Electricity Meters IEC

High Precision Metering

Landis+Gyr Qualigrid

ZMQ202, ZFQ202, ZCQ202

Technical data

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ZMQ202, ZFQ202, ZCQ202 Technical Specifications

Voltage

Nominal Voltage U_n
$3\ x\frac{100}{\sqrt{3}}\ V$, $3\ x\frac{110}{\sqrt{3}}\ V$, $3\ x\frac{115}{\sqrt{3}}\ V$, $3\ x\frac{200}{\sqrt{3}}\ V$, $3\ x\frac{190}{\sqrt{3}}\ldots\frac{230}{\sqrt{3}}\ V$ (user defined)

Voltage Range	
measurement	70 to 115 % U_n
functional	65 to 130 % U_n
measurement shut down	45% U_n for ZMQ lower thresholds possible

Current

Nominal Current	1 A, 5 A

Maximum Current I_{max}	
standard	120 % I_n
metrological	up to 170 % I_n
for -1/2, -5/10	200 % I_n
metrological	up to 240 % I_n
thermal	12 A (at least 1.5 x I_{max})

Influence of short-time overcurrents	
20 I_{max} during 0.5 s according IEC	< 0.05 %
typical 100 A during 1 s possible	

Starting Load (standard)	
120 % / 150 % I_{max}	active energy < 0.05 % P_n reactive energy < 0.1 % Q_n
200 % I_{max}	active energy < 0.1 % P_n reactive energy < 0.2 % Q_n

On request the starting threshold can be multiplied by 2, 4 or 8 but may not exceed 0.4 %.

Frequency

nominal frequency f_n	50 or 60 Hz (selectable)
range	90 to 110 % f_n
range for primary values:	(50) 100 to 40’000 A 400 V to 1000 kV

Measuring Accuracy

Load Dependency	Class 0.2 S Active
1 % I_n, cos φ = 1	± 0.28 %
5 % I_n to I_{max}, cos φ = 1	± 0.14 %
2 % I_n, cos φ = 0.5	± 0.40 %
10 % I_n to I_{max}, cos φ = 0.5	± 0.24 %
deviations between the individual phases at 100 % I_n	< 0.10 %
losses	< 1 %

Additional Power Supply

nominal voltage ranges U_n	
	100 to 230 V AC/DC 24 to 125 V AC/DC
functional range	70 to 115 % U_n
frequency	50 or 60 Hz
max. power consumption	6 VA

Operating Behaviour

Voltage Failure (Power Down)	
block inputs and outputs	immediate
transmitting contacts	after 100 ms
standby operation	after 0.5 s
data storage	after a further 0.2 s
switch off	after approx. 2.5 s

Voltage Restoration (Power Up)	3 phase
function standby	after 1 to 3 s
detection of energy direction + phase voltage	after 1 s

Power Consumption

General	
all values are typical values at $3x\frac{100}{\sqrt{3}}V$	
maximum values	1.5 x typical values
all values are voltage dependant	

Current Circuit (only for measurement)	< 0.1 VA
1 A	0.004 VA
5 A	0.09 VA

Power Consumption

Power supply connected to the voltage circuits	
voltage circuit without transmitting contacts and communication unit	(0.5 W) 0.9 VA
additional power supply with transmitting contacts and communication unit	(0.8 W) 1.4 VA

Power supply not connected to the voltage circuits	
voltage circuit	0.05 VA
additional power supply type	0.1 VA
additional power supply without transmitting module and communication unit	3 VA
additional power supply with transmitting module and communication unit	4.5 VA

Environmental Influences

Temperature Range	according to IEC 62052-11
metrological	–10 °C to 45 °C
operation	–25 °C to 55 °C
storage and transportation with battery	–25 °C to 55 °C
storage and transportation without battery	–25 °C to 70 °C

Temperature Coefficient	
range	–10 °C to 45 °C
at cosφ = 1 (5 % I_n to I_{max})	< ±75 ppm/K
at cosφ = 0.5 (10 % I_n to I_{max})	< ±150 ppm/K

