TENDER DOCUMENT

NIT No DLI/C&E/VI-665/530

FOR

Tender for Design, Engineering, Manufacturing at work, Supply, Testing, Commissioning & Associated Works for 22 Nos. 6.6KV Flux Compensated Magnetic Amplifier (FCMA) Soft starter for HT Motors (Squirrel Cage type) of different rating & Associated Works for the project of "Augmentation of Raw Material Handling Receipt and Handling facilities with new OHP Part-B (Package-061) of Bhilai Steel Plant, (SAIL)".

VOLUME- 2 C

(TENDER DRAWINGS)

ENGINEERING PROJECTS (INDIA) LIMITED
(A GOVT. OF INDIA ENTERPRISE)
Core-3, Scope Complex, 7,
Lodhi Road, New Delhi-110003
TEL NO: 011-24361666  FAX NO. 011- 24363426
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LIST OF DRAWING FOR HT MOTOR
M/S MARATHON ELECTRIC

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</tbody>
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NOTE:
ALL DIMENSIONS ARE IN MM
NOTE:

CONNECT 240 V AC / 1-Ø,
50 Hz. SUPPLY
TO EITHER OF THE TERMINALS.
DEGREE OF PROTECTION – IP55.
**DRAWING NO.**
BSP-EP1-01-061-01-018-55-DE-00625  
**REV.**
01

**RTD/RTD T.BOX**
**HEATER T.BOX**

**ROTATION:** UNI-DIRECTIONAL
**DIRECTION OF ROTATION:** C.W. FROM D.E.

### FRAME

<table>
<thead>
<tr>
<th>DC315F800</th>
<th>250 KW</th>
<th>4</th>
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</thead>
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### ENCLOSURE MOUNTING WEIGHT PAINT SHADE

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<th>B3</th>
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<th>RAL 7042</th>
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</thead>
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### ACCESSORIES

1. 1 NO. P.S.T.B. & 1 NO. N.P.T. BOX. (P.S.T.B)
2. 12 NO. RTD Pt.100–SIMPLEX TYPE
3. 2 NO. BTD Pt.100–DUPLEX TYPE
4. 2 NO. DIAL TYPE BTD
5. 1 NO. HEATER T. BOX
   2X4.5 WATTS, 240 V, 1 PH, 50 Hz. SP. HEATER.

### AGUMENTATION OF RAW MATERIAL RECEIPT & HANDLING FACILITIES
WITH NEW O.J.H.P PART B
BHILAI STEEL PLANT
EPI PACKAGE 061

---

**DESCRIPTION**
Marathon Electric Motors (Indo) Ltd.
AEI WORKS, 1, TARATALA ROAD,
KOLKATA—700024, INDIA

**DRAWING NO.**
DC315F800 4P GENERAL ARRANGEMENT OF T.E.F.C. MOTOR

**DRAWING DATE:** 06.01.2013
**DRAWING NO.:** BSP-EP1-01-061-01-018-55-DE-00625
**REV.:** 01

---

**CONCEPTUAL AND PROPRIETARY INFORMATION OF MARATHON ELECTRIC MOTORS (INDIA) LIMITED. NOT TO BE REPRODUCED OR USED WITHOUT PERMISSION.**
**DRAWING NO.**
BSP-EPI-01-061-01-018-55-DE-00625

**REV.**
01

---

**FRAME**
DC315FB00

**RATING**
250 KW

**POLE**
4

**VOLTAGE/Ph./Hz.**
6.6KV/3PH/50HZ.

---

**ENCLOSURE**
MOUNTING
T.E.F.C./IP55

**WEIGHT**
B3

**PAINT SHADE**
RAL 7042

**3500 KG.**

---

**ACCESSORIES**

1. 1 NO. P.S.T.B. & 1 NO. N.P.T. BOX (P.S.T.B)
2. 12 NOS. RTD Pt.100—SIMPLEX TYPE
3. 2 NOS. BTD Pt.100—DUPLEX TYPE
4. 2 NOS. DIAL TYPE BTD
5. 1 NO. HEATER T. BOX
   2X43WATTS, 240 V, 1 PH, 50 HZ. SP. HEATER.

---

**AGUMENTATION OF RAW MATERIAL RECEIPT & HANDLING FACILITIES**
WITH NEW O.JHP PART B

BHILAI STEEL PLANT

EPI PACKAGE 061

---

**MARATHON ELECTRIC MOTORS (INDIA) LTD.**
A Regal Beloit Company

AEI WORKS, 1, TARATALA ROAD,
KOLKATA—700024, INDIA

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**DC315FB00 4P GENERAL ARRANGEMENT OF T.E.F.C. MOTOR**
ALL DIMENSIONS, IN MM. UNLESS STATED OTHERWISE

CONNECTION & ASSEMBLY DRAWING FOR
SPACE HEATER

NOTE :-
CONNECT 240 V AC / 1-Ø,
50 Hz. SUPPLY
TO EITHER OF THE TERMINALS.
DEGREE OF PROTECTION - IP55.

