

# U389A and U389B

## Electric Meters for Active Energy

3-349-321-03  
3/7.05

### U389A Active Energy Meter with Direct Connection U389B Active Energy Meter with Transformer Connection

- 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 (PTB approval, suitable for calibration)
- Direct connection or via transducer, uncalibrated or calibrated
- Import energy display with 7 place drum type counter mechanism with reverse direction inhibitor
- LED display for energy import
- LED display for incorrect current direction



QUALITY MANAGEMENT SYSTEM



DQS certified per  
DIN ISO 9001:2000  
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.

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 EN 62053-31.

### Applicable Regulations and Standards

IEC/EN 60529/VDE 0470 Part 1	Degrees of protection provided by enclosures (IP Code)
EN 62053-31	Pulse output devices for electromechanical and electronic meters
IEC/EN 61036 / VDE 0418 Part 7	Alternating current static watt-hour meters for active energy (classes 1 and 2)
DIN EN 62052-11	Electricity metering equipment (AC), General requirements
DIN EN 62053-21	Electricity metering equipment (AC), Static meters for active energy

### 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 <sub>B</sub>	Nominal Current (Basic current)
I <sub>max</sub>	Maximum current
U	Effective Value, Voltage
U <sub>r</sub>	Input Voltage Rated Value
VT	Voltage Transformer Transformation Ratio (Voltage Transfer)

# U389A and U389B

## Electric Meters for Active Energy

### Technical Data

#### Measuring Ranges

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

Currents	
Direct Reading $I_B$	5 A
Starting Current	Class 1: 0.4% $I_B$
Direct Reading $I_{max}$	65 A
Current Transformer $I_B$	1 A or 5 A
Starting Current	Class 1: 0.2% $I_B$
Current Transformer $I_{max}$	6 A

Frequency Range	
Nominal Frequency	50 Hz
Maximum Frequency	45 Hz ... 65 Hz

Accuracy Class	
Standard	1 per IEC 61036

#### 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	1000 pulses / kWh 100 pulses / kWh	up to serial number PF ... from serial number PG ...
Pulse Generator Constants, Measuring Transducer	1,000 pulses / kWh	
Pulse Duration $t_E$	30 ms + 20 % ~ 130 ms	up to serial number PF ... from serial number PG ...
Interpulse Period $t_A$	> 30 ms > 50 ms	up to serial number PF ... from serial number PG ...
$U_{ext}$	max. 40 V	
Switched Current	max. 27 mA	

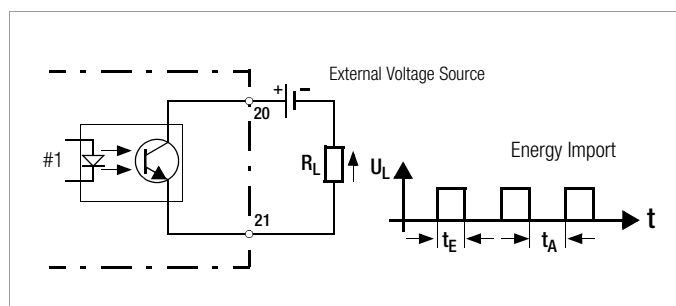


Figure 1 Pulse Output

### 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
Reverse	Inverse current direction	red LED

#### Auxiliary Voltage

All required auxiliary voltages are generated from measurement voltage.

#### Power Consumption

Voltage Circuit	
Four-Wire Meters	< 1,5 W pro Phase < 8 VA pro Phase

Current Circuit	
at $I_{max}$	< 1 VA
at $I_B = 1$ A	< 0.05 VA
at $I_B = 5$ A	< 0.5 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

# U389A and U389B Electric Meters for Active Energy

## Mechanical Design

Housing	
Material	LEXAN polycarbonate per UL94 V0
Dimensions	Height $\leq 90$ mm
	Overall depth $\leq 75$ 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	$\leq 16$ square mm without connector sleeve
Input Voltage	$\leq 2.5$ square mm with connector sleeve or
	$\leq 2 \times 1.5$ square mm without connector sleeve
SO Pulse Output / LON	$\leq 2.5$ square mm with connector sleeve or
	$\leq 2 \times 1.5$ square mm without connector sleeve
Protection	IP 20

