EC Type Examination Certificate Number: **0120/ SGS0005**

EDMI Limited

47 Yishun Industrial Park A
Singapore
768724

Instrument Identification:
Mk10
Whole Current or Transformer Operated, Poly Phase, Credit, Active Import/ Export, Multi-rate, Electricity Meter

Instrument Traceable Number
0120/ SGS0005
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 for 10 years from 11th April 2008 until 10th April 2018
Issue 6

Certification is based on report number(s)
EMA108916/ 1 CT dated 11th April 2008
EMA108916/ 1 WC dated 11th April 2008

Authorised Signature

Jan Saunders

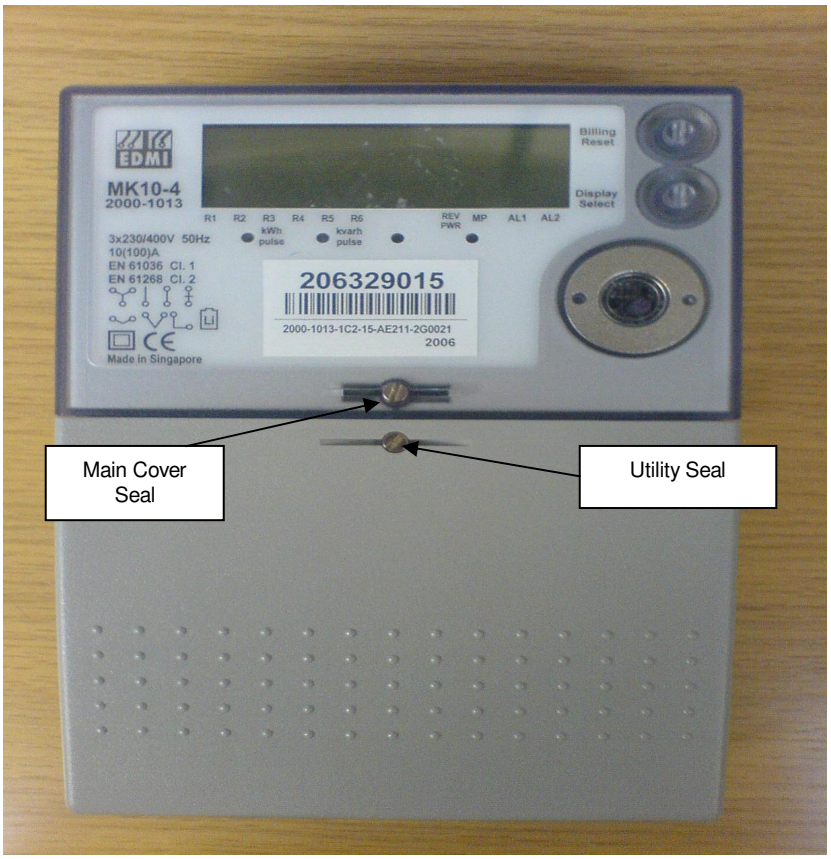
SGS United Kingdom Limited, Notified Body 0120
Unit 202B Worle Parkway, Weston-super-Mare, BS22 6WA□UK
t +44 (0)1934 522917 f +44 (0)1934 522137 www.sgs.com

Contact Address
SGS United Kingdom Ltd, Unit 10, South Industrial Estate, Bowburn, Durham, DH6 5AD□UK
t +44 (0)191 377 2000 f +44 (0)191 377 2020 www.sgs.com

1. Technical Data

Manufacturer	EDMI Limited
Meter Type	Mk10
Voltage Rating *(Un)*	220-240V
Current Rating *(Imin – Iref (Imax))*	0,05-5(20)A or 0,5-10(100)A
Frequency *(Fn)*	50Hz
Active Accuracy Class *(kWh)*	A or B kWh)
Type of circuit	1p2w, 1p3w, 2p3w, 3p3w, 3p4w
Temperature Range	-40°C to +70°C
Software/ Firmware Version No **Identification Location**	Versions 1.27 to 1.367 LCD
Bill Of Materials Number	BOM MK10 Main Board with Special IO Rev A Rev 001
IP Rating	IP51
Insulation Protective Class	Class II
LED Pulse Constant	1000 imp/ kWh
Impulse Voltage Rating	6kV
AC Voltage Rating	4kV
Main Cover Sealing Type	Wire & Crimp
Integrity of meter	Inaccessible without breaking seals
Intended Location of the Meter	Indoor
Type of Register	LCD
Terminal Arrangement(s)	BS

