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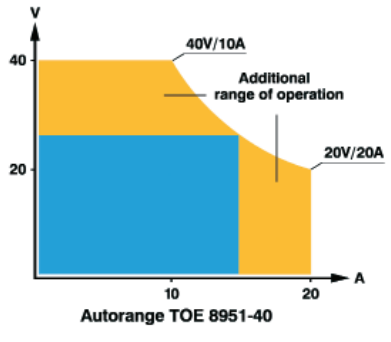
TOE 8951-40

Single-output and dual-output power supplies up to 400 W output power

TOE 8951
TOE 8952

Special features

- Automatic setting to the existing line voltage: 115 V or 230 V, 47 to 63 Hz
- Autoranging
- RS 232 and analog interfaces included as standard
- USB and GPIB interfaces optional
- Outputs at front and rear as standard
- On/off switching of the outputs
- ½ 19" width, 2 HU design → parallel installation possible
- Sensing
- Free LabView™ driver
- Can be used as constant voltage, constant current and constant power source (CV/CC/CP)



Autorange TOE 8951-40

Example: TOE 8951-40 (40 V / 20 A) compared to a standard power supply with 400 W output power.

Performance in absolute perfection

Convenient performance for your applications

The power supplies from the TOE 8950 range are suitable for applications associated with:

Research / development
Laboratory / testing / experiments
Production / test bays
Quality assurance
Service / training

400 W in compact design
The single-output and dual-output power supplies from the TOE 8950 range have an extremely compact design. As a result of the high efficiency of all units, the complete output power of 400 W is available without problem over wide voltage and current ranges at the front via safety sockets and at the rear via a screw-type terminal block.

Autoranging
Power supplies with autoranging can output their rated power over a wide and stepless range of voltage and current combinations.

Autoranging power supplies from TOELLNER have a significantly larger operating range than standard power supplies with the same output power.

Adjustment using incremental spinwheels
The output values are adjusted with a selectable resolution using wear-free incremental spinwheels, guaranteeing reliable and precise setting of all output parameters and operating functions even after many years of use.

Display
The set and measured values for voltage, current and power as well as the menu control functions are output on a 2-row LCD with 20 characters/row.

Highest degree of safety
is guaranteed for your applications by comprehensive protective measures: adjustable overvoltage protection, limit function, fast power OFF switching, polarity reversal protection, resistance to reverse current, various internal electronic monitoring functions.

Innovative sensing circuit
An innovative sensing circuit not only keeps the power supply to your load extremely constant, it even protects sensitive loads if there is a break in the sensor line. The sensing inputs are available at the rear.

Adjustable output power
The possibility for directly setting the power is a further exceptional feature of this series. The output power of 400 W with single-output power supplies or 2 x 200 W with dual-output power supplies can then be reduced down to 5 % of the maximum output power.

Single-output and dual-output power supplies up to 400 W output power

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Tracking mode
With dual-output power supplies, automatic tracking permits control of the output voltage of part 2 as a function (0 – 100 %) of part 1 with retention of all control properties.

Digital and analog interfaces

Digital: RS 232 / GPIB / USB
RS 232 and GPIB/USB (option) interfaces with the following scope of functions are available for communication between PC and power supply:
- Adjustment of output values: voltage, current and power
- OVP and limit adjustment, autocal function, display, store and recall settings
- Switching on/off of output voltage
- Reading of actual values as well as warning/fault states

The command syntax complies with the IEEE 488.2 standard. Standardized SCPI commands are processed.

Fast analog control
The power supplies can be controlled in analog mode; i.e. the output voltage and current can be adjusted independent of one another using externally applied control voltages.
Short adjustment times for the output voltage are implemented using balanced circuitry.
It is therefore possible to generate powerful and fast output signals without problem; up to approx. 700 Hz at 2 V_{pp}.

Interlock
By interrupting the interlock circuit, e.g. by an external emergency stop switch, the power supply output becomes de-energized directly.

