



EU Type Examination Certificate Number: **0120/SGS0276**

# Rayleigh Instruments Limited

Raytel House  
Cutlers Road  
South Woodham Ferrers  
Essex  
CM3 5WA

Instrument Identification:  
**RI-D140-C**  
**HGR45**

**Poly phase, Active Import / Export (kWh), Transformer Operated, Auxiliary Power Supply**

Instrument Traceable Number  
**0120/SGS0276**

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 for 10 years from 6<sup>th</sup> April 2017 until 5<sup>th</sup> April 2027  
Issue 3

Certification is based on report number(s) EMA231682/1 Dated 17th February 2017

Authorised Signature


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](http://www.sgs.com)

Contact Address  
SGS United Kingdom Limited, Units 12A & 12B, South Industrial Estate, Bowburn, Durham, DH6 5AD, UK  
t +44 (0)191 377 2000 f +44 (0)191 377 2020 [www.sgs.com](http://www.sgs.com)

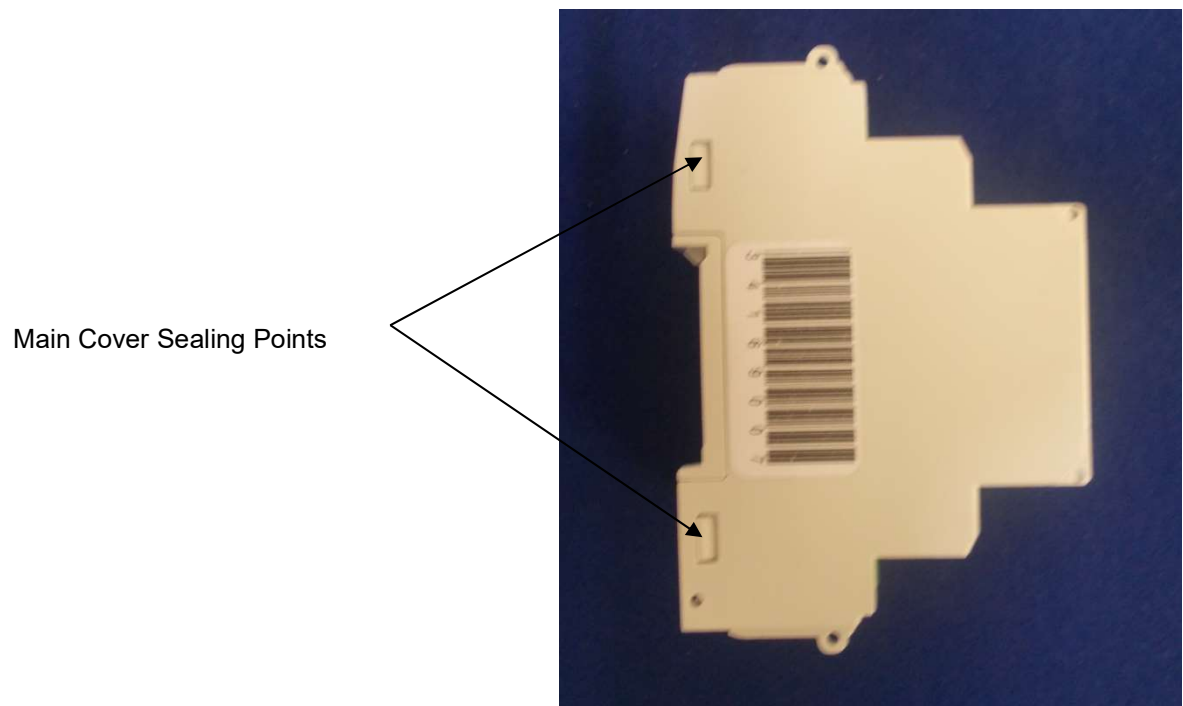
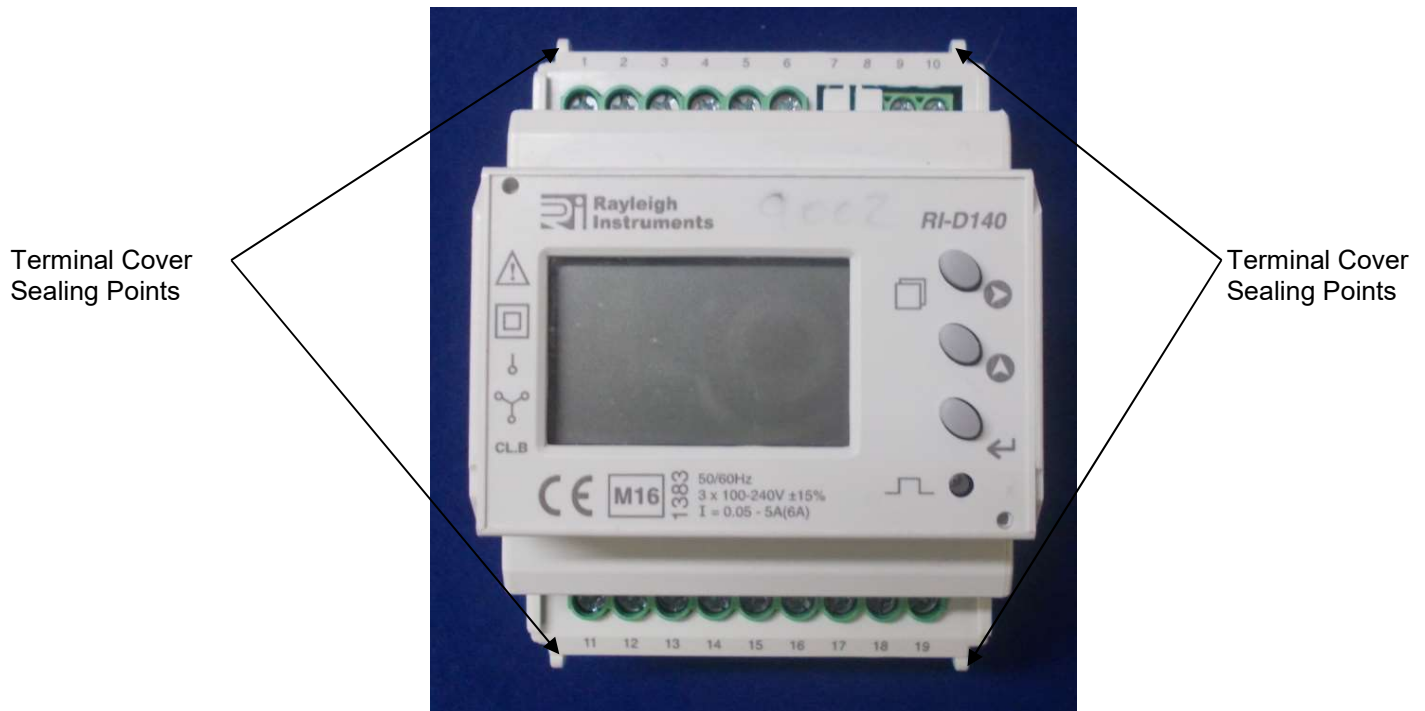
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## 1. Technical Data

