

Description

SICAM MMU (Measurement and Monitoring Unit) is a power monitoring device that measures electrical quantities in power supply system.

SICAM MMU is used in industrial plants, power plants and substations to measure and calculate parameters (for example current, voltage, power, phase angle, harmonics, energy, or frequency) and forward these measured values to network control systems (SCADA, DMS, EMS etc.) via IEC 60870-5-104 or to automation systems via Modbus where they can be further processed and visualized.

Device type	DIN rail mounting device Plastic case 96 mm × 96 mm × 100 mm/ 3.78 in. × 3.78 in. × 3.94 in. (W×H×D) Degree of protection IP20
Supply voltage	DC 24 to 250 V AC 110 to 230 V; 45 to 65 Hz
Input and output circuits	4 inputs for alternating voltage measurements 3 inputs for alternating current measurements up to 10 A continuous current Individually programmable binary outputs Je 6 Binäreingänge und -ausgänge mit SICAM I/O Unit erweiterbar
Signalization LEDs	To automatically monitor the functions of hardware, software, and firmware components
Communication	Ethernet: IEC 60870-5-104 or Modbus TCP communication protocol

Benefits

- Compact and rugged design
- Over 100 measured or calculated values available
- Temperature range: -25 °C to +55 °C / -13 °F to 131 °F
- Measuring accuracy: 0.1 % deviation for rated input voltage and rated input current according to IEC 60688 and 0.2 s according to IEC 62053-21
- High EMC immunity: according to the requirements of EN 61000-62 and EN 61000-6-4 for the EMC directives and the requirements of EN 61010-1 for the lowvoltage directive
- UL certification according to UL 61010-1 standard
- Flexible current measuring range (up to $2 \times I_n$)
- 2 individual binary outputs for fast switching, indications (for example, limit violation) and operation status monitoring
- Ethernet communication via IEC 60870-5-104 or Modbus TCP protocols
- Internal battery to power the real-time clock and save the energy counter values in case of auxiliary-voltage failure
- Real-time clock (RTC), field bus synchronization or network synchronization possible via NTP

Customer Benefit

- Reliable and cost-efficient support of power system management and planning by measurements from distribution systems
- Reduced cabling through Ethernet



[ph_SICAM MMU SR10-001, 2, --, --]

Figure 3.2/1 SICAM MMU

- Real-time data transmission via mobile communications (for example GPRS, UMTS) through reduced data rate
- User-friendly operation through Web server (no extra software for parameterization needed, no converters and extra cables)

Applications

- Equipping secondary substations with measurement instrumentation and communication link
- SICAM MMU is used at power utilities as well as industrial and commercial applications connection in 1-phase systems, in 3-wire and 4-wire systems
- Support of the integration of online measurements into network control systems and automation systems, protocols via IEC 60870-5-104 or Modbus TCP, for example for voltage and load control
- Monitoring of transformers and distributed power generation
- Alarming and notification of limit violations via protocol or binary outputs
- Basic power quality profile monitoring (voltage, frequency, harmonics and unbalance)
- Option to support all power systems IT, TT and TN

