

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

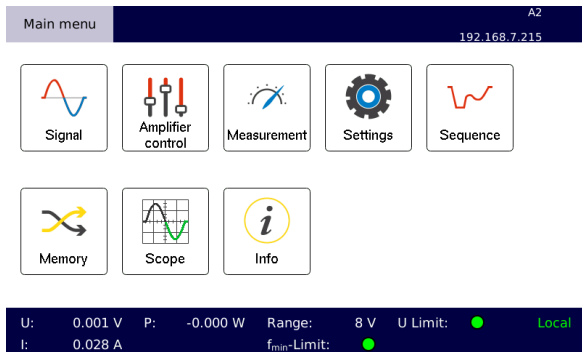


Fig. 1: Main menu

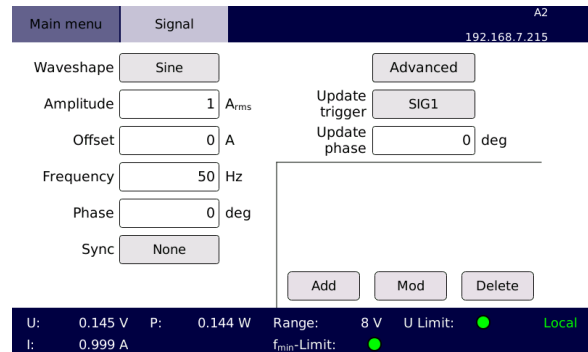


Fig. 2: Signal setting

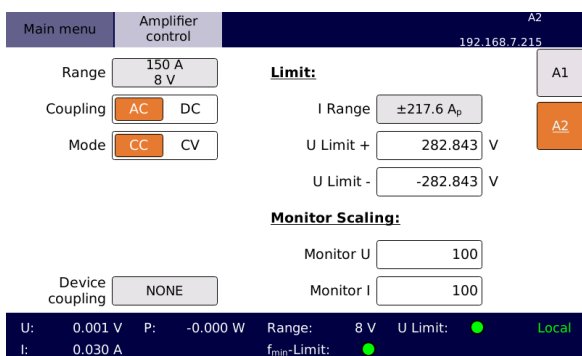


Fig. 3: Amplifier control

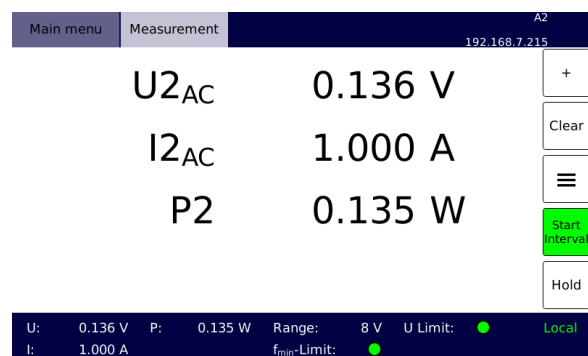


Fig. 4: Measurement

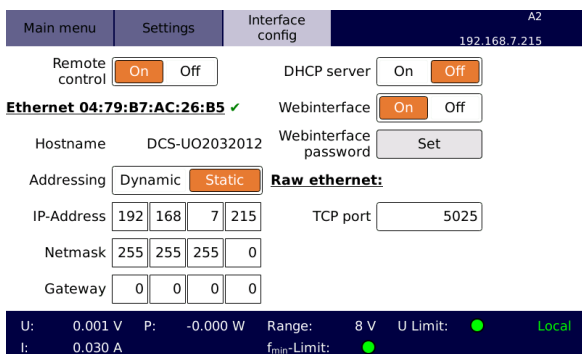


Fig. 5: Interface configuration

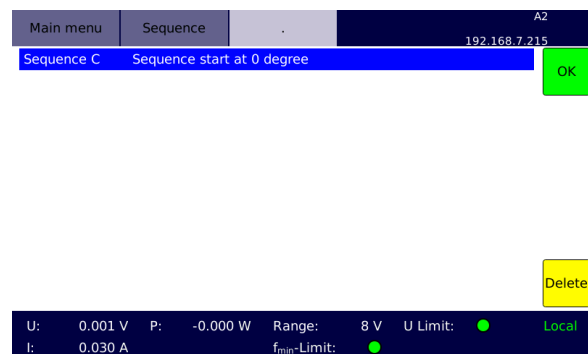


Fig. 6: Sequence menu

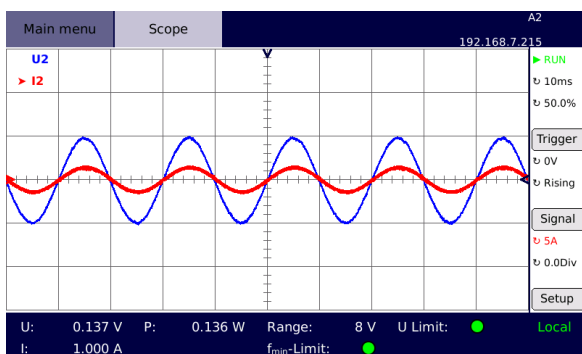


Fig. 7: Internal oscilloscope

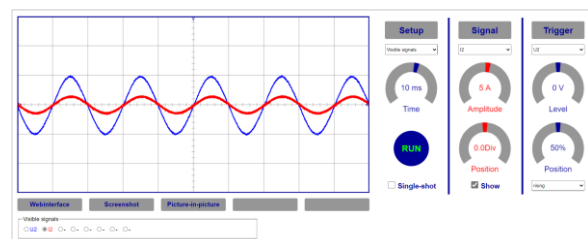


Fig. 8: Web oscilloscope

SOFTWARE CONTROL

SPS SystemControl

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

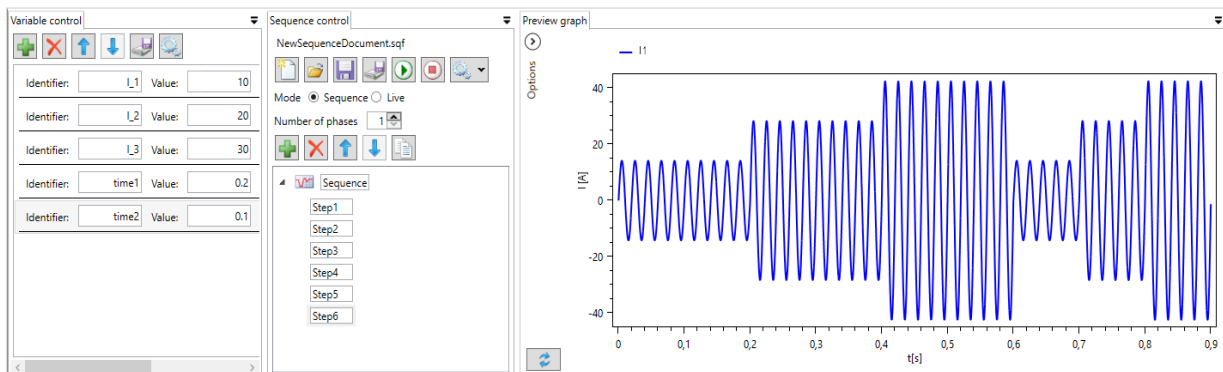


Fig. 9: SPS SystemControl software

SPS CircuitBreakerManager

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

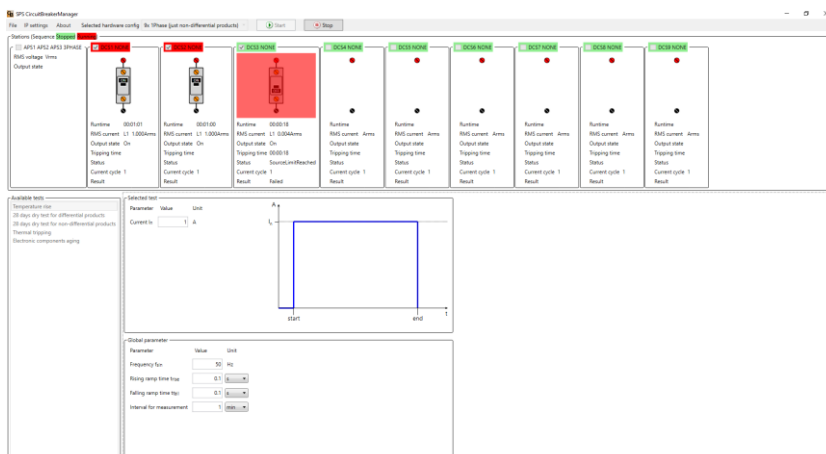


Fig. 10: SPS CircuitBreakerManager software

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 (<i>short circuit to nominal load</i>)		< 1 % (10 % ... 100 % of range)	
Stability (<i>1 h</i>)		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
