kamstrup

Data sheet

OMNIPOWER® single-phase

with integrated 2G modem

- Single-phase residential meter
- Prepared for smart home applications
- Optimised for smart metering systems
- Secured against tampering
- Resistant to errors in the supply network
- Ultra-low power consumption
- Remote firmware update
- Power quality measurements according to EN 50160
- Type approved according to:
  - Active energy
    EN 50470-1 (MID)
    EN 50470-3 (MID)
  - Active energy
    and reactive energy
    IEC 62052-11 (IEC)
    IEC 62053-21 (IEC)
    IEC 62053-23 (IEC)
- Communication protocol:
  - DLMS/COSEM

Contents

Application

OMNIPOWER® single-phase meter is a direct connected electricity meter for registration of electric energy. The meter is fully electronic without movable parts. Thus, energy registration is not affected by shock or impact during transport and mounting. Furthermore, measurements are correct no matter the physical mounting direction.

The shunt measuring principle secures good linearity and a considerable dynamic range. At the same time, the shunt measuring principle is immune to magnetism and DC currents.

The easily readable display scrolls automatically between readings, or readings can be changed manually by the consumer activating the left push button. The required display readings as well as their order are configurable.

In addition to being read from the display, data can be collected via P2P communication using the integrated 2G modem, optical output or from the module area.

From the factory, the meter can be configured to measure both imported and exported energy. Measurements are saved in a permanent memory.

As default, OMNIPOWER® single-phase meter can generate load profiles in all four quadrants. A load profile provides detailed information about consumed and produced energy. An additional logger with 24 channels contains data for analysis purposes.

As default, OMNIPOWER® single-phase meter is supplied with the integrated Supply Control Switch.

The OMNIPOWER® single-phase meter is also designed to support extended analysis of the main grid using measurements of THD, power factor, voltage variations and sags and swells.

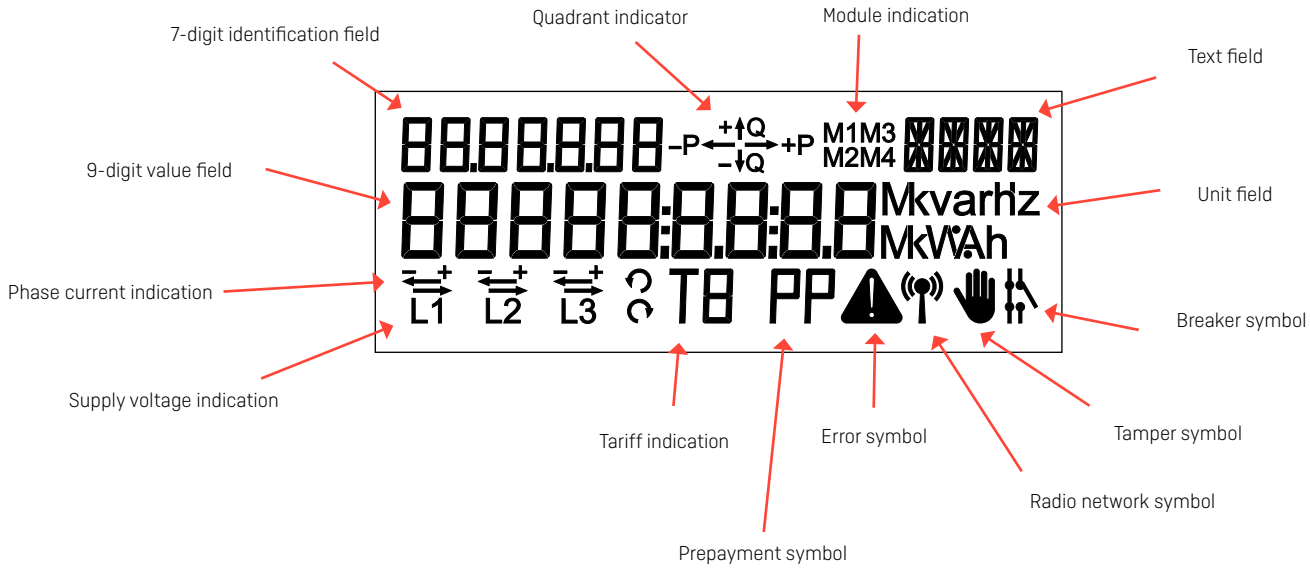
In order to minimise the manual configuration during installation, the meter is pre-configured from the factory. Furthermore, the meter can be reconfigured via a smart metering system.

