

# Kamstrup 382

**kWh meter 5-120 A**

**1 or 2 tariffs**

**Easily readable display**

**Safe data logging of consumption**

**Module space for future updating**

**Large degree of accuracy**

**Optical and serial communication**

**Galvanically separated construction**

**Type approved according to**

**IEC 61036**

**IEC 62052-11**

**IEC 62053-21**



## Application

Kamstrup 382 is a one, two or three-phase direct meter for domestic customers. It can register the consumption in one or two tariffs. Growing demands for flexibility, accurate metering and improved customer information are also fulfilled. The easy-to-read display shows accumulated consumption. When the button is pushed current power, peak power etc. are displayed.

Kamstrup 382 fits in standard switch cabinets and has DIN-standard terminals. With a large dynamic range and configurable processor, Kamstrup 382 is suited to numerous applications.

Having no moving parts the meter does not wear, nor is it sensitive to impacts or mounting. The meter has been designed with extension facilities, and a low internal power consumption, ensuring economical and stable operation.

The meter's full-current measuring circuit measures the three phases individually via shunts, obtaining a very

large and accurate dynamic power range. The meter, which maintains the same measuring quality whether it measures on one, two or three phases, has a low starting current and is linear throughout the whole measuring range.

Due to high resolution, long-term stability and accuracy, together with direct current and voltage measurement through instrument transformer, verification and random sample control are quickly carried out in all available verification rigs.

The processor also controls pulse inputs and outputs as well as external communication and communication with the meter's module area. Display functions and the meter's pulse inputs and outputs can be configured as required, without influencing the verified measurement.

The electricity meter is developed and produced in Denmark and is type approved according to IEC 61036 and IEC 62052-11/IEC 62053-21 as class 1 or 2.



## Kamstrup

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

# Application

## Display

Kamstrup 382 is equipped with a liquid crystal display with 8 numerical digits as well as 3 alphanumerical characters. During normal operation the accumulated value for consumed electric energy is displayed with 7 digits and the corresponding measuring unit kWh by the 3 alphanumeric characters.

Usually, the display shows the accumulated electric energy in kWh. Furthermore, "L1", "L2" and "L3" at the bottom of the display, always show whether the phases are connected.

If 2 tariff functions are used T1 or T2 indicates the active tariff. See display on page 6.

The yellow S0 diode in the middle of the front plate is the meter constant which is 1000 imp/kWh.

Furthermore, three small squares in the top left corner of the display show the consumption of the individual phases with a higher resolution.

Activating the arrow key you can step through several display indications and functions, if these possibilities have been selected during the configuration of the meter. The display changes when the button is released.

- **Accumulated energy, total** ..... kWh  
Always displayed
- **Tariff1\***, **accumulated energy** ..... T1/kWh  
Displayed in two-tariff meter type
- **Tariff2\***, **accumulated energy** ..... T2/kWh  
Displayed in two-tariff meter type
- **Actual power** ..... W  
Average instantaneous power
- **Hour counter** ..... HRS  
Accumulated operating hours
- **Trip recorder, two decimals** ..... kWh  
Can be reset by 6 seconds' activation
- **Peak power** ..... WP  
The month's highest 15-minute power measurement
- **Meter number** ..... NUM  
The meter's programmed customer number
- **Pulse input** ..... m<sup>3</sup>/-/kWh/l  
Shows accumulated input pulses
- **Customer data** .....  
Can display 8 digits, customer specific
- **Display test** .....  
Lights all segments of the display
- **Call** ..... Call  
By pressing the button for 6 seconds a compulsory call to the meter's modem is provoked.

Two minutes after the last activation of the pushbutton, the display will automatically switch to accumulated electric energy in kWh.

## Calculation

A measuring circuit from each phase sends pulses to the microprocessor, which accumulates the pulses in an energy register. When 1 Wh has been counted, an S0 pulse is sent and register 2 is increased by one. Having accumulated 1,000 pulses in register 2, the EEPROM and the display are increased by one.

The average power during the period is calculated every 15 minutes. The highest W peak value of the month is stored in the EEPROM. The value is reset at the end of the month.

