

## The Electronic Load



## Electronic AC Loads, ZSAC Series

H&amp;H

PL

ZS

ZSLC  
Water-cooledZSLV  
Low VoltagePMLI  
Multi-channelZSAC  
ACNL  
Source-SinkAccesso-  
ries

Application Notes

Software

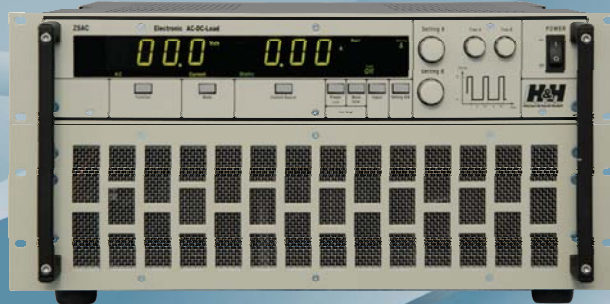
GTC

**SCPI**  
96 Commands


## Interface overview

RS-232	○
USB	○
GPIO	○
LAN	○
System bus	○
Analog	✕
Analog isolated	○

✕ Standard ○ Option / not available



ZSAC4226

- Frequency range up to 700 Hz
- As single phase version and for 3-phase
- Star and delta connection possible
- Input voltages up to 440 V
- Power 400 W ... 21,000 W
- Current and resistance mode
- Programmable waveform

- Dynamic loads
- Phase angle adjustment combined with crest factor
- Harmonics, phase control
- SCPI programming with measurement function
- Full electronic protection
- Isolated measurement outputs for voltage and current
- Isolated analog control input

## Operating Modes

The AC current loads of the ZSAC series feature constant current and resistance operating modes.

In AC mode the current is set as sinusoidal. In resistance mode the height and waveform of the current depends on the input voltage.

## Voltage Types

Depending on the type of voltage the devices can be switched between mains voltage and/or mains-synchronous voltage, AC voltage with variable frequency and DC voltage.

## Waveforms

In current mode a low-distortion sinusoidal waveform is a permanently saved setting. In resistance mode the current depends on the waveform of the applied input voltage.

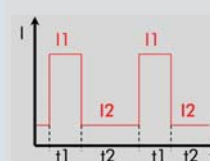
Any waveform can be specified by programming and saved in the retrievable waveform memory.

Functions for harmonics, phase-controlled currents and currents with adjustable crest factor are stored permanently. The phase angle adjustment is combined with the crest factor adjustment.

## Dynamics

The inbuilt modulator enables two independently adjustable currents and times within the range from 100  $\mu$ s ... 1 s.

In AC mode the modulator serves to adjust the envelope curve of the AC current (amplitude modulation).





ZSAC4226

#### Remote Control

All load functions can be controlled remotely via the standard Analog I/O Interface. The control inputs can be operated with TTL levels and 24 V from PLC controllers.

#### Analog Control Input

In the constant-current operating mode the current can be set by 0 ... 3.5 V or 0 ... 7 V DC.

#### Analog Measurement Outputs

There are 0 ... 7 V analog measurement signals for voltage, current and power available. The outputs are electrically isolated from the load input.

#### Cooling

The units are air-cooled. To keep the operating noise low, the fans are temperature and current-dependently controlled.

#### Mechanics

The ZS is a sturdy 19" rack design and can also be used as a table-top device.



From 5 height units there are retractable handles on the top of the device.

Optional castors can be

mounted on heavy devices. Separate installation kits are needed for 19" rack installation.

#### Connections

All connections are at the back. The current connections are designed as touch-protected sockets for 4 or 6mm plugs.



#### Interfaces (Accessories)

The interface cards are removable and can be exchanged or expanded as required. The devices can be fitted with the following interfaces:

- RS-232 + USB <sup>1)</sup> (Option ZS01)
- GPIB + RS-232 + USB <sup>1)</sup> (Option ZS02)
- System interface fiber optic (Option ZS05)
- Ethernet-RS-232 converter (Option ZS15)

