EU-TYPE EXAMINATION CERTIFICATE

Shenzhen Kaifa Technology (Chengdu) Co., Ltd.
No. 99 Tianquan Rd., Hi-Tech Development Zone,
611730, Chengdu, P.R.C.

EU-Type Examination
Certificate No.
1608-23
Revision 4

Type MA309M

Object Electronic three-phase four-wire energy and three-phase four-wire meter connected as single-phase two-wire (phase L1) energy meter.
Direct connected

The object has been assessed and meets the requirements of

EU Directive 2014/32/EU,
Module B

The energy meter(s) meet(s) the essential requirements of Annex V of EU Directive 2014/32/EU, on the harmonization of the laws of Member States relating to the making available on the market of measuring instruments (recast).

This Certification is based on the report(s) listed in the report list in this Certificate.

This Certificate is valid until: May 27, 2035.

This Certificate comprises 8 pages in total.

Issued by KEMA B.V.
Klingelbeekseweg 195,
Arnhem, The Netherlands
Notified Body 2290

Marten Dekker
Operations Director Netherlands

Arnhem, May 27, 2025

PRODUCTS RvA C 685

REVISION OVERVIEW

The highest revision always replaces the earlier issued versions.

Rev. No.	Date of issue	Reason
0	October 11, 2023	First issue
1	August 29, 2024	Report 1651-24 added
2	December 11, 2024	• Report 1758-24 added • Class A added
3	December 20, 2024	• Report 1781-24 added
4	May 27, 2025	• Report 103943101-25 added • 3P4W connected as 2P3W connection added • Model name added • Signature on the front sheet was adapted.

REPORT LIST

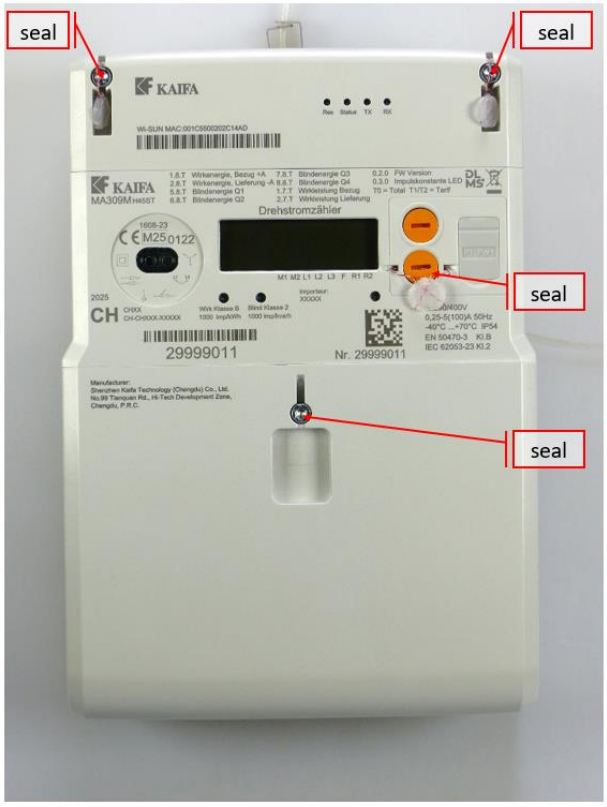
This Certificate is issued based on the following reports.

Report number	Revision	Firmware version
1607-23	0	010101
1651-24	0	010101
1758-24	0	010101
1781-24	0	010102
103943101-25	0	010102 010103

