GOSSEN METRAWATT

KONSTANTER SPL Series
Programmable Electronic Load

3-349-701-03
3/10.16

- 4 operating modes: constant current, constant voltage, constant load, constant power
- High speed sequence and transient measurement, short-circuit proof, battery discharging and other auxiliary functions
- Programmable current rise and fall time, steep edges
- Several groups of parameters (device settings) and sequences (load profile) can be saved and retrieved.
- Floating power input / no grounding
- Safe electrical separation
- Input can be switched on and off.
- Voltage or current control is possible with constant power.
- Settings selected by means of rotary switch and keypad
- Multifunctional LCD panel
- Safety functions, amongst others adjustable power limiting
- Benchtop instrument, also suitable for mounting to a 19" rack

Applications

Series SPL electronic loads are high precision direct current sinks for use in research, product development, production, service and vocational training.
The devices are distinguished by a diverse range of functions and excellent regulating accuracy, as well as outstanding ease of operation.

Features

High levels of operating safety thanks to safety functions and special functions

A multitude of protection and additional functions have been integrated, for example:

- Limiting of the setting ranges for voltage and current with adjustable response delay and reaction
- Overcurrent protection (OCP)
- Overvoltage protection (OVP)
- Power limiting
- Overtemperature protection
- Protection of the electronic load in the event of polarity reversal
- A highly effective, intelligent cooling system reduces system temperature and results in increased power density.
- The input connector terminals are especially well suited for large test current values.

Multifunctionality

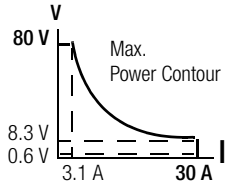
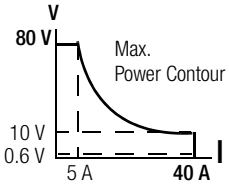
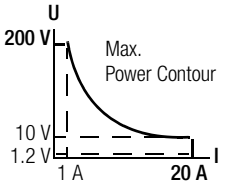
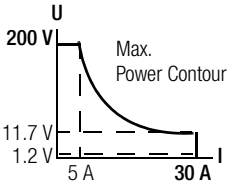
- Equipped with 4 basic operating modes: CC, CV, CR, CP
- Rapid transient measurement of the connected device under test with separate adjustment options for high/low level, rise and fall time
- Extensive sequential test functions with 10 µs as the smallest step rate and 100,000 s as the largest step rate. Cyclical addresses can be freely selected and one sequence can be combined with another, in order to create even more complex test procedures.
- Short-circuit test, battery discharge test and other auxiliary functions
- Remote sensor connector sockets and trigger connector socket are included. The instrument is automatically switched to sensing mode operation as soon as the remote sensors are connected.
- 10 groups of parameter settings can be saved to memory, and the default settings stored to RAM (location 0) are activated automatically when the instrument is switched on.
- SCPI support makes it easy to set up an automatic test equipment system (ATE) which communicates with other programmable devices via the RS 232 port or the optional GPIB interface.

Easy Operation

- Easy-to-configure sequence parameters in combination with extensive sequence editing functions
- Complete electronic calibration is possible without removing the slide-in unit.

