



Power Meter  
SIMEAS P

Power Automation  
Catalog  
2004 · 01

**SIEMENS**

## Editorial

SIMEAS P is simple to configure, can be adapted to user's requirements and easily integrated into networks - the SIMEAS P Power Meter for universal application.

Due to the extensive functionality, the SIMEAS P as a measurement device for power monitoring and recording in all areas of industry.

It can also serve as an element of T.I.P. (Totally Integrated Power)

## SIMEAS P sets new standards

More than 80 measured values, e.g. phase voltages and currents, active power, reactive power, apparent power, symmetry factor, voltage and current harmonics, energy output as well as external signals and states – SIMEAS P shows this data directly on the graphic display (optional) or transfers them to a central computer system for further processing. This measurement device is for all users in a power engineering environment – whether for plant engineers, electricians or technicians.



Although every precaution has been taken in the preparation of this catalogue, SIEMENS AG assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the information contained in this catalogue.

Reserved for changes!

## Power Meter SIMEAS P

### Content

<b>SIMEAS P500/P550 - 7KG7500/7KG7550</b> Built-in device with graphic-display	<b>1</b>
<b>SIMEAS P600/P650 - 7KG7600/7KG7650</b> Built-in device with graphic-display, real time module, battery and measurement buffer	<b>2</b>
<b>SIMEAS P610/P660 - 7KG7610/7KG7660</b> Built-in device with graphic-display and analog/digital in- and output modules	<b>3</b>
<b>SIMEAS P100/200 - 7KG7100/7KG7200</b> Snap-on mounting units without display	<b>4</b>
<b>SIMEAS P – Configuration package</b> For configuration and calibration with a PC	<b>5</b>
<b>Accessories</b> Protection class IP54 Mounting kit for built-in units on 35mm rail	<b>6</b>
<b>Selection and ordering data</b>	<b>7</b>
<b>Technical data</b>	<b>8</b>
<b>Regulations, Standards, Markings</b>	<b>9</b>
<b>Terminal assignments</b>	<b>10</b>
<b>Dimensions</b>	<b>11</b>





## Power Meter SIMEAS P

## SIMEAS P500/P550 - 7KG7500/7KG7550

### Description

- Panel-mounted measurement device for electrical power monitoring
- Large, easy to read graphic display with illuminated background
- 1 • Standard Profibus DP and Modbus RTU/ASCII communication protocol for cyclic transmission of measured values to a central master station
- Suitable for balanced and unbalanced three- and four-wire three-phase systems as well as single-phase systems
- Easy configuration and calibration with the buttons on the front panel of the device or via PC-based configuration software
- User-specific adaptation of the measured value screens
- 2 binary outputs (galvanically isolated solid state contacts) can be configured for energy pulses, limit violations or status signals
- Measured parameters:
  - R.m.s. phase-voltages
  - R.m.s. phase-currents
  - System frequency
  - Active, reactive and apparent power as well as power factor per phase and for the total system
  - Phase current and voltage imbalance
  - Harmonic voltages and currents up to the 21st. harmonic
  - Total current and voltage harmonic distortion THD
  - Active, reactive and apparent energy per phase and for the total system



Fig. 1 SIMEAS P 7KG7500/7KG7550

## Description

### Application

SIMEAS P 500 is a panel-mounted device for direct electrical power monitoring.

With a very simple configuration, the display of measured values is adaptable to the specific requirements of the user.

Network linking is possible with the integrated RS485 port equipped with the standard Profibus DP and Modbus RTU/ASCII communication protocol. That allows indication, evaluation and processing of several SIMEAS P measured parameters at a central master station.

### Technology

Powerful onboard micro-processors ensure fast registration and updating of measured parameters.

SIMEAS P can be connected to any power system configuration directly (up to 690V-systems) or via transformer - from singlephase to four-wire balanced or unbalanced three-phase systems. The power supply unit allows rated supply voltages from 24 to 250 V/DC and 100 to 230V/AC.

### Display

All parameters can be displayed in the SIMEAS P screens as required by the user. Up to 20 screens can be selected with the front keys.

Number, type, content and sequence of the screens are configurable.

SIMEAS P is delivered with programmed default settings. A status line displayed in the measured-value screens indicates status, interfacing and diagnostic messages of SIMEAS P.

The display content is automatically refreshed every 1 s.

### Inputs / Outputs

Figure 2 shows the I/O pin configuration of SIMEAS P. Depending on the type of power system, the non-required inputs remain unused.

### Communication

As communication between field devices is becoming standard, the development of the SIMEAS P communication interface focussed on the universality and flexibility of the transmission protocol. It is connected via an RS485 port with standard 9-pin SUB-D connector (female). SIMEAS P units are delivered with a standard PROFIBUS DP and Modbus RTU/ASCII protocol. The communication protocol can be selected during the setting of the device.

### Operation

Clear designations as well as menu-driven configuration guarantees a simple and easy operation of the SIMEAS P.

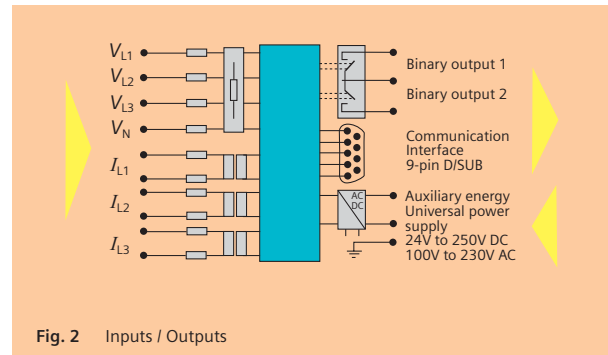


Fig. 2 Inputs / Outputs

### Quality

Development and production of the device is carried out in accordance to ISO 9001, that ensures highest quality standard. That means high system reliability and product life-time. Further characteristics are the constant high accuracy over years, CE designation, EMC strength as well as the compliance with all relevant national and international standards.

### Measuring functions

Measured input voltages and input currents are sampled for calculation of the corresponding r.m.s. values. All parameters derived from measured values are calculated by a processor. They can be displayed in the screens and/or transmitted via the serial interface.

With the SIMEAS P it is also possible to define several limit value groups with different limit values for the measured parameters. These can be combined with logical elements such as AND, OR; violations are counted and indicated

on the screen or made available at the binary outputs. Triggering of the oscilloscope is possible as well.

### Security

Electrical isolation between inputs and outputs, assured by high-voltage testing, guarantees maximum system security.

Configuration and calibration settings are tamper-proof by password protection.

### Service

SIMEAS P require no maintenance and are easy to service due to their modular design.

The units can easily be calibrated via the front keys or with PC-based configuration software.

Screens

1

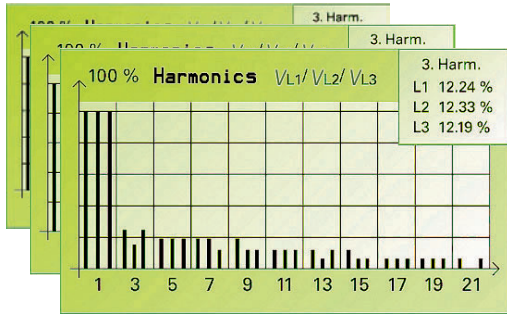


Fig. 3  
Display up to 20 screens  
via front buttons.

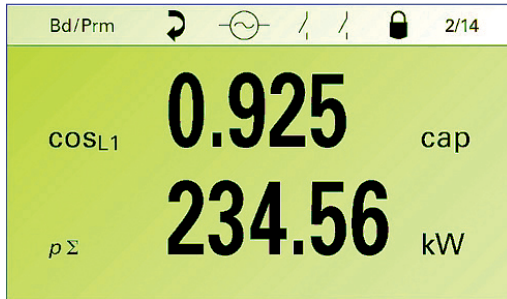


Fig. 4  
2 measured values - digital

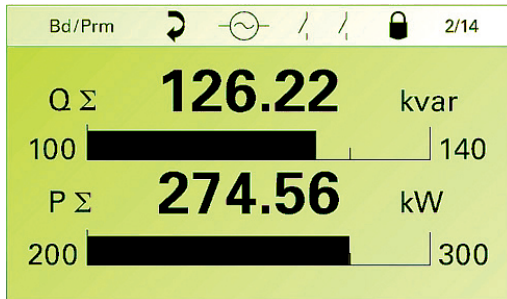


Fig. 5  
2 measured values  
- digital / analog

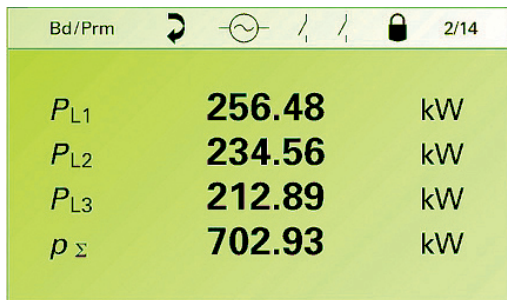


Fig. 6  
4 measured values - digital

Up to 20 screens can be selected on the display of SIMEAS P with the front keys. If requested, this routine can be executed automatically.

- Number, type and sequence of the screens are freely configurable.
- 9 different types of screens can be selected:
  - 4 measured-value screens
  - 1 list screen for minimum, average and maximum values
  - 2 screens for harmonics
  - 1 screen serving as oscilloscope
  - 1 screen serving as phasor diagram

Measured-value screens

- Number and content of the measured value screens and the parameters can be defined individually by the user.
- In addition, designations for the parameters are available for selection in the default setting: UL1, UL2, UL3, cos φ, or Va, Vb, Vc, PF etc.
- In the bar chart display the lower and upper measuring value can be set.
- Measured-value screens can be selected as often as required.
- Status and diagnostic messages of the device are indicated in the status line displayed in the measured-value screens.
- The screens are automatically updated every 1 s.



