	2000	o	o	o	o	80.0	o	x	o	x	7.5
-0AF2		28.6	3000	o	o	o	o	80.0	x	o	x	o	4.5
-0AG2		42.1	4000	o	o	o	o	80.0	o	x	o	o	2.0
-0AK2		60.1	6000	o	o	o	o	80.0	x	o	o	o	1.0
102-0AA2	27	16.4	1200	o	x	o	o	54.4	x	x	x	x	11.5
-0AC2		31.9	2000	o	o	o	o	80.0	x	o	x	o	4.5
-0AF2		40.9	3000	o	o	o	o	80.0	x	x	o	o	2.5
-0AG2		61.4	4000	o	o	o	o	80.0	x	o	o	o	1.0
104-0AA2	37	22.6	1200	o	o	o	o	80.0	x	x	x	x	11.5
-0AC2		43.2	2000	o	o	o	o	80.0	x	x	o	o	2.5
106-0AA2	45	27.0	1200	o	o	o	o	80.0	x	x	o	o	9.5
108-0AA2	55	32.8	1200	o	o	o	o	80.0	o	x	o	x	7.5
132-0AA2	60	38.8	1200	o	o	o	o	80.0	x	o	o	x	6.5

Matching table for SIMODRIVE power modules: 6SC6140- . . . (40 A / 80 A)

Servomotor				PWM converter									
				Current limit					Current controller				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts 2	3	4	5	I_{max} [A]	Contacts 6	7	8	9	K_P (I)
Short-version servomotor													
070-0AF2	3	4.7	3000	x	x	x	x	18.4	o	o	x	x	9.5
-0AG2		6.9	4000	x	o	o	x	27.2	x	x	o	x	8.0
-0AK2		10.4	6000	o	o	x	o	40.0	o	x	x	o	5.5
071-0AC2	4.5	5.4	2000	o	o	x	x	20.4	o	x	x	x	11.0
-0AF2		7.0	3000	x	o	x	x	27.6	o	x	o	x	7.5
-0AG2		10.5	4000	o	o	x	o	40.0	o	x	x	o	5.5
-0AK2		18	6000	x	o	o	o	68.0	x	x	o	o	2.5
073-0AC2	7	8.5	2000	o	x	x	o	32.8	o	o	x	x	9.5
-0AF2		11.1	3000	o	o	x	o	40.0	x	o	o	x	6.5
-0AG2		16.3	4000	o	x	o	o	54.4	o	o	x	o	4.0
-0AK2		24.1	6000	o	o	o	o	80.0	x	x	o	o	2.5
100-0AC2	10	12.4	2000	x	x	o	o	48.8	x	x	o	x	8.0
-0AF2		15.4	3000	o	x	o	o	54.4	o	x	x	o	5.5
-0AG2		23.1	4000	o	o	o	o	80.0	o	o	x	o	4.0
-0AK2		28.1	6000	o	o	o	o	80.0	x	x	o	o	2.5
101-0AC2	15	17.4	2000	x	o	o	o	68.0	o	x	o	x	7.5
-0AF2		22.9	3000	o	o	o	o	80.0	x	o	x	o	4.5
-0AG2		33.6	4000	o	o	o	o	80.0	x	x	o	o	2.5
-0AK2		41.8	6000	o	o	o	o	80.0	o	x	o	o	2.0
103-0AC2	19	22.8	2000	o	o	o	o	80.0	o	x	x	o	5.5
-0AF2		29.3	3000	o	o	o	o	80.0	x	x	o	o	2.5
-0AG2		41.4	4000	o	o	o	o	80.0	o	x	o	o	2.0

Matching table for SIMODRIVE power modules: 6SC6170- . . . (70 A / 140 A)

Servomotor				PWM converter									
				Current limit					Current controller				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts 2	3	4	5	I_{max} [A]	Contacts 6	7	8	9	K_P (I)
Standard-version servomotor													
064-0AG2	4.5	10.7	4000	o	x	o	x	42.0	x	o	x	o	4.5
-0AK2		14.1	6000	o	o	o	x	50.4	x	x	o	o	2.5
066-0AC2	6.5	8.4	2000	o	x	x	x	33.6	x	x	o	x	8.0
-0AF2		10.3	3000	x	x	o	x	40.6	x	o	o	x	6.5
-0AG2		15.8	4000	x	x	x	o	57.4	o	o	x	o	4.0
-0AK2		21.7	6000	x	x	o	o	85.4	o	o	x	o	4.0
072-0AC2	10	12.3	2000	x	o	o	x	47.6	o	x	x	x	11.0
-0AF2		15.7	3000	x	x	x	o	57.4	x	x	o	x	8.0
-0AG2		23.3	4000	x	x	o	o	85.4	x	x	x	o	6.0
-0AK2		33.3	6000	x	o	o	o	119.0	o	o	x	o	4.0
074-0AC2	14	17.1	2000	x	o	x	o	64.4	o	o	x	x	9.5
-0AF2		22.6	3000	x	x	o	o	85.4	o	x	o	x	7.5
-0AG2		32.7	4000	x	o	o	o	119.0	x	o	x	o	4.5
-0AK2		46.7	6000	o	o	o	o	140.0	x	x	o	o	2.5
076-0AC2	18	22.5	2000	x	x	o	o	85.4	x	x	o	x	8.0
-0AF2		28.6	3000	o	x	o	o	95.2	o	x	x	o	5.5
-0AG2		42.1	4000	o	o	o	o	140.0	o	o	x	o	4.0
-0AK2		60.1	6000	o	o	o	o	140.0	o	x	o	o	2.0
102-0AA2	27	16.4	1200	x	o	x	o	64.4	x	x	x	x	11.5
-0AC2		31.9	2000	x	o	o	o	119.0	x	o	o	x	6.5
-0AF2		40.9	3000	o	o	o	o	140.0	x	o	x	o	4.5
-0AG2		61.4	4000	o	o	o	o	140.0	o	x	o	o	2.0
104-0AA2	37	22.6	1200	x	x	o	o	85.4	x	x	x	x	11.5
-0AC2		43.2	2000	o	o	o	o	140.0	o	x	x	o	5.5
-0AF2		56.3	3000	o	o	o	o	140.0	x	x	o	o	2.5
106-0AA2	45	27.0	1200	o	x	o	o	95.2	o	x	x	x	11.0
-0AC2		53.6	2000	o	o	o	o	140.0	o	o	x	o	4.0
-0AF2		67.1	3000	o	o	o	o	140.0	x	x	o	o	2.5
108-0AA2	55	32.8	1200	x	o	o	o	119.0	o	x	x	x	11.0
-0AC2		60.7	2000	o	o	o	o	140.0	o	o	x	o	4.0
-0AF2		78.5	3000	o	o	o	o	140.0	x	x	o	o	2.5
132-0AA2	60	38.8	1200	o	o	o	o	140.0	o	x	x	x	11.0
-0AC2		68.4	2000	o	o	o	o	140.0	o	o	x	o	4.0
134-0AA2	75	48.3	1200	o	o	o	o	140.0	o	o	x	x	3.5
136-0AA2	85	54.6	1200	o	o	o	o	140.0	x	o	o	x	6.5
138-0AA2	105	65.4	1200	o	o	o	o	140.0	x	x	x	o	6.0

Matching table for SIMODRIVE power modules: 6SC6170- . . . (70 A / 140 A)

Servomotor				PWM converter									
				Current limit					Current controller				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	Contacts 2	3	4	5	I_{max} [A]	Contacts 6	7	8	9	K_P (I)
Short-version servomotor													
070-0AK2	3	10.4	6000	x	x	o	x	40.6	o	x	x	o	5.5
071-0AG2	4.5	10.5	4000	o	x	o	x	40.0	o	x	x	o	5.5
-0AK2		18.0	6000	o	o	x	o	70.0	x	x	o	o	2.5
073-0AC2	7	8.5	2000	o	x	x	x	33.6	o	o	x	x	9.5
-0AF2		11.1	3000	o	x	o	x	42.0	o	x	o	x	7.5
-0AG2		16.3	4000	x	o	x	o	64.4	x	o	x	o	4.5
-0AK2		24.1	6000	o	x	o	o	95.2	o	o	x	o	4.0
100-0AC2	10	12.4	2000	x	o	o	x	47.6	o	x	o	x	7.5
-0AF2		15.4	3000	x	x	x	o	57.4	o	x	x	o	5.5
-0AG2		23.1	4000	o	o	x	o	70.0	o	o	x	o	4.0
-0AK2		28.1	6000	o	x	o	o	95.2	x	x	o	o	2.5
101-0AC2	15	17.4	2000	x	o	x	o	64.4	x	o	o	x	6.5
-0AF2		22.9	3000	x	x	o	o	85.4	o	x	x	o	5.5
-0AG2		33.6	4000	x	o	o	o	119.0	o	o	x	o	4.0
-0AK2		41.8	6000	o	o	o	o	140.0	x	x	o	o	2.5
103-0AC2	19	22.8	2000	x	x	o	o	85.4	x	x	x	o	6.0
-0AF2		29.3	3000	x	o	o	o	119.0	x	o	o	x	4.5
-0AG2		41.4	4000	o	o	o	o	140.0	x	x	o	o	2.5

Matching table for SIMODRIVE power modules: **6SC6190- . . . (90 A / 180 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_p (I)
Standard-version servomotor													
064-0AG2	4.5	10.7	4000	x	x	x	x	41.4	x	o	x	o	4.5
-0AK2		14.1	6000	o	x	o	x	54.0	o	x	o	o	2.0
066-0AG2	6.5	15.8	4000	x	o	o	x	61.2	x	o	x	o	4.5
-0AK2		21.7	6000	o	o	o	x	64.8	x	x	o	o	2.5
072-0AC2	10	12.3	2000	o	o	x	x	46.8	o	x	x	x	11
-0AF2		15.7	3000	x	o	o	x	61.2	o	o	x	x	9.5
-0AG2		23.3	4000	o	o	x	o	90.0	x	x	x	o	6.0
-0AK2		33.3	6000	o	x	o	o	122.4	o	o	x	o	4.0
074-0AC2	14	17.1	2000	o	o	o	x	64.8	o	o	x	x	9.5
-0AF2		22.6	3000	o	o	x	o	90.0	o	x	o	x	7.5
-0AG2		32.7	4000	o	x	o	o	122.4	x	o	x	o	4.5
-0AK2		46.7	6000	o	o	o	o	180.0	o	o	x	o	4.0
076-0AC2	18	22.5	2000	o	o	x	o	90.0	x	x	o	x	8.0
-0AF2		28.6	3000	x	x	o	o	109.0	x	o	o	x	6.5
-0AG2		42.1	4000	x	o	o	o	153.0	o	o	x	o	4.0
-0AK2		60.1	6000	o	o	o	o	180.0	x	x	o	o	2.5
102-0AA2	27	16.4	1200	o	o	o	x	64.4	x	x	x	x	11.5
-0AF2		31.9	2000	o	x	o	o	122.4	x	o	o	x	6.5
-0AG2		40.9	3000	x	o	o	o	153.0	o	x	x	o	5.5
-0AK2		61.4	4000	o	o	o	o	180.0	x	x	o	o	2.5
104-0AA2	37	22.6	1200	o	o	x	o	90.0	x	x	x	x	11.5
-0AC2		43.2	2000	x	o	o	o	153.0	x	x	x	o	6.0
-0AF2		56.3	3000	o	o	o	o	180.0	o	o	x	o	4.0
106-0AA2	45	27	1200	o	o	x	o	90.0	o	x	x	x	11.0
-0AC2		53.6	2000	o	o	o	o	180.0	o	x	x	o	5.5
-0AF2		67.1	3000	o	o	o	o	180.0	o	o	x	o	4.0
108-0AA2	55	32.8	1200	o	x	o	o	122.4	x	x	x	o	11.0
-0AC2		60.7	2000	o	o	o	o	180.0	x	o	x	o	4.5
-0AF2		78.5	3000	o	o	o	o	180.0	x	x	o	o	2.5
132-0AA2	60	38.8	1200	x	o	o	o	153.0	x	x	x	x	11.5
-0AC2		68.4	2000	o	o	o	o	180.0	o	x	x	o	4.5
-0AF2		84.8	3000	o	o	o	o	180.0	x	x	o	o	2.5
134-0AA2	75	48.3	1200	o	o	o	o	180.0	x	x	x	x	11.5
-0AC2		83.3	2000	o	o	o	o	180.0	o	o	x	o	4.0
136-0AA2	85	54.6	1200	o	o	o	o	180.0	x	x	x	o	8.0
138-0AA2	105	65.4	1200	o	o	o	o	180.0	x	x	x	o	8.0

Matching table for SIMODRIVE power modules: 6SC6190- . . . (90 A / 180 A)

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_p (I)
Short-version servomotor													
070-0AK2	3	10.4	6000	x	x	x	x	41.4	o	x	x	o	5.5
071-0AG2	4.5	10.5	4000	x	x	x	x	41.4	o	x	x	o	5.5
-0AK2		18.0	6000	x	x	x	o	70.2	x	x	o	o	2.5
073-0AF2	7	11.1	3000	o	x	x	x	43.2	o	x	o	x	7.5
-0AG2		16.3	4000	o	o	o	x	64.8	x	o	x	o	4.5
-0AK2		24.1	6000	o	o	x	o	90.0	o	o	x	o	4.0
100-0AC2	10	12.4	2000	o	o	x	x	46.8	o	x	o	x	7.5
-0AF2		15.4	3000	x	o	o	x	61.2	x	x	x	o	6.0
-0AG2		23.1	4000	o	o	x	o	90.0	x	o	x	o	4.5
-0AK2		28.1	6000	x	x	o	o	109.0	o	o	x	o	4.0
101-0AC2	15	17.4	2000	o	o	o	x	64.8	x	o	o	x	6.5
-0AF2		22.9	3000	o	o	x	o	90.0	o	x	x	o	5.5
-0AG2		33.6	4000	o	x	o	o	122.4	o	o	x	o	4.0
-0AK2		41.8	6000	x	o	o	o	155.0	x	x	o	o	2.5
103-0AC2	19	22.8	2000	o	o	x	o	90.0	x	o	o	x	6.5
-0AF2		29.3	3000	x	x	o	o	109.0	x	o	x	o	4.5
-0AG2		41.4	4000	x	o	o	o	153.0	o	o	x	o	4.0

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Matching table for SIMODRIVE power modules: **6SC6190- . . . (120 A / 240 A)**

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Standard-version serrvomotor													
066-0AG2	6.5	15.8	4000	o	o	x	x	62.4	x	o	x	o	4.5
-0AK2		21.7	6000	o	o	o	x	86.4	o	o	x	o	4.0
072-0AF2	10	15.7	3000	o	o	x	x	62.4	o	o	x	x	9.5
-0AG2		23.3	4000	o	o	o	x	86.4	x	x	x	o	6.0
-0AK2		33.3	6000	o	o	x	o	120.0	o	o	x	o	4.0
074-0AC2	14	17.1	2000	o	o	x	x	62.4	o	o	x	x	9.5
-0AF2		22.6	3000	o	o	o	x	86.4	o	x	o	x	7.5
-0AG2		32.7	4000	o	o	x	o	120.0	x	o	x	o	4.5
-0AK2		46.7	6000	o	x	o	o	163.2	o	o	x	o	4.0
076-0AC2	18	22.5	2000	o	o	o	x	86.4	x	x	o	x	8.0
-0AF2		28.6	3000	x	o	x	o	110.4	x	o	o	x	6.5
-0AG2		42.1	4000	o	x	o	o	163.2	x	o	x	o	4.5
-0AK2		60.1	6000	o	o	o	o	240.0	o	o	x	o	4.0
102-0AA2	27	16.4	1200	o	o	x	x	62.4	x	x	x	x	11.5
-0AC2		31.9	2000	o	o	x	o	120.0	x	o	o	x	6.5
-0AF2		40.9	3000	x	x	o	o	146.4	x	o	x	o	4.5
-0AG2		61.4	4000	o	o	o	o	240.0	o	o	x	o	4.0
104-0AA2	37	22.6	1200	o	o	o	x	86.4	x	x	x	x	11.5
-0AC2		43.2	2000	o	x	o	o	163.2	x	o	o	x	6.5
-0AF2		56.3	3000	x	o	o	o	204.0	x	o	x	o	4.5
106-0AA2	45	27.0	1200	o	x	x	o	98.4	x	x	x	x	11.5
-0AC2		53.6	2000	x	o	o	o	204.0	x	x	x	o	6.0
-0AF2		67.1	3000	o	o	o	o	240.0	x	o	x	o	4.5
108-0AA2	55	32.8	1200	o	o	x	o	120.0	o	x	x	x	11.0
-0AC2		60.7	2000	o	o	o	o	240.0	x	x	x	o	6.0
-0AF2		78.5	3000	o	o	o	o	240.0	o	o	x	o	4.0
132-0AA2	60	38.8	1200	x	x	o	o	146.4	x	x	x	x	11.5
-0AC2		68.4	2000	o	o	o	o	240.0	x	o	o	x	6.5
-0AF2		84.8	3000	o	o	o	o	240.0	o	o	x	o	4.0
134-0AA2	75	48.3	1200	o	x	o	o	163.2	o	x	x	x	11.0
-0AC2		83.3	2000	o	o	o	o	240.0	o	x	x	o	5.5
136-0AA2	85	54.6	1200	o	o	o	o	240.0	x	x	x	x	11.5
138-0AA2	105	65.4	1200	o	o	o	o	240.0	o	x	x	x	11.0

Matching table for SIMODRIVE power modules: 6SC6190- . . . (120 A / 240 A)

Servomotor				PWM converter									
				Current limit					Current controller				
				Contacts					Contacts				
1FT5	M_0 ΔT = 60 K [Nm]	I_0 ΔT = 60 K [A]	n_N [RPM]	2	3	4	5	I_{max} [A]	6	7	8	9	K_P (I)
Short-version servomotor													
071-0AK2	4.5	18.0	6000	x	x	o	x	69.6	x	x	o	o	2.5
073-0AG2	7	16.3	4000	o	o	x	x	62.4	x	o	x	o	4.5
-0AK2		24.1	6000	x	x	x	o	93.6	o	o	x	o	4.0
100-0AF2	11	15.4	3000	o	x	x	x	57.6	o	x	x	o	5.5
-0AG2		23.1	4000	o	o	o	x	86.4	x	o	x	o	4.5
-0AK2		28.1	6000	x	o	x	o	110.4	o	o	x	o	4.0
101-0AC2	15	17.4	2000	o	o	x	x	62.4	x	o	o	x	6.5
-0AF2		22.9	3000	o	o	o	x	86.4	o	x	x	o	5.5
-0AG2		33.6	4000	o	o	x	o	120.0	o	o	x	o	4.0
-0AK2		41.8	6000	o	x	o	o	163.2	x	x	o	o	3.1
103-0AC2	19	22.8	2000	o	o	o	x	86.4	x	x	x	o	6.0
-0AF2		29.3	3000	x	o	x	o	110.4	x	o	x	o	4.5
-0AG2		41.4	4000	o	x	o	o	163.2	o	o	x	o	4.0

2 1FT4 servomotors for the 300V feed drive system

2.1 General information

1FT4 motors are permanently excited motors for small ratings, which are specially designed for main spindle operation. They differ from 1FT5 servomotors as follows:

- Forced air cooling
- Stengthened shaft end (38 x 80 mm, compatible with 1PH5107 motors)
- Optional double bearing design for increased cantilever forces
- Vibrational severity grade R, optional vibration severity grade S

1FT4 motors are available with shaft height 100. 1FT4 motors can be operated with the converter combination SIMODRIVE 610/6RA29.

Feed motors with larger torques can be used. Restrictions apply as a result of the missing holding brake. The ROD 320 incremental shaft encoder or 6FC9 320 encoder are available as incremental shaft angle encoders.

2.2 Design

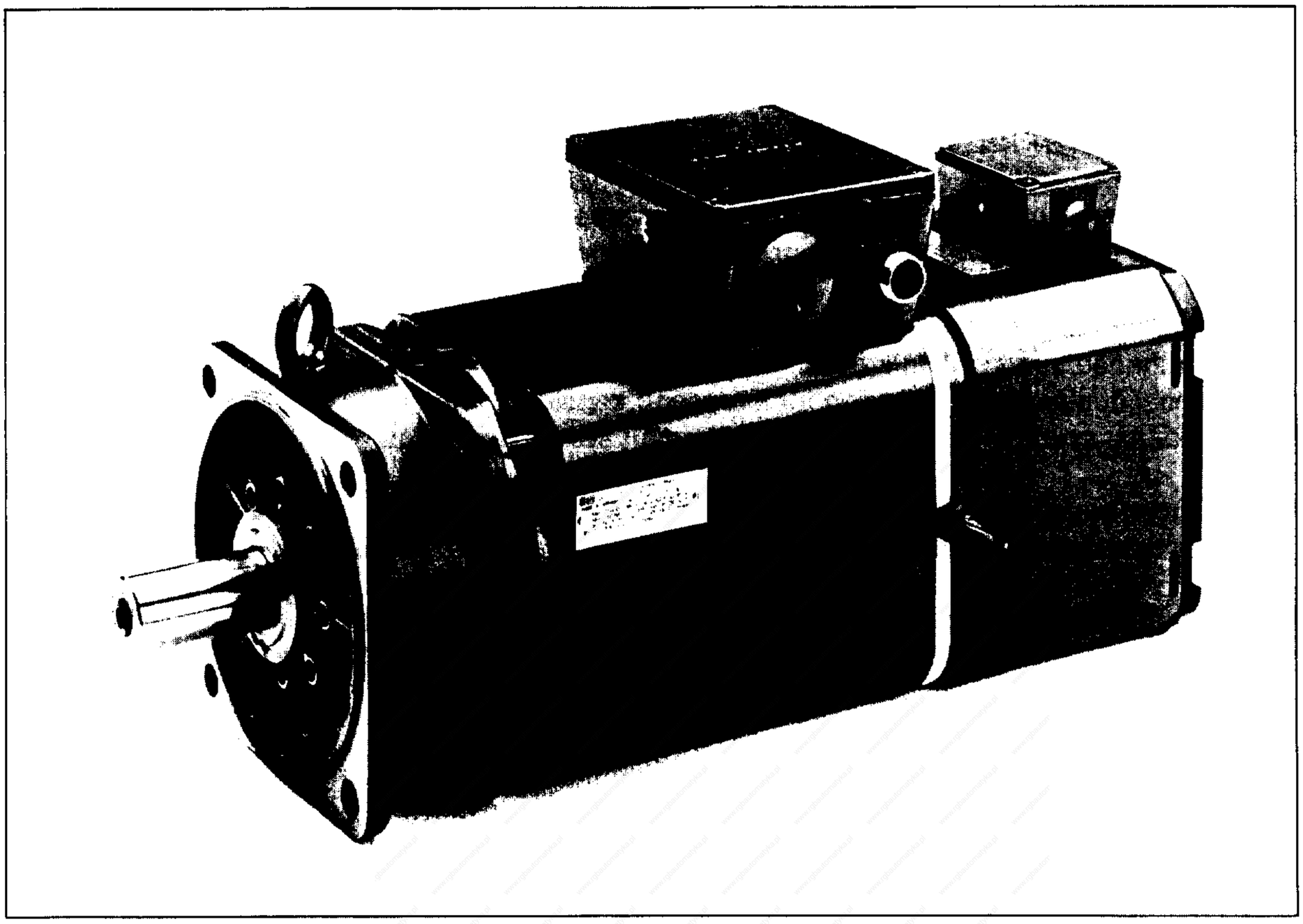


Fig. 2.1 1FT4 AC servomotor (6-pole)

1FT4 AC servomotors are permanently excited brushless synchronous motors.

The basic motor version consists of:

- active section,
- sensor system for sensing motor speed and shaft position (tacho system) and
- temperature sensors (PTC thermistor)
- fan

2.2.1 Tacho system

A brushless three-phase tacho system, type 1FU1050, has been developed for low-maintenance AC feed drives. This system consists of a three-phase tacho and a otor-position transmitter in type 1FU1050.

Main features:

- High signal-voltage quality
- High thermal stability
- Insensitive to noise interference

Trapezoidal voltage signals are available at the tacho output.

2.2.2 Temperature monitor

PTC thermistors for temperature monitoring are installed as standard in the servomotors. The SIMODRIVE 610 PWM converters are equipped with a matched PTC thermistor evaluating circuit as standard. The signal must be externally processed in the interface control. The connection is established via the shaft angle encoder cable. The temperature-monitor signals can also be evaluated directly using the 3UN□□□ tripping unit.The 3UN6 unit has a visual indicating device and a mechanical restart lockout (Catalog NS2, Part 5).

Important!
The integrated temperature detectors protect the servomotors against overload under normal operating conditions. If, however, the servomotors are subjected to brief overloads of more than $4 \times I_0$, then adequate protection can no longer be ensured and an additional protective element such as a thermal overcurrent relay must be provided (refer to Section 5, Installation).

2.2.3 Bearings and motor shaft

The motor is fitted with a locating bearing at the drive end and with a floating bearing at the non-drive end. Thermal expansion in the rotor therefore does not affect the drive end. The bearings are sealed on both sides by packing washers and are pre-lubricated, and have a rated life of 20,000 hours.

When mounted on a gear unit, the servomotor can also be equipped with a rotary shaft seal to DIN 3760 at the drive end to protect it against oil mist and spray.

The standard design servomotors are supplied with cylindrical shaft ends to DIN 748 and fitted key with keyway to DIN 6885. The tacho and otor-position transmitter are fitted on a taper at the non-drive shaft end.

The shaft and bearings are subjected to higher radial stresses when pinion drives or toothed belts are used. The permissible cantilever force F_Q is dependent on the shaft shoulder distance, the load application point and the average operating speed. The permissible cantilever forces are listed in the cantilever-force charts in Section 2-8.

The 1FT4 motors can be optionally equipped with double bearings if larger cantilever forces are present. Motors with double bearings have a maximum speed of 6000 RPM. The maximum cantilever forces can be taken from the diagrams in Section 2-8.

Three different drive shaft end versions are available, all of which have a centering thread to DIN 332, Part 2.

Designation	Servomotor with cylindrical shaft end	Comments
Version a Standard version	With fitted key and keyway to DIN 6885 Tolerance zone k6	Shaft connections with fitted key , keyed or multiple-spline connections are positive-locking. The quality of the fit deteriorates under continuous stressing and varying torque. Rotationally symmetrical displacement increases torque oscillations. Increasing deformation can lead to fractures.
Version b Option K42	Without fitted-key and without keyway Tolerance zone k6	With a frictional connection, the torque must be transmitted through surface pressure only. Reliable transmission of power is guaranteed.

Table 2.1 Drive-side shaft end versions

Description	Making and separating friction-locked connections	
	Operations required	Comments
Shrink fitting	Thermal expansion and shrinking of drive element onto shaft. Separation of connection without irreparable damage or impairment of surface virtually impossible.	Note internal stress characteristics of material and form and changes in diameter/pitch circle if necessary

Table 2.2 Friction-locked connections between motor shaft and drive pinion

- **Rotary shaft seal (option)**

A rotary shaft seal is available for the drive-end bearing. The sealing ring lip runs on a shaft sleeve ground under minimal axial feed conditions according to DIN 3760. The running surface must be reliably lubricated in order to prevent excessive sealing ring wear. The rotary shaft seal is predominantly used on motors with flange-mounted gearboxes lubricated with oil or oil mist.

It increases the degree of protection of the drive-end shaft gland to IP 67. The rotary seal cannot be retrofitted.

2.3 Mode of operation

The AC servomotors provide an almost constant continuous torque and overload capability over the complete speed range. Characteristic S1 defines the thermal limiting characterstic of the motor. Points above this curve can only be operated in the S3 range. The initial lines a and b define the current limiting and thus the thermal limit of various power modules of the transistor PWM converter.

The possible drive rating is specified by the lowest value of the specified limits, i.e the drive can be operated at each speed/power point below the limiting curves

- motor thermal limit
- thermal limit of the power module
- limiting voltage curve

Please note that the SIMODRIVE 610 PWM converter does not have a speed-dependent current limiting. This means that the drive can operate at points above the power lines determined by the user, which can reach the selected current limit of the power module or the limiting voltage characteristic..

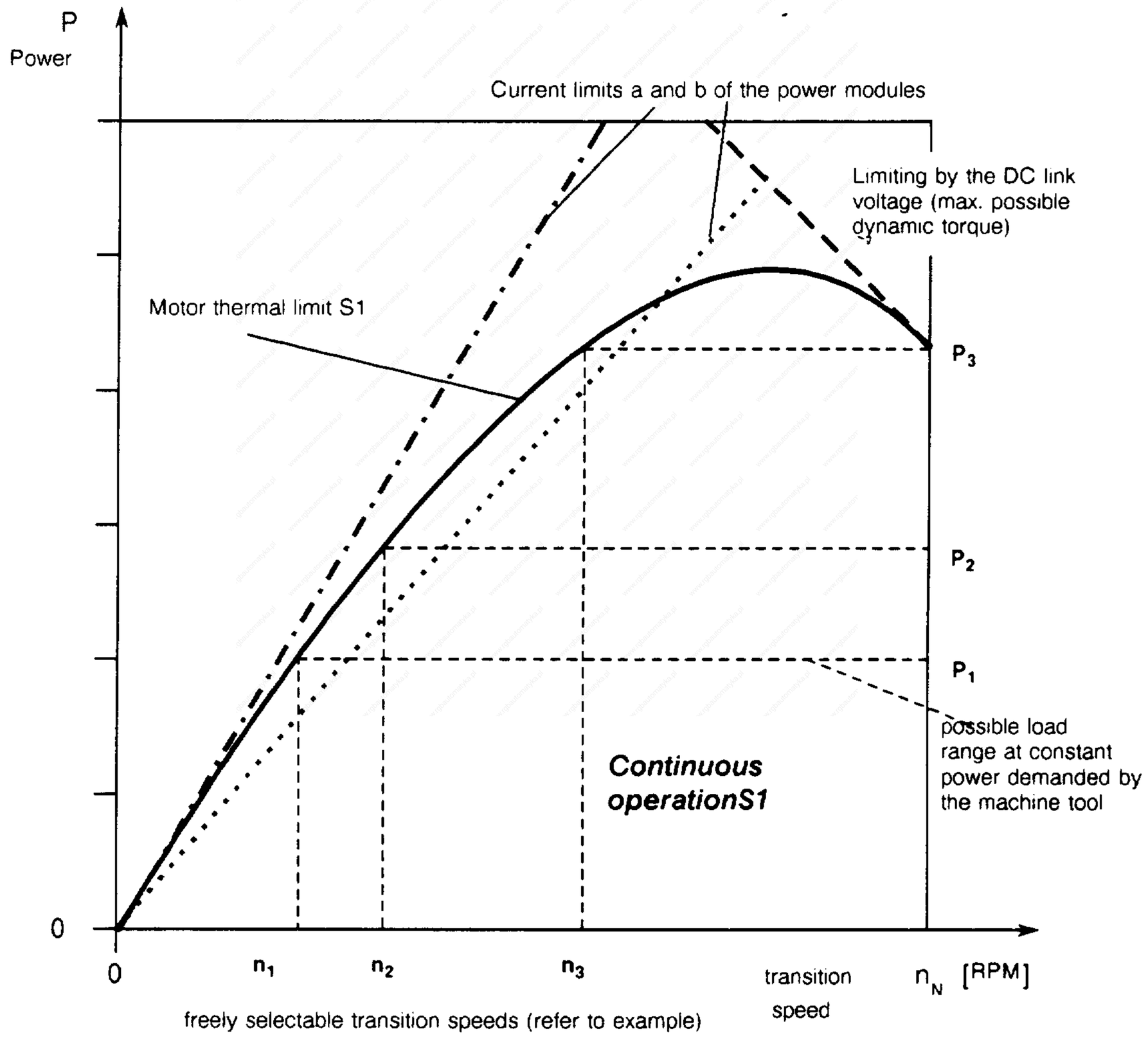


Fig. 2.2 Power-speed characteristics of 1FT4 AC servomotors

The power (S1 operation/100K) is normally specified at a specific transition speed. If the particular application requires a lower transition speed, the power is correspondingly reduced, i.e. the possible power (S1 operation/100K) at the transition point must be reduced in the same ratio as the speeds.

Example:

The power P_{1000} is required for a transition speed n_{eck} = 1000 RPM and speed range.

Motor 1FT4104-OSK21 is selected with a maximum speed of n_{max} = 6000 RPM, P_{3000} = 13.5 kW at n_{eck} = 3000 RPM. The speed range at constant power is 1:2.

Solution:

$$P_{1000} = \frac{13.5\ \text{kW} \times 1000\ \text{RPM}}{3000\ \text{RPM}} = 4.5\ \text{kW}$$

The speed range at constant power is1:6.

2.4 Technical data

2.4.1 General information

The AC servomotors comply with the DIN standards and VDE specifications, in particular to VDE 0530, "Specifications for rotating electrical machines.

Motor voltage	0 V to 260 V [1]
Motor frequency	0 Hz to 300 Hz
Number of poles	2p = 6
Types of construction	IM B5 to DIN 42950 (standard); IM V1; IM V3 (IEC34-7)
Coolant temperature	Up to + 40 °C
Cooling	Separate cooling
Insulation	DURIGNIT® 2000 corresponding to insulation class F for a maximum temperature rise $\Delta T = 100K$ for a coolant temperature of 40°C according to VDE 0530.
Degree of protection	IP54 according to DIN IEC34-5 (VDE 0530 Part S)
Motor noise	Up to 70 dB(A) under load
Short-circuit capability	Resistant to short-circuits; Short-circuit currents of $4xI_0$ can occur for a 3-pole short-circuit. Irreversible demagnetization does not occur.
Vibration severity grade	R according to DIN ISO 2373, optionally S
Shock loading	6 g; the function is not impaired during shock loading.
Cantilever forces	Refer to the diagrams in the Appendix for permissible shaft cantilever forces
paint finish	grey (SN30901-614) with green ring on the non-drive end (SN30901-615); Climatic stressing is dry to moderately damp for indoor installation.

Table 2.4 Technical data

1) Adapted to the 300V DC link voltage

Servo-motor	Rated speed	Locked-rotor torque M_0		Phase current at M_0 I_0		Moment of inertia	Rated torque (S1) $\Delta T = 100K$	Max. speed	Peak current	Time constants		Torque constants	Voltage constants (phase-to-phase)	Wind-ing resist-ance	Wind-ing induct-ance	Ext. brak-ing resist-ance	Brake torque	Weight without hold. brake
										elec.	therm.							
1FT4	n_N	$\Delta T = 60K$	$\Delta T = 100K$	$\Delta T = 60K$	$\Delta T = 100K$	J_{mot}	M_N	n_{max}	I_{max}	T_{el}	T_{th}	K_T	K_E	R	L_A	$R_{a\ opt}$	$M_{B\ opt}$	m
	[RPM]	[Nm]	[Nm]	[A]	[A]	[10^{-4} kgm^2]	[Nm]	[RPM]	[A]	[ms]	[min]	[Nm/A]	[V/1000 RPM]	[Ω]	[mH]	[Ω]	[Nm]	[kg]
101-OSK21	6000	20	25	66	80	90	17	7000	320	14	25	0.31	37	0.031	0.30	0.22	31	27
102-OSG21	4000	33	40	70	85	138	32	5200	350	16	30	0.47	57	0.033	0.56	0.33	39	37
OSK21	6000	33	40	94	114	138	27	7000	470	16	30	0.35	41	0.017	0.29	0.27	39	37
104-OSG21	4000	45	55	92	112	182	42	5200	440	18	35	0.49	57	0.022	0.36	0.18	61	46
OSK21	6000	44	--	120	--	182	35	7000	600	16	30	0.37	43	0.022	0.36	0.39	63	46

Table 2.5 Technical data: 1FT4 AC main spindle motors (300 V DC link voltage)

Servo-motor	Transistion speed	S1 rating	S6 rating		Current
		at n_E	60% at n_E	25% at n_E	at P_E
1FT4	n_E	P_E	P_{E60}	P_{E25}	I_E
	[RPM]	[kW]	[kW]	[kW]	[A]
101-OSK21	3000	7.0	8.7	10.5	72
102-OSG21	3000	11.0	13.7	16.5	75
OSK21	3000	11.0	--	--	100
104-OSG21	3000	15.0	--	--	98
OSK21	3000	--	--	--	120

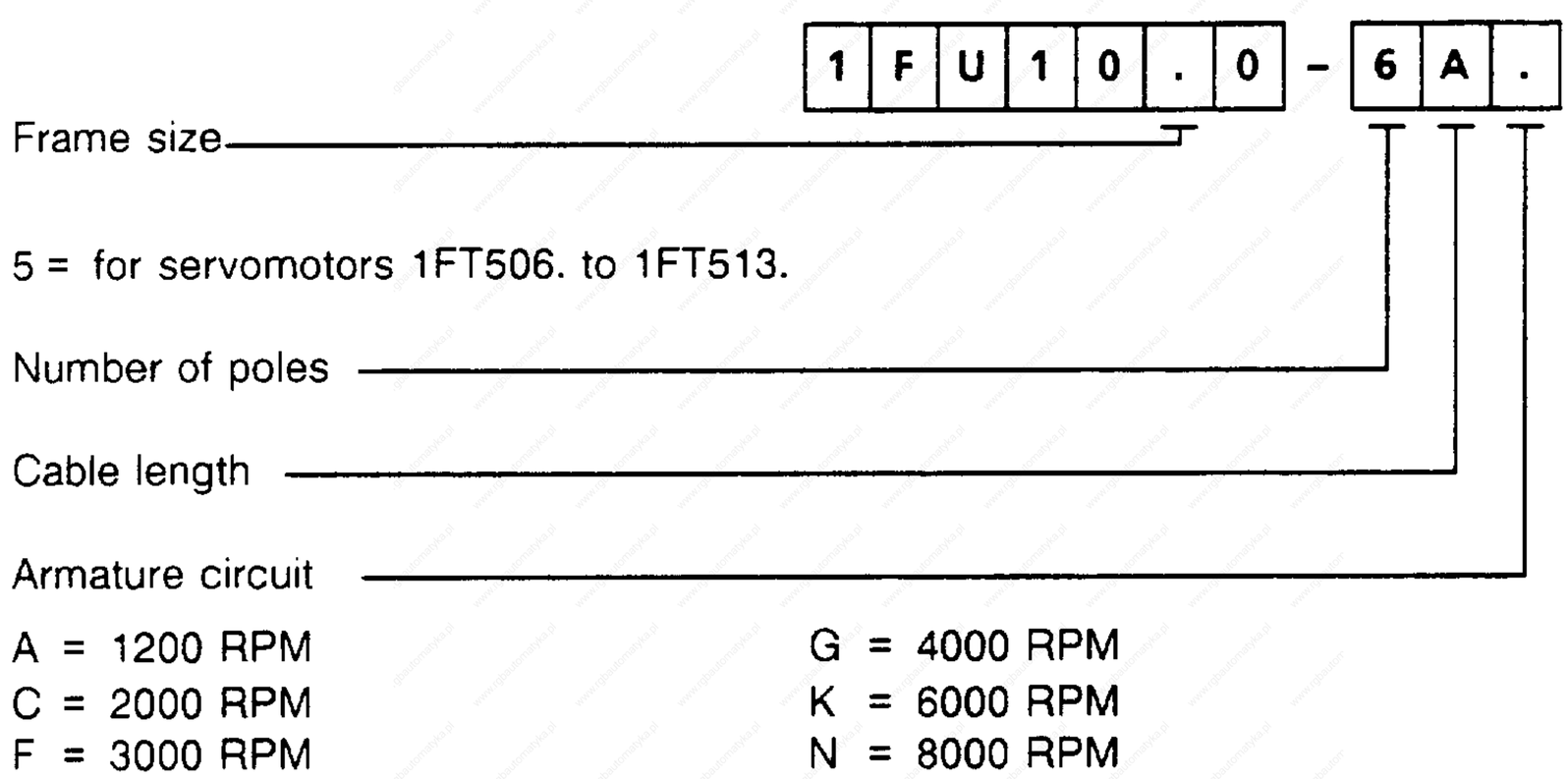
Table 2.6 Technical data: 1FT4 main spindle motors (300 V DC link voltage)

2.4.2 Tacho system

Technical data	**1FU1050**
Speed (mechanical critical speed)	8000 RPM
Number of poles	2p = 6
Magnetic material	AlNiCo
Peak value of phase voltage at rated speed	40 V
Voltage tolerance	± 5 %
Voltage adjustment [1]	± 20 %
Ripple factor	≤ 0.5 %
Linearity error	≤ 0.2 %
Reversing error	≤ 0.2 %

Table 2.7 Technical data: Tacho system

Product designation:



2.4.3 Temperature monitor

Type	Q63100-P426-M135
Cold resistance	< 250 Ω
Response temperature	155°C ± 5°C

Table 2.8 Technical data of PTC thermistor

2.4.4 ROD 320 shaft encoder

The ROD 320 shaft encoder can be used as built-in accessory for digital position control. The ROD320 shaft encoder can be supplied for different numbers of pulses per revolution (Section 2.6).

