



EU Type Examination Certificate Number: **0120/SGS0324**

COMADAN A/S

Messingvej 60
Randers SV
8940
Denmark

Instrument Identification:
EM1-45 Series

Single Phase, Active Import (kWh) Indoor, Electricity Meter

Instrument Traceable Number
0120/SGS0324

has been assessed and certified as meeting the requirements of

EU Directive 2014/32/EU
on Measuring Instruments Annex II, Module B

It is certified that the manufacturer's technical design and specimen for the above instrument has been examined and, based on the evidence submitted, it is considered that the instrument conforms to the requirements of Annex V of EU Directive 2014/32/EU

This certificate must be used in conjunction with a certificate covering the product verification as required in Annex II, Module D or Annex II, Module F


This certificate is valid until 17th February 2024
Issue 2

Certification is based on report number(s) SHES130800321401 dated 18th February 2014
EMA242783

Authorised Signature


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	0120/SGS0324	
	Issue Number: 2	Dated: 3 rd December 2019


1. Technical Data

Manufacturer	COMADAN A/S	
Meter Type	EM1-45, EM1-45-A, EM1-45-B, EM1-45-Modbus, EM1-45-C, EM1-45-A-C, EM1-45-B-C, EM1-45-Modbus-C, EM1-45 V2, EM1-45-A V2, EM1-45-B V2	
Voltage Rating (<i>Un</i>)	230V	
Current Rating (<i>I_{min}</i> – <i>I_{ref}</i> (<i>I_{max}</i>))	0.25-5(45)A	
Frequency (<i>Fn</i>)	50Hz	
Active Accuracy Class (<i>kWh</i>)	A or B (kWh)	
Type of circuit	1p2w	
Temperature Range	-25°C to +55°C	
Software/ Firmware Version No	EM1-45, EM1-45B, EM1-45A: V1.2 EM1-45-Modbus: V2.3 EM1-45-C, EM1-45-B-C, EM1-45-A-C, EM1-45-Modbus-C, EM1-45 V2, EM1-45-B V2, EM1-45-A V2: V2.4	
CRC Checksum	EM1-45, EM1-45B, EM1-45A: 0x00008E1E EM1-45-Modbus: 0x000038A2 EM1-45-C, EM1-45-B-C, EM1-45-A-C, EM1-45-Modbus-C, EM1-45 V2, EM1-45-B V2, EM1-45-A V2: 0x0000272C	
Identification Location	Nameplate	
Bill Of Materials Number	EM1-45, EM1-45-B-DB: V2.1 EM1-45-Modbus-C: DH-JS-170009-1.2 EM1-45-C, EM1-45 V2: DH-JS-180033-1.0 EM1-45-A-C, EM1-45-A V2: DH-JS-190006-1.0 EM1-45-B-C, EM1-45-B V2: DH-JS-190009-1.0 EM-45-A: V2.0 EM-45-Modbus: V151119	
IP Rating	IP51	
Insulation Protective Class	Class II	
LED Pulse Constant	1000imp/kWh & 100imp/kWh	
Impulse Voltage Rating	6kV	
AC Voltage Rating	4kV	
Main Cover Sealing Type	4 x Wire & Crimp	
Integrity of meter	Inaccessible without breaking seals	
Intended Location of the Meter	Indoor	
Type of Register	LCD: EM1-45, EM1-45-B, EM1-45-Modbus, EM1-45-C, EM1-45-B-C, EM1-45-Modbus-C, EM1-45 V2, EM1-45-B V2 Mechanical: EM1-45-A, EM1-45-A-C, EM1-45-A V2	
Terminal Arrangement(s)	DIN	
Location of Manufacturers Address	Side of meter	