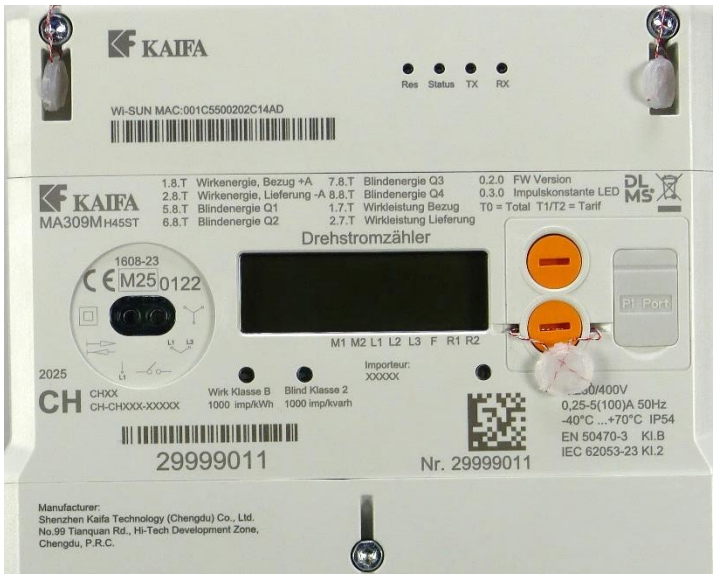
1 TECHNICAL DATA

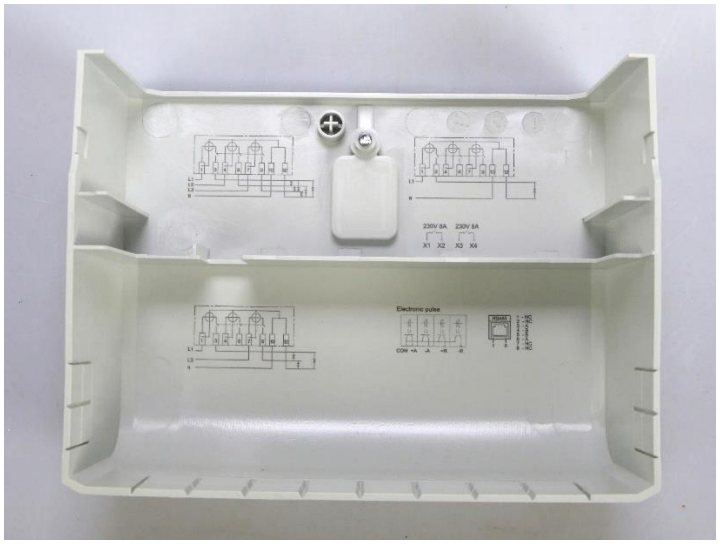
Manufacturer	Shenzhen Kaifa Technology (Chengdu) Co., Ltd., No. 99 Tianquan Rd., Hi-Tech Development Zone, 611730, Chengdu, P.R.C.		
Production location	Shenzhen Kaifa Technology (Chengdu) Co., Ltd., No. 99 Tianquan Rd., Hi-Tech Development Zone, 611730, Chengdu, P.R.C.		
Type	MA309M		
Model	H45ST		
Connection	Direct		
Type of circuit	3P4W	3P4W connected as 1P2W on L	3P4W connected as 2P3W
Accuracy class Wh	1/A/B		
Accuracy class varh	2		
Meter constant	Optical Pulse output active: 500 - 10000 imp./kWh Optical Pulse output reactive: 500 - 10000 imp./kvarh		
V range	3x230/400 V	230 V	2x230/400 V
I range I_{min}-I_n(I_{max})	0,25-5(80) A and 0,25-5(100) A		
Frequency	50 Hz		
Temperature range	-40 .. 70 °C		
Use	Indoor		
IP rating	IP54		
Protection Class	II		
Impulse voltage	8 kV		
Environmental class	M1, M2, E1 and E2, CISPR32 class B		
LR Firmware ID	1) 010102 (for meters without switch) 2) 010103 (for meters with switch)		
LR Firmware CRC	1) A70E8A8C 2) 5856369C		
Register	LCD		
Registry method(s):	Bi-directional method separate registers: received- and delivered energy of the whole connection is added in separate registers		

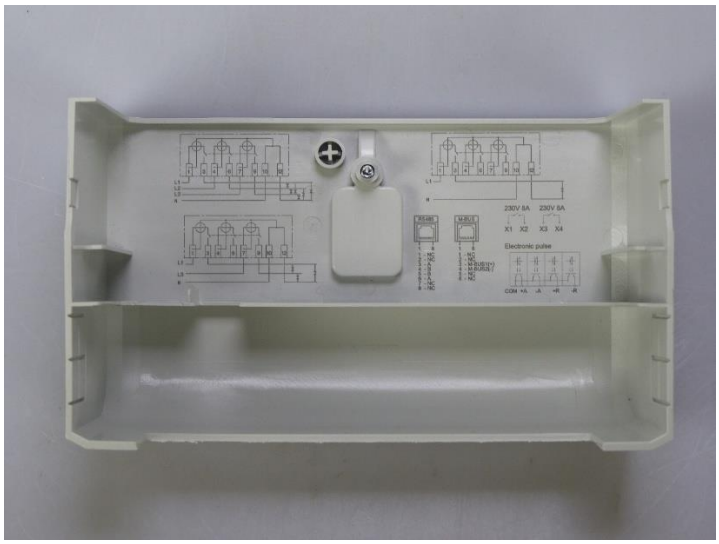
2 PHOTOGRAPHS AND SEALING



3 EXAMPLES OF NAME PLATES







4 CALCULATION OF THE COMPOSITE ERROR / MPE

During the type approval test the intrinsic errors for temperature, voltage and frequency variation are determined per load point. The composite error is determined with the following formula:

$$\varepsilon_m = \sqrt{\varepsilon^2(I, cos\varphi) + \delta^2(T, I, cos\varphi) + +\delta^2(U, I, cos\varphi) + \delta^2(f, I, cos\varphi)}$$