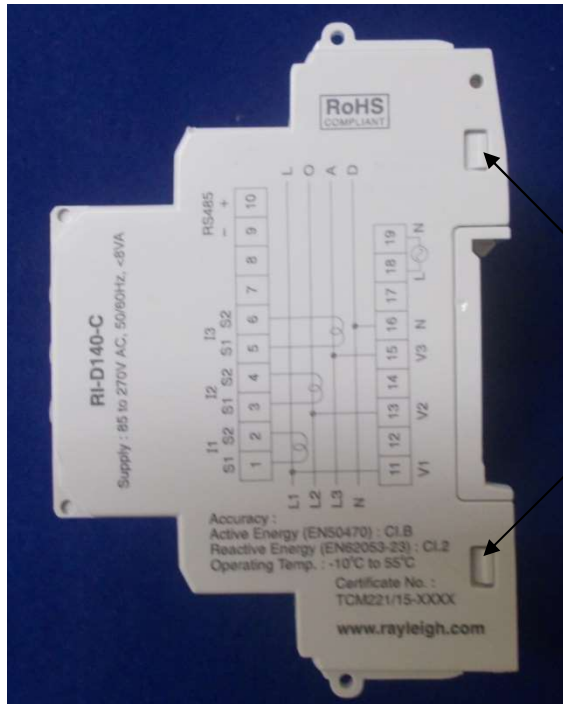
<b>Manufacturer</b>	Rayleigh Instruments Ltd
<b>Meter Type</b>	RI-D140-C and HGR45C
<b>Voltage Rating (<math>U_n</math>)</b>	3 x 85/147 – 240/415V
<b>Auxiliary Supply Voltage</b>	85 - 270V
<b>Current Rating (<math>I_{min}</math> – <math>I_{ref}</math> (<math>I_{max}</math>))</b>	0.05-5(6)A
<b>Frequency (<math>F_n</math>)</b>	50Hz
<b>Active Accuracy Class (<math>kWh</math>)</b>	B ( $kWh$ )
<b>Type of circuit</b>	3P4W, 1P2W
<b>Temperature Range</b>	-25°C to +55°C
<b>Software/ Firmware Version No</b>	V1.0
<b>CRC Checksum</b>	10841
<b>Identification Location</b>	LCD
<b>Bill Of Materials Number</b>	DDCAD RID140-G-C
<b>IP Rating</b>	IP51 Front Display Meter body not rated. Must be installed in a suitable IP rated enclosure
<b>Insulation Protective Class</b>	Class II
<b>LED Pulse Constant</b>	Dependant on CT Ratio
<b>Impulse Voltage Rating</b>	6kV
<b>AC Voltage Rating</b>	4kV
<b>Main Cover Sealing Type</b>	Self destructive label across the joint between base and side of case.
<b>Terminal Cover Sealing Type</b>	4 x wire & crimp
<b>Integrity of meter</b>	Inaccessible without breaking seals
<b>Intended Location of the Meter</b>	Indoor
<b>Type of Register</b>	LCD
<b>Location of Manufacturers Address</b>	Nameplate & Documentation

