DATA SHEET

Three Phase Induction Motor - Squirrel Cage

Customer :  

Product line :  W22 - IE3 Premium Efficiency Multivoltage

<table>
<thead>
<tr>
<th>Frame</th>
<th>315S/M</th>
<th>Cooling method</th>
<th>IC411 - TEFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation class</td>
<td>F</td>
<td>Mounting</td>
<td>B5T</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>S1</td>
<td>Direct of rotation¹</td>
<td>Both</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 °C to +40 °C</td>
<td>Starting method</td>
<td>Inverter</td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m.a.s.l</td>
<td>Approx. weight³</td>
<td>988 kg</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP55</td>
<td>Moment of inertia (J)</td>
<td>1.96 kgm²</td>
</tr>
<tr>
<td>Design</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Output            | 132 kW          | 132 kW             | 132 kW                  | 132 kW            |
|------------------|-----------------|--------------------|-------------------------|
| Poles            | 2               | 2                  | 2                       | 2                 |
| Frequency        | 50 Hz           | 50 Hz              | 50 Hz                   | 60 Hz             |
| Rated voltage    | 380/660 V       | 400/690 V          | 415 V                   | 460 V             |
| Rated current    | 233/134 A       | 224/130 A          | 218 A                   | 197 A             |
| L. R. Amperes    | 1608/926 A      | 1702/987 A         | 1766 A                  | 1675 A            |
| LRC (p.u.)       | 6.9             | 7.6                | 8.1                     | 8.5 x Code J      |
| No load current  | 66.6/38.4 A     | 72.3/41.9 A        | 77.6 A                  | 67.7 A            |
| Rated speed      | 2975 rpm        | 2980 rpm           | 2980 rpm                | 3580 rpm          |
| Slip             | 0.83 %          | 0.67 %             | 0.67 %                  | 0.56 %            |
| Rated torque     | 424 Nm          | 423 Nm             | 423 Nm                  | 352 Nm            |
| Locked rotor torque | 180 %      | 210 %              | 220 %                   | 230 %             |
| Breakdown torque | 280 %           | 310 %              | 340 %                   | 340 %             |
| Service factor   | 1.00            | 1.00               | 1.00                    | 1.00              |
| Noise level²     | 77.0 dB(A)      | 77.0 dB(A)         | 77.0 dB(A)              | 81.0 dB(A)        |
| Locked rotor time| 34 s (hot)      | 34 s (hot)         | 34 s (hot)              | 34 s (hot)        |
| Efficiency (%)   | 50%             | 94.7               | 94.5                    | 94.3              | 92.9          |
| Power factor     | Start           | 0.33               | 0.33                    | 0.33              | 0.32          |
|                  | 50%             | 0.81               | 0.78                    | 0.75              | 0.77          |
|                  | 75%             | 0.87               | 0.86                    | 0.84              | 0.85          |
|                  | 100%            | 0.90               | 0.89                    | 0.88              | 0.88          |
| Bearing type     | 6314-C3         | 6314-C3            |                         |                   |
| Lubrication interval | 5000 h   | 5000 h             |                         |                   |
| Lubricant amount | 27 g            | 27 g               |                         |                   |
| Lubricant type   | MOBIL POLYREX EM|                    |                         |                   |

Foundation loads

<table>
<thead>
<tr>
<th>Drive end</th>
<th>Non drive end</th>
<th>Maximum traction</th>
<th>Maximum compression</th>
</tr>
</thead>
<tbody>
<tr>
<td>6485 N</td>
<td>16177 N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated in IEC 60034-1.

(1) When viewed from the drive end.
(2) Measured at 1m and with tolerance of +3dB(A).
(3) Approximate weight subject to changes after manufacturing process.
(4) At the rated point.

