DCS series of current amplifiers

SWITCH MODE CURRENT AMPLIFIER

Current amplifier DCS 1000

The relating applications:

Circuit breaker testing
Coil testing
Magnetic field generation
Thermal testing
etc.

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

Test and calibration of
power analysers and meters

- ✓ High efficiency > 90 %
- ✓ Harmonic distortion < 1 %
- ✓ DCS/T series with integrated sine wave oscillator unit
- ✓ DCS series with integrated 4-channel signal synthesiser for arbitrary waveform generation and integrated waveform storage capability
- ✓ Current and voltage monitoring unit (optional)
- ✓ Adjustable current and voltage limitation (optional)
- ✓ Extended synchronisation possibilities (e.g. 3 x current + 3 x voltage sources)
- ✓ Modular system concept – basic amplifier unit can be combined with various transformer units for high current applications
- ✓ Multisource operation modes: parallel / serial
- ✓ Internal oscilloscope
- ✓ Amplifier control via webinterface and interface commands
- ✓ Test and evaluation software available

CURRENT SOURCE FOR ALL APPLICATIONS

TOUCHSCREEN USER INTERFACE

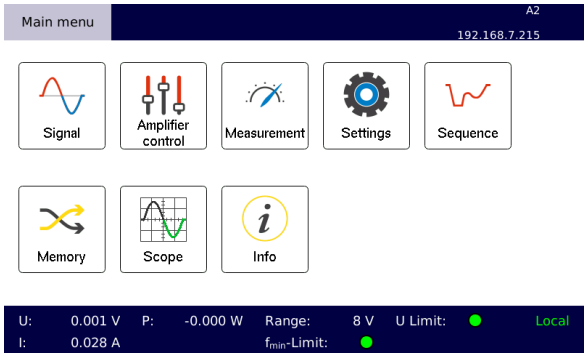

Fig. 1: Main menu

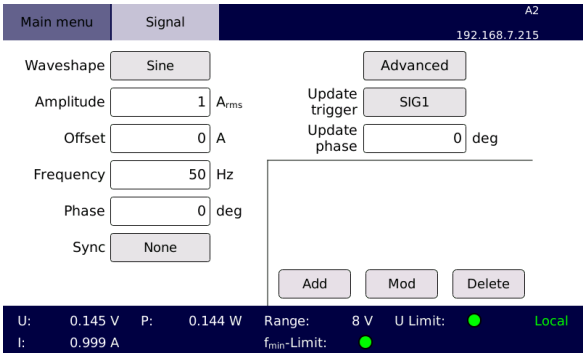

Fig. 2: Signal setting

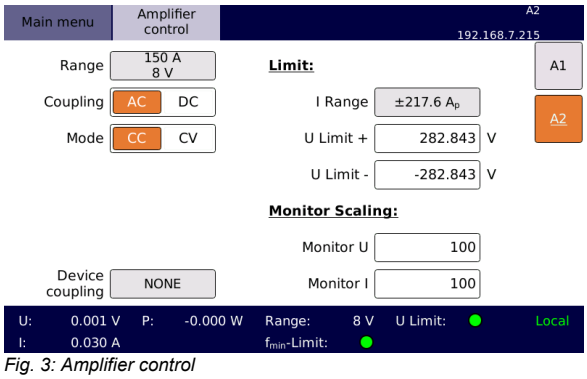

Fig. 3: Amplifier control

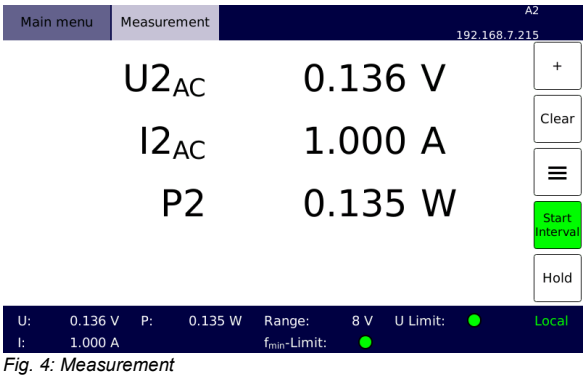

Fig. 4: Measurement

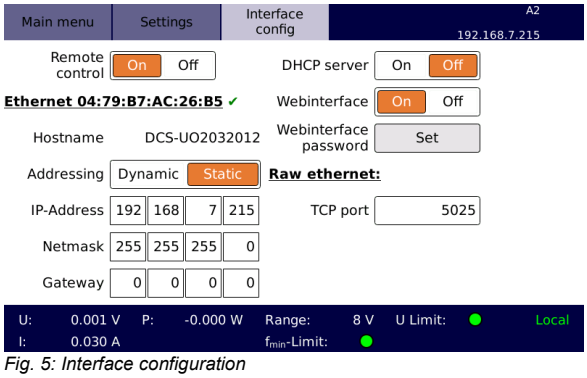

Fig. 5: Interface configuration

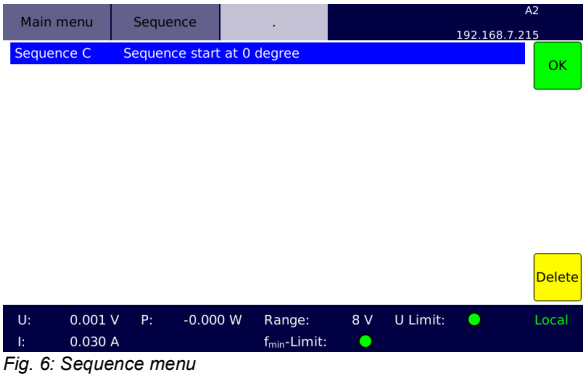

Fig. 6: Sequence menu

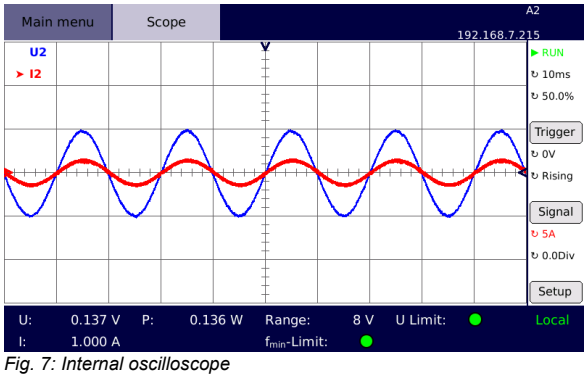

Fig. 7: Internal oscilloscope

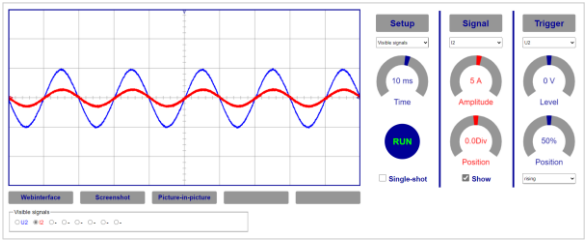

Fig. 8: Web oscilloscope

SOFTWARE CONTROL

SPS SystemControl

- ✓ Simulation and control software for arbitrary waveforms, current and frequency variations
- ✓ Generation of user defined sequences
- ✓ Sequence preview graph