GASKET (3MM LEPRENE) & SEAL (FOR COVER PLATE)
GASKET (3MM LEPRENE) & SEAL (FOR BOTTOM PLATE)

4 FLAME PROOF DOUBLE COMPRESSION GLAND 2C x 4 SQ. mm BRASS NICKEL PLATED
3 TERMINAL BAR. D.M.C.
2 COVER. ALUMINIUM
1 TERMINAL BOX. ALUMINIUM

G4 G3 G2 G1 PT. MATERIAL SPEC. DRAWING NO.
QUANTITY NO. DESCRIPTION

Marathon Electric Motors (India) Ltd.
AEI WORKS, 1, TARATALA ROAD,
KOLKATA-700024, INDIA

HEATER TERMINAL BOX ASSLY.

SHEET NO. 12

CONFIDENTIAL AND PROPERTY OF Marathon Electric Motors (India) Limited
NOT TO BE REPRODUCED OR LENT WITHOUT PERMISSION

REV. CHK'D
APPV'D.

REV. CHK'D
APPV'D.

REV. CHK'D
APPV'D.

REV. CHK'D
APPV'D.

REF. DRG.

DRAWN R.CHAUDHRI 05.07.2011
DRAWING NO.
REV NO.

SCALE N.T.S
CHECKED P.DAS 05.07.2011
APPV'D P.K.PAL 05.07.2011

BSP-EPI-01-061-01-018-55-DE-00625 02.
## DRAWING NO.
BSP-EPI-01-061-01-018-55-DE-00625

## REVISION
01

## ALL DIMNS. ARE IN mm.

### ROTATION: UNI-DIRECTIONAL

### DIRECTION OF ROTATION: C.W. FROM D.E.

### FRAME

<table>
<thead>
<tr>
<th>DC315F800</th>
<th>300 kW</th>
<th>4</th>
<th>6.6kV/3PH/50Hz.</th>
</tr>
</thead>
</table>

### ENCLOSURE

| T.E.F.C./IP55 | B3 | 3600 KG | RAL 7042 |

### ACCESSORIES

1. 1 NO. P.S.T.B. & 1 NO. N.P.T. BOX (P.S.T.B).
2. 12 NOS. RTD PT.100—SIMPLEX TYPE
3. 2 NOS. BTD PT.100—DUPLLEX TYPE
4. 2 NOS. DIAL TYPE BTD.
5. 1 NO. HEATER T. BOX.
   2X43WATTS, 240 V, 1 PH, 50 Hz. SP. HEATER.

### AGUMENTATION OF RAW MATERIAL RECEIPT & HANDLING FACILITIES
WITH NEW OJHP PART B
BHILAI STEEL PLANT
EPI PACKAGE 061

## MATERIAL SPEC.

### DESCRIPTION

| DC315F800 4P GENERAL ARRANGEMENT OF T.E.F.C. MOTOR |

## MARATHON ELECTRIC

A Regal Beloit Company

Marathon Electric Motors (India) Ltd.
AEI WORKS, 1, TARATALA ROAD,
KOLKATA—700024, INDIA

## SHEET NO. 13
**NOTE:**
1. T.BOX IS SUITABLE FOR FAULT LEVEL OF 5000A FOR 6.6kV (FOR 0.25 SECS)  
2. PROVISION OF EARTHING TERMINATION ON THE BOX GIVEN--REF. ITEM NO.19  
3. DEGREE OF PROTECTION : IP-55  
4. RATED CURRENT : 400 AMPS.  
5. DOUBLE COMPRESSION GLAND BRASS Ni-Cr PLATED AS PER BS 6121 SUITABLE FOR 1 x 3 x 185 SQ. mm. AL. XLPE CABLE.  
6. CABLE LUGS SUITABLE FOR CABLE SIZE INDICATED FOR ABOVE CABLE.  
7. TERMINAL BOX IS SUITABLE FOR TERMINATING ABOVE CABLE.  
8. DISTANCE BETWEEN GLAND PLATE & TERMINAL STUD = 597 mm.(MIN.)

