



SIMATIC S7-1200, Analog input, SM 1238 Energy Meter 480 V AC, power measurement module for data acquisition in 1- and 3-phase supply systems (TN, TT) up to 480 V AC; Current range: 1 A, 5A; acquisition of voltage, current, phase angles, power, energy values, frequencies; Channel diagnostics

| General information                                      |                                           |
|----------------------------------------------------------|-------------------------------------------|
| Product type designation                                 | SM 1238, AI energy meter 480 V AC         |
| HW functional status                                     | From FS02                                 |
| Firmware version                                         | V2.0.1                                    |
| Product function                                         |                                           |
| • Voltage measurement                                    | Yes                                       |
| — with voltage transformer                               | Yes                                       |
| • Current measurement                                    | Yes                                       |
| — without current transformer                            | No                                        |
| — with current transformer                               | Yes                                       |
| • Energy measurement                                     | Yes                                       |
| • Frequency measurement                                  | Yes                                       |
| • Power measurement                                      | Yes                                       |
| • Active power measurement                               | Yes                                       |
| • Reactive power measurement                             | Yes                                       |
| • I&M data                                               | Yes; I&M 0                                |
| • Isochronous mode                                       | No                                        |
| Engineering with                                         |                                           |
| • STEP 7 TIA Portal configurable/integrated from version | V13 SP1                                   |
| Operating mode                                           |                                           |
| • cyclic measurement                                     | Yes                                       |
| • acyclic measurement                                    | Yes                                       |
| • Acyclic measured value access                          | Yes                                       |
| • Fixed measured value sets                              | Yes                                       |
| • Freely definable measured value sets                   | No                                        |
| CiR - Configuration in RUN                               |                                           |
| Reparameterization possible in RUN                       | Yes                                       |
| Calibration possible in RUN                              | Yes                                       |
| Installation type/mounting                               |                                           |
| Mounting position                                        | Horizontal, vertical                      |
| Supply voltage                                           |                                           |
| Design of the power supply                               | from CPU                                  |
| Type of supply voltage                                   | DC                                        |
| Input current                                            |                                           |
| Current consumption, max.                                | 180 mA                                    |
| Power loss                                               |                                           |
| Power loss, typ.                                         | 0.75 W                                    |
| Address area                                             |                                           |
| Address space per module                                 |                                           |
| • Address space per module, max.                         | 124 byte; 112 byte input / 12 byte output |

