

HIGH PRECISION METERING

Landis+Gyr Qualigridd

ZMQ200 / ZFQ200 / ZCQ200

TECHNICAL DATA



Current

Nominal Current I_n 1 A, 2 A, 5 A

Maximum Current I_{max}

Standard 120 % I_n
 for 2 A only 120 % I_n
 metrological up to 170 % I_n
 thermal 12 A (at least 1.5 x I_{max})

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 %.

Voltage

Nominal Voltage U_n

$3 \times \frac{100}{\sqrt{3}} V$, $3 \times \frac{110}{\sqrt{3}} V$, $3 \times \frac{115}{\sqrt{3}} V$, $3 \times \frac{200}{\sqrt{3}} V$,
 $3 \times \frac{190}{\sqrt{3}} \dots \frac{230}{\sqrt{3}} V$ (user defined)

Voltage Range

Measurement 70 – 115 % U_n
 Functional 65 – 130 % U_n

Frequency

Nominal Frequency f_n 50 or 60 Hz (selectable)
 tolerance 90 – 110 % f_n
 Range for primary values:

(50) 100-40'000 A
 400 V – 1000 kV

Measuring Accuracy

Load Dependency	Class 0.2S Active
1 % I_n , $\cos \varphi = 1$	± 0.28 %
5 % $I_n - I_{max}$, $\cos \varphi = 1$	± 0.14 %
2 % I_n , $\cos \varphi = 0.5$	± 0.40 %
10 % $I_n - I_{max}$, $\cos \varphi = 0.5$	± 0.24 %
Deviations between the individual phases at 100 % I_n	
	< 0.10 %
Losses	
	< 1 %

Average values of delivered meters with load on all phases

5 % $I_n - I_{max}$, $\cos \varphi = 1$, (measurement uncertainty)	< 0.05 % +/- 0.03 %
5 % $I_n - I_{max}$, $\cos \varphi = 0.5$, (measurement uncertainty)	< 0.08 % +/- 0.06 %

Additional Power Supply

Additional Power Supply	
nominal voltage ranges Un	100 – 230 V AC/DC 24 – 125 V AC/DC
functional range	70 – 115 % Un
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)	
function standby	after 1 – 3 s
detection of energy direction + phase voltage	after 1 – 3 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)	
1 A	0.004 VA
5 A	0.09 VA

Power supply connected to the voltage circuits	
voltage circuit without transmitting module and communication unit	(0.5 W) 0.9 VA
additional power supply with transmitting module 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	
metrological	according to IEC 62052-11 -10 °C – 45 °C

operation	-25 °C – 55 °C
storage and transportation with battery	-25 °C – 55 °C
storage and transportation without battery	-25 °C – 70 °C

Temperature Coefficient	
range	-10 °C – 45 °C
at $\cos\varphi = 1$ (5 % In to I _{max})	< ±75 ppm/K
at $\cos\varphi = 0.5$ (10 % In to I _{max})	< ±150 ppm/K

Relative Humidity	
annual average	according to IEC 62052-11 < 75 %
for 30 days in year	95 %
on other days	85 %
with the exception of condensation and formation of ice	

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

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

Impermeability	
F6 and F9 housing	according to IEC 60529 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	
contact discharge	according to IEC 61000-4-2 8 kV

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

Radio Interference Suppression	
according to IEC/CISPR 22	class B

Fast Transient Burst Test	
current and voltage circuits not under load	to IEC 61000-4-4 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 / 50 μ s - 8 / 20 μ s differential mode	
- current and voltage circuits	4 kV @ 2 Ω
- auxiliary circuits > 40 V	1 kV @ 42 Ω
surge 1.2 / 50 μ s - 8 / 20 μ s common mode	
- current and voltage circuits	4 kV @ 12 Ω 9 μ F

Protection Class II according 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

control voltages	100 – 125 V AC/DC
	200 – 230 V AC/DC
	24 V DC
	48 – 60 V DC

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

input current \leq 3 mA

Transmitting Contacts

type	solid state relay
max switching voltage	125 V AC/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	\leq 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 – 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
1200m	19.2 kbps	16 meters
550m	38.4 kbps	32 meters
250m	57.6 kbps	32 meters

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

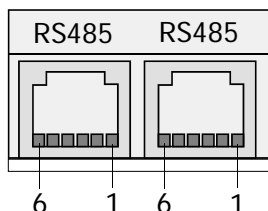
No termination resistor is needed for the described line data. If required by the system, an external load of 1.2 k Ω can be used.

