

SIEMENS

SIMEAS® P

Power Meter

7KG7550/7KG7650/7KG7660

Operating Instructions

Order no:

E50417-B1076-C263-A5

Edition 07/2004



1	Operating Instructions.....	2
1.1	Compliance	2
1.2	General Information	3
1.3	Qualified Personnel	5
1.4	Ordering Data.....	6
1.5	Note Concerning Transport	7
1.6	Range of Application	7
1.7	Mode of Operation.....	8
1.8	Block Diagram	9
1.9	Measured Values	11
1.10	Technical Data.....	13
1.11	Communication Interface	19
1.12	Dimensions	20
1.13	Connection Terminals.....	24
1.13.1	For Devices 7KG7550 and 7KG7650.....	24
1.13.2	For Devices 7KG7660	26
1.14	Mounting and Operation	29
1.14.1	Mounting the Device	30
1.15	Cable Connections	32
1.16	Storage.....	33
1.17	Electrical Connections	33
1.18	Connection Examples.....	35
1.19	Commissioning	39
1.20	Configuration Overview.....	41
1.20.1	Operating Notes	41
1.20.2	Button Functions	41
1.20.3	Window Structure.....	42
1.20.4	Notes.....	43
1.20.5	Overview of the Programming Levels: 7KG7550	44
1.20.6	Overview of the Programming Levels: 7KG7650/7KG7660	45
1.21	Testing and Calibration	46
1.22	Maintenance, Repair and Cleaning	47

The warnings and information contained in these operating instructions are provided to ensure personal safety and maximize the useful life of the product. Please follow them!

This product is UL-certified to Standard UL 61010B-1, based on the specification stated in Chapter 1.10 (Technical Data).
UL File No.: E228586



Measuring Equipment

2UD1

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1 Operating Instructions

1.1 Compliance



This product complies with the directives of the Council of the European Communities in accordance with the laws of the Member States regarding electromagnetic compatibility (EMC Council Directive 89/336/EEC) and the application of electrical equipment within specified voltage limits (Low Voltage Directive 73/23/EEC).

Compliance has been verified via testing performed by Siemens AG as per article 10 of the Council Directives in accordance with the generic standards EN 61000-6-4 and EN 61000-6-2 (for EMC Directive) as well as EN 61010-1 (for Low Voltage Directive).

The device is designed and manufactured for application in industrial environments as defined in the standard EN 61000-6-4.

The device is designed and manufactured in accordance with the international standard IEC 60688.

1.2 General Information

These operating instructions include the information required for proper use of the corresponding products. These operating instructions are intended for technically qualified personnel with sufficient competence and knowledge in the areas of instrumentation and control engineering, which will be referred to as automation engineering throughout the rest of these operating instructions.

In order to ensure safe installation and commissioning, as well as safe operation and maintenance, all personnel should fully understand and comply with all safety information and warnings contained in this document in a technically correct manner. Only personnel who meet the requirements outlined in Chapter 1.3 for qualified personnel possess the expertise and knowledge required to apply the general safety information and warnings of this document correctly for each specific and individual scenario.

While these operating instructions are included with the product, it is important to note that not every aspect of the product, nor every possible installation, operation and maintenance scenario, can be thoroughly discussed.

If more information is required, or if specific problems arise which are not discussed in this document, additional information can be requested from your local Siemens subsidiary or from the address given on the back cover of this document.








WARNING!

If the equipment described in these operating instructions is used in a manner other than that specified by the manufacturer, the protection provided by the equipment may be impaired.

Furthermore, the contents of this operating instructions are not part of an earlier or existing agreement, consent, or a legal regulation and do not represent a modification of any of these. All commitments of Siemens are specified in the specific purchase contract, which also includes the entire and unique warranty regulations. The contractual warranty regulations are neither extended nor restricted by the information in this document.

Explanation of symbols marked on the equipment

	Direct current
	Alternating current
	Three-phase alternating current
	Documentation needs to be consulted
	Protective ground



WARNING!

During operation of electric devices, certain parts of the device are subject to dangerous voltages. Ignoring the warning notes can result in severe injury or damage to property.

Only qualified personnel should be allowed to operate this device. Appropriate transportation, storage, installation and assembly, as well as careful operation and maintenance, are basic requirements for proper and safe operation of this device.

In particular, the general mounting and safety regulations (e. g. IEC or national standards) regarding the correct use of power systems must be observed and complied with. Non-compliance can result in death, personal injury or substantial property damage.

1.3 Qualified Personnel

are persons who are familiar with the installation, assembly, commissioning and operation of the product and who possess the following qualifications:

- training or instruction and authority to operate and service devices/systems according to all applicable safety standards and rules for electric circuits and devices
- education or instruction in the maintenance and use of appropriate safety equipment according to all applicable safety standards
- first aid training

1.4 Ordering Data

Description	Order-No.
Power Meter with graphic-display	
SIMEAS P500 Standard built-in device for control panels 144x144 with graphic display	7KG7 5 5 0 - 0 A A 0 <input type="checkbox"/> - 0 A A 0
Front protection class	
IP 41	1
IP 54	2
SIMEAS P600 Extended built-in device for control panels 144x144 with graphic display, real time clock module, battery and memory for recording of measured quantities	7KG7 6 <input type="checkbox"/> 0 - 0 <input type="checkbox"/> <input type="checkbox"/> 0 <input type="checkbox"/> - 0 <input type="checkbox"/> <input type="checkbox"/> 0
Version	
without I/O modules	5 A A A A
with additional I/O modules	6 A A A A
I/O module in slot A	
without	A
2 binary outputs	B
2 binary inputs	C
2 analog outputs (0 to 20 mA _{DC})	D
2 analog inputs (0 to 20 mA _{DC})	E
3 relais outputs	G
I/O module in slot B	
without	A
2 binary outputs	B
2 binary inputs	C
2 analog outputs (0 to 20 mA _{DC})	D
2 analog inputs (0 to 20 mA _{DC})	E
Front protection class	
IP 41	1
IP 54	2
I/O module in slot C	
without	A
2 binary inputs	C
2 analog outputs (0 to 20 mA _{DC})	D
2 analog inputs (0 to 20 mA _{DC})	E
I/O module in slot D	
without	A
2 binary inputs	C
2 analog outputs (0 to 20 mA _{DC})	D
2 analog inputs (0 to 20 mA _{DC})	E

*) only if position 9 (I/O module in Slot A) ≠ G

1.5 Note Concerning Transport

The Lithium-batteries in our equipment are subject to Special Provision 188 of the UN Recommendations on the Transport of Dangerous Goods Model Regulations and Special Provision A45 of the IATA Dangerous Goods Regulation and the ICAO Technical Instructions.