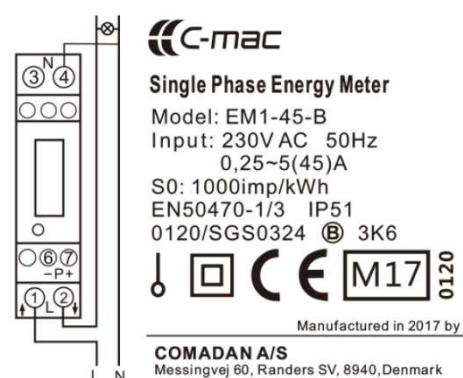
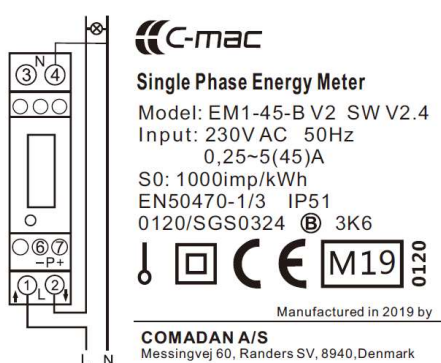
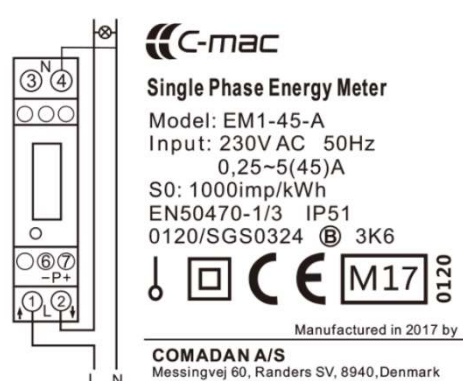
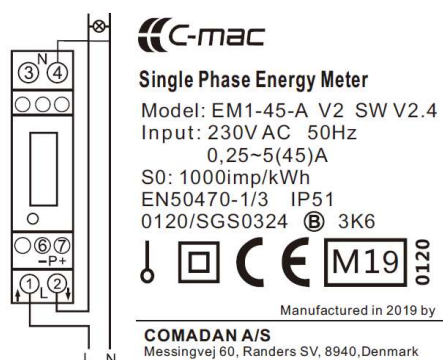
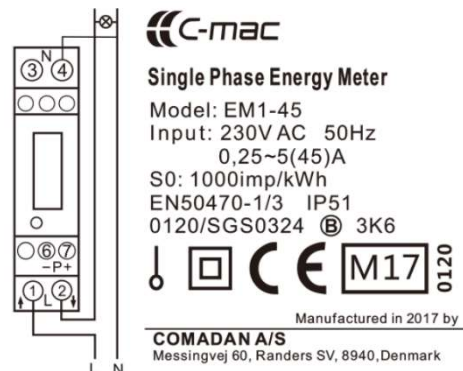
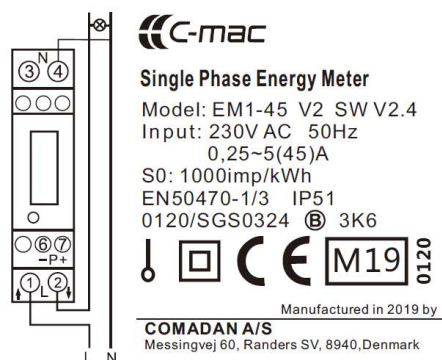
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2. Photograph of Meter and Sealing Plans

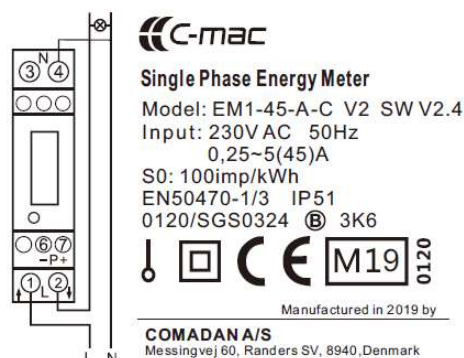
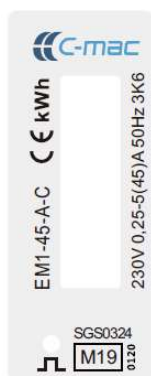
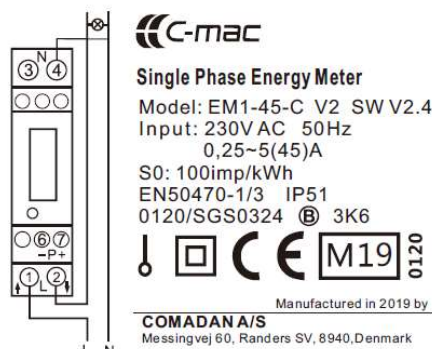
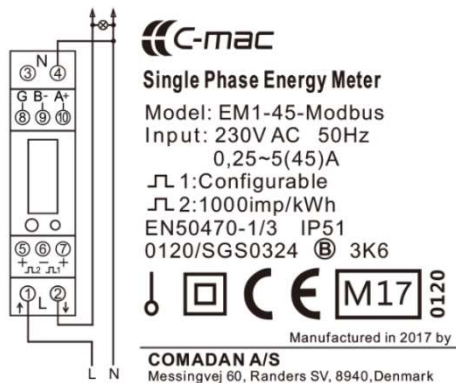



