kamstrup

Data sheet

OMNIPOWER® three-phase DIN rail meter

- 3-phase residential meter
- Prepared for smart home applications
- Optimised for smart metering systems
- Tamper-proof
- Resistant to errors in the distribution network
- Extremely low power consumption
- Remote update of firmware
- 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 62053-23
- Communication protocol:
  - DLMS/COSEM

Contents

Application

OMNIPOWER® three-phase DIN rail meter is a direct connected electricity meter for registration of electric energy. The meter is full electronic without movable parts. Thus, energy registration is not affected by shock and impact during transportation 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 the consumer can switch between the readings manually by activating a 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 a radio mesh network, an optical output or from the module area. The unique module area also enables external changing of tariffs, pulse inputs and outputs, configuration and a wide range of communication media.

From the factory, the meter can be configured to measure both imported and exported energy. As it is constructed with three independent and galvanically separated measuring systems, the meter makes accurate measurements whether it measures one, two or three phases. Measurements are saved in a permanent memory.

By default, the OMNIPOWER® three-phase DIN rail meter can generate load profiles in all four quadrants.

A load profile provides detailed information about consumed and produced energy. An additional logger with 16 channels contains data for analysis purposes.

By default, the OMNIPOWER® three-phase DIN rail meter is delivered with the features smart disconnect and software-controlled prepayment.

Furthermore, the OMNIPOWER® three-phase DIN rail meter is designed for supporting extended analysis of the main network by means of measurements of THD, power factor, voltage imbalance, voltage variations as well as dips and swells.

The meter registers loss of neutral conductor and allows automatic disconnection to minimise damages to household appliances.

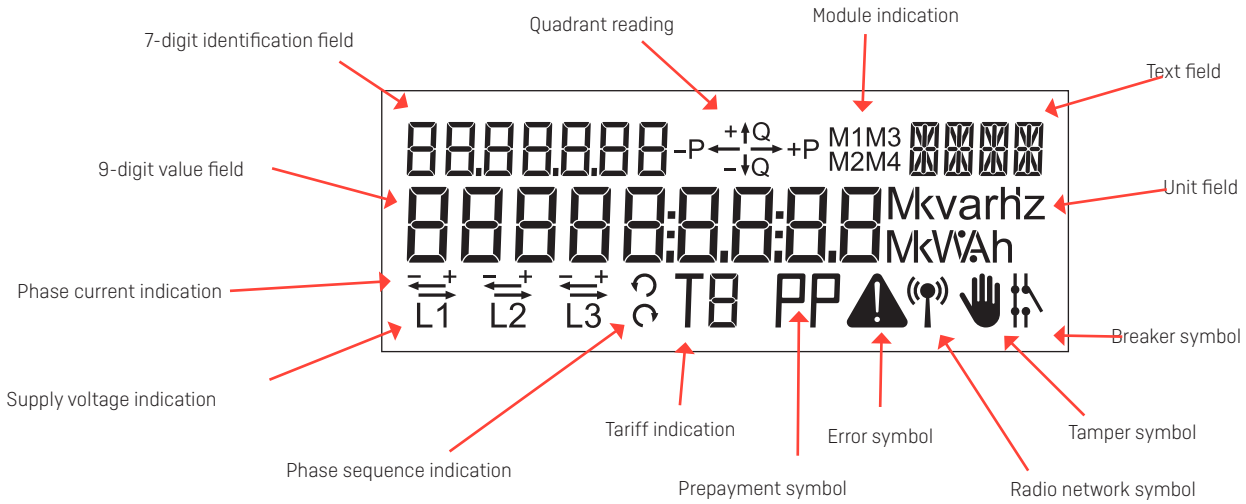
In order to minimise the manual configuration during installation, the meter is pre-configured from the factory. Furthermore, the meter can be reconfigured via a smart metering system.