## Permanent memory

The meter's data memory is updated every time the meter's kWh register is changed. All changes are safely stored in the voltage independent EEPROM.

The following register values are stored hourly: kWh (total), peak power, pulse input and hour counter.

Following each 730 hour period, the same values are stored as monthly values. Values for the last 36 months are stored.

## Optical reading

An optical infrared sender and receiver according to IEC 61107 is placed on the front of the electricity meter to the left. A standard optical readout head with a permanent magnet according to IEC 61107 is to be used to read data or to configure e.g. display set-up and pulse figure.

By using METERTOOL for 162/382 the meter's display indications and pulse set-up can be configured. The meter is protected by a 6-digit password.

It is not possible to change the meter's legal data without breaking the verification seal and modifying the main print.

Kamstrup's reading head, type no. 66-99-102 with 9-pole D-sub plug can be used with a standard PC with Kamstrup's METERTOOL for 162/382 or similar.

## S0 pulse output

Parallel to the S0 diode, galvanically separated S0 pulses are emitted.

1,000 pulses per kWh with a nominal pulse time of 30 ms are emitted.

## Plug-In modules

If needed, the electricity meter can be extended by a plug-in module without subsequent reverification.

The module area communicates with the electricity meter's microprocessor via an internal data bus, which provides innumerable functional possibilities, e.g. tariff, extra pulse output, power supply modules, data communication via radio or utilization of the extra pulse input.

\* The measuring unit is shifting between T and kWh.

## Approved measuring data

Approval	Norm	Others	Norm
Meter	IEC 62052-11, IEC 62053-21	Verification	IEC 61358
Accuracy class	Class 2 or class 1	Terminal box	DIN 43 857
Measuring range	Basic current 5 A or 10 A Max. current 120A, 100 A, 80 A or 60 A	S0 pulse Optical reading	DIN 43 864 IEC 62056-21 (61107)

## Technical data

Measuring principle	Single-phase current measurements via shunt	Materials	
Voltage range	$U_n$ 1 x 230 VAC $\pm 10\%$ 2 x 230/400 VAC $\pm 10\%$ 3 x 230/400 VAC $\pm 10\%$ 3 x 230 VAC $\pm 10\%$	Cover	Transparent polycarbonat
		Bracket	Glass reinforced polycarbonate
		Memory	EEPROM
		Data storage	>10 years without voltage
Current range	$I_b$ 5 A/10 A $I_{max}$ 120A/100 A/80 A/ 60 A	Display	1+7+3 digits, digit height 7 mm kWh: 7 digits
		Optical readout head	IEC 61107 mode A, 300 baud
Frequency	$f_n$ 50 Hz $\pm 2\%$	S0 pulse diode	1000 imp/kWh Pulse duration 30 ms. $\pm 10\%$
Power factor	$\cos \varphi$ 0.5 <small>inductive</small>	S0 pulse output	1000 imp/kWh Pulse duration 30 ms. $\pm 10\%$
Power consumption, voltage circuit	$\leq 0.2$ VA, 0.15 W		
Power consumption, current circuit at $I_b$	$\leq 0.01$ VA		
Application	Indoors or in suitable outdoor cabinet		
Impulse voltage test	12 kV		
Operating temperature	-40°C - +63°C		
Storage temperature	-40°C - +70°C		
Protective class	IP51		
Protection class	II		
Relative humidity	$\leq 95\%$ not condensing		
Weight	Approx. 850 g		

### Connections

Measuring circuit L1,L2,L3 + N	Elevating 1.5 mm <sup>2</sup> - 25 mm <sup>2</sup> (Pz 2) 4 mm <sup>2</sup> - 35 mm <sup>2</sup> (Pz 2) 685 312 Torque 2.5 - 3 Nm
Supply terminal	Cable terminal forks 4 mm (Tx 10) Torque 1 Nm
S0 pulse output	Connection terminals 0.15 mm <sup>2</sup> - 2.5 mm <sup>2</sup>
Data/pulse connections	Connection terminals 0.15 mm <sup>2</sup> - 1 mm <sup>2</sup>

## Connection modules

The meter can be supplied or retrofitted with the following inputs and outputs from the main print via connection modules, without reverification.

