kamstrup

Data sheet

OMNIPOWER® three-phase

- Three-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 62053-21
    IEC 62053-23
- Communication protocol:
  - DLMS/COSEM



Content

Application	3
Functions	4
Approvals	8
Technical data	8
Connections	10
Communication	10
Consumer communication channel (CCC) module	10
Typical accuracy charts	11
Configuration – hardware	12
Configuration – software	13
Installation	17
Safety and installation guidelines	17
Dimensions	18
Accessories	19

Application

Kamstrup OMNIPOWER® three-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 Radio Mesh network, optical output or from the module area. The unique module area also permits external changing of tariffs, pulse inputs and outputs, and configuration as well as 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 1, 2 or 3 phases. Measurements are saved in a permanent memory.

As default, Kamstrup OMNIPOWER® three-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, Kamstrup OMNIPOWER® three-phase meter is supplied with the functions Smart Disconnect and software controlled Prepayment.

The OMNIPOWER® three-phase meter is also designed to support extended analysis of the main grid using measurements of THD, Power Factor, Voltage unbalance, Voltage variations and sags and swells.

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

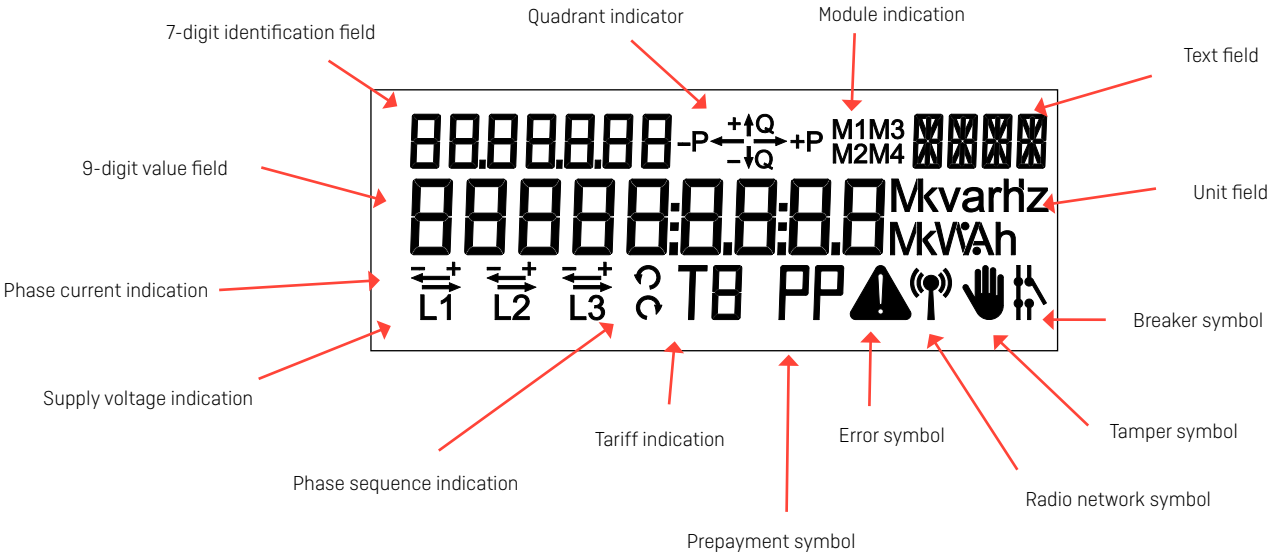
In order to minimise the manual configuration during installation, the meter is pre-configured from the factory. Furthermore, the meter can be reconfigured via a Smart Metering system.

Functions

Display

Kamstrup OMNIPOWER® three-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 temporary or permanent.
Radio Network symbol:	Indicates communication with AMR system.
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 voltage is above the minimum threshold (160 V).
Phase current indication:	Indicates that the load is above the minimum threshold (2,3 W).
Phase sequence indication:	Indicates the phase sequence of the input phases. ↻ = L1L2L3 ↺ = L1L3L2

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

Kamstrup OMNIPOWER® three-phase meter has a shunt for 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 energy registration 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 are stored in the meter's permanent memory. Data are stored by every change of energy register values.

