SIEMENS

SIMEAS P
Power Meter

POWER QUALITY

Catalog SR 10.3.1
2001

SIMEAS P

Content

- Direct-reading panel-mounted measuring device for measurement of power supply parameters.
- Large, easy to read graphic display with blue backlighting.
- Standard PROFIBUS DP interface for cyclic transmission of measured values to central processors up to 12 Mbit/sec.
- Suitable for balanced and unbalanced three- and four-wire three-phase systems as well as single-phase systems.
- Easy configuration and calibration from the front panel or via PC-based configuration software.
- User-specific adaptation of the measured-value screens.
- 2 relay outputs 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 power demand per phase and for the total system.
- Constant high accuracy for years, CE designation, EMC strength.
- High system security and reliability.
- Compliance with all relevant national and international standards.

Description

Application

SIMEAS P is a panel-mounted device for direct reading of power system parameters. With a very simple configuration, the display of measured values is adaptable to the specific requirements of the user. Power system linking is possible with the integral RS485 port equipped with the standard PROFIBUS DP protocol (optional: MODBUS, DNP V3.0) which provides for indication, evaluation and processing of several SIMEAS P measured values at a central master station.

Technology

Powerful onboard microprocessors ensure ultra-fast registration and updating of measured values.
SIMEAS P can be connected to any power system configuration directly (up to 690 V-systems) or via transformer - from single-phase 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 230 V AC making the SIMEAS P really universal.

Design

The front panel with integrated keys and high-resolution blue-backlit graphic display gives the SIMEAS P a smart appearance that emphasizes its high-tech features.

Operation

The SIMEAS P simplicity of design translates into easy and comprehensive operation. Terminology and descriptions in national language provides for rapid menu-assisted configuration of the unit.

Display

All parameters can be displayed on 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 status line 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 unassigned.

Communication

As communication between field devices is becoming standard, 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. SIMEAS P units are delivered with a standard PROFIBUS DP protocol with transmission rates of up to 12 Mbit/s. With auxiliary software SIMEAS P can also use other communication protocols. The integration of MODBUS and DNP V3 is in preparation. Future protocols or modifications and extensions of present standard protocols can be integrated later.

Fig. 1 SIMEAS P

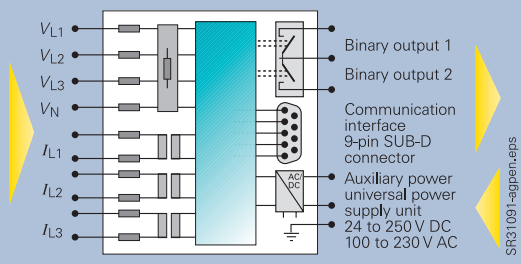

Fig. 2 Inputs / outputs

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 on the screens and/or transmitted via the serial interface.
With the SIMEAS P it is also possible to parameterize several limit value groups with limit values of the parameters. These may 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 tamperproof by password protection.

Service

SIMEAS P units are available ex stock. They 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

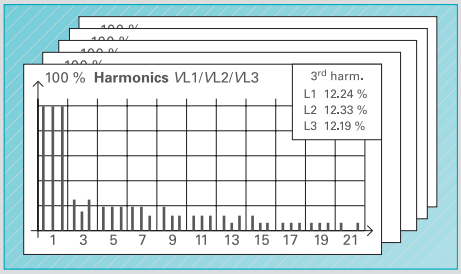

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Fig. 3
Representation of up to 20 screens, selectable with the front keys ▲▼

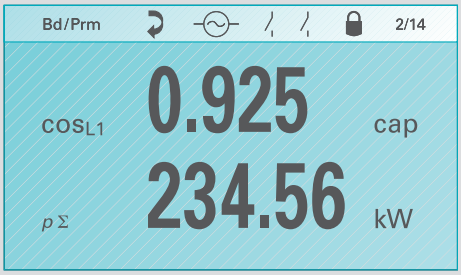

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Fig. 4
2 measured values, digital

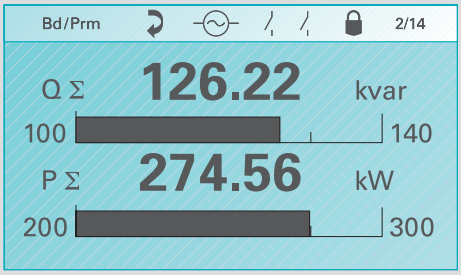

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Fig. 5
2 measured values, digital analog

SR31096-egpde.eps

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 is 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 are determined individually by the user.
- In addition, designations for the parameters are available for selection in the default setting:
  U_{L1}, U_{L2}, U_{L3}, cos φ, etc. or
  V_a, V_b, V_c, PF etc.
- To obtain a higher resolution, the lower and upper measuring value can be set in the bar chart display.
- Measured-value screens can be selected as often as required.
- Status and diagnostic messages of the device are indicated in the status line displayed on the measured-value screens.
- The screens are automatically updated every 1 s.

