ACS 500/LV 4-quadrant amplifier

4-QUADRANT CURRENT AMPLIFIER

Fig. 1: 4-quadrant amplifier ACS 500/LV

The relating applications:

Automated testing of circuit breakers, fuses and relays, coils and measuring transformers, capacitors and terminal blocks

Testing and calibration of power analyzers and powermeters

The adjustable and desired output current is automatically regulated and stabilized according to the user's preferences. The only limitation is the amplifier's performance characteristic.

- ✓ Low harmonic distortion - even under very non-linear load conditions
- ✓ Operates from DC up to 1kHz large signal bandwidth (-3dB)
- ✓ Integrated 4-channel signal synthesizer for arbitrary waveform generation and integrated waveform storage capability
- ✓ High output current accuracy and stability, high short-time current capability
- ✓ Extended synchronization possibilities (e.g. 3 x current + 3 x voltage sources)
- ✓ Modular system concept – basic amplifier unit can be combined with various transformer units for perfectly adapted current ranges
- ✓ Remote control interface (Ethernet, Digital I/O) and optical link for easy PHIL interface
- ✓ Voltage limitation adjustable
- ✓ Touch panel operation 7" (800x480)

CURRENT SOURCE FOR ALL APPLICATIONS

CURRENT AMPLIFIER SYSTEM CONSISTING OF ACS AMPLIFIER, MATCHING TRANSFORMER, SECONDARY SIDE MEASUREMENT COMMON OUTPUT PANEL

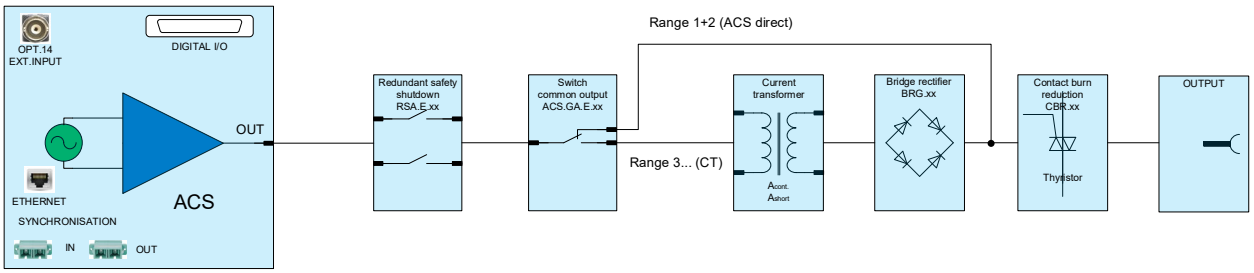

Fig. 2: Schematic overview of current amplifier system

ACS PEAK CURRENT CHARACTERISTIC

Short time peak current capability of the ACS series amplifier in dependency of the time duration of the pulse current

e.g.
for 10sec 2.5 times the nominal current
for 50ms 5 times the nominal current