Functions

Display

OMNIPOWER® single-phase meter is provided with a liquid crystal display (LCD). The registers that can be read from the display depend on the chosen configuration. It is also possible to remotely configure the display.

The display configuration is constructed as three independent display lists: One for automatic shift function, one for manual shift function and one for battery-powered shift function. The display is constructed of segments as shown in the figure below.



9-digit value field:	This field is used for displaying register values.
Unit field:	This field is used for displaying the units that are related to the value field.
7-digit identification field:	OBIS code identification of the value in the value field.
Quadrant indicator:	Indicates the current load type.
Text field:	Contains additional text in connection with the meter's function.
Module indication:	Indicates if and which modules that communicate in the display.
Error symbol:	Indicates critical internal errors.
Breaker symbol:	Indicates the current position of the breaker if smart disconnect is enabled. If smart disconnect is disabled or the meter is without breaker, there is no indication.
Tamper symbol:	Indicates magnetic influence or opening of the terminal cover, either temporarily or permanently.
Radio network symbol:	Indicates communication with AMR systems.
Prepayment symbol:	Indicates whether the prepayment functionality is activated.
Tariff indication:	Indicates the current tariff if tariffs have been selected.
Supply voltage indicator:	Indicates that the voltage is above the minimum threshold (160 V).
Phase current indication:	Indicates that the load is above the minimum threshold (2.3 W).

Functions

Display

The automatic shift function (scroll) changes between the selected readings every 10 seconds. Up to 16 readings can be selected.

The manual shift function changes through activation of the left push button. Up to 30 readings and the reading order can be selected. However, it is not possible to deselect the **legal** readings.

If the battery-operated shift function is selected, it becomes possible to read the display, also when the meter is not power supplied. Up to 8 readings can be selected, and shifts between readings are made by activating the push button.

The meter automatically returns from manual shift function to automatic scroll function two minutes after the last activation of the left push button.

Energy reading

OMNIPOWER® single-phase meter has a shunt for current measurement and resistance division for voltage measurement.

Energy consumption is calculated as an expression of the current compared to the phase voltage and time.

The energy registration is communicated to the meter's legal processor via the meter's own internal bus system and is summed in the meter's main registers.

Permanent memory

Measured and calculated data are stored in the meter's permanent memory. Data are stored by every change of energy register values.

Furthermore, the below values are stored at the end of a debiting period:

Various	Energy registers	Power registers
RTC w/Quality info	Active positive energy A+	Peak power P+max
	Active positive energy A+ Tariff 1	
	Active positive energy A+ Tariff 2	
	Active positive energy A+ Tariff 3	
	Active positive energy A+ Tariff 4	
	Active positive energy A+ Tariff 5	
	Active positive energy A+ Tariff 6	
	Active positive energy A+ Tariff 7	
	Active positive energy A+ Tariff 8	

Optical reading

An optical interface is placed on the front of the meter. This optical connection can be used to read data or configure e.g. display set-up, meter number and other settings.

Changes via the optical connection can be made by using the software program METERTOOL OMNIPOWER®.

It is not possible to change the meter's legal data.

Functions

Breaker

OMNIPOWER® single-phase meter is available with integrated disconnection function which makes it possible to disconnect the electricity meter's supply outputs. The disconnection can be made remotely via an automatic smart metering system.

Do **NOT** use the disconnection as a safety function.

Connection via push button can be configured to only be permitted after previous release command from a smart metering system.

The breaker is a bistable breaker that maintains its current position in the event of a power failure and after the subsequent re-establishment of power.

Load profile*

Load profiles can be configured to 15, 30 or 60 min. according to the integration period and for all four quadrants. The number of generated profiles corresponds to the selected energy type for the meter.

Logging depth in days:			
Minutes	**15**	**30**	**60**
P+	278	556	1113
P+/P-	235	470	941
P+/P-/Q+/Q-	180	360	720

Analysis logger

OMNIPOWER® single-phase meter is provided with a configurable analysis logger. The logging depth is depending on the configuration of the meter as well as the number of registers. The analysis logger can register data from up to 24 different registers at a time.
OMNIPOWER® single-phase meter is available with default settings which can be reconfigured subsequently via METERTOOL OMNIPOWER® or a smart metering system.

