

## 3. MAC 063

### 3.1. Technical Data

Designation	Symbol	Unit	Motor type MAC ...			
			063 A - - - ES	063 B - - - GS	063 C - - - MS	063 D - - - JS
Nominal motor speed <sup>1)</sup>	n	min <sup>-1</sup>	3500	3500	3500	3500
Continuous torque at standstill <sup>2)</sup>	M <sub>dN</sub>	Nm	0.8 (1.0) <sup>5)</sup>	1.5 (1.7) <sup>5)</sup>	2.1(2.7) <sup>5)</sup>	2.7 (3.5) <sup>5)</sup>
Continuous current at standstill	I <sub>dN</sub>	A	2.2 (2.7) <sup>5)</sup>	3.6 (4.0) <sup>5)</sup>	4.1(5.3) <sup>5)</sup>	5.1 (6.6) <sup>5)</sup>
Rotor moment of inertia <sup>3)</sup>	J <sub>M</sub>	kgm <sup>2</sup>	2.4 x 10 <sup>-4</sup>	3.2 x 10 <sup>-4</sup>	4.0 x 10 <sup>-4</sup>	4.8 x 10 <sup>-4</sup>
Torque constant at 20 °C	K <sub>m</sub>	Nm/A	0.370	0.42	0.51	0.53
Windings resistance at 20 °C	R <sub>A</sub>	Ohm	9.6	4.1	2.8	1.9
Windings inductance	L <sub>A</sub>	mH	9.1	3.9	3.2	2.5
Maximum peak of pulse current	I <sub>peak</sub>	A	12	19	22	27
Thermal time constant	T <sub>th</sub>	min	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>
Mass <sup>4)</sup>	m <sub>M</sub>	kg	3.2	3.9	4.6	5.3
			063 A - - - RS	063 B - - - JS	063 C - - - HS	063 D - - - FS
Nominal motor speed <sup>1)</sup>	n	min <sup>-1</sup>	6000	6000	6000	6000
Continuous torque at standstill <sup>2)</sup>	M <sub>dN</sub>	Nm	0.8 (1.0) <sup>5)</sup>	1.5 (1.7) <sup>5)</sup>	2.1(2.7) <sup>5)</sup>	2.7 (3.5) <sup>5)</sup>
Continuous current at standstill	I <sub>dN</sub>	A	3.5 (4.4) <sup>5)</sup>	5.8 (6.6) <sup>5)</sup>	6.8 (8.7) <sup>5)</sup>	8.4 (11.0) <sup>5)</sup>
Rotor moment of inertia <sup>3)</sup>	J <sub>M</sub>	kgm <sup>2</sup>	2.4 x 10 <sup>-4</sup>	3.2 x 10 <sup>-4</sup>	4.0 x 10 <sup>-4</sup>	4.8 x 10 <sup>-4</sup>
Torque constant at 20 °C	K <sub>m</sub>	Nm/A	0.230	0.26	0.31	0.32
Windings resistance at 20 °C	R <sub>A</sub>	Ohm	3.7	1.6	1.1	0.7
Windings inductance	L <sub>A</sub>	mH	3.5	1.5	1.2	0.9
Maximum peak of pulse current	I <sub>peak</sub>	A	19	31	36	46
Thermal time constant	T <sub>th</sub>	min	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>	30 (15) <sup>5)</sup>
Mass <sup>4)</sup>	m <sub>M</sub>	kg	3.2	3.9	4.6	5.3

<sup>1)</sup> The usable motor speed is determined by the drive used.  
 Only those usable speeds n<sub>max</sub> found in the selection lists of the motor-drive combinations are binding.  
<sup>2)</sup> With 60K overtemperature at the motor housing.  
 Continuous torque can be limited by the drive. See selection data.  
<sup>3)</sup> With tacho-generator, without holding brake  
<sup>4)</sup> With tacho-generator, without holding brake, without blower.  
<sup>5)</sup> Parenthetical values apply to versions with surface cooling.

Fig 3.1: Type-dependent motor data

Designation	Symbol	Unit	Data
Permissible ambient temperature	T <sub>um</sub>	°C	0 ... +45
Permissible storage and transport temperature	T <sub>L</sub>	°C	-20 ... +80
Maximum installation elevation		m	1000 meters above sea level
Protection category			IP 65 <sup>1)</sup>
Insulation classification			F
Housing coat			Black prime coat (RAL 9005)
Voltage constant of the tacho-generator	C <sub>w</sub>	Vs/rad V/min <sup>-1</sup>	0,0143 1.5/1000

<sup>1)</sup> Except for the shaft leadthrough in drive shafts, without sealing ring. Protection category is then IP 50.

Fig 3.2: General data MAC 063

Designation	Symbol	Unit	Data holding brake
Principle of action			electrically-actuated release
Holding torque	M <sub>H</sub>	Nm	3.0
Nominal voltage	U <sub>N</sub>	V	DC 24 ± 10%
Nominal current	I <sub>N</sub>	A	0.6
Moment of inertia	J <sub>B</sub>	kgm <sup>2</sup>	0.38 x 10 <sup>-4</sup>
Release delay	t <sub>L</sub>	ms	30
Clamping delay	t <sub>K</sub>	ms	15
Mass	m <sub>B</sub>	kg	0.55

Fig 3.3: Technical data - holding brake

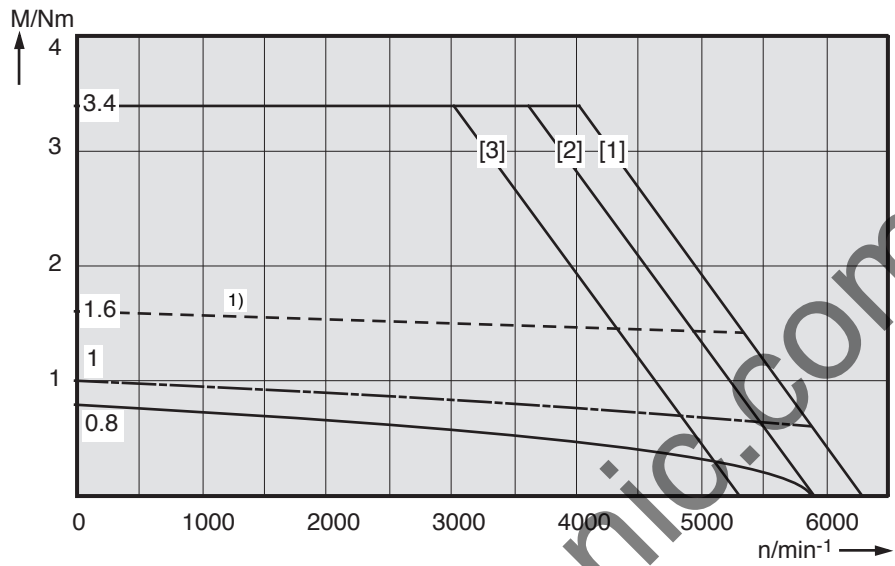
Designation	Symbol	Unit	Data surface cooling	
			Axial cooling	Radial cooling
Power consumption	$S_N$	VA	20/18	16/14
Nominal voltage	$U_N$	V	AC 230 or 115 <sup>1)</sup>	AC 230 or 115 <sup>1)</sup>
Frequency	f	Hz	50/60	50/60
Mass	$m_L$	kg	approx. 1.1 <sup>2)</sup>	approx. 1.0 <sup>2)</sup>
Protection category blower unit			IP 24	IP 24
Protection category blower motor			IP 44	IP 44
<sup>1)</sup> 115 V special design <sup>2)</sup> Blower shroudshroud for motor with tacho feedback.				

