ASYNCHRONOUS THREE-PHASE ELECTRIC MOTORS

Operating and maintenance instructions.

Object of these instructions is to give the installers and users correct operating and maintenance conditions concerning

asynchronous three-phase motors with enclosed construction, external ventilation and squirrel cage rotor.

Receipt and storage of motors.

Every motor is despatched from the factory ready for installation, after quality control during manufacture as well as a final test, that is to

verify if the motor is in accordance with all required standards. On receipt it is recommended to inspect it to find out whether it has got damages during

transportation. Should the motor not be installed immediately, it should be kept indoor, in a clean, dry and vibrationless place.

Installation.

Set up the motor in a well cooled place. Care should be taken to assure that cooling is not hindered by any walls or other machines next to it.

The possibility of inspections and maintenance when operating is to be considered. The motor foundation should be even, solid in order to absorb vibrations, and

sufficiently rigid in order to keep alignment. Alignment. The motor must always be carefully aligned, particularly when coupled

direct to the driven machine. Should any vibrations or bearing failures be observed, check the alignment immediately,

as it might be faulty.

Couplings.

Output transmission to the driven machine may be provided by either direct coupling or by driving belts. In case of a direct coupling, a flexible

coupling is to be used, which avoids any transmission of axial thrusts on the bearings. In case of coupling by driving belts, set up

the motor with shaft parallel to that of the driven machine and on belt tensioning slides, in order to adjust belt tension.

An excessive belt tension might cause the bearings to wear out quickly and, in most serious cases, the shaft to break.

Balancing and installation of couplings and pulleys.

Any different indications excepted, the rotor is dynamically balanced by a half-key in the free shaft end. The maximum levels of vibration are as

follows:

Motor

Size

Vibration level

in mm/s, rms value at

600-3600 rpm

80 – 132 1,8

160 – 225 2,8

250 – 400 4,5

Carefully balance the transmission by a halfkey before fitting. Couplings and pulleys are to be fitted with

greatest care, in order to avoid any impacts which may damage the bearings.

Insulation test.

Before starting the motor and after long periods of inactivity or storage, the insulation resistance of the winding is to

be measured that should be higher than 5 M W at 25°C ambient temperature. If this value cannot be obtained, the winding

is damp and must be dried by a skilled company.

Electric connection.

As to the electric connection, the security ruling standards are to be complied with. Check that data on the

plate are according to the circuit features, to which the motor is to be connected. Connect according to wiring diagrams.

Earthing.

Inside the terminal box or next to it, it is connected, in a visible position, a terminal for earthing the motor, this operation

should be done by means of a copper lead with adequate section according to the ruling standards.

Direction of rotation.

Standard motors can indifferently run in both rotation directions. If terminals U1 V1 W1 are connected to the

mains and if the connecting phase sequence of the mains is 1,2,3, the motor runs clockwise, if seen from the driving end.

The rotation direction can by reversed by exchanging any two of three leads which are connected to the motor.

Electric protections.

Motors must be protected against any consequences of short circuits, of operating overloading, of singlephase

running, by installing before them a suitably sized switch that must be provided with a temperature relay and calibrated for

the rated current. In order to increase the operating security in case of particularly heavy duties, temperature sensors may

be installed in the windings, upon request: Klixon, Thermistors, Heating measuring elements.

Starting the motor.

In the majority, asynchronous three-phase motors with squirrel cage rotor can be operated withdirect starting, checking the plant according

to the absorbed current at the start. Star-delta connection is to be used when very low starting torques and currents are

required, that is 25%-30% of the values it would have in case of direct-on-line starting. When starting the stall torque is to be

sufficiently lower than the starting torque. The commutation from star to delta is to be converted approaching the rated speed.

Should such conditions not take place, starting is to be done by reducing the voltage on the motor terminals by transformer,

resistors or stator reactors. In this way a reduction of the torque curve by

the voltage square and of the current curve

in accordance with the voltage can be obtained.

Maintenance.

The motor as well as the possible accessories should always be kept clean, free of dust traces, dirt, oil or other grime.

As a good rule it is recommended to periodically check whether the motor operates without any vibrations or

anomalous noises, the tension of possible driving belts is correct, the inlet of the ventilation circuit is not obstructed causing

overheating of the windings.

Bearings - Lubrication.

Motors with staunch bearings, that are self-lubricating for life, do not require any lubrication. Bearings life vary

from 3 up to 5 years according to the axial and radial loads that are charged on the shaft and to the enviromental conditions the

motor is used in. Motors provided with the bearings lubrication device are to be lubricated while running according to the lubricating intervals, the grease type and quality as per table 7. The lubricating intervals apply to a motor set up in normal surrounding.

If the environmental conditions are particularly severe owing to dust, water, high temperatures, the intervals are to be reduced.

Table 6 shows bearings mounted on normal standard motor types. Pages 19-20-21 show the spare parts for the

different normal standard motor types. Should problems in connection with operating and maintanance of the electric

machines arise, please contact our Engineering Service.