Kamstrup 162
Generation L

DATA SHEET

- **1-phase residential meter**
- **Prepared for Smart Home applications**
- **Optimised for Smart Metering Systems**
- **Based on open protocols**
- **Secured against tampering**
- **Ultra low power consumption**

Type approved according to:
Active positive energy
EN 50470-1 (MID)
EN 50470-3 (MID)

Active negative energy and
reactive energy
IEC 62052-11
IEC 62053-21
IEC 62053-23
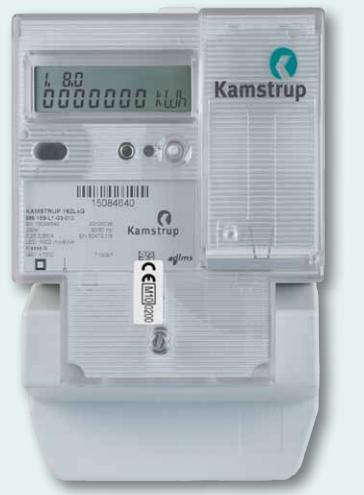
Application

Kamstrup 162L is a direct connected electricity meter for registration of electric energy. The meter is full electronic without movable parts. Thus, shock and impact during transport and mounting do not affect energy registration. Furthermore, measurements are correct, no matter the physical mounting direction.

The shunt measuring principle gives good linearity and a considerable dynamic range.

The shunt measuring principle is immune against magnetism and DC currents.

The easily readable display can scroll automatically between readings, and readings can be changed manually by the consumer activating the 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 the optical output or from the module area. The unique module area also permits external changing of tariffs, pulse inputs and outputs, configuration and a multitude of communication media.

DLMS/COSEM communication protocol is provided as system integration interface allowing standardised interfacing with all systems supporting the common specification.

From the factory, the meter can be configured to measure both imported and exported energy. It is constructed with a galvanically separated measuring system which makes accurate and secure measurements. Measurements are saved in a non-volatile memory.

By default, Kamstrup 162L has the possibility of generating load profiles

for all four quadrants. A load profile gives detailed information about used and produced energy and as real-time values. An additional 16-channel logger provides data for analysis.

Kamstrup 162L is by default supplied with smart disconnect and software controlled prepayment features.

To minimise manual configuration during installation, the meter is pre-configured on delivery. Furthermore, the meter can be reconfigured through a Smart Metering System.

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Features

Display

Kamstrup 162L is equipped with an LCD display. The chosen configuration determines which registers can be read from the display. In addition, it is possible to change the display configuration remotely.

The display configuration is composed of two independent reading lists: One for automatic scroll and one for manual scroll. The display has the following display fields:
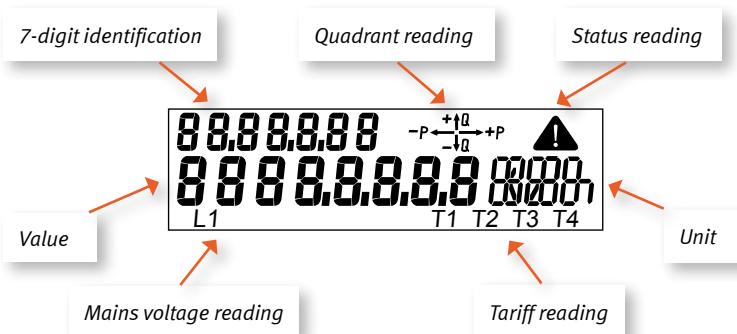
Value	This field is used for displaying register values.
7-digit identification	OBIS code for identifying the value in the value field.
Quadrant reading	Indicates the current active quadrant.
Status reading	Indicates critical internal errors and magnetic influence.
Unit	Units that relate to the value field.
Tariff reading	Indicates the current tariff if tariffs are selected.
Mains voltage reading	Indicates the voltage. If the voltage exceeds the minimum limit, this field will flash or constantly emit light for each phase. If the symbol flashes, the voltage is above the limit and the current is below the limit.

The display scrolls automatically between readings every 10 secs. In automatic scroll mode, up to 16 readings can be selected.

The manual scroll mode is activated by means of the push button. Up to 30 readings can be selected, and the order is optional as well. However, it is not possible to deselect legal readings.

Two minutes after the last activation of the push button, the display returns to automatic scroll mode.

Energy reading

Kamstrup 162L is provided with shunt for current measurement and measures the voltage through voltage division.

The energy consumption is calculated as the voltage drop expressing the current multiplied by phase voltage and time.

The energy registration system is communicated to the legal processor via the internal bus system. After correction, the energy is summed in the main register.