### Table: Description of Components

| 31 | EARTHING TERMINALS | M.S. |
| 30 | LIFTING HOOK(2 NOS.) | M.S. |
| 29 | GLAND PLATE | M.S.(10 THK.) |
| 28 | CABLE SUPPORT | FRP |
| 27 | DOUBLE COMPRESSION CABLE GLAND | BRASS |
| 26 | FERRULE | COPPER Tin PLATED |
| 25 | BOSS | M.S. |
| 24 | DESCRIPTOR & HUMIDITY INDICATOR | M.S. PLATED |
| 23 | GLAND WASHER | NYLON |
| 22 | GLAND BUSH | NEOPRENE |
| 21 | RING NUT | NYLON |
| 20 | GLAND BODY | NYLON |
| 19 | 2 NOS. EARTHING TERMINAL M12 WITH THIMBLE | COPPER |
| 18 | CUSTOMER CABLE | 1 x 3 x 185 SQ. mm. AL. XLPE CABLE |
| 17 | FERRULE | COPPER Tin PLATED |
| 16 | SLG. CHAMBER COVER PLATE | M.S.(6 THK.) |
| 15 | SEALING CHAMBER | M.S.(5 THK.) |
| 14 | GROMMET | NEOPRENE |
| 13 | TERMINAL SEALING PLATE | FRP |
| 12 | GLAND NUT | NYLON |
| 11 | GASKET FOR SLG. CHAMBER | NEOPRENE |
| 10 | EPOXY LINING ON TERMINAL COVER | EPOXY |
| 9 | TERMINAL COVER | M.S.(15 THK.) |
| 8 | CABLE CLAMP | FORGED BRASS |
| 7 | CABLE (MOTOR) | COPPER: 6.6kV GRADE |
| 6 | GASKET FOR LID | NEOPRENE |
| 5 | JOINT BOX | EPOXY MOULDED(6.5 THK. MIN.) |
| 4 | GASKET FOR SLG. PLATE | NEOPRENE |
| 3 | SEALING PLATE (ROUND) | FRP-8 mm. THICK |
| 2 | TERMINAL BOX | M.S.(3-16 THK.) |

**Assy. Drq. of Phase Segregated Terminal Box**

**Marathon Electric Motors (India) Ltd.**
**ARegal Bello Company**

**Kolkata - 700024, India**

**General Tolerance:**

- **Drilled:** 0.90 mm.
- **Forged:** 0.6 mm.

**Drawing No.:**

- **Scale:** 1:1
- **Not to be constructed by last without permission:**
- **Checked:** P.DAG
- **APRVD:** P.K.PAL

**Drawing Date:** 02.04.2013

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**Reference:**

- **Drawing No.:** BSP-EP-01-12-1-018-S5-DE-00625
- **Rev. No.:** 02
NOTE:—
CONNECT 240 V AC / 1–φ, 50 Hz. SUPPLY
TO EITHER OF THE TERMINALS.
DEGREE OF PROTECTION — IP55.

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>DESCRIPTION</th>
<th>MATERIAL SPEC.</th>
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<tbody>
<tr>
<td>3</td>
<td>TERMINAL BAR.</td>
<td>D.M.C.</td>
</tr>
<tr>
<td>2</td>
<td>COVER.</td>
<td>ALUMINIUM</td>
</tr>
<tr>
<td>1</td>
<td>TERMINAL BOX.</td>
<td>ALUMINIUM</td>
</tr>
<tr>
<td>4</td>
<td>FLAME PROOF DOUBLE COMPRESSION GLAND 2C x 4 SQ. mm</td>
<td>BRASS NICKEL PLATED</td>
</tr>
</tbody>
</table>

Marathon Electric Motors (India) Ltd.
AEI WORKS, 1, TARATALA ROAD,
KOLKATA—700024, INDIA

