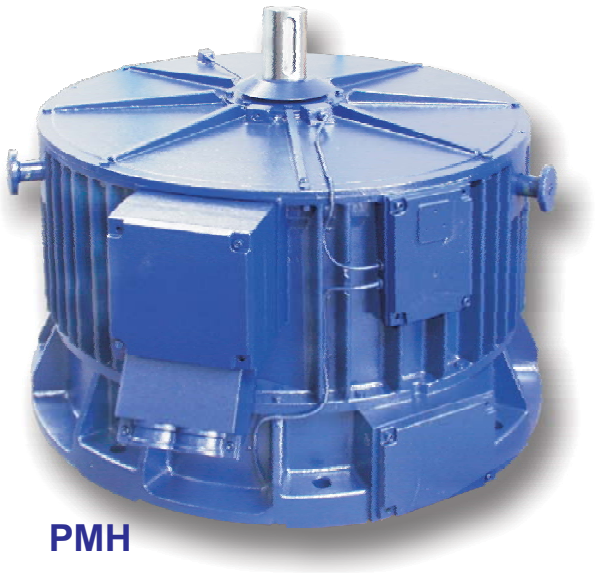
THREE-PHASE INDUCTION MOTORS OF THE SERIES PMH and PMT

APPLICATION

Three-phase low-speed induction motors of the series PMH are intended for direct drives of axial-flow fans for cooling towers without gears, for the environment with the ambient temperature up to + 40 °C (PMT up to +60°C). Due to a direct low speed the noise and vibration levels are reduced, life of the parts of the set is longer, the assembly costs are reduced and the requirements for maintenance are lower in comparison with a high-speed motor with a gearbox. Removal of a gearbox with oil filling is also beneficial for environment protection. The motors are designed for a possibility of the speed-changing ratio 1 : 2, enabling thus a more economical adjustment of the cooling power of a tower in different climatic conditions. They may be also delivered as single-speed ones (without the designation D).

The PMH motors are made for humid environment corresponding to the conditions of cooling towers - relative humidity up to 100 %, temperature of moist air being delivered (forming at the same time a cooling agent removing heat losses from the motor surface) up to + 40 °C (PMT up to +60°C)



PMH

PMT

DESIGN

- The frame is robust, made of grey cast iron, with ribs on the surface. The motor is cooled by external air flowing round the motor, inside the motor there is an auxiliary ventilation circuit. (PMT has its own fan)
- The rotor is mounted in antifriction bearings with grease lubrication, calculated service life is 110 000 running hours. The relubrication interval is either 3 years or 15 000 running hours.
- The motor is mounted in a vertical position with the upward shaft extension. The motor withstands axial and radial loads from the axial-flow fan being driven. The shaft extension is provided with a work centre with a thread and with a thread angle 60°.
- The motor is provided with 2 heating elements 150 W/230 V to be heated during rest periods.
- The end windings are fitted with 6 pcs (in 2 sets) of posistors for thermal protection being embedded into them.

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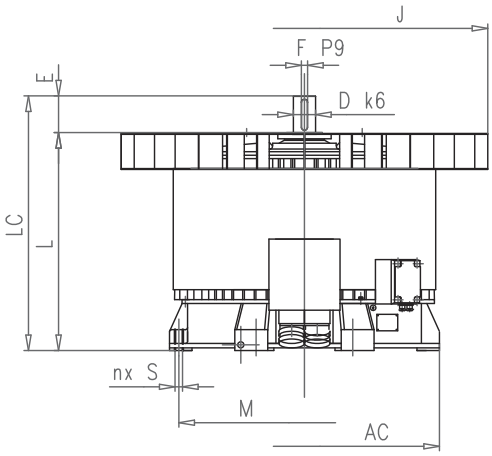
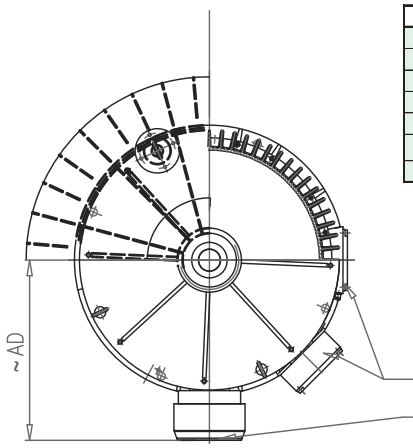