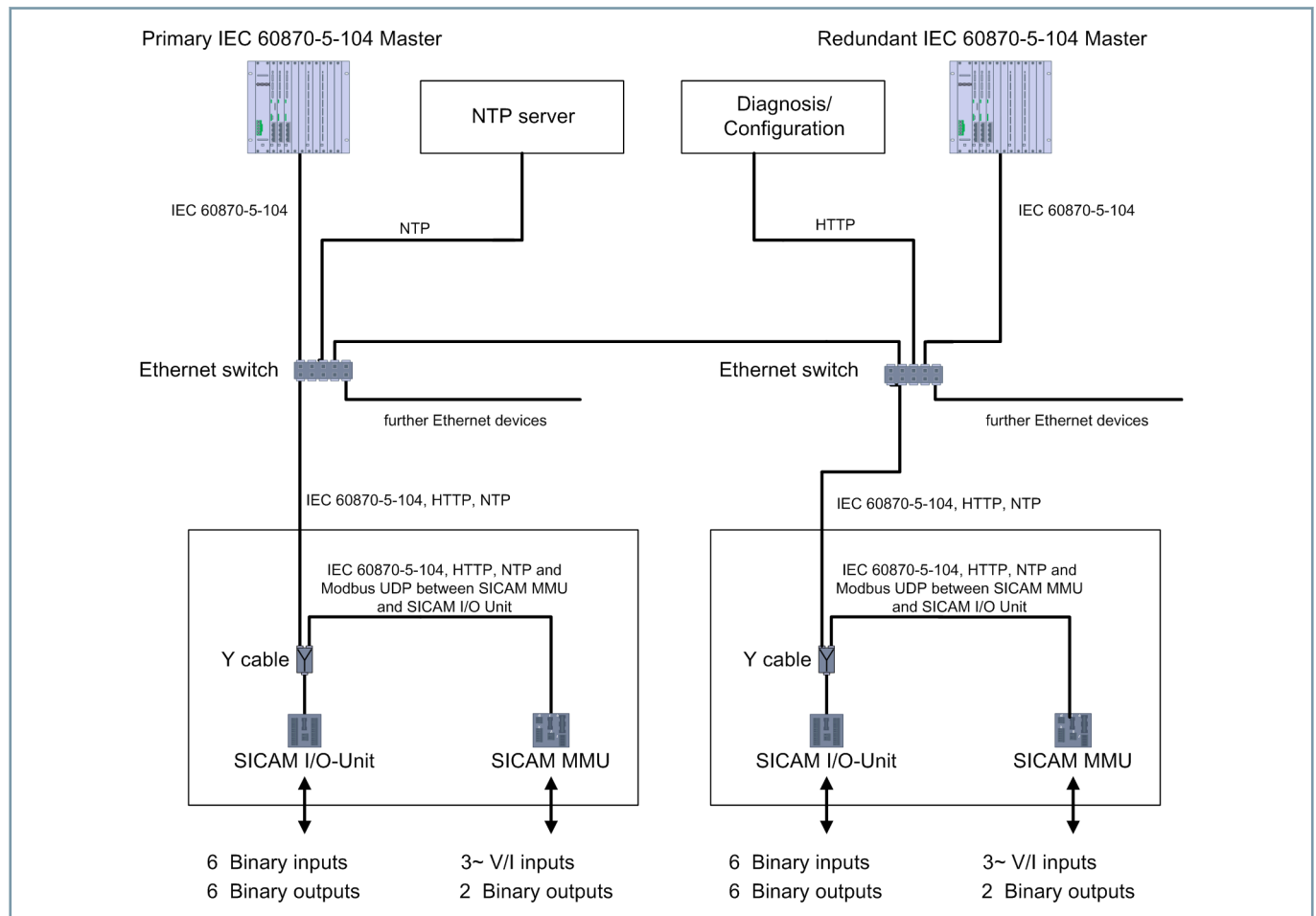
Power Meters

SICAM MMU – Description

Field of Application		Voltage	Current	Power	Frequency	Phase-angle	Harmonics	Energy	Message	Internal cost allocation
Generation and distributed generation	Generator/superordinate transformer	■	■	■	■	■	■	■	■	
Power transmission substation	Incoming feeder	■	■	■						
	Outgoing line	■	■	■						
Transformer substation	Incoming feeder	■								
	Busbar	■	■	■	■			■		
	Feeder	■	■	■	■			■		
Transformer power distribution	Incoming feeder	■	■	■	■		■	■		
	Busbar	■								
	Feeder	■	■	■	■	■		■	■	
Process	SCADA/EMS/DMS	■	■	■	■	■	■	■		
	Energy management	■	■	■	■	■	■	■	■	■
	Motors	■	■	■	■	■	■		■	■
	Commercial (for example air conditioning units)	■	■	■					■	■

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Table 3.2/1 Application and Selection Fields



[dw_connection_device_sub_con, 1, en_US]

Figure 3.2/2 Application Example SICAM MMU

Supply Voltage

Direct Voltage

Rated input voltage	24 V to 250 V
Admissible input voltage tolerance	±20 %
Admissible ripples of the DC input voltage at 24 V, 48 V, 60 V, 110 V, 220 V, 250 V	15 %
Maximum inrush current	
At ≤ 110 V	< 15 A
At 220 V to 300 V after 250 µs:	≤22 A; after 250 µs:< 5 A
Maximum power consumption	5 W

Alternating Voltage

Rated input voltage	110 V to 230 V
Power frequency	45 Hz to 65 Hz
Admissible input voltage tolerance	±20 %
Admissible higher harmonics at AC 115 V and AC 230 V	2 kHz
Maximum inrush current	
At ≤ 115 V	< 15 A
At 230 V	≤22 A; after 250 µs:< 5 A
Maximum power consumption	16 VA

Inputs and Outputs

Inputs for Alternating Voltage Measurements (Terminal Block F)

Rated input alternating voltages (can be parameterized)	
Ph-N/PE	63.5 V 110 V 230 V 400 V (maximum 347 V for UL) Operational measuring uncertainty to IEC 60688: ±0.1 %
Ph-ph	110 V 190 V 400 V 690 V (max. 600 V for UL) Operational measuring uncertainty to IEC 60688: ±0.1 %
Maximum rated input alternating voltage depending on parameterization	1.2-fold rated input alternating voltage
Maximum rated input alternating voltage	
Ph-N/PE	480 V (max. 347 V for UL)
Ph-ph	831 V (max. 600 V for UL)
Input resistances	
A, B, C to N	7.9 MΩ
A, B, C, N, to PE	3.9 MΩ
A-B, B-C, C-A	7.9 MΩ
Further specifications of the voltage measurement inputs	

