

8 MHD090

8.1 Technical Data

Description	Symbol	Unit	MHD090B-035			
			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Type of cooling			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Motor overtemperature						
Electric parameters						
Characteristic motor speed	n_K	min^{-1}	2500			
Continuous torque at standstill	M_{dN}	Nm	12.0	13.5	18.0	not
Continuous current at standstill	I_{dN}	A	11.0	12.5	16.5	available
Peak current	I_{max}	A	49.5			
Torque constant at 20 °C ¹⁾	K_m	Nm/A	1.22			
Voltage constant at 20 °C	$K_{E(eff)}$	V/1000min ⁻¹	111.0			
Winding resistance at 20 °C	R12	Ω	1.88			
Winding inductance	L12	mH	15.5			
Number of pole pairs	p		4			
Rated data ²⁾						
Rated speed	n_N	min^{-1}	3000	3000	3000	
Rated torque	M_N	Nm	7.2	10.2	15.0	
Rated current	I_N	A	4.7	6.7	9.7	not
Rated power	P_N	kW	2.8	4.0	5.9	available
Rated voltage	U_N	V	354	369	399	
Rated frequency	f_N	Hz	200	200	200	
Mechanical parameters						
Rotor inertia	J_M	kgm^2	42.7 x 10 ⁻⁴			
Theoretical maximum torque	M_{max}	Nm	43.5			
Minimum strand cross-section ⁴⁾	S	mm^2	1.0	1.0	1.0	not
Thermal time constant	T_{th}	min	60	60	30	available
Maximum speed	n_{max}	min^{-1}	5000			
Motor mass ^{3) 5)}	m	kg	14.0			
Perm. stor. a. transport temperature	T_L	°C	-20 to +80			
Permissible ambient temperature ⁶⁾	T_{um}	°C	0 to 40			
Maximum setup height ⁶⁾	h	m	1000 above MSL			
Protection category ⁷⁾			IP65			
Insulation class (according to DIN VDE 0530 Part 1)			F			
Housing coat			Prime coat black in a/w RAL 9005			
¹⁾ K_m is to be used for calculations with crest values (I_{dN} , I_{max}). For calculations with root-mean-square values (rated data), the torque constant K_m must be multiplied by a factor of $\sqrt{2}$. ²⁾ Values determined according to EN 60034-1. Current and voltage specified as root-mean-square values. ³⁾ Without holding brake. ⁴⁾ Applicable to REXROTH INDRAMAT cables. Rated according to VDE0298-4 (1992) and installation type B2 according to EN 60204-1 (1993) at an ambient temperature of 40 °C. ⁵⁾ Without blower unit. ⁶⁾ If the limits specified are exceeded, the performance data must be reduced if necessary. For reduction factors, refer to the chapter entitled "Environmental Conditions". ⁷⁾ Provided the power and encoder cables are mounted properly.						

