


EU TYPE EXAMINATION CERTIFICATE

Directive 2014/32/EU, Module B

0598/MID/B/24/015 Issue 1

Product	Active Electrical Energy Meters (Annex V MI-003)		
Model	Meter type EMP1.xx	Description Polyphase, Active Import / Export, Electricity Meter	Instrument Traceable No. 0120/SGS0461
	EMP1.cx	Polyphase, Active Import / Export, Transformer Operated, Electricity Meter	
Certificate holder / Manufacturer	EM-Lite Ltd 1 Stevern Way, Peterborough, PE1 5EL, United Kingdom		
Directive information	For the instruments mentioned in this Certificate, the following essential requirements of Directive 2014/32/EU apply: - Annex I Essential requirements - Annex V Active electrical meters (MI-003)		
Standards	EN 50470-1: 2006, EN 50470-3: 2006		
Validity	This certificate is valid until 2030-06-11 The manufacturer must inform SGS Fimko in case of any intended change to the design. Unauthorised changes will invalidate this certificate. The Manufacturer is permitted to affix the CE-marking onto the instrument(s) after complying with the conformity assessment procedures referred to in Article 17 of the Directive and to draw up a written declaration of conformity.		
Date of issue	2024-10-11 SGS Fimko OY Notified Body 0598		
Signature	 Mikko Välimäki Certification Manager		



Test report(s)

Report Number	Date
EMA308333/1	2022-10-20
EMA277432/1/MID	2022-06-12
EMA32135/1	2023-12-13

Technical information

Meter type(s)	EMP1.**: Direct Connected EMP1.c*: Transformer Operated:
Voltage rating (U ⁿ)	3*230/400V
Current rating (I _{min} – I _{ref} (I _{max}))	EMP1.**: 0.25-5(100)A, 0.5-10(100)A, 1-20(100)A EMP1.c*: 0.05-5(6)A
Frequency (F _n)	50 Hz
Active Accuracy Class (kWh)	A or B (kWh)
Type of circuit	1p2w, 1p3w, 2p3w, 3p4w, 2p of 3p4w
Temperature range	-40°C to +70°C
Software/Firmware version no.:	EMP1.**: V1.00.0, V1.01.6, V1.01.7, V1.06.0, V1.06.6, V1.07.4 V1.07.6, V1.07.9, V1.08.2 EMP1.c*: V2.00.0, V2.00.7, V2.00.8, V2.01.2
CRC Checksum	EMP1.**: A7E9, B4F6, B1EA, 75AA, 4D5C, 230F, DEA7, E0ED, DFFE EMP1.c*: BC4C, E010, 55DB, 862A
Identification location	LCD
Bill of Materials No.	EMP1.**: EMP1.at: EMP1-4006-19, EMP1.av: EMP1-4004-19, EMP1.az: EMP1-4005-19, EMP1.ay: EMP1-4003-19, EMP1.x: EMP1-4002-19, EMP1.w: EMP1-4001-19, EMP1.r : EMP1-4007-19, EMP1.ax:EMP1-4008-19 EMP1.c*: EMP1.cr: EMP1-4010-19, EMP1.cw: EMP1-4011-19 EMP1.cx: EMP1-4009-19, EMP1.cv: EMP1-4012-19

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IP rating	IP54
Insulation protective class	Class II
LED Pulse Constant	EMP1.**: 1000 imp/kWh EMP1.c*: 10000 imp/kWh
Impulse Voltage Rating	6kV
AC Voltage Rating	4 kV
Main Cover Sealing Type	Press fit non-removable lasered plastic seals
Integrity of Meter	Inaccessible without breaking seals
Intended location of the Meter	Indoor
Type of Register	LCD
Terminal Arrangement(s)	BS

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Business ID 0978538-5

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Photograph of Meter and Sealing Plan

