



EU-type examination certificate

Number **T13161** revision 0
Project number 3799859
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Issued by

NMi Certin B.V.,
designated and notified by the Netherlands to perform tasks with respect to
conformity assessment procedures mentioned in article 17 of Directive
2014/32/EU, after having established that the measuring instrument meets the
applicable requirements of Directive 2014/32/EU, to:

Manufacturer

Carlo Gavazzi Controls SPA
Via Safforze 8
32100 Belluno
Italy

Measuring instrument

A static **Active Electrical Energy Meter**

Type : EM630 as Transformer Connected Meter (TCM)
EM640 as Direct Connected Meter (DCM)

Manufacturer's mark or name : Carlo Gavazzi

Reference voltage : 3x120/208 V ... 3x230/400 V (EM640)
3x208 V and 3x400 V (EM640)
230 V (EM640)
3x230/400 V (EM630)
3x400V (EM630)

Reference current : 5 A

Destined for the measurement of : electrical energy, in a
- three-phase four-wire network
- three-phase three-wire network
- single-phase two-wire network

Accuracy class : A or B

Environment classes : M2 / E2

Temperature range : -25 °C / +70 °C

Further properties are described in the annexes
- Description T13161 revision 0
- Documentation folder T13161-1

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NMi Certin B.V.
Thijsseweg 11
2629 JA Delft
The Netherlands
T +31 88 636 2332
certin@nmi.nl
www.nmi.nl

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1 General information about the instrument

All properties of the static active electrical energy meter, whether mentioned or not, shall not be in conflict with the legislation.

1.1 Essential parts

Description	Document	Remarks
measuring sensor - EM630 - EM640	13161/0-07 13161/0-08	
Power board - 2026-02-23	13161/0-15, 13161/0-16	All parts of the printed circuit boards are essential, except the components which are related to parts as described in paragraph 1.4 or 1.6.
Input board EM630 - 2025-10-01 (AV5)	13161/0-17, 13161/0-18	
Input board EM640 - 2025-10-29 (AV2)	13161/0-19, 13161/0-20	
Display board - 2024-12-18	13161/0-21, 13161/0-22	
Sideboard - Ethernet - No Ethernet	13161/0-23, 13161/0-24 or 13161/0-25, 13161/0-26	
Output board - 2024-12-18	13161/0-27, 13161/0-28	

1.2 Essential characteristics

- 1.2.1 See EU-Type examination certificate T13161 revision 0 and the characteristics mentioned below.
- 1.2.2 Approved meter types : EM630 and EM640
An explanation of all type designations is presented in document no. 13161/0-04.
- 1.2.3 Frequency : 50 Hz
- 1.2.4 Meter constant : EM640 1.000 imp./kWh
EM630 1.000 imp./kWh (info display, depending on CT ratio)
- 1.2.5 Number of registers : 1 (no tariffs registers)
- 1.2.6 Error messages : An overview if all error messages is provided in document 13161/0-14
- 1.2.7 Registration method : The following registration methods are allowed:
- PFA Total sum ($|A+| + |A-|$)
 - PFB Import and export, per-phase separate integrated
 - PFC Import and export, sum of phases are integrated

- 1.2.8 Phase sequence : the meter is not sensitive to the direction of the applied phase sequence.
- 1.2.9 Export energy : the meter is capable of measuring energy in 2 directions.
The meter can also be used with 2 phases loaded with import energy and 1 phase loaded with export energy.
- 1.2.10 Software specification (refer to WELMEC 7.2):
- Software type P;
 - Risk Class C;
 - Extension S and D, while extensions O, L and T are not applicable.

Software version	Identification number (checksum)	Remarks
1.0.4.3	0xDE62B1F	Measure FW – EM640
1.0.4.3	0xD8D6D5FF	Measure FW – EM630
1.0.5.3	0x904823C0	Communication FW

The software version is displayed in the display sequence.

1.3 Essential shapes

- 1.3.1 The nameplate is bearing at least, good legible, the information as mentioned in the regulations on energy meters. An example of the markings is shown in document no. 13161/0-05 (EM630) and 13161/0-06 (EM640).
- 1.3.2 Sealing: see chapter 2.
- 1.3.3 The registration observation is executed by means of a LED.

1.4 Conditional parts

- 1.4.1 Terminal block
The connections for the current cables on the terminal block have a diameter of at least 7 mm (EM640) or 2,5 mm (EM630). The cables are connected with the terminal block via 1 screw.