Fig. 8-1: Technical data of MHD090B-035

Description	Symbol	Unit	MHD090B-047			
			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Type of cooling			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Motor overtemperature			60 K	100 K	60 K/100 K	60 K/100 K
Electric parameters						
Characteristic motor speed	n_K	min^{-1}	3200			
Continuous torque at standstill	M_{dN}	Nm	12.0	13.5	18.0	not
Continuous current at standstill	I_{dN}	A	13.2	16.2	19.8	available
Peak current	I_{max}	A	59.4			
Torque constant at 20 °C ¹⁾	K_m	Nm/A	1.0			
Voltage constant at 20 °C	$K_{E(\text{eff})}$	V/1000min ⁻¹	91.0			
Winding resistance at 20 °C	R12	Ω	1.2			
Winding inductance	L12	mH	10.1			
Number of pole pairs	p		4			
Rated data ²⁾						
Rated speed	n_N	min^{-1}	3500	3500	3500	
Rated torque	M_N	Nm	6.2	9.9	14.4	
Rated current	I_N	A	12.0	13.5	18.0	not
Rated power	P_N	kW	2.7	4.8	6.4	available
Rated voltage	U_N	V	332	351	371	
Rated frequency	f_N	Hz	233	233	233	
Mechanical parameters						
Rotor inertia	J_M	kgm^2	43.0×10^{-4}			
Theoretical maximum torque	M_{max}	Nm	43.5			
Minimum strand cross-section ⁴⁾	S	mm^2	1.0	1.0	1.5	not
Thermal time constant	T_{th}	min	60	60	30	available
Maximum speed	n_{max}	min^{-1}	5000			
Motor mass ^{3) 5)}	m	kg	14.0			
Perm. stor. a. transport temperature	T_L	°C	-20 to +80			
Permissible ambient temperature ⁶⁾	T_{um}	°C	0 to 40			
Maximum setup height ⁶⁾	h	m	1000 above MSL			
Protection category ⁷⁾			IP65			
Insulation class (according to DIN VDE 0530 Part 1)			F			
Housing coat			Prime coat black in a/w RAL 9005			
¹⁾ K_m is to be used for calculations with crest values (I_{dN} , I_{max}). For calculations with root-mean-square values (rated data), the torque constant K_m must be multiplied by a factor of $\sqrt{2}$. ²⁾ Values determined according to EN 60034-1. Current and voltage specified as root-mean-square values. ³⁾ Without holding brake. ⁴⁾ Applicable to REXROTH INDRAMAT cables. Rated according to VDE0298-4 (1992) and installation type B2 according to EN 60204-1 (1993) at an ambient temperature of 40 °C. ⁵⁾ Without blower unit. ⁶⁾ If the limits specified are exceeded, the performance data must be reduced if necessary. For reduction factors, refer to the chapter entitled "Environmental Conditions". ⁷⁾ Provided the power and encoder cables are mounted properly.						

Fig. 8-2: Technical data of MHD090B-047

Description	Symbol	Unit	MHD090B-058			
			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Type of cooling			Natural 60 K	Natural 100 K	Surface 60 K/100 K	Liquid 60 K/100 K
Motor overtemperature			60 K	100 K	60 K/100 K	60 K/100 K
Electric parameters						
Characteristic motor speed	n_K	min^{-1}	4000			
Continuous torque at standstill	M_{dN}	Nm	12.0	13.5	18.0	not
Continuous current at standstill	I_{dN}	A	17.5	21.0	26.3	available
Peak current	I_{max}	A	79.0			
Torque constant at 20 °C ¹⁾	K_m	Nm/A	0.77			
Voltage constant at 20 °C	$K_{E(\text{eff})}$	V/1000min ⁻¹	70.0			
Winding resistance at 20 °C	R12	Ω	0.74			
Winding inductance	L12	mH	5.8			
Number of pole pairs	p		4			
Rated data ²⁾						
Rated speed	n_N	min^{-1}	4000	4000	4000	
Rated torque	M_N	Nm	4.2	8.9	13.4	
Rated current	I_N	A	4.3	9.8	13.8	not
Rated power	P_N	kW	2.1	4.9	7.0	available
Rated voltage	U_N	V	286	303	320	
Rated frequency	f_N	Hz	267	267	267	
Mechanical parameters						
Rotor inertia	J_M	kgm^2	43.0×10^{-4}			
Theoretical maximum torque	M_{max}	Nm	43.5			
Minimum strand cross-section ⁴⁾	S	mm^2	1.0	1.5	2.5	not
Thermal time constant	T_{th}	min	60	60	30	available
Maximum speed	n_{max}	min^{-1}	5000			
Motor mass ^{3) 5)}	m	kg	14.0			
Perm. stor. a. transport temperature	T_L	°C	-20 to +80			
Permissible ambient temperature ⁶⁾	T_{um}	°C	0 to 40			
Maximum setup height ⁶⁾	h	m	1000 above MSL			
Protection category ⁷⁾			IP65			
Insulation class (according to DIN VDE 0530 Part 1)			F			
Housing coat			Prime coat black in a/w RAL 9005			
¹⁾ K_m is to be used for calculations with crest values (I_{dN} , I_{max}). For calculations with root-mean-square values (rated data), the torque constant K_m must be multiplied by a factor of $\sqrt{2}$. ²⁾ Values determined according to EN 60034-1. Current and voltage specified as root-mean-square values. ³⁾ Without holding brake. ⁴⁾ Applicable to REXROTH INDRAMAT cables. Rated according to VDE0298-4 (1992) and installation type B2 according to EN 60204-1 (1993) at an ambient temperature of 40 °C. ⁵⁾ Without blower unit. ⁶⁾ If the limits specified are exceeded, the performance data must be reduced if necessary. For reduction factors, refer to the chapter entitled "Environmental Conditions". ⁷⁾ Provided the power and encoder cables are mounted properly.						

