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- ✓ 24 hour rush turnaround / technical support service
- ✓ Established in 1993



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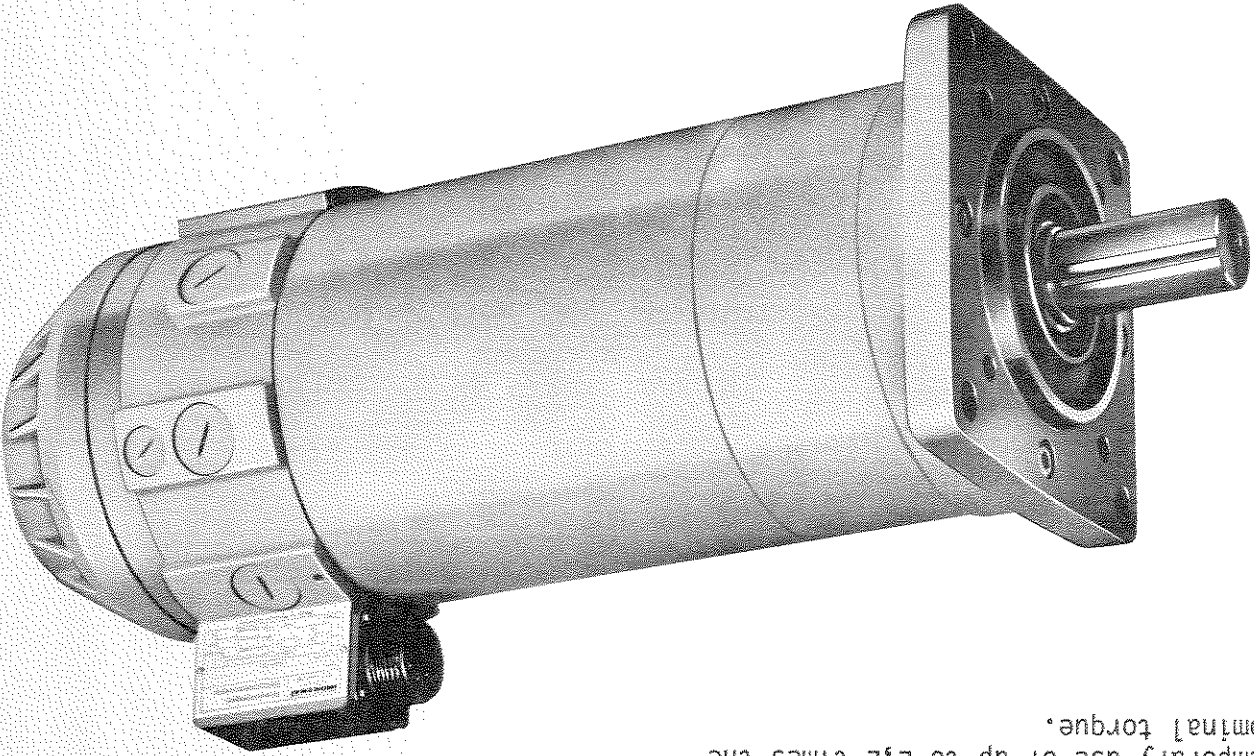
USA: 1 (888) 932 - 9183

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Emergency After hours: 1 (416) 624 0386

Servicing USA and Canada

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INDRAMAT direct-current servo drives of series MDC 3 are permanent magnet, fast-responding 4 quadrant direct-current control drives with continuous static torques from 7 Nm to 35 Nm and useful speeds of up to 1200 rpm. In conjunction with INDRAMAT thyristor control amplifiers or SELEKTOR control amplifiers, the MDC 3 servo motors have drive characteristics meeting ideally those high demands made in feed drives for numerically controlled machine tools, and similar applications. The useful speed stated above is an application-oriented maximum speed with in which operation in position control circuits involving the usual machine tool stresses is assured without optimization and without special dynamic calculations. The servo motors are designed in a fully enclosed construction with protective system IP 54 or in an internal fan version with protective system IP 30. The permanent magnetic field and thermal time constants from 60 to 250 min. permit high peak torques as well as temporary use of up to 2,2 times the nominal torque.

Constructional characteristics:

The field
is an 8-pole field and consists of permanent magnets of field-tested material. It permits low dimensions and prevents the heat losses of an excitation winding.

The rotor
is iron-doped and its copper: iron ratio has been optimized in compliance with the field characteristics. The relatively great rotor inertia provides a corresponding heat capacity for high peak torques and temporary overloading. It furthermore dampens dynamic load reactions and permits a high proportional gain in the speed control loop. The ratio mass to moment of inertia has been designed so that the effective braking and accelerating paths are as small as practicable in view of the basic motor speeds which generally permit the use of a drive for machine tool axis with a gear ratio of up to $i = 1 : 4$.

INDRAMAT permanent magnet direct-current servo drives Series MDC 3



IE 29 832

Type MDC servo motor	symbol	unit	I _{effz} (A)	I _{max} (A)	Torque constant K _m (Nm/A)	Voltage constant C _ω (Vs/rad)	RA (Ω)	LA (mH)	J (kgm ²)	τ _m (ms)	n _{max} (min ⁻¹)	Permissible peak voltage U̇ (V)	Insulation class	Maximum ambient temperature θ (°C)	Thermal time constant T _{th} (min)	m (kg)	Short-circuit torque M _{dk} (Nms/rad)	Continuous torque (2-pulse) M _{deff} (Nm)	Continuous torque (3-pulse) M _{deff} (Nm)	Continuous torque (Selektor) M _{deff} (Nm)
3.40B			33	300	1,07	0,8	0,19	0,6	0,078	13,0	1000	170	F	45	250	69,8	6,0	26	32	35
3.30B			33	300	0,8	0,151	0,5	0,9	0,059	13,9	1000	170	F	45	220	58,4	4,15	20	24	26
3.20C			22	200	0,8	0,257	0,9	0,039	0,039	15,5	1200	170	F	45	170	47	2,5	14	16	18
3.20B ²⁾			33	300	0,535	0,113	0,4	0,039	0,039	15,5	1200	170	F	45	170	47	2,5	14	16	18
3.10F ²⁾			11	100	0,8	0,68	3,6	0,4	0,0196	20,8	1200	170	F	45	120	35,6	0,95	7	8	9
3.10C			22	200	0,4	0,17	0,45	0,0196	0,0196	20,8	1200	170	F	45	120	35,6	0,95	7	8	9

Tachogenerator	Voltage constant C _ω (Vs/rad)	RA (Ω)	RL (Ω)	Ripple percentage	Brake	Holding torque MB (Nm)	Nominal voltage UN (V)	Winding resistance at 20°C R _f (Ω)
	0,317 + 10 %	60	15 K	0,5		20	+ 24 + 10 %	38

1) Excess motor temperature 50°C
2) The motor sizes are not standard models

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Edition 9/79

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IE 29 832

The carbon brushes

are designed to withstand high acceleration current pulses and are arranged so that they are accessible from outside.

