

Capability Statement



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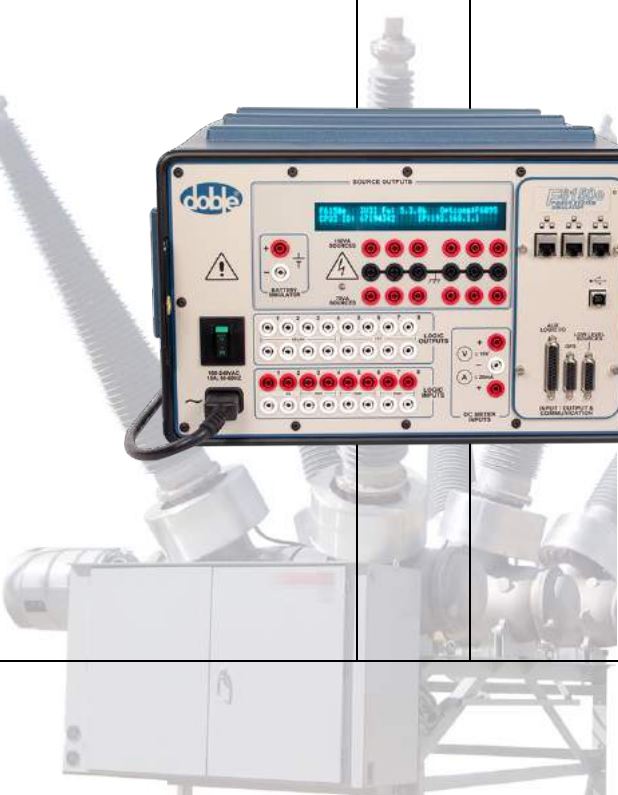
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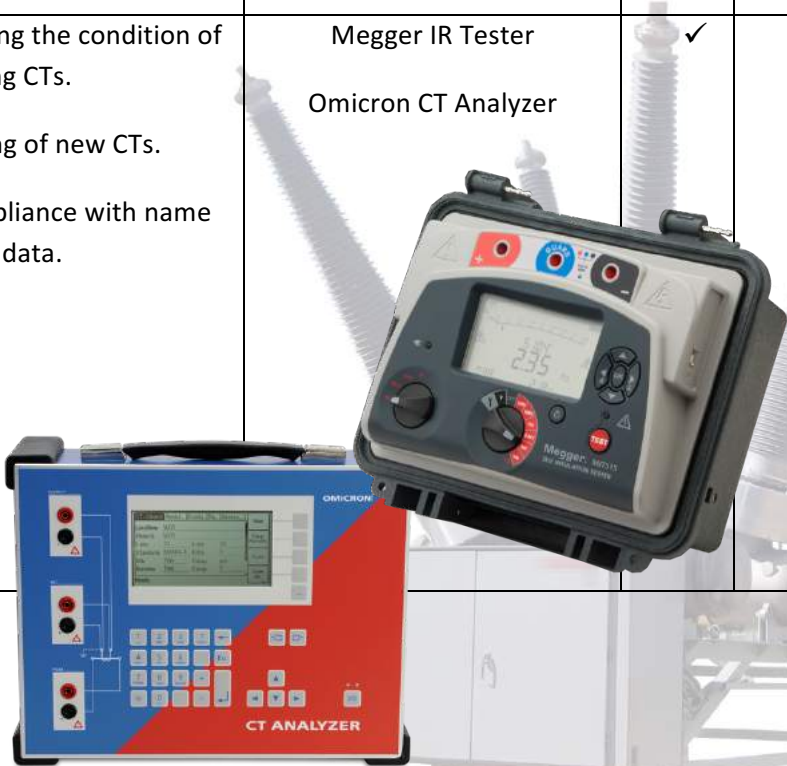
Version 6.0