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

Various	Energy registers	Power registers
RTC w/Quality info	Active positive primary energy A+	Peak power P+max
Hour counter	Active negative primary energy A-	Peak power P+max RTC
Debiting stop counter	Reactive positive primary energy R+	Peak power P+max Tariff 1
Power threshold counter (A+)	Reactive negative primary energy R-	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
	Active positive primary energy A+ Tariff 1	Accumulated peak power P+max
	Active positive primary energy A+ Tariff 2	Accumulated peak power P+max Tariff 1
	Active positive primary energy A+ Tariff 3	Accumulated peak power P+max Tariff 2
	Active positive primary energy A+ Tariff 4	Peak power Q+max
	Reactive positive primary energy R+ Tariff 1	Peak power Q+max RTC
	Reactive positive primary energy R+ Tariff 2	Peak power Q+max Tariff 1
	Reactive positive primary energy R+ Tariff 3	Peak power Q+max Tariff 1 RTC
	Reactive positive primary energy R+ 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

Functions

Plug-in modules

Kamstrup OMNIPOWER® three-phase 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 possibilities such as extra pulse output, tariff, load control and data communication via e.g. GSM/GPRS, and M-Bus.

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.

S0 pulse output

Emits pulses of active energy at 1000 pulses per kWh. The pulses are emitted synchronously with the LED. The maximum voltage, which may be connected to the S0 output, is 27 V DC (at 1 kΩ), and the maximum current, which can be drawn through the output, is 27 mA. The pulse time is 30 msec.

Breaker

Kamstrup OMNIPOWER® three-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 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 disconnection as a safety function.

The reconnection can be made via the same media as the disconnection. Furthermore, 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.

Functions

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**
A+	278	556	1113
A+/A-	235	470	941
A+/A-/R+/R-	180	360	720
A+/A-/R1/R2/R3/R4	145	291	583
A+/A-/R+/R-/R1/R2/R3/R4	122	244	489

* Load profile for Austria is limited to 60 days with a fixed integration period of 15 min

The logging depths listed above apply to OMNIA 3.0 firmware and newer.

Analysis logger

Kamstrup OMNIPOWER® three-phase meter is provided with a configurable analysis logger. The logging depth will be 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.

Kamstrup OMNIPOWER® three-phase meter is available with default setting 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 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, indicated on the display. Magnetic influence does not affect the measuring accuracy.

Approvals

Kamstrup OMNIPOWER® three-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	DIN 43857
S0 pulse output	DIN 43864
Optical reading	DLMS/COSEM
OBIS/EDIS codes	IEC 62056-61

Technical data

Measuring principle	
– Current	Single-phased current measurements by current shunt
– Voltage	Single-phased voltage measurements by voltage divider
Nominal voltage Un	3x230 VAC -20 % - +15 % (for Aron meter only) 1x230 VAC -20 % - +15 % 2x230/400 VAC -20 % - +15 % 3x230/400 VAC -20 % - +15 %
Current	Imin - Iref (Imax)

Kamstrup OMNIPOWER® three-phase meter	
Without breaker	With breaker
0.25-5(100)A 35 mm²	0.25-5(100)A 35 mm²

Accuracy class	MID: Class A, Class B IEC: Class 2, Class 1
Nominal frequency f_n	50 Hz ± 5 % or 60 Hz ± 5 %
Phase displacement	Unlimited
Operating temperature	-40 °C - +70 °C
Storage temperature	-40 °C - +85 °C

Technical data

Protection class	IP54
Protection class	II
Relative humidity	< 75 % year's average at 21 °C < 95 % less than 30 days/year, at 25 °C
Weight	1300 g with breaker/1000 g without breaker
Application area	Indoors or outdoors in suitable meter cabinet