HEATER TERMINAL BOX ASSLY.
HT MOTOR DATA SHEET

DRG. No. BSP-EPI-01-061-01-018-55-DE-00625

**Description**: Conveyor application

**TAG NO.**

**Make**: Marathon Electric Motors (I) Ltd.

**Type**: Sq. cage induction motor

**Protection**: IP55

**Duty**: S1

**Method of starting**: FCMA Starter

**Cooling**: IC 411

**Mounting**: B3

**Enclosure**: TEFC

**Ambient Temperature**: 50Deg.C

**Temperature rise**: Limited to Class ‘B’ 70Deg.C (Absolutly 120Deg) @ rev 03

**Voltage with variation**: 660V±6±9%

**Frequency with variation**: 50Hz+4%5%

**Rated KW at 50 Deg C**: 225KW

**Frame size**: DC315P500

**Class of Insulation**: Class F (VPI)

**Rated Speed (RPM) & Direction of Rotation / Pole**: 1490 & Bi-Directional / 4P

**F.L. Current**: 24 Amps

**Operation at 80% Rated Voltage 3 minutes**

**No. of Start / Hr (Equally Spread permissible)**

**Locked Rotor Withstand Time (Hot/Cold) - Sec at 80%/ 100%/ 110% rated Volt**

(a) At 80% RV = 5 Secs (b) At 100% RV = 16 Secs (c) At 110% RV = 10 Secs

**Starting time - Sec at 80%/ 100%/ 110% at rated Voltage considering DOL Start**

(a) At 80% RV = 4 secs (b) At 100% RV = 2.5 secs (c) At 110% RV = 2 secs

**% STG. Torque (x FLT)**

100% FLT

**% STG. Current (x FLC)**

600% FLC

**Pull up torque % (X. FLT)**

120% FLT

**Pull out Torque % (X. FLT)**

270% FLT

**Temp Rise Limit**: 70Deg.C

**Paint Shade**: RAL 7042 (Traffic Grey)

**Efficiency at 100%, 75%, 50% in CW direction as per GAD**

96.3/93/90

**Efficiency at 100%, 75%, 50% in CCW direction**

85.6/80.5/72.5

**Power factor at 100%, 75%, 50%**

0.80/0.84/0.74

**Rotor GD Sq. value (Kgm2)**

26Kgm2

**Noise Value**: 85dB(A) at a distance of 1mtr. As per IS 12075

**Vibration**: TEEC, IC 411

**Degree of Protection of Motor & TB**: IP55

**Space Heater Details**: 2 x 42W. 240 V. 1 Phase 50Hz.

**Rated Torque KGm**

147Kgm

**Locked Rotor Torque at rated voltage Kgm**

191Kgm

**BreakDown Torque at rated voltage Kgm**

397Kgm

**Motor Weight**: 3500Kg

**Min voltage for start & run**: 80% rated voltage

**Maximum speed permissible**: 150% speed for 2mins @ rev 05

**Overload capacity**: 160% load for 15secs

**Terminal Box Location**: As per GAD

**Starting power factor**: 0.21

**Short current level & withstand time**: 43.7KA For 0.25secs

**Terminal Box suitable for Cable Size**

1 x 3G x 185Sq.mm. XLPE Cable

**GA & all performance characteristics curves.**

Enclosed

**Starts/Hour permissible**: 2 Hot / 3 cold / 5 equally spread starts per Hr

**Bearing**: Anti-Friction

**DC bearing**: NUS20

**NDE Bearing**: 6320-C3

**Terminal Box**: PStB type

**Motor Body + MOC**: Grey iron Casting as per IS

**Motor Feet**: Casting

Note: 1) Above figures are subject to IS Tolerance.

2) Motor is fitted with 2 nos. heater. 12 nos. PT100 (Simplex) RTD & 2 nos. Bearing RTD PT(100) Duplex. 2 nos. dial type BTD. 2 Nos. PStB.

3) For Fluid coupling clutching/locking torque shall be restricted to 140% of mech. KW.

4) Insulated NDE Bracket / Housing will be provided to restrict the shaft induced current.

5) FCMA For HT Motor shall be as per above data.

6) Stator frame shall be fabricated steel/high grade cast iron.

7) Stator core shall be laminated sheets of high grade low loss silicon steel.

8) System fault level will be 40KA for 3 secs

9) Neutral TB shall be PStB type for connection to FCMA.

10) Surge suppress is not required for VPI Motor.

11) Vibration intensity shall be limited to 37.5 micron peak to peak.

12) Bearing shall be of antifriction bearings with regreasing facility.

**Note**: Vibration Sensors should be provided.
### HT MOTOR DATA SHEET

**DRG NO:** BSP-EP1-01-061-01-016-55-DE-00025  
**Tag NO:** Z3C1, Z3C2, Z4BC1, Z5BC1, Z6BC1, Z7AC1, Z11C1, Z11C2, Z2AC1, Z5AC1, Z6AC1, Z7C1, Z8C2, L2C1, L9C1  
**Type:** Marathon Electric Motors (I) Ltd.  
**Protection:** Sq cage induction motor  
**Duty:** IP55  
**Method of starting:** FCMA Starter  
**Mounting:** IC 411  
**Endurance:** B3  
**Ambient Temperature:** 50 Deg C  
**Temperature rise:** Limited to Class F, 70 Deg C  
**Rated KW at 50 Deg C:** 250kW  
**Frame size:** DC3107800  
**Class of Insulation:** Class F (VP 1)  
**Rated Speed (RPM) & Direction of Rotation / Pole:** 1480 & Bi-Directional / 4P  
**F.L. Current:** 26.5 Amps  
**Operation at 80% Rated Voltage (Suitability):** yes  
**Locked Rotor withstand time (H/W/Cold):** 2 Hours / Cold / 3 equally spread starts per hr  
**Rated speed - Sec at 80% / 100% rated Volt Considering DOL Start:**  
- % Std. Torque (x FLT): 110% FLT  
- % Std. Current (x PLC): 600% PLC  
- Pull up torque % (X FLT): 100% FLT  
- Pull out Torque % (X FLT): 240% FLT  
**Temp rise limit:** 70 Deg C  
**Paint Shade:** RAL 7042 (Traffic Grey)  
**Efficiency at 100%, 75%, 50% in CW direction as per GAD:** 96.94, 593.5  
**Efficiency at 100%, 75%, 50% in CCW direction:** 96.5/94, 593, 2.0  
**Motor Design, % value (Kg/m):** 0.966/0.864/0.74  
**Noise Level (L95):** 30Kg/m²  
**Vibration:**  
- Rms: 85dB(A) at a distance of 1m  
- Rated speed: As per IS 12075  
**Type of Enclosure & Cooling:** TEFC IP 55  
**Degree of Protection of Motor & TB:** DC411  
**Rated Torque Kg-m:** 2 x 432W, 240 V, 1 Phase, 50Hz  
**Locked Rotor Torque at rated voltage Kgm:** 163Kgm  
**Breakdown Torque at rated voltage Kgm:** 179Kgm  
**Motor Weight:** 392Kgm  
**Min voltage for start-up:** 95% rated voltage  
**Maximum speed permissible:** 150%/speed for 2mins  
**Overload capacity:** 100% load for 15secs  
**Load life level:** As per GAD  
**Starting power factor:** 0.21  
**Short current level & withstand time:** 43.7KVA for 0.25secs  
**Terminal Box suitable for Cable Size:** 1 x 3C x 185 sq.mm, XLPE cable  
**GA & all performance characteristics curves:** Endorsed  
**Bearing: 2 Hot / 3 cold / 3 equally spread starts per hr**  
**DE bearing:** Anti-Friction  
**NDE bearing:** NNU20  
**Terminal Box:** 6320-0-3  
**Motor Body - MDC:** PETH type  
**Motor Feet:** Grey iron Casting as per IS  
**Note:** All the above figures are subject to IS Tolerance.