## Screens

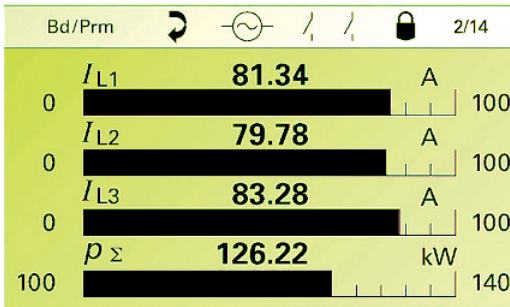


Fig. 7  
4 measured values  
- digital / analog

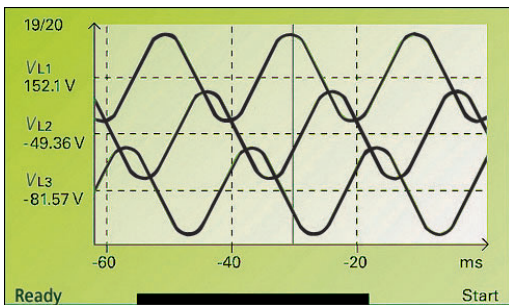


Fig. 8  
Oscilloscope screen

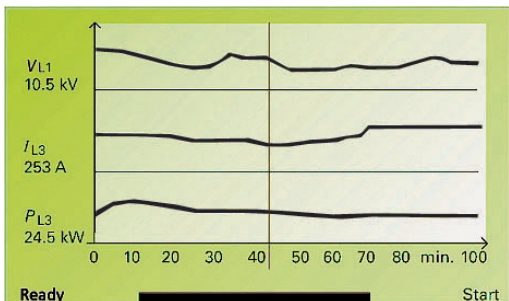


Fig. 9  
Oscilloscope screen  
for r.m.s. values

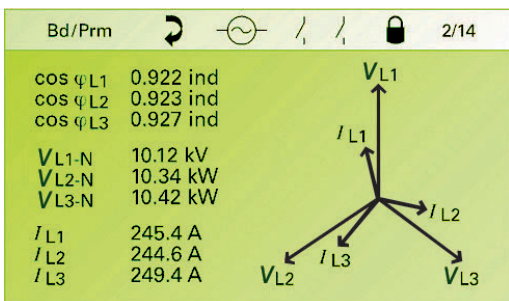


Fig. 10  
Vector diagram

## Oscilloscope

- 3 parameters for voltage or current can be selected from the table (see page 6) of parameters and recorded with pre-fault.
- Recording is started manually or triggered automatically, as soon as an out-of-limit condition occurs.
- With the cursor measurement function the cursor can be shifted with the front keys and the measured values can be read off.
- Also for recording of r.m.s. values up to 3 parameters can be selected from the table of parameters.
- The parameter level is optimized automatically in the screens.
- The recording section displayed is indicated at the bottom of the oscilloscope screen.

## Vector diagram

- The amplitude and phase angles of currents and voltages can be read off from the phase diagram screen.

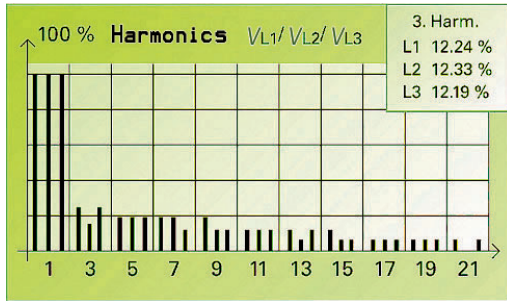


Fig. 11  
Harmonics

	Min.	Mtl.	Max.	6:38
VL1	0.00	0.00	18.90	V
VL2	0.00	0.00	13.55	V
VL3	0.00	0.00	14.77	V
V	0.00	0.00	15.74	V
VE-N	104.0	104.0	105.2	V
VL1	0.00	0.00	18.90	V
VL2	0.00	0.00	13.55	V
VL3	0.00	0.00	14.77	V

Fig. 12  
Listing screens

	Min.	Mtl.	Max.	6:38
▶ Basic parameter ▶ Language / Designation ▶ Information on SIMEAS ▶ Date/Time ▶ Reset ▶ Configuration screens ◀ Exit				

Fig. 13  
Configuration

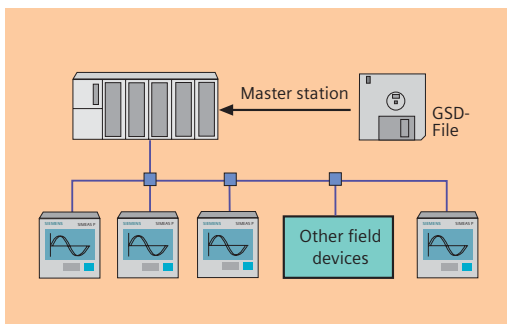


Fig. 14  
SIMEAS P with Profibus DP

### Harmonics

2 screens are available for the measured harmonics:

- Harmonic voltages  
Harmonic currents
- All three phases with all odd-order harmonics up to the 21st harmonic are displayed on the screens.
- Each harmonic can be indicated individually in a digital display in the top right-hand corner of the screen and can be selected via the front keys.

### List screens

- Minimum, average and maximum values of the parameters are indicated on the list screens from the beginning of the recording.
- Start and reset of the recording process is done via the front keys.
- The parameters are freely configurable with regards to their number and sequence.

### Configuration

- Configuration of SIMEAS P is very easy.
- Rapid configuration (even without consulting the manual) possible due to detailed index and operation via cursor and enter-key.
- Configuration and calibration settings are tamperproof by password protection.

### Communication

SIMEAS P is equipped with a communication port in compliance with the EIA standard RS485 with a standard 9-pin SUB-D connector (female) for connection to RS485 field bus systems. The SIMEAS P comes with the following standard communication protocols:

- PROFIBUS DP V1 protocol in compliance with EN 50170 Volume2
- Modbus RTU/ASCII

Therefore, SIMEAS P supports all commonly used communication standards

### Profibus DP

PROFIBUS DP and SIMEAS P are connected in a master-slave operation mode. The communication parameters are loaded to the master station using the GSD file.

The SIMEAS P supports data transmission rates ranging from 9.6 kBit/s to 12 Mbit/s.

Optionally the user can select different types of transmission for cyclic data transfer to the master station.

- Type 1: transmission of 3 parameters
- Type 2: transmission of 6 parameters
- Type 3: transmission of 12 parameters
- Type 4: transmission of 32 parameters

This option provides an efficient and fast data communication between SIMEAS P and master station.

The 3, 6, 12 or 32 measured values for transmission types 1 to 4 can be selected from the table of parameters.

## Limit values, parameters

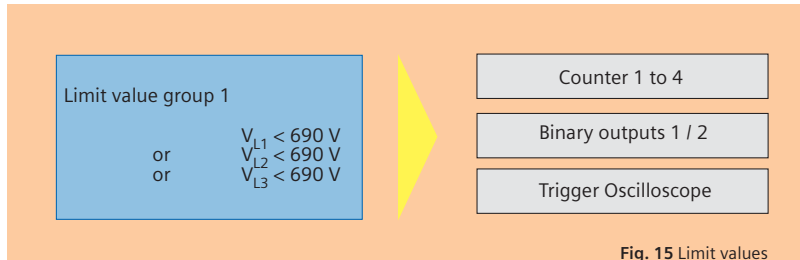


Fig. 15 Limit values

## Limit values

Several limit value groups with up to 6 selectable parameters can be set in the SIMEAS P.

The values can be combined with logical elements such as AND / OR, limit violations are counted, they are available at binary outputs or used for triggering the oscilloscope.

## Parameters

Parameter	Measured path <sup>1)</sup>	Unit	Menu	Tolerances <sup>2)</sup>
Voltage	L1-N, L2-N, L3-N, (N-E)	V, kV	▼ ■ ●	± 0,2 % / ± 0,3 % <sup>7)</sup>
Voltage	L1-L2, L2-L3, L3-L1, $\Sigma$ <sup>3)</sup>	V, kV	▼ ■ ●	± 0,2 % / ± 0,3 % <sup>7)</sup>
Current	L1, L2, L3, N, $\Sigma$ <sup>3)</sup>	A, kA	▼ ■ ●	± 0,2 % / ± 0,3 % <sup>7)</sup>
Active power P + import, -export	L1, L2, L3, $\Sigma$	W, kW, MW	▼ ■ ●	± 0,5 %
Reactive power Q + cap, -ind	L1, L2, L3, $\Sigma$	Var, kvar, Mvar	▼ ■ ●	± 0,5 %
Apparent power S	L1, L2, L3, $\Sigma$	VA, kVA, MVA	▼ ■ ●	± 0,5 %
Power factor $\text{Icos}\phi$ <sup>4)</sup>	L1, L2, L3, $\Sigma$		▼ ■ ●	± 0,5 %
Active power factor $\text{cos}\phi$ <sup>4)</sup>	L1, L2, L3, $\Sigma$		▼ ■ ●	± 0,5 %
Phase angle <sup>4)</sup>	L1, L2, L3, $\Sigma$	°	▼ ■ ●	± 2°
Frequency <sup>5)</sup>	L1-N	Hz	▼ ■ ●	± 10 mHz
Active energy import	L1, L2, L3, $\Sigma$	kWh, MWh	▼ ■	± 0,5 %
Active energy export	L1, L2, L3, $\Sigma$	kWh, MWh	▼ ■	± 0,5 %
Active energy absolute	L1, L2, L3, $\Sigma$	kWh, MWh	▼ ■	± 0,5 %
Active energy saldo	$\Sigma$	kWh, MWh	▼ ■	± 0,5 %
Reactive energy cap	L1, L2, L3, $\Sigma$	kVarh, Mvarh	▼ ■	± 0,5 %
Reactive energy ind	L1, L2, L3, $\Sigma$	kVarh, Mvarh	▼ ■	± 0,5 %
Reactive energy absolute	L1, L2, L3, $\Sigma$	kVarh, Mvarh	▼ ■	± 0,5 %
Apparent energy	L1, L2, L3, $\Sigma$	VAh, kVAh, MVAh	▼ ■	± 0,5 %
Unbalance voltage	Four-wire system	%	▼ ■ ●	± 0,5 %
Unbalance current	Four-wire system	%	▼ ■ ●	± 0,5 %
THD voltage	L1, L2, L3	%	▼ ■ ●	± 0,5 %
THD current	L1, L2, L3	%	▼ ■ ●	± 0,5 %
Harmonic voltage U 5. 7. 11. 13. 17. 19.	L1, L2, L3	%	▼ ■ ●	± 0,5 %
Harmonic current I 5. 7. 11. 13. 17. 19.	L1, L2, L3	A	▼ ■ ●	± 0,5 %
Limit violations	Counter 1, 2, 3, 4		▼ ■	
Analog inputs <sup>6)</sup>	external		▼ ■	± 0,5 %
Binary inputs <sup>6)</sup>	external		▼ ■	

- ▼ Parameters displayable on the measured-value screens
- Parameters selectable via communication
- Parameters selectable for list screens and oscilloscope

- 1) Phases are displayed in dependence of the type of connection
- 2) Tolerances at reference conditions (see chapter 8) are applicable from 0.5 to 1.2 times nominal value
- 3) Average value of all phases
- 4) Measuring beginning with 2% of the internal apparent power

- 5) Measuring beginning with 30% of the input voltage L1-N
- 6) 7KG7610 and 7KG7660 only
- 7) Limit Values for the complete temperature range (see chapter 8) referring to: 0.1 to 1.2 x nominal range.

## Binary outputs

The standard SIMEAS P is equipped with 2 binary outputs which are free for configuration with:

- Status signals
- Energy values from the table of parameters
- Limit violations

Other configurable parameters are, for example, pulse duration, hysteresis and pulse value of the energy parameter.

## Device options

The SIMEAS P500 is also available as P550 with UL-listing.