Internal consumption*

OMNIPOWER® three-phase meter	Without breaker	With breaker
Maximum power consumption of the current circuits with basic current	0.01 VA	0,01 VA
Maximum power consumption of the voltage circuits	0.4 VA 0.1 W	0.4 VA 0.1 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 %
S0 pulse output	1000 imp/kWh 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	7 days fully charged

Connections

Terminals	Elevator terminals		
Size	For use with connection:		
	Multi-cored	7-cored	Massive/terminal tube
35 mm²	≥ 6 mm²	≥ 6 mm²	≥ 2,5 mm²
Screws	Pz 2 or straight slot Torque 2.5 - 3 Nm		

Voltage output	0.25 - 1.5 mm², 5 mm terminal forks
Screws	TORX Tx 10 Torque 1 Nm

Communication

Kamstrup OMNIPOWER® three-phase meter can be supplied or retrofitted with communication modules. The modules function as inputs and outputs for the meter. Mounting of modules does not require subsequent verification of the meter.

Communication Modules

Serial	Serial RS-485 or RS-232 communication or current loop with pulse inputs, tariff inputs or load control.
M-Bus	Reading via wired M-Bus system.
GSM/GPRS	Collection of consumption data via GSM/GPRS communication. Supports SMS reading.

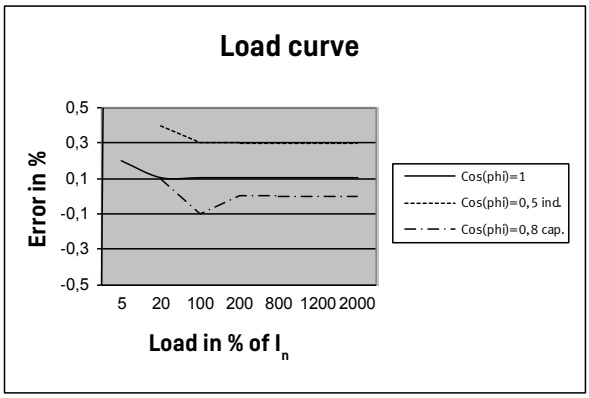
Integrated radio

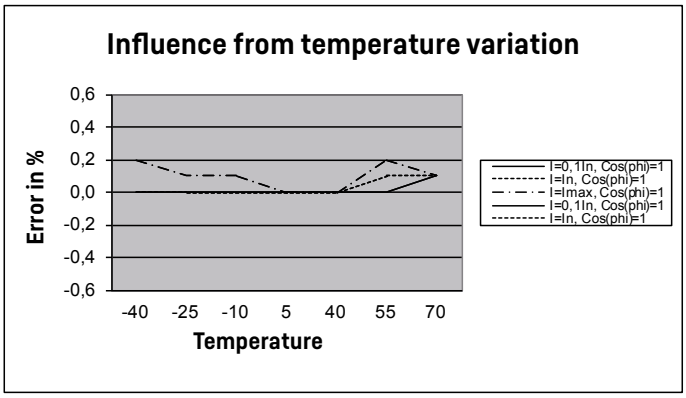
Kamstrup OMNIPOWER® three-phase meter can be provided with built-in radio communication.
Radio communication therefore requires no mounting/retrofitting of communication module. If the meter's module area is used for another type of communication, the built-in radio communication can be deactivated.

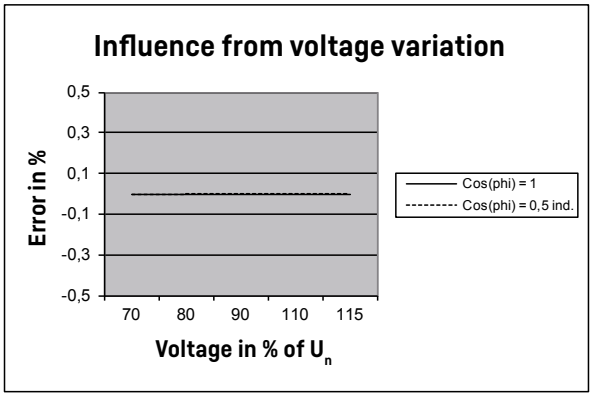
Consumer communication channel (CCC) module