H&amp;H

PL

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ZSLC  
Water-cooled

ZSLV  
Low Voltage

PMLI  
Multi-channel

ZSAC  
AC

NL  
Source-Sink




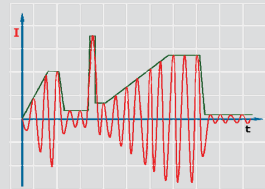
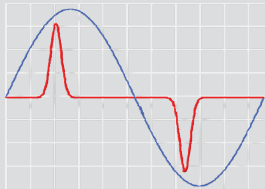
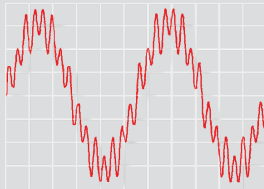
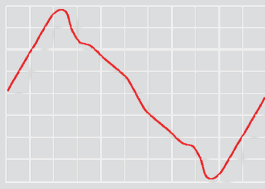
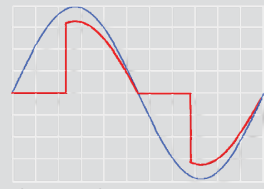
Accesso-  
ries

Application Notes

Software

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## Data Interfaces (Accessories)

H&H	Extended function range when using an optional data interface			<table><tr><td>Settings</td><td>Resolution Accuracy</td><td>16 Bits see technical data</td></tr><tr><td rowspan="2">Measurement function</td><td>Resolution Sampling rate</td><td>18 Bits ca. 300 ms for V+I not synchronized see technical data</td></tr><tr><td>Accuracy</td><td></td></tr><tr><td rowspan="2">Waveform memory</td><td>Measured data memory</td><td>max. 2,000 V/I values + time</td></tr><tr><td>Resolution Functions</td><td>512 points/period programmable waveforms Crest factor Harmonics (3rd to 15th) Phase control Phase shift *</td></tr><tr><td rowspan="4">Load profile generator</td><td>Steps</td><td>max. 50</td></tr><tr><td>Pulse duration</td><td>200 µs ... 2,000 s</td></tr><tr><td>Ramp time</td><td>0 ... 2,000 s</td></tr><tr><td>Cycling rate</td><td>once, n times, continuous</td></tr></table>	Settings	Resolution Accuracy	16 Bits see technical data	Measurement function	Resolution Sampling rate	18 Bits ca. 300 ms for V+I not synchronized see technical data	Accuracy		Waveform memory	Measured data memory	max. 2,000 V/I values + time	Resolution Functions	512 points/period programmable waveforms Crest factor Harmonics (3rd to 15th) Phase control Phase shift *	Load profile generator	Steps	max. 50	Pulse duration	200 µs ... 2,000 s	Ramp time	0 ... 2,000 s	Cycling rate	once, n times, continuous
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PL	<ul style="list-style-type: none"><li>• SCPI programming</li><li>• Settings with 16 Bit resolution</li><li>• Measurement function for voltage, current and power</li><li>• Measured data memory</li><li>• Dynamic load profiles</li><li>• Generation of harmonics</li><li>• Adjustable crest factor</li><li>• Arbitrary programmable waveform</li><li>• Phase control</li></ul>		The interface cards are removable and can be exchanged or expanded as required.																							
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ZSLC Water-cooled																										
ZSLV Low Voltage																										
PMLI Multi-channel	RS-232 + USB Interface (Option ZS01) <sup>1)</sup>		GPIO + RS-232 + USB Interface (Option ZS02) <sup>2)</sup>	GPIO Interface Expansion (Option ZS03) <sup>1) 3)</sup>																						
ZSAC AC	Option ZS01 adds an RS-232 and a USB interface (as virtual COM Port) to the device.		The GPIB interface also includes the RS-232 + USB interface (Option ZS01).	If there is an existing RS-232 interface (Option ZS01), option ZS03 can be upgraded to the GPIB interface. Simply insert the card.																						
NL Source-Sink	Programming is in SCPI.		(Including 2m RS-232 cable, no GPIB cable.)	(Supplied without GPIB cable.)																						
Accessories	(Including 2m RS-232 cable)																									
Application Notes																										
Software																										
GTC																										

1) Can be retrofitted at any time

2) Can only be retrofitted or produced by H&H

3) Requires ZS01 or ZS02

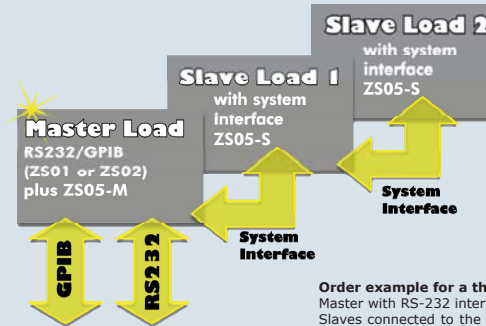
## Setting Up Three-Phase Systems

### Fiber Optic System Interface (Option ZS05)

(ZS05-M for Master devices, ZS05-S for Slave devices)

The fiber optic connection is used to control three phase systems. Including 5m optical cable. Option ZS01 or ZS02 required.

