

## 8. MDD 090

### 8.1. Technical Data

Designation	Symbol	Unit	Motor type MDD ...		
			090 A-N-020	090 B-N-020	090 C-N-020
Nominal motor speed <sup>1)</sup>	$n$	min <sup>-1</sup>	2000	2000	2000
Continuous torque at standstill <sup>2)</sup>	$M_{dN}$	Nm	3.7 (5.0) <sup>5)</sup>	7.2 (10.5) <sup>5)</sup>	10.4 (16.0) <sup>5)</sup>
Continuous current at standstill	$I_{dN}$	A	4.0 (5.4) <sup>5)</sup>	8.3 (12.2) <sup>5)</sup>	12.1 (18.6) <sup>5)</sup>
Theoretic maximum torque <sup>3)</sup>	$M_{max}$	Nm	19.0	39.0	58.6
Maximum current	$I_{max}$	A	21.9	48.6	72.9
Moment of inertia of rotor <sup>4)</sup>	$J_M$	kgm <sup>2</sup>	20 x 10 <sup>-4</sup>	36 x 10 <sup>-4</sup>	53 x 10 <sup>-4</sup>
Torque constant at 20 °C	$K_m$	Nm/A	0.93	0.86	0.86
Windings resistance at 20 °C	$R_A$	Ohm	6.84	1.99	1.20
Windings inductance	$L_A$	mH	27.7	10.1	6.8
Thermal time constante	$T_{th}$	min	45 (30) <sup>5)</sup>	60 (45) <sup>5)</sup>	60 (45) <sup>5)</sup>
Mass <sup>4)</sup>	$m_M$	kg	12.5	18	23
			090 A-N-030	090 B-N-030	090 C-N-030
Nominal motor speed <sup>1)</sup>	$n$	min <sup>-1</sup>	3000	3000	3000
Continuous torque at standstill <sup>2)</sup>	$M_{dN}$	Nm	3.7 (5.0) <sup>5)</sup>	7.2 (10.5) <sup>5)</sup>	10.4 (16.0) <sup>5)</sup>
Continuous current at standstill	$I_{dN}$	A	6.3 (8.5) <sup>5)</sup>	12.6 (18.4) <sup>5)</sup>	19.5 (30.0) <sup>5)</sup>
Theoretic maximum torque <sup>3)</sup>	$M_{max}$	Nm	17.7	38.9	56.3
Maximum current	$I_{max}$	A	32.2	72.9	117.8
Moment of inertia of rotor <sup>4)</sup>	$J_M$	kgm <sup>2</sup>	20 x 10 <sup>-4</sup>	36 x 10 <sup>-4</sup>	53 x 10 <sup>-4</sup>
Torque constant at 20 °C	$K_m$	Nm/A	0.59	0.57	0.53
Windings resistance at 20 °C	$R_A$	Ohm	3.1	0.91	0.46
Windings inductance	$L_A$	mH	13.4	4.7	2.6
Thermal time constante	$T_{th}$	min	45 (30) <sup>5)</sup>	60 (45) <sup>5)</sup>	60 (45) <sup>5)</sup>
Mass <sup>4)</sup>	$m_M$	kg	12.5	18	23
			090 A-N-040	090 B-N-040	090 C-N-040
Nominal motor speed <sup>1)</sup>	$n$	min <sup>-1</sup>	4000	4000	4000
Continuous torque at standstill <sup>2)</sup>	$M_{dN}$	Nm	3.7 (5.0) <sup>5)</sup>	7.2 (10.5) <sup>5)</sup>	10.4 (14.6) <sup>5)</sup>
Continuous current at standstill	$I_{dN}$	A	9.4 (12.7) <sup>5)</sup>	16.7 (24.3) <sup>5)</sup>	24.4 (34.3) <sup>5)</sup>
Theoretic maximum torque <sup>3)</sup>	$M_{max}$	Nm	15.0	38.3	58.6
Maximum current	$I_{max}$	A	41.3	95.3	145.7
Moment of inertia of rotor <sup>4)</sup>	$J_M$	kgm <sup>2</sup>	20 x 10 <sup>-4</sup>	36 x 10 <sup>-4</sup>	53 x 10 <sup>-4</sup>
Torque constant at 20 °C	$K_m$	Nm/A	0.39	0.43	0.43
Windings resistance at 20 °C	$R_A$	Ohm	1.30	0.50	0.29
Windings inductance	$L_A$	mH	14.5	2.6	1.6
Thermal time constante	$T_{th}$	min	45 (30) <sup>5)</sup>	60 (45) <sup>5)</sup>	60 (45) <sup>5)</sup>
Mass <sup>4)</sup>	$m_M$	kg	12.5	18	23