### In/out functions

#### Pulse input

Contact input	
Normal ( $\leq 0.5$ Hz)	Pulse duration $> 1$ s.
Quick ( $\leq 16$ Hz)	Pulse duration $\geq 30$ ms.

#### Pulse output 2

Pulse time, 1 imp/Wh	30 ms $\pm 10\%$
Pulse time, 1 imp/kWh	60 ms $\pm 10\%$

Data output	RS232, open collector 300/1200 baud
-------------	--

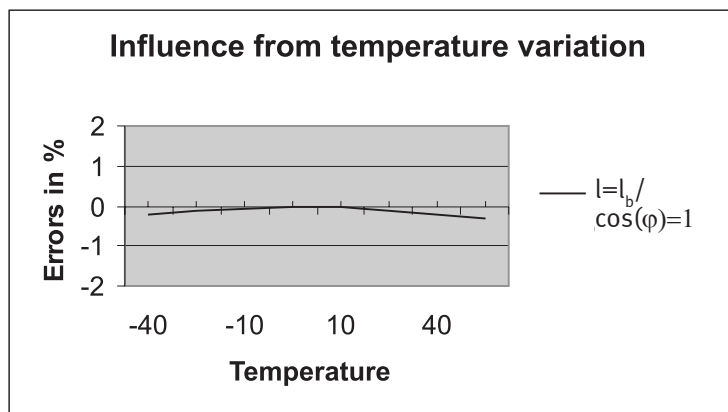
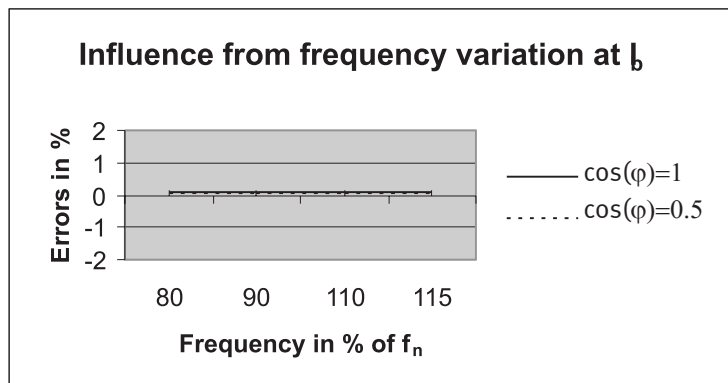
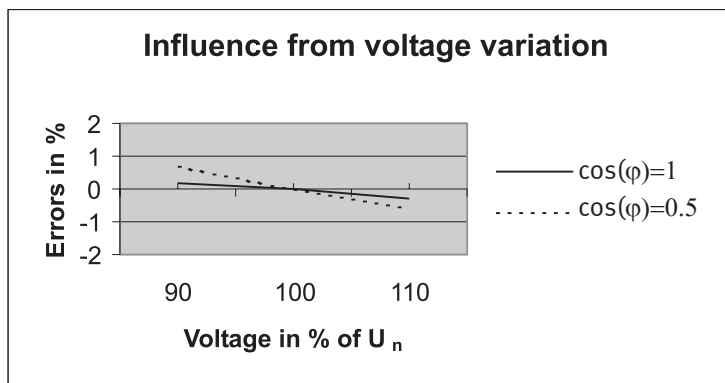
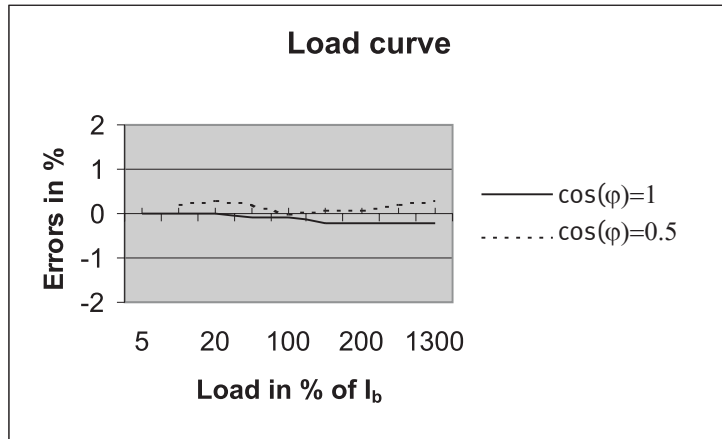
Pulse times and frequency are configurable via optical or hardwired data communication.

