User Manual

ACS - Power Source

HBS Electronic GmbH

HBS Electronic

HBS Electronic GmbH
Mannheimer Strasse 89-91
68782 Bruehl
Tel. +49 (0) 6202 / 97 87 46-0
Fax +49 (0) 6202 / 97 87 46-6
email info@hbs-electronic.de
www.hbs-electronic.de

AM-1007-06.62-E

INTRODUCTION

Thank you for your decision for a product of HBS electronic GmbH.

The ACS Power Source is a programmable AC Source of high efficiency.

The µP controlled sine wave oscillator generates accurate and stable voltages and frequencies. The design of the power booster guarantees a safe feeding of the load.

This manual includes a description of the programmable ACS Power Source with the specifications and operating instructions.

HBS-Electronic GmbH

FEATURES:

- High Speed Mikroprozessor
- Vacuum-Fluorescence Display
- Manual operation on frontpanel
- Remote control (Option) via RS232, USB, LAN or GPIB
- AC and DC Mode
- Constant current and constant voltage mode
- V, I, IP, P, VA, PF, CF Measurement
- Programable Limits für U, I, P
- 20 storable unit states
- 20 storable Sequenz-Tables (Option)
- 3-Phase-Mode (Option)
- Protection against: over power, over voltage, over current and over temperature
- Temperature controlled fan

SAFETY INSTRUCTIONS

Only qualified personnel are allowed to debug and to operate this equipment or to work close to this. Only when this product is transported and installed in a proper way and operated and maintained accordig to the recommendations, can it implement the functions properly and reliably.
The qualified personnel are specified as those personnel who carry out commissioning, grounding and apply volume identification to the circuits, equipments and systems according to the available safety practices and standards.

Before switching on the equipment make sure, that the selected voltage is the same as environment power voltage!

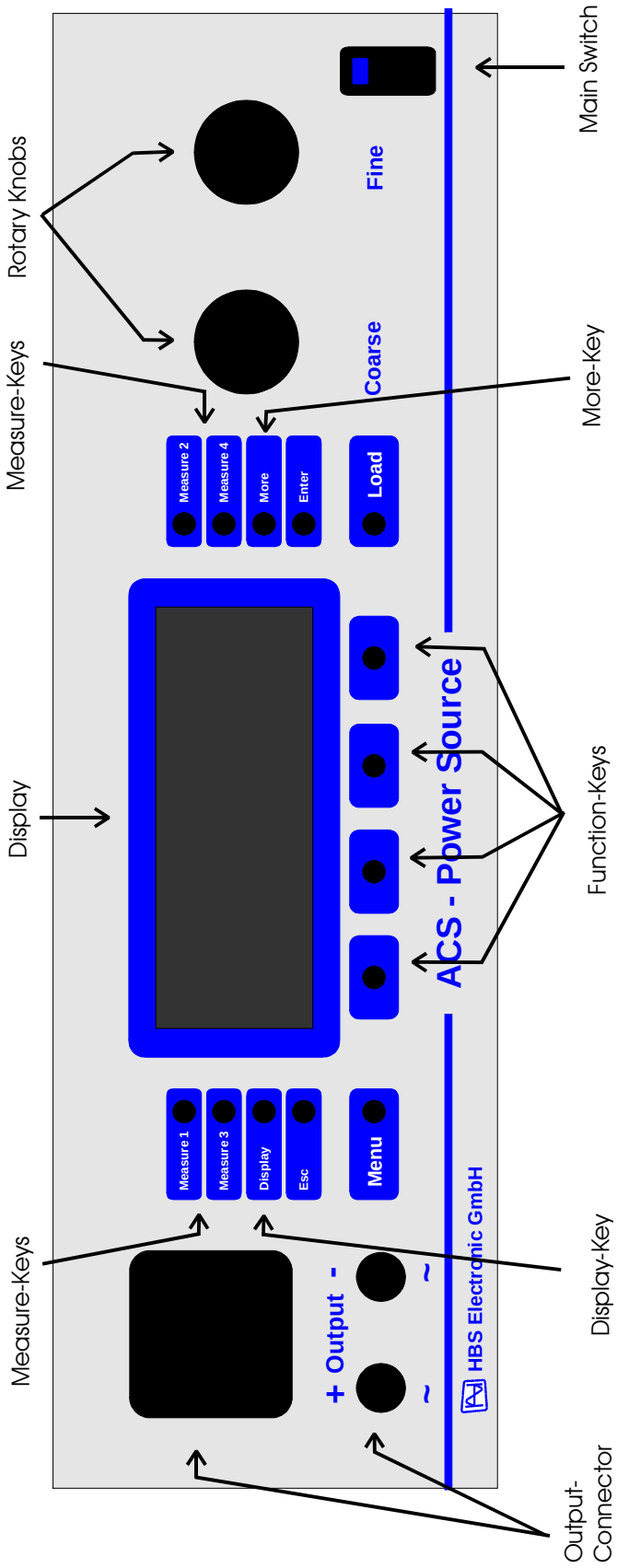
Only connect the power cable with a 3 pole grounded plug to main power!

To avoid damaging the equipment please be sure to change a suitable type of fuse!

Do not remove any covers or parts while equipment is working! There is a high risk of injuries touching life components!

WARNING!

**The ACS Power Source can supply up to 1000 V at the ouput!
There is a high risk of life when touching the output connectors or the connected probe during operation!**


Main Switch
Rotary Knobs
Fine
Coarse
Measure-Keys
More-Key
Measure 2
Measure 4
More
Enter
Load
Display
ACS - Power Source
Function-Keys
Measure 1
Measure 3
Display
Esc
Menu
Measure-Keys
Display-Key
+ Output -
~
~
HBS Electronic GmbH
Output-
Connector

EQUIPMENT DESCRIPTION

FRONTPANEL

The drawing (pg 8) is showing the fronpanel with its elements.
These elements are: display, keys, rotary knobs, output connectors and main switch.

Display

To display the input- and measured values there is a 4*20 chrs Vacuum Fluorescence Display used which is divided in:
menu line, status line and measure value table

Load-Key

Connects / disconnects output power to the load

Function-Keys

4 keys to select action

Menu-Key

Main menu change

Esc-Key

Return to main from submenu

Enter-Key

Input confirmation

Display-Key

Insertion of the satus line, when faded out

More-Key

Call auxiliary menus

Measure-Keys

Indicate value selection

Rotary Knobs

Changing of input values by turning

Output-Connectors

Connection of power output to the load

Main Switch

Switch ON / OFF the AC source

REARPANEL

Output Connector

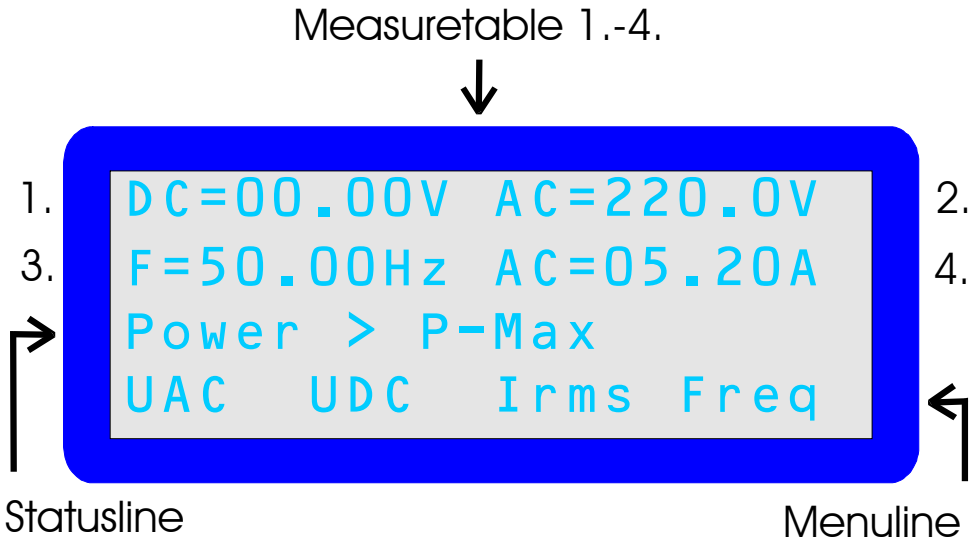
Connection of power output to the load
Pins 1 and 6 (Power-Output).
Pins 2 und 5 (Sense) Voltage Measurment.
Pins 3 und 4 (S-Connector) must be shorten for Output-Relais ON.

Connector Pinout shown on end of Document.

GENERAL

DISPLAY ORGANIZATION

The display surface is partitioned into the ranges menu line, status line and measured value table



Measured value line

Indication of measured and input values.

On Option „3 Phase“ the Table shows only Mesurments of the same kind.
for example:
Measure 1. - Measurment AC-Voltage Phase 1
Measure 2. - Measurment AC-Voltage Phase 2
Measure 3. - Measurment AC-Voltage Phase 3

Statusline

Indication of input values, error indication and instructions.
By indication of „I!“ at the right edge the source announces CC - mode

Menuline

Indicates menu choice.

INPUT MODE

The ACS Power Source supports two input variants.

Continual

Contnuous input with direct effect to the output of the source.

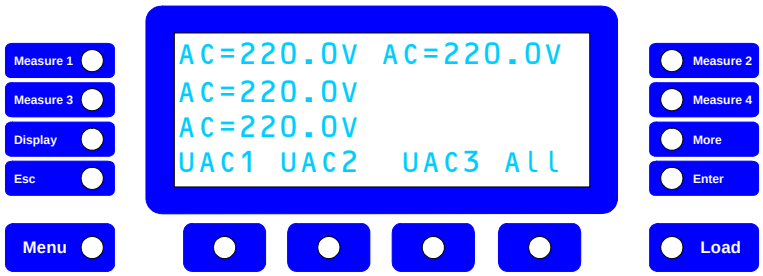
Single

Single input with confirmation by „ENTER KEY“ before effect to the output

3-PHASE OPERATION

MENU

The contents of UAC Menu are diplayed below on the screen:



Press the function key below **>All<**. The input value is shown in the status line. Now you can adjust the required voltage for **all phases** by turning the rotary knobs.

