# THREE-PHASE INDUCTION MOTORS OF THE SERIES PMH

## 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. 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.

## TECHNICAL PARAMETERS

| TYPE | PMH | 40-290D | 45-180D | 75-207D | 75-180D | 90-180D |
|---|---|---|---|---|---|---|
| Power output | P [kW] | 40/5 | 45/6 | 75/9,4 | | 90/11 |
| Speed | n [$min^{-1}$] | 290/144 | 180/90 | 207/102 | 180/90 | |
| Pole number | 2p | 20/40 | 32/64 | 28/56 | 32/64 | |
| Rated torque | Mn [Nm] | 1310/327 | 2361/634 | 3430/863 | 3952/996 | 4658/1172 |
| Rated voltage | $U_{1n}$ [V] | 3AC 400 (3x500)* | | | | |
| Connection | - | YY/Y | | | | |
| Rated current | $I_{1n}$ [A] | 92,6/30 | 105/34 | 176,4/57 | 184,6/57 | 215,2/67,5 |
| Efficiency | [%] | 88,1/72,8 | 88/72,8 | 89/73,6 | 87,6/72 | 90,5/75,7 |
| Power factor | cos $\phi$ | 0,7/0,32 | 0,69/0,34 | 0,68/0,3 | 0,66/0,31 | |
| Frequency | f [Hz] | 50*) | | | | |
| Short-circuit current | $I_k$ [A] | 450/73,5 | 416/71,5 | 748/117 | 668/108 | 753/121 |
| Short-circuit torque | $M_k$ [Nm] | 1261/200 | 1652/386 | 2469/484 | 2400/730 | 2300/447 |
| Moment of inertia of the rotor | J [$kgm^2$] | 20 | 66 | 71 | 84 | 113 |
| Mass of the machine | G [kg] | 1150 | 2180 | 2300 | | 2600 |

*) Voltage and frequency modifications of the motor must be considered according to individual conditions of the application. Other values of power outputs, voltage and speed in a particular type size will be given on request.

## 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.
- 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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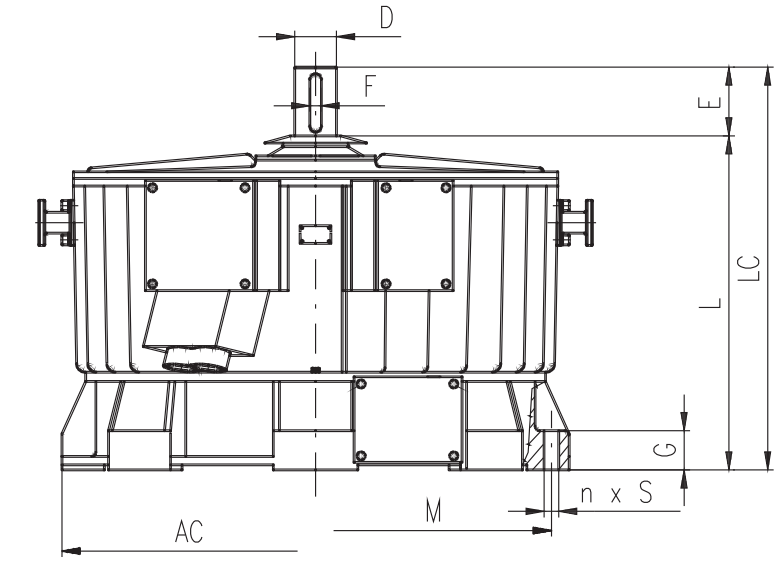
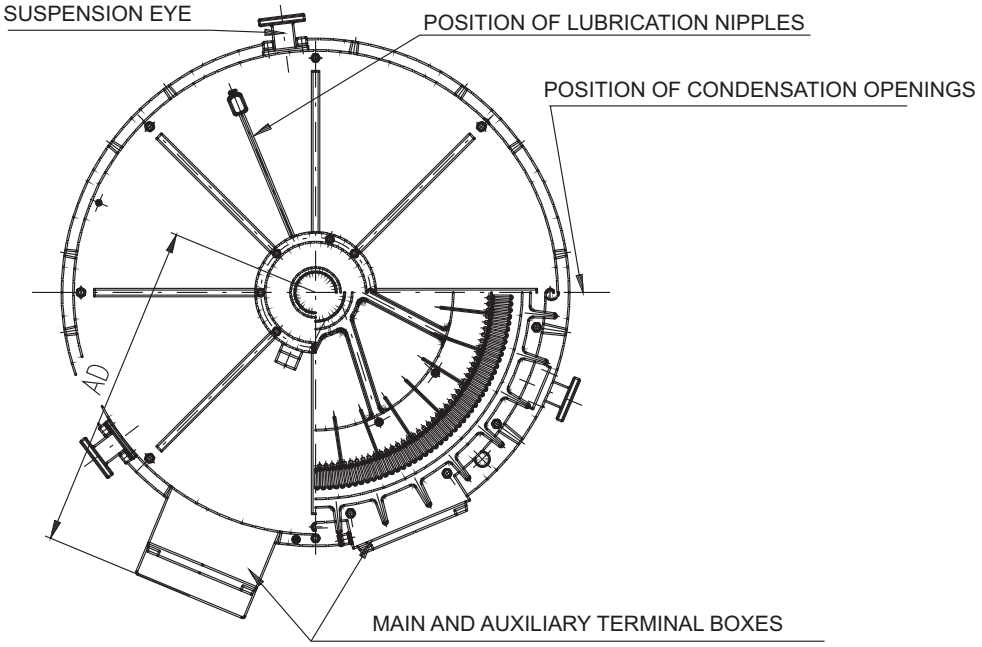
- In addition to the main terminal box the motor is provided also with an auxiliary terminal box into which the outlets of heating elements and posistors of the thermal protection of the winding are brought, and in which there is located also the motor section of the monitoring system.
- The motors are adapted for the application of a monitoring and protective device serving for the monitoring or measurement of temperatures of the bearings and windings and of mechanical vibration of the rear bearing.
- The type of construction of the motors is IM 4331; degree of protection IP54; cooling method IC48.

## BASIC DIMENSIONS




| TYPE | AC | AD | D | E | F | L | LC | M | nxS | G |
|---|---|---|---|---|---|---|---|---|---|---|
| PMH 40-290 | 850 | 620 | 60 k6 | 110 | 18 | 540 | 650 | 800 | 6x ∅ 24 | 28 |
| PMH 45-180 | 1215 | 787 | 80 k6 | 130 | 22 | 800 | 930 | 1130 | 8x ∅ 35 | 94 |
| PMH 75-207 | | | | | | | | | | |
| PMH 75-180 | | | 100 k6 | 165 | 28 | | 965 | | | |
| PMH 90-180D | | 815 | | | | 980 | 1145 | | | |



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