## SIMEAS P600/P650 - 7KG7600/7KG7650

## Description

SIMEAS P 7KG7600 has same functionality like the SIMEAS P500 (7KG7500) as well as some additional features like:

2

- Battery: Recordings like limit violations or energy counter values stay safely in the memory up to 3 month in case of a blackout.
- Real time module: Measured values and states will be recorded with time stamps.
- Measurement memory with memory management.
- Recording and display of limit value violations.
- Log-entries.

## Memory Management

Memory Management			
▶ Mean Values:	5x	533.3 d	
▶ Power recording:	34x	1.1 d	
▶ Oscilloscope:	15x	5.4 d	
▶ Limit values:	38x	49664	
▶ Binary states:	8x	10240	
◀ OK			
◀ Cancel			

Due to the extended memory capacity (1Mbyte) and the new implemented memory management, it is possible to configure the measurement memory for recording of:

- Mean values
- Power values (e.g. with 15 min period time)
- oscilloscope
- limit violations
- binary states

After the assignment of the percentage, the corresponding record time will be calculated and shown on the display automatically.

## Recording of limit value violation

Limit	Time	Reason
4	13.11.02 23:20:10	
VLN2	13.11.02 22:40:12	210,2 V
VLN3	13.11.02 22:40:07	210,2 V
VLN3	13.11.02 22:40:02	
VLN2	13.11.02 22:40:01	
VLN1	12.11.02 08:22:41	235,8 V
VLN1	12.11.02 08:22:40	

In this screen all limit violations will be shown in chronological order.

## Screen of Log entries

	Time
Reset	10.10.02 12:23:40
Power on	10.10.02 12:25:20
Settings	19.09.02 16:20:55
Res. Limit	09.10.01 10:12:05
Res. Mean	22.10.01 09:22:10
Res. Energy	24.10.01 17:13:44
Res. Osci.	12.06.01 08:56:15
Clock	10.10.02 12:00:00
< Cancel	

The most recent change of several status information will be displayed in the screen "Log" with date and time.

## Memory „read-out“

Recorded quantities and binary state information can be read-out with the configuration software SIMEAS P Parameterization using the RS485-interface. Therefore a separate cable together with a RS232/RS485-converter is necessary. The configuration software offers features for indication and evaluation of all saved measured values and binary information. For further information please see chapter SIMEAS P Configuration package.



Fig. 16 SIMEAS P 7KG7600

## Device options

The SIMEAS P600 is also available as P650 with UL-listing.

## Description

### In- and Output-modules

The SIMEAS P610 respectively the P660 has the same functionality like the SIMEAS P600 (7KG7600), furthermore the SIMEAS P can be equipped with additional analog and digital in- and output-modules.

The SIMEAS P610/P660 comes with 4 slots where the modules will be installed. For different application areas 5 different modules are available.

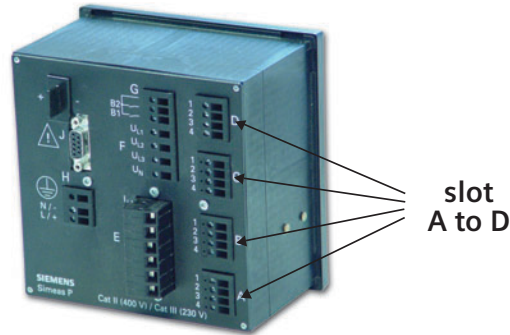


Fig. 17 SIMEAS P610/P660 with In- and Output-modules

3

### Application

The input-modules can be used for acquisition, display and further processing of external signals with a measurement range of 0-20mA<sub>DC</sub>.

Measured values can be shown together with their units on the display. Also the transmission of the current status of a measured signal to a central master station via PROFIBUS DP V1 or Modbus RTU/ASCII is possible.

In addition mean values of all external analog channels as well as states of digital channels can be recorded and saved into the memory. All recorded quantities and binary state information can be "read-out" and evaluated with the configuration software SIMEAS P Parameterization.

Output modules can be used for conversion of any electrical quantity (current, voltage etc.) into a 0-20 mA<sub>DC</sub> output signal (4-20mA<sub>DC</sub> in preparation), generation of impulses for metering, indication of limit value violations as well as for switching operations.

### Module Assignment

The assignment of the different analog/digital modules can only be done in the course of an ordering of a SIMEAS P.

### Examples

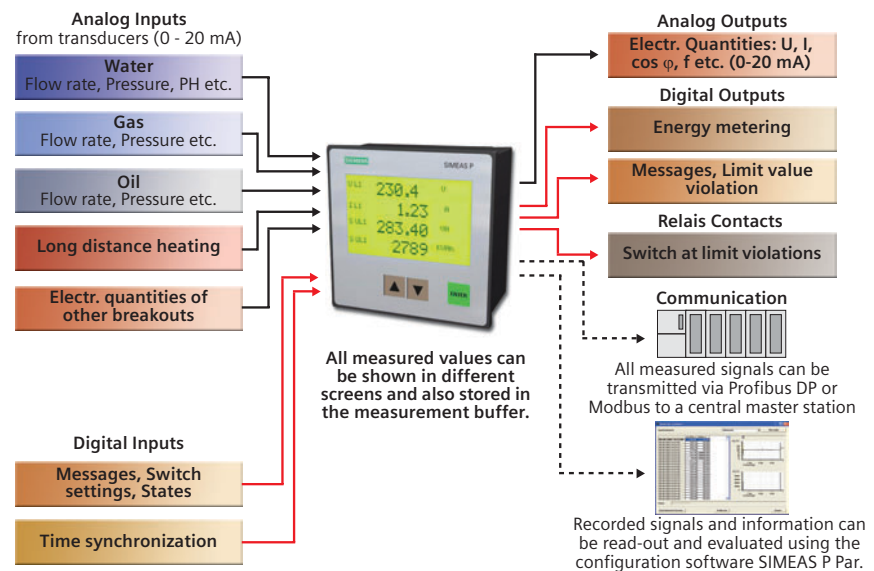


Fig. 18 SIMEAS P610/P660: Applications

A change or a refit of modules of an existing SIMEAS P is not possible. Except of the relay module and the binary output module the modules can be assigned to any of the 4 slots (A, B, C, D). - Unassigned slots may be reserved.

### Device options

The SIMEAS P6610 is also available as P660 with UL-listing.

## SIMEAS P610/P660 - 7KG7610/7KG7660

## Description

## Description and applications

terminal

assignment

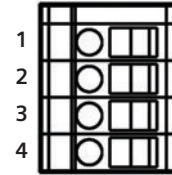
3

## Analog input module

The SIMEAS P can be equipped with maximum 4 analog input modules. Each module comes with 2 analog input channels, designed for a rated measurement range of 0 to 20 mA<sub>DC</sub>. The module itself is galvanically isolated against the internal circuit and also each other module. The two channels of the module are not galvanically isolated among each other.

The analog input modules can be used for:

- Acquisition and display of measured signals with a measurement range of 0 to 20 mA<sub>DC</sub>
- Registration of limit value violations
- Recording of measured signals



AI1+

AI1-

AI2+

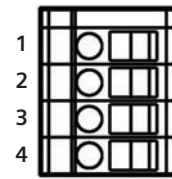
AI2-

## Binary input module

The SIMEAS P can be equipped with maximum 4 binary input modules. Each module comes with 2 galvanically isolated and rooted binary input channels. The input voltage will be transformed into a constant current. A separate power supply for the binary input modules is not necessary.

The binary input modules can be used for:

- Metering function for external signals
- Registration of binary states/messages
- Time synchronization of the SIMEAS P (sets seconds to 00) by using a minute impulse



BI1+

BIR

BIR

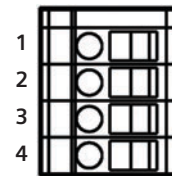
BI2+

## Analog output module

The SIMEAS P can be equipped with maximum 4 analog output modules. Each module comes with 2 channels, designed for a nominal measurement range of 0 to 20 mA<sub>DC</sub>. The module itself is galvanically isolated against the internal circuit and also each other module. The two channels of the module are not galvanically isolated among each other.

The analog output modules can be used for:

- Output of electrical quantities (current, voltage, power,  $\varphi$ ,  $\cos \varphi$ , frequency etc.) between a rated measurement range of 0 to 20 mA<sub>DC</sub> (4-20 mA<sub>DC</sub> in preparation)



AI1+

AI1-

AI2+

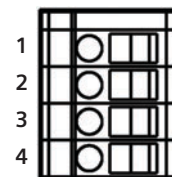
AI2-

## Binary output module

The SIMEAS P can be equipped with maximum 2 binary output modules. Each module comes with 2 rooted binary output channels, realized with 2 solid state contacts.

The binary output modules can be used for:

- Generation of impulses for metering
- Indication of limit value violations
- Indication of the device status
- Indication of the rotation vector of the phase voltages L1-L2-L3



BOR

BO1+

BO2+

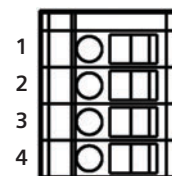
unused

## Relay module

The SIMEAS P can be equipped with maximum one relay module. The relay module comes with 3 rooted electromechanical contacts. With these contacts higher power can be switched which is not possible when using the solid-state contacts. The relay contacts can be configured in the same manner like the channels of the binary output module.

The relay contacts can be used:

- As a switch at limit value violations e.g. compensation of reactive power



RO1

RO2

RO3

ROR

**Description****SIMEAS P100 - 7KG7100**

SIMEAS P100 is a Power Meter for snap-on mounting on a 35 mm DIN rail. The SIMEAS P has same functionality like the SIMEAS P500 except for the graphic display and front keys.

For carrying out the setting of the device the configuration software is necessary.

**SIMEAS P200 - 7KG7200**

SIMEAS P200 is a Power Meter for snap-on mounting on a 35 mm DIN rail. The SIMEAS P has same functionality like the SIMEAS P600 except for the graphic display and front keys.

For carrying out the setting of the device the configuration software is necessary.



Fig. 19 SIMEAS P100/200 - 7KG7100/7KG7200

# SIMEAS P – Configuration package

## Configuration software for SIMEAS P

5

### Application

The SIMEAS P configuration software package enables a simple way to carry out the device settings. The package consists of the parameterizing software, a configuration cable with RS232/RS485 converter as well as plug-in power supply for the converter. The SIMEAS P can be connected to any standard PC via the the RS232/485 converter by means of a 9-pin SUB-D connector.

The software runs with WIN95, WIN98, WIN NT, WIN2000 and Windows XP Professional edition.

The configuration software permits a faster configuration of the SIMEAS P devices. The user can set and store parameters even without having a unit by his side. The parameters will be transferred to the SIMEAS P by using the "Send to unit" command. In this manner a number of SIMEAS P units can be configured with minimum effort. The stored set of parameters is simple reloaded when a unit has to be replaced. Furthermore firmware updates can be reloaded with help of the SIMEAS P configuration software.

The configuration package supports all SIMEAS P units and is absolute essential for the devices SIMEAS P100/P200 und P6xx.