This is only valid for the original battery or original spare batteries.

1.6 Range of Application

The SIMEAS P is capable of recording several different power system measurements. In addition, the SIMEAS P is designed to be utilized in a number of different industries. The display of measured quantities can be easily configured to the specific requirements of the user.

Network linking is possible with the integral RS 485 port equipped with the standard PROFIBUS DP V1 or Modbus RTU/ASCII protocol which provide for indication, evaluation and processing of several SIMEAS P measurements at a central master station.

1.7 Mode of Operation

Input voltages and currents are sampled for calculation of the corresponding r.m.s. values. All measurements derived from sampled values are calculated by a processor.

Measured quantities can be displayed on the screens and/or transmitted via the serial interface.

With the SIMEAS P, it is possible to program limit value groups for various measured quantities to activate limit violations when the value of a specific measured quantity exceeds a programmed threshold. In addition, it is possible use logical elements (AND, OR, etc.) to combine two or more measured quantities for the purpose of generating a limit violation. Limit violations are counted, indicated on the screen and/or utilized to operate the binary output contacts. The oscilloscope may be triggered via a limit violation as well.

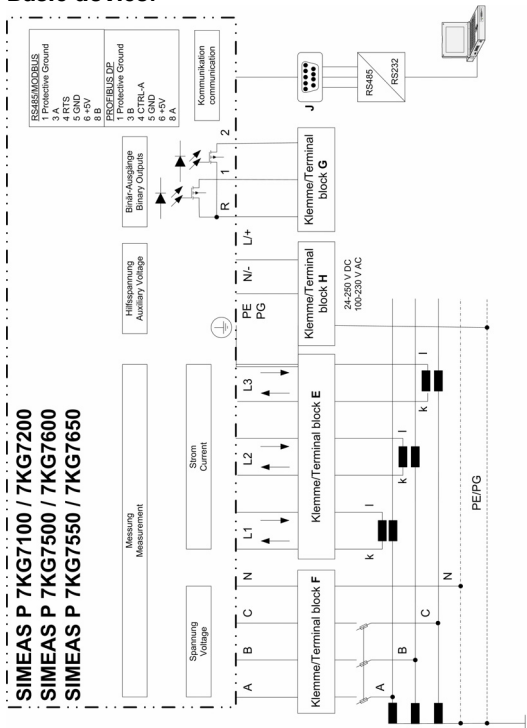
All measured quantities can be displayed on the SIMEAS P screens as required by the user. Up to 20 screens can be selected with the front keys. The number, type, content and sequence of the screens are configurable. SIMEAS P is delivered with pre-programmed default settings.

A status line displayed in the measured value screens indicates status, interfacing and diagnostic messages for the SIMEAS P.

The display is automatically refreshed every second.

1.8 Block Diagram

Basic device:

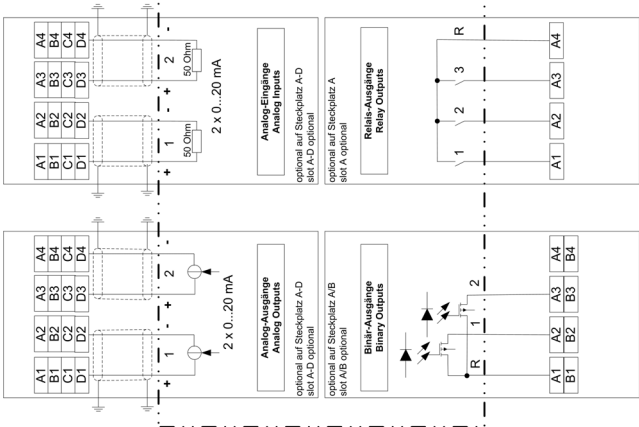


The housing of the RS 485 interface is connected with protective ground (PG).

Additional input and output modules are available for the device 7KG7660 (optional):

- binary input (2 contacts with common contact)
- binary output (2 contacts with common contact)
- relay output (3 contacts with common contact)
- analog input (2 channels)
- analog output (2 channels)

SIMEAS P 7KG7610
SIMEAS P 7KG7660
I/O-Module
I/O-Modules



1.9 Measured Values

Measured values	Measuring path ¹	Menu	Tolerances ²
Voltage	A-N, B-N, C-N, (N-G)	▼ ■ ●	± 0.2%
Voltage	A-B, B-C, C-A, Σ ³	▼ ■ ●	± 0.2%
Current	A, B, C, N, Σ ³	▼ ■ ●	± 0.2%
Real power P + import, - export	A, B, C, Σ	▼ ■ ●	± 0.5%
Reactive power Q + leading, - lagging	A, B, C, Σ	▼ ■ ●	± 0.5%
Apparent power S	A, B, C, Σ	▼ ■ ●	± 0.5%
Power factor $ \cos\phi $ ⁴	A, B, C, Σ	▼ ■ ●	± 0.5%
Active power factor $\cos\phi$ ⁴	A, B, C, Σ	▼ ■ ●	± 0.5%
Phase angle ⁴	A, B, C, Σ	▼ ■ ●	± 2°
Frequency ⁵	A-N	▼ ■ ●	± 10 mHz
Real power import	A, B, C, Σ	▼ ■	± 0.5%
Real power export	A, B, C, Σ	▼ ■	± 0.5%
Real power absolute	A, B, C, Σ	▼ ■	± 0.5%
Real power net	Σ	▼ ■	± 0.5%
Reactive power leading	A, B, C, Σ	▼ ■	± 0.5%
Reactive power lagging	A, B, C, Σ	▼ ■	± 0.5%

Measured values	Measuring path ¹	Menu	Tolerances ²
Reactive power absolute	A, B, C, Σ	▼ ■	± 0.5%
Apparent power	A, B, C, Σ	▼ ■	± 0.5%
Unbalanced voltage	Four-wire system	▼ ■ ●	± 0.5%
Unbalanced current	Four-wire system	▼ ■ ●	± 0.5%
THD voltage	A, B, C	▼ ■ ●	± 0.5%
THD current	A, B, C	▼ ■ ●	± 0.5%
Harmonic voltage V 5. 7. 11. 13. 17. 19. H.	A, B, C	▼ ■ ●	± 0.5%
Harmonic current I 5. 7. 11. 13. 17. 19. H.	A, B, C	▼ ■ ●	± 0.5%
Limit violations	counter 1 to 4	▼ ■	
Analog inputs ⁶	external	▼ ■	± 0.5%
Binary inputs ⁶	external	▼ ■	

1) Phases are displayed based on the type of connection.