### Modules

Radio	Remote reading via radio communication.
-------	---

V.22 modem	Supports caller identification.
S0 supply	Sends pulses and optionally 24 V supply voltage via a two wire.
Data/pulse	Pulse input, pulse output 2 and serial communication.
M-Bus	Remote reading via M-Bus system EN 1434-3.
RCR	Ripple Control Receiver.
Current Loop	Tariff control of 2 tariffs, CS and 230 V.
GSM/GPRS	Remote reading via GSM/GPRS communication. Supports SMS reading.
PLC	Remote reading via power line communication.
TCP/IP	Remote reading via TCP/IP communication.

# Typical accuracy charts



# Ordering details

Type number 685-

### Number of phases

1-phase meter .....	1
2-phase meter .....	2
3-phase meter .....	3

### Current range

5 - 100 A (35 mm <sup>2</sup> terminals).....	1
5 - 120 A (35 mm <sup>2</sup> terminals).....	2
10 - 60 A .....	6
5 - 80 A .....	8
5 - 100 A (25 mm <sup>2</sup> terminals).....	9

### Accuracy class

Class 1 .....	1
Class 2 .....	2

### Modules

No modules .....	OK
S0 Supply module .....	SK
Data/pulse module, relay output .....	RK
Radio/router module .....	QR
M-Bus module .....	MK
RCR module, Ripple Control Receiver .....	EK
V.22 modem .....	HK
Tariff module, 2 tariffs, 230 V.....	WK
Tariff module, 2 tariffs, 230 V, Current Loop .....	FK
GSM/GPRS .....	YN
PLC .....	PO
TCP/IP .....	IK

### Choice of label

TR.....	35
LV .....	45
LIT .....	49
GB .....	50
CH-I .....	59
EST .....	61
CH-D .....	63
CH-F.....	65
NL-STD.....	80
NL.....	81

### Configuration

#### Display

Fixed choice: Accumulated energy in kWh

Optional indications:

- |                  |                 |
|------------------|-----------------|
| 1 Tariff 1 and 2 | 6 Meter number  |
| 2 Actual power   | 7 Pulse input   |
| 3 Hour counter   | 8 Customer data |
| 4 Trip recorder  | 9 Call          |
| 5 Peak power     |                 |

Preceding zeroes: Yes/no

Meter number: Serial no./serial number series  
(max. 8 digits)