2. Photograph of Meter and Sealing Plan



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

where

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

Ambient Temperature Range 5 to 30 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.06	-0.58	-0.15	-0.15	*0.62*
Itr	1.0	0.06	-0.51	-0.12	-0.12	*0.54*
10Itr	1.0	0.08	-0.45	-0.10	-0.11	*0.48*
Imax	1.0	-0.05	-0.39	-0.15	-0.11	*0.43*
Itr	0.5ind	-0.08	0.46	0.15	0.41	*0.64*
10Itr	0.5ind	-0.10	0.38	0.11	0.35	*0.54*
Imax	0.5ind	0.06	0.55	0.14	0.40	*0.70*
Itr	0.8cap	0.08	-0.72	-0.15	-0.28	*0.79*
10Itr	0.8cap	0.13	-0.62	-0.13	-0.24	*0.69*
Imax	0.8cap	0.06	-0.64	-0.21	-0.24	*0.72*

Ambient Temperature Range -10 to 40 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.06	-0.96	-0.15	-0.15	*0.98*
Itr	1.0	0.06	-0.88	-0.12	-0.12	*0.90*
10Itr	1.0	0.08	-0.76	-0.10	-0.11	*0.78*
Imax	1.0	-0.05	-0.69	-0.15	-0.11	*0.72*
Itr	0.5ind	-0.08	0.57	0.15	0.41	*0.72*
10Itr	0.5ind	-0.10	0.50	0.11	0.35	*0.63*
Imax	0.5ind	0.06	0.71	0.14	0.40	*0.83*
Itr	0.8cap	0.08	-1.06	-0.15	-0.28	*1.11*
10Itr	0.8cap	0.13	-0.92	-0.13	-0.24	*0.97*
Imax	0.8cap	0.06	-0.95	-0.21	-0.24	*1.00*

Ambient Temperature Range -25 to 55 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.06	-1.38	-0.15	-0.15	*1.40*
Itr	1.0	0.06	-1.30	-0.12	-0.12	*1.31*
10Itr	1.0	0.08	-1.12	-0.10	-0.11	*1.13*
Imax	1.0	-0.05	-1.02	-0.15	-0.11	*1.04*
Itr	0.5ind	-0.08	0.69	0.15	0.41	*0.82*
10Itr	0.5ind	-0.10	0.67	0.11	0.35	*0.77*
Imax	0.5ind	0.06	0.89	0.14	0.40	*0.99*
Itr	0.8cap	0.08	-1.84	-0.15	-0.28	*1.87*
10Itr	0.8cap	0.13	-1.62	-0.13	-0.24	*1.65*
Imax	0.8cap	0.06	-1.64	-0.21	-0.24	*1.67*

Ambient Temperature Range -40 to 70 Degrees C (OUTDOOR ONLY)						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.06	-1.49	-0.15	-0.15	*1.51*
Itr	1.0	0.06	-1.46	-0.12	-0.12	*1.47*
10Itr	1.0	0.08	-1.29	-0.10	-0.11	*1.30*
Imax	1.0	-0.05	-1.21	-0.15	-0.11	*1.23*
Itr	0.5ind	-0.08	-0.68	0.15	0.41	*0.81*
10Itr	0.5ind	-0.10	-0.74	0.11	0.35	*0.83*
Imax	0.5ind	0.06	0.84	0.14	0.40	*0.94*
Itr	0.8cap	0.08	-2.26	-0.15	-0.28	*2.28*
10Itr	0.8cap	0.13	-2.01	-0.13	-0.24	*2.03*
Imax	0.8cap	0.06	-2.03	-0.21	-0.24	*2.06*