Tamper proof

Apart from the mechanical sealing, the meter also reveals tampering. In case of attempts of tampering (mechanical or magnetic), an event is registered by the meter which is time and date stamped and saved in the permanent memory. Alarms can be automatically transferred via the communication infrastructure and, in some cases, indicated on the display. Magnetic influence does not affect the measuring accuracy.

Approvals

OMNIPOWER® single-phase meter is type approved according to the Measuring Instruments Directive (MID) for active positive energy and according to the national requirements for other energy types, where required.

Approval	**Norm**
Type test according to:	
– Active energy	EN 50470-1 EN 50470-3
– Reactive energy and active energy	IEC 62052-11 IEC 62053-21 IEC 62053-23

Various	**Norm**
Terminal	BS 7856
Optical reading	DLMS/COSEM
OBIS/EDIS codes	IEC 62056-61

Technical data

Measuring principle	
– Current	Current measurement by current shunt
– Voltage	Voltage measurement by voltage divider
Nominal voltage U_n	230 VAC -20 % - +15 %
Current	Imin - Iref (Imax) 0.25-5(100)A 35 mm²
Accuracy class	MID: Class A, Class B IEC: Class 2, Class 1
Nominal frequency fn	50 Hz ± 5 %
Phase displacement	Unlimited
Operating temperature	-40 °C - +70 °C
Storage temperature	-40 °C - +85 °C
Protection class	IP54
Protection class	II

Technical data

Relative humidity, non-condensing	< 75 % year's average at 21 °C < 95 % less than 30 days/year, at 25 °C
Weight	1100 g with breaker
Application area	Indoors or outdoors in suitable meter cabinet
Internal consumption*	

Maximum power consumption of the current circuits with basic current	0.01 VA
Maximum power consumption of the voltage circuits	0.6 VA 0.2 W

* Measured by notified body during type test. Measured at phase L1.

Materials	Glass reinforced polycarbonate
Data storage	EEPROM, > 10 years without voltage
Display	LCD, 7 mm digit height (value field) LCD, 5 mm digit height (identification readings) LCD, 3 mm digit height (voltage and tariff readings)
Meter constant	1000 imp/kWh
S0 pulse diode	1000 imp/kWh, kvarh Pulse time 30 ms ± 10 %
Short circuit level	4500 A

Real-time clock (RTC)

Accuracy	Typically 5 ppm at 23 °C
Backup	Battery life > 10 years at normal operation
	Supercap life > 10 years at normal operation
Supercap operating time	5 days fully charged

Connections

Main terminals	OMNIPOWER® ST	
Size	**Multi-cored**	**7-cored**
35 mm²	≥ 6 mm²	≥ 6 mm²
Screws	Pz 2 or straight slot Torque: 3-3.5 Nm	

Communication via integrated 2G Modem

OMNIPOWER® single-phase meter is provided with built-in P2P communication.
P2P communication therefore requires no mounting/retrofitting of communication module.

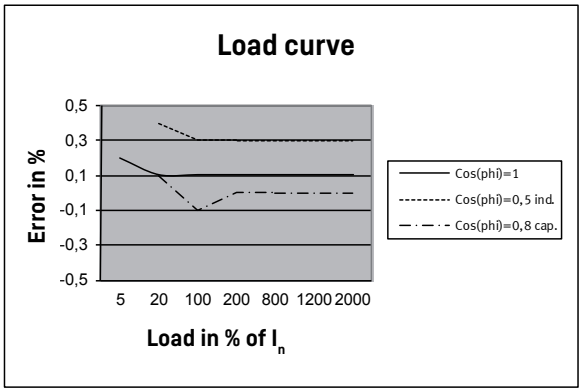
Consumer communication channel (CCC) module