Rev.            Summary of changes | Performed | Checked | Date
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---             | ---                        | ---      | ---      | ---
087663/2019     |                           |          |          |          

Performed by  glord
Checked by     
Date           02/04/2019
## Operation limits with inverter

<table>
<thead>
<tr>
<th>5 Hz up to 50 Hz (Variable torque): 424 Nm</th>
<th>Maximum peak voltage phase-to-phase</th>
<th>( \leq 1600 \text{ V} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \text{dV/dt} )</td>
<td>( \leq 5200 \text{ V/} \mu \text{s} )</td>
</tr>
<tr>
<td></td>
<td>Rise time</td>
<td>( \geq 0.1 \mu \text{s} )</td>
</tr>
</tbody>
</table>

## Notes:

### Standards
- **Specification**: IEC 60034-1
- **Tests**: IEC 60034-2
- **Noise**: IEC 60034-9
- **Vibration**: IEC 60034-14
- **Tolerance**: IEC 60034-1
### Performance
- **Rated current**: 233/134 A
- **LRC (p.u.)**: 6.9
- **Rated torque**: 424 Nm
- **Locked rotor torque**: 180 %
- **Breakdown torque**: 280 %
- **Rated speed**: 2975 rpm
- **Moment of inertia (J)**: 1.96 kgm²
- **Duty cycle**: S1
- **Insulation class**: F
- **Service factor**: 1.00
- **Temperature rise**: 80 K
- **Design**: N
- **Locked rotor time 100%**: 34 s (hot) 61 s (cold)
- **Load inertia (J=GD²/4)**: 1.96 kgm²

### Revision Summary of changes
- Performed by: glord
- Checked by: 
- Date: 02/04/2019

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*This document is exclusive property of WEG S/A. Reprinting is not allowed without written authorization.*
Performance : 132 kW 400/690 V 50 Hz 2P 315S/M
Rated current : 224/130 A
LRC (p.u.) : 7.6
Rated torque : 423 Nm
Locked rotor torque : 210 %
Breakdown torque : 310 %
Rated speed : 2980 rpm
Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Locked rotor time 100% : 34 s (hot) 61 s (cold)
Load inertia (J=GD²/4) : 1.96 kgm²

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### Performance

- **Performance**: 132 kW 415 V 50 Hz 2P 315S/M
- **Rated current**: 218 A
- **LRC (p.u.)**: 8.1
- **Rated torque**: 423 Nm
- **Locked rotor torque**: 220%
- **Breakdown torque**: 340%
- **Rated speed**: 2980 rpm
- **Moment of inertia (J)**: 1.96 kgm²
- **Duty cycle**: S1
- **Insulation class**: F
- **Service factor**: 1.00
- **Temperature rise**: 80 K
- **Design**: N
- **Locked rotor time 100%**: 34 s (hot) 61 s (cold)
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### Rev. Summary of changes Performed Checked Date

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<tr>
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<th>glord</th>
<th>Checked by</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>02/04/2019</td>
</tr>
</tbody>
</table>

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Three Phase Induction Motor - Squirrel Cage

Customer : 

Product line : W22 - IE3 Premium Efficiency Multivoltage

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<th>Performance</th>
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</thead>
<tbody>
<tr>
<td>Rated current</td>
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</tr>
<tr>
<td>LRC (p.u.)</td>
<td>8.5 Code J</td>
</tr>
<tr>
<td>Rated torque</td>
<td>352 Nm</td>
</tr>
<tr>
<td>Locked rotor torque</td>
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<tr>
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Locked rotor time 100% : 34 s (hot) 61 s (cold)
Load inertia (J=GD²/4) : 1.96 kgm²

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Date 02/04/2019 
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This document is exclusive property of WEG S/A. Reprinting is not allowed without written authorization.
Performance : 132 kW 380/660 V 50 Hz 2P 315S/M

Rated current : 233/134 A
LRC (p.u.) : 6.9
Rated torque : 424 Nm
Locked rotor torque : 180 %
Breakdown torque : 280 %
Rated speed : 2975 rpm

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Performance : 132 kW 400/690 V 50 Hz 2P 315S/M
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Rated speed : 2980 rpm
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Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N

Customer : 
Product line : W22 - IE3 Premium Efficiency Multivoltage

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087663/2019-A2

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LOAD PERFORMANCE CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :

Product line : W22 - IE3 Premium Efficiency Multivoltage

Performance : 132 kW 415 V 50 Hz 2P 315S/M
Rated current : 218 A
LRC (p.u.) : 8.1
Rated torque : 423 Nm
Locked rotor torque : 220 %
Breakdown torque : 340 %
Rated speed : 2980 rpm

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N

Rev. Summary of changes Performed Checked Date
Performed by glord
Checked by
Date 02/04/2019

