

**DATA SHEET****Three Phase Induction Motor - Squirrel Cage Rotor**

Customer : SMS GROUP

Product line : MGL

|                      |                          |                                     |                        |
|----------------------|--------------------------|-------------------------------------|------------------------|
| Frame                | : 630                    | Service factor                      | : 1.00                 |
| Output               | : 3000 kW (4000 hp)      | Moment of inertia                   | : 286 kgm <sup>2</sup> |
| Poles                | : 6                      | Locked rotor time                   | : 12s (hot)            |
| Frequency            | : 45.3 Hz                | Temperature rise <sup>3</sup>       | : class B              |
| Rated voltage        | : 690 V Connect.: D      | Duty cycle                          | : S9                   |
| Rated current        | : 2981 A                 | Inlet water temperature             | : 33° C                |
| Rotor voltage        | : Not applicable         | Ambient temperature                 | : 0 °C up to 40 °C     |
| Rotor current        | : Not applicable         | Altitude                            | : 1000 m               |
| Locked rotor current | : 20867 A                | Protection Degree                   | : IP55                 |
| LRC (p.u.)           | : 7                      | Cooling method                      | : IC86W                |
| No load current      | : 745.2 A                | Mounting                            | : B3L                  |
| Rated speed          | : 900 rpm                | Direction of rotation <sup>1</sup>  | : Both                 |
| Slip                 | : 0.66 %                 | Noise level <sup>2</sup>            | : 78 dB(A)             |
| Rated torque         | : 31833 Nm               | Vibration                           | : A 2.3 mm/s rms       |
| Locked rotor torque  | : 100 %                  | Starting method                     | : Frequency inverter   |
| Pull-up torque       | : 100 %                  | Coupling                            | : Direct               |
| **Breakdown torque   | : 250 %                  |                                     |                        |
| Insulation class     | : F                      |                                     |                        |
| Output               | 50%      75%      100%   | Load type                           | : Laminator            |
| Efficiency(%)        | 96.7      96.9      96.8 | Load torque                         | :                      |
| Power factor         | 0.81      0.86      0.87 | Load Inertia (J=GD <sup>2</sup> /4) | :                      |

See notes on page 2

|           |               |               |           |                |
|-----------|---------------|---------------|-----------|----------------|
| Standards | Specification | : IEC 60034-1 | Vibration | : IEC 60034-14 |
|           | Test          | : IEC 60034-2 | Tolerance | : IEC 60034-1  |
|           | Noise         | : IEC 60034-9 |           |                |

This revision replaces and cancel the previous one, which must be eliminated.

(1) Looking the motor from the shaft end.

(2) Measured at 1m and with tolerance of +3dB(A).

(3) At the rated point.

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated.

\*\*Guaranteed values (not subject to standard tolerance)

| Rev.         | Changes Summary |              | Performed     | Checked       | Date        |
|--------------|-----------------|--------------|---------------|---------------|-------------|
| 6            | certified       |              | SUBRAMANIAMV  | SADHU         | MAR/12/2019 |
| Performed by | VANIOJ          | 39174 / 2018 |               |               |             |
| Checked by   | MATEUSGD        |              |               |               |             |
| Date         | 10/DEZ/2018     |              |               |               |             |
|              |                 |              | Page<br>1 / 2 | Revision<br>6 |             |

# DATA SHEET



## Three Phase Induction Motor - Squirrel Cage Rotor

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### Notes:

- Stray load losses 0.50% of input power.
- Torque vs speed curve for vfd starting at CM-11462/2019
- Thermal limit curve at CM-11463/2019
- Performance vs output curve at CM-11464/2019
- Equivalent circuit at CM-11465/2019
- Operation with VFD:
  - 0 3000 3000 kW
  - 0 690 690 V
  - 0 45,3 80,7 Hz
  - 0 900 1600 rpm
  - 31833 31833 17906 Nm
  - 63667 79583 25181 Nm (Breakdown Torque)
  - 2981 2981 3075 A
- VPI Impregnation.
- Rotor copper Bars
- Form Wound Winding

