Supply and installation of M/s Serveron make Transformer on-line DGA monitor – for monitoring eight gases plus moisture

Specifications for Transformer Online Dissolved Gas Analyser (DGA)

1.0 Online Dissolved Gas (Multi-gas) and Moisture Analyser

1.1. Online Dissolved Gas (Multi-gas) and Moisture Analyser (if specified in BPS) along with all required accessories shall be provided with each transformer for measurement & analysis of dissolved gases and moisture in the oil. Interpretations shall be as per IEC 60599-1999.

1.2 The equipment shall detect, measure and analyse the following gases:

<table>
<thead>
<tr>
<th>Gases &amp; Moisture Parameters</th>
<th>Typical Detection Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>H₂</td>
<td>5 – 3,000 ppm</td>
</tr>
<tr>
<td>CH₄</td>
<td>5 – 5,000 ppm</td>
</tr>
<tr>
<td>C₂H₆</td>
<td>5 – 5,000 ppm</td>
</tr>
<tr>
<td>C₂H₄</td>
<td>3 – 5,000 ppm</td>
</tr>
<tr>
<td>C₂H₂</td>
<td>1 – 3,000 ppm</td>
</tr>
<tr>
<td>CO</td>
<td>10 – 10,000 ppm</td>
</tr>
<tr>
<td>CO₂</td>
<td>20 – 30,000 ppm</td>
</tr>
<tr>
<td>O₂</td>
<td>500 – 25,000 ppm</td>
</tr>
<tr>
<td>H₂O</td>
<td>2 – 100 % RS should have facility for measurement of moisture in oil in ppm</td>
</tr>
</tbody>
</table>

1.3 The analyser should measure (not calculate) all above gases and should have 100% sensitivity. The equipment shall be IEC 61850 compliant to integrate with SCADA system. The results shall be communicated to control room or remote location (through SCADA) and shall be compared with the standard preset results to indicate the possible severe damage/failure.

1.4. Equipment shall have facility to give SMS alert to at least three users whenever any fault gas violates the predefined limit.

1.5. Equipment should work on station auxiliary supply. In case other supply is required for the equipment then suitable converter shall be included. All the necessary
power and control cables, communication cables, cable accessories as required shall be provided by the supplier.

1.6. Online DGA shall be installed out door on transformer in harsh ambient and noisy condition (Electromagnetic induction, Corona, and capacitive coupling). The equipment shall be suitable for proper operation in EHV substation (800kV) environment where switching takes place in the EHV/HV System. The suitable indications for power On, Alarm, Caution, normal operation etc. shall be provided on the front panel of the equipment. The equipment shall have IP55 Stainless Steel enclosure, suitable for 55°C ambient temperature and EMI and EMC compatibility. The Equipment must carry a minimum of two (2) years manufacturer’s Warranty.

1.7. The equipment shall connect to the transformer's main body in two locations. One connection is for the supply of oil from the transformer. Second connection is for the return of the oil to the transformer. The connecting oil lines must be of Stainless Steel rigid pipes or flexible hoses.

1.8. The equipment shall be able to measure gas concentration and when downloaded should immediately compare it with user selected alarm & caution level for immediate display. The sampling rate shall be selectable as 2 or 4 or 6 or 12 hours etc. The equipment shall have inbuilt memory to store these results for complete one year even if sampling is done at the lowest interval.

1.9. The Equipment must have an automatic Calibration facility at fixed intervals. For calibration if anything required including cylinder must be mounted with the Equipment.

1.10. The technical feature of the equipment shall be as under:

- Accuracy + 10%
- Repeatability +3% to 10% depending upon gases
- Oil temperature range - 20°C to + 120°C
- External Temp. Range - 20°C to + 55°C

(External temp range of 55°C is important and should not be compromise due to Indian ambient & operating conditions.)
Humidity range 10 to 95 %
Operating Voltage 230 Vac; 50 Hz (±20% variation)
Communications USB & IEC 61850 compliant

1.11. Software for fault indication and fault diagnostics shall include following:

Fault indication:
   i) IEEE, IEC or user configurable levels of dissolved gases
   ii) Rate of change trending

Fault Diagnosis:
   i) Key gases
   ii) Ratios (Rogers, IEC. etc.)
   iii) Duval’s Triangle

1.12. The equipment shall be supplied with all necessary accessories required for carrying
   out DGA of oil sample complete in all respect as per the technical specification. The
   following shall be also form a part of supply.
   i) Software
   ii) Operation Manual (2 set for every unit),
   iii) Software Manual and
   iv) Compact disc giving operation procedures of Maintenance Manual & Trouble-
       shooting instructions.
   v) Basic 8 Gas Monitor with Monitor Mounting Kit
   vi) Calibration Cylinder
   vii) Bleed Fixture & Junction Box with 3.5ft. Cables
   viii) Carrier gas tank regulator, dryer and supply lines
   ix) Load Guide & Ambient Temperature Sensors
   x) Manual DGA sample port assembly
   xi) Oil supply and return assembly
   xii) Associated Software
   xiii) Carrier Gas Cylinder with 99.999% purity with gas regulator and
        pressure guages
   xiv) Suitable SS Tubing of required dia and length for oil & gas
   xv) Moisture Probe for monitoring Moisture
   xvi) Any other accessories required for with the supplied item other than
        what is specified.