Relative Humidity	according to IEC 62052-11
annual average	< 75 %
for 30 days in year	95 %
on other days	85 %

with the exception of condensation and formation of ice

Vibration	according to IEC 68-2-6
frequency	10 to 500 Hz
frequency < 60 Hz	h_{const} = 0.375 mm
frequency > 60 Hz	a_{const} = 5 g
velocity	1 octave/min
duration	10 cycles

Half-wave sinusoidal shock acc. to IEC 68-2-27	
Three shocks in six directions	
a_{max}	80 g
t_i	11 ms

Environmental Influences

Impermeability	according to IEC 60529
f6 and f9 housing	IP51

Flammability (f6 housing only)	according to IEC 695-2-1
contact force of heating wire	1 N
duration	30 s

test temperature = 960°C (terminal block)
test temperature = 650°C (housing)

Electromagnetic Compatibility

Electrostatic Discharges	acc. to IEC 61000-4-2
contact discharge	8 kV

Immunity to Electromagnetic RF Fields according to IEC 61000-4-3	
80 to 2000 MHz	10 V/m
measuring deviation	< 1 %

Radio Interference Suppression according to IEC/CISPR 22	class B

Fast Transient Burst Test	to IEC 61000-4-4
current and voltage circuits not under load	4 kV
current and voltage circuits under load	2 kV
auxiliary circuits > 40 V	2 kV

Insulation Strength

Insulation Test (Security)	
all circuits to earth	4 kV 50 Hz
measurement circuits against all other circuits	4 kV 50 Hz
outputs against all other circuits	2 kV 50 Hz
tariff inputs against all other circuits	2 kV 50 Hz

Impulse Voltage (Surge)	
surge 1.2 / 50µs – 8 / 20µs differential mode	
- current and voltage circuits	4 kV @ 2 Ω
- auxiliary circuits > 40 V	1 kV @ 42 Ω
surge 1.2 / 50µs – 8 / 20µs common mode	
- current and voltage circuits	4 kV @ 12Ω 9µF

For f6: Protection Class II acc. to IEC 62052-11 ⧈

Calendar Clock

Accuracy at 23 °C	< 5 ppm

Backup Time (Power Reserve)	
with supercap	> 20 days
loading time for max. backup time	300 h
with battery (optional)	10 years
battery type	CR-P2

Display

Characteristics	
type	LCD liquid crystal display
digit size in value field	8 mm
number of positions in value field	up to 8
digit size in index field	6 mm
number of positions in index field	up to 8

Inputs and Outputs

Optical Test Output	Active and Reactive Energy
pulse width	40 ms
maximum pulse frequency	12 Hz

Control Inputs	
voltage ranges	100 to 125 V AC/DC 200 to 230 V AC/DC 24 V DC 48 to 60 V DC

The control voltage range is set by jumpers in the hardware.

input current	≤ 3 mA

Transmitting Contacts	
type	solid state relay
max. switching voltage	125 V AC/230 V DC
min. switching voltage	24 V DC
max. continuous switching current	55 mA AC/DC
min. switching current	0.1 mA
electrical lifetime	> 15 x 10^9 pole changes
contact resistance	≤ 50 Ω
insulation between the contacts and other current circuits	3.75 kV AC/1 min
insulation between contact groups	2 kV AC/1 min
pulse length r4	20, 40, 80 ms

Alarm Contacts	
type	monostable with switchover contact
max. switching voltage	250 V AC/DC
normal switching voltage	24 V DC
min. switching voltage	5 V DC at min. 10 mA
max. switching current	100 mA AC/DC at 250 V
min. switching current	5 mA DC
electrical lifetime	10^5 switching operations with ohmic load
insulation	4 kV AC/1 min

Communication Interfaces

Optical Interface for Automatic Meter Reading	
Standard	IEC62056-21
status binary 1	IR LED off
status binary 0	IR LED on
max. bit rate	9600 bps
transmission mode	serial, half duplex, asynchronous start/stop
protocol	dlms (IEC 62056-42/46/53/61/62)