DIMENSIONS

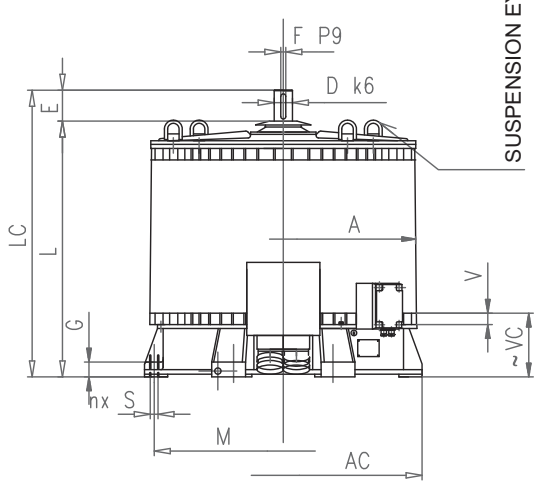
PMT 90 - 180D
PMH 105 - 180D
PMT 110 - 180D
PMH 125 - 180D
PMT 110 - 180I
PMH 125 - 180I
PMH 125 - 145I

TYPE	AC	AD	D	E	F	L	LC	M	n x ÆS	G	J
PMT90-180D	1215	815	100k6	165	28	980	1145	1130	8x35	X	1650
PMH105-180D											
PMT110-180D											
PMH125-180D											
PMT110-180I											
PMH125-180I											
PMH125-145I											

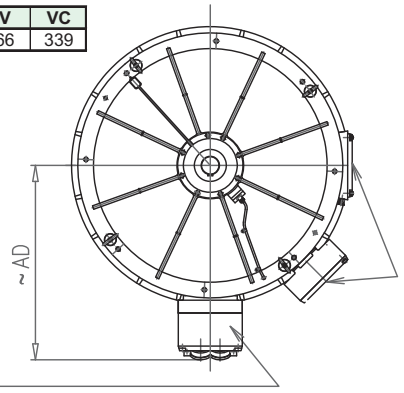


DIMENSIONS

PMH200 - 108I



TYPE	A	AC	AD	D	E	F	L	LC	M	n x ÆS	G	V	VC
PMH200-108I	1430	1500	990	150k6	250	36	1300	1550	1410	8x40	55	66	339



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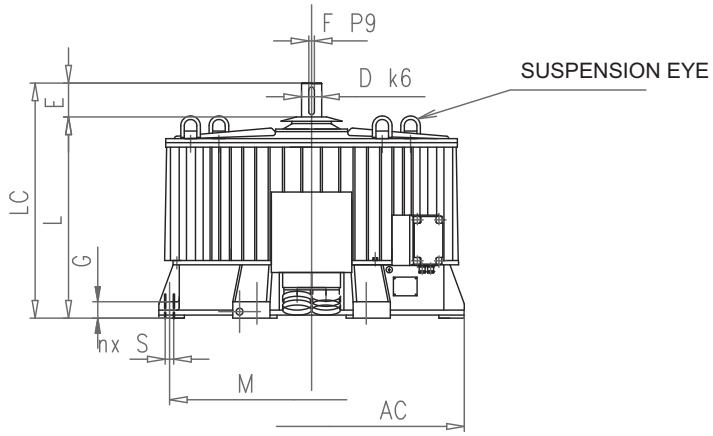
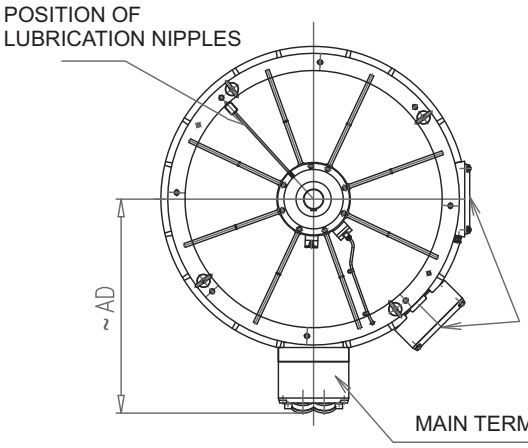