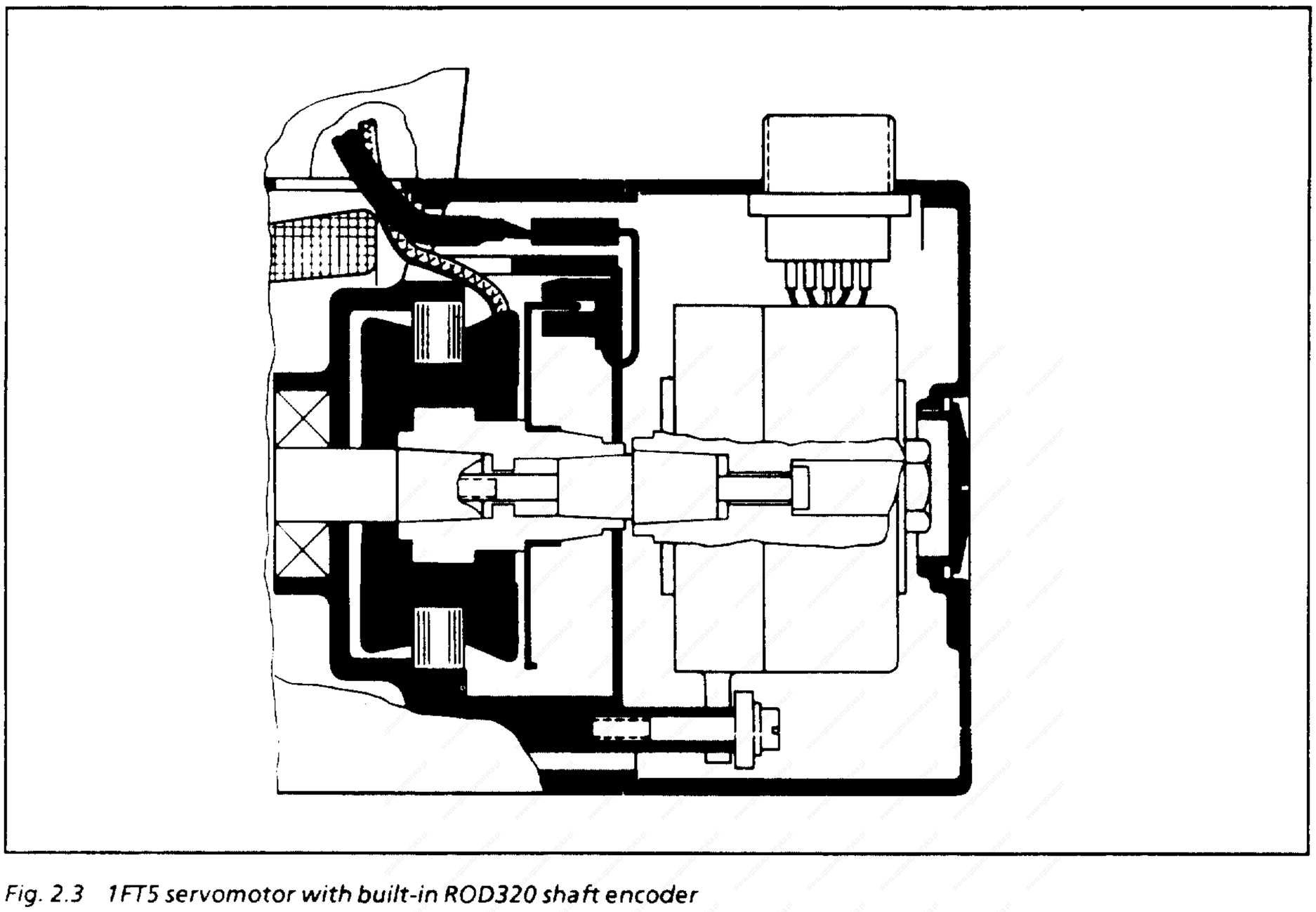


Fig. 2.3 1FT5 servomotor with built-in ROD320 shaft encoder

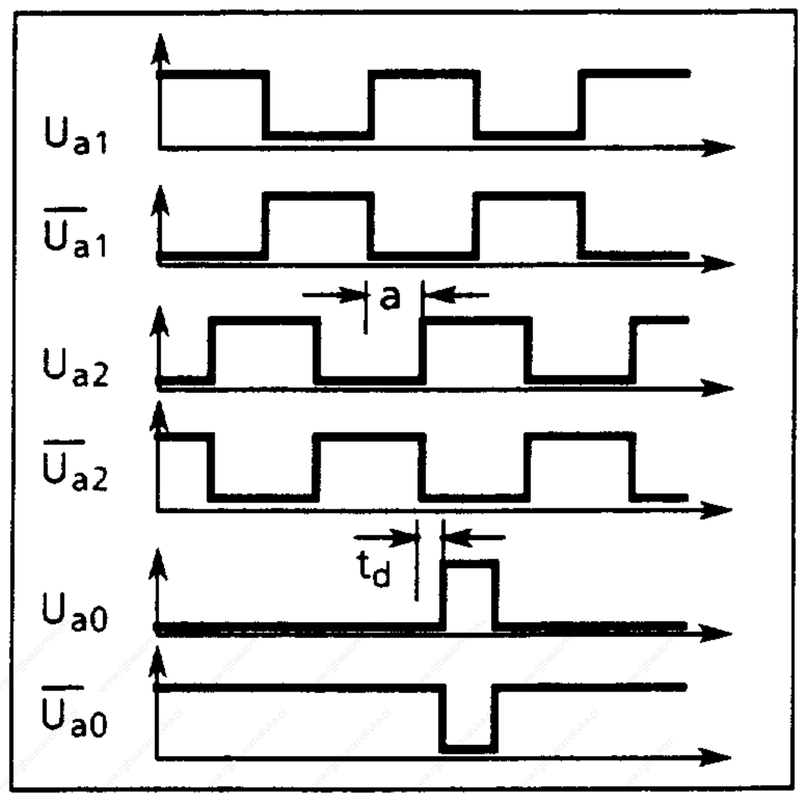
Technical data

Speed (mech.)[2)] Operating voltage Current consumption Frequency range	max. 17 000 RPM for an avg. life of approx. 10 000 hours 5 V DC ±5 % ≤250 mA (unloaded) 0 kHz to 160 kHz
Edge distance (a) Output load capability	≥750 ns (time delay of signal U_{a0} relative to signals U_{a1} and U_{a2}: $t_d \leq$ 60 ns) $I_{source} \leq$ 36 mA DC (at 100 °C) $I_{sink} \leq$ 40 mA DC, $C_{Load} \leq$ 1000pF
Short-circuit resistance	all outputs briefly to 0 V; 1 continuous output at ambient temperature ≤ 25 °C
Light source	filament lamp 5 V / 0.6 W; avg. life 40 000 hours
Operating temperature [1)] Storage temperature	0 °C to +100 °C –30 °C to +115 °C

1) These servomotors can only be utilized with torques with ΔT = 60 K temperature rise when using the ROD 320 shaft encoder.
2) The electrically permissible max. speed is dependent on the encoder resolution. This is the quotient of the max. sampling frequency divided by the resolution (L/revolution) multiplied by 60 (RPM)
For a max. scanning frequency of 160 kHz for the ROD 320 shaft encoder, an encoder resolution of 5000 pulses per revolution (refer to Section 2.6 Type designation) gives a max. speed of
$n_{max} = (160 \times 10^3 \times 60) / 5000 = 1920$ RPM.

Output signals

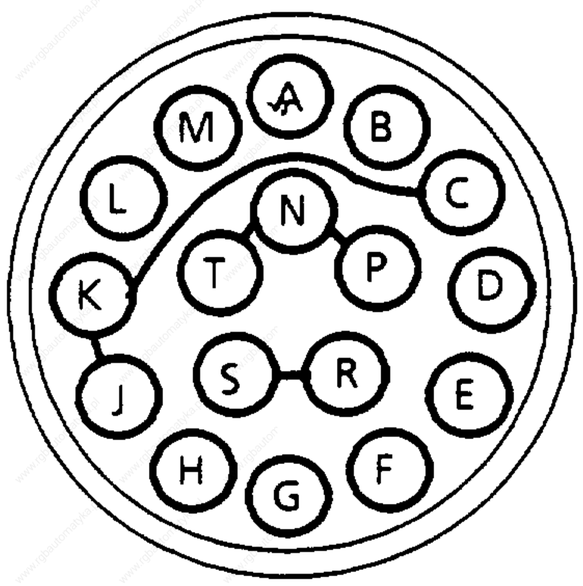
TTL compatible; square-wave pulse trains U_{a1} and U_{a2} and inverted signals. U_{a2} lags behind U_{a1} for clockwise rotation when viewing shaft.



Connection

The shaft encoder is connected by the flange-mounted connector, type CA 02 COM-E20-29P (pin contacts)

Pin No.	Signal
A	U_{a1}
B	U_{a2}
C, J, K	+5 V
D	$\overline{U_{a1}}$
E	$\overline{U_{a2}}$
F	$\overline{U_{a0}}$
G	U_{a0}
H	screen
N, P, T	0 V
R, S	jumper



view of connector end (pins)

Mating connector

6FC9341-1AC (socket contacts) [1] Precut cables are also available as accessories (refer to SINUMERIK and SIMODRIVE Catalogs)

Cable length

Max. 50 m to electronics with differential line receiver at electronics input. It is important to provide the correct operating voltage for the ROD 320.

1) Not included with motor
If waterproof version is required, specify Order No. 1HY 7004.

2.5 Servomotor connection

1FT4 servomotors can only be connected through terminal boxes. (Also refer to the references in Section 3.3 of this description and the installation instructions in Section 3 of the 6RA29 Technical Description, Order No. 6ZB5 420-0AB02-0BA0).
Please pay attention to the data specified on the rating plate, use connecting cables with adequate conductor cross-section according to the following table, and provide strain relief.

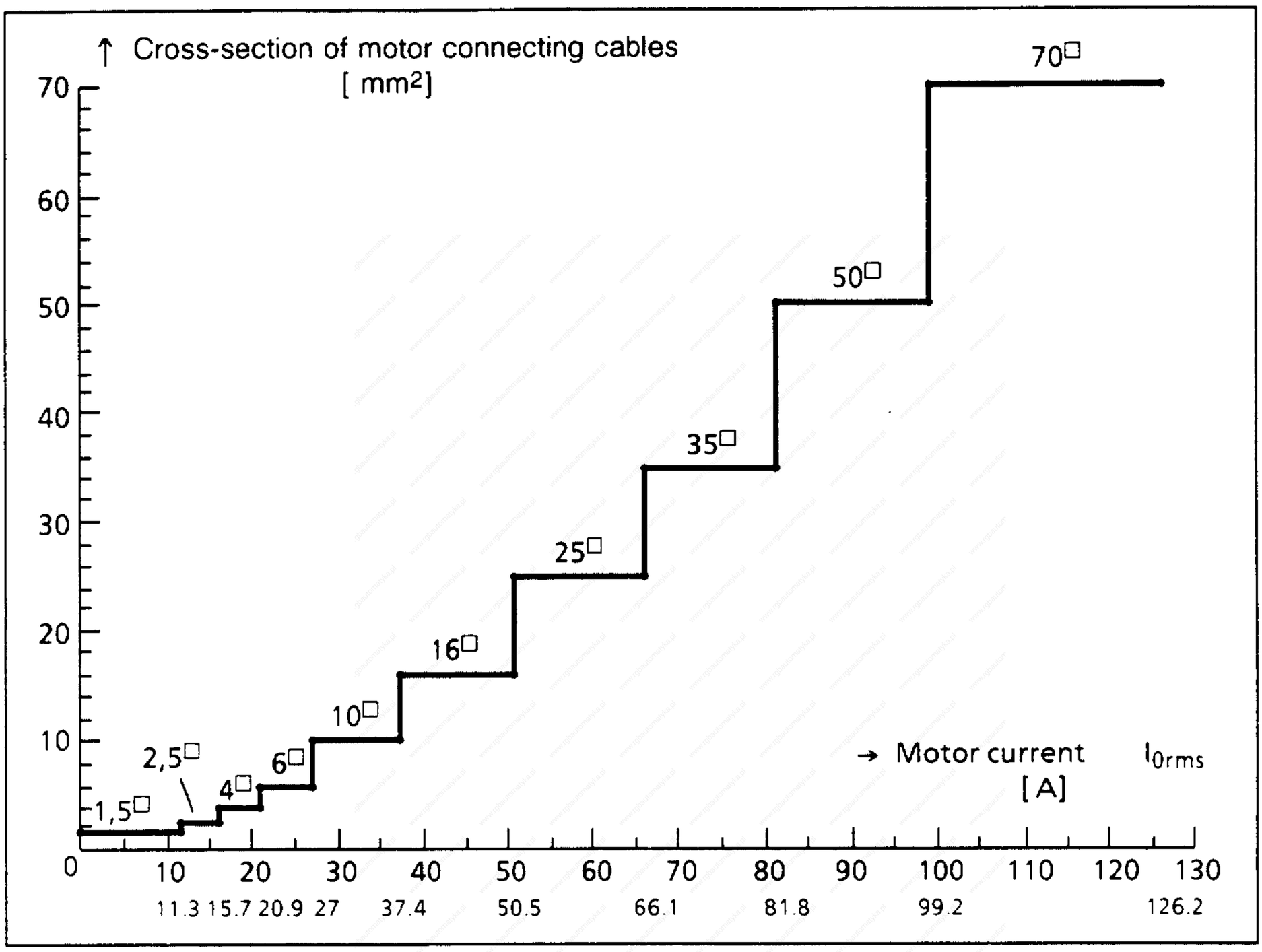


Fig. 2.6 Motor connecting cable cross-section in cable duct to DIN VDE 0113 and VDA for standard machines (ambient temperature +40 °C)

Table 2.8 specifies the current-carrying capacity values to DIN VDE 0113 Part 1 /02.86 "Electrical equipment of industrial machines", for PVC-insulated cables with copper conductors without cable sheath, for a permissible operating temperature of 70°C and at ambient temperatures of +30°C and +40°C in accordance with the conditions as described in the Appendix of DIN VDE 0113 Part 1 and Section B 1.2.3 .

Required cross-section [mm²]	I_{0rms} at + 30 °C [A]	I_{0rms} at + 40 °C [A]
1.0	10	8.7
1.5	13	11.3
2.5	18	15.7
4.0	24	20.9
6.0	31	27.0
10	43	37.4
16	58	50.5
25	76	66.1
35	94	81.18
50	114	99.2

Table 2.10 Current-carrying capacity

Terminal box Type	Cable gland 1)	Max. possible cross-section [mm²]	Stud	Dimension without gland Length x width [mm]
gk330	Pg36	4 x 35	M5	152 x 132
gk420	Pg 36/42	4 x 50	M10	162 x 162

Table 2.11 Terminal boxes

Servomotor 1FT4	Rated for ΔT = 100K I_0 [A]	I_{0rms} [A]	Feeder cross-section 1) 2)	Relevant power module $\hat{I}_N$ [A]	I_{Nrms} [A]	Feeder cable cross-section dimensioned for power module rating I_{Nrms} 2) [mm²]	Terminal box gk 3)
101-OSK21	80	66	25	90	73.5	35	330
102-OSG21	85	70	35	90	73.5	35	330
-OSK21	114	94	50	120	98	50	420
104-OSG21	112	92	50	120	98	50	420
-OSK21	120	99	50	120	98	50	420

Table 2.12 Terminal boxes and power connectors for standard motors

General:

1) The cross-sections specified in Tables 5.5 and 5.6 refer to motor utilization in accordance to a winding temperature rise ΔT = 100 K. The supply-cable cross-sections may be smaller with motor utilization according to ΔT = 60 K winding temperature rise and lower rating power modules.

2) The supply cable cross-sections are rated according to: DIN VDE 0113, Part 1 v. 2/86; Table B II for standard motors, installation in cable duct (4); ambient temperature + 40 °C (Table B I).

3) Standard complement as shown in Table 2.11 for terminal boxes.

Sensor leads

Terminals 9 and 10 at the motor terminal block are normally wired through to pins 9 and 10 on the rotor position transmitter connector thus allowing an evaluation in the PWM converter.

A connecting cable (sensor cable) must be provided between the servomotor and the converter for the control function. The rotor position transmitter and tacho signals are fed via this cable. This connection must be made by the customer. In order to prevent interference, the rotor position transmitter cables must be routed separately from the power cables.

Sensor cable and connector accessories	Order No.
Sensor cable 12 x 0.23 mm^2 screened, sold by the meter without connector	6FC9348-6AA
Sensor cable12 x 0.23 mm^2 screened, with connectors (Converter: 6FC9348-7AB; Motor: 6FC9348-7AC)	6FC9348-5A □
Sensor cable12 x 0.23 mm^2 screened, with connectors (Converter: 6FC9348-7AB; Motor: 6FC9348-7AD)	6FC9348-5B□
Mating connector for 1FT4 [2] (from 10/87)	6FC9348-7AD
Adaptor lead for different connector types for motor mating connector 6FC9348-7AC / cable with connector 6FC9348-7AD	6FC9348-5XA
Adaptor lead for different connector types for motor mating connector 6FC9348-7AD / cable with connector 6FC9348-7AC	6FC9348-5XC
Connector for SIMODRIVE 610 PWM converter	6FC9348-7AB

□ = Cable length

B = 5 m
C = 10 m
D = 15 m
E = 18 m
H = 20 m
F = 25 m
J = 30 m
G = 50 m
Z = as required (length must be specified)

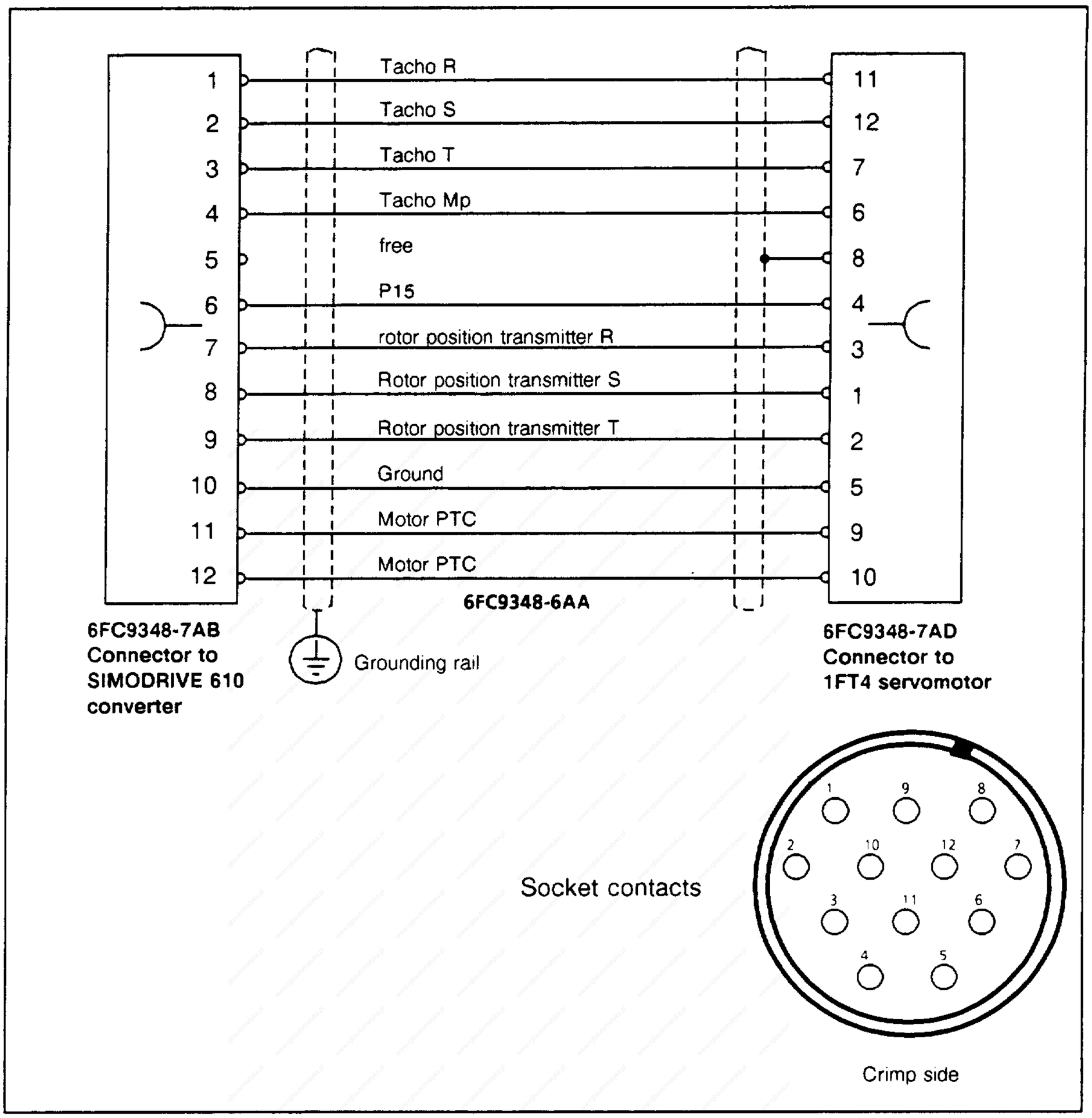
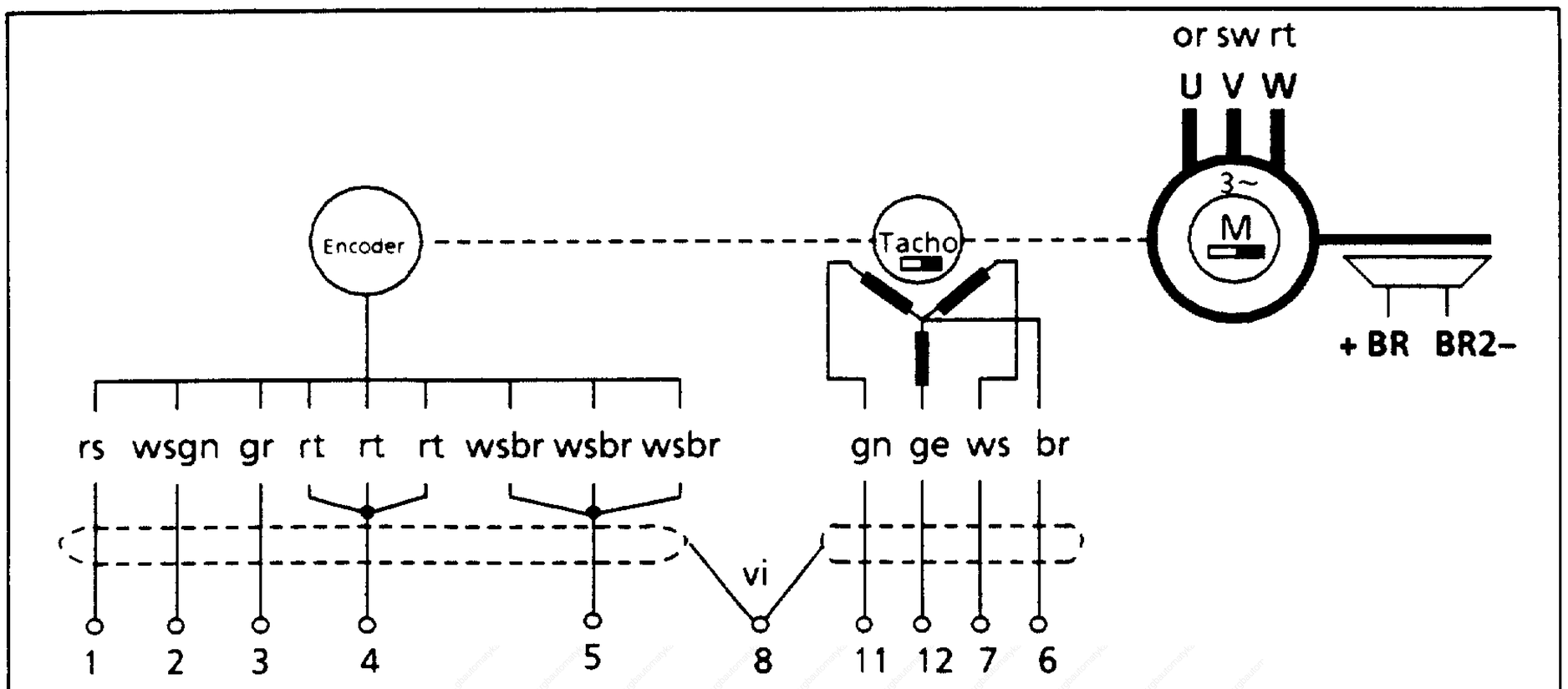
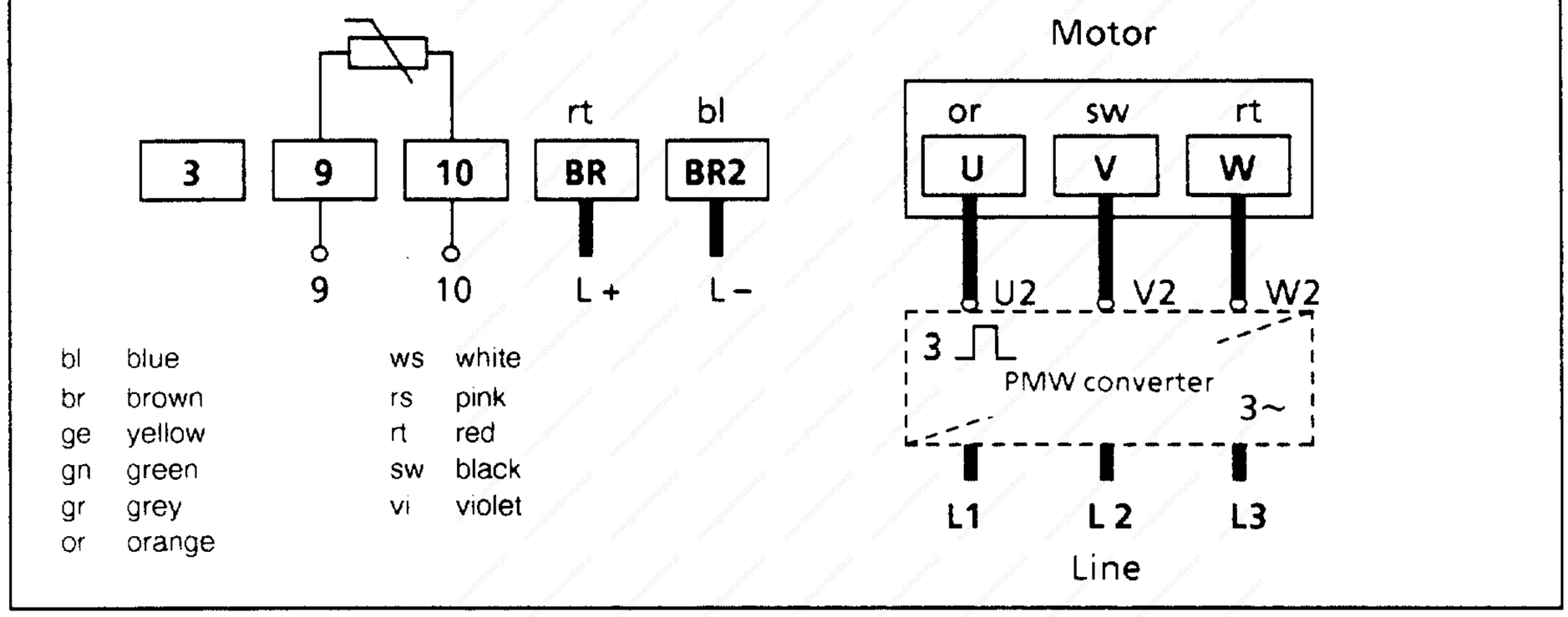


Fig. 2.7 Sensor lead: Connection between PWM converter and servomotor

The sensor cable in Fig. 2.7 is available as precut cable with Order No. 6FC9348-5B□ (refer to the Table on the previous page).



Connector pin assignment according to Fig. 2.7.



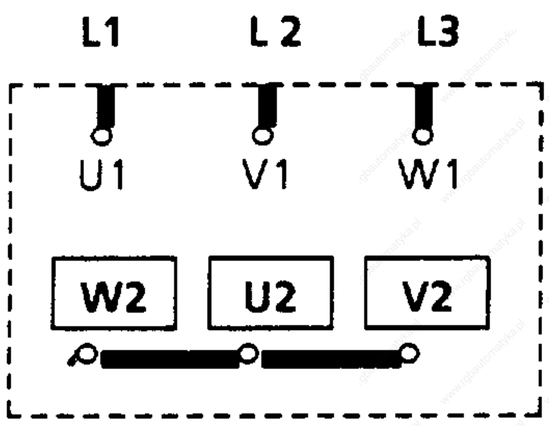
bl	blue	ws	white
br	brown	rs	pink
ge	yellow	rt	red
gn	green	sw	black
gr	grey	vi	violet
or	orange		

Fig. 2.9 Connecting terminals and connector assignment of 1FT4 servomotors with terminal boxes

Fan connection

Voltage (V)	Frequency (Hz)	Power consumption (W)	Current consumption (A)
Y 380	50	160	0.29
Y 380	60	225	0.36

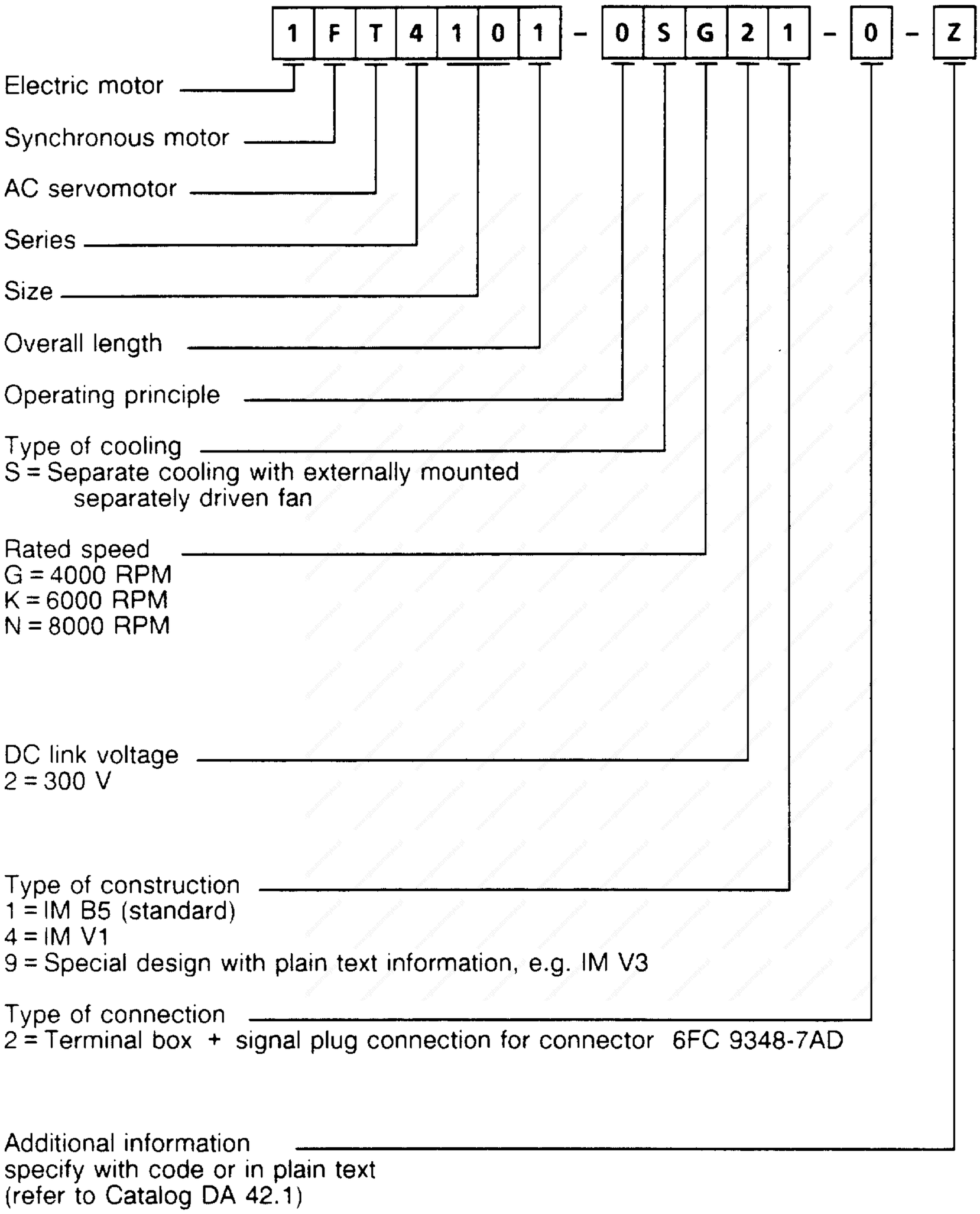
Table 2.10 Technical data of the radial fan



2.6 Product designation

The product designation (also the order No.) consists of a combination of digits and letters. It is subdivided into 4 blocks, which are joined by hyphens.

The first block comprises 7 positions and identifies the motor type. The second block contains codes for other design features. The third and fourth blocks are provided for additional information.



Additional information for standard design and options

Plain text information			Code
Special paint finish			Y54 1)
Second motor rating plate			K31
Strengthened bearing design (double bearing design up to 6000 RPM)			K20
Radial seal on the drive side			K18
Drive-side shaft end design b			K42
	non-standard cylindrical shaft end		Y55 2)
Concentricity tolerance R as per DIN 42-955R			K04
Vibration severity grade S (special)			K02
Terminal box /plug outlet direction 3) turned through 90°			
	Cable entry from the drive side		K83
	Cable entry from the non-drive side		K84 4)
Terminal box/plug outlet direction 3) turned through 180°			K85
Motor with mounted shaft encoder 5)			
	6FC9320-3MS00	5000 Pulses/revolution	H28
	6FC9320-3MN00	2500 Pulses/revolution	H27
	6FC9320-3MK00	2000 Pulses/revolution	H26
	6FC9320-3MG00	1500 Pulses/revolution	H25
	6FC9320-3ME00	1250 Pulses/revolution	H24
	6FC9320-3MB00	1024 Pulses/revolution	H23
	6FC9320-3MA00	1000 Pulses/revolution	H22
	6FC9320-3LX00	720 Pulses/revolution	H21
	6FC9320-3LS00	500 Pulses/revolution	H20
	6FC9320-300	400 Pulses/revolution	H19
	6FC9320-3LL00	250 Pulses/revolution	H18
ROD 320 shaft encoder 6)		5000 Pulses/revolution	H04
		2500 Pulses/revolution	G44
		2000 Pulses/revolution	G42
		1500 Pulses/revolution	—
		1250 Pulses/revolution	H01
		1000 Pulses/revolution	H00
		800 Pulses/revolution	—
		720 Pulses/revolution	—
		600 Pulses/revolution	—
		500 Pulses/revolution	—
		400 Pulses/revolution	—

Plain text information	Code
Motor with mounted planetary gearbox	G93/Y55 6)
Motor prepared for cycloid gearbox mounting	G94 7)

When ordering a 1FT4 AC servomotor, it is necessary to add a "-Z" suffix to the basic order number followed by the code or plain text information describing the option requried.

Example: 1FT4102-0SK21-1-Z
Z = K18 + G45 + shaft encoder 6FC9320 200 pulses/revolution

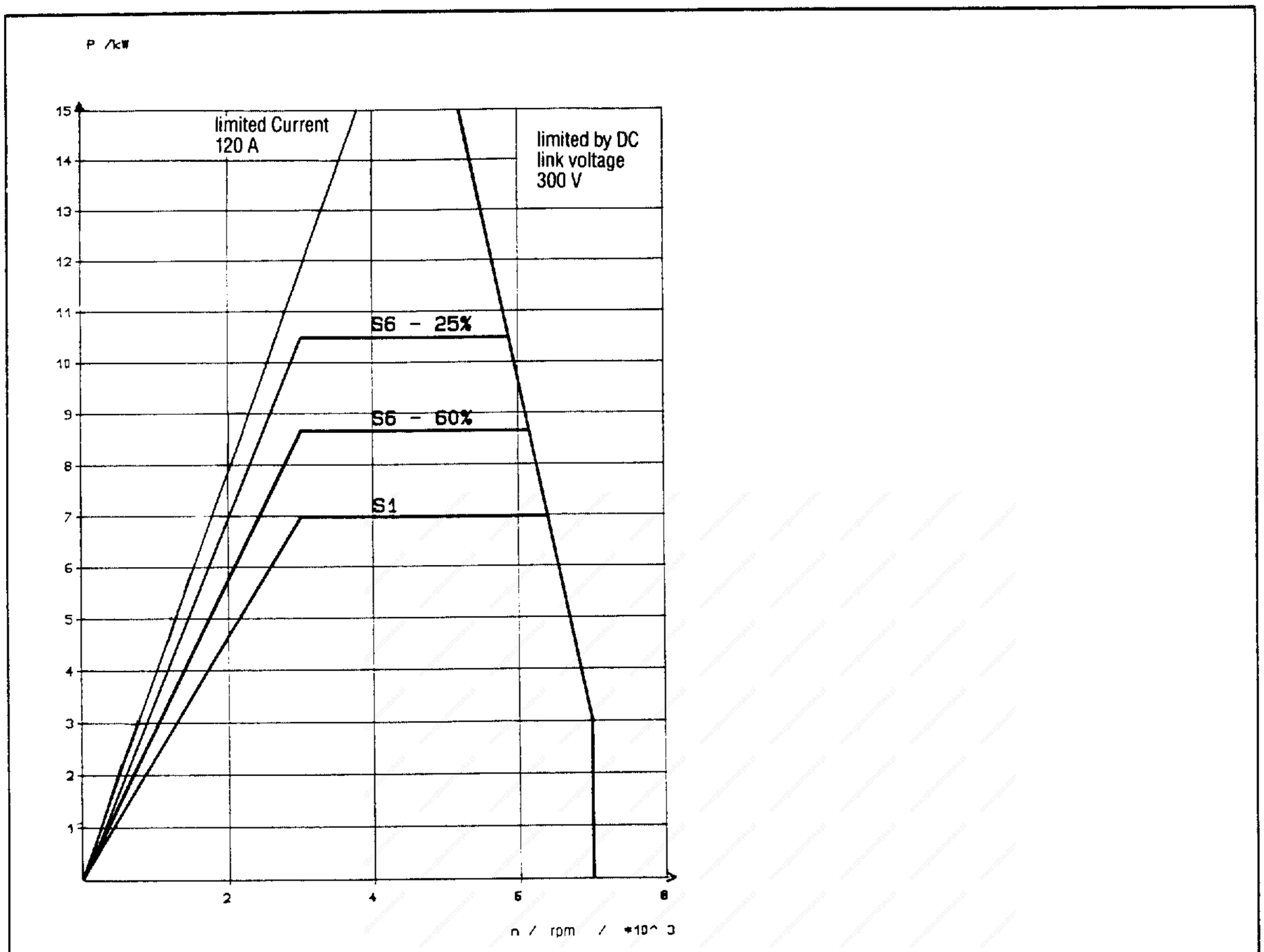
The codes are also specified on the motor rating plate.

---

1) Additionally specify in plain text: Special paint finish RAL...
2) Additionally specify in plain text: non-standard shaft end with diameter (mm) and length (mm)
3) Standard version as per dimension sheets in Section 2-8
4) The terminal box for the fan connection and the connection for the mounted equipment are mounted on the right of the motor when viewing the drive-side shaft end.
5) The shaft encoder incorporated in the motor has a radial lead outlet. Shaft encoders with other resolutions on request.
6) Please note the shaft encoder limiting frequency during the design phase (f = 160 kHz). Motors can only be designed for a winding temperature of ΔT = 60K. Shaft encoders with other resolutions on request.
6) G93 is only possible in conjunction with a non-standard shaft end (option Y55). Specify the gear ratio when ordering.
7) Additionally specify in plain text: Motor shaft acording to the cyclo-drawing number.

2.7 Torque and power versus speed characteristics

The torque-power characteristics for S1 and S3 operation as a function of speed, are illustrated on the subsequent pages. The torque-speed characteristics are valid for a motor utilization according to $\Delta T = 100$ K winding temperature rise.
When designing the drive using these characteristics it should be ensured that the PWM converter can supply the corresponding motor rated current (e.g. design for S3 operation) as continuous current.
Four times the motor rated torque should not be exceeded for acceleration.
The supply voltage of the 6RA29 infeed/regenerative feedback unit is 3-phase 50 Hz /60 Hz 380 to 415 V AC. The DC link voltage is controlled by the infeed/regenerative feedback unit to 300 V.



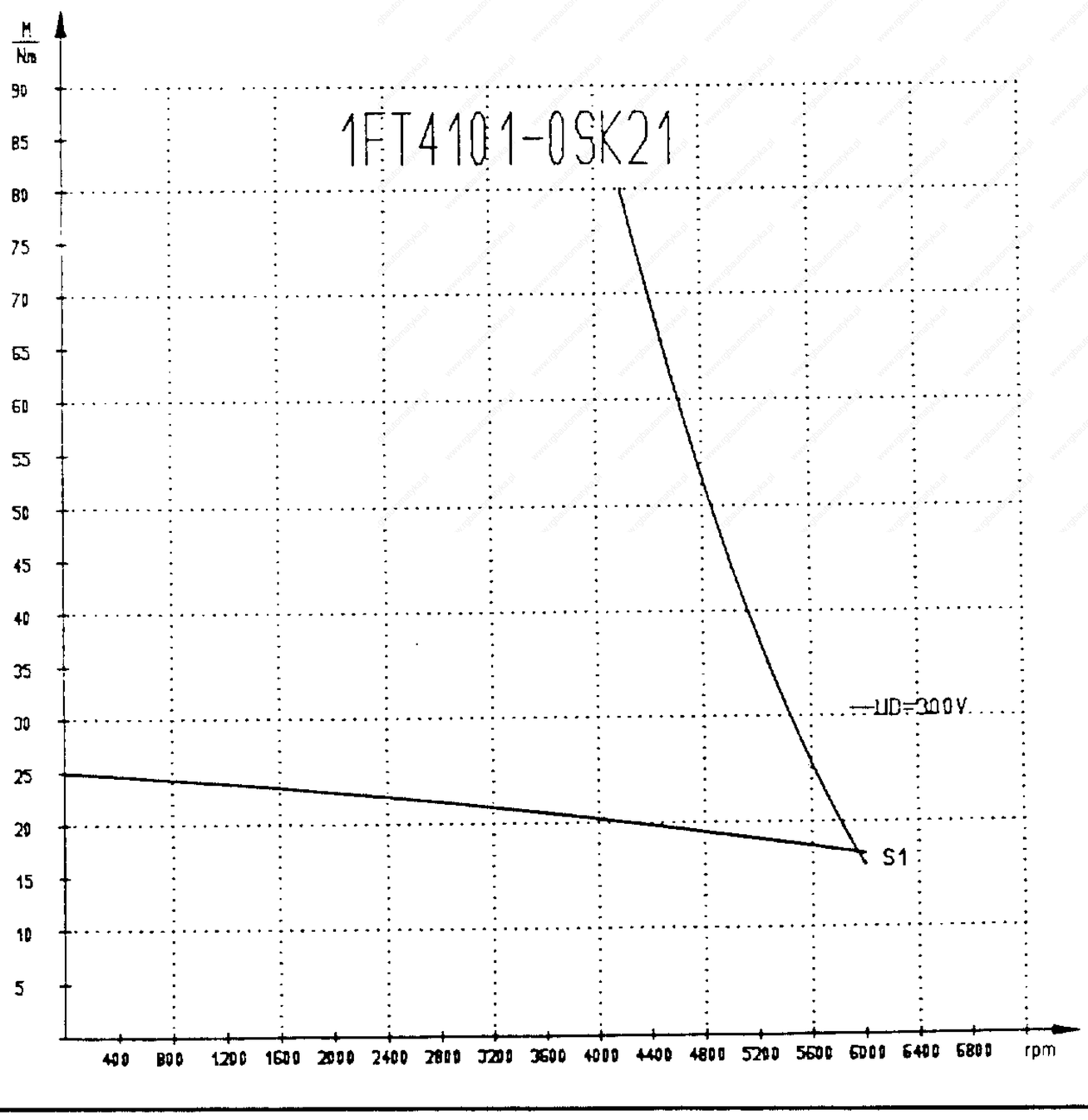


Fig. 2-10 1FT4101-0SK21 servomotor, winding temperature rise ΔT = 100K

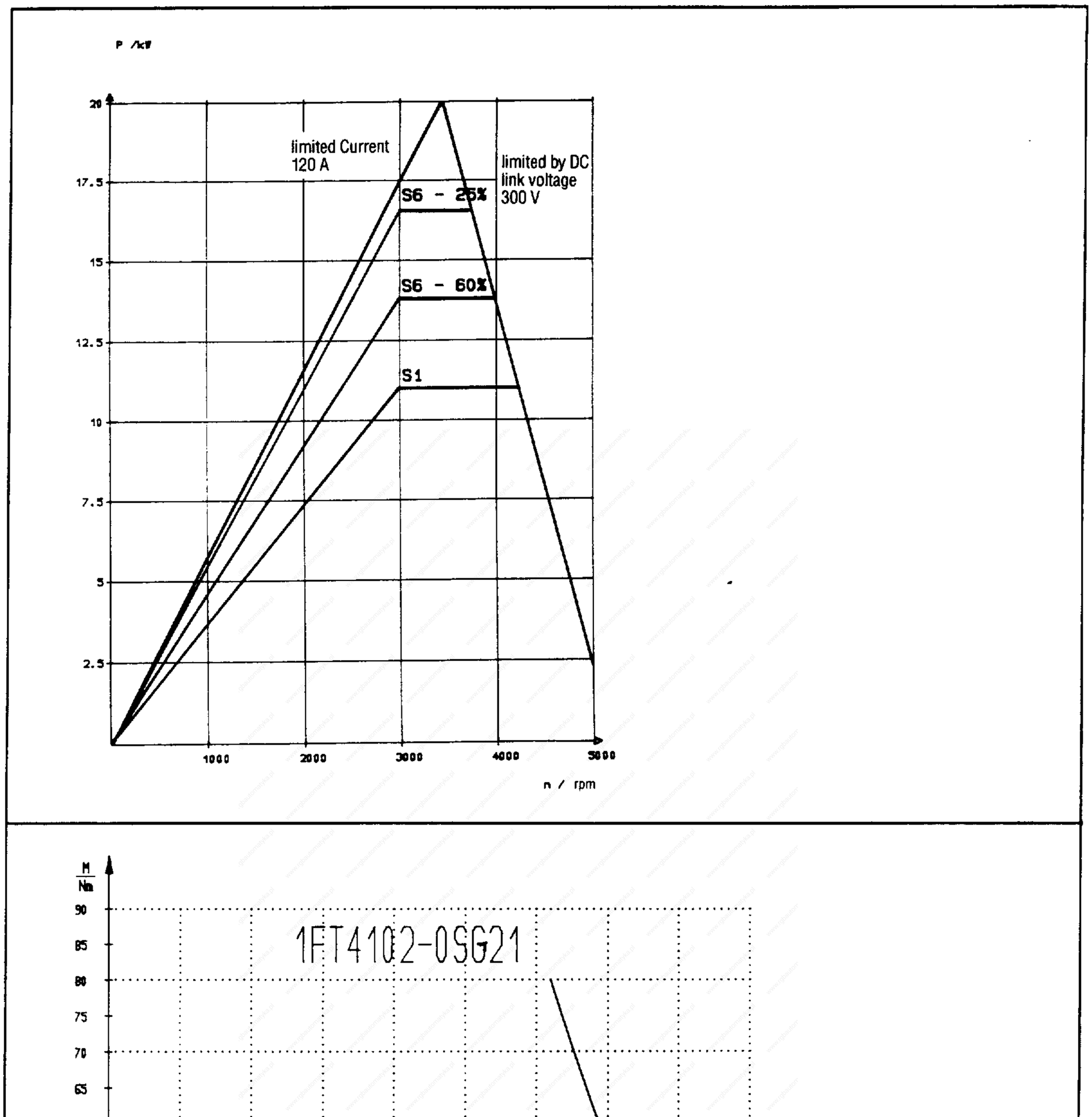
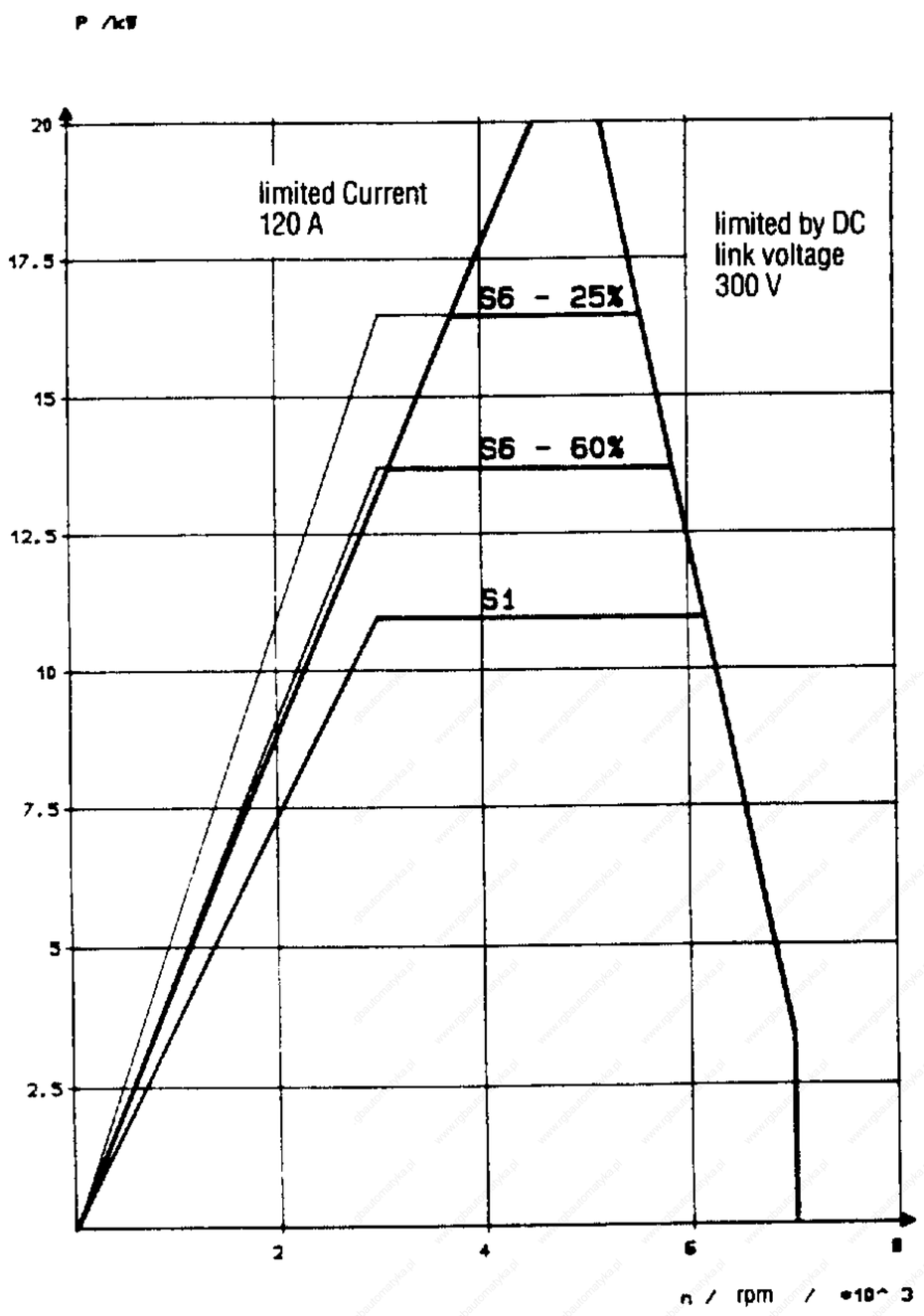