RS485 Interface to Other Meters (Daisy Chain)	
standard	ISO 8482
max. current consumption (with 1 transmitter and 8 receivers)	15 mA
max. current per unit	0.8 mA to 1 mA
status binary 1	differential voltage < -0.2 V
status binary 0	differential voltage > -0.2 V

Max. bus length	**bit rate**	**no. of meters**
1200 m	19.2 kbps	16 meters
550 m	38.4 kbps	32 meters
250 m	57.6 kbps	32 meters

insulation	4 kV AC
transmission mode	serial, bidirectional, asynchronous start/stop
protocol	dlms (IEC 62056-42/46/53/61/62)
connections	2-wire, not exchangeable (twisted pair shielded cable)

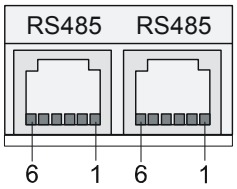
No termination resistor is needed for the described line data. If required by the system, an external load of 1.2 kΩ can be used.

Connections

Current and Voltage Connections	f6
type	screw type terminals
diameter	5.2 mm
recommended conductor cross-section	4 to 6 mm^2
screw type	Pozidriv Kombi No. 1
screw dimensions	M4 X 8
max. head diameter	5.8 mm
tightening torque	≤ 1.7 Nm

Input and Output Connections	f6
auxiliary power supply, tariff inputs, alarm output, synchronisation input and transmitting contacts	
type	spring type terminal

RS485-Interface Connections	f6
type	RJ-12



Pin allocation RS485:
1 GND
2 U_P (Data a)
3 U_N (Data b)
4 U_N (Data b)
5 U_P (Data a)
6 GND

The two RJ12 jacks of the RS485-interface are looped internally to permit a connection of several meters.

Connections f9

direct plug-in Essaillec connectors with automatic short circuit for current transformers

Housing Material

f6

The meter housing is made of polycarbonate which is partly glass-fibre reinforced.

f9

The meter housing is made of lacquered sheet steel. The transparent meter cover is made of polycarbonate.

Standard data						
Un 3x…/√3	**I_n**	**Load**	**P_{max}**	**R [imp/ kWh/kvarh]**	**r4 Pulse value [Wh, varh / imp]**	**Energy register kWh, kvarh, kVA**
100 V	1 A	120 %	208 W	100 000	0.02	0,0000
100 V	1 (2) A	200 %	346 W	50 000	0.02	0,000
100 V	5 A	120 %	1039 W	20 000	0.1	
100 V	5 (7,5) A	150 %	1299 W	50 000	0.1	
100 V	5 (10) A	200 %	1732 W	50 000	0.1	
200 V	1 A	120 %	416 W	25 000	0.05	
200 V	1 (2) A	200 %	693 W	10 000	0.05	
200 V	5 A	120 %	2078 W	25 000	0.2	