<sup>1)</sup> Usable motor speed is determined by the torque requirements of the application. The usable speed  $n_{max}$  found in the selection lists of the motor-drive combinations are binding for **standard applications**. The usable speed for other applications can be found using the required torque in the torque-speed characteristics curves

<sup>2)</sup> With 60 K overtemperature at the motor housing.

<sup>3)</sup> Achievable maximum torque is dependent upon the drive used. **Only** those maximum torques  $M_{max}$  found in the selection list of the motor-drive combinations are binding.

<sup>4)</sup> Without blocking brake, without blower

<sup>5)</sup> Parenthetical values apply to motors with surface cooling.

Fig 8.1: Type dependent motor data

Designation	Symbol	Unit	Data
Permissible ambient temperature	$T_{um}$	°C	0 ... + 45
Permissible storage and transport temperature	$T_L$	°C	-20 ... + 80
Maximum installation elevation		m	1000 meters above sea level
Protection category			IP 65
Insulation classification			F
Housing coat			Black prime coat (RAL 9005)

Fig 8.2: General data MDD 090

Designation	Symbol	Unit	Data Blocking Brake	
Principle of action			electrically actuated release	
Holding torque	$M_H$	Nm	6.5	11
Nominal voltage	$U_N$	V	DC 24 ± 10%	DC 24 ± 10%
Nominal current	$I_N$	A	0.5	0.5
Moment of inertia	$J_B$	kgm <sup>2</sup>	$1.06 \times 10^{-4}$	$1.06 \times 10^{-4}$
Release delay	$t_L$	ms	60	60
Clamping delay	$t_K$	ms	20	20
Mass	$m_B$	kg	0.5	0.5