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## 2. Photograph of Meter and Sealing Plan




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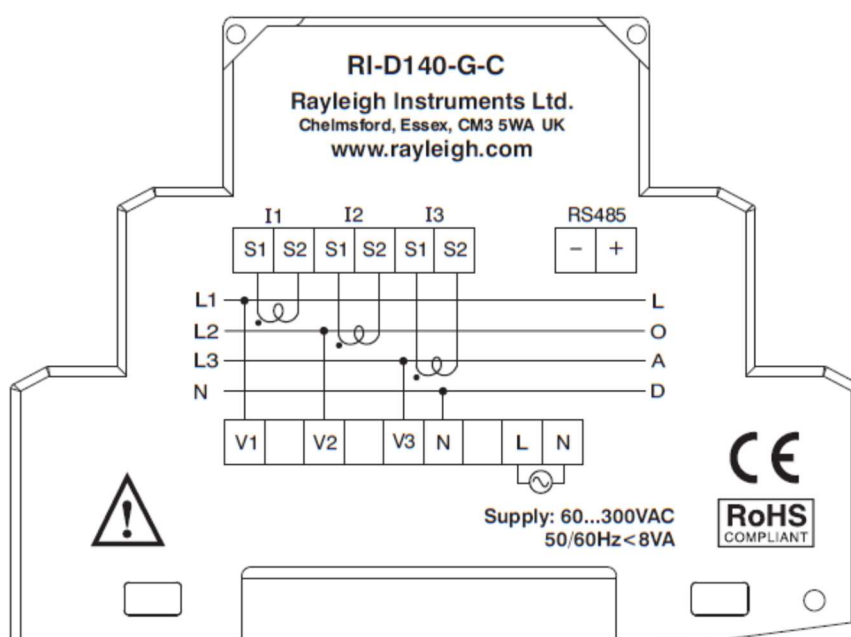
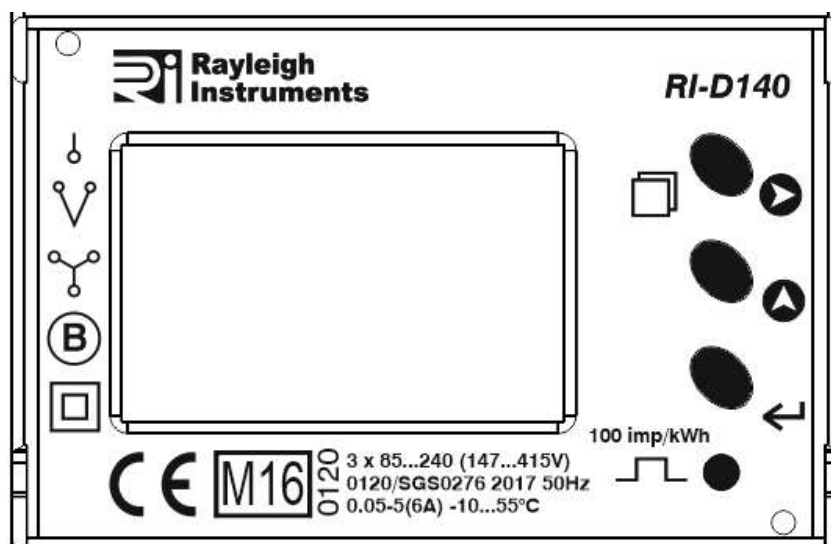
Main Cover Sealing Points