The rotor bearing assembly

consists of maintenance-free machine tool grade roller bearings. The face-end flanged bearing is designed for overhung mounting of straight-toothed spur gears or toothed-belt pulleys.

The tachogenerator

is a 4-pole permanent magnet hollow-shaft tachogenerator with a high e.m.f. and a low interfering voltage. It is mounted on the motor shaft by means of a tensioner so that it is non-positive and absolutely rigid.

An electrically operated brake

with 24 V direct voltage actuation is integrated in the rear bearing bracket. The brake is provided for the "Emergency Off" funktion and to hold the servo motor against external torque effects when the controller is switched off. The brake is wired with an overrunning circuit and a protective diode against incorrect polarity. Transducers for position controls

The servo motor is also produced with a second shaft end and a fastening flange for mounting any transducer with or without a sensor gear. Standard equipment is available in externally mounted assemblies with protective casings.

INDRAMAT permanent magnet direct-current servo drives Series MDC 3

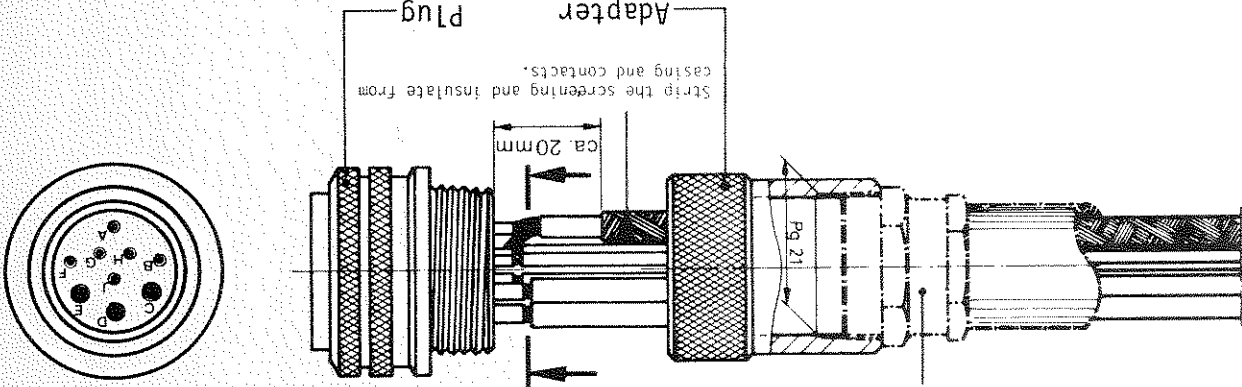
IE 29 832



Recommended wire cross sections	
Terminal	Wire
Tachogenerator	LYCY 2x0,75mm ² *)
Brake	2xNYAF 1mm ²
Thermostate	2xNYAF 1mm ²
H, J	2xNYAF 6mm ²
C, E	2xNYAF 6mm ²
D	1xNYAF 6mm ²

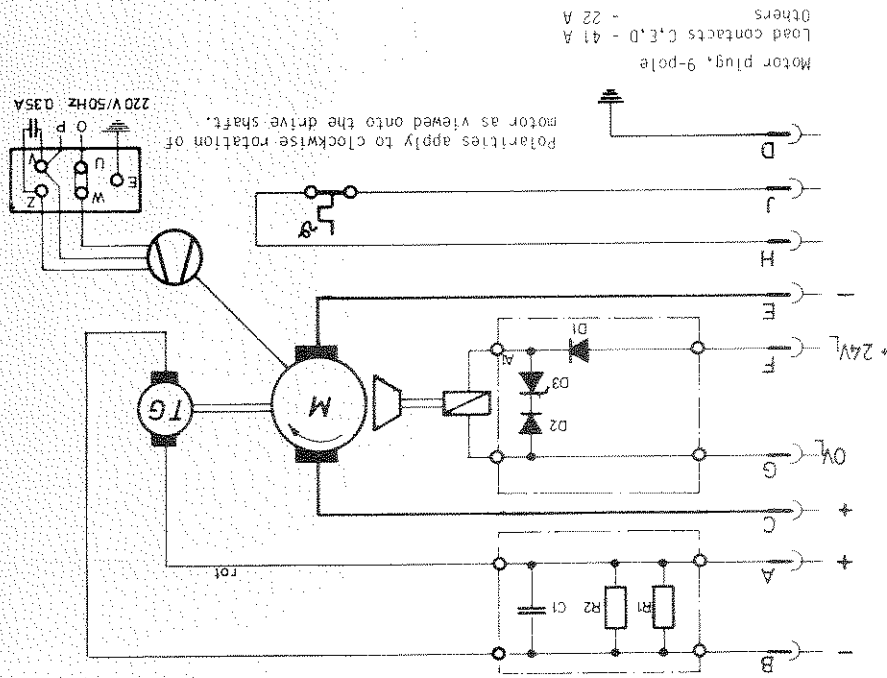
*) screened

Adapter Plug (included in delivery)



Electric protective tube connection Pg 21 (e.g. type SK 21 for protective tube with internal Ø 18.5 and external Ø 22.5 manufactured by Schlemmer).

