Three-phase induction motor

Wound rotor with motorized brush lifting system
Wound rotor three-phase induction motor with motorized brush lifting system

The wound rotor three-phase induction motors with motorized brush lifting system are manufactured with an electromechanic system which allows short circuiting collector rings and lifting brushes immediately after starting the motor.

After the starting procedure, the motors operate in rated conditions. The motors are highly reliable because they are designed with state-of-the-art technology and manufactured with international quality standard materials.

Application: Ball mills
6500 kW, 11,000 V, 6 poles, frame 900

Advantages

Motorized brush lifting implies important advantages in the performance of the motor throughout the years:

- Avoids constant and premature wearing of the brushes and collector rings;
- Reduces the stops for maintenance and replacement of brushes;
- Avoids the accumulation of dust on the brushes inside the brush compartment, keeping the insulation level of the rotor high;
- Increases the useful life of the brushes, collector rings and, consequently, that of the motor.

Application: Water pump
2000 kW, 11,000 V, 4 poles, frame 560

Applications

These motors are recommended in cases in which the load has a high resistant torque or high inertia at starting. The external resistances are used only to start the motor providing high torque and strongly reducing the inrush current.

The brushes are in contact with the collector rings only at starting which avoids unnecessary wearing of the brushes and collector rings during rated operation allowing a longer time of use of the set.

Examples of applications

- Ball mills;
- Fans;
- Exhaust fans;
- Crushers;
- Pumps in general;
- Others

Application: Ball mills
4600 kW, 11,000 V, 6 poles, frame 800
Characteristics

Mounting
- Frame: Cast up to frame 450 and welded steel plates from frame 500 to 1600.
- Stator: In high or low voltage, insulated with Micatherm – VPI WEG insulation system.
- Rotor: Wound and with collector rings.
- Collector rings: Made of stainless steel providing better performance and longer useful life.
- Brush holder: With motorized brush lifting system.
- Brushes: Developed to specifically meet operation conditions at starting of motors.
- Motorized brush lifting system: Has an electromechanic actuator which provides the control to lift the brushes as well as short circuit the collector rings. Has control and signaling limit switches. Needs external control through contactor switches or PLC.

Technical
- Powers: 160 to 27,000 kW
- Voltages: 220 to 13,800 V
- Polarities: 4 to 14 poles
- Insulation class: F
- Protection degree: Open (IP23) or closed (IP54 to IP65W)
- Frames: 280 to 1600 (IEC)
- Mounting: Horizontal or vertical

Operation

Wound rotor motors make the increase of its rotor resistance possible through the use of a variable external resistance (rheostat) connected to the rotor circuit which increases the starting torque with a relatively low current.
The motor starts with the brushes lowered and the collector rings not short circuited. This must be ensured by interlocking the signaling limit switches on the moving parts. As the motor gains speed, the rheostat must decrease its resistance progressively until it reaches the lowest possible value and then it must be short circuited.
When the motor reaches the rated speed, the electromechanical actuator must be driven to short circuit the collector rings and lift the brushes and then the motor will operate at nominal duty.
The system is designed to guarantee that the brushes will not be lifted unless the rotor is short circuited.
The electromechanic actuator has control limit switches which are set to actuate in an accurate way both in the lifting and lowering procedure of the brushes.

Manual operation
Should it not be possible to drive the motorized system, the set of brushes can be driven manually using the flywheel on the superior part of the electromechanic actuator.