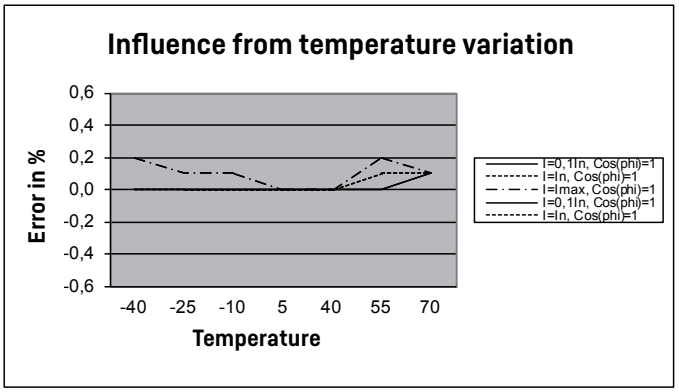
In OMNIPOWER® single-phase meter, it is possible to mount a CCC module. The module can be used for communication and data exchange with smart home products such as energy displays and external equipment. The CCC module is mounted without using tools or breaking the seal of the meter. The mounting may be done by e.g. the consumer himself.

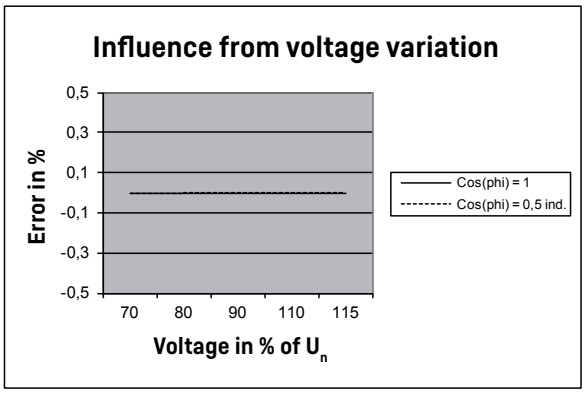
Integrated Auxiliary relay

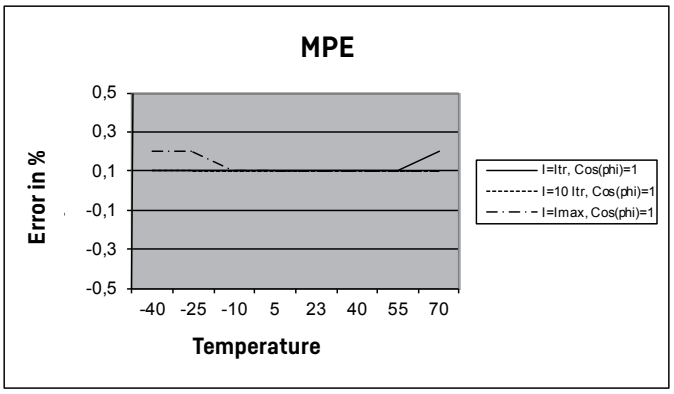
OMNIPOWER® single-phase meter has an integrated auxiliary relay to be used e.g. for controlling the supply to external equipment. The relay is specified for a switching current of 2A. See also connection diagram under "Installation".

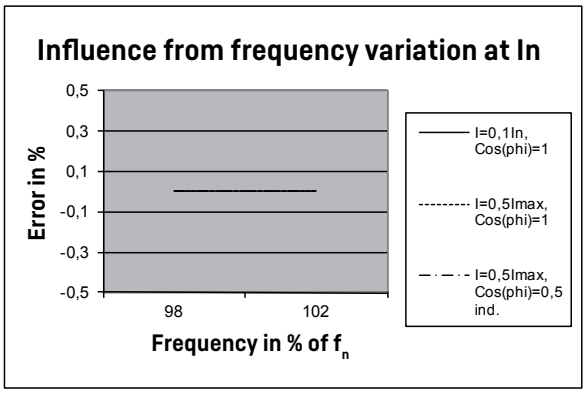
Typical accuracy charts











MPE (Maximum Permissible Error)

Error composed of:

- current load
- voltage variation
- frequency variation
- temperature variation

Configuration – hardware

	68	X_1	-	X_2	X_3	-	X_4	X_5	X_6	-	X_7	X_8	X_9	-	X_{10}	X_{11}	X_{12}	X_{13}	-	X_{14} X_{15} X_{16}
X_1 Meter type no. version																				
Single-phase meter		6																		
X_2 Type no. version																				
OMNIPOWER®				1																
X_3 Housing																				
Standard					1															
ST- meter					2															
Symmetric terminals ST (no primary module)					7															
X_4 Measuring systems																				
1 system							1													
X_5 Current range																				
5-100 A								1												
X_6 Accuracy Class																				
Class A									A											
Class B									B											
Class 2									2											
Class 1									1											
X_7 Generation																				
Generation N											N									
X_8 Variant																				
2. Variant												2								
X_9 Energy type																				
A+													1							
A+/A-													2							
A+/A-/R+/R-													4							
X_{10} Breaker																				
Standard breaker															3					
X_{11} Communication																				
No radio																0				
Radio (For OMNIA®)																1				
Integrated 2G modem																2				
X_{12} Supply backup																				
Supercap																	0			
Supercap + battery																	1			
X_{13} Interface																				
S0 output																		1		
1xLC																		4		
$X_{14}X_{15}X_{16}$ Country code																				XXX
Ireland IE																				069

Configuration – software

	Z1	Z2	Z3	Z4	Z5	Z6
Z1 Decimals in display						
7.0	1					
6.1	2					
7.2	3					
6.3	4					
Z2 LED configuration						
LED switched off without consumption		1				
LED switched on without consumption		2				
Z3 Primary module configuration			XXX			
Z4 Integration period/Load profile period						
15 min.				2		
30 min.				3		
60 min.				4		
Z5 Display configuration						
See display order form or contact Kamstrup					-	
Z6 Debiting stop date						
1						01
2						02
3						03
4						04
5						05
6						06
7						07
8						08
9						09
10						10
11						11
12						12
13						13
14						14
15						15
16						16
17						17
18						18
19						19
20						20
21						21
22						22
23						23
24						24
25						25
26						26
27						27
28						28

Configuration – software

	Z7	Z8
Z7 Debiting logging interval		
None (externally controlled)	00	
Monthly	01	
Every second month, January	02	
Every second month, February	03	
Every third month, January	04	
Every third month, February	05	
Every third month, March	06	
Half-yearly, January	07	
Half-yearly, February	08	
Half-yearly, March	09	
Half-yearly, April	10	
Half-yearly, May	11	
Half-yearly, June	12	
Yearly, January	13	
Yearly, February	14	
Yearly, March	15	
Yearly, April	16	
Yearly, May	17	
Yearly, June	18	
Yearly, July	19	
Yearly, August	20	
Yearly, September	21	
Yearly, October	22	
Yearly, November	23	
Yearly, December	24	
Z8 Pulse out length/Alarm input		
30 msec pulse length/Alarm input deactivated		1
30 msec pulse length/Alarm input active		2
80 msec pulse length/Alarm input deactivated		3
80 msec pulse length/Alarm input active		4

Configuration – software

		Z9	Z10	Z11	Z12
Z9 Disconnect setup					
See Disconnect order form or contact Kamstrup		-			
Z10 Analysis logger setup					
Default setup			000		
Z11 Greenwich Mean Time (GMT)					
0	GMT			00	
1	+ 1 Hour (DK/NO/SE/DE/FR/ES)			01	
2	+ 2 Hours (FI)			02	
3	+ 3 Hours			03	
4	+ 4 Hours			04	
5	+ 5 Hours			05	
6	+ 6 Hours			06	
7	+ 7 Hours			07	
8	+ 8 Hours			08	
9	+ 9 Hours			09	
10	+ 10 Hours			10	
11	+ 11 Hours			11	
12	+ 12 Hours			12	
-11	- 11 Hours			13	
-10	- 10 Hours			14	
-9	- 9 Hours			15	
-8	- 8 Hours			16	
-7	- 7 Hours			17	
-6	- 6 Hours			18	
-5	- 5 Hours			19	
-4	- 4 Hours			20	
-3	- 3 Hours			21	
-2	- 2 Hours			22	
-1	- 1 Hours			23	
Z12 Unit pulse input					
None					00
kWh					01
m^3					02
L					03