Connections

Current and Voltage Connections		f6
type	screw type terminals	
diameter	5.2 mm	
recommended conductor cross-section	4 - 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 UP (Data a)
- 3 UN (Data b)
- 4 UN (Data b)
- 5 UP (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	In	Load	Pmax	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	

Weight and Dimensions f6

Weight

1.6 kg

Terminal Cover

short

no free space

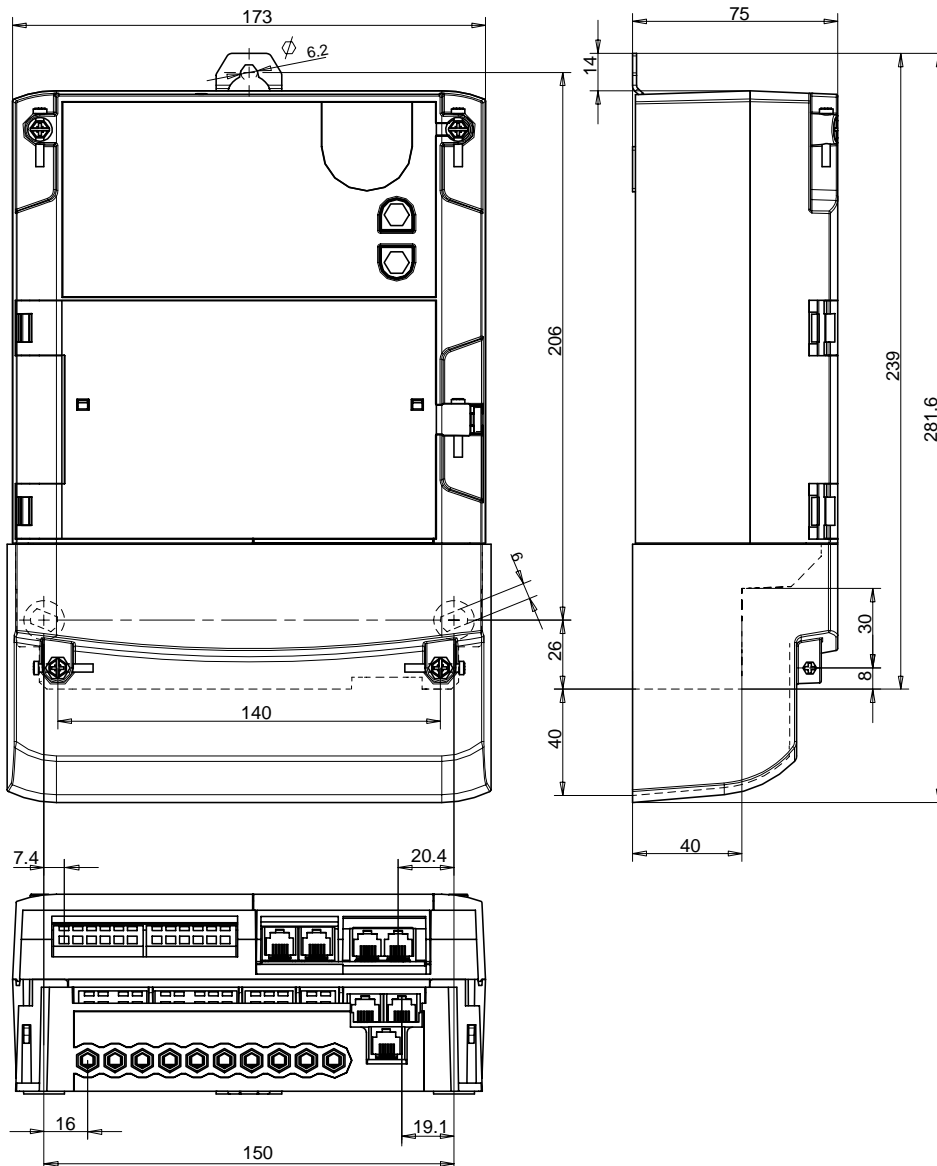
standard

40 mm free space

long

60 mm free space

Meter Dimensions (Standard Terminal Cover)