Features

Display

The OMNIPOWER® three-phase DIN rail meter is equipped with an LCD display. 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 belonging to the value field.
7-digit identification field:	OBIS code for identification of the value in the value field.
Quadrant indication:	Shows 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 does not have a breaker, there is no symbol.
Tamper symbol:	Indicates magnetic influence or opening of meter cover, either temporarily or permanently.
Radio network symbol:	Indicates communication with AMR system.
Prepayment symbol:	Indicates if the prepayment function is enabled.
Tariff indication:	Indicates the current tariff if tariffs have been selected.
Supply voltage indication:	Indicates that the voltage is above the minimum limit (160 V).
Phase current indication:	Indicates that the load is above the minimum limit (2.3 W).
Phase sequence indication:	Indicates the phase sequence of the input phases. ↻ = L1L2L3 ↺ = L1L3L2

Features

Display

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

At the manual shift function, every shift takes place by pressing the left push button. Up to 30 readings and the order of the readings can be selected. However, it is not possible to deselect 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 it is possible to scroll between the readings by pushing the push button.

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

Energy reading

The OMNIPOWER® three-phase DIN rail meter has one shunt per measuring system 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 registration of energy per measuring system 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 is stored in the meter's permanent memory. Data is stored by every change of the energy register values.

In addition, the values below are saved at the end of a debiting period:

Various	Energy registers	Electricity registers
RTC with quality info	A+, Active positive primary energy	Peak power P+max
Hour counter	A-, Active negative primary energy	Peak power P+max RTC
Debiting stop counter	R+, Reactive positive primary energy	Peak power P+max Tariff 1
Power threshold counter (A+)	R-, Reactive negative primary energy	Peak power P+max Tariff 1 RTC
Pulse input	Apparent positive energy E+	Peak power P+max Tariff 2
	Apparent negative energy E-	Peak power P+max Tariff 2 RTC
	A+, Active positive primary energy Tariff 1	Accumulated peak power P+max
	A+, Active positive primary energy Tariff 2	Accumulated peak power P+max Tariff 1
	A+, Active positive primary energy Tariff 3	Accumulated peak power P+max Tariff 2
	A+, Active positive primary energy Tariff 4	Peak power Q+max
	R+, Reactive positive primary energy Tariff 1	Peak power Q+max RTC
	R+, Reactive positive primary energy Tariff 2	Peak power Q+max Tariff 1
	R+, Reactive positive primary energy Tariff 3	Peak power Q+max Tariff 1 RTC
	R+, Reactive positive primary energy Tariff 4	Peak power Q+max Tariff 2
		Peak power Q+max Tariff 2 RTC
		Accumulated peak power Q+max
		Peak power S+max
		Peak power S+max RTC
		Peak power S+max
		Peak power S+max RTC

Features

Plug-in modules

The OMNIPOWER® three-phase DIN rail meter can be mounted/retrofitted with plug-in modules without subsequent reverification.

The module communicates with the meter's microprocessor via an internal data bus. This provides innumerable functional opportunities such as extra pulse output, tariff, load control and data communication via e.g. GSM/GPRS.

Optical reading

An optical communication interface is placed on the front of the meter. This optical connection can be used for reading data or configuring e.g. the display setup, 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 configure the legal data of the meter.

Breaker

The OMNIPOWER® three-phase DIN rail meter is available with integrated disconnect function that makes it possible to disconnect the supply outputs of the electricity meter. The disconnection can be carried out locally by activating the meter's push button, automatically via the functions smart disconnect or prepayment or remotely via an automatic smart metering system.

Do **not** use the connection function as safety function.

The connection can be made via the same media as the disconnection. Furthermore, the connection can be configured via push button to only to be allowed after a previous command about release from a smart metering system.

The breaker is a bistable breaker which keeps its current position in case of power failure and during a subsequent re-establishment of power.