Fig. 8-3: Technical data of MHD090B-058

Holding Brake

Description	Symbol	Unit	Holding brake data
Motor type			MHD090B
Holding torque	M_4	Nm	11.0
Rated voltage	U_N	V	DC 24 ± 10%
Rated current	I_N	A	0.71
Moment of inertia	J_B	Kgm ²	1.66×10^{-4}
Clamping delay	t_1	ms	10
Release delay	t_2	ms	50
Mass	m_B	kg	1.0

Fig. 8-4: Technical data of MHD090 holding brake (optional)



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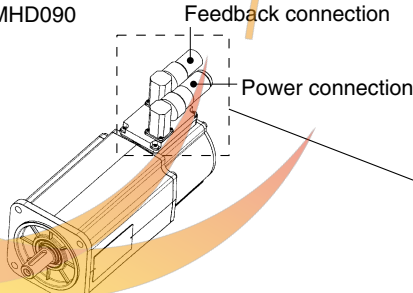
8.2 Type Code – Ordering Name

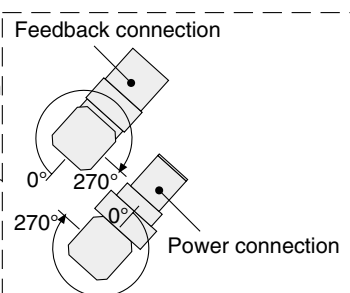
Abbrev.	Column	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0				
Example:		M	H	D	0	9	0	B	-	0	3	5	-	N	G	0	-	U	N																										

1.	Product group	
1.1	MHD = MHD	
2.	Motor size	
2.1	090 = 090	
3.	Motor length	
3.1	Length = B	
4.	Windings code	
4.1	035 = 035	
4.2	047 = 047	
4.3	058 = 058	
5.	Motor feedback	
5.1	digital servo feedback = N	
5.2	digital servo feedback with integrated multiturn absolute encoder = P	
6.	Driven shaft	
6.1	plain shaft (with shaft sealing ring) = G	
6.2	Shaft with key per DIN 6885-1 (with shaft sealing ring) = P	
7.	Holding brake	
7.1	without holding brake = 0	
7.2	holding brake 11,0 Nm = 1	
8.	Output direction of power connection	
8.1	Connector turnable 270° = U	
9.	Housing type ①	
9.1	natural convection = N	
10.	Standard reference	
	<u>Standard</u> <u>Designation</u> <u>Edition</u>	
	DIN 6885-1 Drive Type with Fastenings without Taper Action; Parallel Keys, Keyways, Deep Pattern 1968 August	