2) Motor is fitted with 2 nos. heater, 12 nos. PT100 (Simplex) RTD & 2 nos. Bearing RTD PT100 Duplex, 2 nos. dial type BTD, 2 nos. PSTB, 3 nos.

3) For Fluid coupling cluthing/locking torque shall be restricted to 140% of mech. kw.

4) Insulated NDE Bracket / Housing will be provided to restrict the shaft induced current.

5) FCMA For HT Motor shall be as per above data.

6) Stator frame shall be fabricated steel/high grade cast iron.

7) Stator core shall be laminated sheets of high grade low loss silicon steel.

8) System fault level will be 40KVA for 3 secs.

9) Neutral TB shall be PETH type for connection to FCMA.

10) Surge suppressor is not required for VFD Motor.

11) Vibration intensity shall be limited to 37.5 micron peak to peak.

12) Bearing shall be of antifriction bearings with regreasing facility.

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**Vibration Sensor shall be provided.**

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**SHEET NO: 18**
**HT MOTOR DATA SHEET**

<table>
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<th>Description</th>
<th>Conveyor application</th>
<th>REV. 9</th>
</tr>
</thead>
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<tr>
<td>Make</td>
<td>ZCC1,2CC2</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Marathon Electric Motors (I) Ltd.</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Square cage induction motor</td>
<td></td>
</tr>
<tr>
<td>Duty</td>
<td>IP55</td>
<td></td>
</tr>
<tr>
<td>Method of starting</td>
<td>FCMA Starter</td>
<td></td>
</tr>
<tr>
<td>Mounting</td>
<td>IC 411</td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>TEFC</td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>50 Deg C</td>
<td></td>
</tr>
<tr>
<td>Temperature rise</td>
<td>Limited to Class B, 70 Deg C ( ABSOLUTELY 120 Deg )</td>
<td></td>
</tr>
<tr>
<td>Voltage with variation</td>
<td>3300 V/42.4%</td>
<td></td>
</tr>
<tr>
<td>Frequency with variation</td>
<td>50 Hz±4%</td>
<td></td>
</tr>
<tr>
<td>Rated KW at 56 Deg C</td>
<td>285 Kw</td>
<td></td>
</tr>
<tr>
<td>Frame size</td>
<td>DC315F600</td>
<td></td>
</tr>
<tr>
<td>Class of Insulation</td>
<td>Class F (IP54)</td>
<td></td>
</tr>
<tr>
<td>Rated Speed (RPM) &amp; Direction of Rotation</td>
<td>1491 &amp; Bi-Directional / 4P</td>
<td></td>
</tr>
<tr>
<td>F.L. Current</td>
<td>30 Amps</td>
<td></td>
</tr>
<tr>
<td>Operation at 80% Rated Voltage for Summers</td>
<td>2 Hull/3 Cold/3 equally spread starts per hr</td>
<td></td>
</tr>
<tr>
<td>No. of starts per hr (Equally Spread permissible)</td>
<td>(a) At 80% RV = 23.31 secs</td>
<td></td>
</tr>
<tr>
<td>Locked Rotor withstand time (Hot/Cold) &amp; sec at 80%/100%/110% rated Volt</td>
<td>(b) At 100% RV = 15/20 secs</td>
<td></td>
</tr>
<tr>
<td>Starting time &amp; sec at 80%/100%/110% rated Volt</td>
<td>(c) At 110% RV = 12/16 secs</td>
<td></td>
</tr>
<tr>
<td>Considered per start start</td>
<td>4 secs</td>
<td></td>
</tr>
<tr>
<td>% STG. Torque (% FLT)</td>
<td>140 FLT</td>
<td></td>
</tr>
<tr>
<td>% STG. Current (% FLG)</td>
<td>500 FLT</td>
<td></td>
