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HEIDEN
COMPETENCE IN POWER

Product overview
2021 / 2022

- Source-Sink with recycling load
- AC Source, Frequency Converter
- Grid Simulation
- Power Analyzer
- Test-System
- Power Supply
- Charger
- Elektronic Load
- Ground-Power-Unit
- Customer specific solutions

HEIDEN power GmbH | Am Wiesengrund 1 | 86932 Pürgen | Germany

Company

HEIDEN is both manufacturer and distributor of electronic devices of power electronics. HEIDEN develops, manufactures and distributes electronic AC and DC power supplies, source-sink systems with recycling load, power supplies in all power classes (from 100 W to high-power power supplies with more than 500 kW and currents of more than 10 kA), electronic loads (also with recycling load), chargers for combustion starters, ground power units and starters for the aviation industry, precision power analyzers, measuring instruments and test systems for industrial, research and development applications.

At that time until today

The still independent company HEIDEN electronics GmbH was founded in 1964 and was entered in the commercial register in 1972. In 1995 the headquarters was moved from Munich to Landsberg am Lech. After the founder of the company sold the company due to age in the course of succession arrangements, the company passed 100% to Dipl.-Ing. Franz J. Dorfner, the new owner in 2002/2003. In 2004, HEIDEN power GmbH was founded as an independent, internationally oriented sales company and competent partner for longstanding customers and suppliers.

New modern company headquarters

Due to the positive business development, the premises at the former company headquarters in Munich/Martinsried became too small soon. At the beginning of 1990, the previously management decided to move from Munich to Landsberg am Lech. In order to modernize the working environment and also to enhance the aesthetic appeal, the company moved again to a modern office and production building in the nearby town of Pürgen at the end of 2004.

Continuous growth

In recent years, incoming orders and sales have grown at very considerable rates on average. In addition to the expansion of the company's own product range, growth has also been achieved in particular with merchandise based on partnerships.

Large product range portfolio

HEIDEN products are used in the electronics industry, communications engineering, the automotive industry, aerospace engineering and in scientific research institutions, among others. In order to be able to offer customers the choice from a complete range of products and especially to be able to offer integrated system solutions, HEIDEN has entered into cooperations with other manufacturers, e.g. with Höcherl & Hackl for more than 20 years, with REGATRON in Switzerland for more than 15 years and with other very competent and renowned partners in this environment.

Innovation

Many ideas, processes and solutions have been included into our products and system solutions over the last four decades. Committed employees and a competent management team guarantee „leading edge technology“ and guarantee investment security.

International reputation

From the beginning, national and international key accounts, including Airbus, Daimler, BMW, Porsche, Siemens, Bosch, Miele, but also Fraunhofer Institutes, the DLR and universities have shaped the company's reputation.

Trade Fairs

Always on site and always up-to-date: Visit us at trade fairs and look forward to innovative exhibits and interesting discussions with our specialists! HEIDEN is regularly represented at electronica in Munich and PCIM Europe in Nuremberg, but also at other trade fairs, university forums and congresses.

Expert lectures

HEIDEN also makes important design contributions at trade fairs and specialist forums: In addition to consulting and demonstrations at our trade fair stands, our experts regularly give lectures and inform the interested public about current topics in the field of power supply for laboratory and industry. Visit our website www.heidenpower.com for current dates.

Systemintegration

For some time now, HEIDEN has been offering customer specific system solutions in addition to typical standard products. A competent team of employees is available for planning, implementation and maintenance. In just a few steps we can reach our goal together.

- **Talk to us**

Call us or send us an e-mail in which you describe your requirements. Our team of technicians and engineers will be pleased to receive your application description and explain our possibilities. Together with you, we will work out a concept that is ideally suitable to your application.

- **We point the way**

If a standard device already fits your application, you will receive an attractive offer from us in a short time. Complex solutions require detailed planning. Depending on the technical scope of the project, our team will create a planning concept based on your requirements - you gain transparency.

- **Production & Information**

We manufacture your system as planned and ordered. All special features discussed will be considered. Should you still have any requests for adjustments at this stage, our planning and production team will always have an open ear for you.

- **We stay in contact**

With us you do not only get one device or one system. You get a partner. If you need support, if you want to make extensions or changes: we are there for you.

The pictograms help you to get a quick impression of the most important features of our devices. As many devices are very extensively equipped, we have illustrated the most important functions which are already integrated in the standard version. We will be happy to advise you on additional options!

USB
The machine has a USB interface. Depending on the unit, USB-A for measurement data acquisition on USB sticks or USB-B for control via a PC interface are available.

LAN/Ethernet
The device can be integrated into networks via a LAN interface and controlled via these networks. The Ethernet connection is particularly suitable for cross-linking many devices.

Analog interface
Setpoints can be specified and measured values read back via an analogue interface. Common analogue levels are 0...5 V_{DC} and 0...10 V_{DC}.

IEEE 488/GPIB
The device is equipped with a GPIB interface. The GPIB standard allows control of up to 15 devices. The connection is made via Centronics connector.

RS232
The device is equipped with an RS232 interface. Via the serial COM interface a quick system integration is possible. The 9-pin D-SUB version is usually used.

CAN
The device can be addressed via a CAN interface. This „Multi Master Bus“ is particularly popular in the automotive industry.

SD Card slot
The optional SD card slot expands a device into an automated test station. Besides script programming, measurement data can be recorded.

Fieldbuses
Further fieldbuses are available. Whether ProfiBus, ProfiNet, ModBus or other CAN variants. In the device description you will find which further options are available.

Bidirectional
These device series are capable of operating both as a source and as an electronic load. At higher power levels, the absorbed energy is usually efficiently recovered.

Power regeneration
Absorbed energy is efficiently fed back into the local AC grid. This saves energy and leads to less heating of the operating environment.

Engine Generator Test
An electric engine can be supplied via several channels, while the energy of a load machine is absorbed simultaneously. Only the power loss has to be supplied.

Industrial application
Daily use in an industrial environment requires very robust equipment. Casing and ventilation are specially adapted to these requirements.

Research & Development
Due to a particularly high level of equipment, comprehensive software and a flexible field of application, these devices enjoy great popularity in laboratories, universities and institutes.

Photovoltaic
During developing and testing PV modules and inverters, it is important to map or track characteristics around a maximum power point. The MPP curve is programmable here.

Galvanic
Electroplating applications are usually characterised by a very high direct current consumption. Robust rectifiers for harsh environmental conditions ensure the powerful DC supply.

Railway Technology
Whether on site 16 2/3 Hz AC railway grids or 110 \'$_{DC}$ on-board battery - these devices supply vehicles and components of railway applications in railway depots and workshops.

Ground Power Units
Start helicopters with 28 V_{DC} Onboard power supply at the domestic airfield. Mobile individual devices as well as landing and transport platforms are the ideal equipment for helicopter bases.

Aerospace industry
115 V 400 Hz and 800 Hz on-board power systems are supplied for avionics updates. If aircraft grids are simulated, on-board equipment can already be tested in the laboratory and in production.

HEIDEN COMPETENCE IN POWER

Contents

Z+ programmable DC-Source

As desktop device or 19“ rack

Compact & flexible

The compact desktop unit Z+ impresses with extensive functions in a compact design that sets new standards.
With a size of just 70 x 83 mm, the laboratory power supply unit offers two large displays and separate encoders for voltage and current as well as extensive functions.
On the back of the device there is an analogue interface and monitoring outputs with 0 to 5 V or 0 to 10 V level, an RS232/485 and a USB interface.
The range of output voltages extends from 0 to 10 V to 0 to 650 V at currents of up to 72 A. 16 bit A-D and D-A converters enable highest precision, excellent control characteristics and fast signal times.

Highlights

- 2 U programmable power supply
- Models with 10, 20, 36, 60, 100, 160, 320, 375, 650 V
- Models with 200, 400, 600, 800 W power
- Input voltage single phase 85...265 VAC Modular can be combined in 3 or 4/6 19“ rack
- 16 bit resolution, fast response time for programming
- Integrated arbitrary generator with memory function for up to four arbitrary curves
- Controllable signal outputs
- USB, RS232/485 interfaces & analogue control
- Optional: Front connection sockets
- Optional: LAN, GPIB & isolated analogue interfaces
- Virtual Front Panel (VFP) PC software for setting and control of the devices with function generator and data logger
- 5 years warranty

Technical data

Options

Description	Power	Voltage	Current	Dimensions standard case	Dimensions with front
Zp02-10	200 W	10 V	20 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-10	400 W	10 V	40 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-10	600 W	10 V	60 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp07-10	720 W	10 V	72 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-20	200 W	20 V	10 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-20	400 W	20 V	20 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-20	600 W	20 V	30 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-20	800 W	20 V	40 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-36	216 W	36 V	6 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-36	432 W	36 V	12 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-36	648 W	36 V	18 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-36	864 W	36 V	24 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-60	210 W	60 V	3,5 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-60	420 W	60 V	7 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-60	600 W	60 V	10 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-60	840 W	60 V	14 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-100	200 W	100 V	2 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-100	400 W	100 V	4 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-100	600 W	100 V	6 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-100	800 W	100 V	8 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-160	208 W	160 V	1,3 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-160	416 W	160 V	2,6 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-160	640 W	160 V	4 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-160	800 W	160 V	5 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-320	208 W	320 V	0,65 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-320	416 W	320 V	1,3 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-320	640 W	320 V	2 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-320	800 W	320 V	2,5 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-375	825 W	375 V	2,2 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp02-650	208 W	650 V	0,32 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp04-650	416 W	650 V	0,64 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp06-650	650 W	650 V	1 A	70 x 83 x 350 mm	105 x 83 x 350 mm
Zp08-650	812 W	650 V	1,25 A	70 x 83 x 350 mm	105 x 83 x 350 mm

TDK·Lambda

TDK-Lambda is one of the world's leading manufacturers of power supplies and stands for safety and reliability.

AC-Input	
Input voltage range	85...265 V_{AC} 1ph+N / PE
Input frequency	47...63 Hz

EMV and safety standards	
Safety standard	UL61010-1, EN61010-1, IEC61010-1
Further standards	EN55022B, FCC part 15-B, VCCI-B

DC-Output voltage	
Grid control	0,01 % of final value +2 mV
Load control	0,01 % of final value +2 mV
Temperature stability	0,02 % over 8 h
Rise time 10...90 %	1...50 ms (depending on device type)

DC-Output current	
Grid control	0,01 % of final value +2 mA
Load control	0,01 % of final value +2 mA
Temperature stability	0,05 % over 30 minutes

Functions	
Setpoint default	Voltage and current (incl. Fineadjust)
Protection functions	OVP, UVP, UVL, OCP

Programming & Control	
Digital interfaces	USB, RS232, RS485 Optional Ethernet (LXI) und GPIB
Analog Interface	Built in, optionally galv. isolated

Programming and monitoring	
Prog. Accuracy U analogue	±0,5 % of final value
Prog. Accuracy I analogue	±1 % of final value
Monitoring U analogue	0...5 V / 0...10 V ±1 %
Monitoring I analogue	0...5 V / 0...10 V ±1 %
Prog. Accuracy U digital	0,05 % of final value
Prog. Accuracy I digital	0,1 % + 0,1 % of final value
Monitoring U digital	0,05 % of final value
Monitoring I digital	0,1 % + 0,1 % of final value

HEA-PS2000 B Desktop devices

- Microcontroller-based
- For school and training company, for workshop and development, laboratories and test institutes
- Output Power: 100 W or 332 W
- Output voltages: 0...42 V or 0...84 V
- Output streams: up to 0...10 A
- Auxiliary output: 3...6 V, 12 W
- Overtemperature protection (OT)
- Four-digit display for voltage and current
- Convection cooling
- Case closed at top and bottom
- Safety output connectors

HEA-PS2000 B Single

These laboratory power supplies are available in three power classes with 100 W, 160 W or 320 W. The compact construction, the practical case design as well as a favourable price-quality ratio distinguish this line.

The devices are closed at the top and bottom and have no external cooling elements. The safety output boxes are located on the front of the device. Voltage and power can be adjusted continuously from zero to the nominal value.

Protection functions

In addition to overvoltage protection (OVP), which is intended to protect connected consumers from excessive voltage, there is now also overcurrent protection. This switches off the output when a threshold adjustable from 0...110 % nominal current is reached.

HEA-PS2000 B Triple

The laboratory power supplies offer two main outputs with 100 W or 160 W each and one auxiliary output with 3...6 V and 12 W.

The new „Tracking“ function allows simultaneous adjustment of the two main outputs with the rotary knobs on the left-hand control panel. The outputs are galvanically isolated from each other and can be connected in series or parallel. Together with the „Tracking“ mode, the user can, for example, establish a variable ±15 V power supply.

Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PS2042-06B	100 W	42 V	6 A	≤ 85 %	82 x 174 x 240 mm
HEA-PS2084-03B	100 W	84 V	3 A	≤ 85 %	82 x 174 x 240 mm
HEA-PS2042-10B	160 W	42 V	10 A	≤ 85 %	82 x 174 x 240 mm
HEA-PS2084-05B	160 W	84 V	5 A	≤ 85 %	82 x 174 x 240 mm
HEA-PS2042-20B	320 W	42 V	20 A	≤ 85 %	82 x 174 x 320 mm
HEA-PS2084-10B	320 W	84 V	10 A	≤ 85 %	82 x 174 x 320 mm
HEA-PS2342-06B	2x 100, 1x 12 W	42 V	6 A	≤ 85 %	90 x 282 x 260 mm
HEA-PS2342-10B	2x 160, 1x 12 W	42 V	10 A	≤ 85 %	90 x 282 x 260 mm
HEA-PS2384-03B	2x 100, 1x 12 W	84 V	3 A	≤ 85 %	90 x 282 x 260 mm
HEA-PS2384-05B	2x 160, 1x 12 W	84 V	5 A	≤ 85 %	90 x 282 x 260 mm

AC-Input	
Input voltage range	90...264 V_{AC}
Input frequency	45...65 Hz

EMV and safety standards	
Safety standard	EN 60950

DC-Output voltage	
Accuracy	< 0,2 %
Stability at 0...100 % Load	< 0,15 %
Stability at ±10 % U_E	< 0,02 %

DC-Output current	
Accuracy current	< 0,2 %
Stability at 0...100 % U_{DC}	< 0,05 %
Stability at ±10 % U_{AC}	< 0,15 %

HEA-PSI5000 A / HEA-PS9000 T

The integrated monitoring functions of HEA-PSI5000 series simplify a test setup and often make external monitoring measures unnecessary. With two rotary knobs and five keys, the clearly arranged control panel offers all possibilities to operate the instrument easily and with few movements.

HEA-PSI5000 A

The microprocessor-controlled laboratory power supplies of the series HEA-PSI5000 A offer the user important features for a power supply unit as standard, which makes arating with these devices much easier. Setpoints, actual values and status are simultaneously and clearly displayed in the blue illuminated LCD.

Description	Power	Voltage	Current	Dimensions
HEA-PSI5040-10A	160 W	40 V	10 A	87 x 200 x 301 mm
HEA-PSI5080-05A	160 W	80 V	5 A	87 x 200 x 301 mm
HEA-PSI5200-02A	160 W	200 V	2 A	87 x 200 x 301 mm
HEA-PSI5040-20A	320 W	40 V	20 A	87 x 200 x 301 mm
HEA-PSI5080-10A	320 W	80 V	10 A	87 x 200 x 301 mm
HEA-PSI5200-04A	320 W	200 V	4 A	87 x 200 x 301 mm
HEA-PSI5040-40A	640 W	40 V	40 A	87 x 200 x 331 mm
HEA-PSI5080-20A	640 W	80 V	20 A	87 x 200 x 331 mm
HEA-PSI5200-10A	640 W	200 V	10 A	87 x 200 x 331 mm

Description	Power	Voltage	Current	Dimensions
HEA-PS9040-20T	320 W	40 V	20 A	239 x 92 x 335 mm
HEA-PS9080-10T	320 W	80 V	10 A	239 x 92 x 335 mm
HEA-PS9200-04T	320 W	200 V	4 A	239 x 92 x 335 mm
HEA-PS9040-40T	640 W	40 V	40 A	239 x 92 x 335 mm
HEA-PS9080-20T	640 W	80 V	20 A	239 x 92 x 335 mm
HEA-PS9200-10T	640 W	200 V	10 A	239 x 92 x 335 mm
HEA-PS9040-40T	1.000 W	40 V	40 A	239 x 92 x 395 mm
HEA-PS9080-40T	1.000 W	80 V	40 A	239 x 92 x 395 mm
HEA-PS9200-15T	1.000 W	200 V	15 A	239 x 92 x 395 mm
HEA-PS9500-06T	1.000 W	500 V	6 A	239 x 92 x 395 mm
HEA-PS9040-60T	1.500 W	40 V	60 A	239 x 92 x 395 mm
HEA-PS9080-60T	1.500 W	80 V	60 A	239 x 92 x 395 mm
HEA-PS9200-25T	1.500 W	200 V	25 A	239 x 92 x 395 mm
HEA-PS9500-10T	1.500 W	500 V	10 A	239 x 92 x 395 mm

HEA-PS9000 T

The HEA-PS9000 T is a compact desktop device that provides output voltages between 40 V (SELV according to EN 60950) and 500 V, currents between 4 A and 60 A, and powers between 320 W and 1,500 W. Current, voltage and power are continuously adjustable between 0 % and 100 %, whether manually operated or remote controlled via analogue or digital interface.

The output is located on the front of the slim desktop unit HEA-PS9000 T.

The microprocessor-controlled laboratory power supply units of the HEA-PS9000 T series offer the user many functions and features as standard, in addition to user-friendly, interactive menu navigation, which considerably facilitates daily laboratory work. In this way setpoints, monitoring limits and other settings can be quickly configured. The integrated monitoring functions for all output parameters simplify a test setup and often make external monitoring measures unnecessary.

HEA-PSI9000 DT / T

With function generator

- HEA-PSI9000 DT - DeskTop

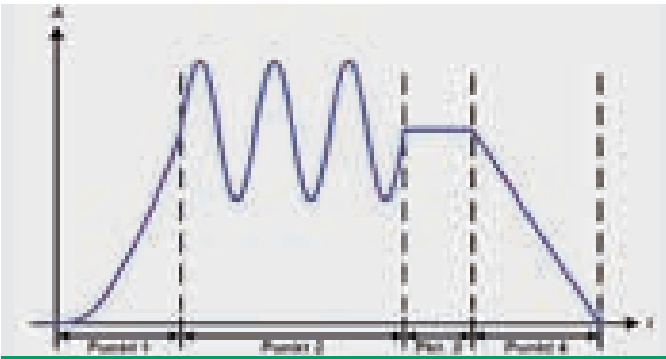
- High efficiency of up to 92
- Output power: 0...320 W to 0...1.500 W
- Output voltages: 0...40 V to 0...750 V
- Output currents: 0...4 A to 0...60 A
- Flexible, power-controlled output stage
- Various protection functions (OVP, OCP, OPP)
- Galvanically isolated, analogue interface
- USB and Ethernet as standard
- Integrated function generator
- Internal resistance simulation and control
- Desktop case with carrying strap and set-up bracket
- 40 V models according to SELV in compliance with EN 60950
- Discharge circuit (Uout < 60 V in ≤ 10 s)

HEA-PSI9000 Desktop units: Conveniently accessible

The output is located in the front of the very compact desktop unit HEA-PSI9000 DT. In addition to a user-friendly, interactive menu navigation, this series offers many functions and features as standard, which considerably facilitate arithmetic with these devices.

High security

The already integrated monitoring functions for all output parameters simplify a test setup and often make external monitoring measures unnecessary. Models with a nominal voltage of 200 V and higher contain a discharge circuit. This discharges the output capacitors after switching off the DC output and ensures that the sometimes dangerously high output voltage is reduced to below 60 V_{DC} sinks. This value is the limit for voltage dangerous to touch.



Example

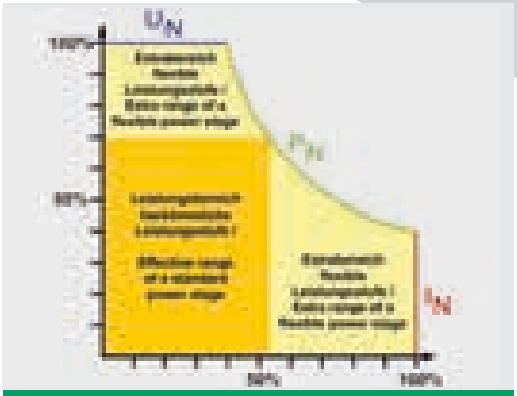
Sequence 1: 1/4 Sine wave (Angle = 270°)
Sequence 2: 3 Sine Waves (Ratio frequency to sequence time 1:3)
Sequence 3: Horizontal ramp (f = 0)
Sequence 4: Declining ramp (f = 0)

Integrated function generator

The HEA-PSI series models have a true function generator that can generate typical functions and apply them to either the output voltage or the output current. This can be configured and controlled completely on the device via the touch panel or remotely via one of the digital interfaces. The predefined functions offer all necessary parameters of the respective function, such as Y-offset, time or frequency or amplitude for free adjustment by the user.

In addition to the standard functions, this arbitrary generator is openly accessible in order to be able to create complex sequences for e.g. product testing from up to 100 sequences. These sequences can be saved and loaded via USB and at the control panel to allow a quick change between different test or inspection sequences.

- HEA-PSI9000T - Tower



The flexible output stage enables a significantly wider voltage and current range of the output.

AC-Input	
Input voltage	90...264 V_{AC} 1 L+N
Input frequency	45...65 Hz

EMV and safety standards	
Safety standard	EN 60950
Further standards	EN 61326, EN 61010, EN 55022 Class B

DC-Output voltage	
Accuracy	< 0,1 %
Stability 0-100 % Load	< 0,05 %
Stability at ±10 % U_E	< 0,02 %
Adjust 10-100 % Load	< 2 ms
Rise time 10-90 %	Max. 30 ms
Overvoltage protection	Adjustable, 0...110 % U_{Nenn}

DC-Output durrent / power	
Accuracy current	< 0,1 %
Stab. at 0-100 % U_{DC}	< 0,15 %
Stability at ±10 % U_{AC}	< 0,05 %
Accuracy power	< 1 %

Programming and control	
Digital interfaces	1x USB Typ B (for communication) 1x USB Typ A (for memory) 1x Ethernet
Analogue interface	Built-in, 15-pin Sub-D socket galvanically isolated

Environmental conditions	
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 % non-condensing
Operating height	< 2.000 m

Description	Power	Voltage	Current	Efficiency	Dimensions Vers. DT	Dimensions Vers. T
HEA-PSI9040-20DT/T	320 W	40 V	20 A	≤ 88 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9080-10DT/T	320 W	80 V	10 A	≤ 89 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9200-04DT/T	320 W	200 V	4 A	≤ 89 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9040-40DT/T	640 W	40 V	40 A	≤ 89 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9080-20DT/T	640 W	80 V	20 A	≤ 91 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9200-10DT/T	640 W	200 V	10 A	≤ 92 %	276 x 103 x 355 mm	92 x 239 x 335 mm
HEA-PSI9040-40DT/T	1.000 W	40 V	40 A	≤ 92 %	276 x 103 x 415 mm	92 x 239 x 335 mm
HEA-PSI9080-40DT/T	1.000 W	80 V	40 A	≤ 92 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9200-15DT/T	1.000 W	200 V	15 A	≤ 93 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9360-10DT	1.000 W	360 V	10 A	≤ 93 %	276 x 103 x 415 mm	
HEA-PSI9500-06DT/T	1.000 W	500 V	6 A	≤ 93 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9750-04DT	1.000 W	750 V	4 A	≤ 93 %	276 x 103 x 415 mm	
HEA-PSI9040-60DT/T	1.500 W	40 V	60 A	≤ 92 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9080-60DT/T	1.500 W	80 V	60 A	≤ 92 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9200-25DT/T	1.500 W	200 V	25 A	≤ 93 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9360-15DT	1.500 W	360 V	15 A	≤ 93 %	276 x 103 x 415 mm	
HEA-PSI9500-10DT/T	1.500 W	500 V	10 A	≤ 93 %	276 x 103 x 415 mm	92 x 239 x 395 mm
HEA-PSI9750-06DT	1.500 W	750 V	6 A	≤ 93 %	276 x 103 x 415 mm	

HEA-MFR 19" 2U 1P	Mounting frame 19" 2U for HEA-PSI9000DT
HEA-IF KE4	Interface card with LAN, USB and analog

HE-LAB / SMP / HP

Compact, reliable and flexible

Standard device or individual single piece

Traditionally, HEIDEN unconditionally relies on what we understand by the best German engineering artistry. Solid quality and well thought-out innovations characterize our high-power DC sources! In a 19“ rack-installation enclosure, the devices are ideally suited for installation in test benches or laboratory equipment. The devices of the HE-LAB series are manufactured on customer request, so many individual adjustments are possible. Whether as a single device or as a complete turnkey system: Here you get the one solution that ideally fits your application!

Quality

Our devices are developed by us according to all rules of the art, equipped with high quality electronic components and put through their paces in endurance tests. Thus only the uncompromisingly high quality to which we have committed ourselves leaves our company.

For professional use

The professional design of the series is demonstrated not least by the many tried and tested operating modes, which make the task enormously easier for the user. While in the UI mode the setting values for voltage and current are passed directly to the switching regulators, in the UIP mode (U/I mode with Adjustable Power Limitation) fixed upper limits for voltage, current and power can be entered. In UIR mode, the device maintains its internal resistance at the set value - an important feature that is particularly useful for testing of loads with high start-up current is important.

PV Simulation

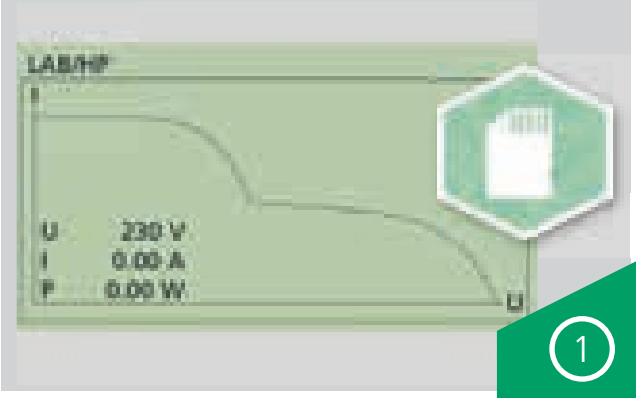
With the solar cell simulation mode PVsim, the devices offer the possibility to map the U/I curve of a solar cell. In doing so open circuit voltage and short circuit current are specified. This allows the behavior of solar modules to be mapped.
The HE-LAB series also offers a script mode for user-specific applications. The device can process scripts with a length of up to 100 commands.

Logging

The device also offers optional data logging for test documentation or subsequent evaluation, at which the values of all parameters are saved to the memory card in adjustable intervals. If this function is combined with a suitable script control, it is also possible to set up an independent stand-alone test station.

Limits and protection functions

The HE-LAB series is short-circuit proof and also offers U-Limit and an I-Limit function. This means that the user can limit the maximum adjustable range for voltage and current to protect connected components from overloading. In addition, an Over-Voltage-Protection is built in, which switches off the device at exceeding of a set limit value.



Highlights of the HE-LAB series

1

Independent

Characteristic curves can be loaded directly onto the device or via the optional SD card slot1). This allows a „stand-alone" workstation without PC. Values logged on SD card can be analyzed and evaluated later.

[1] SSD-Slot optional, please ask. SD card not included

2

Intuitive Software

HEIDEN provides clearly structured software for the HE-LAB series. Not only setpoints can be specified, it is also possible to simulate maximum power points (MPP). In addition, the output and current voltage curves can be recorded.

3

Multifaceted

The HE-LAB series is used wherever high power is required in the smallest space. Even under hard conditions, the HE-LAB series are valued as robust power supplies in industry as well as in research and development.

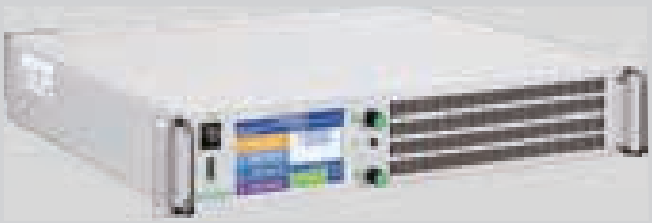
4

Customized

Whether a 19" device with special voltage, extended temperature range or individual control is required: individual adjustments of single devices as well as complete, customer-specific planned systems are possible.

HE-LAB / SMP 750 W – 2,4 kW

The small ones up to 1.200 V



The DC-Source HE-LAB / SMP

Designed for heavy industrial use and proven wherever high power is required in the smallest space - therefore in laboratories, test fields, at test of components or solar inverters, in the development of inverters, as battery replacement and generally in all tasks in industry and electronics production where high currents are required.

Operating modes

While in the UI mode the setting values for voltage and current are passed directly to the switching regulators without additional digital control, in the UIP mode fixed upper limits for voltage, current and power can be entered. In UIR mode, however, the device maintains its internal resistance at the set value - a feature that is particularly interesting for inverter tests or at tests of loads with high starting currents.

Exact display

The graphic display of the HE-LAB series shows in addition to the current measuring and setting values also the respective output characteristic curve and the aratt point.

- Simple operation via front panel
- U_{max} and I_{max} adjustable by the user, to limit output voltage or current
- Memory for freely programmable U/I curves
- UI, UIP, UIR mode, simulation of PV characteristics
- Analogue interface galvanically isolated with selectable level: 0...5 V or 0...10 V
- Soft interlock for external release
- Storable U/I curves (sequential control)
- Script control: Programming of sequences and characteristic curves from the optional memory card
- Data log function: Current operating values are in an adjustable interval on the optional memory card saved.
- Special versions on request

Description	Power	Voltage	Current	Dimensions
HE-LAB/SMP 715	750 W	15 V	50 A	19" x 1 U x 440 mm
HE-LAB/SMP 735	750 W	35 V	22 A	19" x 1 U x 440 mm
HE-LAB/SMP 745	750 W	45 V	17 A	19" x 1 U x 440 mm
HE-LAB/SMP 770	750 W	70 V	11 A	19" x 1 U x 440 mm
HE-LAB/SMP 7150	750 W	150 V	5 A	19" x 1 U x 440 mm
HE-LAB/SMP 7300	750 W	300 V	2,5 A	19" x 1 U x 440 mm
HE-LAB/SMP 7600	750 W	600 V	1,2 A	19" x 1 U x 440 mm
HE-LAB/SMP 71200	750 W	1.200 V	0,6 A	19" x 1 U x 440 mm

Description	Power	Voltage	Current	Dimensions
HE-LAB/SMP 115	1.200 W	15 V	80 A	19" x 1 U x 440 mm
HE-LAB/SMP 135	1.200 W	35 V	35 A	19" x 1 U x 440 mm
HE-LAB/SMP 145	1.200 W	45 V	30 A	19" x 1 U x 440 mm
HE-LAB/SMP 170	1.200 W	70 V	20 A	19" x 1 U x 440 mm
HE-LAB/SMP 1150	1.200 W	150 V	8 A	19" x 1 U x 440 mm
HE-LAB/SMP 1300	1.200 W	300 V	4 A	19" x 1 U x 440 mm
HE-LAB/SMP 1600	1.200 W	600 V	2 A	19" x 1 U x 440 mm
HE-LAB/SMP 11200	1.200 W	1.200 V	1 A	19" x 1 U x 440 mm
HE-LAB/SMP 215	2.400 W	15 V	160 A	19" x 2 U x 440 mm
HE-LAB/SMP 235	2.400 W	35 V	68 A	19" x 1 U x 440 mm
HE-LAB/SMP 245	2.400 W	45 V	53 A	19" x 1 U x 440 mm
HE-LAB/SMP 270	2.400 W	70 V	34 A	19" x 1 U x 440 mm
HE-LAB/SMP 2150	2.400 W	150 V	16 A	19" x 1 U x 440 mm
HE-LAB/SMP 2300	2.400 W	300 V	8 A	19" x 1 U x 440 mm
HE-LAB/SMP 2600	2.400 W	600 V	4 A	19" x 1 U x 440 mm
HE-LAB/SMP 21200	2.400 W	1.200 V	2 A	19" x 2 U x 440 mm

HE-LAB / HP 3 – 63 kW

The strong performers

The DC-Source HE-LAB / HP

Designed for heavy industrial applications, the HE-LAB/HP has proven itself wherever highest power is required - in test fields, at testing of components in power electronics, at testing of circuit breakers or solar inverters, in the development of inverters, as a replacement for batteries and generally in all tasks in industry and electronics production where high currents and power is required.

Operating modes

While in the UI mode the setting values for voltage and current are passed directly to the switching regulators without additional digital control, in the UIP mode fixed upper limits for voltage, current and power can be entered. In UIR mode, however, the device maintains its internal resistance at the set value - a feature that is particularly interesting for inverter tests or at tests of loads with high start-up current.

Power up to 1.4 MW (special versions)

up to 1,4 MW	to 1.500 V	to 50 kA	19“ x 24 HE Rack

Based on the proven HE-LAB / SMS and HE-LAB / HP power parts we manufacture individual systems. Active parallel connection enables higher power, which we install in a turnkey system. Special voltages and dynamic changes are possible as well as special enclosure versions.

- Indications via graphic color display
- Simple operation via front panel
- Constant current, voltage, resistance and Power operation
- U_{max} and I_{max} by the user adjustable, to limit output voltage or current
- Memory locations for freely programmable U/I curves
- UI, UIP, UIR mode, simulation of PV characteristics
- Analogue interface galvanically isolated with selectable level: 0...5 V or 0...10 V
- Soft interlock for external release
- Storable U/I curves (sequential control) Script control: Programming of sequences and characteristic curves from the optional memory card Data log function: Current operating values are in an adjustable interval on the optional memory card saved.
- Digital interfaces like IEEE488, RS232/485, USB and LAN optionally available
- Special versions on request

- 3 - 63 kW in one unit
- Greater power through master / slave
- Voltage from 15 V to 1.500 V
- Currents up to 2.250 A per unit

AC-Input	
Input voltage	1P / 230 V_{AC} 3P / 200 V_{AC} 3P / 400 V_{AC} 3P / 440 V_{AC} 3P / 480 V_{AC}
Input frequency	47...63 Hz

EMV and safety standards	
Safety standard	EN 60950
Interference emission	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005
Measuring, control and laboratory equipment	EN 61010-1:2010

DC-Output	
Settling time	< 3 ms (typ.)
Ripple	< 0,5 % (typ.)
Stability	±0,05 %, ±20 mV
Programming accuracy	0,1 %
Isolation AC - DC	3.000 V
Overvoltage protection	0...120 % Vmax
Safety devices	OC/OV/OT/OP
Grid control	±0,02 % FS
Load control	±0,05 % FS

Programming and control	
Control system	Control panel, RS232, LAN, Analog 0...5 V/0...10 V

Environmental conditions	
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m
Vibration	10...55 Hz/1 min 2G XYZ
Schock	< 20 G

Options	
HE-LAB opt/DC	Input 250...750 V_{DC}
HE-LAB opt/ATE	Without manual operation
HE-LAB opt/LT IEEE	Interface IEEE488
HE-LAB opt/LTRS485	Interface RS485
HE-LAB opt/USB	Interface USB
HE-LAB opt/SD	SD card slot
HE-LAB opt/E	Reduced functions
HE-LAB opt/LOCKAC	Interlock according to machine directionlines for mains input
HE-LABopt/LOCKDC	Interlock according to machine directionlines for DC access

HE-LAB / SMP and / HP Economy

Low-priced entry-level models

Proven technology

Based on the proven HE-LAB/SMP and HE-LAB/HP series, the economy versions HE-LAB/SMP-E and LAB/HP-E set new standards in economic efficiency.

The essentials

We have reduced the equipment to the essentials and integrated the functions that a voltage and current source requires for most applications. We have deliberately omitted the graphic display and programmability via the HMI.

Power where it is needed

Designed for heavy industrial use, the Economy series has proven itself wherever high power is required in the smallest of spaces - therefore in laboratories, test fields, at testing of components in power electronics, atm testing of circuit breakers or solar inverters, in the development of inverters, as a replacement for batteries and generally in all tasks in industry and electronics production where high currents are required.

- Compact design
- Parallel switchable via analogue interface
- Simple operation via front panel
- Constant Current, Constant Voltage,
- Integrated interfaces: AI 0...10 V and RS232
- Intuitive display via 7-segment displays
- U_{max} and I_{max} Adjustable by the user
- Optional digital interfaces:
  IEEE488, 485, USB and LAN

Technical data

The Economy Lines have the same DC output specifications as the proven HE-LAB/SMP and HE-LAB/HP series. Please refer to the data on the previous pages for technical details.

Complete systems

On HE-LAB / SMP / -SMP-E / HP and -HP-E basis

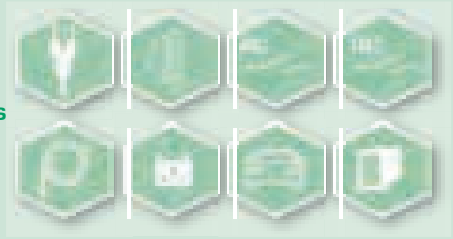
Onboard power supply

For some time now, HEIDEN has been offering customer-specific system solutions in addition to typical standard products. For this purpose, a competent team of employees is available for planning, implementation and maintenance.

The challenge

A well-known sports car manufacturer was confronted with the requirement to provide a 48 VDC on-board power supply system with a nominal 200 A and 12 kW, but also with a peak power of up to 300 A and 18 kW to inject. The output voltage of the required 48 V_{DC} due to its design, the on-board power supply was not allowed to be higher than 60 V_{DC} amount. The challenge here: The on-site AC supply only allowed a power absorption of < 14 kW.

Highlights



The solution

To meet the basic requirement of a charging system that delivers the highest possible DC power under the existing circumstances, HEIDEN installed two HE-LAB / SMS with each input 6 kW. The achieved sum power of 12 kW is achieved by the standard master-slave combination of the HE-LAB / SMS series.

Efficiency and over-current capability

Due to the high efficiency of DC sources, the customer's limited AC connection power is maintained. In the individually designed cabinet systems, HEIDEN integrated a monitored energy storage system to supply the peak current of 300 A. Special high-power super cap capacitors were used.

Security and connectivity

To ensure safe operation of the system, HEIDEN integrated an E-STOP system with PNOZ Safety Control system. In the event of an E-STOP, the safety concept isolates both the AC supply and the specially configured DC output.

Safe unloading

To safely discharge the integrated high-power capacities, HEIDEN engineers developed a passive DC discharge unit that discharges the super caps gently, safely and quickly at a constant current while the rest of the system is already voltage-free. Displays provide information about the current system status and the integrated Ethernet switch enables direct integration into the customer's network infrastructure.

The systems are manufactured individually.
An excerpt of the possible System options can be found on page 104.

HEA-PS, -PSE, -PSI, -PSB Series

Series HEA-PS, -PSE, -PSI, -PSB

One series, many variations. What are the differences between the device series? We have compiled the most common questions for you to help you make a quick selection.

- **What does „autorange“ mean on these devices?**

» Due to the flexible output characteristic curve, the output stage can drive a higher current at lower voltage and apply a higher voltage at lower current. All series have an autorange area.

- **Several devices should be connected in parallel for higher power can be operated. Which devices are suitable special?**

» We recommend devices with master-slave interface,
» that is, the HEA-PSE, -PSI or -PSB. The Master-Slave
» Interface ensures even power distribution and adds up current and power. You only control
» nor the master device.

- **How do the operating concepts distinguish?**

» The series HEA-PS and -PSE have a color TFT
» Display, operation is via rotary encoder and push button.
» The HEA-PSI and -PSB series have a Color display with
» touch function.
» The simultaneous display of target and actual values is
» possible at all devices.

- **Which devices have a functional generator and what can it be used for?**

» The HEA-PSI and -PSB series are supplied ex works with a
» function generator. There can be U(t), I(t), U(I) and I(U) characteristics and functions programmed. This enables a selfsufficient operation e.g. as PV simulator or battery tester.

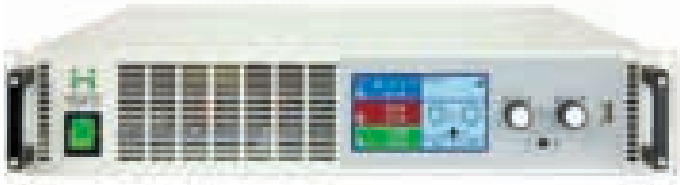
- **Which interfaces are possible, which are already integrated?**

The HEA-PS and -PSE series have the most common Interfaces permanently installed.
The HEA-PSI and -PSB series also feature a digital slot, in order to provide further digital fieldbus interfaces integrate. These can be upgraded at any time.