With the function key below the Word >**UAC1**< you can adjust the required voltage for Phase 1 .

Key-actions:
Functionkey **>UAC1<** Voltage **Phase 1**
Functionkey **>UAC2<** Voltage **Phase 2**
Functionkey **>UAC3<** Voltage **Phase 3**

The Sub-Menu's who where selectet by the **>More<** key effect only to the selectet phase.
For the description of this functions look in the corresponding chapters.

Use the same procedure to Input DC-voltage, current, frequency and Phase.

See also Menu-Structure.

MEASURE SELECT

The ACS - Power Source shows 3 measurements in the Display .
On Option „3 Phases" this table shows any time measurements of the same kind.
for example:
Measure 1. - measured value AC-voltage Phase 1
Measure 2. - measured value AC-voltage Phase 2
Measure 3. - measured value AC-voltage Phase 3

This Measurements are selectet with the **>Measure<** keys.

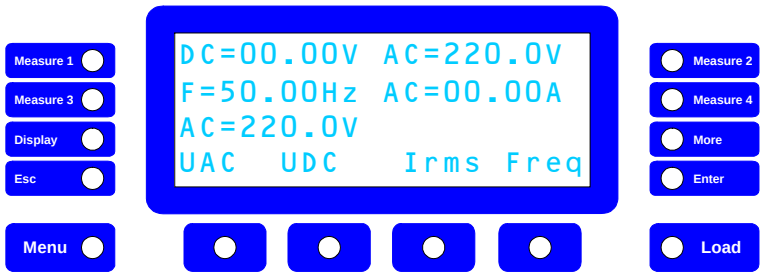
MEASURE-CHANGE

Press **>Measure *1*<**, **>Measure 2<, >Measure 3< *or* >Measure *4*<** beside the Display. Each pressing of the key effects the change of the displayed measurement.
One measurement after each other for F, V, C, VA, P, PF, CrF, CP is displayed.

FIRST STEPS

VOLTAGE SETTING

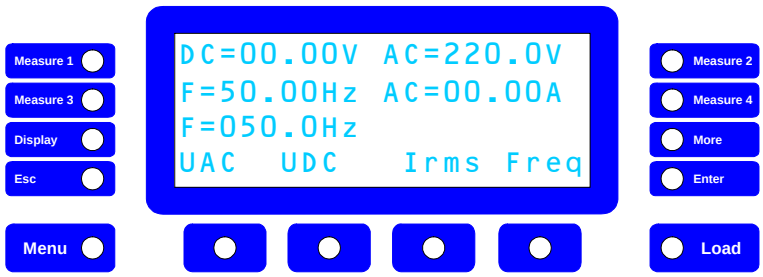
After turn on the contents below are diplayed on the screen:



Press the function key below **>UAC<**. The input value is shown in the status line.
Adjust required voltage by turning the rotary knobs. If the value is not visible (after 5 sec.) it can be faded in by pressing the **>DISPLAY<** key or turning the rotary knob.
After this you can change voltage freely again.

FREQUENCY SETTING

After turn on the contents below are diplayed on the screen:



Press the function key below **>Freq<**. The input value is shown in the status line.
Adjust required frequency by turning the rotary knobs. If the value is not visible (after 5 sec.) it can be faded in by pressing the **>DISPLAY<** key or turning the rotary knob.
After this you can change frequency freely again.

ENABLE LOAD / OUTPUT

By pressing the **>Load<** key the output power will be connected to the load.
The **>Load<** key shines green.
Press **>Load<** key again to disable.

MANUAL OPERATION

MEASURE SELECT
The ACS Power Source display 4 measures on the screen. These can be selected by pressing the **>Measure<** keys.

MEASURE CHANGE
Press the >Measure 2< key on the top right beside the Display. Each pressing of the key effects the change of displayed measured value right on the top of the display.
One value after each other for F, V, C, VA, P, PF, CrF, CP is displayed.

INPUT MODE
The ACS Power Source supports two input variants.

Continual
Contnuous input with direct effect to the output of the source.

Single
Single input with confirmation by „ENTER KEY“ before effect to the output.

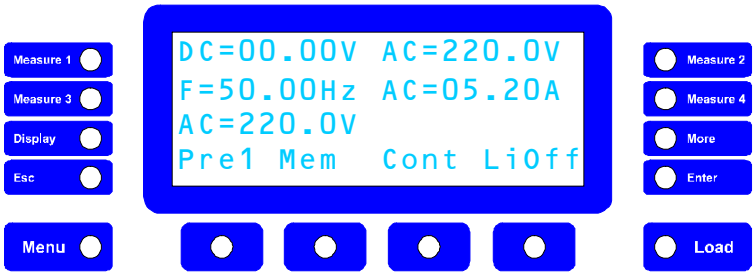
CHANGE OF MODE
Return to main menu by pressing **>Menu<** key as to do under “preset call”.

Press the key **>More<** , then the **>function<** key below displayed >UAC<. The content of the screen changes (see preset call). The input value is displayed in the satus line.

Press **>function<** key below the word **>cont<**. The mode changes from continual to the single mode, the string **>sing<** is displayed now and vice versa.

LIMITS
To protect the probes from e.g. high voltage, the input value can be limited, i.e. the voltage can only be adjusted to a defined value.

ENABLE LIMIT
Change to main menue by pressing >Menue< key.

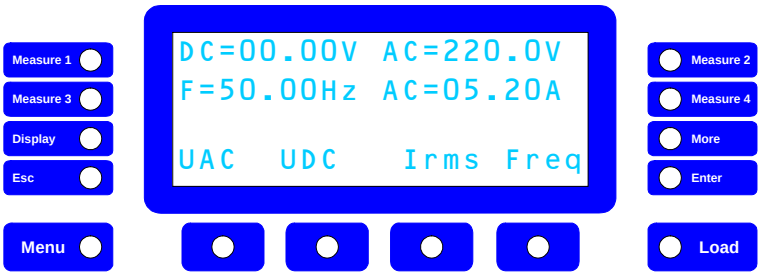


Press the key **>More<** , then the **>function<** key below displayed **>UAC<**. The content of the screen changes as descibed above, the input value is displayed in the satus line.
Adjust now required voltage by turning the rotary knobs.

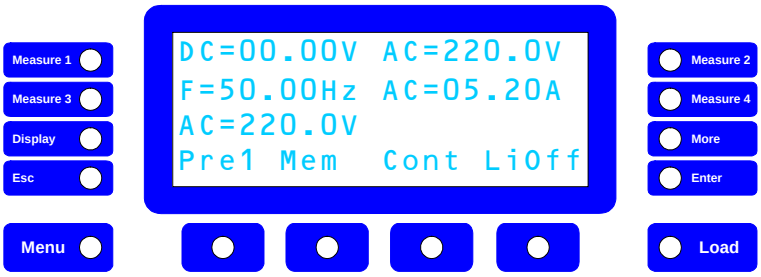
Press **>function<** key below **>LiOff<**. The current AC voltage value will be accepted as input limit, display changes to **>LiOn<**. Vice versa.

PRESETS
The ACS Power Source can save often used input characteres as “preset”.

PRESET CALL
Change to this main menue by pressing **>Menu<** key.



Press the key **>More<** , then the **>function<** key below displayed **>UAC<**.
The content of the screen changes as descibed as following, the input value is displayed in the status line.



Press the >function< key below **>Pre1<**. The value of „preset 1“ is recalled the screen chractere changes to **>Pre2<**. Pressing the key again, „preset 2“ is recalled etc.

CHANGE PRESET
Change to main menu by pressing **>Menu<** as described under “preset call”.

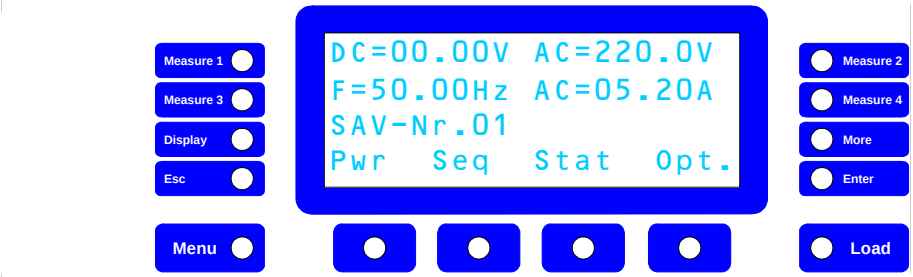
Press the key **>More<** , then the >function< key below displayed **>UAC<**.
The content of the screen changes (see preset call). The input value is displayed in the satus line.

Press **>function<** key below **>Pre1<** until required „preset No.” is displayed. Adjust now required voltage by turning the rotary knobs.
Then press the **>function<** key below **>Mem<** , the new value for this preset is saved.
If you are saving now an „unit state“, the saved presets are available even after switch OFF the unit and can be recalled at switch ON the ACS Power Source again.

UNIT STATES

The ACS-Power Source can save 20 complete unit states(state 1 to 20) for later use. The state **No. 0** contains the manufacturer parameters and cannot be changed. A list of stored parameters is attached as appendix.

To load and save states change to this menu by pressing the **>Menu<** key.



Reach the state menue by pressing the **>function<** key below **>Stat<**

SAVE STATE

To save a set of settings in state No. (n) press the >function< key below **>Save<**. The input value is displayed in the status line.
Select now the required state number by turning the rotary knobs.
Press >Enter< to save the state.

LOAD STATE

WARNING!
Recalling of a saved „unit state“ may effect high voltages at the output!