</tr>
<tr>
<td>Pull up torque % (X FLT)</td>
<td>130 FLT</td>
<td></td>
</tr>
<tr>
<td>Pull out torque % (X FLT)</td>
<td>270 FLT</td>
<td></td>
</tr>
<tr>
<td>Temp Rise Limit</td>
<td>70 Deg C</td>
<td></td>
</tr>
<tr>
<td>Paint Shade</td>
<td>RAL 7042 (Traffic Grey)</td>
<td></td>
</tr>
<tr>
<td>Efficiency at 100%, 75%, 50% in CCW direction as per GAD</td>
<td>96/92/87.7</td>
<td></td>
</tr>
<tr>
<td>Efficiency at 100%, 75%, 50% in CCW direction</td>
<td>95/84/63.2</td>
<td></td>
</tr>
<tr>
<td>Power factor at 100%, 75%, 50%</td>
<td>0.85/0.84/0.74</td>
<td></td>
</tr>
<tr>
<td>Rotor GD Sq. Value (Kg/m2)</td>
<td>32 Kg/m2</td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>As per IS 12075</td>
<td></td>
</tr>
<tr>
<td>Type of Enclosure &amp; Cooling</td>
<td>TEFC, IC 411</td>
<td></td>
</tr>
<tr>
<td>Degree of Protection of Motor &amp; TB</td>
<td>IP55</td>
<td></td>
</tr>
<tr>
<td>Space Heater Details</td>
<td>2 x 432 W/240 V. 1 Phase 50Hz</td>
<td></td>
</tr>
<tr>
<td>Rated Torque KG-m</td>
<td>186 KGm</td>
<td></td>
</tr>
<tr>
<td>Locked Rotor Torque at rated voltage KGm</td>
<td>260 KGm</td>
<td></td>
</tr>
<tr>
<td>Breakdown Torque at rated voltage KGm</td>
<td>502 KGm</td>
<td></td>
</tr>
<tr>
<td>Motor Weight</td>
<td>3000 KG</td>
<td></td>
</tr>
<tr>
<td>Min voltage for start &amp; run</td>
<td>80% rated voltage</td>
<td></td>
</tr>
<tr>
<td>Maximum speed permissible</td>
<td>150% speed for 2 mins</td>
<td></td>
</tr>
<tr>
<td>Overload capacity</td>
<td>160% load for 15 secs</td>
<td></td>
</tr>
<tr>
<td>Terminal Box Location</td>
<td>As per GAD</td>
<td></td>
</tr>
<tr>
<td>Starting power factor</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Short current level &amp; withstand time</td>
<td>43.7 KA For 0.25 secs</td>
<td></td>
</tr>
<tr>
<td>Terminal Box suitable for Cable Size</td>
<td>1 x 30 x 185 Sq.mm. XLPE Cable</td>
<td></td>
</tr>
<tr>
<td>GA &amp; all performance characteristics curves</td>
<td>Endowed</td>
<td></td>
</tr>
<tr>
<td>Starts/Hour permissible</td>
<td>2 Hot / 3 Cold / 3 equally spread starts per hr</td>
<td></td>
</tr>
<tr>
<td>Bearing</td>
<td>Anti-Friction</td>
<td></td>
</tr>
<tr>
<td>DE bearing</td>
<td>NDE Bearing</td>
<td></td>
</tr>
<tr>
<td>Terminal Box</td>
<td>Terminal Box</td>
<td></td>
</tr>
<tr>
<td>Motor Body - MOC</td>
<td>Motor Body - MOC</td>
<td></td>
</tr>
<tr>
<td>Motor Feet</td>
<td>Grey Iron Casting as per IS</td>
<td></td>
</tr>
</tbody>
</table>

Note: 1) All the above figures are subject to ES Tolerance.

2) Motor is fitted with 2 nos. heater, 12 nos. PT100 (Simplex) RTD & 2 nos. Bearing PT(100) Duplex, 2 nos. dial type BTD, 2 Nos. PSTB.

3) For Fluid coupling clutching/locking torque shall be restricted to 140% of mech. KW.

4) Insulated NDE Bracket & Housing will be provided to restrict the shaft induced current.

5) FCMA For HT Motor shall be as per above data.

6) Stator frame shall be fabricated steel high grade cast iron.

7) Stator core shall be laminated sheets of high grade low loss silicon steel.

8) System fault level shall be 40KA for 3 secs.