HEA-PS9000 1U up to 1,5 kW

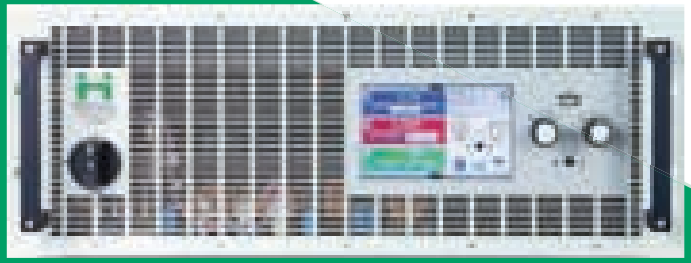
HEA-PS & PSE9000 2U up to 3 kW

HEA-PS & PSE9000 3U up to 15 kW

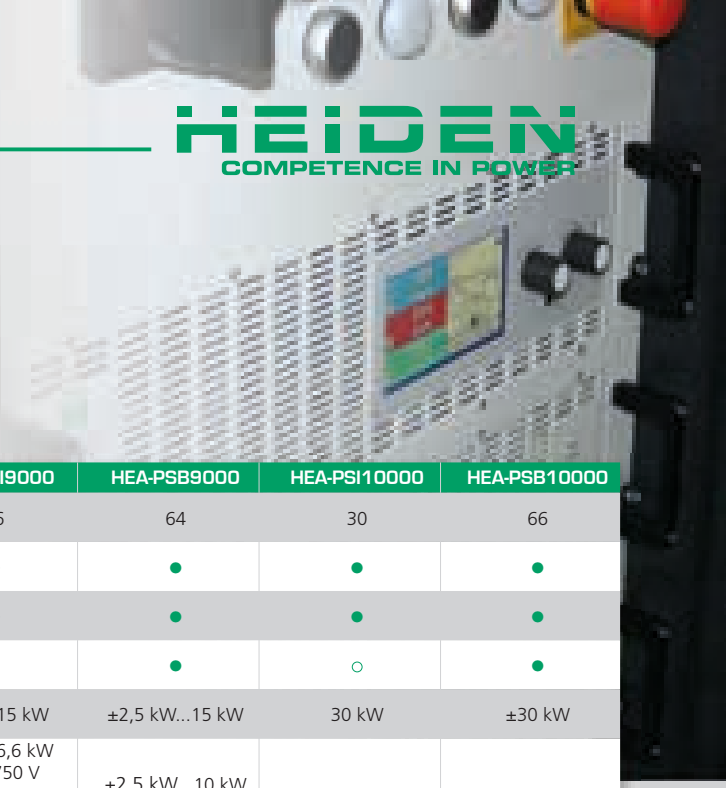


HEA-PSI9000 2U bis 3 kW

HEA-PSI9000 3U up to 15 kW



HEA-PSI and PSB10000 4U 30 kW



Overview

The most important features

- ● Built in serially
- ⊙ optional available
- ○ not available

Features	HEA-PS9000	HEA-PSE9000	HEA-PSI9000	HEA-PSB9000	HEA-PSI10000	HEA-PSB10000
Page	22	25	26	64	30	66
Autorange output	●	●	●	●	●	●
DC-Source	●	●	●	●	●	●
DC-Source-Sink	○	○	○	●	○	●
Power	1 kW...15 kW	3,3 kW...15 kW	1 kW...15 kW	±2,5 kW...15 kW	30 kW	±30 kW
Voltage to	1 kW...6,6 kW max. 750 V 10 kW max. 1.000 V 15 kW max. 1.500 V	3,3 kW...6,6 kW max. 750 V 10 kW max. 1.000 V 15 kW max. 1.500 V	1 kW...6,6 kW max. 750 V 10 kW max. 1.000 V 15 kW max. 1.500 V	±2,5 kW...10 kW max. 750 V ±15 kW max. 1.500 V	max. 2.000 V	max. 2.000 V
Function Generator	○	○	●	●	●	●
Front USB for sticks Programming, Logging	○	○	●	●	●	●
TFT color display	●	●	●	●	●	●
Touch operation	○	○	●	●	●	●
Operating mode CV, CC, CP	●	●	●	●	●	●
Operating mode CR	○	○	●	●	●	●
Analogue Interface	●	●	●	●	●	●
USB	●	●	●	●	●	●
LAN	●	⊙	⊙	⊙	●	●
Interface slot	○	⊙	⊙	●	●	●
Extension module: CAN open CAN RS232 Profibus Ethernet/IPUSB Profinet-IO Modbus-TCP EtherCAT	○	⊙	⊙	⊙	⊙	⊙
Master-Slave-Bus for Parallel connection	○	●	●	●	●	●
PV-Simulation	○	○	●	●	●	●
Operating software	●	●	●	●	●	●
Multi-Control Software for up to 20 devices	⊙	⊙	⊙	⊙	⊙	⊙
Battery test	○	○	○	●	○	●
Akku-Simulation (SoC)	○	○	○	○	○	⊙
Sense connection	●	●	●	●	●	●
Protection functions: OVP, OCP, OPP, OTP	●	●	●	●	●	●

HEA-PS9000 1U and 2U

The Power Supply HEA-PS9000

The microprocessor-controlled laboratory power supplies of the HEA-PS9000 1U and 2U series offer the user many functions and features serially, which make arating with these units considerably easier.

The clearly arranged control panel with two rotary knobs, six keys and a clear, blue illuminated LCD or colored TFT display for values and status offers all possibilities to operate the unit easily and with few movements.

Power

All models have a flexible, power-controlled output stage that reduces current at high output voltage or voltage at high output current so that the maximum output power is not exceeded. The power setpoint is adjustable. So that a wide range of applications can be covered with only one device.

Protection functions

To protect the connected consumers from damage, an overvoltage threshold (OVP), an overcurrent threshold (OCP), and an overpower threshold (OPP) can be set.

When one of these values is reached, the DC output is switched off and an alarm message is shown on the display and on the interfaces. There is also an overtemperature protection (OTP), which switches off the DC output at overheating.

Display

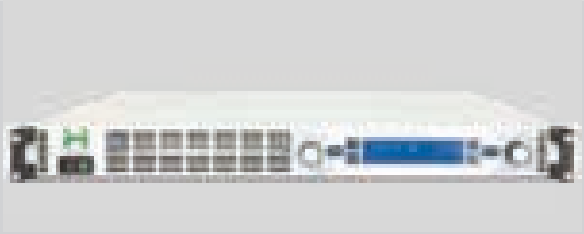
All important information is on a LCD or TFT display. Thus the current output values and the preset setpoints for voltage and current, the control mode (CV, CC, CP) and other statuses, error messages and settings of the setup menu are clearly available.

- High efficiency up to 95 %
- Output power: 1.000 W to 3.000 W
- Output voltages: 0...40 V to 0...750 V
- Output currents: 0...4 A to 0...120 A
- Flexible, power-controlled output stage
- Various protection functions (OVP, OCP, OPP, OTP)
- Control panel with keys and blue LCD or TFT display for actual values, setpoints, status and alarm
- Galvanically isolated, analogue interface
- 40 V models according to SELV in compliance with EN 60950
- Discharge circuit (Uout < 60 V in ≤ 10 s)
- High-speed variants for all models
- USB and Ethernet interface as standard

- Clear, concise display

- LAN
- USB
- Analogue

HEA-PS9000 1U



Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PS9080-50U1	1,5 kW	80 V	50 A	≤ 91 %	19" x 1 U x 500 mm
HEA-PS9200-25U1	1,5 kW	200 V	25 A	≤ 93 %	19" x 1 U x 500 mm
HEA-PS9360-15U1	1,5 kW	360 V	15 A	≤ 94 %	19" x 1 U x 500 mm
HEA-PS9500-10U1	1,5 kW	500 V	10 A	≤ 94 %	19" x 1 U x 500 mm
HEA-PS9750-06U1	1,5 kW	750 V	6 A	≤ 95 %	19" x 1 U x 500 mm
HEA-PS9080-100U1	3 kW	80 V	100 A	≤ 92 %	19" x 1 U x 500 mm
HEA-PS9200-50U1	3 kW	200 V	50 A	≤ 93 %	19" x 1 U x 500 mm
HEA-PS9360-30U1	3 kW	360 V	30 A	≤ 93 %	19" x 1 U x 500 mm
HEA-PS9500-20U1	3 kW	500 V	20 A	≤ 93 %	19" x 1 U x 500 mm
HEA-PS9750-12U1	3 kW	750 V	12 A	≤ 93 %	19" x 1 U x 500 mm

DC-Output voltage	
Accuracy	< 0,1 %
Stability 0...100 % load	< 0,05 %
Stability ±10 % U_E	< 0,02 %
Adjust 10...100 % load	< 2,2 ms
Rise time 10-90 % (CV)	max. 15 ms

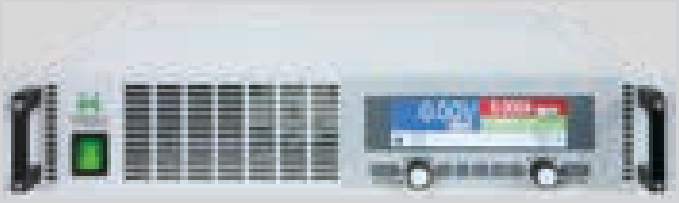
DC-Output current	
Accuracy	< 0,2 %
Stability 0...100 % U_{DC}	< 0,15 %
Stability at ±10 % U_E	< 0,05 %

DC-Output power	
Accuracy	< 1 %

Voltage strength	
Input to enclosure	2.500 V_{DC}
Input to exit	2.500 V_{DC}
Output to enclosure (PE)	max. 400 V_{DC}

Interface	
Analogue interface	galv. separate 10 V < 0,2 % 5 V < 0,4 %

HEA-PS9000 2U



Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PS9040-40U2	1 kW	40 V	40 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9080-40U2	1 kW	80 V	40 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9200-15U2	1 kW	200 V	15 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9360-10U2	1 kW	360 V	10 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9500-06U2	1 kW	500 V	6 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9750-04U2	1 kW	750 V	4 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9040-60U2	1,5 kW	40 V	60 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9080-60U2	1,5 kW	80 V	60 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9200-25U2	1,5 kW	200 V	25 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9360-15U2	1,5 kW	360 V	15 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9500-10U2	1,5 kW	500 V	10 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9750-06U2	1,5 kW	750 V	6 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9040-120U2	3 kW	40 V	120 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9080-120U2	3 kW	80 V	120 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PS9200-50U2	3 kW	200 V	50 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9360-30U2	3 kW	360 V	30 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9500-20U2	3 kW	500 V	20 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PS9750-12U2	3 kW	750 V	12 A	≤ 93 %	19" x 2 U x 463 mm

DC-Output voltage	
Accuracy	< 0,1 %
Stability at 0...100 % load	< 0,05 %
Stability at ±10 % U_E	< 0,02 %
Adjust 10...100 % load	< 2 ms
Rise time 10..90 % (CV)	Max. 30 ms

DC-Output current	
Accuracy	< 0,2 %
Stability 0...100 % U_{DC}	< 0,15 %
Stability at ±10 % U_E	< 0,05 %

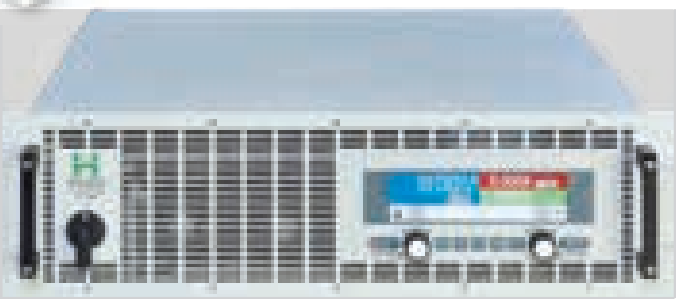
DC-Output power	
Accuracy	< 1%

Voltage strength	
Input to enclosure	2.500 V_{DC}
Input to exit	2.500 V_{DC}
Output to enclosure (PE)	max. 400 V_{DC}

Interface	
Analogue interface	galv. separate 10 V < 0,2 % 5 V < 0,4 %

Specification	
Norms	EN 60950, EN 61326, EN 55022 Class B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2000 m

HEA-PS9000 3U



Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PS9040-170U3	3,3 KW	40 V	170 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9080-170U3	5 KW	80 V	170 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9200-70U3	5 KW	200 V	70 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9360-40U3	5 KW	360 V	40 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9500-30U3	5 KW	500 V	30 A	≤ 95,5 %	19" x 3 U x 609 mm
HEA-PS9750-20U3	5 KW	750 V	20 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PS9040-340U3	6,6 KW	40 V	340 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9040-510U3	10 KW	40 V	510 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9080-340U3	10 KW	80 V	340 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9200-140U3	10 KW	200 V	140 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9360-80U3	10 KW	360 V	80 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9500-60U3	10 KW	500 V	60 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9750-40U3	10 KW	750 V	40 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PS91000-30U3	10 KW	1.000 V	30 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9080-510U3	15 KW	80 V	510 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9200-210U3	15 KW	200 V	210 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9360-120U3	15 KW	360 V	120 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PS9500-90U3	15 KW	500 V	90 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PS9750-60U3	15 KW	750 V	60 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PS91500-30U3	15 KW	1.500 V	30 A	≤ 95 %	19" x 3 U x 609 mm

DC-Output voltage	
Accuracy	< 0,1 %
Stability 0...100 % load	< 0,05 %
Stability ±10 % U_E	< 0,02 %
Adjust 10...100 % load	< 2 ms
Rise time 10...90 % (CV)	max. 30 ms

DC-Output current	
Accuracy	< 0,2 %
Stability 0...100 % U_{DC}	< 0,15 %
Stability at ±10 % U_E	< 0,05 %

DC-Output power	
Accuracy	< 1 %

Voltage strength	
Input to enclosure	2.500 V_{DC}
Input to exit	2.500 V_{DC}
Output to enclosure (PE)	max. 400 V_{DC}
Analogue interface	galv. separate 10 V < 0,2 % 5 V < 0,4 %

Specification	
Norms	EN 60950, EN 61326, EN 55022 Class B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2000 m

Expandability

The individual devices can be configured in various combinations and in cabinets up to 42 U according to customer requirements. This allows systems with total power ratings of up to 150 kW in parallel connection.

Digital Interfaces

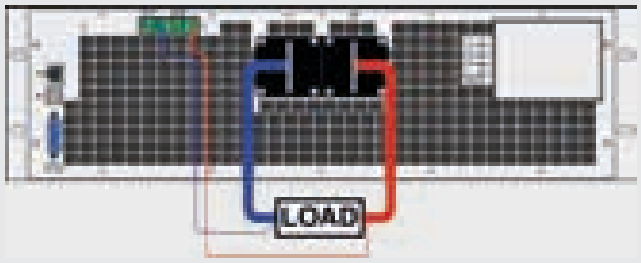
Almost all models are equipped serially with two to 1.500 V_{DC} galvanian separate digital interfaces (standard: 1x USB & 1x Ethernet, with option 3W: 1x USB & 1x GPIB) on the back side. USB and Ethernet can be used either via SCPI command language or ModBus RTU protocol to control and monitor the devices, GPIB only with SCPI.

Remote Control

The standard remote control input (sense) can be connected directly to the consumer to compensate for the voltage drop on the load lines. The device automatically detects when the remote control lines are connected and controls the output voltage directly at the consumer.

Analogue Interface

A galvanically separate analogue interface is located on the back of the device. It has analogue control inputs for 0...10 V or 0...5 V to program voltage, current and power from 0...100 %. Output voltage and output current can be read out via analogue monitor outputs with 0...10 V or 0...5 V. Furthermore there are some status inputs and outputs.



HEA-PS9000 Sense-Function

Sense Connection (Remote Control)

If the source in constant voltage mode (CV) is to keep the output voltage constant not at the DC output, but at the Load, then the „Sense“ input can be connected to the Load.

This compensates for the voltage drop over the connection lines between power supply and Load, which can be caused by high load current. The maximum compensation is listed in the technical data.

Device Terminal

A device can be conveniently operated via the device terminal. In addition to setting the setpoint value, the current values of the DC output can be read off. The clearly arranged software enables the comfortable configuration of all device parameters.

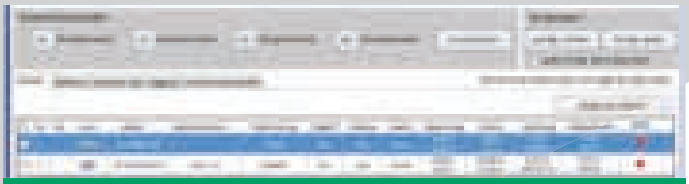
Sequences

The optional sequence function enables the user to change various operating states over a defined period of time. For fast transients and ramps as well as U (I) functions we recommend the HEA-PSI9000 series on the following pages.

Logging

The optional logging function of the HEIDEN Power-Control enables the recording of the current measured values. The generated CSV file can then be reused and evaluated.

High “usability”: The Software HEIDEN powercontrol



Multi-Control: Manage multiple devices

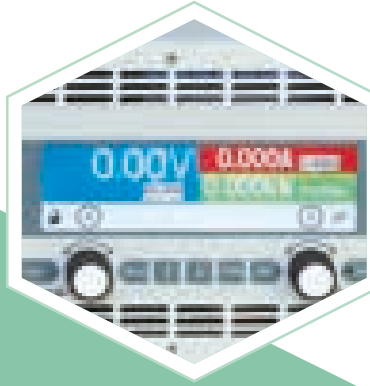
HEA-PSE9000 2U and 3U

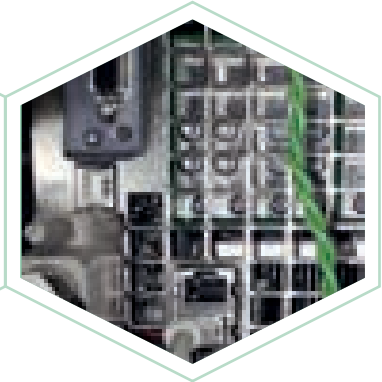
Intermediate stage between HEA-PS and HEA-PSI

The HEA-PSE9000 series of high power laboratory power supplies combine the most important features of the HEA-PS9000 3U and HEA-PSI9000 3U series. All technical data regarding AC connection and DC output are identical to these analogue series.

The differences to the HEA-PS9000 series are the larger selection of digital interfaces, which also allows connection to field buses, and the master-slave bus, which is available serially. The extra features like the integrated function generator and the touch display are reserved for the HEA-PS9000 series.

- Especially suitable for higher power in M-S parallel operation
- Interface slot for digital fieldbus modules (page 28 below)





HEA-PSI9000 2U and 3U

The Power Supply Intelligence HEA-PSI9000

The microprocessor-controlled laboratory power supplies of the HEA-PSI9000 2U and 3U series offer the user many functions and features serially, in addition to a user-friendly, interactive menu navigation, which makes arating with these units considerably easier. In this way setpoints, monitoring limits and other settings as well as the easily exchangeable interface modules can be configured quickly. The integrated monitoring functions for all output parameters simplify a test setup and often make external monitoring measures unnecessary.

Display and operating elements

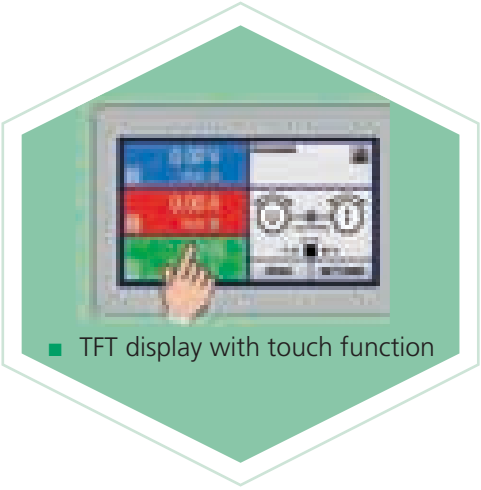
Actual values and setpoints of output voltage, current and power are clearly shown on a graphic display. The color TFT display is touch-sensitive and allows intuitive operation of all functions.
Voltage, current, power and the internal resistance can be adjusted by means of incremental encoders or by direct input via a numeric keypad on the display. To protect against incorrect operation, the operating elements can be locked.

Function generator

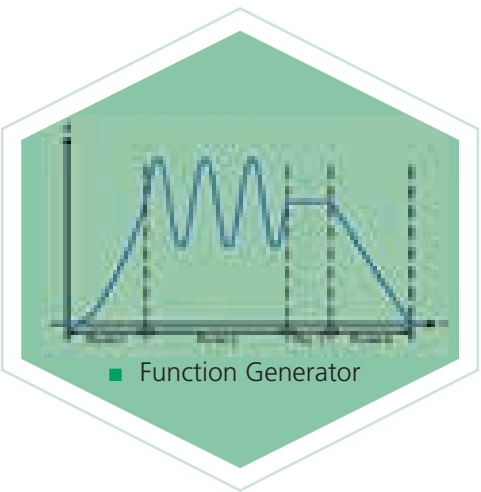
The HEA-PSI series has a true function generator that can generate typical functions and apply them to either the output voltage or the output current. The function generator can be configured and controlled completely on the device via the touch panel, or by remote control system via one of the digital interfaces.

In addition to the standard functions, which are based on a so-called arbitrary generator, this arbitrary generator is openly accessible in order to be able to create and run complex procedures for e.g. product tests from up to 100 sequences. These sequences can be saved and loaded via USB stick and the USB port on the control panel to enable a quick change between different test or inspection sequences.

- High efficiency up to 95,5 %
- Flexible, power-controlled output stage
- Various protection functions (OVP, OCP, OPP, OTP)
- Intuitive TFT touch panel
- Remote control input
- Galvanically separate, analogue interface
- Integrated function generator
- Photovoltaic Sources Simulation
- Internal resistance control
- 40 V models according to SELV in compliance with EN 60950
- Discharge circuit (Uout < 60 V in ≤ 10 s)
- USB interface serially
- Optional, digital interfaces modules

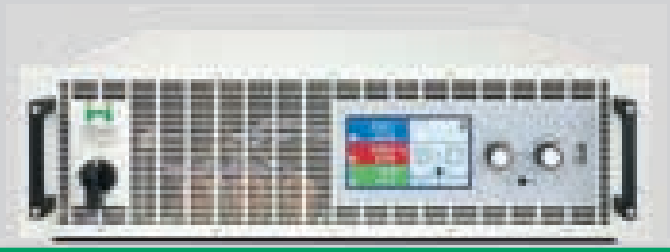


■ TFT display with touch function



■ Function Generator

Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PSI9040-40U2	1 kW	40 V	40 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9080-40U2	1 kW	80 V	40 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9200-15U2	1 kW	200 V	15 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9360-10U2	1 kW	360 V	10 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9500-06U2	1 kW	500 V	6 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9750-04U2	1 kW	750 V	4 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9040-60U2	1,5 kW	40 V	60 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9080-60U2	1,5 kW	80 V	60 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9200-25U2	1,5 kW	200 V	25 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9360-15U2	1,5 kW	360 V	15 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9500-10U2	1,5 kW	500 V	10 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9750-06U2	1,5 kW	750 V	6 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9040-120U2	3 kW	40 V	120 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9080-120U2	3 kW	80 V	120 A	≤ 92 %	19" x 2 U x 463 mm
HEA-PSI9200-50U2	3 kW	200 V	50 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9360-30U2	3 kW	360 V	30 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9500-20U2	3 kW	500 V	20 A	≤ 93 %	19" x 2 U x 463 mm
HEA-PSI9750-12U2	3 kW	750 V	12 A	≤ 93 %	19" x 2 U x 463 mm



Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PSI9040-170U3	3,3 KW	40 V	170 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9080-170U3	5 KW	80 V	170 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9200-70U3	5 KW	200 V	70 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9360-40U3	5 KW	360 V	40 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9500-30U3	5 KW	500 V	30 A	≤ 95,5 %	19" x 3 U x 609 mm
HEA-PSI9750-20U3	5 KW	750 V	20 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PSI9040-340U3	6,6 KW	40 V	340 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9040-510U3	10 KW	40 V	510 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9080-340U3	10 KW	80 V	340 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9200-140U3	10 KW	200 V	140 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9360-80U3	10 KW	360 V	80 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9500-60U3	10 KW	500 V	60 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9750-40U3	10 KW	750 V	40 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PSI91000-30U3	10 KW	1.000 V	30 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9080-510U3	15 KW	80 V	510 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9200-210U3	15 KW	200 V	210 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9360-120U3	15 KW	360 V	120 A	≤ 93 %	19" x 3 U x 609 mm
HEA-PSI9500-90U3	15 KW	500 V	90 A	≤ 95 %	19" x 3 U x 609 mm
HEA-PSI9750-60U3	15 KW	750 V	60 A	≤ 94 %	19" x 3 U x 609 mm
HEA-PSI91500-30U3	15 KW	1.500 V	30 A	≤ 95 %	19" x 3 U x 609 mm

AC-Input	
Voltage (1 / 1,5 kW)	90...264 V_{AC} 1 Ph
Voltage (3 kW)	180...264 V_{AC} 1 Ph
Voltage (3,3 / 5kW)	340...460 V_{AC} 2 Ph
Voltage (10-15 kW)	340...460 V_{AC} 3 Ph
Frequency	45...66 Hz
Power factor	> 0,99

DC-Output voltage	
Accuracy	< 0,1 %
Stability 0...100 % Load	< 0,05 %
Stability ±10 % U_E	< 0,02 %
Adjust 10...100 %	< 2 ms
Anstieg10...90 % U	Max. 30 ms
Overvoltage protection	Adjustable

DC-Output current	
Accuracy	< 0,2 %
Stability	< 0,15 %
Stab. at ±10 % U_E	< 0,05 %

DC-Output power	
Accuracy	< 1 %

Interfaces	
Built in	1x USB Typ B
Slot	upgradeable plug-in modules GPIB
Analogue interface	0..5 V < 0,2 % 0..10 V < 0,4 %

Voltage strength	
Input to enclosure	2.500 V_{DC}
Input to exit	2.500 V_{DC}
Output to enclosure (PE)	max. 400 V_{DC}
Analogue interface	galv. separate 0..10 V < 0,2 % 0..5 V < 0,4 %

Specification	
Norms	EN 60950, EN 61326, EN 55022 Class B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m
Pollution degree	2
Protection class	1

HEA-PSI9000 15U and 24U

Compact and high power

High power

The new system series HEA-PSI9000 15U / 24U supplements the standard power supplies of the HEA-PSI9000 3U series with high power power supplies in 19" cabinets. There are 30 different configurations in five different power levels available. The cabinet system is regarded as a single device with extended power and is also operated or remote controlled in this way. The same options are available as for the standard models of the HEA-PSI9000 3U series.

The 30 kW and 45 kW systems are installed in racks with 15 U and the systems with 60 kW, 75 kW and 90 kW are delivered in racks with 24 U. Each rack has lockable doors at the front and back and four castors that can be locked. The system is delivered completely assembled and is ready for immediate operation after installation on site.

- For three phase connection 400 V and 50/60 Hz
- Nominal power: 30 kW, 45 kW, 60 kW, 75 kW, 90 kW
- Nominal voltages from 80...1.500 V
- Currents up to 3,060 A
- Fully assembled and ready for connection
- Function generator
- USB and analogue interface serially
- Module slot for profinet interface modules, Profibus, CAN, CANopen, RS232, Ethernet, ModBus
- Support for SCPI and ModBus protocol
- Color TFT touch panel

DC output via copper rails (DC bus)
AC input selectively fused
Interfaces integrated.

The systems are manufactured individually. An excerpt of the possible system options can be found on page 104.

HEIDEN
COMPETENCE IN POWER

Description	Power	Voltage	Current	Output capacity	Connecti-on Current	Dimensions
HEA-PSI9080-1020U15	30 kW	80 V	1.020 A	50,8 mF	~ 56 A	15 U
HEA-PSI9200-420U15	30 kW	200 V	420 A	15,1 mF	~ 56 A	15 U
HEA-PSI9360-240U15	30 kW	360 V	240 A	2.400 µF	~ 56 A	15 U
HEA-PSI9500-180U15	30 kW	500 V	180 A	1.518 µF	~ 56 A	15 U
HEA-PSI9750-120U15	30 kW	750 V	120 A	618 µF	~ 56 A	15 U
HEA-PSI91000-80U15	30 kW	1.000 V	80 A	266 µF	~ 56 A	15 U
HEA-PSI91500-60U15	30 kW	1.500 V	60 A	168 µF	~ 56 A	15 U
HEA-PSI9080-1530U15	45 kW	80 V	1.530 A	76,1 mF	~ 84 A	15 U
HEA-PSI9200-630U15	45 kW	200 V	630 A	22,7 mF	~ 84 A	15 U
HEA-PSI9360-360U15	45 kW	360 V	360 A	3.600 µF	~ 84 A	15 U
HEA-PSI9500-270U15	45 kW	500 V	270 A	2.277 µF	~ 84 A	15 U
HEA-PSI9750-180U15	45 kW	750 V	180 A	927 µF	~ 84 A	15 U
HEA-PSI91000-120U15	45 kW	1.000 V	120 A	399 µF	~ 84 A	15 HU
HEA-PSI91500-90U15	45 kW	1.500 V	90 A	252 µF	~ 84 A	15 U
HEA-PSI9080-2040U24	60 kW	80 V	2.040 A	101,5 mF	~ 112 A	24 U
HEA-PSI9200-840U24	60 kW	200 V	840 A	30,2 mF	~ 112 A	24 U
HEA-PSI9360-480U24	60 kW	360 V	480 A	4.800 µF	~ 112 A	24 U
HEA-PSI9500-360U24	60 kW	500 V	360 A	3.036 µF	~ 112 A	24 U
HEA-PSI9750-240U24	60 kW	750 V	240 A	1.236 µF	~ 112 A	24 U
HEA-PSI91000-160U24	60 kW	1.000 V	160 A	432 µF	~ 112 A	24 U
HEA-PSI91500-120U24	60 kW	1.500 V	120 A	336 µF	~ 112 A	24 U
HEA-PSI9080-2550U24	75 kW	80 V	2.550 A	127 mF	~ 140 A	24 U
HEA-PSI9200-1050U24	75 kW	200 V	1.050 A	37,8 mF	~ 140 A	24 U
HEA-PSI9360-600U24	75 kW	360 V	600 A	6.000 µF	~ 140 A	24 U
HEA-PSI9500-450U24	75 kW	500 V	450 A	3.795 µF	~ 140 A	24 U
HEA-PSI9750-300U24	75 kW	750 V	300 A	1.545 µF	~ 140 A	24 U
HEA-PSI91000-200U24	75 kW	1.000 V	200 A	665 µF	~ 140 A	24 U
HEA-PSI91500-150U24	75 kW	1.500 V	150 A	420 µF	~ 140 A	24 U
HEA-PSI9080-3060U24	90 kW	80 V	3.060 A	152,3 mF	~ 168 A	24 U
HEA-PSI9200-1260U24	90 kW	200 V	1.260 A	45,4 mF	~ 168 A	24 U
HEA-PSI9360-720U24	90 kW	360 V	720 A	7.200 µF	~ 168 A	24 U
HEA-PSI9500-540U24	90 kW	500 V	540 A	4.554 µF	~ 168 A	24 U
HEA-PSI9750-360U24	90 kW	750 V	360 A	1.854 µF	~ 168 A	24 U
HEA-PSI91000-240U24	90 kW	1.000 V	240 A	800 µF	~ 168 A	24 U
HEA-PSI91500-180U24	90 kW	1.500 V	180 A	504 µF	~ 168 A	24 U

AC-Input	
Voltage	340...460 V_{AC}
Frequency	45...66 Hz
Powers factor	> 0,99

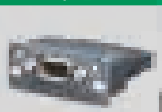
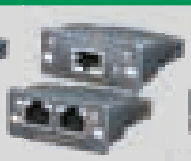
DC-Output voltage	
Accuracy	< 0,1 %
Stability 0...100 % load	< 0,05 %
Stability ±10 % U_E	< 0,02 %
Adjustment 10...100 %	< 2 ms

DC-Output current	
Accuracy	< 0,2 %
Stability	< 0,15 %
Stability at ±10 % U_E	< 0,05 %

DC-Output power	
Accuracy	< 1 %

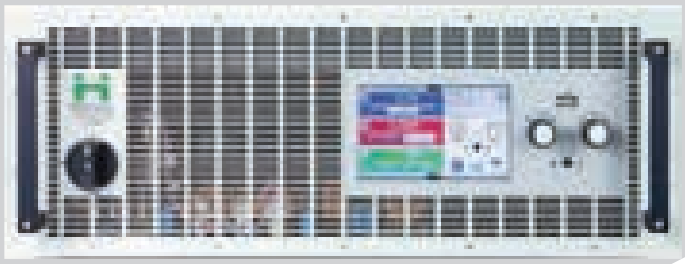
Interfaces	
Built in	1x USB Typ B
Slot	upgradeable plug-in modules GPIB
Analogue interface	5 V < 0,2 % 10 V < 0,4 %

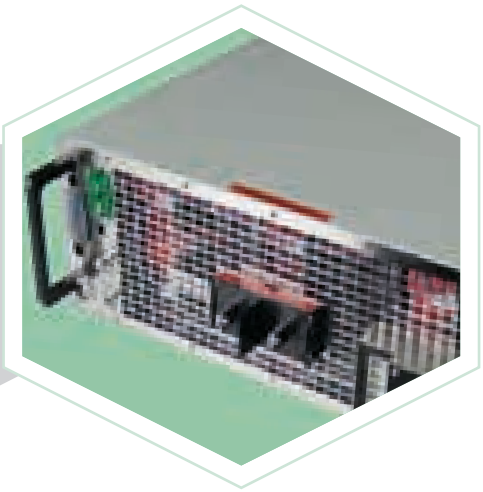
Specification	
Norms	EN 60950, EN 61326, EN 55022 Class B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %

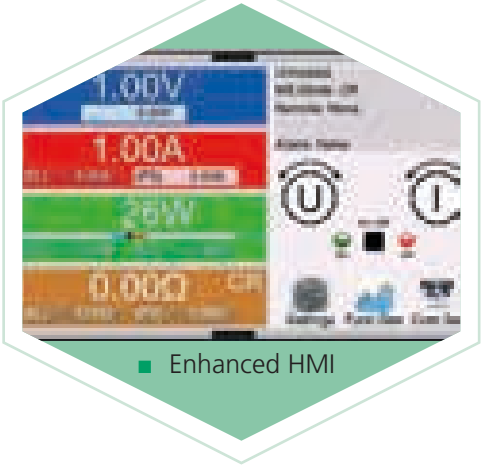
	CAN	CANopen	Ethernet	ModBus TCP	PBus/Pnet	RS232	GPIB	EtherCAT
Interface								
Specs	Type: Bus 10 kBit – 1 MBit CAN 2.0 A & 2.0 B Integrated bus termination DBC files Cyclic data	Type: Bus 10 kBit – 1 MBit CANopen stan-dard EDS/XDD file Customisable database	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control functions 1 or 2 port version Integrated switch (2 port version)	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control Supports ModBus TCP frame 1 or 2 port version Integrated switch (2 port version)	Profinet: Type: Network 1 or 2 port version Integrated switch (2 port version) Profibus: Type: Bus Up to 12 Mbit	Type: P2P 9600 – 115200 Bd No handshaking	Type: P2P Parallel bus IEE 488 standard Built-in	Type: EtherCAT-Slave
Pro	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces	High data speed Long distance Network topology Exchangeable with other interfaces SCPI supported LabView supported Plug 'n play	High data speed Long distance Network topology Exchangeable with other interfaces Easy ModBus network integration Plug 'n play	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces PLC compatible	Medium distance Exchangeable with other interfaces SCPI supported LabView supported Low costs	SCPI supported Very easy setup and integration Unified support of different devices	Integrated PDO and SDO CANopen Protocoll (CoE)
Contra	No plug 'n play on PC side CAN software required High overall costs	No plug 'n play on PC side CANopen software required High overall costs	Typical network issues Complicated setup	ModBus TCP software required Typical network issues Complicated setup	No plug 'n play on PC side Extra software required High overall costs	Low data speed One RS232 port required per device No bus, no network	Short distance Very high costs Built-in Complicated cable system	

HEA-PSI10000 4U

30 kW in 4 U







■ Enhanced HMI

The Power Supply Intelligence

HEA-PSI10000 4U

The new HEA-PSI10000 4U series of high-power laboratory power supplies is a power extension of the proven HEA-PSI9000 3U series and offers the nominal power twice at only 1 height unit more. Compared to the HEA-PSI9000 3U series at 30 kW power, this results in a space saving of 2 U or one third. Due to the extended master-slave bus, up to 36 devices can be realized in a system network, which can achieve a total power of up to 1.08 MW.

Extensive equipment

All models provide the user with many functions and features serially by means of user-friendly, interactive menu navigation, which makes arithmetic with these devices considerably easier. User profiles and functional sequences can be easily configured and stored, increasing the reproducibility of a test or other applications. To increase overall power, individual racks with up to 240 kW in up to 47 U or systems can be configured according to customer requirements.

- AC input range 342...528 VAC
- Power: 30 kW per device
- Voltage: 60 V (SELV according to EN 60950) up to 2,000 VDC
- Currents: 40 A to 1,000 A
- Flexible, power controlled output stage
- Protection functions (OVP, OCP, OPP, OTP)
- Intuitive 5" TFT touch panel with display for all values, status displays and messages
- Remote sensor input with automatic recognition
- Galvanically separate interfaces (analogue, USB, Ethernet)
- Integrated function generator
- Photovoltaic Sources Simulation
- Internal resistance control
- SCPI and ModBus RTU/TCP command language
- LabView supports
- Control system software for Windows

Description	Power	Voltage	Current	Efficiency	Dimensions	Weight
HEA-PSI10060-1000U4	30 kW	60 V	1.000 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI10080-1000U4	30 kW	80 V	1.000 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI10200-420U4	30 kW	200 V	420 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI10360-240U4	30 kW	360 V	240 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI10500-180U4	30 kW	500 V	180 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI10750-120U4	30 kW	750 V	120 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI11000-80U4	30 kW	1.000 V	80 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI11500-60U4	30 kW	1.500 V	60 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSI12000-40U4	30 kW	2.000 V	40 A	≤ 93 %	19" x 4 U x 670 mm	about 50 kg

DC-Output

Devices with DC output voltages between 0...60 V and 0...2.000 V and currents between 0...40 A and 0...1.000 A at a power class with 0...30 kW are available. The connections for input and output are located on the back of the devices.

Discharge Circuit

Models with a nominal voltage of 200 V or higher have a discharge circuit. This discharges the output capacitors after switching off the DC output and ensures that the sometimes dangerously high output voltage drops below 60 VDC in max. 10 seconds. This value is the limit for voltage dangerous to touch.

Protection Functions

To protect the connected consumers from damage, an overvoltage threshold (OVP), an overcurrent threshold (OCP), and an over per power threshold (OPP) can be set. If one of these values is reached, the DC output is switched off and an alarm message is shown on the display and on the interfaces. Furthermore, there is an overtemperature protection, which switches off the DC output at overheating.