2) Tolerances are applicable to 0.5 to 1.2 times nominal value.

3) Average value of all phases.

4) Measurement beginning at 2% of the internal apparent power

5) Measurement beginning at 30% of the input voltage L1-N

6) 7KG7660 only

▼ Measurements can be displayed on measured value screens

■ Measurements selectable over communication

● Measurements selectable for list screens and oscilloscope

1.10 Technical Data

Input signals		Only for connection to AC systems
Max. system voltage	600 V (phase-to-phase)	
Overload	20%	
Frequency of fundamental component	40 ... 65 Hz	
Frequency range f_i	+/- 5 Hz, min. > 30% V_{IN}	
Waveform	Sinusoidal or distorted up to the 21st harmonic	
AC current inputs		I_i 3 current inputs
Input current I_i	1 A; 5 A	
Continuous overload	10 A	
Surge withstand capability	100 A for 1s	
AC voltage inputs		V_i 3 voltage inputs
Input voltage V_{IN}	100/110 V; 190 V; 480 V; 600 V (L-L)	
Continuous voltage capability	1.5 x V_{IN}	
Surge withstand capability	2.0 x V_{IN}	
Input resistance (L - N)	2.663 M Ω	
Binary inputs		(optional, only 7KG7660)
Max. input voltage	300 V DC	
Current consumption for high level	1.8 mA	
Threshold voltage low	≤ 10 V	
Threshold voltage high	≥ 19 V	
Signal delay	max. 3 ms	
Analog inputs		(optional, only 7KG7660)
Measuring range	0 to 20 mA DC	
Input range	0 to 24 mA DC	
Input resistance	50 $\Omega \pm 0.1\%$	
Accuracy	0.5% of the measuring range limit	

Binary outputs	Via isolated solid-state relay
Permissible voltage	230 V/AC; 250 V/DC
Permissible current	100 mA continuous 300 mA for 100 ms
Internal resistance	50 Ω
Permissible operating frequency	10 Hz
Analog outputs	(optional, only 7KG7660)
Nominal output current	0 to 20 mA DC
Output range	0 to 24 mA DC
Max. load resistance	250 Ω
Accuracy	0.2% (typical); max. 1.1% of the nominal value
Relay outputs	(optional, only 7KG7660)
Rated voltage	250 V AC / 150 V DC
Max. permanent current	5 A
Min. permanent current	0,1 mA at 100 mV DC
Rating (resistive)	5 A / 250 V AC or 5 A / 30 V DC
Max. response time	10 ms
Max. release time	7 ms
Overvoltage category	According to IEC 61010 Part1
V_{IN} to 480 V (L-L)	Cat III
V_{IN} to 600 V (L-L)	Cat II
Power Supply	Cat II
Binary outputs, binary inputs and relay outputs	Cat II

Auxiliary power	Multi-range power supply unit AC /DC
Nominal range	24 to 250 V DC or 100 to 230 V AC; 50/60 Hz
Total range 7KG7550 and 7KG7650: 7KG7660:	+/- 20% of nominal range -10% ... +20% of nominal range DC +/- 20% of nominal range AC
Power consumption 7KG7550 and 7KG7650: 7KG7660:	max. 4 W or 10 VA max. 10 W or 35 VA

Battery (only 7KG7650 and 7KG7660)

Type	VARTA CR2032, 3 V, Li-Mn
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Display

Resolution	120 x 240 pixels
Dimensions	4-1/6" x 2-3/8" (103 x 60 mm)

Dimensions, Weight

Panel mounted housing	5-11/16" x 5-11/16" (144 mm x 144 mm)
Weight without I/O modules: with 4 I/O modules and connection board	Approx. 2.0 lbs (0.9 kg) Approx. 2.1 lbs (0.95 kg)

Communication interface

Connection	9-pole D-sub. female connector
Data transfer PROFIBUS DP V1 interface transmission speed	9.600 bit/s to 12 Mbit/sec
Modbus RTU/ASCII	Baud rate (bit/s): 300, 600, 1200, 3400, 4800, 9600, 19200, 38400, 57600, 115200

Electromagnetic compatibility	
Immunity	according to IEC 61000-6-2
Emission	according to CISPR 11, Class A and 47 CFR, Part 15, Class A

Dielectric test, routine test, 2 s	
	according to IEC 61010-1 and UL 61010B-1
Signal inputs mutually (current to current and current to voltage)	2.2 kV; AC
Current inputs to serial interface, PG, binary outputs and power supply	2.2 kV; AC
Power supply, serial interface and binary outputs mutually	3.1 kV; DC
Power supply to PG	3.1 kV; DC
Voltage inputs, binary outputs to PG	1.35 kV; AC
Serial interface to PG	500 V; AC
Additional for 7KG7660	
Binary inputs and binary/relay outputs to PG	2.2 kV; AC
Analog inputs and analog outputs to PG	500 V; AC

Impulse voltage withstand test, test type	according IEC 60688 and IEC 60255-5
All circuits mutually except serial interface	5 kV; 1.2 / 50 μ s

Insulation type of inputs and outputs	
Signal inputs (current)	Reinforced, max. 600 V AC, Cat II or max. 300 V AC, Cat III
Signal inputs (voltage)	Protective impedance, max. 600 V AC, Cat II or max. 300 V AC, Cat III
Power supply	Reinforced, max. 230 V AC/250V DC, Cat II
Binary inputs and binary/relay outputs	Reinforced, max. 230 V AC/250V DC, Cat II
Serial interface	Optical isolated
Analog inputs and analog outputs	Optical isolated

