

# EG-Konformitätserklärung

## EC Declaration of Conformity

Wir / we:

**SPS electronic GmbH**  
**Blätteräcker 18**  
**D-74523 Schwäbisch Hall**

erklären hiermit, daß das nachfolgende genannte Gerät den einschlägigen grundlegenden Sicherheitsforderungen der EG-Richtlinie entspricht.

declare, that the following unit complies with all essential safety requirements of the EC Directive.

Geräteart: Isolationsprüfgerät  
Description of device: Insulationtester

Typ: I 4000 L  
Type:

### EG Richtlinien / EC Directives:



EG Maschinenrichtlinie 89/392/EWG mit Änderungen  
EC Directive for machinery 89/392/EEC with amendments



EG Niederspannungsrichtlinie 73/23/EWG  
EC Directive for low voltage 73/23/EWG



EG Richtlinie Elektromagnetische Verträglichkeit 89/336/EWG mit Änderungen  
EC Directive electromagnetic compatibility 89/336/EWG with amendments

Angewandte harmonisierte Normen:  
Applicable harmonized standards:

- EN 60204, EN 60555, EN 55014

Angewandte nationale Normen und technische Spezifikationen:  
Applicable national standards and technical specifications:

- DIN VDE 0104

12.02.1996

Datum/date

**SPS** electronic  
SPS electronic GmbH  
Blätteräcker 18 • 74523 Schwäbisch Hall-Sulzdorf  
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Unterschrift/sign

Dieser Konformitätserklärung unterliegt grundsätzlich nur das von uns gelieferte oder in Betrieb genommene Gerät.  
Für Änderungen und Erweiterungen ist der Betreiber verantwortlich und damit für die Sicherstellung der Übereinstimmung der veränderten Anlage mit der betreffenden EG-Richtlinie.

Insulation tester  
 =====

I 4000A series  
 =====

O p e r a t i n g m a n u a l - Table of contents  
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\*\*\*\*\*  
 \*  
 \* The devices may only be put into operation by \*  
 \* skilled workers or specially instructed persons. \*  
 \*  
 \* Safety regulations (VDE) must be observed ! \*  
 \*  
 \*\*\*\*\*

<b>Introduction</b>	<b>1.0</b>
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<b>Safety precautions</b>	<b>1.1</b>
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Safety Precautions

1.1

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Insulation Tester I 4000A  
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The devices may only be put into operation by skilled workers or specially instructed persons.

Safety regulations (VDE) must be observed!

Device fusing:  
-----

The main fuse is located at the back panel of the plug-in unit (4 A slow blow)(1).

Only a faulty operation will set the fuses off, according to DIN\* (5 x 20).

Caution: Pull out mains connector before opening device!

-----  
Following structural components are separately fused on the bus  
-----

- a) complete device (without instruments)  
with Si1 = 2 At (Tr)  
failure control: power light off  
light "ready" off
  
- b) instruments  
with Si2 = 1 At (instr.)  
failure control: instruments dark

\* German Industrial Standards

Notes on the Use of  
the Operating Manual

1.2

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The operating manual ist divided up into sections.

Each section (1 ... 3) is a complete unit, which has a table of contents as the first page.

Presentation of text and pictures has been carried out separately.

The text is printed on DIN\* A4 pages, the pictures are printed on DIN\* A3 pages in the appendix.

The abridged manual (section 2.1) enables the user to put the device into operation quickly.

A detailed description is located in section 2.2:

"Operating modes".

The appendix is reserved for skilled personnel.

This section includes the technical details and drawings.

\* German Industrial Standards

Device Series

1.3

Type	Construction Type	Equipment
I 4000A	19" / 4 HE	manual test system
I 4000L	19" / 4 HE	used in automatic test systems

Legal Provisions

1.4

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All indications and notes for operation, maintenance and repair are given to the best of our knowledge and in full consideration of all of our experience up to now.

We are liable, within the bounds of the guarantee obligations listed in the confirmation of order, for eventual faults or omissions. Any further claims are barred.

Claims for damages are excluded, no matter which legal grounds such claims are based on.

Translations are also carried out to the best of our knowledge.

Unfortunately, we cannot accept any liability for wrong translations, even if the translation is carried out by us or by our order.

The only authoritative text is the German text, which can be obtained from us on request.

The presentation of text and drawings is not necessarily in accordance with the delivery after the confirmation of order.

The drawings are not always presented in the scale indicated.

These operating instructions for an SPS - device or for SPS - devices are to be treated confidentially.

They are provided for the exclusive use by authorized persons in your firm.

The transfer to third persons is forbidden and causes liability to pay damages.

SPS electronic  
Blätteräcker 18  
D-7170 Schwäbisch Hall - Sulzdorf

Tel.: (07907) 878-0  
Fax : (07907) 1770 or 878-10  
Ttx : (17)790714 = SPSelec

=====

The duration of the guarantee period is 6 months after delivery.