AC-Input	
Voltage	342...528 V_{AC} 3 Ph
Frequency	45...66 Hz
Power factor	> 0,99

DC-Output voltage	
Accuracy	< 0,05 % from nominal value
Stability 0...100 % load	< 0,05 % from nominal value
Stability ±10 % U_E	< 0,02 % from nominal value
Adjust 10...100 %	< 2 ms
Rise time 10...90 % U	max. 30 ms
Overvoltage protection	Adjustable 0...110 % U_{Nenn}

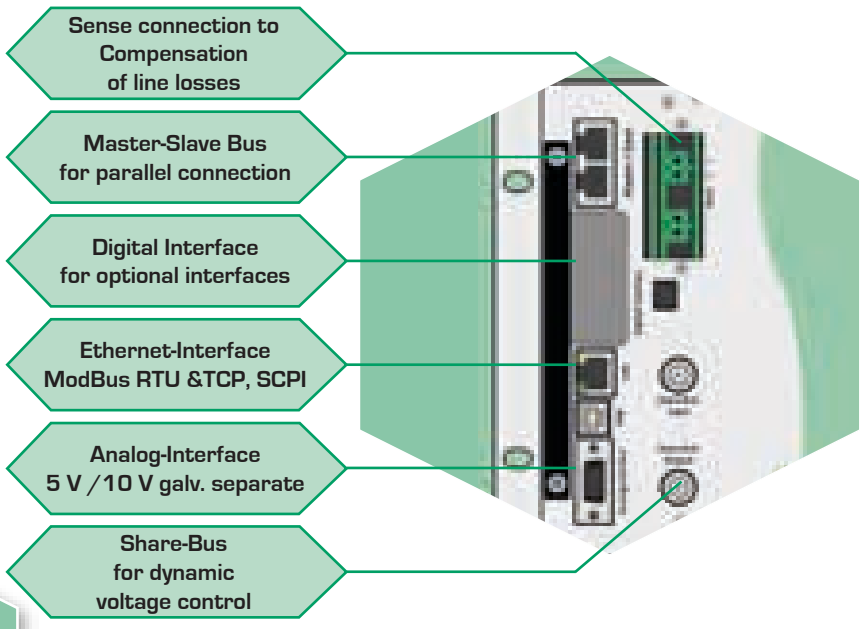
DC-Output current	
Accuracy	< 0,1 % from nominal value
Stability	< 0,15 % from nominal value
Stab. at ±10 % U_E	< 0,05 % from nominal value

DC-Output power	
Accuracy	< 0,3 % from nominal value

Interfaces	
Built in	1x USB Typ B 1x Ethernet 1x Analogue
Slot	upgradeable plug-in modules
Analogue interface	0...5 V < 0,2 % 0...10 V < 0,4 %

Voltage strength	
Input to enclosure	2.500 V_{DC}
Input to exit	2.500 V_{DC}
Output to enclosure (PE) Device dependent	600...2.000 V_{DC}

Specification	
Norms	EN 61010-1 EN 61000-6-2 EN 61000-6-3 Class B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m
Pollution degree	2
Protection class	1



Genesys™ Serie 1U and 2U

The DC-Source Genesys™ Series

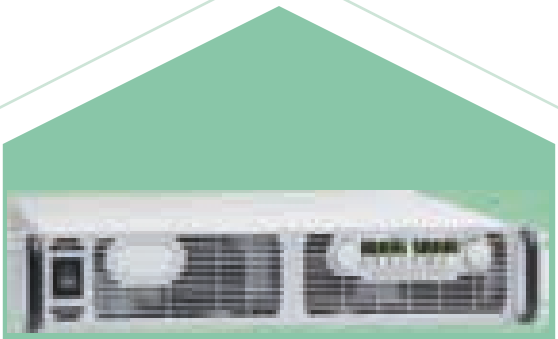
The Genesys™ 1 U and 2 U power supply series are adjustable power supplies that set high standards for universal and reliable use in automated test systems in industry and laboratory applications.

The Genesys™ 1 U and 2 U laboratory power supplies are divided into five power classes of the same design and deliver up to 2.4 kW in 1 U and 5 kW in 2 U. Daat output voltages of up to 600 VDC and currents of up to 300 A in one height unit and up to 600 A in two height units are possible.

- 750 / 1,500 and 2,400 W in a 1 U enclosure
- 3.3 / 5 kW in a 2 U enclosure
- Integrated RS-232/RS-485 interface
- Analogue programming and measurement
- 16 Bit ADC and DAC
- Storage of last values
- 5 years warranty
- Optional: Ethernet / LAN LXI Class C/IEE488.2
- Optional: Isolated analogue interfaces
- Optional: with current sink

Solid equipment

The laboratory power supplies have an integrated analogue, RS232 and RS485 interface and can be optionally extended with LAN, GPIB or isolated analogue interface if required. In the available power levels the units can be connected to worldwide 1-phase or 3-phases input voltage grids.



- 3,3 kW or 5 kW in 2 U

- Compact: up to 2.4 kW in 1 U

TDK·Lambda

TDK-Lambda is one of the world's leading manufacturer of current supplies and stands for safety and reliability.

HEIDEN COMPETENCE IN POWER

Description	Power	Voltage	Current	Dimensions
G07-006-100	0,6 kW	6 V	100 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-008-090	0,72 kW	8 V	90 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-012-060	0,75 kW	12,5 V	60 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-020-038	0,76 kW	20 V	38 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-030-025	0,75 kW	30 V	12,5 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-040-019	0,76 kW	40 V	19 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-060-012	0,75 kW	60 V	12,5 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-080-009	0,76 kW	80 V	9,5 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-100-007	0,75 kW	100 V	7,5 A	19" x 1 U x 422,8 mm
G07-150-005	0,75 kW	150 V	5 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-300-002	0,75 kW	300 V	2,5 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G07-600-001	0,78 kW	600 V	1,3 A	19" x 1 U (opt. 1/2 19") x 422,8 mm
G15-006-200	1,2 kW	6 V	200 A	19" x 1 U x 422,8 mm
G15-008-180	1,44 kW	8 V	180 A	19" x 1 U x 422,8 mm
G15-012-120	1,5 kW	12,5 V	120 A	19" x 1 U x 422,8 mm
G15-020-076	1,52 kW	20 V	76 A	19" x 1 U x 422,8 mm
G15-030-050	1,5 kW	30 V	50 A	19" x 1 U x 422,8 mm
G15-040-038	1,52 kW	40 V	38 A	19" x 1 U x 422,8 mm
G15-050-030	1,5 kW	50 V	30 A	19" x 1 U x 422,8 mm
G15-060-025	1,5 kW	60 V	25 A	19" x 1 U x 422,8 mm
G15-080-019	1,52 kW	80 V	19 A	19" x 1 U x 422,8 mm
G15-100-015	1,5 kW	100 V	15 A	19" x 1 U x 422,8 mm
G15-150-010	1,5 kW	150 V	10 A	19" x 1 U x 422,8 mm
G15-300-005	1,5 kW	300 V	5 A	19" x 1 U x 422,8 mm
G15-600-002	1,56 kW	600 V	2,6 A	19" x 1 U x 422,8 mm
G24-008-300	2,4 kW	8 V	300 A	19" x 1 U x 422,8 mm
G24-010-240	2,4 kW	10 V	240 A	19" x 1 U x 422,8 mm
G24-016-150	2,4 kW	16 V	150 A	19" x 1 U x 422,8 mm
G24-020-120	2,4 kW	20 V	120 A	19" x 1 U x 422,8 mm
G24-030-080	2,4 kW	30 V	80 A	19" x 1 U x 422,8 mm
G24-040-060	2,4 kW	40 V	60 A	19" x 1 U x 422,8 mm
G24-060-040	2,4 kW	60 V	40 A	19" x 1 U x 422,8 mm
G24-080-030	2,4 kW	80 V	30 A	19" x 1 U x 422,8 mm
G24-100-024	2,4 kW	100 V	24 A	19" x 1 U x 422,8 mm
G24-150-016	2,4 kW	150 V	16 A	19" x 1 U x 422,8 mm
G24-300-008	2,4 kW	300 V	8 A	19" x 1 U x 422,8 mm
G24-600-004	2,4 kW	600 V	4 A	19" x 1 U x 422,8 mm
G33-008-400	3,2 kW	8 V	400 A	19" x 2 U x 422,8 mm
G33-010-330	3,3 kW	10 V	330 A	19" x 2 U x 422,8 mm
G33-015-220	3,3 kW	15 V	220 A	19" x 2 U x 422,8 mm
G33-016-200	3,3 kW	16,5 V	200 A	19" x 2 U x 422,8 mm
G33-020-165	3,3 kW	20 V	165 A	19" x 2 U x 422,8 mm
G33-030-110	3,3 kW	30 V	110 A	19" x 2 U x 422,8 mm
G33-040-085	3,4 kW	40 V	85 A	19" x 2 U x 422,8 mm
G33-060-055	3,3 kW	60 V	55 A	19" x 2 U x 422,8 mm
G33-080-042	3,36 kW	80 V	42 A	19" x 2 U x 422,8 mm
G33-100-033	3,3 kW	100 V	33 A	19" x 2 U x 422,8 mm
G33-150-022	3,3 kW	150 V	22 A	19" x 2 U x 422,8 mm
G33-200-016	3,3 kW	200 V	16,5 A	19" x 2 U x 422,8 mm
G33-300-011	3,3 kW	300 V	11 A	19" x 2 U x 422,8 mm
G33-600-005	3,3 kW	600 V	5,5 A	19" x 2 U x 422,8 mm
G50-008-600	4,8 kW	8 V	600 A	19" x 2 U x 423 mm
G50-010-500	5 kW	10 V	500 A	19" x 2 U x 423 mm
G50-016-310	4,96 kW	16 V	310 A	19" x 2 U x 423 mm
G50-020-250	5 kW	20 V	250 A	19" x 2 U x 423 mm
G50-030-170	5,1 kW	30 V	170 A	19" x 2 U x 423 mm
G50-040-125	5 kW	40 V	125 A	19" x 2 U x 423 mm
G50-060-85	5,1 kW	60 V	85 A	19" x 2 U x 423 mm
G50-080-065	5,2 kW	80 V	65 A	19" x 2 U x 423 mm
G50-150-034	5,1 kW	150 V	34 A	19" x 2 U x 423 mm
G50-200-025	5 kW	200 V	25 A	19" x 2 U x 423 mm
G50-400-013	5,2 kW	400 V	12,5 A	19" x 2 U x 423 mm
G50-500-010	5 kW	500 V	10 A	19" x 2 U x 423 mm
G50-600-008	5,1 kW	600 V	8,5 A	19" x 2 U x 423 mm

AC-Input	
Input voltage	85...265 V_{AC} 1,5 kW 170...265 V_{AC} 3 Ph 2,4 kW
Input frequency	47...63 Hz

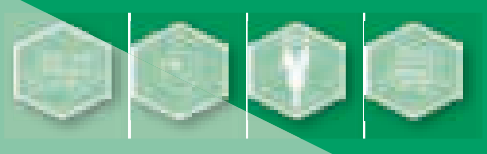
EMV and safety standards	
EN61000-3-2	class A
EN61000-3-3	at 20...100 % P_{out}
IEC1000-4-x	CE Mark, UL60950

DC-Output	
Grid control voltage	0,01 % of Vo + 2 mV
Load control voltage	0,01 % of Vo + 2 mV
Grid control current	0,01 % of Io + 2 mA
Load control current	0,02 % of Io + 5 mA
Temperatur stability	100 PPM/°C
Programming Accuracy	±0,05 % + 2 mV
Isolation	> 100 MΩ at 25°C, 70 % RH 500 V_{DC}
Overvoltage protection	0...120 % Vmax
Safety devices	OCP/OVP/OTP

Programmierung & Control system	
Analogue voltage	0...5 V / 0...10 V ±0,5 % galvanically connected
Analogue current	0 bis 0...5 V / 0...10 V ±1 % galvanically connected
RS232 and 485	16 Bit
RS232 and 485 resolution	0,012 % of Vo Rated
RS232 and 485 accuracy	0,05 % Vo +0,05 % from current value

Environmental conditions	
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 90 % not dewing
Operating height	< 3.000 m
Vibration	MIL-810E method 514.4 test cond. I-3.3.1
Schock	< 20 G
Weight	0,75 kW 7 kg 1,5 kW 8,5 kg 2,4 kW 10 kg 3 ,3 kW 13 kg 5 kW 13 kg

Options	
G-IEEE	GPIB-Interface
G-IS510	Galv. isolated voltage - analogue interface
G-IS420	Galv. isolated voltage - analogue interface
G-LAN	Ethernet/LAN LXI Class C
RS232/485	RS232- or 485-Adapter RJ45 to D-SUB



GENESYS+™ and GSP+

- Programmable power resistor
- High-resolution analogue and digital converters
- Interface LAN, USB, RS232/485
- Anybus CompactCom Interface
- Isolated analogue remote control system and monitoring
- Integrated arbitration generator and memory
- Quick approach to programming
- User-specific U and I slew rate
- Two programmable open-drain outputs
- Auto-configuration at parallel connection up to 20 kW
- 5 years warranty

The new GENESYS+™ series

The new programmable power supply GENESYS+™ is a remarkably small and lightweight, but very high power power supply for industry, research and development. In only one height unit it has an output of 1.5 to 5 kW and so that offers a considerable power density.

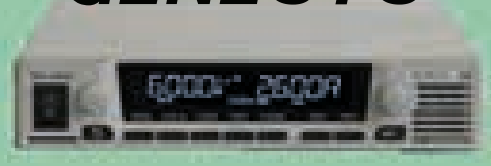
The flexible and reliable current source has an integrated arbitrary generator (100 steps) with memory function in four memory cells. The AC supply is provided by a particularly wide input range.

Proven technology further improved

The GENESYS+™ series is fully compatible with the well-known and proven Genesys™ and Z+ model series and communicates via the same communication protocols and signals. An isolated analogue control and monitoring interface (0 ... 5 V or 0 ... 10 V) is available ex works.

The power supplies are equipped with a CompactCom interface platform, which allows different interface options (e.g. Devicenet, Ethercat, Modbus and Profibus).

GENESYS™



- 1,5 kW in compact 1 U enclosure with half 19“ rack width

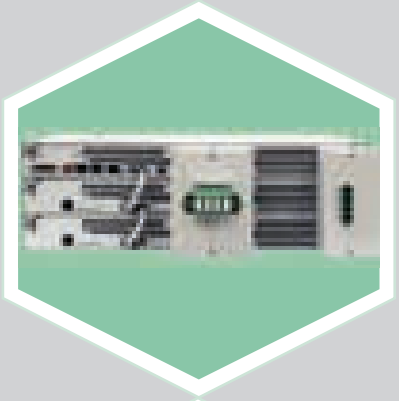
- CV/CC/CP/CR Modes
- Output voltages up to 600 V
- Output currents up to 1500 A
- Nominal power: 1 - 5 kW in 1 height unit up to 15 kW
- 1,5 kW at one height unit and 1/2 19“ width

TDK·Lambda

TDK-Lambda is one of the world's leading manufacturer of current supplies and stands for safety and reliability.

The new GENESYS+™/ GSP+ scalable power

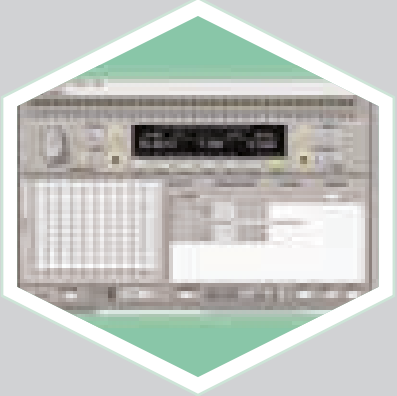
Whether in parallel operation or master-slave mode - the integrated active-current sharing allows the connection of up to four identical units. The total current of all units is measured and displayed or output by the master unit. This combination allows up to four units to work together as one 20 kW unit.



Ready for immediate use

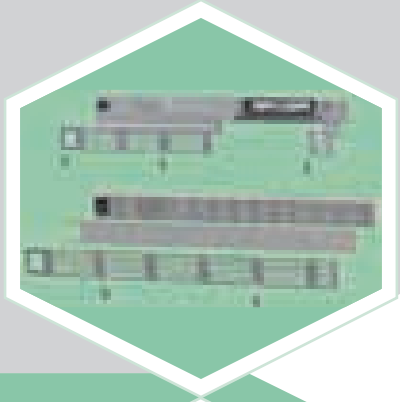
Factory assembly and preparation for systems with two and three units. This means that finished models with 10 kW and 15 kW are available ex works. The „scalable power units" have:

- The connection of the individual devices via master-slave lines
- The supply voltage is connected to a terminal block summarized. This eliminates the need for wiring several modules.
- Depending on the device type, the DC output is connected to a terminal block or a pair of currents.



User interface

The PC software allows programming and monitoring of devices with or without front panel. Up to 31 devices can be addressed. Data logging including error messages, events and return is possible. Furthermore, „real time" sequences can be generated with the arbitrary generator, loaded onto the device and stored. Furthermore, it is possible to create PV-Solar curves with MPP. The most important statuses are also clearly displayed, such as operating status, error and event displays, interlock active and so on. If an interface is active it is also displayed.



Different front panels

With the possibility of using different front panels, the new GENESYS+™ series is equipped for most environmental conditions.

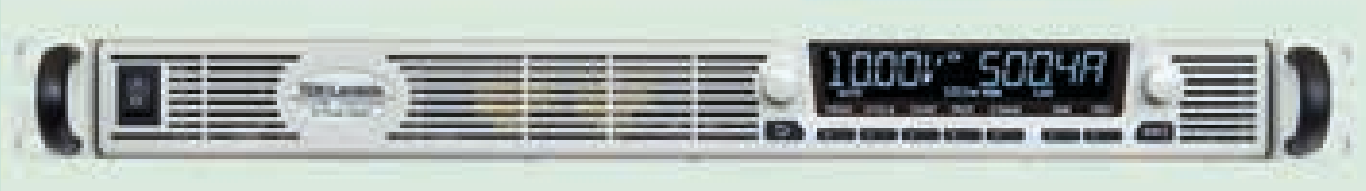
These include empty panels without display and operating elements as well as panels with air filters for use in harsh and dusty environments.

„Blank Front Panel"/ GB+ ATE-Version

The GENESYS+™ series is optionally available without a control element. The Blank Front Panel device is used as a current supply if no separate device control system via a display is required. With the exception of the display functionality, it offers all high-power standard functions and is used as a slave module in parallel or series connection with a master power supply unit with operating unit. The control system of the Blank Front Panel is realized via digital interfaces (LAN, USB, RS-232/485) or via the isolated analogue interface.

Description	Power	Voltage	Current	Weight	Dimensions
G+10H-010	1.000 W	10 V	100 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-020	1.000 W	20 V	50 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-030	1.000 W	30 V	34 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-040	1.000 W	40 V	25 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-060	1.000 W	60 V	17 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-080	1.000 W	80 V	12,5 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-100	1.000 W	100 V	10 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-150	1.000 W	150 V	7 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-300	1.000 W	300 V	3,5 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+10H-600	1.000 W	600 V	1,7 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-010	1.500 W	10 V	150 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-020	1.500 W	20 V	75 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-030	1.500 W	30 V	50 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-040	1.500 W	40 V	38 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-060	1.500 W	60 V	25 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-080	1.500 W	80 V	19 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-100	1.500 W	100 V	15 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-150	1.500 W	150 V	10 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-300	1.500 W	300 V	5 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+15H-600	1.500 W	600 V	2,6 A	3,5 kg	1/2 19" x 1 U x 554 mm
G+17-010	1.700 W	10 V	170 A	5 kg	19" x 1 U x 554 mm
G+17-020	1.700 W	20 V	85 A	5 kg	19" x 1 U x 554 mm
G+17-030	1.680 W	30 V	56 A	5 kg	19" x 1 U x 554 mm
G+17-040	1.680 W	40 V	42 A	5 kg	19" x 1 U x 554 mm
G+17-060	1.680 W	60 V	28 A	5 kg	19" x 1 U x 554 mm
G+17-080	1.680 W	80 V	21 A	5 kg	19" x 1 U x 554 mm
G+17-100	1.700 W	100 V	17 A	5 kg	19" x 1 U x 554 mm
G+17-150	1.680 W	150 V	11,2 A	5 kg	19" x 1 U x 554 mm
G+17-300	1.680 W	300 V	5,6 A	5 kg	19" x 1 U x 554 mm
G+17-600	1.680 W	600 V	2,8 A	5 kg	19" x 1 U x 554 mm
G+27-010	2.650 W	10 V	265 A	6,25 kg	19" x 1 HE x 554 mm
G+27-020	2.700 W	20 V	135 A	6,25 kg	19" x 1 HE x 554 mm
G+27-030	2.700 W	30 V	90 A	6,25 kg	19" x 1 HE x 554 mm
G+27-040	2.720 W	40 V	68 A	6,25 kg	19" x 1 HE x 554 mm
G+27-060	2.700 W	60 V	45 A	6,25 kg	19" x 1 HE x 554 mm
G+27-080	2.720 W	80 V	34 A	6,25 kg	19" x 1 HE x 554 mm
G+27-100	2.700 W	100 V	27 A	6,25 kg	19" x 1 HE x 554 mm
G+27-150	2.700 W	150 V	18 A	6,25 kg	19" x 1 HE x 554 mm
G+27-300	2.700 W	300 V	9 A	6,25 kg	19" x 1 HE x 554 mm
G+27-600	2.700 W	600 V	4,5 A	6,25 kg	19" x 1 HE x 554 mm

Description	Power	Voltage	Current	Weight	Dimensions
G+34-010	3.400 W	10 V	340 A	6,25 kg	19" x 1 U x 554 mm
G+34-020	3.400 W	20 V	170 A	6,25 kg	19" x 1 U x 554 mm
G+34-030	3.360 W	30 V	112 A	6,25 kg	19" x 1 U x 554 mm
G+34-040	3.400 W	40 V	85 A	6,25 kg	19" x 1 U x 554 mm
G+34-060	3.360 W	60 V	56 A	6,25 kg	19" x 1 U x 554 mm
G+34-080	3.360 W	80 V	42 A	6,25 kg	19" x 1 U x 554 mm
G+34-100	3.400 W	100 V	34 A	6,25 kg	19" x 1 U x 554 mm
G+34-150	3.375 W	150 V	22,5 A	6,25 kg	19" x 1 U x 554 mm
G+34-300	3.450 W	300 V	11,5 A	6,25 kg	19" x 1 U x 554 mm
G+34-600	3.360 W	600 V	5,6 A	6,25 kg	19" x 1 U x 554 mm
G+50-010	5.000 W	10 V	500 A	7,5 kg	19" x 1 U x 554 mm
G+50-020	5.000 W	20 V	250 A	7,5 kg	19" x 1 U x 554 mm
G+50-030	5.100 W	30 V	170 A	7,5 kg	19" x 1 U x 554 mm
G+50-040	5.000 W	40 V	125 A	7,5 kg	19" x 1 U x 554 mm
G+50-050	5.000 W	50 V	100 A	7,5 kg	19" x 1 U x 554 mm
G+50-060	5.100 W	60 V	85 A	7,5 kg	19" x 1 U x 554 mm
G+50-080	5.200 W	80 V	65 A	7,5 kg	19" x 1 U x 554 mm
G+50-100	5.000 W	100 V	50 A	7,5 kg	19" x 1 U x 554 mm
G+50-150	5.100 W	150 V	34 A	7,5 kg	19" x 1 U x 554 mm
G+50-200	5.000 W	200 V	25 A	7,5 kg	19" x 1 U x 554 mm
G+50-300	5.100 W	300 V	17 A	7,5 kg	19" x 1 U x 554 mm
G+50-400	5.000 W	400 V	13 A	7,5 kg	19" x 1 U x 554 mm
G+50-500	5.000 W	500 V	10 A	7,5 kg	19" x 1 U x 554 mm
G+50-600	5.100 W	600 V	8,5 A	7,5 kg	19" x 1 U x 554 mm



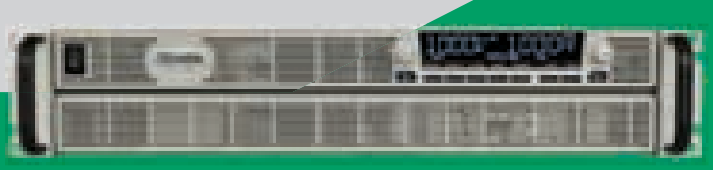
AC-Input	
Input voltage 1,0/1,5/1,7 kW	85...265 V_{AC} 1 Ph
Input voltage 2,7/3,4 kW	170...265 V_{AC} 1 Ph or 342...528 V_{AC} 3 Ph at choice
Input voltage 5 kW	342...528 V_{AC} 3 Ph l 170...265 V_{AC} 3 Ph
Input frequency	47...63 Hz

DC-Output	
Grid control voltage	0,01 %
Load control voltage	0,01 % U_{Out} + 2 mV
Grid control current	0,01 % I_{Out} + 2 mA
Load control current	0,02 % I_{Out} + 5 mA
Temperatur stability	100 PPM/°C
Programming accuracy	±0,05 % + 2 mV
Overvoltage protection	0...120 % V_{max}
Safety devices	OCP/OVP/OTP

Programming & Control system	
Analogue voltage	0...5 V/0...10 V ±0,15 % galvanically isolated
Analogue current	0...5 V/0...10 V ±0,4 % galvanically isolated
RS232 and 485 resolution	16 Bit
RS232 and 485	0,012 % U_{Out}
RS232 and 485 Accuracy	0,05 % U_{Out} +0.05 % from current value

Environmental conditions	
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-30...85°C
Humidity	< 90 % not dewing
Operating height	< 3.000 m
Vibration	MIL-810E method 514.4 test cond. I-3.3.1
Shock	< 20 G

Description	Power	Voltage	Current	Weight	Dimensions
GSP+100-010	10 kW	10 V	1000 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-020	10 kW	20 V	500 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-030	10,2 kW	30 V	340 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-040	10 kW	40 V	250 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-050	10 kW	50 V	200 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-060	10,2 kW	60 V	170 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-080	10,4 kW	80 V	130 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-100	10 kW	100 V	100 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-150	10,4 kW	150 V	68 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-200	10 kW	200 V	50 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-300	10,2 kW	300 V	34 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-400	10 kW	400 V	26 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-500	10 kW	500 V	15,5 A	15,5 kg	19" x 2 U x 554 mm
GSP+100-600	10,2 kW	600 V	17 A	15,5 kg	19" x 2 U x 554 mm
GSP+150-010	15 kW	10 V	1500 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-020	15 kW	20 V	750 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-030	15,3 kW	30 V	510 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-040	15 kW	40 V	375 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-050	15 kW	50 V	300 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-060	15,3 kW	60 V	255 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-080	15,6 kW	80 V	195 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-100	15 kW	100 V	150 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-150	15,3 kW	150 V	102 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-200	15 kW	200 V	75 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-300	15,3 kW	300 V	51 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-400	15 kW	400 V	39 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-500	15 kW	500 V	30 A	23,5 kg	19" x 3 U x 554 mm
GSP+150-600	15,3 kW	600 V	25,5 A	23,5 kg	19" x 3 U x 554 mm



1153 / TopCon

High power DC-Sources

The 1153 / TopCon Series

The DC source 1153 / TC.P with 10, 16, 20, 32 kW and up to 1.200 V and up to 700 A - REGATRON set standards with extended operator functions. Now that the interactive operating and service software TopControl at has defined a standard for the top class devices, further useful and versatile tools are available for the operator.

- Automotive
- Photovoltaics
- Plasma Technology
- Demagnetization

Power and experience

The Swiss company REAGTRON AG develops and produces high power digital power supplies for professional use. Active for over 45 years in electronics manufacturing, REGATRON has accumulated a remarkable experience in the production of high quality modular power supplies and is highly appreciated by many leading companies in the world who use TopCon in their factories, laboratories or R&D centers. In successful cooperation HEIDEN not only distributes REGATRON devices in Germany, but also offers individual system integration as well as complete test and inspection systems.

REGATRON programmable power supplies TCP

Features

- Voltage range nominal up to 1.200 V_{DC}
- CV/CC mode, programmable Ri mode and CP operation with own fully digital controller
- Fully digital control with excellent reproducibility of parameters
- Interconnections: parallel, serial, multiload and Matrix operation with midpoint grounding possible
- Monitoring of the output variables by means of limit-values with hysteresis, window function and timer
- Standard with RS-232 interface and extensive software package TopControl

HEIDEN
COMPETENCE IN POWER

Description	Power	Voltage	Current	Dimensions	Weight
1153-1052	10 kW	52 V	250 A	19" x 6 U x 495 mm	44 kg
1153-1065	10 kW	65 V	193 A	19" x 6 U x 495 mm	44 kg
1153-10100	10 kW	100 V	125 A	19" x 6 U x 495 mm	44 kg
1153-10130	10 kW	130 V	96 A	19" x 6 U x 495 mm	44 kg
1153-10200	10 kW	200 V	63 A	19" x 6 U x 495 mm	44 kg
1153-10400	10 kW	400 V	31 A	19" x 6 U x 495 mm	44 kg
1153-10500	10 kW	500 V	25 A	19" x 6 U x 495 mm	44 kg
1153-10600	10 kW	600 V	20 A	19" x 6 U x 495 mm	44 kg
1153-10800	10 kW	800 V	16 A	19" x 6 U x 495 mm	44 kg
1153-101000	10 kW	1.000 V	13 A	19" x 6 U x 495 mm	44 kg
1153-1652	16 kW	52 V	400 A	19" x 6 U x 495 mm	44 kg
1153-1665	16 kW	65 V	308 A	19" x 6 U x 495 mm	44 kg
1153-16100	16 kW	100 V	200 A	19" x 6 U x 495 mm	44 kg
1153-16130	16 kW	130 V	153 A	19" x 6 U x 495 mm	44 kg
1153-16200	16 kW	200 V	100 A	19" x 6 U x 495 mm	44 kg
1153-16400	16 kW	400 V	50 A	19" x 6 U x 495 mm	44 kg
1153-16500	16 kW	500 V	40 A	19" x 6 U x 495 mm	44 kg
1153-16600	16 kW	600 V	32 A	19" x 6 U x 495 mm	44 kg
1153-16800	16 kW	800 V	25 A	19" x 6 U x 495 mm	44 kg
1153-161000	16 kW	1.000 V	20 A	19" x 6 U x 495 mm	44 kg
1153-2052	20 kW	52 V	500 A	19" x 9 U x 570 mm	64 kg
1153-2065	20 kW	65 V	385 A	19" x 9 U x 570 mm	64 kg
1153-20100	20 kW	100 V	250 A	19" x 9 U x 570 mm	64 kg
1153-20130	20 kW	130 V	192 A	19" x 9 U x 570 mm	64 kg
1153-20200	20 kW	200 V	125 A	19" x 9 U x 570 mm	64 kg
1153-20400	20 kW	400 V	63 A	19" x 9 U x 570 mm	64 kg
1153-20500	20 kW	500 V	50 A	19" x 9 U x 570 mm	64 kg
1153-20600	20 kW	600 V	40 A	19" x 9 U x 570 mm	64 kg
1153-20800	20 kW	800 V	32 A	19" x 9 U x 570 mm	64 kg
1153-201000	20 kW	1.000 V	25 A	19" x 9 U x 570 mm	64 kg
1153-201200	20 kW	1.200 V	20 A	19" x 9 U x 570 mm	64 kg
1153-3252	32 kW	52 V	700 A	19" x 9 U x 570 mm	64 kg
1153-3265	32 kW	65 V	600 A	19" x 9 U x 570 mm	64 kg
1153-32100	32 kW	100 V	400 A	19" x 9 U x 570 mm	64 kg
1153-32130	32 kW	130 V	308 A	19" x 9 U x 570 mm	64 kg
1153-32200	32 kW	200 V	200 A	19" x 9 U x 570 mm	64 kg
1153-32400	32 kW	400 V	100 A	19" x 9 U x 570 mm	64 kg
1153-32500	32 kW	500 V	80 A	19" x 9 U x 570 mm	64 kg
1153-32600	32 kW	600 V	66 A	19" x 9 U x 570 mm	64 kg
1153-32800	32 kW	800 V	50 A	19" x 9 U x 570 mm	64 kg
1153-321000	32 kW	1.000 V	40 A	19" x 9 U x 570 mm	64 kg
1153-321200	32 kW	1.200 V	33 A	19" x 9 U x 570 mm	64 kg

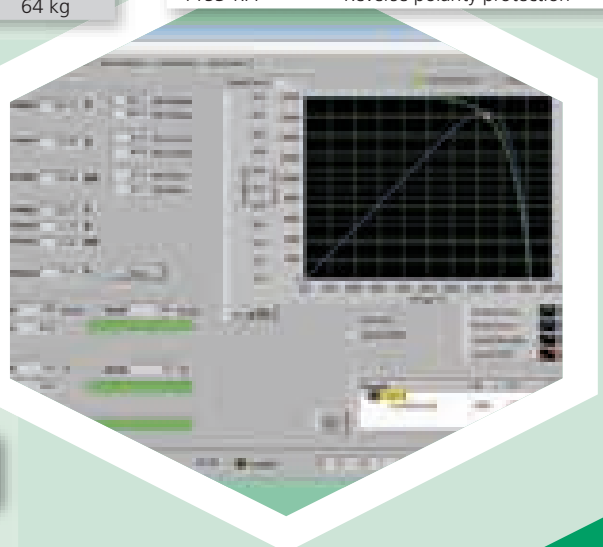
AC-Input	
Voltage	3 x 360...440 V_{AC}
Frequency	48...62 Hz
Input	3L+PE (N not required)

DC-Output	
Grid control	< ±0,1 % F.S.
Load control	< ±0,1 % F.S.
Settling time	< 2 ms
Stability	< ±0.05 % F.S.
Efficiency	92...95 %

Specification	
Norms	EN 61000-6-4 EN 61000-6-2 EN 50178
Cooling	Exhauster
Operating temperature	5...40°C
Storage temperature	-25...70°C
Air humidity	< 95 %

Options	
1153-HMI	Control/display unit
1153-RCU	External control unit
1153-TFE	Function Generator
1153-RS232rear	RS-232 also backside
1153-USB	USB Interface
1153-RS422	RS-422 Interface
1153-ETHERNET	LAN Interface
1153-IEEE	GPIB/IEEE488 Interface
1153-CAN open	CAN open Interface
1153-CAN mp	CAN multi protocol
1153-FIELDBUS	Field bus coupling Profi-, Inter- or DeviceBus
1153-CANcable	Link-Cable Master/Slave
1153-PACOB	Touch protection
1153-LCAL	Liquid Cooling
1153-AF6U	Air filter 10 & 16 kW...6 U
1153-AF9U	Air filter 20 & 32 kW...9 U
1153-NSOC	Special current (if possible)
1153-NSOV	Non standard voltage
1153-ISR	Integrated safety relay
1153-LIN	Linear adjuster
1153-RPP	Reverse polarity protection

Combine 1153 / TC.P systems up to one megawatt or let HEIDEN provide you with Reverse polarity protection an individual rack. In this way you get the customized solution at minimum effort. Extensions like an optional function generator, battery simulation and conditioning as well as photovoltaic simulation for operation and testing of PV inverters complete the functional range.



Options (excerpt)

1153SX / TC.GSX and 1153XS / TC.GXS

High power DC-Source or -Sink

The 1153SX / TC.GSX Series

This series of unidirectional high power DC current supplies based on the latest circuit technologies. The AC input stage consists of a fully active PFC structure, which eliminates the need for external means of power factor correction. In addition, an active medium-frequency synchronized rectifier stage ensures excellent broadband dynamics and optimal stability even at complex load types.

The 1153XS / TC.GXS Grid-tie Sink Series

Also the 1153XS / TC.GXS as a regenerative electronic load is based on the 1153R / TC.GSS technology. The device has the full fourth quadrant. On request a half stage is available which can also apply a voltage at low power in the first quadrant, so that chargers with battery detection can be tested.

Device and system

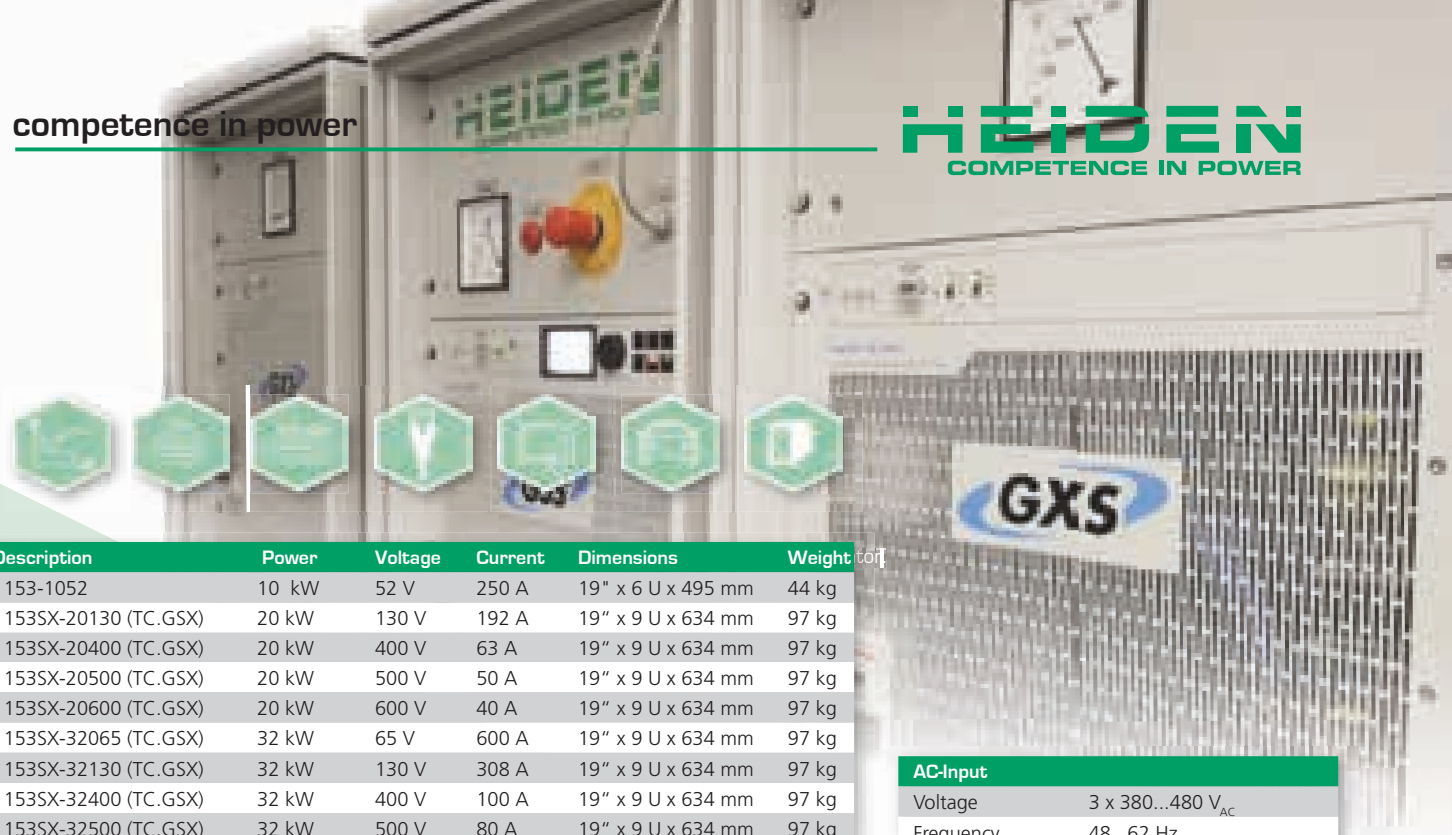
The 1153SX / TC.GSX series can be ordered as a single 19" rack. Obtain the built-in unit. We would also be pleased to design a complete system together with you - according to your requirements. Thereby can provide equipment such as emergency stop concepts, insulation monitoring, connection and connectivity options. According to your wishes we manufacture a complete system ready for connection for you. Just contact us for more information!

Features

- 20 kW and 32 kW, in combination up to 1 MW
- Unique digital control
- Highest control dynamics and adaptability (full access to PID controller)
- IGBT primary switching regulator
- Parallel or serial or matrix operation possible
- Remote control analogue, RS232, optional CAN, USB, LAN and Opto
- Operating and service software Top Control incl. Scope
- Optional software SAS control and others
- Compact and outstanding power

HEIDEN & REGATRON:

over 10 years of partnership



Description	Power	Voltage	Current	Dimensions	Weight
1153-1052	10 kW	52 V	250 A	19" x 6 U x 495 mm	44 kg
1153SX-20130 (TC.GSX)	20 kW	130 V	192 A	19" x 9 U x 634 mm	97 kg
1153SX-20400 (TC.GSX)	20 kW	400 V	63 A	19" x 9 U x 634 mm	97 kg
1153SX-20500 (TC.GSX)	20 kW	500 V	50 A	19" x 9 U x 634 mm	97 kg
1153SX-20600 (TC.GSX)	20 kW	600 V	40 A	19" x 9 U x 634 mm	97 kg
1153SX-32065 (TC.GSX)	32 kW	65 V	600 A	19" x 9 U x 634 mm	97 kg
1153SX-32130 (TC.GSX)	32 kW	130 V	308 A	19" x 9 U x 634 mm	97 kg
1153SX-32400 (TC.GSX)	32 kW	400 V	100 A	19" x 9 U x 634 mm	97 kg
1153SX-32500 (TC.GSX)	32 kW	500 V	80 A	19" x 9 U x 634 mm	97 kg
1153SX-32600 (TC.GSX)	32 kW	600 V	66 A	19" x 9 U x 634 mm	97 kg

Description	Power	Voltage	Current	Dimensions	Weight
1153XS-20065 (TC.GXS)	-20 kW	65 V	-385 A	19" x 9 U x 634 mm	97 kg
1153XS-20130 (TC.GXS)	-20 kW	130 V	-192 A	19" x 9 U x 634 mm	97 kg
1153XS-20400 (TC.GXS)	-20 kW	400 V	-63 A	19" x 9 U x 634 mm	97 kg
1153XS-20500 (TC.GXS)	-20 kW	500 V	-50 A	19" x 9 U x 634 mm	97 kg
1153XS-20600 (TC.GXS)	-20 kW	600 V	-40 A	19" x 9 U x 634 mm	97 kg
1153XS-32065 (TC.GXS)	-32 kW	65 V	-600 A	19" x 9 U x 634 mm	97 kg
1153XS-32130 (TC.GXS)	-32 kW	130 V	-308 A	19" x 9 U x 634 mm	97 kg
1153XS-32400 (TC.GXS)	-32 kW	400 V	-100 A	19" x 9 U x 634 mm	97 kg
1153XS-32500 (TC.GXS)	-32 kW	500 V	-80 A	19" x 9 U x 634 mm	97 kg
1153XS-32600 (TC.GXS)	-32 kW	600 V	-66 A	19" x 9 U x 634 mm	97 kg

Due to the family affiliation to the 1153R / TC.GSS series, the 1153SX / TC.GSX and the 1153XS / TC.GXS can be upgraded to a fully-fledged source sink at a later date. The device must be sent in for this purpose. The possibility of upgrading at a later date gives you all the freedom to adapt your system to future requirements.