(Including 5m optical cable)



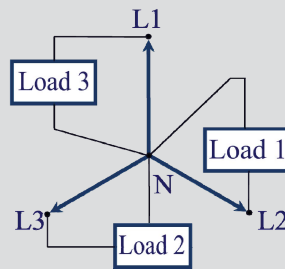
Order example for a three-phase system:  
Master with RS-232 interface  
Slaves connected to the master with fiber optic system interface:

Load 1+ZS01+ZS05-M,  
Load 2+ZS05-S  
Load 3+ZS05-S

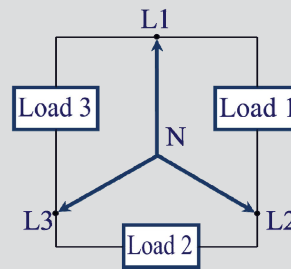
## Wiring of Three-Phase Systems

### Wiring of three-phase systems

Depending on the rated voltage, Phase-Phase, Phase-Neutral or mixed devices can be wired. The control can be either individual, in Master-Slave mode or via interface. For ease of programming we recommend connecting both Slave devices to the Master device by fiber optic interface. The devices can then be programmed jointly or individually.



Phase-Neutral connection (260 V Version)



Phase-Phase connection (440 V Version)

## Hardware Expansions

### Power I/O Card <sup>1) 3)</sup> (Option ZS07)

The Power I/O card can be expanded to control external devices. 8 relay contacts (N/O 125 V/1 A) can be actuated via the data interface and 8 logical inputs (5 V ... 24 V, shared GND) can be queried.

The inputs and outputs are isolated from the load input. The isolation voltage is 500 V DC with respect to the negative load input.



### Castors <sup>1)</sup> (Option ZS09)

Steerable castors can be screwed onto large devices for easier transport. A 19" rack can then often be dispensed with.

This option is available for devices from 5HU and is suitable only for hard floors.



## Calibration

### Factory Calibration Certificate <sup>2)</sup> (Option FCC-ZSACxx)

A Factory Calibration Certificate (FCC) can be supplied with the devices.

The FCC meets the requirements according to DIN EN ISO 9000ff.

This calibration certificate documents the traceability to national standards to illustrate the physical unit in accordance with the international device system (SI).

The recommended calibration interval is 1 year. We would be happy to calibrate your devices at regular intervals.



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- 2) Can only be retrofitted or produced by H&H
- 3) Requires ZS01 or ZS02

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Water-cooled

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## The Electronic Load

### Software Tools

The following SW tools and drivers are delivered as standard with the interfaces:

#### Load Control

Individual devices and multi-channel systems can be controlled via the tool.

The range of functions includes PC device set-up, data logging with graphical display and saving data for other programs.

#### Data Acquisition

As well as device control, measured data can be logged and saved.

The following measured values are saved:  
Time, voltage, current.

#### Waveform Editor

The Waveform Editor permits the intelligent generation of load profiles in the form of straight sections. The load trajectory is displayed on entry. The profiles can be saved.