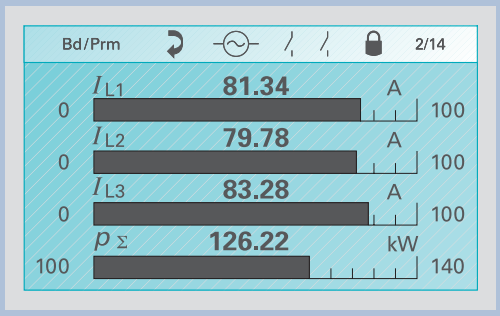

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Fig. 7
4 measured values, digital analog

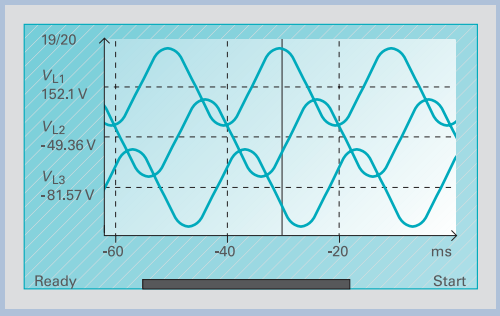

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Fig. 8
Oscilloscope for sinusoidal values

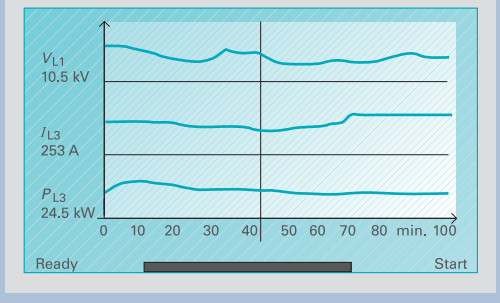

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Fig. 9
Oscilloscope for r.m.s. values

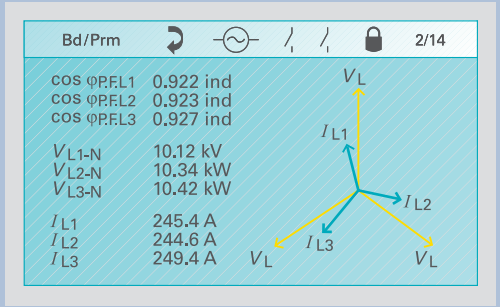

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Fig. 10
Vector diagram

Oscilloscope

- 3 parameters for voltage or current can be selected from the table (see page 7) of parameters and recorded with pre-fault.
- Recording is started manually or triggered automatically, as soon as an out-of-limit condition occurs.
- The cursor is shifted via the front keys. Measured values are read off with time indication from the cursor position on the X- and Y-axis.
- 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

State and pulse value of currents and voltages as well as their phase angles can be read off from the phasor diagram screen.

Screens, configuration, communication

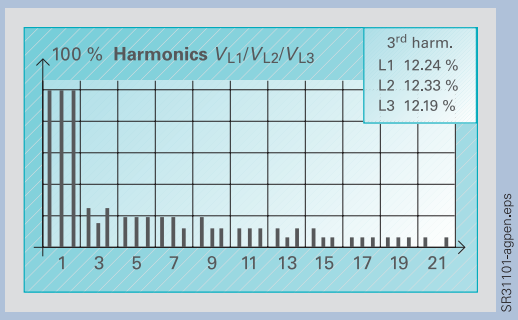
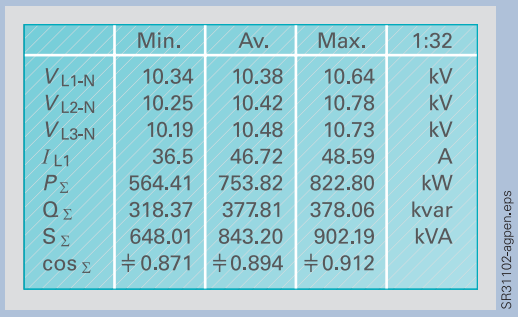


Fig. 11
Harmonics



	Min.	Av.	Max.	1:32
V_{L1-N}	10.34	10.38	10.64	kV
V_{L2-N}	10.25	10.42	10.78	kV
V_{L3-N}	10.19	10.48	10.73	kV
I_{L1}	36.5	46.72	48.59	A
P_{Σ}	564.41	753.82	822.80	kW
Q_{Σ}	318.37	377.81	378.06	kvar
S_{Σ}	648.01	843.20	902.19	kVA
$\cos_{\Sigma}$	∓0.871	∓0.894	∓0.912	

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Fig. 12
List screens

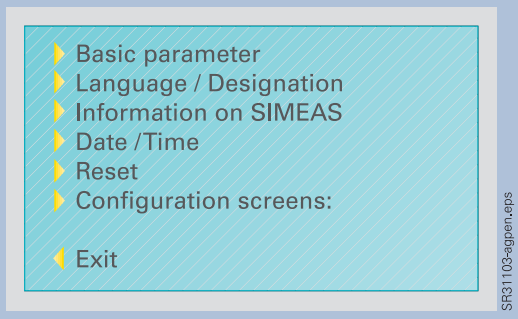

Fig. 13
Configuration

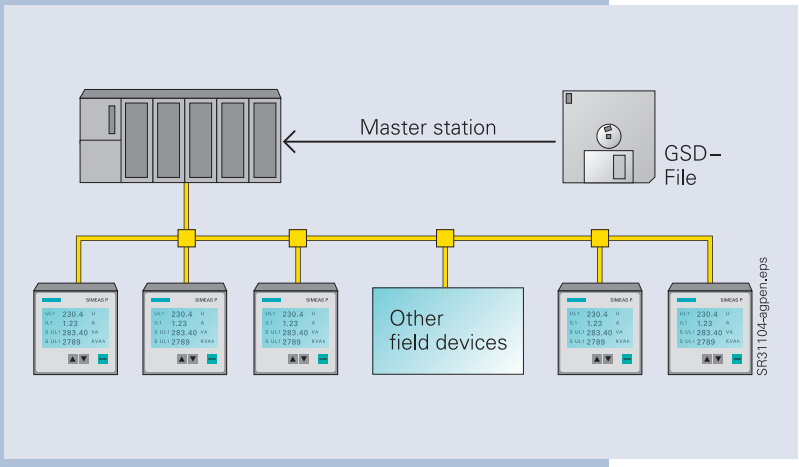

Fig. 14
SIMEAS P with PROFIBUS DP

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 process.
- 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 due to 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 for connection to RS485 field bus systems. SIMEAS P is delivered with an integrated standard

- PROFIBUS DP V1 protocol in compliance with EN 50170 Volume2. (*PRO*cess*F*ield*BUS*)

With help of the auxiliary software SIMSOFT P also other protocols such as

- MODBUS or
- DNP V3

(in preparation) can be loaded. Therefore, SIMEAS P supports all commonly used communication protocols.