Memory capacity
per profile for profile 1 and profile 2

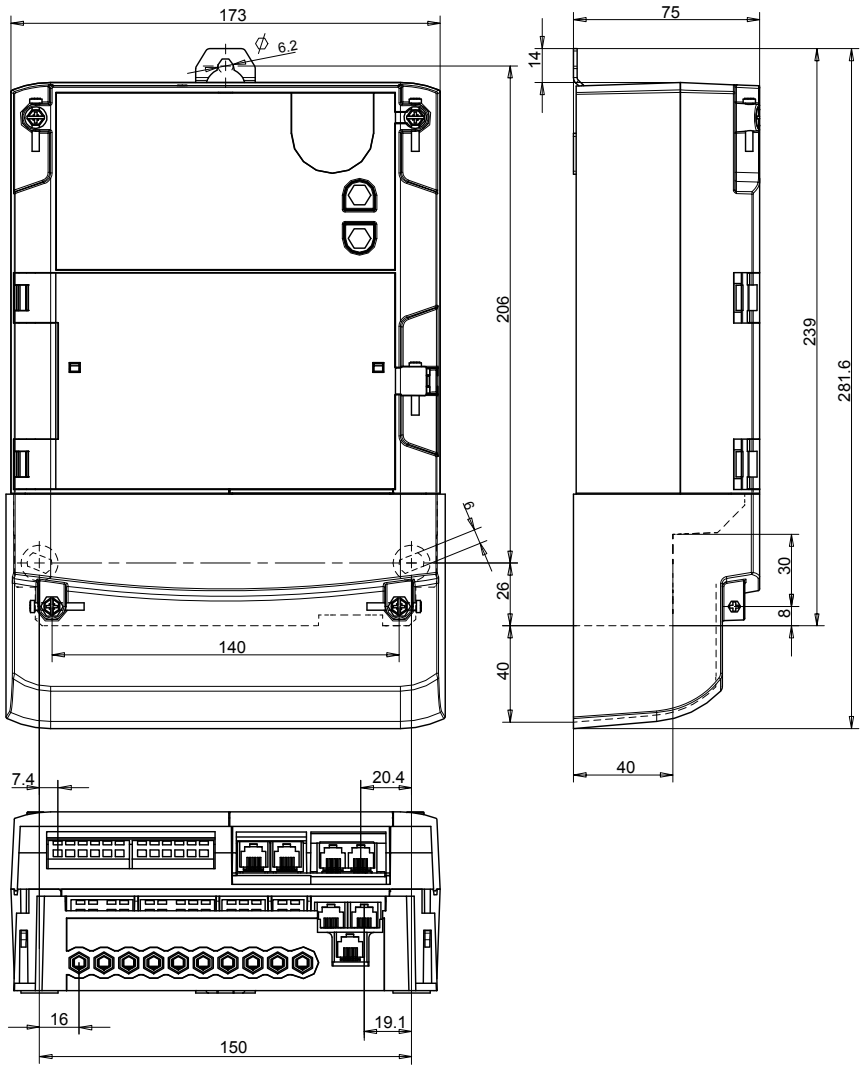
for t_m = 15 min	4 register	e.g. ±A, ±R	681 days
	10 register	e.g. ±A, ±R, 3x U, 3x I	336 days
	36 register		100 days

Weight and Dimensions f6

Weight	1.6 kg

Terminal Cover	
short	no free space
standard	40 mm free space
long	60 mm free space
special	110 mm free space

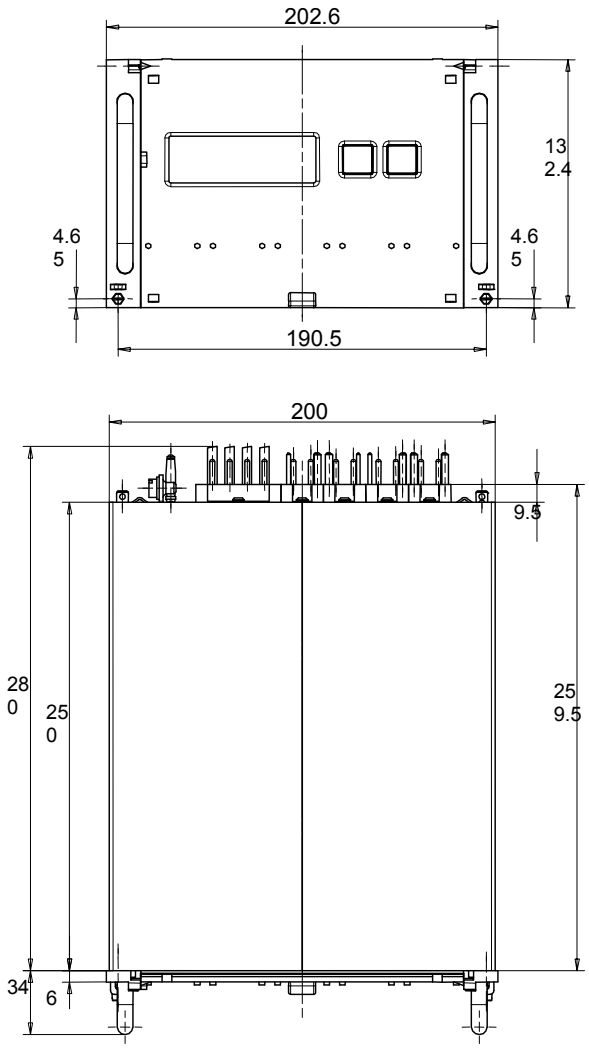
Meter Dimensions (Standard Terminal Cover)