This document is exclusive property of WEG S/A. Reprinting is not allowed without written authorization.
Performance:
- 132 kW 380/660 V 50 Hz 2P 315S/M
- Rated current: 233/134 A
- LRC (p.u.): 6.9
- Rated torque: 424 Nm
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- Breakdown torque: 280%
- Rated speed: 2975 rpm
- Moment of inertia (J): 1.96 kgm²
- Duty cycle: S1
- Insulation class: F
- Service factor: 1.00
- Temperature rise: 80 K
- Design: N
- Heating constant: 41.8 min
- Cooling constant: 125.3 min

Customer: W22 - IE3 Premium Efficiency Multivoltage

---

Rev. Summary of changes Performed Checked Date
---

Performed by: glord
Checked by:
Date: 02/04/2019

This document is exclusive property of WEG S/A. Reprinting is not allowed without written authorization.
Performance:
- Power: 132 kW
- Voltage: 400/690 V
- Frequency: 50 Hz
- Frame: 315S/M
- Rated current: 224/130 A
- LRC (p.u.): 7.6
- Rated torque: 423 Nm
- Locked rotor torque: 210%
- Breakdown torque: 310%
- Rated speed: 2980 rpm
- Moment of inertia (J): 1.96 kgm²
- Duty cycle: S1
- Insulation class: F
- Service factor: 1.00
- Temperature rise: 80 K
- Design: N
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Customer:
Product line: W22 - IE3 Premium Efficiency Multivoltage

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THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer:

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Performance:
- 132 kW 415 V 50 Hz 2P 315S/M
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THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

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<tr>
<td>Duty cycle</td>
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<td>Service factor</td>
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<tr>
<td>Temperature rise</td>
<td>80 K</td>
</tr>
<tr>
<td>Design</td>
<td>N</td>
</tr>
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<td>Heating constant</td>
<td>41.8 min</td>
</tr>
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<td>Cooling constant</td>
<td>125.3 min</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Rev.</th>
<th>Summary of changes</th>
<th>Performed</th>
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<th>Date</th>
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<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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INVERTER CURVE WITH LOAD TORQUE

Three Phase Induction Motor - Squirrel Cage

Customer : 

Product line : W22 - IE3 Premium Efficiency Multivoltage

---

Performance : 132 kW 380/660 V 50 Hz 2P 315S/M

Rated current : 233/134 A  
LRC (p.u.) : 6.9  
Rated torque : 424 Nm  
Locked rotor torque : 180 %  
Breakdown torque : 280 %  
Rated speed : 2975 rpm  
Maximum absorbed power : 132 kW  
Minimum frequency : 5 Hz  
Maximum frequency : 50 Hz

Moment of inertia (J) : 1.96 kgm²  
Duty cycle : S1  
Insulation class : F  
Service factor : 1.00  
Temperature rise : 80 K  
Design : N  
Maximum torque : 424 Nm  
Minimum speed : 300 rpm  
Maximum speed : 3000 rpm

---

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087663/2019-A1

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Performance: 132 kW 400/690 V 50 Hz 2P 315S/M

Rated current: 224/130 A
LRC (p.u.): 7.6
Rated torque: 423 Nm
Locked rotor torque: 210 %
Breakdown torque: 310 %
Rated speed: 2980 rpm
Maximum absorbed power: 132 kW
Minimum frequency: 5 Hz
Maximum frequency: 50 Hz

Moment of inertia (J): 1.96 kgm²
Duty cycle: S1
Insulation class: F
Service factor: 1.00
Temperature rise: 80 K
Design: N