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. SIMEAS P supports data transmission rates ranging from 9.6 kBit/s to 12 Mbit/s. Optionally the user may select 4 different types of transmission for 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 for simple, 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 may be selected from the table of the parameters (see page 7).

Limit values, parameters

Limit values

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

They may be combined with logical elements such as AND, OR, limit violations are counted, they are available at binary outputs or serve for triggering the oscilloscope.

Binary outputs

The basic 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

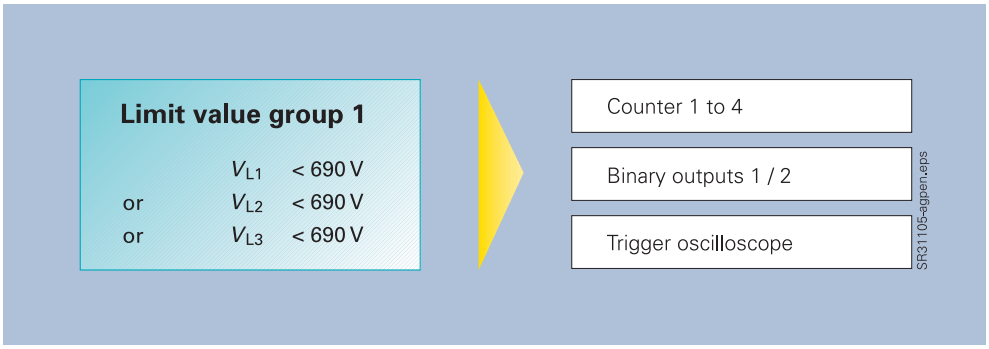

Fig. 15
Limit values

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

Parameters

Parameter	Measured path[1]	Unit	Menu	Tolerances[2]
Voltage	L1-N, L2-N, L3-N, (N-E)	V, kV	▼ ■ ●	± 0.2 %
Voltage	L1-L2, L2-L3, L3-L1, Σ[3]	V, kV	▼ ■ ●	± 0.2 %
Current	L1, L2, L3, N, Σ[3]	A, kA	▼ ■ ●	± 0.2 %
Active power *P* + import, - export	L1, L2, L3, Σ	W, kW, MW	▼ ■ ●	± 0.5 %
Reactive power *Q*	L1, L2, L3, Σ	Var, kvar, Mvar	▼ ■ ●	± 0.5 %
Apparent power *S*	L1, L2, L3, Σ	VA, kVA, MVA	▼ ■ ●	± 0.5 %
Power factor cosφ	L1, L2, L3, Σ		▼ ■ ●	± 0.5 %
Active power factor cosφ	L1, L2, L3, Σ		▼ ■ ●	± 0.5 %
Phase angel	L1, L2, L3, Σ	°	▼ ■ ●	± 2 °
System frequency	L1, L2	Hz	▼ ■ ●	± 10 mHz
Active energy *E* import	L1, L2, L3, Σ	kWh, MWh	▼ ■	± 0.5 %
Active energy *E* export	L1, L2, L3, Σ	kWh, MWh	▼ ■	± 0.5 %
Reactive energy *Q*	L1, L2, L3, Σ	kVarh, Mvarh	▼ ■	± 0.5 %
Apparent energy *ES*	L1, L2, L3, Σ	VA, kVA, MVA	▼ ■	± 0.5 %
Energy balance	L1, L2, L3, Σ	W, kW, MW	▼ ■	± 0.5 %
Energy absolute	L1, L2, L3, Σ	W, kW, MW	▼ ■	± 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 %
Harmonics *V* 5^{th}, 7^{th}, 11^{th}, 13^{th}, 17^{th}, 19^{th}	L1, L2, L3	%	▼ ■ ●	± 0.5 %
Harmonics *I* 5^{th}, 7^{th}, 11^{th}, 13^{th}, 17^{th}, 19^{th}	L1, L2, L3	A	▼ ■ ●	± 0.5 %
Limit violations counter	Counter 1, 2, 3, 4		▼ ■	

▼ 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) With reference to the 1.2 x nominal value
3) Average value of all phases

Software

With the SIMEAS P software the user benefits from a simple and user-friendly tool which will exploit the functions of the SIMEAS P even more efficiently. The package consists of three program units which may be installed separately as requested:

- Configuration
- Visualization
- Evaluation

As an accessory, a configuration cable with RS232/485 converter is available. The SIMEAS P can be connected to any standard notebook or PC by means of a 9-pin SUB-D connector. Installation under Windows 95 / NT.

Configuration

The configuration software as shown in Fig. 17 permits ultrafast configuration of SIMEAS P units. The user can set and store parameters even without having the actual unit by his side. The parameters will be transferred to SIMEAS P when the "Send to unit" command is activated.
In this manner a number of SIMEAS P units can be configured with minimum effort. The stored set of parameters is simply re-loaded when a unit has to be replaced. Furthermore, communication protocols and firmware updates can be loaded with help of the SIMEAS P software.

Visualization

The SIMEAS P software offers the user the possibility of online retrieval, evaluation and time-stamped printing of measured values remotely from a PC or notebook.