KONSTANTER SPL Series
Programmable Electronic Load

Characteristic Values

Type	SPL 250-30	SPL 400-40	SPL 200-20	SPL 350-30
Article number	**K852A**	**K853A**	**K854A**	**K855A**
Input Ratings				
Front Load Input	1	1	1	1
Current	0 ... 30 A	0 ... 40 A	0 ... 20 A	0 ... 30 A
Voltage	0 ... 80 V	0 ... 80 V	0 ... 200 V	0 ... 200 V
Power [1]	250 W at 40 °C	400 W at 40 °C	200 W at 40 °C	350 W at 40 °C
Input Characteristics				
Minimum Operating Voltage @ Full Scale Current	0.6 V	0.6 V	1.2 V	1.2 V
Constant Current Mode (CC)				
Low Range (CCL)	0 ... 3 A	0 ... 4 A	0 ... 2 A	0 ... 3 A
Resolution	0.1 mA	0.1 mA	0.1 mA	0.1 mA
Accuracy	0.1% + 5 mA	0.1% + 5 mA	0.1 % + 5 mA	0.1 % + 5 mA
High Range (CCH)	0 ... 30 A	0 ... 40 A	0 ... 20 A	0 ... 30 A
Resolution	1 mA	1 mA	1 mA	1 mA
Accuracy	0.1% + 10 mA	0.1% + 10 mA	0.1 % + 10 mA	0.1 % + 10 mA
Constant Voltage Mode (CV)				
Range	0 ... 80 V	0 ... 80 V	0 ... 200 V	0 ... 200 V
Resolution	1 mV	1 mV	2 mV	2 mV
Accuracy	0.1% + 10 mV	0.1% + 10 mV	0.1 % + 25 mV	0.1 % + 25 mV
Constant Resistance Mode (CR)				
Low Range (CRL)	0.02 to 2 Ω	0.02 to 2 Ω	0.0666 ... 6.66 Ω	0.0666 ... 6.66 Ω
Resolution	0.1 mΩ	0.1 mΩ	0.1 mΩ	0.1 mΩ
Accuracy	0.5% + 12 mΩ @ I > 4 A	0.5% + 12 mΩ @ I > 4 A	0.5 % + 40 mΩ @ I > 3 A	0.5 % + 40 mΩ @ I > 3 A
Middle Range (CRM)	2 ... 200 Ω	2 ... 200 Ω	6.66 ... 666 Ω	6.6 ... 666 Ω
Resolution	8.6 µS [2]	8.6 µs	2.6 µS [2)]	2.6 µS
Accuracy	0.3% + 1.25 mS @ U > 8 V	0.3% + 1.25 mS @ U > 8 V	0.3 % + 375 mS @ U > 20 V	0.3 % + 375 mS @ U > 20 V
High Range (CRH)	20 ... 2000 Ω	20 ... 2000 Ω	66.6 ... 6660 Ω	66.6 ... 6660 Ω
Resolution	0.96 µs	0.96 µs	0.29 µS	0.29 µS
Accuracy	0.3% + 0.625 mS @ U > 8 V	0.3% + 0.625 mS @ U > 8 V	0.3 % + 188 µS @ U > 20 V	0.3 % + 188 µS @ U > 20 V
Constant Power Mode (CP)				
Range	0 ... 250 W	0 ... 400 W	0 ... 200 W	0 ... 350 W
Resolution @ P < 100 W	1 mW	1 mW	1 mW	1 mW
Resolution @ P ≥ 100 W	10 mW	10 mW	10 mW	10 mW
Accuracy	0.2% + 600 mW	0.2% + 600 mW	0.2 % + 600 mW	0.2 % + 600 mW
Current Measurement				
Low Range	0 ... 3 A	0 ... 4 A	0 ... 2 A	0 ... 3 A
Resolution	0.1 mA	0.1 mA	0.1 mA	0.1 mA
Accuracy	0.05% + 4 mA	0.05% + 4 mA	0.05 % + 4 mA	0.05 % + 4 mA
High Range	0 ... 30 A	0 ... 40 A	0 ... 20 A	0 ... 30 A
Resolution	1 mA	1 mA	1 mA	1 mA
Accuracy	0.05% + 8 mA	0.05% + 8 mA	0.05 % + 8 mA	0.05 % + 8 mA
Voltage Measurement				
Range	0 ... 80 V	0 ... 80 V	0 ... 200 V	0 ... 200 V
Resolution	1 mV	1 mV	1 mV	1 mV
Accuracy	0.1% + 8 mV	0.1% + 8 mV	0.1 % + 50 mV	0.1 % + 50 mV

