



marathonTM
Motors



Teepak

Totally Enclosed Tube Ventilated High Voltage Induction Motors

A Regal Brand

REGAL

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Specifications	
Range	: Upto 3000 KW
Poles	: Upto 14 Pole
Voltage	: Upto 11000 Volt
Frame	: 450 – 1000
Insulation	: C1-F with rise limit C1-B
Rotor	: Squirrel Cage**
Mounting	: Horizontal & Vertical
Rotation	: Uni-direction/Bi-direction
Cooling	: IC 0151
Bearing	: Grease lubricated anti-friction Rolling Element & oil lubricated sleeve bearings.
Degree of Protection	: IP 54, IP 55

*** For Slip-Ring, please refer to us*

Major Features

- Fabricated Robust Steel construction for frames.
- Uniform internal cooling circuit.
- Axial Cooling for smaller ratings, both radial and axial ventilation for larger ratings.
- Basic mounting dimensions as per IS.
- Class 'F' insulation system, both Resin rich & Resin poor (VPI) varieties available.
- Rotors are dynamically balanced .
- Rotor bars are brazed with end rings by One Shot Brazing process.
- Environmentally friendly motors to meet all Drives
- Fault tested Phase Segregated Terminal box.
- RTD, BTD, Dial type Temperature indicator available.
- Separate Terminal Box available for Neutral point, RTD, BTD termination purpose.
- Provision for Magnetic Slot Wedge to improve Efficiency, Power Factor and improve Electromagnetic noise
- Provision for special Epoxy paint system

Design and Construction

Standards and regulations

The machines comply with IS-325, relevant BS and IEC. The motors can be offered to specific requirements of the customers.

The motors are designed for voltage and frequency as per IS 325. The standard values and the permissible variations are :

Voltage – 2.2 to 11 kV \pm 10%

Frequency – upto 60 Hz \pm 5%

Motors are also available to suit systems where voltage and frequency variations exceed the standard limits.

The rated outputs correspond to the continuous running duty with cooling air temperature of 40°C and site altitudes not exceeding 1000 m. above m.s.l.

Types of construction

The machines are available in types of construction B3, V1 or B35.

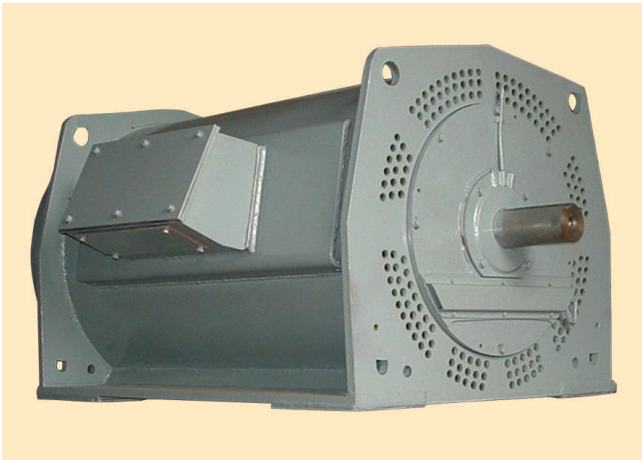


Fig 1 : MARATHON Electric TETV – Horizontal Mounting



Fig 2 : MARATHON Electric TETV – Vertical Mounting

Ventilation system

The machines have closed circuit with a concentric tube nest Cooler, which is Integral with the frame. Rotor is fitted with shaft-mounted external and internal fans.

For 2-Pole machines the internal and external fans are uni-directional.

The external fan is located in the fan casing on the non drive-end and forces the open-circuit air through the cooling tubes of the stator frame.