Configuration – software

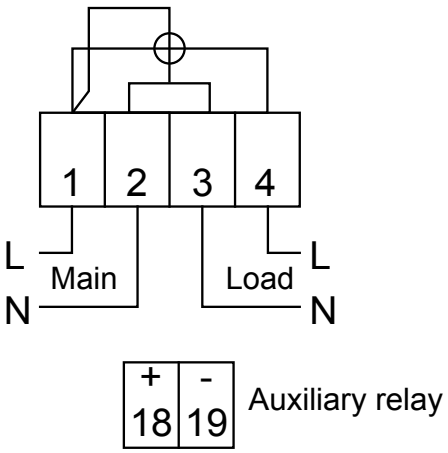
	Z13	Z14	Z15	Z16	Z17	Z18	Z19	Z20
Z13 Tariff control plan								
See tariff order form or contact Kamstrup	–							
Tariff disabled	000							
Register control	002							
Z14 Load control plan (Auxiliary switch)								
See load control order form or contact Kamstrup		–						
Load control disabled		000						
Register control		001						
Z15 Daylight saving time/Summer-winter time table								
None			000					
EU			001					
Z16 Frequency code Protocol				XXX				
Z17 Push button 2 setup								
See PB2 order form or contact Kamstrup					–			
No PB2 setup					000			
Z18 1107 configuration						XXX		
Z19 Breaker position								
No breaker							0	
Connected							1	
Disconnected							2	
Z20 Calendar setup								
See Calendar setup order form or contact Kamstrup								-

	Z25	Z26	Z27	Z28	Z29	Z30
Z25 Debitlogger 2 interval						
Daily	1					
Z26 – Alarm configuration						
No alarms enabled		000				
Z27 – Load profile data (DLMS)						
Absolute values			1			
Delta values (only available for variant 2)			2			
Z28 – Local interface encryption						
N/A (only for variant 1)				0		
Enabled (only available for variant 2)				1		
Disabled (only available for variant 2)				2		
Z29 – Load profile configuration						
A+					1	
A+/A-					2	
A+/A-/R+/R-					3	
P+/P-/Q+/Q-					6	
Z30 – Debit 2 logger configuration						
Profile 01						1
Profile 02 (only available for variant 2)						2
Profile 03						3

Installation

Connection diagrams

The connection diagram appears from the front of the meter.



Safety and installation guidelines

The meter shall only be used for measuring electrical energy and shall operate within the specified values only.

The meter must be switched off when working on it. It can be highly dangerous to touch connected meter parts.

Current local standards, guidelines, regulations and instructions must be observed. Only authorized personnel are permitted to install electricity meters.

Meters for direct connection must be protected against short circuit by a backup fuse in accordance with the maximum current stated on the meter.

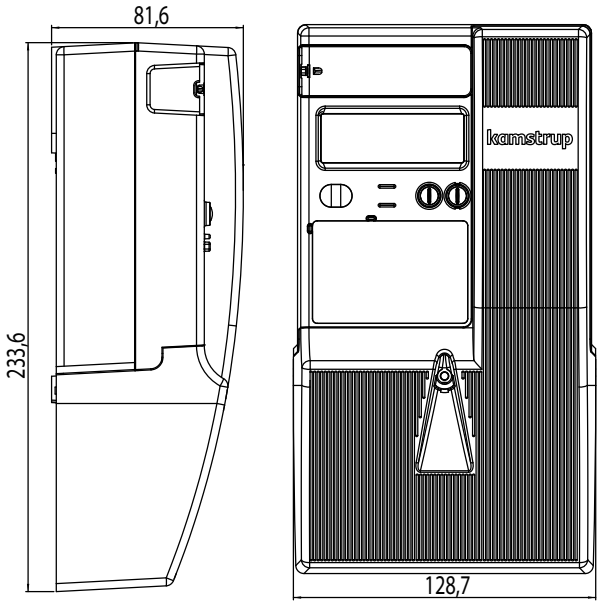
The relevant backup fuse must therefore be removed and kept in a place where it cannot be inserted in the meter by unauthorized personnel.

The meter constant LED flashes proportionally to the consumed active energy.

Only authorized personnel are allowed to break the utility sealing.

Warning! The breaker function in the meter must **NOT** be used as safety function.
When the meter's breaker function is used, the meter is still carrying a voltage.

Dimensions



Accessories

Configuration software

METERTOOL	68 99 580

Various

Standard OMNIPOWER® ST meter cover	59 60 617
Long OMNIPOWER® ST meter cover	59 60 618
Optical reading head with USB plug	66 99 099
Optical reading head with 9-pole D-sub connector	66 99 102

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Kamstrup A/S
Industrivej 28, Stilling
DK-8660 Skanderborg
T: +45 89 93 10 00
F: +45 89 93 10 01
info@kamstrup.com
kamstrup.com