Sealing is via a self-destructive seal applied across the meter casing joint, as shown below

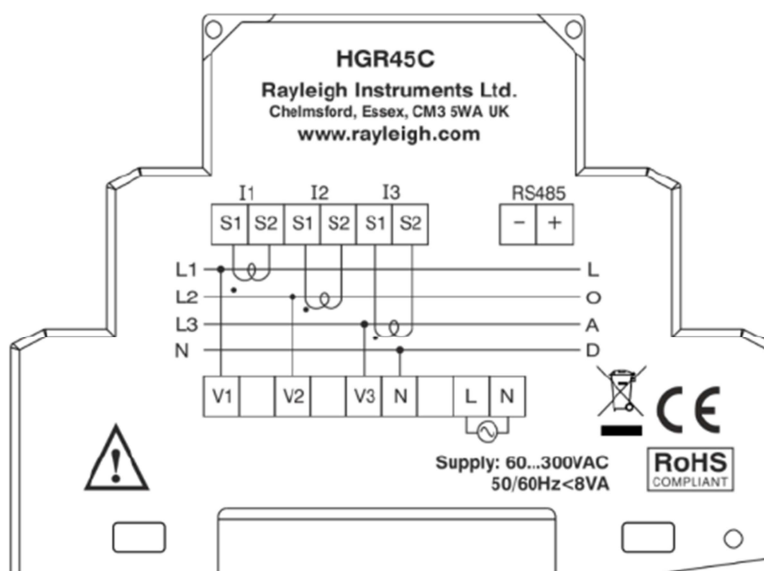
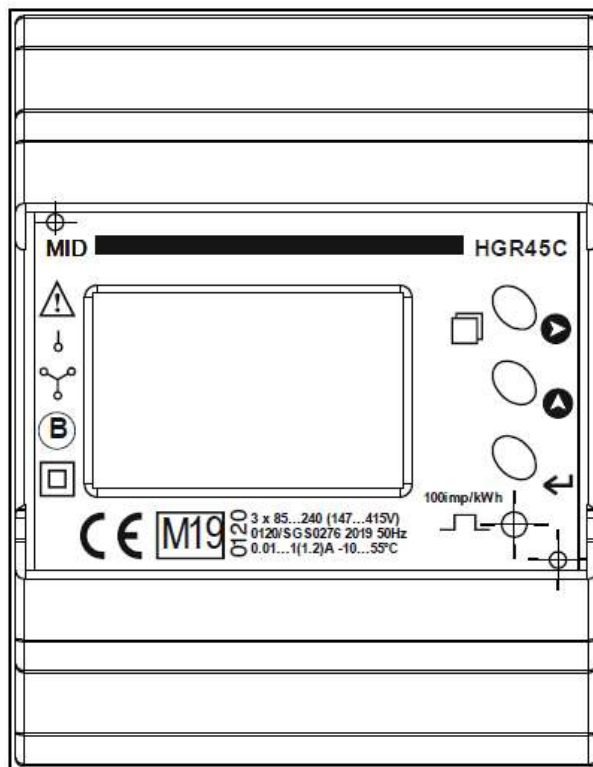



