



EC Type Examination Certificate Number: **0120/SGS0083**

EM-Lite Limited

1 Stevern Way
Peterborough
Cambridgeshire
PE1 5EL

Instrument Identification:

ECA1.* & EM*1.*

Single Phase, Credit, Active Import/ Export, Modular, Electricity Meter

Instrument Traceable Number

0120/ SGS0083

has been assessed and certified as meeting the requirements of

EC Directive 2004/22/EC

on Measuring Instruments Annex 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 MI-003 of EC Directive 2004/22/EC

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

This certificate is valid until 23rd May 2021

Issue 10

Certification is based on report number(s)

EMA146218 dated 24th May 2011

EMA149885 dated 12th August 2011


EMA155457 dated 17th January 2012

EMA190713 dated 23rd January 2015

Authorised Signature


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1. Technical Data

Manufacturer	EM-Lite Ltd
Meter Type(s)	ECA1.* & EM*1.*
Voltage Rating (U_n)	220-240V
Current Rating (I_{min} – I_{ref} (I_{max}))	0,25-5(100)A 0,5-10(100)A 0,75-15(100)A 1-20(100)A
Frequency (F_n)	50Hz
Active Accuracy Class (kWh)	A or B (kWh)
Type of circuit	1p2w
Temperature Range	-40°C to +70°C
Software/ Firmware Version No(s)	See list overleaf
Identification Location	LCD
Bill Of Materials Number(s)	See list overleaf
IP Rating	IP52
Insulation Protective Class	Class II
LED Pulse Constant	1000 imp/ kWh
Impulse Voltage Rating	8kV
AC Voltage Rating	4kV
Main Cover Sealing Type	Wire & Crimp x 1
Integrity of meter	Inaccessible without breaking seals
Intended Location of the Meter	Indoor
Type of Register	LCD

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Bill of Materials

Meter Variant	BOM Number
ECA1. z	ECA1-4002-02
ECA1. y	ECA1-4001-04
EMA1.z	EMA1-4002-02
EMA1.az	EMA1-4003-06
EMA1.y	EMA1-4001-06
EMA1.ay	EMA1-4004-02
EMA1.x	EMA1-4002-02
EMA1.w	EMA1-4001-06
EMB1.z	EMB1-4002-02
EMB1.y	EMB1-4001-06
EMB1.ay	EMB1-4003-03
EMB1.x	EMB1-4002-02
EMB1.w	EMB1-4001-06
EMC1.z	EMC1-4002-02
EMC1.az	EMC1-4003-02
EMC1.y	EMC1-4001-05
EMC1.ay	EMC1-4004-01
EMC1.x	EMC1-4002-02
EMC1.w	EMC1-4001-05