Fig 8.3: Technical data - blocking brake

## 8.2. Torque-Speed Characteristics

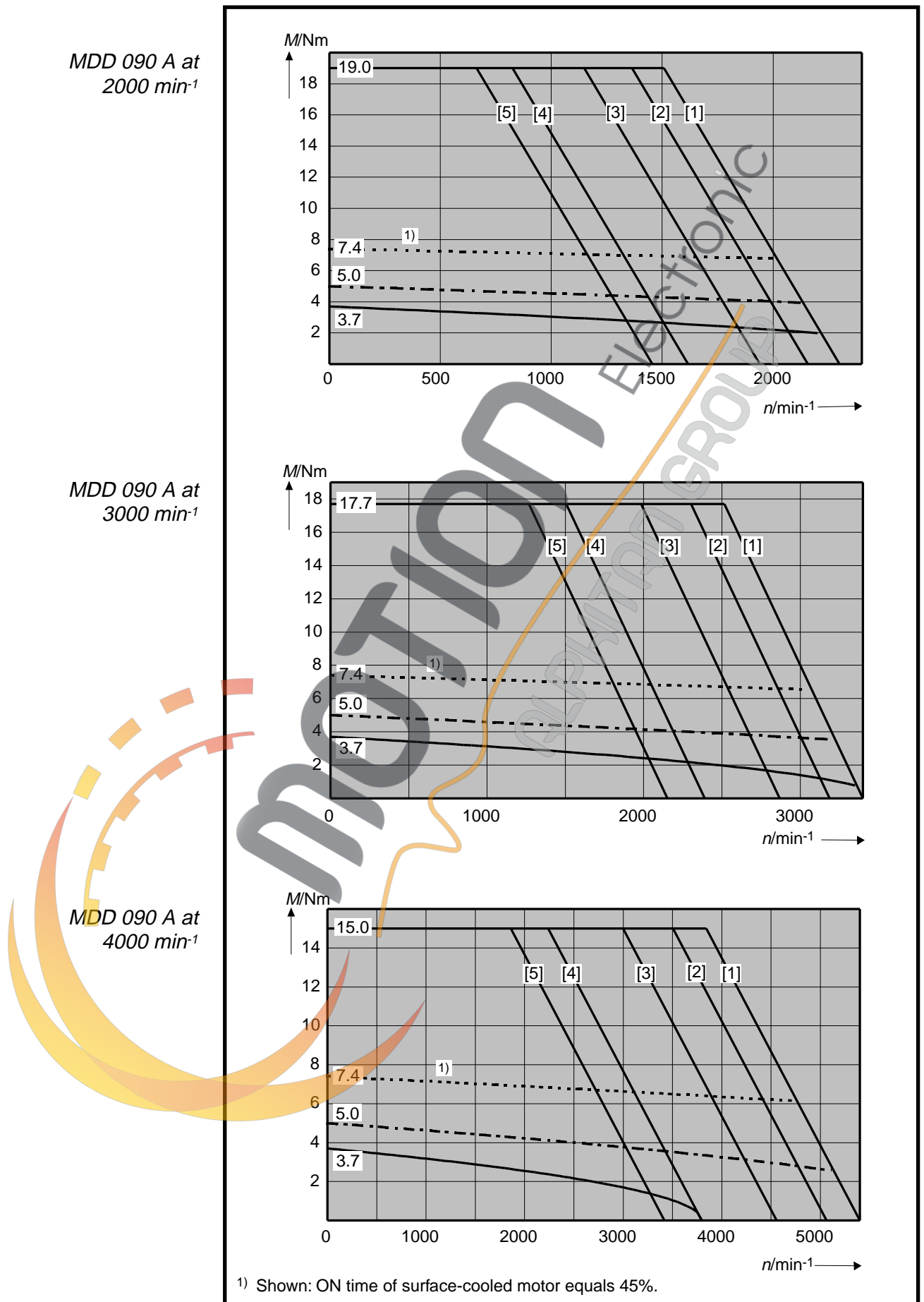