To load the settings from state number (n) press **>function<** key below **>Rcl<**. The input value is displayed in the satus line.
Select now the required state number by turning the rotary knobs.
By pressing the **>Enter<** key, the state is loading.

STATE POWER ON

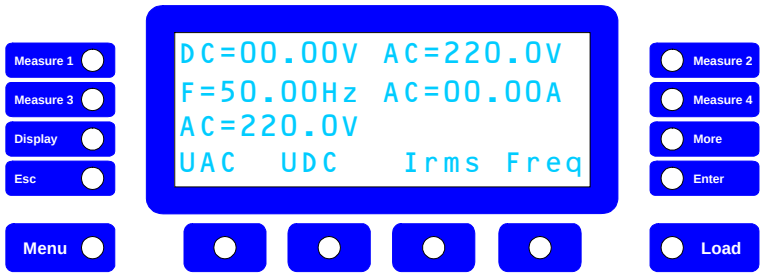
You can operate the states 0 to 20 as switch on setting of the ACS Power Source.

To load a setting from state number (n) at the next switch on press the >function< key below **>P-On<**. The input value is displayed in the satus line.
Select now the required state number by turning the rotary knobs. By pressing the **>Enter<** key the number of the „Power On State“ is saved.

CURRENT REGULATION

CONSTANT CURRENT

Change to this main menue by pressing **>Menu<** key.



Press the >function< key below **>Irms<** The input value is displayed in the status line.
Select now the required voltage by turning the rotary knobs. The source indicates an active current regulation by displaying „I!“ at the right edge of the status line.

PEAK CURRENT

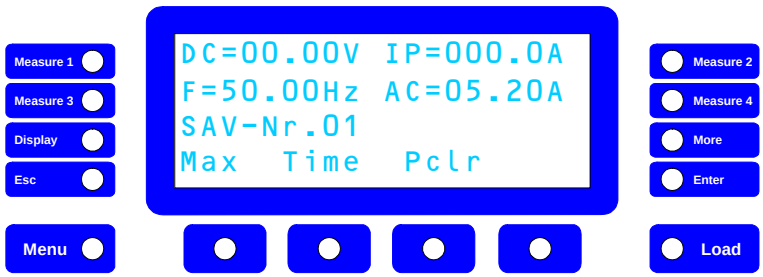
With the ACS Powe Source you can take a measurement of the peak current, the periodic and the inrush current as well.

INRUSH CURRENT

Select the required parameters for voltage, current frequency etc.

Set one measurement indication to peak current **>IP<**.
See measure select.

Go by pressing **>More<** and **>Irms<** keys to the extended current menu.
Reach the second level of the extended current menu by pressing the **>Menu<** key.



To clear the peak current memory by pressing the **>function<** key below **>PClr<**.

Enable the load with **>Load<** key. The inrush current IP=X.XXXA is now displayed.

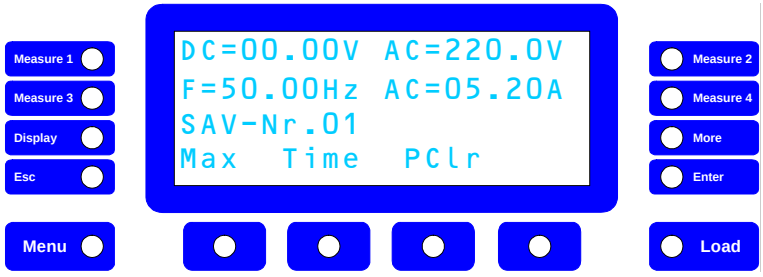
PERIODIC PEAK CURRENT

Do the same preparation as described under „Inrush current“.
Clear the peak current memory by pressing **>function<** key below **>PClr<** at enabled load.
The peak current IP=X.XXXA is displayed now

CURRENT CUT OFF

The ACS Power Source can disable the load automatically exceeding the preset current limit, the exceeding time can be programmed.
Until the cutoff time is reached higher Current-Values can appear, cause this function is no current regulation.

Go by pressing **>More<** and **>Irms<** keys to the extended current menu. Reach the second level of the extended current menu by pressing the **>Menu<** key.

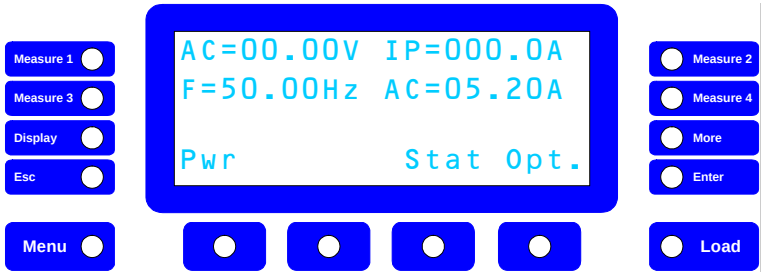


Press the **>function<** key below **>Max<** to define the current limit. Select the required parameter for the current and confirm with **>Enter<** key.
Press the **>function<** key below **>Time<** to define the time. Select the required parameter for the time and confirm with **>Enter<** key.

POWER DISABELING

The ACS Power Source can disable the load automatically exceeding the preset power limit.

Change to this main menue by pressing **>Menu<** key.



Press the **>function<** key below **>Pwr<** to define the power limit. Select the required parameter for the power and confirm with **>Enter<** key.

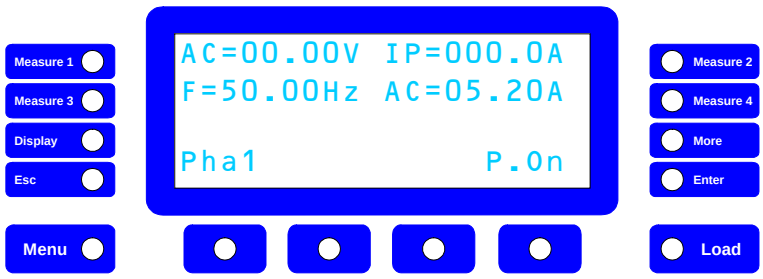
PHASE

The ACS Power Source can switch on required voltage at a defined phase angle.

SWITCH ON PHASE

Select the required parameter for voltage, current frequency etc.

Go to the main menu phase by pressing the **>Menü<** key.



Press the >function< key below **>P.On<** The letters change to **>P.Off<**.

Press the **>function<** key below **>Pha1<**
Select the required parameter for the phase angle.

Enable load by ressing **>Load<** key. The load is enabeled, the AC voltage is at 000.0V.
Press the **>function<** key below **>P.Off<** The letters change to **>P.On<** and the AC voltage is connected with selected phase angle.

EXTERNAL OSCILLATOR

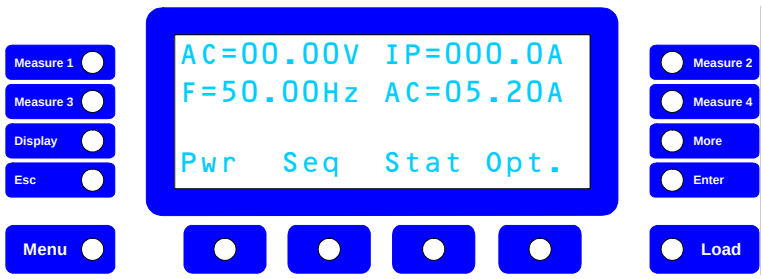
The ACS Power Source can be fed with an external signal. The Power Source works as a real power amplifier in this mode.

Take care on the maximum permissible frequency on this Input!

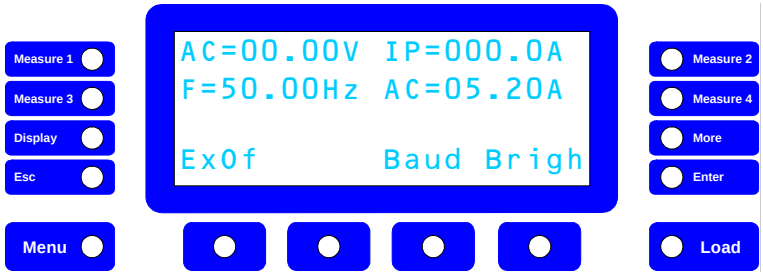
Standard maximum 500 Hz
Option F1 maximum 1 KHz
Option F2 maximum 2 KHz

ENABLE EXTERNAL OSZILLATOR

Go to the main menu phase by pressing the **>Menü<** key.



Press the **>function<** key below **>Opt.<** to enter the option menu.



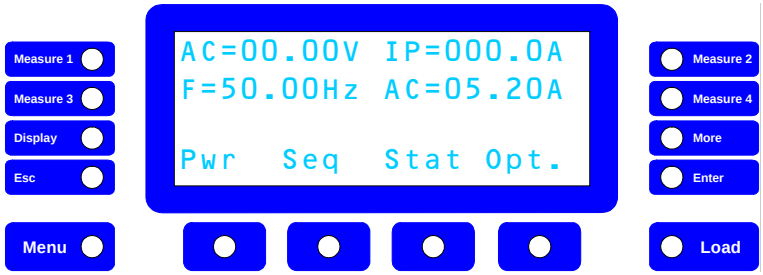
Press the >function< key below **>Ex.Of<** The letters change to **>Ex.On<** and the signal is fed by the external input.
Pressing the key again activates the internal signal of the ACS Power Source.

BAUDRATE

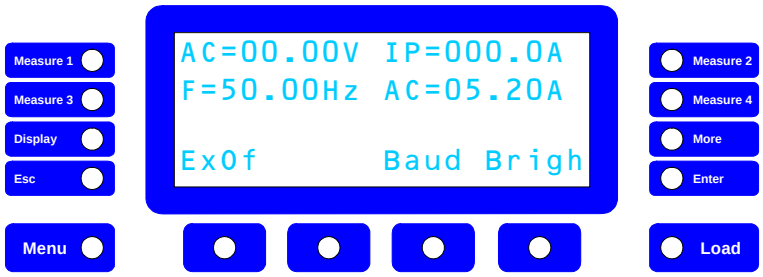
With the ACS Power Power Source you have the choice to select the transfer rate of the RS 232 interface between 9600 and19200 Baud.