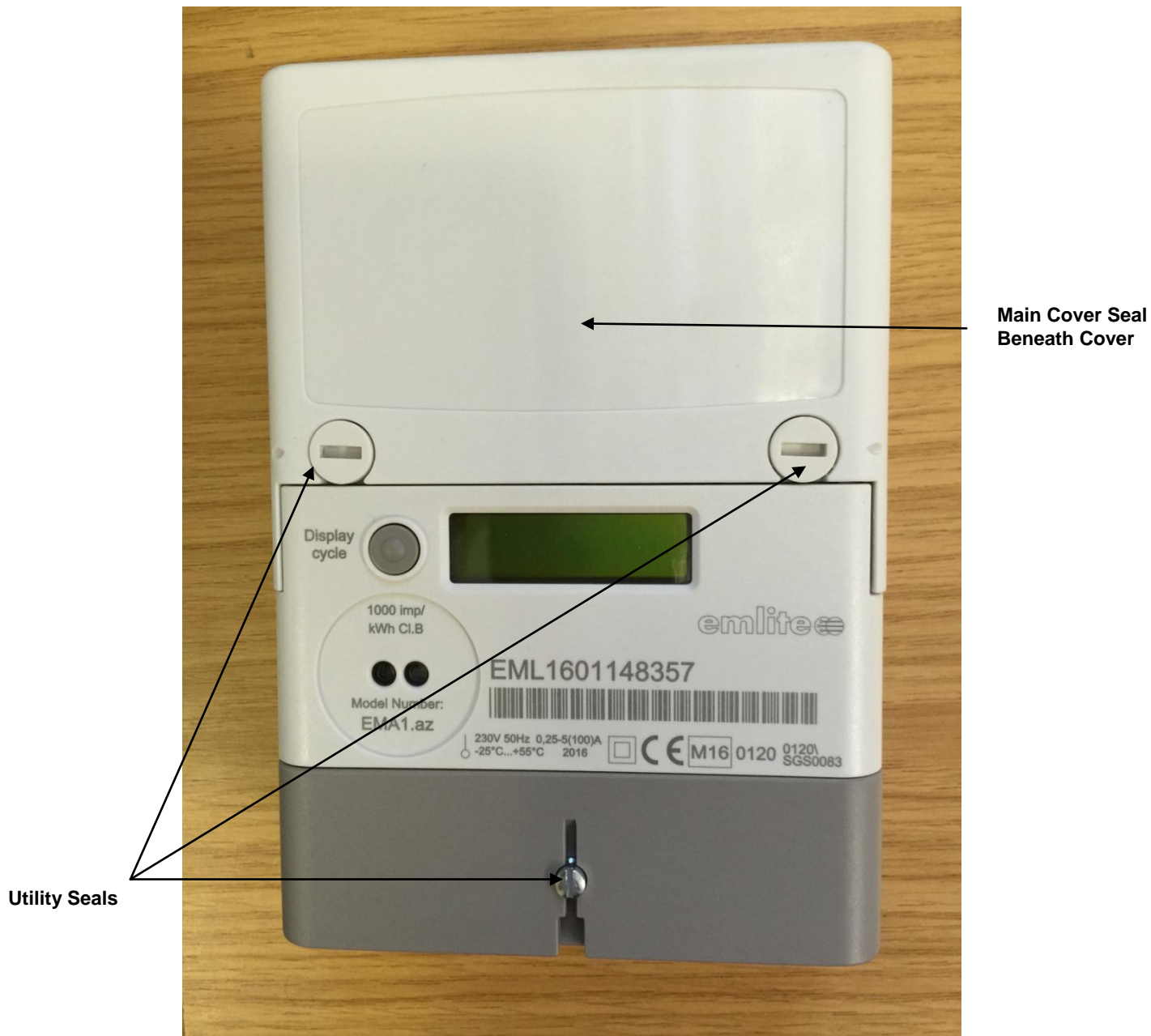
Software Version Numbers


EMA1, EMB1, ECA1

V3.00-1
 V3.02-0
 V3.03-2
 V3.04-0 Checksum 32995
 V3.20-1 Checksum 61849
EMA1.y or .z, EMB1.y or .z
 V3.10-0 Checksum 39352
 V3.11-1 Checksum 16259
 V3.11.2 Checksum 08820
 V3.20-1 Checksum 61849
EMC1.*
 V0.00-3
 V1.00-0
 V1.01-3
 V1.02-0 Checksum 10305
 V1.02-1 Checksum 22571
 V2.00.1 Checksum 49889
 V2.00.3 Checksum 40683
 V3.00.0 Checksum 18714
 V3.00.3 Checksum 25532
 V3.10-1 Checksum 42711

