APPENDICES

Appendix 1

Doubly Fed Induction Generator Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal power</td>
<td>4 x 1.5 MW</td>
</tr>
<tr>
<td>Line to line Voltage</td>
<td>575 V</td>
</tr>
<tr>
<td>Frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Stator resistance</td>
<td>0.00706 pu</td>
</tr>
<tr>
<td>Stator leakage inductance</td>
<td>0.171 pu</td>
</tr>
<tr>
<td>Rotor resistance</td>
<td>0.005 pu</td>
</tr>
<tr>
<td>Rotor leakage inductance</td>
<td>0.156 pu</td>
</tr>
<tr>
<td>Magnetising inductance</td>
<td>2.9 pu</td>
</tr>
<tr>
<td>Inertia constant</td>
<td>5.04</td>
</tr>
<tr>
<td>Friction factor</td>
<td>0.01</td>
</tr>
<tr>
<td>Pair of poles</td>
<td>3</td>
</tr>
</tbody>
</table>

Appendix 2

Load

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal phase to phase voltage</td>
<td>575V</td>
</tr>
<tr>
<td>Nominal frequency</td>
<td>60Hz</td>
</tr>
<tr>
<td>Active Power</td>
<td>500KW</td>
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</table>

Appendix 3

Three Phase Transformer

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVA</td>
<td>12</td>
</tr>
<tr>
<td>Voltage</td>
<td>25KV / 575V</td>
</tr>
<tr>
<td>Connection</td>
<td>Y – Δ</td>
</tr>
</tbody>
</table>
### Appendix 4

**Three Phase Pi Section Line**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Positive sequence resistance</td>
<td>0.1153 ohms / km</td>
</tr>
<tr>
<td>Zero sequence resistance</td>
<td>0.413 ohms / km</td>
</tr>
<tr>
<td>Positive sequence inductance</td>
<td>1.05e-3 H/km</td>
</tr>
<tr>
<td>Zero sequence inductance</td>
<td>3.32e-3 H/ km</td>
</tr>
<tr>
<td>Positive sequence capacitance</td>
<td>11.33e-009 F / km</td>
</tr>
<tr>
<td>Zero sequence capacitance</td>
<td>5.01e-009 F / km</td>
</tr>
<tr>
<td>Line length</td>
<td>10 Km</td>
</tr>
</tbody>
</table>

### Appendix 5

**2MVAPLANT**

**Asynchronous Machine**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>1.68MW</td>
</tr>
<tr>
<td>Volts</td>
<td>2300</td>
</tr>
<tr>
<td>Power factor</td>
<td>0.93</td>
</tr>
<tr>
<td>Rotor</td>
<td>squirrel cage</td>
</tr>
</tbody>
</table>

**Three Phase Series RLC Load**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>Y</td>
</tr>
<tr>
<td>Nominal phase to phase voltage</td>
<td>2300V</td>
</tr>
<tr>
<td>Nominal frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Active Power</td>
<td>200KW</td>
</tr>
</tbody>
</table>

**Three Phase Breaker**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breaker resistance $R_{on}$</td>
<td>0.001 ohms</td>
</tr>
<tr>
<td>Snubbers resistance $R_p$</td>
<td>infinity</td>
</tr>
<tr>
<td>Snubbers resistance $C_p$</td>
<td>infinity</td>
</tr>
</tbody>
</table>
Power Factor Correction Capacitor

Connection  –  Y
Nominal phase to phase voltage  –  2300V
Nominal frequency  –  60 Hz
Capacitive reactive power  –  80 KVAR

Three Phase Transformer

MVA  –  2.5
Voltage  –  25KV / 2.3KV
Connection  –  Δ– Y

Appendix 6

Three Phase Pi Section Line

Frequency  –  60 Hz
Positive sequence resistance  –  0.1153 ohms / km
Zero sequence resistance  –  0.413 ohms / km
Positive sequence inductance  –  1.05e-3 H/km
Zero sequence inductance  –  3.32e-3 H/ km
Positive sequence capacitance  –  11.33e-009 F / km
Zero sequence capacitance  –  5.01e-009 F / km
Line length  –  5 Km

Appendix 7

Three Phase Grounding Transformer

Connection  –  Y –Δ
X₀  –  4.7 ohm

Appendix 8

Three Phase Transformer

MVA  –  47
Voltage  –  120KV / 25KV
Connection  –  Y–Δ
Appendix 9
Neutral Grounding Reactance
MVA – 2500
$X_0 / X_1$ – 3 ohm

Appendix 10
Three Phase Programmable Voltage Source
Voltage – 120KV
Frequency – 60 Hz