Fig. 2-11 1FT4102-0SG21 servomotor, winding temperature rise $\Delta T = 100K$



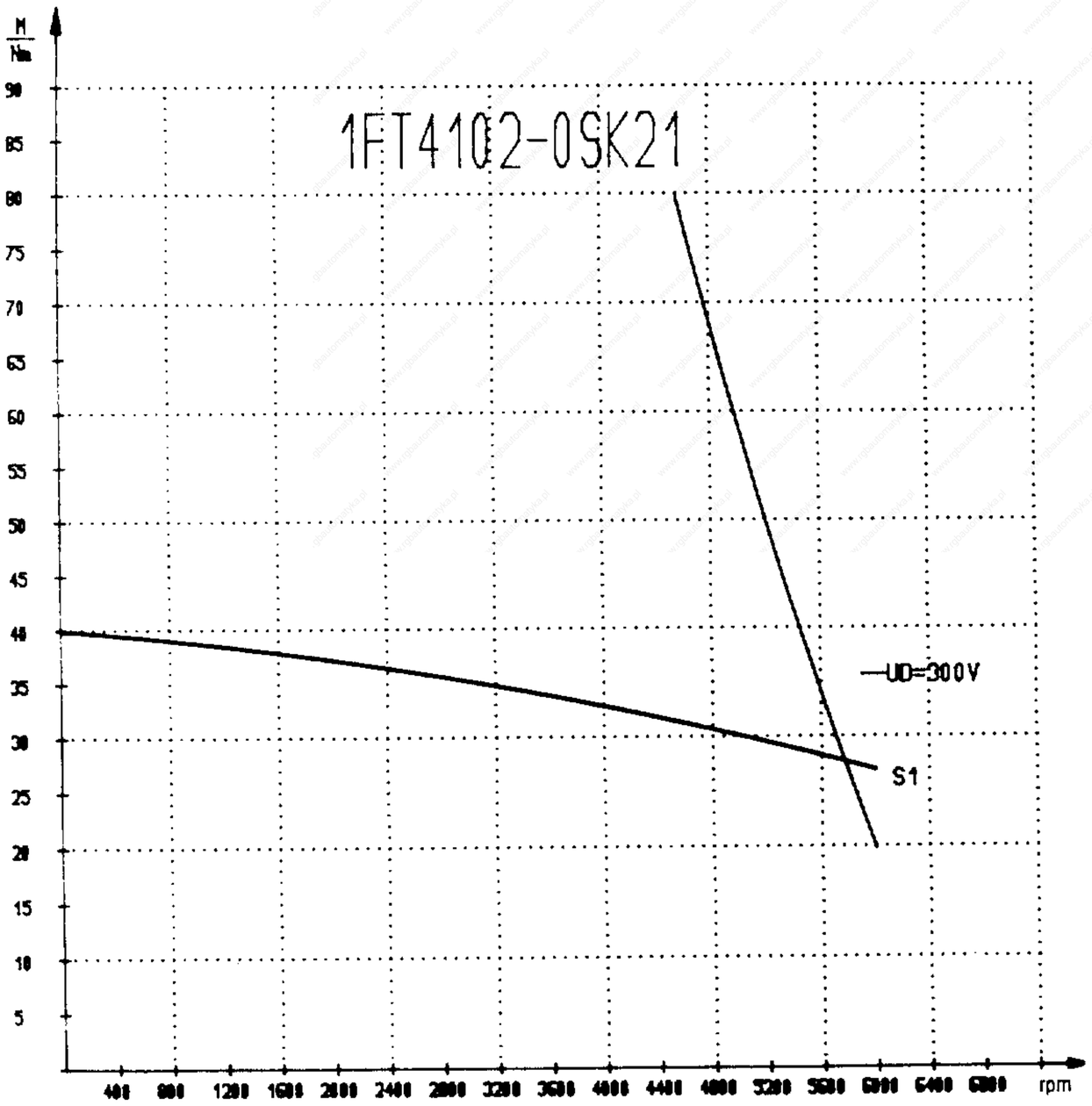


Fig. 2-12 1FT4102-0SK21 servomotor, winding temperature rise $\Delta T = 100K$

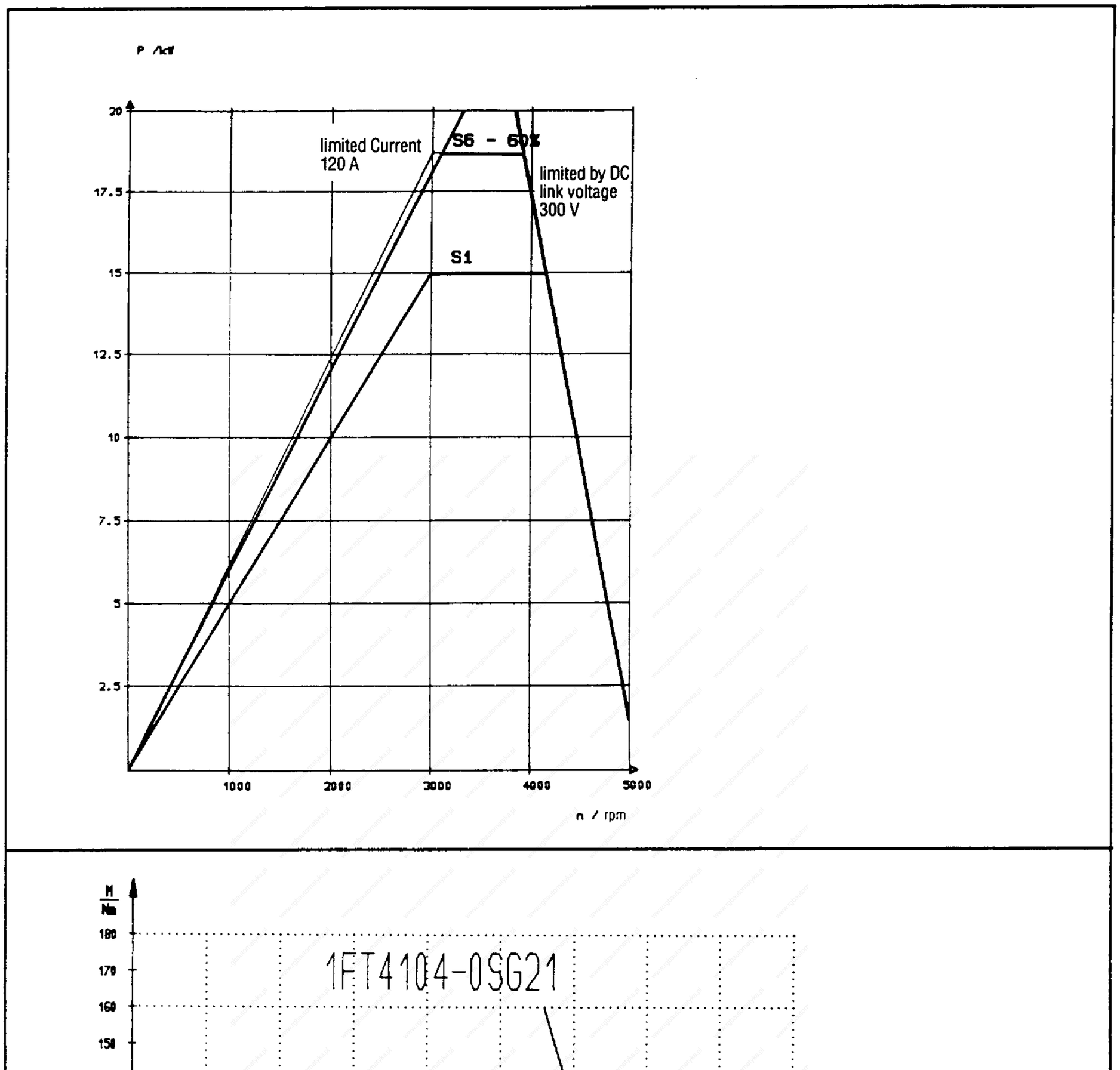


Fig. 2-13 1FT4104-0SG21 servomotor, winding temperature rise $\Delta T = 100K$

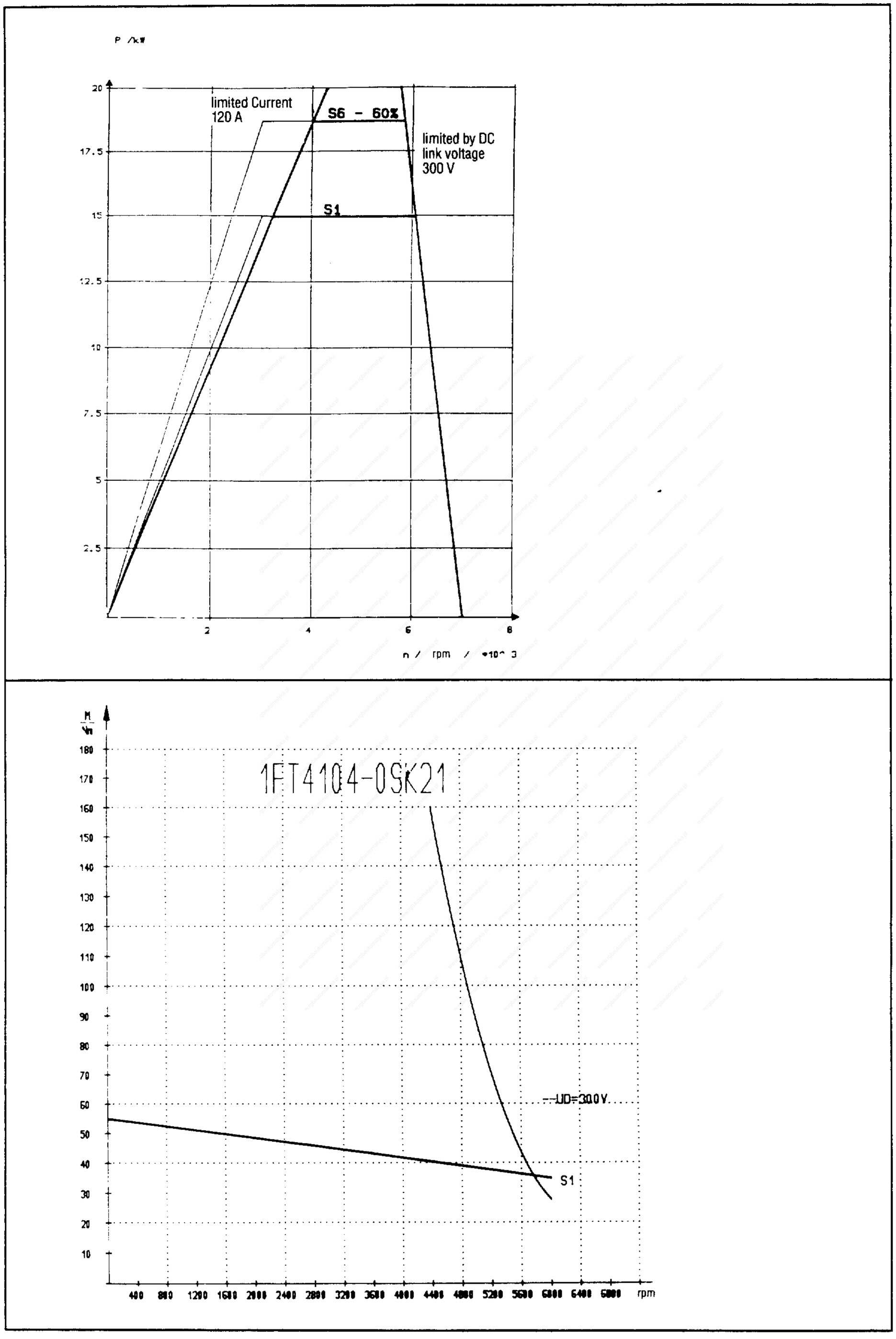


Fig. 2-14 1FT4104-0SK21 servomotor, winding temperature rise ΔT = 100K

2.8 Cantilever force charts

Note: The cantilever force charts show the cantilever force F_Q at distance x from the shaft shoulder with a nominal bearing service life of 20,000 hours.

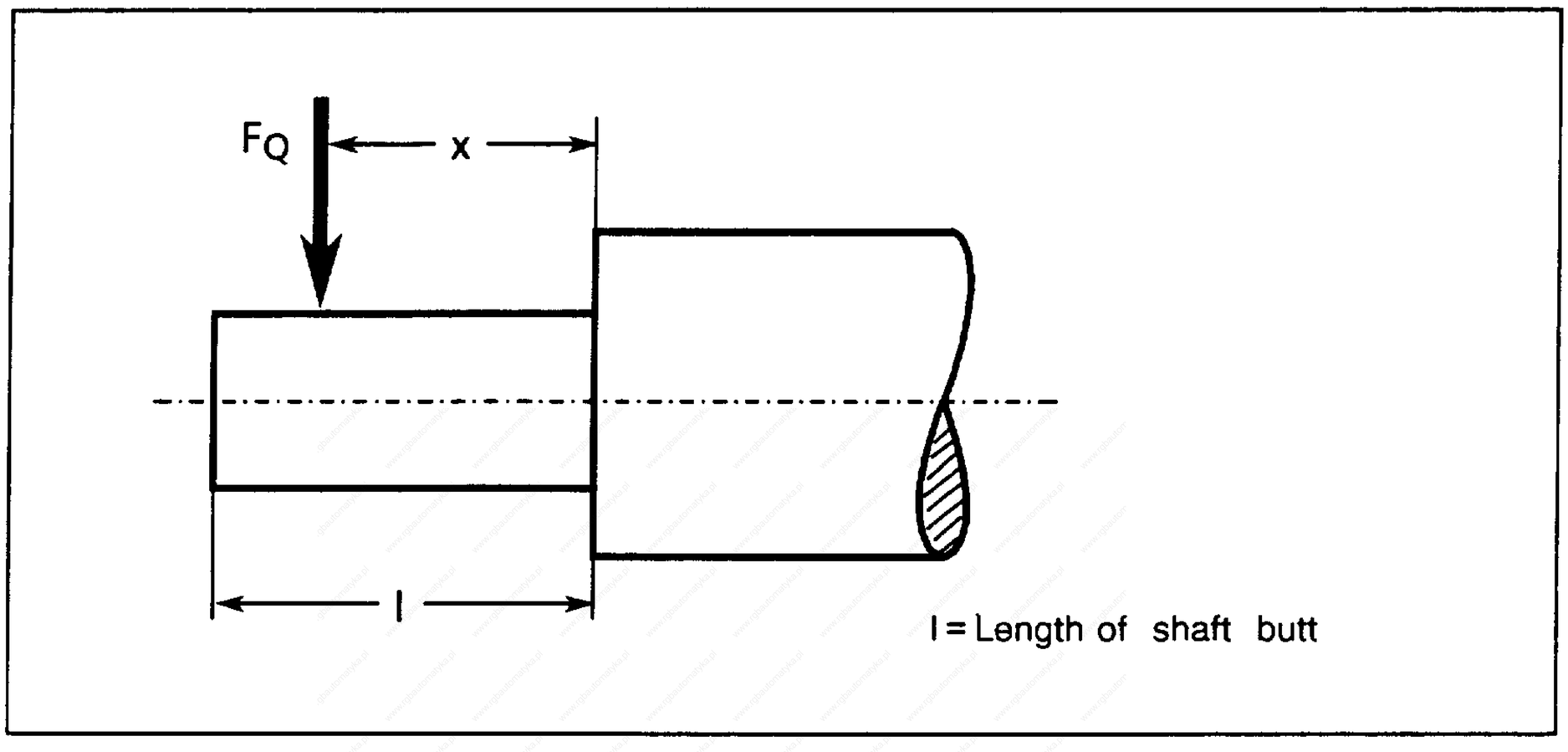


Fig. 2.15 Point of application of cantilever forces at the motor shaft ends

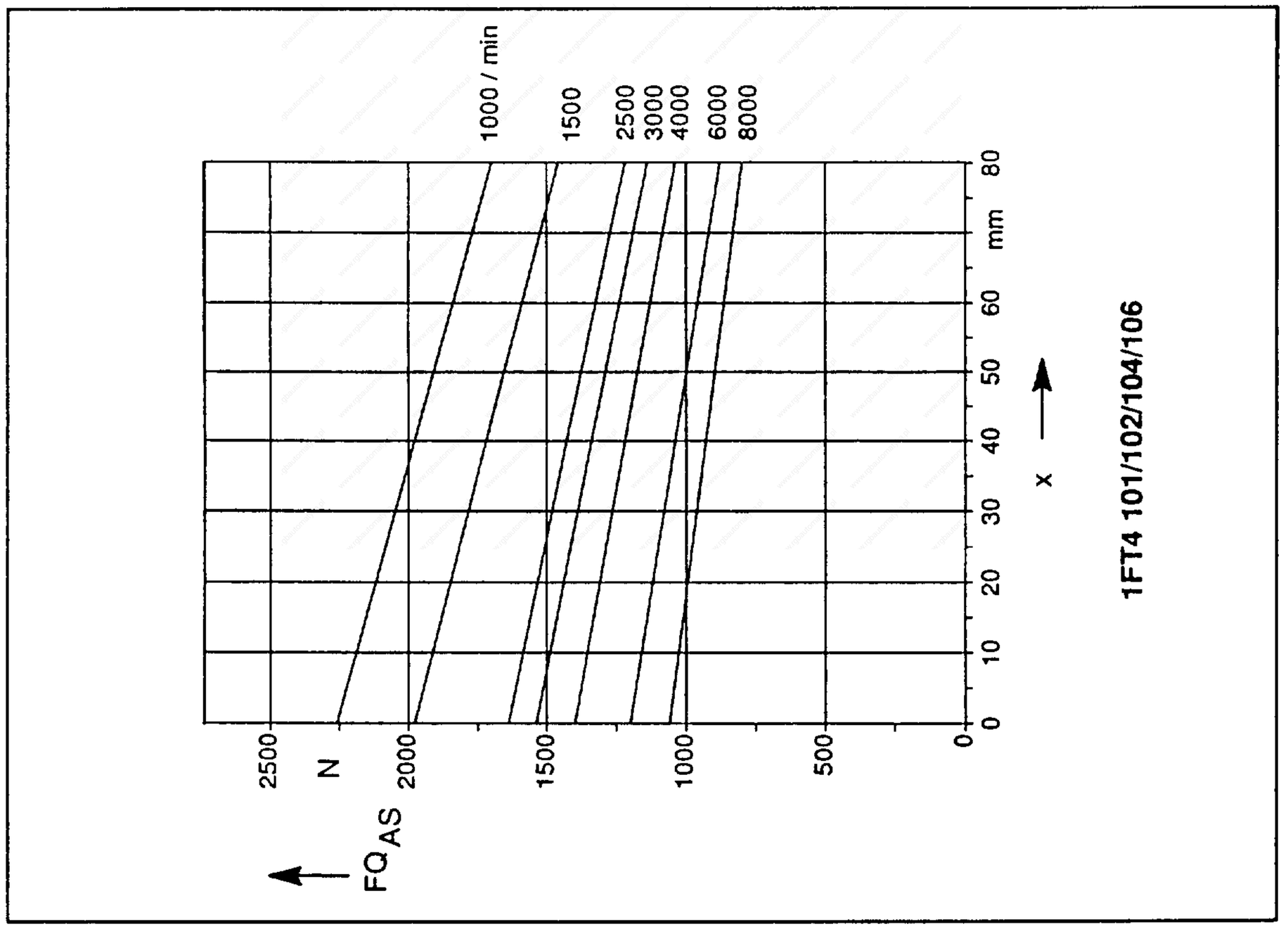


Fig. 2.16 Permissible cantilever forces: 1FT4 101/106 servomotors, single-bearing design

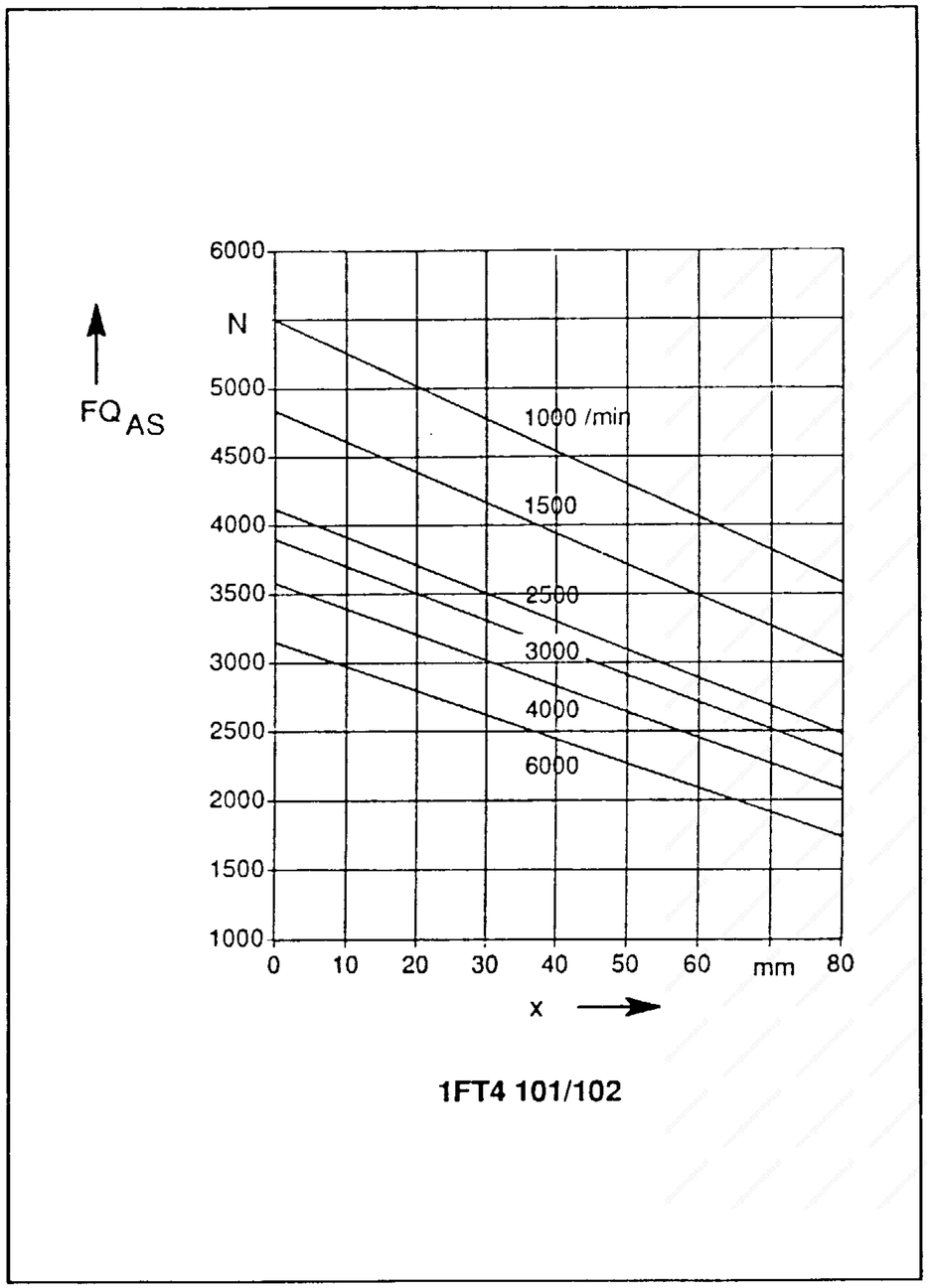


Fig. 2.17 Permissible cantilever forces: 1FT4101/102 servomotor, double-bearing design

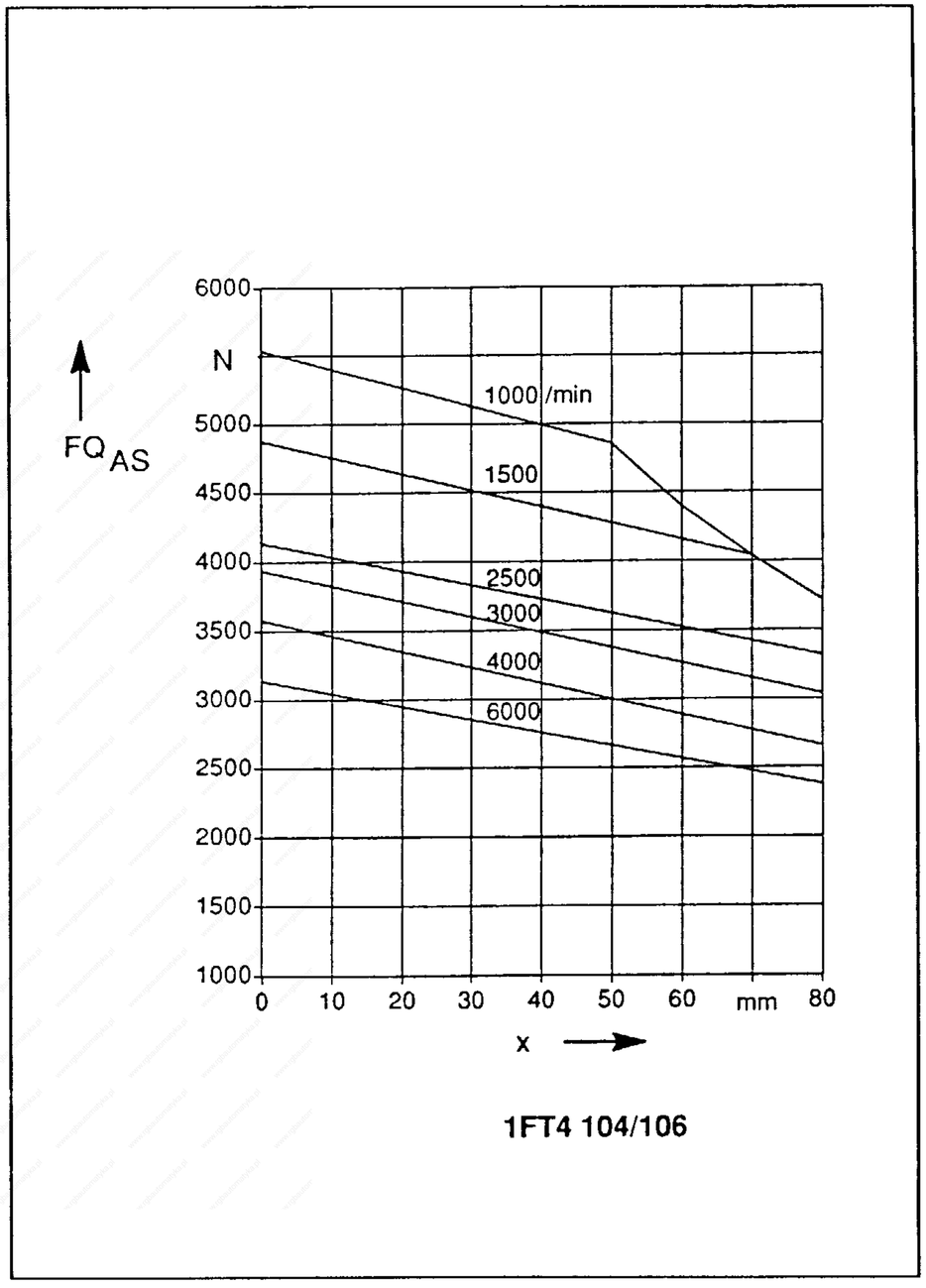


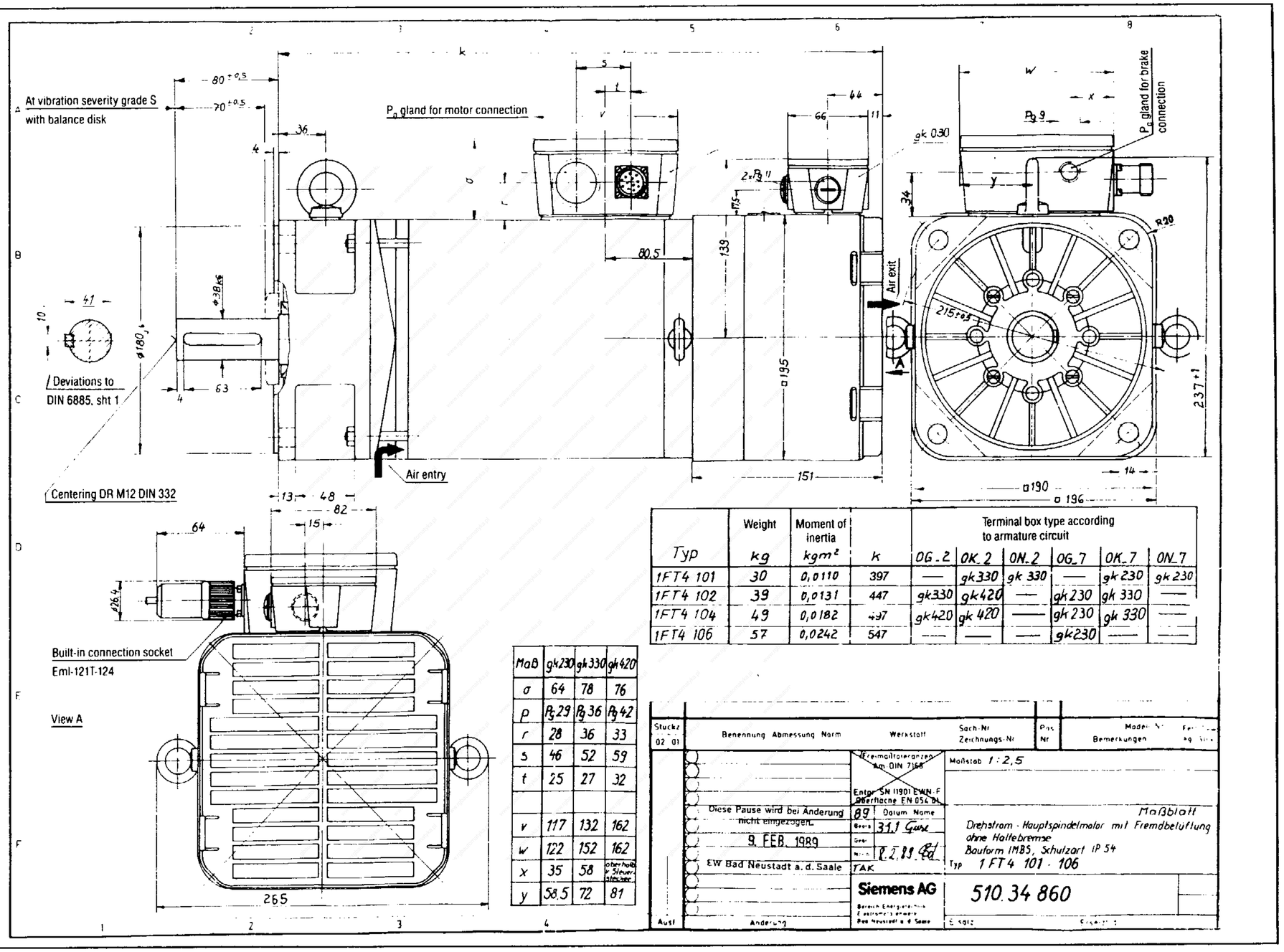
Fig. 2.18 Permissible cantilever forces: 1FT4104/106 servomotors, double bearing design

2.9 Dimension drawings

Note: All dimension drawings not to scale.

All dimensions in mm.

For your convenience we have translated the German text of the dimension drawings into English. Please take into consideration that when ordering a drawing unter its respective number you will receive the German original.



Typ	Weight kg	Moment of inertia kgm^2	k	Terminal box type according to armature circuit					
				0G_2	0K_2	0N_2	0G_7	0K_7	0N_7
1FT4 101	30	0,0110	397	—	gk330	gk 330	—	gk230	gk230
1FT4 102	39	0,0131	447	gk330	gk420	—	gk230	gk 330	—
1FT4 104	49	0,0182	497	gk420	gk 420	—	gk230	gk 330	—
1FT4 106	57	0,0242	547	—	—	—	gk230	—	—

MaB	gk230	gk330	gk420
σ	64	78	76
p	P_g29	P_g36	P_g42
r	28	36	33
s	46	52	59
t	25	27	32
v	117	132	162
w	122	152	162
x	35	58	oberhalb v. Steuerschrank
y	58.5	72	81

Stückz 02 01 | Benennung Abmessung Norm | Werkstatt | Sach-Nr Zeichnungs-Nr | Pos Nr | Bemerkungen

Fremdtoleranzen nach DIN 7168
Entw SN 11901 E-W-N-F Oberfläche EN 054 01
Maßstab 1:2,5

Diese Pause wird bei Änderung nicht eingezogen.
89 Datum Name
Gez 31.1 Gurx
Ges
Norm 9. FEB. 1989 9.2.89 Ed
EW Bad Neustadt a. d. Saale TAK

Maßblatt
Drehstrom-Hauptspindelmotor mit Fremdbelüftung ohne Haltebremse
Bauform IMB5, Schutzart IP 54
Typ 1FT4 101 - 106

Siemens AG
Bereich Energieerzeugung
Energieerzeugende
Bad Neustadt a. d. Saale

510.34 860

Ausf | Änderung | Ersatz | Ersatz f.

Fig.2.19 Dimension drawing for 1FT4 101 to 106 servomotors with separate cooling, IP54 degree of protection

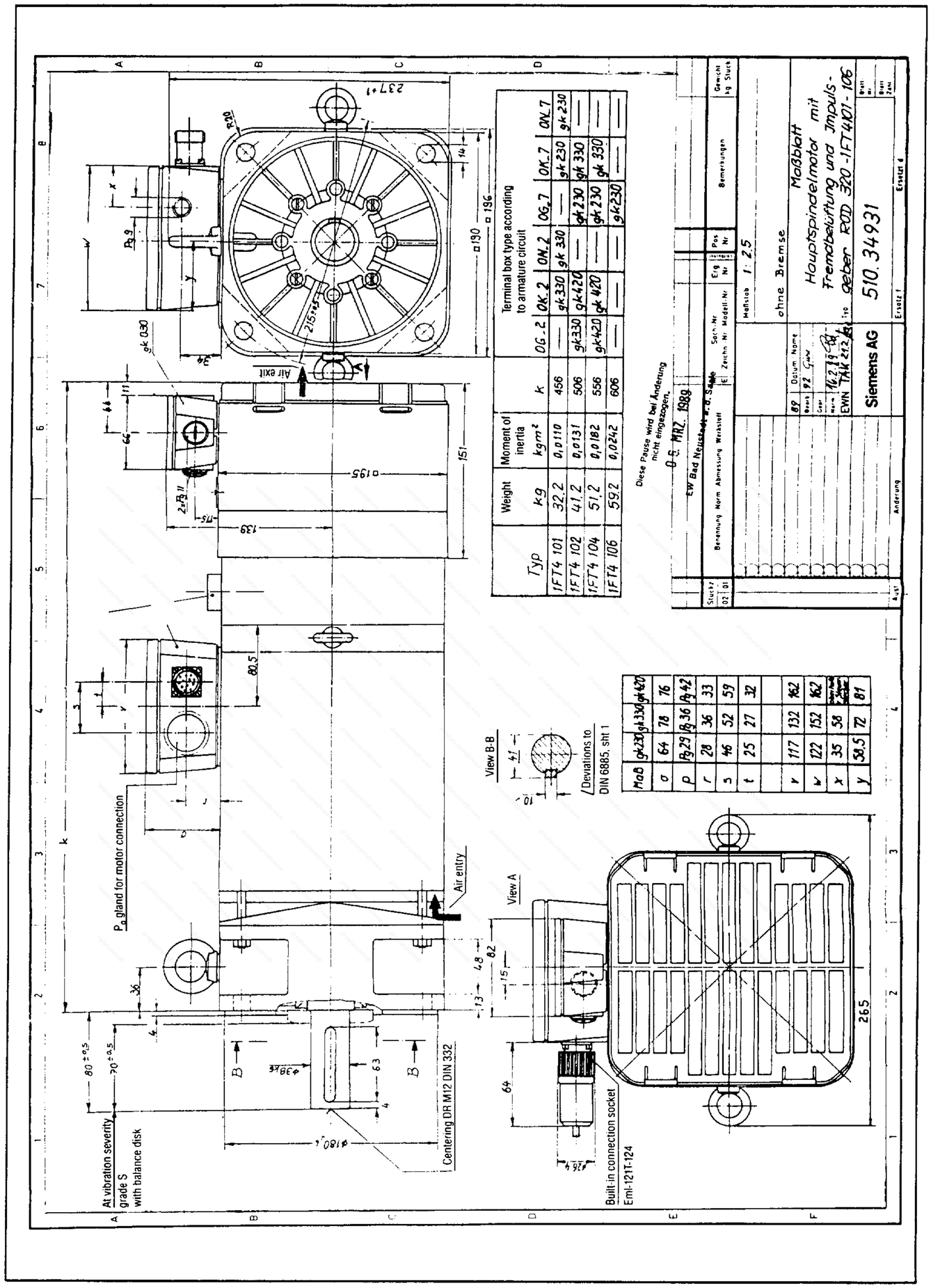


Fig.2.20 Dimension drawing for 1FT4 101 to 106 servomotors with separate cooling and ROD 320 shaft encoder

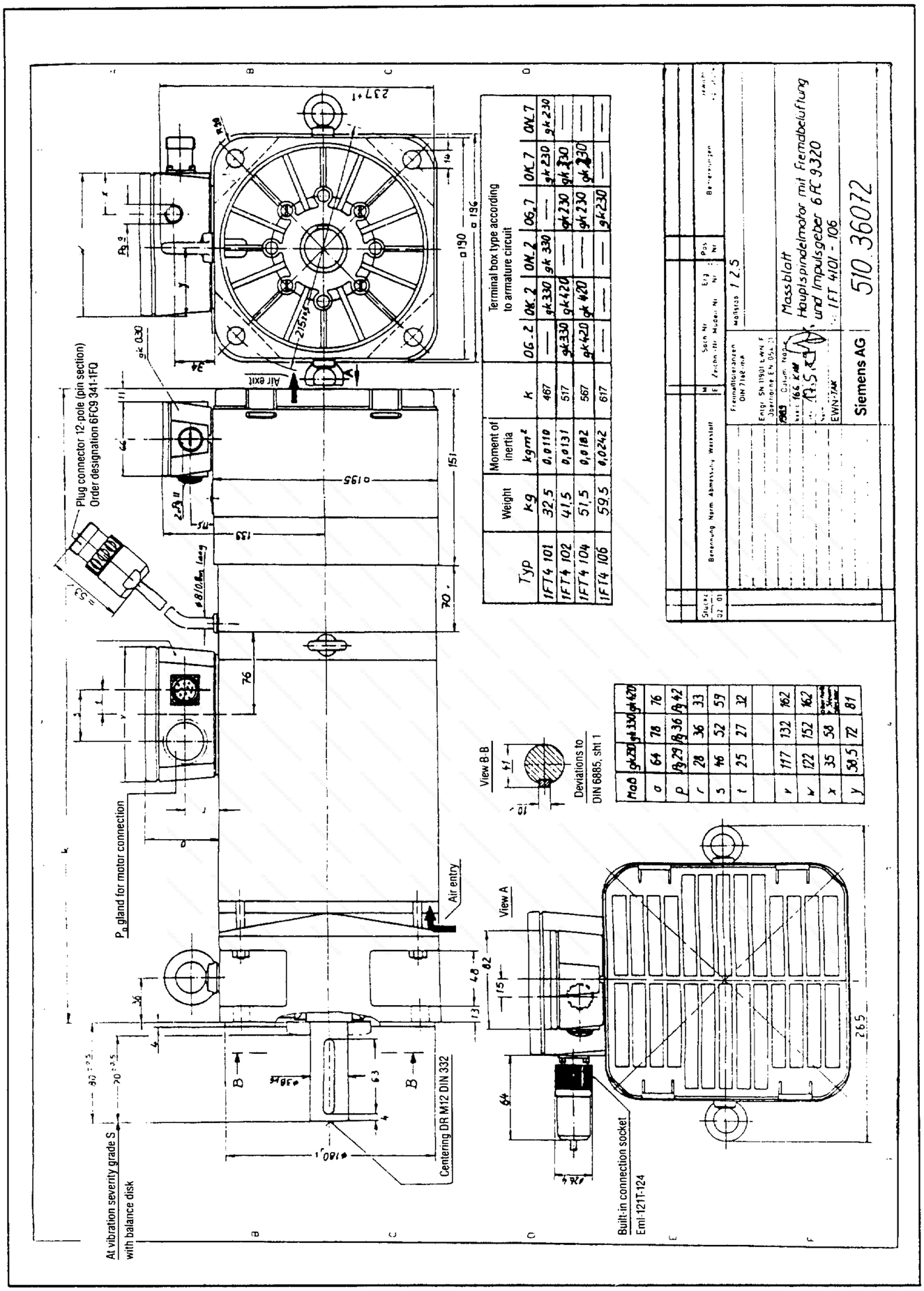


Fig. 2.21 Dimension drawing for 1FT4 101 to 106 servomotors with separate cooling and 6FC9320 shaft encoder

3 1FT5 servomotors for the 300V feed drive system

3.1 General information

The 1FT5 AC servomotors are supplemented with a 300V armature circuit for the 300V feed drive system. This means that some of the motor technical data change (refer to Section 3.4). The 1FT5 motors for 300V are designated by a 2 at the eleventh position of the Order No, e.g. 1FT5102-0AC**2**1. The tacho voltage of these motors is also 40 V at rated speed n_N. All other design features correspond to the 1FT5 motors for a 200 V DC link. All options for the 200 V 1FT5 motors are also available for the 300 V motors.