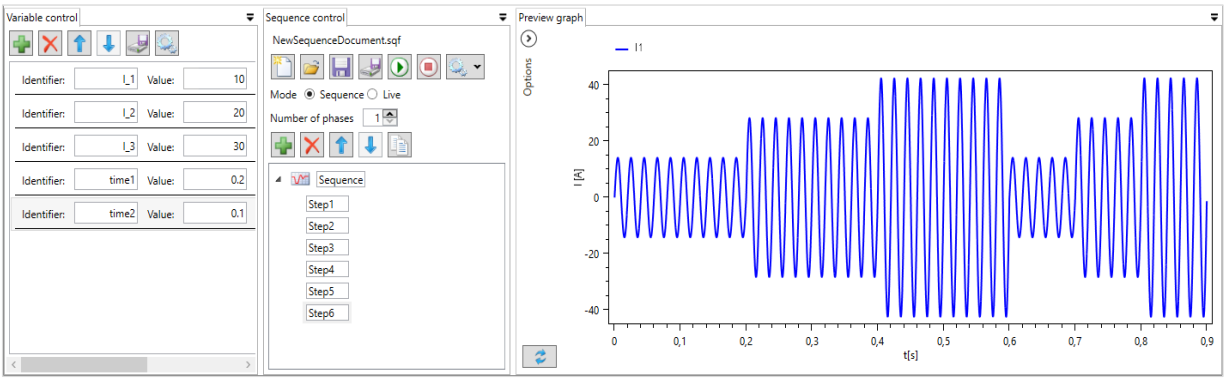

Fig. 9: SPS SystemControl software

SPS CircuitBreakerManager

- ✓ Control software for circuit breaker tests
- ✓ Automated tests available

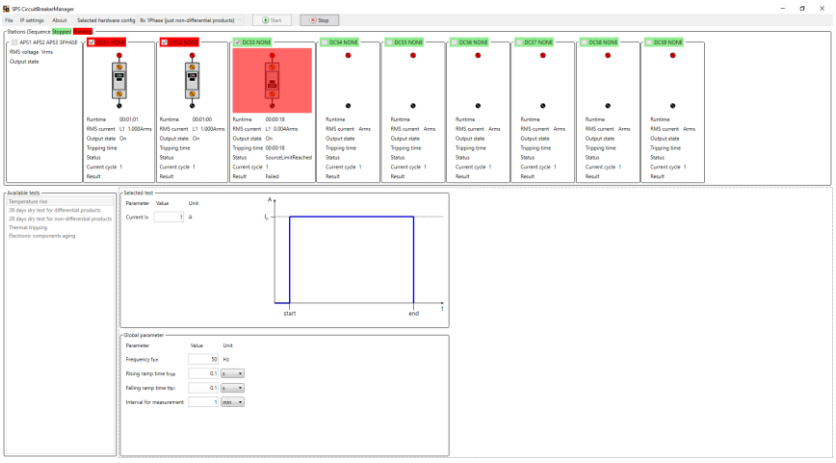

Fig. 10: SPS CiruitBreakerManager software

Command interface

- ✓ Easily integrate the device into your own software applications
- ✓ Remote control commands are based on the SCPI standard

Webinterface

- ✓ Monitor and control the connected device via a web browser
- ✓ Oscilloscope function

TECHNICAL DATA - GENERAL

		DCS and DCS/T series	
Load regulation *(short circuit to nominal load)*		< 1 % (10 % … 100 % of range)	
Stability *(1 h)*		gain: < 0.1 % / offset: < 0.02 % of range at constant load and temperature	
Efficiency		> 90 % at nominal power	
Current accuracy		< 1 % of adjusted value (10 % … 100 % of range)	
Line regulation		< 1.5 x 10^{-4} per 10 V line-voltage change	
Frequency range		**DCS**	**DCS/T**
		45 Hz ... 65 Hz	45 Hz ... 65 Hz
	(optional)	16 2/3 Hz ... 1 kHz	16 2/3 Hz ... 100 Hz
Harmonic distortion		< 1 % (10 % … 100 % of range)	
Protection circuits		overload / open output / overtemperature	
Floating output		max. voltage between earth and the amplifier's ground output: < 300 V (RMS)	
External input *(optional)*	*Max. peak voltage*	0 … U_{ExtMax} (U_{ExtMax} is adjustable between ±2 V … ±25 V)	
	Input impedance	approx. 10 kΩ	
	Delay time	signal delay between amplifier's external input and amplifier's output < 5 µs	
Internal oscillator unit		**DCS**	**DCS/T**
	Type	4-channel synthesiser	-
	Wave forms	DC, sine, square, triangle, ramp, arbitrary	sine
	Amplitude resolution	17 Bit	15 Bit
	Frequency range	DC … 1 MHz	16 2/3 Hz ... 100 Hz
	Frequency resolution	1 µHz	100 mHz
	Frequency accuracy	25 ppm	-
	Phase range	0° … 360°	-
	Phase resolution	0.001°	-
	Memory depth	1 MSample	-
	Synthesiser functions	ADD, AM, FM, PM, PWM	-
	Sequence memory	1024 steps	-
Internal control unit			
	Display	7.0" touchscreen (17.8 cm, resolution 800 x 480)	
	Sequencer	user defined sequences memory	
	User interface	touchscreen / front panel button / incremental encoder webinterface	
	Digital I/O (optional)	8 digital DC inputs: +5 V … +24 V 8 digital DC outputs: +5 V (internal U_{CC}), I_L = 40 mA (external DC input U_{CC}: +5 V … +24 V, I_L = 250 mA)	