Professional software package

The TopControl operating and maintenance software allows easy operation of the devices. It also includes analysis and diagnostic tools that allow you to examine the behavior of the device and your DUT. Optional functions can be tested and reordered for a limited period of time. The activation is usually done by our support within a few minutes.

AC-Input	
Voltage	3 x 380...480 V_{AC}
Frequency	48...62 Hz
Input	3L+PE (N not required)

DC-Output/-Input	
Grid control	< ±0,1 % F.S.
Load control	< ±0,1 % F.S.
Settling time	< 2 ms
Stability	< ±0,05 % F.S.
Efficiency	95 %
Output capacity	Expandable, partly internal switchable

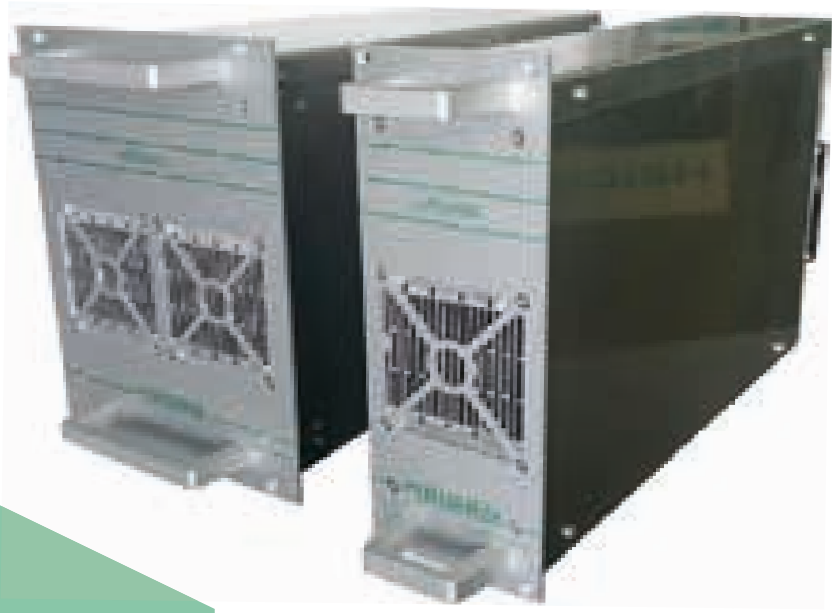
Specification	
Norms	EN 61000-6-4 EN 61000-6-2 EN 50178
Cooling	Exhauster
Operating temperature	5...40°C
Storage temperature	-25...70°C
Humidity	< 95 %
Protection class	Up to IP54 through enclosure

Options	
1153-HMI	Control/display unit
1153-RCU	External control unit
1153-TFE	Function Generator
1153-RS232rear	RS-232 also backside
1153-USB	USB Interface
1153-ETHERNET	LAN Interface
1153-IEEE	GPIB/IEEE488 Interface
1153-CAN open	CAN open Interface
1153-CAN mp	CAN multi protocol
1153-FELDBUS	Field bus coupling Profi-, Inter- or DeviceBus
1153-CAN cable	Link-Cable Master/Slave
1153-PACOB	Touch protection
1153-LCAL	Liquid Cooling
1153-AF9U	Air filter 20 & 32 kW...9 U
1153-NSOV	Non standard voltage
1153-ISR	Integrated safety relay
1153-RPP	Reverse polarity protection

HE-4606 High current source

Robust source for electroplating and power to 2 X

- Up to 2,200 A
- Up to 600 V
- Efficiency: up to 95
- Stainless steel enclosure
- Electronics not in air flow



High current source

Electroplating already has a centuries-old history - and yet it is still developing steadily. More and more fields of application demand high-quality functional and decorative surface coatings. This is where the HE-4606 series comes in and offers solutions for the toughest operating conditions.

High requirements

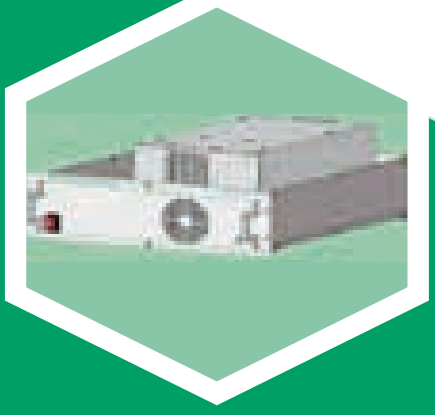
The demands on the quality of the processes are continuously increasing: ever thinner, precisely distributed layers are to be applied with the highest precision, lower energy consumption and the best mechanical properties. The HE-4606 electroplating current source scores here with its special specifications.

Various fields of application

In addition to classic electroplating applications, the source has proven itself in industrial at power 6 X applications, is suitable for high current contact tests or is used for testing and heating electrically conductive ropes.

19" Installation

On request, we can integrate the HE-4606 modules in a 19" enclosure ex works or install them directly in a rack.



Description	Power	Voltage	Current	Dimensions
HE-4606-1	1,8 kW	6 V	300 A	106 x 244,5 x 444,5 mm
HE-4606-1	3 kW	10 V	300 A	106 x 244,5 x 444,5 mm
HE-4606-1	3,6 kW	12 V	300 A	106 x 244,5 x 444,5 mm
HE-4606-1	4,5 kW	15 V	300 A	106 x 244,5 x 444,5 mm
HE-4606-1	6 kW	20 V	300 A	106 x 244,5 x 444,5 mm
HE-4606-1	6 kW	30 V	200 A	106 x 244,5 x 444,5 mm
HE-4606-1	6 kW	40 V	150 A	106 x 244,5 x 444,5 mm
HE-4606-1	6 kW	600 V	10 A	106 x 244,5 x 444,5 mm
HE-4606-2	3,6 kW	6 V	600 A	212 x 244,5 x 468,5 mm
HE-4606-2	6 kW	10 V	600 A	212 x 244,5 x 468,5 mm
HE-4606-2	7,2 kW	12V	600 A	212 x 244,5 x 468,5 mm
HE-4606-2	9 kW	15 V	600 A	212 x 244,5 x 468,5 mm
HE-4606-2	12 kW	20 V	600 A	212 x 244,5 x 468,5 mm
HE-4606-2	12 kW	30 V	400 A	212 x 244,5 x 468,5 mm
HE-4606-2	12 kW	200 V	60 A	212 x 244,5 x 468,5 mm
HE-4606-2	12 kW	600 V	20 A	212 x 244,5 x 468,5 mm
HE-4606-3	7,2 kW	6 V	1.200 A	314 x 262 x 587 mm
HE-4606-3	12 kW	10 V	1.200 A	314 x 262 x 587 mm
HE-4606-3	14,4 kW	12 V	1.200 A	314 x 262 x 587 mm
HE-4606-3	18 kW	15 V	1.200 A	314 x 262 x 587 mm
HE-4606-3	24 kW	20 V	1.200 A	314 x 262 x 587 mm
HE-4606-3	24 kW	40 V	600 A	314 x 262 x 587 mm
HE-4606-3	24 kW	80 V	300 A	314 x 262 x 587 mm
HE-4606-3	24 kW	600 V	40 A	314 x 262 x 587 mm
HE-4606-4	48 kW	20 V	2.200 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	24 V	2.000 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	30 V	1.600 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	40 V	1.200 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	48 V	1.000 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	60 V	800 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	80 V	600 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	120 V	400 A	412 x 261 x 759,2 mm
HE-4606-4	48 kW	160 V	300 A	412 x 261 x 759,2 mm

AC-Input	
Input voltage	3 x 380...460 V_{AC} ±10 %
Input frequency	50...60 Hz

DC-Output	
Ripple voltage	< 1 %
Ripple current	< 1 %
Regulation a accuracy U	< 0,5 %

Programming & Control system	
Analog	0...10 V or 4...20 mA galv. separate
Optional	External control panel, RS485, ProfiBus, TCP/IP

Environmental conditions	
Cooling	exhauster, electronic components not in direct contact with airflow
Operating temperature	5...35°C
Protection class	IP20, Air duct sealing IP53

HE-4606 Mechanics

The high current source HE-4606 is protected by a robust, unpainted stainless steel housing and is therefore not susceptible to harsh environmental conditions. The air flow for cooling takes place only through the cooling tunnel with heat sink, the electronics are not located in the air flow and are sealed in the housing. This prevents the penetration of dirt and suspended matter. The exhausters are mounted on the outside of the housing so that they can be easily maintained by the user.

HE-4606 Complete systems

The DC current source HE-4606 is designed for use in the electroplating industry. The complete electronics is located in a stainless steel enclosure. The electronic control guarantees that the set values are maintained during operation, even if the load on the DC output changes. In addition to the individual devices, HEIDEN also offers ready-to-connect complete systems for mobile or stationary use with integrated control elements.

1138 High current supply

Industrial current supply / electroplating and power to 2 X

- High currents up to 5,000 A per rack
- Ripple < 2
- Efficiency > 85%.
- Power factor cos Phi 0,95
- Constant current control
- Constant voltage control
- Higher currents through parallel connection

Galvanic source

The HEIDEN 1138 DC high current power supply is a high quality electronic rectifier, designed for industrial use, not only in the electroplating industry. The optionally water-cooled DC current source with switch-mode power supply technology is designed for direct installation at the electroplating bath with minimum space requirements.

Electronic control

The electronic control guarantees that the set values are maintained during operation, even if the load on the DC output changes. The power range can be individually multiplied by series or parallel connection.

Various fields of application

In addition to the classic Gavanik applications, the source has proven itself in Industire at power 2 X applications, is suitable for high current contact tests or is used for testing and heating electrically conductive ropes.

Galvanic isolation

The galvanic separation of the power stage from the control system is guaranteed by the digital control card.

Switch mode power supply technology

This DC current source is designed in switch mode power supply technology. The advantages of this technology: very compact design maximum precision in control behavior low ripple, high efficiency (> 85 %)

Description	Power	Voltage	Current	Dimensions	Cooling
1138-6-5000	30 kW	6 V	5.000 A	600 x 600 x 2.200 mm	Air Cooling
1138-8-5000	40 kW	8 V	5.000 A	600 x 600 x 2.200 mm	
1138-10-5000	50 kW	10 V	5.000 A	600 x 600 x 2.200 mm	
1138-12-5000	60 kW	12 V	5.000 A	600 x 600 x 2.200 mm	
1138-15-5000	75 kW	15 V	5.000 A	600 x 600 x 2.200 mm	
1138-18-4000	72 kW	18 V	4.000 A	600 x 600 x 2.200 mm	
1138-20-3500	70 kW	20 V	3.500 A	600 x 600 x 2.200 mm	
1138-24-3000	72 kW	24 V	3.000 A	600 x 600 x 2.200 mm	
1138-30-3500	75 kW	30 V	2.500 A	600 x 600 x 2.200 mm	
1138-1000-80	80 kW	1.000 V	80 A	600 x 600 x 2.200 mm	

AC-Input	
Input voltage	3 x 400 V_{AC} ±10 %
Input frequency	50...60 Hz

EMV Norm	
EN 55011	Curve A

DC-Output	
Control deviation U	< 0,5 %
Control deviation I	< 1 %
Ripple	< 2%

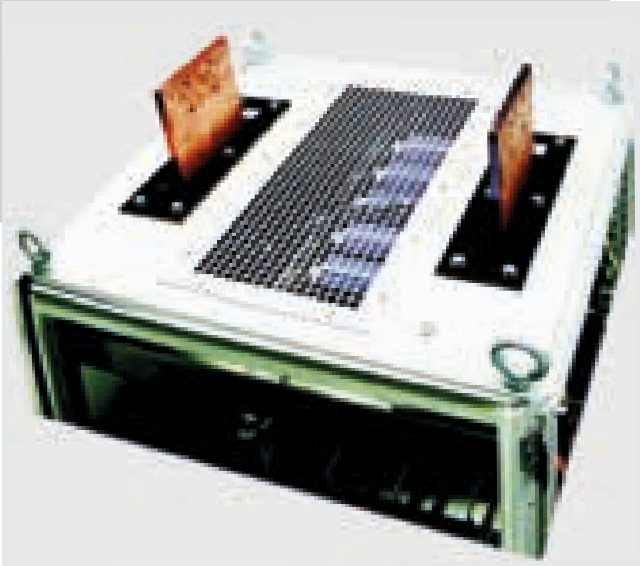
Programming & Control system	
Analogue	0...10 V or 4...20 mA galv. separate
Optional	External control panel RS485, ProfiBus, TCP/IP

Environmental conditions	
Cooling	Exhauster, electronic components not in direct contact with airflow
Operating temperature	max 35°C
Protection class	IP20

If the 1138 high current source is installed directly in the plating area, we recommend to supply the system with cooling air from outside the plating area. Ideally, the system should be installed in a restricted access electrical room.

External control panel

The optionally available external control unit HE280 offers a large illuminated, 3-line LCD display, current and voltage preselection via UP/DOWN keys in enclosure with IP54 protection. The control unit is connected to the high current source via a data cable up to 10 m long. The Control system or the read back of the rectifier data is also carried out via interfaces such as RS485 or TCP/IP, which can be optionally integrated.



DC-Output

The 1138 series is available purely air-cooled. Thereby the system is protected against overheating. The air is supplied via the base on the back, the heated air is discharged from the roof.

The electronic components of the current source are not in direct contact with the Air flow, which serves to cool the unit.

1138-2 W high current supply

Water-cooled for electroplating and power to gas

- Highest currents up to 10.000 A per rack
- Up to 1.000 V
- Ripple < 1 %
- Efficiency > 90
- Power factor cos Phi 0,95
- Constant current control
- Constant voltage control

Galvanic source

The HEIDEN 1138-2 W series is a water-cooled high-current supply in switched-mode power supply technology designed for direct installation on the application with minimum space requirements.

The 1138-2 W is a high-quality electronic rectifier, designed for industrial use, not only in the electroplating industry.

Water cooling

Due to the high DC currents, the racks are equipped with water cooling ex works. This reduces noise emissions and waste heat to the immediate surroundings to a minimum. This allows the racks to be installed directly in the test field. The high protection class IP54 protects the electronics from dirt ingress and ensures reliable operation even under the toughest conditions.

Various fields of application

In addition to the classic electroplating applications, the source has proven itself in the industry at power to gas or power to X applications, is suitable for high current contact tests or is used for testing and heating of electrically conductive ropes.

Galvanic isolation

The galvanic separation of the power stage from the control system is guaranteed by the digital control card.

Switch mode power supply technology

This DC current source is designed in switch mode power supply technology. The advantages of this technology: Very compact design maximum precision in control behavior low ripple, high efficiency > 90 %.

Optional Active Front End (AFE)

With the optional, active power factor correction AFE, the 1138-2W achieves a cosine phi of almost 1.

Description	Power	Voltage	Current	Dimensions	Cooling
1138-2W-20-10000	200 kW	20 V	10.000 A	800 x 600 x 2.200 mm	WasserCooling
1138-2W-25-8000	200 kW	25 V	8.000 A	800 x 600 x 2.200 mm	
1138-2W-40-5000	200 kW	40 V	5.000 A	800 x 600 x 2.200 mm	
1138-2W-50-4000	200 kW	50 V	4.000 A	800 x 600 x 2.200 mm	
1138-2W-60-3000	180 kW	60 V	3.000 A	800 x 600 x 2.200 mm	
1138-2W-80-2500	200 kW	80 V	2.500 A	800 x 600 x 2.200 mm	
1138-2W-100-2000	200 kW	100 V	2.000 A	800 x 600 x 2.200 mm	
1138-2W-120-1600	192 kW	120 V	1.600 A	800 x 600 x 2.200 mm	
1138-2W-150-2000	180 kW	150 V	1.200 A	800 x 600 x 2.200 mm	

The powers, voltages and disturbances listed in the table represent only a part of the possibilities. Smaller and higher voltages up to 1.000 V are possible. We also manufacture the 1138-2W series customer specific. For example, two separate outputs are also possible with e.g. 2 x 20 V and 5,000 A. HEIDEN: Your partner for Power-to-X. Get in touch with us. Our specialists will be happy to advise you.

AC-Input	
Input voltage	3 x 400 V_{AC} ±10 %
Input frequency	50...60 Hz

EMV Norm	
EN 55011	Curve A

DC-Output	
Control deviation U	< 0,5 %
Control deviation I	< 1 %
Ripple	< 1%

Programming & Control system	
Analogue	0...10 V or 4...20 mA galv. separate
Optional	External control panel RS485, ProfiBus, TCP/IP

Environmental conditions	
Cooling	Exhauster, electronic components not in direct contact with airflow
Operating temperature	0...35°C
Protection class	IP54

DC-Output

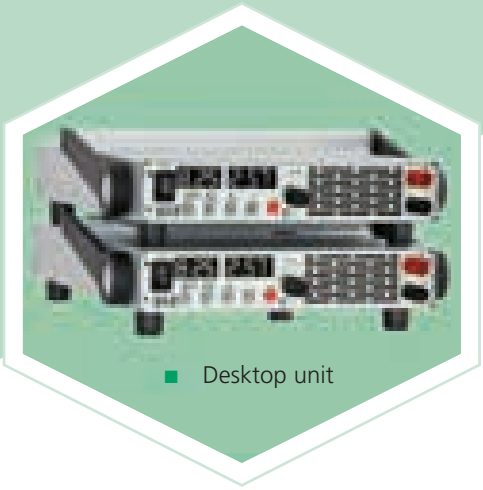
To ensure a safe DC connection with low contact resistance, the DC output is realized by large copper bars on the back of the rack.

External control panel

The optionally available external control unit HE280 offers a large illuminated, 3-line LCD display, current and voltage preselection via UP/DOWN keys in enclosure with IP54 protection. The control unit is connected to the high current source via a data cable up to 10 m long. The control or the read back of the rectifier data is also carried out via interfaces such as RS485 or TCP/IP, which can be optionally integrated.

PLA DC-Load

The small one up to 1.500 W



- Desktop unit

Easy to use

PLA series Electronic Loads combine the classic design of large, easy-to-read displays with modern interfaces and a wide range of functions. The devices can be optionally equipped with various data interfaces. In addition to Ethernet, USB, RS-232, a CAN interface can also be built in as an option. GPIB is also available as an option for the devices from 400 W upwards. An I/O port is available as standard.

Diverse

The devices have the operating modes constant current, constant voltage, constant resistance and constant power, where the resistance and power control is realized by software. In addition, a limit value for voltage or current can be set in each operating mode. Dynamic processes can be simulated with up to 100 setting values. An automatic DAQ function allows to store up to 100 measurement data sets (time, voltage, current) internally.

Measurement data acquisition (DAQ)

In digital remote control mode, the electronic load can store synchronous voltage and current with time stamp at a variable interval. You decide whether the recording ends at the end of the data storage or whether the old data is overwritten in the ring buffer principle.

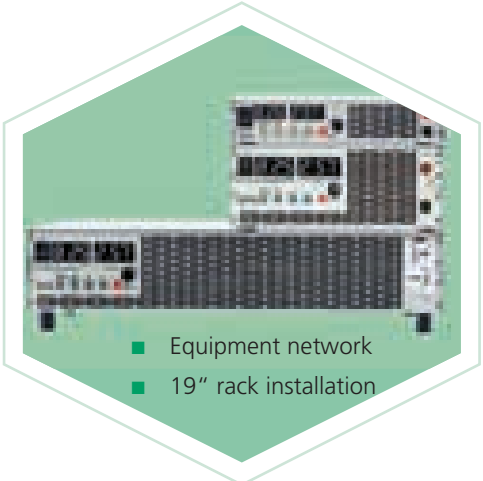
Characteristic curve function

With the characteristic curve function, a sequence of voltage values is linearly interpolated and mapped to a sequence of current values. The characteristic curve to be mapped is defined by setting the voltages and currents sequence each with an SCPI command. Depending on the value of the input voltage, the PLA Load sets the current that corresponds to the interpolated point of the characteristic curve. Up to 100 points are possible.

MPP Tracking

The Maximum Power Point Tracking (MPPT) function consists of the both sub-functions sweeping and tracking, which constantly alternate in an adjustable interval. If the measured Idle Voltage Start is greater than the Minimum Voltage, the electronic load performs a sweep and then readjusts the global MPP found.

- I/O port serially
- Optional: Ethernet/USB/RS-232, CAN, GPIB
- MPP Tracking
- SCPI programming with measuring function
- 19-inch mountable
- Loading inputs front and rear
- Quiet exhauster cooling
- Adjustable limit values for current or voltage
- Dynamic loadings
- Depending on the model up to 1.5 times the power via loadbar
- Electronic protection



- Equipment network
- 19“ rack installation

■ Front and back views PLA 200W

AC-Input	
Voltage	85 ..264 V_{AC}
Frequency	50...60 Hz

DC-Input voltage	
Accuracy	< 0,1 %
Undervoltage protection	± 0,3 %
Resolution	12 Bit

DC-Input current	
Accuracy	< 0,2 %
Overcurrent protection	±0,5 %
Resolution	12 Bit

Measurement accuracy	
Voltage	±0,1 %
Current	±0,2 %
Resolution	16 Bit

Specification	
Norms	DIN EN 61010-1 DIN EN 61010-2-030 DIN EN61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3
Cooling	Exhauster
Operating temp.	5...40°C
Storage temp.	-25...65°C
Humidity	< 80 %
Operating height	< 2.000 m

A free Factory Calibration Certificate (FCC) is supplied with the instruments. The FCC meets the requirements of DIN EN ISO 9000ff. This calibration certificate documents the traceability to national standards for representing the physical unit in accordance with the International System of Units (SI). Within the warranty power period we calibrate a second time free of charge. The recommended calibration interval is 2 years.

Description	Power	Voltage	Current	Dimensions
PLA206	200 W	60 V	30 A	½ 19" x 1 U x 301 mm
PLA206C4	200 W	60 V	4 A	½ 19" x 1 U x 301 mm
PLA212	200 W	120 V	15 A	½ 19" x 1 U x 296 mm
PLA212C2	200 W	120 V	2 A	½ 19" x 1 U x 296 mm
PLA230	200 W	300 V	6 A	½ 19" x 1 U x 296 mm
PLA280	200 W	800 V	3 A	½ 19" x 2 U x 301 mm
PLA406	400 W	60 V	30 A	½ 19" x 2 U x 301 mm
PLA406C8	400 W	60 V	8 A	½ 19" x 2 U x 301 mm
PLA506	500 W	60 V	30 A	½ 19" x 2 U x 301 mm
PLA412	400 W	120 V	15 A	½ 19" x 2 U x 296 mm
PLA412C4	400 W	120 V	4 A	½ 19" x 2 U x 296 mm
PLA512	500 W	120 V	15 A	½ 19" x 2 U x 296 mm
PLA430	400 W	300 V	6 A	½ 19" x 2 U x 296 mm
PLA480	400 W	800 V	3 A	½ 19" x 2 U x 301 mm
PLA806	800 W	60 V	80 A	19" x 2 U x 306 mm
PLA806C16	800 W	60 V	16 A	19" x 2 U x 301 mm
PLA1006	1.000 W	60 V	80 A	19" x 2 U x 306 mm
PLA812	800 W	120 V	40 A	19" x 2 U x 310 mm
PLA812C8	800 W	120 V	8 A	19" x 2 U x 296 mm
PLA1012	1.000 W	120 V	40 A	19" x 2 U x 310 mm
PLA830	800 W	300 V	16 A	19" x 2 U x 296 mm
PLA880	800 W	800 V	8 A	19" x 2 U x 296 mm
PLA1206	1.200 W	60 V	120 A	19" x 2 U x 306 mm
PLA1206C24	1.200 W	60 V	24 A	19" x 2 U x 296 mm
PLA1506	1.500 W	60 V	120 A	19" x 2 U x 306 mm
PLA1212	1.200 W	120 V	60 A	19" x 2 U x 310 mm
PLA1212C12	1.200 W	120 V	12 A	19" x 2 U x 296 mm
PLA1512	1.500 W	120 V	60 A	19" x 2 U x 310 mm
PLA1230	1.200 W	300 V	24 A	19" x 2 U x 296 mm
PLA1280	1.200 W	800 V	12 A	19" x 2 U x 296 mm

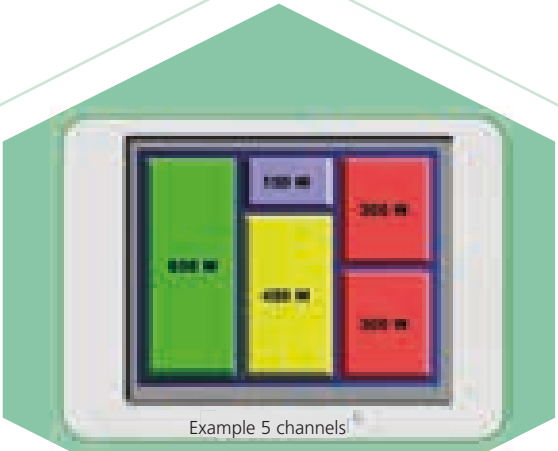
Options	
PLA01	RS-232- + USB- + Ethernet Interface incl. K-RS-SNM 9-9 (RS-232-Cable)
PLA02	GPIB-Interface (from 400 W-devices) requires PLA01
PLA03	CAN-Interface (requires PLA01)
K-RS-SNM 9-9	RS-232-Cable (Nullmodem-Kabel) Serie PLA
PLA10	19"- Installation kit for 1 piece PLA2xx
PLA11	19"- Installation kit for 2 pieces PLA2xx
PLA12	19"- Installation kit fo 1 piece PLA4xx
PLA13	19"- Installation kit fo 2 pieces PLA4xx
PLA14	19"- Installation kit fo 1 piece PLA4xx and 1 piece PLA2xx
PLA15	19"- Installation kit for 1 piece PLA4xx and 2 pieces PLA2xx

Options	
PLA16	Carrying handle for PLA2xx/4xx
PLA17	19"- Installation kit for 1 piece PLA8xx/12xx
PLA18	12 V_{DC}-mains input, reverse polarity protected, 4 mm pole terminals
FCC-N-PLAxx	Factory Calibration Certificate for new devices
FCC-PLAxx	Factory Calibration Certificate for new devices
SAB-PLA-2	Additional safety cover for load connectionsfor units with 2 HU and current rails
K-MS-PLA	Master-Slave-Cable I/O-Port (2 m)
K-MS-CAN	Master-Slave-Cable CAN (2 m)
SX	Changed setting range for PLA series only after consultation
SSX	Customer-specific adjustment range only after consultation

PMLA MultiLoad

The multi-channel

- Configurable Multichannel Load
- Up to 12 channels in 19“, 2 U
- Channel expansion via slave devices
- Maximum 72 channels per system
- Modules 150 W - 300 W - 450 W - 600 W
- Voltages 40 V - 60 V - 120 V - 240 V
- Currents from 1 A to 120 A
- Dynamic loading



Example 5 channels

Short profile

The multi-channel load PMLA combines up to 12 load channels / modules in a compact 19“ enclosure with only two height units. All load channels are galvanically separated from each other, making multi-channel test systems such as burn-in facilities very easy to configure. A master device, which has both a graphical user interface and various data interfaces, controls all load channels of the system, which is extended by one or more slave devices if required.

Configuration

The PMLA Electronic Multichannel Load has up to three cooler units with four installation sites for load modules each, depending on the version. Modules with different powers of 150 W, 300 W, 450 W or 600 W are available. Depending on the power, a module occupies one (150 W), two (300 W), three (450 W) or four internal slots for 600 W per single channel.

Load modules

The modules are available in four different voltages 40 V, 60 V, 120 V and 240 V and for currents from 1 A to 120 A. This allows the configuration of any charge, such as e.g.:
1x 600 W + 1x 450 W + 2x 300 W + 5x 150 W.
The total power is max. 1.800 W.

Discharge function, Energy storage test

The discharge function tests energy storage devices such as batteries, ultracaps, electrolytic capacitors and solar panels and so on by converting them into CC-, CP- or CR operation can be discharged. The discharge function can be combined with the list function, so that a pulsed discharge is possible. An IUa discharge in the combined CC+CV, CR+CV or CP+CV modes is also possible: Thereby discharges the DUT with constant current, resistance or power up to a defined voltage. This voltage is then kept constant until a defined minimum current is reached. Stop criteria are charge, energy, time, current and voltage.

Basic equipment	
PMLA-M	Master device with USB, RS-232 and LAN interface incl. PMLA system bus for connection of up to 5 slave devices.
PMLA-S	Slave device with PMLA system bus for operation on a master device and with output for a another slave device.
Cooling Unit	Empty cooler module (without load modules) with 4 free slots. (Depending on the channels 1x, 2x or 3x per device required).

DC-Input voltage	
Accuracy	< 0,1 %
Undervoltage protection	±0,1 %
Resolution	12 Bit

DC-Input current	
Accuracy	< 0,1%
Overcurrent protection	±0,1 %
Resolution	12 Bit

Measurement accuracy	
Voltage	±0,1 %
Current	±0,2 %
Resolution	16 Bit

Specification	
Norms	DIN EN 61010-1 DIN EN 61010-2-030 DIN EN61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3
Cooling	Exhauster
Operating temp.	5...40°C
Storage temp.	-25...65°C
Humidity	< 80 %
Operating height	< 2000 m

Dimensions
19" x 2 HU - 485 x 88 x 485 mm

Description	Power	Voltage	Current	Dynamic
MA15-04C30	150 W	40 V	30 A	200 µs
MA15-06C20	150 W	60 V	20 A	200 µs
MA15-06C5	150 W	60 V	5 A	200 µs
MA15-12C10	150 W	120 V	10 A	200 µs
MA15-12C2	150 W	120 V	2 A	200 µs
MA15-24C5	150 W	240 V	5 A	200 µs
MA15-24C1	150 W	240 V	1 A	200 µs
MA30-04C60	300 W	40 V	60 A	200 µs
MA30-06C40	300 W	60 V	40 A	200 µs
MA30-06C10	300 W	60 V	10 A	200 µs
MA30-12C20	300 W	120 V	20 A	200 µs
MA30-12C4	300 W	120 V	4 A	200 µs
MA30-24C10	300 W	240 V	10 A	200 µs
MA30-24C2	300 W	240 V	2 A	200 µs
MA45-04C90	450 W	40 V	90 A	200 µs
MA45-06C60	450 W	60 V	60 A	200 µs
MA45-06C15	450 W	60 V	15 A	200 µs
MA45-12C30	450 W	120 V	30 A	200 µs
MA45-12C6	450 W	120 V	6 A	200 µs
MA45-24C15	450 W	240 V	15 A	200 µs
MA45-24C3	450 W	240 V	3 A	200 µs
MA60-04C120	600 W	40 V	120 A	200 µs
MA60-06C80	600 W	60 V	80 A	200 µs
MA60-06C20	600 W	60 V	20 A	200 µs
MA60-12C40	600 W	120 V	40 A	200 µs
MA60-12C8	600 W	120 V	8 A	200 µs
MA60-24C20	600 W	240 V	20 A	200 µs
MA60-24C4	600 W	240 V	4 A	200 µs

System View

The system view shows the most important states as well as voltage and current of all channels (up to 72) in the system. By quickly selecting a channel, the new channel is selected and immediately switched to the settings view.

■ System View

Options	
PMLA02	GPIB Interface for PMLA-M
PMLA03	CAN-Interface for PMLA-M
PMLA15	Extra mating connector for 1x cooling unit
FCC-N-PMLA/CH	„Factory Calibration Certificate for new devices for 1 module MAxx-xxCxx".
FCC-PMLA/CH	„Factory Calibration Certificate for 1 Modul MAxx-xxCxx"
K-RS-SNM 9-9	RS-232 cable (null-modem cable) PMLA series
Patch-Cable 0,5 m	Patch Cable 1:1 blue, 0.5 m

PLI DC-Load

The strong performer

- Ethernet + USB + RS-232 + CAN + Analogue I/O port
- CC-, CV-, CR-, CP-, CCV-, CVC,Mode + opt. MPPT
- SCPI programming with measuring function
- Dynamic loads with synchronized DAQ
- Measurement data storage directly on USB stick
- Depending on model via loadbar
- High power density up to 28,800 W
- Full electronic protection

High comfort

The PLI series of Electronic Loads offer convenient operation through a graphical user interface. The strength of the devices lies especially in the very extensive Equipment at interfaces. In addition to Ethernet, USB, RS-232 and analogue I/O port, a CAN interface is built in as standard.

Many types

The type spectrum of the PLI series comprises 103 power classes from 600 W to 28,800 W. The models up to 300 V are also temporarily over-loadable. The amount and duration of the possible Over-load depends on the operating temperature of the power stage. For this purpose, the device indicates the currently possible BeLoadability.

Mechanics

The PLI series is designed in a stable 19" technology, can be used as a desktop unit, as well as built in 19" racks. From five height units upwards, there are retractable heavy load carrying handles on the top of the device. Optional castors can be installed on heavy equipment. For 19" installation, optional installation kits are available for devices up to 3,200 W. Larger units are already prepared for installation.

Useful operating modes

The devices have the operating modes constant current, constant voltage, constant resistance and constant power. In addition, limit values for voltage and current can be set in each operating mode. Dynamic processes can be simulated with up to 300 setting values. An automatic DAQ function allows measurement data to be easily stored on an external USB stick. Optionally, MPPT can be activated for testing photovoltaic panels.

Connections

All connections are located at the backside. The current connections of the smaller devices are designed as touch-protected pole terminals, of the larger devices with solid copper bars. The 600 W units also have connections on the front side.

H&H Höcherl & Hackl
The electronic load

For more than 30 years H&H has been a leading manufacturer of high quality and reliable electronic loads.

Battery test and measurement

The discharge function tests energy storage devices such as batteries, ultracaps, electrolytic capacitors and so on by discharging them in CC, CP or CR mode. The discharge function can be combined with the list function, so that a pulsed discharge is possible.

An IUa discharge in the combined CC+CV, CR+CV or CP+CV modes is also possible:

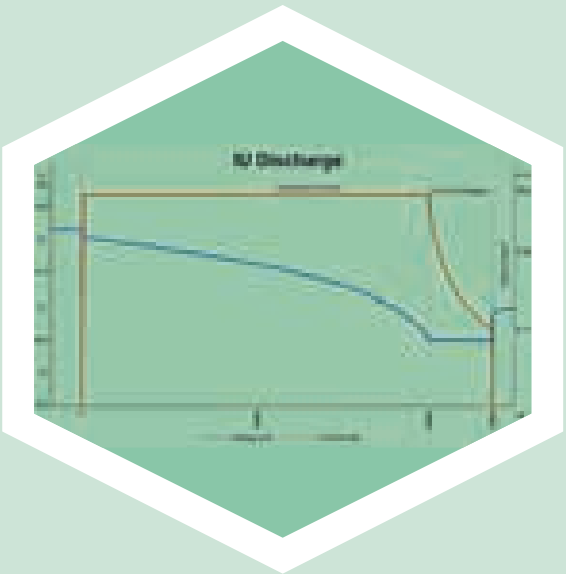
Thereby discharges the DUT with constant current, resistance or power up to a defined voltage. This voltage is then kept constant until a defined minimum current is reached. Stop criteria are charge, energy, time, current and voltage.

Atm data logging a follow-up time can be defined to observe the recovery phase.

Internal resistance measurement

The electronic load can measure the DC current internal resistance of the connected DUT. The determination of the internal resistance Ri is based on the principle as specified in various standards for batteries and accumulators, e.g. DIN EN 61951, DIN EN 61960. At intervals of a few seconds, the load at two defined loading levels measures the terminal voltage of the test object and calculates the internal resistance.

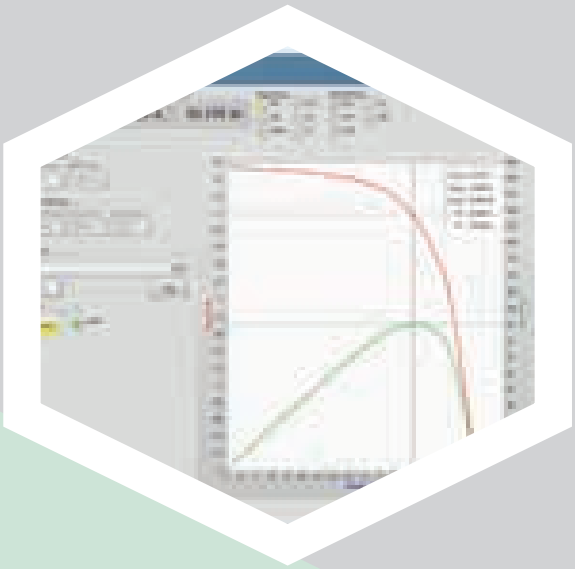
The load levels I1 and I2 and their durations are adjustable.



- Loading of energy storage and PV modules
- Recording of UI characteristics
- Protection against deep discharge of the energy storage

MPP tracking (with option PLI21)

The MPPT function acquires measurement data from a connected solar panel. Thereby continuously alternates the function between the MPPT process and a sweep process. During the MPPT process, the load controls the global MPP found at the sweep.



Master-Slave operation

To increase the power or current, up to 5 PLI loads of the same type and firmware revision can be connected in parallel in master-slave operation.

The system operates externally like a device. The master unit controls the entire current of the system, displays the total measured values and delivers them at query via one of the data interfaces.

Limitations: DAQ functions are not available in Master-Slave operation and the CAN interface is not available for data communication. At use of the master-slave cable K-MS-PLI the I/O port is also not usable.