Protection Tests

| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|--|---|---|--|---------------|-------------------|
| <p>Protection relay Secondary Injection Test for Numerical and Electro-mechanical relays during,</p> <p>1. Routine Maintenance work.</p> <p>2. Programing relays with new settings.</p> <p>3. Commissioning of new relay panels.</p> | <p>Test operational behaviors of the relays and carry out protection functions such as:</p> <ol style="list-style-type: none">1. Distance, Line Differential, Overcurrent, Earth Faults, Directional Over current and Earth fault Protection schemes in transmission lines.2. Differential, Directional Overcurrent, Earth Fault, Overcurrent, Sensitive Earth Faults, Stand-by Earth Fault and Restricted Earth Fault protection schemes in Power Transformers.3. Differential, Over Current, Earth fault, and other protection Schemes related to Generators.4. Testing of Feeder Protection Relays in substation Panel.5. Testing of Protection Relays in Industrial switchboards.6. Testing of teleprotection schemes. | <p>Assists to find the health of protection relays, trip and alarm circuits preventing protection failures that may leads to maloperation or no operation.</p> <p>Calibrate electro-mechanical and microprocessor relays for their correct operations. (pickup and Time)</p> <p>Assists to find the condition of the relay after a settings change.</p> | <p>Doble F6150 Power System Simulator.</p>  The image shows a Doble F6150 Power System Simulator, a large industrial-grade electronic device used for testing power system components. It features a control panel with a digital display, numerous analog and digital input/output terminals, and a power switch. The device is mounted on a metal frame. | ✓ | ✓ |

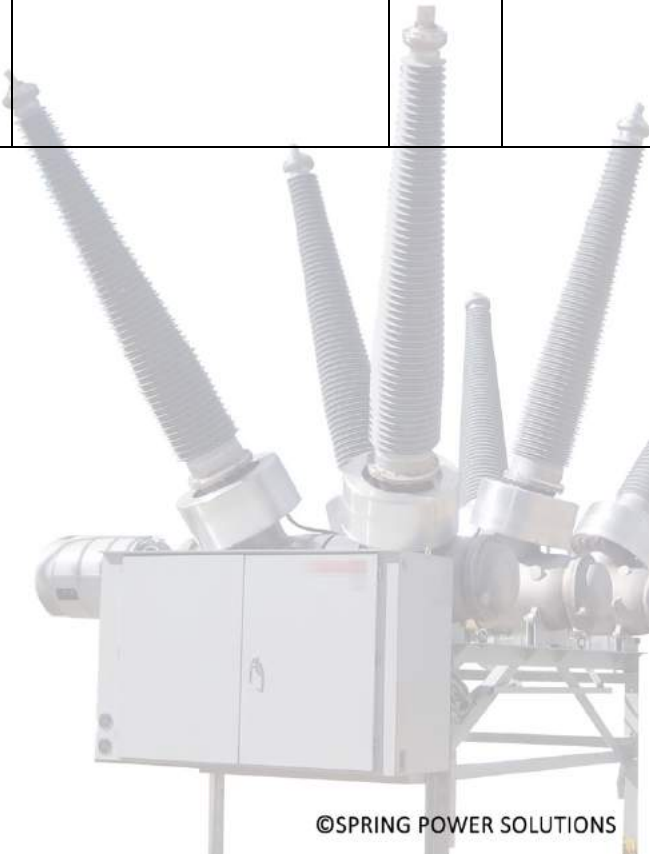
Protection Tests

| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|---|---|---|---|---------------|-------------------|
| Programming relays with New settings | <p>These tests will include Alarm and trip checks for individual function and relays.</p> <p>Customer provided settings will be programmed to relays and tested for new settings.</p> | Accuracy of the implemented settings can be confirmed. |  | ✓ | ✓ |
| Instrument Transformer Tests | <p>The portable CT Analyzer by Omicron will be Used for CT testing.</p> <p>This equipment can perform following tests on CTs</p> <ol style="list-style-type: none"> 1. Ratio test with Phase angle accuracy 2. Polarity 3. CT Excitation/Saturation (Mag. Curve) 4. CT winding Resistance 5. CT Burden <p>Omicron CT analyzer can Test Bushing CTs inside Transformers easily. Insulation resistances are checked using Megger IR tester.</p> <p>For VTs, IR testing, Polarity testing and Winding resistance can be done.</p> | <p>Assist in determining the condition of existing CTs.</p> <p>Commissioning of new CTs.</p> <p>Checking for compliance with name plate data.</p> | <p>Megger IR Tester</p> <p>Omicron CT Analyzer</p>  | ✓ | ✓ |