Reference conditions	The stated error limits apply for reference conditions
Input current I_i	$I_{IN} \pm 1\%$
Input voltage V_i	$V_{IN} \pm 1\%$
Frequency	45 ... 65 Hz
Waveform	AC, harmonic distortion $\leq 5\%$
Ambient temperature T_A	73.4 °F \pm 1.8 °F (23 °C \pm 1 °C)
Power supply voltage V_H	$V_{HN} \pm 1\%$
Warm-up time	≥ 15 min
External fields	no

Environmental conditions	The device is designed for indoor use only
Ambient Temperature	According to IEC 60688
Operating Temperature Range	32° F to 131° F (0° C to 55° C)
Storage Temperature Range	-13° F to 158° F (-25° C to 70° C)
Max. relative humidity	80 % for temperatures up to 87 °F decrease linearly to 50 % at 104 °F
Max. altitude above sea level	6,560 ft (2000 m)
Pollution degree	2, no condensation

Additional Technical Data	
Internal fuse, primary	Not replaceable Type T500mA/250V according IEC 60127 and UL 248-14
Internal fuse, secondary	Not replaceable Type F2A/125 V according UL 248-14

Protection class according IEC 60529	
Device	
- Front	IP41 IP54 see ordering data
- Rear	IP20
Personal protection	IP1x

1.11 Communication Interface

Pin-No.	RS485-Interface	PROFIBUS-Interface
1	Protective Ground	Protective Ground
2		
3	A	B (RxD/TxD-P)
4	RTS	CTRL-A
5	GND _{EXT}	GND _{EXT}
6	+5 V _{EXT}	+5 V _{EXT}
7		
8	B	A (RxD/TxD-N)
9		

The bus is terminated at the connection cable.

The isolated interface supply voltage is provided via the D-subminiature female connector. Therefore, the matching resistors for signals can be connected to the cable.



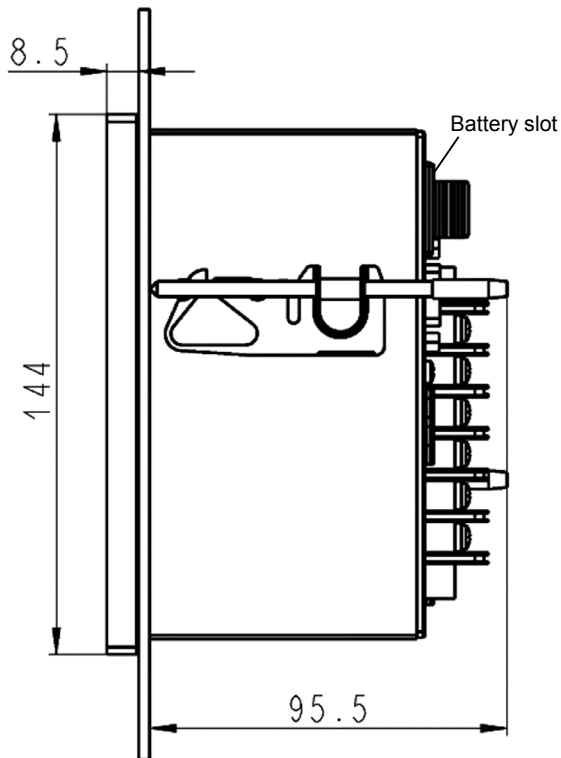
WARNING!

All computing devices connected to the RS485 communication interface port shall be connected to a SELV circuit and must comply with the following standards: UL 1950 and IEC/EN 60950.

1.12 Dimensions

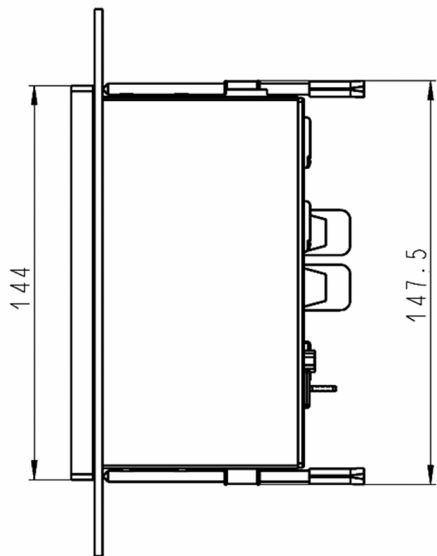
IP41 Front

NOTE: All dimensions are in mm.



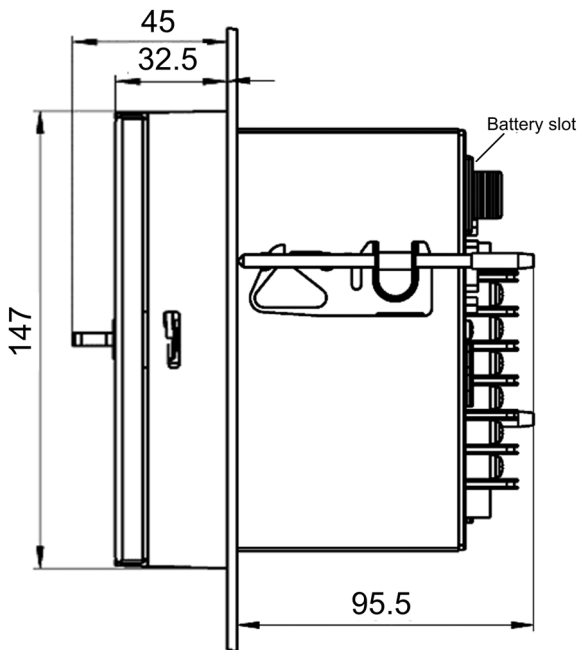
Width of the device:

144 mm



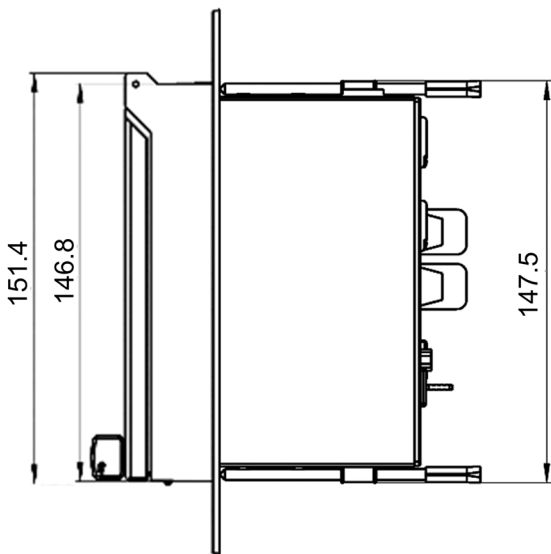
IP54 Front

NOTE: All dimensions in mm.