### Configuration of the measurement memory

Devices with measurement buffer (SIMEAS P6xx and P200) offer the opportunity to record measured quantities and state information. Therefore the configuration software enables menu items for the determination of values und state information which should be recorded.

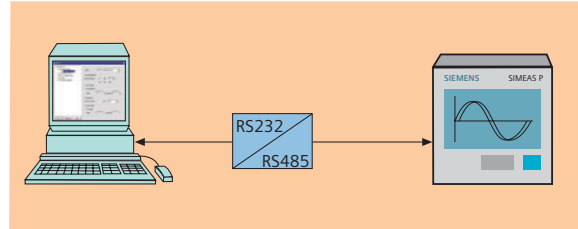


Fig. 20a Configuration

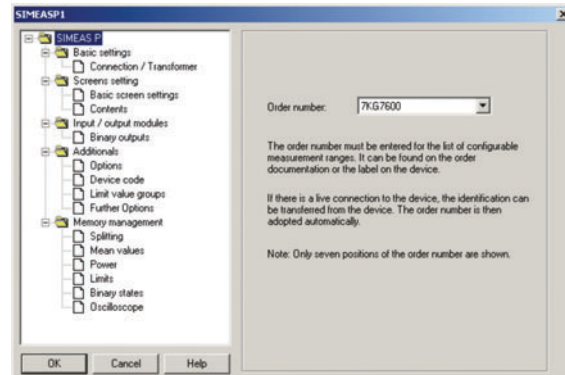


Fig. 20b Configuration

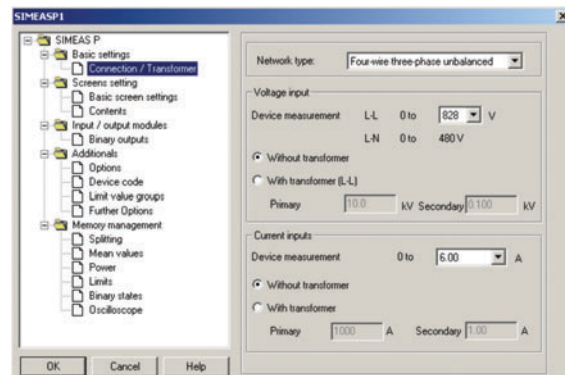


Fig. 20c Configuration



## Configuration software for SIMEAS P

## Memory read-out

Separate functions, integrated in the configuration software, enable a read-out of the following information:

- Mean values
- Mean values of power
- Oscilloscope recordings
- state information of binary channels
- limit value violations
- Log-entries

## Display and evaluation

All values and information read-out via the software will be shown in tabular and graphical manner together with the time stamp on the screen automatically.

The context menu offers some functions (masking of signals, copy, zoom, measuring functions) for an easy analysis of measured values and state information.

The following measured values can be shown in graphical manner:

- Mean values
- Mean values of power
- Oscilloscope recordings
- State information of binary channels

The following information will be show in tabular form:

- Limit value violations
- Log-entries

## Export function

The software enables also a function for the export of transmitted values and state information into a ASCII-file. This ASCII-file can be used in other applications e.g. MS-Excel. Oscilloscope recordings can be exported into COMTRADE formatted files.

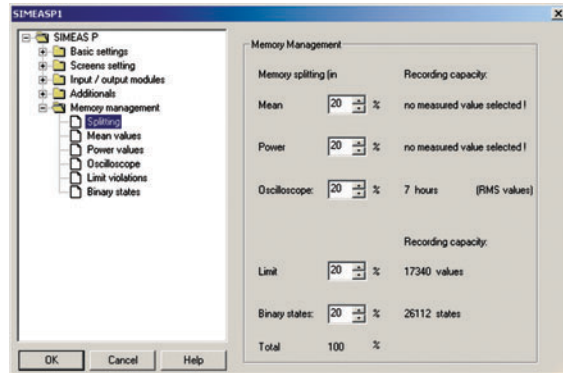


Fig. 21a Configuration of the measurement memory

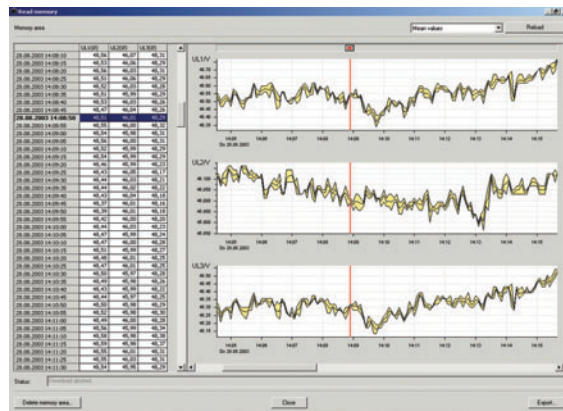


Fig. 21b Display and evaluation

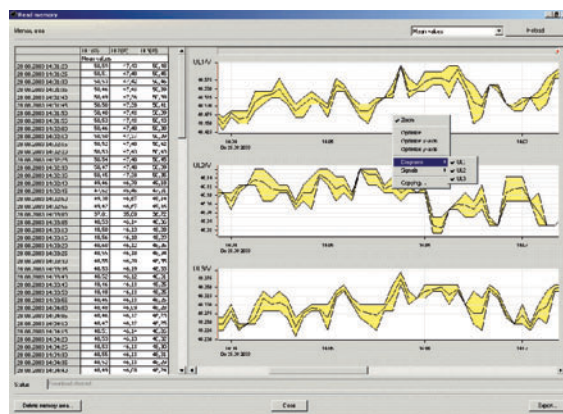


Fig. 21c Display and evaluation

## Accessories

### Description

#### Protection class IP54

6

For the devices SIMEAS P5xx – 7KG75xx and SIMEAS P6xx – 7KG76xx an optional transparent plastic fascia is available. That guarantees a protection class of IP54 for the front of the SIMEAS P.

#### Mounting kit for built-in units on 35 mm rail

For the devices SIMEAS P5xx – 7KG75xx and SIMEAS P6xx – 7KG76xx an optional mounting kit for snap-on mounting on a 35 mm rail is available. That enables also a mounting of SIMEAS P devices with a display on a 35 mm rail.

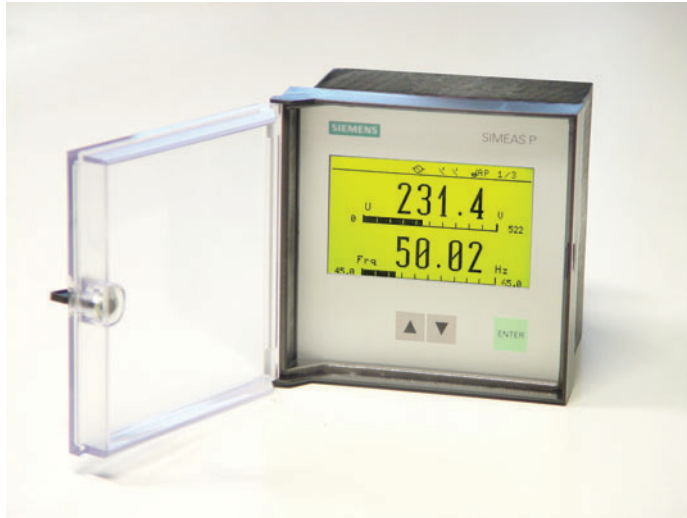


Fig. 22 SIMEAS P500/600 with transparent plastic fascia for protection class IP54

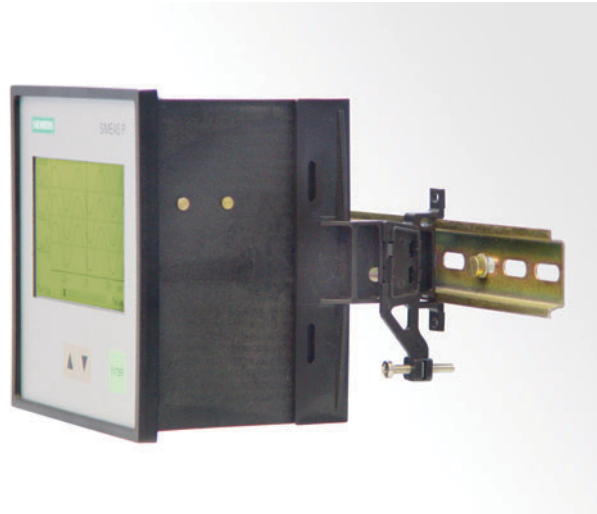


Fig. 23 SIMEAS P500/600 with mounting kit for snap-on mounting on a 35 mm rail

SIMEAS P

**Power Meter without display**

**SIMEAS P 100**

Standard snap-on mounting unit

7KG71 0 0 - 0 A A 0 0 - 0 A A 0

**SIMEAS P 200**

Extended snap-on mounting unit with real-time module, battery and memory for recording of measured quantities

7KG72 0 0 - 0 A A 0 0 - 0 A A 0

**Power Meter with graphic-display**

**SIMEAS P 500**

Standard built-in device for control panels 144x144 with graphic display

7KG75  0 - 0 A A 0  - 0 A A 0

**Version**

Standard	0
With UL-listing	5

**Facia**

Degree of protection IP 41 (standard)	1
Degree of protection IP 54	2

Positionnumber: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

**SIMEAS P 600**

Extended built-in device for control panels 144x144 with graphic display, real-time module, battery and memory for recording of measured quantities

7KG76  0 - 0   0  - 0   0

**Version**

Without I/O-modules	0	A	A	A	A
With additional I/O-modules	1				
With UL-listing without I/O-modules	5	A	A		A
With UL-listing with I/O-modules	6				A

**I/O-module in slot A**

Without	A
2 binary outputs	B
2 binary inputs	C
2 analog outputs (0-20 mA <sub>DC</sub> )	D
2 analog inputs (0-20 mA <sub>DC</sub> )	E
3 relay outputs	G

**I/O-module in slot B**

Without	A
2 binary outputs	B *)
2 binary inputs	C
2 analog outputs (0-20 mA <sub>DC</sub> )	D
2 analog inputs (0-20 mA <sub>DC</sub> )	E

**Facia**

Degree of protection IP 41 (standard)	1
Degree of protection IP 54	2

**I/O-module in slot C**

Without	A
2 binary inputs	C
2 analog outputs (0-20 mA <sub>DC</sub> )	D
2 analog inputs (0-20 mA <sub>DC</sub> )	E

**I/O-module in slot D**

Without	A
2 binary inputs	C
2 analog outputs (0-20 mA <sub>DC</sub> )	D
2 analog inputs (0-20 mA <sub>DC</sub> )	E

\*) only if position 9 ≠ G



## Selection and ordering data

### SIMEAS P

7

#### SIMEAS P configuration package

consisting of:

##### Software

for configuration, calibration of SIMEAS P units by means of a personal computer

##### Cable connector for connecting SIMEAS P to a PC

length 5m incl. RS232/RS485 converter

Connector:

PC-side:

9-pin SUB-D connector, female

SIMEAS P side:

9-pin SUB-D connector, male

##### Plug-in power supply unit for the converter

##### Power supply:

AC 230V / 50Hz

AC 120V / 60Hz

7KG7050-8A

A  
B

#### Mounting kit

for snap-on mounting of built-in devices on a 35mm DIN rail according to DIN EN 50022

7KG7052-8AA

## Technical data

<b>Input</b>	Only for connection to AC systems	
Max. system voltage	VL-N 400V/VL-L 690V	
Overload	20%	
Frequency of the fundamental component	45...65 Hz	
Sampling rate	3,2 kHz (50 Hz) 3,84 kHz (60 Hz)	
Resolution	12 bit	
Frequency range $f_i$	+/- 5Hz, min.>30% $V_{IN}$	
Waveform	Sinusoidal or distorted up to the 21st harmonic	
<b>AC current input</b>	$I_{IN}$ Current inputs	
Input current $I_{IN}$	1A; 5A	
Continuous overload	10A	
Surge withstand capability	100A for 1s	
Power consumption per phase	83 $\mu$ VA at 1A ; 2,1mVA at 5A	
<b>AC voltage input</b>	$V_{IN}$ Voltage inputs	
Measuring range $V_{IN}$	100/110V; 190V; 400V ; 690V (phase-to-phase)	
Continuous overload capacity	1,5 x $V_{IN}$	
Surge withstand capability	2,0 x $V_{IN}$	
Input resistance (phase-to-ground)	2,663 M $\Omega$	
Power consumption per phase	120mW ( $V_{PG} = 400$ V)	
<b>Binary inputs</b>	(optional, only 7KG7610/7KG7660)	
Max. input voltage	300V DC	
Current consumption for high level	1.8mA	
Threshold voltage low	$\leq 10V$	
Threshold voltage high	$\geq 19V$	
Signal delay	max. 3 ms	
<b>Binary outputs</b>	via isolated solid-state relay	
Permissible voltage	230V AC ; 250V DC	
Permissible current	100mA continuous 300mA for 100 ms	
Internal resistance	50 $\Omega$	
Permissible operating frequency	10 Hz	
<b>Analog inputs</b>	(optional, only 7KG7610/7KG7660)	
Measuring range	0 to 20mA DC	
Input range	0 to 24mA DC	
Input resistance	50 $\Omega \pm 0,1\%$	
Accuracy	0.5% of nominal value	
<b>Analog outputs</b>	(optional, only 7KG7610/7KG7660)	
Output current	0 to 20mA DC	
Output range	0 to 24mA DC	
Max. load resistance	250 $\Omega$	
Accuracy	0.2% (typical); max. 1.1% of nominal value	
<b>Relay outputs</b>	(optional, only 7KG7610/7KG7660)	
Max. switching voltage	250V AC/150V DC	
Max. permanent current	5A	
Min. permanent current	1mA at 5V DC	
Max. response time	10 ms	
Min. release time	7 ms	

<b>Overvoltage category</b>	According to IEC 61010 Part1	
$V_{IN}$ to 400V ( $\varphi$ - $\varphi$ )	Cat III	
$V_{IN}$ to 230V ( $\varphi$ -N)	Cat III	
$V_{IN}$ to 690V ( $\varphi$ - $\varphi$ )	Cat II	
$V_{IN}$ to 400V ( $\varphi$ -N)	Cat II	
Power supply	Cat II	
Binary outputs, binary inputs and relay outputs	Cat II	
Analog inputs and analog outputs	Cat III	
<b>Auxiliary power</b>	Multi-range power supply unit AC/DC	
Nominal range	24 to 250V DC or 100/230V AC	
Operating range	+/- 20% of nominal range	
7KG7610/7KG7660 only:	- 10%...+ 20% of nominal range DC +/- 20% of nominal range AC	
Power consumption	max. 4W or 10VA	
7KG7610/7KG7660 only:	max. 10W or 35VA	
<b>Battery (only 7KG7200/7KG76xx)</b>		
Type	VARTA CR2032, 3V, Li-Mn	
<b>Display</b>	Graphic display	
Resolution	120 x 240 pixels	
Dimensions	103 x 60 mm (4-1/6" x 2-3/8")	
<b>Dimensions, Weight</b>		
Panel mounted housing (7KG7500/7KG76xx)		
Dimensions	144 x 144 mm (5-11/6" x 5-11/16")	
Weight	without I/O-modules with 4 I/O-modules and connection board	
	Approx. 0.9 kg (2.0 lbs) Approx. 0.95 kg (2.1 lbs)	
Standard rail mounting (7KG7100/7KG7200)		
Dimensions	94 x 157 mm	
Weight	Approx. 0.55 kg (1.2 lbs)	
<b>Communication interface</b>		
Connection	9-pole D-SUB female connector	
Data transfer		
PROFIBUS DP V1 interface transmission speed	9.600 bit/s to 12 Mbit/s	
Data transfer		
Modbus RTU/ASCII	Baud rate (bit/s):	
PC RS485	300, 600, 1200, 3400, 4800, 9600, 19200, 38400, 57600, 115200	
<b>Electromagnetic compatibility</b>		
Immunity	according to IEC 61000-6-2	
Emission	according to CISPR 11, Class A and 47 CFR, Part 15, Class A	

## Technical Data

## Technical Data

8

<b>Dielectric strength, routine test</b>	according to IEC 61010-1
Signal inputs (current to current and current to voltage)	2.2kV; 50 Hz; AC
Current inputs to serial interface, PG, voltage inputs, relay outputs and power supply	2.2kV; 50 Hz; AC
Power supply, serial interface, voltage inputs and relay outputs mutually	3.1kV; DC
Power supply to PG	3.1kV; DC
Serial interface to PG	500V; AC
<b>Additional for 7KG7610/7KG7660</b>	
Binary inputs and binary outputs to PG	2.2kV; 50 Hz; AC
Analog inputs and analog outputs to PG	500V; 50 Hz; AC
<b>Impulse voltage withstand test, test type</b>	according to IEC 60688 and IEC 60255-5
All circuits mutually except serial interfaces	5kV; 1.2/50 $\mu$ s
<b>Insulation type of inputs and outputs</b>	
Signal inputs (current)	Reinforced, max. 600V AC, Cat II or max. 300V AC, Cat III
Signal inputs (voltage)	Protective impedance, max. 600V AC, Cat II or max. 300V AC, Cat III
Power supply	Reinforced, 230V AC/250V DC, Cat II
Outputs	Reinforced, 270V AC/125V DC, Cat II
Binary outputs	Reinforced, 230V AC/250V DC, Cat II
Binary inputs	Reinforced, 300V DC, Cat II

<b>Reference conditions</b>	The stated error limits (table 3-3) apply for reference conditions
Input current $I_{IN}$	$I_{IN} \pm 1\%$
Input voltage $V_{IN}$	$V_{IN} \pm 1\%$
Frequency	45...65 Hz
Waveform	Sinus, harmonic distortion $\leq 5\%$
Ambient temperature $T_A$	$23\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$ ( $73,4\text{ }^\circ\text{F} \pm 1,8\text{ }^\circ\text{F}$ )
Auxiliary voltage $V_H$	$U_{HN} \pm 1\%$
Warm-up time	$\geq 15\text{ min}$
External fields	no
<b>Environmental conditions</b>	The device is designed for indoor use only
Ambient temperatures	according to IEC 60688
Operating temperature range	$0\text{ }^\circ\text{C}$ to $55\text{ }^\circ\text{C}$ ( $32\text{ }^\circ\text{F}$ to $131\text{ }^\circ\text{F}$ )
Storage temperature range	$-25\text{ }^\circ\text{C}$ to $70\text{ }^\circ\text{C}$ ( $-13\text{ }^\circ\text{F}$ to $158\text{ }^\circ\text{F}$ )
Max. rel. humidity	80% for temperatures up to $31\text{ }^\circ\text{C}$ ( $87\text{ }^\circ\text{F}$ ) decrease linearly to 50% at $40\text{ }^\circ\text{C}$ ( $104\text{ }^\circ\text{F}$ )
Max. altitude above sea level	2000 m (6.560 ft)
Pollution degree	2, no condensation
<b>Additional Technical Data</b>	
Internal fuse	Not replaceable Type T500mA/250V according IEC 60127
Internal fuse, secondary	Not replaceable Type F2A/125V according UL 248-14
<b>Dynamical mechanical stress</b>	
Standards	IEC 60255-21 and IEC 60068
Vibrations, sinusoidal for stationary application	according to IEC 60225-21-1, IEC 60068-2-6, Cl. 2
Shock, semi-sinusoidal for stationary application	according to IEC 60225-21-2, IEC 60068-2-27, Cl. 1
Vibrations on earthquake for stationary application	according to IEC 60225-21-3, IEC 60068-3-3, Cl. 1
<b>Protection class according to IEC 60529</b>	
Device	
- Front	IP41 or IP54 see Ordering Data
- Rear	IP20
Personal protection	IP2x

## Regulations, Standards, Markings

## Regulations, Standards

The SIMEAS P unit complies with the product standard IEC 60688. This general standard refers to all single specifications where test procedures are described in detail. Furthermore, all standards to be complied with in conformity with EC regulations as well as the European standard EN 61010 (VDE 0411) Part 1, describing the safety regulations for measuring, control and laboratory equipment are applicable.

9

Standard	Reference to	Test
IEC 60688	IEC 60255-5	Surge withstand capability test 5 kV; pulse shape 1.2 / 50 $\mu$ s, creepage distances and clearances
IEC 60688	IEC 60255-22-1	1 MHz high-frequency disturbance test 2.5 kV / 1.0 kV
IEC 60688		Temperature test with impressed overcurrents and overvoltages
EMC regulation	EN 50011	Radio interference voltage and emitted interference according to limit class A
EMC regulation	IEC 61000-4-2	Electrostatic discharge 4 kV contact and 8 kV air discharge
EMC regulation	IEC 61000-4-3	Electromagnetic RF fields 10 V/m
		Frequency range 80 –1000 MHz amplitude-modulated
		Frequency 900 MHz pulse-modulated
EMC regulation	IEC 61000-4-4	Electrical fast transient puls shape 2 kV puls shape 5 / 50 ns
EMC regulation	IEC 61000-4-5	Lightning impulse test – surge pulse shape 1.2 / 50 $\mu$ s
EMC regulation	IEC 61000-4-6	Amplitude-modulated supply with RF power 10 V / 0.15 – 80 MHz
EMC regulation	IEC 61000-4-8	Power frequency magnetic fields immunity test 30 A/m
EMC regulation	IEC 61000-3-2	Harmonic power system currents
EMC regulation	IEC 61000-3-3	Supply voltage fluctuations
EN 61010-1		Insulation test
EN 61010-1	IEC 60068-2-75	Mechanical strength test
EN 61010-1	IEC 60068-2-75	Impact test
EN 61010-1	IEC 60068-2-6	Vibration test