The SPS-guarantee will be fulfilled, provided that:

- a) the devices be put into operation by specialists at the customers.
- b) regular inspections be carried out properly and with specified intervals; that parts subject to normal wear be replaced in time.

Any faults occurring must be reported to SPS immediately.

- c) the appropriate connection lines leading up to the device be installed by the buyer before the putting into operation. (These tasks are not a part of the delivery).

The guarantee period begins from the date on the device's delivery note.

SPS guarantees the good performance, careful and competent workmanship and production, and the use of A-1 materials.

The terms of the guarantee also cover the parts of the devices delivered to the seller by sub-suppliers.

The guarantee does not cover parts subject to special wear, such as fuses, control lamps, etc.

During the guarantee period, the terms of the guarantee will take effect in such a way that any parts which are found to be faulty or fail due to the use of unsuitable materials, unsuitable production methods or faulty construction will be replaced free of charge on request by SPS.

This will occur on the condition that the defective parts be sent to SPS for examining after the exchange.

Application	2.0
-----	
Abridged manual	2.1
Control - and operating elements	2.2
Possible applications	2.3

Abridged Manual

2.1

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Insulation tester I 4000A

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The devices may only be put into operation by skilled workers or specially instructed persons.

Safety regulations (VDE) must be observed when using high voltage!

\*\*\*\*\*

A) Read over section 1.1 "Safety precautions" carefully.

The measures described are for your safety.

B) Abridged Data:

-----

- plug-in unit 19" / 4 HE
- integrated micro processor (SAB 8085).  
Enables simple customized adaptations within the process.  
(surcharge)
- digital display instruments für test voltage, nominal voltage, resistance, resistance limit value and test time.
- measuring range from 1 MOhm to 2000 MOhm
- safety current limitation on 10 mA, however, through control loop no break-down of test voltage possible.
- controlled output voltage.
- adjustable voltage from 200 VDC to 5000 VDC.
- 12 Bit accuracy of all internal measuring systems for currents and voltages.

- measuring technique without compromise
- adjustable test time from 1,5 seconds to 100 seconds.
- adjustable limit value for insulation resistance from 1 MOhm to 2000 MOhm.

Note

```
*****
*
* - The negative terminal of the device is located
*   on the protective wire. Please consider during
*   measuring.
*
* - In order to avoid device resp. system problems
*   of a unit the usage of high frequency throttles
*   is recommended. Small inductivities are suffi-
*   cient, located as close as possible to the
*   U.U.T.*
*
*****
```

C) Mains connection: - Insert mains cable in the cold appliance socket (22) (housing back panel) then in the mains socket (220 V; 50 Hz).

D) Connect test pistols (SP 02) (2 pieces): insert plugs (23, 24) in the sockets (2, 3) and tighten the cap nuts.

- The polarity does not matter due to the use of a.c. voltage.
- If d.c. voltage, the "positive" terminal at the socket (2) and the "negative" terminal at the socket (3)

\* Unit Under Test

E) Test procedure:  
-----

E.0) General  
-----

- The U.U.T.\* is applied with the pre-selected nominal voltage at the potentiometer "Uset" (11) - the test voltage is displayed at the instrument "test voltage / kVDC" (17).
- The resistance is measured and compared with the pre-selected nominal value at the potentiometer "Rmin" (13).
- If the measured resistance value is below the nominal value, an insulation fault exists.
- If the measured resistance value is above the nominal value, a good case exists.

E.1) Manual Start / Stop  
-----

- start the test with switch "Start" (14)
- light "test" (9) lights
- good case : light "pass" (6) lights
- fault case: light "fault" (7) lights
- test is stopped by pressing switch "Start"

E.2) Test with programmed test time  
-----

- start the test with key "Start (t)" (14)
- light "test" (9) lights
- good case : \* light "pass" (6) lights  
\* light "end" (10) lights  
\* light "ready" (8) lights
- fault case: \* stop test  
\* buzzer sounds  
\* light "fault" (7) lights  
\* light "end" (10) lights  
\* acknowledgement with key "fault" (7)

F) Protective contact

- If delivery of the device within the housing the protective contact is closed.

If the protective contact is not closed, the device cannot be put into operation.

A.) General

The device I 4000A is equipped with display- and operating elements on the front panel.

B.) Light "fault" (7)

If the programmed limit value for the insulation resistance falls below, this light is active. The integrated key enables acknowledgement of faults resp. errors.

C.) Light "pass" (6)

This signal is active, if the limit value for the resistance is exceeded.

D.) Light "error" (5)

If a test is initiated and no correct test is possible, this light becomes active. This is the case, if the test voltage is not directly connected with the U.U.T.\*, or an internal interference exists. The integrated key has the same function as for the light-/key-combination "fault".