Main Cover Sealing Points



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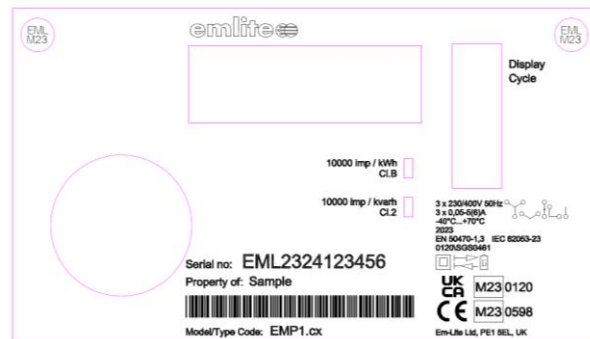
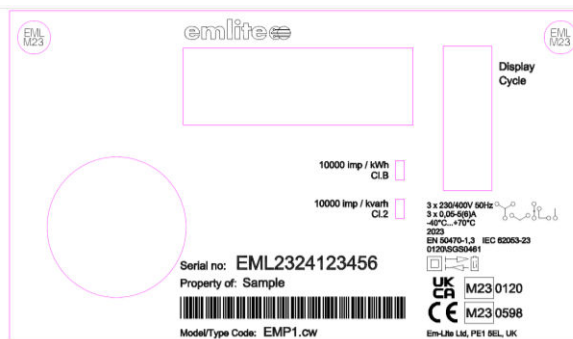
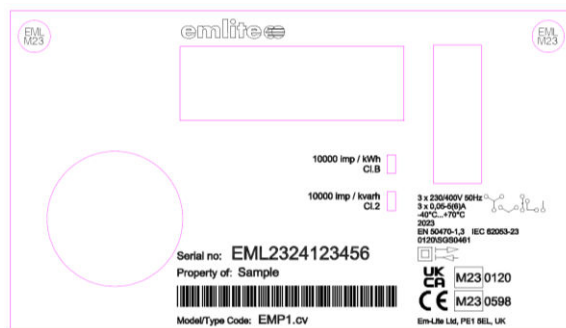
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Example of Nameplates

Direct Connected



Transformer Operated



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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:

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

where

$\delta e(T, I, \cos\varphi)$ = Additional error due to variation of the temperature at the same load

$\delta e(U, I, \cos\varphi)$ = Additional error due to variation of the voltage at the same load

$\delta e(f, I, \cos\varphi)$ = Additional error due to variation of the frequency at the same load.