## UL-Listing

This product is UL-certified to Standard UL 61010B-1, based on the specification stated in Chapter 1.8 (Technical Data).  
UL File No.: E228586



Measuring Equipment

2UD1



# Terminal assignments

## Typical terminal assignments

10

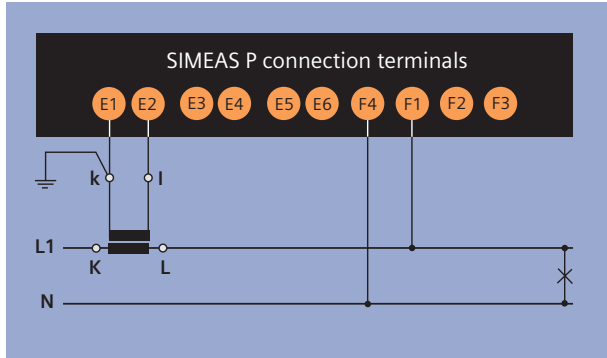


Fig. 24 Single-phase AC

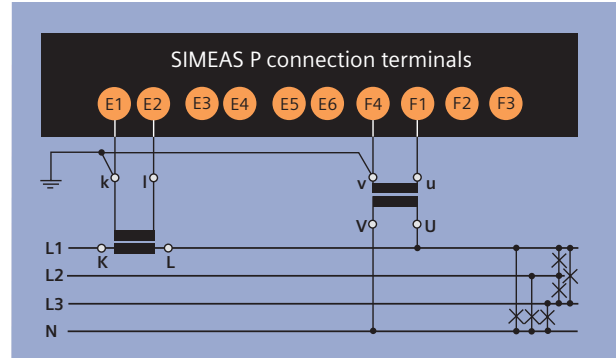


Fig. 25 4-wire-3-phase balanced

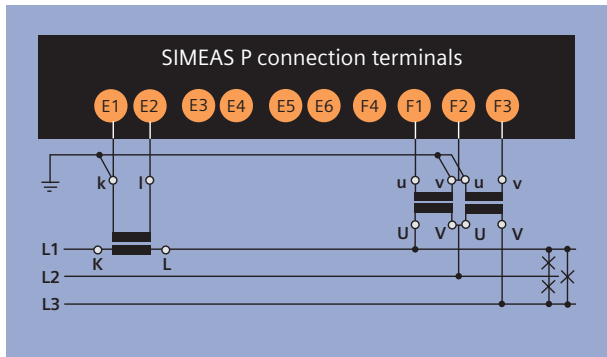


Fig. 26 3-wire-3-phase balanced

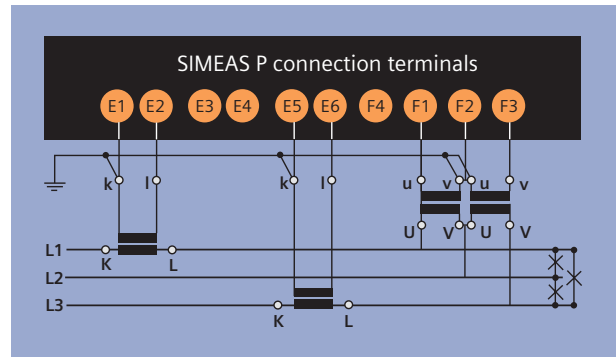


Fig. 27 3-wire-3-phase

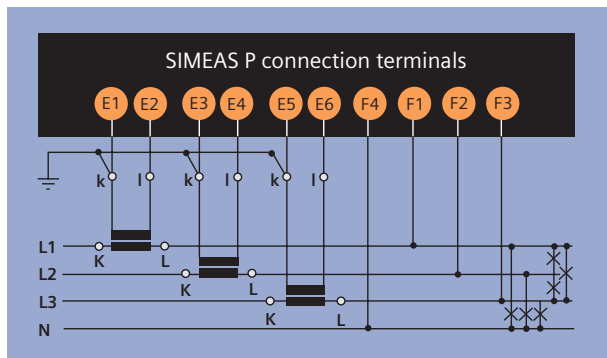


Fig. 28 4-wire-3-phase (low-voltage system)

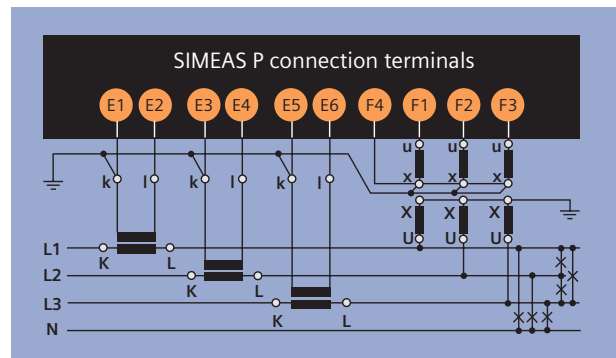


Fig. 29 4-wire-3-phase (high-voltage system)

The above mentioned terminal assignments are just some configuration examples. Within the range of the admissible maximum current and voltage values a current or voltage

transformer is not compulsory. On the other hand, Y- or V-connected voltage transformers can be used.

All input or output terminals not required for measurement remain unassigned.