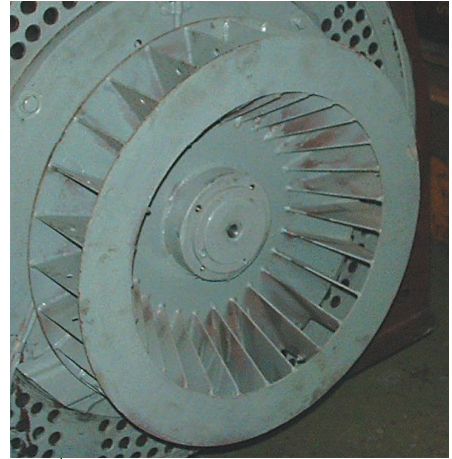


Fig 3 : Typical External Fan

The internal fan in the main compartment forces the

primary air to circulate in symmetrical ducts in the laminated rotor core. The primary air circulates through the end Windings and the ducts in the core packs and extracts the heat to the cooling tubes.

Degrees of protection

The machines are manufactured with a degree of protection IP 54 or IP 55, corresponding to IS 4691 or IEC 34-5. Method of cooling complies with IC 0151. The motors are suitable to service both indoor and outdoor, and is strongly recommended for dusty environments.

Stator frame and winding

The stator frame is of welded construction. The axial cooling tubes are expanded into the two end walls.

The stator core pack is fitted centrally in the stator frame and secured against rotation and displacement.

The stator winding (two layer lap type) constitute of diamond shaped coils and are provided with Mica based insulation system complying with class F insulation requirements. The insulation system comprises of two varieties – Resin Rich Varnish Impregnated type or, Resin Poor Epoxy Impregnated (VPI) type. The insulation possesses high die-electric strength, high resistance to moisture and aggressive gases and vapours, thus providing excellent mechanical stability and longer life.



Fig 4 : Typical Wound Stator

Rotor construction

The rotor consists of a rigid shaft made out of ultrasonically tested steel forging. It is manufactured from carbon manganese steel of grade C45, 150M19, or equivalent. Standard motors have a single plain parallel shaft extension with a single key way and the motors are balanced with a half key fitted. The extension is drilled and tapped as per standard.

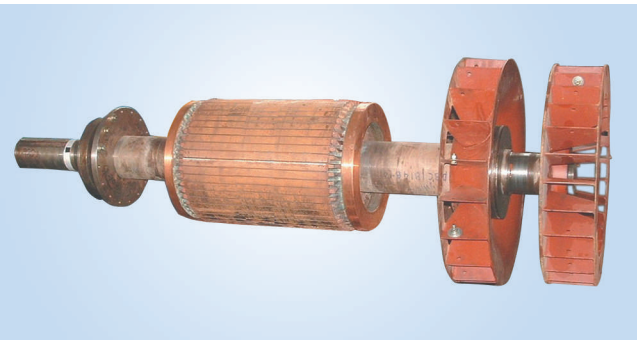


Fig 5 : Typical Cage Rotor

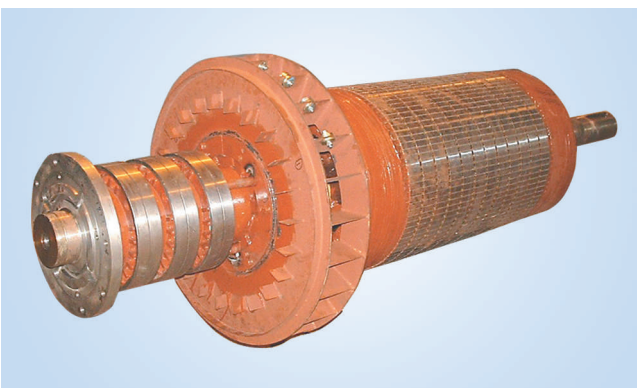


Fig 6 : Typical Wound Rotor

All squirrel cage motors have copper or copper alloy rotor cages. Tight fitting rotor bars are butt brazed to copper endrings by one shot brazing process. Rotors of slipring motors are designed and manufactured with high

quality Class F/H insulated bars to suit arduous site conditions. All rotors are dynamically balanced to more stringent levels to make the overall motor vibration severity well below the limits specified in IS I2075.

End shields

The end shields at the drive and non drive-ends are made of fabricated steel or cast iron. The end shields are designed for fitting the bearing assembly and take care for transmitting the static and dynamic load.