3.2 Assignment: 1FT5 servomotor - SIMODRIVE 610 PWM converter

Locked-rotor torque ΔT = 60 K	Locked-rotor torque ΔT = 100 K	Rated speed	AC servomotor	Phase current at M_0 ΔT = 60 K	Phase current at M_0 ΔT = 100 K	Moment of inertia	PWM converter power mod.	
			1FT5				for M_0 (60 K)	for M_0 (100 K)
M_0	M_0	n_N		I_0	I_0	J_{mot}	I_N (60 K)	I_N (100 K)
[Nm]	[Nm]	[RPM]	Order No.	[A]	[A]	[10^{-4} kgm^2]	[A]	[A]
Standard-version servomotors								
27	33	1200	1FT5102-0AA2	16.4	20.0	131	20	20
37	45		1FT5104-0AA2	22.6	27.5	182	30	30
45	55		1FT5106-0AA2	27.0	33.0	242	30	40
55	68		1FT5108-0AA2	32.8	40.5	298	40	40 [1]
60	75		1FT5132-0AA2	38.8	48.5	454	40	70
75	90		1FT5134-0AA2	48.3	58.0	579	70	70
85	105		1FT5136-0AA2	54.6	67.5	705	70	70
105	130		1FT5138-0AA2	65.4	81.0	893	70	90
0.15	0.17	2000	1FT5020-0AC2	0.43	0.49	0.13	3	3
0.27	0.33		1FT5022-0AC2	0.69	0.85	0.22	3	3
0.4	0.5		1FT5024-0AC2	0.91	1.1	0.30	3	3
0.25	0.3		1FT5032-0AC2	0.6	0.71	0.37	3	3
0.5	0.6		1FT5034-0AC2	1.0	1.2	0.62	3	3
0.75	0.9		1FT5036-0AC2	1.4	1.7	0.93	3	3
0.6	0.75		1FT5042-0AC2	1.2	1.3	1.2	3	3
1.2	1.5		1FT5044-0AC2	1.9	2.4	2.3	3	3
2.0	2.5		1FT5046-0AC2	2.5	3.2	4.5	3	3
2.2	2.6		1FT5062-0AC2	2.8	3.3	4.2	3	3 [1]
4.5	5.5		1FT5064-0AC2	5.8	7.1	7.3	8	8
6.5	8		1FT5066-0AC2	8.4	10.3	10.7	20	20
10	12		1FT5072-0AC2	12.3	14.8	21	20	20
14	18		1FT5074-0AC2	17.1	22.0	37	20	20 [1]
18	22		1FT5076-0AC2	22.5	27.5	53	30	30
27	33		1FT5102-0AC2	31.9	39.0	131	30 [1]	40
37	45		1FT5104-0AC2	43.2	52.5	182	40 [1]	70
45	55		1FT5106-0AC2	53.6	65.5	242	70	70
55	68		1FT5108-0AC2	60.7	75.0	298	70	70 [1]
60	75		1FT5132-0AC2	68.4	85.5	454	70	90
75	90		1FT5134-0AC2	83.3	100.0	579	90	120

Locked-rotor torque ΔT = 60 K **M_0** [Nm]	**Locked-rotor torque** ΔT = 100 K **M_0** [Nm]	**Rated speed** **n_N** [RPM]	**AC servomotor** **1FT5** Order No.	**Phase current at M_0** ΔT = 60 K **I_0** [A]	**Phase current at M_0** ΔT = 100 K **I_0** [A]	**Moment of inertia** **J_{mot}** [10^{-4} kgm²]	**PWM converter power mod.** for M_0 (60 K) **I_N (60 K)** [A]	**PWM converter power mod.** for M_0 (100 K) **I_N (100 K)** [A]
Standard-version servomotors (continued)								
0.15	0.17		1FT5020-0AF2	0.56	0.63	0.13	3	3
0.27	0.33		1FT5022-0AF2	0.90	1.1	0.22	3	3
0.4	0.50		1FT5024-0AF2	1.20	1.5	0.30	3	3
0.25	0.30		1FT5032-0AF2	0.75	0.95	0.37	3	3
0.5	0.60		1FT5034-0AF2	1.30	1.6	0.62	3	3
0.75	0.90		1FT5036-0AF2	1.80	2.2	0.93	3	3
0.6	0.75		1FT5042-0AF2	1.40	1.8	1.2	3	3
1.2	1.50		1FT5044-0AF2	2.70	3.4	2.3	8	8
2.0	2.50		1FT5046-0AF2	3.60	4.5	4.5	8	8
2.2	2.60	3000	1FT5062-0AF2	3.50	4.1	4.2	8	8
4.5	5.50		1FT5064-0AF2	7.20	8.8	7.3	8	8 [1]
6.5	8		1FT5066-0AF2	10.3	12.7	10.7	20	20
10	12		1FT5072-0AF2	15.7	18.8	21.0	20	20
14	18		1FT5074-0AF2	22.6	29.0	37.0	30	30
18	22		1FT5076-0AF2	28.6	35.0	53.0	30	40
27	33		1FT5102-0AF2	40.9	50.0	131.0	40 [1]	70
37	45		1FT5104-0AF2	56.3	68.5	182.0	70	70
45	55		1FT5106-0AF2	67.1	82.0	242.0	70	90
55	68		1FT5108-0AF2	78.5	97.0	298.0	90	90 [1]
60	75		1FT5132-0AF2	84.8	106.0	454.0	90	120
0.15	0 17		1FT5020-0AH2	0.63	0.71	0.13	3	3
0.27	0 33		1FT5022-0AH2	1.05	1.3	0.22	3	3
0.4	0.50		1FT5024-0AH2	1.45	1.8	0.30	3	3
0.25	0.30		1FT5032-0AH2	0.95	1.2	0.37	3	3
0.5	0.60	4500	1FT5034-0AH2	1.70	2.0	0.62	3	3
0.75	0.90		1FT5036-0AH2	2.40	2.4	0.93	3	3
0.6	0.75		1FT5042-0AH2	1.90	2.4	1.2	3	3
1.2	1.50		1FT5044-0AH2	3.50	4.4	2.3	8	8
2.0	2.50		1FT5046-0AH2	5.40	6.8	4.5	8	8
2.2	2.60		1FT5062-0AG2	5.40	6.4	4.2	8	8
4.5	5.50		1FT5064-0AG2	10.7	13.1	7.3	20	20
6.5	8		1FT5066-0AG2	15.8	19.5	10.7	20	20
10	12	4000	1FT5072-0AG2	23.3	28.0	21.0	30	30
14	18		1FT5074-0AG2	32.7	42.0	37.0	30 [1]	40 [1]
18	22		1FT5076-0AG2	42.1	51.5	53.0	40 [1]	70
27	33		1FT5102-0AG2	61.4	75.0	131.0	70	70 [1]

Table 3.1 b Assignment: 1FT5 servomotor – SIMODRIVE 610 PWM converter

1) With the assigned power modules, the motor cannot be fully utilized according to ΔT = 60 K or 100K winding temperature rise.

Locked-rotor torque ΔT = 60 K	Locked-rotor torque ΔT = 100 K	Rated speed	AC servomotor	Phase current at M_0 ΔT = 60 K	Phase current at M_0 ΔT = 100 K	Moment of inertia	PWM converter power mod.	
							for M_0 (60 K)	for M_0 (100 K)
M_0	**M_0**	**n_N**	**1FT5**	**I_0**	**I_0**	**J_{mot}**	**I_N (60 K)**	**I_N (100 K)**
[Nm]	[Nm]	[RPM]	Order No.	[A]	[A]	[10^{-4} kgm²]	[A]	[A]
Standard-version servomotors (continued)								
0.15	0.17		1FT5020-0AK2	0.68	0.77	0.13	3	3
0.27	0.33		1FT5022-0AK2	1.20	1.45	0.22	3	3
0.40	0.50		1FT5024-0AK2	1.60	2.0	0.30	3	3
0.25	0.30		1FT5032-0AK2	1.10	1.4	0.37	3	3
0.50	0.60	6000	1FT5034-0AK2	2.10	2.5	0.62	3	3
0.75	0.90		1FT5036-0AK2	3.10	3.8	0.93	3	3
0.60	0.75		1FT5042-0AK2	2.50	3.1	1.2	3	3
1.20	1.50		1FT5044-0AK2	4.80	6.0	2.3	8	8
2.00	2.50		1FT5046-0AK2	6.70	8.3	4.5	8	8
2.20	2.60		1FT5062-0AK2	7.10	8.4	4.2	8	20
4.50	5.50		1FT5064-0AK2	14.1	17.2	7.3	20	20
6.50	8		1FT5066-0AK2	21.7	26.7	10.7	30	30
10.0	12		1FT5072-0AK2	33.3	40	21	40	40
14.0	18		1FT5074-0AK2	46.7	60	37	70	70
18.0	22		1FT5076-0AK2	60.1	73.5	53	70	70 [1]

Table 3.1 c Assignment: 1FT5 servomotor – SIMODRIVE 610 PWM converter

1) With the assigned power modules, the motor cannot be fully utilized according to ΔT = 60 K or 100K winding temperature rise.

Locked-rotor torque ΔT = 60 K **M_0** [Nm]	**Locked-rotor torque** ΔT = 100 K **M_0** [Nm]	**Rated speed** **n_N** [RPM]	**AC servomotor** **1FT5** Order No.	**Phase current at M_0** ΔT = 60 K **I_0** [A]	**Phase current at M_0** ΔT = 100 K **I_0** [A]	**Moment of inertia** **J_{mot}** [10^{-4} kgm²]	**PWM converter power mod.** for M_0 (60 K) **I_N (60 K)** [A]	**PWM converter power mod.** for M_0 (100 K) **I_N (100 K)** [A]
Short-version servomotors								
3	3.5	2000	1FT5070-0AC2	3.7	4.3	5.1	8	8
4.5	5.5		1FT5071-0AC2	5.4	6.6	11	8	8
7	9		1FT5073-0AC2	8.5	10.9	18	8 [1]	20
10	13		1FT5100-0AC2	12.4	16.1	52	20	20
15	19		1FT5101-0AC2	17.4	22.0	72	20	20 [1]
19	25		1FT5103-0AC2	22.8	30.0	102	30	30
3	3.5	3000	1FT5070-0AF2	4.7	5.5	5.1	8	8
4.5	5.5		1FT5071-0AF2	7.0	8.3	11	8	8 [1]
7	9		1FT5073-0AF2	11.1	14.3	18	20	20
10	13		1FT5100-0AF2	15.4	20.0	52	20	20
15	19		1FT5101-0AF2	22.9	29.0	72	30	30
19	25		1FT5103-0AF2	29.3	38.5	102	30	40 [1]
3	3.5	4000	1FT5070-0AG2	6.9	8.0	5.1	8	8
4.5	5.5		1FT5071-0AG2	10.5	12.8	11	20	20
7	9		1FT5073-0AG2	16.3	21.0	18	20	20
10	13		1FT5100-0AG2	23.1	30.0	52	30	30
15	19		1FT5101-0AG2	33.6	42.5	72	40	40 [1]
19	25		1FT5103-0AG2	41.4	54.5	102	40 [1]	70
3	3.5	6000	1FT5070-0AK2	10.4	12.1	5.1	20	20
4.5	5.5		1FT5071-0AK2	18.0	22.0	11	20	20
7	9		1FT5073-0AK2	24.1	31.0	18	30	30 [1]
10	13		1FT5100-0AK2	28.8	37.7	52	30	40
15	19		1FT5101-0AK2	41.8	53.0	72	40 [1]	70

Table 3.2 Assignment: 1FT5 servomotor – SIMODRIVE 610 PWM converter

1) With the assigned power modules, the motor cannot be fully utilized according to ΔT = 60 K or 100K winding temperature rise.

3.3 Servomotor connection

Before carrying out connecting or installation work, the unit must be disconnected from the supply. As a result of the permanent magnetization, voltage is present at the motor and tacho generator terminals when the rotor is turning.

The servomotors should only be operated with the assigned SIMODRIVE 610 transistor PWM converters. The 1FT5 servomotors and SIMODRIVE 610 PWM converters can be connected according to DIN VDE 0113 and VDA [1]. The connecting points fulfill the requirements for cross-sections according to DIN VDE 0113 Part 1/02.86 Tables BI and BII for standard motors with cable installation in cable ducts (4) and +40°C ambient temperature.

The servomotors must be mounted so that adequate heat dissipation through radiation and natural convection is ensured. In the case of separately cooled motors, the heated discharged air must not be drawn in again.

High temperatures can build up on the servomotor surfaces and protection against accidental contact must be provided as required.

For motor versions with a fitted key in the motor shaft, the motor is factory balanced with the key.

Please pay attention to the data specified on the rating plate, use connecting cables with adequate conductor cross-section (refer to Tables 5.1 and 5.2 of the Technical description SIMODRIVE 610, Order No. 6ZB5420-0AC02-0BA0) and provide strain relief.

Only one connector is used for connecting up the power connections of the 1FT5 020 to 046 servomotors. The feeder cross-section for the motors is 1.5 mm^2. The restrictions regarding the conductor cross-section, as described on pages 3/7 of the Technical description of the 6RA29 infeed/regenerative feedback unit, Order No. 6ZB5 420-0AB02-0BA0, are not relevant for these motors. The motors are provided with connectors as standard. Terminal box connection is not possible.

The mating connector allows power connections with cross-sections according to DIN VDE 0113 and VDA. The power cables have crimped plug connections which provide the following advantages:

- reproducible connections when using the correct tool
- the cables are not thermally stressed
- no cold solder joints
- high reliability

The power cables (including brake feeder cable) are available as motor connection accessories, either available by the meter, or as precut cables with connectors on the motor side. The brake feeder cables are screened. The screen should be attached to protective ground.

Terminal boxes Type	Cable gland 1)	Max. possible cross-section [mm²]	Studs	Dimension w/out gland length x width [mm]
gk030	Pg21	4 x 4	Lamp-wire connection	82 x 66
gk130	Pg29	4 x 10	M4	110 x 105
gk230	Pg29	4 x 16	M5	122 x 117
gk330	Pg36	4 x 35	M5	152 x 132
gk420	Pg 36/42	4 x 50	M10	162 x 162

Table 3.3.1 Terminal boxes

Connector types		Dimension dia. x length w/out cable gland	Max. possible cross-section at the power contacts	Electrical data	
Order No.	Plug size	[mm]	[mm²]	Current [A]	Voltage [V]
6FC9348-7DA	1	25 x 59	1.5	11.3	380
-7DN	1	25 x 59	2.5	15.7	600
-7DC	2	55 x 76	2.5	15.7	600
-7DD	2	55 x 76	4	20.9	600
-7DE	2	55 x 76	6	27	600
-7DG	2	55 x 76	10	37.4	600
-7DH	3	63 x 111	16	50.5	600
-7DK	3	63 x 111	25	66.1	600
-7DL	3	63 x 111	35	81.6	600
-7DM	3	63 x 111	50	99.2	600

Table 3.3.2 Connector types

1) Pg-Verschraubung ausgelegt auf SIMODRIVE-Leitungszubehör.

Servo-motor	Rated for ΔT = 100K			Relevant power module		Feeder cable cross-section dimensiond for power module rating	Term-inal box	Connec-tor type
1FT5	I_0 [A]	I_{0rms} [A]	Feeder cross-section 1) 2) [mm²]	$\hat{I}_N$ [A]	I_{Nrms} [A]	I_{Nrms} 2) [mm²]	gk 10)	6FC9 348- 10)
062-0AC2	3.3	2.7	1.5	8	6.5	1.5	030	7DA
-0AF2	4.1	3.3	1.5	8	6.5	1.5	030	7DA
-0AG2	6.4	5.2	1.5	8	6.5	1.5	030	7DA
-0AK2	8.4	6.9	1.5	28 3)	6.5	1.5	030	7DA
064-0AC2	7.1	5.8	1.5	8	6.5	1.5	030	7DA
-0AF2	8.8	7.2	1.5	8 3)	6.5	1.5	030	7DA
-0AG2	13.1	10.7	1.5	20	16.3	4 8)	030	7DA
-0AK2	17.2	14.0	2.5	20	16.3	4	030	7DC
066-0AC2	10.3	8.4	1.5	20	16.3	4 8)	030	7DA
-0AF2	12.7	10.4	1.5	20	16.3	4 8)	030	7DA
-0AG2	19.5	15.9	4	20	16.3	4	030	7DD
-0AK2	26.7	21.8	6	30	24.7	6	130	7DE
072-0AC2	14.8	12.1	2.5	20	16.3	4 7)	130	7DC
-0AF2	18.8	15.4	2.5	20	16.3	4 7)	130	7DC
-0AG2	28.0	22.9	6	30	24.5	6	130	7DE
-0AK2	26.7	32.7	10	40	32.7	10	130	7DG
074-0AC2	22.0	18.0	4	20 3)	16.3	4	130	7DD
-0AF2	29.0	23.7	6	30	24.5	6	130	7DE
-0AG2	42.0	34.3	10	40 3)	32.7	10	130	7DG
-0AK2	60.0	49.0	16	40	57.2	25 5) 7)	230	7DH
076-0AC2	27.5	22.5	6	30	24.5	6	130	7DE
-0AF2	35.0	28.6	10	40	32.7	10	130	7DG
-0AG2	51.5	42.0	16	70	57.2	25 7)	230	7DH
-0AK2	73.5	60.0	25	70 3)	57.2	25	330	7DK
102-0AA2	20.0	16.3	4	20	16.3	4	230	7DD
-0AC2	39.0	31.8	10	40	32.7	10	230	7DG
-0AF2	50.0	40.8	16	70	57.2	25 5) 7)	330	7DH
-0AG2	75.0	61.2	25	70 3)	57.2	25	330	7DK
104-0AA2	27.5	22.5	6	30	24.5	6	230	7DE
-0AC2	52.5	42.9	16	70	57.2	25 5) 7)	230	7DH
-0AF2	68.5	55.9	25	70	57.2	25	330	7DK
106-0AA2	33.0	26.9	6	40	32.7	10 7)	230	7DE
-0AC2	65.5	53.5	25	70	57.2	25	330	7DK
-0AF2	82.0	67.0	35	90	73.5	35	330	7DL
108-0AA2	40.5	33.1	10	40 3)	32.7	10	230	7DG
-0AC2	75.0	61.2	25	70 3)	57.2	25	330	7DK
-0AF2	97.0	79.2	35	90 3)	73.5	35	430	7DL
132-0AA2	48.5	39.6	16	70	57.2	25 7)	430	7DH
-0AC2	85.5	69.8	35	90	73.5	35	430	7DL
-0AF2	106.0	86.5	50	120	98.0	50	430	7DM
134-0AA2	58.0	47.4	16	70	57.2	25 7)	430	7DH
-0AC2	100.0	81.6	35	120	98.0	50	430	7DM
136-0AA2	67.5	55.1	25	70	57.2	25	430	7DK
138-0AA2	81.0	66.1	25	90	73.5	35 7)	430	7DK

Table 3.3.3 Terminal boxes and power connectors for standard motors

Servo-motor	Rated for ΔT = 100K			Relevant power module		Feeder cable cross-section dimension for power module rating	Terminal box	Connector type
1FT5	I_0 [A]	I_{0rms} [A]	Feeder cross-section 1) 2) [mm²]	I_N [A]	I_{Nrms} [A]	I_{Nrms} 2) [mm²]	gk 10)	6FC9 348- 10)
070-0AC2	4.3	3.5	1.5	8	6.5	1.5	030	7DA
-0AF2	5.5	4.5	1.5	8	6.5	1.5	030	7DA
-0AG2	8.0	6.5	1.5	8	6.5	1.5	030	7DA
0AK2	12.1	9.9	1.5	20	16.3	4 8)	030	7DA
071-0AC2	6.6	5.4	1.5	8	6.5	1.5	030	7DA
-0AF2	8.6	7.0	1.5	8 3)	6.5	1.5	030	7DA
-0AG2	12.8	10.5	1.5	20	16.3	4 8)	030	7DA
0AK2	22.0	18.0	4	20	16.3	4	030	7DD
073-0AC2	10.9	8.9	1.5	20	16.3	4 7)	030	7DC
-0AF2	14.3	11.7	2.5	20	16.3	4 7)	030	7DC
-0AG2	21.0	17.1	4	20	16.3	4	030	7DD
0AK2	31.0	25.3	6	30 3)	24.5	6	130	7DE
100-0AC2	16.1	13.1	2.5	20	16.3	4 7)	130	7DC
-0AF2	20.0	16.3	4	20	16.3	4	130	7DD
-0AG2	20.0	24.5	6	30	24.5	6	130	7DE
0AK2	37.5	30.6	10	40	32.7	10	130	7DG
101-0AC2	22.0	18.0	4	20 3)	16.3	4	130	7DD
-0AF2	29.0	23.7	6	30	24.5	6	130	7DE
-0AG2	42.5	34.5	10	40 3)	32.7	10	130	7DG
0AK2	53.0	43.3	16	70	57.2	25 7) 5)	230	7DH
103-0AC2	30.0	24.5	6	30	24.5	6	130	7DE
-0AF2	38.5	31.4	10	40	32.7	10	130	7DG
-0AG2	54.5	44.5	16	70	57.2	25 7) 5)	230	7DH

Table 3.3.4 Terminal boxes and power connectors for short-version motors

General:

1) The cross-sections specified in Tables 5.5 and 5.6 refer to motor utilization in accordance to a winding temperature rise of ΔT = 100 K. The feeder cross-sections may be smaller with motor utilization according to ΔT = 60 K winding temperature rise and lower rating power modules.

2) The feeder cross-sections are rated according to: DIN VDE 0113, Part 1 v. 2/86; Table B II for standard motors, installation in cable duct (4); ambient temperature +40 °C (Table B I).

3) The motor cannot be fully utilized in accordance with a winding temperature rise of ΔT = 100 K with specified power module.

Motors with terminal boxes:

4) The GK030 terminal box cannot be used for connecting up 6 mm² cross-sections. Protective equipment, adapted to the 4 mm² cable cross-section to be connected, should be provided.

5) The GK230 terminal box should be equipped with an adaptor for Pg gland 36.

6) Cable cross-section cannot be connected. It is recommended that two smaller core cross-sections are connected in parallel.

Motors with connectors:

7) A larger connector type within the same connector-size range must be provided for the corresponding feeder cross-sections. This must be taken into account when ordering.

8) Cable cross-section cannot be connected in the same connector-size range. Protective equipment appropriately rated for use with the max. possible feeder cross-section must be provided.

9) Connector size is dimensioned for the conductor sizes required by the power module. A connector cannot be used when fully utilizing the motor. In this case a terminal box must be used.

10) Standard complement as shown in Table 3.3 for terminal boxes or Table 3.4 for connectors.

Accessory power cables		Order No.		
No. of cores × cross-section [mm²]	Cable diameter [mm]	Cable without connector (avail. by meter)	Cable with connector (pre-cut)	Connector (motor end)
4 x 1.5 + 2 x 1.5	10.5 + 1.5	6FC9348-6DA	6FC9348-4A□	6FC9348-7DA
4 x 2.5 + 2 x 1.5	13.5 (16.8) + 1.5	-6DB	-4N□	-7DN

□ = Cable length

B = 5 m	F = 25 m
C = 10 m	J = 30 m
D = 15 m	G = 50 m
E = 18 m	Z = as required (specify length)
H = 20 m	

The power cables, including brake supply cable for connecting the 1FT5 servomotor to the SIMODRIVE 610 converter are pre-cut cables.
The pre-cut cables consist of:

- Connector with PG gland (VITON sealing material)
- Crimped cable connections
- Power cable adapted to SIMODRIVE requirements

Sensor cables

Terminals 9 and 10 at the motor terminal block are wired through to pins 9 and 10 on the rotor position transmitter connector as standard, thus allowing signals to be evaluated in the converter.

A connecting cable (sensor cable) must be provided between the servomotor and the converter, for the control function. The rotor position transmitter and tacho signals are fed via this cable. This connection must be made by the customer. In order to prevent interference, the rotor position transmitter cables must be routed separately from the power cables.

Accessory sensor cable and connectors	Order No.
Sensor cable 12 x 0.23 mm² screened, sold by meter w/out connector	6FC9348-6AA
Sensor cable 12 x 0.23 mm² screened, with connectors (Converter: 6FC9348-7AB; Motor: 6FC9348-7AC)	6FC9348-5A □
Sensor cable 12 x 0.23 mm² screened with connectors (Converter: 6FC9348-7AB; motor: 6FC9348-7AD)	6FC9348-5B□
Mating connector for 1FT5 AC servomotors [2] (from 10/87)	6FC9348-7AD
Adaptor cable for different connector types for motor mating connector 6FC9348-7AC / cable with connector 6FC9348-7AD	6FC9348-5XA
Adaptor lead for different connector types for motor mating connector 6FC9348-7AD / cable with connector 6FC9348-7AC	6FC9348-5XC
Connector for SIMODRIVE 610 PWM converter [3]	6FC9348-7AB

□ = Cable length

B = 5 m
C = 10 m
D = 15 m
E = 18 m
H = 20 m
F = 25 m
J = 30 m
G = 50 m
Z = as required (length must be specified)

2) Not included with 1FT5 servomotors (only included with code H40)
3) Included with the SIMODRIVE 610 PWM converter.

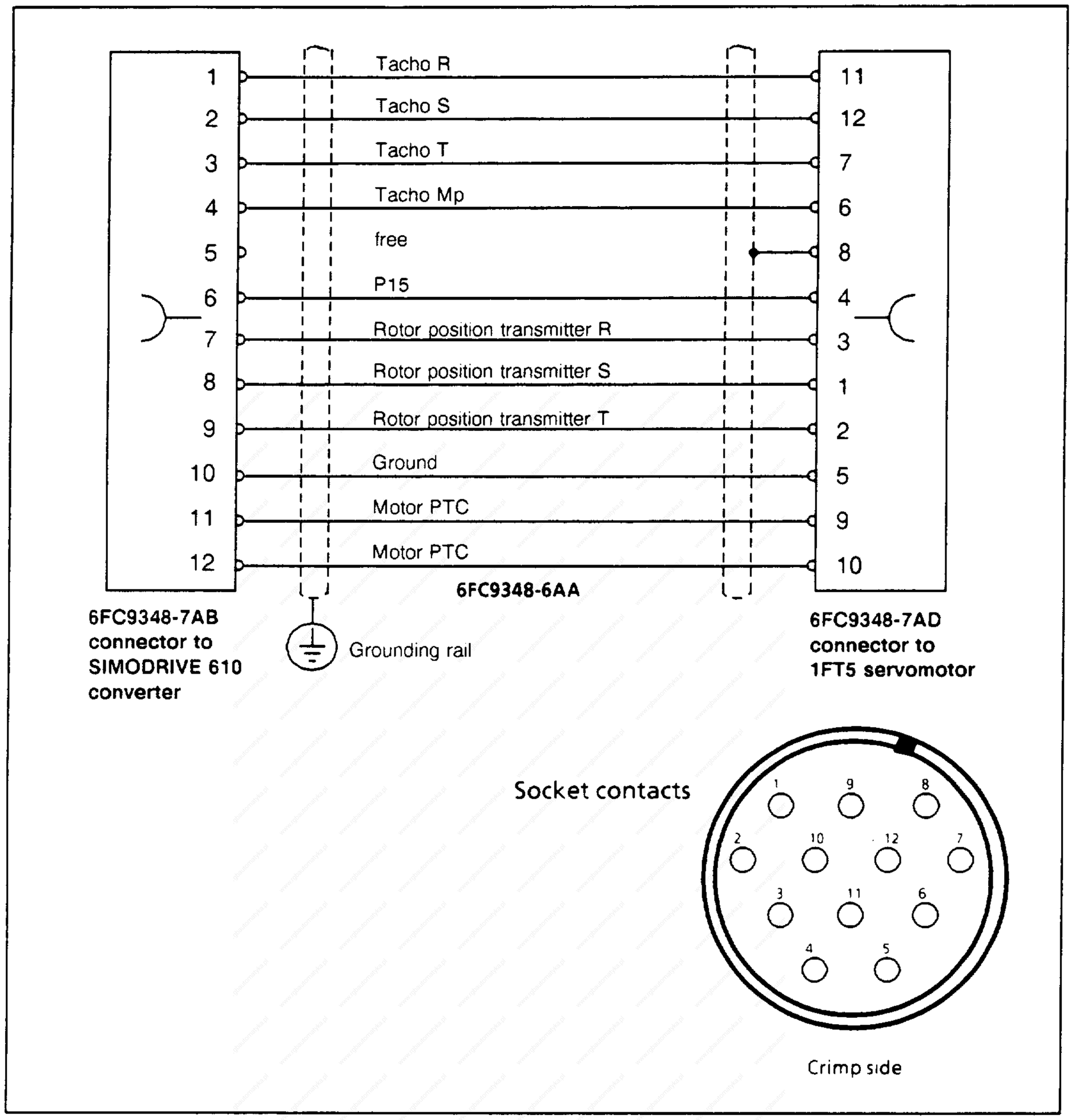
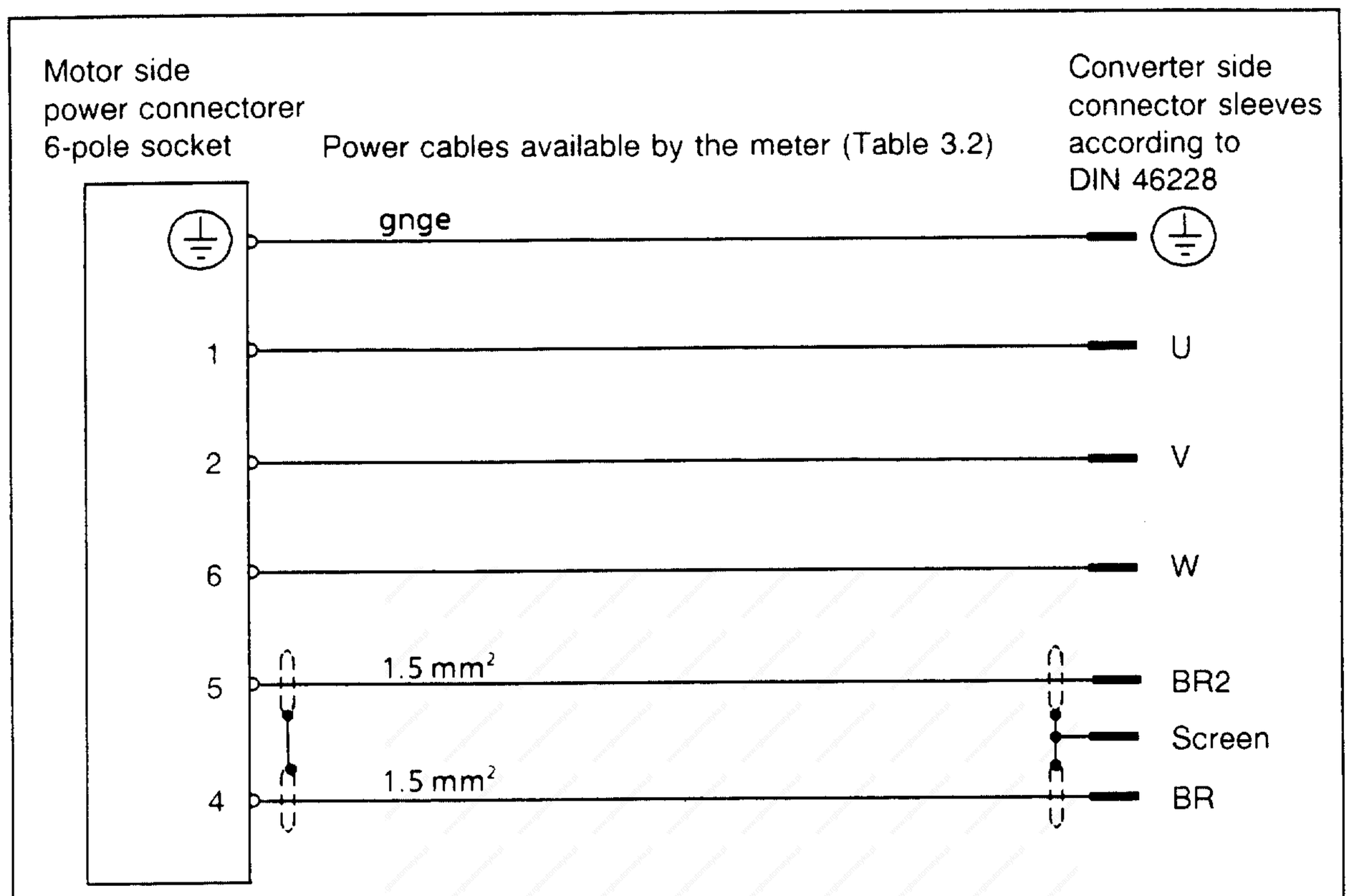
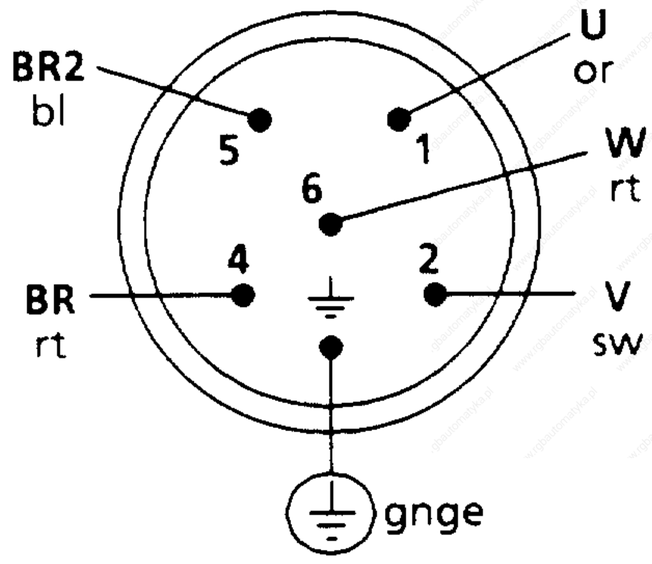


Fig. 3.1 Sensor lead: Connections between the PWM converter and the servomotor

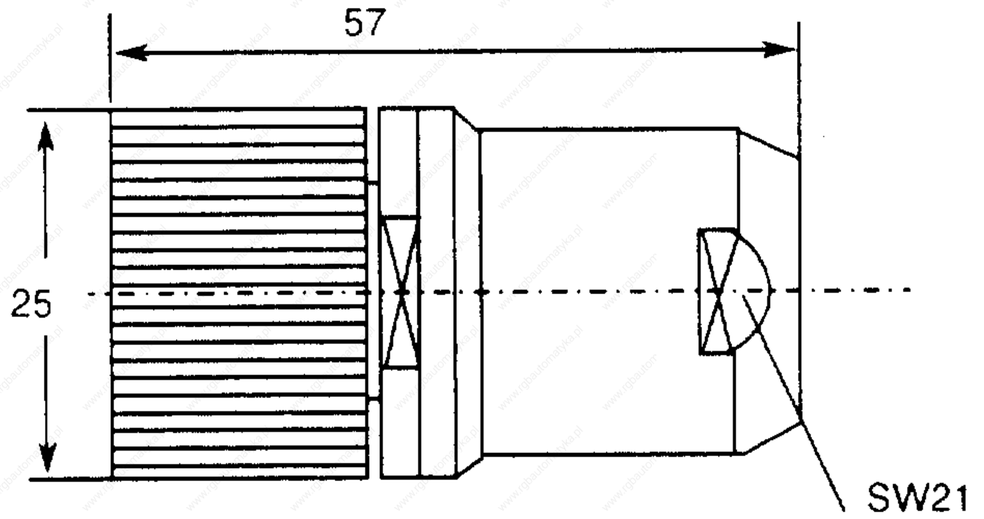
The sensor cable in Fig. 3.2 can be obtained as pre-cut cable with Order No. 6FC9348-5B□ (refer to table on the previous page).



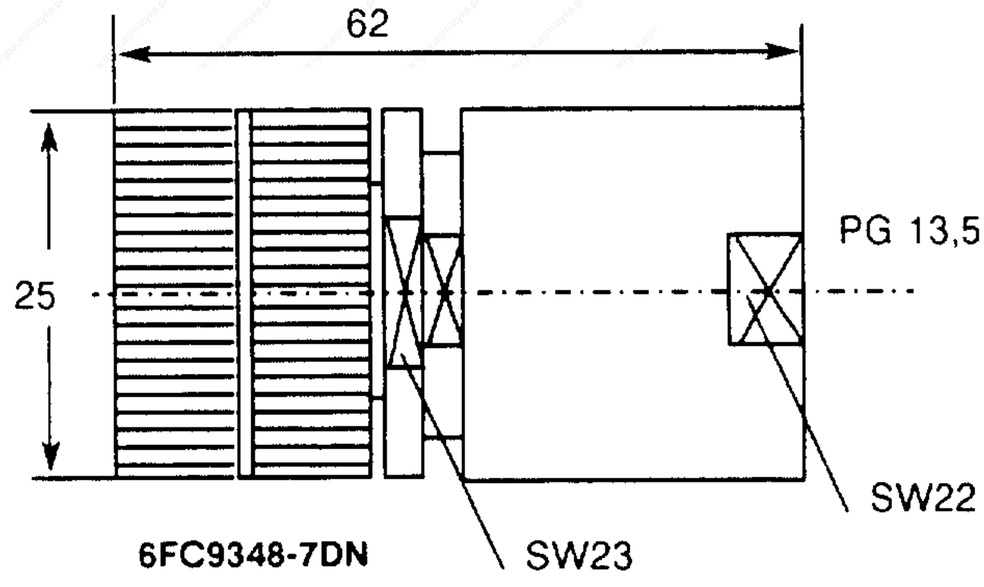
1FT5 02□ to 1FT5 04□ servomotors



Mating connector 6FC9 348-7DA and 6FC9 348-7DN



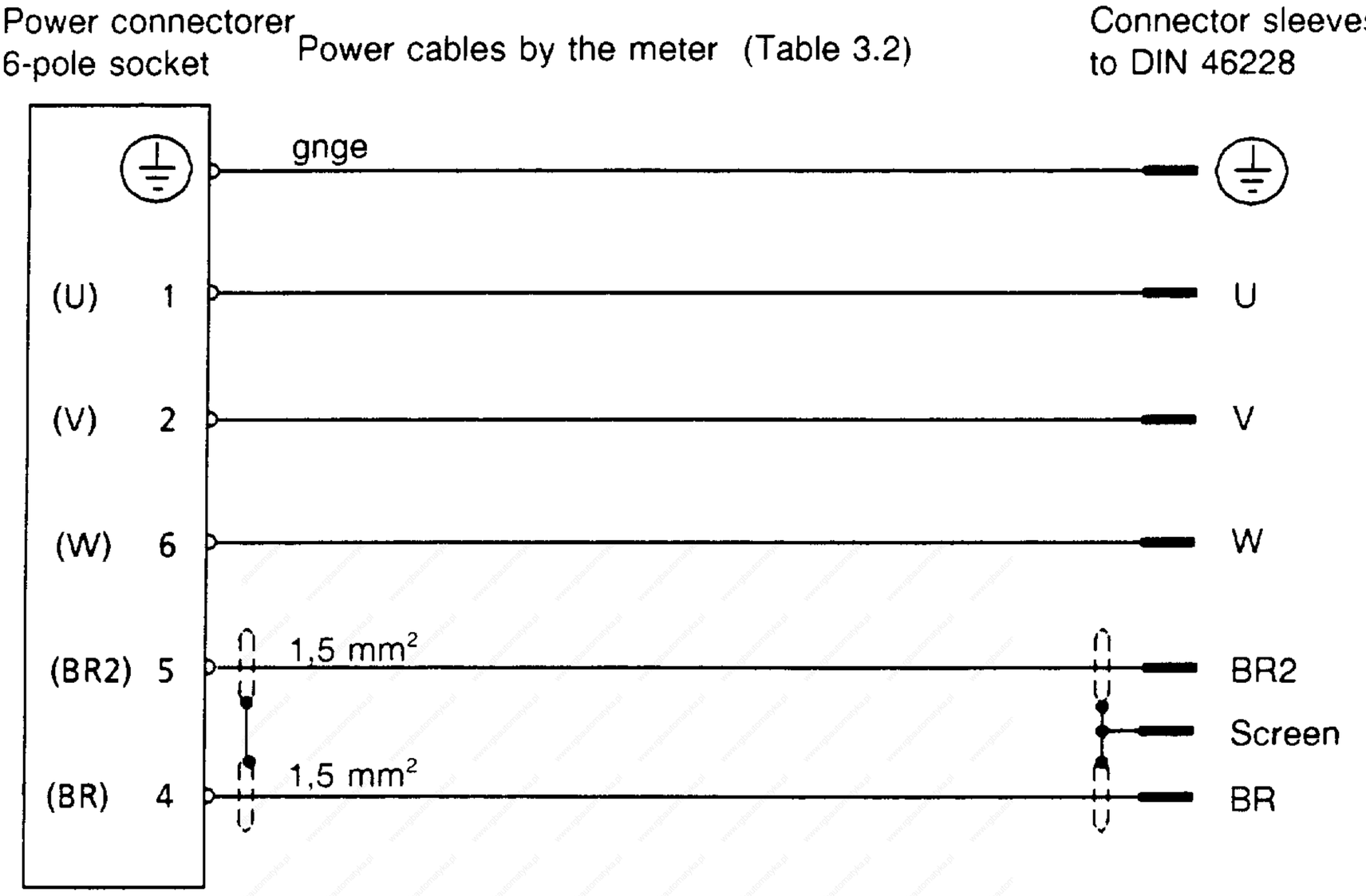
6FC9348-7DA (old type)



6FC9348-7DN

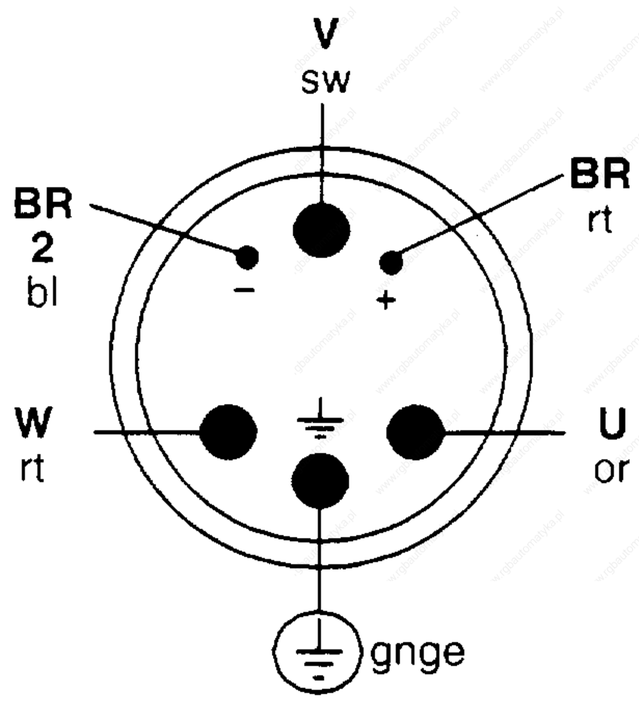
View of the connector pins of the motor flange outlet .