Protection Tests



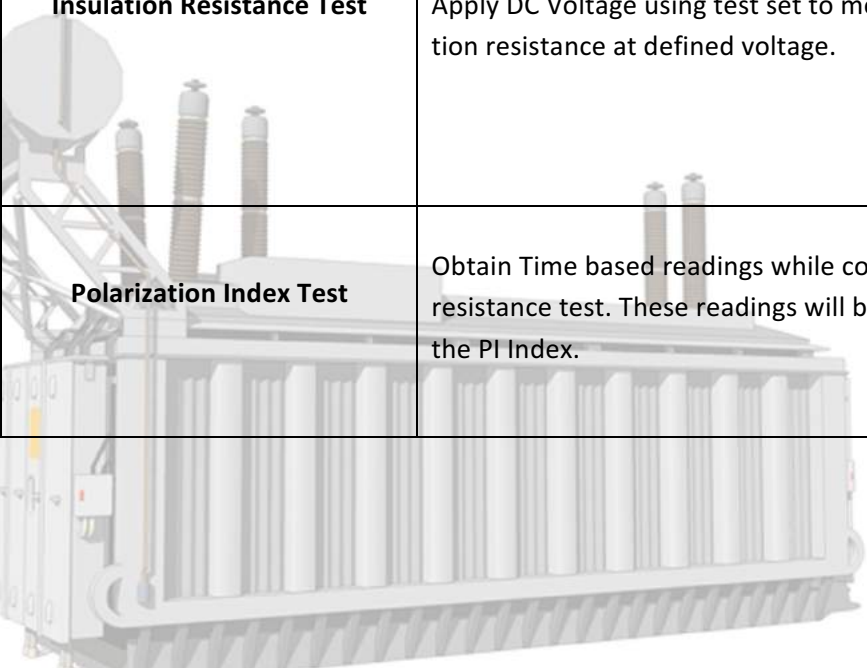
| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|------------------------|---|--|-----------------|------------------|----------------------|
| Primary Injection Test | Test are carried out for existing and new commissioning bays. Omicron CPC 100 test unit is use to check complete current path for the relay. | Useful in commissioning work and fault diagnosing. Inject high current to primary side of CTs to determine the overall condition of the system. | Omicron CPC 100 | ✓ | ✓ |