Bearings

Depending on the design and the operating conditions specified in the order, the machines are fitted with grease-lubricated rolling element bearings oil lubricated sleeve bearings, Insulated bearings/brackets are provided on request. The bearings are selected for minimum maintenance and avoid the need of external lubrication systems.

Terminal boxes

The electrical connections of the stator winding are terminated in the main terminal box. The terminal box is generally of phase segregated and of double walled construction. The design minimizes the possibility of phase to phase to earth fault, limits its extent and reduces the possible hazard to the personnel in operation. These Phase Segregated Terminal Boxes (PSTB) have been successfully fault tested at CPRI laboratory, Bhopal, PVC/XLPE cables can be directly terminated to PSTB.

Machines containing auxiliary circuits for functions such as anti-condensation heating, temperature monitoring etc. are fitted with separate auxiliary terminal boxes. All types of Terminal boxes comply with degree of protection IP 54/55 or, IEC 34.5.



Fig 7 : Typical Termination Arrangement Showing RTD-BTD (L) PSTB (C), Space Heater (R)

* PHASE SEGREGATED TERMINAL BOX

Fault level : 3.3 kV - 250 MVA
6.6. kV- 500 MVA

* Terminal boxes for motors with voltage ratings above 6.6 kV are phase separated type with bushings.

The number, location and type of terminal boxes can be seen from the dimension drawing of the machine; circuit arrangement and connections of the main and auxiliary circuits are either documented in the O & M manuals or supplied separately.

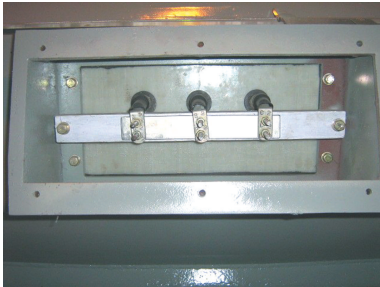


Fig 8 : Typical Arrangement for Neutral Point Termination (Shorting Link Supplied separately)



Fig 9 : Typical Alternative Arrangement for Neutral Point Termination

Paint System

Surface is primed after degreasing and cleaning using Epilux 610 primer to a dry film. A single finish coat of two pack Epoxy paint is then applied.

Accessories

Provided on request are PT 100 winding temperature detectors, PT100 bearing temperature detectors, Dial type temperature indicator for bearings vibration monitoring probes shock pulse transducers etc.

Space heaters are provided as standard feature.

