

U3589

Electric Meters for Active Energy

3-349-224-03
2/3.03

- Acquisition of active energy
- 4-Wire 3-Phase current system, any load
- Remote pulse transmission for energy import (S0 compatible)
- For use in household, industrial and light industrial applications
- Class 1 or 2 (PTB approval, suitable for calibration)
- Direct connection or via transducer (identifier)
- Import energy display with 7 place drum type counter mechanism with reverse direction inhibitor
- LED display for energy import
- LED display for incorrect phase sequence and phase failure



QUALITY MANAGEMENT SYSTEM



DQS certified per
DIN EN ISO 9001 Reg. No.1262

Applications

The electronic electric meter registers energy consumption in three-phase current systems. Its compact, rugged design allows for universal implementation in industrial systems, at construction sites, in the office, at leisure facilities and in the household. The meter can be mounted in any position on a top-hat rail per EN 50022, or fastened to the wall with screws.

Installation of the energy meter at incoming power supply lines, distribution centers or directly at power consumers allows for the individual acquisition of energy data, and consequently targeted billing of energy costs. The potential-free pulse output for energy import allows for remote transmission of meter readings as well as for use in automatic billing systems, or for peak load optimization.

Description

Active power is continuously ascertained based on input voltages and input currents in the 3 Hall generators.

Power fractions are summed and fed to a voltage-frequency transducer.

The output frequency is directly proportional to the power ratio at the primary side. The power-proportional pulse sequence is then fed to the counter mechanism, as well as to the import LED and the pulse output optocoupler.

The optocoupler output signal is potential-free and is in compliance with the S0 standard per DIN 43 864.

Applicable Regulations and Standards

| | |
|--------------------------------|---|
| IEC/EN 61 326 | Electrical equipment for measurement, control and laboratory use - EMC requirements |
| IEC/EN 60529 / VDE 0470 Part 1 | Degrees of protection provided by enclosures (IP Code) |
| DIN 43 856 | Electric meters, tariff switching clocks and ripple-control receivers |
| DIN 43 864 | Current interface for pulse transmission between pulse meters and tariff devices |
| IEC 60068-2 | Basic environmental test procedures |
| IEC 60255-4 | High-frequency disturbance test |
| IEC/EN 61036 / VDE 0418 Part 7 | Alternating current static watt-hour meters for active energy (classes 1 and 2) |

Symbols and their Meanings

| Symbol | Meaning |
|------------------|---|
| CT | Current Transformer Transformation Ratio (Current Transfer) |
| CT × VT | CT Factor x VT Factor |
| f | Frequency |
| I | Effective Value, Current |
| I _B | Nominal Current (Basic current) |
| I _{max} | Maximum current |
| U | Effective Value, Voltage |
| U _r | Input Voltage Rated Value |
| VT | Voltage Transformer Transformation Ratio (Voltage Transfer) |
| X | Multiplier (Hall Generator) |

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Technical Data

Measuring Ranges

| Voltages | |
|-------------------------|--|
| 4 Wire System, Any Load | 3 x 230 V / 400 V or 3 x 57.7 V / 100 V |
| Allowable Deviation | + 15% / - 20% |

| Currents | |
|-------------------------------|---|
| Direct Reading I_B | 10 A |
| Starting Current | Class 1: 0.4% I_B , Class 2: 0.5% I_B |
| Direct Reading I_{max} | 63 A |
| Current Transformer I_B | 1 A or 5 A |
| Starting Current | Class 1: 0.2% I_B , Class 2: 0.3% I_B |
| Current Transformer I_{max} | 2 A or 6 A |

| Frequency Range | |
|-------------------|-----------------|
| Nominal Frequency | 50 / 60 Hz |
| Maximum Frequency | 45 Hz ... 65 Hz |

| Accuracy Class | |
|----------------|--|
| Standard | 1 or 2 per IEC 61036, depending upon order feature |

Overload Capacity

| | |
|-------------------|---|
| Counters | unlimited 1.15 U_r and I_{max} |
| Direct Connection | 5 times 3 s U_r and 100 A (interval: 5 min) |
| Direct Connection | 1 times 1 s U_r and 250 A |
| Connection via CT | 0.5 s 20 x I_{max} |

Pulse Output

The electric meters are equipped with a pulse output as standard equipment, see figure 1. The pulse output is electrically isolated from the measuring circuit via optocoupler.