Independent of the SIMEAS P display all parameters determined in SIMEAS P can be presented on a graphic display.

Evaluation

The sinusoidal or r.m.s.-values recorded by SIMEAS P can be displayed (Fig. 19) and processed very professionally and printed out in graphical or tabular form. All relevant measured values can also be selected and recorded from the PC or notebook with the same possibilities of representation and evaluation.
The records may be subjected to further processing by a variety of user-friendly tools.
Setting or shifting of up to 8 cursors is possible with online representation of the measured values at the specific cursor position in tabular form.
Other features:
Zooming, labelling, storing and printing of selected parameters etc.

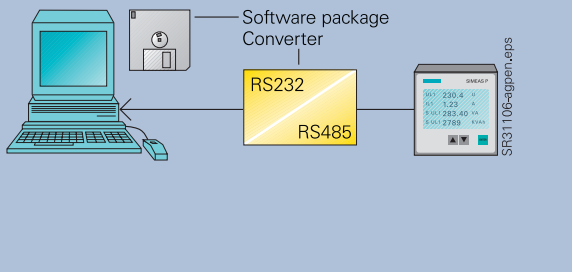

Fig. 16
Configuration

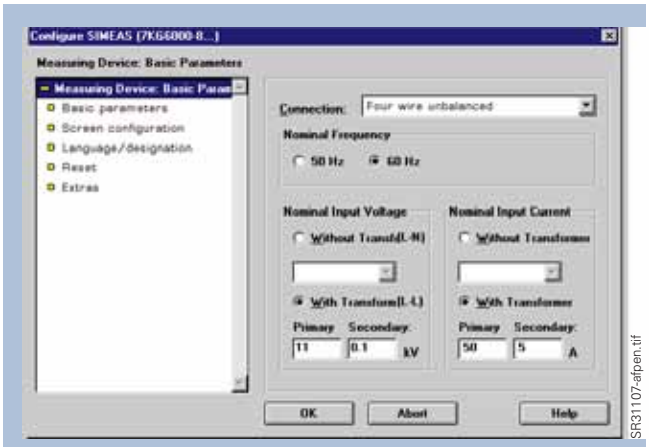

Fig. 17
Configuration

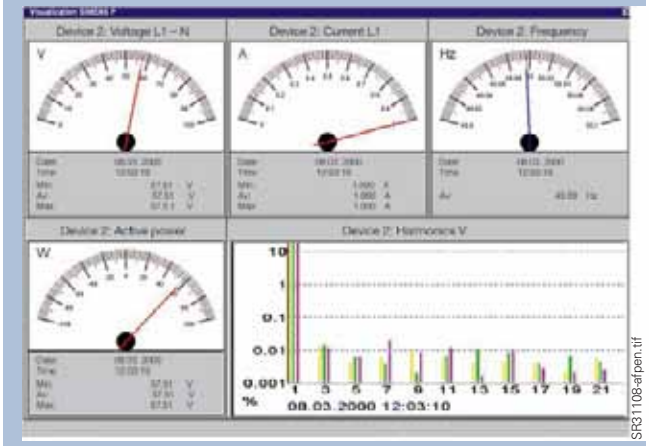

Fig. 18
Visualization

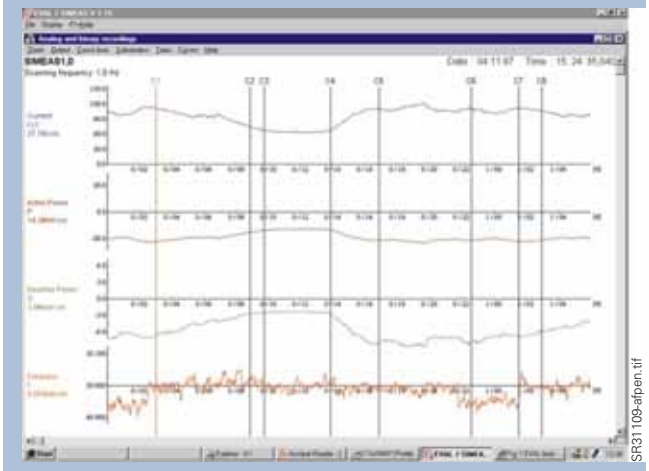

Fig. 19
Evaluation

Typical terminal assignments

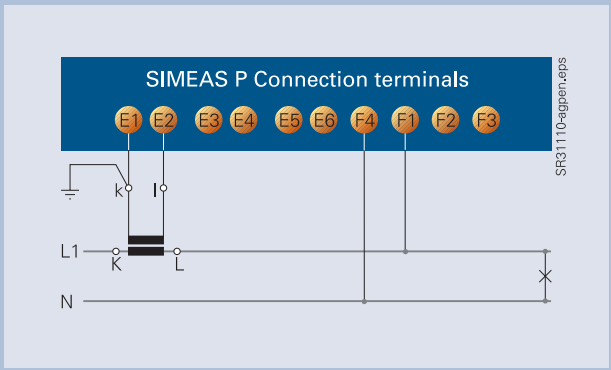

Fig. 20
Single-phase AC current

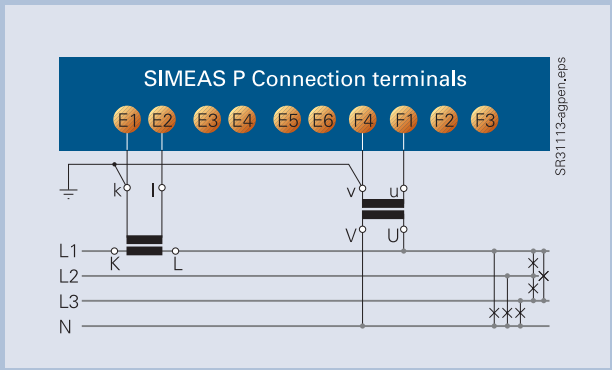

Fig. 21
4-wire – 3-phase current, balanced loading

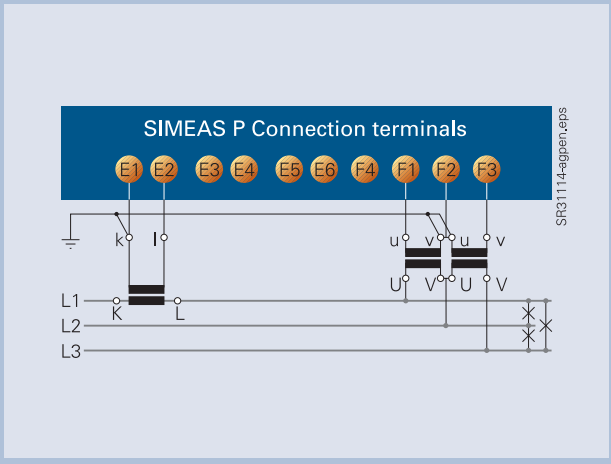

Fig. 22
3-wire – 3-phase current, balanced loading

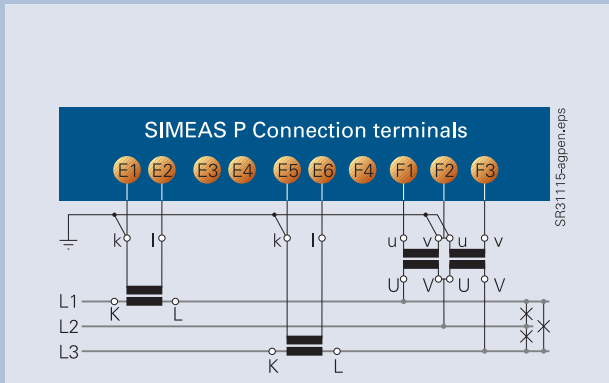

Fig. 23
3-wire – 3-phase current, any loading

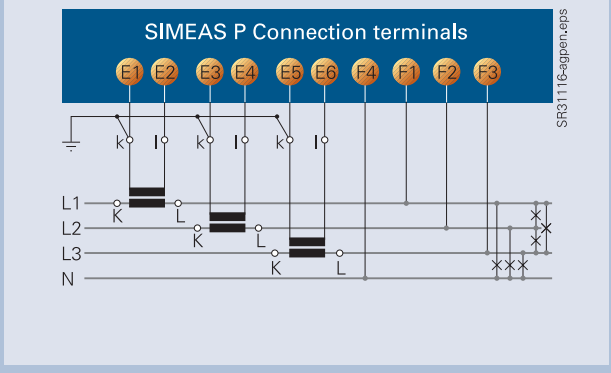