Results taken from report EMA108916/ 1 WC dated 11th April 2008

4. 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:
$e_c = \sqrt{e^2(I.\cos\theta) + e^2(T.I.\cos\theta) + e^2(U.I.\cos\theta) + e^2(f.I.\cos\theta)}$

where

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

Ambient Temperature Range 5 to 30 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.05	-0.17	0.06	0.05	*0.19*
Itr	1.0	-0.07	-0.17	0.05	0.03	*0.19*
10Itr	1.0	-0.03	-0.20	-0.02	-0.01	*0.20*
Imax	1.0	-0.04	-0.16	-0.03	-0.01	*0.17*
Itr	0.5ind	-0.26	-0.27	0.01	0.02	*0.38*
10Itr	0.5ind	-0.06	-0.15	-0.03	-0.04	*0.17*
Imax	0.5ind	-0.06	-0.16	-0.01	-0.03	*0.17*
Itr	0.8cap	-0.03	-0.23	0.02	0.00	*0.23*
10Itr	0.8cap	-0.02	-0.19	-0.02	-0.01	*0.19*
Imax	0.8cap	-0.04	-0.15	-0.03	-0.02	*0.16*

Ambient Temperature Range -10 to 40 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.05	-0.66	0.06	0.05	*0.67*
Itr	1.0	-0.07	-0.46	0.05	0.03	*0.47*
10Itr	1.0	-0.03	-0.41	-0.02	-0.01	*0.41*
Imax	1.0	-0.04	-0.37	-0.03	-0.01	*0.37*
Itr	0.5ind	-0.26	-0.41	0.01	0.02	*0.49*
10Itr	0.5ind	-0.06	-0.40	-0.03	-0.04	*0.41*
Imax	0.5ind	-0.06	-0.38	-0.01	-0.03	*0.39*
Itr	0.8cap	-0.03	-0.42	0.02	0.00	*0.42*
10Itr	0.8cap	-0.02	-0.36	-0.02	-0.01	*0.36*
Imax	0.8cap	-0.04	-0.34	-0.03	-0.02	*0.34*

Ambient Temperature Range -25 to 55 Degrees C						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.05	-0.73	0.06	0.05	*0.74*
Itr	1.0	-0.07	-0.71	0.05	0.03	*0.72*
10Itr	1.0	-0.03	-0.66	-0.02	-0.01	*0.66*
Imax	1.0	-0.04	-0.62	-0.03	-0.01	*0.62*
Itr	0.5ind	-0.26	-1.00	0.01	0.02	*1.03*
10Itr	0.5ind	-0.06	-0.79	-0.03	-0.04	*0.79*
Imax	0.5ind	-0.06	-0.71	-0.01	-0.03	*0.71*
Itr	0.8cap	-0.03	-0.64	0.02	0.00	*0.64*
10Itr	0.8cap	-0.02	-0.52	-0.02	-0.01	*0.52*
Imax	0.8cap	-0.04	-0.53	-0.03	-0.02	*0.53*

Ambient Temperature Range -40 to 70 Degrees C (OUTDOOR ONLY)						
Current	**PF Cos**	**e(Icos)**	**e(TIcos)**	**e(UIcos)**	**e(fIcos)**	**%MPE**
Imin	1.0	-0.05	-1.01	0.06	0.05	*1.01*
Itr	1.0	-0.07	-0.98	0.05	0.03	*0.98*
10Itr	1.0	-0.03	-0.92	-0.02	-0.01	*0.92*
Imax	1.0	-0.04	-0.88	-0.03	-0.01	*0.88*
Itr	0.5ind	-0.26	-1.50	0.01	0.02	*1.52*
10Itr	0.5ind	-0.06	-1.17	-0.03	-0.04	*1.17*
Imax	0.5ind	-0.06	-0.99	-0.01	-0.03	*0.99*
Itr	0.8cap	-0.03	-0.78	0.02	0.00	*0.78*
10Itr	0.8cap	-0.02	-0.75	-0.02	-0.01	*0.75*
Imax	0.8cap	-0.04	-0.79	-0.03	-0.02	*0.79*

Results taken from report EMA108916/ 1 CT dated 11th April 2008

5. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter

MK 10 2000-10 Whole Current or Transformer Operated, Poly Phase, Credit, Active/ Reactive, Import/ Export, Multi-rate, Electricity Meter, Rev A PCB.