DIMENSIONS

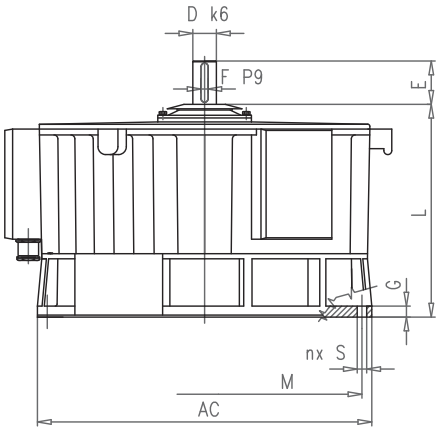
1PMH75 - 180D
1PMH75 - 207D
1PMH75 - 190IS
1PMH45 - 180D
PMH90 - 180D
PMT75 - 180D
PMT75 - 207D
PMH90 - 180I
PMH110 - 180I



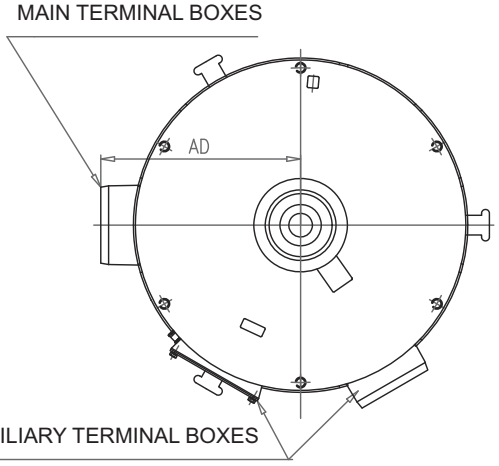
TYPE	AC	AD	D	E	F	L	LC	M	n x ÆS	G
1PMH75-180D	1215	815	100k6	165	28	800	965	1130	8x35	65
1PMH75-207D										
1PMH75-190IS										
1PMH45-180D			80k6	130	22		930			
PMH90-180D			100k6	165	28	980	1145			X
PMT75-180D										
PMT75-207D										
PMH90-180I										
PMH110-180I										

DIMENSIONS

PMH40 - 290I
PMH40 - 290IS



TYPE	AC	AD	D	E	F	L	LC	M	n x ÆS	G
PMH40-290I	850	620	60k6	110	18	540	X	800	6x24	X
PMH40-290IS										



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TECHNICAL PARAMETERS

TYPE	PMH.....		40-290D	45-180D	75-207D	75-180D	90-180D	105-180D	125-180D
Power output	P	[kW]	40,0 / 5,0	45,0 / 6,0	75,0 / 9,4	75,0 / 9,4	90,0 / 11,3	105,0 / 13,0	125,0 / 16,0
Speed	n	[min^{-1}]	292 / 146	182 / 90	209 / 104	181 / 90	185 / 92	184 / 92	184 / 92
Pole number	2p	[-]	20 / 40	32 / 64	28 / 56	32 / 64	32 / 64	32 / 64	32 / 64
Rated torque	M_n	[Nm]	1 308 / 327	2 361 / 635	3 430 / 863	3 957 / 996	4 659 / 1 172	5 456 / 1 354	6 481 / 1 664
Rated voltage	U_n	[V]	3 AC 400 (3 AC 500)*						
Frequenz	f	[Hz]	50 *)						
Connection	-		YY / Y						
Rated current	I_n	[A]	94 / 31	107 / 35	178 / 60	187 / 60	218 / 71	248 / 73	303 / 94
Efficiency	η	[%]	88,1 / 72,9	88,0 / 72,8	89,0 / 73,7	87,6 / 72,0	90,1 / 75,7	89,5 / 77,0	89,8 / 75,3
Power factor	cosϕ	[-]	0,70 / 0,32	0,69 / 0,34	0,68 / 0,31	0,66 / 0,31	0,66 / 0,31	0,68 / 0,33	0,66 / 0,33
Short-circuit current	I_k	[A]	451 / 72	420 / 70	750 / 120	670 / 110	754 / 125	754 / 125	1 080 / 190
Short-circuit torque	M_k	[Nm]	1 260 / 270	1 645 / 390	2 470 / 480	2 720 / 590	2 300 / 420	2 300 / 420	3 600 / 860
moment of inertia of the rotor	J	[$kg.m^2$]	20	70	79	91	125	150	175
Mass of the machine	m	[kg]	1 150	2 180	2 300	2 300	2 910	3 050	3 280