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Non-volatile memory

Measured and calculated data is stored in the non-volatile memory (EEPROM). Data is stored when there are changes in the energy register values.

At debiting stop, the following values are also stored:

Active energy A+
Active energy A-
Reactive energy R+
Reactive energy R-
Active energy A+ Tariff (T1-T4)
Reactive energy R+ Tariff (T1-T4)
Peak power P+max Tariff 1
Peak power P+max Tariff 1 Hour
Peak power P+max Tariff 1 Date
Peak power P+max Tariff 2
Peak power P+max Tariff 2 Hour
Peak power P+max Tariff 2 Date
Peak power P+max
Peak power P+max Date
Peak power P+max Hour
Accumulated peak power P+max acc
Date
Hour
Hour counter
Number of debiting periods
Power threshold counter
Pulse input

Plug-in modules

Kamstrup 162L can be fitted/retrofitted with plug-in modules without the need for reverification.

Plug-in modules add functionality such as additional pulse output and data communication via e.g GSM/GPRS, TCP/IP, wireless M-Bus and Radio Mesh.

In 162L, two module slots are available.

Optical reading

On the front of the meter, an optical infra-red transmitter/receiver is located. This optical connection is used for reading and configuring the display set-up, meter number and other settings.

Changes via the optical connection are carried out with the software program "METERTOOL for kWh meters".

Legal data cannot be changed without breaking the verification seal.

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Breaker

Kamstrup 162L comes in a version with breaker. The breaker enables the disconnection of power supply to the consumer. The disconnection can be activated locally via the push button of the meter, automatically via the functions Smart Disconnect or Prepayment, via "METERTOOL for kWh meters" or remotely via Smart Metering Systems.

The breaker is never to be used as a safety function.

The following variants of Kamstrup 162L are supplied with breaker: 162LxC, 162LxF, 162LxG.

Load profile

Load profiles can be configured to 5, 15, 30 or 60 min. and for all four quadrants. The number of generated profiles corresponds to the selected energy type for the meter. The logging depth is up to 2388 days depending on the configuration. See below.

Logging interval Minutes	5	15	30	60
A+	199 days	597 days	1194 days	2388 days
A+/A-	113 days	341 days	682 days	1364 days
A+/A-/R+/R-	61 days	183 days	367 days	734 days

Analysis logger

Kamstrup 162L is provided with a configurable analysis logger. The logging depth is up to 520 days depending on the configuration and the number of registers. The analysis logger registers data from up to 16 different registers. Kamstrup 162L is supplied with standard set-up, but can be reconfigured subsequently by means of "METERTOOL for kWh meters". For further information, see "Technical Description".

Advanced tampering protection

In addition to the mechanical seal protection, the meter detects tampering. In case of a tamper attempt an alarm is activated, stamped with time and date and logged in the non-volatile memory. Alarms can also be automatically transmitted via the communication infrastructure. Magnetic influence will not affect the measuring accuracy.

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Approvals

Kamstrup 162L is type approved according to the Measuring Instrument Device (MID) for active positive energy and according to national requirements for other energy types, where required.

– Active positive energy	EN 50470-1
	EN 50470-3
– Reactive energy and active negative energy	IEC 62052-11
	IEC 62053-21
	IEC 62053-23
– Terminal	DIN 43857
– SO pulse output	DIN 43864
– Optical interface	DLMS/COSEM, EN 62056-21 mode A
– OBIS/EDIS codes	IEC 62056-61

Technical specifications

Measuring principle	Current measurement by shunt
	Voltage measurement by voltage division
Nominal voltage Un	230 VAC ± 10 %

Current Ib (Imax)

Without breaker	With breaker 35 mm²
5(85)A	5(85)A

Accuracy class	MID: class A, class B
	IEC: class 2 , class 1
Nominal frequency fn	50 Hz ±2 %
Phase displacement	Unlimited
Operating temperature	-40°C to +70°C
Storage and transport temperature	-40°C to +85°C
IP protection class	IP52
Protection class	II
Relative humidity	< 75 % year's average at 21°C
	< 95 % less than 30 days/year, at 25°C
Weight	450 g without breaker/750 g with breaker
Application area	Indoors/outdoors in suitable meter cabinet

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Technical specifications

Power consumption

	Without breaker	With breaker
Current circuit	0.01 VA	0.01 VA
Voltage circuit	0.5 VA, 0.45 W	0.7 VA, 0.80 W