Motor plug with line connection



MDC 3 wiring diagram

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INDRAMAT permanent magnet direct-current servo drives Series MDC 3

IE 29 832

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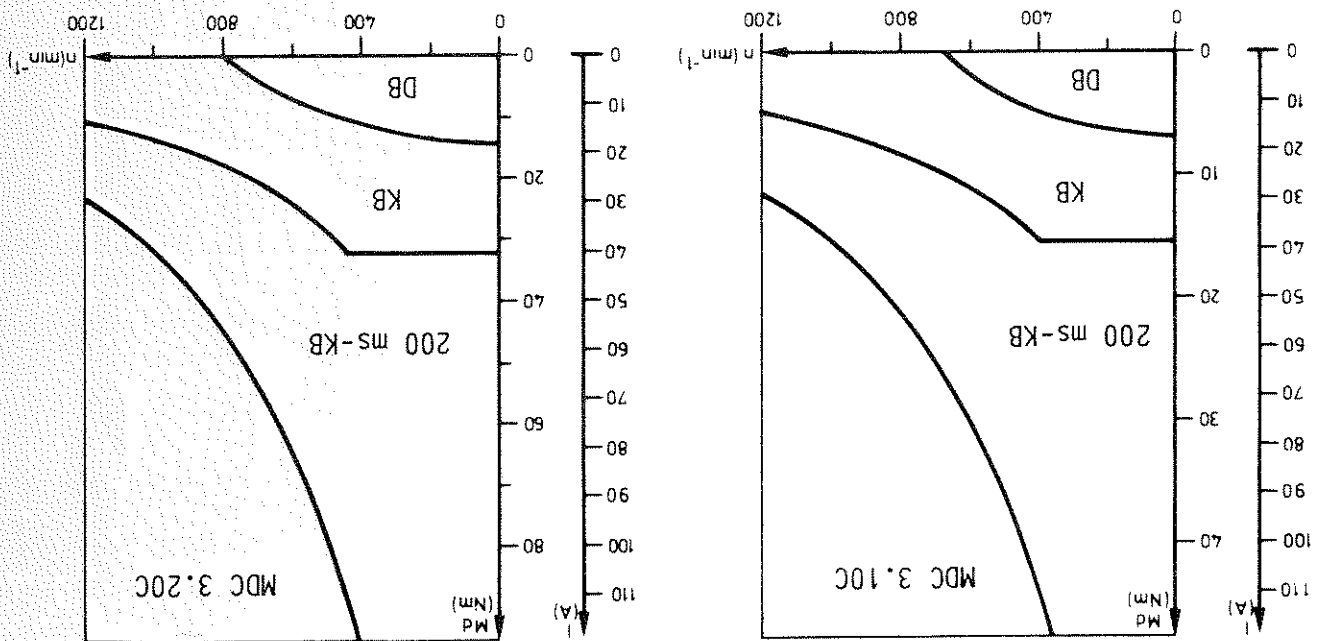
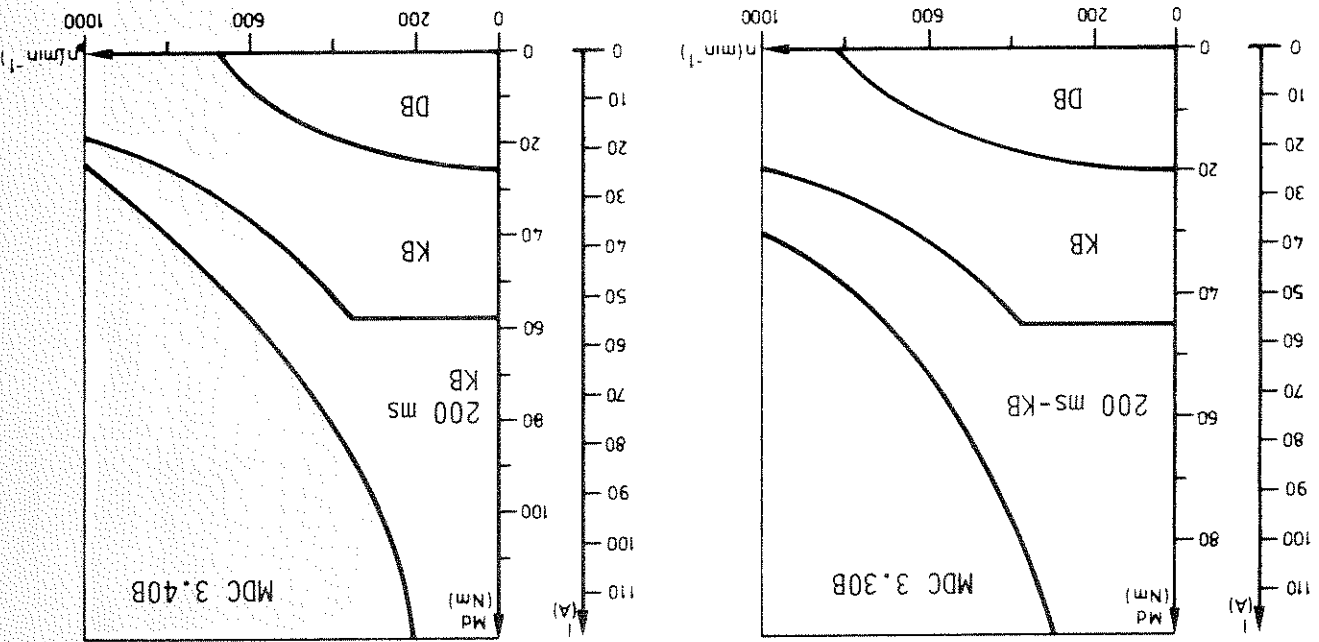
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Edition 9/79

Servo motor	20	40	60	80	100	% c.d.f.
MDC 3.10C	16	11	9	8	7	Nm
MDC 3.20C	32	22	18	16	14	Nm
MDC 3.30B	45	32	26	23	20	Nm
MDC 3.40B	58	41	34	29	26	Nm

Excess motor temperature 50°C. Temporary excessive torques are permissible up to a cycle time of 15 min. with a correspondingly reduced cyclic duration factor (c.d.f.)

KB = short-time duty DB = continuous duty



Diese Unterlage darf weder kopiert noch Dritten zugänglich gemacht werden. Gesetzl. urh. Urheberrecht.

