



RW Type

Screen Protected Drip Proof
Low Voltage Slipring Induction Motors



Motors for the Long Run!

Type RW – A symbol of versatility

The type RW motors have been designed basically for heavy duty use with driven machine imposing overloads and severe mechanical shocks and vibrations. These motors are equally suitable for smooth constant loads since the motors are also designed with high efficiency and power factor. Because of optimum utilisation of materials, with improved ventilation techniques the motors are 10 – 15% lighter in weight and yet more rugged because of their inherent special construction.

Because of high Pull Out Torque and inherent thermal margin kept for high slip operation these motors are ideally suited for rerolling mills and cane cutter/cane crusher/cane leveller/cane fiberizer applications pertaining to sugar industries. Because of high efficiency and power factor these motors are also suitable for pump/fan applications.

Specifications :

Protection & Cooling	: IP23 (Screen Protected Drip Proof), IC01
Duties	: The motors are basically rated for S1 (continuous duty) but can be adapted to other duties such as S6, S7, S8 etc.
Insulation	: Class 'F' insulation (temperature rise limited to class 'B')
Supply	: 3 phase, 415 volt \pm 10%, 50 cycle \pm 5% as standard. But other voltages and frequencies are also catered for upto 660 volt class.
Slipping unit and brushgear	: Continuously rated
Winding and enclosure treatment	: Tropicalisation treatment is provided as a standard practice.
Mounting	: a) Horizontal footmounted – B3 mounting as standard. b) Vertical flange mounting – V1 construction available for frame sizes RW105, RW120, RW136, RW152 and RW168.

Construction :

Frame and Endshields : Girder construction, rugged cast iron/M.S. fabricated frame with internally ribbed heavy cast iron/M.S. fabricated endshields with centering spigots and each secured by four substantial high tensile bolts for RW 78, 89 & 105 frames and eight bolts for RW 120 frames onwards. The feet with ample thickness, are cast integrally to the frame and access is available for vertical drilling for dowelling pins to obtain positive location and retention of alignment with driven machine under severe mechanical shock, vibration or thermal expansion/contraction over a period. Two steel slinging eye bolts are screwed in stator frame. Each endshield is furnished with steel mesh covered ventilation openings except for force ventilated motors where only two openings for fixing the ventilating ducts are provided.

Stator and Rotor : Cold rolled (non-oriented) steel sheet is used for stator/rotor laminations.

Laminations are held by steel endplates. Stator laminations are keyed and retained in the stator frame through a key ring while the motor laminations are keyed to the shaft and secured by steel endplates.

Winding : Stator is wound either with superenamelled wire as per IS 4800 part V or with glass fibre lapped enamelled strip conductors, depending on size and application of motor.

Rotors for frame sizes upto RW89 are wound with round superenamelled copper wire whereas for higher sizes bar wave windings are provided. Rotor coil overhangs are secured to an internal support ring, while upper portion of the overhang is secured with non magnetic banding.

Insulation/Treatment : Class 'F' to IS 1271. Temperature rise limited to class 'B' limit in accordance with IS 325. The insulating materials, binders, fillers and impregnants used for Class 'F' insulation are the latest and proven to be fully compatible under thermal cycling are ageing, while thicknesses, layers, direct and creepage clearance supporting and securing elements etc. are maintained at a level that only caters to the basic insulation levels governed by the voltage class of the motor but takes care of the mechanical stresses caused by the thermal cycling, short circuit and overloads, overspeeding, frequent starting/braking, forced vibrations, and shocks over the anticipated motor life. The wound stators and rotors along with their leads are first preheated for expulsion of moisture, cooled to prepolymerisation temperature of the varnish, dipped in



Fig. 2 Coil Setting
thermosetting varnish and baked – the number of dipping and baking cycles depending on the type of environment and service condition.

Ventilation System :

The type RW motors are basically short core length large diameter motors where cooling is inherently better. The inclusion of a powerful and effective ventilation system furnishes a large safety margin on temperature rise thereby minimising duration for elevated temperature. Additionally tunnel slots have been introduced in the large frame sizes for direct cooling of stator conductors. The axial ventilating holes and the tunnel slot system along with the blower capacity and battle system are matched to ensure effective cooling to limit the winding temperature rise to safe value.

The stators and rotors are provided with a large number of axial ventilating holes. A high capacity radial discharge shaft mounted blower to robust steelplate construction (lightly shrunkfit on motor shaft and secured by a locking plug and additionally, in case of



Fig. 1 Wound Stator

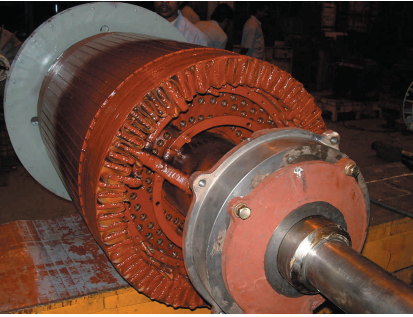


Fig. 3 Wound Rotor Assembly without Slipring

vertical motors, secured by a locking ring) alongwith a fixed air guide provides a powerful suction through the motor. The fan blades are rivetted and spot welded and specially designed for minimum windage loss. Air is drawn from the non drive end radially and expelled similarly at the drive end, thereby ensuring that the cooling air is not drawn from the immediate vicinity of the driven machine to which the motor may be coupled in case of force ventilated motors the blower may be retained or dispensed with. The blower is balanced separately before mounting on the motor shaft and the rotor and blower assembly are dynamically balanced again as an unit after assembly.