Fig. 3.2 Power connector connection on the 1FT5 02 to 1FT5 04 servomotors

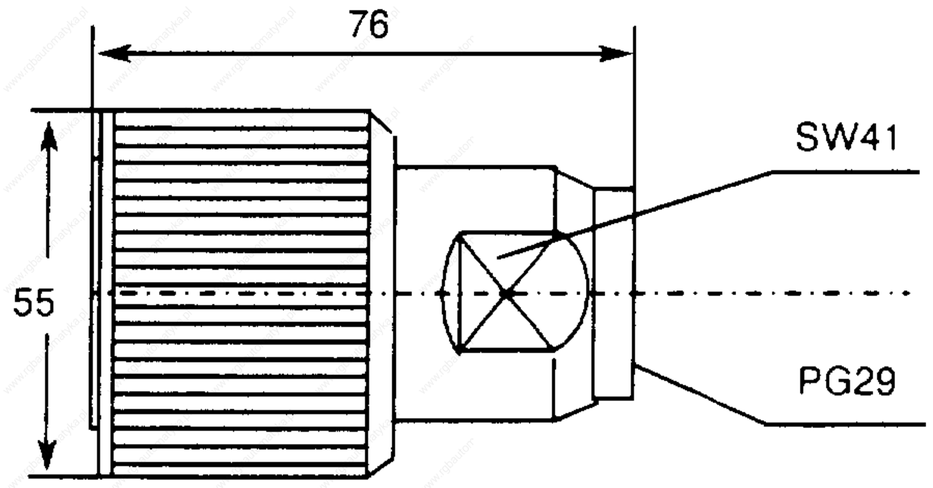


Pre-cut power cables 6FC9 348-4□□ (Table 3.2)

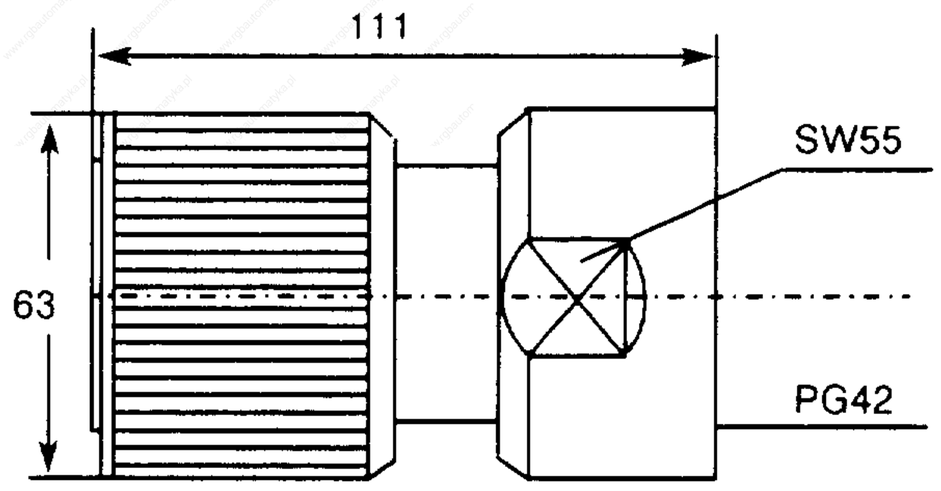
1FT5 06□ to 1FT5 13□ servomotors



6FC9 348-7DC to 6FC9 348-7DM mating connector



6FC9 348-7DC, 7DD, 7DE, 7DG



6FC9 348-7DH, 7DK, 7DL,

View of the connector pins of the motor flange outlet.

Fig. 3.3 Power connector connection on 1FT5 06 to 1FT5 13 servomotors

3.4 Technical data

Servo-motor 1FT5	Rated speed n_N [RPM]	Locked-rotor torque M_0 ΔT = 60K [Nm]	Locked-rotor torque M_0 ΔT = 100K [Nm]	Phase current at M_0 I_0 ΔT = 60K [A]	Phase current at M_0 I_0 ΔT = 100K [A]	Moment of inertia J_{mot} [10^{-4} kgm^2]	Rated torque (S1) ΔT = 100K M_N [Nm]	Max. speed n_{max} [RPM]	Peak current I_{max} [A]	Time constants elec. T_{el} [ms]	Time constants therm. T_{th} [min]	Torque constants K_T [Nm/A]	Voltage constants (Phase-to-phase) K_E [V/1000 RPM]	Winding resistance R [Ω]	Winding inductance L_A [mH]	Weight without hold. brake m [kg]
020-0AC2	2000	0.15	0.17	0.43	0.49	0.13	0.17	8500	2.0	0.53	30	0.35	35	52.4	26.9	1.0
-0AF2	3000			0.56	0.63			11000	2.6			0.27	27	29.2	16.0	
-0AH2	4500			0.63	0.71			11000	3.3			0.24	24	23.0	12.5	
-0AK2	6000			0.68	0.77			11000	3.5			0.22	22.5	21.6	11.1	
022-0AC2	2000	0.27	0.33	0.69	0.85	0.22	0.33	7600	4.3	0.78	35	0.39	39.5	21.8	17.4	1.5
-0AF2	3000			0.9	1.1			9800	5.6			0.30	30.5	13.3	10.4	
-0AH2	4500			1.05	1.3			11000	7.0			0.26	27	10.7	8.3	
-0AK2	6000			1.2	1.45			11000	9.0			0.23	24	8.1	6.2	
024-0AC2	2000	0.4	0.5	0.91	1.1	0.3	0.5	6600	6.0	0.86	40	0.44	45.5	20.9	15.3	2.0
-0AF2	3000			1.2	1.5		0.5	8500	8.0			0.34	35	10.3	9.1	
-0AH2	4500			1.45	1.8		0.47	10300	11.0			0.28	29	6.8	6.2	
-0AK2	6000			1.6	2.0		0.4	11000	14.0			0.25	26	5.4	4.9	
032-0AC2	2000	0.25	0.3	0.6	0.71	0.37	0.3	6450	5.0	0.9	35	0.42	46.5	29.4	25.0	1.7
-0AF2	3000			0.75	0.95		0.3	8450	6.5			0.32	35.5	16.0	14.7	
-0AH2	4500			0.95	1.2		0.28	10000	8.0			0.26	29	11.4	9.8	
-0AK2	6000			1.1	1.4		0.24	10000	9.5			0.22	25	7.9	7.3	
034-0AC2	2000	0.5	0.6	1.0	1.2	0.62	0.6	5350	9.0	1.3	40	0.51	56	13.7	18.3	2.4
-0AF2	3000			1.3	1.6		0.6	7000	11.0			0.39	43	8.3	10.8	
-0AH2	4500			1.7	2.0		0.55	9100	14.0			0.30	33	5.1	6.4	
-0AK2	6000			2.1	2.5		0.5	10000	17.0			0.24	27	3.3	4.3	
036-0AC2	2000	0.75	0.9	1.4	1.7	0.93	0.9	5100	12.0	1.5	45	0.53	59	8.6	13.7	3.1
-0AF2	3000			1.8	2.2		0.9	6600	15.0			0.41	45.5	5.2	8.2	
-0AH2	4500			2.4	2.9		0.8	8700	20.0			0.31	34.5	3.2	4.6	
-0AK2	6000			3.1	3.8		0.6	10000	26.0			0.24	27	2.1	2.8	

Table 3.4 a Technical data: Servomotors, standard version

Servo-motor 1FT5	Rated speed n_N [RPM]	Locked-rotor torque M_0 $\Delta T = 60K$ [Nm]	Locked-rotor torque M_0 $\Delta T = 100K$ [Nm]	Phase current at M_0 I_0 $\Delta T = 60K$ [A]	Phase current at M_0 I_0 $\Delta T = 100K$ [A]	Moment of inertia J_{mot} [10^{-4} kgm^2]	Rated torque (S1) $\Delta T = 100K$ M_N [Nm]	Max. speed n_{max} [RPM]	Peak current I_{max} [A]	Time constants elec. T_{el} [ms]	Time constants therm. T_{th} [min]	Torque constants K_T [Nm/A]	Voltage constants (Phase-to-phase) K_E [V/1000 RPM]	Winding resistance R [Ω]	Winding inductance L_A [mH]	Weight without hold. brake m [kg]
042-0AC2	2000	0.6	0.75	1.1	1.3	1.2	0.75	4600	8.5	1.7	40	0.57	65	11.8	20.3	3.2
-0AF2	3000			1.4	1.8		0.75	6300	11.5			0.42	47.5	6.7	10.7	
-0AH2	4500			1.9	2.4		0.75	8000	15.0			0.32	36.5	3.5	6.4	
-0AK2	6000			2.5	3.1		0.65	8000	19.0			0.24	27.5	2.0	3.7	
044-0AC2	2000	1.2	1.5	1.9	2.4	2.3	1.5	4150	15.0	2.8	45	0.62	72	4.6	12.4	4.2
-0AF2	3000			2.7	3.4		1.5	5900	21.0			0.44	51	2.3	6.2	
-0AH2	4500			3.5	4.4		1.4	7700	28.0			0.34	39	1.3	3.7	
-0AK2	6000			4.8	6.0		1.2	8000	37.0			0.25	29	0.7	2.0	
046-0AC2	2000	2.0	2.5	2.5	3.2	4.5	2.5	3350	24.5	3.8	50	0.79	89	2.4	9.5	6.4
-0AF2	3000			3.6	4.5		2.4	4850	35.0			0.55	62	1.2	4.6	
-0AH2	4500			5.4	6.8		2.1	7200	52.5			0.37	41.5	0.55	2.1	
-0AK2	6000			6.7	8.3		1.8	8000	64.0			0.30	34.5	0.38	1.4	

Table 3.4 b Technical data: Servomotors, standard version

Servo-motor 1FT5	Rated speed n_N [RPM]	Locked-rotor torque M_0 $\Delta T = 60K$ [Nm]	Locked-rotor torque M_0 $\Delta T = 100K$ [Nm]	Phase current at M_0 I_0 $\Delta T = 60K$ [A]	Phase current at M_0 I_0 $\Delta T = 100K$ [A]	Moment of inertia J_{mot} [10^{-4} kgm²]	Rated torque (S1) $\Delta T = 100K$ M_N [Nm]	Max. speed n_{max} [RPM]	Peak current I_{max} [A]	Time constants elec. T_{el} [ms]	Time constants therm. T_{th} [min]	Torque constants K_T [Nm/A]	Voltage constants (phase to phase) K_E [V/1000 RPM]	Winding resistance R [Ω]	Winding inductance L_A [mH]	Weight without hold. brake m [kg]
062-0AC2	2000	2.2	2.6	2.8	3.3	4.2	2.3	3200	13	5.6	25	0.78	93	3.75	21.1	6.5
-0AF2	3000			3.5	4.1		2.2	4000	16			0.63	75	2.41	13.7	
-0AG2	4000			5.4	6.4		2.2	6000	26			0.41	50	1.01	5.9	
-0AK2	6000			7.1	8.4		2.1	8000	34			0.31	37	0.61	3.5	
064-0AC2	2000	4.5	5.5	5.8	7.1	7.3	4.4	3200	28	8.0	30	0.78	93	1.22	9.8	8.5
-0AF2	3000			7.2	8.8		4	4000	35			0.63	75	0.77	6.2	
-0AG2	4000			10.7	13.1		3.7	6000	52			0.41	50	0.35	2.8	
-0AK2	6000			14.1	17.2		3	8000	69			0.31	37	0.21	1.6	
066-0AC2	2000	6.5	8	8.4	10.3	10.7	6.6	3200	41	9.2	35	0.78	93	0.69	6.4	10.5
-0AF2	3000			10.3	12.7		5.6	4000	51			0.63	75	0.44	4.2	
-0AG2	4000			15.8	19.5		5.5	6000	78			0.41	50	0.19	1.8	
-0AK2	6000			21.7	26.7		4.2	8000	107			0.31	37	0.11	0.97	
072-0AC2	2000	10	12	12.3	14.8	21	9.5	3150	59	9	35	0.81	95	0.635	5.8	13.5
-0AF2	3000			15.7	18.8		8	3900	75			0.64	76	0.403	3.7	
-0AG2	4000			23.3	28		7.5	6000	112			0.43	50	0.182	1.7	
-0AK2	6000			33.3	40		5	7000	160			0.3	36	0.093	0.82	
074-0AC2	2000	14	18	17.1	22	37	14	3100	89	11	40	0.81	95	0.326	3.6	17.2
-0AF2	3000			22.6	29		12.5	4000	116			0.63	75	0.19	2.1	
-0AG2	4000			32.7	42		11	6000	168			0.43	50	0.09	0.99	
-0AK2	6000			46.7	60		7	7000	240			0.3	36	0.045	0.51	
076-0AC2	2000	18	22	22.5	27.5	53	17	3150	110	12	45	0.81	95	0.2	2.4	21
-0AF2	3000			28.6	35		16.5	4000	140			0.63	75	0.124	1.5	
-0AG2	4000			42.1	51.5		13	6000	206			0.43	50	0.055	0.66	
-0AK2	6000			60.1	73.5		4	7000	295			0.3	35	0.03	0.36	
102-0AA2	1200	27	33	16.4	20	131	31	1600	81	16	45	1.65	187	0.335	5.2	31
-0AC2	2000			31.9	39		29	3050	158			0.85	97	0.088	1.37	
-0AF2	3000			40.9	50		25	4000	203			0.66	75	0.054	0.83	
-0AG2	4000			61.4	75		10	6000	305			0.44	50	0.027	0.37	

Table 3.4 c Technical data: Servomotors, standard version

Servo-motor 1FT5	Rated speed n_N [RPM]	Locked-rotor torque M_0 ΔT = 60K [Nm]	Locked-rotor torque M_0 ΔT = 100K [Nm]	Phase current at M_0 I_0 ΔT = 60K [A]	Phase current at M_0 I_0 ΔT = 100K [A]	Moment of inertia J_{mot} [10^{-4} kgm^2]	Rated torque (S1) ΔT = 100K M_N [Nm]	Max. speed n_{max} [RPM]	Peak current I_{max} [A]	Time constants elec. T_{el} [ms]	Time constants therm. T_{th} [min]	Torque constants K_T [Nm/A]	Voltage constants (phase to phase) K_E [V/1000 RPM]	Winding resistance R [Ω]	Winding inductance L_A [mH]	Weight without hold. brake m [kg]
104-0AA2	1200	37	45	22.6	27.5	182	40	1600	110	18	50	1.65	187	0.2	3.5	39
-0AC2	2000			43.2	52.5		35	3050	210			0.86	98	0.056	0.96	
-0AF2	3000			56.3	68.5		29	4000	274			0.66	75	0.033	0.57	
106-0AA2	1200	45	55	27	33	242	42	1550	132	19	50	1.67	190	0.15	2.9	45
-0AC2	2000			53.6	65.5		39	3150	262			0.84	95	0.038	0.72	
-0AF2	3000			67.1	82		28	3900	328			0.67	76	0.025	0.46	
108-0AA2	1200	55	68	32.8	40.5	298	55	1550	162	18	55	1.68	192	0.122	2.2	51
-0AC2	2000			60.7	75		43	2850	300			0.91	104	0.035	0.65	
-0AF2	3000			78.5	97		20	3750	390			0.7	80	0.022	0.42	
132-0AA2	1200	60	75	38.8	48.5	454	55	1700	194	22	80	1.55	175	0.087	2	75
-0AC2	2000			68.4	85.5		40	2950	342			0.89	101	0.03	0.67	
-0AF2	3000			84.8	106		12	3000	424			0.71	80	0.019	0.42	
134-0AA2	1200	75	90	48.3	58	579	65	1650	232	27	85	1.56	178	0.064	1.6	95
-0AC2	2000			83.3	100		50	2900	400			0.9	103	0.021	0.53	
136-0AA2	1200	85	105	54.6	67.5	705	80	1650	270	27	90	1.56	177	0.046	1.2	120
138-0AA2	1200	105	130	65.4	81	893	100	1600	324	29	100	1.61	183	0.038	1.1	140

Table 3.4 d Technical data: Servomotors, satndard version

Servo-motor	Rated speed	Locked-rotor troque M_0		Phase current at M_0 I_0		Moment of inertia	Rated torque (S1) $\Delta T = 100K$	Max. speed	Peak current	Time constants		Torque constants	Voltage constants (phase-to-phase)	Wind-ing resist-ance	Wind-ing induct-ance	Weight without hold. brake
										elec.	therm.					
1FT5	n_N	$\Delta T = 60K$	$\Delta T = 100K$	$\Delta T = 60K$	$\Delta T = 100K$	J_{mot}	M_N	n_{max}	I_{max}	T_{el}	T_{th}	K_T	K_E	R	L_A	m
	[RPM]	[Nm]	[Nm]	[A]	[A]	[10^{-4} kgm^2]	[Nm]	[RPM]	[A]	[ms]	[min]	[Nm/A]	[V/1000 RPM]	[Ω]	[mH]	[kg]
070-0AC	2000	3	3.5	3.7	4.3	5.1	3	3050	17	5.3	25	0.82	95	4.3	22.4	7.5
-0AF	3000			4.7	5.5		2.6	4000	22			0.62	72	2.52	13.1	
-0AG	4000			6.9	8		2.5	5750	32			0.44	52	1.42	7.3	
-0AK	6000			10.4	12.1		2	7000	48			0.29	35	0.68	3.4	
071-0AC	2000	4.5	5.5	5.4	6.6	11	4.8	3050	26	6.5	30	0.83	98	1.91	12.4	8.5
-0AF	3000			7	8.6		4.1	3900	34			0.64	76	1.1	7.1	
-0AG	4000			10.5	12.8		4	6000	51			0.43	50	0.49	3.2	
-0AK	6000			18	22		3.3	7000	88			0.25	30	0.16	1.1	
073-0AC	2000	7	9	8.5	10.9	18	7.8	3050	44	8.5	35	0.83	98	0.86	7.3	10.5
-0AF	3000			11.1	14.3		7	4000	57			0.63	75	0.5	4.3	
-0AG	4000			16.3	21		6.5	6000	84			0.43	50	0.22	1.9	
-0AK	6000			24.1	31		5	7000	125			0.29	34	0.11	0.94	
100-0AC	2000	10	13	12.4	16.1	52	12	3150	65	11	35	0.81	94	0.365	4	15.5
-0AF	3000			15.4	20		11	4000	80			0.65	75	0.23	2.5	
-0AG	4000			23.1	30		9.5	5850	120			0.44	51	0.115	1.3	
-0AK	6000			28.8	37.5		4	6000	150			0.35	41	0.07	0.77	
101-0AC	2000	15	19	17.4	22	72	17	2900	90	13	40	0.88	102	0.205	2.6	19
-0AF	3000			22.9	29		15	4000	116			0.65	75	0.115	1.5	
-0AG	4000			33.6	42.5		12	5750	170			0.45	52	0.055	0.72	
-0AK	6000			41.8	53		4	6000	212			0.36	42	0.037	0.48	
103-0AC	2000	19	25	22.8	30	102	22.5	3100	120	15	45	0.84	96	0.12	1.8	22
-0AF	3000			29.3	38.5		20	4050	155			0.65	74	0.07	1	
-0AG	4000			41.4	54.5		12	5750	220			0.46	52	0.036	0.54	

Table 3.4 e Technical data: Servomotors, short version

Tacho system

Technical data	1FU1030	1FU1050
Speed (mechanical critical speed)	8000 RPM	8000 RPM
Number of poles	2p = 6	2p = 6
Magnetic material	SmCo	AlNiCo
Peak value of phase voltage at rated speed	1)	40 V
Voltage tolerance	±5 %	±5 %
Voltage adjustment 2)	±20 %	±20 %
Ripple factor	≤ 1.0 %	≤ 0.5 %
Linearity error	≤ 0.2 %	≤ 0.2 %
Reversing error	≤ 0.2 %	≤ 0.2 %

Table 3.5 Technical data: Tacho system

Product designation:

1	F	U	1	0	.	0	–	6	A	.

Frame size

3 = for servomotors 1FT502. to 1FT504.
5 = for servomotors 1FT506. to 1FT513.

Number of poles

Cable length

Armature circuit

A = 1200 RPM (not with 1FU1030)
C = 2000 RPM
F = 3000 RPM
G = 4000 RPM (not with 1FU1030)
H = 4500 RPM (only with 1FU1030)
K = 6000 RPM

1) Armature circuit C / F: 11 V / 16,5 V; armature circuit H / K: 30 V / 40 V
2) In the SIMODRIVE 610 PWM converter

3.5 Torque-speed characteristics

The torque-power characteristics for S1 and S3 operation as a function of speed, are illustrated on the subsequent pages. The torque-speed characteristics are valid for a motor utilization according to $\Delta T = 100K$ winding temperature rise.
When designing the drive using these characteristics it should be ensured that the PWM converter can supply the corresponding motor rated current (e.g. design for S3 operation) as continuous current.
Four times the motor rated torque should not be exceeded for acceleration.
The supply voltage of the 6RA29 infeed/regenerative feedback unit is 3-phase 50 Hz/60 Hz 380 to 415 V AC. This results in a 300V DC linkvoltage, depending on the supply voltage tolerance. The resulting torque limiting characteristic can lead to a reduction of the accelerating torque during acceleration with increasing speed.

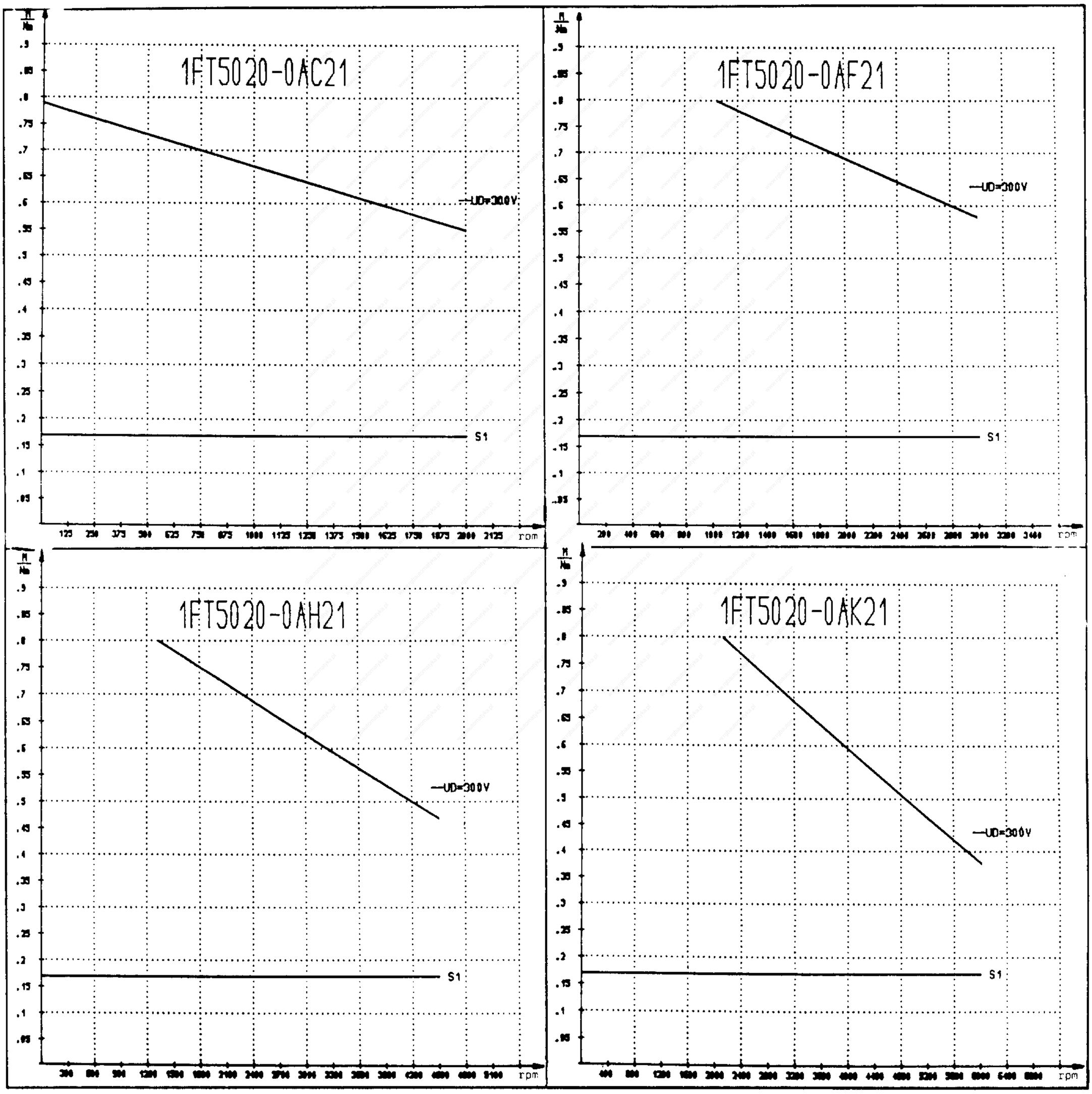


Fig. 3.4 Torque-speed characteristics: Servomotor 1FT5020-0A□2 Winding temperature rise $\Delta T = 100K$

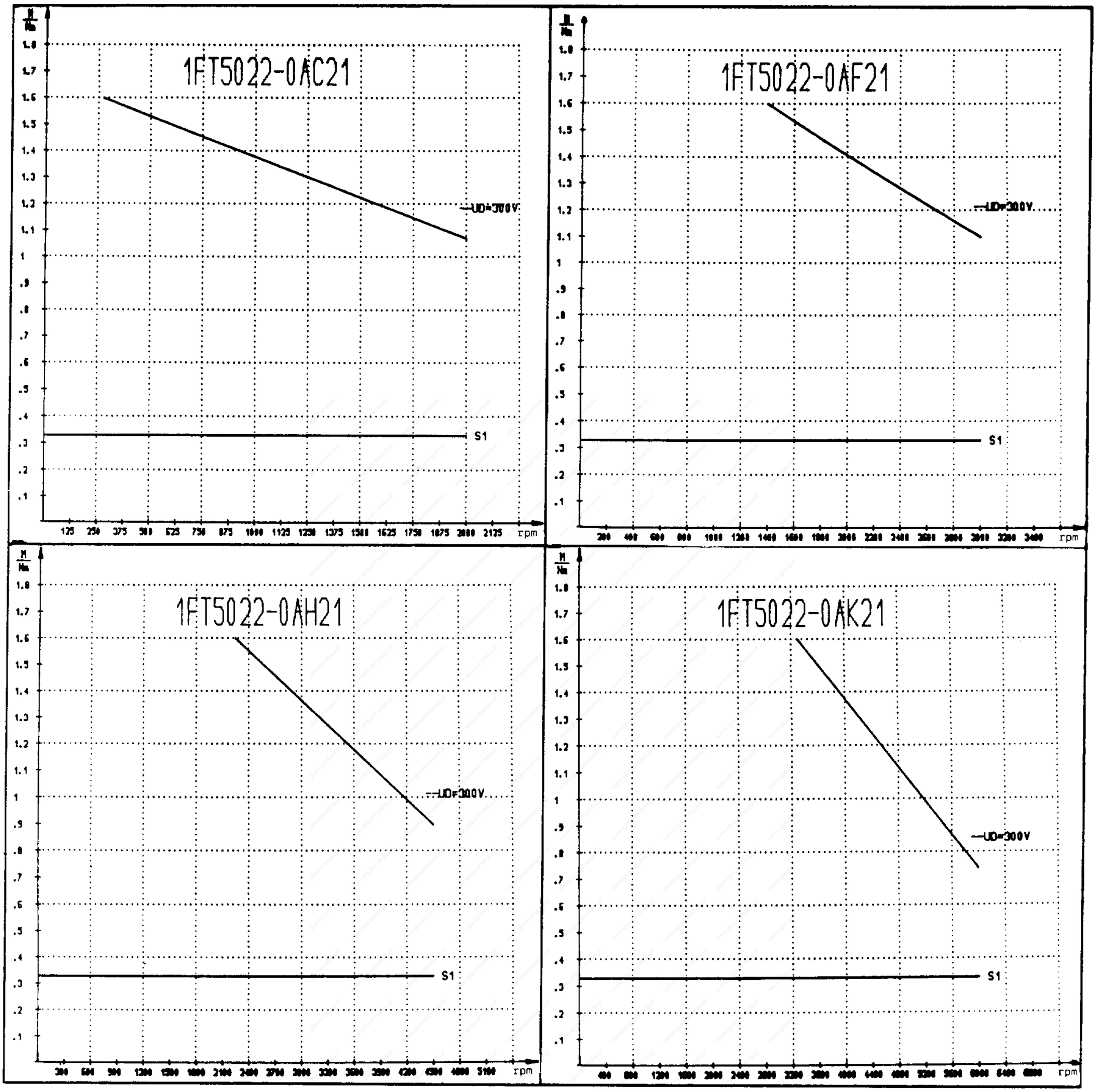


Fig. 3.5 Torque-speed characteristics: Servomotor 1FT5022-0A□2 Winding temperature rise $\Delta T = 100K$

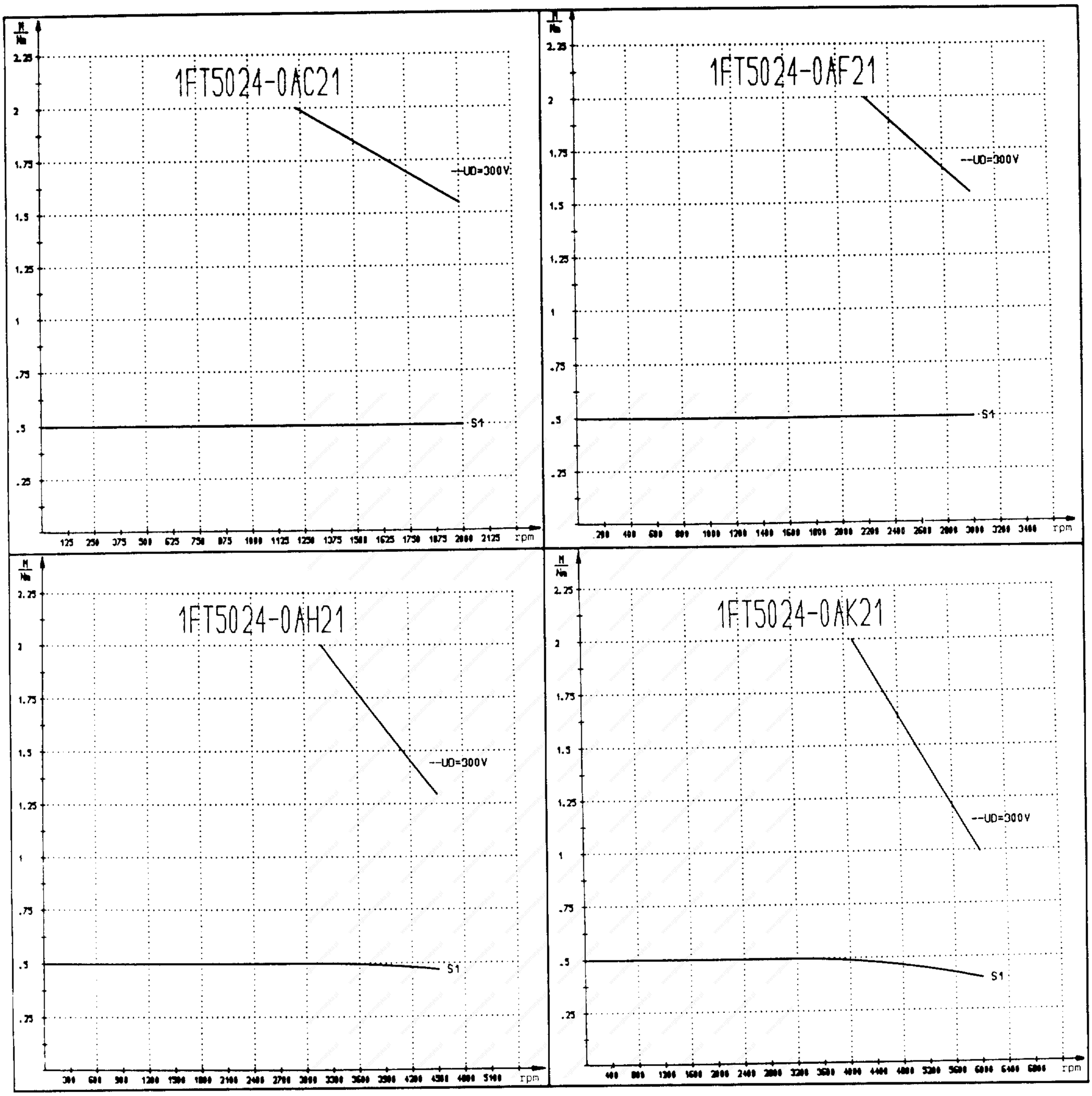


Fig. 3.6 Torque-speed characteristics: Servomotor 1FT5024-0A□2 Winding temperature rise ΔT = 100K

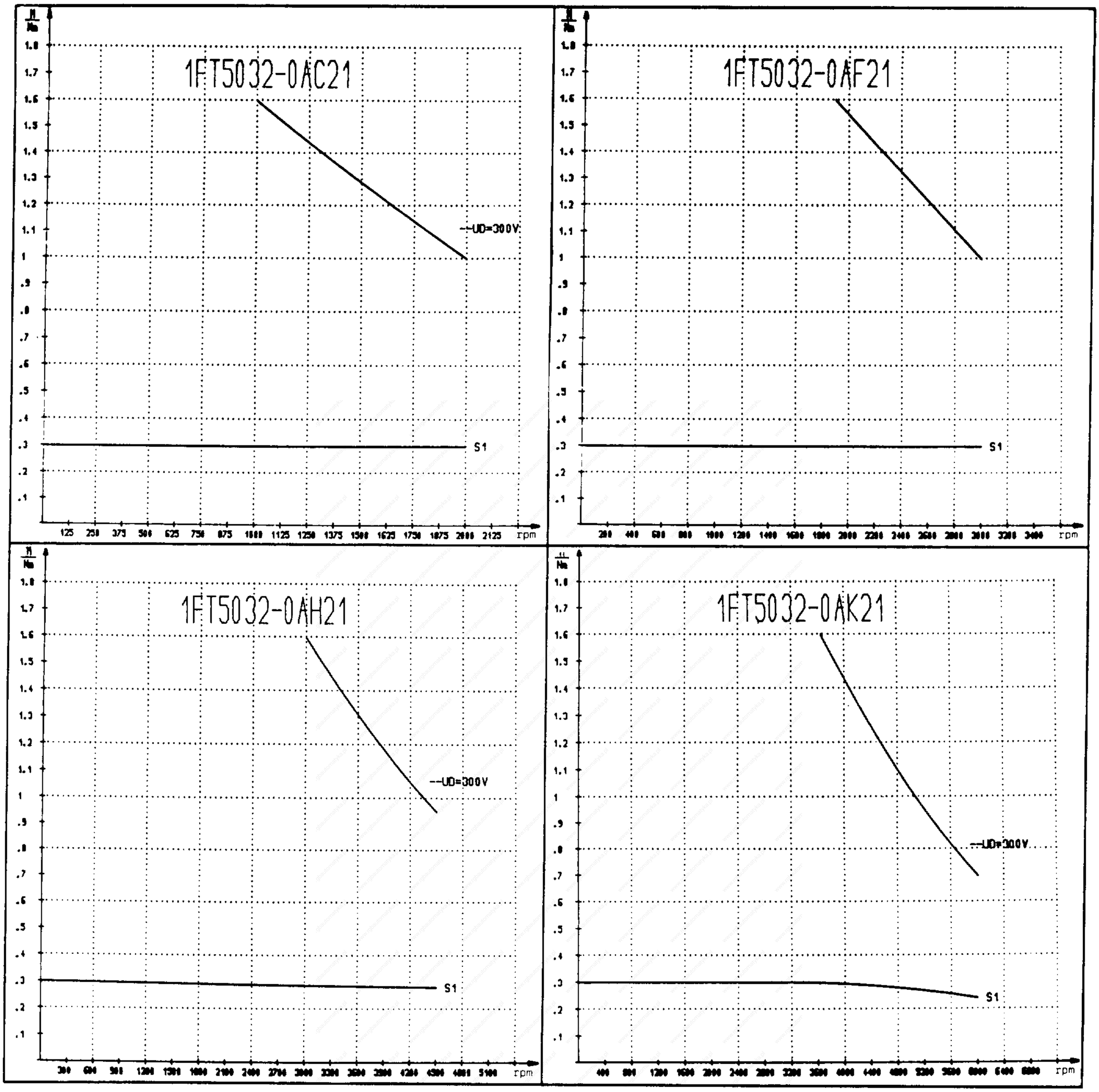


Fig. 3.7 Torque-speed characteristics: Servomotor 1FT5032-0A☐ 2 Winding temperature rise ΔT = 100K

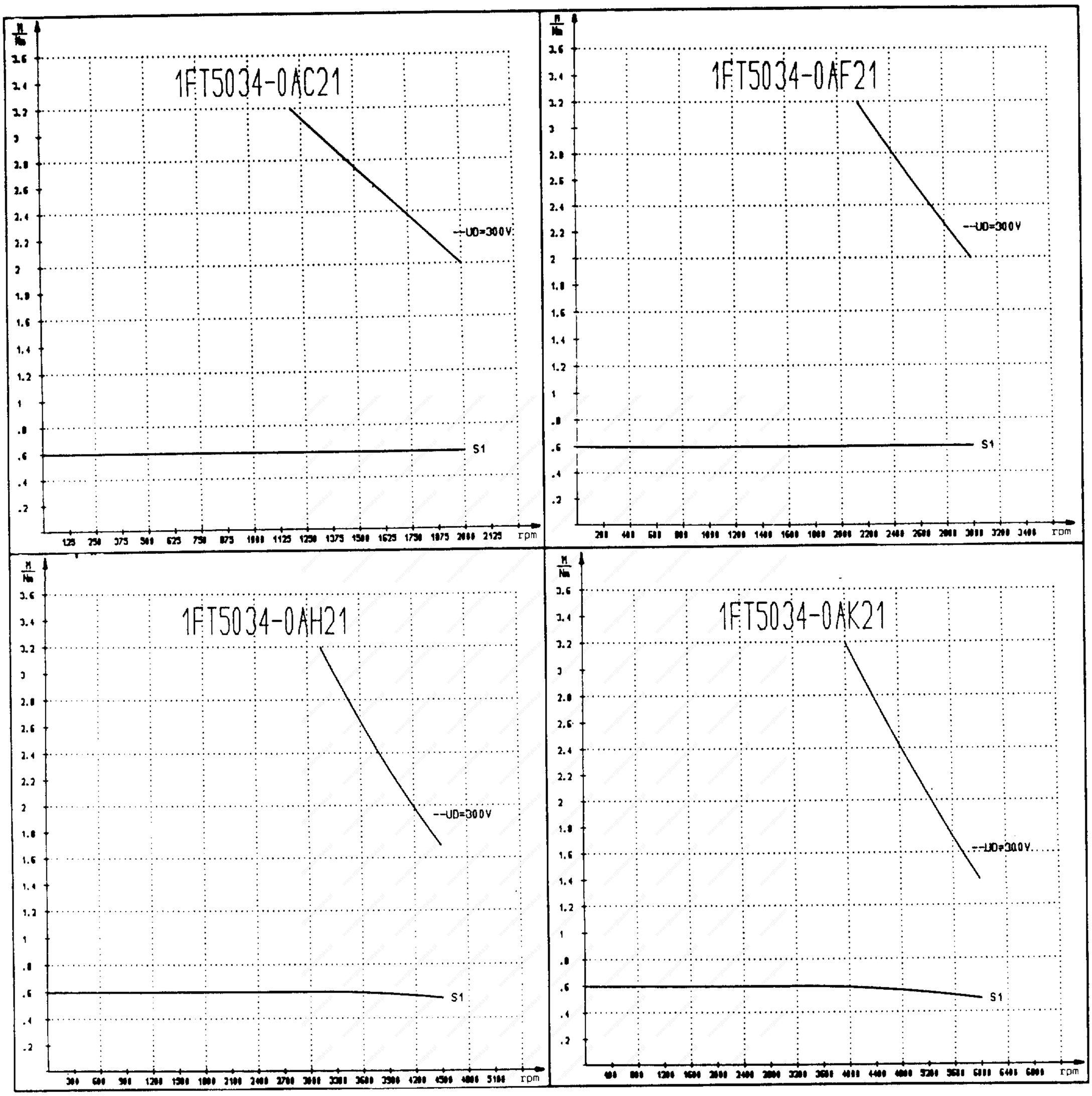


Fig. 3.8 Torque-speed charactersitics: Servomotor 1FT5034-0A□2 *Winding temperature rise ΔT = 100K*

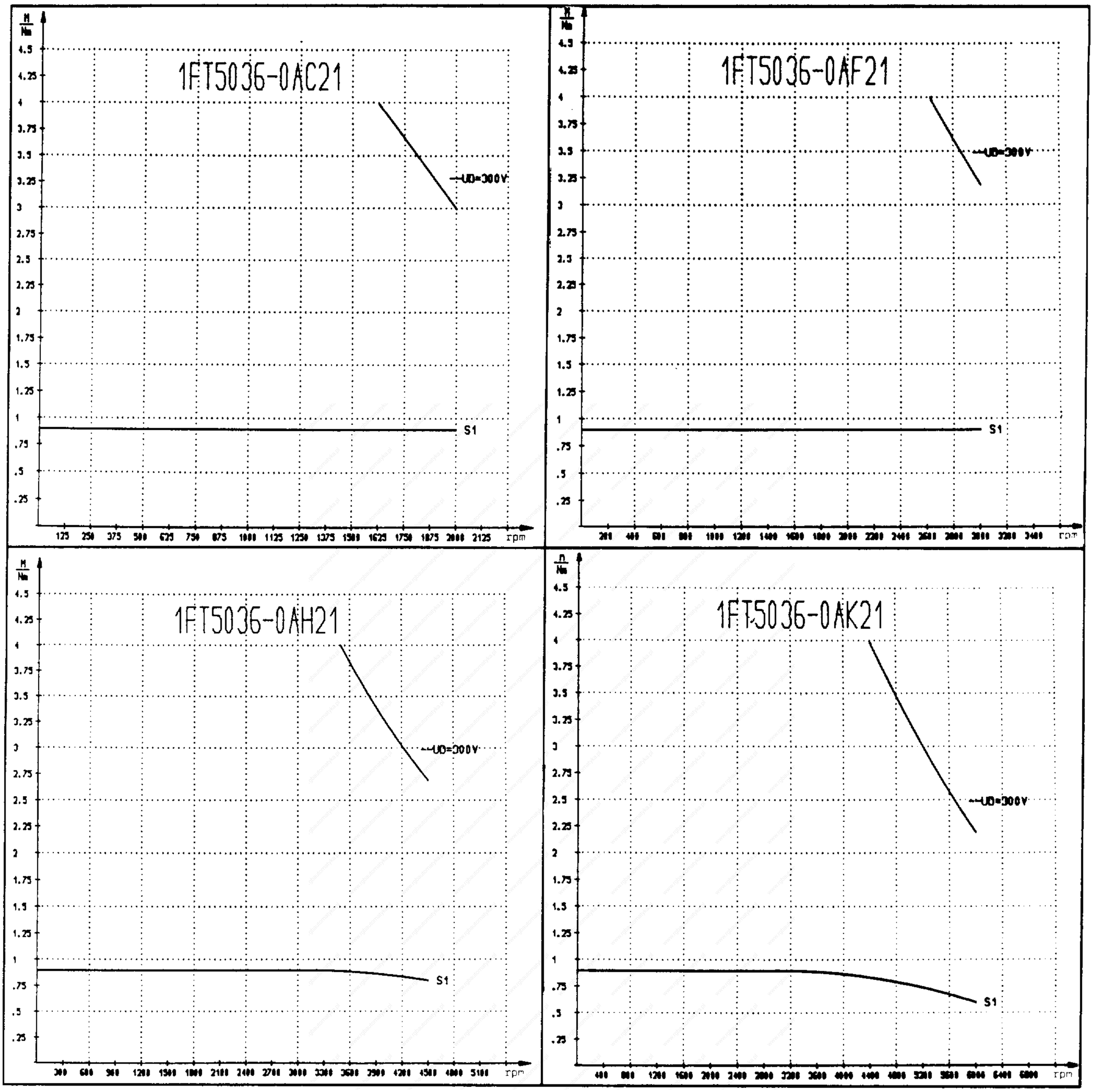


Fig. 3.9 Torque-speed characteristics: Servomotor 1FT5036-0A□2 Winding temperature rise ΔT = 100K