Terminals 7KG7100/7KG7200/7KG7500 and 7KG7600

Terminals  
SIMEAS P100/200  
7KG7100 / 7KG7200

10

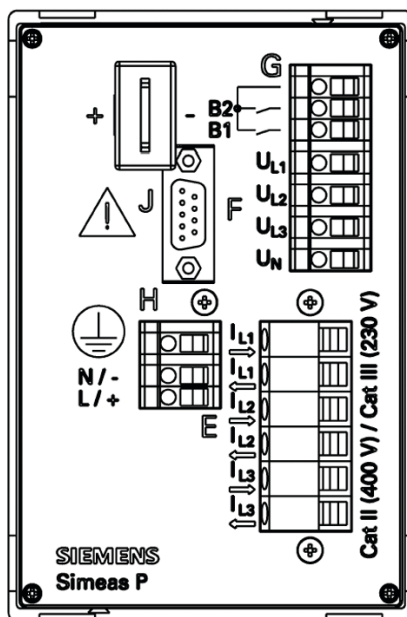


Fig. 30 Front view SIMEAS P100/P200

Terminals  
SIMEAS P500/600  
7KG7500 / 7KG7600

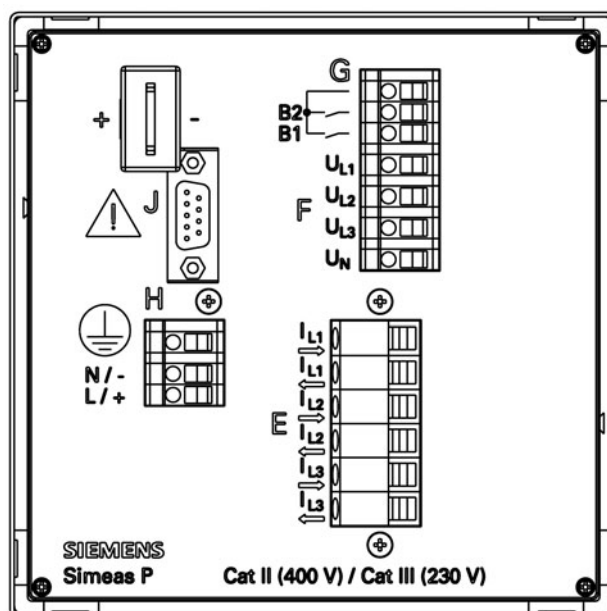


Fig. 31 Rear view SIMEAS P500/P600

# Terminals

Terminals 7KG7550/7KG7610/7KG7650

10

Terminals  
SIMEAS P550/650  
7KG7550/7KG7650

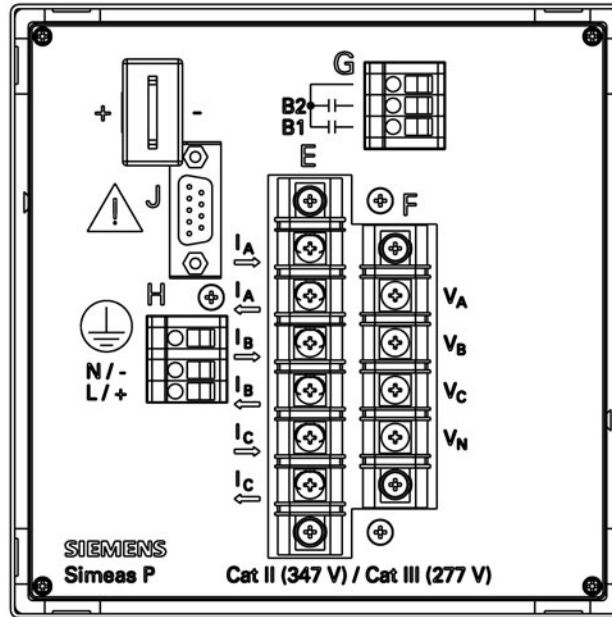


Fig. 32 Rear view SIMEAS P550/P650

Terminals  
SIMEAS P610  
7KG7610

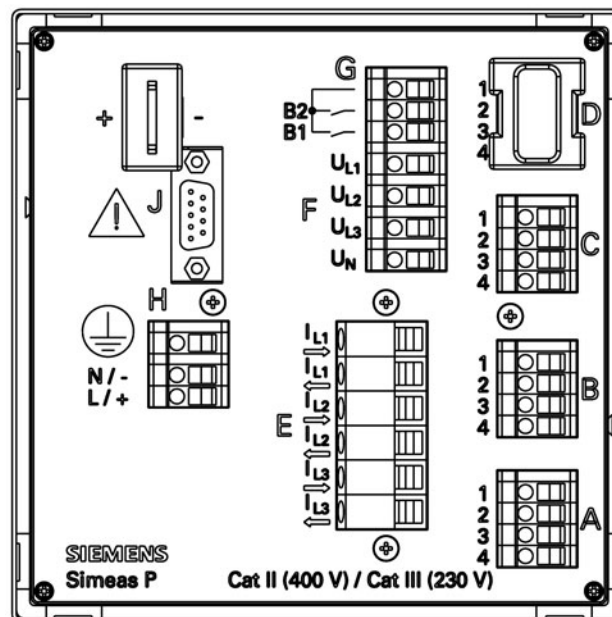


Fig. 33 Rear view SIMEAS P610

Terminals 7KG7660

Terminals  
SIMEAS P660  
7KG7660

10

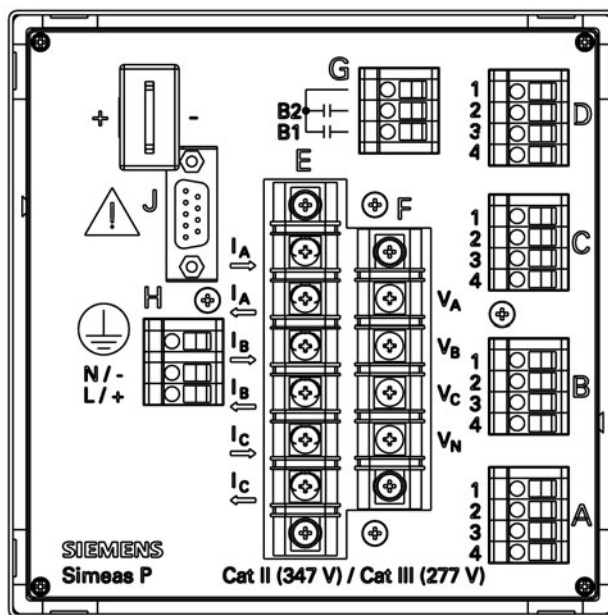
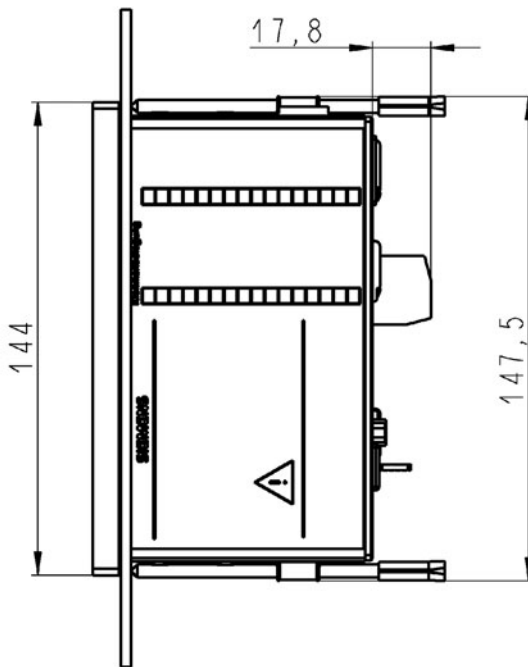
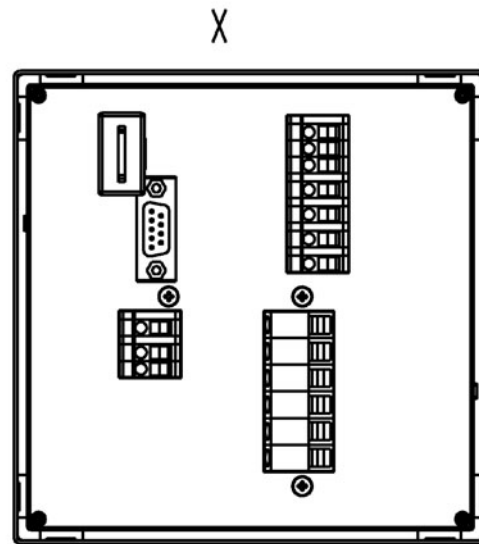
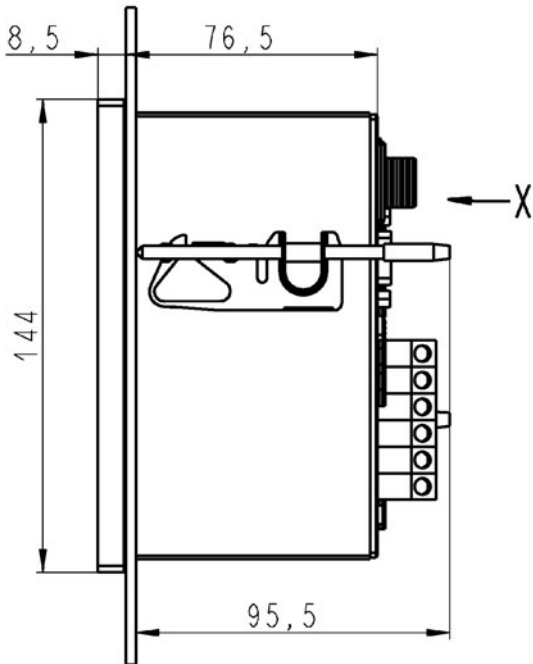


Fig. 34 Rear view SIMEAS P660

# Dimensions

SIMEAS P500/P600 - 7KG7500/7KG7600

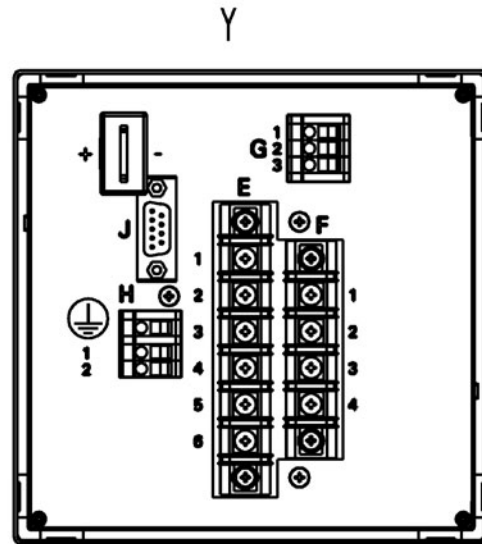
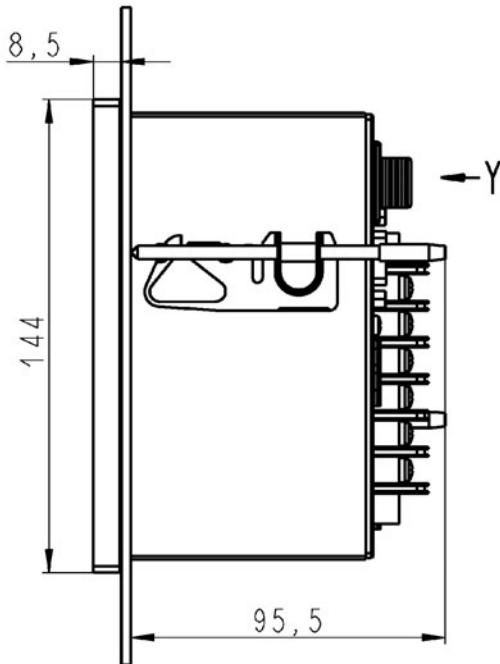
11



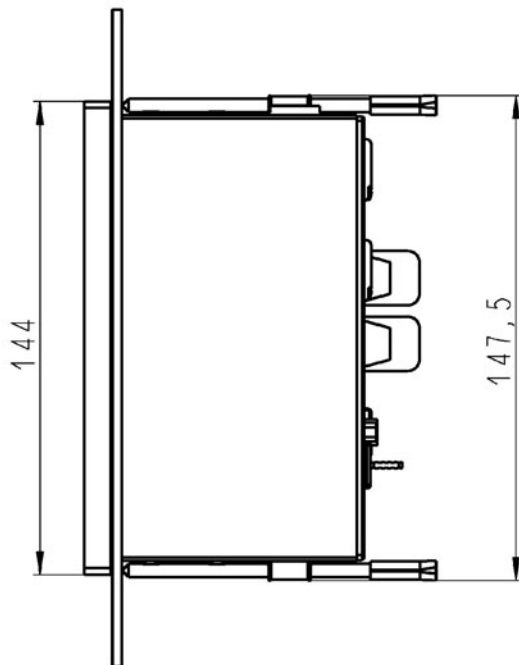
**Attention:**  
Depending on the cable cross-section a minimal bend radius has to be considered

Dimensions in mm  
Panel cutout  $138^{+1} \times 138^{+1}$  mm

SIMEAS P550/P650 - 7KG7550/7KG7650



11



**Attention:**

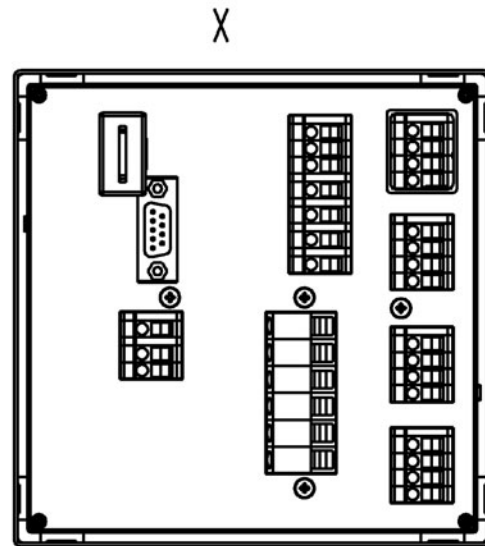
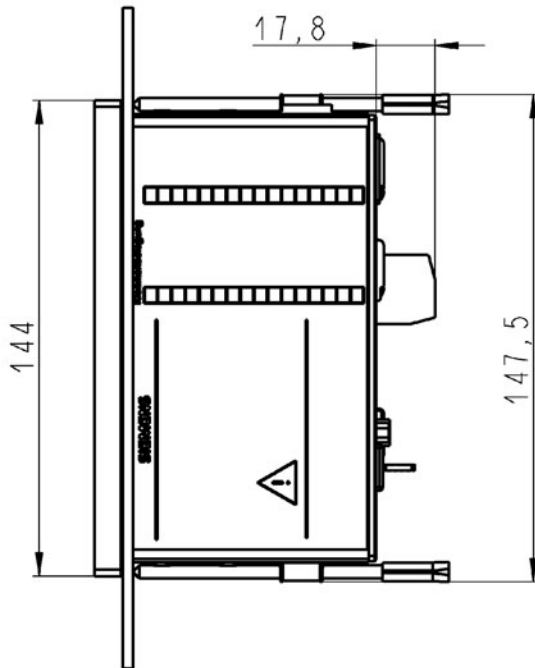
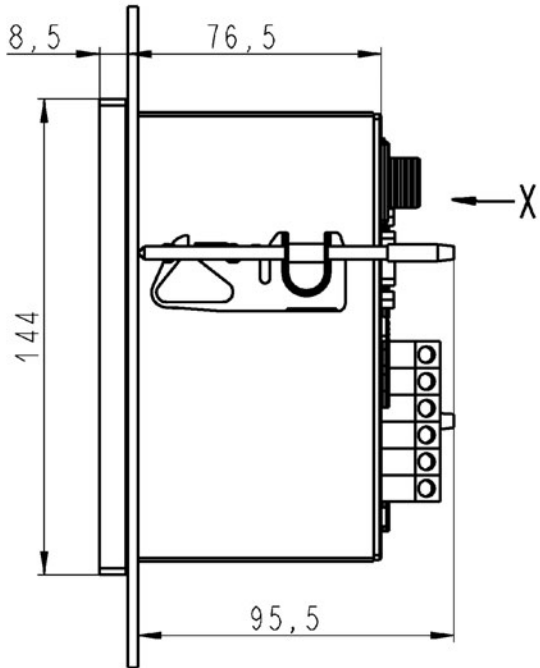
Depending on the cable cross-section a minimal bend radius has to be considered