Weight and Dimensions f9

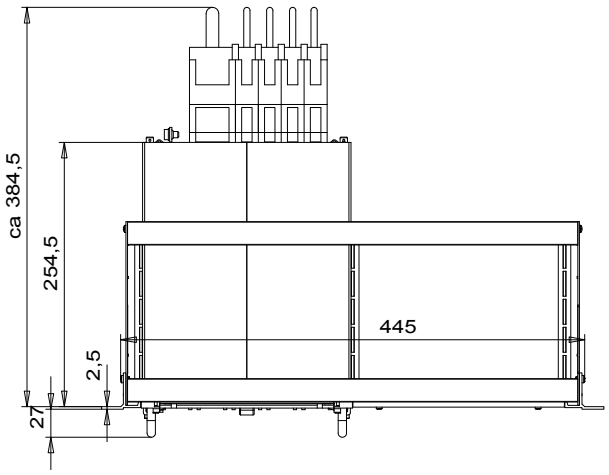
Weight	4.4 kg

Rack Mounting

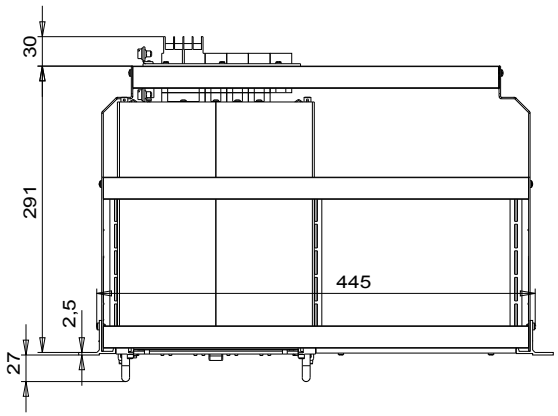


earth screw for cable connection; earth pin for chassis f9.11 and f9.12

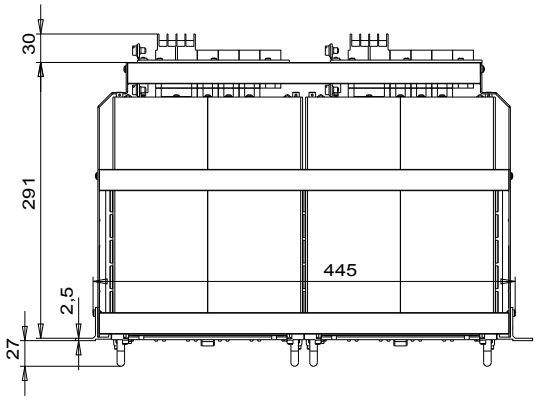
Chassis	f9.10 (meter with cable connections)