E.) Light "power" (4)

Switch combination "power". Mains switch with integrated control lamp.

F.) 3 1/2-digit digital instrument "resistance / MOhm" (18)

In digital form the measured U.U.T.\* resistance is displayed in the range of 1 MOhm to 2000 MOhm. By pressing of key "Rmin/MOhm" (16) the programmed limit value is displayed on the instrument. If the key "time x 0,1/s" (15) is pressed the programmed test time in seconds is displayed on the instrument (1,5 - 100 seconds).

\* Unit Under Test

G.) Key "Rmin / MOhm" (16)

By pressing of this key the display of the programmed limit value "resistance / MOhm" appears on the instrument. (only active in mode "ready").

H.) Key "time x 0,1/s" (15)

By pressing this key the display of the programmed test time "resistance / MOhm" appears on the instrument (only active in mode "ready").

I.) Light diode "O.V." (19)

If the measuring unit has exceeded its limit values, the signal overflow is released. This is possible if the resistance of the U.U.T.\* is too low or too high, or if the voltage range of the U.U.T.\* has been exceeded.

J.) Light "ready" (8)

If the test device for a new test cycle is ready, the protection contact and the thermo contact (internal) closed, as well as none of the functions "Rmin/MOhm", "time x 0,1/s" and "Uset/kVDC" is set, then this light is active.

K.) Light "test" (9)

The test device works a programmed test cycle.

L.) Light "end" (10)

A test procedure has been ended.

M.) 3 1/2-digit digital instrument "test voltage / kVDC" (17)

The momentarily impressed voltage at the U.U.T.\* is displayed. By pressing key "Uset / kVDC" the programmed nominal voltage is displayed (only active in mode "ready").

N.) Key "Uset / kVDC" (20)

If this key is pressed the display "test voltage / kVDC" of the programmed nominal value for the test voltage is displayed at the instrument (only active in mode "ready").

\* Unit Under Test

0.) Light diode "set  $\neq$  true" (21)

If the programmed nominal value is different from the actual value of the voltage within certain limits, this light diode ist active.

Possible Application

2.3

-----  
Insulation test device I 4000A  
-----

Application

The insulation test devices of series I 4000 can be applied, wherever highest standards are a must in programming, flexibility, self-assurance and most precise measuring. A micro processor, especially developed for this test device, controls and monitors all functions of this device.

For the control circuit and for the test voltage two identical, however, completely independent measuring circuits are available.

Because of a safety current limitation, connected with short turn-off times, the U.U.T.\* is strained to a minimum during a fault case.

\* Unit Under Test

<b>Appendix</b>	<b>3.0</b>
-----	
<b>Data sheets</b>	<b>3.1</b>
<b>Drawings</b>	<b>3.2</b>

Data Sheets

3.1

A. Power supply

General

voltage : 220 V +/- 10 %  
frequency : 50 Hz to 60 Hz  
power : max. 4 A  
fuse : 4 At on the back-panel of the  
plug-in unit "power 4 At"

Function	Denomination	plug-in unit(X1)	housing (X1)
phase	L	1	corresponding to the norm for cold devices plug connec- tions
neutral	N	2	
protective wire	PE	PE	

B. Test Voltage

General

voltage : max. 5000 VDC  
current : safety limited to  
max. 10 mADC in short circuit

C. Dimensions

width : 464 mm  
depth : 370 mm  
height : 177 mm (= 19" / 4 HE)  
weight : gross 147 N

Function	Denomination	plug-in unit (front panel)
positive test voltage	+	HV-sockets
negative test voltage	-	