Fig 3.4: Technical data - surface cooling

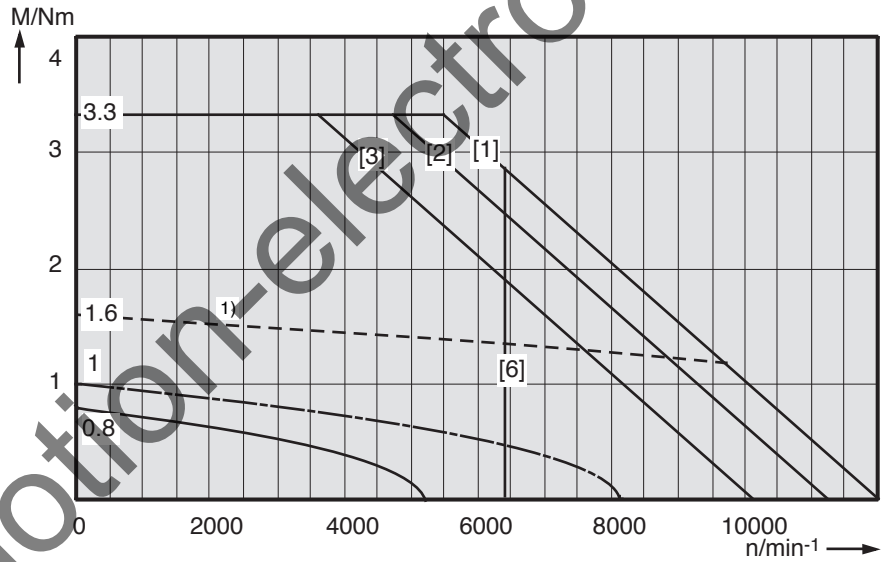
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### 3.2. Torque-Speed Characteristics

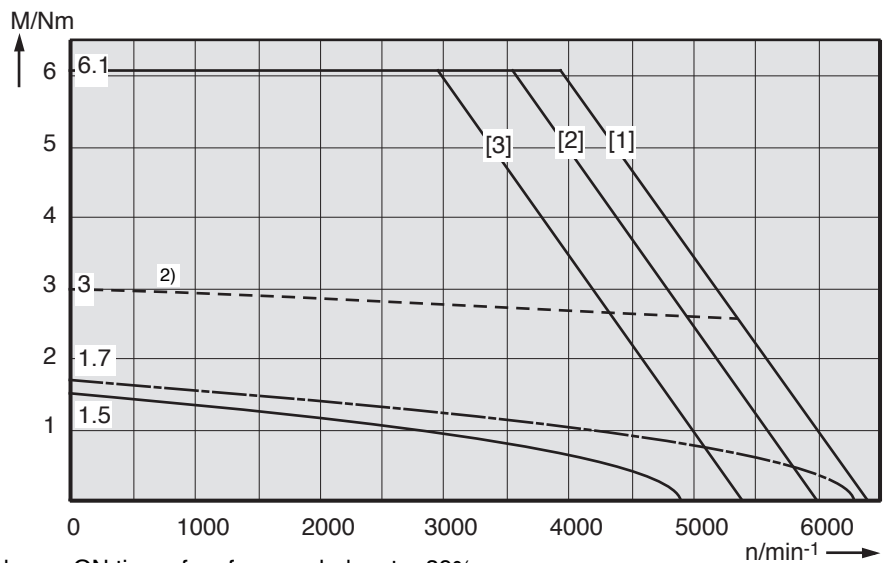
MDD 063 A - - - ES  
3500 min<sup>-1</sup>



MDD 063 A - - - RS  
6000 min<sup>-1</sup>



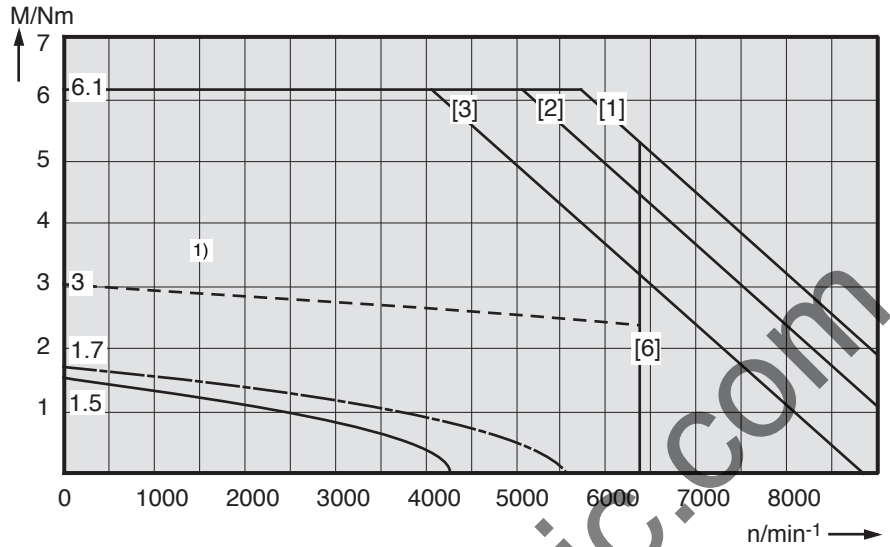
MDD 063 B - - - GS  
3500 min<sup>-1</sup>