#### Harmonics

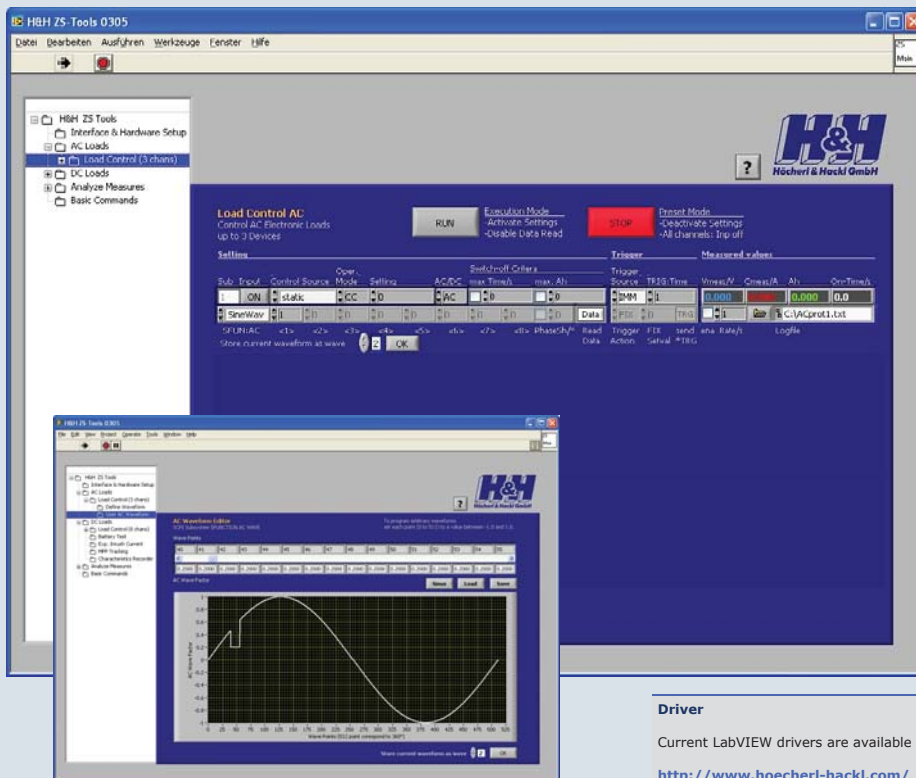
Portions of harmonics up to 8th can be added to the basic frequency.

#### Phase Control

Phase-controlled currents with phase angles of 0 ... 180° can be set.

#### Basic Communication Tool

The Basic Communication Tool can be used to send any commands for test purposes and for commissioning of test systems.



#### Driver

Current LabVIEW drivers are available from:

<http://www.hoecherl-hackl.com/>

or

<http://www.ni.com/downloads/instrument-drivers/d/>

LabVIEW®

## 400 W ... 21,000 W AC

Model (order number)	ZSAC426	ZSAC444	ZSAC1426	ZSAC1444	ZSAC2826	ZSAC2844
Voltage	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC
Current	6 A	3 A	10 A	5 A	20 A	10 A
Power	400 W	400 W	1,400 W	1,400 W	2,800 W	2,800 W
Resistance	2 ... 2,000 Ω	3 ... 6,666 Ω	1 ... 1,200 Ω	2 ... 4,000 Ω	0,5 ... 600 Ω	1 ... 2,000 Ω
Connection <sup>1)</sup>	SB4	SB4	SB4	SB4	SB6	SB4
Power consumption	95 VA	78 VA	190 VA	140 VA	315 VA	250 VA
Noise max. <sup>2)</sup>	53 dB(A)	53 dB(A)	71 dB(A)	71 dB(A)	72 dB(A)	71 dB(A)
Weight	13 kg	13 kg	28 kg	29 kg	34 kg	33 kg
Housing <sup>3)</sup>	19" - 2 HU	19" - 2 HU	19" - 5 HU	19" - 5 HU	19" - 5 HU	19" - 5 HU
Model (order number)	ZSAC4226	ZSAC4244	ZSAC5626	ZSAC5644	ZSAC7026	ZSAC7044
Voltage	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC	6 ... 260 V AC 6 ... 360 V DC	10 ... 440 V AC 10 ... 660 V DC
Current	30 A	15 A	40 A	20 A	50 A	25 A
Power	4,200 W	4,200 W	5,600 W	5,600 W	7,000 W	7,000 W
Resistance	0.33 ... 400 Ω	0.7 ... 1,333 Ω	0.25 ... 300 Ω	0.5 ... 1,000 Ω	0.2 ... 240 Ω	0.4 ... 800 Ω
Connection <sup>1)</sup>	SB6	SB4	SB6	SB6	SB6	SB6
Power consumption	450 VA	300 VA	560 VA	420 VA	670 VA	560 VA
Noise max. <sup>2)</sup>	73 dB(A)	73 dB(A)	73 dB(A)	73 dB(A)	74 dB(A)	74 dB(A)
Weight	41 kg	39 kg	53 kg	51 kg	58 kg	59 kg
Housing <sup>3)</sup>	19" - 5 HU	19" - 5 HU	19" - 8 HU	19" - 8 HU	19" - 8 HU	19" - 8 HU
Model (order number)	ZSACRV8426	ZSAC8444	ZSACRV9826	ZSAC9844	ZSACRV11226	ZSAC11244
Voltage	50 ... 260 V AC 50 ... 360V DC	10 ... 440 V AC 10 ... 660 V DC	50 ... 260 V AC 50 ... 360V DC	10 ... 440 V AC 10 ... 660 V DC	50 ... 260 V AC 50 ... 360V DC	10 ... 440 V AC 10 ... 660 V DC
Current	60 A	30 A	70 A	35 A	80 A	40 A
Power	8,400 W	8,400 W	9,800 W	9,800 W	11,200 W	11,200 W
Resistance	0.84 ... 200 Ω	0.33 ... 666 Ω	0.72 ... 171 Ω	0.3 ... 570 Ω	0.63 ... 150 Ω	0.25 ... 500 Ω
Connection <sup>1)</sup>	SB6	SB6	SB6	SB6	SB6	SB6
Power consumption	380 VA	670 VA	440 VA	700 VA	515 VA	775 VA
Noise max. <sup>2)</sup>	74 dB(A)	74 dB(A)	75 dB(A)	75 dB(A)	76 dB(A)	76 dB(A)
Weight	63 kg	64 kg	76 kg	79 kg	82 kg	84 kg
Housing <sup>3)</sup>	19" - 8 HU	19" - 8 HU	19" - 11 HU	19" - 11 HU	19" - 11 HU	19" - 11 HU
Model (order number)	ZSACRV12626	ZSAC12644	ZSACRV14026	ZSAC14044	ZSACRV15444	ZSACRV16844
Voltage	50 ... 260 V AC 50 ... 360V DC	10 ... 440 V AC 10 ... 660 V DC	50 ... 260 V AC 50 ... 360V DC	10 ... 440 V AC 10 ... 660 V DC	50 ... 440 V AC 50 ... 660 V DC	50 ... 440 V AC 50 ... 660 V DC
Current	90 A	45 A	100 A	50 A	55 A	60 A
Power	12,600 W	12,600 W	14,000 W	14,000 W	15,400 W	16,800 W
Resistance	0.56 ... 133 Ω	0.22 ... 444 Ω	0.5 ... 120 Ω	0.2 ... 400 Ω	0.91 ... 363 Ω	0.84 ... 333 Ω
Connection <sup>1)</sup>	SB6	SB6	SB6	SB6	SB6	SB6
Power consumption	580 VA	1.150 VA	640 VA	980 VA	695 VA	735 VA
Noise max. <sup>2)</sup>	76 dB(A)	76 dB(A)	77 dB(A)	77 dB(A)	77 dB(A)	78 dB(A)
Weight	84 kg	85 kg	91 kg	104 kg	98 kg	106 kg
Housing <sup>3)</sup>	19" - 11 HU	19" - 11 HU	19" - 14 HU	19" - 14 HU	19" - 14 HU	19" - 14 HU
Model (order number)	ZSACRV18244	ZSACRV19644	ZSACRV21044			
Voltage	50 ... 440 V AC 50 ... 660 V DC	50 ... 440 V AC 50 ... 660 V DC	50 ... 440 V AC 50 ... 660 V DC			
Current	65 A	70 A	75 A			
Power	18,200 W	19,600 W	21,000 W			
Resistance	0.77 ... 307 Ω	0.72 ... 285 Ω	0.67 ... 266 Ω			
Connection <sup>1)</sup>	SB6	SB6	SB6			
Power consumption	805 VA	875 VA	900 VA			
Noise max. <sup>2)</sup>	78 dB(A)	78 dB(A)	79 dB(A)			
Weight	116 kg	123 kg	130 kg			
Housing <sup>3)</sup>	19" - 17 HU	19" - 17 HU	19" - 17 HU			

1) SB4: 4mm safety socket  
SB6: 6mm safety socket (also fits 4mm jack)  
2) Measured on the front panel from distance 1m  
3) 1 HU = 44.45 mm