Output ON/OFF
A convenient feature is the output switch-off function which at standby permits immediate reduction of the voltage and current values to 0 V and 0 A. When the output key is activated, the set or programmed values for voltage and current are present immediately. The switchover can be carried out manually, via a remote control command from the PC, via an external TTL signal[1)], or via an external switching contact[1)].
[1)] Interlock or inhibit option required

Autocal function
The power supplies are equipped with a self-calibration function protected by a "security code". This function can be manually executed from a menu or also remote-controlled.

Price and performance
The exceptional specifications, extraordinary features, and best possible processing quality provide the power supplies of the TOE 8950 series with an excellent price/performance ratio.

Options

- GPIB and USB interfaces
- Arbitrary function
- Interlock
- Inhibit



TOE 8951-40

Single-output and dual-output power supplies

TOE 8951 – 400 W
TOE 8952 – 2 x 200 W

Special features

- Autoranging
- RS 232 and analog interfaces included as standard
- USB and GPIB interfaces optional
- Outputs at front and rear as standard
- On/off switching of the outputs
- ½ 19" width, 2 HU design
  → parallel installation possible
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Outputs

- Floating for all models
- Electrically isolated in the dual-output power supplies
  → series and parallel connections possible
- Safety sockets at front
- Available at rear on screw terminal block

Overview

	Output 1		Output 2		
Model	Voltage	Current	Voltage	Current	Power
Single-output power supplies					
TOE 8951-20	0 - 20 V	0 - 40 A	–	–	400 W
TOE 8951-40	0 - 40 V	0 - 20 A	–	–	400 W
TOE 8951-60	0 - 60 V	0 - 14 A	–	–	400 W
TOE 8951-80	0 - 80 V	0 - 10 A	–	–	400 W
TOE 8951-130	0 - 130 V	0 - 6 A	–	–	400 W
Dual-output power supplies					
TOE 8952-20	0 - 20 V	0 - 20 A	0 - 20 V	0 - 20 A	2 x 200 W
TOE 8952-40	0 - 40 V	0 - 10 A	0 - 40 V	0 - 10 A	2 x 200 W
TOE 8952-60	0 - 60 V	0 - 7 A	0 - 60 V	0 - 7 A	2 x 200 W
TOE 8952-80	0 - 80 V	0 - 5 A	0 - 80 V	0 - 5 A	2 x 200 W
TOE 8952-130	0 - 130 V	0 - 3 A	0 - 130 V	0 - 3 A	2 x 200 W

Arbitrary function (option)

TOE 8951
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Arbitrary function

The power supplies of these series can be optionally equipped with an arbitrary function (curve memory integrated in the unit). The units execute an entered curve autonomously, even without a PC connection. Dual-output power supplies of the TOE 8952 series have a separate curve memory per output. Two signals can then be output synchronous to one another. A burst function defines the number of desired curve sweeps.

In addition, the curve memory can be divided into up to 10 blocks. Each individual block can be used repeatedly. The advantage is to be found in the extremely efficient use of memory space.

The new and powerful software from TOELLNER permits fast and convenient input of curves using a graphic curve editor. Oscilloscope signals recorded in a vehicle can be read in directly and subsequently simulated. Voltage dips, starting processes in the vehicle, and noise voltages on the vehicle electrics can thus be simulated rapidly and without problem. Standardized test pulses in accordance with DIN 16750 or ISO 7637, such as load dump test pulses (also clipped), jump starts and reset response, or specific and standardized test curves from many different vehicle manufacturers, can be simulated and are included in the scope of delivery. New and future versions from manufacturers, as well as new test versions, are implemented can be entered in next to no time.

TOE 9151 or TOE 9152 option required (arbitrary function in the unit) if curves are to be output via internal memories.