Customer data: Max. 8 digits

#### In/out

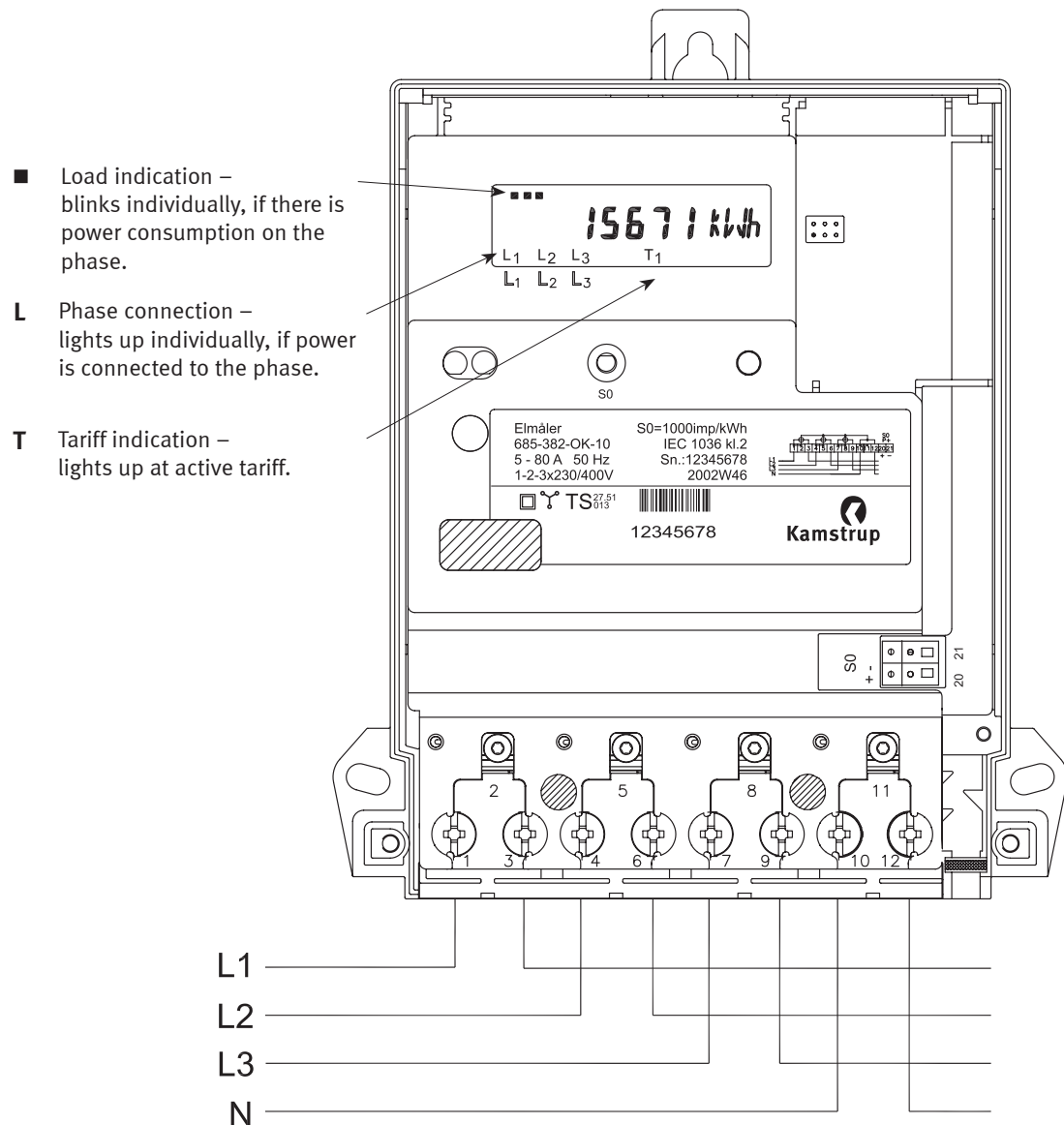
Pulse input:	Normal/quick
Pulse constant	0.25 - 1000 imp/unit
Units	None/kWh/l/m <sup>3</sup>
Pulse output 2:	1 imp/kWh or 1000/kWh

### Special mounting

- Contact plug
- Long terminal cover 60 mm
- Extra long terminal cover 100 mm

## Installation

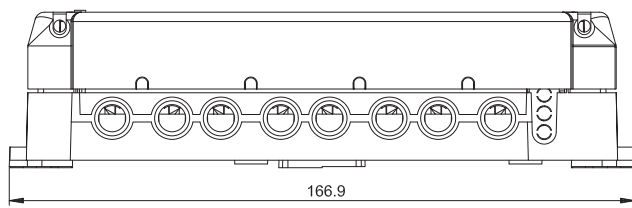
Only authorized personnel are permitted to install the electricity meter.