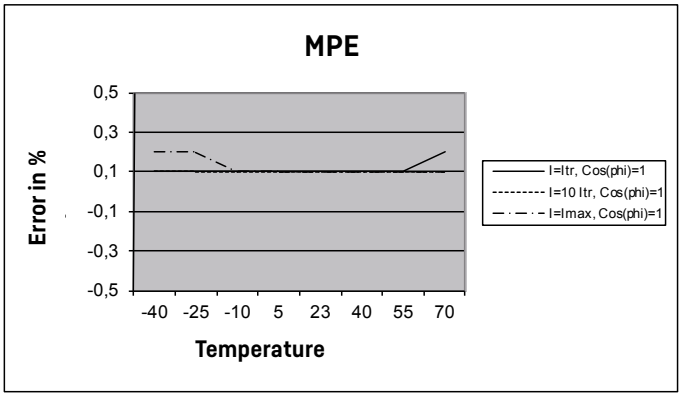
In Kamstrup OMNIPOWER® three-phase meter it is possible to mount a CCC module. The module can be used for communication and data exchange with Smart Home products such as energy displays and external relays. The CCC module is mounted without using tools or breaking the seal of the meter. The mounting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

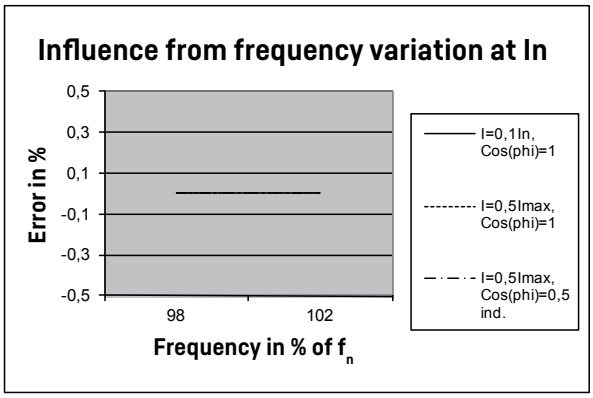
Typical accuracy charts











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 - Metertype no. Version																						
Three-phase meter		4																				
X_2 - Type no. Version																						
OMNIPOWER®				1																		
X_3 - Housing																						
Standard					1																	
50 mm² terminals with 2 screws					5																	
X_4 - Measuring systems																						
2 system							2															
3 systems							3															
X_5 - Current range																						
5-100A								1														
5-65A								4														
10-60A								6														
10-80A								7														
5-80A								8														
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																						
1. Variant												1										
2. Variant												2										
X_9 - Energy type																						
A+													1									
A+/A-													2									
A+/A-/R+/R-													4									
X_{10} - Breaker																						
No breaker															0							
Standard breaker															3							
Breaker Version 2															5							
X_{11} - Communication																						
No radio																0						
Radio (for OMNIA®)																1						
X_{12} - Supply back-up																						
Supercap																	0					
Supercap + battery																	1					
X_{13} - Interface																						
None																		0				
S0 output																		1				
APS																		2				
$X_{14}X_{15}X_{16}$ - 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 off at no consumption				1		
LED on at no 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 in / Alarm in	Input	Input			03	
Pulse in / Alarm in inverted	Input	Input			04	
Pulse in / A+ out	Input	Output			05	
R+ out / A+ out	Output	Output			06	
2-tariff / Alarm in	Input	Input			07	
2-tariff inverted / Alarm in	Input	Input			08	
2-tariff / Alarm in inverted	Input	Input			09	
2-tariff inverted / Alarm in inverted	Input	Input			10	
2-tariff / A+ out	Input	Output			11	
2-tariff inverted / A+ out	Input	Output			12	
Pulse in / 2-tariff	Input	Input			13	
Pulse in / 2-tariff inverted	Input	Input			14	
Debiting stop pulse / -	Input	-			15	
A- out / A+ out	Output	Output			16	
Load control load / Status control	Input	Output			17	
Pulse in / Load tariff sync	Input	Output			18	
Pulse in inv. / Load tariff sync	Input	Output			19	
Pulse in / Load tariff sync inverted	Input	Output			20	
Pulse in inv. / Load tariff sync inverted	Input	Output			21	
4-tariff sync load control	Input	Input			22	
4-tariff sync load control inverted	Input	Input			23	
Load control 1 / Load control 2	Output	Output			26	
Pulse in / Load control	Input	Output			27	
Pulse in / Toggle Load control 1 & 2	Input	Output			28	
Earth fault module with 2x5A relays	I2C	I2C			29	
Z4 Integration period / Load profile period						
15 min.						2
30 min.						3
60 min.						4