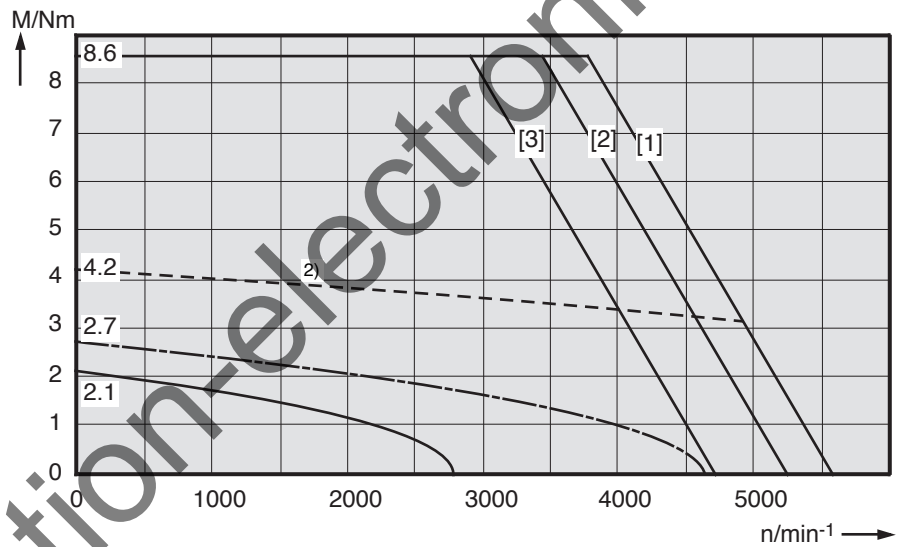
1) shown: ON time of surface-cooled motor 39%  
2) shown: ON time of surface-cooled motor 32%

Fig 3.5: Torque-speed Characteristics MAC 063

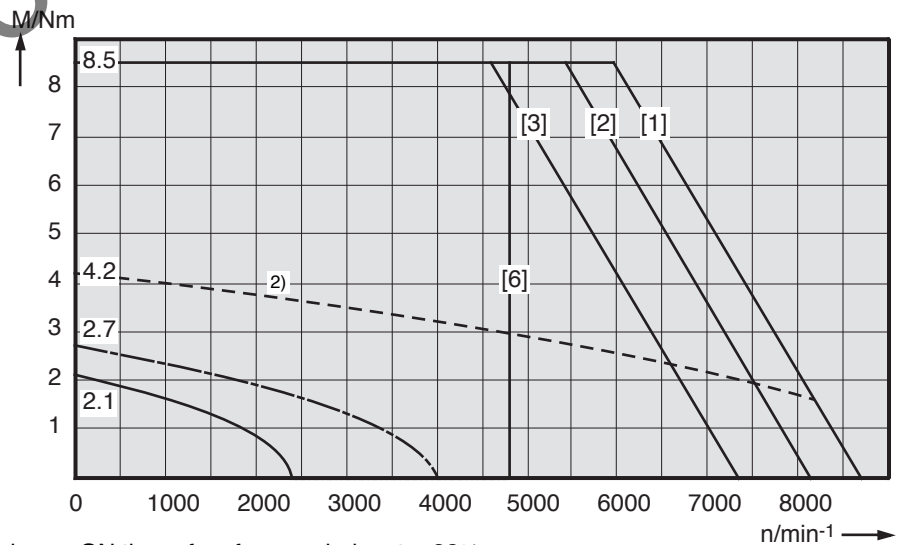
MDD 063 B - - - JS  
6000 min<sup>-1</sup>



MDD 063 C - - - MS  
3500 min<sup>-1</sup>



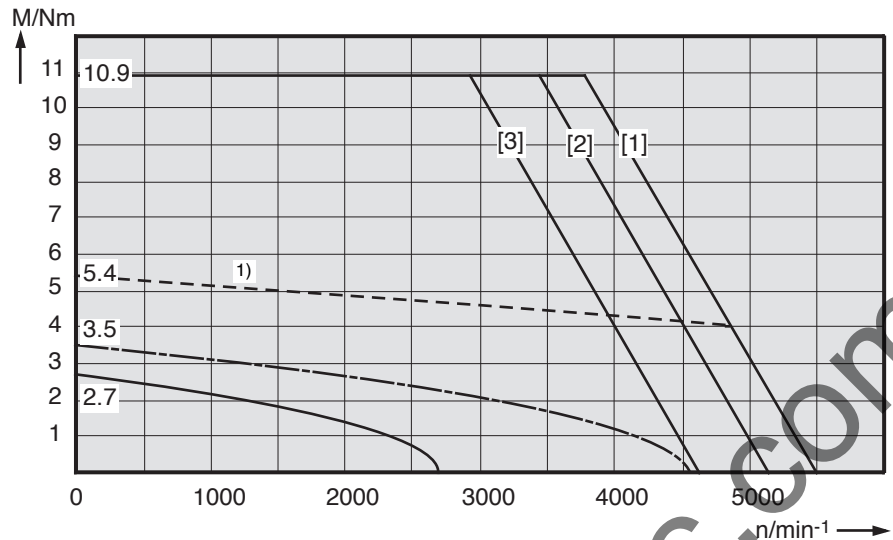
MDD 063 C - - - HS  
6000 min<sup>-1</sup>



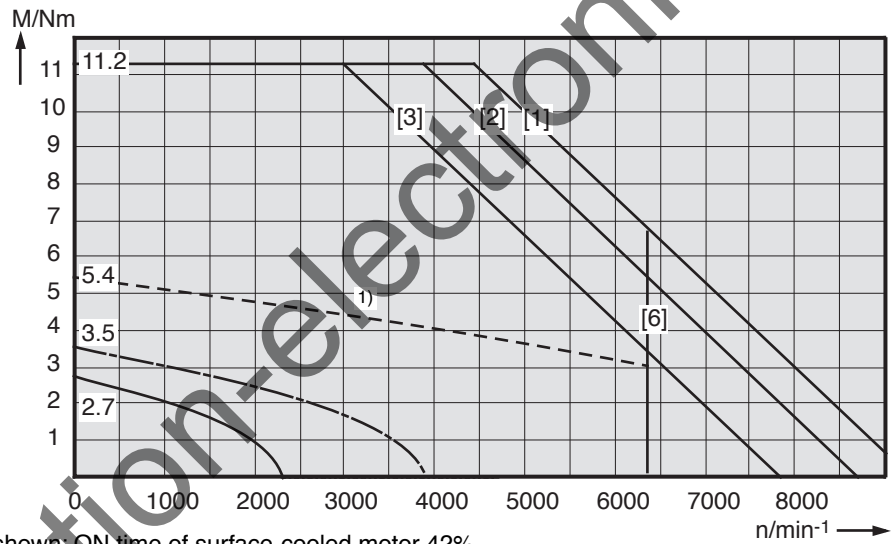
1) shown: ON time of surface-cooled motor 32%  
2) shown: ON time of surface-cooled motor 41%