Direct Connected

		Influence Factors for Temperature. Frequency & Voltage							
Current	PF Cos	-40°C	-25°C	-10°C	5°C	30°C	40°C	55°C	70°C
I _{min}	1.0	0.49	0.36	0.27	0.16	0.09	0.11	0.13	0.20
I _{tr}	1.0	0.50	0.37	0.25	0.13	0.09	0.11	0.12	0.17
10I _{tr}	1.0	0.58	0.44	0.28	0.20	0.13	0.14	0.13	0.13
I _{max}	1.0	0.71	0.63	0.42	0.22	0.09	0.09	0.09	0.13
I _{tr}	0.5ind	0.51	0.35	0.24	0.11	0.09	0.11	0.18	0.33
10I _{tr}	0.5ind	0.57	0.42	0.33	0.18	0.12	0.17	0.20	0.33
I _{max}	0.5ind	0.67	0.59	0.41	0.16	0.09	0.06	0.11	0.06
I _{tr}	0.8cap	0.55	0.40	0.26	0.14	0.10	0.10	0.11	0.16
10I _{tr}	0.8cap	0.50	0.36	0.23	0.18	0.15	0.15	0.15	0.18
I _{max}	0.8cap	0.71	0.53	0.35	0.20	0.06	0.06	0.09	0.10
L1						0.00	0.00	0.00	0.00
I _{tr}	1.0	0.52	0.42	0.25	0.12	0.10	0.11	0.08	0.14
10I _{tr}	1.0	0.62	0.49	0.29	0.19	0.13	0.14	0.13	0.20
I _{max}	1.0	0.79	0.63	0.38	0.23	0.07	0.07	0.02	0.06
I _{tr}	0.5ind	0.48	0.35	0.23	0.12	0.10	0.13	0.17	0.32
10I _{tr}	0.5ind	0.58	0.46	0.26	0.15	0.09	0.15	0.14	0.25
I _{max}	0.5ind	0.72	0.57	0.34	0.25	0.20	0.21	0.21	0.21
L2									
I _{tr}	1.0	0.49	0.33	0.20	0.10	0.09	0.12	0.14	0.26
10I _{tr}	1.0	0.50	0.30	0.21	0.11	0.10	0.09	0.17	0.18
I _{max}	1.0	0.74	0.57	0.35	0.19	0.10	0.10	0.10	0.10
I _{tr}	0.5ind	0.47	0.30	0.14	0.11	0.13	0.16	0.21	0.45
10I _{tr}	0.5ind	0.49	0.33	0.23	0.17	0.18	0.17	0.19	0.32
I _{max}	0.5ind	0.66	0.58	0.29	0.18	0.11	0.08	0.08	0.08
L3									
I _{tr}	1.0	0.62	0.49	0.28	0.16	0.08	0.09	0.11	0.19
10I _{tr}	1.0	0.64	0.51	0.30	0.15	0.11	0.14	0.11	0.14
I _{max}	1.0	0.80	0.64	0.40	0.25	0.06	0.06	0.06	0.10
I _{tr}	0.5ind	0.60	0.44	0.26	0.14	0.08	0.12	0.17	0.29
10I _{tr}	0.5ind	0.65	0.52	0.30	0.13	0.09	0.09	0.13	0.21
I _{max}	0.5ind	0.89	0.65	0.38	0.35	0.01	0.04	0.09	0.05

Transformer Connected

		Influence Factors for Temperature. Frequency & Voltage							
Current	PF Cos	-40°C	-25°C	-10°C	5°C	30°C	40°C	55°C	70°C
I _{min}	1.0	1.01	0.80	0.53	0.25	0.08	0.16	0.09	0.08
I _{tr}	1.0	1.03	0.76	0.49	0.21	0.11	0.21	0.22	0.10
10I _{tr}	1.0	0.87	0.68	0.45	0.22	0.07	0.22	0.13	0.06
I _{max}	1.0	0.95	0.67	0.44	0.22	0.14	0.20	0.19	0.16
I _{tr}	0.5ind	1.21	0.91	0.60	0.29	0.09	0.22	0.23	0.16
10I _{tr}	0.5ind	0.89	0.73	0.50	0.31	0.25	0.28	0.29	0.25
I _{max}	0.5ind	0.79	0.59	0.36	0.21	0.21	0.31	0.26	0.20
I _{tr}	0.8cap	0.99	0.84	0.45	0.20	0.10	0.18	0.17	0.08
10I _{tr}	0.8cap	0.93	0.61	0.39	0.20	0.17	0.22	0.21	0.17
I _{max}	0.8cap	0.95	0.60	0.44	0.21	0.11	0.17	0.17	0.10
L1									
I _{tr}	1.0	0.85	0.77	0.44	0.14	0.13	0.21	0.14	0.13
10I _{tr}	1.0	0.95	0.70	0.46	0.23	0.13	0.22	0.23	0.14
I _{max}	1.0	0.88	0.70	0.31	0.19	0.19	0.31	0.25	0.14
I _{tr}	0.5ind	1.31	1.00	0.67	0.36	0.08	0.17	0.14	0.18
10I _{tr}	0.5ind	0.90	0.65	0.43	0.30	0.21	0.27	0.32	0.21
I _{max}	0.5ind	0.88	0.64	0.34	0.20	0.16	0.28	0.28	0.13
L2									
I _{tr}	1.0	1.15	0.81	0.50	0.18	0.18	0.47	0.49	0.17
10I _{tr}	1.0	0.91	0.72	0.41	0.18	0.08	0.12	0.12	0.08
I _{max}	1.0	0.78	0.56	0.33	0.17	0.05	0.17	0.10	0.05
I _{tr}	0.5ind	1.29	0.99	0.68	0.23	0.15	0.28	0.45	0.20
10I _{tr}	0.5ind	0.94	0.77	0.49	0.36	0.30	0.32	0.29	0.29
I _{max}	0.5ind	0.82	0.69	0.46	0.22	0.08	0.08	0.09	0.08
L3									
I _{tr}	1.0	1.11	0.55	0.23	0.16	0.13	0.15	0.13	0.16
10I _{tr}	1.0	0.92	0.61	0.32	0.12	0.18	0.20	0.27	0.11
I _{max}	1.0	0.89	0.56	0.41	0.14	0.14	0.22	0.28	0.12
I _{tr}	0.5ind	1.30	0.87	0.54	0.24	0.13	0.28	0.16	0.19
10I _{tr}	0.5ind	1.00	0.79	0.44	0.29	0.27	0.28	0.29	0.26
I _{max}	0.5ind	0.96	0.64	0.37	0.08	0.10	0.15	0.23	0.08