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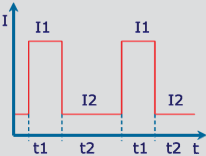
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## Technical Data ZSAC, ZSACRV Series

H&H	Technical Data ZSAC, ZSACRV Series										
PL	Accuracy of manual setting, no preset function <sup>1)</sup>										
			of the setting value				of the corresponding range				
	Current	DC 400 Hz	±0.5 % ±1 %				±0.3 % ±0.6 %				
	Accuracy of manual setting via preset function <sup>1)</sup>										
ZS			of the setting value				of the corresponding range				
	Current	DC, 50 Hz 400 Hz	±0.9 % ±1.4 %				±0.3 % ±0.6 %				
	Resistist.	DC, 50 Hz 400 Hz	±1.9 % ±3.4 %				±0.5 % of current range ±1 % of current range				
	Total Harmonic distortion <sup>2)</sup>										
ZSLC Water-cooled	50 Hz		1 % at rated current								
	400 Hz		5 % at rated current								
	Accuracy of display										
			of the measured value (real value)				of the corresponding range				
ZSLV Low Voltage	Voltage	DC, 50 Hz 400 Hz	±0.3 % ±0.6 %				±0.1 % ±1 digit ±0.2 % ±1 digit				
	Current	DC, 50 Hz 400 Hz	±0.5 % ±1 %				±0.3 % ±1 digit ±0.6 % ±1 digit				
	Accuracy analog control										
	0 ... 3.5 V / 0 ... 7 V for current										
PMLI Multi-channel			of the setting value				of the corresponding range				
	Current	DC, 50 Hz 400 Hz	±0.5 % ±1 %				±0.3 % ±0.6 %				
	Input resistance of analog inputs >10kΩ										
	Accuracy of analog measurement outputs 0 ... 7 V for current, voltage, 0 ... 5 V for power										
ZSAC AC			of analog signal of real value				offset voltage				
	Voltage	DC, 50 Hz 400 Hz	±0.5 % ±1 %				±15 mV ±30 mV				
	Current	DC, 50 Hz 400 Hz	±0.5 % ±1 %				±15 mV ±30 mV				
	Power	DC, 50 Hz 400 Hz	±2 % ±4 %				±30 mV ±60 mV				
NL Source-Sink	GND electrically isolated from load input, max. ±500 V with respect to negative load input										
	Input										
	Frequency range		DC, 40 Hz ... 700 Hz								
	Input resistance		DC: >50 kΩ when load input is off								
Accesso- ries	Input capacity		approx. 1.5 µF / 1,400 W								
	Parallel operation		up to 3 devices in Master-Slave mode (hardware-controlled)								
	Minimum voltage ZSAC ZSACRV		See type overview See type overview								
	Permissible operating voltage		Negative load input - case 125 V DC								
Application Notes	Protective devices		Over-current and over-power protection Over-voltage protection up to 120% of rated voltage <sup>1)</sup> Over-temperature cut-off Transient protection								
	Rated power		up to T <sub>A</sub> = 21 °C								
	Derating		-1.2 % / °C for T <sub>A</sub> > 21 °C								
GTC	<div><div>1) The accuracy applies for the specified frequencies. At higher frequencies the accuracy decreases.</div><div>2) The Total Harmonic Distortion increases at lower currents.</div></div>										

- 1) The accuracy applies for the specified frequencies.  
At higher frequencies the accuracy decreases.
- 2) The Total Harmonic Distortion increases at lower currents.