Note:
 ① Housing type "N" is for natural convection and surface cooling

Illustration example: MHD090

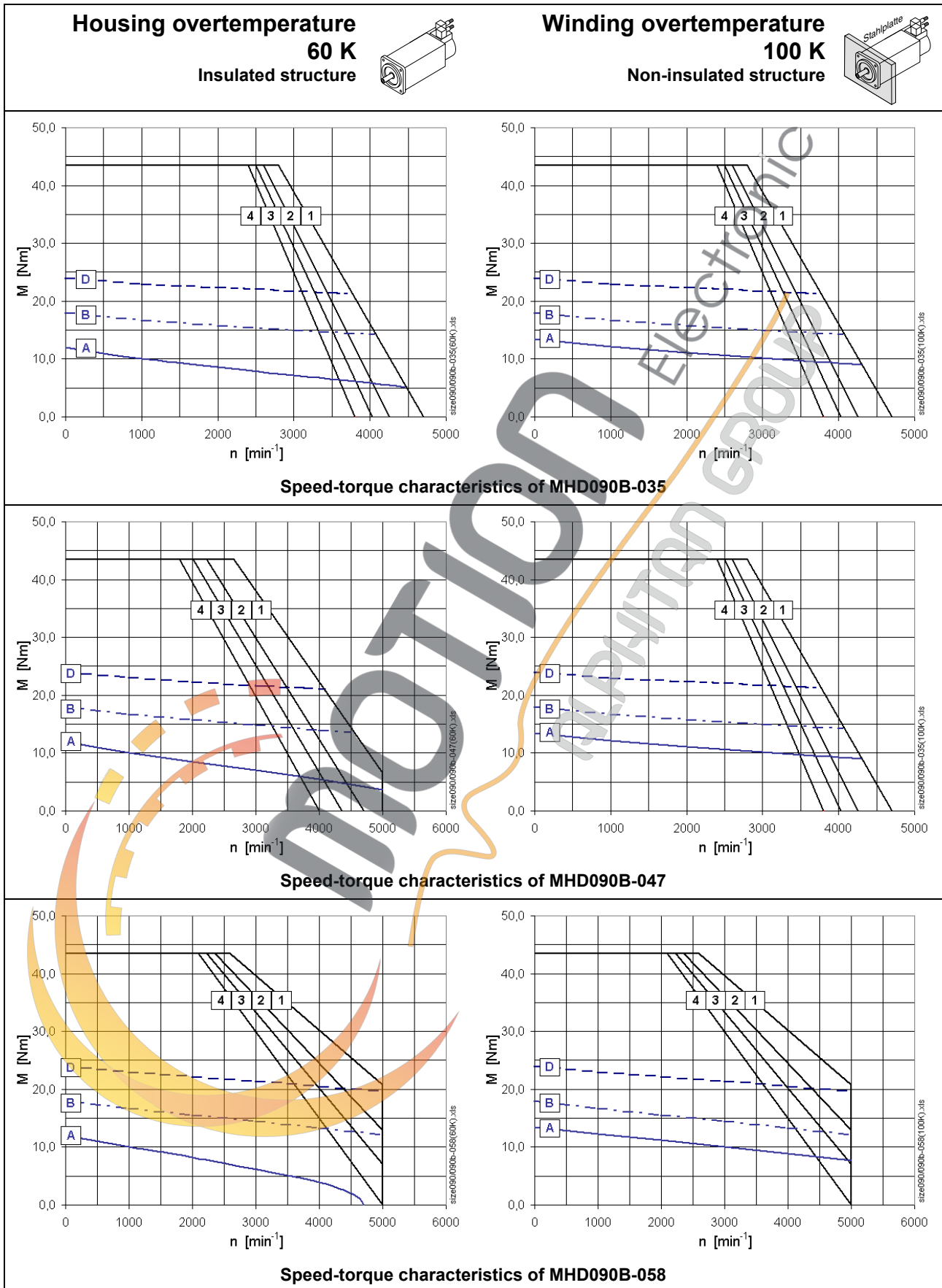




typecodeMHD090_M05.fh7

Fig. 8-5: MHD090 type code

8.3 Speed-Torque Characteristics



- [A]: M_{dN} Natural conv. (S1 continuous operation)
- [B]: M_{dN} Surface cooling (S1 continuous operation)
- [C]: M_{dN} Liquid cooling (S1 continuous operation)
- [D]: M_{kB} (S6 intermittent operation)
- [1]: HDS to HVR
- [2]: HDS to HVE or DKCxx.3 with a power connection of 3 x AC 480 V
- [3]: HDS to HVE or DKCxx.3 with a power connection of 3 x AC 440 V
- [4]: HDS to HVE or DKCxx.3 with a power connection of 3 x AC 400 V