Accuracy
1 = Class B Active Energy
3 = Class A Active Energy

Series
0 = Standard Config
3 = Special IO version

Voltage Range
1 = 220/380-240/415V (140-290V limit)

Current Range
A = 0,05-5(20)A CT
C = 0,5-10(100)A DC

Terminal Configuration
1 = AABBCC (CT)
2 = AABBCCNN (DC)

Optical Communications
1 = IEC Flag

Modem Comunications
0 = None
1 = RS232 with RJ45
2 = RS485 (4-wire) with RJ45
3 = RS485 (4-wire) with Screw Terminals
5 = RS232 with RJ45 and GSM/GPRS Power Supply

Firmware Series
A = Standard

EEPROM Memory
D = 128kB
E = 256kB

Battery Type
0 = no internal or external battery
2 = 950mAh internal battery (10 year+)
3 =1200mAh external battery (10 year+)

LCD Type
1 = Standard VDEW Display
2 = Standard VDEW with green backlight

Anti-tamper Features
0 = Firmware-only
1 = Magnetic Field Sensor

Pulsing LEDs
1 = LED1
2 = LED1, 2

Passive Inputs
0 = none
A = 2x240V passive
B = 2x110V passive
C = 2x048V passive
D = 2x012V passive
E = 2x005V passive
F = 2X005 Active (Not for Special IO)
G = 1x240V passive
H = 1x110V passive
I = 1x048V passive
J = 1x012V passive
K = 1x005V passive
L = 3x240V passive
M = 3x110V passive
N = 3x048V passive
O = 3x012V passive
P = 3x005V passive

Q = 4x240V passive
R = 4x110V passive
S = 4x048V passive
T = 4x012V passive
U = 4x005V passive

Active Inputs (Only for Special IO, otherwise blank)

0 = None
1 = 1 x 005V Active
2 = 2 x 005V Active
3 = 3 x 005V Active
4 = 4 x 005V Active

Outputs (BOSFET)

0 = None
A = 2x240V FET (O/P at TB5 & TB6)
B = 4x240V FET (O/P at TB5, TB6, TB7 & TB8)
C = 6x240V FET (O/P at TB3, TB4, TB5, TB6, TB7 & TB8)
D = 1x240V FET (Std Mk10 O/P only at TB8)
E = 2x240V FET (Std Mk10 O/P only at TB7, TB8)
F = 4x240V FET (Std Mk10 O/P only at TB3, TB4, TB7, TB8)
H = 3x240V FET

Outputs (S0) (Only for Special IO, otherwise blank)

0 = None
1 = 1 x S0
2 = 2 x S0
3 = 3 x S0
4 = 4 x S0

Outputs (Relay) (Only for Special IO, otherwise blank)

0 = None
1 = 1 x 2-A Relay @ TB2
2 = 2 x 2-A Relay (@ TB5&TB2 if need two Relay OP)

Modifications to the meter(s) described according to approval No.**0120/ SGS0005** must be notified to the issuing body to confirm the meter(s) continuing compliance to the relevant pattern approval standard(s).

6. Document Revision History

Issue	Date	Comments
1	11/04/2008	Initial Issue
2	11/04/2008	Re-format of the certificate number
3	03/06/2009	Minor Firmware Update to 1.36
4	10/05/2010	Minor Firmware Update to 1.363
5	07/10/2010	Minor Firmware Update to 1.366
6	16/03/2012	Minor Firmware Update to 1.367