Width of the device:

144 mm



Housing:

Panel section:

Protection Class:

Panel flush mounting or cubicle mounting

5-7/8" x 5-7/8" (138⁺¹ x 138⁺¹ mm)

Front IP 41 or IP 54 (refer to ordering data, section 1.4)

Terminals

Power supply/PG:

Voltage and

current inputs:

Contact outputs:

RS485-Interface:

Input/output module contacts

(optional, 7KG7660 only) Wire size #12-22 AWG

Screw-drive terminals for

Wire size #12-22 AWG

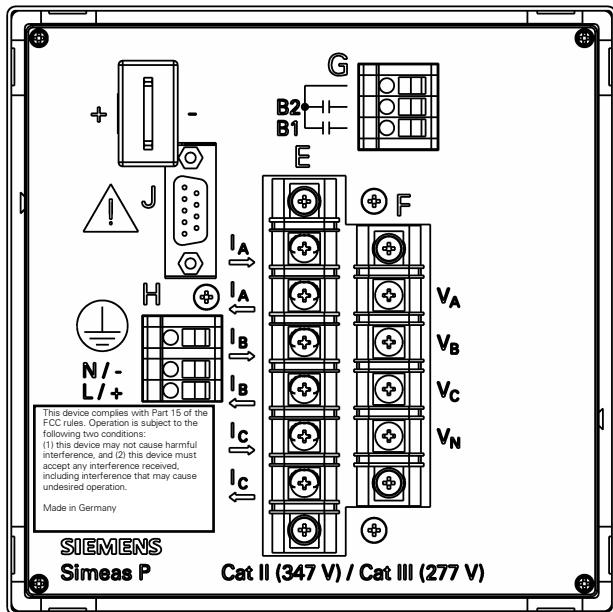
Wire size #12-22 AWG

Wire size #12-22 AWG

9-pole D-subminiature female connector

1.13 Connection Terminals

1.13.1 For Devices 7KG7550 and 7KG7650



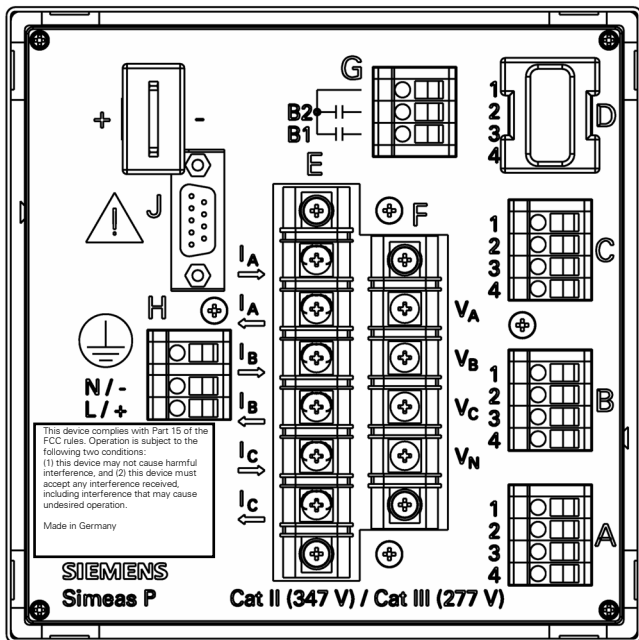
Attention

A protective ground must be connected to the SIMEAS P prior to operation.

Table 1 Terminal Assignment

Terminal	Function	
E1	I_A	A phase current, in
E2	I_A	A phase current, out
E3	I_B	B phase current, in
E4	I_B	B phase current, out
E5	I_C	C phase current, in
E6	I_C	C phase current, out
F1	V_A	Phase A voltage input
F2	V_B	Phase B voltage input
F3	V_C	Phase C voltage input
F4	V_N	Neutral
G1	Root	Common path for output contacts
G2	B2	Binary output contact 2
G3	B1	Binary output contact 1
H1		Protective ground
H2	N/-	Supply voltage -
H3	L/+	Supply voltage +

1.13.2 For Devices 7KG7660









Attention

A protective ground must be connected to the SIMEAS P prior to operation.

Table 2 Terminal Assignment

Terminal	Function	
E1	I_A	A phase current, in
E2	I_A	A phase current, out
E3	I_B	B phase current, in
E4	I_B	B phase current, out
E5	I_C	C phase current, in
E6	I_C	C phase current, out
F1	V_A	Phase A voltage input
F2	V_B	Phase B voltage input
F3	V_C	Phase C voltage input
F4	V_N	Neutral
G1	Root	Common path for output contacts
G2	B2	Binary output contact 2
G3	B1	Binary output contact 1
H1		Protective ground
H2	N/-	Supply voltage -
H3	L/+	Supply voltage +
A1 ... A4	optional, see Table 3, I/O modules	
B1 ... B4	optional, see Table 3, I/O modules	
C1 ... C4	optional, see Table 3, I/O modules	
D1 ... D4	optional, see Table 3, I/O modules	

Table 3 I/O modules

Module Type	Terminal	Allocation	Ordering Code (refer to section 1.4)
Not equipped			A
BO 2 binary outputs		BOR BO1+ BO2+ n.c.	B
BI 2 binary inputs		BI1+ BIR BIR BI2+	C
AO 2 analog outputs		AO1+ AO1- AO2+ AO2-	D
AI 2 analog inputs		AI1+ AI1- AI2+ AI2-	E
RO 3 relays outputs		RO1 RO2 RO3 ROR	G

1.14 Mounting and Operation



WARNING!