MDC 3 direct-current servo motors
Operating limits with
2-pulse thyristor control
Enclosed version. Protective system IP 54

INDRAMAT

106-61-4153-0

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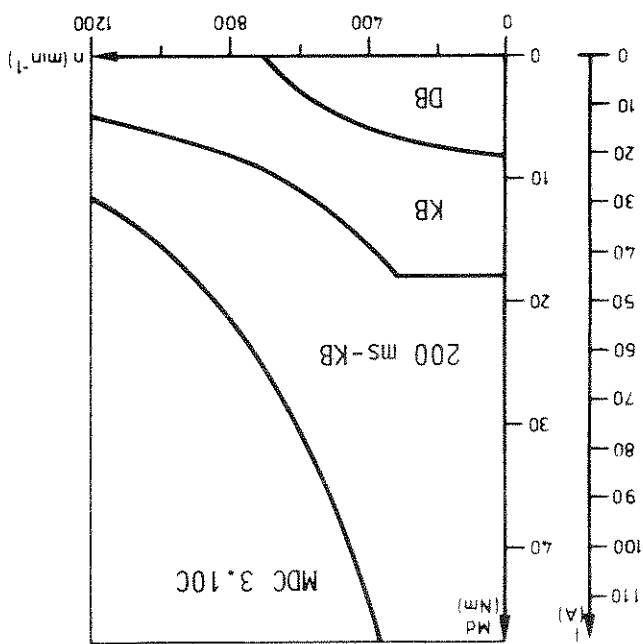
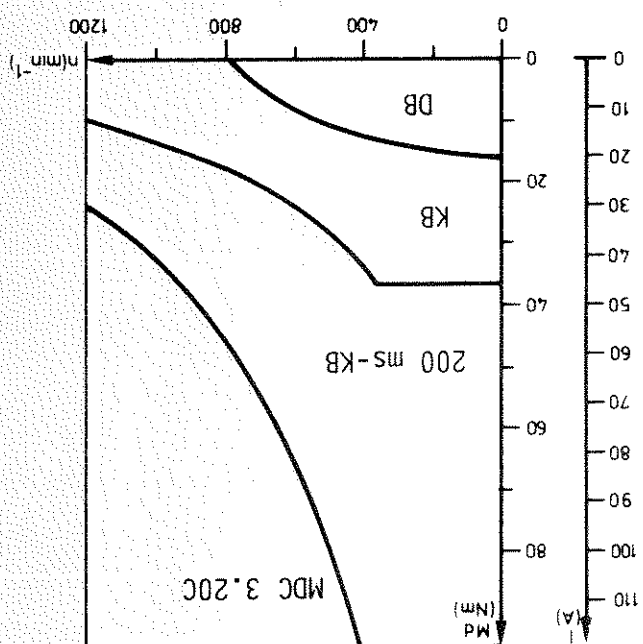
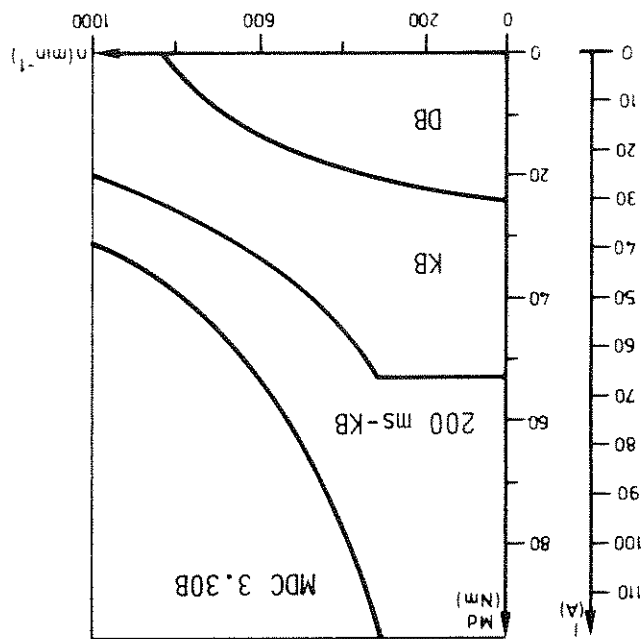
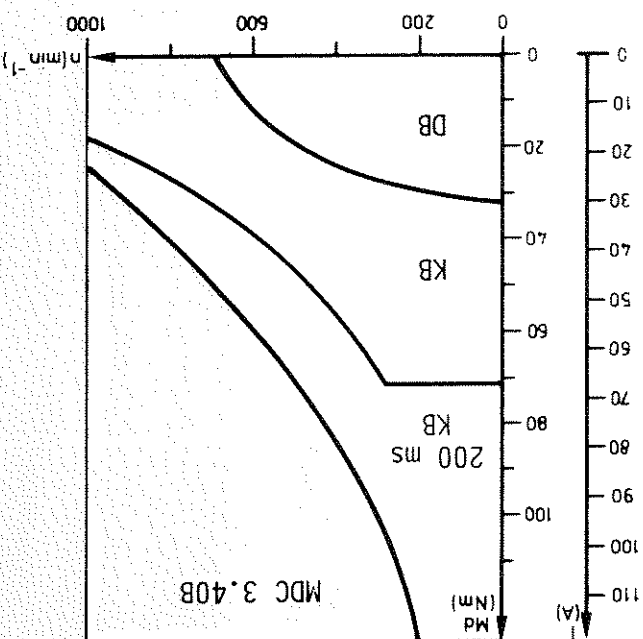
-5-

Edition 9/79

Servo motor	20	40	60	80	100	% c.d.f.
MDC 3.10C	18	13	10	9	8	Nm
MDC 3.20C	36	25	21	18	16	Nm
MDC 3.30B	54	38	31	27	24	Nm
MDC 3.40B	72	51	41	36	32	Nm

Excess motor temperature 50°C. Temporary excessive torques are permissible up to a cycle time of 15 min. with a correspondingly reduced cyclic duration factor. (c.d.f.)

KB = short-time duty
DB = continuous duty



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MDC 3 direct-current servo motors
Operating limits with
3-pulse thyristor control