Power consumption per input at V_{rated} 400 V	38 mW
Admissible frequency	45 Hz to 65 Hz
Measuring error (with compensation) at 23 °C ± 1 °C 50 Hz or 60 Hz	Typical 0.1 % at rated input alternating voltage to IEC 60668
Continuous overload capacity	1.5 x rated input voltage Ph-N: max. 347 V for UL Ph-ph: max. 600 V for UL
Surge overload capacity	2 x rated input voltage to IEC 60255-2 Ph-N: max. 347 V for UL Ph-ph: max. 600 V for UL

Inputs for AC Current Measurements (Terminal Block E)

Input AC currents	
Rated input AC current ranges (can be parameterized)	1 A 5 A Operational measuring uncertainty to IEC 60688: ±0.1 %
Maximum input AC current	2 x rated input AC current
Power consumption per input	
At 1 A	1 mVA
At 5 A	2.5 mVA
Additional information about the current measurement inputs	
Admissible frequency	45 Hz to 65 Hz
Maximum voltage	150 V
Measuring error (with compensation) at 23 °C ± 1 °C 50 Hz or 60 Hz	Typical 0.1 % at rated input AC current
Thermal stability	10 A continuous 100 A for maximum 1 s to IEC 60688

Binary Outputs (Terminal Block G)

Maximum contact voltage	
Alternating Voltage	230 V
Direct Voltage	250 V
Maximum currents	
Maximum continuous touch current	100 mA
Maximum pulse current for 0.1 s	300 mA
Additional information about the binary outputs	
Internal resistance	35 Ω
Admissible switching frequency	10 Hz
Number of switching cycles	Unlimited

Power Meters

SICAM MMU – Technical Data

Communication Interfaces

Ethernet (Connection Z)

Ethernet, electrical	Operation	With device-internal software
	Connection	Housing top RJ45 connector socket 100BaseT to IEEE 802.3 LED yellow: 100 Mbits/s (OFF/ON) LED green: Connection/no connection (ON/OFF)
	Protocols	Modbus TCP IEC 60870-5-104
	Voltage strength	DC 700 V
	Transmission rate	100 Mbits/s
	Cable for 100Base-T	100 Ω to 150 Ω STP, CAT5
	Maximum cable length 100Base-T	100 m, at best routing

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Environmental Data

Temperature specifications	Temperature during operation	-25 °C to +55 °C
	Temperature during transportation	-25 °C to +70 °C
	Temperature during storage	-25 °C to +70 °C
	Temperature during storage	20 K/h
Humidity specifications	Mean relative humidity	≤ 75 %
	Maximum relative humidity	95 % on 30 days per year
	Condensation during operation	Not permitted
	Condensation during transportation and storage	Permitted

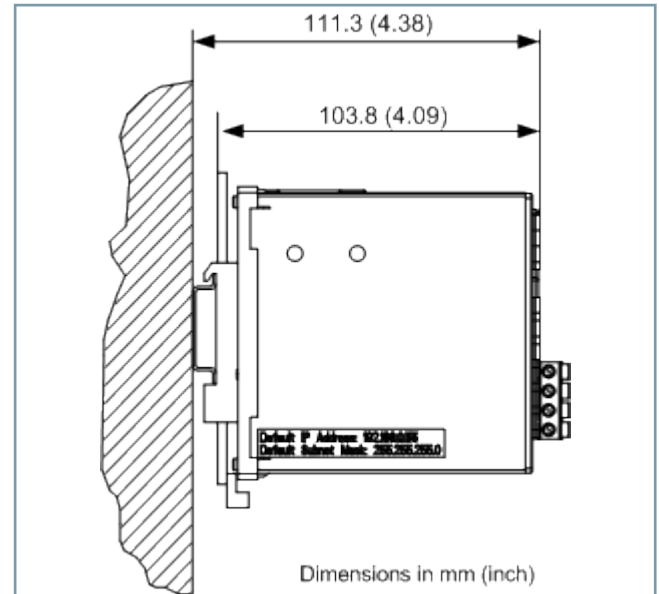
General Data

Battery	Type	PANASONIC CR2032 VARTA 6032 101 501
	Voltage	3 V
	Capacity	230 mAh
	Typical service life	10 years; Operation with permanently applied supply voltage 2 months inside of 10 years; Operation with not permanently applied supply voltage
Protection class to IEC 60529	DIN-rail side	IP20
	Terminal side (connections)	IP20
	Top	IP20

Dimensions

Mass	Approx. 0.5 kg
Dimensions (W x H x D)	96 mm x 96 mm x 100 mm

Table 3.2/3 Dimensions



[SICAM MMU Maßbild, 1, en_US]

Figure 3.2/14 Dimensional Drawing of the SICAM MMU