During operation of electric devices, certain parts of the device are subject to dangerous voltages. Ignoring the warning notes can result in severe injury or damage to property. Strict compliance with all safety information is imperative.

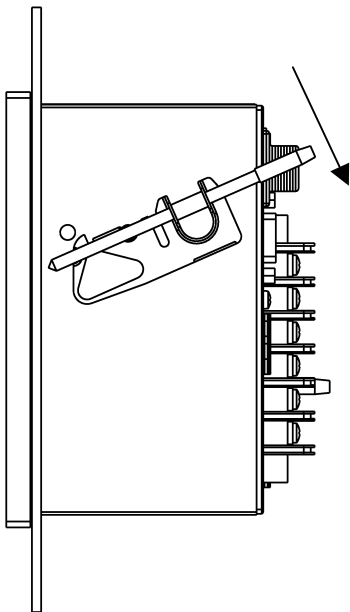
The SIMEAS® P is a build-in device and must therefore be installed on a switchboard or in a control cabinet. After installation, it is important that all terminals are properly covered to prevent accidental contact with energized parts.

- The device location should be largely free from vibrations. The device must be operated within allowable ambient temperature limits (see technical specifications).
- Operating the device outside of the operating temperature range can lead to measurement errors and device failure.
- Steps must be taken to prevent condensation on or within the device during operation.
- Steps should be taken to minimize exposure of the device to direct sun light and large temperature variations.

1.14.1 Mounting the Device

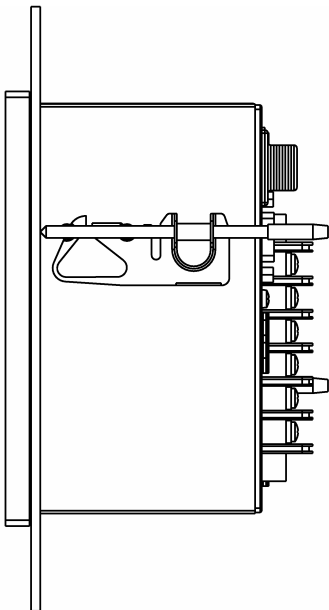
To mount the device, proceed as follows:

- Swing the mounting element (provided with the device) over the rear cone.



Note: Minimum thickness of the mounting plate:
1 mm; steel

- Move the mounting element to the horizontal position. Use a screw driver 0.6 x 4.5 mm to fix the mounting elements until the slipping clutch takes effect.



Note: To prevent accidental contact with energized parts the above described mounting must be taken carefully and correctly.

1.15 Cable Connections

Listed below is information on making connections to the SIMEAS P, as well as examples of suitable cable types.

- Measured quantity input connections (voltage, current):
Wire size: #12-22 AWG Cu
Min. cable voltage rating min. 600 V AC
Solid or stranded with connector sleeve
Torque rating: 9 in-lb. max.
- Power supply, PG, output contact connections and I/O module contacts:
Wire size: #12-22 AWG Cu
Min. cable voltage rating min. 300 V ac
Solid or stranded with connector sleeve
Torque rating: 7 in-lb. max.

The maximum allowable device operating current is 0.5 A. To ensure proper selectivity in the fusing sequence, the power supply line is to be equipped with a minimum 2A circuit breaker (the maximum value depends on the wiring of the cabinet). The circuit breaker must be installed close to the device.

The switch must be marked as "switch for SIMEAS P" and must comply with IEC60947-1 and IEC60947-3.

- The protective ground is at least the same gauge size as the power supply wire.
- Connection to communication interface:
Standard PROFIBUS cable type A
Two-wire or four-wire, twisted and shielded
- For analog inputs and outputs you have to use shielded cables with the shield connected to ground.

1.16 Storage

During storage, a temperature range between +50°F (10°C) and +95°F (35 °C) is recommended in order to prevent premature aging of components, particularly the electrolytic capacitors.

For longer storage periods, it is recommended that voltage be applied to the device power supply for one or two days every other year, in order to regenerate the electrolytic capacitors. The same is valid before the device is finally installed.

1.17 Electrical Connections



WARNING!

Some of the following steps are carried out in the presence of hazardous voltages. They must be performed only by qualified personnel who are thoroughly familiar with safety regulations and precautionary measures; and pay due attention to them.



WARNING!

For field wiring and installation, all national and local codes must be adhered to.

During electrical installation, all rules and regulations for power systems must be observed.

- If current transformers are used, the secondary connections of the current transformers must be short-circuited before the current leads to the device are interrupted.
- The protective ground terminal of the device must be connected to the protective ground of the panel or cubicle.
- For connection of an auxiliary DC voltage, the correct polarity must be used.
- All of the terminals should be checked to verify proper connections.
- The polarities and phasing of all instrument transformers should be checked.
- Before initial energization with supply voltage, the device shall be situated in the operating area for at least two hours to ensure temperature equalization and to avoid humidity and condensation problems.

1.18 Connection Examples

The input connections shown below are only examples. Direct connection without the use of current or voltage transformers can be made to the SIMEAS P as long as the maximum allowable current and voltage ratings of the SIMEAS P are not exceeded.

The voltage transformers can be connected in wye or open-delta configurations.

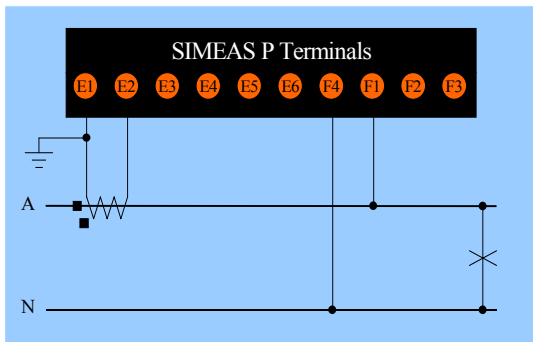
All inputs not required for measurements should remain disconnected.