Impulse voltage test	
– IEC 62052-11	6 kV
– SP 1618	12 kV
Fast transient burst test	
– IEC 62053-21	4 kV
Materials	
– Cover	Transparent polycarbonate
– Base	Glass reinforced polycarbonate
Data storage	EEPROM
	> 10 years without voltage
Display	LCD, 7 mm digit height (for value and unit fields)
	LCD, 5 mm digit height (for identification readings)
	LCD, 3 mm digit height (for voltage and tariff indication)
Meter constant	1000 imp/kWh
S0 LED diode	1000 imp/kWh
	Pulse duration 30ms ± 10 %
Short circuit level	4500 A
RTC accuracy	Typical 5 ppm at 23°C
RTC back-up	
– supercap lifetime	> 10 years at normal operation
Back-up time with supercap	7 days fully charged

Connections

Main terminals	Elevating connections
Screws	Pz 2 or straight slot, torque 2.5 – 3 Nm

Size	For use with connector type:		
	Multi-core	**7-core**	**Massive/cable end-sleeve**
Brass terminal 35 mm²	≥ 10 mm²	≥ 10 mm²	≥ 4 mm²
Steel terminal 35 mm²	≥ 6 mm²	≥ 6 mm²	≥ 1.5 mm²
Steel terminal 25 mm²	≥ 6 mm²	≥ 6 mm²	≥ 1.5 mm²

Voltage output	0.25 – 1.5 mm² or 5 mm cable terminal forks
Screws	TORX Tx 10, torque 1Nm

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Communication

Kamstrup 162L can be supplied and retrofitted with communication modules. The modules act as inputs and outputs for the main PCB. The mounting of modules does not require reverification of the meter.

Communication modules

S0 supply	Sends 24 V via 2-wire and pulses by drawing the voltage to 0 V at every pulse. Can e.g. supply MULTICAL®.
Serial	Serial RS485 or serial RS232 communication with pulse input and output.
Maximum load (current)	

Pulse value Imp/kWh, Imp/kvarh	Pulse duration/pulse pause	
	30 msecs.	80 msecs.
1	105A	105A
10	105A	105A
100	105A	105A
1000	86A	32A
10000	8.6A	3.2A

M-Bus	Reading via wireless or wired M-Bus system.
Current Loop	Serial communication via current loop. Tariff control of 2 or 4 tariffs via current loop.
PLC	Data collection via power lines.
TCP/IP	Data collection via TCP/IP communication.
GSM/GPRS	Data collection via GSM/GPRS communication. Supports SMS readings.
Radio (RF)	Data collection via radio waves.

Integrated radio

The following variants of Kamstrup 162L have integrated radio communication on the main PCB and do not require communication module: 162Lx6, x7, xF and xG. If another kind of communication module is mounted, the integrated radio will be deactivated.

Secondary plug-in module

In Kamstrup 162L, it is possible to mount a secondary plug-in module. The module enables communication and data exchange with inhouse units such as energy displays and communication devices. The secondary plug-in module is mounted without tools and without breaking the seal. The mounting can be carried out e.g. by the consumer. To use the secondary plug-in module, the meter needs to be mounted with a special cover. For further information, see "Technical Description".