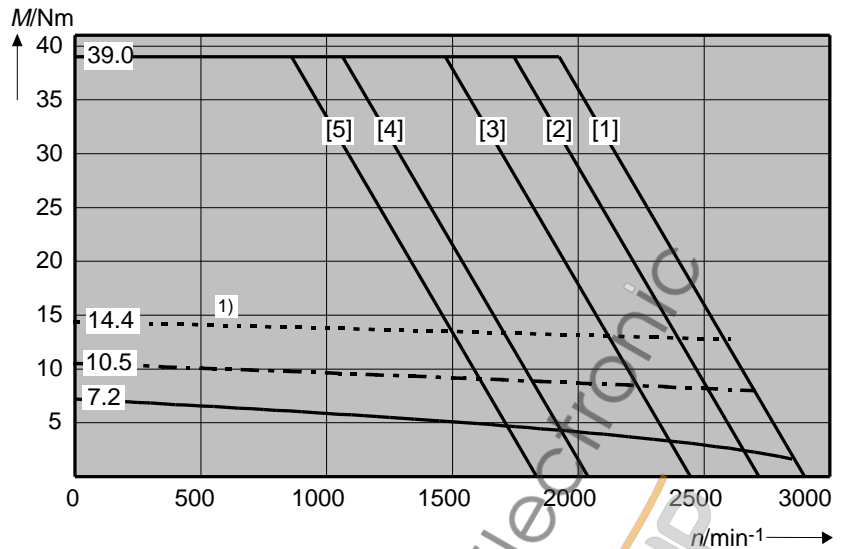
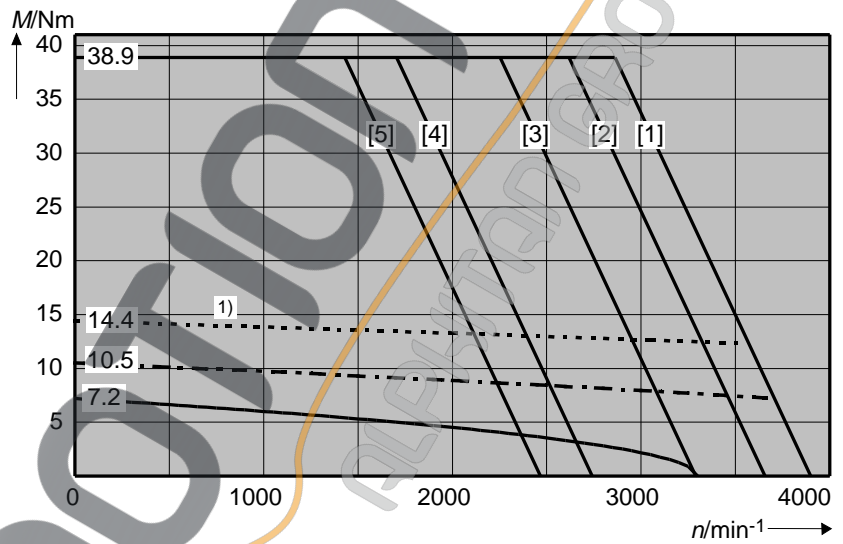