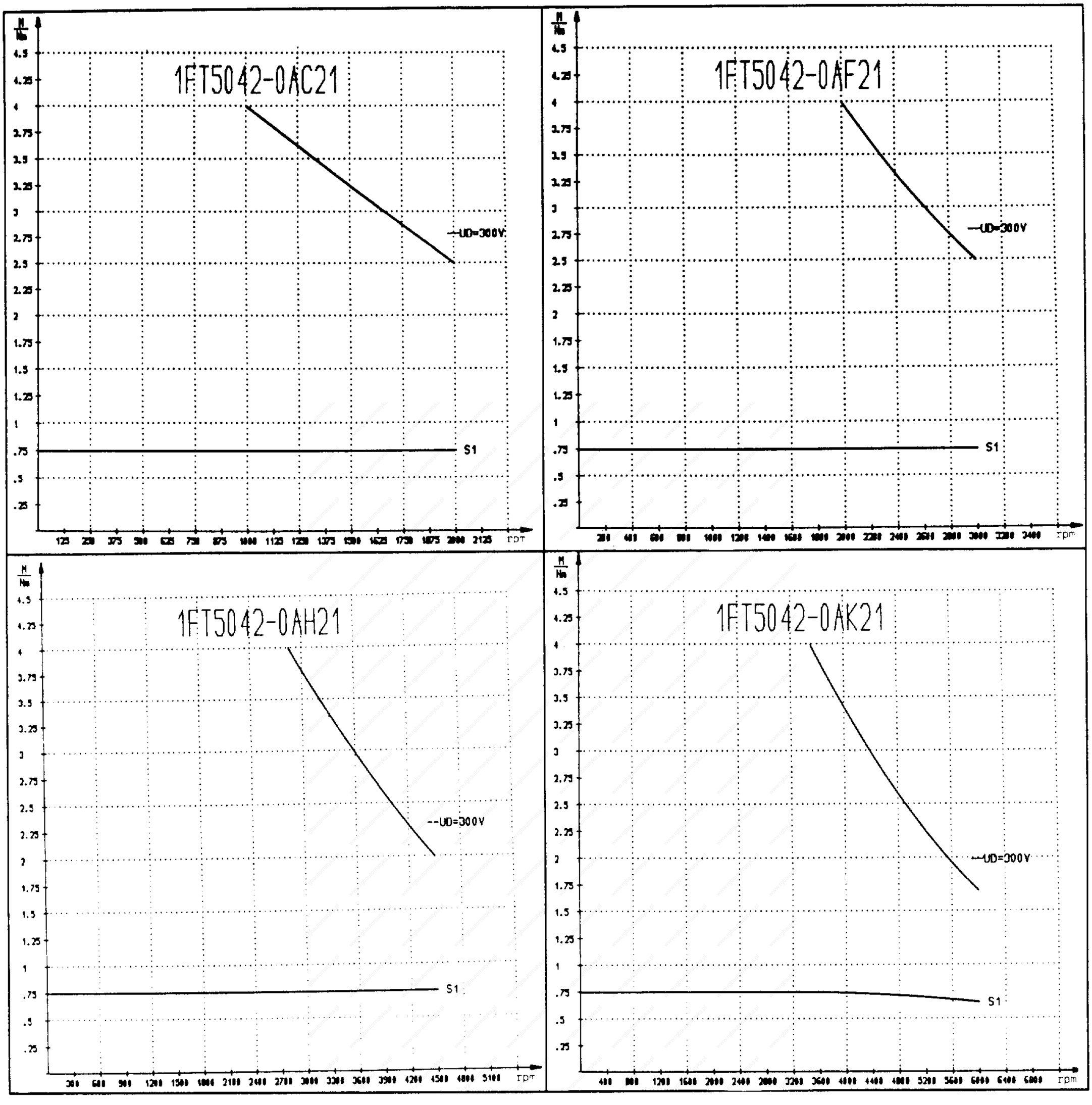


Fig. 3.10 Torque-speed characteristics: Servomotor 1FT5042-0A□2 Winding temperature rise ΔT = 100K

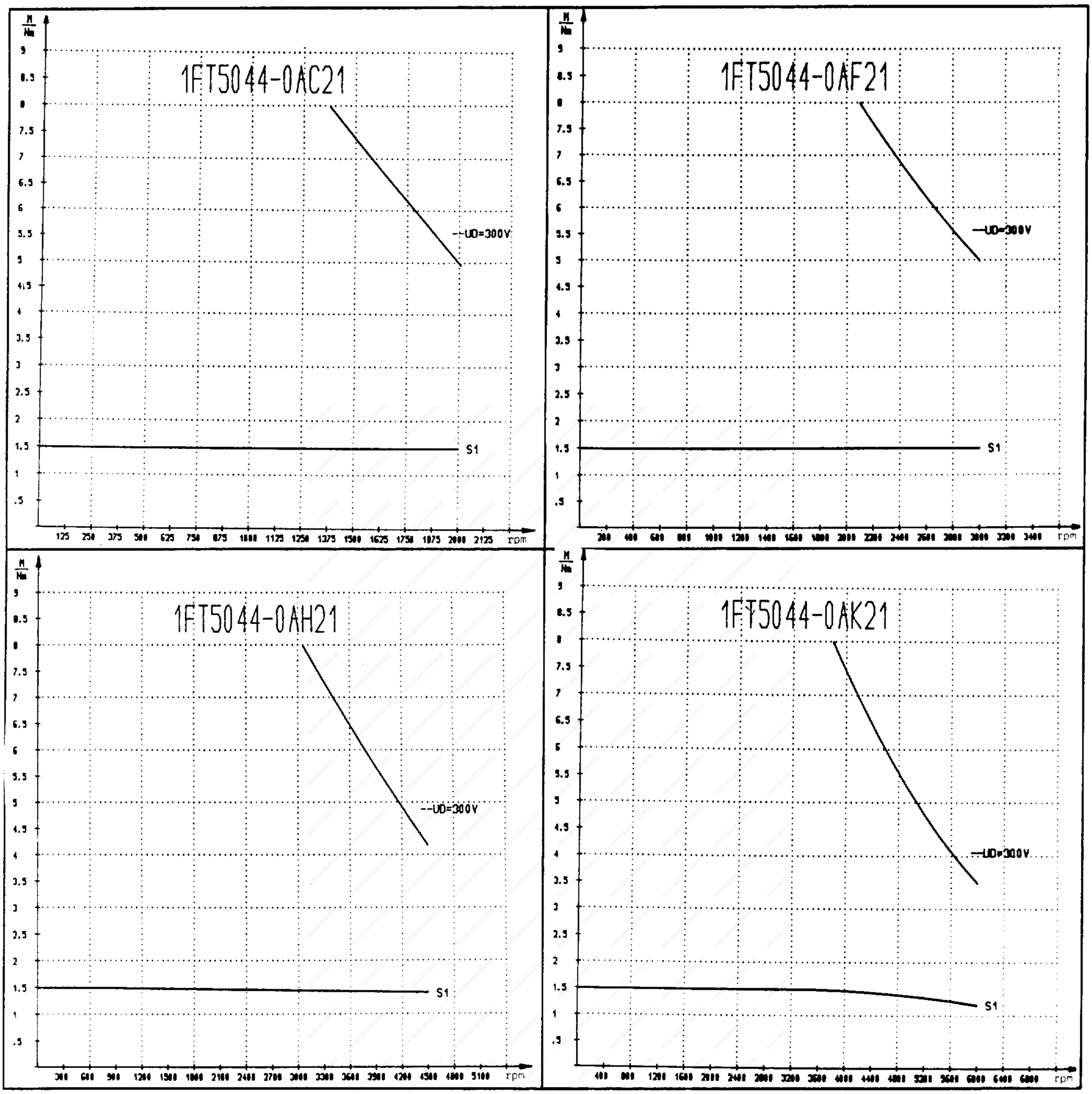


Fig. 3.11 Torque-speed characteristics: Servomotor 1FT5044-0A□2 Winding temperature rise $\Delta T = 100K$

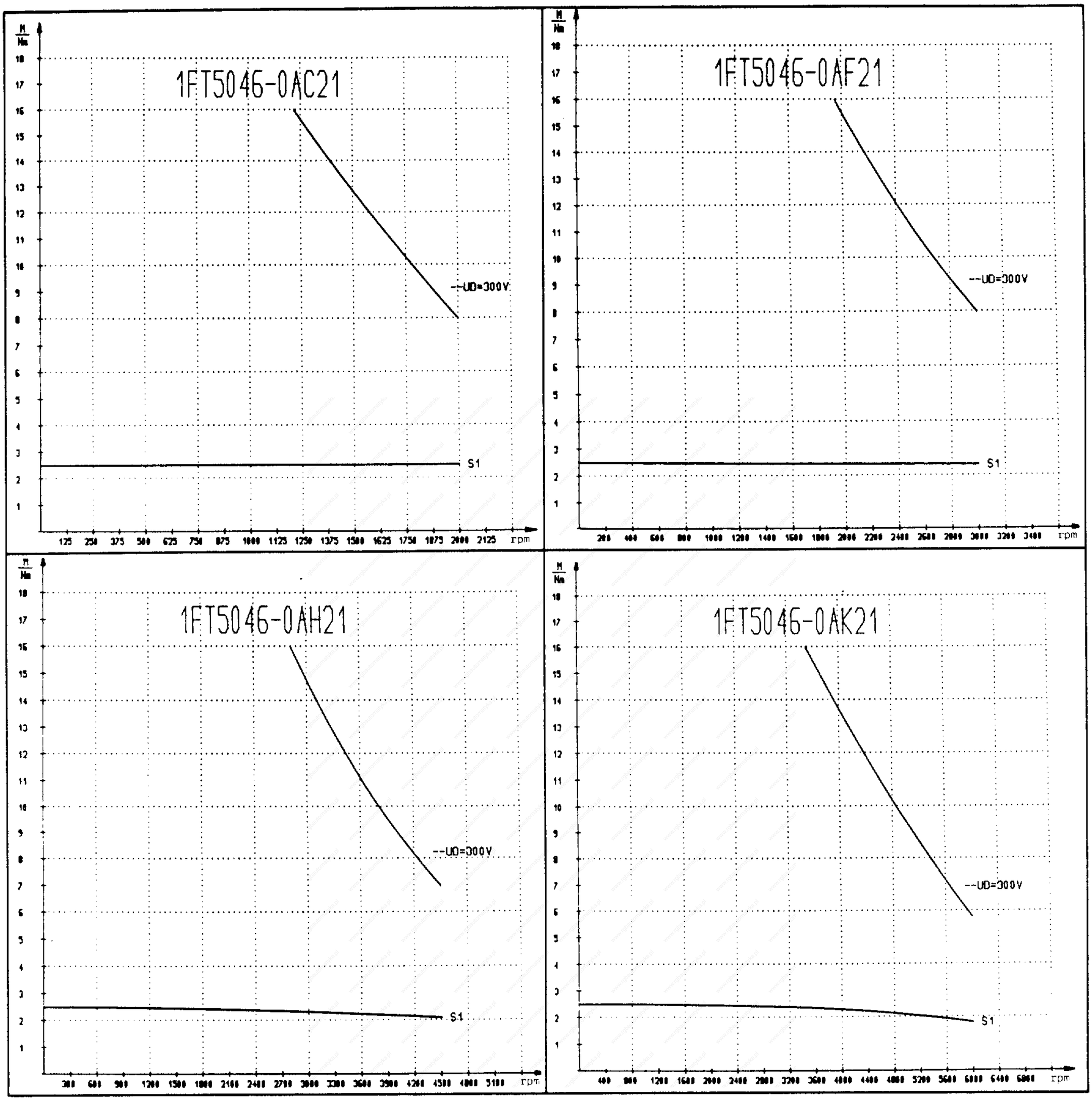


Fig. 3.12 Torque-speed characteristics: Servomotor 1FT5046-0A□2 Winding temperature rise $\Delta T = 100K$

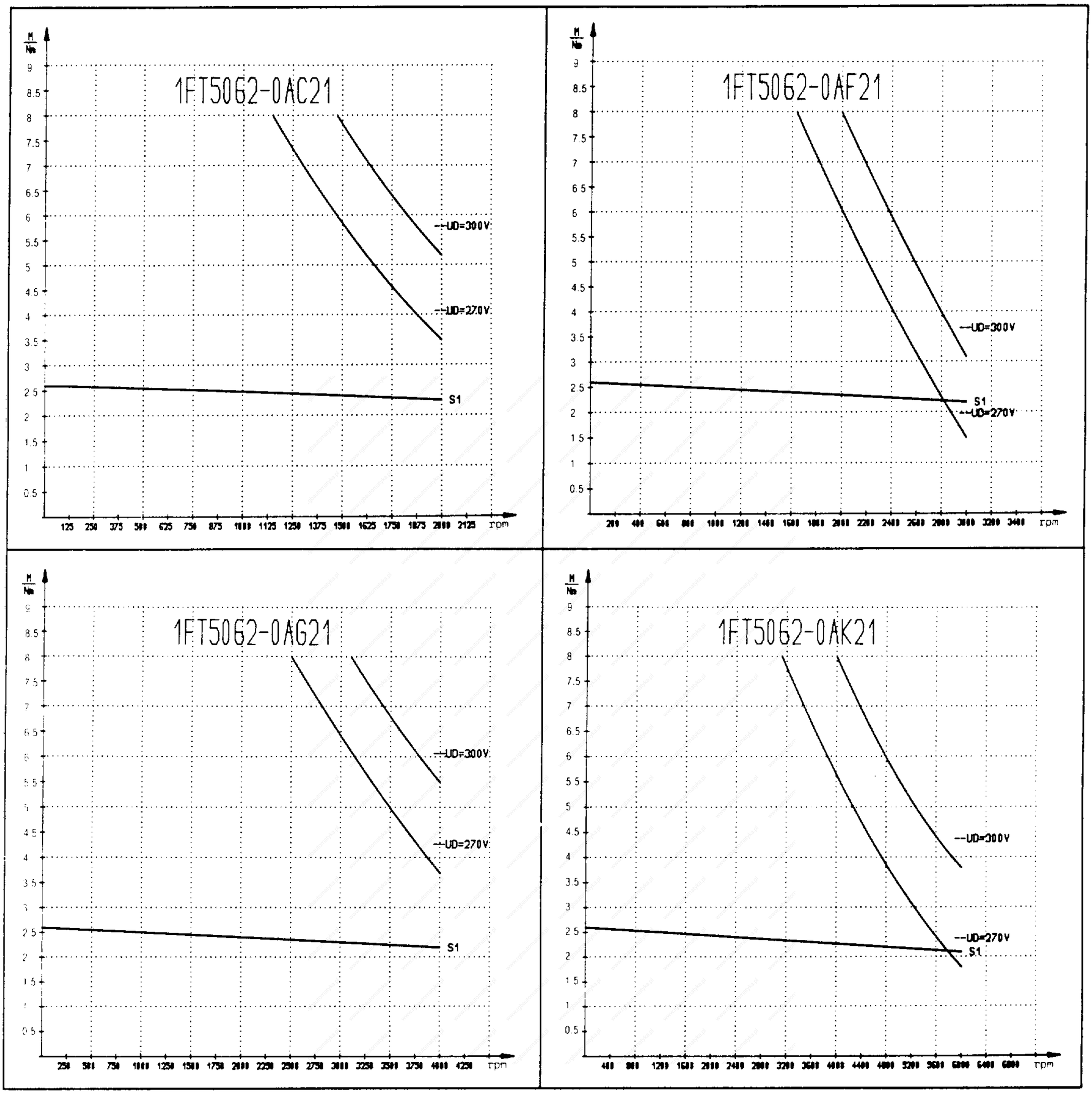


Fig. 3.13 Torque-speed characteristics: Servomotor 1FT5062-0A □ 2 Winding temperature rise ΔT = 100K

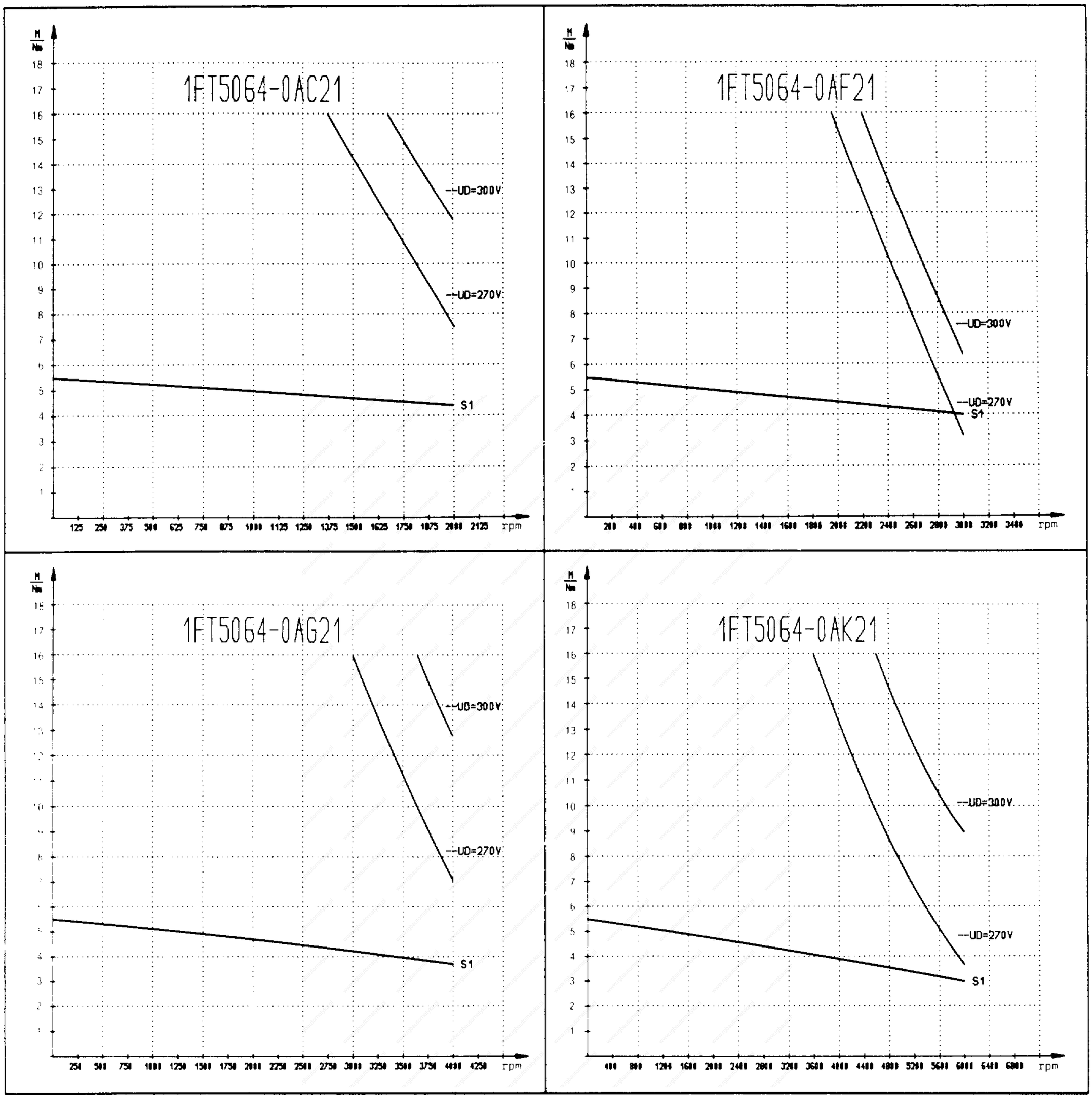


Fig. 3.14 Torque-speed characteristics: Servomotor 1FT5064-0A□ 2 Winding temperature rise ΔT = 100K

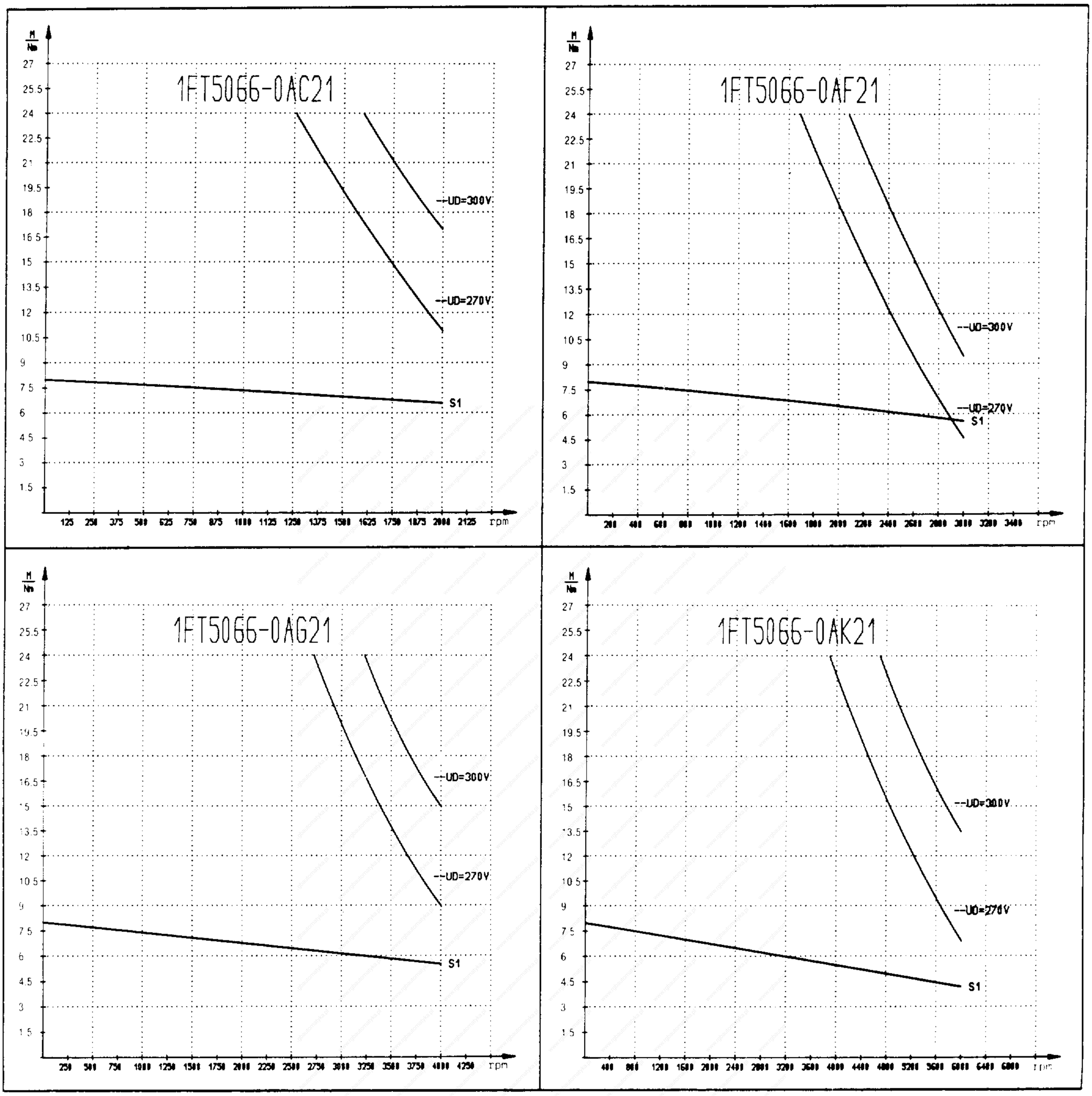


Fig. 3.15 Torque-speed characteristics: Servomotor 1FT5066-0A□ 2 Winding temperature rise ΔT = 100K

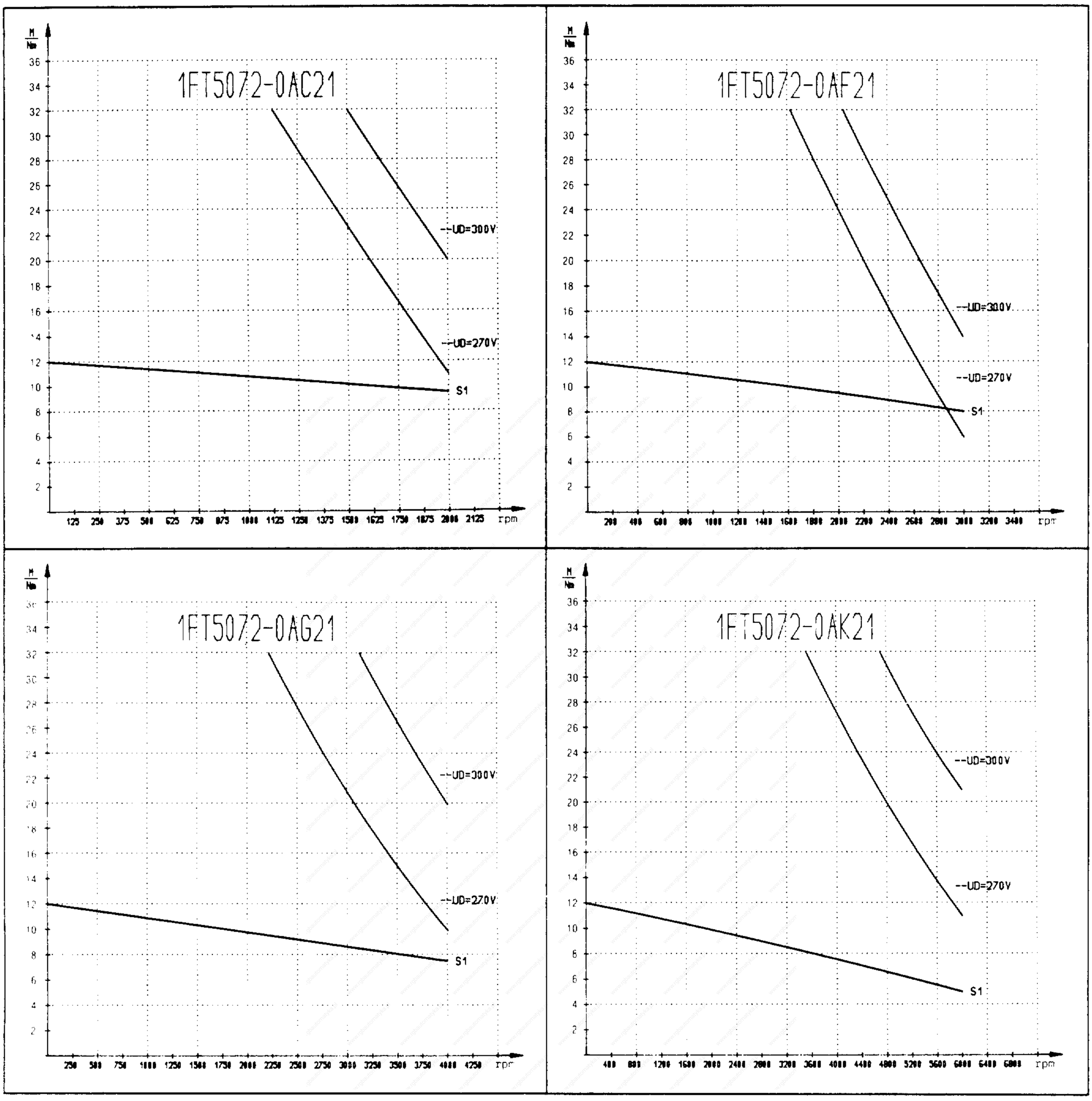


Fig. 3.16 Torque-speed characteristics: Servomotor 1FT5072-0A☐ 2 Winding temperature rise ΔT = 100K

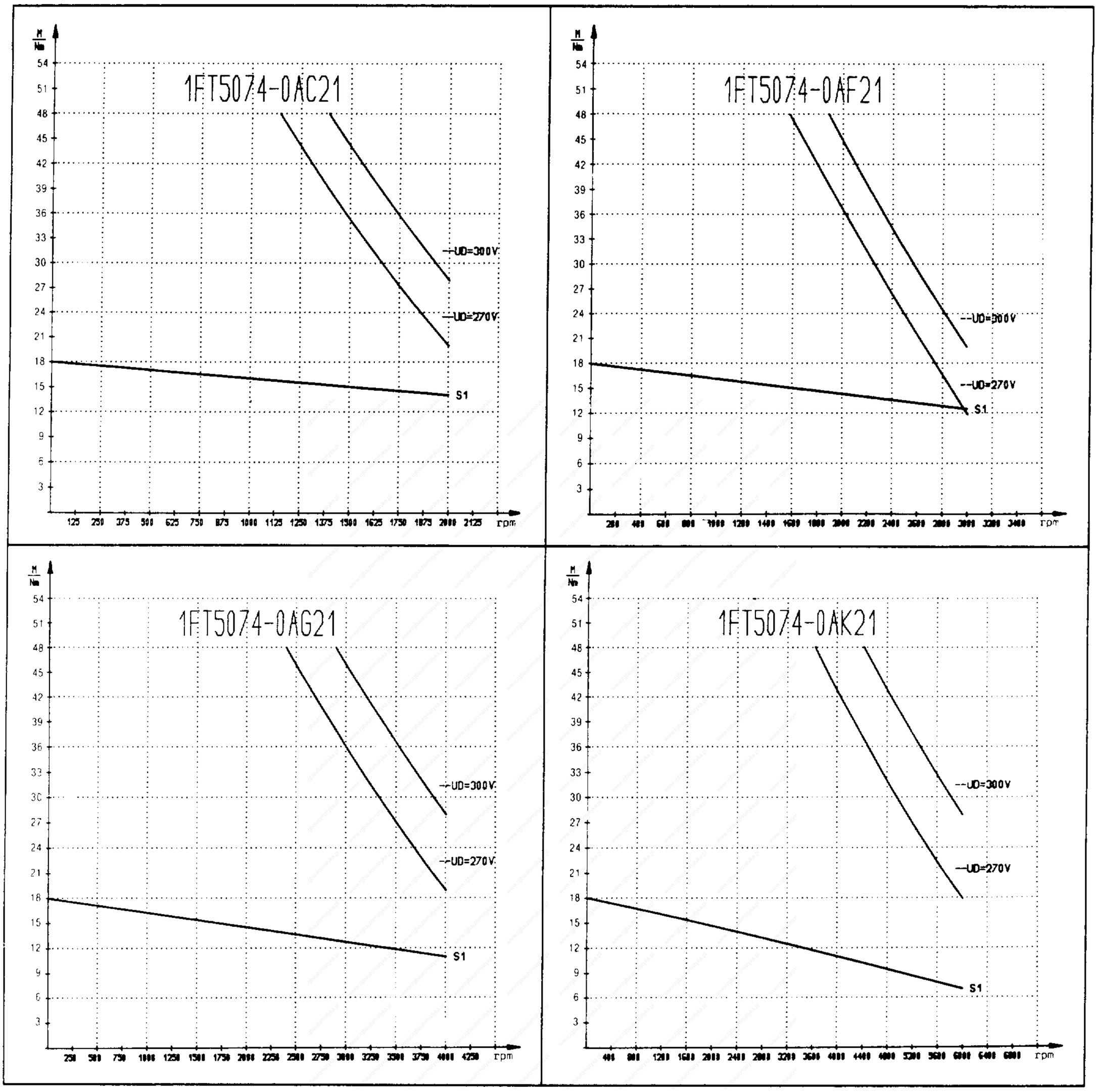


Fig. 3.17 Torque-speed characteristics: Servomotor 1FT5074-0A□ 2 Winding temperature rise ΔT = 100K

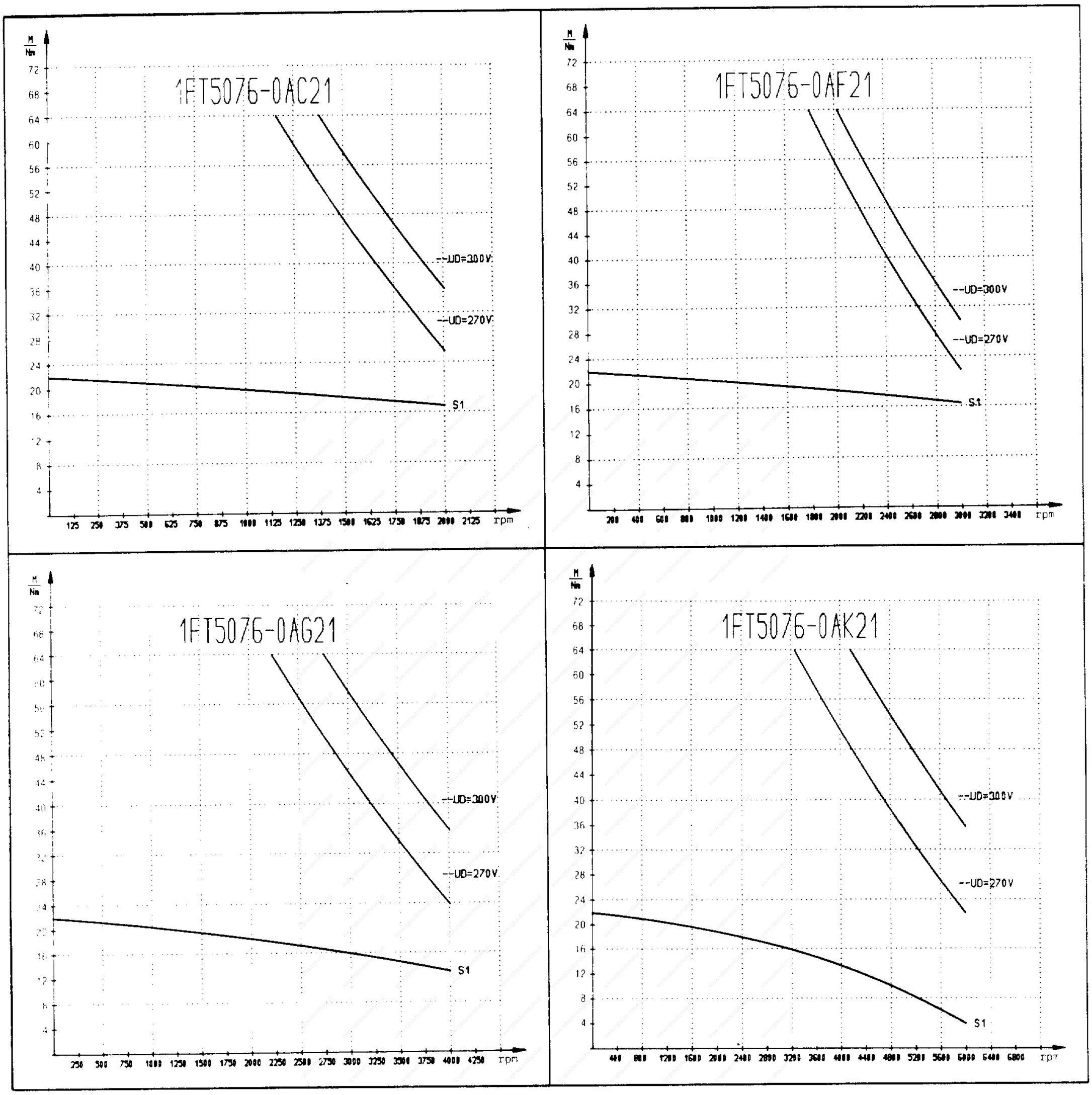


Fig. 3.18 Torque-speed characteristics: Servomotor 1FT5076-0A□2 Winding temperature rise $\Delta T = 100K$

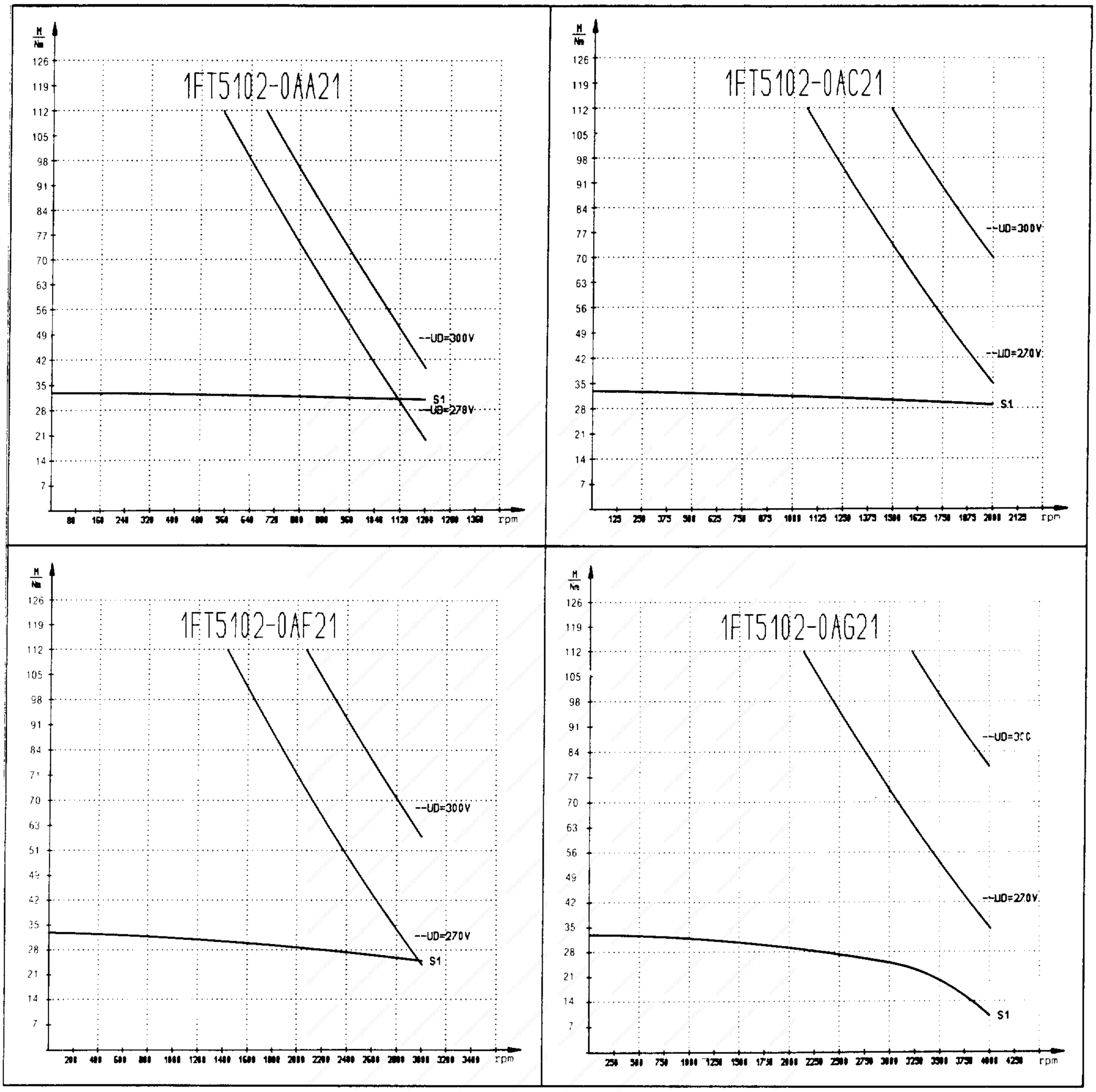


Fig. 3.19 Torque-speed characteristics: Servomotor 1FT5102-0A□2 Winding temperature rise $\Delta T = 100K$

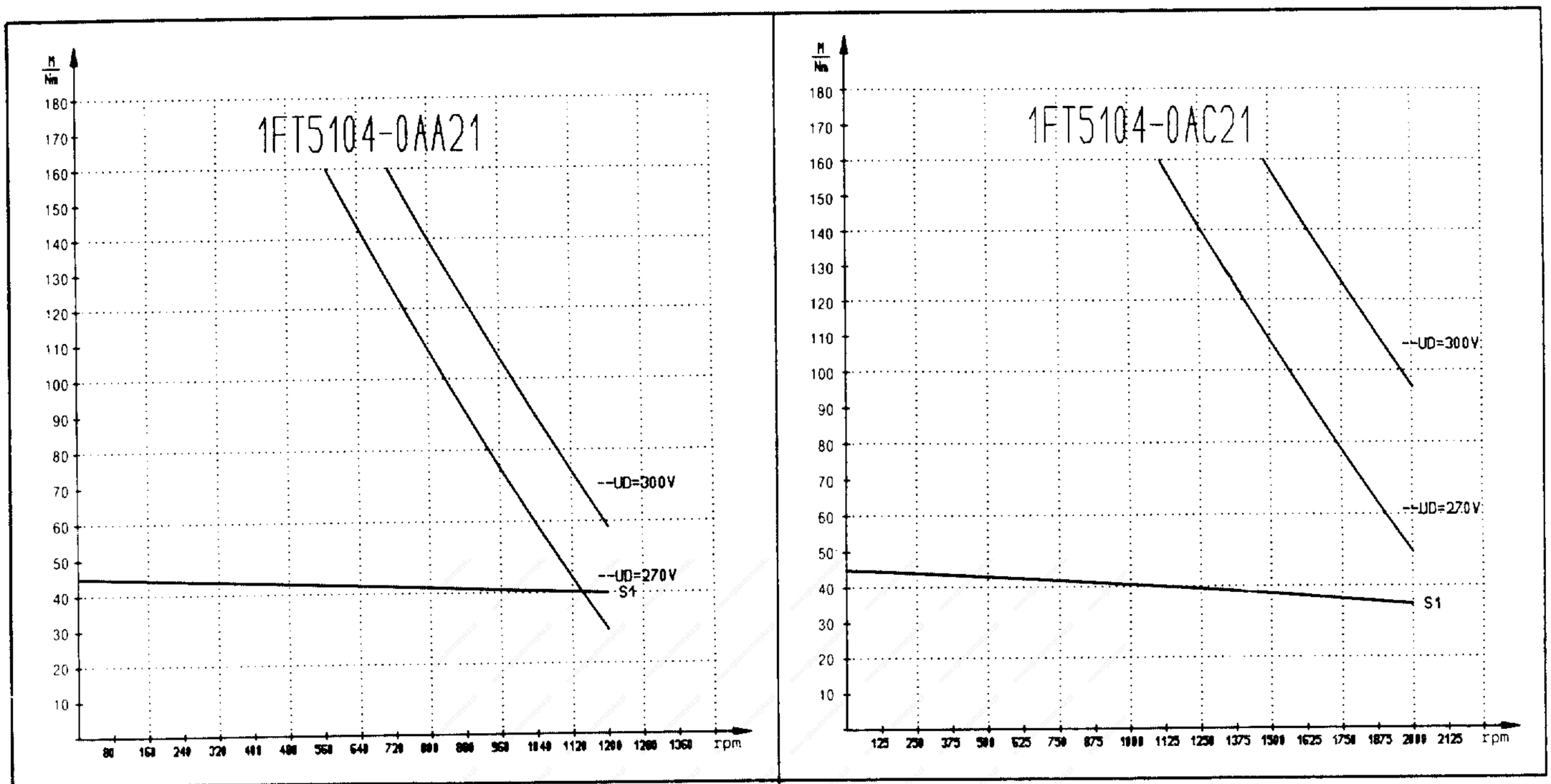


Fig. 3.20 Torque-speed characteristics: Servomotor 1FT5104-0A□2 *Winding temperature rise $\Delta T = 100K$*