Transformer Tests



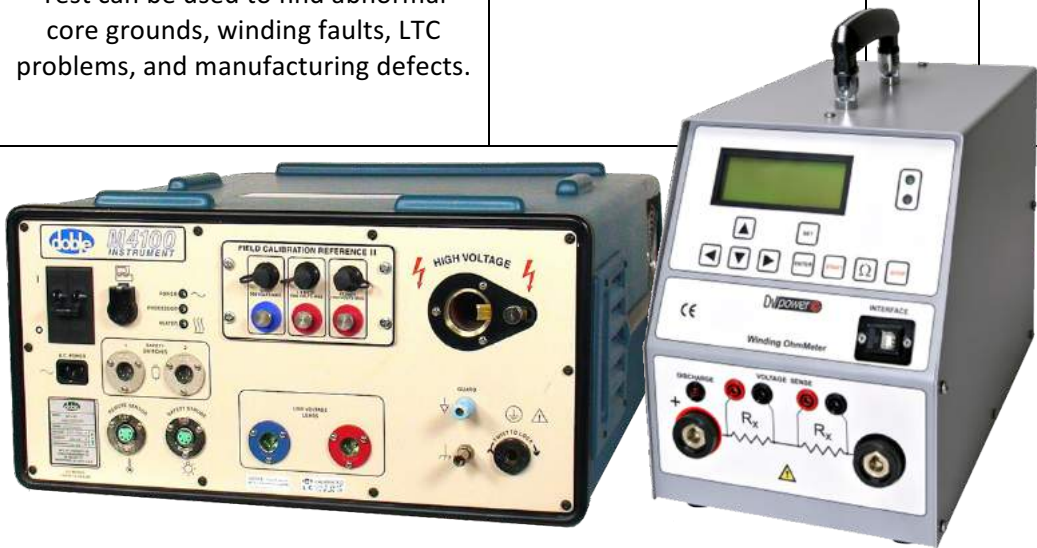
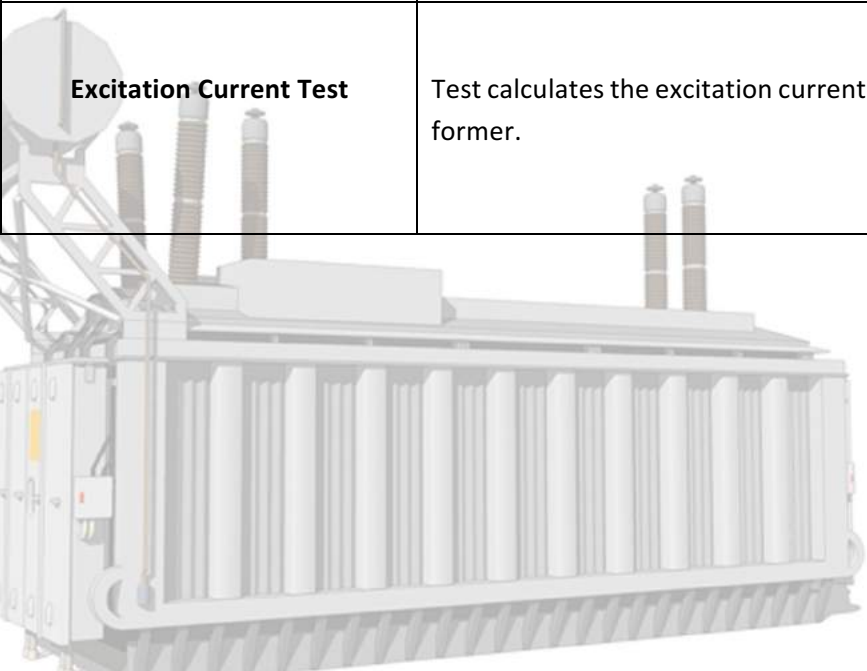
| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|--------------------------------------|--|--|--|---------------|-------------------|
| Sweep Frequency Analysis (SFRA) Test | This test analysis the mechanical integrity of the transformer. | This test assists to find core movement, winding deformation and displacement, faulty core grounds, partial winding collapse, hoop buckling broken or loosened clamping structures, Shorted turns and open windings. | Doble M5400 | ✓ | ✓ |
| Insulation Resistance Test | Apply DC Voltage using test set to measure the insulation resistance at defined voltage. | Assist to locate faulty windings. Prevent possible failure on energization. Test can be done easily. Inconclusive. Can be used only as a cursory test. | Megger 10kV Insulation Resistance Tester | ✓ | ✓ |
| Polarization Index Test | Obtain Time based readings while conducting insulation resistance test. These readings will be used to evaluated the PI Index. | Test indicates how polluted the windings have become. | Megger 10kV Insulation Resistance Tester | ✓ | ✓ |