### Customer information:

- Suitable for VFD operation,
- Sinewave filters are YES
- VFD voltage magnitude levels are LOW
- LRT and LRC are not applicable for motors with VFD operation,
- Peak voltage (phase-phase):  $\leq 3100$  V
- Peak voltage (phase-ground):  $\leq 1800$  V
- dV/dT:  $\leq 11300$  V/ microseconds
- THD:  $< 5\%$

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| Date         | 10/DEZ/2018     |  | Page<br>2 / 2 | Revision<br>6 |             |

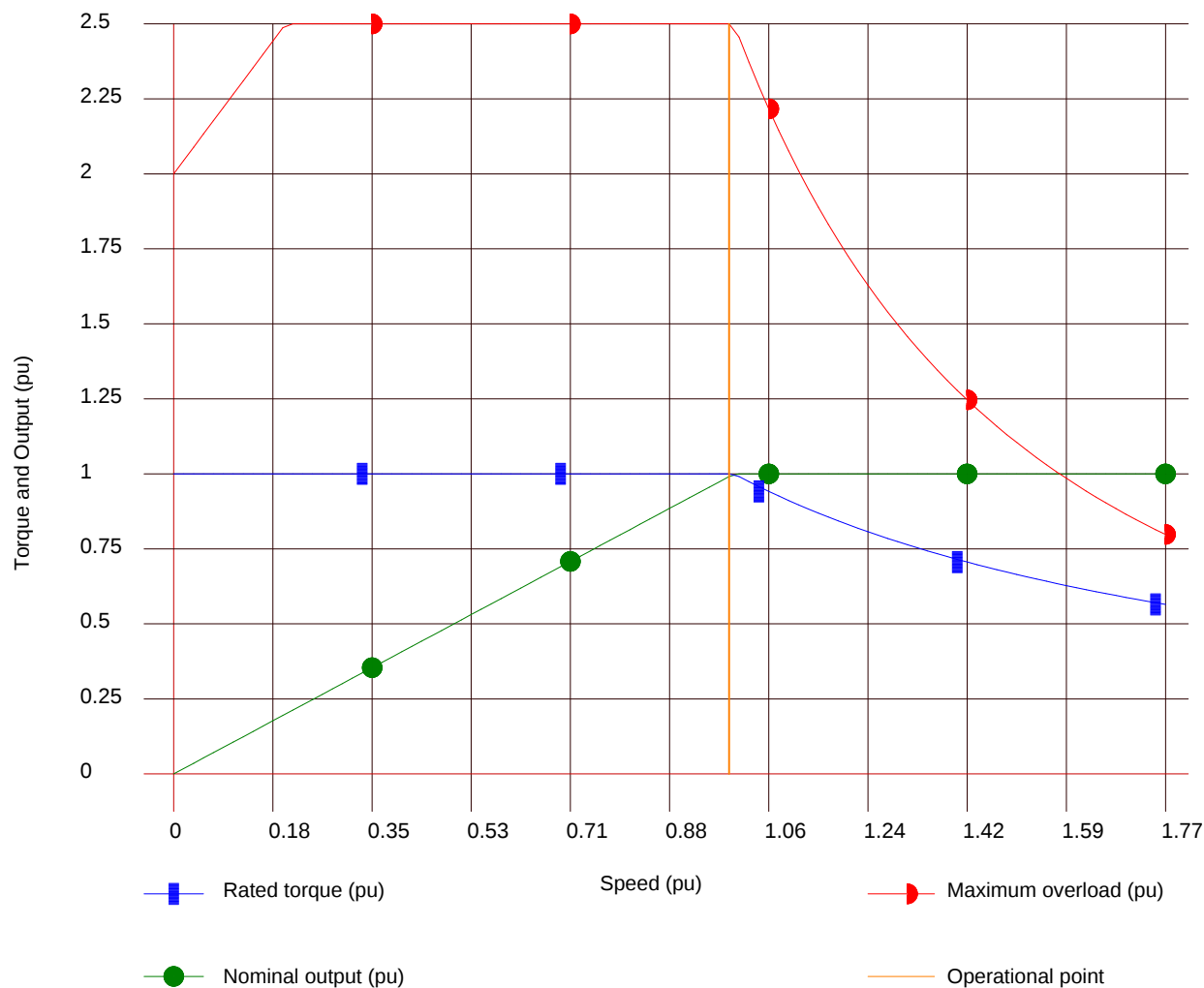
# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage Rotor