Standard models				
Description	Power	Voltage	Current	Dimensions
PLI606	0,6 kW	60 V	60 A	2 U
PLI606C10	0,6 kW	60 V	10 A	2 U
PLI612	0,6 kW	120 V	20 A	2 U
PLI630	0,6 kW	300 V	16 A	2 U
PLI660	0,6 kW	600 V	8 A	2 U
PLI680	0,6 kW	800 V	6 A	2 U
PLI1406C20	1,2 kW	60 V	20 A	2 U
PLI12806	1,28 kW	60 V	1.200 A	11 U
PLI12812	1,28 kW	120 V	600 A	11 U
PLI1406	1,4 kW	60 V	120 A	2 U
PLI1412	1,4 kW	120 V	40 A	2 U
PLI1430	1,4 kW	300 V	32 A	2 U
PLI1460	1,4 kW	600 V	16 A	2 U
PLI1480	1,4 kW	800 V	12 A	2 U
PLI2106C30	1,8 kW	60 V	30 A	2 U
PLI2106	2,1 kW	60 V	180 A	2 U
PLI2112	2,1 kW	120 V	60 A	2 U
PLI2130	2,1 kW	300 V	48 A	2 U
PLI2160	2,1 kW	600 V	24 A	2 U
PLI2180	2,1 kW	800 V	18 A	2 U
PLI3206	3,2 kW	60 V	300 A	3 U
PLI3212	3,2 kW	120 V	150 A	3 U
PLI3230	3,2 kW	300 V	60 A	3 U
PLI3260	3,2 kW	600 V	40 A	3 U
PLI3280	3,2 kW	800 V	30 A	3 U
PLI4230	4,2 kW	300 V	90 A	5 U
PLI4260	4,2 kW	600 V	60 A	5 U
PLI4280	4,2 kW	800 V	45 A	5 U
PLI4806	4,8 kW	60 V	450 A	5 U
PLI4812	4,8 kW	120 V	225 A	5 U
PLI5630	5,6 kW	300 V	120 A	8 U
PLI5660	5,6 kW	600 V	80 A	8 U
PLI5680	5,6 kW	800 V	60 A	8 U
PLI6406	6,4 kW	60 V	600 A	8 U
PLI6412	6,4 kW	120 V	300 A	8 U
PLI7030	7 kW	300 V	150 A	8 U
PLI7060	7 kW	600 V	100 A	8 U
PLI7080	7 kW	800 V	75 A	8 U
PLI8006	8 kW	60 V	750 A	8 U
PLI8012	8 kW	120 V	375 A	8 U
PLI8430	8,4 kW	300 V	180 A	8 U
PLI8460	8,4 kW	600 V	120 A	8 U
PLI8480	8,4 kW	800 V	90 A	8 U
PLI9606	9,6 kW	60 V	900 A	8 U
PLI9612	9,6 kW	120 V	450 A	8 U
PLI9830	9,8 kW	300 V	210 A	11 U
PLI9860	9,8 kW	600 V	140 A	11 U
PLI9880	9,8 kW	800 V	105 A	11 U
PLI11206	11,2 kW	60 V	1.050 A	11 U
PLI11212	11,2 kW	120 V	525 A	11 U
PLI11230	11,2 kW	300 V	240 A	11 U
PLI11260	11,2 kW	600 V	160 A	11 U
PLI11280	11,2 kW	800 V	120 A	11 U
PLI12630	12,6 kW	300 V	270 A	11 U
PLI12660	12,6 kW	600 V	180 A	11 U
PLI12680	12,6 kW	800 V	135 A	11 U
PLI14030	14 kW	300 V	300 A	14 U
PLI14060	14 kW	600 V	200 A	14 U
PLI14080	14 kW	800 V	150 A	14 U

Standard models				
Description	Power	Voltage	Current	Dimensions
PLI14406	14,4 kW	60 V	1.350 A	11 U
PLI14412	14,4 kW	120 V	675 A	11 U
PLI15430	15,4 kW	300 V	330 A	14 U
PLI15460	15,4 kW	600 V	220 A	14 U
PLI15480	15,4 kW	800 V	165 A	14 U
PLI16006	16 kW	60 V	1.500 A	14 U
PLI16012	16 kW	120 V	750 A	14 U
PLI16830	16,8 kW	300 V	360 A	14 U
PLI16860	16,8 kW	600 V	240 A	14 U
PLI16880	16,8 kW	800 V	180 A	14 U
PLI17606	17,6 kW	60 V	1.650 A	14 U
PLI17612	17,6 kW	120 V	825 A	14 U
PLI18230	18,2 kW	300 V	390 A	17 U
PLI18260	18,2 kW	600 V	260 A	17 U
PLI18280	18,2 kW	800 V	195 A	17 U
PLI19206	19,2 kW	60 V	1.800 A	14 U
PLI19212	19,2 kW	120 V	900 A	14 U
PLI19630	19,6 kW	300 V	420 A	17 U
PLI19660	19,6 kW	600 V	280 A	17 U
PLI19680	19,6 kW	800 V	210 A	17 U
PLI20806	20,8 kW	60 V	1.950 A	17 U
PLI20812	20,8 kW	120 V	975 A	17 U
PLI21030	21,0 kW	300 V	450 A	17 U
PLI21060	21,0 kW	600 V	300 A	17 U
PLI21080	21,0 kW	800 V	225 A	17 U
PLI22406	22,4 kW	60 V	2.100 A	17 U
PLI22412	22,4 kW	120 V	1.050 A	17 U
PLI22430	22,4 kW	300 V	480 A	20 U
PLI22460	22,4 kW	600 V	320 A	20 U
PLI22480	22,4 kW	800 V	240 A	20 U
PLI23830	23,8 kW	300 V	510 A	20 U
PLI23860	23,8 kW	600 V	340 A	20 U
PLI23880	23,8 kW	800 V	255 A	20 U
PLI24006	24,0 kW	60 V	2.250 A	17 U
PLI24012	24,0 kW	120 V	1.125 A	17 U
PLI25230	25,2 kW	300 V	540 A	20 U
PLI25260	25,2 kW	600 V	360 A	20 U
PLI25280	25,2 kW	800 V	270 A	20 U
PLI25606	25,6 kW	60 V	2.400 A	20 U
PLI25612	25,6 kW	120 V	1.200 A	20 U
PLI27206	27,2 kW	60 V	2.550 A	20 U
PLI27212	27,2 kW	120 V	1.275 A	20 U
PLI28806	28,8 kW	60 V	2.700 A	20 U
PLI28812	28,8 kW	120 V	1.350 A	20 U

HV models - 1.200 V				
Description	Power	Voltage	Current	Dimensions
PLI24K12HV	2,4 kW	1.200 V	12 A	3 U
PLI36K12HV	3,6 kW	1.200 V	18 A	5 U
PLI48K12HV	4,8 kW	1.200 V	24 A	8 U
PLI60K12HV	6 kW	1.200 V	30 A	8 U
PLI72K12HV	7,2 kW	1.200 V	36 A	8 U
PLI84K12HV	8,4 kW	1.200 V	42 A	11 U
PLI96K12HV	9,6 kW	1.200 V	48 A	11 U
PLI108K12HV	10,8 kW	1.200 V	54 A	11 U
PLI120K12HV	12 kW	1.200 V	60 A	14 U
PLI132K12HV	13,2 kW	1.200 V	66 A	14 U
PLI144K12HV	14,4 kW	1.200 V	72 A	14 U

EC models - Extended current range up to 1,8 kA / 300 V				
Description	Power	Voltage	Current	Dimensions
PLI3230EC	3,2 kW	300 V	208 A	3 U
PLI4230EC	4,2 kW	300 V	312 A	5 U
PLI5630EC	5,6 kW	300 V	416 A	8 U
PLI7030EC	7 kW	300 V	520 A	8 U
PLI8430EC	8,4 kW	300 V	624 A	8 U
PLI9830EC	9,8 kW	300 V	728 A	11 U
PLI11230EC	11,2 kW	300 V	832 A	11 U
PLI12630EC	12,6 kW	300 V	936 A	11 U
PLI14030EC	14 kW	300 V	1.040 A	14 U
PLI15430EC	15,4 kW	300 V	1.144 A	14 U
PLI16830EC	16,8 kW	300 V	1.248 A	14 U
PLI18230EC	18,2 kW	300 V	1.352 A	17 U
PLI19630EC	19,6 kW	300 V	1.456 A	17 U
PLI21030EC	21,0 kW	300 V	1.560 A	17 U
PLI22430EC	22,4 kW	300 V	1.664 A	20 U
PLI23830EC	23,8 kW	300 V	1.768 A	20 U
PLI25230EC	25,2 kW	300 V	1.872 A	20 U

EC models – Extended current range up to 936 A / 600 V				
Description	Power	Voltage	Current	Dimensions
PLI3260EC	3,2 kW	600 V	104 A	3 U
PLI4260EC	4,2 kW	600 V	156 A	5 U
PLI5660EC	5,6 kW	600 V	208 A	8 U
PLI7060EC	7 kW	600 V	260 A	8 U
PLI8460EC	8,4 kW	600 V	312 A	8 U
PLI9860EC	9,8 kW	600 V	364 A	11 U
PLI11260EC	11,2 kW	600 V	416 A	11 U
PLI12660EC	12,6 kW	600 V	468 A	11 U
PLI14060EC	14 kW	600 V	520 A	14 U
PLI15460EC	15,4 kW	600 V	572 A	14 U
PLI16860EC	16,8 kW	600 V	624 A	14 U
PLI18260EC	18,2 kW	600 V	676 A	17 U
PLI19660EC	19,6 kW	600 V	728 A	17 U
PLI21060EC	21 kW	600 V	780 A	17 U
PLI22460EC	22,4 kW	600 V	832 A	20 U
PLI23860EC	23,8 kW	600 V	884 A	20 U
PLI25260EC	25,2 kW	600 V	936 A	20 U

ZV Modelle - mit Null-Volt-Option				
Designation	Power	Voltage	Current	Dimensions
PLI606ZV	600 W	60 V	60 A	2 U
PLI612ZV	600 W	120 V	20 A	2 U
PLI1206ZV	1.200 W	60 V	120 A	2 U
PLI2106ZV	2.100 W	60 V	360 A	8 U
PLI2306ZV	2.300 W	60 V	300 A	8 U
PLI2606ZV	2.600 W	60 V	200 A	8 U
PLI3206ZV	3.200 W	60 V	540 A	8 U
PLI3506ZV	3.500 W	60 V	450 A	8 U
PLI3706ZV	3.700 W	60 V	360 A	8 U
PLI4306ZV	4.300 W	60 V	720 A	11 U
PLI4606ZV	4.600 W	60 V	600 A	11 U
PLI4806ZV	4.800 W	60 V	540 A	11 U
PLI6006ZV	6.000 W	60 V	720 A	11 U
PLI7506ZV	7.500 W	60 V	720 A	11 U

MR Models - with several current ranges You can find all current ranges in the data sheet				
Description	Power	Voltage	Current	Dimensions
PLI508MR4	500 W	80 V	60 A	½ 19" 2 U
PLI512MR4	500 W	120 V	40 A	½ 19", 2 U
PLI530MR3	500 W	300 V	16 A	½ 19", 2 U
PLI580MR3	400 W	800 V	6 A	½ 19", 2 U
PLI1008MR4	1.000 W	80 V	120 A	2 U
PLI1012MR4	1.000 W	120 V	80 A	2 U
PLI1030MR3	1.000 W	300 V	32 A	2 U
PLI1080MR3	1.000 W	800 V	12 A	2 U
PLI1508MR4	1.500 W	80 V	180 A	2 U
PLI1512MR4	1.500 W	120 V	120 A	2 U
PLI1530MR3	1.500 W	300 V	48 A	2 U
PLI1580MR3	1.500 W	800 V	18 A	2 U

AC-Input	
Voltage	115 / 230 V_{AC} ±10 %, switchable
Frequency	50...60 Hz

DC-Input voltage	
from the setting value	±0,2 %
from the appropriate range	±0,05 %

DC-Input current	
from the setting value	±0,2 %
from the appropriate range	±0,05 %

Resistance at 5 % to 100 % of the voltage range	
from the setting value	±1,4 %
from the appropriate range	±0,3 % of the current range

Power (at U and I > 30 % of the range)	
from the setting value	±0,35 %
from the appropriate range	±0,1 %

Accuracy of voltage measurement	
from the setting value	±0,01 %
from the appropriate range	±0,005 %

Accuracy of current measurement	
from the setting value	±0,2 %
from the appropriate range	±0,05 %

Temperature characteristics	
Long-term power	will be reachedat T_u= 21°C
Derating	-1,2 % per°C for T_u> 21°C

Specification	
Norms	DIN EN 61010-1 DIN EN 61010-2-030 DIN EN 61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3
Cooling	Exhauster
Operating temperature	5...40°C
Storage temperature	-25...65°C
Humidity	80 % at 31°C linear decreasing to 50 % at 40°C
Operating height	< 2.000 m

One series - an impressive variety of variants. We will be pleased to support you in selecting the right device. Let us know your application and our experts will provide you with a customized offer! The loads are available as single units, on request we integrate them directly into individual complete systems. Contact our sales team and let them advise you!

ERI DC-Load

The regenerative

- Energy feedback into the local current grid
- Low heat generation, low noise, laboratory operation
- CC, CV, CR, CP, CCV, CVC mode
- Ethernet + USB + RS-232 + CAN serially
- SCPI programming with measuring function
- Dynamic loads with synchronized DAQ
- Measurement data storage directly on USB stick
- Adjustable limit values for current and voltage

Energy recovery

The electronic loads of the ERI series put in the absorbed power of up to 10.8 kW per load back into the local supply grid with an efficiency of up to 90%. The strength of the devices lies in the very extensive range of interfaces. In addition to Ethernet, USB, RS-232 and an I/O port, a CAN interface is also built in serially. The programming is done in SCPI syntax with a high command volume.

Mechanics

The ERI series is designed in stable 19" technology. It can be used as a desktop unit or built in a 19" rack without additional options. All connections are located at the backside. The current connections are designed as solid copper bars.

Operating mode

The devices of the regenerative ERI series have the operating modes constant current, constant voltage, constant resistance and constant power. In addition, limit values for voltage and current can be set in each operating mode. Dynamic processes can be simulated with up to 300 setting values. An automatic DAQ function allows measurement data to be stored directly on an external USB stick.

Measurement data acquisition

The data acquisition tool installed serially at the ERI extends the functionality of the devices to a complete test station.

Security

At devices for input voltages which are dangerous to touch, covers for the load inputs are supplied as touch protection.

Dynamic function

With the LIST function, complex load profiles can be realized in the CC, CV, CR and CP operating modes. 300 load levels with a corresponding ramps and residence time can be realized.

Settings memory

Three settings memories are available for the permanent storage of device settings. This allows recurring test tasks to be quickly reconstructed. The last settings when switching off the instrument can be taken over. The electronic load when switching on can optionally set the reset state, switch off the last active settings atm or set memory position 1 or 2.

Software tool

The tool is a control software for electronic loads of the ERI series. With a navigation bar you can switch between the individual applications. In the main menu (setting) the most important device settings are made.

A measured value and status bar informs about the current device status. The data logger function can be configured and activated.

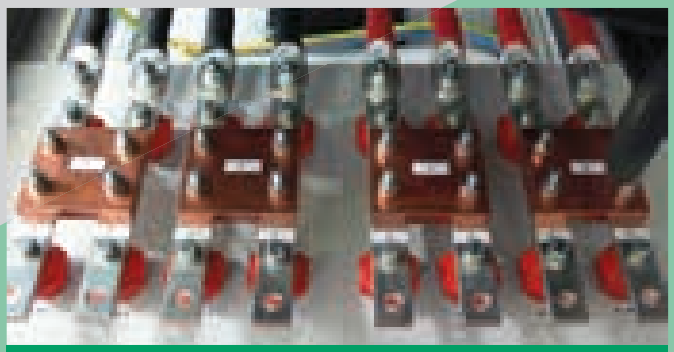
List editor

The List Editor generates tabular setting values for current, voltage, resistance or power, the corresponding rise and fall times and the dwell times. In addition, a separate measurement rate for current and voltage can be specified for each rise and dwell time, which is synchronous to the settlement values.

This generated waveform is sent directly to the device via a data interface or stored on a data carrier for further processing.

Data viewer

Measured values of the instrument's DAQ memory can be read from the instrument and displayed graphically with the help of the data viewer. The data can then be saved as *.CSV file on a data carrier for further processing.



Also as individual multi-channel system

Description	Power	Voltage	Current	Dimensions	Weight
ERI03612	3.600 W	120 V	110 A	19" x 3 U x 654 mm	21 kg
ERI07212	7.200 W	120 V	220 A	19" x 3 U x 654 mm	29 kg
ERI10812	10.800 W	120 V	330 A	19" x 3 U x 654 mm	38 kg
ERI03640	3.600 W	400 V	45 A	19" x 3 U x 654 mm	21 kg
ERI07240	7.200 W	400 V	90 A	19" x 3 U x 654 mm	29 kg
ERI10840	10.800 W	400 V	135 A	19" x 3 U x 654 mm	38 kg

AC-Input	
Voltage (3,6 kW)	1/N/PE 230 V_{AC}
Voltage (7,2 kW)	2/N/PE 400/230 V_{AC}
Voltage (10,8 kW)	3/N/PE 400/230 V_{AC}
Frequency	50 Hz
Mains-side fuse	C16

Accuracy setting	
Voltage	< 0,2 %
Current	< 0,05 %
Resistance	±1,4 %
Power	±0,35 % - ±0,7 %
Resolution	14 Bit

Accuracy of the measurement (CV, CC, CR Mode)	
Voltage	±0,03 %
Current	±0,2 %
Power	U*I product
Resolution	18 Bit
Measuring rate	330 ms

Accuracy trigger voltage	
Trigger voltage	±1 % U-range
Measuring rate	200 µs

Protection and monitoring	
Safety devices	Overcurrent Overload Excessive temperature
Monitoring messages	Overvoltage Undervoltage Reverse polarity display

Voltage strength	
neg. Input enclosure	500 V_{DC}
pos. Input enclosure	800 V_{DC}
Sense connections	PH2/7.62-BU

Specification	
Norms	DIN EN 61010-1 DIN EN 61010-2-30 DIN EN 61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3
Cooling	Exhauster
Operating temperature	5...40°C
Storage temperature	-25...65°C
Humidity	< 80 % at 31°C
Operating height	< 2.000 m

HEA-ELR5000

Regenerative, multi-channel load

- 19" 6 U rack for up to 10 separate load modules
- Input powers: up to 0...320 W per module
- Input voltages: 0...80 V or 0...200 V
- Input currents: 0...12 A or 0...25 A
- Multilingual TFT touch panel operating unit
- Ethernet / LAN serially

General

The new Multi-channel load HEA-ELR5000 offers the possibility to configure an electronic multichannel DC load with power recovery in a rack insert for 19" systems. For this purpose, up to 10 load modules, each with 320 W nominal power, can be installed in the rack. The modules are separate from each other, but require the rack containing the regenerative DC-AC converter. They can also be expanded for higher power. Parallel connection of the modules to their DC input is possible.

Powers, voltages, currents

The new Multi-channel load HEA-ELR5000 is available with two load models. An 80 VDC version and a 200 VDC version. The models offer 320 W nominal power, where the 80 VDC model is designed for 25 A current and the 200 VDC Model for 12 A. Due to the expandability to up to 10 modules in one rack, the power can be increased to 3,200 W can be increased.
The modules offer the typical control modes ConstantCurrent (CC), ConstantVoltage (CV) and ConstantPower (CP). The mains feedback function converts the supplied DC energy into a mains-synchronous sine current and feeds it back into the local mains supply. This almost completely eliminates the usual heat generation and saves energy costs. The colored TFT touch panel offers an intuitive way of manual operation. The standard ethernet interface offers the uncomplicated integration of all modules of a rack into a network via a local 1 U 19" switch. The modules can be monitored and controlled via a supplied Windows software or user created applications (LabView or similar) using SCPI or ModBus protocol.

Description	Input Power	Input voltage	Input Current	Dimensions	Weight
Modul HEA-ELR5080-25	320 W	80 V	25 A	81 x 132,5 x 310 mm	2,35 kg
Modul HEA-ELR5200-12	320 W	200 V	12 A	81 x 132,5 x 310 mm	2,35 kg
HEA-ELR5000-Rack	up to 3.600 W	up to 200 V	up to 250 A	19" x 6 U x 500 mm	35,8 kg

HEA fuel cell test system

Regenerative individual system

For some time now, HEIDEN has been offering customer-specific system solutions in addition to typical standard products. For this purpose, a competent team of co-workers is available for planning, implementation and maintenance.

Development and testing

The development and testing of fuel cells requires the use of precise and highly reliable test systems. Newly developed fuel cells have to be tested under load conditions as close to reality as possible. The HEIDEN test systems make this possible, precisely tailored to individual customer requirements.

Six independent channels

Up to six fuel cells of 7 kW each can be charged simultaneously and independently of each other via regenerative DC charging. Besides constant voltage, constant current and constant power, complete test sequences can be programmed. The loads take the power and put it back efficiently into the AC grid. In addition to the efficiency advantage, the test bay/ laboratory is not additionally heated by this technology.

Grid analysis

An integrated grid analysis module monitors the supply grid during the complete test operation. If the supply grid fails or shows unacceptably high fluctuations in voltage or frequency, the regenerative operation is stopped. This function ensures that no island grid can be build. In order not to interrupt the test sequence of the fuel cells the system automatically switches to non-recovering, electronic loads, which release the absorbed energy as thermal energy. These loads are supported by an uninterruptible power supply (UPS).

- Redundant fuel cell loading system
- 42 kW (84 kW) system power
- Customized project planning
- Channels of 2 x 7 kW each
- Up to 500 VDC
- 4...20 mA PLC interface
- Status signalling
- Mobile 19" system
- Power recovery with grid analysis
- Use of 6 regenerative loads HEA-ELR9000
- Redundancy through electronic loading HEA-EL9000
- Automatic switchover at power failure to UPS supported, non-regenerative charging
- Digital/potential-free signal connection to customer's SPS
- Robust Harting connections, customer-specific

The systems are manufactured individually. An excerpt of the possible system options can be found on page 104.

HEA-ELR9000 HP

Regenerative DC-Load

- For 1-phase or 3-phases mains connection
- Feedback of the taken DC power
- Galvanically isolated DC input
- Input power up to 15 kW per device
- Expandable to 200 kW or more
- Input voltages up to 1.500 V
- Input currents up to 510 A per device
- FPGA/DSP-based digital control

Regeneration

The HEA-ELR9000 series of electronic DC loads with mains recovery offer many voltage levels up to 1.500 V, currents up to 510 A and powers up to 15 kW for the most diverse range of application. The loads are available in four typical control modes CC, CV, CP and CR and can be extended for higher power.

Flexible power stage

The DC input range is extremely flexible and allows the use of high input voltages or optionally high input current within the respective nominal power. For comfortable operation, this series has a high-resolution, intuitively operated TFT touch panel with integrated function generator and predefined curves as well as alarm manager, memory and storable user profiles.

Measurement and display

The display resolution is 4 digits, which can be set in the range of 0...100 Adjustable DC input parameters (U, I, P, R) have a high accuracy and stability and are very dynamic (current pulses up to 30 µs). For remote operation the devices are equipped with a potential-separate analogue interface (0...5 V / 0...10 V) and USB. Further interface options such as CAN, CANopen, Ethernet, Profibus/net, RS232 or Modbus can be retrofitted via the plug & play slot on the backside of the panel. This device series is an indispensable tool for the reproducibility of test results and is suitable for integration into professional automated test benches and for cascading for high-load applications.

The efficient mains recovery function converts the supplied DC energy into a mains-synchronous sinus current and put it back into the AC mains. Thereby achieves an efficiency of up to 94.5 %. This reduces the usual heat generation of electronic loads.

Description	Power	Voltage	Current	Resistance	Dimensions	Weight
HEA-ELR9080-170	3,5 kW	80 V	170 A	0,01...12 Ω	19" x 3 U x 609 mm	17 kg
HEA-ELR9250-70	3,5 kW	250 V	70 A	0,09...120 Ω	19" x 3 U x 609 mm	17 kg
HEA-ELR9500-30	3,5 kW	500 V	30 A	0,42...480 Ω	19" x 3 U x 609 mm	17 kg
HEA-ELR9750-22	3,5 kW	750 V	22 A	0,8...1.100 Ω	19" x 3 U x 609 mm	17 kg
HEA-ELR9080-340	7 kW	80 V	340 A	0,005...6 Ω	19" x 3 U x 609 mm	24 kg
HEA-ELR9250-140	7 kW	250 V	140 A	0,04...60 Ω	19" x 3 U x 609 mm	24 kg
HEA-ELR9500-60	7 kW	500 V	60 A	0,21...240 Ω	19" x 3 U x 609 mm	24 kg
HEA-ELR9750-44	7 kW	750 V	44 A	0,43...550 Ω	19" x 3 U x 609 mm	24 kg
HEA-ELR91000-30	7 kW	1.000 V	30 A	0,83...950 Ω	19" x 3 U x 609 mm	24 kg
HEA-ELR9080-510	10,5 kW	80 V	510 A	0,003...4 Ω	19" x 3 U x 609 mm	31 kg
HEA-ELR9250-210	10,5 kW	250 V	210 A	0,03...40 Ω	19" x 3 U x 609 mm	31 kg
HEA-ELR9500-90	10,5 kW	500 V	90 A	0,14...160 Ω	19" x 3 U x 609 mm	31 kg
HEA-ELR9750-66	10,5 kW	750 V	66 A	0,29...360 Ω	19" x 3 U x 609 mm	31 kg
HEA-ELR91500-30	10,5 kW	1.500 V	30 A	1,2...1.450 Ω	19" x 3 U x 609 mm	31 kg
HEA-ELR9080-170 HP	5 kW	80 V	170 A	0,02...25 Ω	19" x 3 U x 670 mm	18 kg
HEA-ELR9200-70 HP	5 kW	200 V	70 A	0,1...150 Ω	19" x 3 U x 670 mm	18 kg
HEA-ELR9360-40 HP	5 kW	360 V	40 A	0,3...520 Ω	19" x 3 U x 670 mm	18 kg
HEA-ELR9500-30 HP	5 kW	500 V	30 A	0,5...1.000 Ω	19" x 3 U x 670 mm	18 kg
HEA-ELR9750-20 HP	5 kW	750 V	20 A	1,28...2.200 Ω	19" x 3 U x 670 mm	18 kg
HEA-ELR9080-340 HP	10 kW	80 V	340 A	0,01...13 Ω	19" x 3 U x 670 mm	25 kg
HEA-ELR9200-140 HP	10 kW	200 V	140 A	0,05...75 Ω	19" x 3 U x 670 mm	25 kg
HEA-ELR9360-80 HP	10 kW	360 V	80 A	0,15...260 Ω	19" x 3 U x 670 mm	25 kg
HEA-ELR9500-60 HP	10 kW	500 V	60 A	0,25...500 Ω	19" x 3 U x 670 mm	25 kg
HEA-ELR9750-40 HP	10 kW	750 V	40 A	0,6...1.100 Ω	19" x 3 U x 670 mm	25 kg
HEA-ELR9080-510 HP	15 kW	80 V	510 A	0,006...10 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR9200-210 HP	15 kW	200 V	210 A	0,033...50 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR9360-120 HP	15 kW	360 V	120 A	0,1...180 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR9500-90 HP	15 kW	500 V	90 A	0,16...340 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR9750-60 HP	15 kW	750 V	60 A	0,4...740 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR91000-40 HP	15 kW	1.000 V	40 A	0,8...1.300 Ω	19" x 3 U x 670 mm	32 kg
HEA-ELR91500-30 HP	15 kW	1.500 V	30 A	2,5...3.000 Ω	19" x 3 U x 670 mm	32 kg

AC-Input	
Voltage	230 / 400 V_{AC} +10 % / -15 %
Frequency	45...66 Hz
PFC	> 0,99

Accuracy settings	
Voltage	< 0,3 %
Current	< 0,4 %
I Rise time 10...90 %	< 50 µs
I Stability 1...100 % U_{DC}	< 0,15 %
Resistance	≤ 1 % + 0,3 % I_{NENN}
Power	< 1 %

Protection and monitoring	
Safety devices	Overcurrent Overload Excessive temperature
Monitoring messages	Overvoltage Undervoltage
Touch protection	Cover Caps

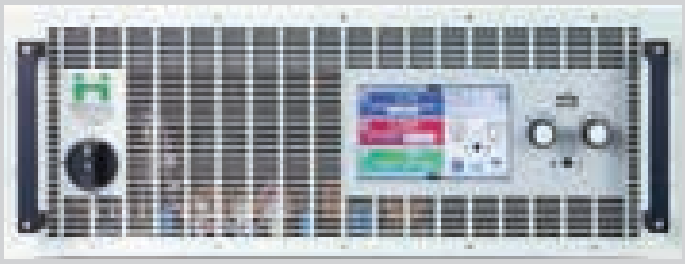
Voltage strength	
neg. Input enclosure	±400 V_{DC}
pos. Input enclosure	±400 V_{DC} + U_{in}

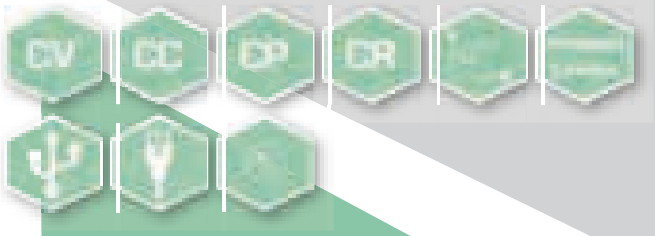
Specification	
Norms	EN 60950, EN 50160 (Class 2)
Cooling	Exhauster
Operating temperature	0...50 °C
Storage temperature	-20...70 °C
Humidity	< 80 %
Operating height	< 2.000 m

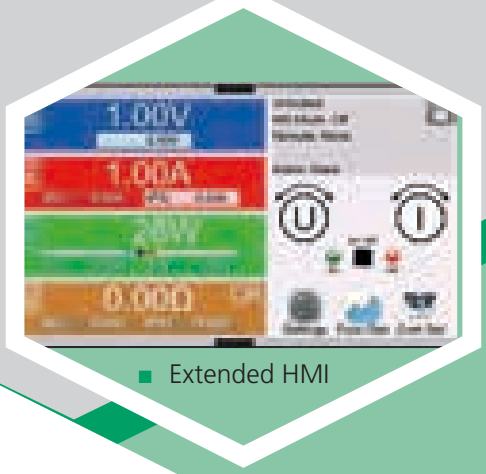
Interface	CAN	CANopen	Ethernet	ModBus TCP	PBus/Pnet	RS232	GPIB	EtherCAT
								
Specs	Type: Bus 10 kBit – 1 MBit CAN 2.0 A & 2.0 B Integrated bus termination DBC files Cyclic data	Type: Bus 10 kBit – 1 MBit CANopen standard EDS/XDD file Customisable database	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control functions 1 or 2 port version Integrated switch (2 port version)	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control Supports ModBus TCP frame 1 or 2 port version Integrated switch (2 port version)	Profinet: Type: Network 1 or 2 port version Integrated switch (2 port version) Profibus: Type: Bus Up to 12 Mbit	Type: P2P 9600 – 115200 Bd No handshaking	Type: P2P Parallel bus IEE 488 standard Built-in	Type: EtherCAT-Slave Integrated PDO and SDO CANopen Protocoll (CoE)

HEA-ELR10000

Regenerative DC-Load







- Extended HMI

The regenerative load

HEA-ELR10000

The new HEA-ELR10000 series of electronic loads with mains recovery is an extension of the HEA-ELR9000 HP series and offers twice the nominal power at only 1 height unit more. Compared to the HEA-ELR9000 HP series at 30 kW power, this results in a space saving of 2 U or one third. Due to the extended master-slave bus, up to 36 devices can be realized in a system network, which can achieve a total power of up to 1.08 MW.

Power recovery

At these electronic loads, the mains input is also always used for energy recovery of the power taken at the DC input, which is converted with an efficiency of up to 95.5 %. This type of energy recovery helps to save costs and avoids costly cooling systems compared to conventional loads that convert their input power into heat.

- AC input range 342...528 V_{AC}
- Power: 30 kW per device
- Energy recovery with high efficiency
- Galvanically isolated DC input
- Input power: 30 kW per device
- Input voltages: 60 V up to 2.000 V
- Input currents: 40 A up to 1,000 A per device
- FPGA-based, digital control
- Multilingual TFT touch panel operating unit
- User profiles, function generator
- Galvanically separate interfaces (analogue, USB, Ethernet)
- Master-Slave-Bus for parallel connection
- Extra USB port for autonomous data recording
- Optional, digital, pluggable interface modules
- SCPI and ModBus RTU command language and LabView
- Control system software for Windows

Description	Power	Voltage	Current	Resistance	Dimensions	Weight
HEA-ELR10060-1000 4U	30 kW	60 V	1.000 A	0,003...5 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR10080-1000 4U	30 kW	80 V	1.000 A	0,003...5 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR10200-420 4U	30 kW	200 V	420 A	0,0165...25 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR10360-240 4U	30 kW	360 V	240 A	0,05...90 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR10500-180 4U	30 kW	500 V	180 A	0,08...170 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR10750-120 4U	30 kW	750 V	120 A	0,2...370 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR11000-80 4U	30 kW	1.000 V	80 A	0,4...650 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR11500-60 4U	30 kW	1.500 V	60 A	0,8...1.500 Ω	19" x 4 U x 670 mm	about 50 kg
HEA-ELR12000-40 4U	30 kW	2.000 V	40 A	1,7...2.700 Ω	19" x 4 U x 670 mm	about 50 kg

Battery test

For testing all types of batteries, e.g. with constant current or constant resistance discharge, the devices offer a battery test mode. This mode shows separate values like elapsed test time and removed capacity (Ah). The data recorded during the test on a PC, e.g. with HEA power control, can be exported and evaluated as an Excel table in CSV format (discharge diagram). An adjustable table, maximum test time and a variable final discharge voltage supplement the existing setting options.

Function generator and table control

A special feature is the convenient, FPGA-based, digital function and arbitrary generator, which enables the control system of time-sequential, freely programmable load profiles. This enables the generation of alternating sine and rectangular functions or sawtooth or ramp curves. With a freely programmable, digital value table with 3,276 interpolation points embedded in the control loop, non-linear internal resistances of consumers, such as batteries or LED chains, can be simulated as desired.

AC-Input	
Voltage	342...528 V_{AC} 3 Ph
Frequency	45...66 Hz
Power factor	> 0,99

DC-Input voltage	
Accuracy	< 0,05 % of nominal value

DC-Input current	
Accuracy	< 0,1 % of nominal valuet
Stability	< 0,15 % of nominal value
Rise time 10...90 %	≤ 300 µs

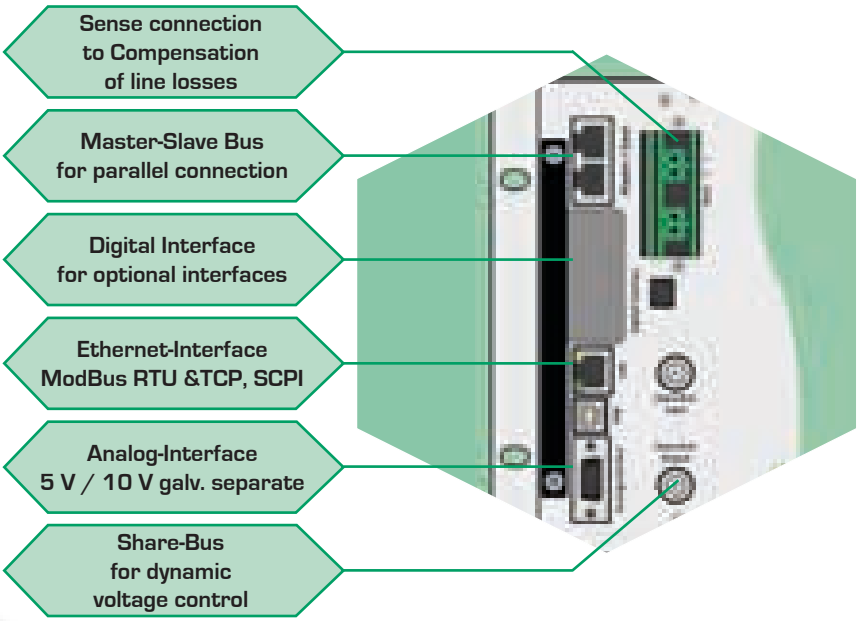
DC-Input power	
Accuracy	< 0,3 % of nominal value

DC-Input resistance	
Accuracy	≤ 0,3 % R_{Max} + 1 % I_{NENN}

Interfaces	
Built in	1x USB Typ B 1x Ethernet 1x Analogue
Slot	Retrofittable plug-in modules
Analogue interface	0...5 V < 0,2 % 0...10 V < 0,4 %

Voltage strength	
AC-Input - enclosure	2.500 V_{DC}
AC-Input - DC-Input	2.500 V_{DC}
DC-Input - enclosure (PE) Device dependent	600...2.000 V_{DC}

Specification	
Norms	EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013 EN 61000-6-3:2011-09 EN 61000-6-4:2011-09 Class B EN 50160:2011-02 Net class 2
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m
Pollution degree	2
Protection class	1



HEA-PSB9000

Bidirectional DC Source-Sink

The power supply bidirectional HEA-PSB9000

The new HEA-PSB9000 series combines the advantages and technology of the proven DC source HEA-PSI9000 with the regenerative load part of the HEA-ELR9000 series.

Primarily the bidirectional DC source takes over the tasks of a flexible current supply. Furthermore, the HEA-PSB9000 fulfills the function of a regenerative electronic load by absorbing energy and efficiently putting it back into the local grid. The parameters for the current supply as well as the setpoints for the electronic load can be flexibly adjusted.

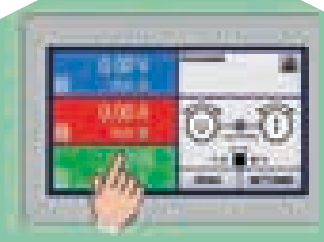
Charge and discharge

The bidirectional DC source HEA-PSB9000 can be used to charge and discharge batteries, fuel cells and other energy storage devices. For this purpose, the user is provided with numerous integrated functions such as a battery test mode, an arbitrary generator and a vehicle starting curve. Since the internal resistance is adjustable, the functional modes of batteries or photovoltaic modules can also be simulated.

Intuitiv

The HEA-PSB9000 series of microprocessor-controlled laboratory power supply units offers user-friendly, interactive menu navigation many functions and features serially, which make arithmetic much easier. User profiles and function sequences can be easily configured and stored, thus increasing the reproducibility of a test or other applications. To increase overall power, racks with up to 540 kW can be configured according to customer requirements.

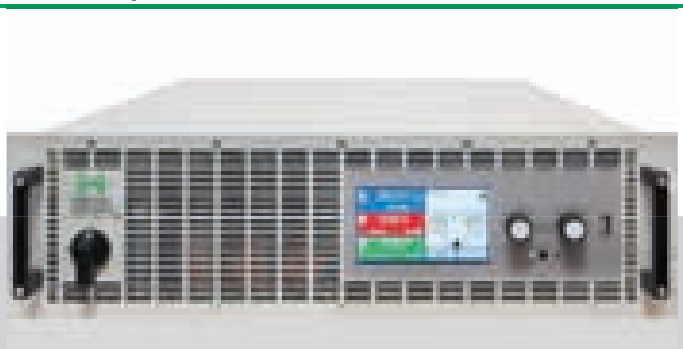
- Source and sink in one device
- Flexible, power-controlled output stage
- Various protection functions (OVP, OCP, OPP, OTP)
- Intuitive TFT touch panel
- Remote sensing input
- Galvanically separate, analogue interface
- Integrated function generator
- Photovoltaic sources simulation
- Internal resistance control
- Discharge circuit (Uout < 60 V in ≤ 10 s)
- USB interface serially
- Optional, digital interfaces modules, alternatively
- Fixed IEEE/GPIB port



■ TFT display with touch function

■ Function Generator

HEIDEN
COMPETENCE IN POWER



Description	Power	Voltage	Current	Efficiency	Dimensions
HEA-PSB9060-120 1ph	±2,5 kW	60 V	±120 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9080-120 1ph	±2,5 kW	80 V	±120 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9200-70 1ph	±2,5 kW	200 V	±70 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9360-40 1ph	±2,5 kW	360 V	±40 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9500-30 1ph	±2,5 kW	500 V	±30 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9750-20 1ph	±2,5 kW	750 V	±20 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9060-120U3	±5 kW	60 V	±120 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9080-120U3	±5 kW	80 V	±120 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9200-70U3	±5 kW	200 V	±70 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9360-40U3	±5 kW	360 V	±40 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9500-30U3	±5 kW	500 V	±30 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9750-20U3	±5 kW	750 V	±20 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9060-240U3	±10 kW	60 V	±240 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9080-240U3	±10 kW	80 V	±240 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9200-140U3	±10 kW	200 V	±140 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9360-80U3	±10 kW	360 V	±80 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9500-60U3	±10 kW	500 V	±60 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9750-40U3	±10 kW	750 V	±40 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9060-360U3	±15 kW	60 V	±360 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9080-360U3	±15 kW	80 V	±360 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9200-210U3	±15 kW	200 V	±210 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9360-120U3	±15 kW	360 V	±120 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9500-90U3	±15 kW	500 V	±90 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB9750-60U3	±15 kW	750 V	±60 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB91000-40U3	±15 kW	1.000 V	±40 A	≤ 95 %	19" x 3 U x 670 mm
HEA-PSB91500-30U3	±15 kW	1.500 V	±30 A	≤ 95 %	19" x 3 U x 670 mm

AC-Input	
Voltage (2,5 kW)	230 V_{AC} ±15 %
Voltage (ab 5 kW)	340...528 V_{AC}
Frequency	45...66 Hz
Power factor	> 0,99

DC-Output/Input voltage	
Accuracy	< 0,1 %
Stability 0...100 % Load	< 0,05 %
Stability ±10 % U_E	< 0,02 %
Adjustment 10...100 %	< 1,5 ms
Rise time 10...90 % U	Max. 30 ms
Overvoltage protection	Adjustable

DC-Output/Input current	
Accuracy	< 0,2 %
Stability	< 0,15 %
Stability ±10 % U_E	< 0,05 %

DC-Output/Input conduction	
Accuracy	< 1 %

Interfaces	
Built in	1x USB Typ B 1x GPIB opt.
Slot	Retrofittable plug-in modules
Analogue interface	0..5 V < 0,2 % 0..10 V < 0,4 %

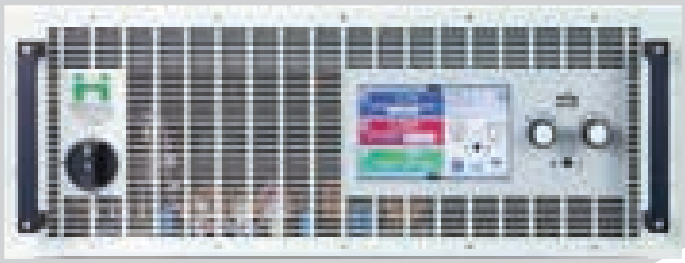
Voltage strength	
AC-Input - enclosure	2.500 V_{DC}
AC-Input - DC-Output	2.500 V_{DC}
Output to enclosure	max. 400 V_{DC}
galv. separatee Analogue interface	0..10 V < 0,2 % 0..5 V < 0,4 %

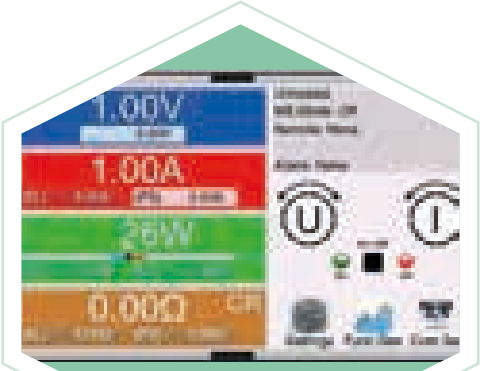
Specification	
Norms	EN 60950 EN 61326 EN 55022 Kl. B
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m

	CAN	CANopen	Ethernet	ModBus TCP	PBus/Pnet	RS232	GPIB	EtherCAT
Interface								
Specs	Type: Bus 10 kBit – 1 MBit CAN 2.0 A & 2.0 B Integrated bus termination DBC files Cyclic data	Type: Bus 10 kBit – 1 MBit CANopen standard EDS/XDD file Customisable database	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control functions 1 or 2 port version Integrated switch (2 port version)	Type: Network 10/100 MBit TCPIP, HTTP, ICMP Website with control Supports ModBus TCP frame 1 or 2 port version Integrated switch (2 port version)	Profinet: Type: Network 1 or 2 port version Integrated switch (2 port version) Profibus: Type: Bus Up to 12 Mbit	Type: P2P 9600 – 115200 Bd No handshaking	Type: P2P Parallel bus IEE 488 standard Built-in	Type: EtherCAT-Slave
Pro	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces	High data speed Long distance Network topology Exchangeable with other interfaces SCPI supported LabView supported Plug 'n play	High data speed Long distance Network topology Exchangeable with other interfaces Easy ModBus network integration Plug 'n play	Industrial grade High data speed Medium distance Bus topology Exchangeable with other interfaces PLC compatible	Medium distance Exchangeable with other interfaces SCPI supported LabView supported Low costs	SCPI supported Very easy setup and integration Unified support of different devices	Integrated PDO and SDO CANopen Proto-coll (CoE)
Contra	No plug 'n play on PC side CAN software required High overall costs	No plug 'n play on PC side CANopen software required High overall costs	Typical network issues Complicated setup	ModBus TCP software required Typical network issues Complicated setup	No plug 'n play on PC side Extra software required High overall costs	Low data speed One RS232 port required per device No bus, no network	Short distance Very high costs Built-in Complicated cable system	

HEA-PSB10000

Bidirectional DC Source-Sink





■ Extended HMI

Bidirectional DC Source-Sink
HEA-PSB10000

The new bi-directional current supply units of the HEA-PSB10000 series offer high power in a small package space, namely 30 kW in only 4 height units. Compared to the HEA-PSB9000 3U series, this results in a space saving of 2 U or one third at 30 kW power.