Maximum current	Document no.	Remarks
6 A	13161/0-10	EM630
65 A	13161/0-11	EM640

- 1.4.2 **Housing**
The meter has got a dustproof housing, which has sufficient tensile strength. The cover is made of synthetic material. An example of the housing is presented in document no. 13161/0-01 (EM630) and 13161/0-02 (EM640).
- 1.4.3 **Terminal cover**
The terminal cover is made of synthetic material.
- 1.4.4 **Register**
The quantity of measured energy is presented by means of a display with at least 6 elements. The way of presentation is described in document no. 13161/0-09
For test purposes an indication with a least significant element of at least 0,01 kWh is available.
- 1.4.5 **communication**
The meter is provided with WiFi and Ethernet (optional) communication. Via the communication no legally relevant data can be altered. Further, the meter is provided with an output module.

Description	Document	Remarks
Module output board O1 - 2025-10-01 (O1)	13161/0-29, 13161/0-30	Digital output
Module output board S1 - 2025-10-01 (S1)	13161/0-31, 13161/0-32	Modbus RTU
Module outout board M1 - 2025-10-01 (M1) - 2025-10-01 (M1 V2)	13161/0-33, 13161/0-34 or 13161/0-35, 13161/0-36	M-Bus

1.5 Conditional characteristics

- 1.5.1 **Maximum current:**
 EM630 (TCM) : smaller than or equal to 6 A, and at least 1,2 times higher than the reference current.
 EM640 (DCM) : smaller than or equal to 65A, and at least 5 times higher than the reference current.
- 1.5.2 **Minimum current:**
 EM640 : 0,25 A (0,5 x I_{tr})
 EM630 : 0,05 A (0,2 x I_{tr})



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1.6 Non-essential parts

1.6.1 Pulse output

2 Seals

The cover and base of the meter are closed with 4 clips. The meter is sealed with a tamper proof sealing label located over the seam between the cover and base.

An example of the sealing is presented in document no. 13161/0-12.

3 Conditions for conformity assessment according to module D or F

The influence factors for temperature, frequency and voltage, which are necessary to perform the conformity assessment according to module D or F, are presented in Annex 1, belonging to this EU-Type examination certificate.

Based on the WELMEC 11.1, section 2.4.6, the sum of the square values is presented

Influence factors for temperature, frequency and voltage

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

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

with:

- $\delta e(T, I, \cos \varphi)$ = the additional percentage error due to the variation of the temperature at a certain load;
- $\delta e(U, I, \cos \varphi)$ = the additional percentage error due to the variation of the voltage at the same load;
- $\delta e(f, I, \cos \varphi)$ = the additional percentage error due to the variation of the frequency at the same load.

EM640 at 3x120/208 V

Current	Power factor	-25°C [%]	-10°C [%]	+5°C [%]	+23°C [%]	+30°C [%]	+40°C [%]	+55°C [%]	+70°C [%]
$I_{\min}$	1	0.63	0.40	0.19	0.05	0.12	0.15	0.28	0.35
I_{tr}	1	0.63	0.39	0.19	0.01	0.08	0.15	0.27	0.35
	0,5 ind. 0,8 cap.	0.63 0.63	0.39 0.39	0.20 0.20	0.01 0.01	0.07 0.07	0.15 0.15	0.26 0.26	0.35 0.35
I_{tr} phase R	1	0.59	0.34	0.21	0.02	0.07	0.15	0.28	0.38
	0,5 ind.	0.54	0.36	0.15	0.00	0.10	0.20	0.31	0.40
I_{tr} phase S	1	0.56	0.30	0.20	0.01	0.05	0.13	0.24	0.31
	0,5 ind.	0.46	0.25	0.17	0.01	0.11	0.18	0.29	0.40
I_{tr} phase T	1	0.53	0.48	0.24	0.01	0.02	0.11	0.25	0.30
	0,5 ind.	0.46	0.22	0.19	0.03	0.06	0.16	0.24	0.35
10 I_{tr}	1	0.64	0.39	0.19	0.01	0.06	0.15	0.26	0.35
	0,5 ind.	0.64	0.40	0.20	0.01	0.06	0.14	0.27	0.35
	0,8 cap.	0.64	0.40	0.21	0.02	0.07	0.15	0.28	0.35
10 I_{tr} phase R	1	0.64	0.41	0.21	0.01	0.04	0.14	0.28	0.38
	0,5 ind.	0.61	0.36	0.17	0.01	0.11	0.20	0.32	0.39
10 I_{tr} phase S	1	0.64	0.41	0.21	0.03	0.04	0.11	0.22	0.30
	0,5 ind.	0.62	0.38	0.18	0.02	0.08	0.17	0.29	0.41
10 I_{tr} phase T	1	0.65	0.44	0.22	0.01	0.05	0.13	0.24	0.32
	0,5 ind.	0.59	0.35	0.20	0.02	0.04	0.13	0.24	0.33
$I_{\max}$	1	0.59	0.40	0.24	0.13	0.13	0.17	0.25	0.31
	0,5 ind.	0.58	0.39	0.22	0.04	0.05	0.08	0.15	0.24
	0,8 cap.	0.55	0.32	0.18	0.02	0.05	0.10	0.21	0.24
$I_{\max}$ phase R	1	0.49	0.31	0.20	0.03	0.04	0.12	0.23	0.26
	0,5 ind.	0.48	0.32	0.15	0.02	0.07	0.13	0.21	0.27
$I_{\max}$ phase S	1	0.54	0.34	0.22	0.08	0.08	0.10	0.18	0.23
	0,5 ind.	0.54	0.33	0.19	0.02	0.02	0.13	0.22	0.28
$I_{\max}$ phase T	1	0.55	0.39	0.23	0.04	0.04	0.08	0.20	0.22
	0,5 ind.	0.52	0.35	0.18	0.02	0.03	0.09	0.17	0.24