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### 3. Examples of Nameplates



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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

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		Influence Factors for Temperature. Frequency & Voltage					
Current	PF Cos	-25°C	-10°C	5°C	30°C	40°C	55°C
I <sub>min</sub>	1.0	0.23	0.15	0.13	0.13	0.20	0.32
I <sub>tr</sub>	1.0	0.47	0.22	0.22	0.20	0.26	0.36
10I <sub>tr</sub>	1.0	0.25	0.25	0.25	0.25	0.34	0.34
I <sub>max</sub>	1.0	0.41	0.41	0.41	0.42	0.42	0.53
I <sub>tr</sub>	0.5ind	0.24	0.21	0.22	0.22	0.33	0.48
10I <sub>tr</sub>	0.5ind	0.41	0.54	0.54	0.50	0.78	0.78
I <sub>max</sub>	0.5ind	0.33	0.33	0.34	0.53	0.79	0.59
I <sub>tr</sub>	0.8cap	0.64	0.35	0.32	0.33	0.36	0.43
10I <sub>tr</sub>	0.8cap	0.36	0.35	0.44	0.36	0.36	0.59
I <sub>max</sub>	0.8cap	0.39	0.43	0.40	0.43	0.40	0.40
L1					0.00	0.00	0.00
I <sub>tr</sub>	1.0	0.58	0.25	0.14	0.08	0.11	0.27
10I <sub>tr</sub>	1.0	0.21	0.21	0.21	0.21	0.30	0.30
I <sub>max</sub>	1.0	0.35	0.35	0.35	0.35	0.37	0.37
I <sub>tr</sub>	0.5ind	0.61	0.48	0.55	0.45	0.36	0.32
10I <sub>tr</sub>	0.5ind	0.43	0.43	0.43	0.23	0.22	0.25
I <sub>max</sub>	0.5ind	0.44	0.43	0.53	0.46	0.25	0.34
L2							
I <sub>tr</sub>	1.0	0.43	0.29	0.25	0.29	0.31	0.46
10I <sub>tr</sub>	1.0	0.46	0.39	0.38	0.44	0.46	0.46
I <sub>max</sub>	1.0	0.26	0.26	0.26	0.28	0.25	0.29
I <sub>tr</sub>	0.5ind	0.18	0.10	0.10	0.16	0.24	0.35
10I <sub>tr</sub>	0.5ind	0.52	0.51	0.48	0.48	0.49	0.63
I <sub>max</sub>	0.5ind	0.36	0.36	0.36	0.33	0.38	0.39
L3							
I <sub>tr</sub>	1.0	0.44	0.26	0.23	0.26	0.33	0.47
10I <sub>tr</sub>	1.0	0.47	0.47	0.51	0.50	0.51	0.67
I <sub>max</sub>	1.0	0.41	0.38	0.38	0.38	0.39	0.71
I <sub>tr</sub>	0.5ind	0.34	0.37	0.31	0.45	0.54	0.72
10I <sub>tr</sub>	0.5ind	1.05	0.81	1.01	1.06	1.01	1.24
I <sub>max</sub>	0.5ind	0.77	0.59	0.60	1.08	0.94	0.97




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## 5. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter
RI-D140-C HGR45C	Poly phase, Active Import/ Export (kWh), Transformer Operated with RS485 Modbus communications

Modifications to the meter(s) described according to approval No.**0120/SGS0276** 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	06/04/2017	Initial Issue
2	08/08/2017	0.02-1(6)A variant and RI-D140-B-MB removed from approval. New sealing method.
3	29/03/2019	Addition of HGR45C variant

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**END OF CERTIFICATE**