|                                                                                   |                                                                                                   |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>Time of day</b>                                                                |                                                                                                   |
| Operating hours counter                                                           |                                                                                                   |
| • present                                                                         | Yes                                                                                               |
| <b>Analog inputs</b>                                                              |                                                                                                   |
| Cycle time (all channels), typ.                                                   | 50 ms; Time for consistent update of all measured and calculated values (cyclic und acyclic data) |
| <b>Interrupts/diagnostics/status information</b>                                  |                                                                                                   |
| Alarms                                                                            |                                                                                                   |
| • Diagnostic alarm                                                                | Yes                                                                                               |
| • Limit value alarm                                                               | Yes                                                                                               |
| • Hardware interrupt                                                              | No                                                                                                |
| Diagnostics indication LED                                                        |                                                                                                   |
| • Monitoring of the supply voltage (PWR-LED)                                      | Yes                                                                                               |
| • Channel status display                                                          | Yes; green LED                                                                                    |
| • for channel diagnostics                                                         | Yes; red Fn LED                                                                                   |
| • for module diagnostics                                                          | Yes; green/red DIAG LED                                                                           |
| <b>Integrated Functions</b>                                                       |                                                                                                   |
| Measuring functions                                                               |                                                                                                   |
| • Measuring procedure for voltage measurement                                     | TRMS                                                                                              |
| • Measuring procedure for current measurement                                     | TRMS                                                                                              |
| • Type of measured value acquisition                                              | seamless                                                                                          |
| • Curve shape of voltage                                                          | Sinusoidal or distorted                                                                           |
| • Buffering of measured variables                                                 | Yes                                                                                               |
| • Parameter length                                                                | 74 byte                                                                                           |
| • Bandwidth of measured value acquisition                                         | 2 kHz; Harmonics: 39 / 50 Hz, 32 / 60 Hz                                                          |
| Measuring range                                                                   |                                                                                                   |
| — Frequency measurement, min.                                                     | 45 Hz                                                                                             |
| — Frequency measurement, max.                                                     | 65 Hz                                                                                             |
| Measuring inputs for voltage                                                      |                                                                                                   |
| — Measurable line voltage between phase and neutral conductor                     | 277 V                                                                                             |
| — Measurable line voltage between the line conductors                             | 480 V                                                                                             |
| — Measurable line voltage between phase and neutral conductor, min.               | 0 V                                                                                               |
| — Measurable line voltage between phase and neutral conductor, max.               | 293 V                                                                                             |
| — Measurable line voltage between the line conductors, min.                       | 0 V                                                                                               |
| — Measurable line voltage between the line conductors, max.                       | 508 V                                                                                             |
| — Internal resistance line conductor and neutral conductor                        | 3.4 MΩ                                                                                            |
| — Power consumption per phase                                                     | 20 mW                                                                                             |
| — Impulse voltage resistance 1,2/50μs                                             | 1 kV                                                                                              |
| — Measurement category for voltage measurement in accordance with IEC 61010-2-030 | CAT II; CAT III in case of guaranteed protection level of 1.5 kV                                  |
| Measuring inputs for current                                                      |                                                                                                   |
| — measurable relative current (AC), min.                                          | 1 %; Relative to the secondary rated current 5 A                                                  |
| — measurable relative current (AC), max.                                          | 100 %; Relative to the secondary rated current 5 A                                                |
| — Continuous current with AC, maximum permissible                                 | 5 A                                                                                               |
| — Apparent power consumption per phase for measuring range 5 A                    | 0.6 VA                                                                                            |
| — Rated value short-time withstand current restricted to 1 s                      | 100 A                                                                                             |
| — Input resistance measuring range 0 to 5 A                                       | 25 mΩ; At the terminal                                                                            |
| — Surge strength                                                                  | 10 A; for 1 minute                                                                                |
| — Zero point suppression                                                          | Parameterizable: 2 ... 250 mA, default 50 mA                                                      |
| Accuracy class according to IEC 61557-12                                          |                                                                                                   |
| — Measured variable voltage                                                       | 0,2                                                                                               |
| — Measured variable current                                                       | 0,2                                                                                               |
| — Measured variable apparent power                                                | 0.5                                                                                               |
| — Measured variable active power                                                  | 0.5                                                                                               |
| — Measured variable reactive power                                                | 1                                                                                                 |

|                                     |                                   |
|-------------------------------------|-----------------------------------|
| — Measured variable power factor    | 0.5                               |
| — Measured variable active energy   | 0.5                               |
| — Measured variable reactive energy | 1                                 |
| — Measured variable neutral current | 0.5; calculated                   |
| — Measured variable phase angle     | ±1 °; not covered by IEC 61557-12 |
| — Measured variable frequency       | 0.05                              |

#### Potential separation

##### Potential separation channels

|                                          |                                    |
|------------------------------------------|------------------------------------|
| • between the channels and backplane bus | Yes; 3 700V AC (type test) CAT III |
|------------------------------------------|------------------------------------|

#### Isolation

|                       |                                  |
|-----------------------|----------------------------------|
| Isolation tested with | 2 300V AC for 1 min. (type test) |
|-----------------------|----------------------------------|

#### Standards, approvals, certificates

|                       |     |
|-----------------------|-----|
| CE mark               | Yes |
| CSA approval          | Yes |
| UL approval           | Yes |
| cULus                 | Yes |
| FM approval           | Yes |
| RCM (formerly C-TICK) | Yes |
| KC approval           | Yes |
| Marine approval       | Yes |

#### Ambient conditions

|                                      |        |
|--------------------------------------|--------|
| Ambient temperature during operation |        |
| • horizontal installation, min.      | -20 °C |
| • horizontal installation, max.      | 60 °C  |
| • vertical installation, min.        | -20 °C |
| • vertical installation, max.        | 50 °C  |

#### Dimensions

|        |        |
|--------|--------|
| Width  | 45 mm  |
| Height | 100 mm |
| Depth  | 75 mm  |

#### Weights

|                 |       |
|-----------------|-------|
| Weight, approx. | 165 g |
|-----------------|-------|

#### Other

|                                               |                                                                    |
|-----------------------------------------------|--------------------------------------------------------------------|
| Data for selecting a current transformer      |                                                                    |
| • Burden power current transformer x/1A, min. | As a function of cable length and cross section, see device manual |
| • Burden power current transformer x/5A, min. | As a function of cable length and cross section, see device manual |

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