Electricity Meters IEC/MID

Industrial and Commercial

Landis
|Gyr+

manage energy better

ZMG400AR/CR

E550 Series 2

Technical Data

Building on its tradition of industrial meters, Landis+Gyr is now bringing out the E550 Series 2, the latest generation of ZMG400 meters. The E550 Series 2 offers two electrical interfaces, advanced modem solution, event logging and anti-tampering functions.

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Revision history

Version	Date	Comments
a	17.02.2010	First edition
b…e	23.07.2010	Continuous improvement
f	01.12.2011	Corrected error in solid state output (DC deleted)
g	02.12.2011	Corrected error in electromechanical output (DC deleted)
h	20.01.2012	New extension boards 060 with 6 output contacts and 240 with 2 control inputs and 4 output contacts.
k	02.10.2012	Corrected temperature range
m	29.05.2013	Battery Mode update in Environmental Influences table

The E550 transformer connected I&C meters record active and reactive energy consumption in 1-phase 2-wire, 2-phase 3-wire, 3-phase 4-wire and 3-phase 3-wire (no neutral) networks.

Basic Version

The basic version provides energy registers for tariffication, red test diodes for active and reactive energy, an optical interface for meter reading and an electrical interface.

Interfaces

The Series 2 now supports two independent electrical interfaces.

The meter supports RS232, RS485, RS422, CS and a specially powered RS232 to supply external modems.

Installation support

The monitoring of voltage, current, demand and power factor supports the installation.

E550 Series 2 ZMG400AR/CR – Technical specifications

General

Voltage

Nominal voltage U_n ZMG400xR	
	3 x 58/100 V to 69/120 V
	3 x 110/190 V to 133/230 V
	3 x 220/380 V to 240/415 V
	3 x 58/100 V to 277/480 V

Voltage range	80% to 115 % Un

Frequency

Nominal frequency f_n	50 or 60 Hz
Tolerance	$\pm$ 2%

Application

1 phase 2 wire; 2 phase 3 wire; 3 phase 4 wire, 3-phase 3-wire (no neutral)

IEC-specific Data

Current

Nominal current I_n	selectable: 1 or 5 A

Maximum current I_{max}	
Metrological 1 A	max. 600%
Metrological 5 A	max. 200%
Thermal 1 A	8 A
Thermal 5 A	12 A

Short circuit 0.5 s	20 x I_{max}

Measurement Accuracy

ZMG405xR	
Active energy, to IEC 62053-22	class 0.5 S
Reactive energy, to IEC 62053-23	class 1

ZMG410xR	
Active energy, to IEC 62053-21	class 1
Reactive energy, to IEC 62053-23	class 2

Measurement Behaviour

Starting current ZMG405xR	
According to IEC	0.1% I_n
Typical	0.07% I_n

Starting current ZMG410xR	
According to IEC	0.2% I_n
Typical	0.14% I_n

The startup of the meter is controlled by the starting power and not by the starting current.

Starting power in M-circuit	single phase

Nominal voltage x starting current

MID-specific Data

Current (for classes B and C)

Reference current I_{ref}	selectable: 1.0, 5.0 A

Minimum current I_{min}	0.01 x I_{ref}

Transitional current I_{tr}	0.05 x I_{ref}

Maximum current I_{max}	2.0, 6.0, 10.0 A

Measurement Accuracy	to EN 50470-3
ZMG400xR	classes B and C

Measurement Behaviour

Starting current I_{st}	
Class B: I_{st}	0.002 or 0.01 A
Class C: I_{st}	0.001 or 0.005 A

General

Operating Behaviour

Voltage failure (Power Down)

Bridging time	0.5 s
Data storage	after another 0.2 s
Switch off	after approx. 10 s

Voltage restoration (Power Up)

Function standby 3 phases	after 4 s
Function standby 1 phase	after 5 s
Detection of energy direction and phase voltage	after 4 to 5 s

Power Consumption

Power consumption per phase in voltage circuit

Phase voltage	58 V	100 V	277 V
Active power (typical)	0.8 W	0.8 W	1.5 W
Apparent power (typical)	1.0 VA	1.1 VA	2.5 VA