Load profile

Load profiles can be configured to 15, 30 or 60 minutes 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
A+/A-/R+/R-	180	360	700

Analysis log

The OMNIPOWER® three-phase DIN rail meter is equipped with a configurable analysis logger. The logging depth depends on the configuration of the meter and the number of registers. The analysis logger can register data from up to 16 different registers at a time.

The OMNIPOWER® three-phase DIN rail meter is available with default settings that 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 alarm is activated which is time and date stamped and saved to the permanent memory. Alarms can be automatically transferred via the communication infrastructure and, in some cases, be indicated on the display. Magnetic influence does not affect the measuring accuracy.

Approvals

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

Approvals	**Standards**
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	**Standard**
Terminal	DIN 43856
S0 optical pulse signal	DIN 43864, S0 only as LED, not as output
Optical reading	DLMS/COSEM
OBIS codes	IEC 62056-61

Technical data

Measuring principle	
– Current	Single-phase current measurements by current shunt
– Voltage	Single-phase voltage measurements by voltage divider
Nominal voltage Un	1x230 VAC -20 % - +15 % 2x230/400 VAC -20 % - +15 % 3x230/400 VAC -20 % - +15 %
Current	I_{tr} - I_b (Imax)

OMNIPOWER® three-phase meter
With breaker
0.25-5(63)A 35 mm²

Accuracy class	MID: Class A, Class B
Nominal frequency f_n	50 Hz ± 5 %
Phase displacement	Unlimited
Operating temperature	-40 °C - +55 °C
Storage temperature	-40 °C - +85 °C

Technical data

Protection class	IP52
Protection class	II
Relative humidity	< 75 % of year's average at 21 °C < 95 % less than 30 days/year, at 25 °C
Weight	1000 g with breaker
Application area	Indoors or outdoors in suitable meter cabinet

Own consumption*

OMNIPOWER® three-phase DIN rail meter	With breaker
Maximum current consumption in the circuits with base current	0.01 VA
Maximum current consumption in the voltage circuits	0.4 VA 0.1 W

* Measured by authorized body during type test. Measured on 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 display) LCD, 3 mm digit height (display of voltage and tariff)
Meter constant	1000 imp/kWh
S0 pulse output	1000 imp/kWh Pulse duration 30 ms ± 10 %
Short-circuit level	UC2 4500ARMS

Real-time clock (RTC)

Accuracy	Typically 5 ppm at 23 °C
Backup	Battery lifetime > 10 years at normal operation Supercap lifetime > 10 years at normal operation
Supercap operating time	7 days fully charged

Connections

Terminals	**Elevator terminals**		
Size	For use with connection:		
	Multi-core	7-core	Massive/terminal tube
35 mm²	≥ 6 mm²	≥ 6 mm²	≥ 2.5 mm²
Screws	Pz 2 or straight slot Torque 2.5 – 3 Nm		

Communication

The OMNIPOWER® three-phase DIN rail meter can be delivered and retrofitted with communication modules. The modules function as inputs and outputs for the meter. No reverification of the meter is required when mounting modules.

Integrated radio

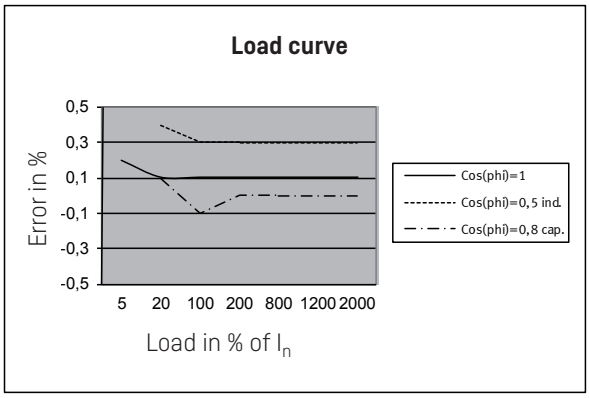
The OMNIPOWER® three-phase DIN rail meter can be delivered with built-in radio communication.
Radio communication therefore requires no mounting/retrofitting of a communication module. If the module area of the meter is used for another type of communication, the built-in radio communication can be disabled.