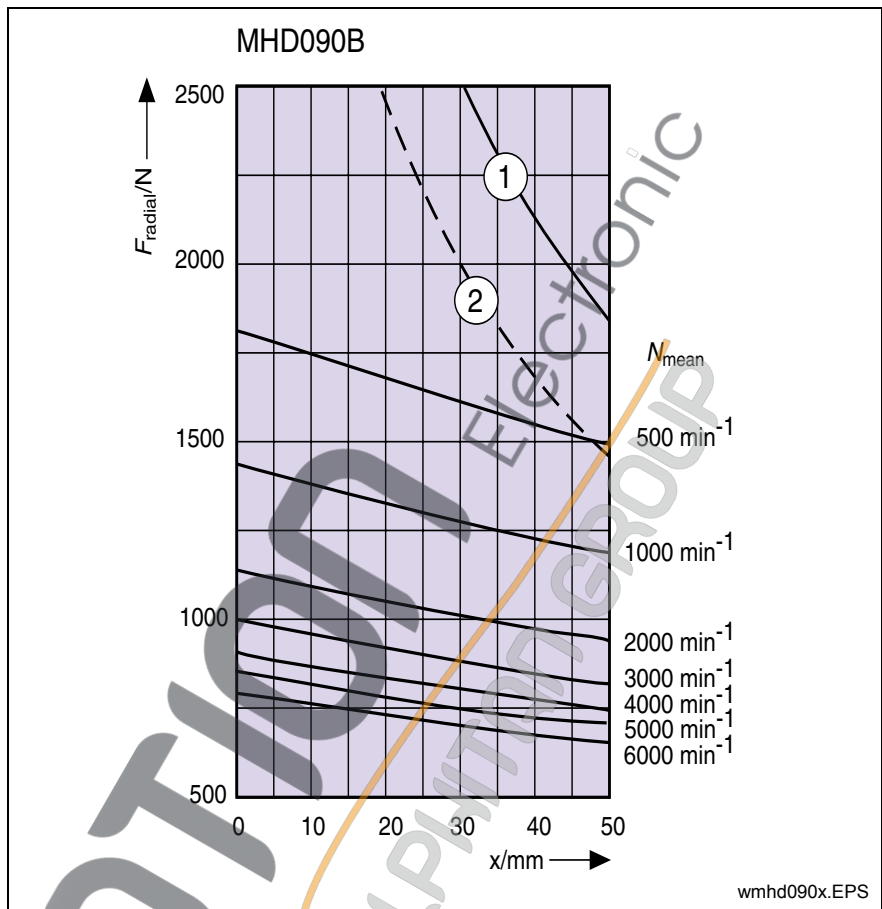
Fig. 8-6: Speed-torque characteristics



8.4 Shaft Load

Permissible maximum radial force $F_{\text{radial_max}}$ and permissible radial force F_{radial}

For explanations refer to Chapter 16.