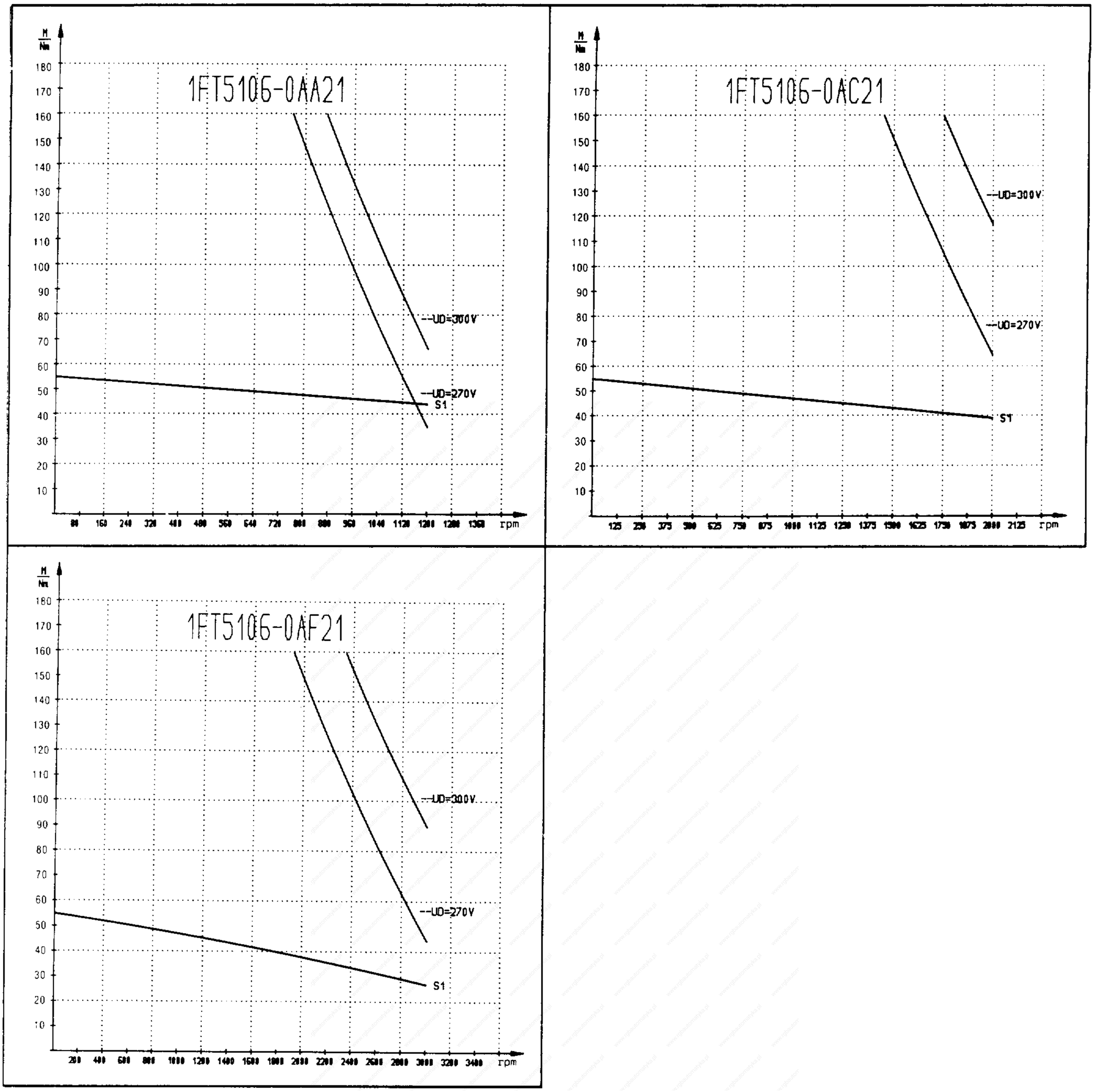


Fig. 3.21 Torque-speed characteristics: Servomotor 1FT5106-0A□2 *Winding temperature rise $\Delta T = 100K$*

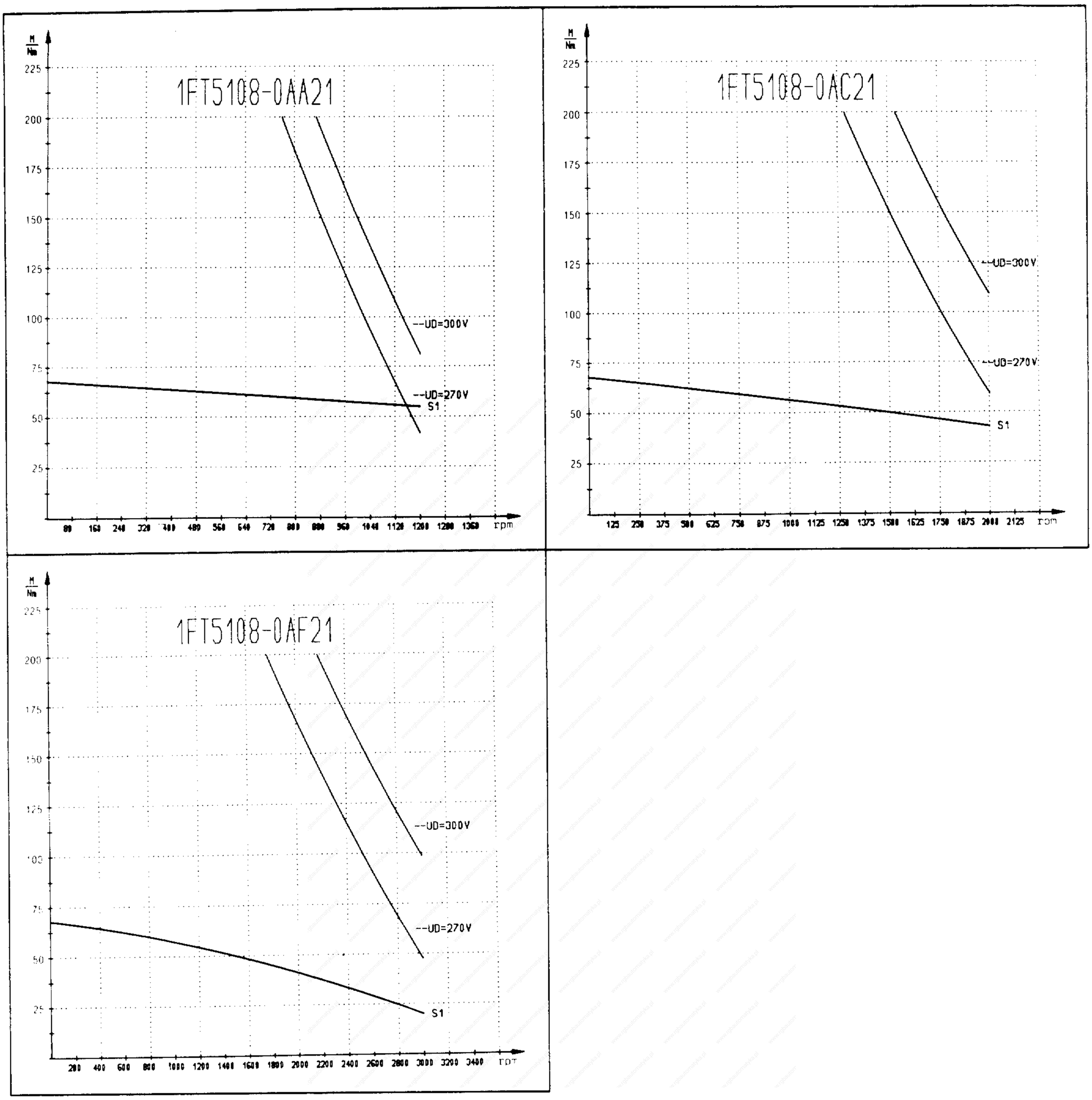


Fig. 3.22 Torque-speed characteristics: Servomotor 1FT5108-0A□2 *Winding temperature rise ΔT = 100K*

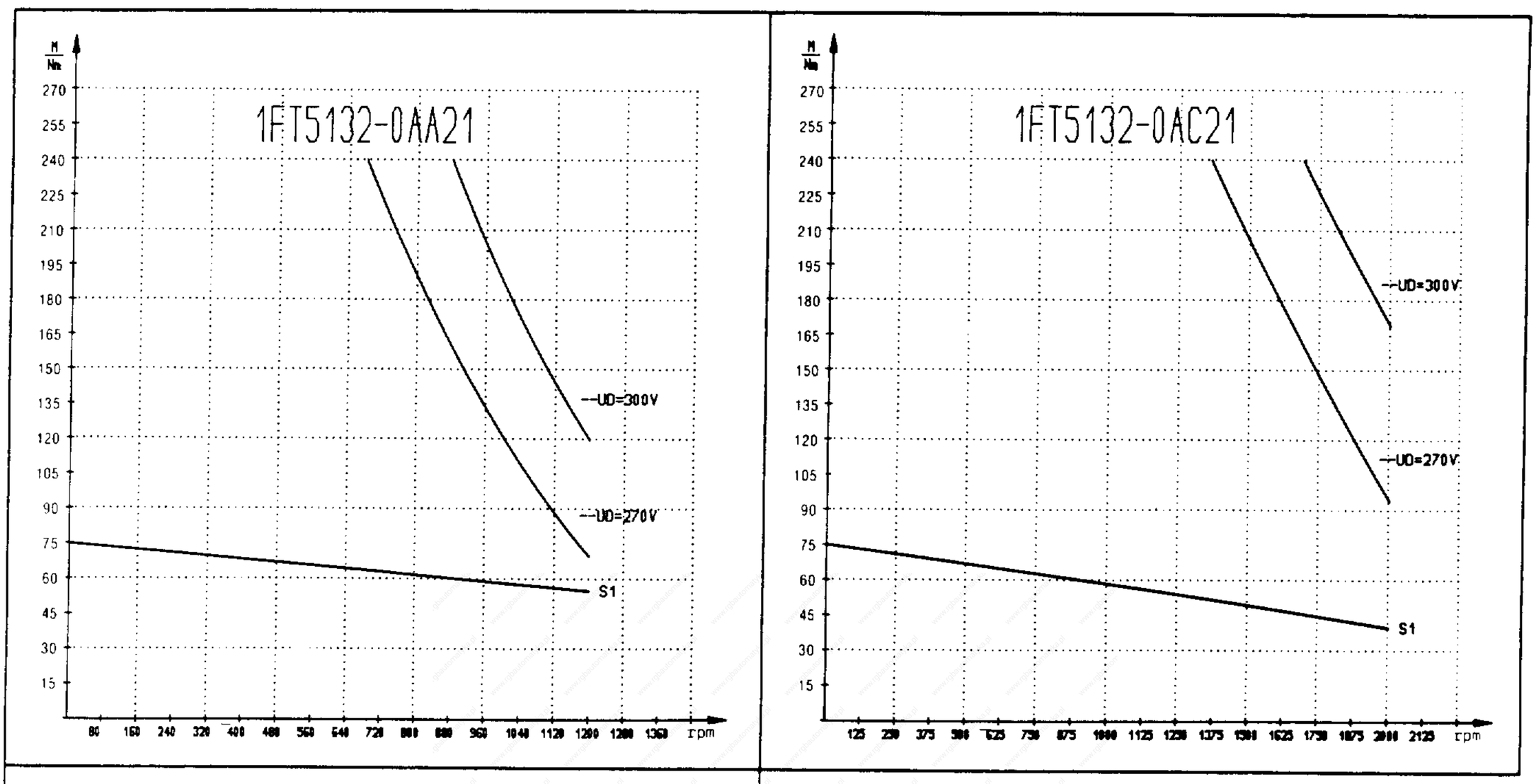


Fig. 3.23 Torque-speed characteristics: Servomotor 1FT5132-0A□2 *Winding temperature rise ΔT = 100K*

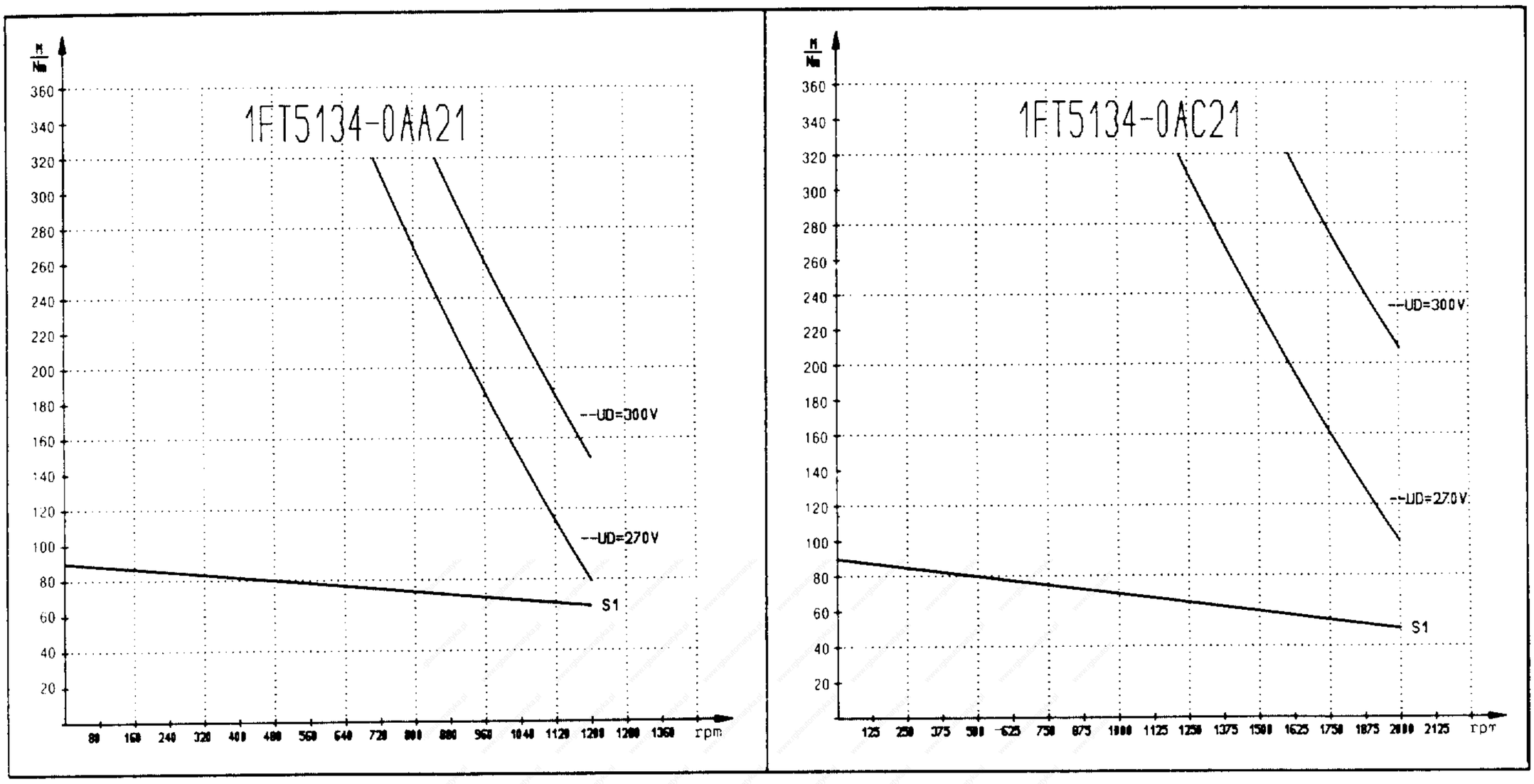


Fig. 3.24 Torque-speed characteristics: Servomotor 1FT5134-0A□2 Winding temperature rise ΔT = 100K

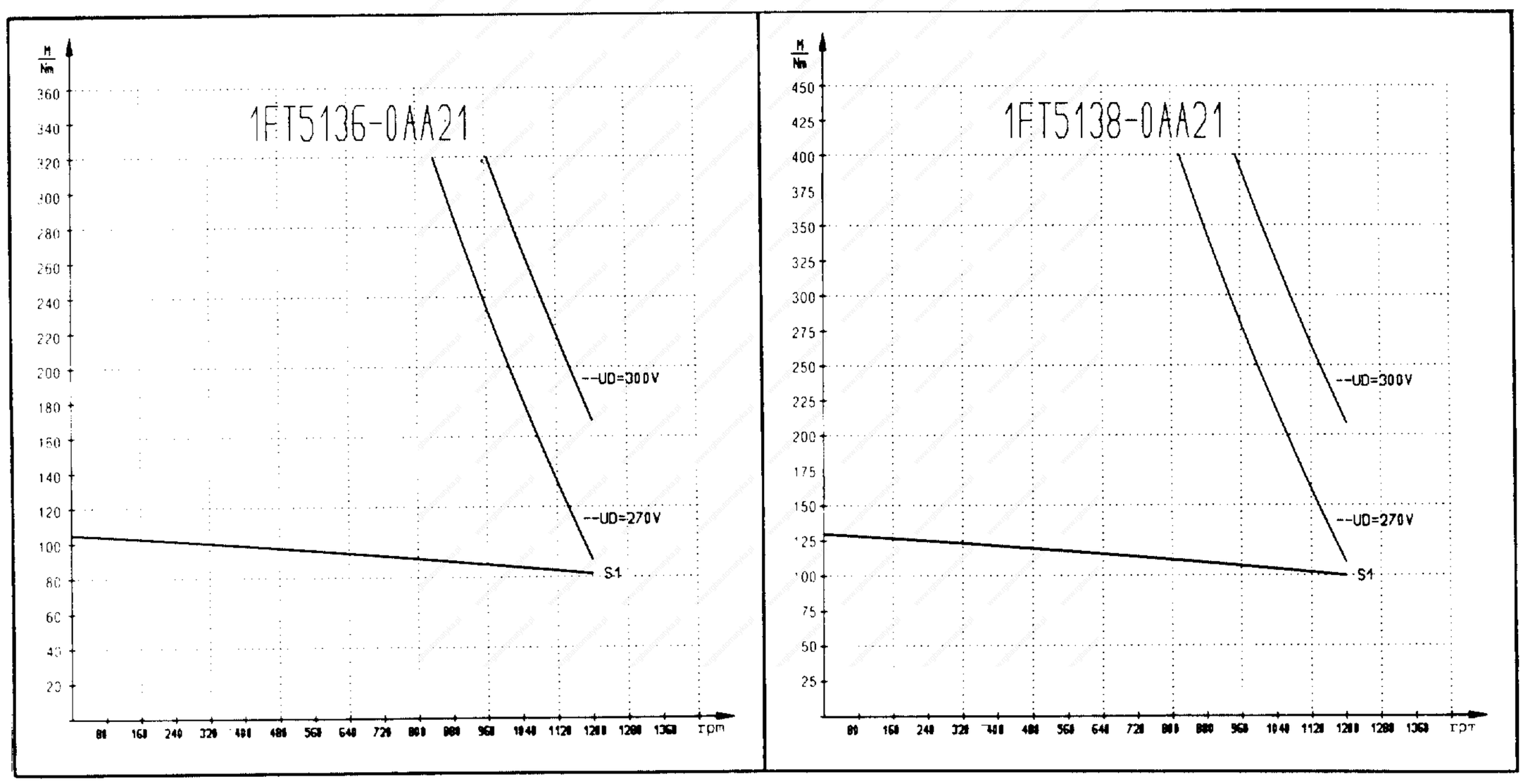


Fig. 3.25 Torque-speed characteristics: Servomotor 1FT5136-0A□2, 1FT5138-0A□2Winding temperature rise ΔT = 100K

3.5.2 Servomotors, short version

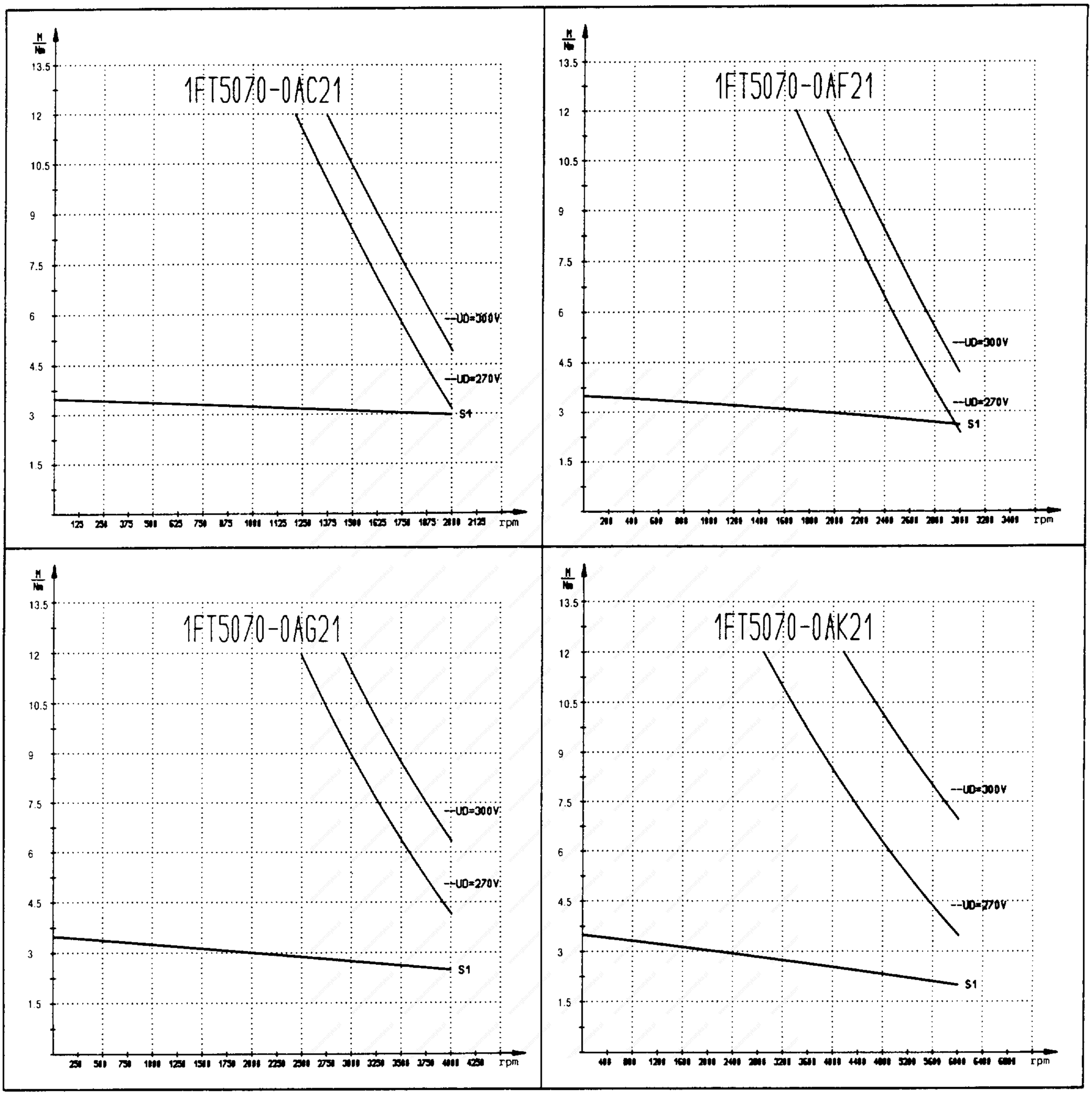


Fig. 3.26 Torque-speed characteristics: Servomotor 1FT5070-0A□2 Winding temperature rise $\Delta T = 100K$

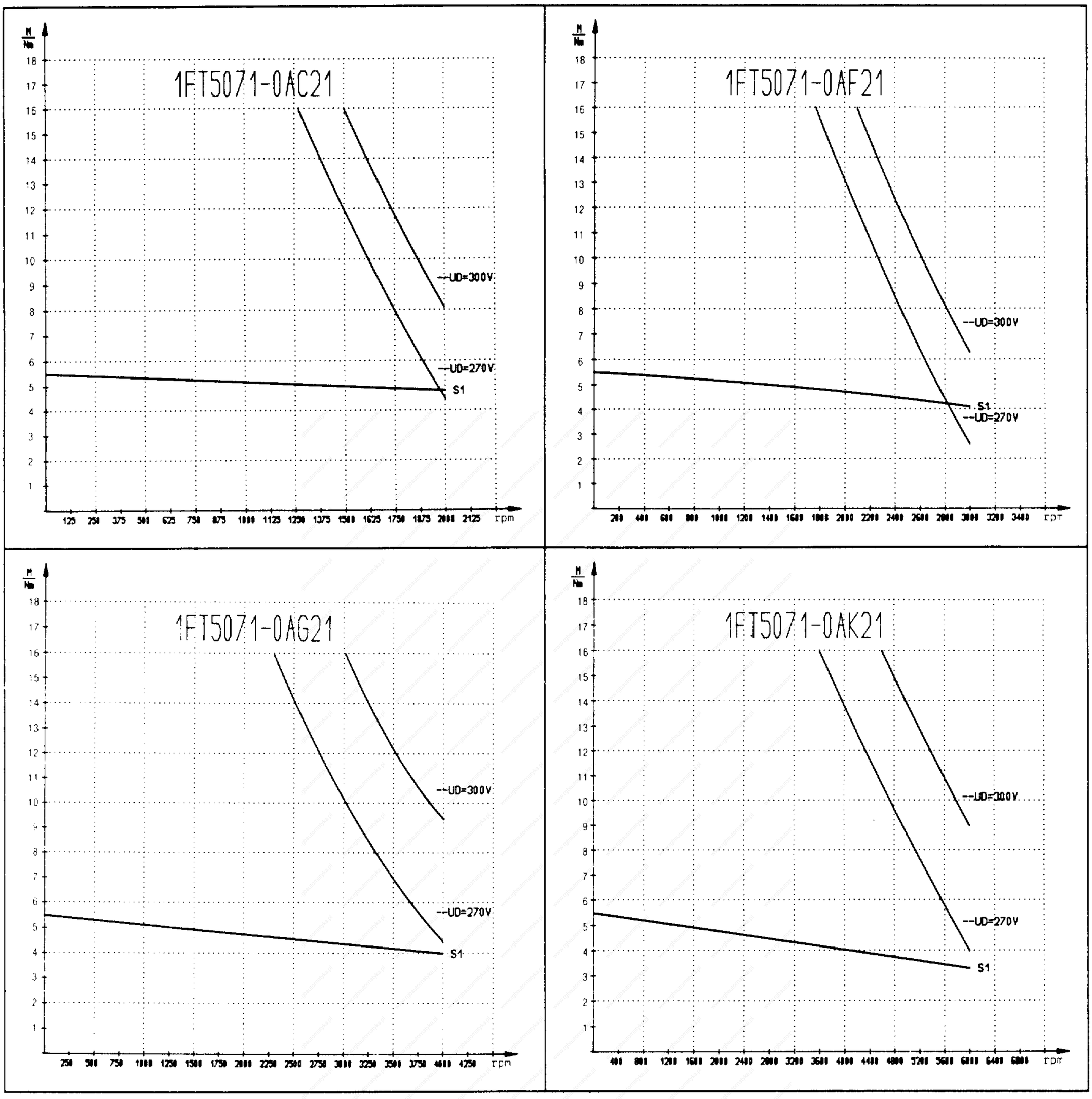


Fig. 3.27 Torque-speed characteristics: Servomotor 1FT5071-0A□2 Winding temperature rise ΔT = 100K

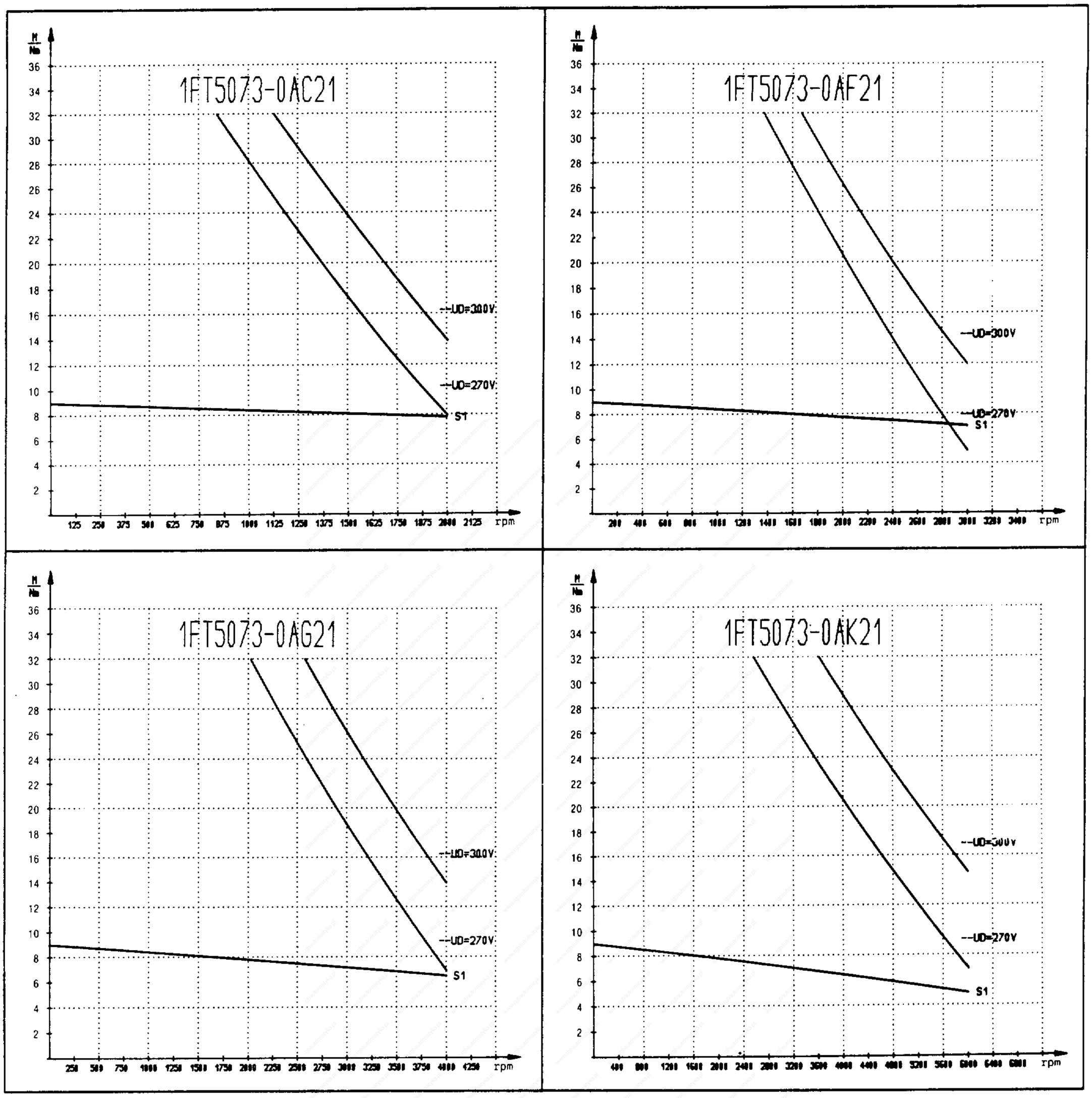


Fig. 3.28 Torque-speed characteristics: Servomotor 1FT5073-0A□2 Winding temperature rise ΔT = 100K

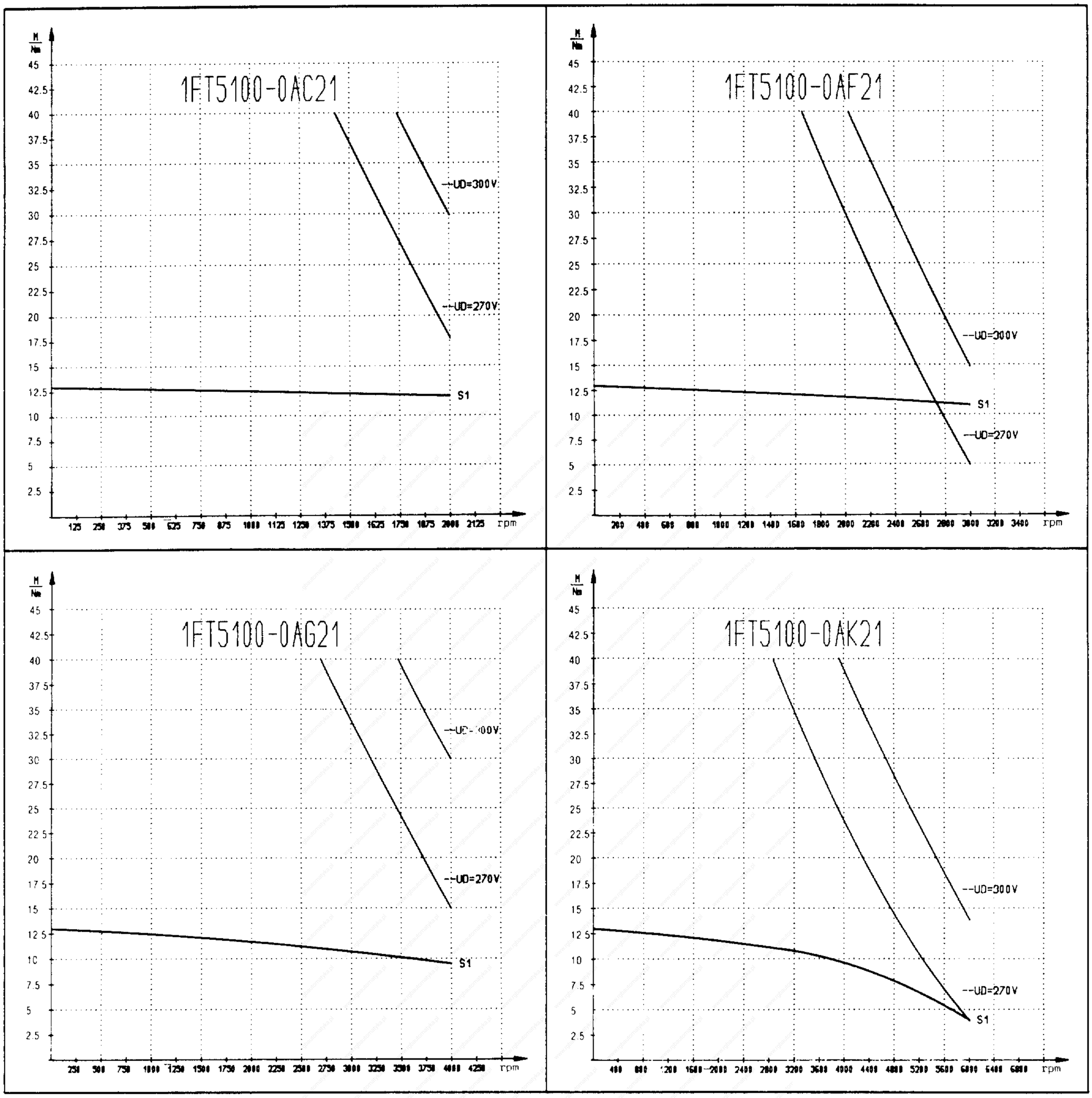


Fig. 3.29 Torque-speed characteristics: Servomotor 1FT5100-0A□2 Winding temperature rise $\Delta T = 100K$

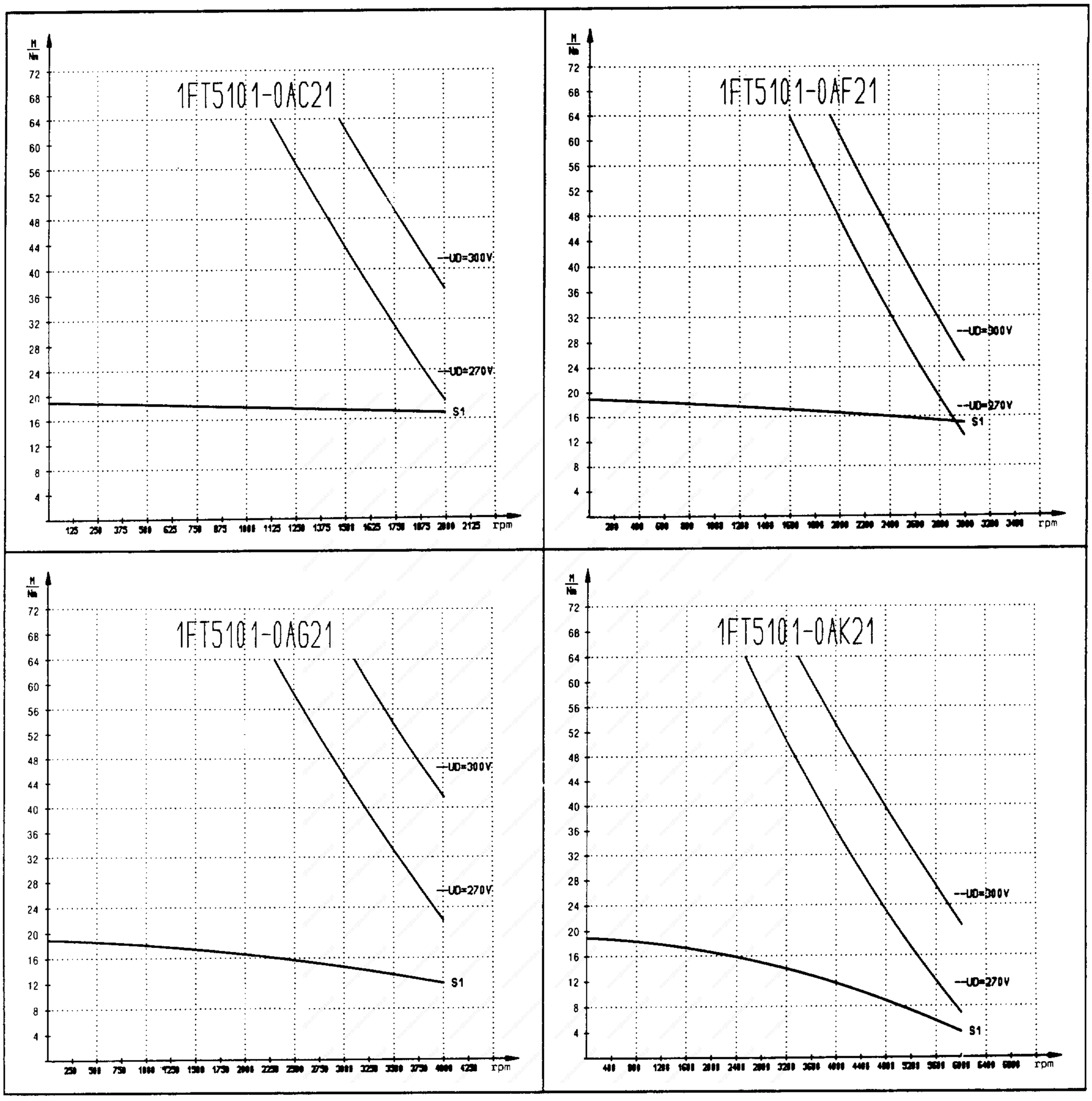


Fig. 3.30 Torque-speed characteristics: Servomotor 1FT5101-0A□2 Winding temperature rise ΔT = 100K

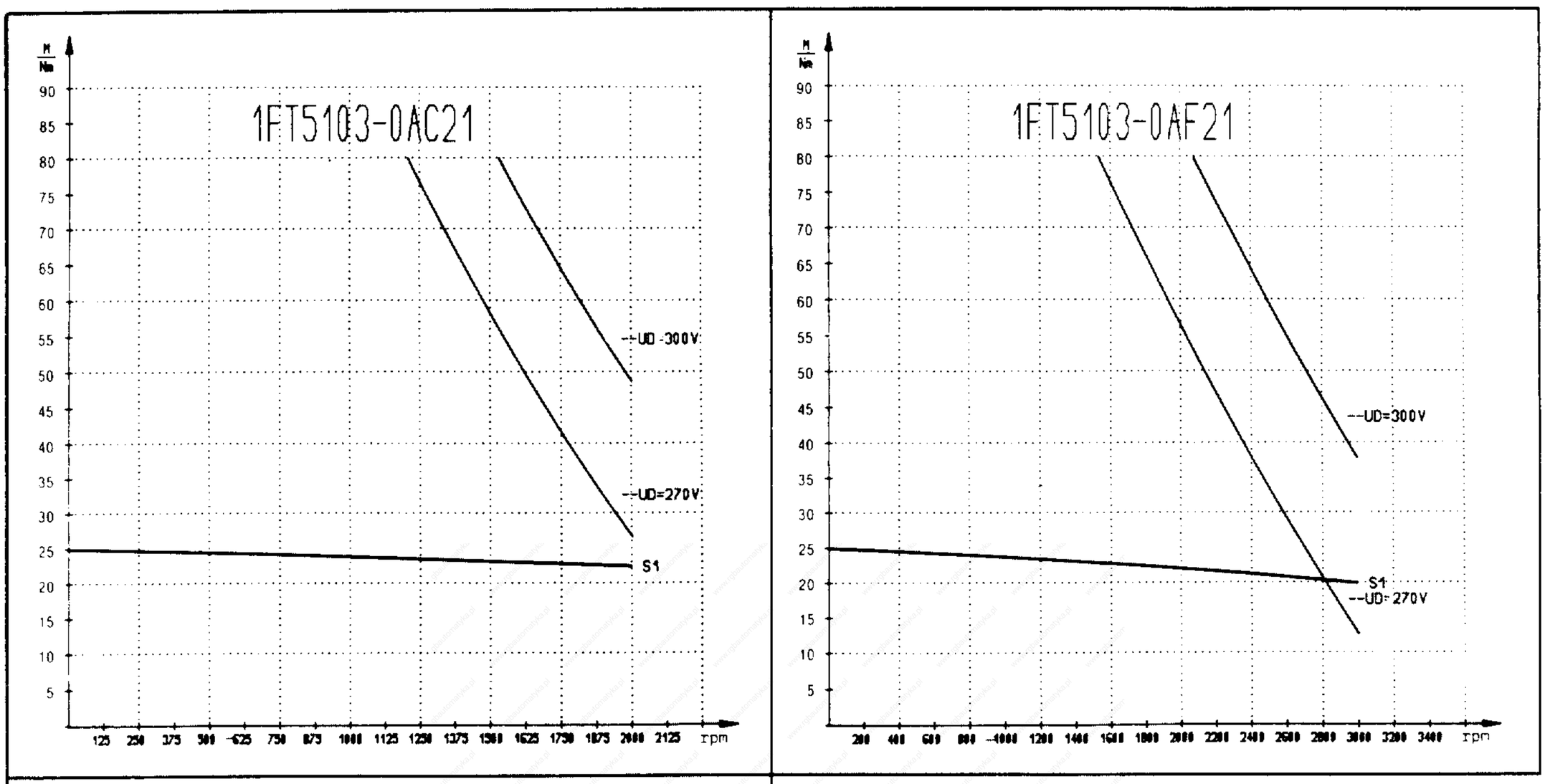


Fig. 3.31 Torque-speed characteristics: Servomotor 1FT5103-0A□2 Winding temperature rise ΔT = 100K

3.6 Dimension sheets

Notes: All dimensions not to scale.

All dimensions in mm.

For your convenience we have translated the German text of the dimension drawings into English. Please take into consideration that when ordering a drawing unter its respective number you will receive the German original.