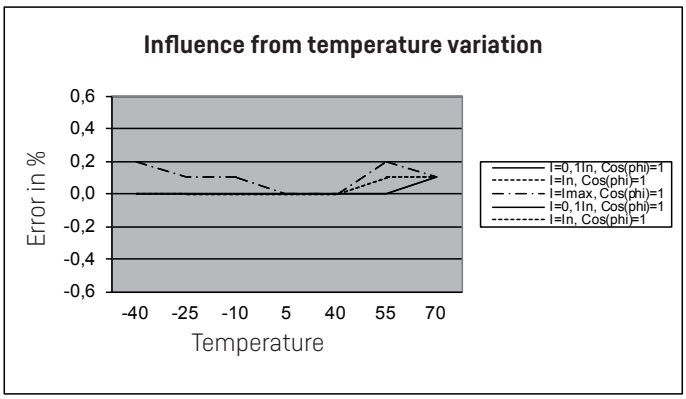
Consumer Communication Channel module (CCC)

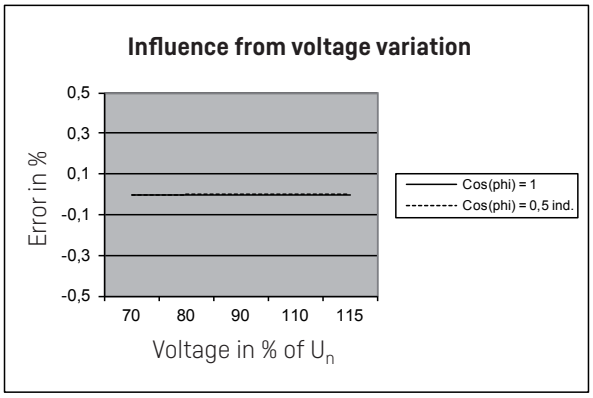
It is possible to mount a CCC module in the OMNIPOWER® three-phase DIN rail meter. The module can be used for communication and data exchange with smart home products such as energy displays and external relays. The CCC module is mounted without using tools or

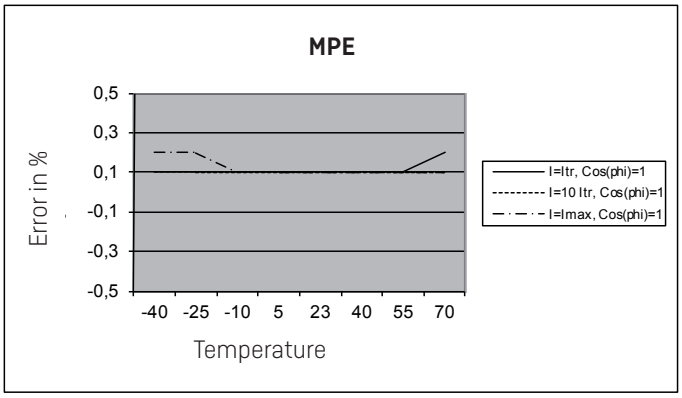
breaking the seal of the meter. The consumer can carry out the mounting.

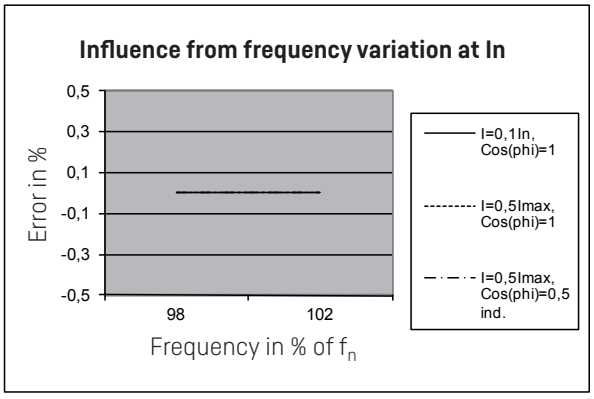
Typical accuracy diagrams











MPE, Maximum Permissible Error

Error composed of:

- current
- 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 number version																	
Three-phase meter		4															
X_2 - Type number version																	
OMNIPOWER®			1														
X_3 - Case																	
DIN rail meter				4													
X_4 - Metering systems																	
3 Systems					3												
X_5 - Electricity range																	
5-63 A						9											
X_6 - Accuracy class																	
Class A							A										
Class B							B										
X_7 - Generation																	
Generation N								N									
X_8 - Variant																	
Variant 2									2								
X_9 - Energy type																	
A+										1							
A+/A-										2							
A+/A-/R+/R-										4							
X_{10} - Breaker																	
Default breaker											4						
X_{11} - Communication																	
Radio (for OMNIA®)												1					
X_{12} - Supply backup																	
Supercap													0				
X_{13} - Interface																	
None														0			
$X_{14}X_{15}X_{16}$ - Country code																	
Denmark																XXX	

Configuration – software

			Z1	Z2	Z3	Z4
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	**I/O 1**	**I/O 2**				
No function	-	-			00	
4-tariff	Input	Input			01	
4-tariff inverted	Input	Input			02	
Pulse input / alarm input	Input	Input			03	
Pulse input / alarm input inverted	Input	Input			04	
Pulse input / A+ output	Input	Output			05	
R+ output / A+ output	Output	Output			06	
2-tariff / alarm input	Input	Input			07	
2-tariff inverted / alarm input	Input	Input			08	
2-tariff / alarm input inverted	Input	Input			09	
2-tariff inverted / alarm input inverted	Input	Input			10	
2-tariff / A+ output	Input	Output			11	
2-tariff inverted / A+ output	Input	Output			12	
Pulse input / 2-tariff	Input	Input			13	
Pulse input / 2-tariff inverted	Input	Input			14	
Debiting stop pulse / -	Input	-			15	
A output / A+ output	Output	Output			16	
Load control load / Status control	Input	Output			17	
Pulse input / Load tariff synchronisation	Input	Output			18	
Pulse input inverted / Load tariff synchronisation	Input	Output			19	
Pulse input / Load tariff synchronisation inverted	Input	Output			20	
Pulse input inverted / Load tariff synchronisation inverted	Input	Output			21	
4-tariff synchronisation load control	Input	Input			22	
4-tariff synchronisation load control inverted	Input	Input			23	
Load control 1 / Load control 2	Output	Output			26	
Pulse input / Load control	Input	Output			27	
Pulse input / Change between load control 1 & 2	Input	Output			28	
Z4 Integration period / Load profile period						
15 min.						2
30 min.						3
60 min.						4

Configuration – software

	Z5	Z6
Z5 - Display configuration		
See the 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

	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 ms pulse length / Alarm input disabled		1
30 ms pulse length / Alarm input enabled		2
80 ms pulse length / Alarm input disabled		3
80 ms pulse length / Alarm input enabled		4

Configuration – software

		Z9	Z10	Z11	Z12
Z9 Disconnect setup					
See the disconnect order form, or contact Kamstrup		-			
Z10 Analysis logger setup					
Default setup			000		
Z11 Greenwich 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 hour			23	
Z12 Unit for pulse input					
None					00
Active energy					01
m^3					02
L					03