Power consumption per phase in current circuit

Phase current 1(6)A	1 A	6 A
Active power (typical)	0.02 W	0.6 W
Apparent power (typical)	0.01 VA	0.25 VA

Phase current 5(10)A	5 A	10 A
Active power (typical)	0.1 W	0.35 W
Apparent power (typical)	0.02 VA	0.1 VA

Environmental Influences

Temperature range to IEC 62052-11

Operation	–40 °C to +70 °C
Battery Mode	–25 °C to +70 °C
Storage	–40 °C to +85 °C

Temperature coefficient

Range	–25 °C to +70 °C
Average value (typical)	± 0.012% per K
At $\cos\varphi=1$ (from 0.05 I_b to I_{max})	± 0.02% per K
At $\cos\varphi=0.5$ (from 0.1 I_b to I_{max})	± 0.03% per K

Impermeability to IEC 60529	IP 53

Electromagnetic Compatibility

Electrostatic discharges to IEC 61000-4-2

Contact discharge	8 kV
Air discharge	15 kV

Electromagnetic RF fields to IEC 61000-4-3

80 MHz to 2 GHz	10 and 30 V/m

Radio disturbance

According to IEC/CISPR 22	class B

Fast transient burst test to IEC 61000-4-4

Current and voltage circuits	4 kV
Auxiliary circuits > 40 V	2 kV

Surge immunity test to IEC 61000-4-5

Current and voltage circuits	4 kV
Auxiliary circuits > 40 V	1 kV

Insulation Strength

Insulation strength	4 kV at 50 Hz during 1 min.

Impulse voltage 1.2/50 µs to IEC 62052-11

Current and voltage circuits	10 kV
Auxiliary circuits > 40 V	6 kV

Protection class II to IEC 60050-131	□ 2

Calendar Clock

Calendar Type

Gregorian or Persian (Jalaali)

Accuracy	< 5 ppm

Backup time (power reserve)

With supercap	> 21 days
Charging time for 7 days backup time	24 h
Charging time for max. backup time	300 h
With battery 1 (calendar clock, display, readout)	10 years
Battery type	UM3-R6-AA
With battery 2 (calendar clock only)	10 years
Battery type	CR2032

Display

Characteristics

Type	LCD liquid crystal display
Digit size in value field	9 mm
Number of digits in value field	up to 8
Digit size in index field	8 mm
Number of digits in index field	up to 7

Inputs and Outputs

Control inputs

Control voltage U_S	100 to 277 V_{AC}
Max. input voltage	320 V_{AC}
Input current	< 2 mA ohmic at 230 V_{AC}

Output solid state

Type	solid state relay
Voltage	12 to 277 $V_{AC/DC}$
Max. current	100 mA
Max. switching frequency (pulse length 20 ms)	25 Hz

Inputs and Outputs (cont.)

Output electromechanical

Type	electromechanical relay
Max switch voltage	277 V_{AC}
Max. switch current	6 A
Rated current	5 A

Optical test outputs — active and reactive energy

Type	red LED
Number	2
Meter constant	selectable

Communication Interface

Optical interface — to IEC 62056-21

Type	serial, asynchronous, half-duplex
Max. transmission rate	19,200 bps
Protocols	IEC 62056-21 and dlms

RS232 Interface (powered and not powered) — to DIN 61393 / DIN 66259

Type	serial, asymmetric, asynchr., bidirectional
Operating mode	intelligent or transparent
Nominal voltage	±9 V_{DC}
Maximum voltage	±15 V_{DC}
Minimum voltage	±5 V_{DC}
Max. transmission rate	38,400 bps
Protocols	IEC 62056-21 and dlms
Max. conductor length depending on environment and connecting cable	30 m
Insulation resistance to meter	4 kV_{AC}/50 Hz, 1 min
Creep distance	≥ 6.3 mm

RS485 Interface — to ISO-8482

Type	serial, symmetrical, half duplex
Nominal input voltage common mode range	–7 to +12 V_{DC}
Binary 1 state	difference voltage < –0.2 V
Binary 0 state	difference voltage > 0.2 V
Max. transmission rate	38,400 bps
Max. number of slaves	31
Protocols	IEC 62056-21 and dlms
Max. conductor length depending on environment and connecting cable	≤ 1000 m
Insulation resistance to meter	4 kV_{AC}/50 Hz, 1 min
Creep distance	≥ 6.3 mm