Fig. 24
4-wire – 3-phase current, any loading
(low-voltage system)

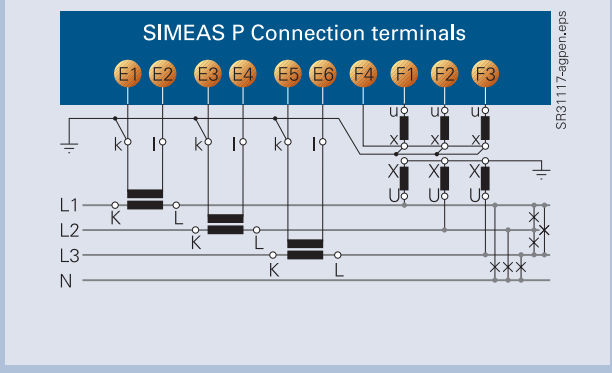

Fig. 25
4-wire – 3-phase current, any loading
(high-voltage system)

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.

Technical data

Input	for connection to AC systems only
Max. system nominal voltage	Y 400 /Δ 690 V
Control range	1.2 V_{EN} / I_{EN}
Rated frequency f_{EN}	50 Hz; 60 Hz
Input frequency range f_E	± 5 Hz from 10 % V_{EN} or higher
Waveform	sinusoidal or distorted up to the 21st harmonic
AC current input	I_E
Rated input current I_{EN}	1 A; 5 A
Continuous overload	10 A
Surge withstand capability	100 A for 1s
Power consumption	83 µVA at 1A ; 2.1 mVA at 5 A
AC voltage input	V_E
Rated voltage EU version V_{EN}	100 / 110 V; 190 V; 400 V; 690 V (phase-phase)
Continuous overload capacity	1.5 x V_{EN}
Surge withstand capability	2.0 x V_{EN}
Input resistance	2.663 MΩ
Power consumption	120 mW (V_{EN} = 400 V)
Surge voltage category	acc. to DIN EN 61010 Part 1
V_{EN} to 400 V (phase-phase)	III
V_{EN} to 690 V (phase-phase)	II
Auxiliary power	multi-range power supply unit AC/DC.
Rated range	24 to 250 V DC or 100 to 230 V AC
Total range	± 20 % of rated range
Power consumption	max. 6 W
Binary outputs	via isolated solid-state relay
Permissible voltage	230 V AC ; 400 V DC
Permissible current	150 mA continuous 500 mA for 100 ms
Output resistance	12.5 Ω
Permissible switching frequency	10 Hz