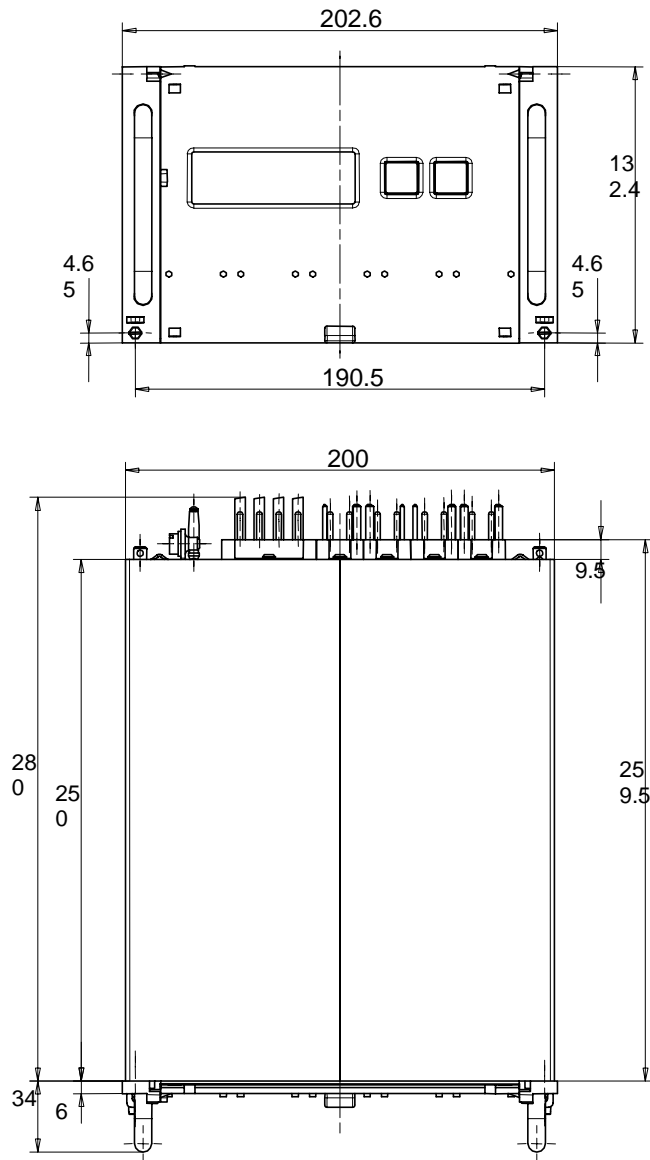


Weight and Dimensions f9

Weight

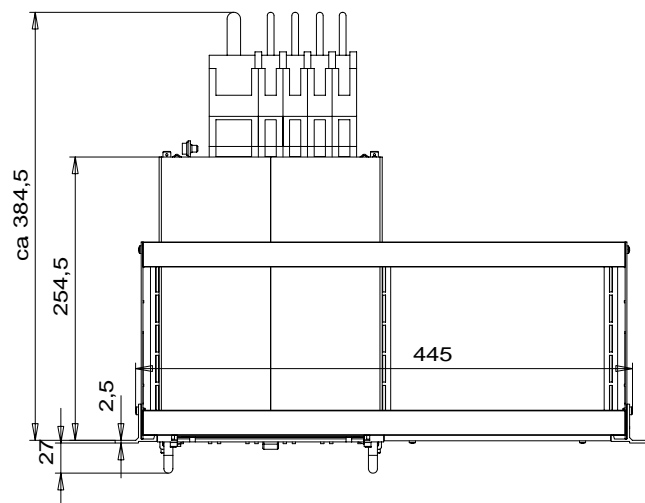
4.4 kg

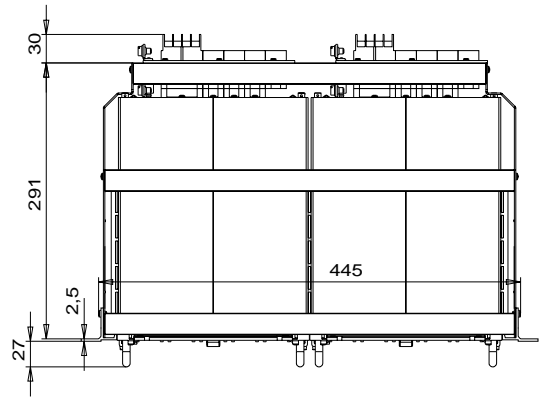
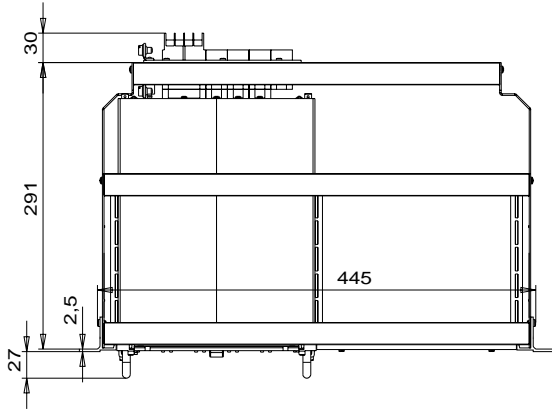
Rack Mounting



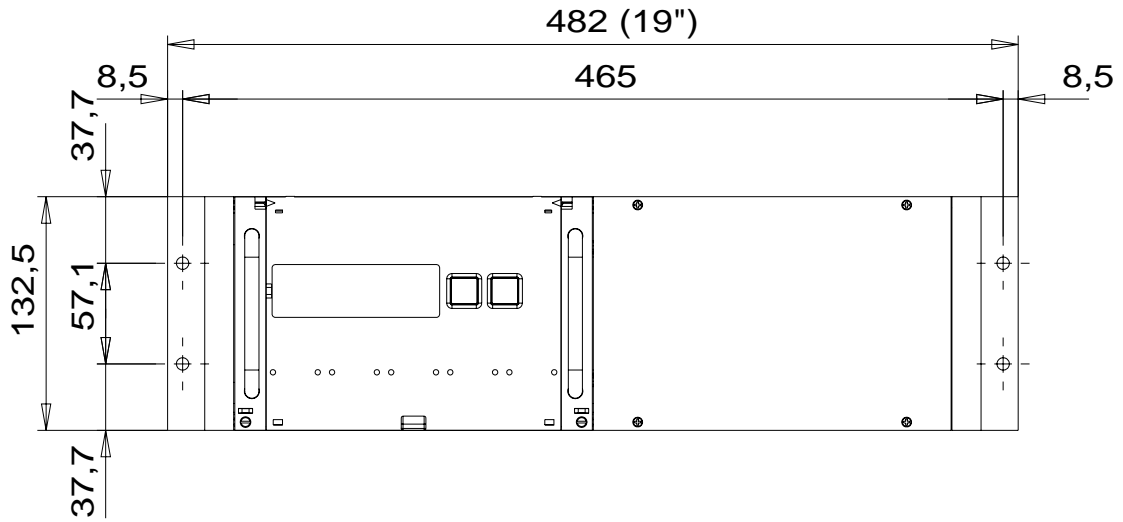
Chassis

f9.10 (meter with cable connections)

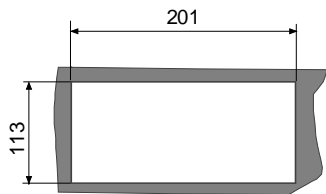




Front



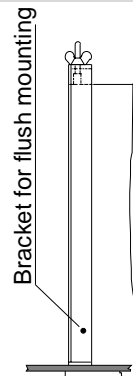
Flush Mounting for f9



Cut-out for panel-flush mounting



Cut-out for 19" Chassis



Bracket for flush mounting

Type Designation

ZMQ 2 02 C.4 r4 f6

Network Type

ZMQ three phase 3 wire network (M-circuit)
ZFQ three phase 3 wire network (F-circuit)
ZCQ single phase 2 wire network (C-circuit)

Accuracy Class

02 class 0.2 S according to IEC
05 class 0.5 S according to IEC

SW Configuration

C.2 for serial connection to FAG/FBC
C.4 basic measurement functions (as ZxU)
C.6 additionally losses (as ZxV), 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 with fixed pulse width (4 x u)

r4a 8 normally open contacts with fixed pulse width (8 x a)
r4aa 4 twin normally open contacts with fixed pulse width (2 x 4 x a)
r3 4 changeover contacts with symmetric mark/space ratio (4 x u)
and storage of contact position in case of power outage

Housing

f6: wall mounted housing
f9: rack mounted housing

subject to technical changes

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