Enclosed version. Protective system IP 54

106-61-4152-0

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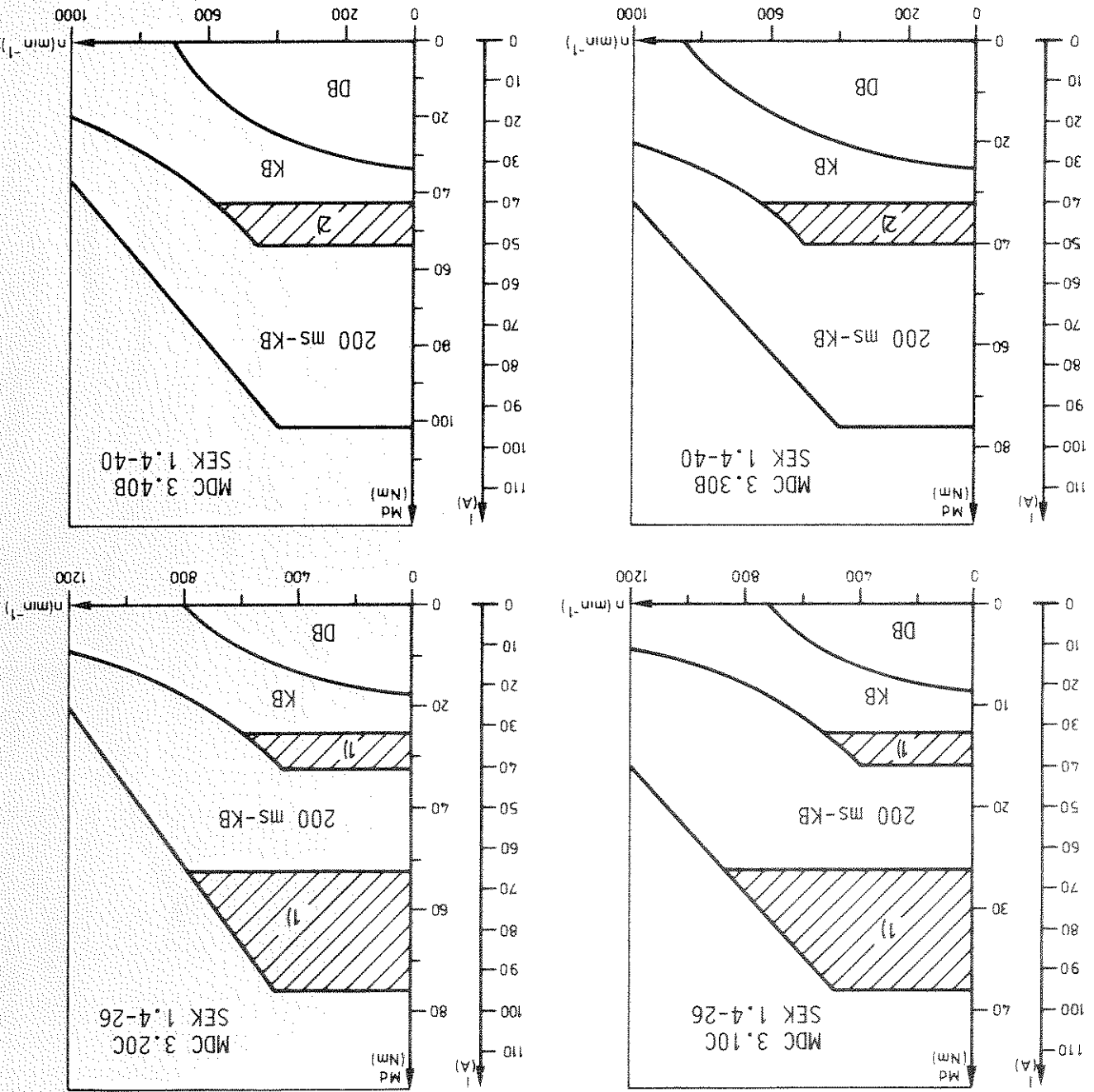
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Edition 9/79

Servo motor	20	40	60	80	100	%c.d.f.
MDC 3.10C	16	14	12	10	9	Nm
MDC 3.20C	32	28	24	20	18	Nm
MDC 3.30B	40	40	32	29	26	Nm
MDC 3.40B	54	54	43	39	35	Nm

Excess motor temperature 50°C. Temporary excessive torques are permissible up to a cycle time of 15 min. with a correspondingly reduced cyclic duration factor (c.d.f.)

KB = short-time duty DB = continuous duty



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MDC 3 direct-current servo motors

Operating limits with

SELEKTOR control

Enclosed version. Protective system IP 54

106-61-4151-1

Type MDC servo motor	Symbol	unit	3.11C	3.11F ⁽²⁾	3.21B ⁽²⁾	3.21C	3.31B
Permissible continuous effective current	I _{effZul}	(A)	32	16	47	32	47
Maximum peak pulse current	I _↓	(A)	200	100	300	200	300
Torque constant	K _m (Nm/A)		0,4	0,8	0,535	0,8	0,8
Voltage constant	C _ω (Vs/rad)		0,4	0,8	0,535	0,8	0,8
Armature resistance at 20°C	R _A (Ω)		0,17	0,68	0,113	0,257	0,151
Armature inductance	L _A (mH)		0,45	3,6	0,4	0,9	0,5
Rotor moment of inertia	J (kgm ²)		0,0196	0,0196	0,039	0,039	0,059
Mechanical time constant	T _m (ms)		20,8	20,8	15,5	15,5	13,9
Maximum useful speed	n _{max} (min ⁻¹)		1000	1000	1000	1000	1000
Permissible peak voltage	U (V)		170	170	170	170	170
Insulation class			F	F	F	F	F
Maximum ambient temperature	θ _a (°C)		45	45	45	45	45
Thermal time constant	t _{th} (min)		120	120	170	170	220
Weight	m (kg)		35,6	35,6	47	47	58,4
Short-circuit torque	M _{dk} (Nms/rad)		0,95	0,95	2,5	2,5	4,15
Continuous torque (2-pulse)	M _{deff} (Nm)		-	-	-	-	-
Continuous torque (3-pulse)	M _{deff} (Nm)		11	11	23	23	34
Continuous torque (SELEKTOR)	M _{deff} (Nm)		12,5	12,5	25	25	37
Tachogenerator							
Voltage constant	C _ω (Vs/rad)		0,317 ± 10 %				
Armature resistance	R _A (Ω)		60				
Minimum terminating resistance	R _L (Ω)		15 k				
Ripple percentage	(%)		0,5				
Brake							
Holding torque	M _B (Nm)		20				
Nominal voltage	U _N (V)		24 ± 10 %				
Winding resistance at 20°C	R _i (Ω)		38				
Fan							
Power	(W)		77				
Voltage	(V)		220 ~				
Current	(A)		0,35				
Frequency	(Hz)		50/60				