CS Interface — to IEC 62056-21 / DIN 66258

Type	serial, bidirectional, current interface
Nominal voltage without load	24 V_{DC}
Max. voltage without load	30 V_{DC}
Binary 1 state	10–30 mA
Binary 0 state	≤ 2 mA
Max. transmission rate	9600 bps
Protocols	IEC 62056-21 and dlms

Insulation resistance to meter	4 kV_{AC}/50 Hz, 1 min
Creep distance	≥ 6.3 mm

RS422-Interface — to ISO-8482

Type serial, symmetric, asynchronous, bidirectional	
Nominal input voltage common mode range	–3 to +3 V_{DC}
Binary 1 state	difference voltage < –0.2 V
Binary 0 state	difference voltage > 0.2 V
Max. transmission rate	38,400 bps
Max. number of slaves	10
Protocols	IEC 62056-21 and dlms
Max. conductor length depending on environment and connecting cable	1000 m
Insulation resistance to meter	4 kV_{AC}/50 Hz, 1 min
Creep distance	≥ 6.3 mm

Weight and Dimensions

Weight	approx. 1.5 kg

External dimensions

Width	177 mm
Height (with short terminal cover)	244 mm
Height (with standard terminal cover)	281.5 mm
Height (with extended hook)	305.5 mm
Depth	75 mm

Suspension triangle

Height (with extended hook)	230 mm
Height (suspension eyelet open)	206 mm
Height (suspension eyelet covered)	190 mm
Width	150 mm

Terminal cover

Short	no free space
Standard	40 mm free space
Long (opaque, transparent)	60 mm free space
Standard	80 mm free space
Standard	110 mm free space
GSM	60 mm free space
ADP1 adapter	
RCR/FTY adapter	

Material

Housing

Polycarbonate, partly glass-fibre reinforced

Connections

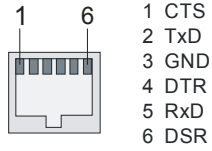### Phase connections

Type	cage type terminals
Cross section	5.2 x 5.2 mm
Recommended conductor cross section	4 to 6 mm²
Screw head	Pozidrive Combi No. 2
Screw dimension	M4 x 15

Connections (cont.)

Screw head diameter	≤ 5.6 mm
Tightening torque	1.5 to 2 Nm

RS232 Interface

Type designation	.0**2**/.4**2**/.6**2**
Type	RJ 12
Pin assignment	

1 6

1 CTS
2 TxD
3 GND
4 DTR
5 RxD
6 DSR

RS485 Interface

Type designation	.0**3**/.4**3**/.6**3**/.**3**7
Type	RJ 12
Pin assignment	

1 6

1 c (common ground)
2 a (data a)
3 b (data b)
4 b
5 a
6 c
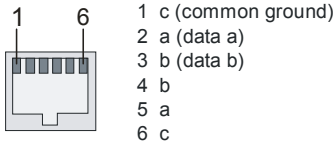
CS Interface

Type designation	.**4**0/.**4**2/.**4**3
Type	screw type terminals

+ ▢▢ -
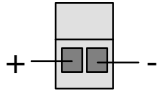
RS422-Interface

Type designation	.**6**0/.**6**2/.**6**3
Type	RJ 12
Pin assignment	

RS422	RS422

6 1 6 1

1 GND
2 U_P (Data a)
3 U_N (Data b)
4 U_N (Data z)
5 U_P (Data y)
6 GND
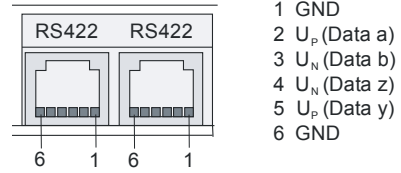
The two RJ12 jacks of the RS422-interface are looped internally to permit connection of several meters.

