SPS electronic

Operating Manual

for High Voltage Test Device
HA 4000L

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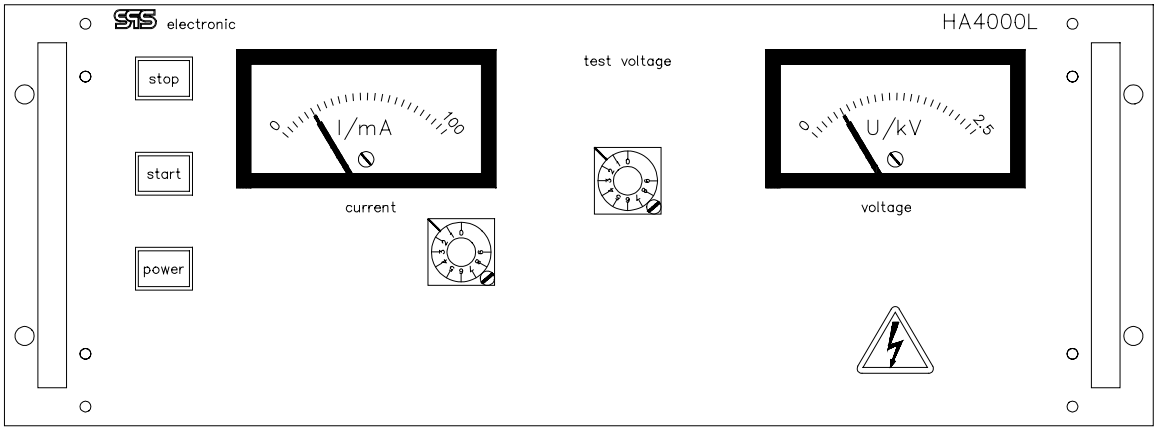

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Contents

1. General

The high voltage test device of series HA 4000L was exclusively designed for the use in automatic test systems. Due to the various interfaces, manual operation is only partly possible.

With the high voltage test device HA 4000L air and leakage paths for electrical devices and systems can be tested. Measuring of these paths according VDE 0110- or IEC 384-regulations.

2. Protection measures

- potential free voltage
- transformer and transducer double insulated
- actual display twice
- external warning lamp set possible
- four switch-on settings
- integrated warning buzzer
- two independant breaking circuits

3. Highlights

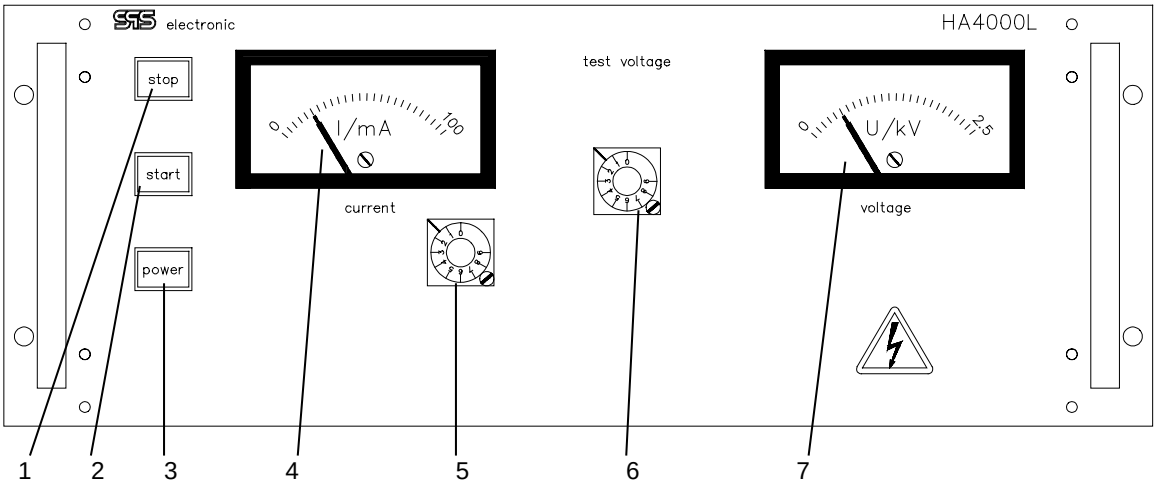
- High voltage test device for system use
- plug-in unit 19" / 4 HU
- potential free output voltage
- potential free interface:
  * measured data via analog signals
  * status signals via digital signals
- programmable via IEC bus (option IE 24)
- programmable via RS 232 or V24 (option IE 24)
- secondary acquisition of all measured values
- test voltage:
  * settable via front panel
  * via interface specification
  * programmable (option PA 5002L)
- electronic current release:
  * settable via front panel
  * programmable
- continuous power output 500VA
- integrated isolation amplifier with a test voltage of 15000 VAC for voltage and current
- displays for programmed parameters

4. Operation

4.1 Operation controls

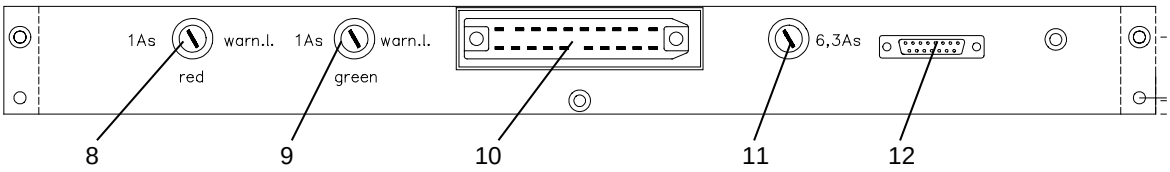
For the various display and control elements of test device HA 4000L, please see table of functions below.