Fig 3.6: Torque-speed characteristics MAC 063

MDD 063 D - - JS  
3500 min<sup>-1</sup>



MDD 063 D - - FS  
6000 min<sup>-1</sup>



1) shown: ON time of surface-cooled motor 42%

Fig 3.7: Torque-speed characteristics MAC 063

### 3.3. Shaft Load Capacity

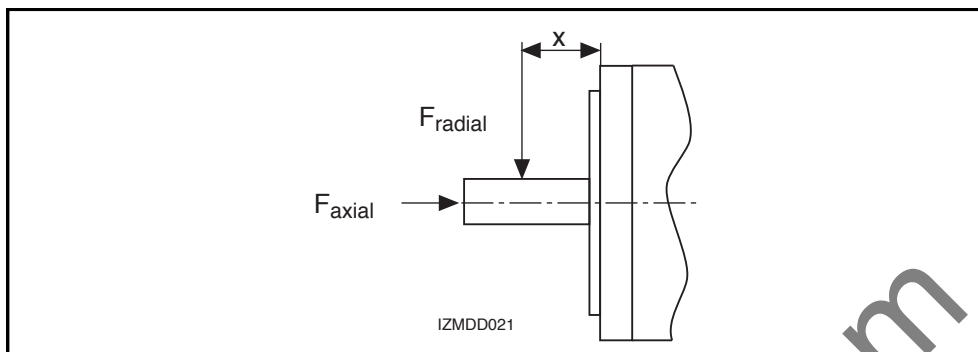


Fig 3.8: Shaft load

Permissible radial force  
 $F_{radial}$

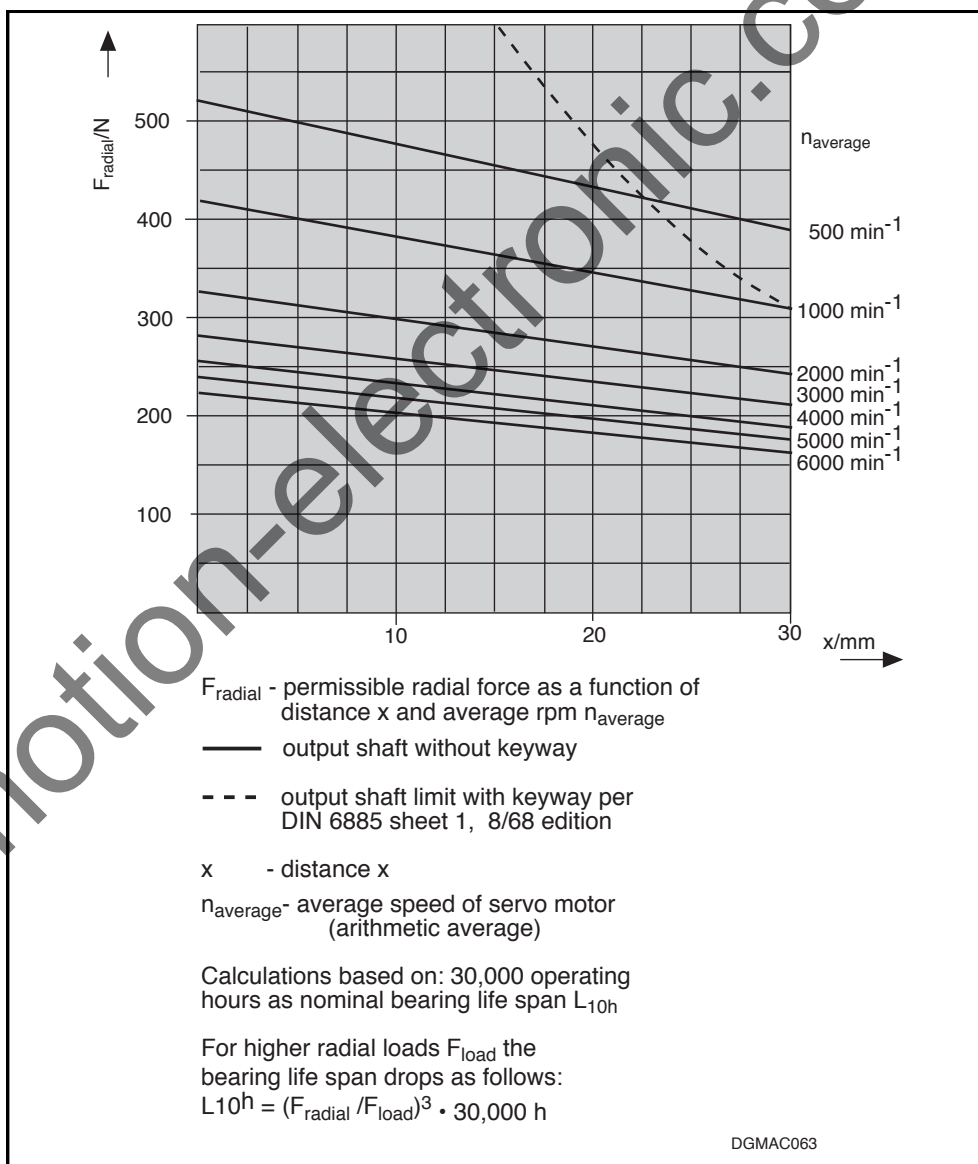


Fig 3.9: Permissible radial force

Permissible axial force  
 $F_{axial}$

$$F_{axial} = 0.57 \cdot F_{radial}$$

$F_{axial}$  - Permissible axial force

$F_{radial}$  - Permissible radial force

### 3.4. Dimensional Data - Natural Convection

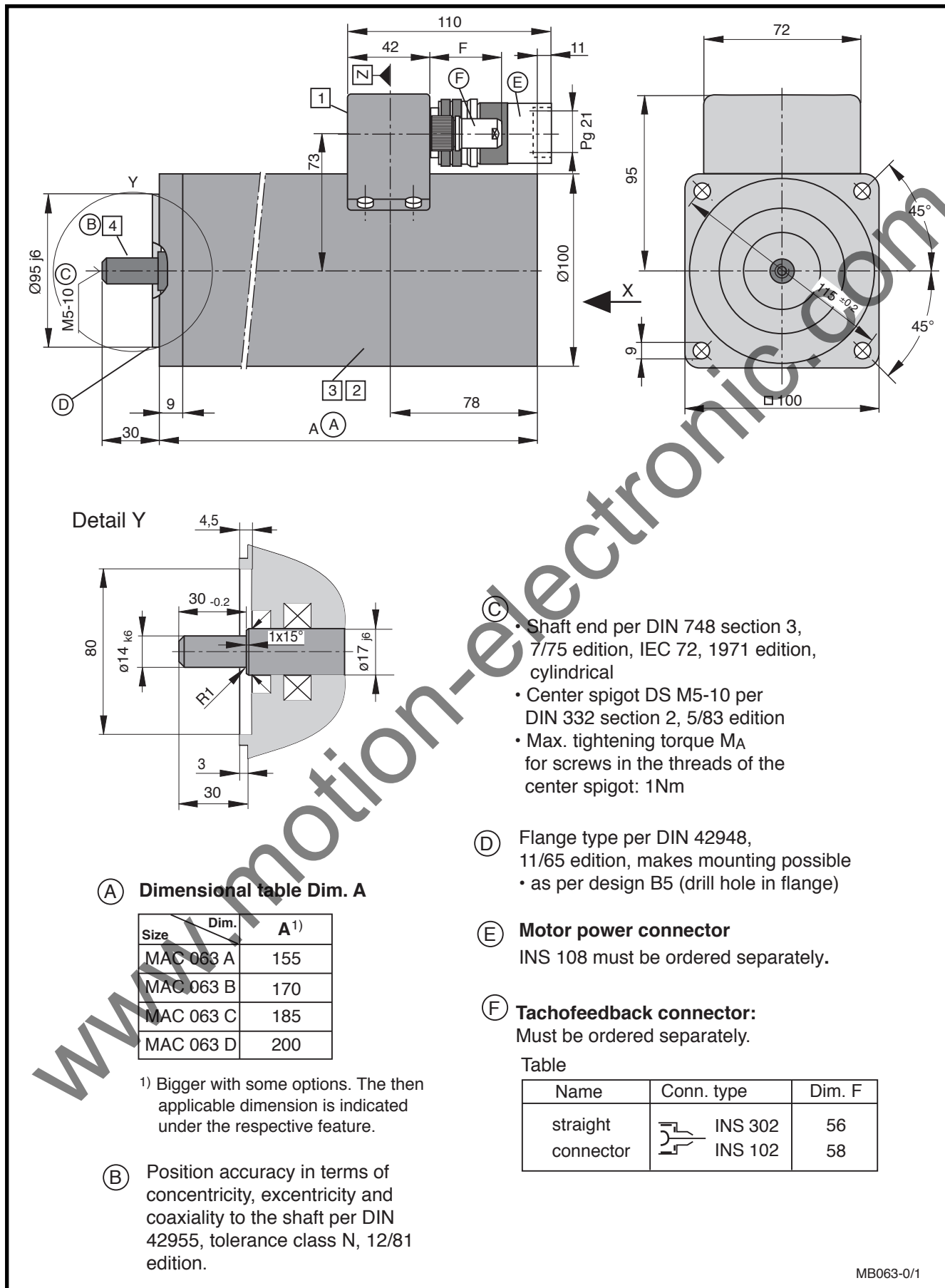


Fig 3.10: Dimensional data - MAC 063 (natural convection)

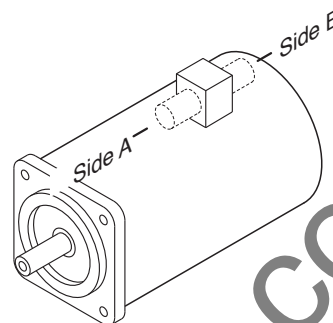
### Available options

**1 Power connection**

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

- to side A
- to side B

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