Display	high-resolution graphic display
Resolution	120 x 240 pixels
Dimensions	103 x 60 mm
Background illumination	blue
Communication interface	
Interface	
Termination system	9-pin SUB-D connector
Transmission rate	12 MBauds max. with PROFIBUS
Transmission protocols	PROFIBUS DP V1.0
Ambient temperature	acc. to IEC 60 688
Operating temperature range	0 °C to +55 °C, 32 °F to +131 °F
Storage/transportation temperature range	–25 °C to +70 °C, –13 °F to +158 °F
Utilization category	IR2 (environment)
Dielectric strength	
Acc. to IEC 60 688	5 kV 1.2 / 50 µs
Dimensions and housing construction	
Dimensions	144 x 144 x 82.5 mm (5.6 x 5.6 x 3.2 inches) (width x height x depth)
Housing construction	Panel-mounting housing according to DIN 43700 Degree of protection IP 42 (Front)
Connector elements	Degree of protection IP 20 (Terminals)
Auxiliary power	Terminal for cable diameter 2.5 mm^2
Voltage inputs	Terminal for cable diameter 2.5 mm^2
Current inputs	Terminal for cable diameter 4.0 mm^2
Binary outputs	Terminal for cable diameter 2.5 mm^2
RS485 bus interface	9-pin SUB-D connector
Weight	
Weight	approx. 0.9 kg

Specifications and standards

Standard	Reference to	Test
IEC 60 688	IEC 60 521	Surge withstand capability test 5 kV; pulse shape 1.2 / 50 µs, creepage distances and clearances
IEC 60 688	IEC 60 255-22-1	1 MHz high-frequency disturbance test 2.5 kV / 1.0 kV
IEC 60 688		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 61 000-4-2	Electrostatic discharge 4 kV contact and 8 kV air discharge
EMC regulation	IEC 61 000-4-3	Electromagnetic RF fields 10 V/m Frequency range 80 –1000 MHz amplitude-modulated Frequency 900 MHz pulse-modulated
EMC regulation	IEC 61 000-4-4	Electrical fast transient pulse shape 2 kV pulse shape 5 / 50 ns
EMC regulation	IEC 61 000-4-5	Lightning impulse test – surge pulse shape 1.2 / 50 µs
EMC regulation	IEC 61 000-4-6	Amplitude-modulated supply with RF power 10 V / 0.15 – 80 MHz
EMC regulation	IEC 61 000-4-8	Power frequency magnetic fields immunity test 30 A/m
EMC regulation	IEC 61 000-3-2	Harmonic power system currents
EMC regulation	IEC 61 000-3-3	Supply voltage fluctuations
EN 61010-1	IEC 60 664	Insulation test
EN 61010-1		Mechanical strength test
EN 61010-1	IEC 60 817	Impact test
EN 61010-1	IEC 60 068-2-6	Vibration test

Specifications and standards

The SIMEAS P unit complies with the product standards IEC 688 / 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.

Selection and ordering data

Designation	Order No.
SIMEAS P with PROFIBUS DP V1 interface	**7KG7000–8AA**
SIMEAS P configuration package consisting of: Software for configuration, calibration data readout and analysis of SIMEAS P units by means of a personal computer Cable connector for connecting SIMEAS P to the PC length 5 m incl. RS232/RS485 converter Connector: PC side: 9-pin SUB-D connector, female SIMEAS P side: 9-pin SUB-D connector, male	**7KG7050–8AA**
Mounting kit for snap-on mounting on a 35 mm DIN rail according to DIN EN 50022	**7KG7052–8AA**

Terminals, dimensions

Terminal assignment

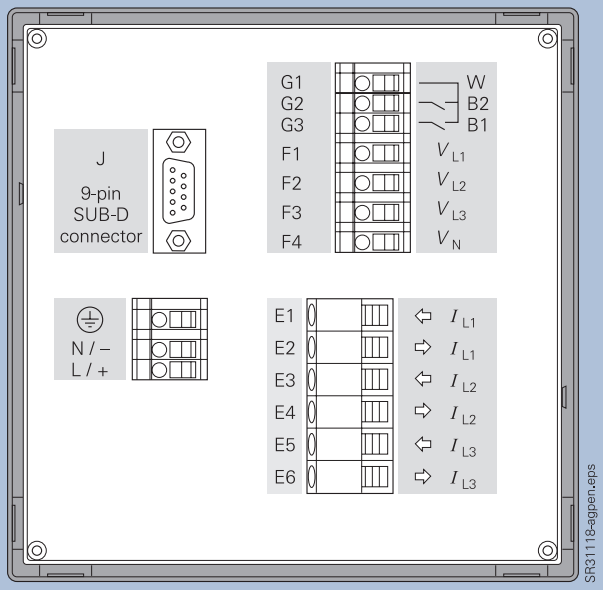

Fig. 26
SIMEAS P terminals – rear view

Dimensions in mm (in inches)

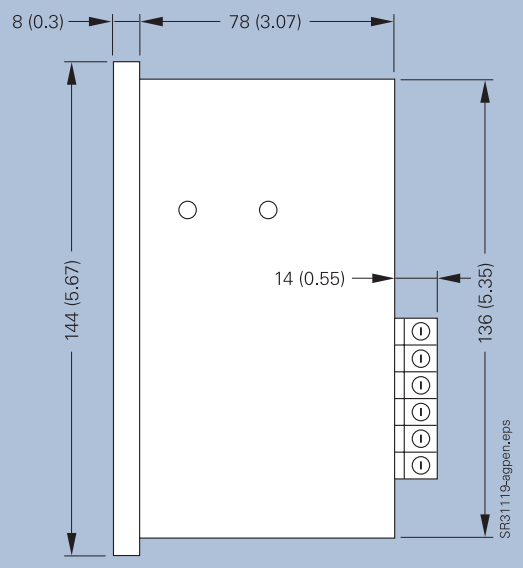

Fig. 27
Side view

Appendix

Catalog Index of the Power Transmission and Distribution, Power Automation Division