Schwäbisch Hall, Jan. 1, 1990

Spare-parts list no. 36 for I 4000L insulation testers

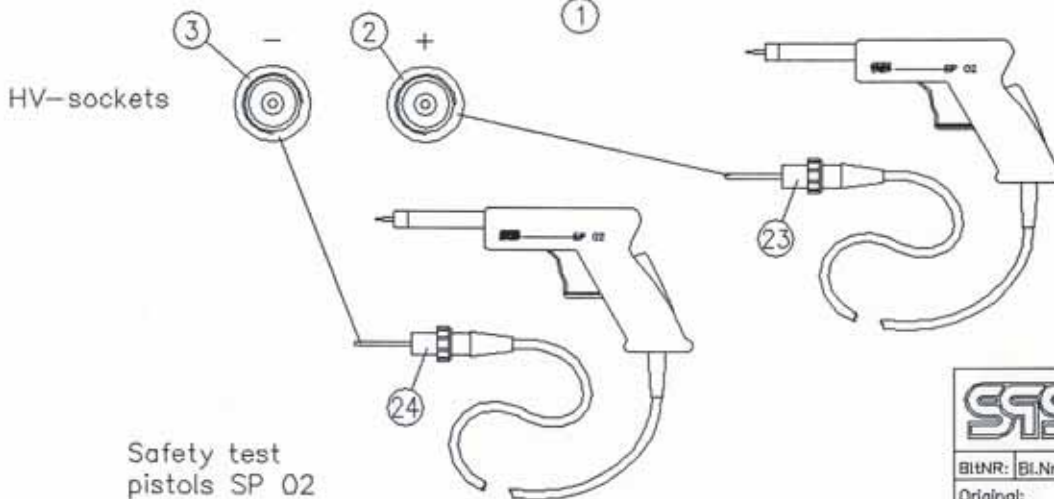
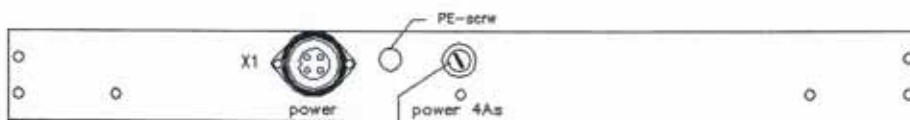
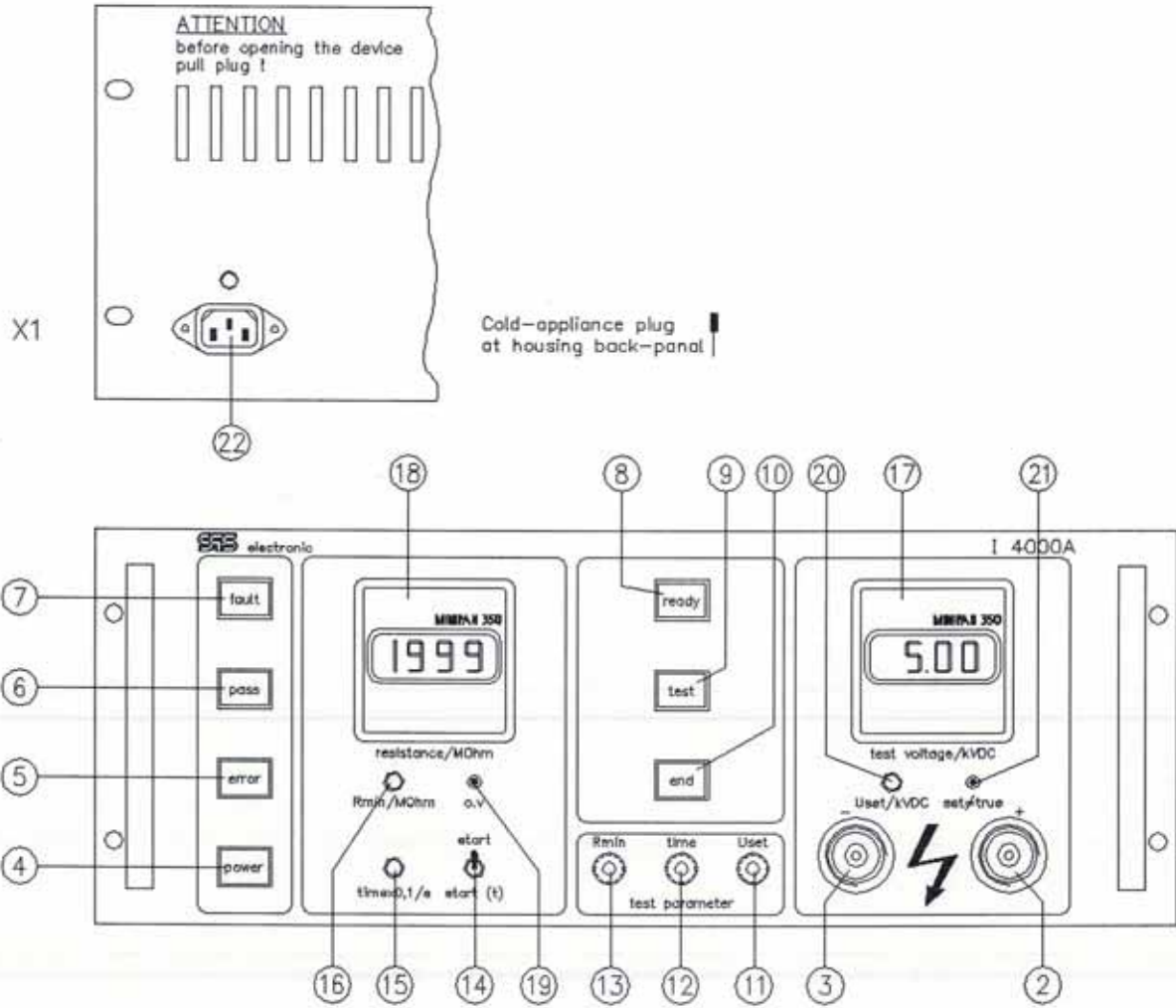
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P = priority (1=very important)    System no. :  
L = delivery period                    Feature :  
MS = minimum quantity  
MI = amount in device  
PI = price index