**2 Motor version**

- Tachofeedback and second shaft end

View X:

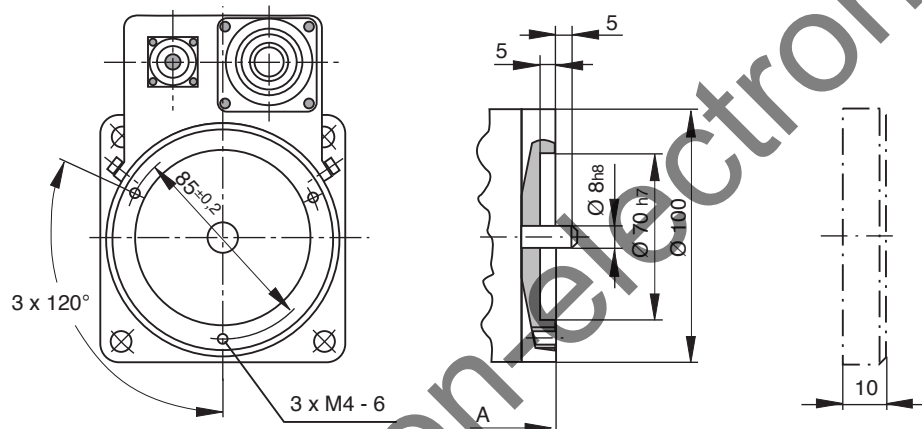


Table	Dim. A
MAC 063 A	162.5
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

Cover mounted at delivery.

- Tachofeedback and mounted incremental encoder

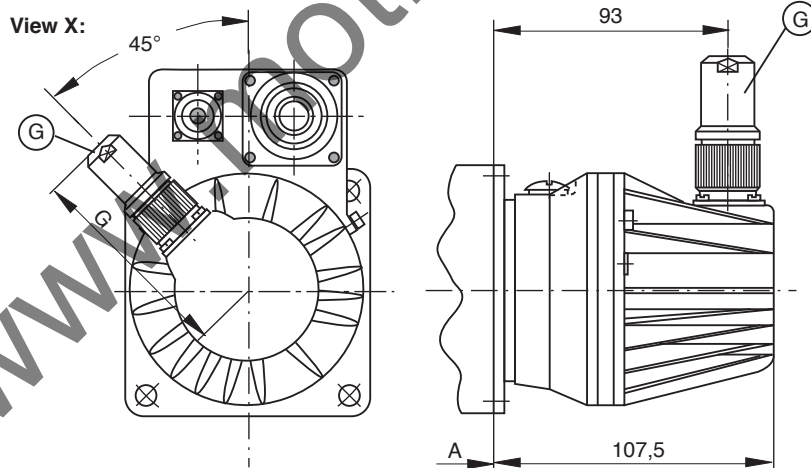


Table	Dim. A
MAC 063 A	162.5
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

**G Incremental encoder connector**  
Must be ordered separately.

Name	Conn. type	Dim. G
straight conn.	INS 301	88
	INS 101	90
angle conn.	INS 351 INS 311	86

- Tachofeedback and mounted absolute encoder (see following page)

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Fig 3.11: Dimensional data - MAC 063 - available options - (natural convection)



### Available options

- Tachofeedback and mounted absolute encoder

View X:

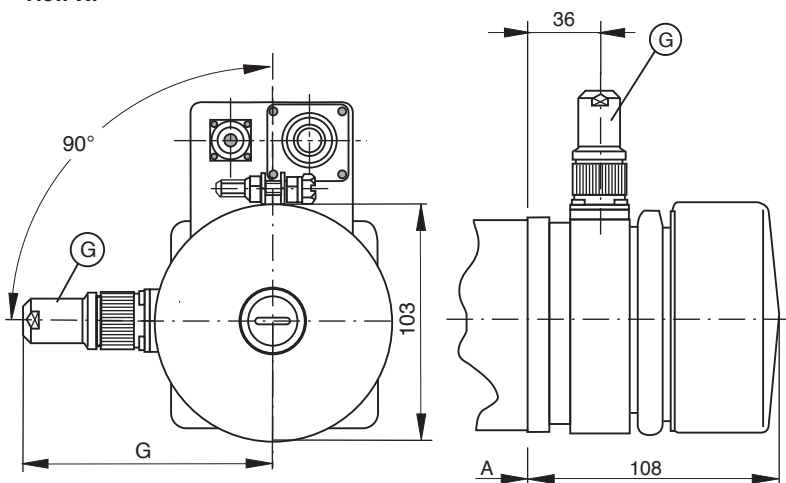


Table	Dim. A
MAC 063 A	162.5
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

G Absolute encoder conn.  
Must be ordered separately.