Configuration – software

	Z5	Z6
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

	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	London time			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							
Module Port control	001							
Register control	002							
Z14 Load control plan								
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								
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 PB2 order form or contact Kamstrup					–			
No PB2 setup					000			
Z18 1107 configuration								
See 1107 order form or contact Kamstrup						–		
Disabled						000		
Mode A and C, UD (only available for variant 1)						001		
Mode A and C, UD2 (only available for variant 1)						002		
Z19 Breaker position								
No breaker							0	
Connected							1	
Disconnected							2	
Z20 Calendar setup								
See Calendar setup order form or contact Kamstrup								–

Configuration – software

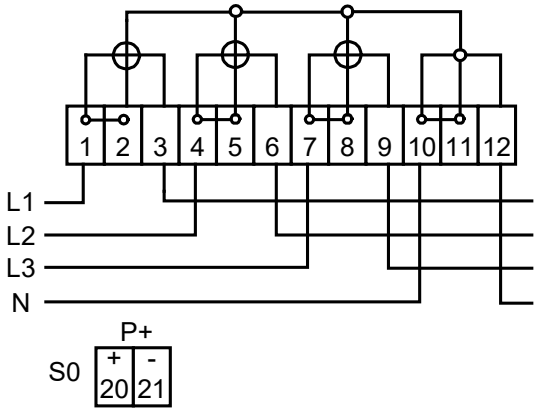
	Z25	Z26	Z27	Z28	Z29	Z30
Z25 Debitlogger 2 interval						
Daily	1					
Weekly	2					
Monthly	3					
Z26 – Alarm configuration						
No alarms enabled		000				
Z27 – Load profile data (DLMS)						
Absolute values			1			
Delta values (only available for variant 2)			2			
Z28 – Local interface encryption						
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	
A+/A-/R1/R2/R3/R4 (only available for variant 2)					4	
A+/A-/R+/R-/R1/R2/R3/R4 (only available for variant 2)					5	
Z30 – Debit 2 logger configuration						
Profile 01						1
Profile 02 (only available for variant 2)						2

Installation

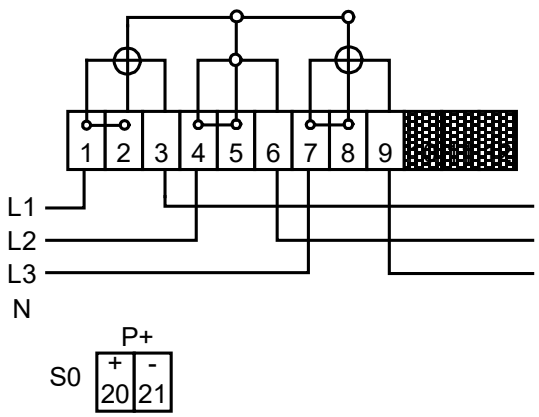
Connection diagrams

Connection diagram appears from the front of the meter.

3-phase, 4-wire



3-phase, 3-wire (Aron)



Safety and installation guidelines

The meter shall only to 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.