- (1): $F_{\text{radial_max}}$ (plain shaft)
- (2): $F_{\text{radial_max}}$ (shaft with keyway)

Fig. 8-7: MHD090: Permissible maximum radial force $F_{\text{radial_max}}$ and permissible radial force F_{radial}

Permissible axial force F_{axial}

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

- x : 0.34 for MHD090B
- F_{axial} : permissible axial force in N
- F_{radial} : permissible radial force in N

Fig. 8-8: MHD090: permissible axial force F_{axial}

8.5 Dimensions

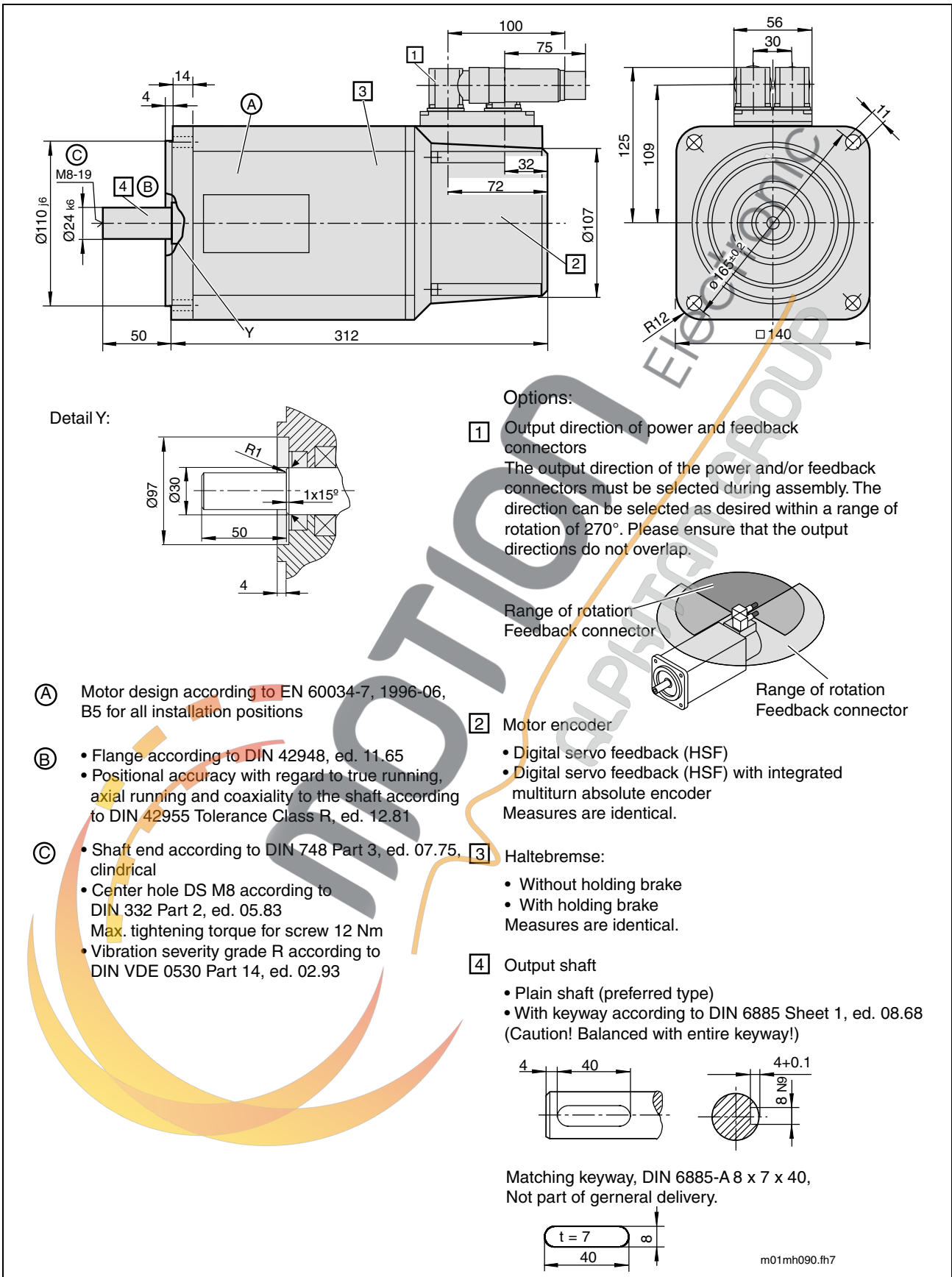


Fig. 8-9: Dimensional data MHD090

8.6 Blower Units

MHD motors can also be delivered with optional blower units. Please refer to the “Surface” column of the data sheets for performance data of surface-cooled motors. The mechanical dimensions of the blower units are represented in the dimension drawings. The possibilities of combining motor and blower unit and the technical data of the blowers are represented in the table below.