1) 50 °C excess motor temperature

2) The motor sizes are not standard models

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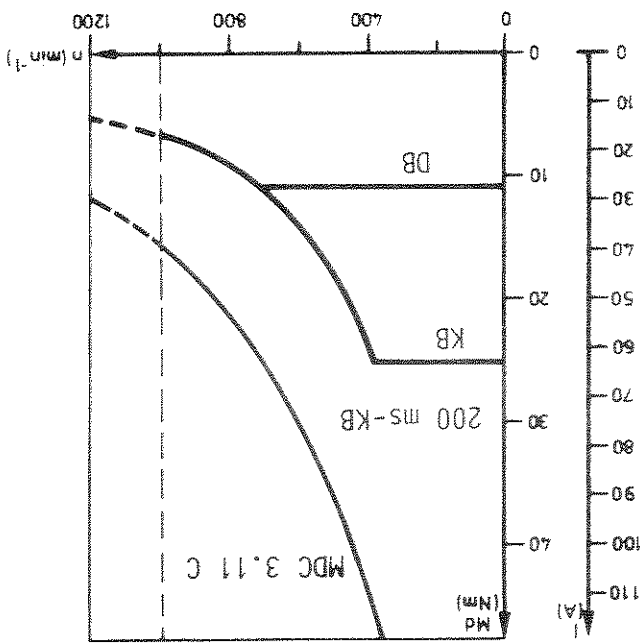
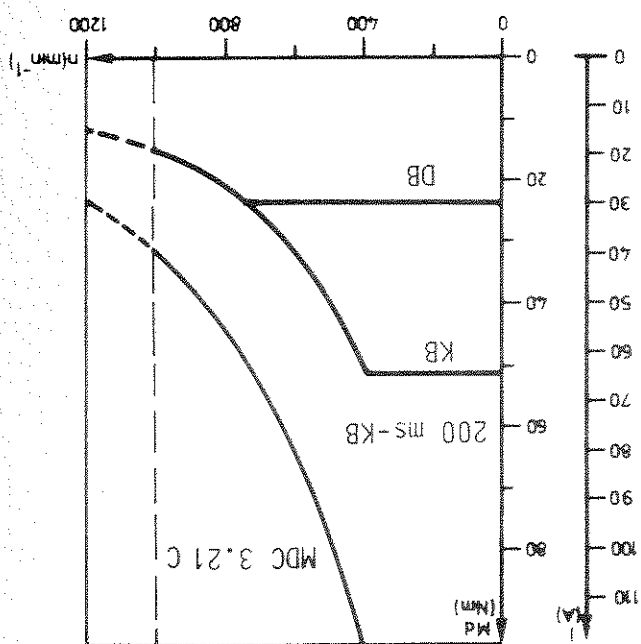
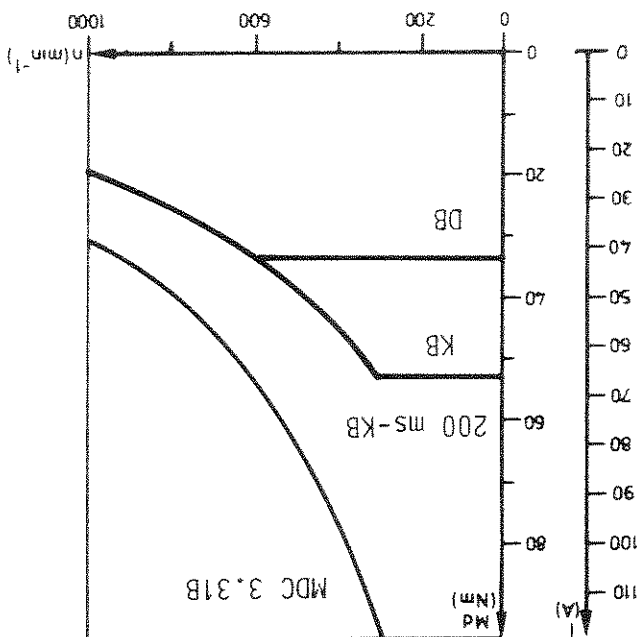
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Edition 9/79

Servo motor	20	40	60	80	100	%c.d.f.
MDC 3.11C	25	18	14	12	11	Nm
MDC 3.21C	51	36	30	26	23	Nm
MDC 3.31B	54	54	44	38	34	Nm

Excess motor temperature 50 °C. Temporary excess torques are permissible up to a cycle time of 15 min. with a correspondingly reduced cyclic duration factor (c.d.f.)

KB = short-time duty DB = continuous duty



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MDC 3 direct-current servo motors
Operating limits with
3-pulse thyristor control

Internal fan version, protective system IP30

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109-84-4156-0

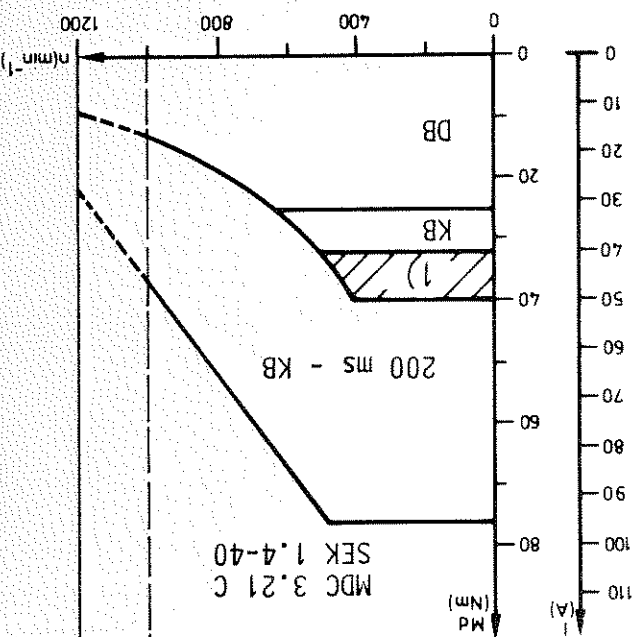
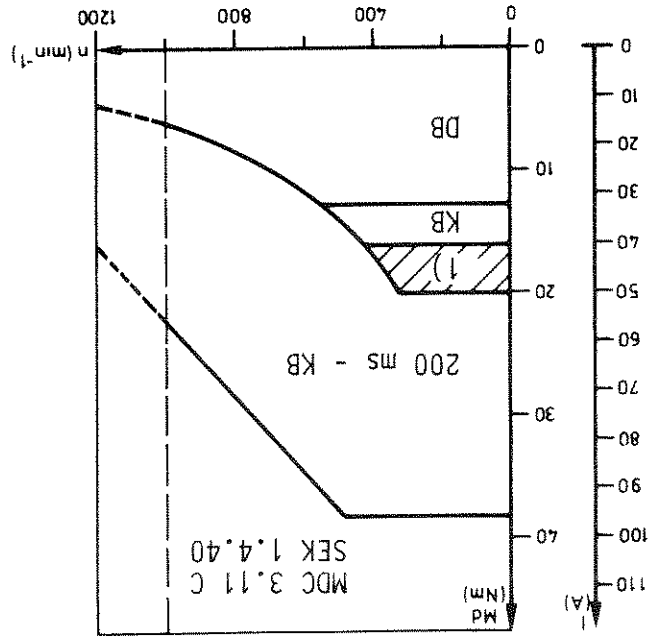
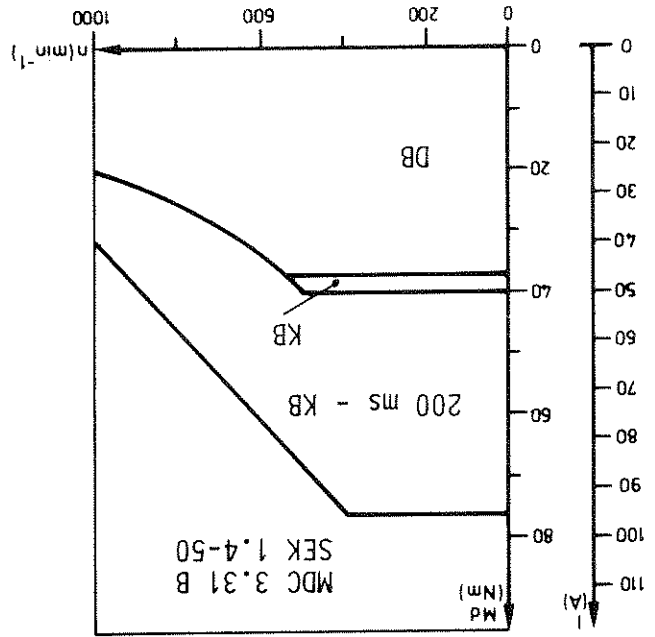
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Edition 9/79

