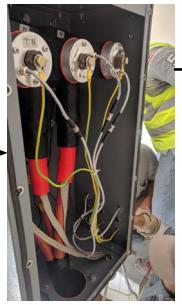
Case Study

SEWA Smart Grid Automation Solution

"ZELISKO" & "**GOLDENSANDS**"
provide a turnkey retrofit
distribution automation system
for 11-6.6/0.4kv Substation

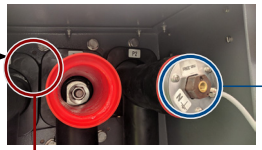
Smart-grid Overview

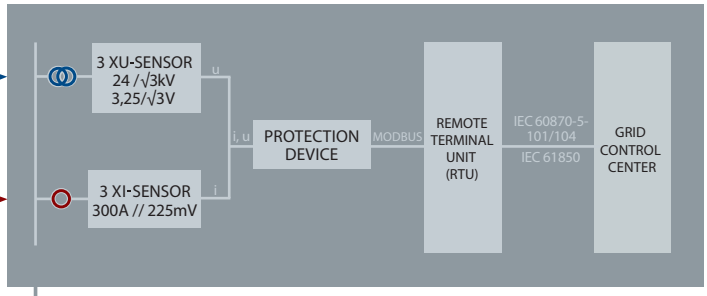
Smart metering and smart grids can only function with a powerful sensor and secured communications platform. It must be able to transport all important energy data – in real-time, IP -based, securely encrypted,as broadband and more.
These requirements are met by The low power Voltage and current sensors as per IEC 60044-7 and IEC 60044-8 uses the IP based tele control Scada and or electricity grid for data transmission ,thus provides an optimal end to end solutions for energy supply companies. LP VT and LP CT technology can close the existing gaps in the Smart grid sensing area for the medium- and low-voltage grids as well as between energy suppliers, their customers and the technical systems. Here the technology can be used with other proven standards from the telecommunications industry including broadband, the TCP/IP protocol and the Ethernet. In addition, utilities can also ensure encrypted data transmission, data protection and data security.



CABLE COMPARTMENT OF
SCHNEIDER RE2c (11kV - RMU).

ZELISKO SENSORS





Pilot POC Stage

To achieve the required improvements SEWA turned to ZELISKO having already seen the improvement to the quality of ZELISKO Sensors had achived from world class companies such as Siemens and Schneider.

GoldenSands being a local partner to **Zelisko** in Middle-East region has partnerd with SEWA to deploy a pilot POC program with Zelisko Sensors installed into an existing **Schneider-RE2c RMU (11-6.6/0.4kv) Substation** located at American University of Sharjah inorder to address major issues like Transformer losses, Metering, Earth-Fault Indication, and Demand Calculation at M.V and L.V-Panels.
After the success of this POC project, SEWA will move to a full implementation stage.

Major Components Involved

Voltage Sensor

Current Sensor

Grid Intelligent Monitor

RTU

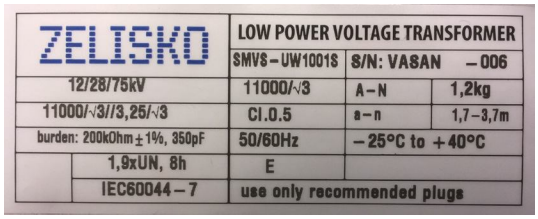
- Transmission of the instantaneous values of current and voltage
- RTU communication to grid control center

ZELISKO

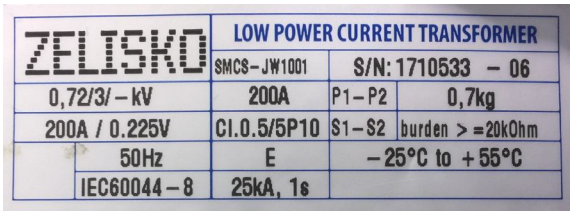
GOLDEN SANDS TRADING CO.