Name	Conn. type	Dim. G
straight conn.	INS 326	104
	INS 92	106
angle conn.	INS 322	102

### 3 Blocking brake

- without blocking brake  
Dim. A retained
- Standard blocking brake: 3 Nm

Table for blocking brake

Dim. Size	Vers. 2 A	Vers. 3 & 4 A
MAC 063 A	180	187.5
MAC 063 B	195	202.5
MAC 063 C	210	217.5
MAC 063 D	225	232.5

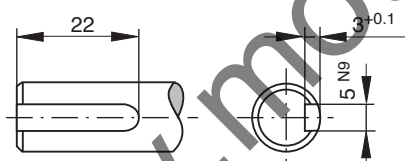
Vers. 2 = Motor with tachofeedback

Vers. 3 = Motor with tachofeedback and second shaft end

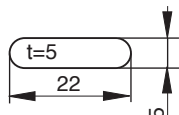
Vers. 4 = Motor with tachofeedback and mounted encoder

### 4 Output shaft

- plain shaft (recommended type)
- with keyway per DIN 6885 sh. 1, 8/68 edition  
(Note! balanced with entire key.)



Matching key: DIN 6885-A 5 x 5 x 22  
Must be ordered separately.



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Fig 3.12: Dimensional data - MAC 063 - available options - (natural convection)

### 3.5. Dimensional Data - Radial Cooling

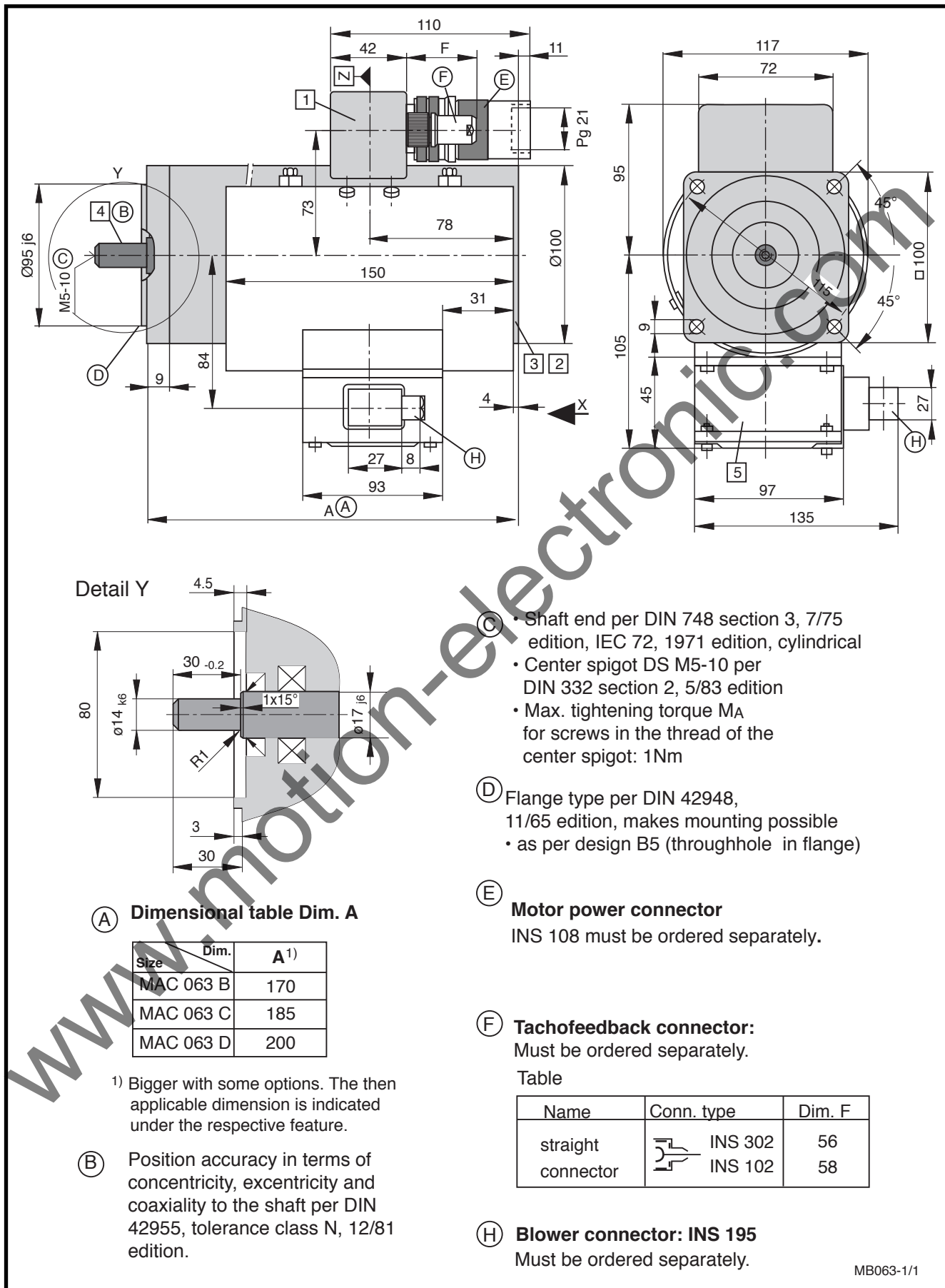


Fig 3.13: Dimensional data - MAC 063 (radial cooling)

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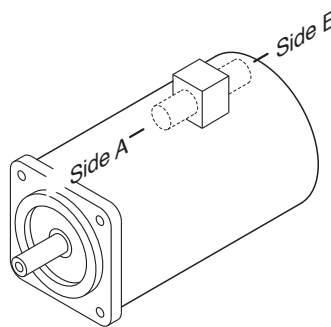
### Available options

#### 1 Power connection

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

- to side A
- to side B

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



#### 2 Motor version

- Tachofeedback and second shaft end

View X:

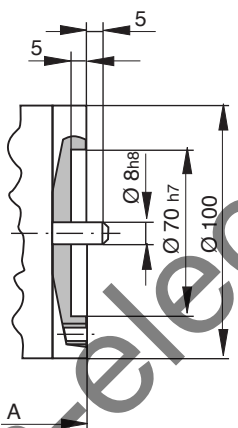
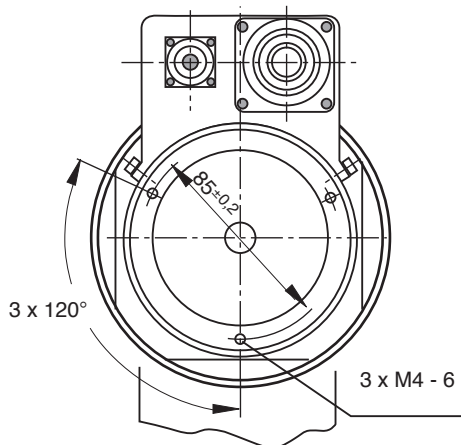
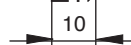


Table	Dim. A
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

Cover mounted at delivery.



- Tachofeedback and mounted incremental encoder

View X:

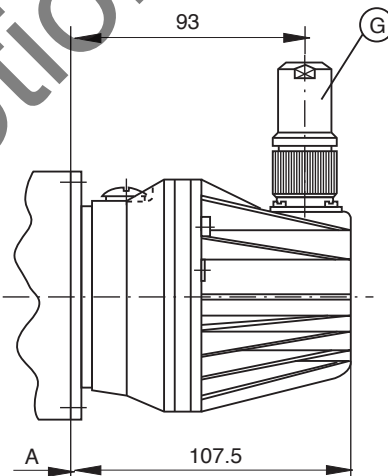
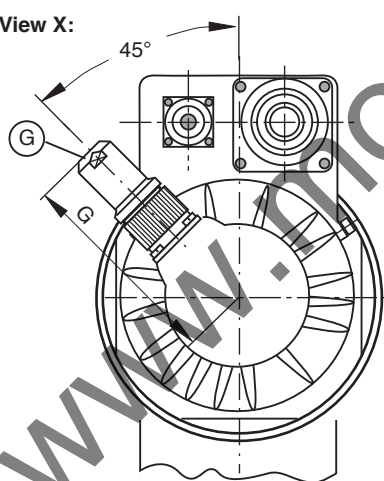


Table	Dim. A
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

#### G Incremental encoder connector

Must be ordered separately.

Name	Conn. type	Dim. G
straight conn.	INS 301	88
	INS 101	90
angle conn.	INS 351	86
	INS 311	

- Tachofeedback and mounted absolute encoder (see following page)

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Fig 3.14: Dimensional data - MAC 063 - available options - (radial cooling)

**Available options**

- Tachofeedback and mounted absolute encoder

View X:

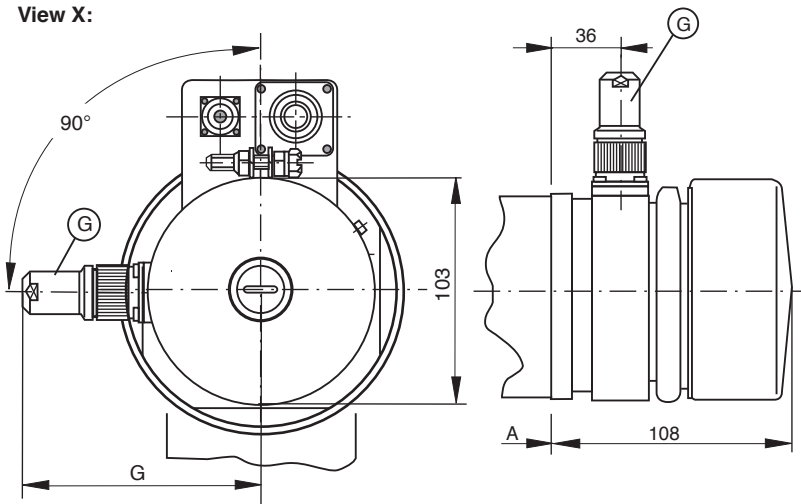


Table	Dim. A
MAC 063 B	177.5
MAC 063 C	192.5
MAC 063 D	207.5

**G Absolute encoder conn.**  
Must be ordered separately.

Name	Conn. type	Dim. G
straight conn.	INS 326	104
	INS 92	106
angle conn.	INS 322	102

**3 Blocking brake**

- without blocking brake  
Dim. A retained
- Standard blocking brake: 3 Nm

**Table for blocking brake**

Dim. Size	Vers. 2 A	Vers. 3 & 4 A
MAC 063 B	195	202.5
MAC 063 C	210	217.5
MAC 063 D	225	232.5

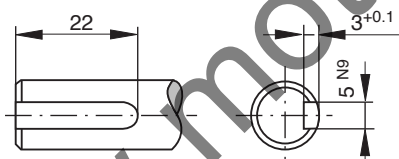
Vers. 2 = Motor with tachofeedback

Vers. 3 = Motor with tachofeedback and second shaft end

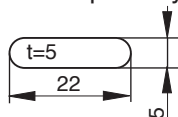
Vers. 4 = Motor with tachofeedback and mounted encoder

**4 Output shaft**

- plain shaft (recommended type)
- with keyway per DIN 6885 sh. 1, 8/68 edition  
(Note! balanced with entire key.)

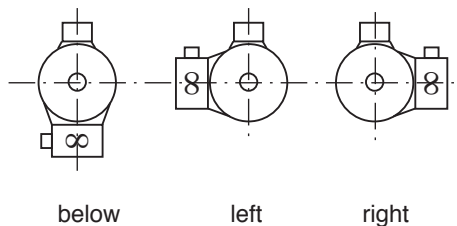


Matching key: DIN 6885-A 5 x 5 x 22  
Must be ordered separately.



**5 Blower arrangement**

Looking towards motor shaft.