Servo motor	20	40	60	80	100	%c.d.f.
MDC 3.11 C	20	20	16	14	12,5	Nm
MDC 3.21 C	40	40	32	28	25	Nm
MDC 3.31 B	40	40	40	40	37	Nm

KB = short-time duty DB = continuous duty 1) SEK 1.4-50
 Excess motor temperature 50 °C. Temporary excess torques are permissible up to a cycle time of 15 min. with a corresponding reduced cyclic duration factor (c.d.f.)



MDC 3 direct-current servo motors

Operating limits with

SELEKTOR control

Internal fan version. Protective system IP 30

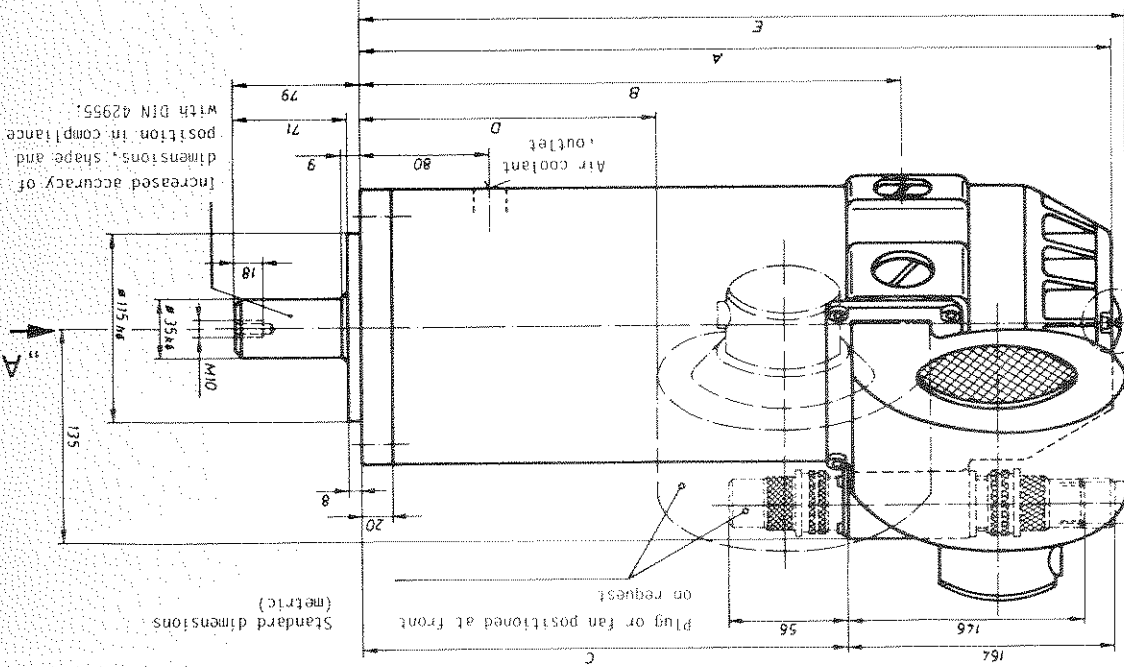
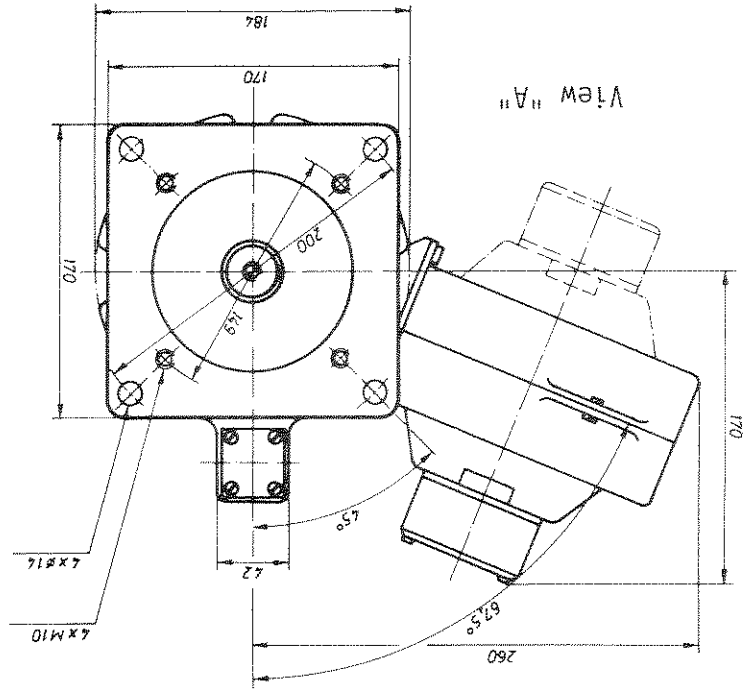
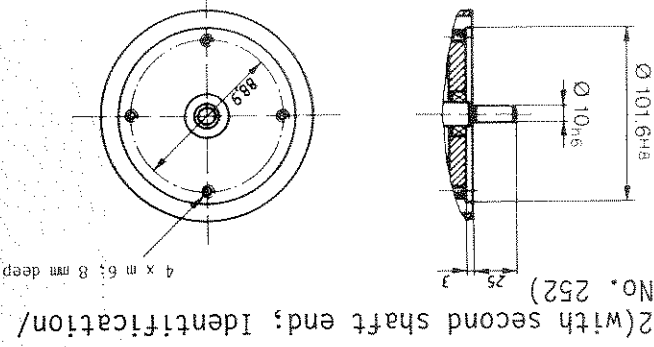
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106-61-4158-0