3.6.1 1FT5 AC servomotors, short version

3.6.1.1 Basic version

- 1FT502☐, 1FT503☐ and 1FT50☐ AC servomotors with connector

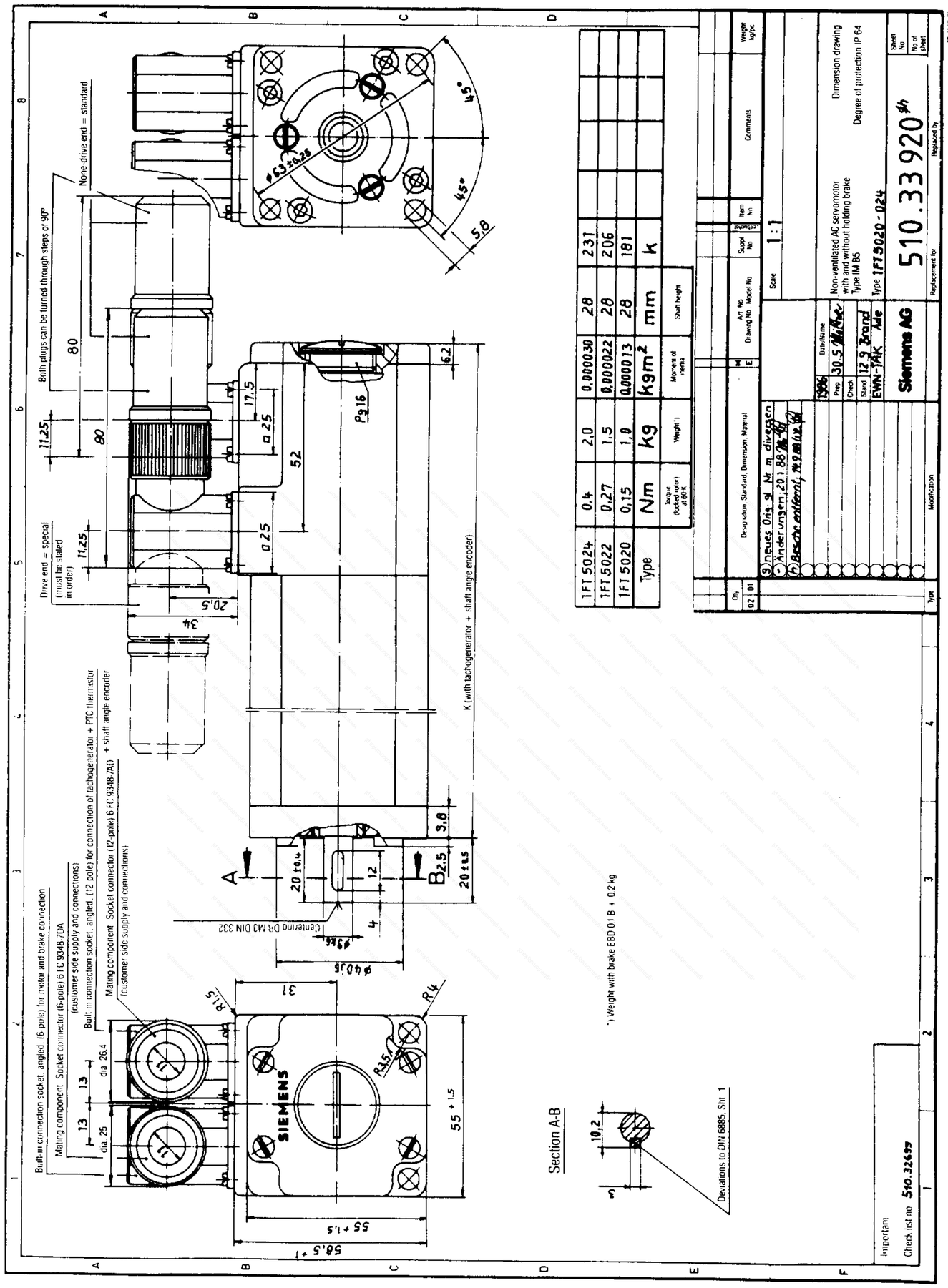
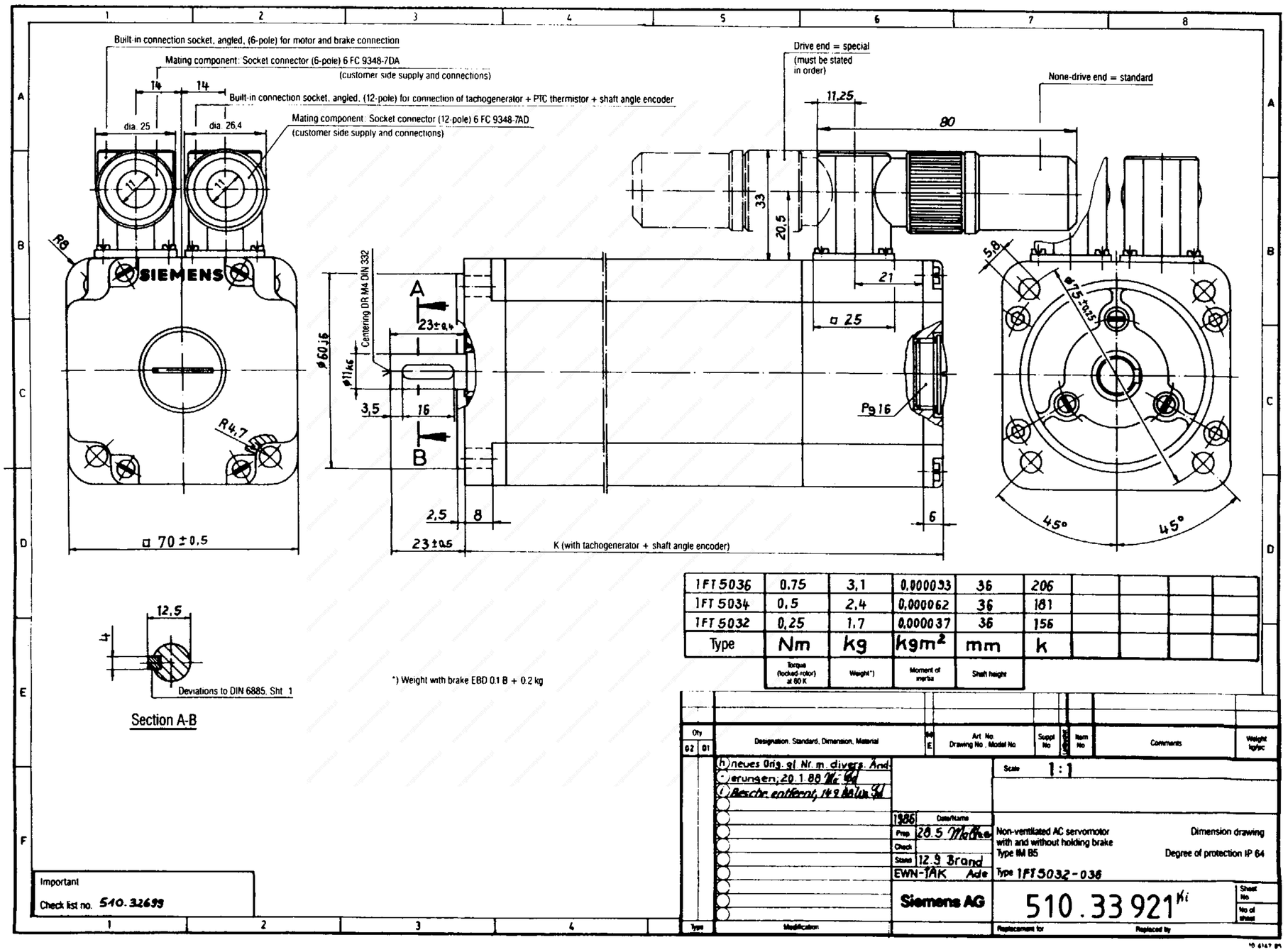
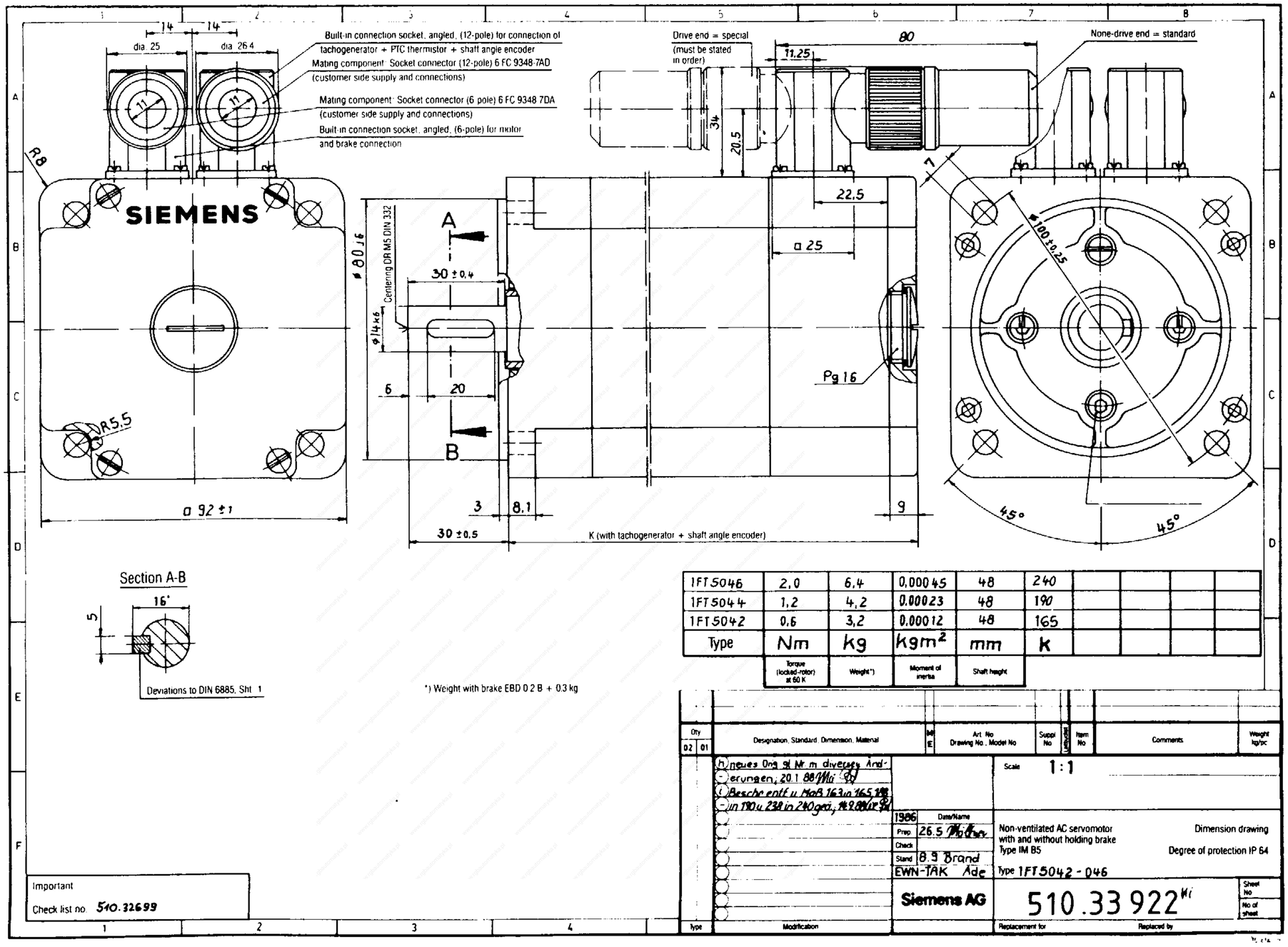


Fig. 3.32 Dimension sheet for AC Servomotors 1FT5 020 to 1FT5 024, type of construction IM B5

Fig. 3.33 Dimension sheet for AC servomotors 1FT5 032 to 1FT5 036, type of construction IM B5





Type	Nm	kg	kgm²	mm	k
	Torque (locked-rotor) at 60 K	Weight*)	Moment of inertia	Shaft height	
1FT5046	2.0	6.4	0.00045	48	240
1FT5044	1.2	4.2	0.00023	48	190
1FT5042	0.6	3.2	0.00012	48	165

Qty 02	Qty 01	Designation, Standard, Dimension, Material	MI E	Art. No. Drawing No., Model No	Suppl No	Modification	Item No	Comments	Weight kg/pc

Modification: (1) neues Dng St Nr m diversen Änderungen, 20.1.88 Mü
(2) Beschr entf u Maß 163 in 165, 198 in 190 u 238 in 240 gem. Nr 2 88 02 Sa

	Date/Name
1986	
Prep	26.5 Müller
Check	
Stand	8.9 Brand
EWN-TAK	Ade

Siemens AG

Scale 1:1

Non-ventilated AC servomotor with and without holding brake
Type IM B5

Dimension drawing
Degree of protection IP 64

Type 1FT5042 - 046

510.33922^Wi

Sheet No
No of sheet

Replacement for | Replaced by

Fig. 3.34 Dimension sheet for AC servomotors 1FT5 042 to 1FT5 046, type of construction IM B5

3.6.2 Options

- 1FT5 servomotors... with mounted shaft encoders
- 1FT5 servomotors... with absolute shaft encoders

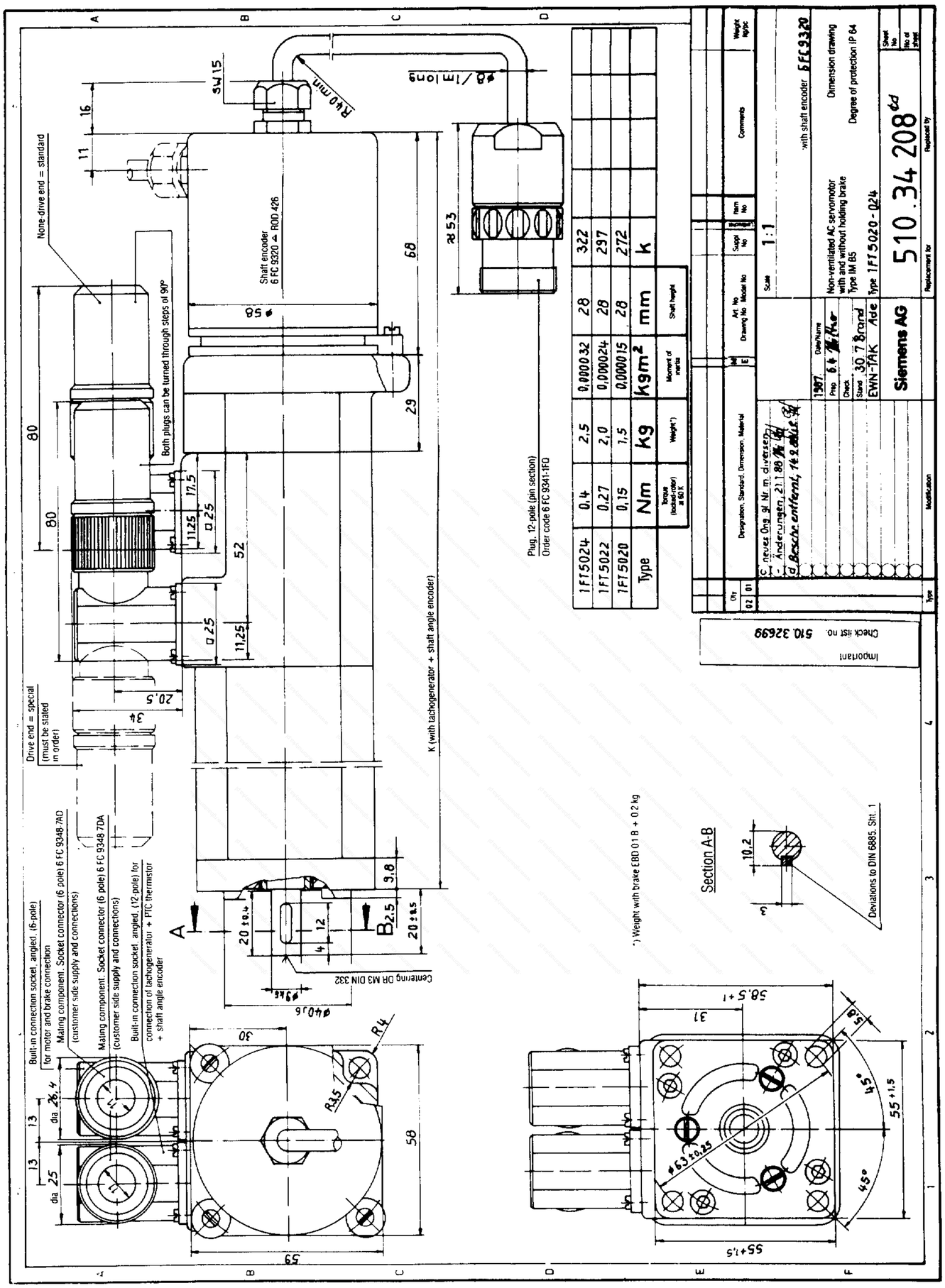
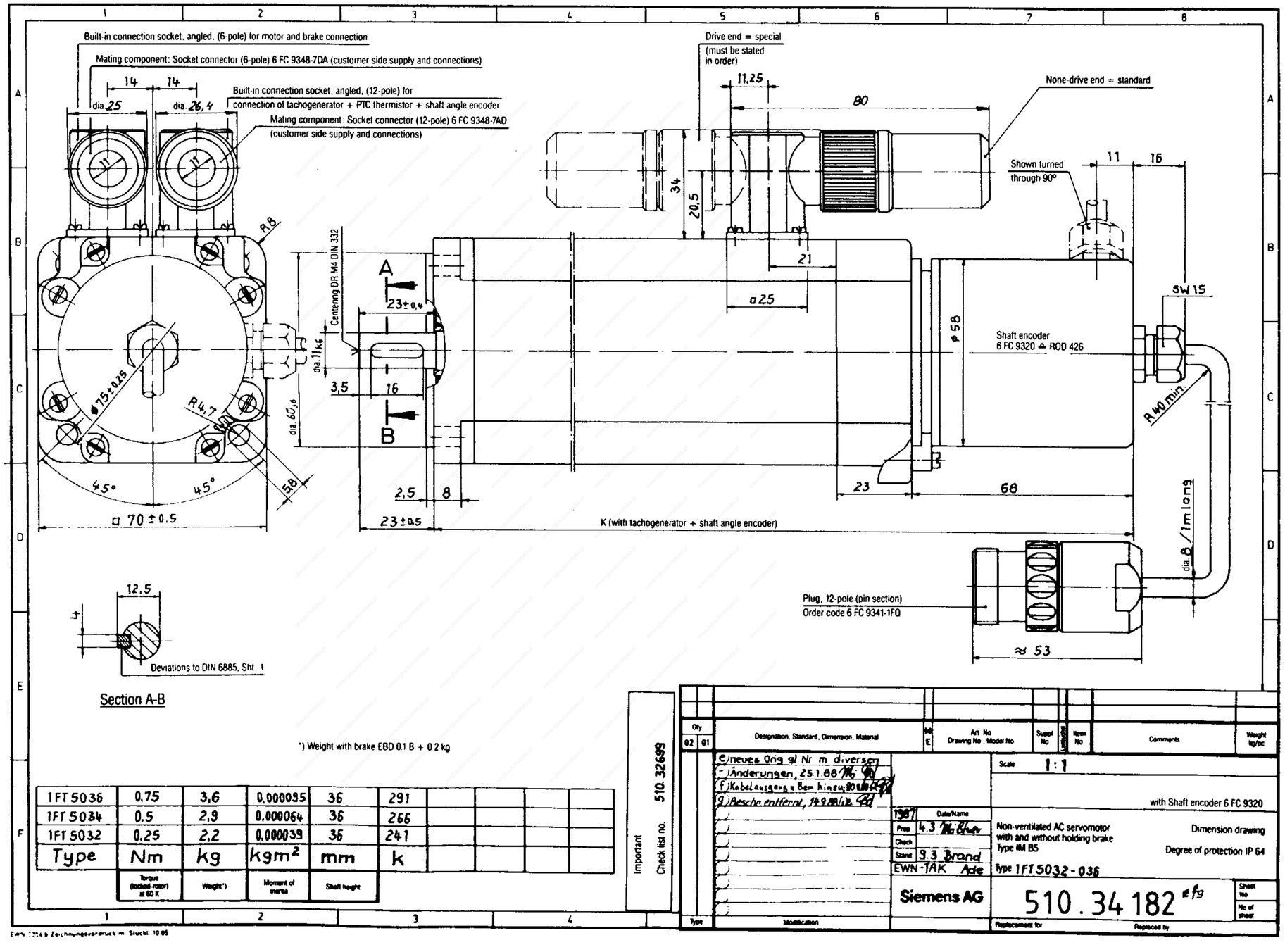
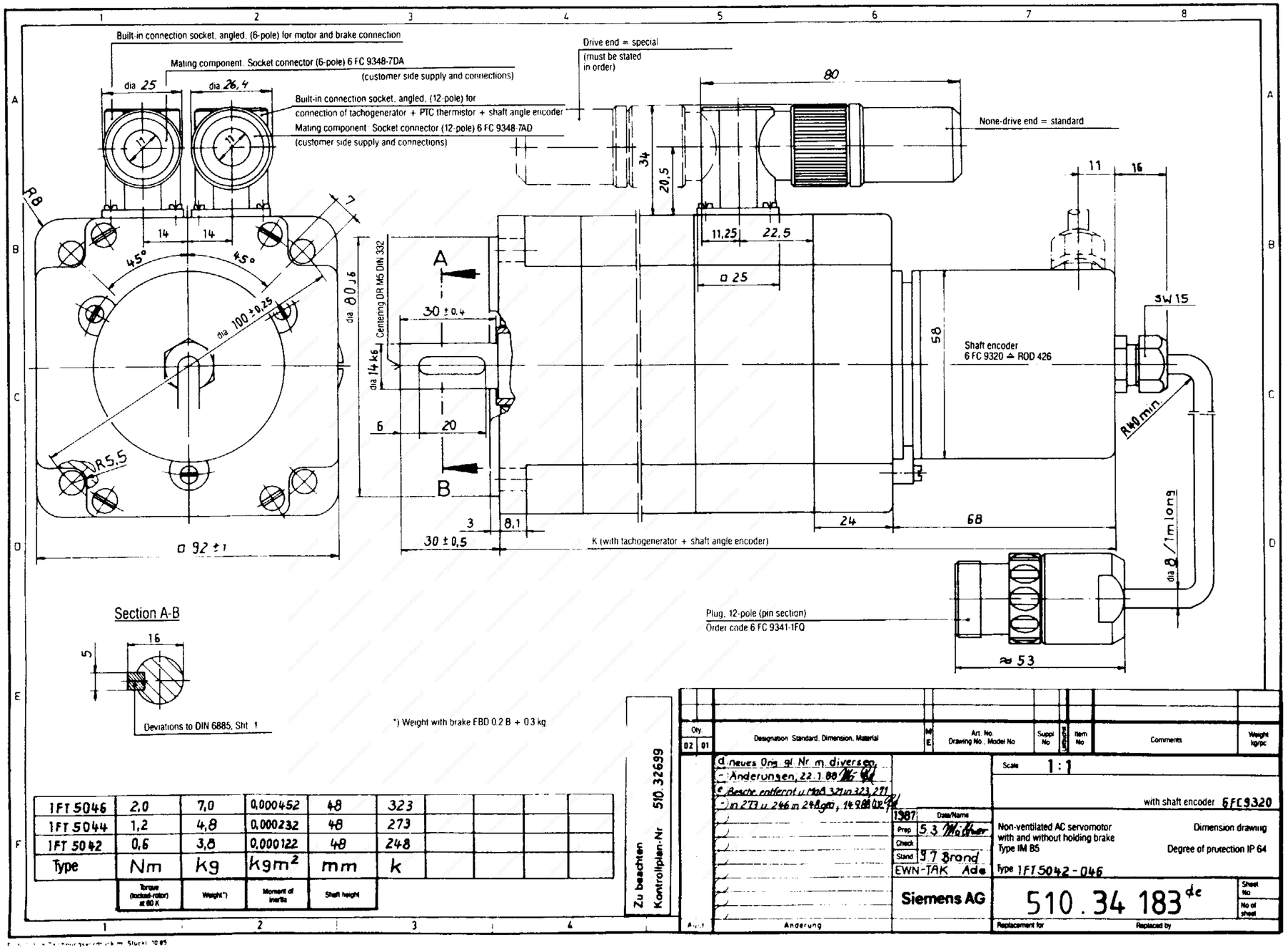


Fig. 3.35 Dimension sheet for AC servomotors 1FT5 020 to 1FT5 024 with shaft encoder 6FC9 320 - Type of construction IM B5

Fig. 3.36 Dimension sheet for AC servomotors 1FT5 032 to 1FT5 036 with shaft encoder 6FC9 320 - Type of construction IM B5



Type	Torque (locked-rotor) at 60 K	Weight*)	Moment of inertia	Shaft height					
1FT5036	0.75	3,6	0,000035	36	291				
1FT5034	0.5	2,9	0,000064	36	266				
1FT5032	0.25	2,2	0,000039	36	241				
Type	Nm	kg	kgm^2	mm	k				



Type	Torque (locked-rotor) at 60 K	Weight*)	Moment of inertia	Shaft height					
1FT 5046	2,0	7,0	0,000452	48	323				
1FT 5044	1,2	4,8	0,000232	48	273				
1FT 5042	0,6	3,8	0,000122	48	248				
Type	Nm	kg	kgm²	mm	k				

Zu beachten Kontrollplan-Nr 510.32699

Qty. 02	01	Designation. Standard. Dimension. Material	M E	Art. No. Drawing No.; Model No	Suppl No	Modification	Item No	Comments	Weight kg/pc
		a neues Orig gl Nr m. diversen							
		c Änderungen, 22.1.80							
		e Besche. entfernt u. Mod. 321 in 323, 271							
		in 273 u. 246 in 248 geä., 14.9.82							

Änderung

1987 Date/Name
Prep. 5.3
Check
Stand 9.7 Brand
EWN-TAK Ade

Siemens AG

Scale 1:1
with shaft encoder 6FC9320
Non-ventilated AC servomotor with and without holding brake
Type IM B5
Dimension drawing
Degree of protection IP 64
Type 1FT5042-046
510.34 183 de
Sheet No
No of sheet
Replacement for
Replaced by

Fig. 3.37 Dimension sheet for AC servomotors 1FT5 042 to 1FT5 046 with shaft encoder 6FC9 320 - Type of construction IM B5

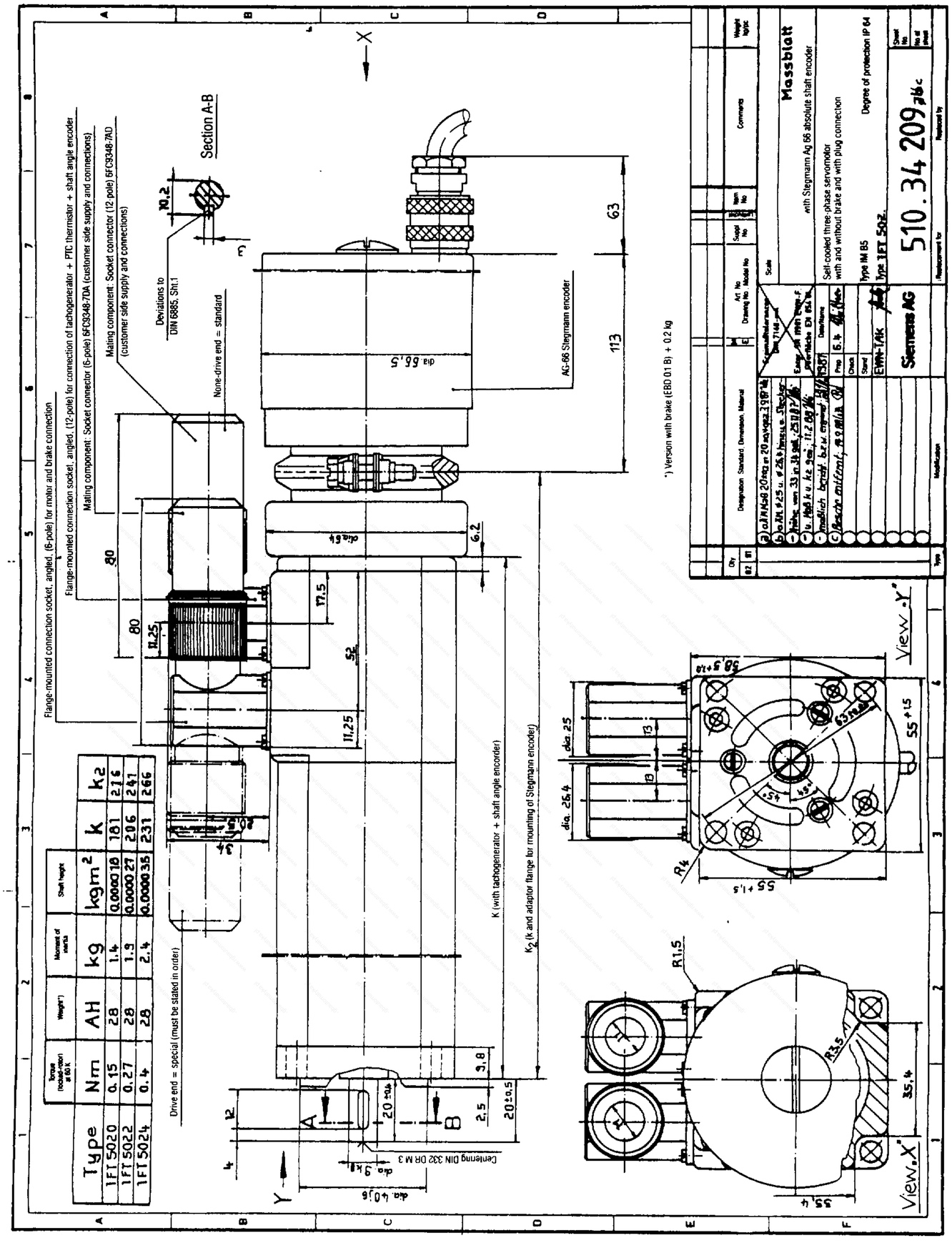
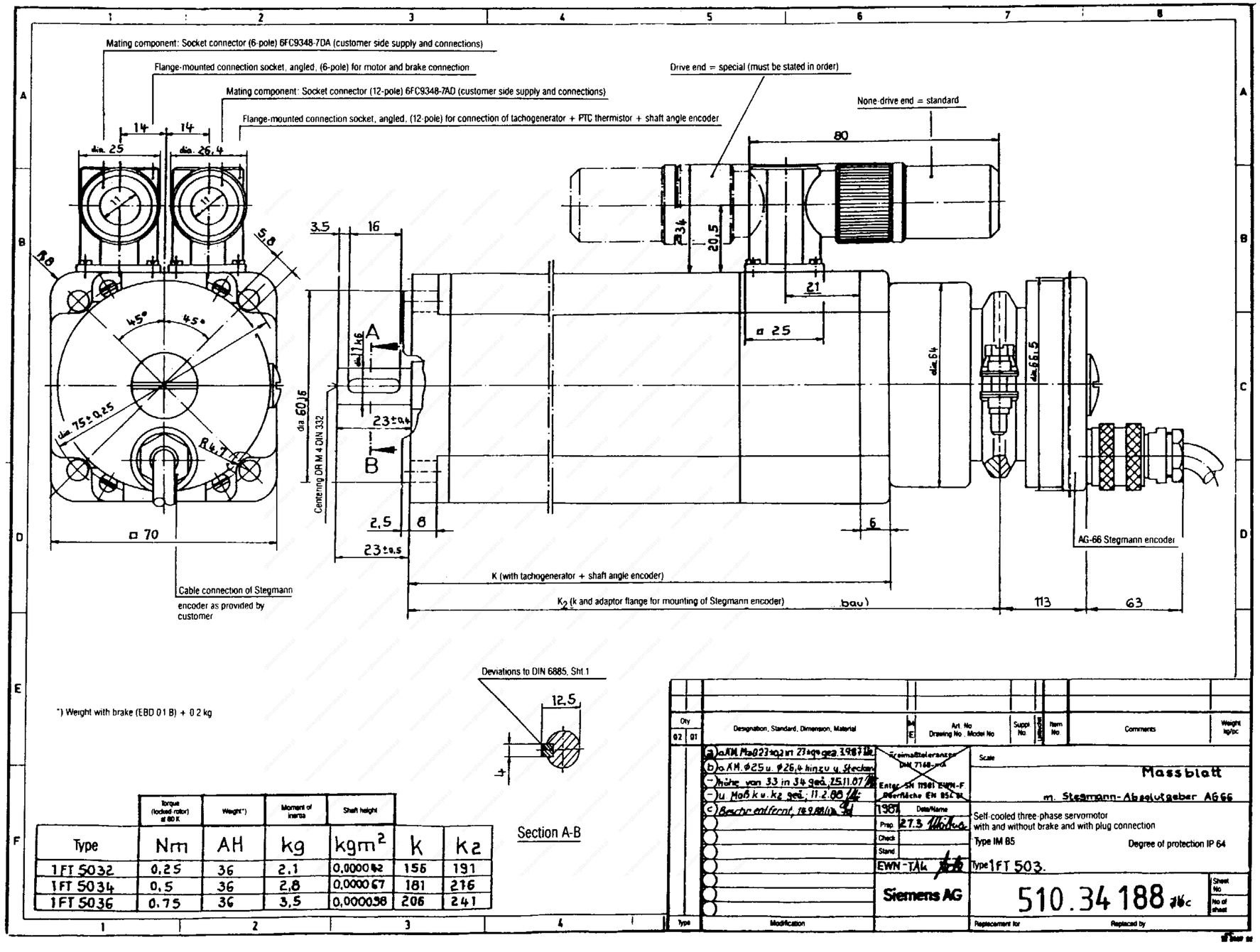


Fig. 3.38 Dimension sheet for AC servomotors 1FT5 020 to 1FT5 024 with absolute shaft encoder AG-66 - Type of construction IM B5



Type	Torque (locked-rotor) at 60 K Nm	Weight*) AH	Moment of inertia kg	Shaft height kgm²	k	k2
1FT 5032	0,25	36	2,1	0,000042	156	191
1FT 5034	0,5	36	2,8	0,000067	181	216
1FT 5036	0,75	36	3,5	0,000038	206	241

Qty G2	Qty G1	Designation, Standard, Dimension, Material	Art. No Drawing No. Model No	Suppl. No	Item No	Comments	Weight kg/pc
		a) AM Ma022±0,2 in 27±0 gez. 3.98					
		b) AM Ø25 u. Ø26,4 hinzu u. Stecker					
		-- Höhe von 33 in 34 geä. 25.11.97					
		-- u. Maß k u. k2 geä. 11.2.00					
		c) Bezeichnung entfernt, 18.9.98					

Freimaßtoleranzen DIN 7168-mK
Ersatz für 1981 EWN-F Oberfläche EN 85 Si

	Date/Name
1981	
Prep.	27.3
Check	
Stand	
EWN-TAL	

Siemens AG

Scale

Massblatt
m. Stegmann-Absolutgeber AG66

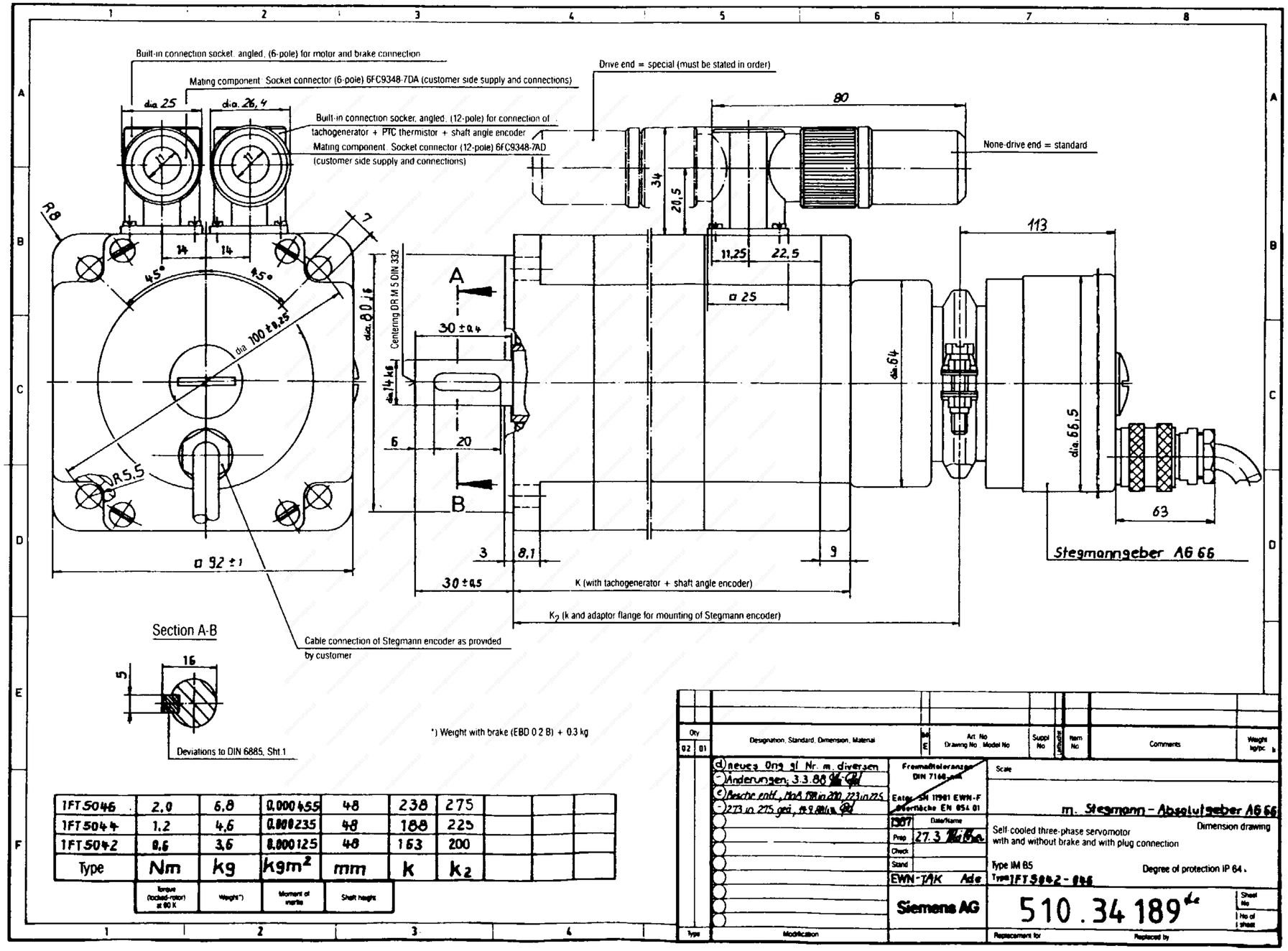
Self-cooled three-phase servomotor with and without brake and with plug connection
Type IM B5
Degree of protection IP 64
Type 1FT 503.

510.34 188 .16c

Sheet No.
No. of sheet

Type | Modification | Replacement for | Replaced by

Fig. 3.39 Dimension sheet for AC servomotors 1FT5 032 to 1FT5 036 with absolute shaft encoder AG-66 - Type of construction IM B5



Type	Nm	kg	kgm²	mm	k	k2			
	Torque (locked-rotor) at 60 K	Weight*)	Moment of inertia	Shaft height					
1FT5046	2,0	6,8	0,000455	48	238	275			
1FT5044	1,2	4,6	0,000235	48	188	225			
1FT5042	0,6	3,6	0,000125	48	163	200			

Qty 02	01	Designation, Standard, Dimension, Material	Art. No / Drawing No. / Model No	Suppl. No	Item No	Comments	Weight kg/pc.
		d neues Org. gl. Nr. m. diversen					
		- Änderungen 3.3.88					
		c Besche entf., Mat. 5 Min 200, 273 in 275					
		- 273 in 275 geä., 19.8.88					

Modification

Fremdtoleranzen DIN 7168 mittel
Ersatz für: SN 11981 EWN-F
Oberfläche EN 054 01

	Date/Name
1987	
Prep.	27.3.
Check	
Stand	

EWN-TAK Ade

Siemens AG

Scale

m. Stegmann - Absolutgeber AG 66

Self-cooled three-phase servomotor with and without brake and with plug connection

Dimension drawing

Type IM B5

Degree of protection IP 64

Type 1FT5042-0AB

510.34 189 de

Sheet No. | No. of sheets

Replacement for | Replaced by

Fig. 3.40 Dimension sheet for AC servomotors 1FT5 042 to 1FT5 046 with absolute shaft encoder AG-66 - Type of construction IM B5

4 Appendix

Explanation of terms

- *Locked-rotor torque M_0*

  The locked-rotor torque M_0 can be output at N = 0 for an infinite period of time, the servomotor in this case draws current I_0.
  - Locked-rotor torque (60 K) with a winding temperature rise of $\Delta T = 60$ K
  - Locked-rotor torque (100 K) with a winding temperature rise of $\Delta T = 100$ K

- *Rated torque M_n*

  The servomotor can produce the rated torque M_n at its shaft in accordance with the specified duty-type rating (S1 or S3) and operating time with a cycle time of 10 min (DIN VDE 0530) and at the rated speed n_N. This is based on a winding temperature rise of $\Delta T = 100$ K.

- *Peak current I_{max}*

  The peak current I_{max} is the highest current value still avoiding irreversible magnetization. The maximum acceleration current should not exceed 4.5 times the rated current. The actual acceleration current is determined by the maximum current of the assigned converter. In order to protect the mechanical integrity of the motor, a peak torque of $4 \times M_0$ (100K) must not be exceeded.

- *Maximum speed n_{max}*

  The maximum speed n_{max} is the limit speed at which the servomotor, depending on the specified DC link voltage of the converter, can be operated at no load (M = 0). No further current can be impressed on the motor when this speed is exceeded at the specified rated DC link voltage. In addition, these values also allow for maximum speed limits defined by the mechanical components of the motor.

- *Torque constant K_T*

  The torque constant K_T is the quotient of the locked-rotor torque and the associated current with a DC supply (form factor 1). Reduction of the torque constant due to the frictional torque and the core and stray losses has not been taken into account. These correction factors do not apply under locked-rotor conditions.

- *Voltage constant K_E*

  The voltage constant K_E is the upper limit value referred to 1000 RPM of the line-to-line induced voltage.

- *Electrical time constant T_{el}*

  The electrical time constant T_{el} is the quotient of the stator winding inductance and the stator winding resistance. It is a reasonably constant value for every servomotor type, regardless of the armature circuit. It specifies the time required by the armature current to reach 63% of its final value when voltage is applied abruptly and the rotor locked.

- *Thermal time constant T_{th}*

  Average housing time constant τ in which the housing reaches 63 % of its final temperature rise.

- *Mechanical time constant T_{mech}*

  The mechanical time constant T_{mech} is determined by the tangent on a theoretical acceleration curve at its point of origin. It is calculated from:

$$T_{mech} = \frac{J_{mot} \times R_{U\text{-}V}}{K_T \times K_E} \times 2\pi \times \frac{1000}{60} \quad [s]$$

In this equation:

J_{mot} moment of inertia of servomotor [kgm²]
$R_{U\text{-}V}$ resistance of two stator winding phases [Ω]
K_T torque constant [Nm/A]
K_E voltage constant [V/1000 RPM]

- *Braking resistance $R_{a\ opt}$*

  $R_{a\ opt}$ is the resistance to be series-connected externally to each phase of the motor winding during armature short-circuit braking. When the specified resistance value is zero, optimum braking is achieved without external resistances, i.e. direct short-circuit at the terminals.

- *Braking torque $M_{B\ opt}$*

  $M_{B\ opt}$ is the mean optimum braking torque achieved by means of a resistance adjustment.

- *Winding inductance L_A* *per-phase values*

- *Winding resistance R* *per-phase values*

- *Rated DC current*

  The rated DC output current I_N specified in the type designation and the technical data is the preload current with which the converter can be loaded when the short-time limit current is used. The rated DC output current must be seen as a continuous thermal current and cannot be increased.

- *Short-time limit current*

  The short-time limit current I_{dmax} is a current which is permissible for a maximum of 200 ms with a load cycle of 10 s. The preload current is the rated DC current. This short-time limit current is required for acceleration and braking and is sufficient for feed drives of normal design.

- *Converter current limit*

  The maximum current limit of the converters is adjusted in the factory to the short-time limit current (2 x rated current). The value must be matched to the servomotors connected.

To

Siemens AG

AUT V812
Postfach

D-8500 Nürnberg 1

Suggestions **Corrections**
For booklet: SIMODRIVE 1FT4 and 1FT5 300VAC drives for 6RA29 infeed/regenerative feedback unit
Description Order No.: 6ZB5420-0AB02-0BN0 Edition: 09.89

Sender: Name _____ Firm/Department _____ Address _____ Telephone /	If you have discovered any printing errors when reading this document, please send us details using this printed form. We would also be very grateful for any ideas and suggestions for improvement.

Suggestions and/or corrections

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Automation Systems for
Machine Tools and Robots
Postfach 4848, D-8500 Nuernberg 1
Federal Republic of Germany

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(2210) 420/0005.90-5606-BS 01.901.0 (2430)

progress
in automation:
Siemens