Technical specifications

Number of steps	1000
Step data	Voltage, current, step time
Step time	10 ms to 100 s, resolution 5 ms
Curve triggering	
Internal	Manual with key or over bus with remote control command
External	Via TTL signal or switch contact
Number of blocks	10
Max. block sweeps	1 to 65535 or ∞

Arbitrary function

- 1000 interpolation points
- 10 blocks with repeat function
- 10 ms < t < 100 s per interpolation point
- Burst function (also for each individual block)

Software for arbitrary function

- Graphic and tabular input of curve
- Data input from oscilloscopes
- Library with standard curves for automotive industry

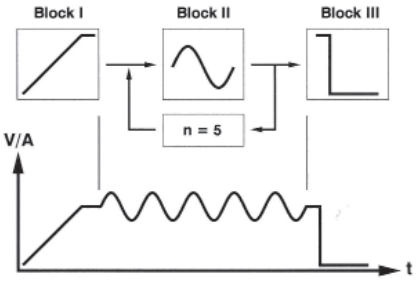
Curve input options

- Manual
- Via RS 232, GPIB or USB interface
- Convenient TOELLNER software with graphic curve input option

Application examples
Arbitrary function

TOE 8951
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Application example
Example of a sinusoidal signal with start block for initialization process, repetition block with a sinusoidal signal and 5 sweeps, and an end block for switching off a consumer.





Display of sequence with output of current block, currently executed step, and number of busts of the current block.

Technical specifications
Single-output power supplies

TOE 8951



TOE 8951-40

Output		TOE 8951-20	TOE 8951-40	TOE 8951-60	TOE 8951-80	TOE 8951-130
Voltage		0 - 20 V	0 - 40 V	0 - 60 V	0 - 80 V	0 - 130 V
Current		0 - 40 A	0 - 20 A	0 - 14 A	0 - 10 A	0 - 6 A
Power adjustable in range		20 - 400 W	20 - 400 W	20 - 400 W	20 - 400 W	20 - 400 W
Setting resolution	Voltage Current Power	5 mV 10 mA 0,1 W	10 mV 5 mA 0.1 W	10 mV 2 mA 0.1 W	20 mV 2 mA 0.1 W	20 mV 1 mA 0,1 W
Setting accuracy	Voltage Current Power	0,1 % + 10 mV 0,2 % + 40 mA 0,4 % + 1 W	0.1 % + 20 mV 0.2 % + 20 mA 0.4 % + 1 W	0.1 % + 30 mV 0.2 % + 15 mA 0.4 % + 1 W	0.1 % + 40 mV 0.2 % + 10 mA 0.4 % + 1 W	0,1 % + 60 mV 0,2 % + 5 mA 0,4 % + 1 W
Deviation in regulation with 100 % change in load	Voltage Current	10^{-4} + 5 mV 5 x 10^{-4} + 20 mA	10^{-4} + 5 mV 5 x 10^{-4} + 10 mA	10^{-4} + 5 mV 5 x 10^{-4} + 7 mA	10^{-4} + 5 mV 5 x 10^{-4} + 5 mA	10^{-4} + 5 mV 5 x 10^{-4} + 2 mA
With change in line voltage ± 10 %		5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}
Regulation time with change in load from 20 % to 100 % I_{rated} Tolerance: 0.2 % V_{rated}		100 µs	100 µs	100 µs	100 µs	100 µs
Setting time of output voltage with change in setpoint 0 V to V_{rated} no-load/full load V_{rated} to 1 V no-load/full load		6 ms/10 ms 30 ms/8 ms	8 ms/10 ms 50 ms/10 ms	10 ms/15 ms 100 ms/25 ms	15 ms/20 ms 200 ms/50 ms	50 ms/60 ms 1,5 s/400 ms
Residual ripple (rms) 10 Hz to 10 MHz	Voltage Current	3 mV 12 mA	3 mV 10 mA	6 mV 7 mA	10 mV 5 mA	12 mV 2 mA
Measuring accuracy	Voltage Current Power	0,1 % + 20 mV 0,2 % + 60 mA 0,4 % + 1 W	0.1 % + 30 mV 0.2 % + 30 mA 0.4 % + 1 W	0.1 % + 45 mV 0.2 % + 20 mA 0.4 % + 1 W	0.1 % + 60 mV 0.2 % + 15 mA 0.4 % + 1 W	0,1 % + 80 mV 0,2 % + 10 mA 0,4 % + 1 W
Temperature coefficient	Voltage Current	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K
Analog interface Control voltage (reference potential is the negative pole of the output)	0 -5 V for 0 -5 V for	0 - 20 V 0 - 40 A	0 - 40 V 0 - 20 A	0 - 60 V 0 - 14 A	0 - 80 V 0 - 10 A	0 - 130 V 0 - 6 A
Protection functions Adjustment range for OVP Adjustment range for limit		3 - 22 V 0 - 20 V	3 - 44 V 0 - 40 V	3 - 66 V 0 - 60 V	3 - 88 V 0 - 80 V	3 - 143 V 0 - 130 V
Resistant to feedback	Voltage Current	100 V 40 A	100 V 20 A	100 V 14 A	100 V 10 A	160 V 6 A