Frequency converters (I), Power / Frequency converters (IS)

TYPE	PMH.....		40-290I	40-290IS	75-190IS	90-180I	110-180I	125-180I	125-145I	200-108I
Power output	P	[kW]	40	40	75	90	110	125	125	200
Speed	n	[min^{-1}]	291	290	190	181	181	180	145	108
Pole number	2p	[-]	10	20	32	16	16	16	16	20
Rated torque	M_n	[Nm]	1 314	1 316	3 774	4 754	5 810	6 621	8 244	17 702
Rated voltage	U_n	[V]	380	400	400	365	380	380	400	385
Frequenz	f	[Hz]	24,7	49,7	52,5	24,6	24,5	24,5	19,8	18,3
Connection	-		Y							D
Rated current	I_n	[A]	77	93	175	178	214	239	231	398
Efficiency	η	[%]	90,9	89,5	89,2	92,1	93,0	92,6	91,0	92,7
Power factor	cosϕ	[-]	0,87	0,70	0,69	0,87	0,84	0,86	0,86	0,81
Short-circuit current	I_k	[A]	-	490	705	-	-	-	-	-
Short-circuit torque	M_k	[Nm]	-	1 590	3 400	-	-	-	-	-
moment of inertia of the rotor	J	[$kg.m^2$]	17	18	90	95	110	135	150	430
Mass of the machine	m	[kg]	1 100	1 150	2 180	2 800	3 050	3 280	3 550	5 950

TYPE	PMT.....		75-207D	75-180D	90-180D	110-180D
Power output	P	[kW]	75,0 / 10,0	75,0 / 9,4	90,0 / 11,3	110 / 15
Speed	n	[min^{-1}]	212 / 106	185 / 92	185 / 92	185 / 92
Pole number	2p	[-]	28 / 56	32 / 64	32 / 64	32 / 64
Rated torque	M_n	[Nm]	3 385 / 905	3 880 / 975	4 659 / 1 172	5 688 / 1 557
Rated voltage	U_n	[V]	3 AC 400 (3 AC 500)*			
Frequenz	f	[Hz]	50 *)			
Connection	-		YY / Y			
Rated current	I_n	[A]	175 / 61	178 / 59	218 / 71	275 / 92
Efficiency	η	[%]	90,8 / 76,5	90,3 / 75,7	90,1 / 75,7	90,1 / 76,1
Power factor	cosϕ	[-]	0,68 / 0,31	0,67 / 0,31	0,66 / 0,31	0,64 / 0,31
Short-circuit current	I_k	[A]	670 / 120	635 / 110	754 / 125	1 010 / 160
Short-circuit torque	M_k	[Nm]	1 500 / 325	1 800 / 350	2 300 / 420	2 990 / 540
moment of inertia of the rotor	J	[$kg.m^2$]	105	125	150	175
Mass of the machine	m	[kg]	2 540	2 910	3 050	3 280

Frequency converters (I)

TYPE	PMT.....		110-180I
Power output	P	[kW]	110
Speed	n	[min^{-1}]	181
Pole number	2p	[-]	16
Rated torque	M_n	[Nm]	5 810
Rated voltage	U_n	[V]	400
Frequenz	f	[Hz]	24,5
Connection	-		Y
Rated current	I_n	[A]	199
Efficiency	η	[%]	93,2
Power factor	cosϕ	[-]	0,86
Short-circuit current	I_k	[A]	-
Short-circuit torque	M_k	[Nm]	-
moment of inertia of the rotor	J	[$kg.m^2$]	150
Mass of the machine	m	[kg]	3 425

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