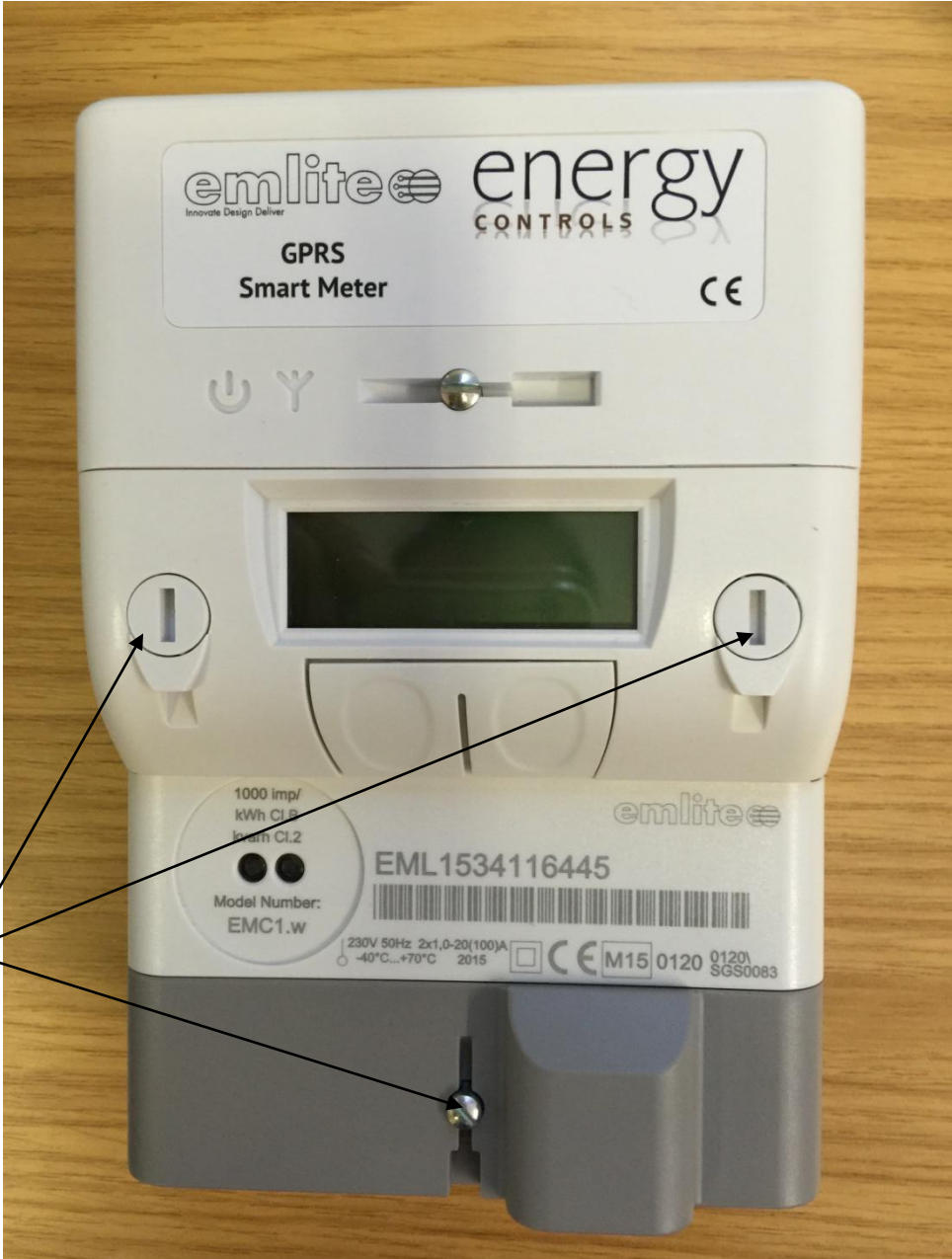
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2. Photograph of Meter EM*1 and Sealing Plan




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Photographs of Meter EMC1w with MC11ba and MC11b Modules Fitted and Sealing Plan



Utility Seals

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3. Calculation of the composite error/ MPE

In addition to the accuracy requirements the composite error e_c of the meter is shown below

The composite error at a certain load is calculated from the following formula:

$$e_c = \sqrt{e^2(l.\cos\theta) + e^2(T.l.\cos\theta) + e^2(U.l.\cos\theta) + e^2(f.l.\cos\theta)}$$

where

$e^2(l.\cos\theta)$	=	Intrinsic error of meter at a certain load
$e^2(T.l.\cos\theta)$	=	Additional error due to variation of the temperature at the same load
$e^2(U.l.\cos\theta)$	=	Additional error due to variation of the voltage at the same load
$e^2(f.l.\cos\theta)$	=	Additional error due to variation of the frequency at the same load

Ambient Temperature Range 5 to 30 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.1	-0.02	0.07	0.12
Itr	1.0	0.12	0.15	0.01	0.04	0.20
10Itr	1.0	0.01	0.22	-0.03	0.04	0.23
I _{max}	1.0	0.06	0.26	0.02	0.09	0.28
Itr	0.5ind	-0.06	-0.08	-0.07	0.03	0.13
10Itr	0.5ind	-0.02	0.2	-0.03	0.07	0.21
I _{max}	0.5ind	0.22	0.34	0.14	0.19	0.47
Itr	0.8cap	0.17	0.12	-0.02	0.05	0.21
10Itr	0.8cap	0.08	0.21	-0.04	0.03	0.23
I _{max}	0.8cap	0.16	0.41	0.18	0.24	0.53

Ambient Temperature Range -10 to 40 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.23	-0.02	0.07	0.24
Itr	1.0	0.12	0.27	0.01	0.04	0.30
10Itr	1.0	0.01	0.38	-0.03	0.04	0.38
I _{max}	1.0	0.06	0.44	0.02	0.09	0.45
Itr	0.5ind	-0.06	-0.12	-0.07	0.03	0.15
10Itr	0.5ind	-0.02	0.37	-0.03	0.07	0.38
I _{max}	0.5ind	0.22	0.52	0.14	0.19	0.61
Itr	0.8cap	0.17	0.23	-0.02	0.05	0.29
10Itr	0.8cap	0.08	0.38	-0.04	0.03	0.39
I _{max}	0.8cap	0.16	0.58	0.18	0.24	0.67