Accuracy of setting Programming via data interface <sup>1)</sup>		
	of the setting value	of the corresponding range
<b>Current</b> DC 400 Hz	±0.5 % ±1 %	±0.3 % ±0.6 %
<b>Resistance</b> DC 400 Hz	±1.5 % ±3 %	±0.5 % of current range ±1 % of current range
<b>Resolution setting</b>	16 Bit	
Accuracy of reading, read out via data interface		
	of the measured value (real value)	of the corresponding range
<b>Voltage</b> DC 400 Hz	±0.5 % ±1 %	±0.05 % ±0.1 %
<b>Current</b> DC 400 Hz	±0.5 % ±1 %	±0.05 % ±0.1 %
<b>Resolution of measurement</b>	18 Bit	
<b>Sampling rate</b>	330 ms, not triggerable	
<b>External control functions</b>	Load on - off Trigger input and output Remote shut down	
Dynamics		
<b>2 currents and 2 times can be set independently</b>		
<b>Time ranges</b>	100 ms	1000 ms
<b>Accuracy of time setting</b>	of the setting value ±1.4 %	of the corresponding range ±0.5 %
Operating conditions		
<b>Operating temperature</b>	5 °C ... 40 °C	
<b>Cooling</b>	Variable controlled fans	
<b>Noise</b>	See type overview	
<b>Supply voltage</b>	115/230 V~ ±10 %, 50 ... 60 Hz	
<b>Dimensions, Weight</b>	See type overview and table page 43	
<b>Color:</b> Front panel Side panels, top	RAL7032 (pebble grey) RAL7037 (stone grey)	
<b>Electrical safety</b>	DIN EN 61010-1	
<b>EMC, CE marking</b>	DIN EN 61326-1 DIN EN 61000-3-2 DIN EN 61000-3-3	
<b>Warranty</b>	2 years	

Subject to technical modifications



## Accessories

### High Current Cables

#### High Current Cables (Standard)

Highly flexible cables in different lengths, cross-sections and voltage strengths with cable lug.

Color coding via cable lug.

Two leads are always required for device connection.

Several cables can be connected in parallel for higher currents.



Standard HKS cable in different cross sections

#### High current cables (low induction)

For dynamic load with high rise times and for long load lines.

These double cables enable the voltage of the test unit to be supplied to the load input with

very low inductive losses.

Only in this way it is possible to realize fast current rise times.

The maximum voltage is 300V.



Low induction high current HKI cables

<sup>1)</sup> The specified values for L and R relate to two parallel cables leading to the test unit.

Type	Cross-section (mm <sup>2</sup> )	Current (A)	Voltage (V)	L <sup>1)</sup> (μH/m)	R <sup>1)</sup> (mΩ/m)	Connection mm
HKS16-l-rt/sw	16	120	100	0.64	3.02	Ø 10
HKS25-l-rt/sw	25	160	100	0.64	2.15	Ø 12
HKS35-l-rt/sw	35	200	100	0.62	1.54	Ø 12
HKS50-l-rt/sw	50	250	100	0.61	1.00	Ø 12
HKS70-l-rt/sw	70	300	100	0.52	0.68	Ø 12
HKS95-l-rt/sw	95	365	100	0.55	0.50	Ø 12
HKS120-l-rt/sw	120	450	100	0.44	0.37	Ø 12
HKM70-l-rt/sw	70	260	450	0.52	0.68	Ø 12
HKM240-l-rt/sw	240	750	450	0.50	0.22	Ø 16
HKV16-l-rt/sw	16	100	1,500	0.64	3.02	Ø 10
HKV70-l-rt/sw	70	250	1,500	0.52	0.68	Ø 12

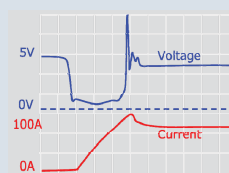
Dielectric strength: HKS cable: 100V  
HKM cable: 450V  
HKV cable: 1,500V

Order examples: HKS16-2-rt: 16 mm<sup>2</sup>, l=2 meters, red  
HKS50-1-sw: 50 mm<sup>2</sup>, l=1 meter, black

Type	Cross-section (mm <sup>2</sup> )	Current (A)	Voltage (V)	L (μH/m)	R (mΩ/m)	Connection mm
HKI12-l	2x12	80	300	0.065	3.79	Ø 10
HKI30-l	2x30	130	300	0.065	1.82	Ø 12
HKI70-l	3x70	250	300	0.081	0.68	Ø 12

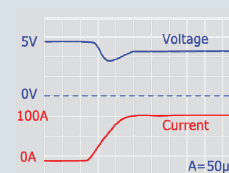
Order example: HKI30-3: 30 mm<sup>2</sup>, l=3 meters

**Comparison:**  
**Standard cable - low inductance cable**  
Voltage source 5 V, load variation 0 to 100 A



Voltage and current diagram with 2 m standard cable HKS35, slack. Voltage drops as current on cable increases.

The cable determines the maximum rise speed of the current.



Voltage and current diagram with 2 m low-inductance cable HKI30. The voltage remains stable while the current increases at the load input.