Fig 8.4: Torque-speed characteristics curves - MDD 090

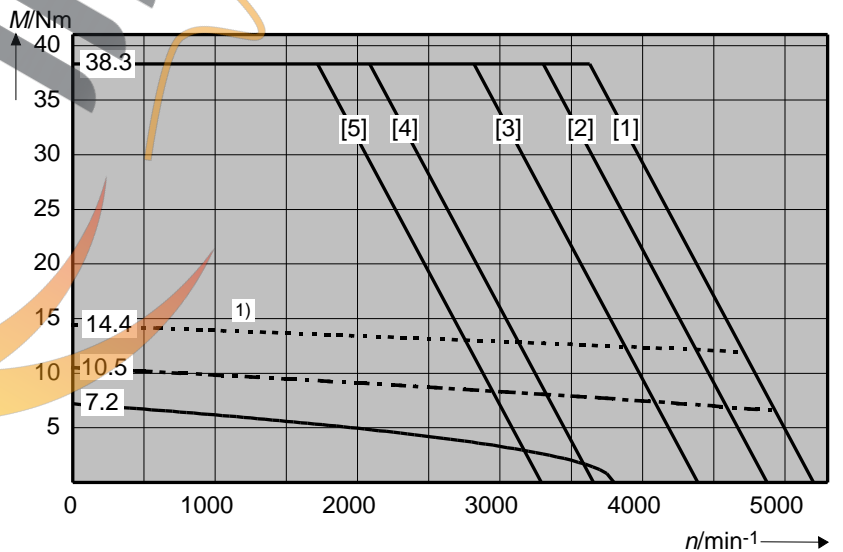
MDD 090 B at  
2000 min<sup>-1</sup>



MDD 090 B at  
3000 min<sup>-1</sup>



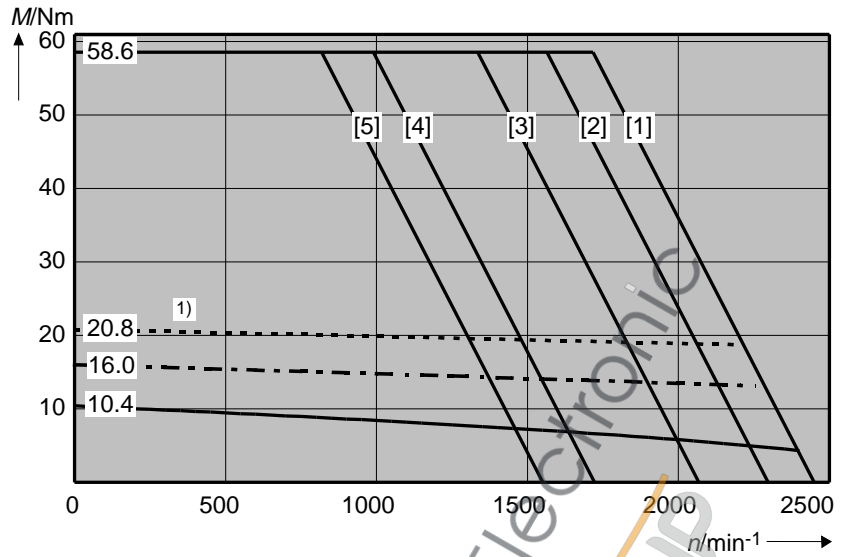
MDD 090 B at  
4000 min<sup>-1</sup>



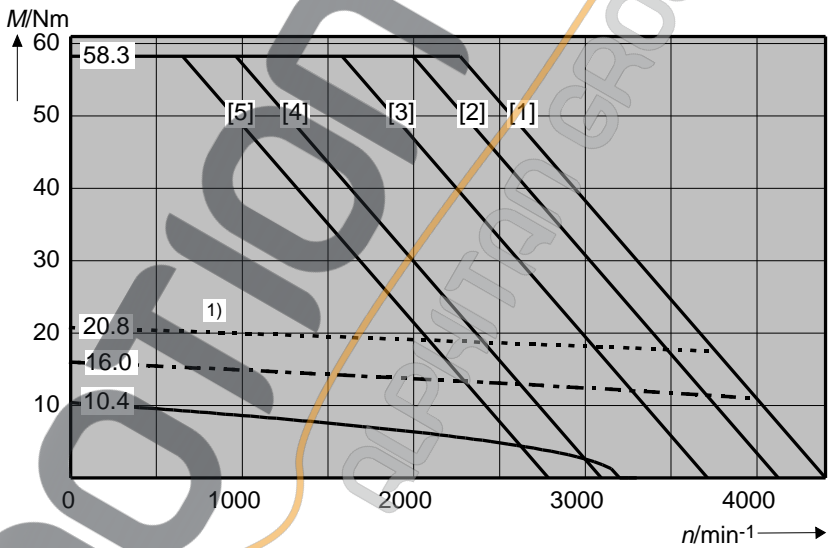
1) Shown: ON time of surface-cooled motor equals 53%.

Fig 8.5: Torque-speed characteristics curves - MDD 090

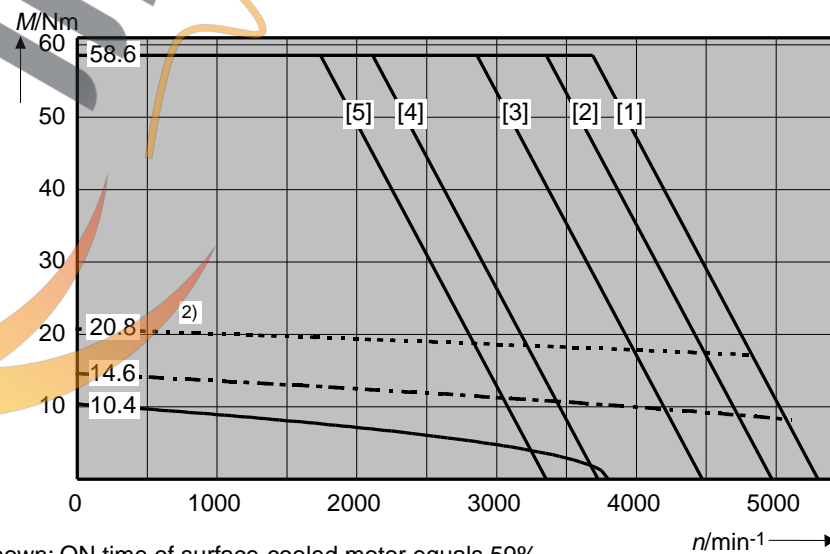
MDD 090 C at  
2000 min<sup>-1</sup>



MDD 090 C at  
3000 min<sup>-1</sup>



MDD 090 C at  
4000 min<sup>-1</sup>



- 1) Shown: ON time of surface-cooled motor equals 59%.
- 2) Shown: ON time of surface-cooled motor equals 49%.