EM640 at 3x230/400V

Current	Power factor	-25°C [%]	-10°C [%]	+5°C [%]	+23°C [%]	+30°C [%]	+40°C [%]	+55°C [%]	+70°C [%]
I_{min}	1	0.58	0.35	0.18	0.06	0.11	0.17	0.28	0.29
I_{tr}	1	0.61	0.38	0.19	0.00	0.07	0.15	0.27	0.31
	0,5 ind.	0.63	0.39	0.19	0.01	0.06	0.15	0.26	0.29
	0,8 cap.	0.62	0.38	0.19	0.00	0.07	0.14	0.27	0.32
I_{tr} phase R	1	0.53	0.33	0.19	0.01	0.06	0.15	0.28	0.35
	0,5 ind.	0.50	0.36	0.15	0.03	0.11	0.19	0.30	0.36
I_{tr} phase S	1	0.52	0.32	0.21	0.01	0.05	0.13	0.24	0.28
	0,5 ind.	0.44	0.26	0.19	0.02	0.08	0.16	0.28	0.34
I_{tr} phase T	1	0.44	0.42	0.23	0.02	0.05	0.12	0.22	0.27
	0,5 ind.	0.43	0.30	0.18	0.02	0.04	0.15	0.25	0.30
10 I_{tr}	1	0.63	0.39	0.19	0.02	0.08	0.14	0.28	0.33
	0,5 ind.	0.63	0.39	0.18	0.01	0.06	0.14	0.27	0.32
	0,8 cap.	0.62	0.39	0.19	0.02	0.08	0.15	0.26	0.33
10 I_{tr} phase R	1	0.64	0.41	0.22	0.01	0.06	0.14	0.27	0.35
	0,5 ind.	0.58	0.34	0.14	0.01	0.12	0.19	0.31	0.38
10 I_{tr} phase S	1	0.62	0.39	0.20	0.01	0.03	0.10	0.23	0.28
	0,5 ind.	0.62	0.38	0.20	0.01	0.08	0.16	0.28	0.36
10 I_{tr} phase T	1	0.61	0.40	0.19	0.02	0.08	0.15	0.25	0.32
	0,5 ind.	0.56	0.35	0.18	0.01	0.05	0.14	0.26	0.31
I_{max}	1	0.58	0.35	0.23	0.11	0.12	0.16	0.25	0.28
	0,5 ind.	0.54	0.34	0.17	0.04	0.07	0.10	0.20	0.23
	0,8 cap.	0.52	0.32	0.22	0.05	0.07	0.09	0.18	0.22
I_{max} phase R	1	0.49	0.33	0.16	0.03	0.04	0.09	0.19	0.22
	0,5 ind.	0.50	0.30	0.17	0.05	0.11	0.16	0.23	0.26
I_{max} phase S	1	0.52	0.32	0.18	0.04	0.04	0.09	0.17	0.20
	0,5 ind.	0.53	0.34	0.18	0.01	0.04	0.11	0.20	0.23
I_{max} phase T	1	0.51	0.33	0.18	0.06	0.07	0.12	0.20	0.23
	0,5 ind.	0.51	0.31	0.20	0.01	0.03	0.11	0.19	0.22