Monitoring unit *(optional, not available for DCS/T series)*		voltage		current	
	Max. peak output	±10 V			
	Scaling factor 'sf' (adjustable)	sf: 0.2 … 1000		sf: 0.1 … 1000	
	Bandwidth	300 kHz		200 kHz	
	Monitoring accuracy	± (% of reading + % of range + error(sf))			
	Frequency	DC 45 Hz … 450 Hz	10 Hz … 45 Hz 450 Hz … 5 kHz	5 kHz … 15 kHz	15 kHz … 30 kHz
	Voltage monitor accuracy	0.12 + 0.02 + 2 mV * sf	0.3 + 0.2 + 2 mV * sf	0.7 + 0.4 + 2.2 mV * sf	1.4 + 0.8 + 2.3 mV * sf
	Current monitor accuracy	0.22 + 0.04 + 2 mA * sf	0.5 + 0.4 + 2 mA * sf	1.1 + 0.8 + 2.2 mA * sf	2.2 + 1.6 + 2.3 mA * sf
	Noise of ADC measurement (RMS)	< 20 mV (DC … 300 kHz)		< 1.5 mA (DC … 300 kHz)	
	Noise DAC output (RMS)	< 0.2 mV (DC … 300 kHz)			
	Delay time	< 1 µs			
	Output impedance	47 Ω			
	Isolation	earth / remaining electronics / each other			
	Protection	short circuit			
Interface		Ethernet 100 Mbit/s (HiSLIP SCPI) USB 2.0 Host			
Synchronisation bus *(multiple devices, optional)*		device synchronisation and internal communication optical fibre, LC duplex: - synchronised sequence start - parallel operation - only one ethernet connection required			
Insulation resistance		> 1 MΩ			
Peak withstand voltage *(max. 10s, output to earth)*		> 2000 V			
Cooling		temperature-controlled forced air cooling			
Ambient temperature		+10 °C up to +40 °C			
Storage temperature		-25 °C up to +60 °C			
Relative humidity		non condensing, max. 80 % for temperature < 31 °C, decreasing linearly to 50 % at 40 °C			
Ingress protection		IP20			

TECHNICAL DATA – DCS series

		DCS 1000
Power AC	*continuous*	1000 VA
Internal current range *(RMS, optional)*		100 A (U_{max}: 10 V)
Power supply *(±10 %, 50/60 Hz)*		230 V
Line protection, connection		16 A, Schuko
Housing		plug-in unit or rack, light grey (RAL7035)
	Amplifier approx. dimensions (H x W x D)	19", 4 U 178 x 483 x 650 mm
Weight	*Amplifier (approx.)* *incl. internal current range*	15 kg 40 kg

TECHNICAL DATA – DCS and DCS/T series

		DCS 5000 (/T)	DCS 10000 (/T)
Power AC	*continuous*	5000 VA	10000 VA
Internal current range *(RMS, optional)*		500 A (U_{max}: 10 V)	1000 A (U_{max}: 10 V)
Power supply *(±10 %, 50/60 Hz)*		230 V / 400 V	230 V / 400 V
Line protection, connection		3 x 16 A, CEE	3 x 20 A, CEE
Housing		plug-in unit or rack, light grey (RAL7035)	
	Amplifier approx. dimensions (H x W x D)	19", 6 U 266 x 483 x 600 mm	19", 8 U 356 x 483 x 600 mm
Weight	*Amplifier (approx.)* *incl. internal current range*	37 kg 70 kg	40 kg 130 kg

OPTIONS AND ACCESSORIES

OPT.01	IEEE488	Not in combination with OPT.02
OPT.02	RS232	Not in combination with OPT.01
OPT.05	U/I monitor *(not available for DCS/T series)*	Galvanically isolated voltage and current measurement outputs accessible via BNC sockets (includes OPT.14)
OPT.14	External input *(not available for DCS/T series)*	0 … $U_{Ext\ max}$ $U_{Ext\ max}$ peak is adjustable between ±2 V … ±25 V OPT.14 includes a digital low pass input filter Type Bessel or Butterworth, order 1 ... 6 (adjustable) Filter frequency selectable 100 Hz ... 10 MHz
OPT.16	Extended frequency	Extended frequency range 16 2/3 Hz ... 100 Hz, DCS/T series
OPT.16K	Extended frequency	Extended frequency range 16 2/3 Hz ... 1 kHz, DCS series
OPT.30	Optical link	Optical interface to real time simulator LC duplex interface / Aurora 8B/10B protocol / 2 Gb/s data rate
OPT.IO.F	Additional I/O ports	Additional I/O ports DCS series
OPT.IO.T	Additional I/O ports	Additional I/O ports DCS/T series
IT	Current transformer	Current transformer for additional high current ranges
RSA	Redundant switch off	Two channel redundant shutdown system