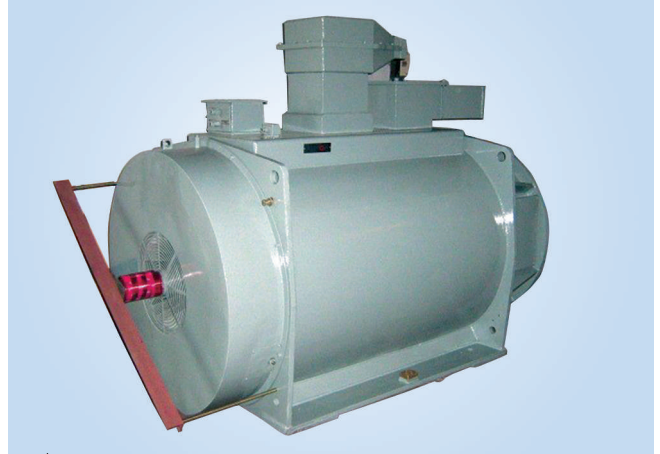


Fig 10 : MARATHON Electric TETV Slipring Version

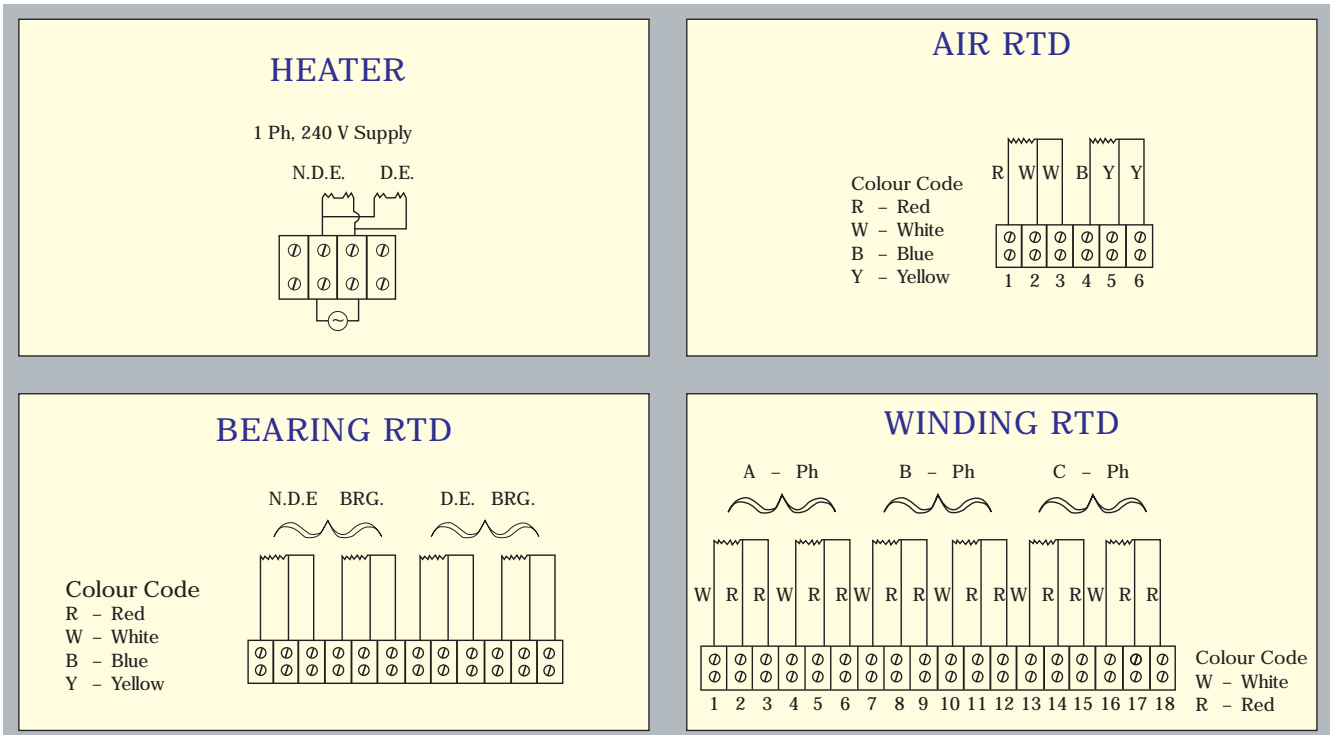


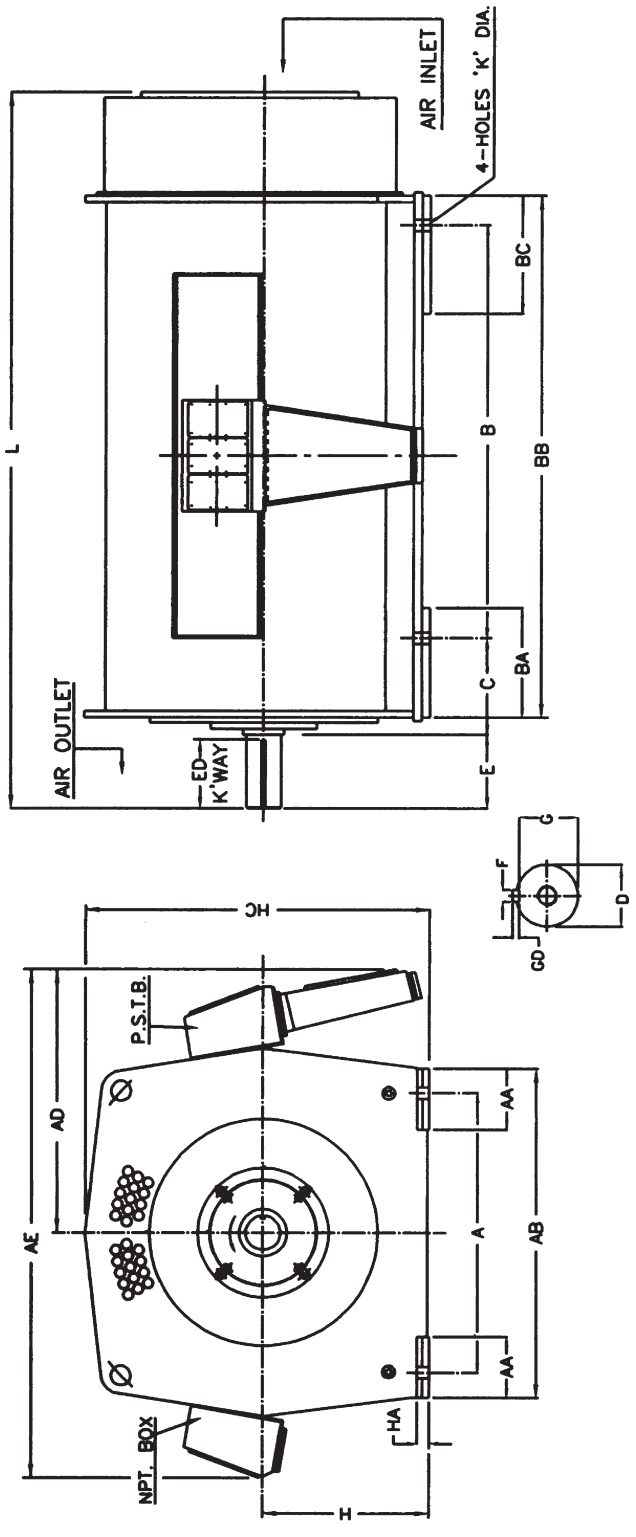
Fig 11 : Typical Wiring Diagrams for winding RTD, Bearing RTD and Space Heater

Total Quality

The complete range of HT Motors is manufactured to a Quality Assurance Plan, which lays down stringent acceptance norms for each stage of production. All materials are critically tested in-house to ensure

conformity with National and International standards.

Customers are welcome to carry out stage inspection or final inspection during manufacture. Type testing can be done upto 4000 KW, 11KV, 4 Pole.



ROTATION :- BI-DIRECTIONAL

DETAILS OF SHAFT END

FRAME	A	B	C	K	BB	BA	BC	AB	AA	HA	H	HC MAX.	AD MAX.	AE MAX.	D	E	ED	F	GD	G	L MAX.	WT. (APPROX.) (kg.)
TS 400	686	900	280	36	1250	300	300	886	200	30	400	900	800	1550	100	210	205	28	16	90	1825	2800
TS 450	800	1165	200	42	1400	260	300	1040	240	35	450	1000	950	1850	100	210	205	28	16	90	2000	3000
TS 500	850	1250	335	42	1600	315	315	1076	250	36	500	1100	1025	1950	100	210	205	28	16	90	2100	3700
TS 560	950	1300	205	42	1600	260	420	1170	220	42	560	1250	1150	2250	110	210	200	28	16	90	2200	4500
TS 630	1000	1400	280	42	1800	400	400	1210	240	47	630	1350	1150	2250	120	210	205	28	16	109	2500	6000
TS 710	1250	1600	254	42	1920	400	400	1400	250	50	710	1500	1150	2250	130	250	220	32	18	119	2600	7000

THIS GAD IS TENTATIVE & FOR REFERENCE ONLY.
FOR V1/B35 MOUNTING, PLEASE REFER TO WORKS.