BAUDRATE SELECT

Change to this main menue by pressing **>Menu<** key.



Press the **>function<** key below **>Opt.<** to enter the option menu.



Press the **>function<** key below **>Baud<**.

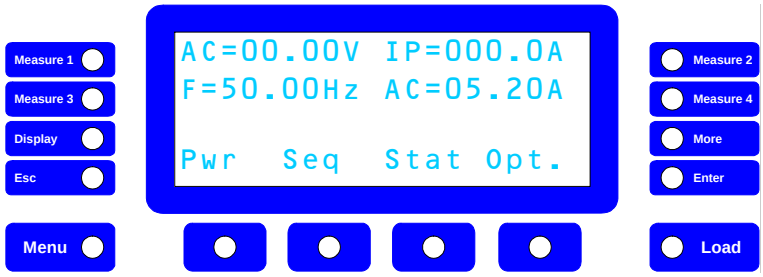
Select the required Baudrate for the RS232 Interface by turning the rotary knobs.
This setting takes effect after the next restart.

DISPLAY-BRIGHTNESS

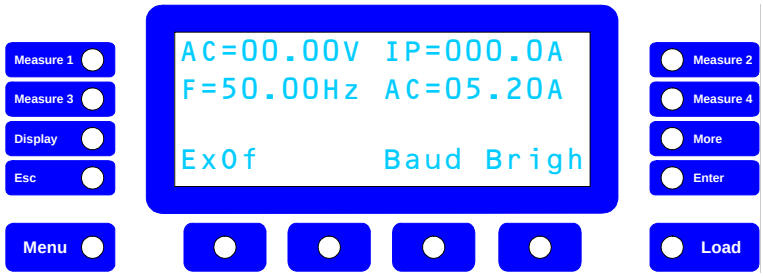
The brightness of the vacuum fluorescence display of the ACS Power Source can be adjusted in 4 levels.

BRIGHTNESS CHANGE

Change to this main menue by pressing **>Menu<** key.



Press the **>function<** key below **>Opt.<** to enter the option menu.



Press the **>function<** key below **>Brigh<**.

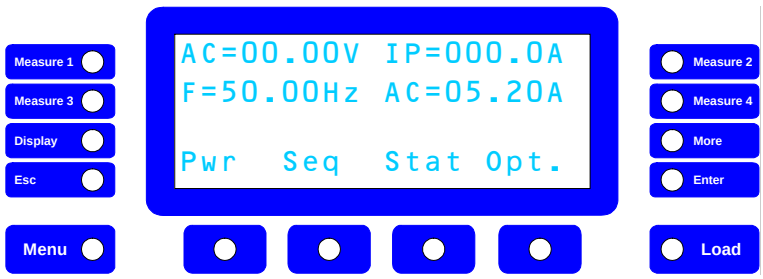
Select the required brightness level by turning the rotary knobs.

SEQUENCES

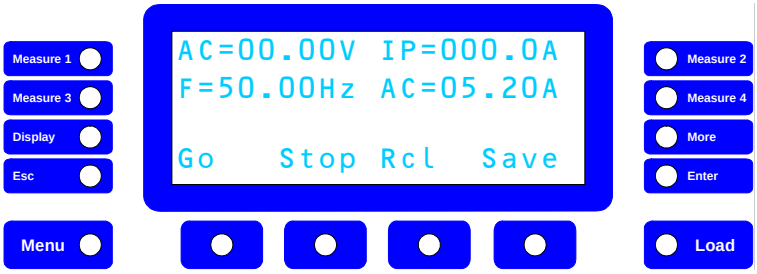
The ACS Power Source provides operation of automatic command sets (sequences).
The operator can save 20 sequences of 50 commands for later recall. This possibility allows e.g. simultions of voltage surges and drops.
The minimum time for a command is 10 msec at a step length of also 10 msec.
The complete data transfer of sequences can be made by the help of the software tool "ACS CONTROL" or by simple remote commands.

SEQUENCE - LOAD - SAVE - RUN

Change to this main menue by pressing **>Menu<** key.



Press the **>function<** key below **>Seq.<** to enter the sequence menu.



SEQUENCE LOADING

To load a sequence Number (n) from memory(NV-RAM) in the execution-memory(RAM) press the function key below the word **>Rcl<**. The input value is displayed in the status line.
Select now the required memory number by turning the rotary knobs.

By pressing the **>Enter<** key the sequence is loaded into the execution-memory(RAM).

SEQUENCE SAVING

To save a previous with the PC-programm(ACS-Control) or remote-commands transfered sequence Number (n) from execution-memory(RAM) in the memory(NV-RAM) press the function key below the word **>Save<**. The input value is displayed in the status line.
Select now the required memory number by turning the rotary knobs.
By pressing the **>Enter<** key the sequence is saved in the memory(NV-RAM).

SEQUENCE RUNNING

To run a previous in execution-memory(RAM) loaded sequence press the function key below the word **>Go<.** The input value is displayed in the status line.
Select now the required number of sequence-repetitions by turning the rotary knobs.
Run the sequence by pressing **>Enter<** key.
The sequence running can be interrupted or stopped by pushing the function key below **>Stop<**.

REMOTE CONTROL

GENERAL

The ACS Power Source can be controlled via an interface RS 232 or via IEEE 488 as an option. All settings and measuerements can be done with these interfaces, the resolution is 12 Bit.

RS232 INTERFACE

The data transfer rate of the RS 232 interface is 19200 or 9600 Baud, 8 Databits, no parity, 1 Stopbit

The connection to the control PC is made by a „Null – Modem“ assignment, the signals RXD, TXD, RTS und CTS were used.

Tu enable the RS 232 interface all the DIP switches of the optional interfaces have be locked in RS 232 mode.

IEEE488 INTERFACE

The IEEE 488 interface was realized with the GPIB Controller CB 7210.2 (Computer Boards). It provides an IEEE 488.2 conformal interface.

SETTINGS:

The settings of the interface operation parameters were made by the 8-way DIP switch on the rear of the Power Source. The DIP switch is only read out at Power-On. Due to this a restart of the ACS Power Source is necessary having changed the settings of the DIP switch.

Switch Nr.
1. IEEE488 Adresse Value 1
2. IEEE488 Adresse Value 2
3. IEEE488 Adresse Value 4
4. IEEE488 Adresse Value 8
5. IEEE488 Adresse Value 16
6. RS232 / IEEE488
7. not used
8. 19200 Baud / 9600 Baud

Switch 6. =OFF RS232 operation
=ON IEEE488 operation

At IEEE 488 operation the BAUDRATE must be set on DIP switch and the frontpanel at 19200 Baud!

Switch 8. =OFF 19200 Baud *IEEE488
=ON 9600 Baud

Switch 1 to switch 5 specifie the IEEE unit addressThe address area is between 1 and 30, the setting of the address is mede binary by the assigned value.
To get address 5 lock switch 1 and switch 3 at ON.

Switch 1. = 1
\+ Switch 3. = 4
= 5

Refer the attached address table (appendix)

PROGRAMMING

Commands and feedbacks are transmitted as ASCI codes. Before a new command can be sent, the feedback must be read out completely.

COMMAND SYNTAX

A command consists of keyword, delimiter, value and end character. Commands can also consist of several keywords, these have to be separated by colon <:>.
The keyword represents the name of the command for identifying.
As delimiter between command and value a comma <,> is agreed.
The end character terminates the command. RS232 mode allows <CR> or <LF> as end character; IEEE488 mode recognizes <LF> or the BUS message <EOI> as end character.
If unit is sending signals to the BUS (Talker) these will be terminated with <LF> and <EOI> simultanuously.

COMMAND INPUT

Keyword input in capitals, lower cases or in mixed way is allowed.

-e.g. command.: sour:voltac,220
SOUR:VOLTAC,220
Sour:VoltAc,220

At the input of values numbers can be sent as “integer” or “real” separated by <.> as a comma.

-e.g. INTEGER: SOUR:VOLTAC,1
SOUR:VOLTAC,10

-e.g. REAL : SOUR:VOLTAC,220.0
SOUR:VOLTAC,200.
SOUR:VOLTAC,0.4
SOUR:VOLTAC,.3
SOUR:VOLTAC,230.100

REMOTE-STATE

The ACS-Power Source supports 3 modes of remote control

Local
Unit can be operated manually or remote controlled

Remote
Unit can be remote controlled. Operation by hand is possible after pressing >Menu< key, which is workig as <Local> key in this case.

Remote with Lockout
Unit can only be remote controlled in this mode. An operation by hand is only possible after having sent the command „Local“ or after restart the ACS-Power Source.

PROGRAMMING EXAMPLES

*idn?	Unit returns the ID-string.
	This first command shifts the unit to Remote State at IEEE 488 mode. At RS232 mode the command <SYST:REM> shifts the unit to Remote-State.
*rcl,0	reads out default data from register 0.
SOUR:VOLTAC,230	adjusts the AC voltage to 230V AC.
OUTP,1	enables the output relay.
gtl	IEEE488 command: back to Local-State. At RS232 mode the command <SYST:LOC> shifts the unit to Local-State.

Setting an AC voltage 115VAC / 60Hz at a max. current of 0.5A.

SOUR:VOLTAC,115	voltage 115V-AC
SOUR:CURR,0.5	current 0.5A
SOUR:FREQ,60	frequency 60Hz
OUTP,1	output relay ON

Setting a DC voltage 24VDC at a max. current of 1A.

SOUR:VOLTDC,24	voltage 24V-DC
SOUR:CURR,1	current 1A
OUTP,1	output relay ON

Setting an AC voltage 230VAC / 50Hz, the voltage should be connected at a phase angle of 90 degs.