Case Study

ZELISKO Voltage Sensor (Schneider RMU)

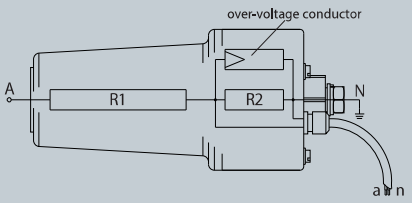


ZELISKO Current Sensor (Schneider RMU)



Function and error limits

VOLTAGE SENSOR



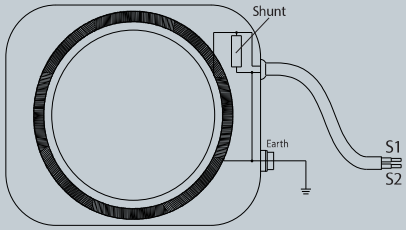
Output signal: 3,25/√3 V according to IEC 60044-7

THE FUNCTION PRINCIPAL OF THE **"VOLTAGE SENSOR"** IS BASED ON A RESISTIVE DIVIDER

It consists of 2 resistive elements,which divide the input signal in order to revieve a normed output value. The surge protector provides protection of sequentially connected measuring devices.

Function and error limits

PHASE CURRENT SENSOR



Output signal: 225 mV according to IEC 60044-8

THE **"PHASE CURRENT SENSOR"** IS BASED ON AN ALMOST POWERLESS INDUCTIVE CURRENT TRANSFORMER.

The current is converted to a proportional voltage by implementing a shunt resistor.

Accuracy limits of voltage sensors for measurement purposes

Class		Voltage error (%)	Phase displacement (min)
Accuracy class IEC 60044-7	0,5	0,5	20
	1	1	40
	3	3	limit values are not specified

Accuracy limits of phase current sensors for measurement purposes

Class		Current error (%)					Phase displacement (min)			
		5% I_p	20% I_p	50% I_p	100% I_p	120% I_p	5% I_p	20% I_p	100% I_p	120% I_p
Accuracy class IEC 60044-8	0,5	1,5	0,75	–	0,5	0,5	90	45	30	30
	1	3	1,5	–	1	1	180	90	60	60
	3	–	–	3	–	3	limit values are not specified			

Accuracy limits of voltage sensors for protection purposes

Class		Voltage error (%)	Phase displacement (min)
Accuracy class IEC 60044-7	3P	3	120
	6P	6	240

Accuracy limits of phase current sensors for protection purposes

Class		Current error (%) 100% I_p	Phase displacement (min)	Composite error at rated accuracy-limits
Accuracy class IEC 60044-8	5P	1	60	5
	10P	3	–	10

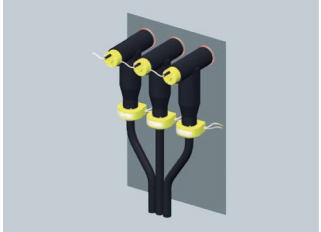
Configuration Option - Retro-fit Solution

The compact sensors of Zelisko enable an easy and quick retrofit without major changes in the switch-gear and in the network infrastructure.

Original equipment

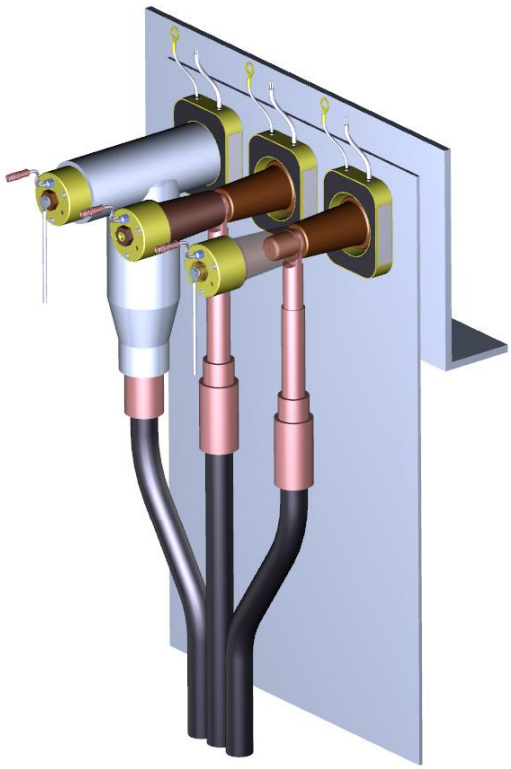
3 x SMCS-JW1001 (current sensor)
3 x SMVS-UW1001 (voltage sensor)

