Consists of:
- DTMS device (GPRS modem + 3 phase metering system)
- 3G/4G communication
- IP56 box
- Oil Level Sensor
- Oil Temperature sensor
- Rechargeable battery
- Three phase current transformer (based on current rating)
- Cloud Computing Platform
- IP56 box

Function:
- Real time remote monitoring of 3-Phase voltage, Current, PF, Energy consumption, harmonics, Oil Temperature, Oil level etc
- Alarm on overload, Unbalance, Low power factor, Low oil level, High Oil temperature, Over/Low voltage etc
- Dashboard, Analytics & Downloadable reports
- Email & SMS notifications
- DTMU unit tampering notification
Fault Detection & Incident Management (Integrated Scaled up model)

Field Asset Configurations

Data Modelling & Processing

Integrated Application

User Interface – PC/Mobile/Client systems

Customized Reports & Notifications

DEVICE MANAGEMENT

Asset Category
- Poles
- Smart Meters
- Towers
- Powerlines
- Controllers

Location
- Location 1
- location n

Asset Name
- Transformer #203
- Powerline Sensor #203
- Powerline Sensor #XYZ

Devices
- 1. Oil Temp
- 2. Ambient Temp
- 1. Electric Field
- 2. Electric Current
- 3. Line Temp
- 1. Current
- 2. Electric Field
- 3. Temperature

Attributes
- Temperature
- 1. Current
- 2. Electric Field
- 3. Temperature

Interaction Model
In cloud
DTMU Unit features & Hardware specifications

Input AC Power Supply

The DTMU will be powered from a Three Phase Voltage, Two Phase or Single Phase Voltage. It can turn even from a single phase power supply.

Troubleshooting LED's:

- Metering LED: OFF — Three Phase Meter is working
  ON — Three Phase Meter is not working
- Health Status LED: Blink every Second
- Oil Level / Oil Temperature LED: OFF — Sensors are working
  ON — One or Both the sensors are not working
- Device Active / Inactive Mode LED: OFF — Active Mode
  ON — Inactive Mode
- Response From Cloud Server LED: OFF — Valid Response
  ON — No communication with Server
- SIM Registration LED: OFF — SIM Registered
  ON — SIM Not Registered
- Tampering Status: OFF — Enclosure Lead is Close
  ON — Enclosure Lead is Open

Wiring/Cabling Requirements:

DTMU unit has following external cables for sensor and power supply connections (All wire/cables are provided along with the DTMU unit)

- Three Phase Voltage Sensor: Four Core 1.5 Sqmm 2 meter Wire
- Three Phase Current Sensor: Six Core 2.5 Sqmm 2 meter wire
- Oil Level Sensor: Two Core 1.5 Sqmm 2 Meter Wire
- Oil Temperature Sensor: Three Core 1.5 Sqmm 2 Meter Wire
- Winding Temperature Sensor: Two Core 1.5 Sqmm 2 Meter Wire (Optional)

Oil Temperature Sensor:

- Temperature Range: 0 – 150 Degree C
- Sensor Type: Head Type
- Accuracy: +/- 2 Degree C
- IP Class: IP-65 Protection
- Wire Type: Three Core 1.5 Sqmm 2 meter Wire (Provided)

Oil Level Sensor:

- Level Range: 0 – 100 % in 10 Steps
- Accuracy: +/- 1 Step
- Insert Diameter: Less than 25mm
- Wire Length: 0-2 Meter (Provided)
- Rod Insert Length: 150mm Standard (Can Change depend on Size of Transformer)

GPRS Modem:

- Built-in Model for Remote Connectivity
- Quad Band: 850/900/1800/1900 MHz
- GPRS Multi-slot Class: Class 12
- GPRS Mobile Station: Class B
- Operating Temperature: 0 to 60 Degree C
- Antenna: Omnidirectional GSM 850 / 900 / 1800 / 1900 MHz Impedance 50 ohm

Environmental Requirements:

The DTMU unit can be used for Outdoor applications. Provided Three Phase CT's are inside transformer panel. The DTMU shall be capable of operating in following environment

- Operating Temperature: 0 to +60 degree C
- Storage Temperature: -20 to +70 degree C
- Degree of Protection: IP65 excluding Three Phase Current CT's
- Mechanical Resistance to Vibration and Shocks

Warranty: 18 Months after Installation
### Configuring Transformation information & Alarm setting in the Cloud Platform