SOUR:VOLTAC,230	voltage 230V-AC
SOUR:FREQ,50	frequency 50Hz
OUTP:PHASON,0	phase(voltage) OFF
SOUR:PHAS,90	phase angle 90 degree
OUTP,1	output relay ON
OUTP:PHASON,1	phase(voltage) turns on at 90 degree

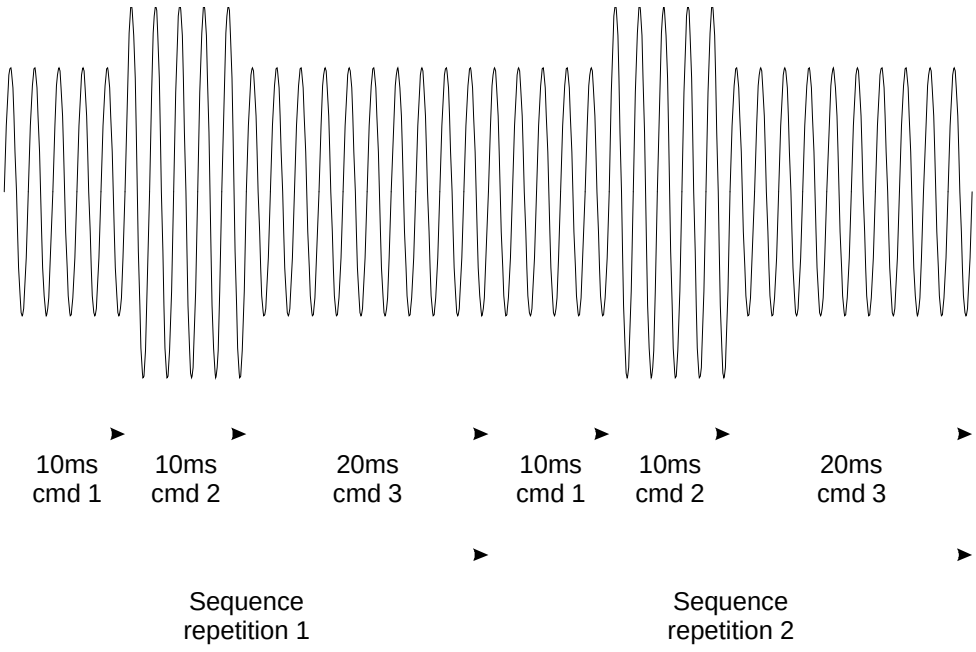
3-Phase mode:
Setting an AC voltage 115V AC/60Hz and 160V AC/60Hz at phase 1.

SOUR:FREQ,60	frequency 60Hz
SOUR:VOLTAC,115	voltage 115V-AC (all phases)
SOUR1:VOLTAC,160	voltage 160V-AC (phase 1)
OUTP,1	output relay ON

SEQUENCE PROGRAMMING EXAMPLE

Generate a sequence with 10ms/100VAC, 10ms/130VAC, 20ms/100VAC by repetition of 2 times.
The sequence-commands are entered as decimal values.

SEQ:TIME,00.00.00.010	command-duration 10 ms
SEQ:VAL1,100	command-value 1 (voltage 100V on UAC-command)
SEQ:VAL2,0	command-value 2 (unused on UAC-command)
SEQ:VAL3,500	command-value 3 (frequency 500 HZ-UAC-command)
SEQ:NEW,4	sequence-command UAC, transfer to sequence-table SEQ:NEW only on new-table
SEQ:TIME,00.00.00.010	command-duration 10 ms
SEQ:VAL1,130	command-value 1 (voltage 130V on UAC-command)
SEQ:VAL2,0	command-value 2 (unused on UAC-command)
SEQ:VAL3,500	command-value 3 (frequency 500 HZ-UAC-command)
SEQ:SET,4	sequence-command UAC, tranfer to sequence-table SEQ:SET for more table-entrys
SEQ:TIME,00.00.00.020	command-duration 20 ms
SEQ:VAL1,100	command-value 1 (voltage 100V on UAC-command)
SEQ:VAL2,0	command-value 2 (unused on UAC-command)
SEQ:VAL3,500	command-value 3 (frequency 500 HZ-UAC-command)
SEQ:SET,4	sequence-command UAC, transer to sequence-table SEQ:SET for more table-entrys
SEQ:TIME,00.00.00.010	command-duration 10 ms
SEQ:VAL1,100	command-value 1 (voltage 100V on UAC-command)
SEQ:VAL2,0	command-value 2 (unused on UAC-command)
SEQ:VAL3,500	command-value 3 (frequency 500 HZ-UAC-command)
SEQ:SET,255	sequence-command END, transfer to sequence-table SEQ:SET for more table-entrys
SEQ:CNT,2	command - number of repetition for the sequence
SEQ:STORE,1	store the sequence in memory No.1
SEQ:GO,2	Starts the sequence with 2 repetitions.



COMMON - COMMANDS

*ACS?	returns the actual ACS-Status-Byte.
*ACSB?	returns the ACS-Status-Byte.
*CLS	delete the Status-Byte and Event-Status-Register
*ESE	sets the Event-Status-Enable-Register.
*ESE?	returns the Event-Status-Enable-Register.
*ESR?	returns the Event-Status-Register.
*IDN?	returns the ID-String.
*OPC	sets the OperationComplete Bit in the ESR-Register.
*OPC?	write an ASCII "1" in the Out-Buffer.
*OPT?	returns the ID of the installed options.
*RCL	recalls for unit state X.
*RST	recalls for unit default settings.
*SAV	saves unit state X.
*SRE	sets the Service-Request-Enable-Register.
*SRE?	returns the Service-Request-Enable-Register.
*STB?	returns the Status-Byte-Register.

*ACS?

Returns the actual ACS-Status-Register.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

*ACSB?

Returns the ACS-Status-Register.
This Register stores the data until readout and delete after that.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

*CLS

Delete the Status-Byte and Event-Status-Register
Enable Registers are not delete.

*ESE,X

Sets Bits in Event-Status-Enable-Register. This Register is an Enable-Mask for the Event-Status-Register.
X= 0 - 255
Bitdefinition - see in Chapter Status-Register.

*ESE?

Returns the Event-Status-Enable-Register.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

*ESR?

Returns the Event-Status-Register.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

*IDN?

returns the Unit ID-String.
Response:
Manufacturer: HBS Electronic,
Unit-Typ: ACS-0250-PS,
Serien No. 0,
Revision: V1.21

*OPC

sets the Operation-Complete Bit in the ESR-Register.
Bitdefinition - see in Chapter Status-Register.

*OPC?

write an ASCII "1" in the Out-Buffer.
Response: 1

*OPT?

Returns the ID of the installed options.
Response: HV,F1
if options HV and F1 are installed.

possible options:
NONE no Option
HV: expanded voltage-range 1
XHV: expanded voltage-range 2
F1: expanded frequency-range 1
F2: expanded frequency-range 2
SEQ: sequenz Option
CR2: current-measurement-range 2
OT1: output-option 1
3P: 3 phase option

*RST

recalling for Unit default settings.
See appendix STATE 0 - Default Settings.

*RCL,X

WARNING! Recalling of a saved „unit state" may effect high voltages at the output!

Recall unit state X.
X= 0 - 20

*SAV,X

Save unit state X.
X= 1 - 20

*SRE,X

Sets Bits in the Event-Status-Enable-Register. This Register is an Enable-Mask for the Event-Status-Register.
X= 0 - 255
Bitdefinition - see in Chapter Status-Register.

*SRE?

Returns the Event-Status-Enable-Register.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

*STB?

Returns the Event-Status-Register.
Response: 0 - 255
Bitdefinition - see in Chapter Status-Register.

MEASURE - COMMANDS

MEAS[n] n = 1, 2 or 3 for Phases 1, 2 oder 3
Standard (e.g. MEAS:VOLT? for 1-Phase-source)
n = 0 is not available

:CURR?	Returns at the output measured current rms.
:CURRP?	Returns at the output measured peak current.
:CFACT?	Returns at the output measured crest factor.
:PFACT?	Returns at the output measured power factor.
:VA?	Returns at the output measured power(VA).
:VOLT?	Returns at the output measured voltage rms.
:POW?	Returns at the output measured power(W).

:CURR?
Returns at the output measured current rms.
Respose: C (A).

:CURRP?
Returns at the output measured peak current.
Response: C (A).

:CFACT?
Returns at the output measured crest factor.
Response: Factor N.

:PFACT?
Returns at the output measured power factor.
Response: Factor N.

:POW?
Returns at the output measured power.
Response: P (W).

:VOLT?
Returns at the output measured voltage rms.
Response: V (V).

:VA?
Returns at the output measured power.
Response: P (VA).

OUTPUT - COMMANDS

OUTP

:AUX	sets the external oscillator to ON or OFF.
:AUX?	returns the state of the external oscillator
:OT1	1* sets Output-Option 1
:OT1?	1* returns the State of the Output-Option 1
:PHASON	sets the phase (voltage).
:PHASON?	returns the state of the phase (voltage).
:PON	sets the Power-On-State.
:PON?	returns the preset value of the Power-ON-State.
:STAT	sets the output relay to open or closed.
:STAT?	returns the state of the output relay.

1* Option

:AUX,X

sets the external Oscillator.
X=1 extern Oscillator ON
X=0 extern Oscillator OFF

Take care on the maximum permissible frequency on this Input!

Standard maximum 500 Hz
Option F1 maximum 1 KHz
Option F2 maximum 2 KHz

:OT1,X

activate Output-Option 1.
X=1 Output-Option 1 ON
X=0 Output-Option 1 OFF

:PHASON,X

sets the Phase(voltage).
X=1 Phase(voltage) ON.
X=0 Phase(voltage) OFF.