Where
$\varepsilon^2(I, cos\varphi)$ = Intrinsic error of the meter at a certain load
$\delta^2(T, I, cos\varphi)$ = Additional error due to the variation of the temperature at the same load
$\delta^2(U, I, cos\varphi)$ = Additional error due to the variation of the voltage at the same load
$\delta^2(f, I, cos\varphi)$ = Additional error due to the variation of the frequency at the same load

Results are in the table below:
As 3P4W

I in % of I_{ref}	cos φ	Phase	Composite error %							
			-40 ºC	-25 ºC	-10 ºC	5 ºC	30 ºC	40 ºC	55 ºC	70 ºC
5	1	RST	0,69%	0,56%	0,37%	0,21%	0,09%	0,15%	0,27%	0,32%
10	1	RST	0,70%	0,55%	0,37%	0,19%	0,07%	0,14%	0,25%	0,32%
10	0,5 ind.	RST	0,79%	0,61%	0,41%	0,25%	0,14%	0,17%	0,24%	0,30%
10	0,8 cap.	RST	0,67%	0,54%	0,37%	0,20%	0,06%	0,14%	0,24%	0,32%
10	1	R	0,63%	0,50%	0,33%	0,16%	0,06%	0,10%	0,16%	0,17%
10	0,5 ind.	R	0,66%	0,52%	0,31%	0,16%	0,07%	0,10%	0,15%	0,17%
10	1	S	0,80%	0,60%	0,39%	0,19%	0,06%	0,18%	0,31%	0,39%
10	0,5 ind.	S	0,92%	0,66%	0,43%	0,25%	0,11%	0,19%	0,28%	0,34%
10	1	T	0,66%	0,57%	0,40%	0,22%	0,05%	0,15%	0,28%	0,39%
10	0,5 ind.	T	0,73%	0,60%	0,43%	0,23%	0,06%	0,15%	0,25%	0,34%
I_{max}	1	RST	0,69%	0,54%	0,36%	0,18%	0,07%	0,16%	0,25%	0,33%
I_{max}	0,5 ind.	RST	0,77%	0,60%	0,41%	0,22%	0,08%	0,15%	0,23%	0,29%
I_{max}	0,8 cap.	RST	0,67%	0,53%	0,36%	0,18%	0,08%	0,16%	0,26%	0,34%
I_{max}	1	R	0,79%	0,62%	0,41%	0,24%	0,16%	0,22%	0,31%	0,39%
I_{max}	0,5 ind.	R	0,86%	0,64%	0,41%	0,22%	0,11%	0,18%	0,26%	0,32%
I_{max}	1	S	0,79%	0,61%	0,42%	0,26%	0,19%	0,23%	0,31%	0,37%
I_{max}	0,5 ind.	S	0,66%	0,48%	0,29%	0,14%	0,09%	0,10%	0,13%	0,12%
I_{max}	1	T	0,71%	0,51%	0,31%	0,13%	0,05%	0,08%	0,09%	0,08%
I_{max}	0,5 ind.	T	0,85%	0,62%	0,41%	0,23%	0,14%	0,20%	0,31%	0,39%

3P4W as 1P2W on phase L1

I in % of I_{ref}	cos φ	Composite error %								
		ºC	-40	-25	-10	5	30	40	55	70
5	1		0,32%	0,29%	0,23%	0,14%	0,07%	0,10%	0,16%	0,18%
10	1		0,34%	0,31%	0,23%	0,13%	0,05%	0,10%	0,14%	0,19%
10	0,5 ind		0,41%	0,33%	0,28%	0,15%	0,07%	0,10%	0,14%	0,16%
10	0,8 cap		0,30%	0,26%	0,22%	0,10%	0,04%	0,11%	0,18%	0,21%
I_{max}	1		0,34%	0,32%	0,23%	0,12%	0,04%	0,09%	0,16%	0,20%
I_{max}	0,5 ind		0,40%	0,35%	0,26%	0,13%	0,03%	0,08%	0,13%	0,17%
I_{max}	0,8 cap		0,32%	0,29%	0,22%	0,12%	0,04%	0,10%	0,17%	0,21%

5 OPTIONS AND VARIANTS

Overview of variants with details

Type designation	Details of the meter
MA309M H45ST	• Communication options: 4G+2G CAT M1+NB CAT M1 Wi-Sun RS485 P1 port Wired M-Bus Optical output • Pulse output (limited meter constant) • Auxiliary relay terminal 3x • HAN port • With and without Supply switch

END OF DOCUMENT

The laboratories of KEMA Labs are:

- CESI S.p.A., Milan, Italy.
- FGH Engineering & Test GmbH, Mannheim, Germany.
- IPH Institut “Prüffeld für elektrische Hochleistungstechnik” GmbH, Berlin, Germany.
- KEMA B.V., Arnhem, The Netherlands.
- KEMA Labs, Zkušebnictví, a.s., Prague, the Czech Republic.
- KEMA-Powertest, LLC, Chalfont, United States.