Configuration – software

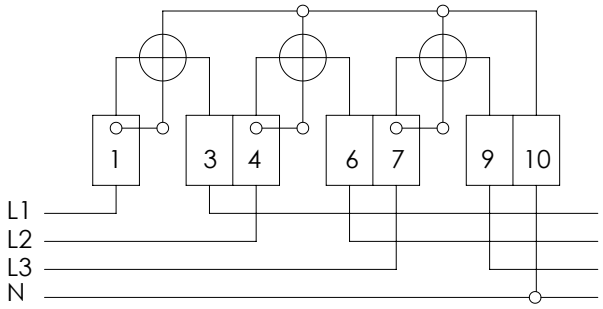
	Z13	Z14	Z15	Z16	Z17	Z18	Z19	Z20	Z25
Z13 Tariff schedule									
See the tariffs order form, or contact Kamstrup	–								
Tariff disabled	000								
Module port control	001								
Register control	002								
Z14 Load control plan									
See the load control order form, or contact Kamstrup		–							
Load control disabled		000							
Register control		001							
Z15 Summer time / Summer/standard time table									
None			000						
EU			001						
Z16 Frequency code protocol									
None				000					
CH 318 K				318					
EU 319 K				319					
SE 326 K				326					
SE 328 K				328					
SE 329 K				329					
NO 337 K				337					
NO 338 K				338					
NO 339 K				339					
DK 348 K				348					
DK 349 K				349					
FI 356 K				356					
FI 357 K				357					
FI 359 K				359					
PL 369 K				369					
AT 378 K				378					
AT 379 K				379					
Z17 Push button 2 setup									
See the push button 2 order form, or contact Kamstrup					–				
No push button 2 setup					000				
Z18 1107 configuration									
See the 1107 order form, or contact Kamstrup						–			
Disabled						000			
Mode A and C, UD						001			
Mode A and C, UD2						002			
Z19 Breaker position									
No breaker							0		
Connected							1		
Disconnected							2		
Z20 Calendar setup									
See the calendar setup order form, or contact Kamstrup								–	
Z25 - Debit logger 2 interval									
Daily									1
Weekly									2
Monthly									3

Installation

Connection diagrams

The connection diagram appears from the front of the meter.

3-phase, 4-wire



Safety and installation guidelines

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

The meter must be switched off when working on it. It can be potentially fatal 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 security in accordance with the maximum current stated on the meter.

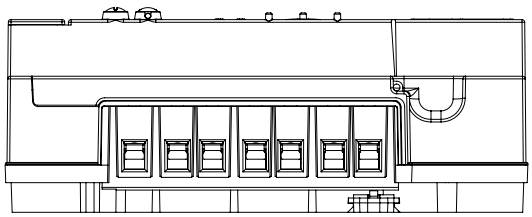
Therefore, the relevant security must be removed and kept in a place where it cannot be inserted in the meter by unauthorized persons.

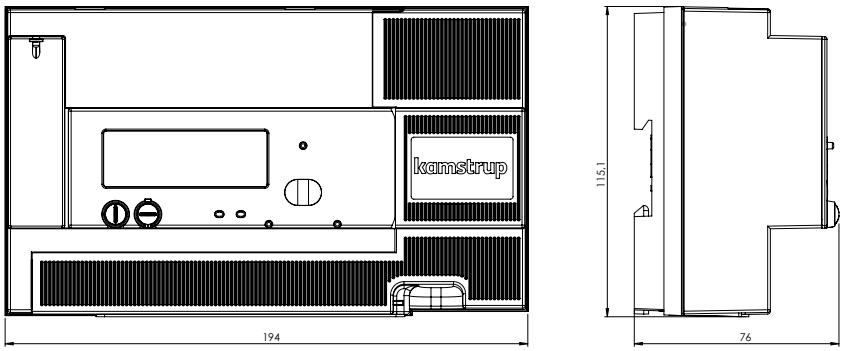
The meter constant LED flashes proportionally to the consumed active energy.

Only authorized personnel must break the utility sealing.

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

Dimensions





Accessories

Modules	
OMNICON GSM*	681Axxxxxxx
OMNICON MUC module*	68 50 079
Software	
Configuration software, METERTOOL	68 99 580
Various	
Optical reading head with USB plug	66 99 099
Optical reading head with 9-pole D-sub connector	66 99 102

* only for OMNIA® systems

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