Electrical Values

| | |
|---|--|
| Pulse Generator Constants, Direct | 100 pulses / kWh |
| Pulse Generator Constants, Measuring Transducer | 1,000 pulses / kWh $I_B = 5$ A 2,000 pulses / kWh $I_B = 1$ A |
| Pulse Duration | 100 ms + 50 % |
| Interpulse Period | > 50 ms |
| U_{ext} | max. 40 V |
| Switched Current | max. 27 mA |

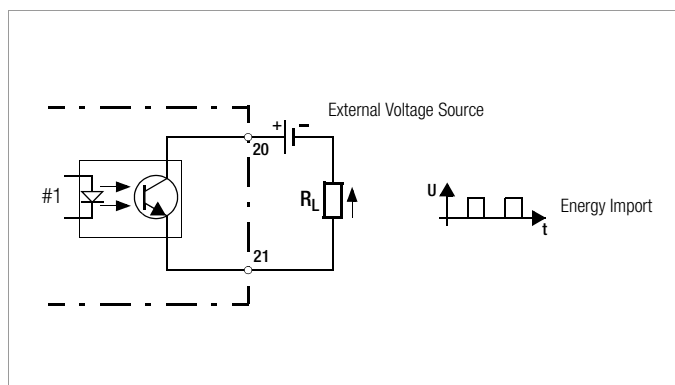


Figure 1 Pulse Output

Display

| Counter Mechanism (secondary counter mechanism, kWh) | |
|--|--------------------------------|
| Direct Connection | sequence processor, 6+1 places |
| Connection via Transducer | sequence processor, 5+2 places |

| LED | Signals | |
|--------|--|--|
| Bez | Import for Direct Connect Meter | red LED; 1,000 pulses / kWh |
| Bez | Import for Meter with 5 A Current Transformer Terminal | red LED; 10,000 pulses / kWh |
| Bez | Import for Meter with 1 A (2 A) Current Transformer Terminal | red LED; 20,000 pulses / kWh |
| Status | Actuation of Counter Mechanism | red LED, pulses / counter mechanism increments |
| | Phase Failure | red LED |
| | Phase Sequence Error | red LED, approx. 1 pulse / s |
| Anlauf | Start-up | red LED |

Auxiliary Voltage

All required auxiliary voltages are generated from measurement voltage.

Power Consumption

| Voltage Circuit | |
|------------------|------------------|
| Four-Wire Meters | < 1 VA per phase |

| Current Circuit | |
|-----------------|-----------|
| at I_{max} | < 1 VA |
| Bei $I_B = 1$ A | < 0.05 VA |
| at $I_B = 5$ A | < 0.5 VA |
| at $I_B = 10$ A | < 0.02 VA |

Potential Insulation

| Nominal Insulation Voltage | |
|----------------------------|----------|
| Inputs | AC 300 V |
| Outputs | DC 50 V |

| Insulation Test Voltage | |
|--------------------------|---------|
| Input ↔ Output / Housing | AC 4 kV |
| Output ↔ Housing | 500 V |

Electrical Safety

| | |
|-------------------------------|------------------|
| Protection Class | II |
| Overvoltage Category | III IEC/EN 61036 |
| Allowable Contamination Level | 2 |

| Electromagnetic Compatibility per IEC 61036 | |
|---|--|
| Surge Voltage | 6 kV, 1.2 / 50 ms 10+ / 10- surges (IEC 60255-4) |
| Burst | 2 kV (DIN EN 61000-4-4) |
| Electromagnetic Fields | 10 V / m (DIN EN 61000-4-3) |
| Electrostatic Discharge | 15 kV (DIN EN 61000-4-2) |