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Fig 3.15: Dimensional data - MAC 063 - available options - (radial cooling)

### 3.6. Dimensional Data - Axial Cooling

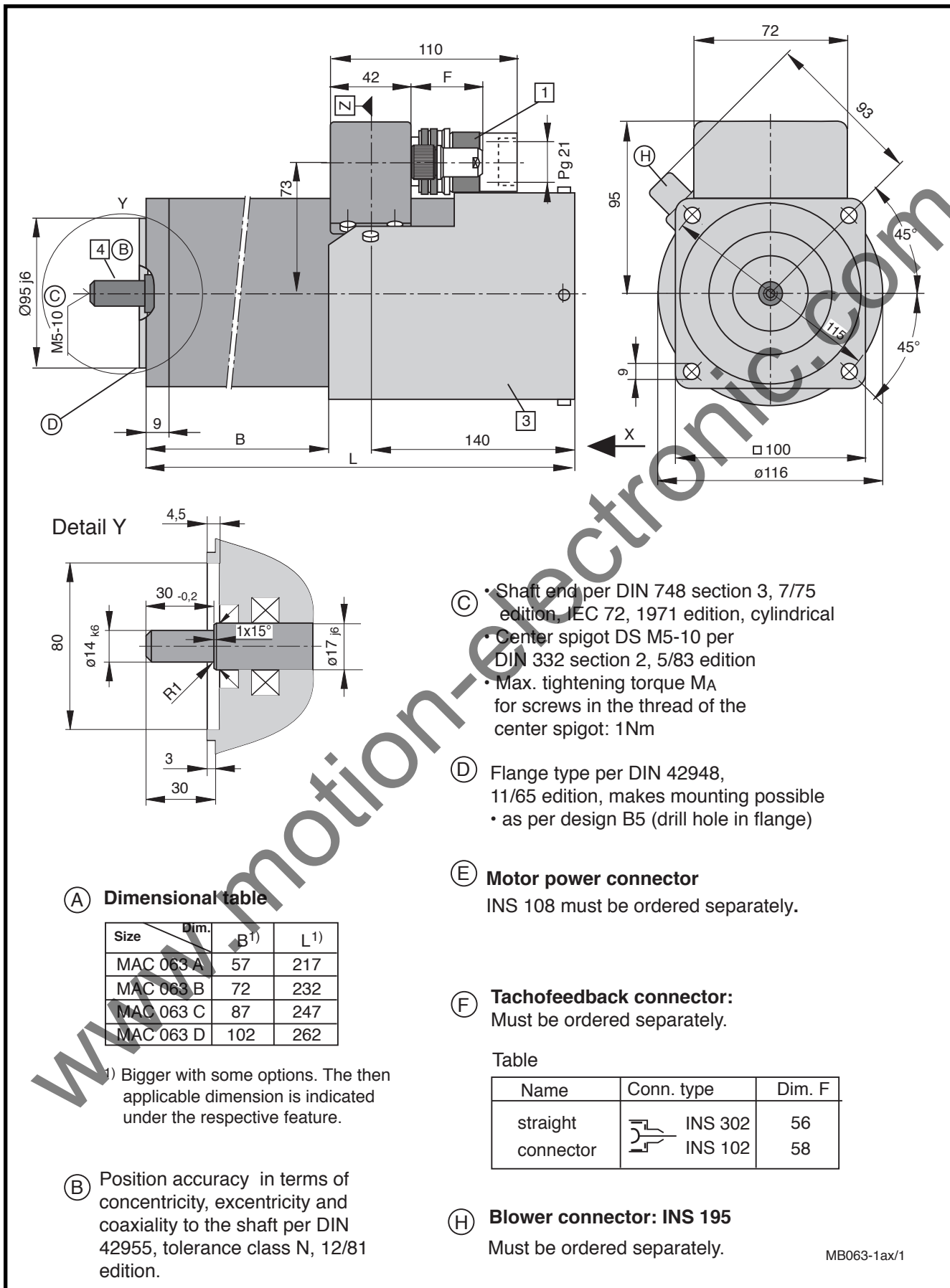


Fig 3.16: Dimensional data - MAC 063 (axial cooling)

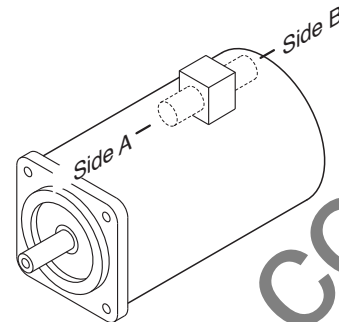
## Available options

### 1 Power connection

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

- to side A
- to side B

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



### 3 Blocking brake

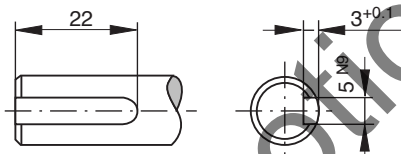
- without brake, dimensions B and L are retained
- Standard blocking brake: 3 Nm

Table with blocking brake  
3 Nm holding torque:

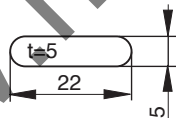
Size	Dim.	B	L
MAC 063 A		82	242
MAC 063 B		97	257
MAC 063 C		112	272
MAC 063 D		127	287

### 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 5 x 5 x 22  
Must be ordered separately.



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Fig 3.17: Dimensional data - MAC 063 - available options - (axial cooling)

### 3.7. Available Options

Type code fields		Example:	MAC 063 A-0-RS-4 - C/095-A-0/WI 520LV/S000							
1. Motor for analogue drives		MAC								
2. Motor size		063								
3. Motor length		A, B, C, D								
4. Type of cooling:										
natural convection										
surface cooling										
			axial		radial					
					blower right		blower below		blower left	
			AC	AC	AC	AC	AC	AC	AC	AC
			230 V	115 V	230 V	115 V	230 V	115 V	230 V	115 V
0			1 <sup>1)</sup>	2 <sup>1)</sup>	6 <sup>3)</sup>	A <sup>3)</sup>	7 <sup>3)</sup>	B <sup>3)</sup>	8 <sup>3)</sup>	C <sup>3)</sup>
5. Type of windings										
Nominal rpm			Motor length							
			A	B	C	D				
3500 min <sup>-1</sup>			ES	GS	MS	JS				
6000 min <sup>-1</sup>			RS	JS	HS	FS				
6. Motor feedback										
Motor type										
with tachofeedback		2								
with tachofeedback and second shaft end		3								
with tachofeedback and mounted incremental or absolute encoder		4								
Tacho voltage										
set to nominal motor speed: 1.5 V/1000 min <sup>-1</sup>		-								
Tacho type										
standard		C								
increased smooth run quality		F								
7. Centering diameter										
for design B05		095								
8. Power connection										
connector to side A		A								
connector to side B		B								
9. Blocking brake										
without blocking brake		0								
with standard blocking brake (3 Nm)		1								
Mounted encoder	10. Type <sup>2)</sup>									
	Incremental encoder with standard mounting	WI								
	Absolute encoder	AM								
	11. Encoder code <sup>2)</sup>									
	For available types, see section 2.4 "Motor feedback"									
12. Special types										
Fixed and documented by INDRAMAT with special number (see Drawing no.: 106-0105-4301-XX)										
Does not apply to standard motors.										

Fig 3.18: Type codes - MAC 063

### 3.8. Special options

Specification of Option	S001	S006	S007
with keyway per DIN 6885, sheet 1	X		X
output shaft with shaft sealing		X	X

Fig 3.19: Special options with a MAC 063

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