DANFYSIK

SYSTEM 9400

Power Supply

NEW, COST-EFFICIENT!

SYSTEM 9400 Power Supply

SYSTEM 9400 is the newest, cost-efficient addition to Danfysik's portfolio of high-performance power converters suitable for supplying power to magnets and other applications where high current or voltage stability is required. With the SYSTEM 9400 power converter program Danfysik now offers our customers a new, cost-optimized generation of high-performance current/voltage-controlled power converters ranging from 0.6 kW to 100 kW in a 100ppm superior price/performance class.
The SYSTEM 9400 is a compact 19-inch rack mount (3U) modular design with current capabilities up to 250 A / voltage up to 120 V. A current transducer (DCCT) is incorporated for superior performance. As options, the SYSTEM 9400 can be configured with a polarity switch.
The SYSTEM 9400 is available in both water-cooled and air-cooled versions.
The SYSTEM 9400 is based on a high efficiency primary full bridge phase modulated zero voltage-switching topology, which offers several benefits compared with traditional hard-switching technology, such as improved EMI performance and higher efficiency.
The SYSTEM 9400 can be controlled locally by the control panel or via remote. Using the analog and digital interfaces, various parameters can be set and read from the power supply via the remote applications and also trigger inputs.

System 9400 can be used in a wide range of applications:

- Powering Super Conducting electromagnets
- Powering magnets in accelerators for research and medical application
- Powering coils for establishment of stable magnetic fields
- Applications where high current stability is needed, e.g. correctors and dipoles

Detailing features

- Unipolar and bipolar versions
- Remote or local mode control
- Soft start mode
- Adjustable slew rate limit
- Protected against injected inductive energy
- Programmable ramp figures (optional)
- Water cooled version
- Analog (0-10 V) and digital interfaces (RS-422)

Other Danfysik Power supplies

Danfysik SYSTEM 8500 provides solutions for ultra-stable power supplies, 2 and 4 quadrant power supplies.

Key Performance Parameters

Warm up time

Warm up time (cold)	30 min.
Warm up time (stand-by)	15 min.

Drift

Long term 8 hours stability (FWHM)	100ppm

Line regulation

±10% slow, T > 1 min.	±5ppm
±1% fast, T > 3 m sec.	±5ppm

Load regulation

±10% resistance change	±5ppm

Output ripple and noise

Voltage spikes – peak to peak	: < 100 mV @ 1-100 kHz
Switching frequency	: 140 kHz

Load range

Time Constant (L/R)	0 - 1 sec
Inductance (L)	0 - 1 H (standard or Customized)
Resistance (Rmin)	>61 mΩ

Temperature coefficient

Ambient 15 – 40°C	10ppm/°C

Accuracy

Current setting resolution	20 bit DAC
Current reproducibility	±10ppm
Absolute current calibration	-0 / +400ppm at Imax
Current read-back resolution	16 bit ADC
Voltage read-back resolution	16 bit ADC

Current control range (setting range)

Unipolar	1 – 100%
Bipolar	±100%

Output Characteristics

Ramp speed (0 – 100%)	0.1 – 10 sec (adjustable)
Current loop bandwidth	2 – 100 Hz
Voltage loop bandwidth	>200 Hz

Isolation

Isolation test voltage (output to chassis)	1 kV
Galvanic isolation	between mains and output

Technical specifications

AC INPUT					
AC Mains input voltage	400-415 V ±10%, 3 phase + neutral + ground, 47-63 Hz. For other input voltages, contact Danfysik				
DC OUTPUT	**15V Unipolar**	**60V Unipolar**	**100V Unipolar**	**120V Unipolar**	**60V Bipolar**
Output current range [A]	50 -250	50 – 250	30 – 250	25 –250	±50 – ±150 (±100 for Air-cooled)
Cooling	Water and air-cooled system available				
External Polarity Switch (optional)	Yes				
Efficiency	90-93% depending on the AC input voltage				
Regulation type	Constant Current Regulation / Constant Voltage Regulation* Automatic switch between CC or CV mode. *Only via remote control				
Converter topology	Full-bridge primary Zero-Voltage-Switching with current doubler rectification				
Water Cooling (only for water cooled versions)					
Water flow	1 l/min pr unit @ max. inlet temperature 35°C				
Differential pressure	1 bar				
Test pressure	15 bar				
Connection	⅜” hose stub				
Quick Connectors (optional)	Rectus type, Snap coupling or ask for more options				
Cabinet lay-out					
Material	Steel				
Unit Dimensions W x D x H	482 mm x 550 mm x 132.5 mm (3U) 19 inch rack mount				
Weight	32 kg (shipping weight 35 kg)				
Temperature ratings					
Operating temperature (ambient)	15 - 40°C				
Storage temperature	-20 - 50°C, non-condensing				
Norms					
Immunity for industries	EN/IEC 61000-6-2:2005				
Emission for industries	EN/IEC 61000-6-4:2007				
Harmonic emission (single phase)	EN/IEC 61000-3-2:2000				
Harmonic emission (three phase)	EN/IEC 61000-3-12:2005				
Electromagnetic compatibility	EN/IEC 61000-3-11:2000				
Safety requirements for electrical equipment	EN/IEC 61010-1:2001				

Control panel

Alphanumeric LCD display

Pre-set output current	6 digits [A]
Actual output current	5 digits [A]
Output voltage	2 digits [V]
Interlock status*)	text string
Menu system	local control

Push buttons and status Indicators

OFF	[Button]/[LED
Reset (interlock)	[Button]/[LED
ON	[Button]/[LED
Menu	[Button]
Ready (in regulation)	[LED]

*)Interlock status: Over voltage, Over current, Over temperature, Fan fault, Earth leakage, AC fault, External interlock (ext. 1 – 4), Summary interlock

Control interface

Function	Remote Control Interface		Analog Control Interface	
	Command	Read-back status	Command	Read-back status
ON/OFF	Yes	Yes		
Reset	Yes			
Remote status	Yes	Yes		
Output current	Yes (Current set value)	Yes	Yes (Current set value)	Yes
Output voltage	Yes (Voltage set value)	Yes	Yes (Voltage set value)	Yes
Ambient temperature		Yes		
Ramp profile control (optional)	Yes		Yes	

Remote Control Interface RS-422/RS-485 as standard (RS-232 or SPI are available on request)

Analog input signals: 0-10 V (±10 V for bipolar)

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