9) Neutral TB shall be PSTB type for connection to FCMA.

10) Surge suppressor is not required for VPI Motor.

11) Vibration intensity shall be limited to 37.5 micron peak to peak.

12) Bearing shall be of antifriction bearings with greasing facility.

**Vibration Sensor Shall be provided.**
# HT MOTOR DATA SHEET

<table>
<thead>
<tr>
<th>DRG NO. - BSP-0.91-051-01-018-55-DE-06025</th>
<th>REV-P</th>
</tr>
</thead>
</table>

**Description**
- Conveyor application
- Marathon Electric Motors (I) Ltd.

**Type**
- Sq. cage induction motor
- IP55

**Protection**
- FCMA Starter
- IC 411

**Mounting**
- B3

**Enclosure**
- TEFC

**Ambient Temperature**
- 60Deg C

**Temperature rise**
- Limited to Class B - 70Deg C

**Voltage with variation**
- 6600V ±6.5%

**Frequency with variation**
- 50Hz ±4.5%

**Rated KW at 56 Deg C**
- DC 315/902

**Frame size**
- 300kW

**Operation at 80% Rated Voltage**
- DC 700V

**Class of Insulation**
- Class F (VPI)

**Rated Speed (RPM) & Direction of Rotation / Pole**
- 1400 RPM - Directional / 4P

**F.L. Current**
- 31.5 Amps

**No. of Start / HR (Equally Spread permissible)**
- 2 Hot / Cold / 3 equally spread starts per hr

**Locked Rotor Withstand Time (Hot/Cold)**
- (a) At 80% RV = 23.23 secs
- (b) At 100% RV = 15.20 secs
- (c) At 110% RV = 12.18 secs

**Starting time - Secs at 80% 100% 110% rated Volt Considering**
- DC Start - 43.7KAF for 0.25secs
- (a) At 80% RV = 43.7KAF for 0.25secs
- (b) At 100% RV = 26.5KAF for 0.25secs
- (c) At 110% RV = 21.8KAF for 0.25secs

**% STG. Torque (x FLT)**
- 140% FLT

**% STG. Current (x FLC)**
- 600% FLC

**Pull up torque % (x FLT)**
- 130% FLT

**Pull out torque % (x FLC)**
- 270% FLT

**Temp Rise Limit**
- 70Deg C

**Paint Shade**
- RAL 7042 (Traffic Grey)

**Efficiency at 100%, 75%, 50% in CW direction as per GAD**
- 99.95 rooms

**Efficiency at 75%, 50% in CCW direction**
- 95.1% 75% 50%

**Power factor at 100%, 75%, 50%**
- 0.870 0.850 0.75

**Rotor OD Sq. value (Kg/m)**
- 34Kg/m

**Noise Value**
- 25dB(A) at a distance of 1mtr

**Vibration**
- As per IS 12075

**Type of Enclosure & Cooling**
- TEFC, IP55

**Degree of Protection of Motor & TB**
- IP55

**Space Heater Details**
- 2 x 43W-240 V, 1 Phase, 50Hz

**Rated Torque KG-m**
- 196Kgm

**Locked Rotor Torque at rated voltage Kgm**
- 274Kgm

**Breakdown Torque at rated voltage Kgm**
- 528Kgm

**Motor Weight**
- 3500Kg

**Min voltage for start and run:**
- 80% rated voltage

**Overload capacity:**
- 150% speed for 2mins

**Overload load for 15secs:**
- As per GAD

**Starting power factor**
- 0.21

**Short circuit current level & withstand time:**
- 43.7KA for 0.25secs

**Terminal Box suitable for Cable Size**
- 1 x 3C x 185 sq. mm. XLPE Cable

**GA & all performance characteristics curves,**
- Endorse

**Starts/Hour permissible:**
- 2 Hot / 3 cold / 3 equally spread starts per hr

**DE bearing**
- Anti-Friction

**NDE Bearing**
- NU2320 rev 01

**Terminal Box**
- PSTB type

**Motor Body - MOC**
- Grey Iron Casting as per IS

**Motor Feet**
- Casting

---

**Note:** All above figures are subject to IS Tolerance.

2) Motor is fitted with 2 nos. heater, 12 nos. PT100 (Simplex) RTD & 2noss. Bearing RTD PT(100) Duplex, 2 nos. dial type BTD, 2 Nos. PSTB.

3) For Fluid coupling clamping locking torque shall be restricted to 140% of mech. KW.

4) Insulated NDE Bracket Housing will be provided to restrict the shaft induced current.

5) FCMA For HT Motor shall be as per above data.

6) Stator frame shall be fabricated steel high grade cast iron.

7) Stator core shall be laminated shears of high grade low loss silicon steel.

8) System fault level will be 40KA for 3 secs.

9) Neutral TB shall be PSTB type for connection to FCMA.