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Typical accuracy charts

Load curve

Influence from temperature variation

Influence from voltage variation

MPE

Influence from frequency variation
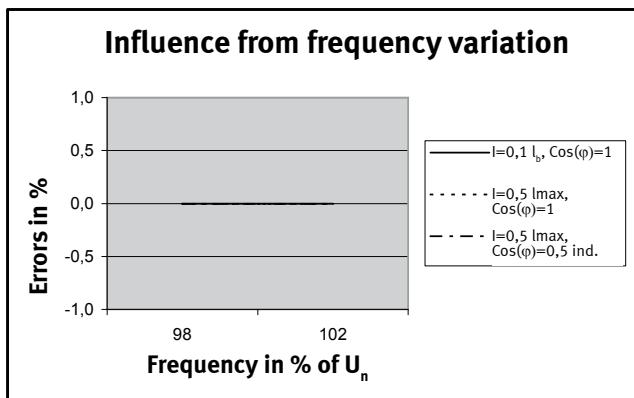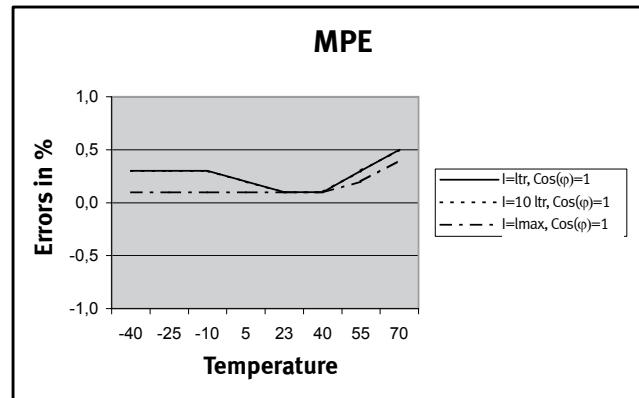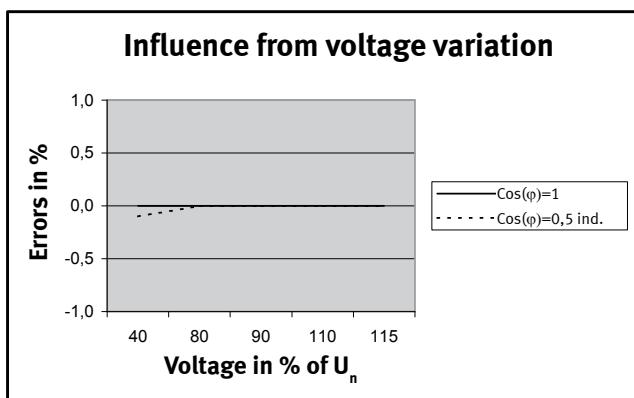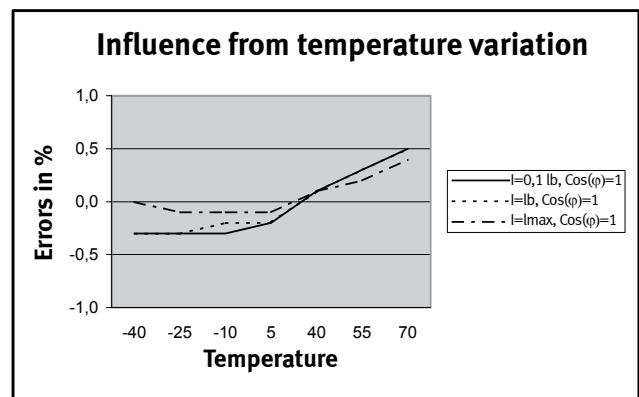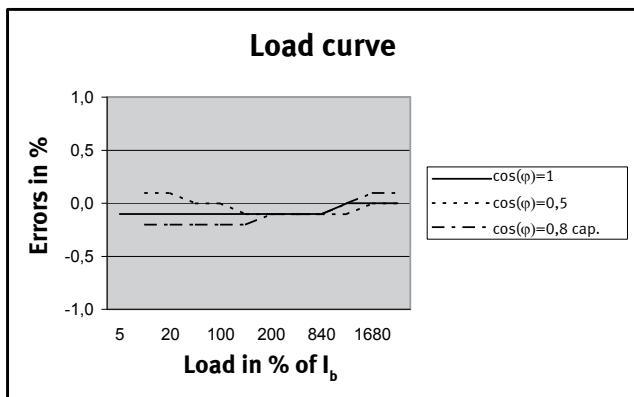
MPE (Maximum Permissible Error)

Composite error from:
– load
– voltage variation
– frequency variation
– temperature variation

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Installation

Connection diagram

The connection diagram appears from the type label on the front of the meter.

1-phase, 2-wire
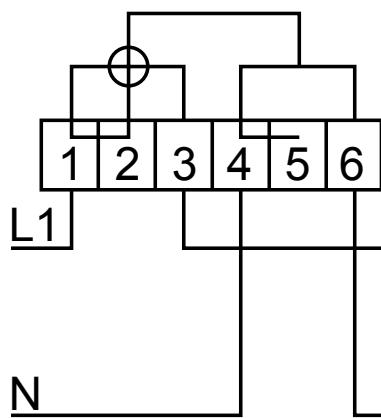
Guidelines for safety and installation

The meter shall only be used for measuring electrical energy and shall operate within the specifications of the meter.

The meter must be switched off during installation and maintenance. It can be highly dangerous to touch the meter parts when the meter is switched on.

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

The breaker is never to be used as a safety function.

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

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

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

Only authorized personnel are allowed to break the utility sealing.

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Layout and dimensions

Phase indication

The connection terminal can be sealed through sealing screws and top cover.