4.1.1 Front panel



Pos	Denomination	Function
1	luminous key "stop"	breaking the high voltage generation via two separate circuits. This key is also used as **Emergency key**
2	luminous key "start"	set to switch-on position
3	luminous key "power"	switch-on of device
4	display "current"	display of actual current values in mA
5	scale(fixable) "current"	set max. release current
6	scale (fixable "test voltage"	set test voltage
7	display "test voltage"	display of actual voltage values in kV

4.1.2 Back panel



Pos	Denomination	Function
8	fuse	protection for external red warning lamp (1 As)
9	fuse	protection for external green warning lamp (1 As)
10	mains and control interface	mains connection (pin configuration, please see chapter 5.4.2)
11	fuse	device fuse (6.3 As)
12	control interface	connection possibility for control (pin configuration, please see chapter 5.4.3)

4.2 How to switch on device

The high voltage test device HA 4000L is switched to the position ready for operation via the mains switch "power" (3) on the front panel. The position ready for operation is indicated by the yellow "power" light (3) and the green "start" light (2).

While the device is in the position ready for operation no high voltage can be created according VDE 0104. For that, the test device has to be put into the switch-on position by pressing the key "start" (2).

The switch-on position can also be reached by the signal "set" of the control interface. The overriding control should activate the signal "set" for about 0.5 seconds before each high voltage testing.

The switch-on position is indicated by the following elements:

- yellow control light of key "power"
- red control light of key "stop"

Now the device is ready for the first test start.

4.3 How to set test voltage

The test voltage, which is necessary for high voltage testing, is set via the fixable scale "test voltage" (6) at the front panel of the test device. Graduation 0 - 10 is equivalent to a test voltage from 0 to 2500 VAC. The set voltage value can be locked via a setscrew.

4.4 How to set release current

The max. permissible leakage current is set via the fixable scale "current" (5). The graduation 0 - 10 is equivalent to a leakage current from 0 to 100 mA. The set leakage current can be fixed via the scale.

5. Technical information

5.1 Dimension, weight, and capacity

Dimension

Width:	464 mm
Depth:	310 mm
Height:	195 mm (= 19" / 4 HU)

Weight

Gross:	172 N

Mains supply

phase:	L, X1/a9
neutral:	N, X1/a8
protective wire:	PE, X1/a0
voltage:	230 V ± 10 %
frequency:	50 - 60 Hz
current:	max . 6 A
fuse:	6.3 A slow

Mains supply is only used for generation of auxiliary voltage and creation of test voltage.

Warning light RED

phase:	L1LA, X1/a6
neutral:	LAon, X1/b7
voltage	230 V ± 10 %
frequency:	50 - 60 Hz
current:	max . 1 A
fus:	1 A slow

The voltage applied here is equivalent to the mains supply. Signal is active when the device is in the switch-on position.

Warning light GREEN

phase:	L1LA, X1/a6
neutral:	LAout, X1/a7
voltage:	230 V ± 10 %
frequency:	50 - 60 Hz
current:	max . 1 A
fuse:	1 A slow

The voltage applied here is equivalent to the mains supply. Signal is active when the device is **not** in the switch-on position

Measurement voltage

range 1 0 - 2.5 kVAC
scale 105 degrees
class 1.5
via active isolation amplifier potential free

Measurement current

range 1: 0 - 100 mAAC
scale 105 degrees
class 1.5
via active separation amplifier potential free

Output voltage

range:	0 - 2500 Veff
distortion factor:	< 5 %
frequency:	equivalent to test voltage supply
potential:	equivalent to test voltage supply, otherwise potential free

Output current

range:	0 - 100 mAeff
distortion factor:	< 5 %
frequency:	equivalent to test voltage supply
potential:	equivalent to test voltage supply, otherwise potential free

5.2 Fuses

Device fuses

ATTENTION ! DANGER OF LIFE !
Please pull mains plug before opening the device.

main fuse:	6.3 A slow
external warning lamp set	230 V / 1 A

The device fuses are located at the back panel of the plug-in unit.

Electronic fusing

range:	100 mA
pre-arcing time:	20 ms
circuits:	2 separate circuits

5.3 Control signals

5.3.1 General

All analog signals are potential free in regard to the digital signals, mains voltage, supply voltage, and test voltage.