Attention:

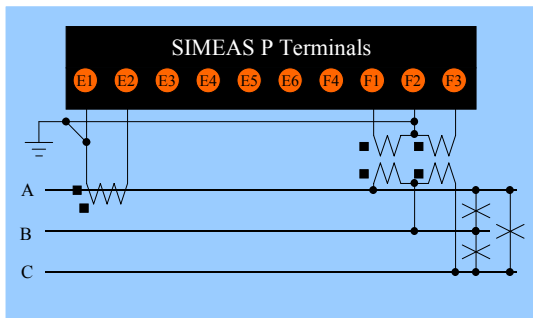
The single ground connection of the instrument transformers is shown for illustration only.

Actual grounds must be installed directly at each instrument transformer.

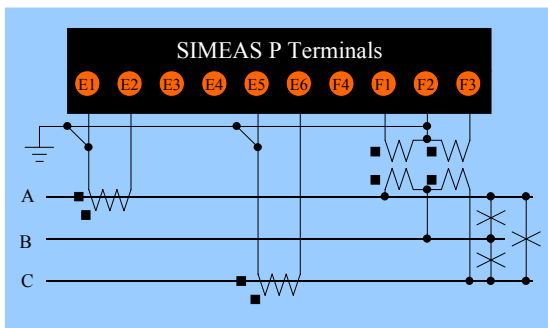
Single-phase AC current



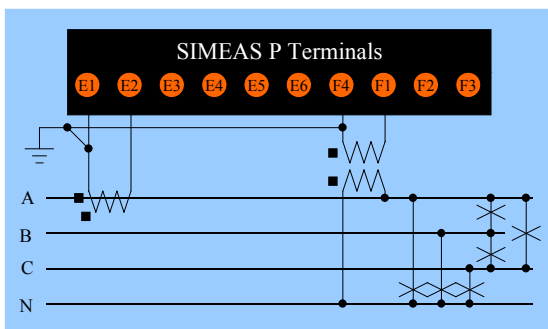
Three-wire three-phase balanced



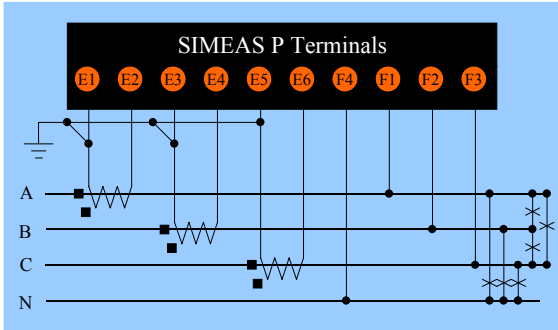
Three-wire three-phase, unbalanced



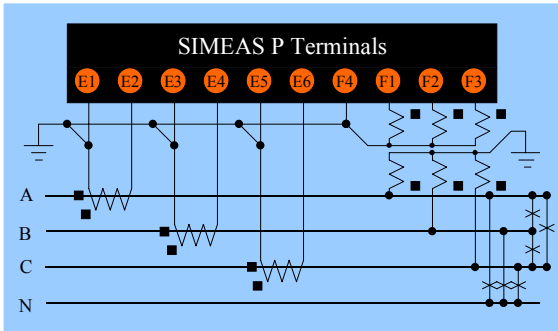
Four-wire three-phase, balanced



Four-wire three-phase, unbalanced (low voltage system)



Four-wire three-phase, unbalanced (high-voltage system)



1.19 Commissioning

The ratings and information on the nameplate should be checked prior to connecting the power supply voltage. In particular, power supply voltage ratings, as well as input voltage and current ratings should be verified. A warm-up period of 15 minutes is required before the device will perform within specified accuracy limits.

For model # 7KG7650 and # 7KG7660, a battery is included with the device. This battery provides a buffer for all memory and the real-time clock within the SIMEAS P. The battery must be installed prior to applying voltage to the power supply or voltage or current to the measured quantity inputs: Remove the cover of the battery slot on the rear of the device (refer to section 1.12), insert the battery according to the polarity printed on the rear of the device, and replace the back cover.



WARNING!

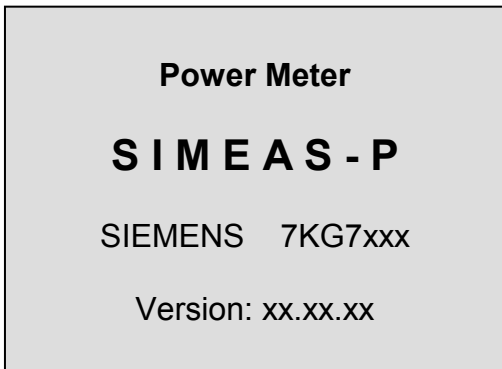
Servicing of the battery circuit and replacing of the battery must be performed by qualified personnel only.

Battery may explode if mistreated:

Do not reverse the polarity! Do not disassemble! Do not completely discharge! Do not throw the battery into a fire!

The supplied battery contains lithium. Do not throw the battery into the trash! It must be disposed of in accordance with the applicable regulations!

After applying voltage to the power supply, the SIMEAS P will run in the startup-phase for 15 seconds.



1.20 Configuration Overview

1.20.1 Operating Notes

This chapter describes the basic setting options of the SIMEAS P that are made via the front buttons.



The Main Menu of the programming level can be accessed from the Measured Values screens, the Min-Max Values screens or the Phasor Diagram screen via the "ENTER" button.

In addition, the Main Menu of the programming level can be accessed from the Harmonics screen by holding down the "ENTER" button, or from the Oscilloscope Menu by selecting "Main Menu" and pressing the "ENTER" button.

1.20.2 Button Functions

The following functions are performed via the   buttons:

- Moving the cursor to the entry line.
- Scrolling through selection lists when entering settings.
- Selecting numbers when entering numerical values.

If the buttons are held down, the scrolling continues automatically.

The selected line, setting or number is confirmed by pressing the "ENTER" button.

1.20.3 Window Structure

Selecting * and pressing "ENTER" moves the cursor directly to the data entry field on the same line.

Selecting > and pressing "ENTER" opens a new window for additional data entry.

Selecting < "OK" and pressing "ENTER" confirms the settings and returns the user to the previous level.



Selecting < "Cancel" and pressing "ENTER" cancels the setting changes just made and returns the user to the previous level.