Title	Designation	Order No.:
Power Quality		
Fault and Digital Recorder SIMEAS R	SR 10.1.1	E50001-K4011-A101-A1-7600
Central Fault Data Unit DAKON	SR 10.1.2	see Intranet
OSCOP P The Program for Power Quality Recorders	SR 10.1.3	E50001-K4013-A101-A1-7600
Power System Quality Analysis OSCILLOSTORE	SR 10.2	E50001-K4020-A101-A1-7600
SIMEAS Q Quality Recorder	SR 10.2.5	E50001-K4025-A101-A1-7600
SIMEAS P Power Meter	SR 10.3.1	E50001-K4031-A101-A1-7600
SIMEAS T Transducers for Power Variables	SR 10.4	E50001-K4040-A101-A1-7600
Low Voltage Capacitors and Power Factor Correction Units SIPCON T	SR 10.6	E50001-K4060-A101-A1-7600
Energy Automation		
Substation SICAM RTU System	SICAM 2.1.1	E50001-K5602-A111-A1-7600
SICAM miniRTU 6MD202 Remote Terminal Unit	SICAM 2.2.1	E50001-K5602-A211-A2-7600
SICAM microRTU 6MD203 Remote Terminal Unit	SICAM 2.3.1	E50001-K5602-A311-A3-7600
SICAM SAS Substation Automation System	SICAM 3.1.1	E50001-K5603-A111-A1-7600
PS20A-6EP8090 Power Supply Module	SICAM 5.1.1	E50001-K5605-A111-A1-7600
DI32-6MD1021 Digital Input Functional Module	SICAM 5.2.1	E50001-K5605-A211-A1-7600
AI32-6MD1031 Analog Input Functional Module	SICAM 5.2.2	E50001-K5605-A221-A1-7600
AI16-6MD1032 Analog Input Functional Module	SICAM 5.2.3	E50001-K5605-A231-A1-7600
Visualization System for SICAM SAS: SICAM WinCC	SICAM 6.1.1	E50001-K5606-A111-A2-7600
SICAM plusTOOLS Configuration System	SICAM 6.2.1	E50001-K5606-A211-A1-7600
Numerical Protective Relaying		
Numerical Protection Devices	LSA 2.0.1	E50001-K5702-A011-A1-7600
Operation and Evaluation Software for Numerical Protection Devices	LSA 2.0.2	E50001-K5702-A121-A1-7600
Relay Selection Guide	LSA 2.0.3	E50001-K5702-A031-A2-7600
SIPROTEC 7SJ601 Overcurrent Protection	LSA 2.1.16	E50001-K5712-A261-A1-7600
7SJ41 Definite-Time Overcurrent Protection Relay	LSA 2.1.10	E50001-K5712-A201-A2-7600
7SJ511 Numerical Overcurrent-Time Protection (Version V3)	LSA 2.1.3	E50001-K5712-A131-A2-7600
7SJ512 Numerical Overcurrent-Time Protection (Version V3)	LSA 2.1.4	E50001-K5712-A141-A3-7600
7SJ512 Numerical Feeder Protection (Version V3.6)	LSA 2.1.30	E50001-K5712-A411-A1-4A00
SIPROTEC 7SJ531 Numerical Line and Motor Protection with Control Function	LSA 2.1.9	E50001-K5712-A191-A4-7600
7SJ551 Multi-Function Protection Relay	LSA 2.4.2	E50001-K5742-A121-A3-7600
SIPROTEC 4 7SJ61/62/63 6MD63 Multifunction Protection Relay and Bay Controller	SIP 3.1	E50001-K4403-A111-A1-4A00
SIPROTEC 7SJ600 Numerical Overcurrent, Motor and Overload Protection Relay	SIP 3.2	E50001-K4403-A121-A1-7600
SIPROTEC 7SJ602 Numerical Overcurrent, Motor and Overload Protection Relay	SIP 3.3	E50001-K4403-A131-A1-7600
SIPROTEC 7SA510 Distance Protection Relay (Version V3)	LSA 2.1.17	E50001-K5712-A271-A1-7600
SIPROTEC 7SA511 Distance Protection Relay (Version V3)	LSA 2.1.11	E50001-K5712-A211-A2-7600
7SA513 Line Protection Relay (Version V3)	LSA 2.1.12	E50001-K5712-A221-A1-7600
7SA518/519 Overhead Control-Line Protection Relay (Version V3)	LSA 2.1.14	E50001-K5712-A241-A2-7600
SIPROTEC 4 7SA6 Distance Protection Relay for all Voltage Levels	SIP 4.3	E50001-K4404-A131-A1-7600
3VU13 Miniature Circuit-Breaker	LSA 2.1.8	E50001-K5712-A181-A2-7600
7SD502 Line Differential Protection with Two Pilot Wires	LSA 2.2.1	E50001-K5722-A111-A2-7600
7SD503 Line Differential Protection with Three Pilot Wires	LSA 2.2.2	E50001-K5722-A121-A2-7600
7SD511/512 Current Comparison Protection Relay (Version V3) for Overhead Lines and Cables	LSA 2.2.3	E50001-K5722-A131-A2-7600
SIPRPOTEC 7SD60 Numerical Current Differential Protection Relay for Two Pilot-Wire Link	SIP 5.2	E50001-K4405-A121-A2-7600
SIPROTEC 4 7SD610 Universal Differential Protection Relay for Two Line Ends	SIP 5.4	E50001-K4405-A141-A1-7600
7UT512/513 Differential Protection Relay (Version V3) for Transformers, Generators and Motors	LSA 2.2.4	E50001-K5722-A141-A2-7600
SIPROTEC 7SS50 Version V1.2 Busbar/Circuit-Breaker Failure Protection Relay (Summation Current Transformer Version)	SIPROTEC 5.1	E50001-K4405-A111-A1-7600
Auxiliary Current Transformers 4AM50, 4AM51, 4AM52 and Isolating Transformers 7XR95	LSA 2.2.6	E50001-K5722-A161-A1-7600
SIPROTEC 7SS52 Distributed Numerical Busbar and Circuit-Breaker Failure Protection Relay	LSA 2.2.7	E50001-K5722-A171-A1-7600
Introduction to Earth-Fault Detection	LSA 2.3.1	E50001-K5732-A111-A2-7600
7SN71 Transient Earth-Fault Relay	LSA 2.3.2	E50001-K5732-A121-A1-7600
7XR96 Toroidal Current Transformer	LSA 2.3.3	E50001-K5732-A131-A1-7600
7VC1637 Earth-Leakage Monitor	LSA 2.3.4	E50001-K5732-A141-A1-7600
7SK52 Motor Protection	LSA 2.4.1	E50001-K5742-A111-A1-7600
Introduction to Generator Protection	LSA 2.5.1	E50001-K5752-A111-A1-7600