:STAT,X

sets the Output-Relay.
X=1 Relay ON
X=0 Relay OFF
example: OUTP,1 OUTP:STAT,1

:AUX?

returns the state of the external oscillator.
Response: 0 | 1
1 extern Oscillator ON
0 extern Oscillator OFF

:OT1?
returns the State of the Output-Option 1.
Response: 0 | 1
1 Output-Option 1 ON
0 Output-Option 1 OFF

:PHASON?
returns the State the Phase(voltage).
Response: 0 | 1
X=1 Phase(voltage) ON.
X=0 Phase(voltage) OFF.

:PON,X
sets the Power-On-State (memory No.).
X=0 - 20

:PON?
Return the preset value of the Power-ON-State.
Response: Power-On-State No.

:STAT?
returns the State of the output-relay.
Response: 0 | 1
1 - Output-Relay enabled.
0 - Output-Relay disabled.

SEQUENCE - COMMANDS

SEQ

:CNT	sets the number of repetition for the sequence
:GO	starts the execution of a sequence
:LOAD	loads a sequence from NV-RAM into RAM
:NEW	transfers the sequence data in the sequence-table
:SET	transfers the Sequenz data in the sequence-table
:STOP	stops the execution of a sequence
:STORE	store a sequence from RAM into NV-RAM
:TIME	sets the time of the sequence-command
:VAL1	sets the value 1 for the sequence-command
:VAL2	sets the value 2 for the sequence-command
:VAL3	sets the value 3 for the sequence-command

:CNT,X

sets the number of repetition for the sequence.
X = number of repetition 0 - 60000
X = 0 forever

:GO,X

Starts the sequence with X repetition.
X = number of repetition 0 - 60000
X = 0 forever
without paramater = stored number of repetition

:LOAD,X

load a sequence from NV-RAM into RAM
X = sequence-number 1 - 20

:NEW,X

transfer the sequence data in the sequence-table.
use only for 1. table entry from a sequence !
the data of VAL1, VAL2, VAL3, TIME and CNT are transferd to the sequence-table.
X = sequence-command 1 - 255
command UAC =dec. 4
command-table see „sequence commands“

:SET,X

transfer the sequence data in the sequence-table.
the data of VAL1, VAL2, VAL3, TIME and CNT are transferd to the sequence-table.
X = sequence-command 1 - 255
command UAC =dec. 4
command-table see „sequence commands“

:STOP

stops the execution of a sequence

:STORE,X
store a sequence from RAM into NV-RAM
X = sequence-Number 1 - 20

:TIME,X
sets the time(command-duration) of the sequence-command
X in HH.MM.SS.MSMSMS minimal 10 ms in steps of 10 ms
SEQ:TIME,00.00.00.010 command-duration 10 ms

:VAL1,X
sets the value 1 for the sequence-command.
X in the unit of the sequence-command-data.
z.B. command UAC(dec. 4)
SEQ:VAL1,100 AC-Voltage 100 Volts

:VAL2,X
sets the value 2 for the sequence-command.
X in the unit of the sequence-command-data.
z.B. command UAC(dec. 4)
SEQ:VAL2,100 unused by UAC-command

:VAL3,X
sets the value 3 for the sequence-command.
X in the unit of the sequence-command-data.
z.B. command UAC(dec. 4)
SEQ:VAL3,50 Frequency 50 Hertz

SOURCE - COMMANDS

SOUR[n] n = 1, 2 or 3 for Phase 1, 2 or 3
Standard (e.g. SOUR:VOLTAC,100) for 1-Phase-Source and to set all 3 Phases at one time.
n = 0 is not available

:CURR	1* sets the current for constant current mode (CC).
:CURRCLR	clears the Peak-current memory(IP-Measure)
:CURRMAX	sets the current limit setpoint.
:CURRTIME	sets the time delay for current cut off.
:CURRRNG	*2 activate the current-measure-range 2
:FREQ	1* sets the frequency of the AC voltage
:PHAS	1* sets the phase of the voltage
:POWMAX	sets the value for power cut off.
:VOLTAC	1* sets the value of the AC voltage
:VOLTDC	1* sets the value of the DC voltage
:CURR?	1* returns the preset value for constant current mode (CC).
:CURRMAX?	returns the preset value for current cut off.
:CURRTIME?	returns the preset value for the time delay for current cut off.
:CURRRNG?	*2 returns the State of the current-measure-range 2
:FREQ?	1* returns the preset value of the frequency of the AC voltage.
:PHAS?	1* returns the preset value of the power on phase of the AC voltage.
:POWMAX?	returns the preset value for power cut off.
:VOLTAC?	1* returns the preset value for AC voltage
:VOLTDC?	1* returns the preset value for DC voltage

*1 3-Phase-command (e.g. SOUR1:VOLTAC,100)
*2 Option

:CURR,X
sets the current for current constant mode (CC).
X in Ampere.

:CURRCLR
clears the Peak-Current memory(IP-Measure)

:CURRMAX,X
sets the point for current cut off.
X in Ampere.

:CURRTIME,X
sets the time delay for current cut off.
X in Seconds.

:CURRRNG,X
activate the current-measure-range 2.
X=1 current-Measure-range 2 ON
X=0 current-Measure-range 2 OFF

:FREQ,X
sets the frequency of the AC voltage
X in Hertz.

:PHAS,X
sets the phase of the voltage
X in Grad.

:POWMAX,X
sets the point for power cut off.
X in VA.

:VOLTAC,X
sets the value of the AC voltage
X in Volt.

:VOLTDC,X
sets the value of the DC voltage
X in Volt.

:CURR?
returns the preset value for constant current mode (CC).
Response: I in Ampere.

:CURRMAX?
returns the preset value for current cut off.
Response: I in Ampere.

:CURRTIME?
returns the preset value for the time delay for current cut off.
Response: T in seconds.

:CURRRNG?
returns the State of the current-measure-range 2.
Response: 0 | 1
1 current-measure-range 2 ON
0 current-measure-range 2 OFF

:FREQ?
returns the preset value of the frequency of the AC voltage
Response: F in Hertz.

:PHAS?
returns the preset value of the power on phase of the AC voltage
Response: Phase angle in degree.

:POWMAX?

returns the preset value for power cut off.
Response: P in VA.

:VOLTAC?

returns the preset value for AC voltage
Response: U in Volt.

:VOLTDC?

returns the preset value for DC voltage
Response: U in Volt.

SYSTEM - COMMANDS

SYST

:LOC	shifts unit to Local-State
:REM	shifts unit to Remote-State
:RWL	shifts unit to Local-Lockout-State

:LOC

shifts unit to Local-State
(only in RS232 Mode).

:REM

shifts unit to Remote-State
(only in RS232 Mode).

:RWL

shifts unit to Local-Lockout-State
(only in RS232 Mode).

COMMAND-TABLE

*ACS?	returns the actual ACS-Status-Byte.
*ACSB?	returns the ACS-Status-Byte.
*CLS	delete the Status-Byte and Event-Status-Register
*ESE	sets the Event-Status-Enable-Register.
*ESE?	returns the Event-Status-Enable-Register.
*ESR?	returns the Event-Status-Register.
*IDN?	returns the ID-String.
*OPC	sets the OperationComplete Bit in the ESR-Register.
*OPC?	write an ASCII "1" in the Out-Buffer.
*OPT?	returns the ID of the installed options.
*RCL	recalls for unit state X.
*RST	recalls for unit default settings.
*SAV	saves unit state X.
*SRE	sets the Service-Request-Enable-Register.
*SRE?	returns the Service-Request-Enable-Register.
*STB?	returns the Status-Byte-Register.

MEAS[n]	
:CURR?	Returns at the output measured current rms.
:CURRP?	Returns at the output measured peak current.
:CFACT?	Returns at the output measured crest factor.
:PFACT?	Returns at the output measured power factor.
:VA?	Returns at the output measured power(VA).
:VOLT?	Returns at the output measured voltage rms.
:POW?	Returns at the output measured power(W).
OUTP	
:AUX	sets the external oscillator to ON or OFF.
:AUX?	returns the state of the external oscillator
:OT1	1* sets Output-Option 1
:OT1?	1* returns the State of the Output-Option 1
:PHASON	sets the phase (voltage).
:PHASON?	returns the state of the phase (voltage).
:PON	sets the Power-On-State.
:PON?	returns the preset value of the Power-ON-State.
:STAT	sets the output relay to open or closed.
:STAT?	returns the state of the output relay.
1* Option	
SEQ	
:CNT	sets the number of repetition for the sequence
:GO	starts the execution of a sequence
:LOAD	loads a sequence from NV-RAM into RAM
:NEW	transfers the sequence data in the sequence-table
:SET	transfers the Sequenz data in the sequence-table
:STOP	stops the execution of a sequence
:STORE	store a sequence from RAM into NV-RAM
:TIME	sets the time of the sequence-command
:VAL1	sets the value 1 for the sequence-command

:VAL2	sets the value 2 for the sequence-command
:VAL3	sets the value 3 for the sequence-command

SOUR[n]

:CURR	1* sets the current for constant current mode (CC).
:CURRCLR	clears the Peak-current memory(IP-Measure)
:CURRMAX	sets the current limit setpoint.
:CURRTIME	sets the time delay for current cut off.
:CURRRNG	*2 activate the current-measure-range 2
:FREQ	1* sets the frequency of the AC voltage
:PHAS	1* sets the phase of the voltage
:POWMAX	sets the value for power cut off.
:VOLTAC	1* sets the value of the AC voltage
:VOLTDC	1* sets the value of the DC voltage
:CURR?	1* returns the preset value for constant current mode (CC).
:CURRMAX?	returns the preset value for current cut off.
:CURRTIME?	returns the preset value for the time delay for current cut off.
:CURRRNG?	*2 returns the State of the current-measure-range 2
:FREQ?	1* returns the preset value of the frequency of the AC vol tage.
:PHAS?	1* returns the preset value of the power on phase of the AC voltage.
:POWMAX?	returns the preset value for power cut off.
:VOLTAC?	1* returns the preset value for AC voltage
:VOLTDC?	1* returns the preset value for DC voltage