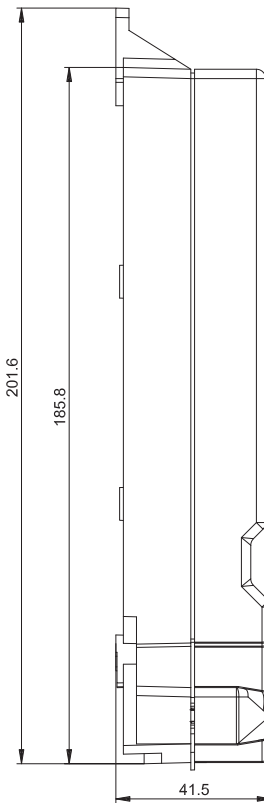
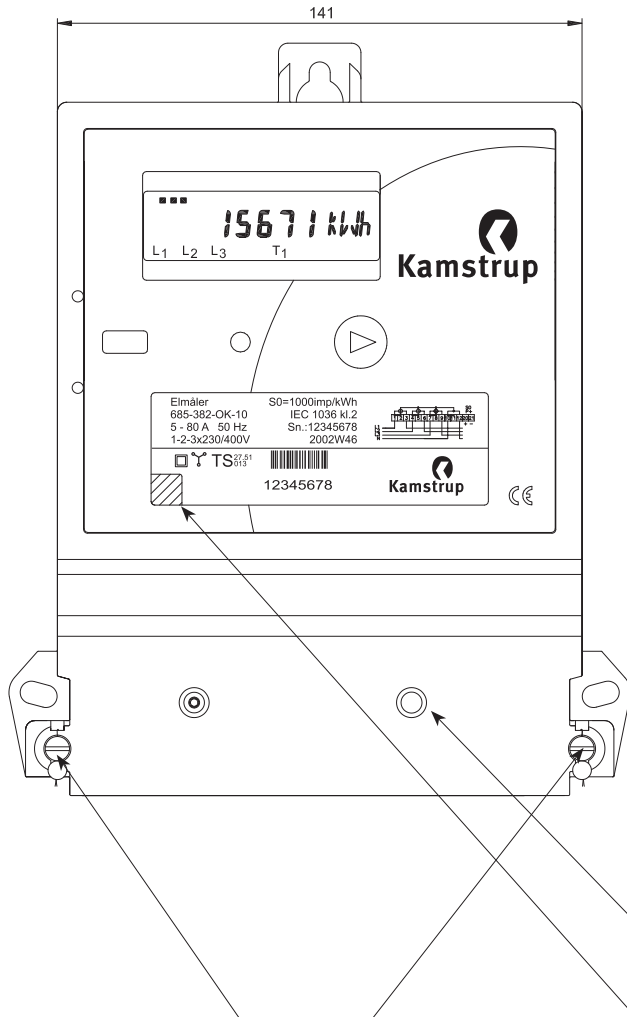
## Warning

Do not touch connections or inner parts once the voltage supply has been connected to the meter.

# Sealing



Dimensions stated in [mm]



The electricity meter's connection terminals can be sealed in the usual way through the sealing screws and the holes in the meter's top cover.

The electricity meter is provided with a verification sealing from the factory, which is visible through the top cover.

## Accessories

### Modules

Radio/router module	68 50 043 3xxx
S0 Supply module	68 50 001
Data/pulse module, relay output	68 50 003
Tariff control module	68 50 006
M-Bus module	68 50 005
RCR modul, Ripple Control Receiver	68 50 012
V.22 modem	68 50 010
Tariff module, 4 tariffs, 230 V, data	68 50 007
Tariff module, 2 tariffs, 230 V	68 50 008
Tariff module, 2 tariffs, 230 V, Current Loop	S7590 026
GSM/GPRS	68 11 xxxxx
PLC	68 50 036
TCP/IP	68 50 040

### Software

Configurations SW, METERTOOL for 162/382	68 99 540
--	-----------

### Accessories

Long terminal cover 60 mm	30 26 226
Extra long terminal cover 100 mm	30 26 323
Optical readout head with 9-pole D-sub plug	66 99 102
Optical readout head with USB plug	66 99 099
Top fitting, metal bow	68 50 101
Contact plugs, 50 pcs.	68 50 102
Cable terminals, 50 pcs.	68 50 103
Safety test probe	68 30 008