## Dimensional Drawing / Mounting

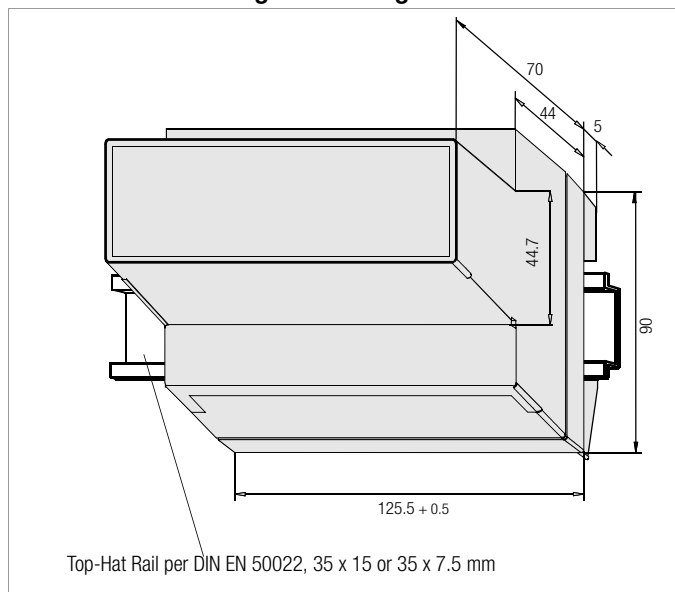


Figure 2 Dimensional Drawing for Top-Hat Rail Mounting (Front and Side View)

## Terminal Cover

A sealable terminal cover provides for contact protection.

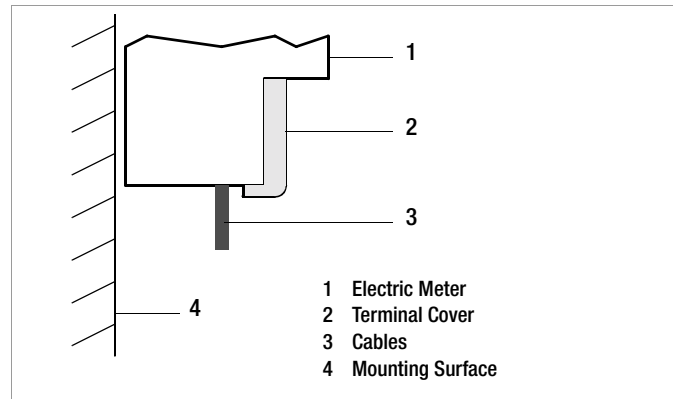


Figure 3 Terminal Cover

## Connector Pin Assignment

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

## Electric Meter for Active Energy

### Direct Connection

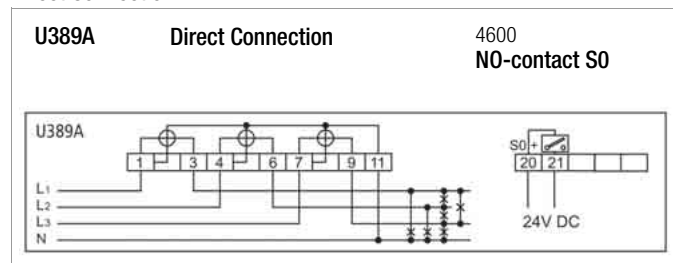


Figure 4 4-Wire 3-Phase Current System, Any Load (Without Current Transformer)

### Transformer Connection

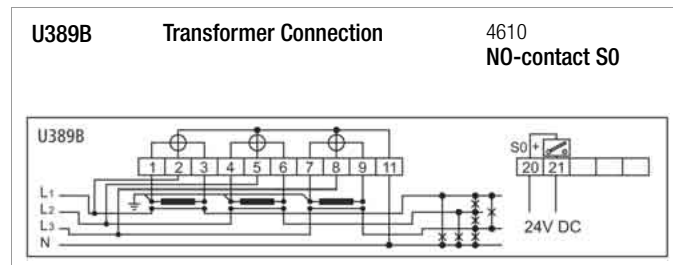


Figure 5 4-Wire 3-Phase Current System, Any Load (With Current Transformer)

# U389A and U389B

## Electric Meters for Active Energy

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### Order Information

Designation			Article Number	
<b>Active Energy Electric Meter 4 Wire System, Any Load</b>			uncalibrated	calibrated *
Direct Connection 5 A (65 A) with Pulse Frequency Output	up to serial no. PF ... from serial no. PG ...	1,000 pulses / kWh 100 pulses / kWh	U389A	U389C *
Transformer Connection 5//1 (6 A) with Pulse Frequency Output		1,000 pulses / kWh	U389B	U389D *

\* in preparation, scheduled availability: as of August 2006

### Accessories

Designation		Article Number
Door Mounting Kit (dimensional drawing incl.)		U270A
Plug-on Current Transformer	ASK 31.3 ... 412.4 *	see price list
Wound-primary Current Transformer	WSK 30 ... 70.6 *	see price list

\* Please state the complete order code for the requested variant as shown in the price list.

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