Type	SPL 250-30	SPL 400-40	SPL 200-20	SPL 350-30
Article number	**K852A**	**K853A**	**K854A**	**K855A**
Power Measurement				
Range	0 ... 250 W	0 ... 400 W	0 ... 200 W	0 ... 350 W
Resolution @ P < 100 W	1 mW	1 mW	1 mW	1 mW
Resolution @ P ≥ 100 W	10 mW	10 mW	10 mW	10 mW
Accuracy	0.1% + 600 mW	0.1% + 600 mW	0.1 % + 600 mW	0.1 % + 600 mW
Current Slew Rates				
Range CCH	1 mA/µs ... 3 A/µs	1 mA/µs ... 4 A/µs	1 mA/µs ... 2 A/µs	1 mA/µs ... 3 A/µs
Range CCL [3]	100 µA/µs ... 300 mA/µs	100 µA/µs ... 400 mA/µs	100 µA/µs ... 200 mA/µs	100 µA/µs ... 300 mA/µs
Resolution	1 mA/µs	1 mA/µs	1 mA/µs	1 mA/µs
Accuracy [4]	3% + 10 µs	3% + 10 µs	3 % + 10 µs	3 % + 10 µs
Transient Operation				
Transient Mode	Continuous, pulse, toggled	Continuous, pulse, toggled	Continuous, pulse, toggled	Continuous, pulse, toggled
Frequency Range [5]	0.38 Hz ... 50 kHz	0.38 Hz ... 50 kHz	0.38 Hz ... 50 kHz	0.38 Hz ... 50 kHz
Highest/Lowest Time	0 ... 655.35 ms	0 ... 655.35 ms	0 ... 655.35 ms	0 ... 655.35 ms
Resolution	10 µs	10 µs	10 µs	10 µs
Accuracy	0.2% + 10 µs	0.2% + 10 µs	0.2 % + 10 µs	0.2 % + 10 µs
Rise/Fall Time	10 µs ... 655.35 ms	10 µs ... 655.35 ms	10 µs ... 655.35 ms	10 µs ... 655.35 ms
Resolution	10 µs	10 µs	10 µs	10 µs
Accuracy	0.2% + 10 µs	0.2% + 10 µs	0.2 % + 10 µs	0.2 % + 10 µs
List Characteristics (Sequence)				
Step Rate	10 µs ... 100,000 s	10 µs ... 100,000 s	10 µs ... 100000 s	10 µs ... 100000 s
Resolution	10 µs	10 µs	10 µs	10 µs
Accuracy	0.2% + 10 µs	0.2% + 10 µs	0.2 % + 10 µs	0.2 % + 10 µs
Number of Steps	1 ... 50	1 ... 50	1 ... 50	1 ... 50
Cycle	1 ... 65,535	1 ... 65,535	1 ... 65535	1 ... 65535
Storage Capacity	7 Lists	7 Lists	7 Lists	7 Lists
Expanded Functions	Chain	Chain	Chain	Chain
Battery Discharge				
Discharge Time	1 s ... 100 h	1 s ... 100 h	1 s ... 100 h	1 s ... 100 h
Resolution	1 s	1 s	1 s	1 s
Accuracy	0.2% + 1 s	0.2% + 1 s	0.2 % + 1 s	0.2 % + 1 s
Battery Capacity	1 mA ... 3000 Ah	1 mA ... 4000 Ah	1 mA ... 2000 Ah	1 mA ... 3000 Ah
Resolution	1 mAh	1 mAh	1 mAh	1 mAh
Accuracy	0.3% + 0.01 Ah	0.3% + 0.01 Ah	0.3 % + 0.01 Ah	0.3 % + 0.01 Ah
Short Circuit				
CCL Mode	3.3 A	4.4 A	2.2 A	3.3 A
CCH Mode	33 A	44 A	22 A	33 A
CV Mode	0 V	0 V	0 V	0 V
CRL Mode	0.0180 Ω	0.0180 Ω	0.06 Ω	0.06 Ω
CRM Mode	1.80 Ω	1.80 Ω	6 Ω	6 Ω
CRH Mode	18 Ω	18 Ω	60 Ω	60 Ω
CPV Mode	270 W	420 W	220 W	370 W
CPC Mode	0 W	0 W	0 W	0 W
Maximum Slew Rate				
Current	3 A/µs	4 A/µs	2 A/µs	3 A/µs
Voltage	0.6 V/µs	0.6 V/µs	0.6 V/µs	0.6 V/µs
Programmable Open Circuit	≥ 20 kΩ	≥ 20 kΩ	≥ 20 kΩ	≥ 20 kΩ
Trigger Input				
Trigger Level	TTL falling edge	TTL falling edge	TTL falling edge	TTL falling edge
Trigger Pulse Width	≥ 10 µs	≥ 10 µs	≥ 10 µs	≥ 10 µs
Maximum Input Levels				
Current	33 A	44 A	22 A	33 A
Voltage	84 V	84 V	210 V	210 V
Protection Features	OV, OC, OP, OT, RV	OV, OC, OP, OT, RV	OV, OC, OP, OT, RV	OV, OC, OP, OT, RV