Ambient Conditions

| | |
|-------------------------------|-----------------------|
| Nominal Operating Temperature | -10 ... +45 °C |
| Max. Operating Temperature | -20 ... +55 °C |
| Storage Temperature | -25 ... +70 °C |
| Relative Humidity | < 75 % annual average |
| Height | up to 2000 m |

Mechanical Design

| Housing | |
|------------|---|
| Material | LEXAN polycarbonate per UL94 V0 |
| Dimensions | Height ≤ 90 mm |
| | Overall depth ≤ 75 mm |
| | Width 125.5 +0.5 mm |
| Weight | < 0.5 kg |
| Mounting | Top-hat rail per DIN EN 50022 or wall mount |
| Protection | IP 51 |

| Terminals | |
|-----------------------|--|
| Input Current | ≤ 16 square mm without connector sleeve |
| Input Voltage | ≤ 2.5 square mm with connector sleeve or |
| | ≤ 2 x 1.5 square mm without connector sleeve |
| SO Pulse Output / LON | ≤ 2.5 square mm with connector sleeve or |
| | ≤ 2 x 1.5 square mm without connector sleeve |
| Protection | IP 20 |

Dimensional Drawing / Mounting

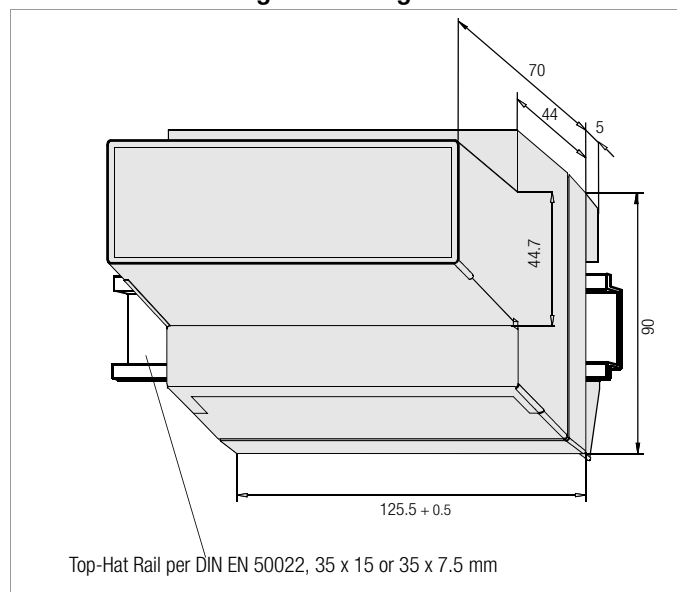


Figure 2 Dimensional Drawing for Top-Hat Rail Mounting (Front and Side View)

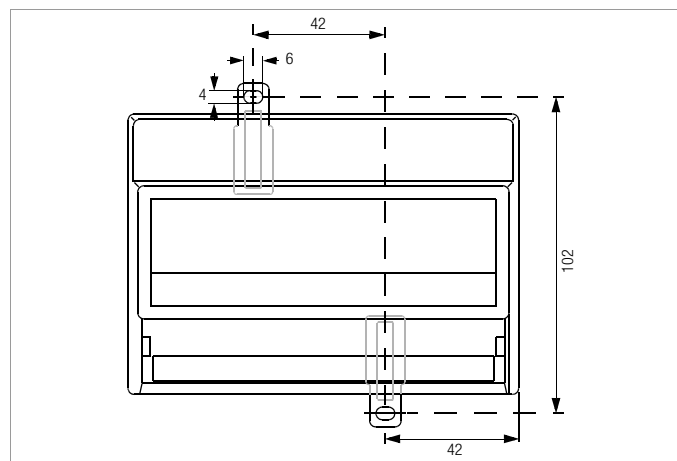


Figure 3 Dimensional Drawing for Wall Mounting (Front View)

Terminal Cover

A sealable terminal cover provides for contact protection.