Transformer Tests



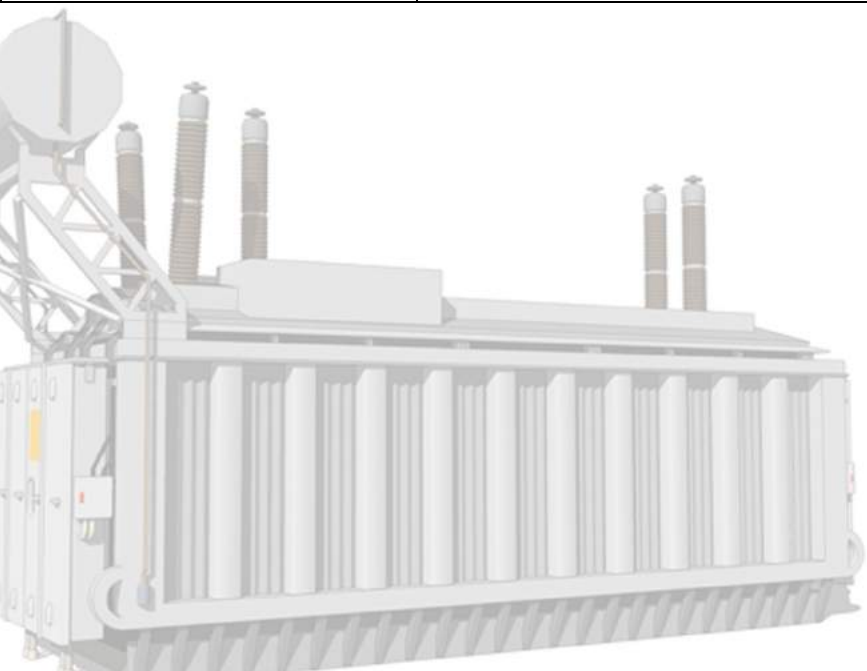
| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|----------------------------------|--|--|------------------|---------------|-------------------|
| Winding Resistance test | This test analysis the resistivity of the windings which allows to compare the condition of each phase. | Test identifies shorted turns, poor or incorrect connections. | DV Power-RMO20TW | ✓ | ✓ |
| Dielectric Loss Angle (DLA) Test | DLA assessment is done for windings, bushings and cables to evaluate the losses corresponding to its voltage. This can be preform up to a voltage of 10kV. | Identify the quality of the insulation. Indicates weaknesses due to voids in the insulation. More conclusive test than Insulation resistance test. | Doble M4100 | ✓ | ✓ |
| Excitation Current Test | Test calculates the excitation current drawn by the transformer. | Test can be used to find abnormal core grounds, winding faults, LTC problems, and manufacturing defects. | | ✓ | ✓ |



Transformer Tests



| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|------------------------|---|--|------------------|---------------|-------------------|
| Transformer Ratio Test | Transformer ratio can be checked using Megger TTR 300 series or CPC 100 against name plate data at lower voltage. | Test confirms the ratio of the transformer design. | DV Power-RMO20TW | ✓ | ✓ |
| Leakage Reactance Test | Test calculates short circuit impedance of the transformer. | Test detects any displacements or deformations of the winding. | Doble M4110 | ✓ | ✓ |



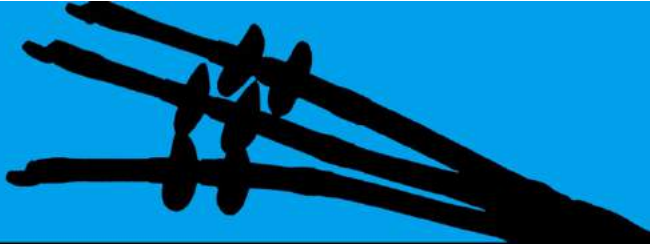
High Voltage Cable Tests



| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|----------------------------|---|--|--|------------------|----------------------|
| Insulation Resistance Test | Apply DC Voltage using Insulation resistance test set and measure the insulation resistance at defined voltage. | Assist to locate faulty windings. Prevent possible failure on energization. Test can be done easily. Inconclusive. Can be used only as a cursory test. | Megger 10kV Insulation Resistance Tester | ✓ | ✓ |
| VLF Hi- Potential Test | The portable cable hi-potential test set is used to test medium and high voltage cables under required standards. | This is a pass or fail test to check the integrity of the cable. | HV Inc. VLF-6022CM | ✓ | ✓ |