Dimensions in mm  
Panel cutout  $138^{+1} \times 138^{+1}$  mm

# Dimensions

SIMEAS P610 - 7KG7610

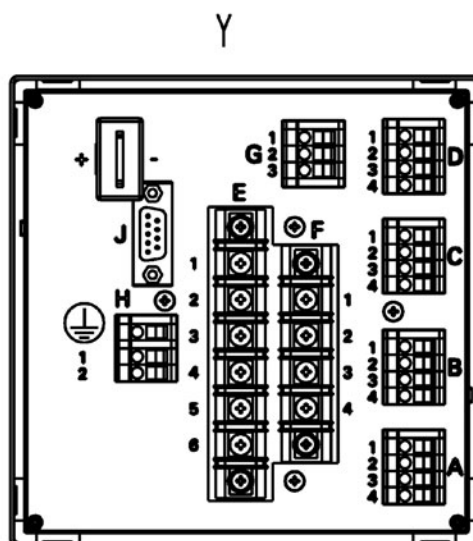
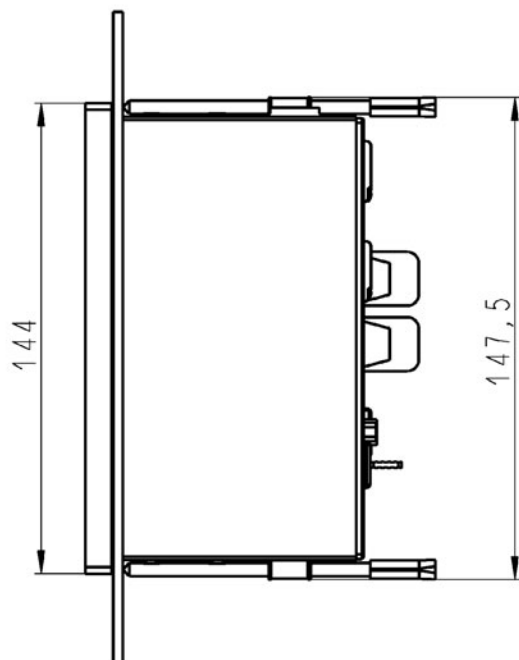
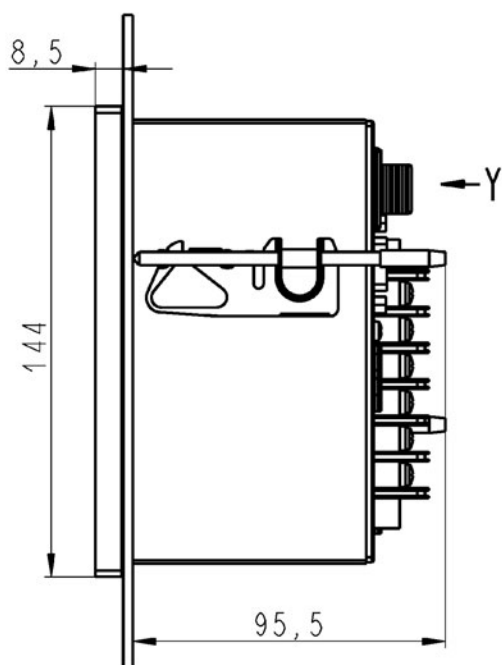
11



**Attention:**  
Depending on the cable cross-section a minimal bend radius has to be considered

Dimensions in mm  
Panel cutout  $138^{+1} \times 138^{+1}$  mm

SIMEAS P660 - 7KG7660



11

**Attention:**

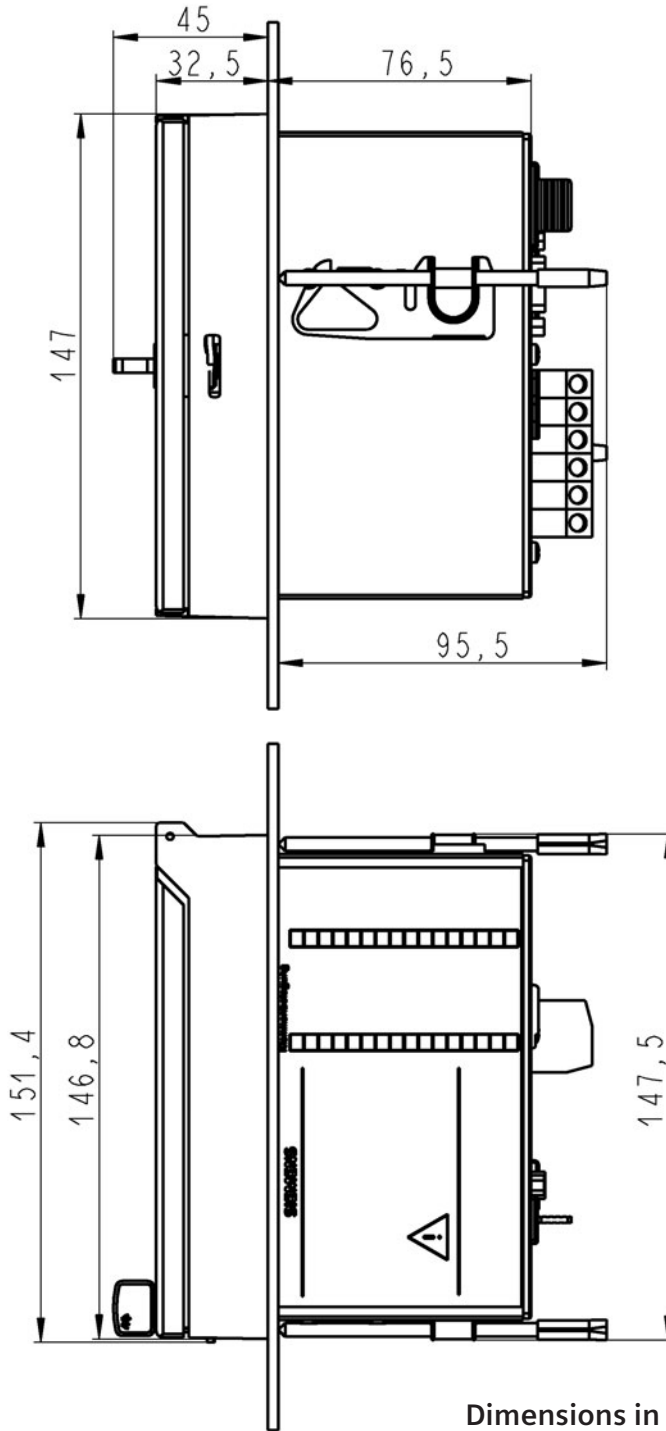
Depending on the cable cross-section a minimal bend radius has to be considered

Dimensions in mm  
Panel cutout  $138^{+1} \times 138^{+1}$  mm

# Dimensions

SIMEAS P5xx/P6xx with transparent plastic facia IP 54

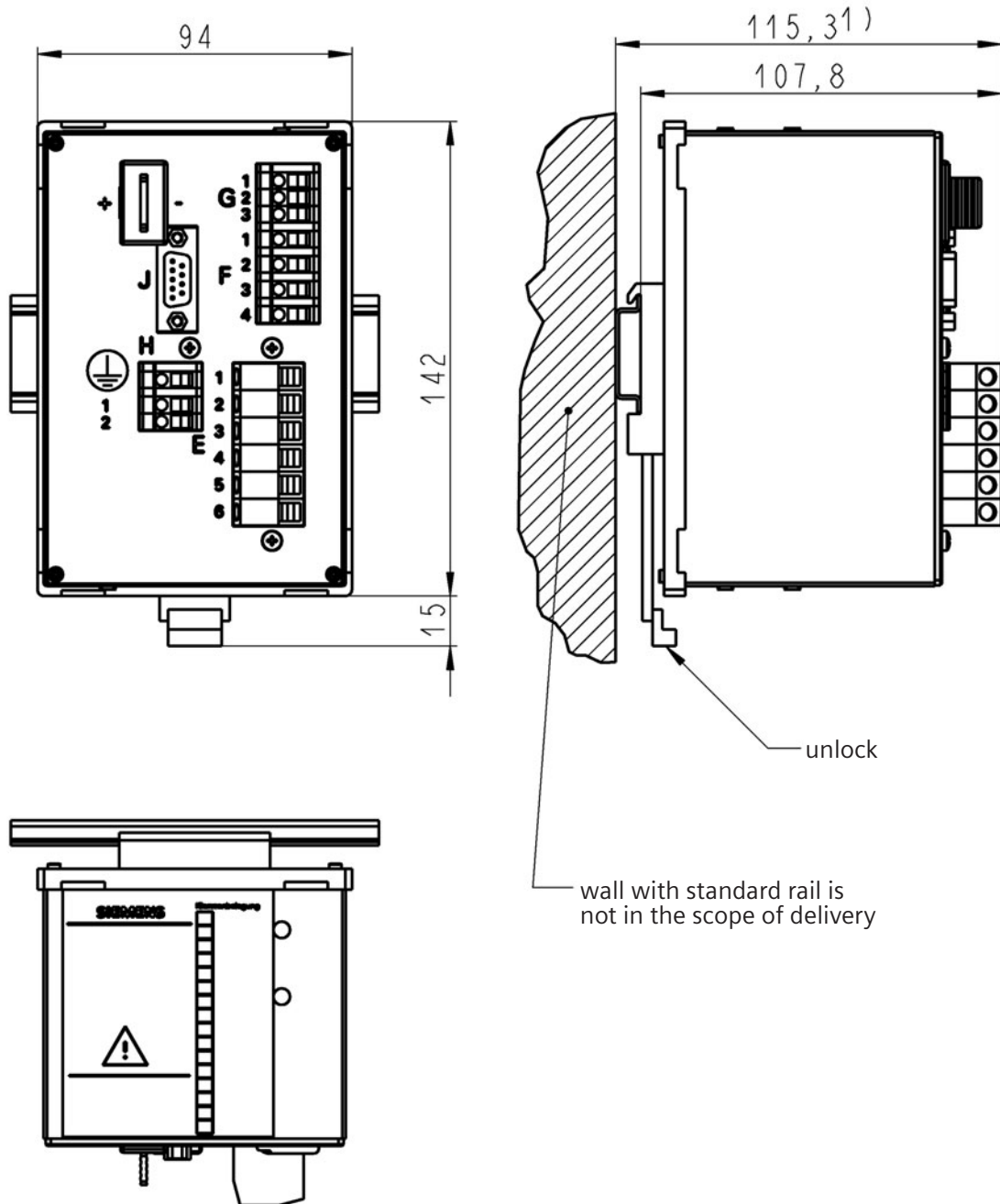
11



Dimensions in mm  
Panel cutout 138<sup>+1</sup> x 138<sup>+1</sup> mm



SIMEAS P100/P200 - 7KG7100/7KG7200



11

1) dimension illustration valid for standard rail according DIN EN 50022 - 35x7,5 mm

Dimensions in mm

Notes





Published by

Siemens Aktiengesellschaft  
Power Automation  
Postfach 48 06  
90026 Nürnberg  
Germany

[www.powerquality.de](http://www.powerquality.de)

Editor and Layout:  
Dept. Marketing Services  
Power Automation

Order No.: E50417-X1076-C274-A3