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Technical specifications
Dual-output power supplies

TOE 8952

Output		TOE 8952-20	TOE 8952-40	TOE 8952-60	TOE 8952-80	TOE 8952-130
Voltage		2 x 0 - 20 V	2 x 0 - 40 V	2 x 0 - 60 V	2 x 0 - 80 V	2 x 0 - 130 V
Current		2 x 0 - 20 A	2 x 0 - 10 A	2 x 0 - 7 A	2 x 0 - 5 A	2 x 0 - 3 A
Power adjustable in range		2 x 10 - 200 W	2 x 10 - 200 W	2 x 10 - 200 W	2 x 10 - 200 W	2 x 10 - 200 W
Setting resolution	Voltage Current Power	5 mV 5 mA 0,1 W	10 mV 2 mA 0.1 W	10 mV 1 mA 0.1 W	20 mV 1 mA 0.1 W	20 mV 1 mA 0,1 W
Setting accuracy	Voltage Current Power	0,1 % + 10 mV 0,2 % + 20 mA 0,4 % + 1 W	0.1 % + 20 mV 0.2 % + 10 mA 0.4 % + 1 W	0.1 % + 30 mV 0.2 % + 7 mA 0.4 % + 1 W	0.1 % + 40 mV 0.2 % + 5 mA 0.4 % + 1 W	0,1 % + 60 mV 0,2 % + 3 mA 0,4 % + 1 W
Deviation in regulation with 100 % change in load	Voltage Current	10^{-4} + 5 mV 5 x 10^{-4} + 10 mA	10^{-4} + 5 mV 5 x 10^{-4} + 5 mA	10^{-4} + 5 mV 5 x 10^{-4} + 3 mA	10^{-4} + 5 mV 5 x 10^{-4} + 2 mA	10^{-4} + 5 mV 5 x 10^{-4} + 1,5 mA
With change in line voltage ± 10 %		5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}	5 x 10^{-5}
Regulation time with change in load from 20 % to 100 % I_{rated} Tolerance: 0.2 % V_{rated}		100 µs	100 µs	100 µs	100 µs	100 µs
Setting time of output voltage with change in setpoint 0 V to V_{rated} no-load/full load V_{rated} to 1 V no-load/full load		6 ms/10 ms 30 ms/8 ms	8 ms/10 ms 50 ms/10 ms	10 ms/15 ms 100 ms/25 ms	15 ms/20 ms 200 ms/50 ms	50 ms/60 ms 1,5 s/400 ms
Residual ripple (rms) 10 Hz to 10 MHz	Voltage Current	3 mV 10 mA	3 mV 5 mA	6 mV 3 mA	10 mV 2 mA	10 mV 1,5 mA
Measuring accuracy	Voltage Current Power	0,1 % + 20 mV 0,2 % + 30 mA 0,4 % + 1 W	0.1 % + 30 mV 0.2 % + 10 mA 0.4 % + 1 W	0.1 % + 45 mV 0.2 % + 7 mA 0.4 % + 1 W	0.1 % + 60 mV 0.2 % + 5 mA 0.4 % + 1 W	0,1 % + 80 mV 0,2 % + 5 mA 0,4 % + 1 W
Temperature coefficient	Voltage Current	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K	10^{-4}/K 10^{-4}/K
Analog interface Control voltage (reference potential is the negative pole of the output)	0 -5 V for 0 -5 V for	0 - 20 V 0 - 20 A	0 - 40 V 0 - 10 A	0 - 60 V 0 - 7 A	0 - 80 V 0 - 5 A	0 - 130 V 0 - 3 A
Protection functions Adjustment range for OVP Adjustment range for limit		3 - 22 V 0 - 20 V	3 - 44 V 0 - 40 V	3 - 66 V 0 - 60 V	3 - 88 V 0 - 80 V	3 - 143 V 0 - 130 V
Resistant to feedback	Voltage Current	100 V 20 A	100 V 10 A	100 V 7 A	100 V 5 A	160 V 3 A