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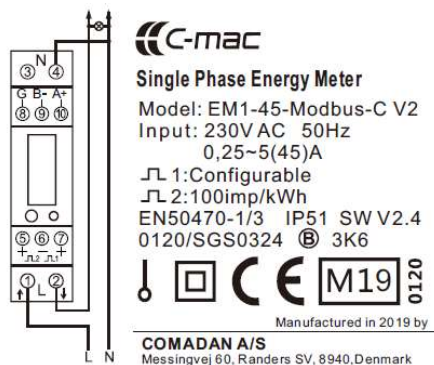
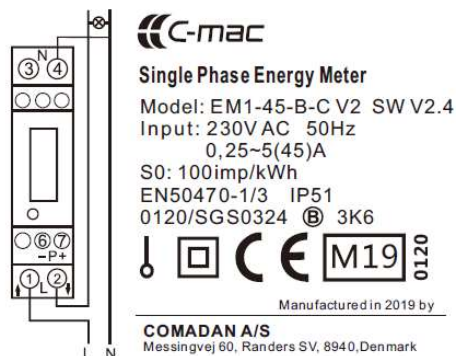
3. Examples of Nameplates




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4. Calculation of the composite error/ MPE


During the type approval examination the influence factors for temperature, frequency and voltage are determined per load point. The table below represents the sum of the square values per load, determined via the following formula:-

$$\delta e(T, U, f) = \sqrt{(\delta e^2(T, I, \cos\phi) + \delta e^2(U, I, \cos\phi) + \delta e^2(f, I, \cos\phi))}$$

where

$\delta e(T, I, \cos\phi)$	=	Additional error due to variation of the temperature at the same load
$\delta e(U, I, \cos\phi)$	=	Additional error due to variation of the voltage at the same load
$\delta e(f, I, \cos\phi)$	=	Additional error due to variation of the frequency at the same load

		Influence Factors for Temperature, Voltage & Frequency					
Current	PF Cos	-25°C	-10°C	5°C	30°C	40°C	55°C
I _{min}	1.0	0.12	0.12	0.12	0.13	0.12	0.12
I _{tr}	1.0	0.16	0.16	0.16	0.16	0.16	0.16
10I _{tr}	1.0	0.17	0.16	0.16	0.16	0.16	0.16
I _{max}	1.0	0.13	0.13	0.13	0.13	0.13	0.13
I _{tr}	0.5ind	0.29	0.29	0.29	0.29	0.29	0.29
10I _{tr}	0.5ind	0.40	0.40	0.40	0.40	0.40	0.40
I _{max}	0.5ind	0.16	0.16	0.16	0.16	0.16	0.16
I _{tr}	0.8cap	0.24	0.24	0.24	0.24	0.24	0.24
10I _{tr}	0.8cap	0.31	0.31	0.31	0.31	0.31	0.31
I _{max}	0.8cap	0.09	0.09	0.09	0.09	0.09	0.09


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5. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter
EM1-45	Single Phase 230V, 0.25-5(45)A LCD register, 1000imp/kWh
EM1-45-C V2	Single Phase 230V, 0.25-5(45)A LCD register, 100imp/kWh
EM1-45-B	Single Phase 230V, 0.25-5(45)A LCD register with backlight, 1000imp/kWh
EM1-45-B-C V2	Single Phase 230V, 0.25-5(45)A LCD register with backlight, 100imp/kWh
EM1-45-A	Single Phase 230V, 0.25-5(45)A Mechanical register, 1000imp/kWh
EM1-45-A-C V2	Single Phase 230V, 0.25-5(45)A Mechanical register, 100imp/kWh
EM1-45-Modbus	Single Phase 230V, 0.25-5(45)A, LCD register, 2 Pulse Outputs, RS485 Communication Port, Modbus, 1000imp/kWh
EM1-45-Modbus-C V2	Single Phase 230V, 0.25-5(45)A, LCD register, 2 Pulse Outputs, RS485 Communication Port, Modbus, 100imp/kWh
EM1-45 V2	Single Phase 230V, 0.25-5(45)A LCD register, 1000imp/kWh
EM1-45-B V2	Single Phase 230V, 0.25-5(45)A LCD register with backlight, 1000imp/kWh
EM1-45-A V2	Single Phase 230V, 0.25-5(45)A Mechanical register, 1000imp/kWh

Modifications to the meter(s) described according to approval No.**0120/SGS0324** must be notified to the issuing body to confirm the meter(s) continuing compliance to the relevant pattern approval standard(s).

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6. Document Revision History

Issue	Date	Comments
1	03/10/2017	Initial Issue
2	03/12/2019	Addition of EM1-45-C, EM1-45-B-C, EM1-45-A-C, EM1-45-Modbus-C, EM1-45 V2, EM1-45-A V2 and EM1-45-B V2 variants

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END OF CERTIFICATE