Fig 8.6: Torque-speed characteristics curves - MDD 090

### 8.3. Shaft Load Capacity

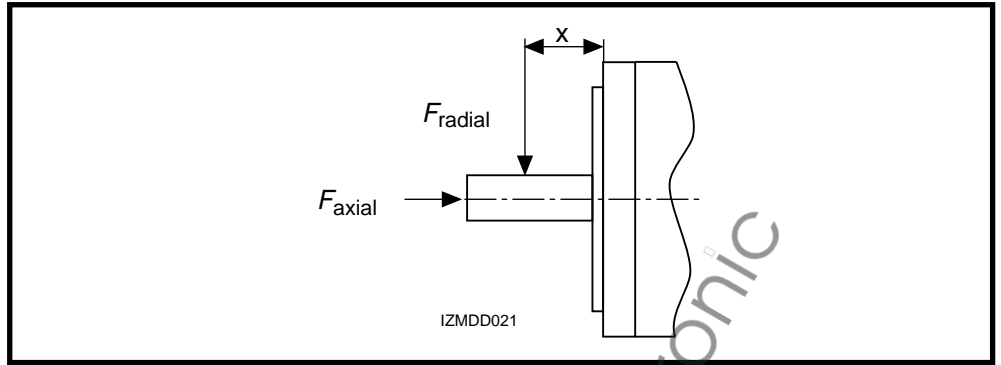


Fig 8.7: Shaft load

Permissible radial force  
 $F_{\text{radial}}$

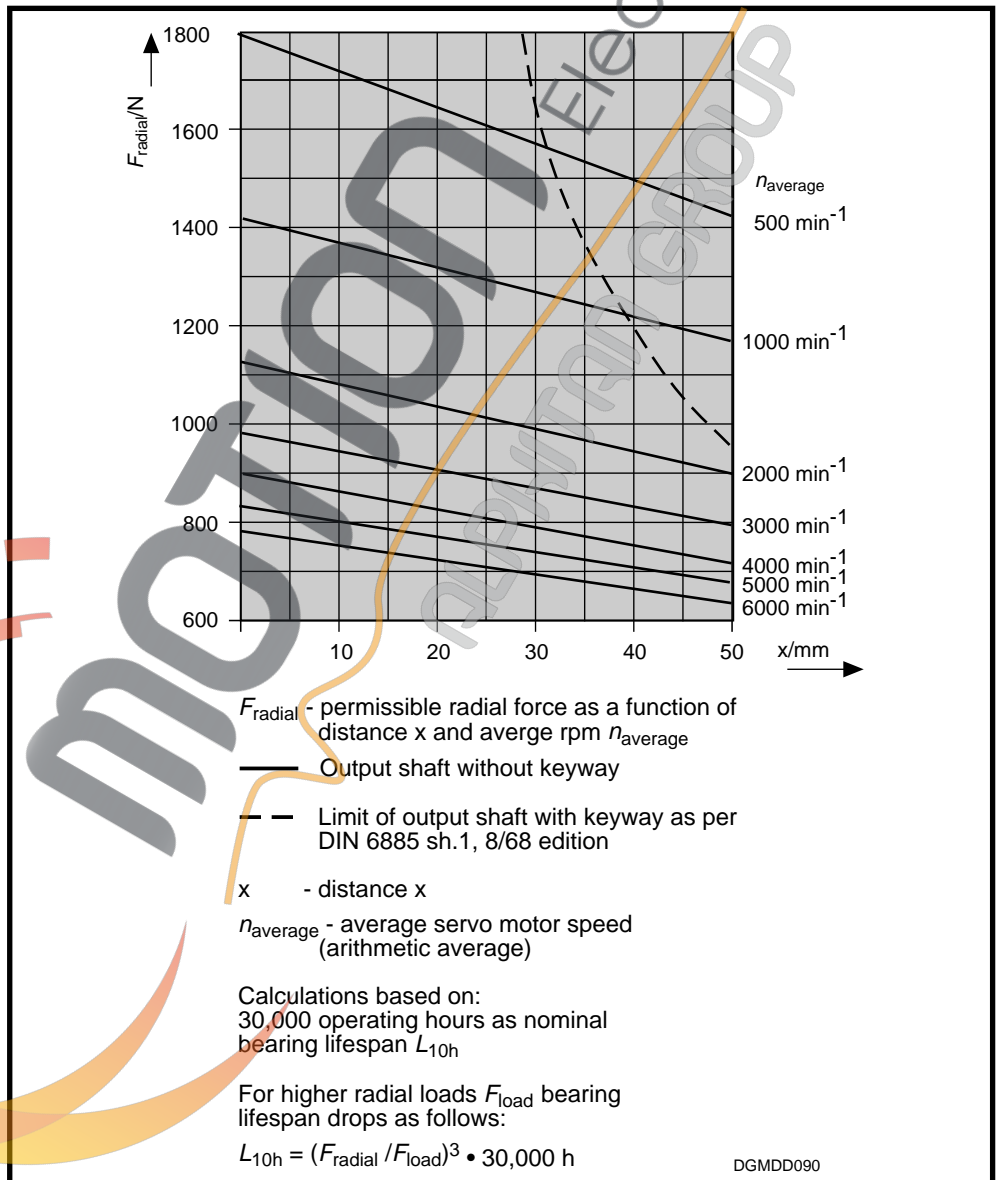


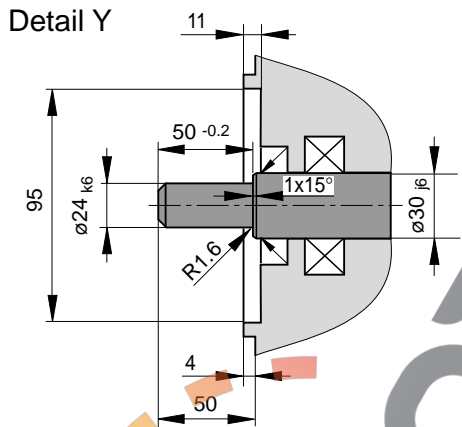
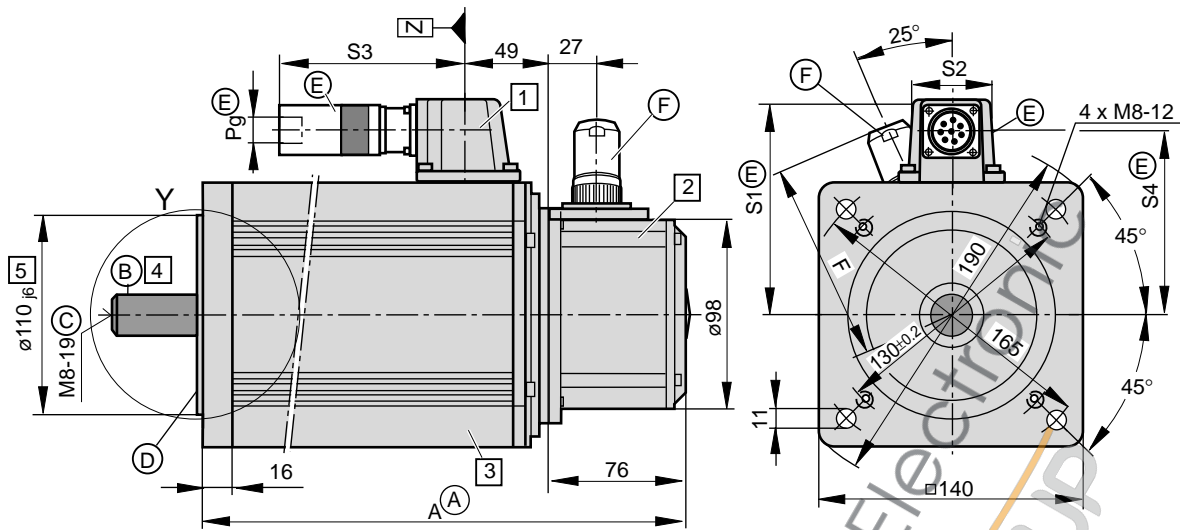
Fig 8.8: Permissible radial force

Permissible axial force  
 $F_{\text{axial}}$

$$F_{\text{axial}} = 0.34 \cdot F_{\text{radial}}$$

$F_{\text{axial}}$  - permissible axial force  
 $F_{\text{radial}}$  - permissible radial force

### 8.4. Dimensional Data



- Shaft end per DIN 748 section 3, 7/75 edition, IEC 72, 1971 edition, cylindrical
- Center hole DS M3-8 per DIN 332 section 2, 5/83 edition
- Max. tightening torque  $M_A$  for screws in the threads of the center hole: 5 Nm
- Balance class N per DIN VDE 0530 section 14, 2/93 edition

- Flange type per DIN 42948, 11/65 edition, makes mounting possible
  - as per design B5 (throughholes in flange)
  - as per design B14 (threads in flange)

- **Motor power connector**  
Depends on the motor, must be ordered separately.