Retrofit



3 x SMCS/T-JW1002 (current sensor)
3 x SMVS-UW1001 (voltage sensor)

The equipment of the T-connectors with the sensors depends on the type of application, the size of the cable connection compartment in the switchgear, and the local situation (i.e. original equipment or retrofit). Zelisko sensors can be seamlessly retrofit with leading RMU brands such as Schneider, Siemens, LUCY



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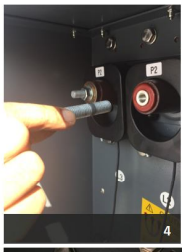
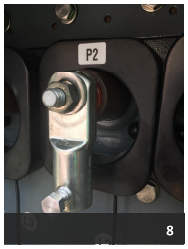
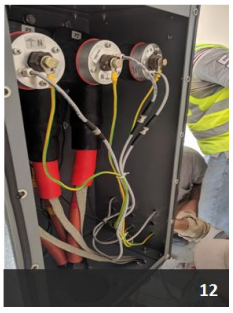
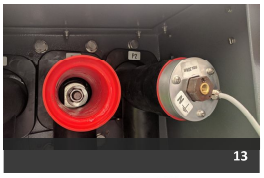
Installation Sequence at M V Panel

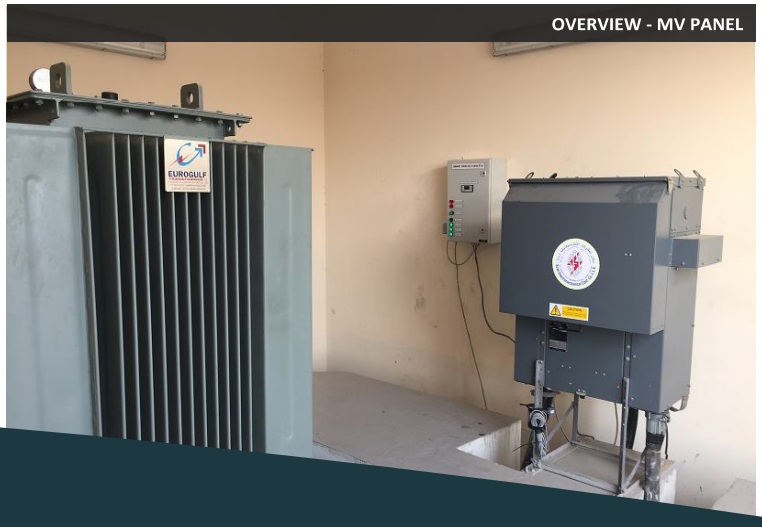
1. Installation of Zelisko CT/VT Sensor inside RMU.
2. Installation of RTU Panel with Grid Intelligence Monitoring Relay.
3. Connecting Sensor Cable to Relay and further establish standard Modbus communication between Relay and RTU.
4. Establish RTU Communication to SCADA over IEC61850.
5. SCADA screens showing live data for various parameters as follows:
   a. Measured True RMS value for alternating voltage, alternating current and power frequency.
   b. Active power (P), Reactive power (Q), Apparent power (S), Power factor (cos O), phase angle, energy and other relevant values.
   c. Peak-Demand and Calculated Transformer losses.
   d. Fault Indication for Over-Voltage, Under-Voltage, Over-Current, Directional Earth-fault, and Phase-fault.











Installation Sequence at L V Panel

1. Installation of Zelisko LVCT Sensorith ratio (2500:5A).
2. Installation of Eltako MID-Approved Energy Meter 3x5A available with Display and adjustable CT-Ratio.
3. Establish Meter communication to SCADA via RTU.
4. Scada Screen showing live data Active-Energy (MWh) & Momentary Power. (kWh)