Item no!	Item	!Type	!P!	L!	MS!	MI!	PI !
XXXXXX	Complete plug-in unit	I 4000L	3	8	1	1	3870
890037	Jack mains supply	BU 04-R	3	4	1		9
890034	Free connector interface	ST 15-D	3	4	1		6
830352	Free connector interface	ST 25-D	3	4	1		8
890025	Complete plug-in housing	EH 1904L	3	8	1		759
830331	HV-free connector 4-pin	ST 04-LEMO	3	8	1		140
830330	HV-panel jack 4-pin	BU 04-LEMO	3	8	1		91
830401	Free connector 10-pin	ST 10-HARD	3	4	1		9
830403	Panel jack 10-pin	BU 10-HARD	3	4	1		10
830400	Free connector 16-pin	ST 16-HARD	3	4	1		10
830402	Panel jack 16-pin	BU 16-HARD	3	4	1		13
840060	Digital instrument 199,9	ZM 35/10VDC/199,9	2	8	1	1	110
840062	Digital instrument 5,00	ZM 35/10VDC/5,00	2	8	1	1	110
890175	Instrument transformer V/I	WD 40	2	8	1	1	289
890176	HV-rectifier	GL 40	2	8	1	1	487
850014	Mains transformer	I 45	2	4	1	1	51
850013	HV-transformer	I 40	2	8	1	1	67
810152	Rectifier	B 125/110-10	2	4	1	2	5
820410	Capacitor Elko	4700uF/100V	2	4	1	2	13
890150	Central processing unit	CPU 25	2	8	1	1	554
890135	Input/output negative	EG 85	2	8	1	1	134
890177	Input/output positive	EG 87	2	8	1	1	189
890136	Output driver PNP	AGT 85	2	8	1	1	140
890178	Control	RU 40	2	8	1	1	653
890179	Supply	VS 40	2	8	1	1	220
890180	Power amplifier	PA 40	2	8	1	1	330
890181	Isolating amplifier	TV 48	2	8	1	1	420
890182	Isolating amplifier	TV 49	2	8	1	1	389
860057	HV relay 2*C-0,12VDC/0,5A	860057	1	2	1	1	33
840021	Switch	2*ON Rafi	1	2	1	1	8
840019	Pushbutton	1*ON Rafi	1	2	1	2	7
840032	Light	Rafi	1	2	1	5	2
840009	Pushbutton	1*CHANGE-OVER	1	2	1	4	4
810137	Built-in LED	3 mm/red	1	2	10	2	1
840018	Incandescent bulb	30V	1	2	5	1	1
840017	Incandescent bulb	24V	1	2	5	6	1
820470	Fuse	4 A slow-blow	1	2	10	1	1

- All prices, which aren't listed, according to the valid price index.
- Offer firm for 6 months, after which prices are subject to change.
- There will be a DM 25,- surcharge on all orders under DM 250,-.
- Delivery ex works, 30 days net.

# Operating Manual Insulation Tester



Safety test pistols SP 02

Layer  
Text deutsch:-- deutsch  
Text engl:----- engl

<b>SFS</b> electronic				
Bltnr:	Bl.Nr.	Zeichner:	Datum:	AuftragNR:
Original:		A. Straub	23.02.1990	I 4000A
Projektleiter:				
Projekt:	Bedienungsanleitung I 4000A			

Isolationsprüfgerät I4000L/A

Fehler und Messgrenzen kleinste Widerstände

RBG	=	Begrenzungswiderstand	=	600 kOhm
RX	=	Prüflingswiderstand		
UPr	=	Prüfspannung am Prüfling		
U <sub>soll</sub>	=	Leerlaufspannung am Ausgang des Geräts		
RMU	=	Innenwiderstand der Spannungsmessung	=	100000 kOhm
IK	=	Kurzschlussstrom am Ausgang des Geräts		
RMI	=	Innenwiderstand Strommessung	=	10 kOhm
I	=	gemessener Strom (RMI als Messwiderstand)		
IRX	=	Strom durch Prüfling		
RXA	=	Angezeigter Messwert des Geräts		
UQ	=	Quellenspannung		

Für den max. Kurzschlussstrom am Ausgang des Geräts ergibt sich:

$$IK = \frac{U_{Qmax}}{RBG} = \frac{6000 \text{ V}}{600 \text{ kOhm}} = 10 \text{ mA}$$