10) Surge suppress is not required for VPI Motor.

11) Vibration intensity shall be limited to 37.5 micron peak to peak.

12) Bearing shall be of antifriction bearings with regreasing facility.

---

**Vibration Sensors shall be provided.**
EFFICIENCY & POWER FACTOR VS % LOAD CURVE
225KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro Systems
Negative Sequence Curve
for 225KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: MisTecpro systems
THERMAL WITHSTAND CHARACTERISTICS CURVE
225KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems
THERMAL WITHSTAND CHARACTERISTICS CURVE
225KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems
Clutching point shall be restricted to 140% Torque
EFFICIENCY & POWER FACTOR VS % LOAD CURVE
250KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems
Negative Sequence Curve
for 250KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: MisTecpro systems

Time in Secs.

0 10 20 30 40 50 60
0 50 100 150 200 250 300
350 400 450 500 550 600
650 700 750 800 850 900
950 1000 1050 1100 1150 1200
1250 1300 1350 1400 1450 1500
1550 1600 1650 1700 1750 1800
1850 1900 1950 2000

DRG NO:- BSP-EPI-01-061-01-018-55-DE-00625
REV1
THERMAL WITHSTAND CHARACTERISTICS CURVE
250KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

TIME (SECONDS)

CURRENT (X FLC)

Marathon Electric Motors (I) Ltd.
Thermal_withstand Chart 3
TORQUE Vs. SPEED CHARACTERISTIC CURVE
250KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

Clutching point shall be restricted to 140% Torque

TORQUE (X FLT)

110% RV
100% RV
80% RV
Fluid Coupling Ch.

% SPEED (RPM)
EFFICIENCY & POWER FACTOR VS % LOAD CURVE
285KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro Systems
Negative Sequence Curve
for 285KW, 4 POLE, 5600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

Time in Secs.

0 10 20 30 40 50

0 50 100 150 200

2000 1950 1900 1850 1800 1750 1700 1650 1600 1550 1500 1450 1400 1350 1300 1250 1200 1150 1100 1050 1000 950 900 850 800 750 700 650 600 550 500 450 400 350 300 250 200 150 100 50

Negative Sequence Current (%)

D RG. NO: BSP-EPI-01-061-01-018-55-DE-00625
REV1
THERMAL WITHSTAND CHARACTERISTICS CURVE
285KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

TIME (SECONDS)

CURRENT (X FLC)

Cold

Hot

Marathon Electric Motors (I) Ltd.

Thermal_withstand Chart 3

DRG. NO: BSP-EPF-01-061-01-018-55-DE-00625
Clutching point shall be restricted to 140% Torque

TORQUE Vs. SPEED CHARACTERISTIC CURVE
285KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

TORQUE (x FLT)

110% RV
100% RV
80% RV
Fluid Coupling Ch.

% SPEED (RPM)
Current-Speed curve for 300kW, 4 Pole, 6000 V, DC315PE800 Motor
EFFICIENCY & POWER FACTOR VS % LOAD CURVE
300KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems

\[ \begin{align*}
\text{% EFFICIENCY} & \quad \text{% LOAD} \\
76 & \quad 50 \\
78 & \quad 75 \\
80 & \quad 100 \\
82 & \quad \quad \\
84 & \quad \quad \\
86 & \quad \quad \\
88 & \quad \quad \\
90 & \quad \quad \\
92 & \quad \quad \\
94 & \quad \quad \\
96 & \quad \quad \\
98 & \quad \quad \\
0.68 & \quad 0.7 \\
0.7 & \quad 0.72 \\
0.74 & \quad 0.76 \\
0.78 & \quad 0.8 \\
0.8 & \quad 0.82 \\
0.84 & \quad 0.86 \\
0.88 & \quad 0.9 \\
0.9 & \quad \quad \\
\end{align*} \]

EFFICIENCY \quad POWER FACTOR
THERMAL WITHSTAND CHARACTERISTICS CURVE
300KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems
Clutching point shall be restricted to 140% Torque

TORQUE Vs. SPEED CHARACTERISTIC CURVE
300KW, 4 POLE, 6600 V, DC315F800 Motor
CUSTOMER: M/s Tecpro systems
10.09.2013
To
Mr. Sunil K. Kholi
Dy. General Manager
Engineering Projects India Ltd
Corporate Office
Newdelhi-110 003

Dear Sir,

Ref: Your e-mail dtd 11th Sep-2013 regarding frame size for HT motors Bhilai Pkg-061 A/c Tecpro Systems Ltd

We hereby confirm you that Frame Size for all the ratings from 225KW -300KW in 4 pole 6.6KV confirming the MECON specification for this project is DC315F800 only

Assuring you of our best service and attention all times

Thanking You
Yours Faithfully

For Marathon Electric Motors (India) Ltd

D. Rajesh Khanna
Manager-Sales