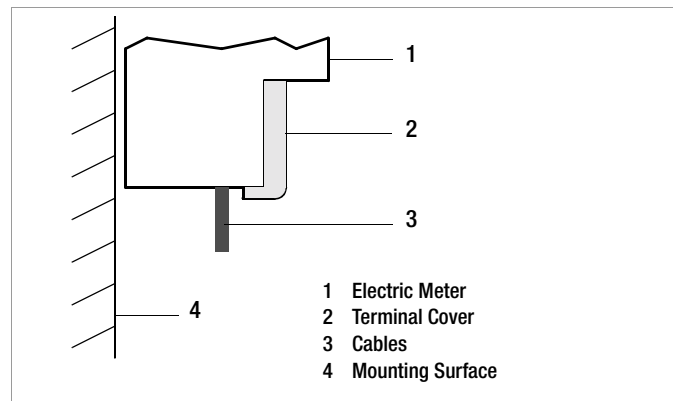


Figure 4 Terminal Cover

Connector Pin Assignment

Connector elements are safety screw terminals which are provided with a sealable terminal cover as standard equipment.

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Direct Connection

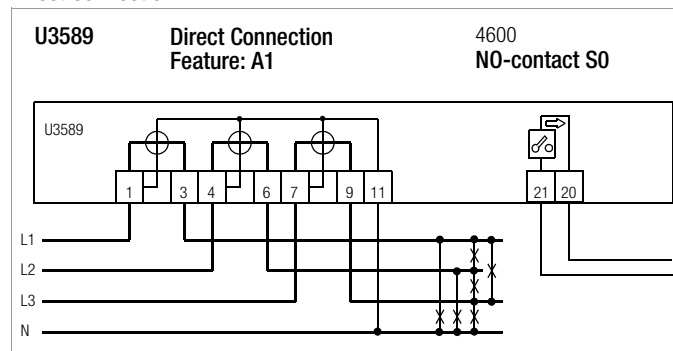


Figure 5 4-Wire 3-Phase Current System, Any Load (Without Current Transformer)

Transformer Connection

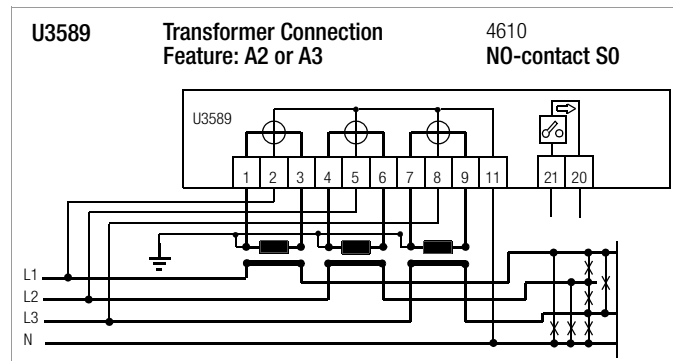


Figure 6 4-Wire 3-Phase Current System, Any Load (With Current Transformer)

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Order Information

| Designation | | Article Number/Feature | |
|--|-------------------------------------|------------------------|--|
| Active Energy Electric Meter 4 Wire System, Any Load | | U3589 | |
| Connection | | | |
| Direct Connection 10 A (63 A) with Pulse Frequency Output | 100 pulses / kWh | A1 | |
| Transformer Connection / 5 A (6 A) with Pulse Frequency Output | 1,000 pulses / kWh | A2 | |
| Transformer Connection / 1 A (2 A) with Pulse Frequency Output | 2,000 pulses / kWh | A3 | |
| Input Voltage | | | |
| Input Voltage Rated Value U_r (L1 – L2) | 100 V | U3 | |
| | 400 V | U6 | |
| Accuracy Class | | | |
| | 2 | G0 | |
| | 1 | G1 | |
| Calibration | | | |
| | none | P0 | |
| | incl. | P1 | |
| | incl., plus calibration certificate | P2 | |

Order Example: 4 Wire System, Any Load, Transformer Connection / 5 A 1,000 pulses/kWh, Input Voltage 400 V, Accuracy Class 2, plus Certificate

Identification: 3589 A2 U6 G0 P1

Accessories

| Designation | Article Number |
|---|----------------|
| Door Mounting Kit (dimensional drawing incl.) | U270A |

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