The actual control behaviour of the test unit can be analyzed.

H&amp;H

PL

ZS

ZSLC

Water-cooled

ZSLV

Low Voltage

PMLI

Multi-channel

ZSAC

AC

NL

Source-Sink

Accessories

Application Notes

Software

GTC

	H&H
	PL
	ZS
	ZSLC Water-cooled
	ZSLV Low Voltage
	PMLI Multi-channel
	ZSAC AC
	NL Source-Sink
	Accesso- ries
	Application Notes
	Software
GTC	

Accessories

HKV16/CON High Current Cable (for ZSAC Series )

The HKV16/CON high-current cables are manufactured with an SB6 jack at one end which fits the electronic ZSAC loads with SB6 connections.

The other end is unassembled.

1 set HKV16 cable (red and black), 2 m long, included as standard with all loads with SB6 connection.



HKV16/CON high current cable for ZSAC series with SB6 socket

Order examples:  
HKV16/CON-2-rt: 16mm<sup>2</sup>, l=2 meters, red  
HKV16/CON-6-sw: 16mm<sup>2</sup>, l=6 meters, black

Type	Cross section (mm <sup>2</sup> )	Current (A)	Voltage (V)	Inductance <sup>1)</sup> (μH/m)	Resistance <sup>1)</sup> (mΩ/m)	Connection
HKV16/CON-l-(rt/sw)	16	100	600	0.64	3.02	SB6

Other Cables

Master-Slave Cable

Order no.: K-MS-ZS  
For Master-Slave operation of two devices. Length: 2m

RS-232 Cable

Order no.: K-RS-SNM9-9  
Null modem cable (RTS-CTS-handshake)  
Length: 2m

Manuals

Extra Manual:

German + English:  
Order no.: HB-XXXX <sup>2)</sup>

Coolant Distribution for ZSLC Loads

We supply the coolant distributors to match the configuration of your loads.



1) The specified values for resistance and inductivity relate to two parallel cables leading to the test unit

2) XXXX = model name

## Accessories

### 19" Racks

#### 19" Racks for the Installation of Electronic Loads

The installation of electronic loads requires special racks which are designed for adequate air outlet of the heated exhaust air.

H&H racks are fitted at the back

with large scale air vents to allow exhaust air to escape practically unhindered.

The rear door is shorter to accommodate the connection cable.

The installation depth is 680 mm.

Model	Installation height front (HU)	Air outlet rear (HU)	Height (mm)
Rack 34	34	27	1,710
Rack 38	38	32	1,910
Rack 43	43	36	2,110
Rack 47	47	41	2,310

The connection cable is guided through flexible foam rubber lips.

A socket strip near the floor is provided for mains connection of devices.



19" rack for electronic loads

### Mains Switches for Rack Installation

Model	Voltage	Current	Switches	RCCB	Connection	Miscellaneous	Height
SE-1PH	1~230 V	16 A	Central emergency-off switch	-	Terminal	-	2 HU
SE-3PH-16	3~230/400 V	16 A	Central emergency-off switch	-	Terminal	-	2 HU
SE-3PH-32	3~230/400 V	32 A	Central emergency-off switch	-	Terminal	-	2 HU
SE-3PH-DC	3~230/400 V	32 A	Central emergency-off switch	30 mA	2x16 A CEE 3x safety sockets	DC power supply 12 V/8 A	3 HU
SE-3PH-FI	3~230/400 V	16 A	Central emergency-off switch	30 mA	1x16 A CEE 3x safety sockets	-	3 HU



SE-3PH-FI



SE-3PH-16



SE-3PH-DC

H&amp;H

PL

ZS

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Water-cooled

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## Hoecherl & Hackl GmbH

Industriestr. 13

94357 Konzell

Germany

Tel.: +49 9963/94301- 0

Fax.: +49 9963/94301-84

E-Mail: [office@hoecherl-hackl.com](mailto:office@hoecherl-hackl.com)

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Caltest Instruments Ltd  
4 Riverside Business Centre  
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Guildford  
Surrey GU1 4UG  
United Kingdom

Tel: +44 (0) 1483 302 700

Fax: +44 (0) 1483 300 562

**[sales@caltest.co.uk](mailto:sales@caltest.co.uk)**

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