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Motor size		1	2	3	4
A	Dimensions	370	470	570	670
B		238	338	438	538
C		205	305	405	505
D		85	185	285	385
E		382	482	582	682

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Dimensions in inches

Standard dimensions (metric)

Increased accuracy of dimensions, shape and position in compliance with DIN 42955!

INDRAMAT permanent magnet direct-current servo drives Series MDC 3

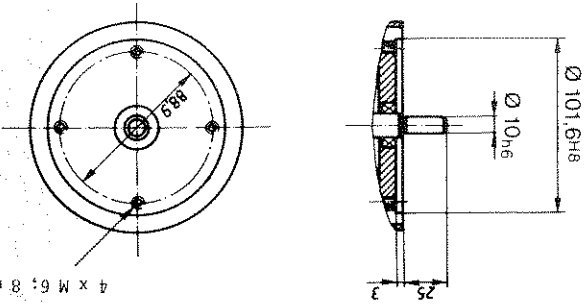
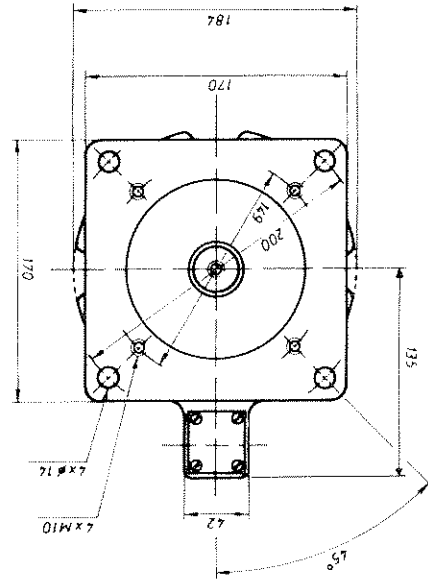
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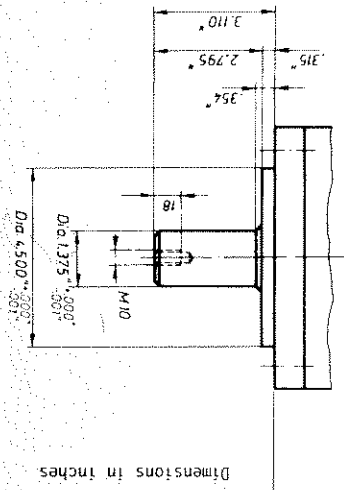
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Dimensions		Motor size			
A	370	470	570	670	770
B	238	338	438	538	638
C	205	305	405	505	605

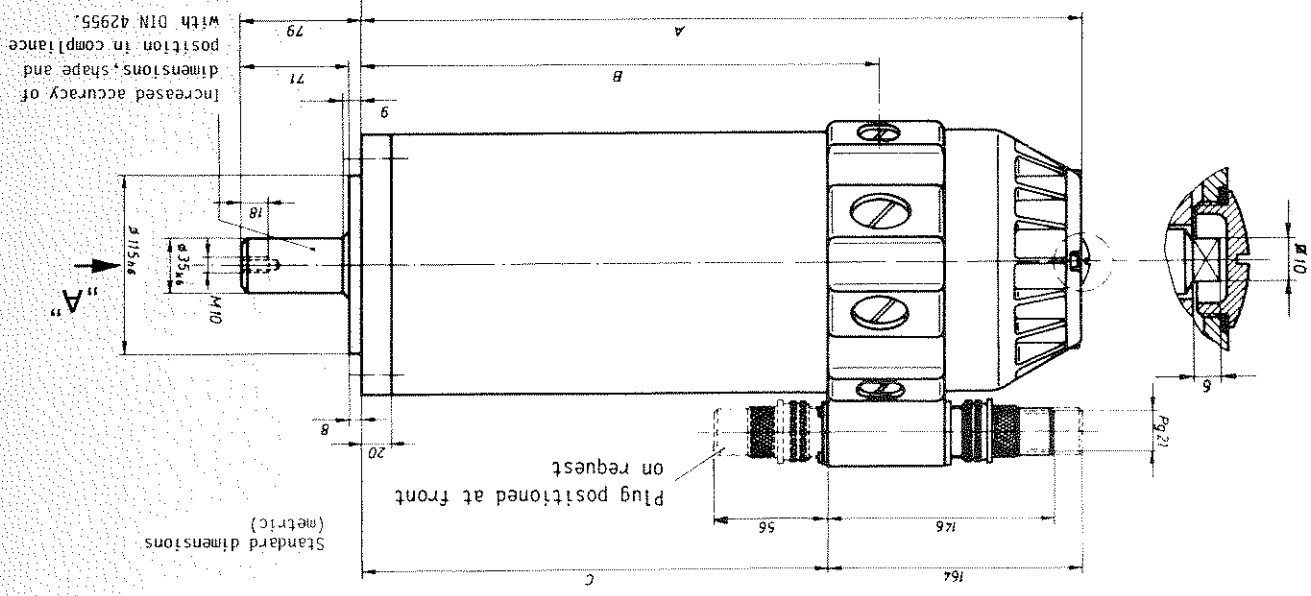
View "A"



Model 2 (with second shaft end; Identification/Group No. 252).
4 x M 6; 8 mm deep

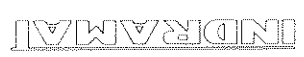


Dimensions in inches



Model 1 (without additional feedback)

INDRAMAT permanent magnet direct-current servo drives Series MDC 3



106-61-2001-1