Maximum torque: 424 Nm
Minimum speed: 300 rpm
Maximum speed: 3000 rpm

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### Performance

- **Rated current**: 218 A
- **LRC (p.u.)**: 8.1
- **Rated torque**: 423 Nm
- **Locked rotor torque**: 220 %
- **Breakdown torque**: 340 %
- **Rated speed**: 2980 rpm
- **Maximum absorbed power**: 132 kW
- **Minimum frequency**: 5 Hz
- **Maximum frequency**: 50 Hz
- **Moment of inertia (J)**: 1.96 kgm²
- **Duty cycle**: S1
- **Insulation class**: F
- **Service factor**: 1.00
- **Temperature rise**: 80 K
- **Design**: N
- **Maximum torque**: 424 Nm
- **Minimum speed**: 300 rpm
- **Maximum speed**: 3000 rpm
- **Rated current**: 218 A
- **Rated voltage**: 415 V
- **Rated frequency**: 50 Hz
- **Service factor**: 1.00
- **Temperature rise**: 80 K
- **Design**: N
- **Maximum torque**: 424 Nm
- **Minimum speed**: 300 rpm
- **Maximum speed**: 3000 rpm
- **Rated current**: 218 A
- **Rated voltage**: 415 V
- **Rated frequency**: 50 Hz
- **Service factor**: 1.00
- **Temperature rise**: 80 K
- **Design**: N
- **Maximum torque**: 424 Nm
- **Minimum speed**: 300 rpm
- **Maximum speed**: 3000 rpm

### INVERTER CURVE WITH LOAD TORQUE

Three Phase Induction Motor - Squirrel Cage

Customer:
Product line: W22 - IE3 Premium Efficiency Multivoltage

Performance:
- **132 kW** 415 V 50 Hz 2P 315S/M

<table>
<thead>
<tr>
<th>Performance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated current</td>
<td>218 A</td>
</tr>
<tr>
<td>LRC (p.u.)</td>
<td>8.1</td>
</tr>
<tr>
<td>Rated torque</td>
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<tr>
<td>Rated speed</td>
<td>2980 rpm</td>
</tr>
<tr>
<td>Maximum absorbed power</td>
<td>132 kW</td>
</tr>
<tr>
<td>Minimum frequency</td>
<td>5 Hz</td>
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<td>Temperature rise</td>
<td>80 K</td>
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<tr>
<td>Design</td>
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<tr>
<td>Maximum torque</td>
<td>424 Nm</td>
</tr>
<tr>
<td>Minimum speed</td>
<td>300 rpm</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>3000 rpm</td>
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</tbody>
</table>

### Summary of changes

- **Performed by**: glord
- **Checked by**:
- **Date**: 02/04/2019

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*This document is exclusive property of WEG S/A. Reprinting is not allowed without written authorization.*
Performance : 132 kW 460 V 60 Hz 2P 315S/M

Rated current : 197 A
LRC (p.u.) : 8.5 Code J
Rated torque : 352 Nm
Locked rotor torque : 230 %
Breakdown torque : 340 %
Rated speed : 3580 rpm
Minimum absorbed power : 132 kW
Minimum frequency : 5 Hz
Maximum frequency : 60 Hz

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum torque : 424 Nm
Minimum speed : 300 rpm
Maximum speed : 3600 rpm

Customer :
Product line : W22 - IE3 Premium Efficiency Multivoltage

INVERTER CURVE WITH LOAD TORQUE

Three Phase Induction Motor - Squirrel Cage

Performance : 132 kW 460 V 60 Hz 2P 315S/M

Rated current : 197 A
LRC (p.u.) : 8.5 Code J
Rated torque : 352 Nm
Locked rotor torque : 230 %
Breakdown torque : 340 %
Rated speed : 3580 rpm
Minimum absorbed power : 132 kW
Minimum frequency : 5 Hz
Maximum frequency : 60 Hz

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum torque : 424 Nm
Minimum speed : 300 rpm
Maximum speed : 3600 rpm

Customer :
Product line : W22 - IE3 Premium Efficiency Multivoltage

INVERTER CURVE WITH LOAD TORQUE

Three Phase Induction Motor - Squirrel Cage

Performance : 132 kW 460 V 60 Hz 2P 315S/M

Rated current : 197 A
LRC (p.u.) : 8.5 Code J
Rated torque : 352 Nm
Locked rotor torque : 230 %
Breakdown torque : 340 %
Rated speed : 3580 rpm
Minimum absorbed power : 132 kW
Minimum frequency : 5 Hz
Maximum frequency : 60 Hz

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum torque : 424 Nm
Minimum speed : 300 rpm
Maximum speed : 3600 rpm

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Performance : 132 kW 380/660 V 50 Hz 2P 315S/M
Rated current : 233/134 A
LRC (p.u.) : 6.9
Rated torque : 424 Nm
Locked rotor torque : 180 %
Breakdown torque : 280 %
Rated speed : 2975 rpm
Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum peak voltage phase-to-phase <= 1600 V
dV/dt <= 5200 V/µs
Rise time >= 0.1 µs