Digital input signals

voltage:	10 VDC - 30 VDC
internal resistance:	> 1 kOhm
ripple:	max 10 %
active:	at input signal, positive logic

Digital output signals

potential free relay contact

voltage:	max. 230 VAC
current:	max. 1 A
active:	if condition is met

Analog output signals

voltage:	standardized to 0 - 10 VDC
current:	max. 1 mA
function:	signal specific
reference potential:	GNA

5.3.2 Digital input signals

Signal	Function
set signal "set" (X1/b3 and X2/2)	During active signal the device is set to mode "set (switch-on position)" This signal has to be created after each switching on and after each high voltage error. If the device is already set, the signal is without effect, so that the signal can be created cyclical after each test step. An impulse of 50 mse duration is sufficient.
start signal "start" (X1/b2 and X2/10)	If the device is in switch-on position, a high voltage is created as long as a signal is given. The connection or disconnection takes place during the zero cycle.

5.3.3 Digital output signals

Signal	Function
error "F" X1/a1, X1/b1, X2/4 and X2/5)	If the leakage current exceeds the set threshold during high voltage test, the test device breaks the high voltage and gives the message high voltage error via error contact.

5.3.4 Analog output signals

Signal	Function
signal "AGU" (X2/14)	A low voltage can be taken out, proportional and potential free to the high voltage. 10 VDC is equivalent to 2500 VAC. Reference potential GNA.
signal "AGI" (X2/7)	A low voltage can be taken out, proportional and potential free to the leakage current. 10 VDC are equivalent to 100 mA. Reference potential GNA.

5.4 Interface configuration

5.4.1 High voltage connection

Faston 6.3 mm on high voltage transducer Wdl 201.

Denomination	Pin	Configuration
HVL		high side high voltage
HVN		low side high voltage

! Only the "low" connection (no brushing against protective wire) of the high voltage can be connected to the protective wire. Earthing on the "high" side (red point at high voltage transducer Wdl 201) results compulsorily in destruction !

5.4.2 Plug-in interface X1

Design according DIN 41622 (20 pole plug)

Denomination	Pin	Configuration
PE	a0	protective wire connection
L in	a9	mains phase (230 VAC ± 10% max. 4 A)
N in	a8	neutral wire of mains supply
L1LA	a6	reference potential for warning lights
LAon	b7	connection for warning lights (red)
LAout	a7	connection for warning lights (green)
+UN	a2	voltage supply for external contacts
F.	a1	contact high voltage error
F.	b1	contact high voltage error
Set	b3	set signal for switch-on position
Start	b2	start signal test device

5.4.3 Control interface X2

Type: 15 pole D-Sub, plug

Denomination	Pin	Configuration
Set	2	set signal for switch-on position
F.	4	contact high voltage error
F.	5	contact high-voltage error
AGI	7	analog signal leakage current, standardized from 0 - 10 VDC
GNA	8	mass analog signals
Start	10	start signal
M	12	mass digital signals
AGU	AGU	analog signal test voltgae, standarized from 0 - 10 VDC

6. Appendix

6.1 Service address

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6.2 Important regulations and standards

Regulation for preventing accidents	"general regulations" (VGB 1)
Regulation for preventing accidents	"electric plants and electrical equipment" (VGB 4)
Regulation for preventing accidents	"first aid" (VGB 109)
DIN VDE 0101	"erection of power installations with rated voltages exceeding 1 kV"
DIN VDE 0104	"electrical test equipment with voltages exceeding 1 kV"
DIN VDE 105 part 1	"operation of power installations - general requirements"
DIN VDE 106 part 1	"classification of electrical and electronic equipment protection agains electric shock"
DIN 40 008 part 3	"safety signs for electrical engineering, warning signs and additional signs"
DIN 40 050	"IP-degrees of protection provided by enclosures; -protection of electrical equipment against contact, foreign bodies and water"

6.3 Terms of guarantee

Guarantee period
12 months after delivery

Conditions for a guarantee claim
1. The high voltage test device HA 4000L must have been put into operation by qualified personnel at the customer's.
2. Inspections must be carried out regularly (once a year) and thoroughly (by SPS electronic GmbH).
3. Defective or worn parts have to be replaced immediately. The operation of such parts is forbidden for safety reasons.
4. Defective parts, subject to guarantee claims, have to be sent to SPS electronic GmbH for inspection.
5. Defects occurred must be reported to SPS electronic GmbH immediately.

Beginning of guarantee period
Guarantee starts with the date of delivery note.

Guarantee
SPS electronic GmbH guarantees a good function of the high voltage test device, a conscientious and professional design and manufacture as well as the use of high-quality material.

All parts are being replaced free of charge if parts became defective or useless during the guarantee period due to the use of inadequate material, manufacturing faults or an imperfect engineering.

Excluded from guarantee
1. Damages due to outside influences, above all because of handling malpractices or of local conditions.
2. Damages at devices from which the serial number has been removed, destroyed or falsified.
3. Wear parts, such as fuses, signal bulbs, etc.