Appendix

Catalog Index of the Power Transmission and Distribution, Power Automation Division

Title	Designation	Order No.:
Numerical Protective Relaying		
7UM511 Generator Protection Relay (Version V3)	LSA 2.5.2	E50001-K5752-A121-A2-7600
7UM512 Generator Protection Relay (Version V3)	LSA 2.5.3	E50001-K5752-A131-A2-7600
7UM515 Generator Protection Relay (Version V3)	LSA 2.5.4	E50001-K5752-A141-A2-7600
7UM516 Generator Protection Relay (Version V3)	LSA 2.5.5	E50001-K5752-A151-A1-7600
SIPROTEC 4 7UM611/612 Multifunction Generator Protection Relay	SIP 6.1	E50001-K4406-A111-A1-7600
SIPROTEC 4 7UM62 Multifunction Generator, Motor and Transformer Protection Relay	SIP 6.2	E50001-K4406-A121-A1-7600
7UW50 Tripping Matrix	LSA 2.5.6	E50001-K5752-A161-A1-7600
7VE51 Synchronizing Unit	LSA 2.5.7	E50001-K5752-A171-A1-7600
7VP151 Three-Phase Portable Test Set (Omicron CMC56)	LSA 2.6.1	E50001-K5762-A111-A2-7600
7XV72 Test Switch	LSA 2.6.2	E50001-K5762-A121-A1-7600
7SV50 Numerical Circuit-Breaker Failure Protection Relay	LSA 2.7.1	E50001-K5772-A111-A1-7600
7SV512 Numerical Circuit-Breaker Failure Protection Relay	LSA 2.7.2	E50001-K5772-A121-A1-7600
7VK512 Numerical Auto-Reclose/Check-Synchronism Relay	LSA 2.7.3	E50001-K5772-A131-A1-7600
7SM70 Analog Output Unit	LSA 2.7.5	E50001-K5772-A151-A1-7600
7SM71 Analog Output Unit	LSA 2.7.6	E50001-K5772-A161-A1-7600
7SV7220 Power Supply Unit	LSA 2.7.9	E50001-K5772-A191-A1-7600
SIPROTEC 7RW600 Numerical Voltage, Frequency and Overexitation Relay	SIP 2.1	E50001-K4402-A111-A1-7600
Communication for Protection Devices		
Centralized and Remote Control of Siemens Protection Relays (Overview)	SIPROTEC 8.1	E50001-K4408-A111-A1-7600
DIGSI 4 - Software for Configuration and Operation of SIPROTEC 4 units	SIP 8.2	E50001-K4408-A121-A1-7600
DIGRA 4 - Software for the Visualization and Analysis of Fault Records	SIP 8.3	E50001-K4408-A131-A1-7600
Operating and Analysis Software DIGSI V3	LSA 2.8.2	E50001-K5782-A121-A1-7600
6MB252 Mini Bay Unit for Energy Automation with SICAM	SIPROTEC 7.1	E50001-K4407-A111-A1-7600
SIPROTEC 4 6MD66 Bay Control Unit	SIP 7.2	E50001-K4407-A121-A1-7600
Analog Protective Relaying		
Static Analog Network Protection Relays	R 1.1	E50001-K4501-A111-A1-7600
Static Analog Machine Protection Relays	R 1.2	E50001-K4501-A121-A1-7600
Static Analog Ancillary Protection Equipment	R 1.3	E50001-K4501-A131-A1-7600
Hand and Electrical Reset Tripping Relay 7PA20	R (Extract)	E86010-K4500-A151-A1-7600
Trip Circuit Supervision Relay 7PA21	R (Extract)	E86010-K4500-A161-A1-7600
Pilot-Wire Differential Relay 7SD24	R (Extract)	E86010-K4500-A131-A1-7600
Microprocessor Based Overcurrent Relay 7SJ55	R (Extract)	E50001-K4500-A361-A2-7600
High-Speed Busbar Differential Relay 7SS10	R (Extract)	E50001-K4500-A241-A2-7600
High Impedance Differential Relay 7VH80	R (Extract)	E86010-K4500-A321-A1-7600
Auto-Reclose Relay 7VK14	R (Extract)	E86010-K4500-A141-A1-7600

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