The user has two units in one at his disposal: A power supply unit (source) and an electronic load (sink) with energy recovery. This means that the units come with the function of two-quadrant operation serially. The internal electronic load ensures high voltage dynamics by discharging the necessary capacities at the DC connection and serves as a full load with energy recovery for a connected source in systems of up to 1.92 MW.

In source mode, the device is a controllable, flexible power source like the laboratory power supplies from the HEA-PSI9000 3U series. Thereby combines all the advantages of the devices and eliminates the disadvantages of two separate devices in terms of weight, space requirements, costs and integration into test software.

- AC input range 342...528 V
- Bidirectional DC source-sink in one
- Energy recovery with high efficiency
- Power: 30 kW per device, expandable
- Voltages: 60 V to 2,000 V
- Currents: 40 A to 1,000 A per device
- Flexible, power-controlled DC <-> AC stage
- Protection functions (OVP, OCP, OPP, OTP)
- Large TFT touch panel with display for all values
- Sense input with automatic recognition
- Galvanically separate interfaces (analogue, USB, Ethernet)
- Integrated function generator
- Battery test, MPP tracking simulation
- PV simulation according to DIN EN 50530
- Optional, digital interfaces modules
- SCPI and ModBus RTU command language, LabView

Description	Power	Voltage	Current	Efficiency	Dimensions	Weight
HEA-PSB10060-1000U4	±30 kW	60 V	±1.000 A	up to 94 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB10080-1000U4	±30 kW	80 V	±1.000 A	up to 94 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB10200-420U4	±30 kW	200 V	±420 A	up to 94,2 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB10360-240U4	±30 kW	360 V	±240 A	up to 94,6 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB10500-180U4	±30 kW	500 V	±180 A	up to 95,3 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB10750-120U4	±30 kW	750 V	±120 A	up to 95,5 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB11000-80U4	±30 kW	1.000 V	±80 A	up to94,6 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB11500-60U4	±30 kW	1.500 V	±60 A	up to 95,3 %	19" x 4 U x 670 mm	about 50 kg
HEA-PSB12000-40U4	±30 kW	2.000 V	±40 A	up to 95,5 %	19" x 4 U x 670 mm	about 50 kg

DC-Output

Devices with DC voltages between 0...60 V and 0...2.000 V, currents between 0...40 A and 0...1.000 A and a power class of 30 kW are available. The DC connection is located on the back of the units.

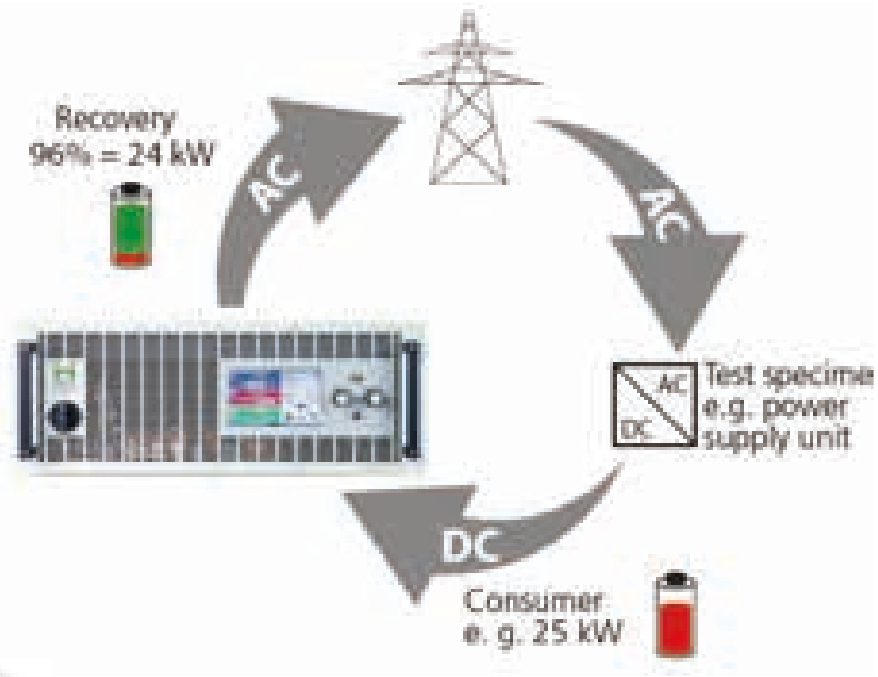
Source-Sink operation

One of the outstanding features of these devices is the integration of an electronic load (sink) and a power supply unit (source) in one enclosure. It can not only be used as source or sink, but also switches between the two operating modes without transition or time loss. This operating mode is also called two-quadrant operation.

Power Recovery

In all devices of this series, the mains connection is always used for energy recovery of the power recorded at the DC input at load operation, which is converted with an efficiency of up to 95.5%. This type of energy recovery helps to save costs and avoids costly cooling systems compared to conventional loads that convert their input power into heat.

Principle representation:



AC-Input	
Voltage	342...528 V_{AC} 3 Ph
Frequency	45...66 Hz
Power factor	>0.99

DC-Output/Input voltage	
Accuracy	< 0,05 % from nominal value
Stability 0...100 % Load	< 0,05 % from nominal value
Stability ±10 % U_E	< 0,02 % from nominal value
Adjust 10...100 %	< 2 ms
Rise time 10...90 % U	Max. 30 ms
Overvoltage protection	Adjustable 0...110 % U_{Nenn}

DC-output/Input current	
Accuracy	< 0,1 % from nominal value
Stability	< 0,15 % from nominal value
Stab. at ±10 % U_E	< 0,05 % from nominal value

DC-Output/Input power	
Accuracy	< 0,3 % from nominal value

Interfaces	
Built in	1x USB Typ B 1x Ethernet 1x Analogue
Slot	Retrofittable plug-in modules
Analogue interface	0...5 V < 0,2 % 0...10 V < 0,4 %

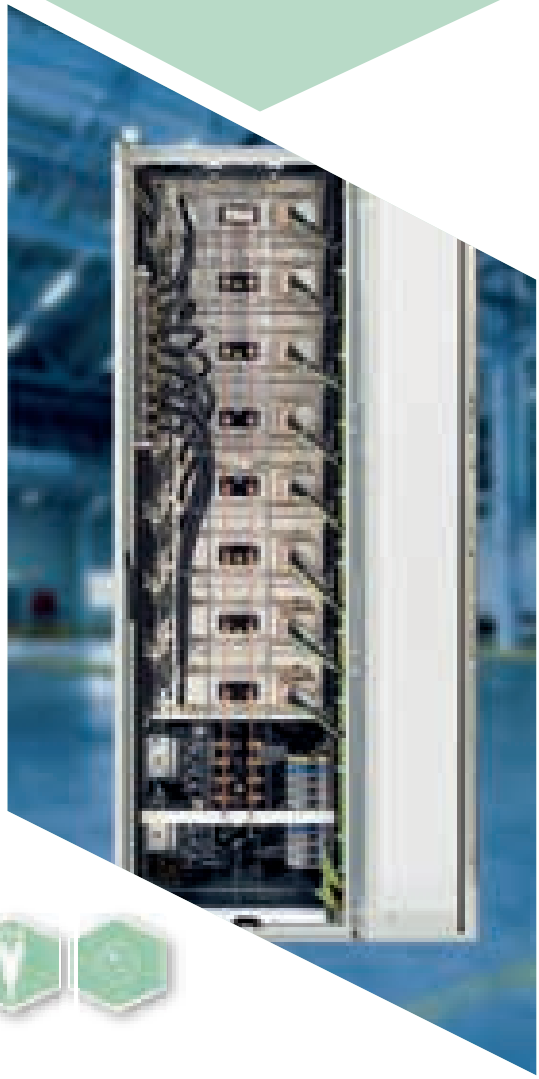
Voltage strength	
AC-Input - enclosure	2.500 V_{DC}
AC-Input - DC-Output	2.500 V_{DC}
Output to case (PE) Device dependent	500...2.000 V_{DC}

Specification	
Norms	EN 61010-1:2011-07 EN 61000-6-2:2016-05, EN 61000-6-3:2011-09 Class B EN 50160:2011-02 Grid Class 2
Cooling	Exhauster
Operating temperature	0...50°C
Storage temperature	-20...70°C
Humidity	< 80 %
Operating height	< 2.000 m
Pollution degree	2
Protection class	1

HEIDEN COMPETENCE IN POWER

HEA-PSI und -PSB

Complete systems with air or water cooling

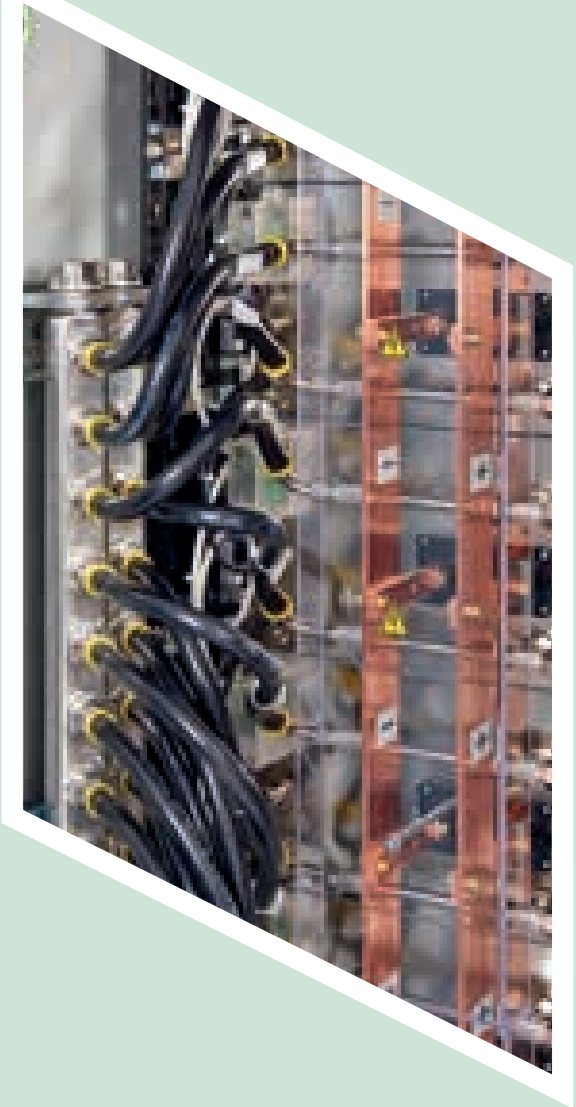


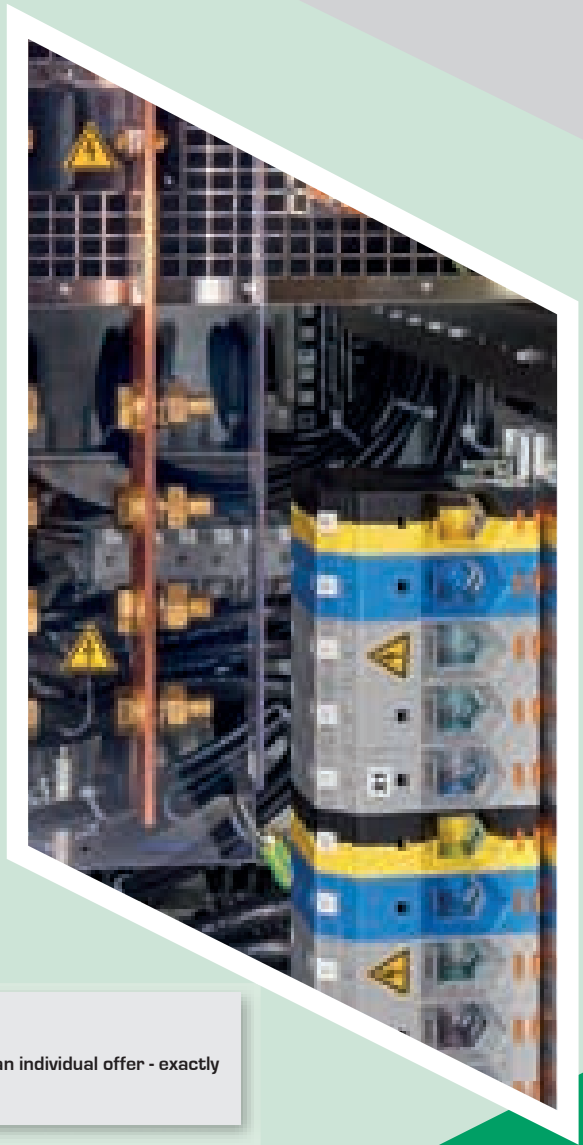
A system as you like it

Let our system construction department manufacture individual complete systems for you. On the basis of your individual specification we will put together an exactly fitting solution for you. Benefit from our experience and save money and time with our turnkey solutions!

- Ready to connect 19" high power racks with up to 2,000 VDC, 64,000 A and 2 MW
- Unidirectional and bidirectional sources and sinks according to customer requirements
- 24 U racks for the accommodation of four devices of 30 kW each
- Very compact dimensions even at high power:
- 120 kW in 19" racket format 24 U or 240 kW in 19" racket format 42 U
  600 mm width, 1000 mm depth
- Safety standards according to EN 61010, EN 60950, EN 60204-1
- Emergency stop with door contact switch available
- Insulation monitoring for the galvanically separated DC output

- Integrated distribution of the cooling medium at water cooling integrated in the racket
- Central AC connection in the racket, at higher power in a reasonable distribution, e.g. 2x 250 A per phase
- Optional AC mains monitoring, especially for regenerative systems
- Central DC bus on copper bar or separate outputs for a multi-channel system
- Additional protection against accidental contact voltage-carrying parts in the racket
- Lockable, honeycomb perforated doors
- Racket on a mounting base or mobile on lockable heavy-duty castors
- Connection to the automation or remote control system via EtherCAT, Profinet, Profibus, USB, LAN, Analog, RS232
- Integrated function generator for control system of the entire system
- Master-Slave control system of the individual, installed devices
- Many customized special versions possible - just ask us!





For stationary operation or mobile use, with water or air cooling:
Talk to our system specialists about your requirements and receive an individual offer - exactly matching your application!

HEIDEN
COMPETENCE IN POWER

1153R / TC.GSS

Bidirectional DC Source-Sink

- Automotive
- Photovoltaics
- Plasma Technology
- Demagnetization

The 1153R / TC.GSS Grid-tie Source Sink Series

The 1153R / TC.GSS series of the Swiss manufacturer REGATRON AG excels with a completely new concept. It was the first fully digitally controlled power supply unit which controls the energy directions for inputting and putting back the load.
This combines the thousandfold proven concept of the TopCon power supplies with an efficient and integrated regenerative topology, which is also equipped with PFC.

Scalable and expandable

By combining basic units, finely graded system powers from 20 kW to 1 MW can be achieved. The modular concept allows the configuration to be varied and changed at any time with minimal effort. This guarantees investment security.

Software package

The 1153R / TC.GSS series can be conveniently operated and monitored using the free „TopControl" software package. In addition, many extensions such as an optional function generator, battery simulation and conditioning as well as photovoltaic simulation for operating and testing PV inverters are available.

Many variants

In addition to the 2-quadrant variant 1153R / TC.GSS (grid-tie source sink), versions as pure source 1153SX / TC.GSX and as pure mains regenerative high power load 1153XS / TC.GXS are also possible.

Features

- 20 kW and 32 kW, in combination up to 1 MW
- Unique digital control
- Highest control dynamics and adaptability
  (full access to PID controller)
- IGBT primary switching regulator

Parallel or serial or matrix operation possible

remote control analogue, RS232, optional CAN, USB, LAN

Operating and service software Top Control incl. Scope

Optional BatSim, BatControl, SAS-Steuerung and more.

Compact and unsurpassed power

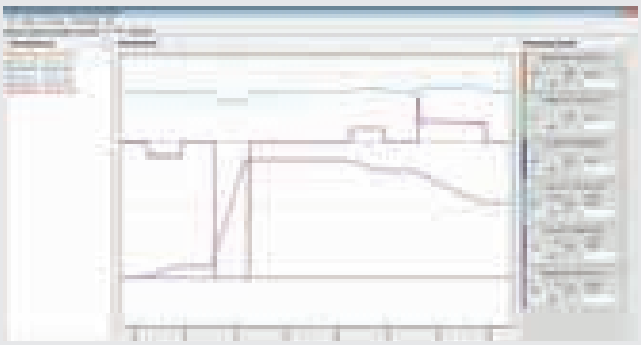
HEIDEN & REGATRON:

over 10 years of partnership

REGATRON programmable power supplies GSS

Description	Power	Voltage	Current	Dimensions	Weight
1153R-20065 (TC.GSS)	±20 kW	65 V	±385 A	19" x 9 U x 634 mm	97 kg
1153R-20130 (TC.GSS)	±20 kW	130 V	±192 A	19" x 9 U x 634 mm	97 kg
1153R-20400 (TC.GSS)	±20 kW	400 V	±63 A	19" x 9 U x 634 mm	97 kg
1153R-20500 (TC.GSS)	±20 kW	500 V	±50 A	19" x 9 U x 634 mm	97 kg
1153R-20600 (TC.GSS)	±20 kW	600 V	±40 A	19" x 9 U x 634 mm	97 kg
1153R-32065 (TC.GSS)	±32 kW	65 V	±600 A	19" x 9 U x 634 mm	97 kg
1153R-32130 (TC.GSS)	±32 kW	130 V	±308 A	19" x 9 U x 634 mm	97 kg
1153R-32400 (TC.GSS)	±32 kW	400 V	±100 A	19" x 9 U x 634 mm	97 kg
1153R-32500 (TC.GSS)	±32 kW	500 V	±80 A	19" x 9 U x 634 mm	97 kg
1153R-32600 (TC.GSS)	±32 kW	600 V	±66 A	19" x 9 U x 634 mm	97 kg

Extend the 1153R / TC.GSS series with software modules to complete battery simulators and testers with integrated data acquisition. We offer this DC source sink as a 19" single device or as an individual system, for testing in a mobile rack with emergency stop, discharge-system, insulation monitoring and robust transport rack.



AC-Input	
Voltage	3 x 380...480 V_{AC}
Frequency	48...62 Hz
Input	3L+PE (N not required)

DC-Output/Input	
Grid control	< ±0,1 % F.S.
Load control	< ±0,1 % F.S.
Settling time	< 2 ms
Stability	< ±0,05 % F.S.
Efficiency	92 %
Output capacity	Extendable, partly internal switchable

Specification	
Norms	EN 61000-6-4 EN 61000-6-2 EN 50178
Cooling	Exhauster
Operating temp.	5...40°C
Storage temp.	-18...70°C
Humidity	< 95 %
Protection class	Up to IP53 through enclosure

Options	
1153-HMI	Control/display unit
1153-RCU	External control unit
1153-TFE	Function Generator
1153-RS232rear	RS-232 also backside
1153-USB	USB Interface
1153-ETHERNET	LAN Interface
1153-IEEE	GPIB/IEEE488 Interface
1153-CAN open	CAN open Interface
1153-CAN mp	CAN multi protocol
1153-FELDBUS	Field bus coupling Profi-, Inter- or DeviceBus
1153-CAN cable	Link-Cable Master/Slave
1153-PACOB	Touch protection
1153-LCAL	Liquid Cooling
1153-AF9U	Air filter 20 & 32 kW...9 HU
1153-NSOV	Non standard voltage
1153-ISR	Integrated safety relay
1153-RPP	Reverse polarity protection

Figure above: Mobile 64 kW 1153R / TC.GSS source-sink system with increased IP protection.
Figure right: 192 kW 1153SX / TC.GSX source system as PV simulator.

G5

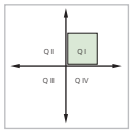
Impressively performant DC Source-Sink

The new device series G5

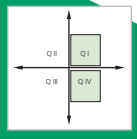
The G5 represents the latest development stage of the bidirectional DC power supplies of the Swiss manufacturer REGATRON AG in this case. REGATRON and HEIDEN thus continue the successful series of bidirectional current supply. Compact, high-power and extremely dynamic. Rise and fall times in the millisecond range are a thing of the past. In the future control the devices within 100 to 200 µs. Generation 5 (G5) is available in the following versions:

REGATRON
programmable power supplies

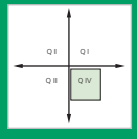
- (G5.SRC) Source / Programmable DC Power Supply
- (G5.SAS) Solar array simulation



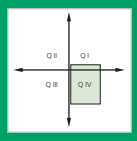
- (G5.RSS) Regenerative Source Sink
- (G5.DT) Drive Train Testing
- (G5.BS) Battery Simulation
- (G5.BT) Battery Testing
- (G5.UNV) Universal Regenerativ DC Power Supply



- (G5.RLD) Regenerative Load / FuelCell Testing



- (G5.CT) Charger Tester



High dynamics / µs instead of ms

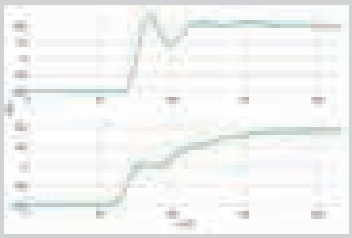


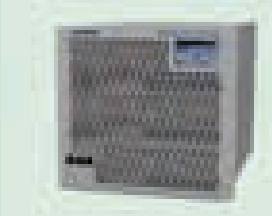
Figure
Parameterization example: set-value step currents. -97...97 A@333VDC in <50 µs with overshoot (top), in <200 µs w/o overshoot (bottom).

General Dynamic Data

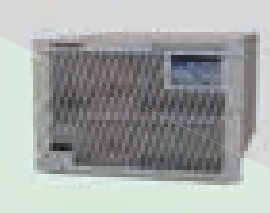
rise/fall time	voltage 0…90 %	150…200 µs
set-value step	current -90…90 %	50…100 µs
response time load step	CV, recovery within 0.5 % set value	100…150 µs

High power density

54 kW in 10 U



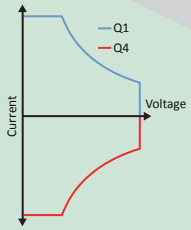
36 kW in 7 U



18 kW in 4 U

Large Autoranging Area

- Autoranging factor 3 at 500 V, 1.000 V and 1.500 V devices
- Nominal current in Q4: starting from 3 V at 500 V devices
  starting from 5 V at 1.000 V devices
  starting from 8 V at 1.500 V devices



Highest precision

Static accuracy:
- Voltages accuracy: 0,01 % FS
- Current accuracy: 0,02 % FS

2 Current ranges:
- 2. Current measuring range from -10 to +10 % of the nominal current to 0,01 % accuracy

Rippel:
- Rippel voltage 0,05 % FS, with extended capacity 0,02 % FS
- Rippel Current: 0,05 % FS

Available voltages and power ranges:

Power class	Voltages
18 kW	80 V to 1.000 V
27 kW	80 V to 1.500 V
36 kW	80 V to 1.000 V
54 kW	80 V to 1.500 V

Higher power up to over 2.000 kW are possible by parallel connection. Of course, the G5 series offers all conceivable advantages with regard to parallel, serial or mixed operation. The units can be interconnected as follows:

At parallel operation only the output voltage of the devices must be identical. Devices with different power can be operated in a parallel network. This allows for smaller power expansions in large systems with e.g. 216 kW. A 216 kW system with 1,000 V can easily be extended by only 18 kW. This means that you will not incur any major costs if one system is just not sufficient.

Complete systems

On G5 / 1153R / 1153 base

19“ rack systems with 162 kW at less than 2 meters height and protection classes up to IP 54

Directly in the test bench

The bidirectional G5 series is ideally suited for a wide variety of tasks. Highly dynamic applications in the automotive environment can be implemented without problems. Whether batteries have to be tested or drive inverters and entire drive trains have to be operated - with the optional mobile or stationary systems you can ensure stable voltages at high current dynamics. But also highly dynamic voltage curves are possible. This is achieved by the functionality of being able to easily adjust the output capacities in two steps via software. We manufacture the G5 rack systems according to your individual requirements, no matter if fuel cell test, solar simulation, test of chargers etc. The G5 stands for power, precision, voltage, current, dynamics and flexibility.

Examples of possible systems S	
System	**Purpose**
G5.SAS	Pure DC source with appropriate software for the simulation of solar fields with shading, daily routines and so on
G5.CT	Test of chargers. With a Q1 share of 2% of the system power you simulate a connected battery. As soon as the charger starts load it with a Q4 content of up to 100%.
G5.UNV	Do you switch between different application areas, starting with solar cell simulation up to battery and fuel cell testing? Then the solution is: G5.UNV The universal G5 with all available functions and software.

HEIDEN Test System HTS17

Bidirectional DC Source-Sink

Typical applications

- Battery simulation
- Battery test
- Testing of fuel cells
- Testing for solar systems
- Engine test benches

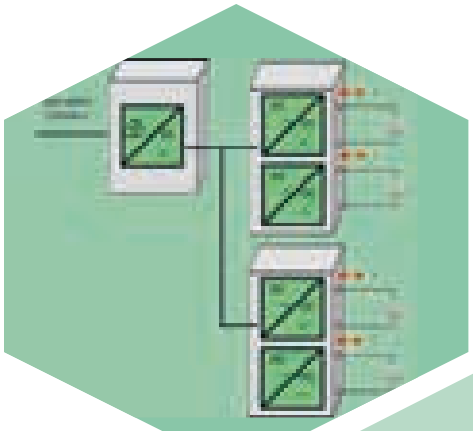
DC source sink and industrial battery tester and high-power battery simulator

The HEIDEN test system 17 (HTS17) is an extremely high power source/sink system with power regeneration. This system has already proven itself many times in this field. We have realized a large number of complex projects with already delivered systems up to one megawatt.

High power bidirectional

This high power DC source sink is built in rugged industrial switchboards and is proven in both industrial and laboratory applications where high DC power from 60 kW to several MW are required. At voltages of up to 1,000 VDC, currents of up to 1,600 A are possible as source and sink. The HTS17 enables dynamic transitions from supplying to regenerative (sink) operation.

- Power single system up to 500 kW per system
- Total power parallel system up to 1 MW
- Output voltage single system up to 1.000 V
- Output current Single system up to 1.600 A (higher output currents on request)
- Output galv. isolated to mains
- Control Accuracy 0.1 % F.S.
- Voltages Ripple 0.1 % F.S.
- DC current measurement with 0.1 % accuracy
- Current rise time typical < 1 ms
- Seamless transition source/sink
- Multi-channel systems with up to four channels



HTS17 - Single channel version

Description	Power	Voltage	Current	Rise time Current 10...90 %
HTS17-60-300-200	±60 kW	10...300 V	±200 A	<1 ms
HTS17-60-300-600	±60 kW	10...300 V	±600 A	<1 ms
HTS17-60-300-1000	±60 kW	10...300 V	±1.000 A	<1 ms
HTS17-100-300-600	±100 kW	10...300 V	±600 A	<1 ms
HTS17-100-300-1000	±100 kW	10...300 V	±1.000 A	<1 ms
HTS17-100-600-200	±100 kW	10...600 V	±200 A	<1 ms
HTS17-100-600-600	±100 kW	10...600 V	±600 A	<1 ms
HTS17-100-600-1000	±100 kW	10...600 V	±1.000 A	<1 ms
HTS17-100-800-200	±100 kW	10...800 V	±200 A	<1 ms
HTS17-100-800-600	±100 kW	10...800 V	±600 A	<1 ms
HTS17-100-800-1000	±100 kW	10...800 V	±1.000 A	<1 ms
HTS17-100-1000-200	±100 kW	10...1.000 V	±200 A	<1,3 ms
HTS17-100-1000-600	±100 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-100-1000-1000	±100 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-160-600-600	±160 kW	10...600 V	±600 A	<1 ms
HTS17-160-600-1000	±160 kW	10...600 V	±1.000 A	<1 ms
HTS17-160-800-200	±160 kW	10...800 V	±200 A	<1 ms
HTS17-160-800-600	±160 kW	10...800 V	±600 A	<1 ms
HTS17-160-800-1000	±160 kW	10...800 V	±1.000 A	<1 ms
HTS17-160-1000-200	±160 kW	10...1.000 V	±200 A	<1,3 ms
HTS17-160-1000-600	±160 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-160-1000-1000	±160 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-250-600-600	±250 kW	10...600 V	±600 A	<1 ms
HTS17-250-600-1000	±250 kW	10...600 V	±1.000 A	<1 ms
HTS17-250-800-600	±250 kW	10...800 V	±600 A	<1 ms
HTS17-250-800-1000	±250 kW	10...800 V	±1.000 A	<1 ms
HTS17-250-1000-600	±250 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-250-1000-1000	±250 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-320-600-600	±320 kW	10...600 V	±600 A	<1 ms
HTS17-320-600-1000	±320 kW	10...600 V	±1.000 A	<1 ms
HTS17-320-800-600	±320 kW	10...800 V	±600 A	<1 ms
HTS17-320-800-1000	±320 kW	10...800 V	±1.000 A	<1 ms
HTS17-320-1000-600	±320 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-320-1000-1000	±320 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-400-600-1000	±400 kW	10...600 V	±1.000 A	<1 ms
HTS17-400-800-1000	±400 kW	10...800 V	±1.000 A	<1 ms
HTS17-400-1000-600	±400 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-400-1000-1000	±400 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-500-600-1000	±500 kW	10...600 V	±1.000 A	<1 ms
HTS17-500-800-1000	±500 kW	10...800 V	±1.000 A	<1 ms
HTS17-500-1000-600	±500 kW	10...1.000 V	±600 A	<1,3 ms
HTS17-500-1000-1000	±500 kW	10...1.000 V	±1.000 A	<1,3 ms
HTS17-650-1000-1000	±650 kW	10...1.000 V	±600 A	<1,3 ms

HTS17M - Multi channel version

Description	Power	Voltage	Current	2 CH	4 CH
HTS17M-60-300-200-x	±60 kW	300 V	±200 A	●	●
HTS17M-100-300-200-x	±100 kW	300 V	±200 A	●	●
HTS17M-100-300-600-x	±100 kW	300 V	±600 A	●	●
HTS17M-100-600-200-x	±100 kW	600 V	±200 A	●	●
HTS17M-100-600-600-x	±100 kW	600 V	±600 A	●	
HTS17M-100-800-200-x	±100 kW	800 V	±200 A	●	●
HTS17M-100-1000-200-x	±100 kW	1.000 V	±200 A	●	●
HTS17M-160-300-200-x	±160 kW	300 V	±200 A		●
HTS17M-160-300-600-x	±160 kW	300 V	±600 A	●	●
HTS17M-160-300-1000-x	±160 kW	300 V	±1.000 A	●	●
HTS17M-160-600-200-x	±160 kW	600 V	±200 A	●	●
HTS17M-160-600-600-x	±160 kW	600 V	±600 A	●	
HTS17M-160-800-600-x	±160 kW	800 V	±600 A	●	
HTS17M-160-1000-200-x	±160 kW	1.000 V	±200 A	●	
HTS17M-160-1000-600-x	±160 kW	1.000 V	±600 A	●	
HTS17M-250-600-600-x	±250 kW	600 V	±600 A	●	●
HTS17M-250-600-1000-x	±250 kW	600 V	±1.000 A	●	
HTS17M-250-800-600-x	±250 kW	800 V	±600 A	●	●
HTS17M-250-800-1000-x	±250 kW	800 V	±1.000 A	●	
HTS17M-250-1000-600-x	±250 kW	1.000 V	±600 A	●	●
HTS17M-250-1000-1000-x	±250 kW	1.000 V	±1.000 A	●	
HTS17M-320-600-200-x	±320 kW	600 V	±200 A		●
HTS17M-320-600-600-x	±320 kW	600 V	±600 A	●	●
HTS17M-320-600-1000-x	±320 kW	600 V	±1.000 A	●	●
HTS17M-320-800-200-x	±320 kW	800 V	±200 A	●	●
HTS17M-320-800-600-x	±320 kW	800 V	±600 A	●	●
HTS17M-320-800-1000-x	±320 kW	800 V	±1.000 A	●	
HTS17M-320-1000-600-x	±320 kW	1000 V	±600 A	●	●
HTS17M-320-1000-1000-x	±320 kW	1000 V	±1.000 A	●	
HTS17M-400-600-600-x	±400 kW	600 V	±600 A	●	●
HTS17M-400-600-1000-x	±400 kW	600 V	±1.000 A	●	●
HTS17M-400-800-200-x	±400 kW	800 V	±200 A		●
HTS17M-400-800-600-x	±400 kW	800 V	±600 A	●	●
HTS17M-400-800-1000-x	±400 kW	800 V	±1.000 A	●	●
HTS17M-400-1000-600-x	±400 kW	1.000 V	±600 A	●	●
HTS17M-400-1000-1000-x	±400 kW	1.000 V	±1.000 A	●	
HTS17M-500-600-600-x	±500 kW	600 V	±600 A	●	●
HTS17M-500-600-1000-x	±500 kW	600 V	±1.000 A	●	●
HTS17M-500-800-600-x	±500 kW	800 V	±600 A	●	●
HTS17M-500-800-1000-x	±500 kW	800 V	±1.000 A	●	●
HTS17M-500-1000-600-x	±500 kW	1.000 V	±600 A	●	●
HTS17M-500-1000-1000-x	±500 kW	1.000 V	±1.000 A	●	●
HTS17M-650-1000-1000-x	±650 kW	1.000 V	±1.000 A	●	●

Further versions on request

AC-Input	
Voltage	380/400/440/480 V_{AC} ±10 %
Frequency	50/60 Hz ±5 %
Power factor	0,83 (at 10 % Load) > 0,99 (at 100 % Load)

DC-Output/Input	
Control Accuracy U und I	0,1 % F.S.
Voltagestoleranz dynamisch: (0...100 % I_{nenn} in 3 ms)	< 3 % Tester / < 1 % Simulator
CurrentRise time 10 %...90 %	< 1 ms

Interfaces	
Built in	CAN, ModBus, VNC Ethernet
Optional	ProfiBus, ProfiNet, Analogue, SCPI, EtherCAT

Norms	
Low voltage directive	2014/35/EU
EMV-Norms	EN 61000-2-4, EN 61000-6-2 EN 61000-6-4 61800-3C2(A1) EMV Norms 2014-30-EU

Specification	
Operating temperature	5...40°C
Storage temperature	-25...60°C
Humidity	<85 % non-condensing
Operating height	<1000 m

Options (excerpt)

- Water cooling through heat exchanger
- DC contactors for switching under load
- Insulation monitoring can be switched off
- Increased IP protection class
- Tester-/Simulator switchable
- Additional distribution racks

DC Bidirectional

Application at Schaeffler Engineering GmbH Source-Sink HTS17

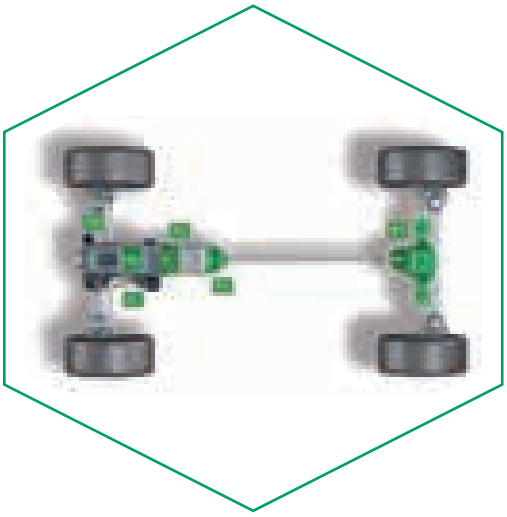
Schaeffler Engineering, based in Werdohl and Clausthal-Zellerfeld, among others, has been relying on our bidirectional DC source/sink solutions for many years.

Optimized system

Whether a conventional variant with a combustion engine or an electrified hybrid solution with an additional electric drive: a powertrain is always made up of many components. Engine, flywheel, clutch and transmission, gear ratio, differential, drive shafts and wheels must be perfectly matched to each other in order to enjoy dynamic, smooth propulsion. And of course, a correctly adjusted powertrain also ensures maximum efficiency. This is because the power is optimally transmitted and the engine's full potential is exploited. Schaeffler Engineering tests and optimizes the interaction of all individual systems on the test benches with the aim of obtaining a result that literally moves the driver. No matter what type of drive is involved.