Balancing :

Rotors along with shaft mounted blower are dynamically balanced to limit vibration to value well within specified limits as per IS:12075. Lower vibration levels when specified by users, may also be provided.

Shaft, Bearing/Lubrication :

■ Shaft : Large diameter shaft : For large output the shaft is often mounted with 2 bearings at non drive end.

■ Bearing/Lubrication : Ball and roller bearings are standard. Cartridge - type housings exclude foreign matter and facilitate easy maintenance Endplay arrangements may be provided if required. The motors are equally suitable for direct coupling through flexible or solid couplings. The ball bearing at non driving end serves as the locating bearing and caters to the axial thrust associated with the most normal drives. However in case of high magnitude of thrust as in the case of vertically mounted motors, a special bearing arrangement such as duplex or angular contact, is incorporated. The size of bearing and shaft diameter provided in the RW motors, will eliminate, in most cases, the need for a jackshaft (countershaft) drive

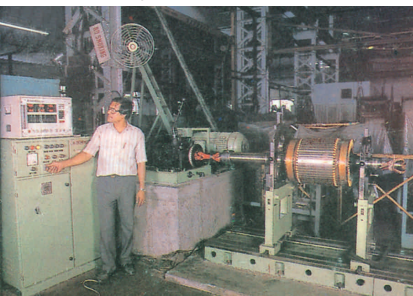


Fig. 4 Rotor Balancing

when radial loads are exceptionally high and yet furnish an acceptable expected bearing life. The bearings are housed in cartridges which are spigot located accurately into the endshields, thereby furnishing the facility of motor withdrawal from stator without disturbing the bearings.

Regreasing nipples are provided and are fully accessible for grease replenishment when the motor is in service. Bearing cartridges are machine grooved to prevent ingress of excess grease into the motor.

Bearing sizes, as used in RW sizes of motors are as follows :

Frame Size	D.E.	N.D.E.
RW 78	N317	6315
RW 89	N320	6317
RW 105	N224	6320
RW 120	N224	6320
RW 136	N224	6320
RW 152 -	N326	N224
RW 168L		& 6224
RW 168100 & RW 168112	NU332	6332

Slipring Unit, Brushes and Brushgear :

Sliprings of hard wearing Copper Nickel alloy are mounted outside endshield at nondriving end. Collector is keyed to shaft and secured to withstand thermal cycling shock and vibration. Carbon brushes are of a grade specially selected to provide satisfactory wear life. The brush holders are amply rated, the design of tension spring and associated levers permit only a small change in brush pressure for a large amount of brush wear, thereby minimising the frequency of tension adjustment. All brushes are fully bedded on

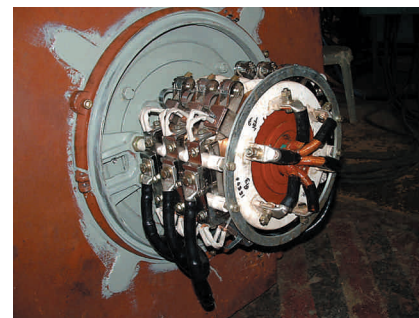


Fig. 5 Slipring Assembly

the collector and run in before the motors are dispatched from the works.

A hinged sheet steel cover with three switchbolts and wingnuts is provided for rapid access to the brushgear and sliprings. Sliprings

and brushgears are continuously rated for motors requiring speed regulations (with external rotor resistance) or with frequent starting and stopping.

Slipring chambers are having provision for ventilation for cooler operation. Slipring assembly for higher Rotor Voltages (>1000V) are specially manufactured by providing phase separators (Fig. 6). Carbon brush size used for RW range of motors are tabulated as follows. (Table 2)

Terminal Box :

Two terminal box seats are furnished on opposite sides of the frame enabling a choice of position (right or left hand side) of the terminal box. When one box is used the other is blanked off, the stator and rotor leads being brought to the same double entry box. For PW136 frame sizes and above two

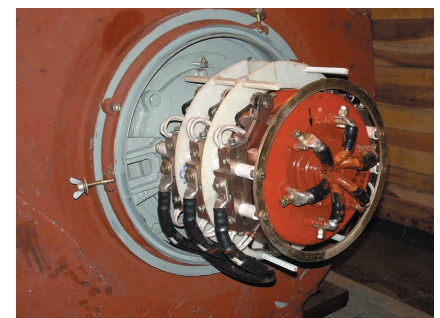


Fig. 6 Special Slipring Assembly

terminal boxes are provided as standard. The leads fitted with thimbles are connected to non hygroscopic single stud type terminal bars which are staggermounted to permit easy handling and termination of highly derated Aluminium conductor cables. The terminal boxes are of larger sizes to suit the cable sizes. All current carrying parts and their associated fasteners are plated and passivated.

Large size terminal box of fabricated steel are used for easy access. The terminal box is mounted on an adaptor plate. Cable boxes and glands to suit the motor users cable may be provided.

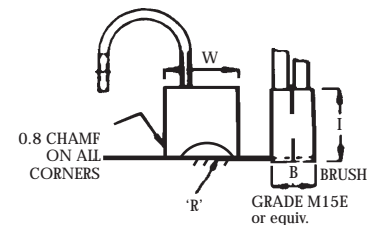


Fig. 7 Terminal bars are generally of single stores type

Frame size	W	B	H	R
RW 78	31.75	15.88	31.75	69.85
RW 89	31.75	15.88	31.75	69.85
RW 105	31.75	22.225	35.56	101
RW 120	31.75	22.225	35.56	101
RW 136	31.75	22.225	35.56	101
RW 152	38.1	31.75	44.45	127
RW 168	38.1	31.75	44.45	127