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Product line : MGL



Performance : 3000 kW 690 V 45.3 Hz 6P 630

Rated current : 2981 A  
LRC (p.u.) : 7  
Rated torque : 31833 Nm  
Locked rotor torque : 100 %  
Breakdown torque : 250 %  
Rated speed : 900 rpm

Moment of inertia : 286 kgm<sup>2</sup>  
Duty cycle : S9  
Insulation class : F  
Service factor : 1.00  
Temperature rise : class B

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|-----------|-----------------|--|---------------|---------|------|
|           |                 |  |               |         |      |
| Performed | PRATHIMA        |  | 11462 / 2019  |         |      |
| Checked   | SADHU           |  |               |         |      |
| Date      | 12/MAR/2019     |  | Page<br>1 / 1 |         |      |
|           |                 |  | Revision<br>0 |         |      |

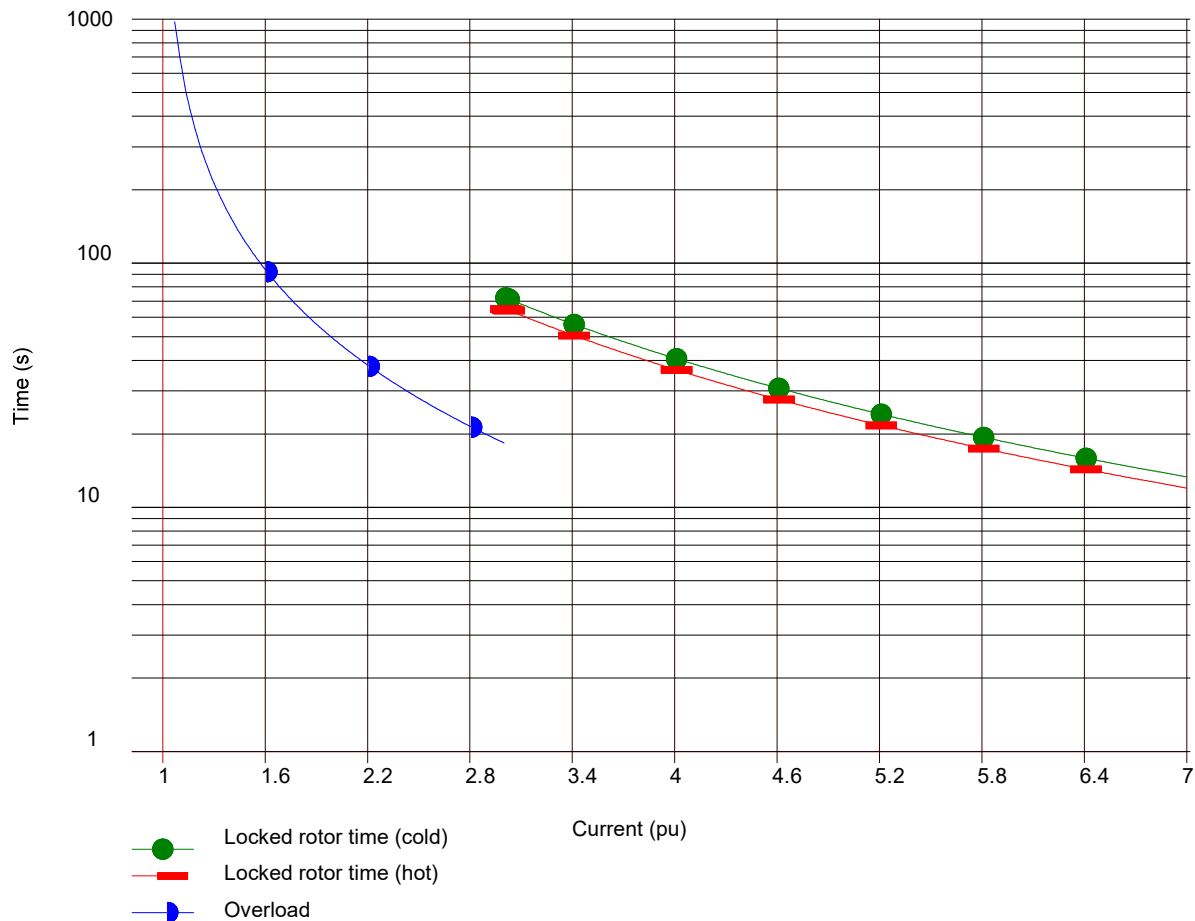
# THERMAL LIMIT CURVE

## Three Phase Induction Motor - Squirrel Cage Rotor



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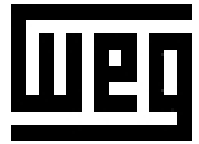
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|           |                 |  |               |               |      |
| Performed | PRATHIMA        |  | 11463 / 2019  |               |      |
| Checked   | SADHU           |  |               |               |      |
| Date      | 12/MAR/2019     |  | Page<br>1 / 1 | Revision<br>0 |      |

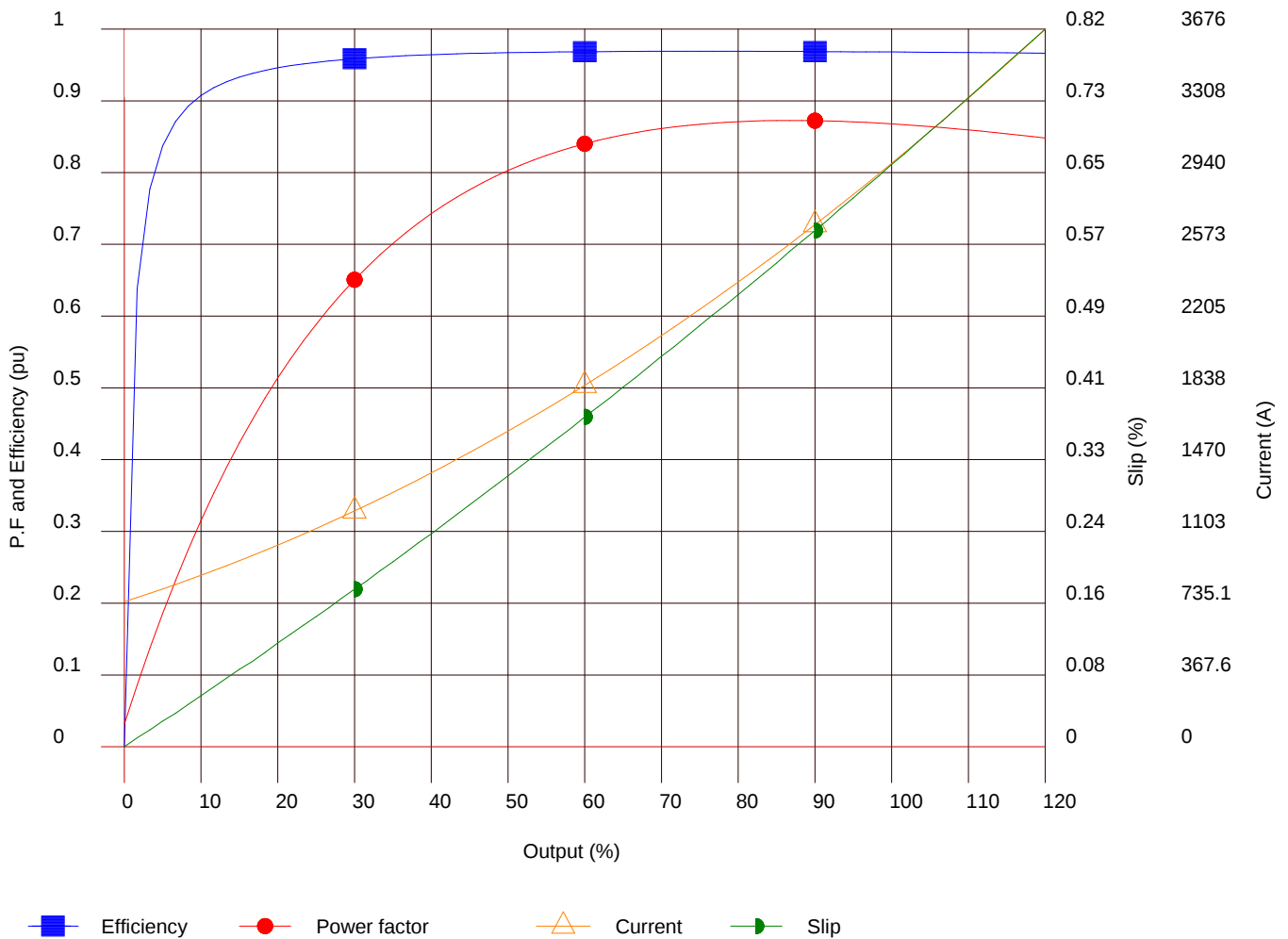
# LOAD PERFORMANCE CURVE

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 Duty cycle : S9  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : class B