Für den Strom durch den Prüfling ergibt sich :

$$IRX = I = \frac{UPr}{RMU} = I = \frac{UPr}{100 \text{ MOhm}}$$

Für den Prüflingswiderstand ergibt sich:

$$RX = \frac{UPr}{I - UPr/100MOhm}$$

Grenzwerte des Geräts für die kleinstmöglichen Widerstände

Parameter : Prüfspannung UPr  
Gerätekonstante : Strommessbereich = 0,001 A 1 mA  
Fehler bei 0,1% : ohne Bedeutung

RX<sub>Amin</sub> =  $\frac{UPr}{1mA - UPr/100MOhm}$  Die Grenze wird durch den Strommessbereich von max. 1mA bestimmt

UPr/VDC	RXmin /MOhm
0	0,0
50	0,0
100	0,1
150	0,2
200	0,2
250	0,3
300	0,3
350	0,4
400	0,4
450	0,5
500	0,5
550	0,6
600	0,6
650	0,7
700	0,7
750	0,8
800	0,8
850	0,9
900	0,9
950	1,0
1000	1,0
1050	1,1
1100	1,1
1150	1,2
1200	1,2
1250	1,3
1300	1,3
1350	1,4
1400	1,4
1450	1,5
1500	1,5
1550	1,6
1600	1,6
1650	1,7
1700	1,7
1750	1,8
1800	1,8
1850	1,9
1900	1,9
1950	2,0
2000	2,0
2050	2,1
2100	2,1
2150	2,2
2200	2,2
2250	2,3
2300	2,4
2350	2,4
2400	2,5
2450	2,5
2500	2,6
2550	2,6
2600	2,7

Fehler und Messgrenzen kleinste Widerstände  
Isolationsprüfergerät I 40001/A

2650	2,7
2700	2,8
2750	2,8
2800	2,9
2850	2,9
2900	3,0
2950	3,0
3000	3,1
3050	3,1
3100	3,2
3150	3,3
3200	3,3
3250	3,4
3300	3,4
3350	3,5
3400	3,5
3450	3,6
3500	3,6
3550	3,7
3600	3,7
3650	3,8
3700	3,8
3750	3,9
3800	4,0
3850	4,0
3900	4,1
3950	4,1
4000	4,2
4050	4,2
4100	4,3
4150	4,3
4200	4,4
4250	4,4
4300	4,5
4350	4,5
4400	4,6
4450	4,7
4500	4,7
4550	4,8
4600	4,8
4650	4,9
4700	4,9
4750	5,0
4800	5,0
4850	5,1
4900	5,2
4950	5,2
5000	5,3

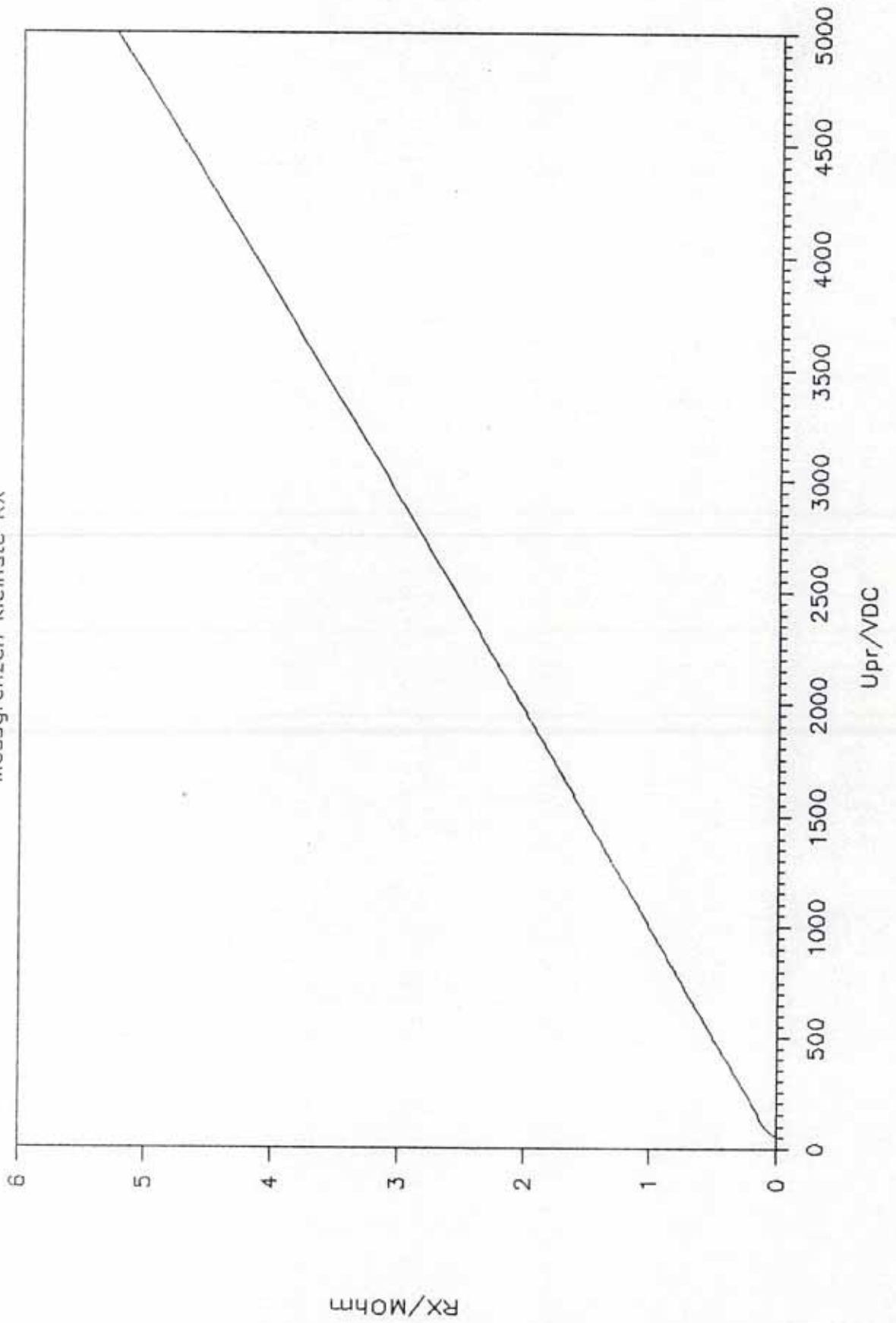
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SPS electronic  
7170 Schwäb. Hall  
Tel 07907/878-0  
FAX 07907/1770