Motor			Ordering name of blower unit			
			LEMH-RB090B1XX	LEMH-RB090B2XX		
MHD090B			x	x		

Technical data of blower unit						
Description	Symbol	Unit				
Type of cooling			Radial		Axial	
Rated voltage	U_n	V	230 V, $\pm 15\%$ 50 / 60 Hz	115 V, $\pm 10\%$ 50 / 60 Hz	Not available	Not available
Power consumption	P_n	W	45 / 39	41 / 38		
Rated current	I	A	0.20 / 0.17	0.36 / 0.33		
Mean air volume	V	m ³ /h	325 / 380	325 / 380		
Blower unit mass	m_L	kg	1.2	1.1		
Noise level		dB(A)	48 / 52	48 / 52		
Air flow			B → A blowing			

--- Blower installation not possible; x Blower installation possible

Fig. 8-10: Technical data of MHD090 blower units (optional)#

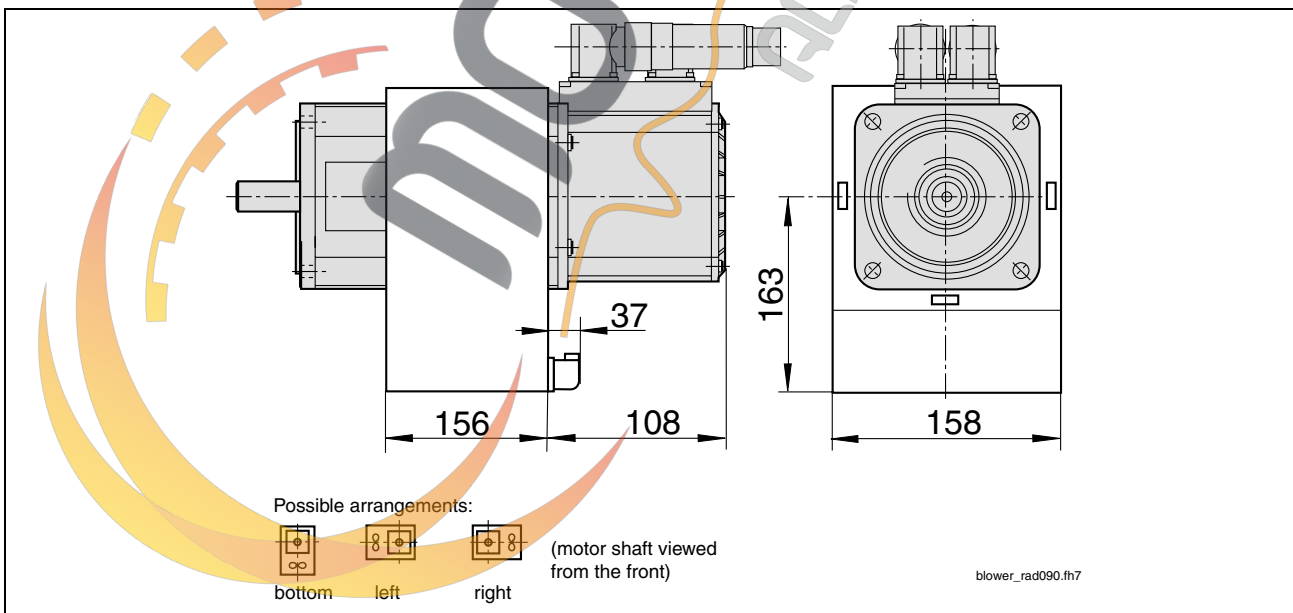


Fig. 8-11: MHD090 blower unit