#### Transformer Parameters
- **Transformer Rating:** 63 KVA
- **Transformer ID:** Transformer ID
- **Transformer Type:** Transformer Type
- **Winding Current (A):** 0
- **Gradient Temperature (°C):** 0
- **State:** ACTIVE
- **Inactive:** INACTIVE
- **Max Oil Level Steps:** 10
- **Data Frequency (mins):** 1

#### DU Installation Location
- **State:** MAHARASHTRA
- **Region:** VIDARBHA
- **Zone:** NAGPUR
- **Circle:** NAGPUR RURAL Q&M
- **Division:** HINGANGAT
- **Sub-Division:** 1830 HINGANGAT (U) S/DN
- **Location:** PRATHHGIRGH
- **Sub-Location:** RIGHT

#### Email For Alarms
- **Email - 1:** abc@example.com
- **Email - 2:** abc@example.com
- **Email - 3:** abc@example.com

#### SMS for Alarms
- **Phone Number - 1:** 5840040010
- **Phone Number - 2:** 5840040010
- **Phone Number - 3:** 5840040010
### Dashboard Pages & Key Parameters status for each Transformer

<table>
<thead>
<tr>
<th>Transformer</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>KVA</th>
<th>KW</th>
<th>KVAR</th>
<th>PF</th>
<th>Oil Level (%)</th>
<th>Oil Temp</th>
<th>vTMD</th>
<th>THD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformer 1</td>
<td>416.8</td>
<td>123.4</td>
<td>567.8</td>
<td>90.12</td>
<td>345.6</td>
<td>0.75</td>
<td>89%</td>
<td>45°C</td>
<td>0.12</td>
<td>0.03</td>
</tr>
<tr>
<td>Transformer 2</td>
<td>456.7</td>
<td>234.5</td>
<td>678.9</td>
<td>10.12</td>
<td>456.7</td>
<td>0.85</td>
<td>76%</td>
<td>32°C</td>
<td>0.15</td>
<td>0.04</td>
</tr>
</tbody>
</table>

#### Parameter 1:
- **Voltage:** Three Phase Voltage with respect to Neutral
- **Current:** Three Phase Current with respect to Neutral
- **KVA:** Total power consumed by a load for each Phase
- **KW:** Active Power consumed by a load for each phase
- **KVAR:** Reactive power consumed by a load for each phase
- **PF:** Power factor of each Phase
- **Oil Level (%):** Transformer Oil Level status in %
- **Oil Temperature:** Transformer Oil Temperature value
- **vTMD:** Voltage Total Harmonic Distortion
- **THD:** Current Total Harmonic Distortion

#### Parameter 2:
- **Voltage:** Three Phase Voltage between each Phase
- **System - KVA/KW/KVAR/PF/FREQ:** Including all three phase values
- **System - KWh/KVARh/KVARh:** Including all three phase values per hour
- **KW and Max KW Demand:** Demand of active power and its maximum value
- **KVA and Max KVA Demand:** Demand of total power and its maximum value
- **Unbalance V/w.r.t R:** Unbalance Y/B phase Voltage and current w.r.t R Phase
- **Winding Temperature:** Winding Temperature (Optional)
- **Ambient Temperature:** (Optional)

#### Parameter 3:
- **Device Location:** It gives Nearby Cell Tower Location
- **Sensor Extra Parameters:** TBD
- **MAX KW/KVA DEMAND:** Maximum Demand in a year, Month, Date, Hour, Minute, Sec

#### Harmonics:
- **Each phase 3rd, 5th, 7th, 9th, 11th, 13th, 15th Voltage and Current Harmonics value**
### Dashboard – Transformer Event Log & Device status

**Transformer Information**

- **Location**: [Details not visible]
- **System Date**: [Details not visible]

#### Downloadable Reports (Can also be interfaced with your system)

<table>
<thead>
<tr>
<th>Device ID</th>
<th>Time Stamp</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A123</td>
<td>2018-12-01 12:00</td>
<td>Battery State</td>
<td>Transformer power supply is on</td>
</tr>
<tr>
<td>B456</td>
<td>2018-11-29 18:30</td>
<td>Battery State</td>
<td>Transformer power supply is on</td>
</tr>
<tr>
<td>C789</td>
<td>2018-11-27 09:45</td>
<td>Battery State</td>
<td>Transformer power supply is on</td>
</tr>
</tbody>
</table>

**Events from DU**

<table>
<thead>
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<tr>
<td>2018-12-01 12:00</td>
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</table>

**Reports**

- By Region (TBD)
- By Zone (TBD)
- By Division (TBD)