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Ambient Temperature Range -25 to 55 Degrees C						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.36	-0.02	0.07	0.37
Itr	1.0	0.12	0.4	0.01	0.04	0.42
10ltr	1.0	0.01	-0.62	-0.03	0.04	0.62
Imax	1.0	0.06	-0.64	0.02	0.09	0.65
Itr	0.5ind	-0.06	0.16	-0.07	0.03	0.19
10ltr	0.5ind	-0.02	-0.54	-0.03	0.07	0.55
Imax	0.5ind	0.22	0.68	0.14	0.19	0.75
Itr	0.8cap	0.17	-0.37	-0.02	0.05	0.41
10ltr	0.8cap	0.08	-0.66	-0.04	0.03	0.67
Imax	0.8cap	0.16	0.74	0.18	0.24	0.81


Ambient Temperature Range -40 to 70 Degrees C (OUTDOOR ONLY)						
Current	PF Cos	e(lcos)	e(Tlcos)	e(Ulcos)	e(flcos)	%MPE
Imin	1.0	0.01	0.42	-0.02	0.07	0.43
Itr	1.0	0.12	-0.65	0.01	0.04	0.66
10ltr	1.0	0.01	-1.03	-0.03	0.04	1.03
Imax	1.0	0.06	-1.3	0.02	0.09	1.30
Itr	0.5ind	-0.06	0.3	-0.07	0.03	0.32
10ltr	0.5ind	-0.02	-1	-0.03	0.07	1.00
Imax	0.5ind	0.22	-1.1	0.14	0.19	1.15
Itr	0.8cap	0.17	-0.64	-0.02	0.05	0.66
10ltr	0.8cap	0.08	-1.13	-0.04	0.03	1.13
Imax	0.8cap	0.16	-1.06	0.18	0.24	1.11

Results taken from:-

Report: EMA155457-1

Dated: 17th January 2012

Sample: SGS1000-01


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4. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter
ECA1.z	4 terminal basic variant, no auxiliary connections, no modular comms, no breaker
ECA1.y	4 terminal with auxiliary relay, no modular comms, no breaker
EMA1.z	4 terminal basic variant, no auxiliary connections
EMA1.az	4 terminal basic variant, no auxiliary connections, no breaker
EMA1.y	4 terminal with auxiliary relay
EMA1.ay	4 terminal with auxiliary relay, no breaker
EMA1.x	4 terminal with external hub connections
EMA1.w	4 terminal with auxiliary relay and external hub connections
EMB1.z	5 terminal (100A Heating Control) basic variant, no auxiliary connections
EMB1.y	5 terminal with auxiliary relay
EMB1.ay	5 terminal (100A Heating Control) with auxiliary relay, no breaker
EMB1.x	5 terminal with external hub connections
EMB1.w	5 terminal with auxiliary relay and external hub connections
EMC1.z	twin element basic variant, no auxiliary connections
EMC1.az	twin element basic variant, no auxiliary connections, no breakers
EMC1.y	twin element with auxiliary relay
EMC1.ay	twin element basic variant, with auxiliary relay, breaker on element 2
EMC1.x	twin element with external hub connections
EMC1.w	twin element with auxiliary relay and external hub connections
EMC1.w	twin element with auxiliary relay and external hub connections
MC11b + MC11a	smart module and gateway for use with all variants

Modifications to the meter(s) described according to approval No. **0120/ SGS0083** 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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5. Document Revision History

Issue	Date	Comments
1	24/05/2011	Initial Issue
2	12/08/2011	Addition approval of EMC1.* and ECA1.* variants
3	17/01/2012	Major Firmware update to EMC1 variants. Minor Firmware updates to ECA1, EMA1 and EMB1 variants
4	30/10/2012	New EMB1.ay variant added. Also, minor firmware updates to 3.10.0 on EMA1.* & EMB1.* variants for use with coin mech.
5	11/10/2013	Minor Firmware updates to ECA1, EMA1, EMB1 to V3.04.0 with Checksum 44051, EMA1.z, EMA1.y, EMB1.z, EMB1.y to V3.11.1 with Checksum 16259
6	18/09/2014	Minor software updates for EMC1.* variants V2.00.1 & V3.00.0 with checksums
7	26/11/2014	Updated BOM list & additional variant EMC1.az added
8	26/01/2015	Option for smart module and gateway modules for all variants
9	13/01.2016	Updated software versions and new meter photos.
10	17/08/2017	Variant EMC1.ay added to approval. New software versions and BOM numbers added. Change of address.