Performance limits with inverter:
5 Hz up to 50 Hz (Variable torque): 424 Nm
5 Hz up to 50 Hz (Variable torque): 424 Nm

Electrical limits:
Maximum voltage phase-to-phase <= 1600 V
dV/dt <= 5200 V/µs
Rise time >= 0.1 µs

Customer : 
Product line : W22 - IE3 Premium Efficiency Multivoltage

Operation limits with inverter:
5 Hz up to 50 Hz (Variable torque): 424 Nm
5 Hz up to 50 Hz (Variable torque): 424 Nm

Summary of changes:
Performed by glord
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Date 02/04/2019

Rev. 0
Summary of changes
Performed Checked Date
087663/2019-A1
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Performance : 132 kW 400/690 V 50 Hz 2P 315S/M
Rated current : 224/130 A
LRC (p.u.) : 7.6
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Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum peak voltage phase-to-phase <= 1600 V
dV/dt <= 5200 V/µs
Rise time >= 0.1 µs

VFD OPERATION CURVE
Three Phase Induction Motor - Squirrel Cage

Customer : 
Product line : W22 - IE3 Premium Efficiency Multivoltage

Operation limits with inverter
5 Hz up to 50 Hz (Variable torque): 424 Nm

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Date 02/04/2019

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Performance : 132 kW 415 V 50 Hz 2P 315S/M
Rated current : 218 A
LRC (p.u.) : 8.1
Rated torque : 423 Nm
Locked rotor torque : 220 %
Breakdown torque : 340 %
Rated speed : 2980 rpm
Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N
Maximum peak voltage phase-to-phase <= 1600 V
dV/dt <= 5200 V/µs
Rise time >= 0.1 µs

Operation limits with inverter
5 Hz up to 50 Hz (Variable torque): 424 Nm

Rev. | Summary of changes | Performed | Checked | Date
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Performed by glord 087663/2019-A3
Checked by Page 21/23 0
Date 02/04/2019

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Performance : 132 kW 460 V 60 Hz 2P 315S/M

Rated current : 197 A
LRC (p.u.) : 8.5 Code J
Rated torque : 352 Nm
Locked rotor torque : 230 %
Breakdown torque : 340 %
Rated speed : 3580 rpm

Operation limits with inverter
5 Hz up to 50 Hz (Variable torque): 424 Nm

Moment of inertia (J) : 1.96 kgm²
Duty cycle : S1
Insulation class : F
Service factor : 1.00
Temperature rise : 80 K
Design : N

Maximum peak voltage phase-to-phase <= 1600 V
dV/dt <= 5200 V/μs
Rise time >= 0.1 μs
EQUIVALENT CIRCUIT

Three Phase Induction Motor - Squirrel Cage

Customer:

Product line: W22 - IE3 Premium Efficiency Multivoltage

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>1.6744 ohms</td>
</tr>
<tr>
<td>X1</td>
<td>3.5490 ohms</td>
</tr>
<tr>
<td>R2'</td>
<td>0.9857 ohms</td>
</tr>
<tr>
<td>X2'</td>
<td>4.2803 ohms</td>
</tr>
<tr>
<td>Rfe</td>
<td>3036.2900 ohms</td>
</tr>
<tr>
<td>Xm</td>
<td>111,9098 ohms</td>
</tr>
</tbody>
</table>

All parameters reflected to stator side.
Per phase values, for T connection.
 Resistances at 20.0 °C, reactances at rated voltage and frequency.

Performance: 132 kW 380 V 50 Hz 4P 315S/M

Performance summary:

- R1 = Stator resistance
- R2' = Rotor resistance
- Rfe = Core loss resistance
- X1 = Stator leakage reactance
- X2' = Rotor leakage reactance
- Xm = Magnetizing reactance
- Zbase = Base impedance

- T\textsuperscript{do} = Open circuit AC time constant
- T\textsuperscript{d} = Short circuit AC time constant
- Ta = Short circuit DC time constant
- X/R = X/R Ratio
- RS = Supplementary losses resistance
- X\textsuperscript{d} = Xs = Subtransient reactance
- X2(-) = Negative sequence reactance

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