Product Variant Identification Details:

Type Designation	Description of meter
EMP1.at	Multi-rate version with ToU functionality, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes terminal cover and magnetic tamper detect
EMP1.av	Basic Single Rate Polyphase Meter, one pulse output
EMP1.az	Basic Single Rate Polyphase Meter, no outputs
EMP1.ay	Modular Smart meter version without supply control switch, no outputs
EMP1.x	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits.
EMP1.w	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring and meter case tamper detect.
EMP1.r	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case and magnetic tamper detect.
EMP1.ax	Modular smart meter version without supply control switch, with two pulsed outputs and auxiliary relay for control of off-peak circuits
EM1P.cx	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits.
EMP1.cw	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case tamper detect.
EMP1.cr	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case and magnetic tamper detect.
EMP1.cv	Basic Single Rate Polyphase CT Meter, one pulse output
MC12	Communication Module for use with all modular versions

Certificate Revision History

Issue	Date	Comments
0120/SGS0461 Issue 1	2020-06-12	Initial Issue
0120/SGS0461 Issue 2	2020-09-10	Software version V1.01.6 & checksum B4F6 added. BOM updated for all variants.
0120/SGS0461 Issue 3	2021-04-26	New models; EMP1.ay, EMP1.x, EMP1.w, EMP1.r and MC12 added. Software versions V1.01.7, V1.06.0 & checksum B1EA, 75AA added. Bom number updated for all models. Change of Notified Body reference
0120/SGS0461 Issue 4	2021-11-19	New variant EMP1.ax added to approval. New software version V1.06.6 & updated BoM versions
0120/SGS0461 Issue 5	2022-10-24	New model EMP1.cx added to approval.
0120/SGS0461 Issue 6	2023-03-02	Additional software version V1.07.4 & checksum 230F
0120/SGS0461 Issue 7	2023-04-26	New software versions. EMP1.xx: V1.07.6, CRC DEA7. EMP1.cx: V2.00.7, CRC E010.
0120/SGS0461 Issue 8	2023-12-29	Additional wiring configurations for all models. New software version V1.07.9 and CRC E0ED for direct connected models. New software version 2.00.8 and CRC 55DB for CT models. New CT variant EMP1.cv added to approval
1	2024-10-11	This certificate replaces earlier issued certificate 0120/SGS0461 Issue 8. The manufacturer can use the previous certificate number 0120/SGS0461 in their Declaration of Conformity and other documentation until normal lifecycle of the documentation comes to its end. New EU Type Examination Certificate number: 0598/MID/B/24/015 Issue 1 New software version V1.08.2, CRC DFFE for direct connected models. New software version V2.01.2, CRC 862A for CT models. New BoM version V19 due to removal of unused IC power switch and removal of IC U16 and replacing R123 with a zero Ohm resistor