Fehler und Messgrenzen kleinste Widerstände  
Isolationsprüfergerät I 40001/A

# Isolationsprüfgerät I4000L (i4000104)

Messgrenzen kleinste RX



Isolationsprüfgerät I4000L/A

Fehler und Messgrenzen durch Auflösung der Strommessung

RBG	=	Begrenzungswiderstand	=	600 kOhm
RX	=	Prüflingswiderstand		
UPr	=	Prüfspannung am Prüfling		
UQ	=	Quellenspannung		
RMU	=	Innenwiderstand der Spannungsmessung	=	100000 kOhm
IK	=	Kurzschlussstrom am Ausgang des Geräts		
RMI	=	Innenwiderstand Strommessung	=	10 kOhm
I	=	gemessener Strom (RMI als Messwiderstand)max. Messbereich		
IRX	=	Strom durch Prüfling		
U <sub>soll</sub>	=	Leerlaufspannung des Geräts		
RXA	=	Angezeigter Messwert des Geräts		

Für den max. Kurzschlussstrom am Ausgang des Geräts ergibt sich:

$$IK = \frac{U_{Qmax}}{RBG} = \frac{6000 \text{ V}}{600 \text{ kOhm}} = 10 \text{ mA}$$

Für den Strom durch den Prüfling ergibt sich :

$$IRX = I = \frac{UPr}{RMU} = I = \frac{UPr}{100 \text{ MOhm}}$$

Für den Prüflingswiderstand ergibt sich:

$$RX = \frac{UPr}{I - UPr/100 \text{ MOhm}}$$

Grenzwerte des Geräts durch Systembedingte Messfehler

Parameter	:	Prüfspannung	UPr	
Gerätekonstante	:	Strommessbereich	= 0,001 A	= 1mA
Fehler bei 0,1%	:	Spannung +/-	5 V	
	:	Strom +/-	0,000001 A	= 1uA