**(A) Dimensional table Dim. A**

Size	Dim. A 1)
MDD 090 A	275
MDD 090 B	340
MDD 090 C	405

1) Bigger with some options. The then applicable dimension is indicated with the respective feature.

- **Concentricity, excentricity and coaxiality to the shaft per DIN 42955, tolerance class R, 12/81 edition.**

**Table of dimensions**

dim. type	S1	S2	S3	S4	Pg
INS 252 2)	110	42	130	95	13,5
INS 108 3)	125	45	110	105	21

2) with MDD 090 A-N-020, MDD 090 A-N-030, MDD 090 A-N-040, MDD 090 B-N-020  
3) other MDD 090

**(F) Feedback connector**

Must be ordered separately.

**Table of dimensions**

Name	Connector type	Dim. F
straight conn.	INS 513	110
	INS 512	112
angle conn.	INS 511	108
	INS 510	

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Fig 8.9: Dimensional data - MDD 090

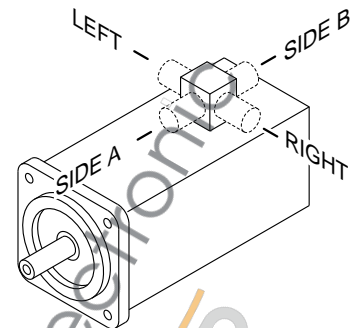
## Available Options

### 1 Power connection

The output direction of the electrical power connector is selected at the time the order is placed. Possible output direction is either:

- side A or
- side B
- to the right
- to the left

The drawing depicts side A as output direction. The dimensions of any other output direction are obtained by virtually turning the connector housing around the Z axis.



### 2 Motor feedback

- Digital servo feedback (DSF)
- Digital servo feedback (DSF) with integrated multiturn absolute encoder

The dimensions are identical.

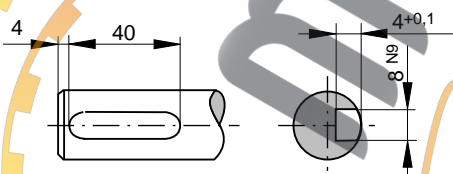
### 3 Blocking brake

- without blocking brake
- with blocking brake: 6.5 Nm
- with blocking brake: 11 Nm

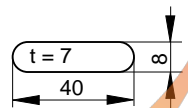
The dimensions are identical.

### 4 Output shaft

- plain shaft (preferred type)
- with keyway per DIN 6885 sheet 1, 8/68 edition  
(Note: balanced with entire key!)



Matching key: DIN 6885-A 8 x 7 x 40



### 5 Special centering diameter

- $\varnothing 130_{j6}$

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Fig 8.10: Dimensional data - MDD 090 -available options



### 8.5. Available Versions

Type code field:	Example:	MDD	090	B	N	020	N	2	L	110	G	B	0
1. Name Motor for digital drive controllers	MDD												
2. Motor size	090												
3. Motor length	A, B, C												
4. Housing design: Standard (suited for natural convection and surface-cooling)	N												
5. Nominal speed 2000 min <sup>-1</sup> 3000 min <sup>-1</sup> 4000 min <sup>-1</sup>	020 030 040												
6. Balance class Standard (R per DIN VDE 0530 section 14, 2/93 edition)	N												
7. Side B shaft end Standard (without side B shaft end)	2												
8. Motor feedback digital servo feedback digital servo feedback with integrated multiturn absolute encoder	L M												
9. Centering diameter ø110 mm (Standard) ø130 mm	110 130												
10. Output shaft plain shaft shaft with keyway per DIN 6885 sh. 1, 8/68 edition	G P												
11. Power connection connector to side A connector to side B connector to the right (looking onto motor shaft, connecting housing at top) connector to the left (looking onto motor shaft, connecting housing at top)	A B R L												
12. Blocking brake without blocking brake with 6.5 Nm blocking brake with 11.0 Nm blocking brake	0 1 2												

Fig 8.11: Type codes - MDD 090

Quelle: INN 41.60 TLMD090