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|           |                 |  |              |            |      |
| Performed | PRATHIMA        |  | 11464 / 2019 |            |      |
| Checked   | SADHU           |  |              |            |      |
| Date      | 12/MAR/2019     |  | Page 1 / 1   | Revision 0 |      |

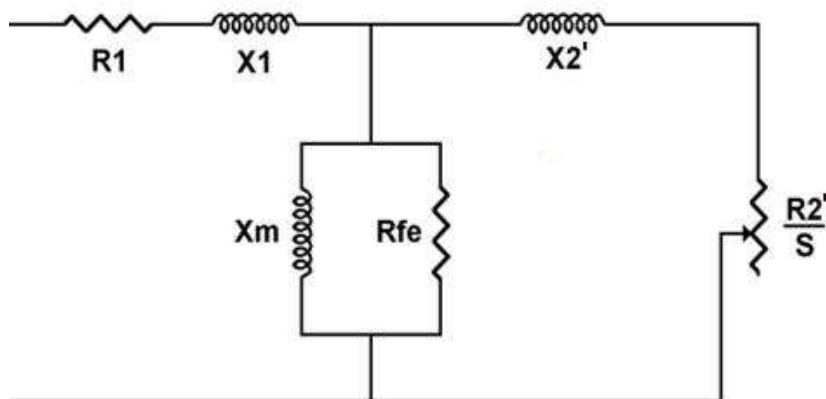
# EQUIVALENT CIRCUIT

## Three Phase Induction Motor - Squirrel Cage Rotor



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| Rated      |                       |           |                       |
|------------|-----------------------|-----------|-----------------------|
| <b>R1</b>  | 0.003 ohms / 0.025 pu | <b>X1</b> | 0.042 ohms / 0.312 pu |
| <b>R2</b>  | 0.003 ohms / 0.023 pu | <b>X2</b> | 0.059 ohms / 0.439 pu |
| <b>Rfe</b> | 75.51 ohms / 563.5 pu | <b>Xm</b> | 1.616 ohms / 12.06 pu |

| Locked rotor |                       |           |                       |
|--------------|-----------------------|-----------|-----------------------|
| <b>R1</b>    | 0.003 ohms / 0.025 pu | <b>X1</b> | 0.029 ohms / 0.216 pu |
| <b>R2</b>    | 0.010 ohms / 0.078 pu | <b>X2</b> | 0.028 ohms / 0.208 pu |
| <b>Rfe</b>   | 74.04 ohms / 552.6 pu | <b>Xm</b> | 1.593 ohms / 11.89 pu |

|               |            |             |                       |
|---------------|------------|-------------|-----------------------|
| <b>T"do</b>   | 1.936 s    | <b>X/R</b>  | 17.16 pu              |
| <b>T"d</b>    | 0.115 s    | <b>X'd</b>  | 0.099 ohms / 0.735 pu |
| <b>Ta</b>     | 0.031 s    | <b>X" d</b> | 0.056 ohms / 0.421 pu |
| <b>Z base</b> | 0.134 ohms |             |                       |

All parameters reflected to stator side.

Per phase values, for connection D.

Resistances at 115 °C, reactances at rated voltage and frequency.

R1 = Stator resistance  
R2 = Rotor resistance  
Rfe = Core loss resistance  
X1 = Stator leakage reactance  
X2 = Rotor leakage reactance  
Xm = Magnetizing reactance  
Z base = Base impedance

T"do = Open circuit AC time constant  
T"d = Short circuit AC time constant  
Ta = Short circuit DC time constant  
X/R = X/R ratio  
X'd = Transient reactance  
X" d = Subtransient reactance

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