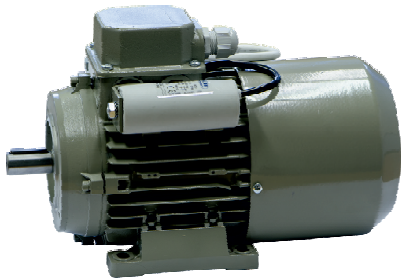




## Installation, Operation & Maintenance Instructions SINGLE-PHASE SQUIRREL-CAGE INDUCTION ELECTRIC MOTORS 1EMPC, 1EMPCC SERIES

This document complements the Installation, Operation & Maintenance Instructions for Exico three-phase motors



### ENVIRONMENTAL REQUIREMENTS

The same conditions are applicable as for standard three-phase electric motors.

### MOTOR DESCRIPTION

The 63-100 frame sizes 1EMPC series single-phase electric motors feature a running capacitor permanently connected to the winding.

The 63-100 frame sizes 1EMPCC series single-phase electric motors are capacitor start-capacitor run motors. The running capacitor remains permanently connected whereas the starting capacitor gets disconnected by the centrifugal switch when the motor reaches the nominal speed.

The capacitors are normally fastened to the terminal box with a metal holder.

All single phase motors have aluminium frame, endshields and/or flanges.

The performance data for each motor type are available in DataSheets, which are available for download from [www.exico.co.uk](http://www.exico.co.uk) website.

### OPERATION

For commissioning and operation please refer to the Installation, Operation & Maintenance Instructions for Exico three-phase motors

**WARNING!** Before starting any works on the motor, be sure that it has been disconnected from the mains!

### INSTALLATION

In the case of vertically installed motors, additional measures must be taken to ensure that no water can penetrate inside the motor along the shaft.

Quiet running: Exact alignment of the coupling and a well-balanced transmission element (coupling, pulley, fan, etc.) is essential for quiet vibration-free running. If necessary, the whole motor and transmission element should be balanced.

The cable entry can be turned by  $4 \times 90^\circ$ .

### LUBRICATION

The motors are as standard equipped with bearings lubricated for life.

### CONNECTION TO THE MAINS

The connection diagram can be found inside the Terminal Box Lid:

a) Special attention is to be paid to the single-phase motor connection to the mains and the cable dimensions as the required power is supplied by two leads only and the current is higher than at three-phase motors. The supply voltage drop should be minimized! In case the voltage at the motor terminals is lower than that stated on the rating plate, lower values of all torques shall be expected, ie. starting torque, rated torque and pull out torque. To a certain extent, real values for such situation can be established as follows:

$$M' = M_n (U'/U_n)^2$$

where:  $M'$  = demanded torque value (Nm)

$M_n$  = rated torque (Nm)

$U'$  = real voltage at the terminals (V)

$U_n$  = voltage given on the rating plate (V)

$$M_n = 9.549 P/n$$

where:  $P$  = rated output given on the rating plate (watts)

$n$  = rated speed given on the rating plate (r.p.m.)

- b) In case of a long storage period, it is recommended to clean all lead ends at the terminals and the terminal board connecting material.  
It is also necessary to observe tightening torques of the terminal board bolts and nuts stated in the same section of the standard three-phase electric motor operation manual.
- c) For protection a circuit breaker of an appropriate rated value is recommended.

## MAINTENANCE

The single-phase electric motor maintenance principles have been extended by the operations connected with the centrifugal switch which is used on the 1EMPC and 1EMPCC motor series.

Motor dismantling should be done as follows:

- a) To remove the shaft key
- b) To unscrew the fastening screws and remove the fan cover
- c) To pull off the fan
- d) To unscrew the fastening screws and remove the centrifugal switch cover
- e) To disconnect the leads by unsoldering them from the immovable parts of the centrifugal switch
- f) To unscrew the grab screw and remove the rotating part of the centrifugal switch
- g) To loosen and remove the endshield fastening screws
- h) To remove the drive end endshield
- i) To remove the non-drive end endshield together with the rotor from the stator.

In case of further dismantling:

- j) To unscrew the switch fastening screws and to dismantle the fixed part of the centrifugal switch
- k) To remove the non-drive end endshield from the bearing.

The motor assembly should be carried out in reverse. Additional attention should be paid to the fact that during repeated assembly of the motor with the centrifugal switch, the sealing is to be restored between the plastic cover of the centrifugal switch and the endshield recess (eg by plastic cement). Additionally, an axial clearance 0.5-1 mm between the fan and the rubber sealing ring should be observed. The ring has to be coated with a neutral grease. Also the joint sealing between the endshields and the frame should be renewed (see chapter "Installation" of the three-phase motor operation manual). The aforementioned measures are necessary to observe the IP54 enclosure. The 1EMPC series single-phase electric motors can be dismantled in accordance with the instructions given for the standard three-phase electric motors.

## STORAGE

The same principles shall be applied as those from the same section of the three-phase electric motors operation manual.

## FAILURES

Similar failure descriptions shall be valid as those of the three-phase electric motors.

Capacitors can create another source of failures. The capacitor failure can cause a loss of torque.

Capacitor failure or winding fault can be indicated by the capacitor surface temperature being higher than the motor frame surface temperature.