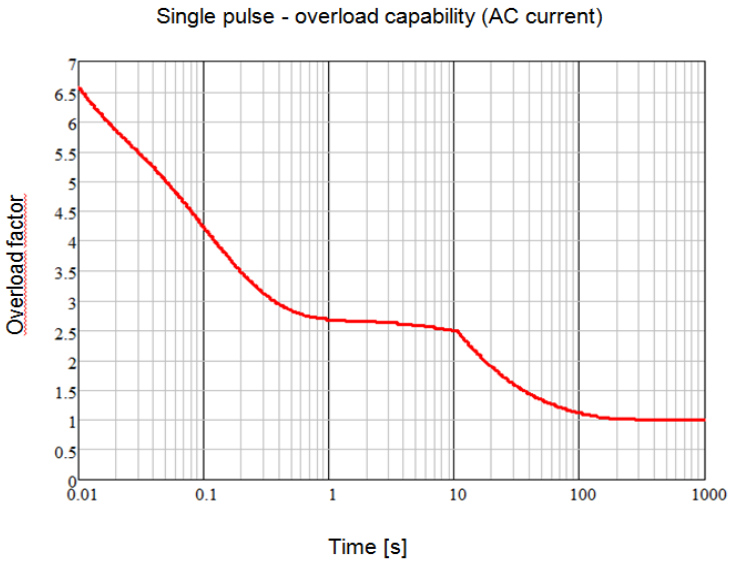

Fig. 3: peak current capability

TECHNICAL DATA - GENERAL

		ACS 500/LV			
Nominal current ranges	*AC (DC)*	0 ... $10A_{rms}$ (0 ... $15V_p$ / $\pm15V_{DC}$)			
Peak current		$60A_p$			
Load regulation nominal current short circuit / nominal load cos phi 1		45Hz … 65Hz 0.2% 0.1%	65Hz … 450Hz 5.0% 1.0%		
Frequency bandwidth		large signal: DC … 1kHz (-3dB)			
Floating output		max. voltage between earth and the amplifier's ground output: $<300V_{rms}$			
Protection circuits		overcurrent / overload / overtemperature			
External input (optionally)	*Max. voltage*	0 … V_{ExtMax} (V_{ExtMax} is adjustable between $\pm2V_p$ … $\pm25V_p$)			
	Impedance	approx. 10kΩ			
	Delay time	Signal delay between amplifier's external input and amplifier's output <5µs			
Interface		Ethernet 100MBit			
Internal oscillator unit					
	Wave forms	DC, sine, square, triangle, ramp, arbitrary			
	Amplitude resolution	17Bit			
	Frequency range	DC … 1MHz			
	Frequency resolution	1µHz			
	Frequency accuracy	25ppm			
	Phase range	0° … 360°			
	Phase resolution	0.001°			
	Memory depth	1MSample			
	Synthesizer functions	ADD, AM, FM, PM, PWM			
	Sequence memory	1024 steps			
Internal control unit					
Monitoring unit[2)]		voltage		current	
Max. output		$\pm10V_p$			
Scaling factor 'sf' (adjustable)		sf: 0.2 … 1000		sf: 0.1 … 1000	
Bandwidth		300kHz		200kHz	
Monitoring accuracy		± (% of measured value + % of voltage measurement range value + error(sf))			
frequency		DC 45Hz … 450Hz	10Hz … 45Hz 450Hz … 5kHz	5kHz … 15kHz	15kHz … 30kHz
voltage monitor		0.12 + 0.02 + 2mV*sf	0.3 + 0.2 + 2mV*sf	0.7 + 0.4 + 2.2mV*sf	1.4 +0.8 + 2.3mV*sf
current monitor		0.22 + 0.04 + 2mA*sf	0.5 + 0.4 + 2mA*sf	1.1 + 0.8 + 2.2mA*sf	2.2 + 1.6 + 2.3mA*sf
Noise of ADC measurement		$<20mV_{rms}$ (DC … 300kHz)		$<1.5mA_{rms}$ (DC … 300kHz)	
Noise DAC output		$<0.2mV_{rms}$ (DC … 300kHz)			
Delay time		<1µs			
Output impedance		47Ohm			
Isolation		earth / remaining electronics / each other			
Protection		short circuit			
Housing / Dimensions		19"- desktop unit with adjustable feet (7U), H/W/D: 311x484x355(mm) colour light grey (RAL 7035)			
Power supply		230V (±10%) 50Hz/60Hz, 16A safety plug (3-pole), power supply cord: 2m			
Ambient temperature		0°C up to 40°C			
Relative Humidity (non-condensing)		max. 80% for temperatures <31°C, decreasing linearly to 50% at 40°C			
System of protection		IP20			

Display		7.0” Touchscreen (17.8cm, resolution 800x480)
Sequencer		Integrated sequences User defined sequences memory
User interface		Touchscreen / front-panel button / incremental encoder
Digital I/O		8 digital inputs: +5VDC … +24VDC 8 digital outputs: +5VDC (internal VCC), IL=40mA (external VCC input: +5VDC … +24VDC, IL=500mA)
Digital instrument		
	Voltage measurement ranges	112.5V_p / 225V_p / 450V_p / 900V_p (auto ranging)
	Voltage accuracy	± (% of measured value + % of voltage measurement range value)
		DC 45Hz … 450Hz: 0.1 + 0.02 10Hz … 45Hz 450Hz … 5kHz: 0.2 + 0.2
	Current measurement ranges [A_p]	depending on peak current of the amplifier other measurement ranges on request
		ACS: *500* — *range 1*: 3 — *range 2*: 6 — *range 3*: 12 — *range 4*: 26.4
	Current accuracy	± (% of measured value + % of current measurement range value)
		DC 45Hz … 450Hz: 0.2 + 0.04 10Hz … 45Hz 450Hz … 5kHz: 0.4 + 0.4

ACS SERIES ADD-ONS AND OPTIONS

OPT.05	U/I monitor	Galvanically isolated BNC plugs for monitoring voltage and current (includes OPT.14)
OPT.13.30	Extended frequency range	Extended frequency range DC … 30kHz (-3dB)
OPT.14	External input	0 … $V_{Ext\ max}$ $V_{Ext\ max}$ is adjustable between ±2V_p … ±25V_p OPT.14 includes a digital low pass input filter Type Bessel or Butterworth, order 1 … 6 (adjustable) Filter frequency selectable 100Hz … 10MHz
OPT.30	Optical link	Optical interface to real time simulator LC duplex interface / Aurora 8B/10B protocol / 2Gb/s data rate
OPT.OVP	Output protection	Protects the ACS output against hazardous voltages/currents
OPT.VS	Synchronisation	Interface for synchronisation with other ACS/APS
RSA	Redundant switching off	Redundant safety shutdown system
ACS.GA	Common output	Common output for amplifier and current transformer
STMB.SHUNT.	Shunt measurement	Current measurement via shunt resistor
STMB.LEM.	LEM measurement	Current measurement via integrated LEM module (wiring)
STMB.LEM2.	LEM measurement	Current measurement via additional LEM module (module plus wiring)