*1 3-Phase-command (e.g. SOUR1:VOLTAC,100)
*2 Option

SYST

:LOC	shifts unit to Local-State
:REM	shifts unit to Remote-State
:RWL	shifts unit to Local-Lockout-State

SEQUENCE-COMMANDS

Command	decimal Value	Action
UAC	4	sets the value of the AC-voltage for all phases
UAC1	10	sets the value of the AC-voltage-Phase 1
UAC2	11	sets the value of the AC-voltage-Phase 2
UAC3	12	sets the value of the AC-voltage-Phase 3
UDC	3	sets the value of the DC-voltage for all phases
UDC1	6	sets the value of the DC-voltage-Phase 1
UDC2	17	sets the value of the DC-voltage-Phase 2
UDC3	18	sets the value of the DC-voltage-Phase 3
PHAS1	30	Phase angle Phase 1
PHAS2	31	Phase angle Phase 2
PHAS3	32	Phase angle Phase 3
FREQ	1	sets the value of the frequency for all phases
FREQ1	22	sets the value of the frequency Phase 1
FREQ2	23	sets the value of the frequency Phase 2
FREQ3	24	sets the value of the frequency Phase 3
RUAC	5	Ramp AC-voltage
RUAC1	13	Ramp AC-voltage-Phase 1
RUAC2	14	Ramp AC-voltage-Phase 2
RUAC3	15	Ramp AC-voltage-Phase 3
RUDC	6	Ramp DC-voltage
RUDC1	19	Ramp DC-voltage-Phase 1
RUDC2	20	Ramp DC-voltage-Phase 2
RUDC3	21	Ramp DC-voltage-Phase 3
RPHAS1	33	Ramp Phase angle Phase 1
RPHAS2	34	Ramp Phase angle Phase 2
RPHAS3	35	Ramp Phase angle Phase 3

UAC
UAC1
UAC2
UAC3
- VAL1 AC-voltage in Volt
- VAL2 unused
- VAL3 frequency in Hertz

UDC
UDC1
UDC2
UDC3
- VAL1 DC-voltage in Volt
- VAL2 unused
- VAL3 unused

PHAS1
PHAS2
PHAS3
- VAL1 phase angle in degree
- VAL2 unused
- VAL3 unused

FREQ
FREQ1
FREQ2
FREQ3
- VAL1 unused
- VAL2 unused
- VAL3 frequency in Hertz

RUAC
RUAC1
RUAC2
RUAC3

linear voltage-ramp in steps of 10 ms
- VAL1 Start-value of the Ramp (AC-voltage in Volt)
- VAL2 Stop-value of the Ramp (AC-voltage in Volt)
- VAL3 Frequency in Hertz

RUDC
RUDC1
RUDC2
RUDC3

linear voltage-ramp in steps of 10 ms
- VAL1 Start-value of the Ramp (DC-voltage in Volt)
- VAL2 Stop-value of the Ramp (DC-voltage in Volt)
- VAL3 unused

RPHAS1
RPHAS2
RPHAS3

linear Phase-angle-ramp in steps of 10 ms
- VAL1 Start-value of the Ramp (phase in degree)
- VAL2 Stop-value of the Ramp (phase in degree)
- VAL3 unused

STATUS REGISTER

Status-Byte

The Status-Byte Register can be read with the *STB? command.

Bit	Dec	Hex		
0	1	01		Not used
1	2	02		Not used
2	4	04	EAV	Error available
3	8	08	QSB	Not used
4	16	10	MAV	Message available
5	32	20	ESB	Event Status Bit
6	64	40	RQS	Service Request
7	128	80	OSB	Not used

Bit 2, EAV
This Bit is set when an error occurs.

Bit 4, MAV
A message is available in the GPIB Output-Buffer. This Bit is cleared after the GPIB Output-Buffer is read.

Bit 5, ESB
This is a summary Bit for the ESR. It is set when any of the ESR-Bits are set, and cleared when the ESR is read.

Bit 6, RQS
This Bit represents a Service Request who is enabled with the *SRE command.

Event-Status-Register

The Event-Status Register can be read with the *ESR? command.

Bit	Dec	Hex		
0	1	01	OPC	Operation Complete
1	2	02		Not used
2	4	04	QYE	Query Error
3	8	08	DDE	
4	16	10	EXE	
5	32	20	CME	Command Error
6	64	40	URQ	User Request
7	128	80	PON	Power On

Bit 0, OPC
This Bit is set after the last command is completed. (*OPC).

Bit 2, QYE
A Query Error occurs. (Query aborted, no message available).

Bit 6, URQ
This Bit is set when the Local-Key is pushed.

Bit 7, PON
This Bit is set once at power-up. The ESR-Summary-Bit is not set.

ACS-Status-Byte

The ACS-Status Byte Register can be read with the *ACS? command.

Bit	Dec	Hex		
0	1	01	OL1	Overload Bit Phase 1
1	2	02	OL2	Overload Bit Phase 2
2	4	04	OL3	Overload Bit Phase 3
3	8	08	CC1	Constant-Current Bit Phase 1
4	16	10	CC2	Constant-Current Bit Phase 2
5	32	20	CC3	Constant-Current Bit Phase 3
6	64	40		Not used
7	128	80	SEQ	Sequenz is running

Bit 0, OL1
This Bit is set when maximum power, temperature or maximum current from Phase 1 is reached.

Bit 1, OL2
This Bit is set when maximum power, temperature or maximum current from Phase 2 is reached.

Bit 2, OL3
This Bit is set when maximum power, temperature or maximum current from Phase 3 is reached.

Bit 3, CC1
This Bit is set when the device is in Constant-Current-Mode on Phase 1.

Bit 4, CC2
This Bit is set when the device is in Constant-Current-Mode on Phase 2.

Bit 5, CC3
This Bit is set when the device is in Constant-Current-Mode on Phase 3.

Bit 7, SEQ
This Bit is set when a Sequence is running.

APPENDIX

IEEE488 ADRESS-TABLE

Device ADR.	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5		Listener ADR.
1	ON	OFF	OFF	OFF	OFF	!	A
2	OFF	ON	OFF	OFF	OFF	„	B
3	ON	ON	OFF	OFF	OFF	#	C
4	OFF	OFF	ON	OFF	OFF	$	D
5	ON	OFF	ON	OFF	OFF	%	E
6	OFF	ON	ON	OFF	OFF	&	F
7	ON	ON	ON	OFF	OFF	‘	G
8	OFF	OFF	OFF	ON	OFF	(	H
9	ON	OFF	OFF	ON	OFF	)	I
10	OFF	ON	OFF	ON	OFF	*	J
11	ON	ON	OFF	ON	OFF	+	K
12	OFF	OFF	ON	ON	OFF	,	L
13	ON	OFF	ON	ON	OFF	-	M
14	OFF	ON	ON	ON	OFF	.	N
15	ON	ON	ON	ON	OFF	/	O
16	OFF	OFF	OFF	OFF	ON	0	P
17	ON	OFF	OFF	OFF	ON	1	Q
18	OFF	ON	OFF	OFF	ON	2	R
19	ON	ON	OFF	OFF	ON	3	S
20	OFF	OFF	ON	OFF	ON	4	T
21	ON	OFF	ON	OFF	ON	5	U
22	OFF	ON	ON	OFF	ON	6	V
23	ON	ON	ON	OFF	ON	7	W
24	OFF	OFF	OFF	ON	ON	8	X
25	ON	OFF	OFF	ON	ON	9	Y
26	OFF	ON	OFF	ON	ON	:	Z
27	ON	ON	OFF	ON	ON	;	[
28	OFF	OFF	ON	ON	ON	<	
29	ON	OFF	ON	ON	ON	=	]
30	OFF	ON	ON	ON	ON	>	^

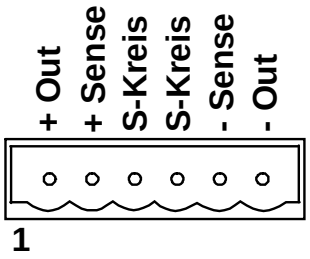
IEEE488 ASSIGNMENT

Pin	Name	Signal
1	DIO1	Data Input/Output
2	DIO2	Data Input/Output
3	DIO3	Data Input/Output
4	DIO4	Data Input/Output
5	EOI	End or Identfiy
6	DAV	Data Valid
7	NRFD	Not Ready for Data
8	NDAC	No Data Accepted
9	IFC	Interface Clear
10	SRQ	Service Request
11	ATN	Attention
12	GND	Shield Ground
13	DIO5	Data Input/Output
14	DIO6	Data Input/Output
15	DIO7	Data Input/Output
16	DIO8	Data Input/Output
17	REN	Remote Enable
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Logic Ground

RS232 ASSIGNMENT

Pin	Name	Signal
1	DCD	Data Channel Received
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Ready for Sending
9	RI	Ring Indicator

POWER-OUT ASSIGNMENT



Connector: PTR - STLZ950 /WH6
System-plug: PTR - AKZ950 /6

Pin	Name	Signal
1	+ Out	+ AC/DC output
2	+ Sense	+ Sense-input
3	S-Kreis	protection-circuit
4	S-Kreis	protection-circuit
5	- Out	- Sense-input
6	-Out	- AC/DC output

Pins 1 and 6 (Power-Output).
Pins 2 und 5 (Sense) Voltage Measurment.
Pins 3 und 4 (S-Kreis) must be shorten for Output-Relais ON.