HEIDEN delivers the HTS17 to Schaeffler Engineering and other test systems for the following test stands:

- Power up to 560 kW maximum 3.000 Nm, 14.000 min^{-1}
- Towing operation until 550 kW, 3.000 Nm, 12.000 min^{-1}
- Highly dynamic drive with rotary vibration simulator
- Conditioning for fuel, oil and coolant in temperature range down to -32°C
- All-wheel roller test bench with 300 kW for a variable vehicle mass up to 2.500 kg
- Motorcycle roller test bench with 200 kW



System integration - from the individual component to the vehicle

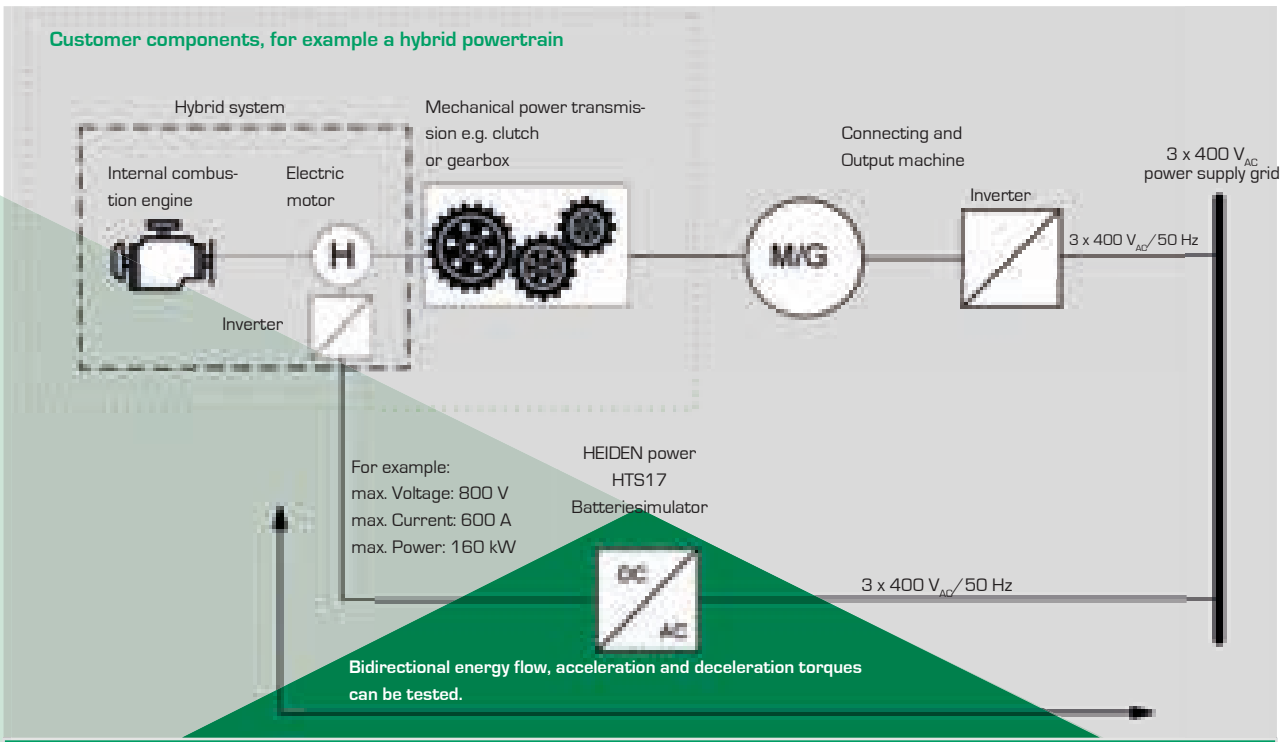
At the system integration stage, all individual components of the respective hybridization variant are combined to form a complete system. The degree of electrification determines the complexity. From the simple mild hybrid 48 V (MHEV) to the highly complex plug-in hybrid (PHEV), whose battery can be charged both via the combustion engine and the mains supply.

- The prerequisite for successful system integration is a close exchange between all project teams.

Validation - More than test drives

Reliable tests in all phases of the project already ensure the greatest possible functional reliability and additionally reduce development costs. The validation and evaluation of the application maturity level are decisive elements for a successful project with a 100% degree of target fulfillment.

- Experienced and motivated engineers with the latest tools do this.



Theoretical consideration test bench hybrid drive and powertrain

1311-NL

Source-Sink uni- and bipolar

- Source-sink function
- Fast, linear control
- Current, voltage operation
- Adjustable limit values
- As 2-quadrant or 4-quadrant version
- Analogue measurement outputs for voltage and current
- Analogue control inputs

Operating modes

The 1311-NL source sinks can operate in constant voltage or constant current mode. In voltage mode, two current limits (source current and sink current) are independently adjustable. In current mode, an upper and a lower limit voltage can be set.

Source-Sink operation

Depending on the setting of the output variable and the properties of the connected test object, the device automatically decides whether it is to be configured as a source or a sink. The change from source to sink mode is carried out quickly.

2-quadrant/4-quadrant operation

Devices for 2-quadrant operation can supply current at positive output voltage or take it backwards. To ensure that at settings close to 0 V and longer connection lines the desired function is guaranteed, the 2-quadrant devices are already equipped with an output voltage of -1 V. The 2-quadrant devices are therefore also 4-quadrant devices, but with a limited negative voltage. 4-quadrant devices can set negative values of the same size as positive values.

Remote control system

The analogue I/O port can be used to remotely control many source-sink functions. Operating mode selection, outputs on/off, and control speed adjustment can be operated with logic levels. As an option (1311-NL06) a version galvanically separated from the output is available.

Analogue control system

Depending on the set operating mode, the output voltage or the output current can be specified with a control voltage of 0...±5 V or 0...±10 V DC. Two further analogue inputs are available for limiting the voltage or current.

Analog measurement outputs

For voltage and current, analog measuring signals of 0...±10 V are available. The signals follow the curve. The current connections are designed as pole terminals or as solid copper bars with screw connection. 4 mm plugs, forked cable lugs and stripped wires can be used.

Connections

All connections are located at the backside. The current connections are designed as pole terminals or as solid copper bars with screw connection. 4 mm plugs, fork cable lugs and stripped wires can be used.

Unipolar (2-Quadranten)

Description	Power	Voltage	Current	Dimension
1311u-1V010C20	±200 W	10 V	±20 A	2 U
1311u-1V020C10	±200 W	20 V	±10 A	2 U
1311u-1V030C8	±240 W	30 V	±8 A	2 U
1311u-1V042C6	±252 W	42 V	±6 A	2 U
1311u-1V080C3	±240 W	80 V	±3 A	2 U
1311u-1V100C2	±200 W	100 V	±2 A	2 U
1311u-1V008C80	±640 W	8 V	±80 A	5 U
1311u-1V010C60	±600 W	10 V	±60 A	5 U
1311u-1V020C40	±800 W	20 V	±40 A	5 U
1311u-1V026C32	±832 W	26 V	±32 A	3 U
1311u-1V044C22	±968 W	44 V	±22 A	3 U
1311u-1V60C16	±960 W	60 V	±16 A	3 U
1311u-1V080C11	±880 W	80 V	±11 A	3 U
1311u-1V008C160	±1.280 W	8 V	±160 A	8 U
1311u-1V010C120	±1.200 W	10 V	±120 A	8 U
1311u-1V020C80	±1.600 W	20 V	±80 A	8 U
1311u-1V026C60	±1.560 W	26 V	±60 A	8 U
1311u-1V044C40	±1.760 W	44 V	±40 A	8 U
1311u-1V060C30	±1.800 W	60 V	±30 A	8 U
1311u-1V080C20	±1.600 W	80 V	±20 A	8 U
1311u-1V008C240	±1.920 W	8 V	±240 A	11 U
1311u-1V010C180	±1.800 W	10 V	±180 A	11 U
1311u-1V020C120	±2.400 W	20 V	±120 A	11 U
1311u-1V026C90	±2.340 W	26 V	±90 A	11 U
1311u-1V044C60	±2.640 W	44 V	±60 A	11 U
1311u-1V060C45	±2.700 W	60 V	±45 A	11 U
1311u-1V080C30	±2.400 W	80 V	±30 A	11 U
1311u-1V008C320	±2.560 W	8 V	±320 A	14 U
1311u-1V010C240	±2.400 W	10 V	±240 A	14 U
1311u-1V020C160	±3.200 W	20 V	±160 A	14 U
1311u-1V026C120	±3.120 W	26 V	±120 A	14 HU
1311u-1V044C80	±3.520 W	44 V	±80 A	14 U
1311u-1V060C60	±3.600 W	60 V	±60 A	14 U
1311u-1V080C40	±3.200 W	80 V	±40 A	14 U

AC-Input	
Voltage	115 / 230 V_{AC} ±10 %
Frequency	50...60 Hz

DC-Output/Input current	
from setting value	±0,2 %
from the appropriate range	±0,05 %
Resolution	16 Bit

DC-Output/Input voltage	
from setting value	±0,1 %
from the appropriate range	±0,05 %
Resolution	16 Bit

Bipolar (4-Quadranten)

Description	Power	Voltage	Current	Dimension
1311b-10V10C010	±100 W	±10 V	±10 A	2 U
1311b-20V20C05	±100 W	±20 V	±5 A	2 U
1311b-30V30C0,35	±105 W	±30 V	±3,5 A	2 U
1311b-50V50C02	±100 W	±50 V	±2 A	2 U
1311b-08V08C046	±368 W	±8 V	±46 A	3 U
1311b-10V10C038	±380 W	±10 V	±38 A	3 U
1311b-20V20C24	±480 W	±20 V	±24 A	3 U
1311b-30V30C16	±480 W	±30 V	±16 A	3 U
1311b-44V44C11	±484 W	±44 V	±11 A	3 U
1311b-08V08C080	±640 W	±8 V	±80 A	8 U
1311b-10V10C060	±600 W	±10 V	±60 A	8 U
1311b-20V20C40	±800 W	±20 V	±40 A	8 U
1311b-30V30C32	±960 W	±30 V	±32 A	8 U
1311b-44V44C20	±880 W	±44 V	±20 A	8 U
1311b-08V08C120	±960 W	±8 V	±120 A	11 U
1311b-10V10C090	±900 W	±10 V	±90 A	11 U
1311b-20V20C60	±1.200 W	±20 V	±60 A	11 U
1311b-30V30C48	±1.440 W	±30 V	±48 A	11 U
1311b-44V44C30	±1.320 W	±44 V	±30 A	11 U
1311b-08V08C160	±1.280 W	±8 V	±160 A	14 U
1311b-10V10C120	±1.200 W	±10 V	±120 A	14 U
1311b-20V20C80	±1.600 W	±20 V	±80 A	14 U
1311b-30V30C64	±1.920 W	±30 V	±64 A	14 U
1311b-44V44C40	±1.760 W	±44 V	±40 A	14 U

Options	
13xx-K-RS-SNM 9-9	RS-232-cable (null modem cable) NL series
13xx-ZS03	IEEE499 Interface
13xx-ZS13-15	Data acquisition tool fast measurement data acquisition
13xx-ZS15	Ethernet-RS-232-Converter
13xx-ZS06-N	Galvanically isolated analogue I/O interfaces instead of standard analogue I/O interface at order for new device
13xx-ZS06	Galvanically isolated analogue I/O interfaces for retrofitting to existing equipment
13xx-ZS07	Power-I/O-Card
13xx-ZS09	Device rolls
13xx-FCC-N-NLxx	Factory Calibration Certificate for new devices
13xx-FCC-NLxx	Factory Calibration Certificate
13xx-SAB-NL-2	Additional safety cover for load connections for units with 2 U
13xx-SAB-NL-3	Additional safety cover for load connections for units with 3 U
13xx-SAB-NL-5	Additional safety cover for load connections for units from 5 U
13xx-K-MS-NL-2	Master-Slave cable for 2 devices (2 m)
13xx-K-MS-NL-3	Master-Slave cable for 3 devices (2x 2 m)

1652 - DC / DC Converter

The 1652 series is adapted and manufactured according to customer requirements. Tell us your requirements and receive an individual offer and a customized product!

Customer-specific and industry-proven

Our 1652 series of customer-specific, pulsed DC/DC converters are robust and designed for industrial use. The pulse frequency is at 40 kHz, so that the transmitted energy is transferred via the transformer with a square-wave voltage. The downstream diode rectifier rectifies this again and is connected to a pulsating rectifier voltage, a sieve and smoothing filter for a smooth output voltage.

Adjustable and protected

The output voltage and current values are fed to an electronic control unit, so that a stable output voltage. This system is equipped with safety devices, which protect against overvoltage and overtemperature. The system is cooled by a thermally controlled exhauster. An additional overtemperature monitoring protects the system at exhauster failure or at too high ambient temperatures.

Solar DC / DC Converter

The 1652 series can be equipped as a solar converter on request. The DC input then has one or more string inputs that are powered by your PV field. The Inverter uses the integrated MPP tacker to determine the optimal aratt point above a U/I characteristic curve according to DIN 41772.

Constant output or charge output stage

At the output, either a fixed or an adjustable voltage can be selected. If a battery is to be fed from a PV field, an integrated charge controller ensures a constant current. Programmable monitoring thresholds such as over- and undervoltage ensure reliable protection of the battery. Different charging modes such as strong charge, trickle charge and automatic mode can be selected to suit your application.

EZA 2500 DC/DC
Bidirectional

DC/DC bidirectional

The bidirectional EZA2500 DC/DC converter is a compact interface between 320 VDC high voltage sources such as solar or wind power plants and 48 VDC battery networks. The digitally controlled module automatically changes the converter direction and delivers 2,500 W nominal power in only 1 U height.

Application

The typical application area of the EZA2500 bidirectional includes classic energy storage systems of small and medium power as well as test systems for lithium-ion batteries and systems for energy recovery, e.g. at robots, cranes, driverless transport vehicles or elevators. In elevators, for example, the EZA2500 can replace the large high-charge brake resistors and use the braking energy, which is usually lost as waste heat, to charge storage batteries.

Description	Power	Low Voltage DC	High Voltage DC	Dimensions
EZA2500-32048	2,5 kW	36...60 V_{DC} 48 $V_{Nominal}$	300...380 V_{DC} 320 $V_{Nominal}$	19" x 1 U x 400 mm
EZA2500-48320	2,5 kW	36...65 V_{DC} 48 $V_{Nominal}$	260...400V_{DC} 320 $V_{Nominal}$	19" x 1 U x 400 mm

EZA 11000 DC/DC
Bidirectional

DC / DC bidirectional

The TDK-Lambda EZA11K-320240 series, specially designed for energy storage systems, has a remarkable nominal power of 11 kW at just 1 U height and converts a nominal input voltage of 240...400 VDC into 150...300 VDC output voltage for charging lithium-ion batteries. When the input voltage drops or stops, the converter seamlessly changes the operating mode and draws current from the batteries to stabilize the DC grid with the energy stored there. Typical fields of application for the EZA11 kW are storage systems for short-term load peaks, emergency backup supplies and for energy recovery during braking.

Up to five converters can be operated in parallel to provide powers of over 50 kW. The use of a fully digital control, SiC-MOSFETs (silicon carbide) and innovative ferrite materials enables the converter to achieve efficiencies of up to 92%.

Descrip-tion	Power	Low Voltage DC	High Voltage DC	Dimensions
EZA11K-320240	11 kW	150 - 300 V_{DC}	240 - 400 V_{DC}	19" x 1 U x 530 mm

TDK·Lambda

TDK-Lambda is one of the world's leading manufacturer of current supplies and stands for safety and reliability.

1100 Ground Power Unit

Grid-connected

- For starting helicopters and airplanes
- Operation on 190...420 VAC mains 50 / 60 Hz (400 Hz)
- Start current up to 800 A
- Storage temperature -40...+50°C
- Operational power -30...+40 %
- Easy to move
- Housing made of stainless V2A steel, powder-coated

Starting and supply of aircraft with 28 V on-board power supply

The ground power units of the HEIDEN 1100 series are used for mobile supply of consumers with 24...28 VDC

Supply voltages, such as industrial trucks, military equipment, motor vehicles, mobile and stationary engines, aircraft and others consumers with a high current demand. These power supply units provide energy for starting aircraft and to conserve the on-board battery during maintenance. They supply large and undisturbed DC currents.

Worldwide use

The type HEIDEN 1100-128 can be used worldwide for all common 3-phase public grids, as it contains a reversible mains voltage adjustment for sine and delta voltages from 190-200-210 and current voltages 380-400-420 VAC with 50 / 60 Hz.

Only the power cables and a few other components must be ordered according to the respective mains voltage. The conversion for operation on American or European grids can also be done by the customer at a later date.

For maintenance equipment with 115 / 230 V devices

Measuring instruments for diagnostics and tools for maintenance equipment directly on the aircraft or helicopter, which has a 115 VAC or 230 VAC mains voltage can be supplied via the service sockets (SchuKo socket type F or USA socket type B). This supply is galvanically isolated from the mains supply.

For harsh environmental conditions

These ground-power supplies are designed for worldwide use and can therefore be used under harsh climatic conditions. An enclosure made of stainless V2A steel with powder coating with special exhauster openings and appropriate rain protection guarantee a wide operating temperature range.

Description	Power kW	Voltage	Continuous current	Peak current	Dimensions
1100-128	5s / 14 kW	28 V	200 A	800 A xxx 5s	870 x 9590 x 1.005 mm

- Special versions are available with support batteries, mounting for forklift trucks, special voltages and individual cables.

1101 Ground Power Unit

Grid-independent

Starting and supply of 28 V DC

Aircraft

The independent 1101 ground power supply reliably supplies energy for starting and maintenance of airplanes to save the on-board accumulator. The 1101 delivers large and undisturbed DC currents.

Mobile current supply

The GPU 1101 is used for the mobile supply of consumers with high current demand and 24...29 VDC supply voltages such as industrial trucks, military equipment, motors, as well as a power supply and charging device.

Internal energy storage

The energy required for starting or supply is taken from novel, internal Lithium Iron Phosphate high power batteries with 100 Ah, which are charged with the integrated charger.

Energy for > 5 starts

In the standard configuration, more than five starting procedures of common helicopters (EC135 and H145) can be performed without recharging. These units thus surpass all alternatives available on the market so far!

Shortest charging time

The charging time of an energy storage device depends mainly on the discharge state, the permissible charge current and the power capability/intelligence of the charger.

The energy required for a battery that is discharged to 30 % is < 60 minutes. The processor-controlled charging is carried out with up to 3,000 W and enables very short charging times.

High continuous current

For service or maintenance purposes a continuous current supply is usually required. If the energy required for this is not to be taken or only partially taken from the batteries, the device must be connected to the public AC grid.

The built-in charger charges the energy storage with up to 120 A. If more than this charging current is continuously drawn from the device, the energy storage device is discharged with the difference between the discharge and charging current. If less current is continuously drawn, the energy storage device is charged simultaneously.

Description	Capacity	Charger	Voltage	Current	Dimensions
1101-328N-Lilon-nSW	100 Ah	3 kW	28 V	120 A (1000 A_{peak})	960 x 519 x 530 mm

Options	
1101-Opt.BL	Option flashing light for better recognizability on the runway
1101-Opt.Cable	Special cables (type, length, design) on request
1101-Opt.Plug	Special plug (AC, DC) on request
1101-Opt.H2	For operation < 0° C

1103 Platform GPU

Take-off, landing and transport platform

The Ground Power Units (GPU) of the HEIDEN 1103-P3028 series make an important technical contribution to the air rescue chain when very fast reactions are required. In air rescue, rescue and transport helicopters are mainly used as ambulance transporters and also as transfer vehicles for patients. A rescue helicopter must be ready for operation and deployment in any situation. In an emergency, seconds are usually crucial and can make the difference between life and death. Each helicopter therefore has a defined operational area and a base where it can be supplied and moved with a launch and transport platform. The helicopter is also supplied with energy via this platform during avionics tests.

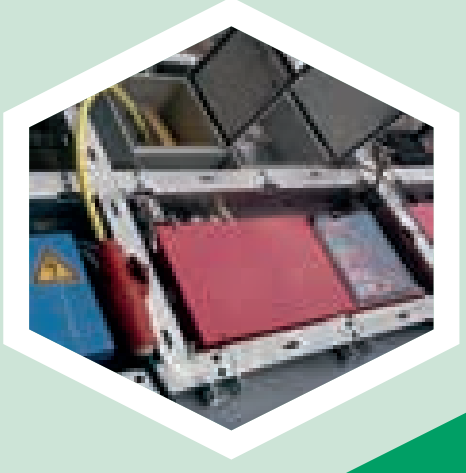
Energy supply

The power supply of the helicopter - and partly also of the complete platform - is ensured by the power-capable HEIDEN 1103-P3028 GPU. The GPU 1103-P3028 provides the correct on-board power supply and supplies the helicopter at avionics tests, at charging of the on-board battery and atm start for the next mission.

Individual

The platform concept is usually adapted to the existing infrastructure and regional requirements. Solutions with LiIo battery storage or stationary grid-connected as 1100-128P version - HEIDEN works closely with a renowned mechanical engineering company in the planning and production of the complete platform. Ask us for your individual platform!

- 28 V_{DC} supply
- Cargo during transport into the hangar
- Special versions can be planned individually
- Independent of mains power through high power batteries
- Powered by existing infrastructure
- Supply before the start e.g. for avionics updates
- Supply during engine startup



1104 HighPower GPU

Grid-connected

For high power engines

The requirements of the aviation industry are becoming increasingly demanding. With the new helicopter generations, the need for even higher starting and operating currents has become apparent. HEIDEN has responded by developing a new, even more powerful GPU with a rated power of up to 25 kW. The mains-powered 1104 can be operated both mobile and stationary and meets the requirements of current aircraft types.

- 28 V_{DC} supply
- Start current: Up to 30 s: 1.500 A
- Continuous current: 450 A, limited by connector
- DC output line: 4 meters
- AC connection cable: 15 meters
- Weight: 420 kg

1105 Trolley GPU

mobile / high power / compact

Aviation supply

The Ground Power Units (GPU) of the 1105 series are designed for mobile supply of 24...29 VDC supply voltages to consumers such as industrial trucks, military equipment, automobiles, mobile and stationary engines, aircraft and other consumers with high current requirements.

Support and start

This Ground Power Unit 1105 (mobile aviation ground power) supplies energy for starting aircraft and for conserving the on-board battery during maintenance. Air conditioning units can thus be operated even before the aircraft takes off. The 1105 supplies large and interference-free DC currents. Thanks to the integrated lithium-iron-phosphate energy storage with intelligent battery management system, the 1105 is independent of the mains supply. The type 1105 can be charged worldwide on standard 1-phase mains grids. If the GPU is connected to the AC grid, an even higher DC current can be drawn from the battery by automatically combining the integrated charger with the power cells.

Mobile trolley

The 1105 impresses above all with its compact design as a mobile case system and can be easily transported and conveniently moved by one person thanks to the trolley handle. The robust case has a pressure equalization valve and withstands even the toughest environmental conditions. In addition to the standard version, many customized versions with individual cable and connector types are available.

- 28 V_{DC} supply
- 8 lithium iron phosphate cells
- 60 Ah
- 800 A Peak-current
- 40 A continuous current only at mains connection
- High voltages stability at Load
- Very robust case with pull-out handle (trolley)
- Automatic pressure compensation valve
- Comfortable rubber-coated handles on top/side
- Robust polyurethane rollers with stainless steel bearings
- Battery-powered 130 A, t depending on state of charge

HE-ACS and HE-ACS3
HE-ACQ and HE-ACQ3

AC and DC source single and three-phases

AC and DC

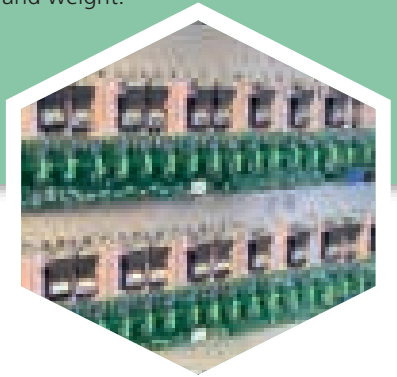
Linear or pulsed

The linearly controlled AC and DC sources of the HEIDEN HE-ACS series are used to simulate frequencies, voltages, waveforms, phase angles and currents in various single- and three-phase grids in order to investigate the behavior of components, motors and devices in normal operation or at under- and overvoltages. The AC signal can also be programmed with a DC offset.

Transformer or switching power supply

The HE-ACS AC sources feature the highest signal quality, which is due to the input transformer and the linear regulator.

The HE-ACQ version, on the other hand, is equipped with switched-mode power supplies and offers significantly higher power with reduced installation space and weight.



Single or three-phase

The HEIDEN AC sources of the HE-ACS and HE-ACQ series are available as single-phase as well as three-phases version. Three of the proven power stages are used in the three-phases systems. Phase angles and the programmed values are synchronized via an internal bus. At higher power levels, the devices are installed in a mobile rack for maximum flexibility. At the rack version we are happy to meet customer-specific requirements.

High functional diversity

The devices of the HE-ACS and HE-ACQ series feature an outstanding variety of functions. For example, they offer UI control or can be used as constant voltage and constant current source can be supplied. For applications where an AC voltage must be superimposed on a DC voltage, an adjustable DC voltage offset adjustable is also available as standard.

Programmable

Besides sinusoidal signals, many other signal variants are possible. With the integrated flicker simulation, short-term power failures can be simulated.

Measurement acquisition

The devices of the HE-ACS and HE-ACQ families measure automatically output voltage, RMS current, average and peak current, active power, reactive power, apparent power, power factor and crest factor. These quantities are displayed simultaneously on the large graphic display.

The user has an overview of the entire process at all times and does not need to connect additional measuring devices for most tasks.

	One phase				Three phases		
Description	Power	Voltage	Current	Dimensions	Power	Current	Dimensions
HE-ACS-250	250 VA	300 / 425 V	3 A	19" x 4 U x 434,5 mm	3x 250 VA	3x 3 A	3x 19" x 4 U x 434,5 mm
HE-ACS-500	500 VA	300 / 425 V	6 A	19" x 4 U x 434,5 mm	3x 500 VA	3x 6 A	3x 19" x 4 U x 434,5 mm
HE-ACS-1000	1.000 VA	300 / 425 V	10 A	19" x 6 U x 434,5 mm	3x 1.000 VA	3x 10 A	3x 19" x 6 U x 434,5 mm
HE-ACS-2000	2.000 VA	300 / 425 V	15 A	19" x 6 U x 434,5 mm	3x 2.000 VA	3x 15 A	3x 19" x 6 U x 434,5 mm
HE-ACS-3000	3.000 VA	300 / 425 V	20 A	19" x 10 U x 434,5 mm	3x 3.000 VA	3x 20 A	3x 19" x 10 U x 434,5 mm
HE-ACS-4000	4.000 VA	300 / 425 V	30 A	19" x 16 U x 600 mm	3x 4.000 VA	3x 30 A	3x 19" x 16 U x 600 mm
HE-ACS-5000	5.000 VA	300 / 425 V	35 A	19" x 16 U x 600 mm	3x 5.000 VA	3x 35 A	3x 19" x 16 U x 600 mm
HE-ACS-6000	6.000 VA	300 / 425 V	40 A	19" x 16 U x 600 mm	3x 6.000 VA	3x 40 A	3x 19" x 16 U x 600 mm
HE-ACS-7000	7.000 VA	300 / 425 V	50 A	19" x 20 U x 800 mm	3x 7.000 VA	3x 50 A	3x 19" x 20 U x 800 mm
HE-ACS-8000	8.000 VA	300 / 425 V	60 A	19" x 20 U x 800 mm	3x 8.000 VA	3x 60 A	3x 19" x 20 U x 800 mm
HE-ACS-9000	9.000 VA	300 / 425 V	70 A	19" x 25 U x 800 mm	3x 9.000 VA	3x 70 A	3x 19" x 25 U x 800 mm
HE-ACS-10000	10.000 VA	300 / 425 V	80 A	19" x 25 U x 800 mm	3x 10.000 VA	3x 80 A	3x 19" x 25 U x 800 mm

	One phase				Three phases		
Description	Power	Voltage	Current	Dimensions	Power	Current	Dimensions
HE-ACQ-250	250 VA	300 / 425 V	3 A	19" x 3 U x 620 mm	3x 250 VA	3x 3 A	3x 19" x 3 U x 620 mm
HE-ACQ-500	500 VA	300 / 425 V	6 A	19" x 3 U x 620 mm	3x 500 VA	3x 6 A	3x 19" x 3 U x 620 mm
HE-ACQ-1500	1.500 VA	300 / 425 V	10 A	19" x 3 U x 620 mm	3x 1.500 VA	3x 10 A	3x 19" x 3 U x 620 mm
HE-ACQ-2000	2.000 VA	300 / 425 V	15 A	19" x 6 U x 620 mm	3x 2.000 VA	3x 15 A	3x 19" x 6 U x 620 mm
HE-ACQ-3000	3.000 VA	300 / 425 V	20 A	19" x 6 U x 620 mm	3x 3.000 VA	3x 20 A	3x 19" x 6 U x 620 mm
HE-ACQ-4500	4.500 VA	300 / 425 V	30 A	19" x 9 U x 620 mm	3x 4.500 VA	3x 30 A	3x 19" x 9 U x 620 mm
HE-ACQ-5000	5.000 VA	300 / 425 V	35 A	19" x 9 U x 620 mm	3x 5.000 VA	3x 35 A	3x 19" x 9 U x 620 mm
HE-ACQ-6000	6.000 VA	300 / 425 V	40 A	19" x 9 U x 620 mm	3x 6.000 VA	3x 40 A	3x 19" x 9 U x 620 mm
HE-ACQ-7500	7.500 VA	300 / 425 V	50 A	19" x 9 U x 620 mm	3x 7.500 VA	3x 50 A	3x 19" x 9 U x 620 mm
HE-ACQ-8000	8.000 VA	300 / 425 V	60 A	19" x 12 U x 620 mm	3x 8.000 VA	3x 60 A	3x 19" x 12 U x 620 mm
HE-ACQ-9000	9.000 VA	300 / 425 V	70 A	19" x 12 U x 620 mm	3x 9.000 VA	3x 70 A	3x 19" x 12 U x 620 mm
HE-ACQ-10500	10.500 VA	300 / 425 V	80 A	19" x 12 U x 620 mm	3x 10.500 VA	3x 80 A	3x 19" x 12 U x 620 mm
HE-ACQ-12000	12.000 VA	300 / 425 V	90 A	19" x 18 U x 620 mm	3x 12.000 VA	3x 90 A	3x 19" x 18 U x 620 mm

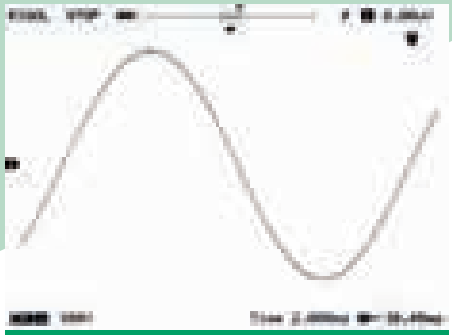
- **Features**
- Simulation of single-phase and three-phase grids
- Output voltages up to 700 V_{AC}/1.000 V_{DC}
- Variable frequency of up to 2.000 Hz
- Signal shapes sine, rectangle, triangle
- Maximum currents up to 600 A per phase
- Indication via large, graphic display
- Measurements of voltage, current effective, mean value, peak current, active power, reactive power, apparent power, power factor, crest factor
- Constant voltage and constant current operation
- Script control system
- Cos Phi 0,7...1 (special versions on request)
- Linear output stage
- High signal quality

- **Options**
- External oscillator input
- Creation of any curve progression
- The script control system in conjunction with the data log function on SD-Card enables the setup an independent „Stand-Alone" test station
- Memory locations for freely programmable wave forms
- Sync input/output for triggering external measuring devices
- Output voltage can be switched on for a certain time
- Special versions on request

Arbitrary curve shapes

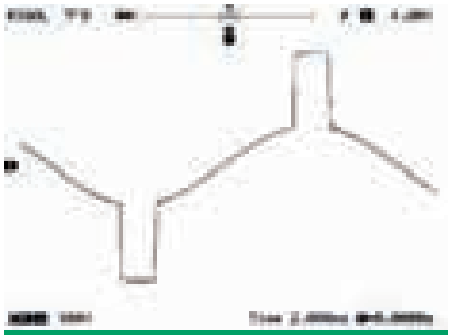
In addition to sine, rectangular and triangular voltages, the HE-ACS and HE-ACQ family can also generate any other wave forms. All that is required is to create a corresponding wave file and transfer it to the AC source via SD card. The AC source, which can store up to three such curves, sequentially simulates the waveform. This way the stepped voltage curves of a rectangular inverter or the signal curves of triacs or dimmers can be simulated without any problems. External signals can also be fed in via an oscillator input, so that users can use their own signal generators.

Play of programmable signals



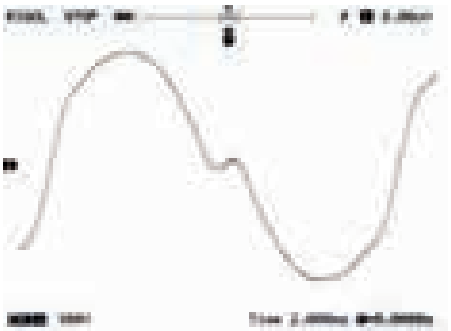
Sinus

Customized
400 Hz (DC...500 Hz) System
for aircraft suppliers



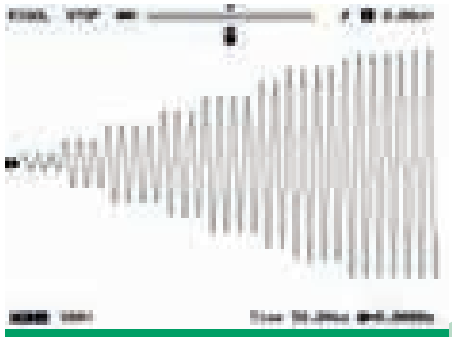
Sinus voltage flip

Ripple control signal



Phase shift

freely programmed signal shape



Amplitude ramp

HE-AC300-3 and HE-AC200-1

Mobile, compact single or three-phases AC source

The smallest, three-phases AC

Aviation equipment - current supply

Usually for the operation of an aircraft 3 x 200 V_{AC} / 400 Hz is required. This power supply can be provided either via a stationary connection or a standard three-phases AC source in a 19" rack.

In practice, however, the design of larger devices poses a major problem for the technician carrying out the necessary aircraft software updates directly on board or in the warehouse. The solution is our HE-AC300-3. Despite its small dimensions of 103 mm x 57 mm x 226 mm and its low weight, the 300 W are powerful enough to operate even large devices in stand-by mode. The power supply can either be taken from the 28 V_{DC}-on-board power supply or via the optional power supply unit directly from the 230 V_{AC} socket can be operated.

- **Single phase output**
- **Three phases output**
- **Very compact enclosure**

Specifications	
Input voltage	24...48 V_{DC} external 230 V_{AC} power supply optional
Output voltage	3x 0...140 V_{AC} optional 1x 0...140 V_{AC}
Output frequency	360...800 Hz
Output power	300 W total (200 W at 1 Ph version)
Display	graphic OLed-Display
Operation	1 rotary/pressure switch, 1 off switch
Interfaces	USB
Dimensions	103 mm x 57 mm x 226 mm
Weight	about 1,9 kg

Options
External 230 V_{AC} -> 28 V_{DC} power supply for operation at a single-phase AC outlet
Preprogrammed power interrupts according to ABD100
Driver for LabView, ProfiLab or Visual Studio
Built-in device without display and without control element
CAN
RS232
RS485

1650 Series

Voltage and frequency converter

Single or three-phases

The frequency and voltage converters of the 1650 series are designed for the simulation of aviation 400 Hz and 800 Hz grids, international single and three-phases grids (e.g. 50 / 60 Hz) with variable voltages and frequencies. The converters are custom-made and have, for example, switchable ranges of common sizes.

Foreign grids

Frequency converters are used to supply consumers that require a different frequency and possibly voltage than the available mains supply has, e.g. 400 Hz at a voltage of 115 V.

Modular design

The frequency converters are constructed with mains rectifier and inverter. The mains rectifier is designed for mains supply and the inverter supplies the desired output frequency and voltage in one or three phases.
The output of the converters is galvanically isolated from the input and is manufactured with powers from 500 VA to 50 kVA.
They prove themselves in continuous operation under the toughest industrial conditions. These devices have a significant economic efficiency due to their well thought-out concept.

- Three phases to one phase of higher power can be combined (e.g. 3x 10 kVA to 1x 30 kVA)
- Very robust design for industrial environment
- Power from 500 VA to 50 kVA, 1- or 3-phase
- Short-circuit proof and overloading
- Galvanic isolation
- For supplying alternating voltage consumers with different frequency and voltage
- Output e.g. 115 V 1-phase, 3x 120 / 208 V 3-phase, other values up to 750 V are possible
- 16 2/3 Hz, 50 Hz, 60 Hz, 300 Hz, 400 Hz, 800 Hz fixed and adjustable
- Efficiency 81 to 92 %
- Switch-on current limiter with monitoring
- Indicator LEDs for operating states
- 1x signalling contact operation (fault)
- Structure selectable depending on power on Mounting plate or in wall-mounted, floor-standing rack, 19 " full insertion
- Input and output fuses
- RS232 and LAN interface optional

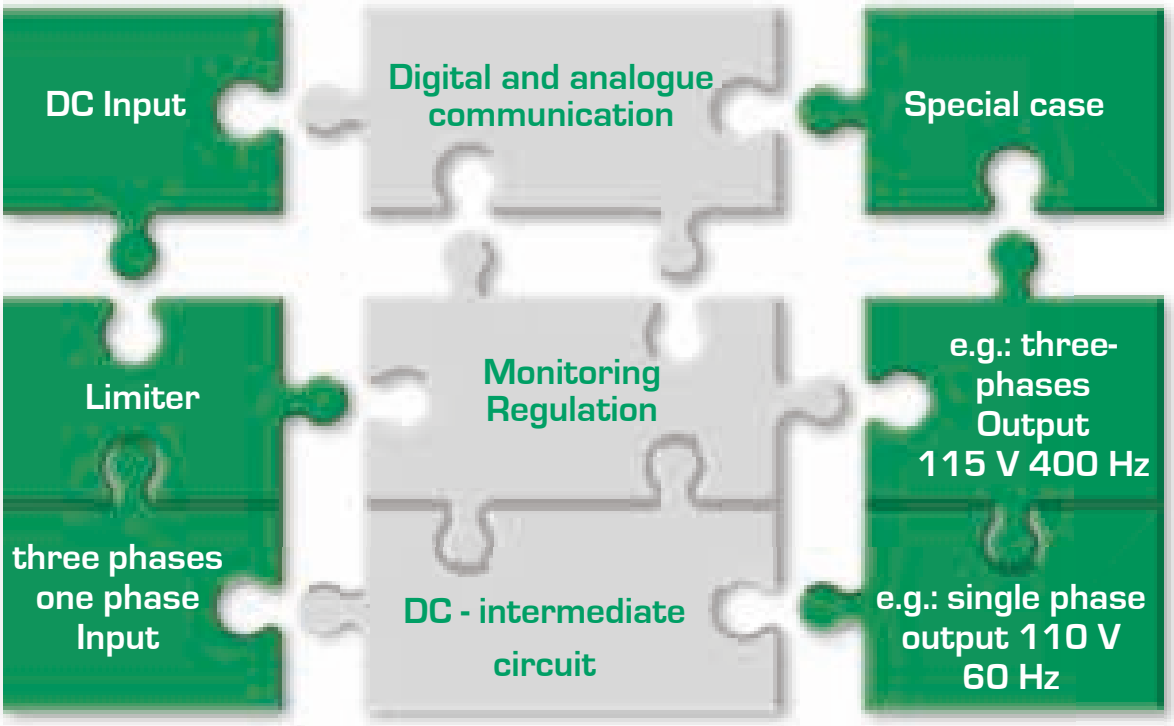
Desciprtion	Phases	Output power	Output voltage	Output frequency
1650-xxx-yyy	1	250 to 50.000 VA	e.g. 75 to 265 V	e.g. 45 to 75 Hz
1650-xxx-yyy	1	250 to 50.000 VA	e.g. 75 to 265 V	e.g. 400 to 800 Hz
1650-xxx-yyy	3	250 to 50.000 VA	e.g. 75 to 300 V Ph-N	e.g. 45 to 75 Hz
1650-xxx-yyy	3	250 to 50.000 VA	e.g. 75 to 300 V Ph-N	e.g. 400 to 800 Hz
1650-xxx-yyy	3 / 1	250 to 50.000 VA	e.g. 75 to 300 V Ph-N	e.g. 45 to 75 Hz
1650-xxx-yyy	3 / 1	250 to 50.000 VA	e.g. 75 to 300 V Ph-N	e.g. 400 to 800 Hz

AC-Input	
Input voltage	Selectable between 10...660 V_{AC} ±10 % one or three phases
Input frequency	Selectable between 16 2/3 to 800 Hz

AC-Ausgang	
Voltage	50...750 V_{AC} fixed/adjustable
Frequency	15...800 Hz fixed/adjustable
Frequency accuracy	±0,1 % Sinus
Voltage tolerance	±1,5 %
overvoltage behaviour	about 110 % for 1 min
Short circuit behaviour	about 130 % I_{nenn} for 20 ms
Distortion factor	≤ 3 %
Allowed CosPhi	> 0,8 ind.