High Voltage Cable Tests



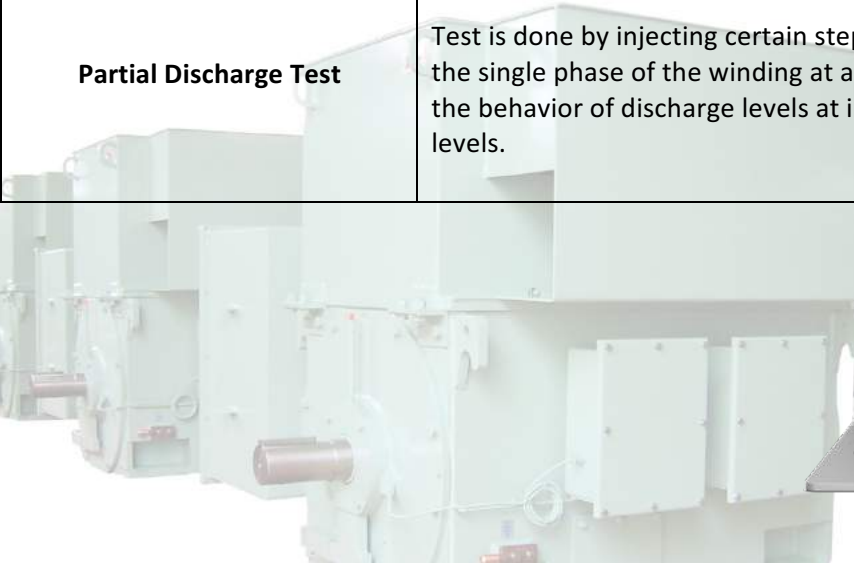
| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|---|---|---|----------------------------------|------------------|----------------------|
| Partial Discharge Test | Test is done by applying high voltage to the one phase of the cable and monitors the discharge levels. | Detect the level of PD activities in voids in the insulation. Test indicates the degree of insulation deterioration. | Doble Lemke PD Diagnostic System | ✓ | ✓ |
| Tan – Delta Test, Monitored Withstand Test | Test is done by applying high voltage to each phase of cable and monitor tan delta value. MW Test is a combination of VLF and tan delta test to analysis of individual core insulation health while conducting pressure test. Time allocation for the VLF will be selected rendering to the neetrac standards. | This Test provides the gradation of Insulation of the cable. | BAUR Viola TD | ✓ | ✓ |



High Voltage Motor & Generator Tests



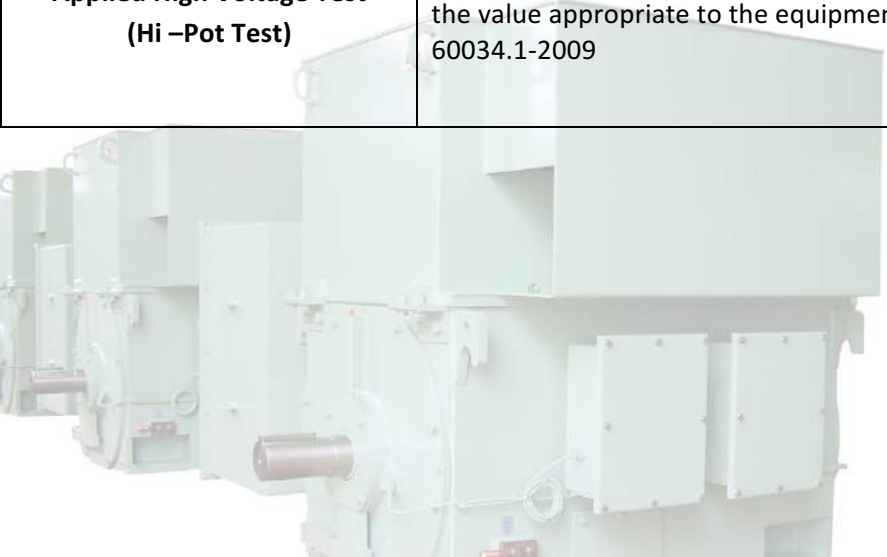
| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|-----------------------------------|---|---|--|---------------|-------------------|
| Insulation Resistance Test | Test will conduct injecting DC Voltage using Insulation resistance test set and measure the insulation resistance at defined voltage. | Assist to locate faulty windings. Prevent possible failure on energization. Test can be done easily. Inconclusive. Can be used only as a cursory test. | Megger 10kV Insulation Resistance Tester | ✓ | ✓ |
| Polarization Index Test | Obtain Time based readings while conducting insulation resistance test. These readings will be used to evaluate the PI index. | Test indicates how polluted the windings have become. | | ✓ | ✓ |
| Partial Discharge Test | Test is done by injecting certain steps of high voltage to the single phase of the winding at a time and monitor the behavior of discharge levels at individual voltage levels. | Detect the level of PD activities in voids in the insulation. Test indicates the degree of main wall insulation deterioration. | Doble Lemke PD Diagnostic System | ✓ | ✓ |