The meter is provided with visible verification sealing.
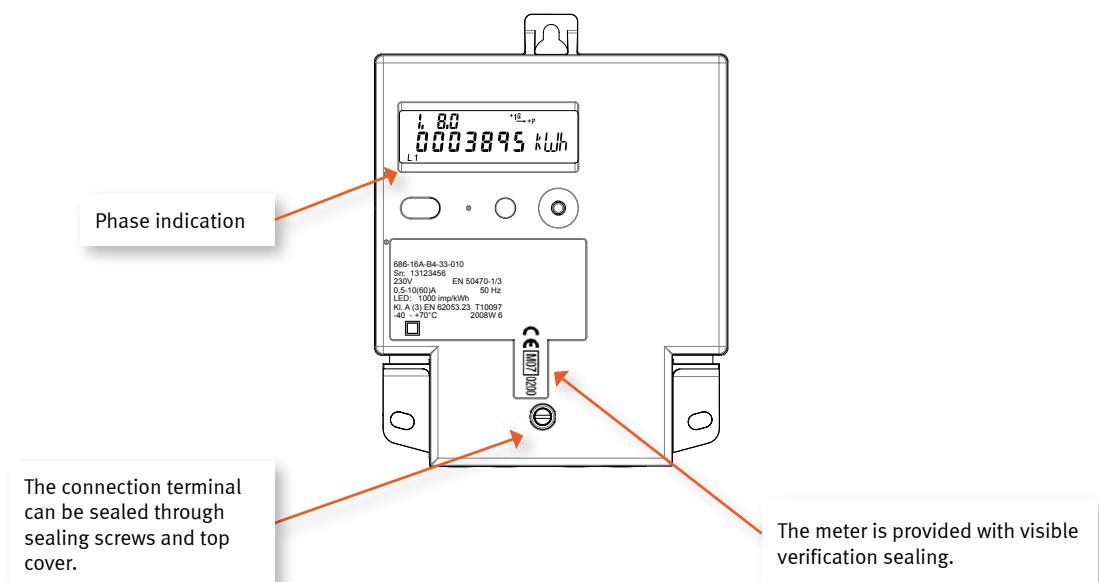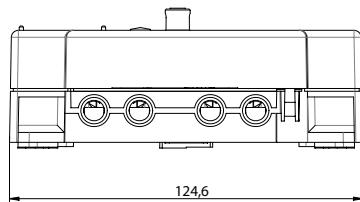
Kamstrup 162 without breaker   **Kamstrup 162 with breaker**
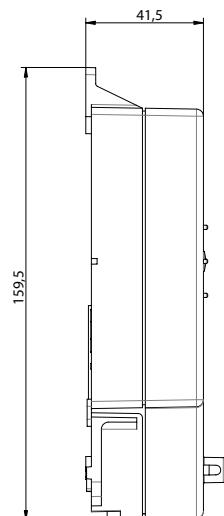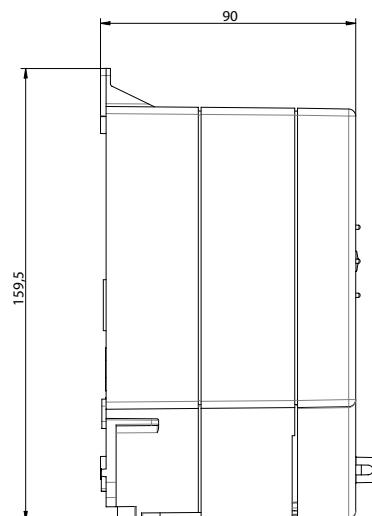
Accessories

Modules	Part No.
S0 supply module	68 50 001
Data/pulse module, relay output (RS232)	68 50 003
M-Bus module (wired)	68 50 005
Tariff module, 2 tariffs, 230 VAC	68 50 008
Tariff module, 4 tariffs, 230 VAC, current loop	68 50 018
S0 pulse module	68 50 021
IP101i, TCP/IP module	68 50 040
Radio module, router, high-power	68 50 043
GSM6i/RF, GSM7i	68 50 053
Pulse input/load control module (for integrated radio)	68 50 055
LON, twisted pair	68 50 057
5A load control module	68 50 058
Z-Wave slave module	68 50 061
Wireless M-Bus	68 50 064
2 x 5A load control module	68 50 069

Secondary plug-in modules	
Connection module for secondary plug-in module	68 50 062
Secondary plug-in module – Z-Wave slave module *	68 40 001

Configuration software	
"METERTOOL for kWh meters"	68 99 570

Covers	
Long terminal cover 60 mm for meter without breaker	30 26 270
Long terminal cover 60 mm for meter with breaker	30 26 367
High cover	59 60 148
Standard cover	59 60 147
High cover for secondary module	59 60 149

Miscellaneous	
Optical reading head with USB connector	66 99 099
Optical reading head with 9-pole D-sub connector	66 99 102
DIN rail mounting kit	68 30 007
Extension for top mounting ring	68 30 010
Top fitting, metal bow	68 50 101
Pins, 50 pcs.	68 50 102
Cable terminals, 50 pcs.	68 50 103

* Not sold separately. Only possible in combination with module 68 50 062 or 68 50 053.