	(<i>optional</i>)	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	<i>Max. peak voltage</i>	0 ... U _{ExtMax} (U _{ExtMax} is adjustable between ±2 V ... ±25 V)	
<i>(optional)</i>	<i>Input impedance</i>	approx. 10 kΩ	
	<i>Delay time</i>	signal delay between amplifier's external input and amplifier's output < 5 μs	
Internal oscillator unit		DCS	DCS/T
	<i>Type</i>	4-channel synthesiser	-
	<i>Wave forms</i>	DC, sine, square, triangle, ramp, arbitrary	sine
	<i>Amplitude resolution</i>	17 Bit	15 Bit
	<i>Frequency range</i>	DC ... 1 MHz	16 2/3 Hz ... 100 Hz
	<i>Frequency resolution</i>	1 μHz	100 mHz
	<i>Frequency accuracy</i>	25 ppm	-
	<i>Phase range</i>	0° ... 360°	-
	<i>Phase resolution</i>	0.001°	-
	<i>Memory depth</i>	1 MSample	-
	<i>Synthesiser functions</i>	ADD, AM, FM, PM, PWM	-
	<i>Sequence memory</i>	1024 steps	-
Internal control unit			
	<i>Display</i>	7.0" touchscreen (17.8 cm, resolution 800 x 480)	
	<i>Sequencer</i>	user defined sequences memory	
	<i>User interface</i>	touchscreen / front panel button / incremental encoder webinterface	
	<i>Digital I/O (optional)</i>	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 and DCS/T series

		DCS 1000	DCS 1500
Power AC	<i>continuous</i>	1000 VA	1500 VA