EM630 at 3x230/400V

Current	Power factor	-25°C [%]	-10°C [%]	+5°C [%]	+23°C [%]	+30°C [%]	+40°C [%]	+55°C [%]	+70°C [%]
I_{min}	1	0.73	0.50	0.30	0.05	0.12	0.15	0.33	0.45
I_{tr}	1	0.72	0.50	0.28	0.04	0.11	0.16	0.33	0.46
	0,5 ind.	0.74	0.50	0.28	0.01	0.11	0.15	0.33	0.45
	0,8 cap.	0.72	0.49	0.28	0.01	0.10	0.15	0.33	0.45
I_{tr} phase R	1	0.79	0.52	0.32	0.01	0.08	0.19	0.36	0.53
	0,5 ind.	1.10	0.84	0.60	0.05	0.10	0.12	0.13	0.23
I_{tr} phase S	1	0.52	0.35	0.20	0.13	0.17	0.22	0.31	0.41
	0,5 ind.	0.51	0.26	0.03	0.01	0.37	0.48	0.65	0.81
I_{tr} phase T	1	0.99	0.72	0.47	0.01	0.07	0.04	0.27	0.36
	0,5 ind.	0.56	0.38	0.22	0.01	0.05	0.12	0.24	0.33
20 I_{tr}	1	0.73	0.52	0.31	0.04	0.09	0.14	0.30	0.42
	0,5 ind.	0.73	0.52	0.30	0.01	0.08	0.12	0.29	0.41
	0,8 cap.	0.71	0.49	0.27	0.02	0.09	0.13	0.32	0.42
20 I_{tr} phase R	1	0.76	0.51	0.30	0.04	0.10	0.21	0.35	0.50
	0,5 ind.	1.09	0.83	0.60	0.01	0.09	0.14	0.10	0.20
20 I_{tr} phase S	1	0.49	0.31	0.16	0.02	0.08	0.16	0.27	0.37
	0,5 ind.	0.49	0.24	0.03	0.01	0.38	0.48	0.65	0.81
20 I_{tr} phase T	1	0.94	0.69	0.45	0.02	0.08	0.04	0.25	0.36
	0,5 ind.	0.55	0.38	0.21	0.01	0.06	0.12	0.24	0.33
I_{max}	1	0.70	0.49	0.30	0.08	0.12	0.15	0.31	0.41
	0,5 ind.	0.73	0.51	0.29	0.05	0.09	0.15	0.27	0.41
	0,8 cap.	0.72	0.49	0.30	0.02	0.08	0.11	0.28	0.43
I_{max} phase R	1	0.75	0.52	0.33	0.03	0.09	0.15	0.32	0.49
	0,5 ind.	1.10	0.88	0.63	0.18	0.21	0.25	0.21	0.26
I_{max} phase S	1	0.48	0.31	0.15	0.04	0.09	0.19	0.28	0.35
	0,5 ind.	0.49	0.24	0.05	0.04	0.36	0.47	0.63	0.79
I_{max} phase T	1	0.96	0.70	0.44	0.09	0.10	0.09	0.24	0.35
	0,5 ind.	0.56	0.35	0.20	0.06	0.07	0.15	0.22	0.31

EM630 at 3x400V

Current	Power factor	-25°C [%]	-10°C [%]	+5°C [%]	+23°C [%]	+30°C [%]	+40°C [%]	+55°C [%]	+70°C [%]
I_{min}	1	0.65	0.44	0.27	0.17	0.19	0.25	0.33	0.48
I_{tr}	1	0.65	0.42	0.25	0.10	0.12	0.20	0.33	0.45
	0,5 ind.	0.52	0.35	0.17	0.04	0.07	0.14	0.23	0.33
	0,8 cap.	0.68	0.44	0.24	0.01	0.07	0.19	0.34	0.48
I_{tr} phase R	1	0.73	0.48	0.26	0.01	0.09	0.21	0.38	0.54
	0,5 ind.	0.71	0.51	0.36	0.01	0.12	0.04	0.06	0.16
I_{tr} phase T	1	0.60	0.33	0.11	0.01	0.27	0.39	0.57	0.73
	0,5 ind.	0.52	0.33	0.16	0.00	0.06	0.13	0.23	0.31
20 I_{tr}	1	0.64	0.41	0.22	0.04	0.07	0.16	0.30	0.43
	0,5 ind.	0.51	0.34	0.22	0.03	0.06	0.12	0.20	0.31
	0,8 cap.	0.66	0.42	0.23	0.01	0.08	0.19	0.34	0.47
20 I_{tr} phase R	1	0.68	0.46	0.23	0.02	0.12	0.24	0.40	0.57
	0,5 ind.	0.68	0.50	0.35	0.02	0.13	0.05	0.06	0.16
20 I_{tr} phase T	1	0.58	0.32	0.08	0.02	0.26	0.40	0.57	0.72
	0,5 ind.	0.54	0.35	0.18	0.01	0.05	0.13	0.21	0.30
I_{max}	1	0.61	0.41	0.24	0.08	0.11	0.19	0.32	0.44
	0,5 ind.	0.46	0.33	0.14	0.05	0.10	0.19	0.22	0.30
	0,8 cap.	0.66	0.45	0.25	0.04	0.07	0.19	0.32	0.46
I_{max} phase R	1	0.70	0.45	0.25	0.01	0.12	0.22	0.35	0.52
	0,5 ind.	0.71	0.51	0.37	0.05	0.17	0.08	0.05	0.12
I_{max} phase T	1	0.58	0.34	0.13	0.09	0.29	0.39	0.57	0.71
	0,5 ind.	0.52	0.33	0.18	0.03	0.05	0.15	0.22	0.32