RS232 powered

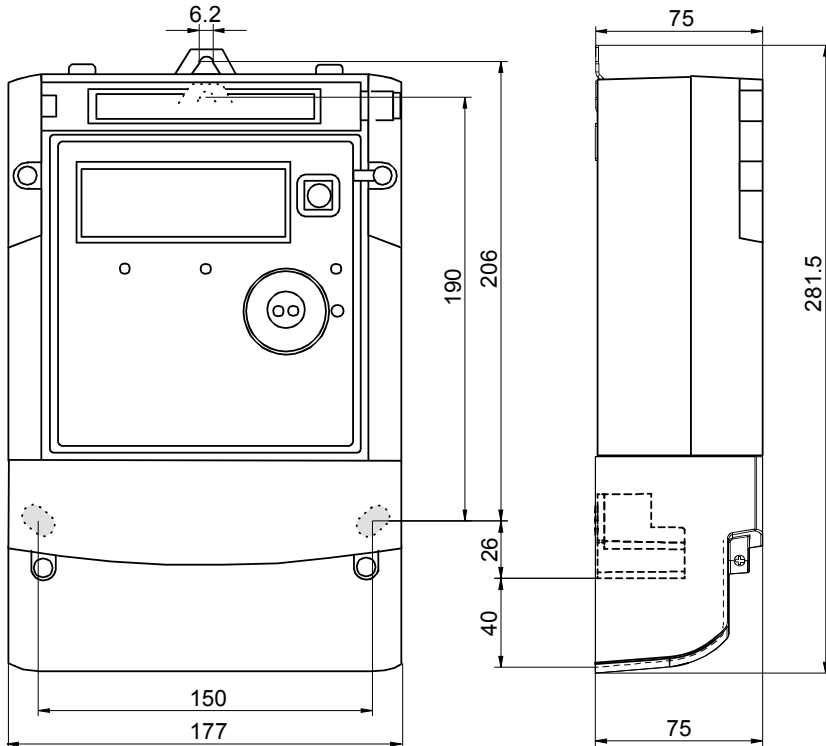|	
Type designation	.0**7**/.**3**7
Type	RJ 45
Pin assignment	

1 8

1 NC
2 CTS
3 TxD
4 GND
5 NC
6 RxD
7 NC
8 V+ (10 ... 14 V)
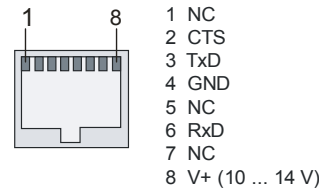
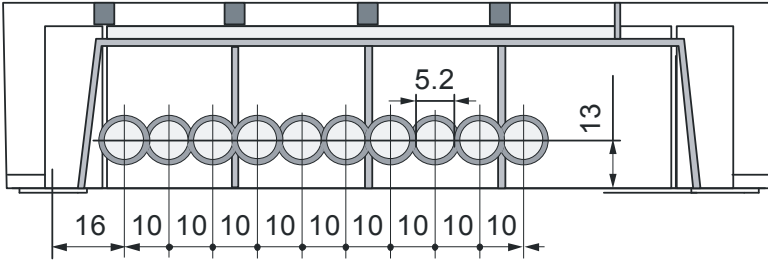### Voltage outputs U1, U2, U3, N

Type	screw type terminals
Max. current	1 A
Max. voltage of control inputs	300 V

Meter Dimensions (standard terminal cover, suspension eyelet open)