Environmental conditions	
Cooling	Konvection/exhauster
Operating temperature	0...40°C
Permissible climate data	Room climate, 3K3 according to IEC 60721
Humidity	< 85 %

Let us know your individual requirements. Our team will configure a voltage and frequency converter based on our proven system components and tailored exactly to your application. Since only those functions are integrated that you really need, we achieve an excellent price-power ratio. Convince yourself and ask us!



1660 U / f converter

Customized voltage- / frequency converter

HACQ(R) 11 / 13 AC supply

Uni- / bidirectional AC supply

- Systems from 10 to 500 kVA
- Single and three-phases version
- Robust industrial technology
- Frequencies up to 800 Hz
- Voltages up to 660 V
- Unidirectional and bidirectional design

Foreign grids

The static frequency converters contain only proven and industry-proven components of modern technology. This series can be delivered with static and adjustable output frequency as well as with adjustable output voltage.

A clear and well-arranged structure and the associated easy maintenance characterize this single or three-phases AC current supply system. On request, the systems can also be supplied as bidirectional AC source sink.

- **We would be pleased to check your requirements and specifications for feasibility!**

- Sinusoidal input current
- Output frequency adjustable
- Setting via:
  - Potentiometer
  - Button control system
  - Analogue interface 0...10 V
- Event log
- Output voltage Adjustable
- Increased short circuit current
- Design according to customer requirements:
  - Analogue measuring instruments
  - LCD measuring system
  - RS-232 interface
  - external control panel
  - CAN interface
  - Ethernet

Single phase systems				
Description	**Power**	**Input-voltage**	**Output-voltage**	**Output frequency**
1660-10	10 kVA	400 / 230 V	Fixed values 230 V other Voltages on request	possible output ranges 45...105 Hz 95...420 Hz 195...805 Hz
1660-20	20 kVA	400 / 230 V		
1660-30	30 kVA	400 / 230 V		
1660-50	50 kVA	400 / 230 V		
1660-80	80 kVA	400 / 230 V		
1660-100	100 kVA	400 / 230 V		
1660-120	120 kVA	400 / 230 V		

Three phase systems				
Description	**Power**	**Input-voltage**	**Output-voltage**	**Output frequency**
1660-3-10	10 kVA	400 / 230 V	Fixed values 230 V/400 V other Voltages on request	possible output ranges 45...105 Hz 95...420 Hz 195...805 Hz
1660-3-20	20 kVA	400 / 230 V		
1660-3-30	30 kVA	400 / 230 V		
1660-3-50	50 kVA	400 / 230 V		
1660-3-80	80 kVA	400 / 230 V		
1660-3-100	100 kVA	400 / 230 V		
1660-3-120	120 kVA	400 / 230 V		
1660-3-160	160 kVA	400 / 230 V		
1660-3-200	200 kVA	400 / 230 V		
1660-3-250	250 kVA	400 / 230 V		
1660-3-330	330 kVA	400 / 230 V		

Description	**Power**	**Input-voltage**	**Output-voltage**	**Output frequency**
HACQ(R)11-10	10 kVA	400 / 230 V	possible output ranges 3...150 V 6...300 V 12...600 V 1/N/PE adjustable optional bidirectional	possible output ranges 45...105 Hz 95...420 Hz 195...805 Hz adjustable optional bidirectional
HACQ(R)11-15	15 kVA	400 / 230 V		
HACQ(R)11-20	20 kVA	400 / 230 V		
HACQ(R)11-25	25 kVA	400 / 230 V		
HACQ(R)11-30	30 kVA	400 / 230 V		
HACQ(R)11-40	40 kVA	400 / 230 V		
HACQ(R)11-50	50 kVA	400 / 230 V		
HACQ(R)11-60	60 kVA	400 / 230 V		
HACQ(R)11-80	80 kVA	400 / 230 V		
HACQ(R)11-100	100 kVA	400 / 230 V		
HACQ(R)11-120	120 kVA	400 / 230 V		
HACQ(R)11-160	160 kVA	400 / 230 V		
HACQ(R)11-200	200 kVA	400 / 230 V		

Three phase systems				
HACQ(R)13-10	10 kVA	400 / 230 V	possible output ranges 8...150 / 87 V 15...300 / 173 V 30...600 / 346 V 3 / N / PE optional bidirectional	possible output ranges 45...105 Hz 95...420 Hz 195...805 Hz optional bidirectional
HACQ(R)13-15	15 kVA	400 / 230 V		
HACQ(R)13-20	20 kVA	400 / 230 V		
HACQ(R)13-25	25 kVA	400 / 230 V		
HACQ(R)13-30	30 kVA	400 / 230 V		
HACQ(R)13-40	40 kVA	400 / 230 V		
HACQ(R)13-50	50 kVA	400 / 230 V		
HACQ(R)13-60	60 kVA	400 / 230 V		
HACQ(R)13-80	80 kVA	400 / 230 V		
HACQ(R)13-100	100 kVA	400 / 230 V		
HACQ(R)13-120	120 kVA	400 / 230 V		
HACQ(R)13-160	160 kVA	400 / 230 V		
HACQ(R)13-200	200 kVA	400 / 230 V		
HACQ(R)13-250	250 kVA	400 / 230 V		
HACQ(R)13-330	330 kVA	400 / 230 V		
HACQ(R)13-400	400 kVA	400 / 230 V		
HACQ(R)13-500	500 kVA	400 / 230 V		

AC-Input	
Input voltage	Selectable between 110...660 V_{AC} ±10 %
Input frequency	50/60 Hz

AC-Output	
Voltage	50...750 V_{AC} fixed / adjustable
Frequency	15...800 Hz fixed / adjustable
Frequency accuracy	±0,5 %
Voltage tolerance:	
- static	±1 % (from the final value)
- dynamic @ 50 / 60 Hz	±4 % at 100 % Loadwechsel
- dynamic @ 800 Hz	±8 % at 100 % load change
- asymmetrical load	±2 % at 100 % Crooked Load
Settling time	< 1,5 Periods
Overload	150 % for 1 min. 125 % for 10 min. 110 % for 20 min.
Short circuit behaviour	2 x I nominal, at 1-ph 3,5 x I Nominal at 3-ph, for 5 seconds (EN50091,part 1)
Distortion factor	< 100 Hz ≤ 3 % > 100 Hz ≤ 5 %
Permissible CosPhi	Any Derating at ≠ 0,8 ind.
Permissible crest factor of the load currents:	≤ 2,3 (at 100 % load)

Environmental conditions	
Cooling	Konvection/exhauster
Operating temperature	0...40°C
Permissible climate data	Room climate, 3K22 to IEC 60721
Humidity	< 85 %

From 16 2/3 Hz railroad grids up to 400 Hz / 800 Hz aviation grids: With our voltage and frequency converters, you can create grid shapes and conditions that are required for production, testing and operation.

AC-Load ACL

ACLS single-phase and ACLT three-phases

Description

DC voltage and AC voltage up to 1,000 Hz loads the ACL series. Besides the single-phase models (ACLS) there are also three-phases loads (ACLT) which combine 3 channels or phases in one enclosure. Ethernet, USB, RS-232, CAN, I/O interface and a system bus for master-slave connection are built in serially, the GPIB interface is available as an option. The programming is done in SCPI with an extensive command syntax.

Operating modes

The ACL series loads have the operating modes constant current, constant resistance, constant power and constant voltage (CC, CR, CP, CV mode). In ACL mode, the load current mode has the set wave form independent of the input voltage. In resistance mode the height and wave form of the current depends on the input voltage. In power and voltage mode, the power or voltage is controlled by adjusting the input current.

Single-phase and rotary currents

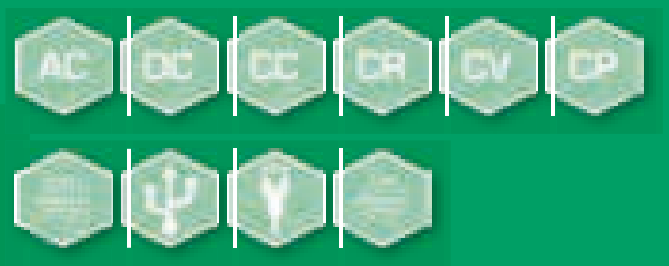
In addition to the ACLS single-phase loading systems, the ACLT series models were developed for loading rotary current systems. They combine three alternating current load channels in one enclosure. The three load channels can be used to load 3 different DUTs in AC or DC operation or to test a rotary current system.

Parallel connection

To increase the maximum load current several channels of a rotary current device ACLT, but also several single-phase devices ACLS can be connected in parallel. Several single-phase devices can be connected to a master-slave system.

User interface

In addition to the load input, which is switched on and off via a large button, and the rotary wheel for setpoint adjustment, the devices are operated via intuitive menu navigation on a 4.3“ touch display by tapping and wiping as on a smartphone. The most common functions can be accessed via a shortcut. For each dialog window there is an associated help window that explains the meaning of the respective elements. The language of the help function can be set to German or English.v



H&H Höcherl & Hackl
The electronic load

For more than 30 years H&H has been a leading manufacturer of high quality and reliable electronic loads.

One-phase load input

Description	Power	Voltage	Current	Dimensions
ACLS00528	500 W	280 V	4 A	2 U
ACLS00550	500 W	500 V	2 A	2 U
ACLS01028	1 KW	280 V	8 A	2 U
ACLS01050	1 KW	500 V	4 A	2 U
ACLS01428	1,4 KW	280 V	10 A	5 U
ACLS01450	1,4 KW	500 V	5 A	5 U
ACLS02828	2,8 KW	280 V	20 A	5 U
ACLS02850	2,8 KW	500 V	10 A	5 U
ACLS04228	4,2 KW	280 V	30 A	5 U
ACLS04250	4,2 KW	500 V	15 A	5 U
ACLS05628	5,6 KW	280 V	40 A	8 U
ACLS05650	5,6 KW	500 V	20 A	8 U
ACLS07028	7 KW	280 V	50 A	8 U
ACLS07050	7 KW	500 V	25 A	8 U
ACLS08428	8,4 KW	280 V	60 A	10 U
ACLS08450	8,4 KW	500 V	30 A	8 U
ACLS09828	9,8 KW	280 V	70 A	13 U
ACLS09850	9,8 KW	500 V	35 A	11 U
ACLS11228	11,2 KW	280 V	80 A	13 U
ACLS11250	11,2 KW	500 V	40 A	11 U
ACLS12628	12,6 KW	280 V	90 A	13 U
ACLS12650	12,6 KW	500 V	45 A	11 U
ACLS14028	14 KW	280 V	100 A	16 U
ACLS14050	14 KW	500 V	50 A	14 U
ACLS15428RV	15,4 KW	280 V	110 A	16 U
ACLS15450	15,4 KW	500 V	55 A	16 U
ACLS16828RV	16,8 KW	280 V	120 A	16 U
ACLS16850	16,8 KW	500 V	60 A	16 U
ACLS18228RV	18,2 KW	280 V	120 A	19 U
ACLS18250	18,2 KW	500 V	65 A	19 U
ACLS19628RV	19,6 KW	280 V	120 A	19 U
ACLS19650	19,6 KW	500 V	70 A	19 U
ACLS21028RV	21 KW	280 V	120 A	19 U
ACLS21050	21 KW	500 V	75 A	19 U

Three-phase LoadInput

Description (data per phase)	Power	Voltage	Current	Dimensions
ACLT04228	1,4 KW	280 V	10 A	6 U
ACLT04250	1,4 KW	500 V	5 A	6 U
ACLT08428	2,8 KW	280 V	20 A	10 U
ACLT08450	2,8 KW	500 V	10 A	10 U
ACLT12628	4,2 KW	280 V	30 A	14 U
ACLT12650	4,2 KW	500 V	15 A	14 U
ACLT16828	5,6 KW	280 V	40 A	18 U
ACLT16850	5,6 KW	500 V	20 A	18 U
ACLT21028	7 KW	280 V	50 A	22 U
ACLT21050	7 KW	500 V	25 A	22 U
ACLT25228	8,4 KW	280 V	60 A	26 U
ACLT25250	8,4 KW	500 V	30 A	26 U

AC-Input Mains	
Power supply voltage	230 V_{AC}
Input frequency	50 Hz

AC-Input load input	
Frequency range	DC, 40...1.000 Hz
Parallel mode	for 5 devices
Derating	-1,2 %/°C for Tu > 21°C

AC/DC-Input voltage	
Accuracy DC	±0,5 % from setting value ±0,1 % from range
Accuracy AC	±1 % from setting value ±0,2 % from range

AC/DC-Input current	
Accuracy DC	±0,2 % from setting value ±0,15 % from range
Accuracy AC 40...400 Hz	±0,5 % from setting value ±0,3 % from range
Accuracy AC >400 Hz	±0,75 % from setting value ±0,5 % from range

Protection and monitoring	
Safety devices	overcurrent, overload, overtemperature
Monitoring message	Overtemperature Overvoltage display Subvoltage display

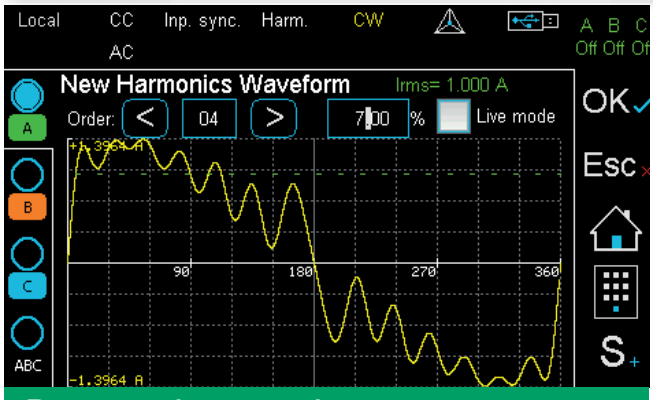
Norms	
Electrical safety	DIN EN 61010-1 DIN EN 61010-2-030
EMV	DIN EN 61326-1 DIN EN 55011 DIN EN 61000-3-2 DIN EN 61000-3-3

Harmonics and arbitrary wave form

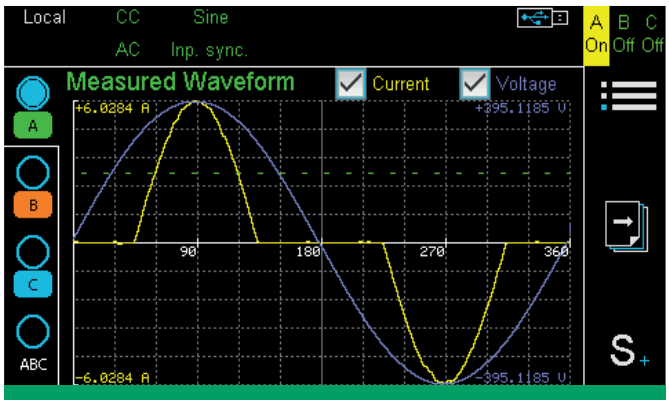
At the wave form with harmonics, the amplitudes of the fundamental wave, normalized from 0 to 1, as well as the up to 24 harmonics (even and odd) are summed up. The definition of a period with 360 individual points provides for highest flexibility.

Measurement data acquisition (DAQ)

The electronic load can also store synchronous data records from voltage and current with time stamp at a defined interval independently of the LIST function. Up to 40,000 data records are stored in a ring buffer. After the recording is finished, the data is read out via data interface or transferred to a USB memory.



Programming example



Measurement of voltage and current

TC.ACS Grid simulator

30 kVA or 50 kVA bidirectional

- 4 quadrant simulator
- High-speed amplifier
- RLC load mode
- 30 or 50 kVA modules
- Up to > 1 MVA System power

Field of application

With the increasing spread of additive energy systems such as solar, wind and bio power plants, compliance with strict input regulations by manufacturers is becoming increasingly important. Grid simulators allow both the simulation of a wide range of grid conditions and the generation of grid errors and disturbances, with which the regenerative devices to be tested can be evaluated and tested. Exact test standards for regenerative power supply units already exist today and it is to be expected that this set of rules will be expanded in the near future. Modern Grid simulators should therefore have a system architecture whose behavior can be parameterized to a large extent by software.

The programmable test parameters

The modular grid simulator system TC.ACS from REGATRON is based on highly switched functional basic units with versatile intervention possibilities and high system dynamics. This guarantees a comprehensive adaptability to the most diverse tasks. With the help of the application software ACSControl, both current and future requirements for the grid situation can be met.

- Variation of the mains frequency
- Voltage dips in the grid or individually per phase
- Micro-Ruptures and Flicker
- Over- and undervoltage
- Voltage asymmetries
- Superimposed harmonics and interharmonics
- Variation of the phase angle
- Special states for the EMV test
- Transitions from inputting to regenerative operation

The Hardware

The modular structure, based on units of 30 kVA and 50 kVA power, allows flexible adaptation to changing power requirements. Systems of up to > 1 MVA can be set up by simple parallelization of basic units. The hardware is available in all four quadrants and is fully regenerative.

In addition to testing regenerative devices, linear and non-linear power supply systems can also be operated for measurement and evaluation purposes. Single-phase operation is also permissible.

AC-Input (Grid-Port)	
Voltage	3 x 360...528 V_{AC}
Frequency	48...62 Hz
Nominal power	1

AC-Output voltage (Sim-Port)	
Output specification	3 L + N + PE
Voltage range	0...305 V_{AC}
Current range	0…72 Arms / 144 Arms (1 s) 0…43 Arms / 86 Arms (1 s)
Adjustment resolution	0,1 V
Accuracy at 50/60 Hz	0,05 % FS
Adjustment 10 %...90 %	≤ 100 µs

DC-Output voltage (Sim-Port)	
Voltage range L1-L2	0...800 V_{DC}
Voltage range L3-N	0...400 V_{DC}
Currentlimit at DC per phase	20 A

AC-DC-Output frequency (Sim-Port)	
Output Frequency	0...1.000 Hz (bis 5 kHz Modulation)
Accuracy	2 mHz
Einstellauflösung.	1 mHz

Measurement accuracy	
Voltage	±0,7 %
Current	±1,4 %

Specification	
Efficiency	90 %
Weight	150 kg
width/height/depth	19" x 11 U x 634 mm
Noise emission	≤ 74 dB @ 1 m
Operating temperature	5...40°C
Storage temperature	-18...70°C
Humidity	0...95 %

Options	
1153AS-GridSim	Grid simulation software
1153AS-RLC Load Sim	RLC load modus
1153AS-Current Control Mode	Current control
TC.ACS-LAE5.2WR/4WR	Water-air heat exchanger
TC.ACS.Sense	Sense with consideration possible output transformers

The user benefits at a glance

Many of today's grid simulators are based on analog amplifiers in the grid branches. This allows a high system dynamic, but at the same time a very high loss power is achieved. In addition to the very high hardware costs, the use of analog systems means a comprehensive building infrastructure and, for efficiency reasons, an upper power limit of a few 10 kVA. With the TC.ACS grid simulators, REGATRON breaks completely new ground. State-of-the-art microcomputer-controlled switching technology with a high clock rate enables an energy efficiency that is no longer comparable with analog technology, while at the same time providing high system dynamics and high-quality output currents. The resulting user advantages are:

- Compact and fully modular design
- High efficiency at all operating points
- Low demands on the building infrastructure
- Air or liquid cooled versions
- Expandability to systems > 1 MVW
- Full regenerative capability in 4-Q applications
- Operation as autonomous 4-Q analog amplifier possible
- Hardware-in-the-loop operation possible
- User-friendly application software with preconfigured test situations
- Integration into an integral SAS simulation system

Description	Ph	Power	Output voltage	Output frequency	Output current
TC.ACS-30	3	30 kVA	0...305 V Ph-N	DC to 1 kHz (5 kHz modulation)	43 A (86 A/1 s)
TC.ACS-50	3	50 kVA	0...305 V Ph-N	DC to 1 kHz (5 kHz modulation)	72 A (144 A/1 s)

TC.ACS Complete system

Planned and manufactured according to customer specifications

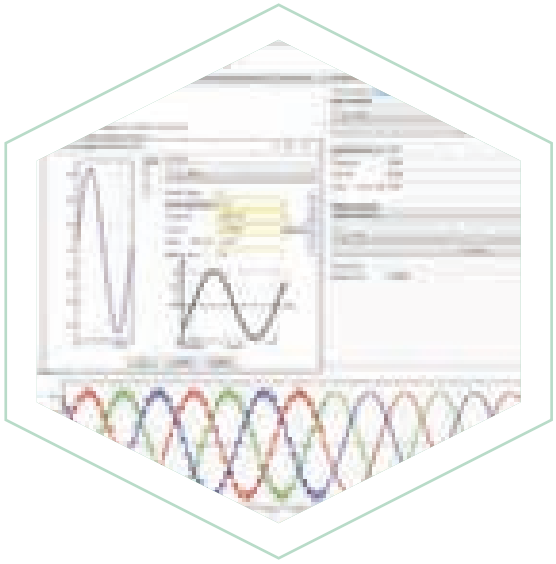
Let us know your individual requirements. Our team of experts will configure a grid simulator system that is tailored to your needs and fits perfectly into your infrastructure.

- Robust flight case | 19“ rack
- On pedestal or castors
- Operating concept customer-specific
- Water-air heat exchanger
- GridSim Mode
- RLC Load Mode
- Amplifier Mode

- Output control panel
- Individual output port
- Galv. Separation by transformer
- AC distribution and protection
- Multi-channel systems
- AC cables

TC.ACS

Software / Tools



Application software: ACS Control and GridSim

The customized software ACS Control allows manual control and specification of voltage and frequency.

Extended by the optional GridSim, it enables the programming and running of automated test sequences including data acquisition of the system. For this purpose, the software contains its own screens for parameterization, for test sequences, for visualization of the current plant data and measured values as well as for recording and documenting measured values.

- Grid simulation with normal sine wave
- Amplitude modulation (AM) Acts: EN 61000-4-11
- Frequency modulation (FM) Acts: UL 1741
- Additive curves acts: EN 61000-4-13
- Harmonic via fourier tool acts: EN 61000-4-13

  (Test of AC onboard chargers)

Application Software: RLC-Load Mode

With this option TC.ACS simulates the RLC resonant circuits with previously calculated values. Corrections of the values during operation are easily possible, so that the grid can be adjusted step by step according to your requirements. This completely eliminates the time-consuming manipulation and rewiring of the R-L-C components.

- R, L and C portions programmable
- Regeneration of the absorbed energy
- Loading of AC sources
- Island grid detection according to DIN V VDE V 0126-1-1 or

  VDE-AR-N 4105

Application Software: Amplifier Mode

In amplifier mode, you use the TC.ACS as a full 4-quadrant amplifier with up to 1 kHz fundamental frequency and 5 kHz modulation frequency. In HIL systems you can map your simulated scenarios.

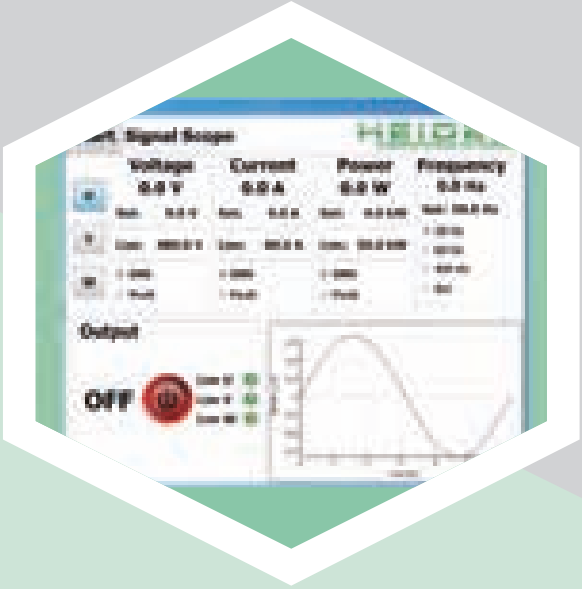
- Voltage amplifier
- Current amplifier
- Programmable limits
- Programmable gain factor

HACR50 AC Supply

Bidirectional

- Simulation of three-phases grids 3Ph/N/PE
- 50.000 VA permanent
- 100.000 VA 30 seconds (overloading capability)
- 19" built-in unit with only 6 height units
- Weight: < 60 kg

- Voltage regulation: < 1% F.S.
- THDu < 1% @f OUT < 500 Hz
- Efficiency: 94 %.
- Output voltage: 0...460 VAC phase-phase
- Adjustable variable frequency from 1 to 1,000 Hz
- 80 A per phase permanent
- 160 A per phase for up to 30 seconds
- Display/operation via 7" touch panel
- Measurement of: voltage, current, active power and power factor



High power density

The new, bidirectional AC source is equipped with a proven digital power stage to provide or take power at the output interface. With only 6 U and a total weight of approx. 60 kg, the AC source/ sink can be used as a mobile device installed in a flight case. The HACR50 is characterized by its high overload capacity of 100% (100 kVA) for 30 seconds. The connection via Ethernet enables a modern integration of the AC source/sink into the existing infrastructure.

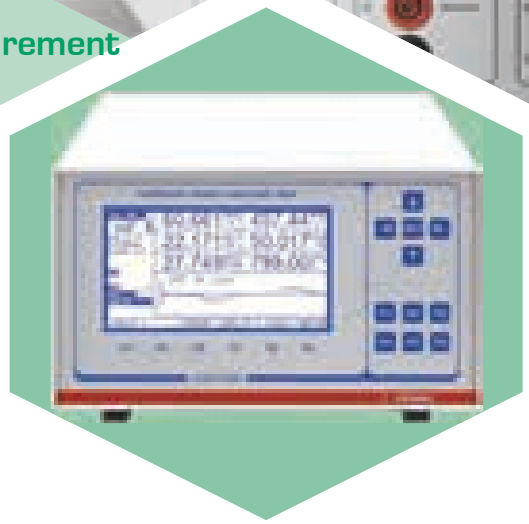
Easy to use

The graphical representation of the measured and input values are displayed via a high-resolution touch panel.

- Optionally installed in a flight case for mobile applications
- Constant voltage operation
- Current-limitation
- Digital interface: LAN
- Programming through digital interface
- Air cooling
- Special versions on request

PA 106A

One- and three-phases power measurement



- Suitable for frequency converter / power section
- Large and bright display with representation of up to 10 / 40 values
- Scope function and bar display of the harmonics 1...99
- Measuring range: DC-1 MHz, 1.5 mA...40 A
- 0.3 V...1,000 V
- Accuracy: 0.1 % and 0.05
- Interfaces: IEEE-488, RS232, USB, LAN
- Analogue outputs and inputs
- PC Software for Windows

Optional high-precision current sensors

PC software for Windows

The 106A power measuring device enables the harmonic measurement of current flows in single- and three-phases systems. The power analyzer is universally applicable and has a wide current range from 1 mA - 40 A. Measurements can be carried out to record the standby consumption or measurements on frequency converters.

The 106A is suitable for measurements on many products such as household appliances, motors, generators, emergency power supplies, frequency converters, transformers, switching regulators or lighting equipment.

Whether in the lab or atm on-site for maintenance or service, Infratek power analyzers are always the right choice. Small dimensions and low weight also make the instruments attractive for portable applications.

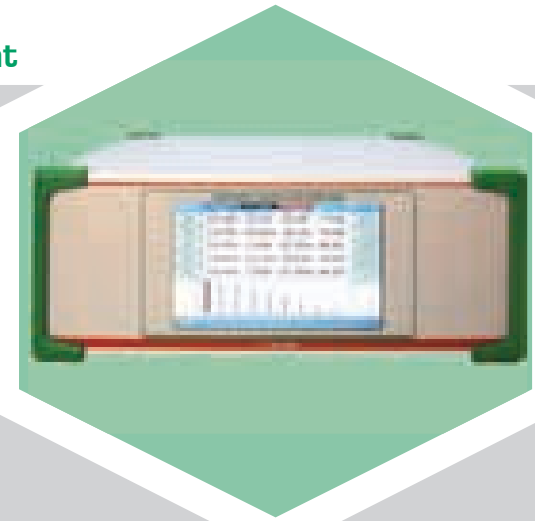
Model	Quantity phases	Scanning frequency	Accuracy	Harmonics Analysis
106A-1/0,05	1	300 kHz	0,05 %	Yes
106A-1/0,1	1	300 kHz	0,1 %	Yes
106A-1/nh	1	300 kHz	0,1 %	No
106A-3/0,05	3	300 kHz	0,05 %	Yes
106A-3/0,1	3	300 kHz	0,1 %	Yes
106A-3/nh	3	300 kHz	0,1 %	No

Options	
Interfaces	USB, RS232,LAN or IEEE-488 interface centronics printer output
Current sensors	3x 100 A, 3x 200 A, 1x 300 A, 1x 3.000 A
Software	Software for motor/generator tests, LabView driver
Rack installation	Installation kit for 19" racks
Our staff will help you with the ideal configuration.	

PA 108 A

One to six-phases power measurement

- Suitable for frequency converter / power part
- Large and bright color display
- Scope function and bar display
- Measurement of the 1...88 harmonics
- Measuring range: DC...2 MHz, 1.5 mA...40 A
- 0.3 V...1,000 V
- Accuracy: 0.02% and 0.08
- Analogue Outputs / Inputs
- Tourque & Speed measurement



The power analyzer Infratek 108 A has an easy to read touch screen with TFT color display. With only two clicks on the touch screen or alternatively via the cordless computer mouse, all settings can be made intuitively or selected from a variety of pre-set measurement parameters. An integrated 4 GB memory is available for storing settings and data.

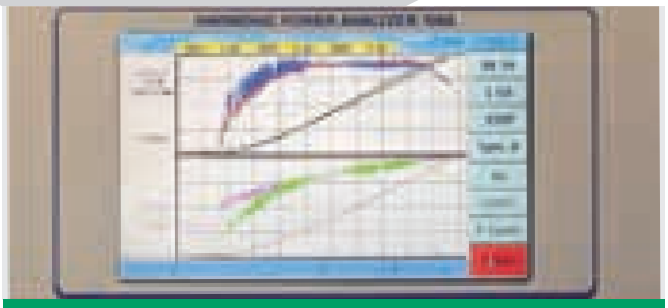
Due to their high DC measurement accuracy, the versatile 108A series instruments are also suitable for applications in the field of renewable energies, such as efficiency measurements on solar inverters.

One to six channels

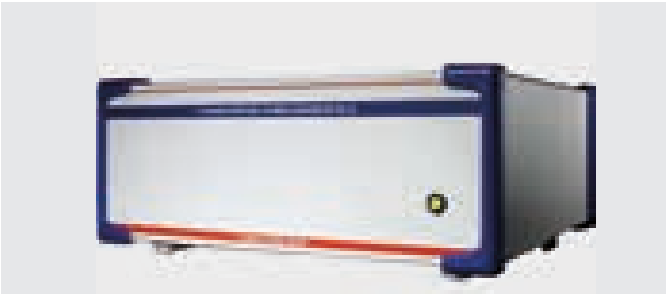
The Infratek 108 A power analyzer is available in one to six phase versions. That offers the 108A countless functions:

High precision measurements for testing and development of power electronics, such as electric motors with torque sensing, converter systems, wind and solar power, transformer testing, to name a few.

Intuitive touch operation



Measurement of critical operating points of the D.U.T.



Optional without HMI for automated measurements

PC software package

Model	Number of phases	Scanning frequency	Accuracy	Harmonics Analysis
108A-1/0,02	1	500 kHz	0,02 %	Yes
108A-1/0,08	1	500 kHz	0,08 %	Yes
108A-3/0,02	3	500 kHz	0,02 %	Yes
108A-3/0,08	3	500 kHz	0,08 %	Yes
108A-4/0,02	4	500 kHz	0,02 %	Yes
108A-4/0,08	4	500 kHz	0,08 %	Yes
108A-6/0,02	6	500 kHz	0,02 %	Yes
108A-6/0,08	6	500 kHz	0,08 %	Yes

Options (Extract)	
Interfaces	USB, RS232, LAN or IEEE-488
Current sensors	3x 100 A, 3x 200 A 1x 300 A, 1x 3000 A
Our staff will help you with the ideal configuration.	

HEIDEN
COMPETENCE IN POWER

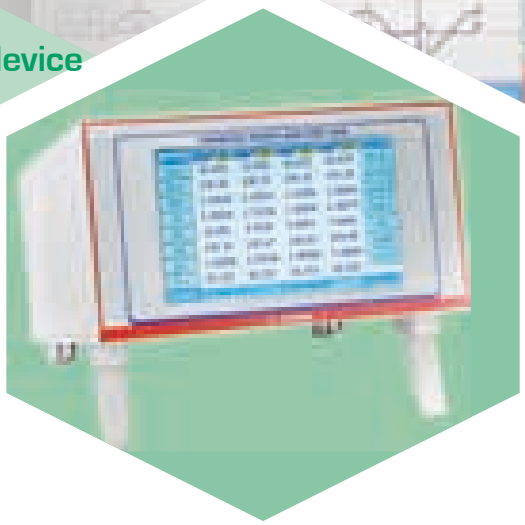
PA 108 B

One to four-phases power measuring device

- Suitable for frequency converter / power part
- Large and bright color display
- Scope function and bar display
- Measurement of the 1...88 harmonics
- Measuring range: DC...2 MHz
- Current input range 1.5 mA...40 A
- Per current sensor 10 A...700 A
- 0.3 V...1,000 V
- Accuracy: 0.02 %.
- 18 bit measurement resolution

AC

DC



One to four channels

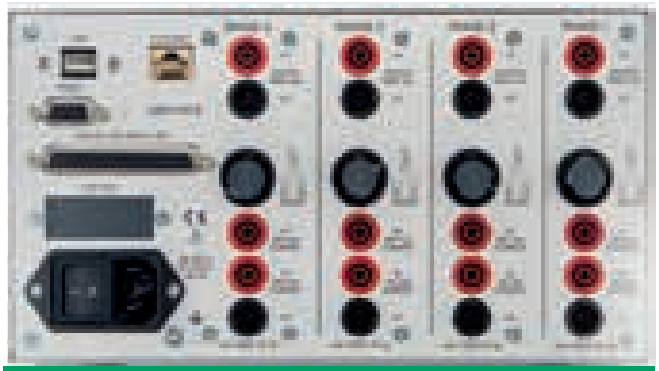
The new Infratek 108B power analyzer is technically based on the 108A and comes in a new, compact enclosure. Thereby, the 108B offers countless functions:

High precision measurements for testing and development of power electronics, such as electric motors with torque sensing, converter systems, wind and solar energy, transformer tests, to name a few, are possible. Recently the new energy saving mode has been implemented as an option, which extends the lifetime of the display.

Intuitive touch operation

The power analyser 108B has an easy to read touch screen with TFT color display. The operating concept is already known and proven from the 108A. With only two clicks on the touch screen or alternatively via the cordless computer mouse, all settings can be set intuitively or selected from a variety of pre-set measurement parameters.

Due to their high DC measurement accuracy, the versatile 108B series devices are also suitable for applications in the field of renewable energies, such as efficiency measurements on solar inverters.



Rear view 108B

Optional extensions matching the device

Model	Number of phases	Scanning frequency	Accuracy	Harmonics Analysis
108B-1/0,02	1	500 kHz	0,02 %	Yes
108B-1/0,05	1	500 kHz	0,08 %	Yes
108B-3/0,02	3	500 kHz	0,02 %	Yes
108B-3/0,08	3	500 kHz	0,08 %	Yes
108B-4/0,02	4	500 kHz	0,02 %	Yes
108B-4/0,08	4	500 kHz	0,08 %	Yes

Options (Extract)	
Interfaces	USB, RS232, LAN or IEEE-488
Current sensors	3x 100 A, 3x 200 A, 1x 300 A, 1x 3.000 A
Our staff will help you with the ideal configuration.	

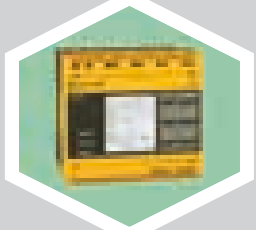
INFRATEK AG
electronic products

Complete systems

With your preferred equipment

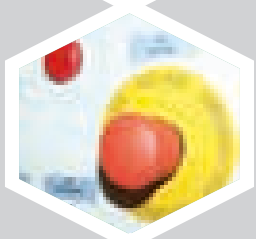
Rack system

In addition to the standard devices, we manufacture complete systems ready for connection. Choose from the most common options or let us know your desired equipment! We manufacture your turnkey system!



Isolation monitoring

Whether for increased accident prevention, fire prevention or increased plant availability - insulation monitoring is particularly recommended for high voltages. We install your preferred type.

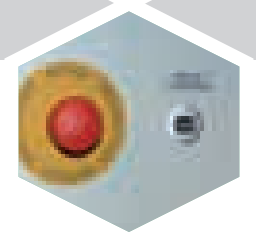


Emergency stop

If a dangerous condition is detected by the user, quick action is required. Our safety concepts are manufactured on customer request and can be integrated into existing protective circuits.

Safety discharge unit

If the DUT has energy storage, dangerous voltage may be present at the system interfaces even if the output is switched off. Discharge units establish a safe state.



Field bus connection

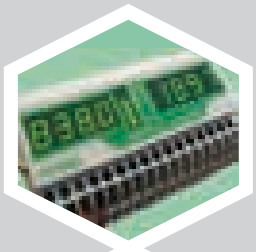
Network and fieldbus connections can be taken out of the system on request, ensuring simple and fast connectivity.

Selective distribution

The system is protected with selective line protection. Emergency stop and control circuits can be easily integrated.

Buffer storage

If high peak power is required, the use of short-term energy storage systems are possible. These store the energy required for transient processes.



U/I Display

An active voltage and current display gives you a constant overview of the current system values during operation. A peak-value function stores the maximum values.

Display and control elements

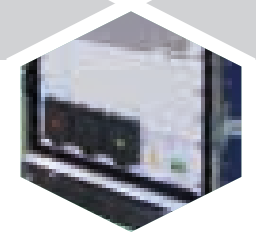
Intuitive operation and a quick overview of the system status. We manufacture the front panels to match the peripherals used and the application.

Contactors

Whether AC or DC contactors, a safe isolation and a defined output state is not only important during maintenance. We plan the circuit concept according to your requirements.

Individual cables

The system is immediately ready to start thanks to ready-made connection cables. Whether AC or DC side, various plugs and cable versions are possible.

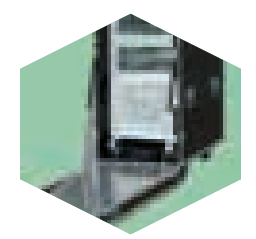


DC-Outputs

Connectivity as individual as your application. Do you need a special system connection? We install the right connection!

Control panel

For maximum flexibility, switch panels are suitable. This allows many individual channels to be switched to a channel of higher power. The switch panel is optimally matched to the device selection.



Transport enclosure

A high quality system deserves a well protected storage. Environmental influences, shocks and vibrations are kept away by insulated HEIDEN enlosure systems. The enlosure is ideally suited to your syst

Perfectly tuned

As individual as your application

Directly in the test field

In professional use, our systems supply energy where it is needed. Schaeffler Engineering GmbH successfully uses the systems for operating and testing engine and generator test benches.

Customer-specific planning and manufacture of the systems ensures rapid operational readiness and high operational reliability.

Picture source: Schaeffler Engineering GmbH

Optimally integrated

We selectively adapt the AC power supply and AC or DC output port to the system and your application. This ensures fast integration into the infrastructure, into your test bench and into existing safety circuits.

We supply the necessary cables in the desired length, with individually assembled, partly coded, reverse polarity protected plugs or sockets. Emergency stop systems are usually realized via two-channel safety switching devices.

Picture source: HEIDEN electronics GmbH

Simulation or test

Each application requires individual characteristics. We clarify the requirements of your application already in the needs analysis. In addition to individual controller setups, we adjust the output capacities if necessary.

Battery simulators can be equipped with increased capacities. If fast transients are required, the capacity can be reduced.

Picture source: HEIDEN electronics GmbH

Individual up to the coating

Our systems fit you down to the load detail. Not only the technology is coordinated in detail, we also realize your requirements up to special painting in your corporate design! Let us know your requirements and convince yourself of our systems!

Picture source: HEIDEN power GmbH

Initial operation

Modification and support

Individual adaptations

Has your application changed, would you like a technical modification or an extension of the power of your HEIDEN system? Let us know your new requirements and we will be happy to advise you on implementation.

Already in the design of new systems we attach importance to later expandability. For many systems we offer optional parallel and master-slave preparations.

Commissioning and instruction

If you have ordered commissioning of your new system, we will visit you on site. Our service staff will commission the system. Individual settings and control parameters are adjusted directly to your application. Our technicians will explain the special features and details to you - no questions remain unanswered!

Help where it is needed

A device from our company does not work correctly? We support you fast, uncomplicated and competent. Our technicians and engineers analyze the problem directly based on your error description, measurements or remote maintenance. You can contact us quickly via our online RMA system!

Approach

Map

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