Internal current range (RMS)		100 A (U _{nom} : 10 V)	100 A (U _{nom} : 15 V)
Power supply (±10 %, 50/60 Hz)		230 V	
Line protection, connection		16 A, Schuko	
Housing		plug-in unit or rack, light grey (RAL7035)	
	<i>Amplifier approx. dimensions (H x W x D)</i>	19", 4 U 178 x 483 x 650 mm	19", 4 U 178 x 483 x 650 mm
Weight	<i>Amplifier (approx.) incl. internal current range</i>	15 kg 40 kg	17 kg 50 kg

		DCS 5000 (/T)	DCS 10000
Power AC	<i>continuous</i>	5000 VA	10000 VA
Internal current range (RMS)		500 A (U _{nom} : 10 V)	1000 A (U _{nom} : 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)	
	<i>Amplifier approx. dimensions (H x W x D)</i>	19", 6 U 266 x 483 x 600 mm	19", 8 U 356 x 483 x 600 mm
Weight	<i>Amplifier (approx.) incl. internal current range</i>	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 <i>(not available for DCS/T series)</i>	Galvanically isolated voltage and current measurement outputs accessible via BNC sockets (includes OPT.14)
OPT.14	External input <i>(not available for DCS/T series)</i>	$0 \dots U_{\text{Ext max}}$ $U_{\text{Ext max}}$ peak is adjustable between $\pm 2 \text{ V} \dots \pm 25 \text{ V}$ 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