6.2
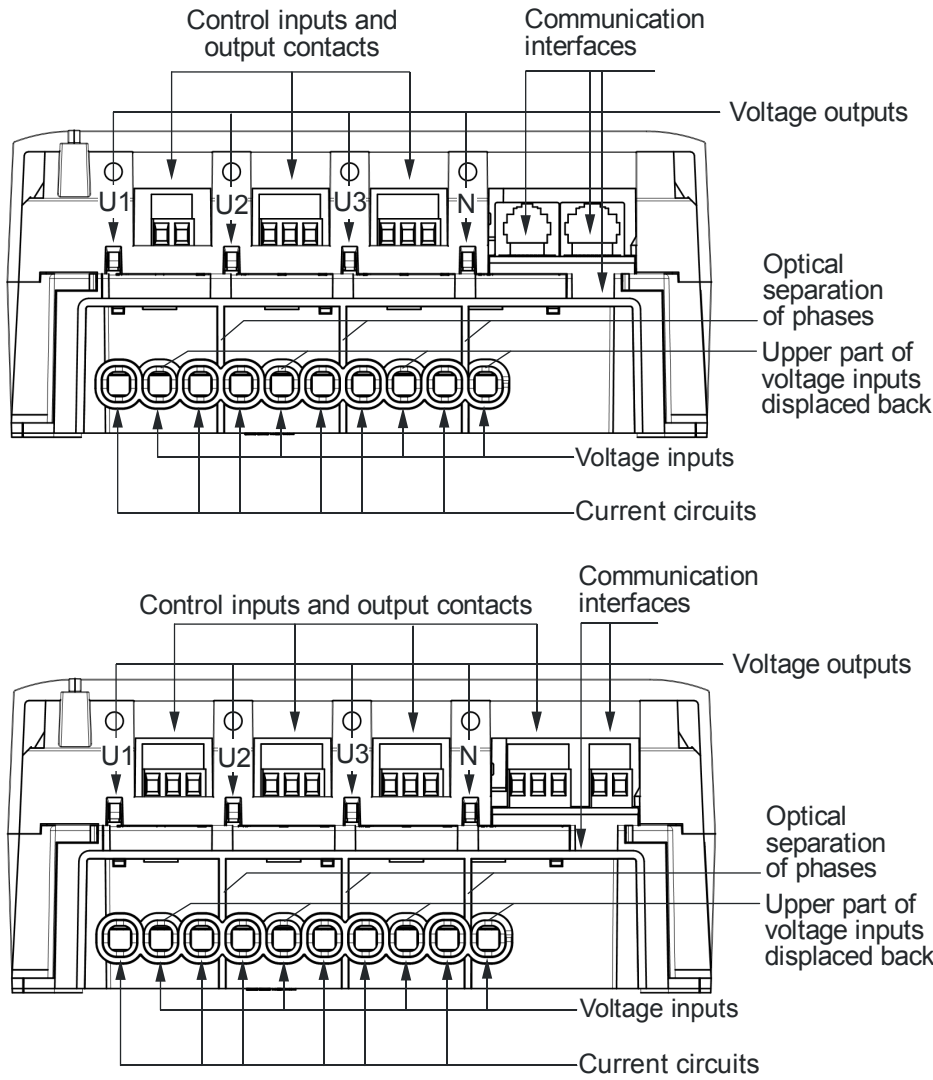
75

206
190
26
40
281.5

150
177
75

The height of the suspension triangle with extended hook is 230 mm. See also User Manual.

Terminal Dimensions

Terminal Layout

Type designation					ZMG	4	10	CR	4.	260	b.	43 S2

Network type

ZMG   **3-phase 4 wire network (M-circuit)**

Connection type

4   Transformer operated

Accuracy class

10   Active energy class 1 (IEC), B (MID)
05   Active energy class 0.5 (IEC), C (MID)

Measured quantities

CR   Active and reactive energy
AR   Active energy

Tariff functions

1   Energy rates, externally controlled
2   Energy rates, internally controlled with time switch (TOU)
3   Energy and demand rates, externally controlled
4   Energy and demand rates, internally controlled with time switch (TOU)

Number of control inputs / number of output contacts / special functions

000   No control inputs, no output contacts, no special functions
020   2 output contacts
060   6 output contacts
240   2 control inputs, 4 output contacts
260   2 control inputs, 6 output contacts
440   4 control inputs, 4 output contacts
041   No control inputs, 4 output contacts, 1 output relay 5A

Additional functions

0   None
3   With software events
4   With hardware and software events
7   With load profile
a   With load profile and software events
b   With load profile, hardware and software events

Interfaces 2 (Xx**) and 1 (**x**X) (S2 = Series 2)**

00 No interfaces	40 CS*	60 RS422**	07 Powered RS232***
02 RS232	42 CS and RS232*	62 RS422 and RS232**	37 RS485 and
03 RS485	43 CS and RS485*	63 RS422 and RS485**	Powered RS232***

*) only as .260x.4x or as .440x.4x
**) only as .041x.6x
***) only as .020x.07, .041x.37, .240x.37 or as .060x.37