REFERENCE LIST : TETV MOTORS

Sl. No.	Year of Supply	Voltage (KV)	Qty.	Rating (KW)	Synch. Speed (RPM)	Type
1	2005	3.3	2	610	1000	SQ
2	2005	3.3	1	610	1000	SQ
3	2006	6.6	1	650	1500	SQ
4	2006	3.3	2	610	1000	SQ
5	2006	3.3	1	610	1000	SR
6	2006	6.6	2	630	1000	SQ
7	2006	6.6	1	550	1000	SQ
8	2006	3.3	3	610	1000	SQ
9	2006	6.6	1	500	750	SQ
10	2006	6.6	1	700	750	SQ
11	2006	6.6	3	500	1500	SQ
12	2006	6.6	3	500	750	SQ
13	2006	6.6	1	630	1000	SQ
14	2006	6.6	2	500	1500	SQ
15	2006	6.6	6	500	1500	SQ
16	2006	6.6	2	650	1500	SQ
17	2006	6.6	4	550	1500	SQ
18	2006	6.6	1	550	1500	SQ
19	2006	6.6	2	690	1000	SQ
20	2006	6.6	1	525	3000	SQ
21	2006	3.3	2	630	1000	SR
22	2006	3.3	3	630	1000	SR
23	2006	3.3	3	630	1000	SR
24	2006	6.6	2	750	1500	SQ
25	2006	6.6	1	750	750	SQ
26	2006	6.6	2	700	1000	SQ
27	2006	6.6	2	690	1000	SQ
28	2006	3.3	2	900	1000	SQ
29	2007	3.3	1	800	1500	SQ
30	2007	3.3	1	650	1500	SQ
31	2007	6.6	2	600	1500	SQ
32	2007	3.3	2	650	1500	SQ
33	2007	6.6	3	550	1500	SQ
34	2007	6.6	2	700	1000	SQ
35	2007	6.6	2	550	1000	SR
36	2007	6.6	2	750	1500	SQ
37	2007	3.3	2	800	1500	SQ
38	2007	3.3	7	650	1500	SQ

Sl. No.	Year of Supply	Voltage (KV)	Qty.	Rating (KW)	Synch. Speed (RPM)	Type
39	2007	6.6	1	730	1000	SQ
40	2007	6.6	1	730	1000	SQ
41	2007	6.6	3	620	1000	SQ
42	2007	3.3	4	650	1500	SQ
43	2007	6.6	1	670	1500	SQ
44	2007	6.6	1	750	1500	SQ
45	2007	6.6	1	650	1500	SQ
46	2007	3.3	1	600	1500	SQ
47	2007	3.3	4	800	1500	SQ
48	2007	3.3	1	800	1500	SQ
49	2007	6.6	2	630	1000	SQ
50	2007	6.6	1	650	1000	SQ
51	2007	6.6	2	500	1500	SQ
52	2007	6.6	3	520	1500	SQ
53	2007	3.3	1	500	750	SQ
54	2007	6.6	1	530	1500	SQ
55	2007	6.6	3	510	3000	SQ
56	2007	6.6	3	700	1500	SQ
57	2007	3.3	3	725	1000	SQ
58	2007	3.3	6	630	1000	SQ
59	2007	3.3	1	725	1000	SQ
60	2008	6.6	2	690	1000	SQ
61	2008	6.6	1	700	1500	SQ
62	2008	6.6	4	525	1500	SQ
63	2008	6.6	4	750	1500	SQ
64	2008	6.6	1	500	750	SQ
65	2008	6.6	1	650	1500	SQ
66	2008	6.6	1	1120	1000	SQ
67	2008	6.6	1	740	1000	SQ
68	2008	6.6	1	518	1000	SQ
69	2008	6.6	1	518	1000	SQ
70	2008	6.6	1	990	1000	SR
71	2008	6.6	1	660	1000	SR
72	2008	6.6	1	630	750	SQ
73	2008	6.6	5	630	1500	SQ
74	2008	3.3	2	1000	1000	SQ
75	2008	3.3	2	600	1000	SQ
76	2008	3.3	4	560	600	SQ

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