Funktion : I = UPr/100MOhm + UPr/RX plus Messfehler +1uA

$$I = UPr/100MOhm + UPr/RX + 1uA \text{ da}$$

$$RX = \frac{UPr}{I - UPr/100MOhm} \text{ folgt}$$

UPr  
RXA= -----  
+1 uA + UPr/RX

SPS electronic  
7170 Schwäb. Hall  
Tel. 07907/878-0

RX/MOhm =	180	50	5
UPr/VDC	RXA/ MOhm	RXA/ MOhm	RXA/ MOhm
0	0,0	180,0	0,0
50	39,1	180,0	4,5
100	64,3	180,0	4,8
150	81,8	180,0	4,8
200	94,7	180,0	4,9
250	104,7	180,0	4,9
300	112,5	180,0	4,9
350	118,9	180,0	4,9
400	124,1	180,0	4,9
450	128,6	180,0	4,9
500	132,4	180,0	5,0
550	135,6	180,0	5,0
600	138,5	180,0	5,0
650	141,0	180,0	5,0
700	143,2	180,0	5,0
750	145,2	180,0	5,0
800	146,9	180,0	5,0
850	148,5	180,0	5,0
900	150,0	180,0	5,0
950	151,3	180,0	5,0
1000	152,5	180,0	5,0
1050	153,7	180,0	5,0
1100	154,7	180,0	5,0
1150	155,6	180,0	5,0
1200	156,5	180,0	5,0
1250	157,3	180,0	5,0
1300	158,1	180,0	5,0
1350	158,8	180,0	5,0
1400	159,5	180,0	5,0
1450	160,1	180,0	5,0
1500	160,7	180,0	5,0
1550	161,3	180,0	5,0
1600	161,8	180,0	5,0
1650	162,3	180,0	5,0
1700	162,8	180,0	5,0
1750	163,2	180,0	5,0
1800	163,6	180,0	5,0
1850	164,0	180,0	5,0
1900	164,4	180,0	5,0
1950	164,8	180,0	5,0
2000	165,1	180,0	5,0
2050	165,5	180,0	5,0
2100	165,8	180,0	5,0
2150	166,1	180,0	5,0
2200	166,4	180,0	5,0
2250	166,7	180,0	5,0
2300	166,9	180,0	5,0

2350	167,2	180,0	49,0	50,0	5,0	5,0
2400	167,4	180,0	49,0	50,0	5,0	5,0
2450	167,7	180,0	49,0	50,0	5,0	5,0
2500	167,9	180,0	49,0	50,0	5,0	5,0
2550	168,1	180,0	49,0	50,0	5,0	5,0
2600	168,3	180,0	49,1	50,0	5,0	5,0
2650	168,6	180,0	49,1	50,0	5,0	5,0
2700	168,8	180,0	49,1	50,0	5,0	5,0
2750	168,9	180,0	49,1	50,0	5,0	5,0
2800	169,1	180,0	49,1	50,0	5,0	5,0
2850	169,3	180,0	49,1	50,0	5,0	5,0
2900	169,5	180,0	49,2	50,0	5,0	5,0
2950	169,6	180,0	49,2	50,0	5,0	5,0
3000	169,8	180,0	49,2	50,0	5,0	5,0
3050	170,0	180,0	49,2	50,0	5,0	5,0
3100	170,1	180,0	49,2	50,0	5,0	5,0
3150	170,3	180,0	49,2	50,0	5,0	5,0
3200	170,4	180,0	49,2	50,0	5,0	5,0
3250	170,6	180,0	49,2	50,0	5,0	5,0
3300	170,7	180,0	49,3	50,0	5,0	5,0
3350	170,8	180,0	49,3	50,0	5,0	5,0
3400	170,9	180,0	49,3	50,0	5,0	5,0
3450	171,1	180,0	49,3	50,0	5,0	5,0
3500	171,2	180,0	49,3	50,0	5,0	5,0
3550	171,3	180,0	49,3	50,0	5,0	5,0
3600	171,4	180,0	49,3	50,0	5,0	5,0
3650	171,5	180,0	49,3	50,0	5,0	5,0
3700	171,6	180,0	49,3	50,0	5,0	5,0
3750	171,8	180,0	49,3	50,0	5,0	5,0
3800	171,9	180,0	49,4	50,0	5,0	5,0
3850	172,0	180,0	49,4	50,0	5,0	5,0
3900	172,1	180,0	49,4	50,0	5,0	5,0
3950	172,2	180,0	49,4	50,0	5,0	5,0
4000	172,2	180,0	49,4	50,0	5,0	5,0
4050	172,3	180,0	49,4	50,0	5,0	5,0
4100	172,4	180,0	49,4	50,0	5,0	5,0
4150	172,5	180,0	49,4	50,0	5,0	5,0
4200	172,6	180,0	49,4	50,0	5,0	5,0
4250	172,7	180,0	49,4	50,0	5,0	5,0
4300	172,8	180,0	49,4	50,0	5,0	5,0
4350	172,8	180,0	49,4	50,0	5,0	5,0
4400	172,9	180,0	49,4	50,0	5,0	5,0
4450	173,0	180,0	49,4	50,0	5,0	5,0
4500	173,1	180,0	49,5	50,0	5,0	5,0
4550	173,2	180,0	49,5	50,0	5,0	5,0
4600	173,2	180,0	49,5	50,0	5,0	5,0
4650	173,3	180,0	49,5	50,0	5,0	5,0
4700	173,4	180,0	49,5	50,0	5,0	5,0
4750	173,4	180,0	49,5	50,0	5,0	5,0
4800	173,5	180,0	49,5	50,0	5,0	5,0
4850	173,6	180,0	49,5	50,0	5,0	5,0
4900	173,6	180,0	49,5	50,0	5,0	5,0
4950	173,7	180,0	49,5	50,0	5,0	5,0
5000	173,7	180,0	49,5	50,0	5,0	5,0

Isolationprüfgerät I4000L  
Fehlertoleranzen (i4000i07)