KONSTANTER SPL Series
Programmable Electronic Load

Type	SPL 250-30	SPL 400-40	SPL 200-20	SPL 350-30
Article number	**K852A**	**K853A**	**K854A**	**K855A**
Reverse Current Capacity				
Input OFF	25 A	30 A	25 A	25 A
Input ON	40 A	50 A	35 A	40 A
Ripple and Noise				
Current (rms/p-p)	3 mA / 30 mA	3 mA / 30 mA	3 mA / 30 mA	3 mA / 30 mA
Voltage (rms)	5 mV	5 mV	12 mV	12 mV
Environmental Conditions				
Temperature	0 ... 50 °C	0 ... 50 °C	0 ... 50 °C	0 ... 50 °C
Relative Humidity	≤ 85%	≤ 85%	≤ 85%	≤ 85%
Remote Interface [6]	RS232, GPIB	RS232, GPIB	RS232, GPIB	RS232, GPIB
Programming Language	SCPI	SCPI	SCPI	SCPI
Mains Input				
Supply Voltage	AC 115 V / AC 230 V +10/–15%	AC 115 V / AC 230 V +10/–15%	AC 115 V / AC 230 V +10/–15%	AC 115 V / AC 230 V +10/–15%
Line Frequency	48 ... 63 Hz	48 ... 63 Hz	48 ... 63 Hz	48 ... 63 Hz
Dimensions	213 mm x 104 mm x 391 mm	213 mm x 104 mm x 391 mm	213 mm x 104 mm x 391 mm	213 mm x 104 mm x 391 mm
Dimensions with rubber protection	226 mm x 110 mm x 414 mm	226 mm x 110 mm x 414 mm	226 mm x 110 mm x 414 mm	226 mm x 110 mm x 414 mm
Net Weight	5.8 kg	5.8 kg	5.8 kg	5.8 kg
Gross Weight (rubber protection included)	Approx. 6 kg	Approx. 6 kg	Approx. 6 kg	Approx. 6 kg

[1] Maximum continuous power available is derated linearly from 100% of maximum at 40 °C, to 75% of maximum at 55 °C.

[2] Conductance (S) = 1 / Resistance (Ω).

[3] The set level is 10 times larger than the slew rate in CCL mode.

[4] The actual transition time is defined as the time required for the input to change from 10% to 90% or from 90% to 10% of the programmed excursion.

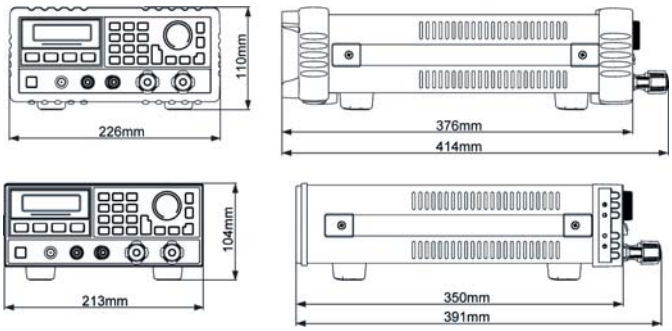
[5] Transient frequency depends on the time for high/low level and rising/falling edge.

[6] Full remote control via RS 232 with optional GPIB.

Data Interface

- Supports SCPI (standard commands for programmable instruments) and Labview, and can be operated with the required software.
- The firmware can be updated online.

Dimensions



Scope of Delivery

1 Benchtop instrument
1 Rubber protector
1 Condensed operating instructions
1 CD ROM with operating instructions (German and English) and Programming Guide (English)

Views

Font Panel with Rubber Protection

Rear Panel with Rubber Protection and Optional GPIB interface

Input Terminals

KONSTANTER SPL Series
Programmable Electronic Load

Order Information

Description	Type	Article Number
Single-channel electronic load with multifunctional digital display, with characteristic current, resistance, power and voltage curves, input: max. 80 V DC / max. 30 A / max. 250 W, supply power: 115/ 230 V AC 50/60 Hz, benchtop instrument also suitable for 19" rack mounting	KONSTANTER SPL 250-30	K852A
Single-channel electronic load with multifunctional digital display, with characteristic current, resistance, power and voltage curves, input: max. 80 V DC / max. 40 A / max. 400 W, supply power: 115/230 V AC 50/60 Hz, benchtop instrument also suitable for 19" rack mounting	KONSTANTER SPL 400-40	K853A
1 channel electronic load with digital multifunctional display, with current, resistance, power and voltage characteristic, Input max. 200 V DC / max. 20 A / max. 200 W, Line input 115/230 V AC 50/60 Hz, benchtop unit, suitable for 19" rack mounting	KONSTANTER SPL 200-20	K854A
1 channel electronic load with digital multifunctional display, with current, resistance, power and voltage characteristic, Input max. 200 V DC / max. 30 A / max. 350 W, Line input 115/230 V AC 50/60 Hz, benchtop unit, suitable for 19" rack mounting	KONSTANTER SPL 350-30	K855A
GPIB IEEE488 interface, plug-in interface for SPL electronic load	IEEE488 Interface	K890A
Option USB-Interface for SPL electronic load	USB-Interface	K891A

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