General data

TOE 8951
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General data

Output Insulation	Floating and electrically isolated ± 250 V against ground
RS 232 interface Interface Transfer rate Setting rate Measuring rate Software	 9-pin D-SUB connector, electrically isolated from main output 110 to 57,600 baud Approx. 20 settings/s Approx. 15 measurements/s Command sequence in accordance with IEEE 488.2; SCPI
Analog interface Control voltage Input impedance	 0 - 5 V each for 0 - V_{max} and 0 - I_{max} Approx. 10 kOhm
Line voltage	115 V or 230 V ± 10 %, 47 - 63 Hz, the unit sets itself automatically to the existing line voltage
Power consumption	Approx. 680 VA
Protective measures	Protection class 1 in accordance with DIN EN 61010-1
EMC	EN 61326
Operating temperature	0 °C to 40 °C
Storage temperature	- 20 °C to 70 °C
Reference temperature	23 °C ± 1 °C
Dimensions with feet	224 x 88 x 405 mm (W x H x D) 224 x 103 x 405 mm (W x H x D)
19" system	½ 19", 2 HU
Weight	Approx. 5 kg
Housing	Aluminium/steel



Rear of unit
Dual-output power supply with USB interface
TOE 8952 series



TOE 8952-40

Ordering data/options

TOE 8951
TOE 8952

Supplied accessories

– 1 power cord
– 1 instruction manual
– 1 RS 232 interface cable

Free driver for LabView™
at www.TOELLNER.de

Ordering data

Single-output power supplies

TOE 8951-20	Power supply	20 V / 40 A
TOE 8951-40	Power supply	40 V / 20 A
TOE 8951-60	Power supply	60 V / 14 A
TOE 8951-80	Power supply	80 V / 10 A
TOE 8951-130	Power supply	130 V / 6 A

Dual-output power supplies

TOE 8952-20	Power supply	2 x 20 V / 20 A
TOE 8952-40	Power supply	2 x 40 V / 10 A
TOE 8952-60	Power supply	2 x 60 V / 7 A
TOE 8952-80	Power supply	2 x 80 V / 5 A
TOE 8952-130	Power supply	2 x 130 V / 5 A

Options

GPIB interface

TOE 8951/015	For TOE 8951-xx
TOE 8952/015	For TOE 8952-xx

USB interface

TOE 8951/025	For TOE 8951-xx
TOE 8952/025	For TOE 8952-xx

Arbitrary function in the unit

TOE 9151	For TOE 8951-xx
TOE 9152	For TOE 8952-xx

PC software for curve generation

TOE 9751	For TOE 8951-xx
TOE 9752	For TOE 8952-xx

Interlock/inhibit options

The interlock and inhibit control options permit external enabling or OFF/ON switching of the main output by means of a switch or a TTL signal.

Interlock option TOE 8950/101

Control via contact	Control via TTL signal	Power supply output
Close	Low	**On**
Open	High	**Off**

Inhibit option TOE 8950/102

Control via contact	Control via TTL signal	Power supply output
Close	Low	**Off**
Open	High	**On**

Cables and adapters

TOE 9101	USB/GPIB adapter
TOE 9009	IEEE-488 cable, 2 m
TOE 9521	19" adapter, 2 HU asymmetric for single installation
TOE 9522	19" adapter, 2 HU parallel installation set for 2 units



19" adapter, TOE 9522
2 HU, parallel installation set for 2 units of the TOE 8950 series

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