MENU STRUCTURE

MAIN MENU-1

UAC UDC Irms Freq *1

UAC

Pr.1 Mem cont LiOff *2

UDC

Pr.1 Mem cont LiOff *2

Irms

Pr.1 Mem cont LiOff *2

Max Time PClr *3

Freq

Pr.1 Mem cont LiOff *2

MAIN MENU-2

Pha1 P.On *1

Pha1

Pr.1 Mem cont LiOff *2

MAIN MENU-3

Pwr Seq Stat Opt. *1

Pwr

Pr.1 Mem cont LiOff *2

Seq

Go Stop Rcl Save *2

Stat

Rcl Save P-On *2

Opt.

ExOf Baud Brigh *2

*1 Change of MAIN MENUS by pressing **>Menu<** key..

*2 Shift to SUB MENUE by pressing **>More<** key and the e.g. **>UAC<**.
Return to MAIN MENU by pressing **>Esc<** key.

*3 Shift to additional SUB MENUS by pressing **>Menu<** key.
Return to MAIN MENU by pressing **>Esc<** key.

MENU STRUCTURE - Option 3 Phases

MAIN MENU-1	UAC1	UAC2	UAC3	All	*1
UAC					
	Pr.1	Mem	cont	LiOff	*2
MAIN MENU-2	UDC1	UDC2	UDC3	All	*1
UDC					
	Pr.1	Mem	cont	LiOff	*2
MAIN MENU-3	IAC1	IAC2	IAC3	All	*1
IAC					
	Pr.1	Mem	cont	LiOff	*2
	Max	Time	PClr		*3
MAIN MENU-4	Frq1	Frq2	Frq3	All	*1
Freq					
	Pr.1	Mem	cont	LiOff	*2
MAIN MENU-5	Pha1	Pha2	Pha3	P.On	*1
Pha					
	Pr.1	Mem	cont	LiOff	*2
MAIN MENU-6	Pwr	Seq	Stat	Opt.	*1
Pwr					
	Pr.1	Mem	cont	LiOff	*2
Seq					
	Go	Stop	Rcl	Save	*2
Stat					
	Rcl	Save	P-On		*2
Opt.					
	ExOf		Baud	Brigh	*2

*1 Change of MAIN MENUS by pressing **>Menu<** key..

*2 Shift to SUB MENUE by pressing **>More<** key and the e.g. **>UAC<**.
Return to MAIN MENU by pressing **>Esc<** key.

*3 Shift to additional SUB MENUS by pressing **>Menu<** key.
Return to MAIN MENU by pressing **>Esc<** key.

STATE 0 - Default Settings

Voltage AC = 0 Volt.
- Preset 1 = 24,0 Volt.
- Preset 2 = 48,0 Volt.
- Peset 3 = 110,0 Volt.
- Preset 4 = 230,0 Volt.

Voltage DC = 0 Volt.
- Preset 1 = 10,0 Volt.
- Preset 2 = 20,0 Volt.
- Preset 3 = 30,0 Volt.
- Preset 4 = 40,0 Volt.

Current rms = I-Max.
- Preset 1 = 0,100 Ampere.
- Preset 2 = 0,200 Ampere.
- Preset 3 = 0,300 Ampere.
- Preset 4 = 0,400 Ampere.

Frequency = 50 Hertz.
- Preset 1 = 16,7 Hertz.
- Preset 2 = 50,0 Hertz.
- Preset 3 = 60,0 Hertz.
- Preset 4 = 400,0 Hertz.

Phase 1 = 0 Grad.
Phase 2 = 120 Grad.
Phase 3 = 240 Grad.
- Preset 1 = 60,0 Grad.
- Preset 2 = 90,0 Grad.
- Preset 3 = 120,0 Grad.
- Preset 4 = 270,0 Grad.

Voltage Limit AC = OFF.
Voltage Limit DC = OFF.
Current Limit = OFF.
Frequency Limit = OFF.
Phase Limit = OFF.

Power cut off = P-Max.
Current cut off = I-Max.

Power shut down delay = 20 seconds.
Current shut down delay = 2,00 seconds.

External Oscillator = OFF.
Phase(Voltage) = ON.

Load(Output relay) = OFF.

Measure 1 = Frequency.
Measure 2 = Voltage.
Measure 3 = Power(VA).
Measure 4 = Current.

Option „3 Phases“
Measure 1 = Voltage Phase 1.
Measure 2 = Voltage Phase 2.
Measure 3 = Voltage Phase 3.
Measure 4 = not used

Specifications

Typ	ACS-0400-PS	ACS-0800-PS	ACS-1600-PS
Power Output (VA)	400 / 500* * extended for 1 minute	800 / 1000* * extended for 1 minute	1600 / 2000* * extended for 1 minute
Voltage-Range Standard	0-300VAC 0-425VDC	0-300VAC 0-425VDC	0-300VAC 0-425VDC
Voltage-Range (Option HV)	0-500VAC 0-700VDC	0-500VAC 0-700VDC	0-500VAC 0-700VDC
Voltage-Range (Option XHV)	0-700VAC 0-1000VDC	0-700VAC 0-1000VDC	0-700VAC 0-1000VDC
Maximum Current r.m.s. (Option HV) (Option XHV)	3A 1,8A 1,5A	6A 3,6A 3A	12A 7,2A 6A
Maximum Current DC (Option HV) (Option XHV)	3A 1,8A 1,5A	6A 3,6A 3A	12A 7,2A 6A
Max. period. peak Current (Option HV) (Option XHV)	8A 4,8A 4A	20A 12A 10A	40A 24A 20A
Creast Factor	2,6	3,3	3,3
Line Regulation	0,1%	0,1%	0,1%
Load Regulation on Nominalpower	0,1%	0,1%	0,1%
Distortion on Nominalpower	0,2%	0,2%	0,2%
Programming Accuracy AC-Voltage	0,1% (10-400Hz)	0,1% (10-400Hz)	0,1% (10-400Hz)
Programming Accuracy DC-Voltage	0,1%	0,1%	0,1%
Programming Accuracy Constantcurrent r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
Programming Accuracy Frequency	0,1Hz	0,1Hz	0,1Hz
Programming Accuracy Switch On Phase	0,1 degree	0,1 degree	0,1 degree
Frequency Standard Frequency (Option F1) Frequency (Option F2)	500Hz 1 kHz 2 kHz	500Hz 1 kHz 2 kHz	500Hz 1 kHz 2 kHz
External Oscillator Input Frequency Standard Frequency (Option F1) Frequency (Option F2)	20Vss DC-500 Hz DC-1 kHz DC-2 kHz	20Vss DC-500 Hz DC-1 kHz DC-2 kHz	20Vss DC-500 Hz DC-1 kHz DC-2 kHz
Measurement Voltage r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
Measurement Current r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
Measurement Current peak	0,8%	0,8%	0,8%
Measurement Real Power	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
external Oscillator input (Option T) with optical isolation	Option	Option	Option
Interface with optical isolation IEEE488,USB,LAN	Option RS232 Standard	Option RS232 Standard	Option RS232 Standard
chassis 19“	19“ 3HE, weight 17Kg deepness 590mm	19“ 3HE, weight 19Kg deepness 590mm	19“ 6HE, weight 32Kg deepness 590mm

Specifications

Typ	ACS-2200-PS	ACS-3000-PS	ACS-4600-PS
Power Output (VA)	2200 / 2750* * extended for 1 minute	3000 / 3750* * extended for 1 minute	4600 / 5750* * extended for 1 minute
Voltage-Range Standard	0-300VAC 0-425VDC	0-300VAC 0-425VDC	0-300VAC 0-425VDC
Voltage-Range (Option HV)	0-500VAC 0-700VDC	0-500VAC 0-700VDC	0-500VAC 0-700VDC
Voltage-Range (Option XHV)	0-700VAC 0-1000VDC	0-700VAC 0-1000VDC	0-700VAC 0-1000VDC
Maximum Current r.m.s. (Option HV) (Option XHV)	16A 9,6A 8A	20A 12A 10A	30A 18A 15A
Maximum Current DC (Option HV) (Option XHV)	16A 9,6A 8A	20A 12A 10A	30A 18A 15A
Max. period. peak Current (Option HV) (Option XHV)	60A 36A 30A	80A 48A 40A	100A 60A 50A
Creast Factor	3,75	4	4
Line Regulation	0,1%	0,1%	0,1%
Load Regulation on Nominalpower	0,1%	0,1%	0,1%
Distortion on Nominalpower	0,2%	0,2%	0,2%
Programming Accuracy AC-Voltage	0,1% (10-400Hz)	0,1% (10-400Hz)	0,1% (10-400Hz)
Programming Accuracy DC-Voltage	0,1%	0,1%	0,1%
Programming Accuracy Constantcurrent r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
Programming Accuracy Frequency	0,1Hz	0,1Hz	0,1Hz
Programming Accuracy Switch On Phase	0,1 degree	0,1 degree	0,1 degree
Frequency Standard Frequency (Option F1) Frequency (Option F2)	500Hz 1 kHz 2 kHz	500Hz 1 kHz 2 kHz	500Hz 1 kHz 2 kHz
External Oscillator Input Frequency Standard Frequency (Option F1) Frequency (Option F2)	20Vss DC-500 Hz DC-1 kHz DC-2 kHz	20Vss DC-500 Hz DC-1 kHz DC-2 kHz	20Vss DC-500 Hz DC-1 kHz DC-2 kHz
Measurement Voltage r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	
Measurement Current r.m.s.	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
Measurement Current peak	0,8%	0,8%	0,8%
Measurement Real Power	0,2% (40-400Hz)	0,2% (40-400Hz)	0,2% (40-400Hz)
external Oscillator Input (Option T) with optical isolation	Option	Option	Option
Interface with optical isolation IEEE488, USB, LAN	Option RS232 Standard	Option RS232 Standard	Option RS232 Standard
chassis 19“	19“ 6HE, weight 34Kg deepness 590mm	19“ 6HE, weight 38Kg deepness 590mm	19“ 12HE, weight 64Kg Rack