*	Number of Screens :	14
*	Repeat Ratio :	0 Sec.
*	Illumination :	99 Min.
*	Contrast :	5
>	Screen Construction	
<	OK	
<	Cancel	

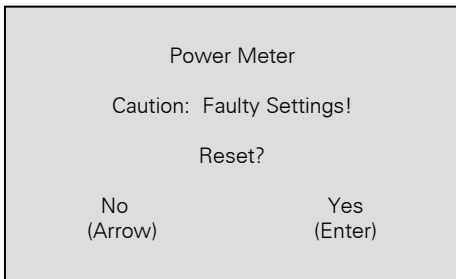
1.20.4 Notes

- The selection of the measured quantity depends on the selected input voltage and current connections.
- If the number selected is too large, "Overflow" is displayed and the input value is automatically set to the maximum value.
- If the power supply voltage is switched off during programming, the message illustrated below appears when the device is restarted. Therefore, the power supply voltage should only be switched off in level 1 (measuring screens).

Message

Select "No" via the   buttons to retain the settings as they existed prior to the loss of power supply voltage.

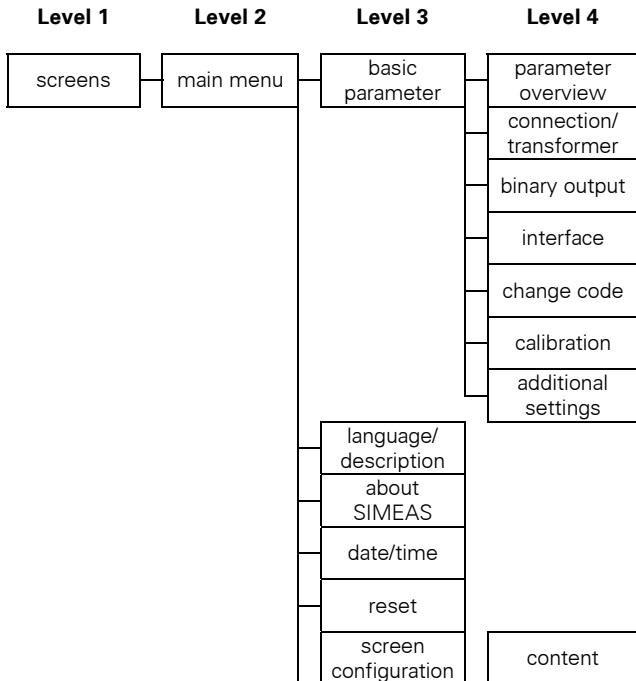
Choose "Yes" by pressing the "ENTER" button to restore the default settings.



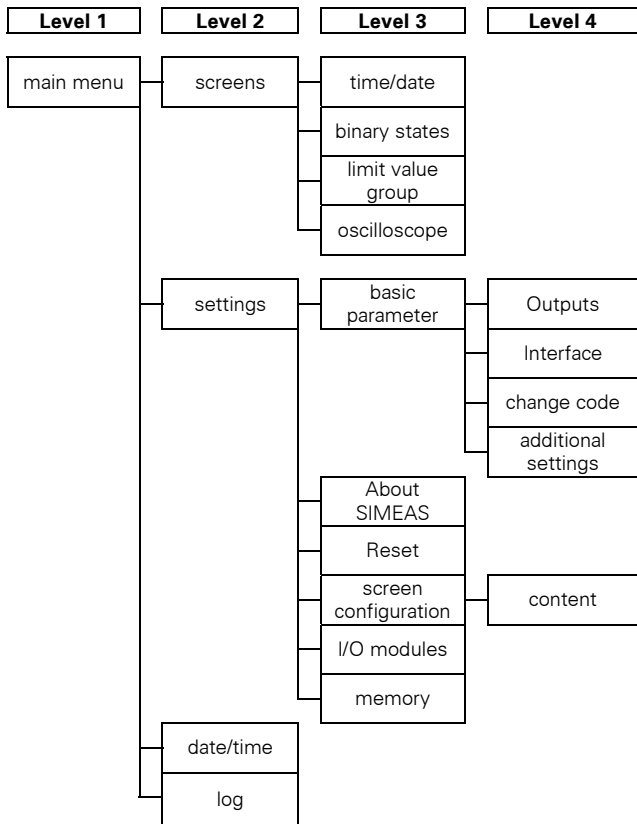
1.20.5 Overview of the Programming Levels: 7KG7550

- Level 1 corresponds to the measured value screens
- Levels 2 through 4 correspond to the programming screens and are described as follows:

A detailed description of device programming is given in the SIMEAS P Instruction Manual (Order no: E50417-B1076-C210).



1.20.6 Overview of the Programming Levels: 7KG7650/7KG7660



1.21 Testing and Calibration



WARNING!

The following measures must be carried out in compliance with the accident prevention instructions. Appropriate electrical tools must be used.

A calibration instrument, which indicates AC voltages, AC currents, and phase angles with an error of $\leq 0.1\%$, is required for testing and calibrating the Power Quality Recorder.

For isolated test instruments, terminal N must be grounded.

A detailed description of the device calibration is given in the SIMEAS P instruction manual (Order No: E50417-B1076-C210), chapter 7.1.

1.22 Maintenance, Repair and Cleaning

The SIMEAS P does not require special maintenance. If necessary, it can be checked in a laboratory and readjusted.

Repair of defective modules is never recommended because specially selected electronic components are used which must be handled in accordance with the procedures required by **E**lectrostatically **E**ndangered **C**omponents (EEC).

Therefore, if a device defect is suspected, it is recommended that the complete device be returned to the manufacturer. Use the original transport packaging or an appropriate packaging for return.

If it is unavoidable to replace individual modules, it is imperative that the standards related to the handling of Electrostatically Endangered Components are observed.



WARNING!

When carrying out changes on site, the instructions for handling electrostatically endangered components must be observed (EEC).

Cleaning

The meter should be mounted in a dry, dirt free location. Once installed, it is not necessary to clean the device.

To operate properly and effectively, environmental conditions should fall within the guidelines listed in the Technical Data (Chapter 1.10).

If necessary, the device can be switched off and wiped with a clean, dry and soft cloth. Do not use solvent

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Ordering no: E50417-B1076-C263-A5
To order at: Berlin PTD
Printed in Germany