EECC Distribution Transformer Smart Monitoring System

Datasheet V1.0

WWW.EECL.SA

General description of devices

The EECC-DTSMS (Distribution Transformer Smart Monitoring System) is an advanced solution designed to enhance the performance and reliability of distribution transformers. It continuously monitors key electrical parameters such as voltage stability, current balance, and power factor using Current Transformers (CTs) and voltage sensors. The system also detects power losses, helping utilities optimize energy distribution and minimize inefficiencies.

A smart MCU processes real-time data, enabling predictive maintenance and reducing failure risks by assessing transformer temperature, load conditions, and insulation health. Fully integrated with SCADA and smart meters, the system allows for remote monitoring, advanced analytics, and operational improvements. By providing real-time insights and seamless data communication, the EECC-DTSMS enhances grid stability, improves asset management, and ensures efficient power distribution.

Power Quality

- **Measures key power quality parameters such as voltage fluctuations, harmonics, power factor, and frequency variations.**
- **Helps in identifying anomalies that may affect the performance of connected loads.**

Power losses.

- **Identifies technical and non-technical losses in the distribution network.**
- **Provides data-driven insights to minimize energy wastage and improve system efficiency.**

Network Health.

- **Monitors transformer temperature, load conditions, and insulation health.**
- **Detects early signs of potential failures, enabling predictive maintenance and reducing.**

Providing Data could be utilized by smart meters SCADA for analysis.

- **Collects and transmits real-time operational data to smart meters and SCADA systems.**
- **Enables advanced analytics, fault detection, and optimization of grid performance.**

Communication Standards:

- **Network Compatibility**: GPRS/GSM, 2G, and 4G networks.
- **Cellular Bands**:
  - GSM/EDGE:850,900,1800MHz.
  - WCDMA:B1,B2,B5,B8.
  - FDD-LTE:B1,B3,B4,B5,B7,B8,B28.
  - TDD-LTE:B40.

- **Protocol**: Uses **IEC60870-5-104**, where the indicator serves as the **Master** and the SCADA system as the **Slave**.

Technical Specifications:

Current	
Channel input voltage range	0-900mVAC peak,636 mV RMS
Measurement range	Different current sensors have different ranges
Rcoil	50mV/kA@50Hz(0-12000A),@60Hz(0-10000A) 85mV/kA@50Hz(0-7000A),@60Hz(0-6000A)
VCT	0~99999A
Voltage	
Channel input voltage range	0~600VAC Phase Voltage
Maximum range	720VAC Phase Voltage
Power supply	
Power Supply	18-36VDC
Maximum power consumption	3.5W

Accuracy and Certification:

Measuring accuracy	
current measurement accuracy	0.1%+Accuracy of current sensor
Voltage measurement accuracy	±0.2%(60V~600V AC)
Grid frequency	±0.01%(45~65Hz)
Power factor	±0.005
Active and apparent power	IEC62053-22 level 0.5S
Reactive power	IEC62053-21 level 1S
Active energy	IEC62053-22 level 0.5S
Reactive energy	IEC62053-21 level 1S
Environment condition	
Operating temperature	-20℃～+70℃
Storage temperature	-40℃～+85℃
Humidity range	5～95% RH, 50℃(non-condensing)
Class of pollution	2
Over voltage capability	CAT III 1000V, It is suitable for distribution system below 277 / 480VAC
Insulation strength	IEC61010-1
Altitude	3000m Max
Antipollution level	IP20（Meet the standard of IEC 60629）
Quality guarantee period	12 months
EMC（electromagnetic compatibility）	
Electrostatic discharge	Level IV(IEC61000-4-2)
Radiated immunity	Level III (IEC61000-4-3)
EFT Electrical fast burst immunity	Level IV (IEC61000-4-4)
Surge immunity	Level IV (IEC61000-4-5)
Conducted disturbance immunity	Level III (IEC61000-4-6)
Power frequency magnetic field immunity	0.5mT (IEC61000-4-8)
Conduction and radiation	Class B (EN55022)
Measurement standard	
EN 62052-11, EN61557-12, EN 62053-21, EN 62053-22, EN 62053-23, EN 50470-1, EN 50470-3, EN 61010-1, EN 61010-2, EN 61010-031	

Supported Functions:

Instantaneous value	
Phase Voltage	U1,U2,U3,AVG
Line Voltage	U12,U23,U31,AVG
Current	I1,I2,I3,AVG,IN
Grid Frequency	F1,F2,F3,∑
Power Factor PF	PF1,PF2,PF3,∑
Fundamental power factor DPF	DPF1,DPF2,DPF3,∑
Active power	P1,P2,P3,∑
Reactive power	Q1,Q2,Q3,∑
Apparent power	S1,S2,S3,∑
Energy	
Active energy Pos.	EP1,EP2,EP3,∑
Active Energy Neg.	EP1,EP2,EP3,∑
Reactive Energy Pos.	EQ1,EQ2,EQ3,∑
Reactive energy Neg.	EQ1,EQ2,EQ3,∑
Apparent Energy	ES1,ES2,ES3,∑
Tariff Energy	ET1,ET2, ET3,ET4, ET5,ET6
Harmonics	
Voltage Harmonic Distortion Voltage Harmonic Value	THD (Total harmonic percentage), TOHD (Odd total harmonic percentage), TEHD (Even total harmonic percentage), phase L1.L2.L3 1-50th harmonic percentage, phase ABC 1-50th harmonic voltage value
Current Harmonic Distortion Current Harmonic Value	THD （Total harmonic percentage）, TOHD (Odd total harmonic percentage), TEHD (Even total harmonic percentage), phase L1.L2.L3 1- 50th harmonic percentage, phase ABC 1-50th harmonic current value
Phasor diagram	
Phasor diagram	between voltage and current
Phase Sequence	voltage and current
Voltage Angle	U1,U2,U3
Current Angle	I1,I2,I3
UI Angle	UI1,UI2,UI3
Demand	
Demand	P,Q,S
Active power DMD Max.	P and Time
Reactive power DMD Max.	Q and Time
Apparent power DMD Max.	S and Time
Unbalance	
Voltage unbalance	Negative Sequence, zero Sequence
current unbalance	Negative Sequence, zero Sequence
Max.&Min.	
Phase Voltage	U1,U2,U3,AVG
Line Voltage	U12,U23,U31,AVG
Current	I1,I2,I3,AVG,IN
Active power	P1,P2,P3,∑
Reactive power	Q1,Q2,Q3,∑
Apparent power	S1,S2,S3,∑