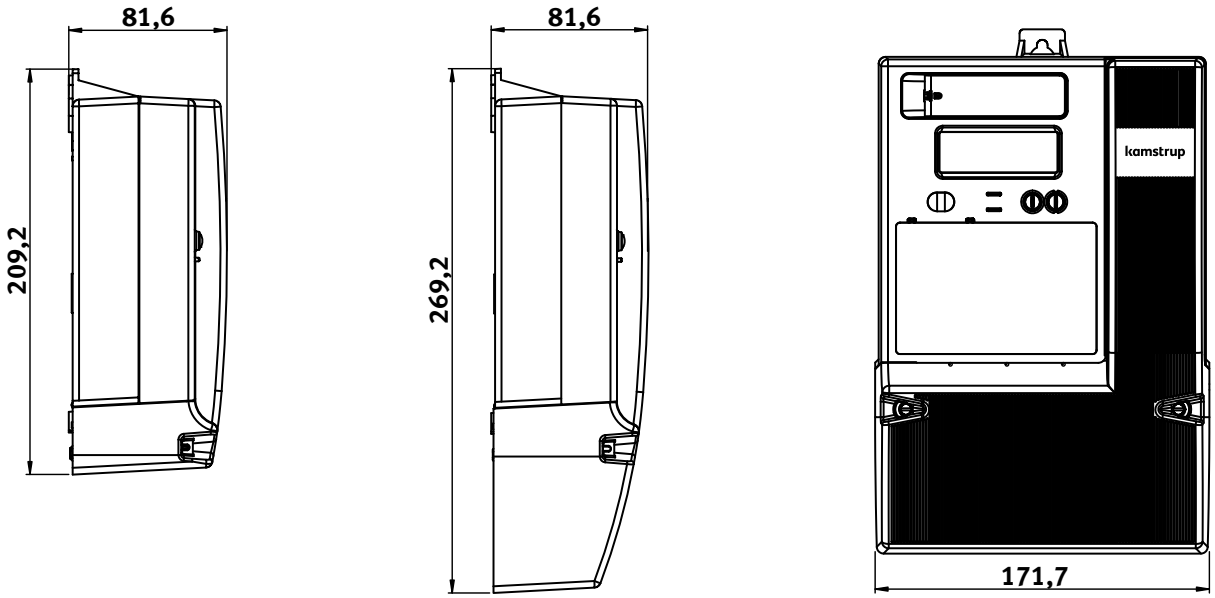
The relevant backup fuse must therefore be removed and kept in a place where it cannot be inserted in the meter by unauthorized personnel.

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

Only authorized personnel must 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

Modules

IP101i, TCP/IP-module*	68 50 040
GSM8i 2G*	6819x0xxxxx
GSM8i 2G m/ 2x5A Load Control*	6819x5xxxxx
GSM8i 2G m/ RS-485 add-on*	6819x6xxxxx
OMNICON® GSM**	681Axxxxxxx
5A Load control module	68 50 058
M-Bus module, secondary addressing*	68 50 068
2 x 5A load control modules	68 50 069
RS485-module, multi drop*	68 50 072
Data-/pulse module, dual pulse, 9600	68 50 075
Tariff control, 4-tariff, 230 V input, current loop	68 50 076
Tariff control, 4-tariff, 230 V input	68 50 078
OMNICON® MUC-module**	68 50 079
Earth fault module**	68 50 080
Earth fault module with MUC module**	68 50 081
Wireless M-Bus, Submetering	68 50 083
RS-485 (Excl. LC/Tariff)	68 50 084

Software

Configurations SW, METERTOOL	68 99 580

Various

Standard meter cover	59 60 370
Long meter cover, 60mm	59 60 316
Extra long terminal cover, 100 mm	59 60 317
Optical reading head with USB plug	66 99 099
Optical reading head with 9-pole D-sub connector	66 99 102
METERTOOL kit for CT ratio programming	68 30 017

* for non Kamstrup systems only

** for OMNIA® system only

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