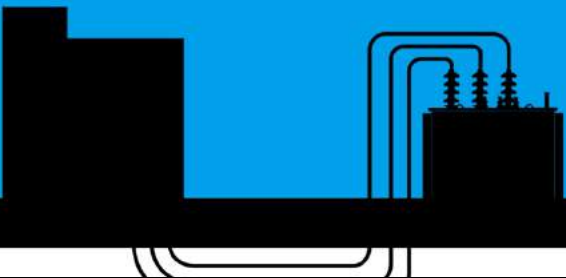
High Voltage Motor & Generator Tests



| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|--|---|--|------------------|---------------|-------------------|
| Winding Resistance Test | This test analysis the resistivity of the windings which allows to compare the condition of each phase. | Test identifies shorted turns, poor connections or wrong connections. | DV Power RMO20TW | ✓ | ✓ |
| Dielectric Loss Angle (DLA) Test | DLA assessment is done for windings, bushings and cables to evaluate the losses corresponding to its voltage. This can be preform up to a voltage of 10kV.. | Identify the quality of the insulation. Indicates weaknesses due to voids in the insulation. More conclusive test than Insulation resistance test. | Doble M4100 | ✓ | ✓ |
| Applied High Voltage Test (Hi –Pot Test) | Test stresses the insulation by applying high voltage to the value appropriate to the equipment specified in AS 60034.1-2009 | Test verifies the integrity of the insulation system prior to installation. This is a pass or fail test. Recommended for new windings only. | TBA | ✓ | ✓ |



High Voltage Switchboard Tests



| TEST | DESCRIPTION | BENEFITS AND LIMITATIONS | EQUIPMENT | STATUS REPORT | DOCUMENT PROVIDED |
|--|---|---|--|---------------|-------------------|
| Applied High Voltage Test (High Voltage Withstand) | Test stresses the insulation by applying high voltage to the value appropriate to the equipment specified in AS 60034.1-2009. | Test identifies shorted turns, poor connections or wrong connections. | DV Power RMO20TW | ✓ | ✓ |
| Insulation Resistance (IR) | Apply DC Voltage using Insulation resistance test set and measure the insulation resistance at defined voltage. | Assists to locate direct insulation failures. Basic guidance of Level of insulation. | Megger 10kV Insulation Resistance Tester | ✓ | ✓ |



Online Partial Discharge Monitoring

| PRODUCT | DESCRIPTION | BENEFITS AND LIMITATIONS | APPLICATIONS |
|--------------------|--|---|---|
| BlueBox Technology | BlueBOX is developed by expert European Engineers with the latest technology. Now available for your HV field diagnostics, becoming increasingly popular around the world BlueBox Technology has patented for unique and powerful analytical tools that have been specifically designed and proven to solve the difficulties faced by conventional online PD measurement methods. | <ul style="list-style-type: none">• Discrimination of background electrical noise.• Partial Discharge automatic location.• Identification and separation of different partial discharge sources.• Assessment of the criticality of the PD sources identified.• Simultaneous automated insulation condition diagnosis of multiple network systems. | <ul style="list-style-type: none">• SMC (Continuous PD Monitoring System)<ul style="list-style-type: none">- Continuous Monitoring of PD performed during normal operation of the network.• SMT (Temporary PD Monitoring System)<ul style="list-style-type: none">- Temporal Monitoring of PD performed during normal operation of the network.• SMP (Portable PD Monitoring System)<ul style="list-style-type: none">- Off-line PD measures using an HV mobile generator (ACR Generator) or On-line PD measurements during normal operation of the network. |