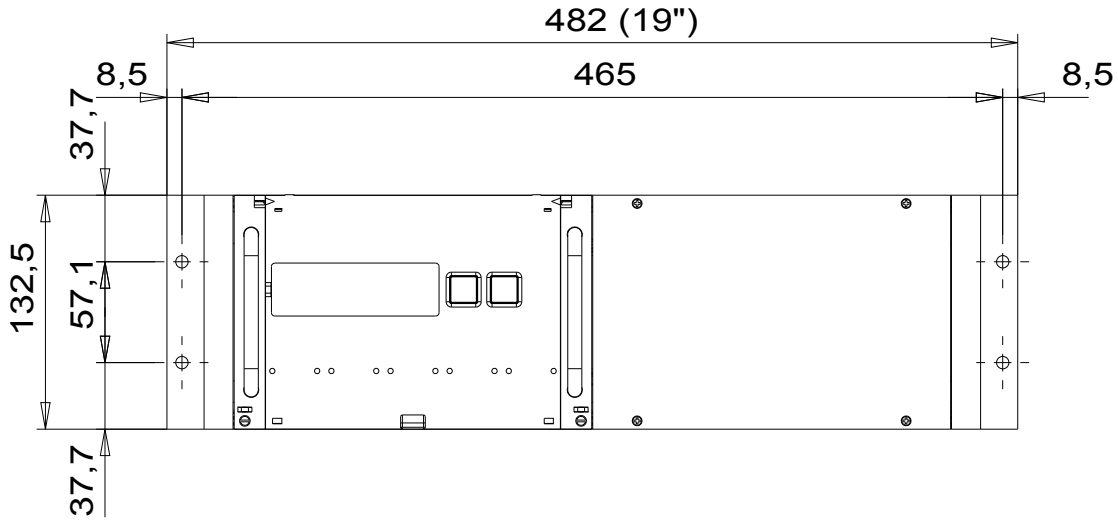
Chassis f9.11 (direct plug-in meter)



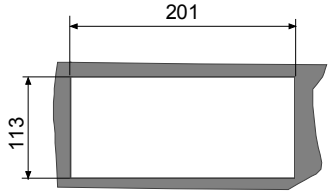
Chassis f9.12 (two direct plug-in meters)



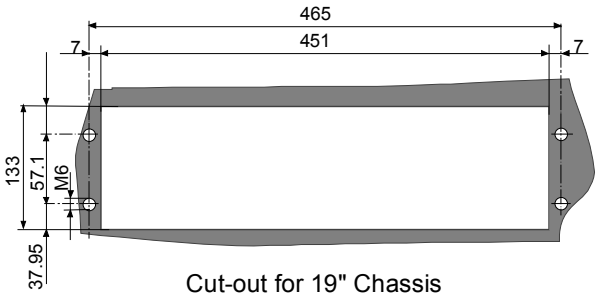
Front



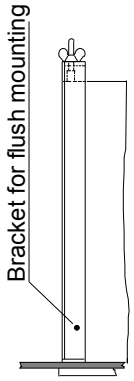
Flush Mounting for f9



Cut-out for panel-flush mounting



Cut-out for 19" Chassis



ZMQ 2 02 C.8 r4 f6

Network type

ZMQ	3-phase 4-wire network (M-circuit)
ZFQ	3-phase 3-wire network (F-circuit)
ZCQ	1-phase 2-wire network (C-circuit)

Accuracy class

02	Class 0.2 S for active energy according to IEC
05	Class 0.5 S for active energy according to IEC

Software configuration

C.4	basic measurement functions
C.6	additionally losses, harmonic distortion and CT/VT correction
C.8	additionally apparent energy and single phase measurement, max. demand, power factor, monthly billing values

Transmitting contacts

r4	4 changeover contacts for +A, –A, +R, –R with fixed pulse width (4 x u)
r4a	8 normally open contacts with fixed pulse width (8 x u)
r4aa	4 normally open contacts for +A, –A, +R, –R in 2 groups with fixed pulse width (2 x 4 x u)
r3	4 changeover contacts for +A, –A, +R, –R with symmetric mark/space ratio (4 x u) and storage of contact position in case of power outage

Casing

f6	Wall mounted housing (Plastic housing for wall mounting)
f9	Rack mounted housing (Metal housing equipped with ESSAILEC connectors) – for flush mounting in 19" rack with counter connectors – for flush mounting in 19" rack with cable connectors – for switchboard mounting with cable connectors

Customer specific versions

– C.2: for serial connection to FAG/FBC (only with H90 and former hardware)

– C.7: specific functionality for India with Availability Based Tariff

– 16.7 Hz version

– Current ranges 1 (4) A; 1.5 (6) A; 2 A, 120% I_n

– 3 x 400/230 V for direct connection to low voltage network

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Landis+Gyr
manage energy better