



## System 8500 MPS 859

The power supply 859 is available up to 500 kW output power. High efficiency, very low AC line distortion and a high power factor are key MPS 859 features.

The latest IGBT (Insulated gate bipolar transistor) technology has been used in the series regulator; very low electrical and acoustic noise levels have been achieved by the use of a new design of filter.

All power components, including the mains transformer and filter coils, are water cooled to reduce the ambient thermal load.

As other System 8500 power supplies, the modular design concept has been maintained, making service easy and fast.

The MPS 859 offers you advanced power circuit technology, using the latest components combined with the normal high quality standards expected with a Danfysik power supply.

### Main features

- Power range from 80 to 500 kW
- Current range from 300 to 10,000 A
- Full quadrant operation
- Short-circuit & open-circuit operation
- 1 ppm stability class
- Very high efficiency - typical 95%
- Very low EMI on AC line and current output
- Very low AC line distortion (< 10%)
- High power factor > 0.95
- All power components water cooled to reduce ambient thermal load

### Applications

- High stability spectrometer magnets
- Superconducting magnets
- Superconducting wire testing
- Calibration of high current shunts

## Specifications

DC OUTPUT RATINGS	
Power range	80 - 500 kW
Standard current range	300 - 1,500 Amp
Optional current range	300 - 10,000 Amp
Voltage range	10 - 300 Volt

PERFORMANCE	
All drift and regulation data are given for max. current output.	
Warm up time (cold start)	60 min.
Warm up time (from stand by)	15 min.
Drift: Short term 3 min. Long term 8 hours	< +/- 1 ppm (fwhm) < +/- 10 ppm (fwhm)
Line regulation: +/- 10% slow, T > 1 min. +/- 1% fast, T > 3 m sec.	< 0.5 ppm < 0.5 ppm
Load regulation: +/- 10% resistance change	< 0.5 ppm
Current ripple (depending on requirement): Obtainable with RC network Obtainable with active filter	< 20 ppm < 1 ppm
Temperature coefficient: Ambient Cooling water	0.2 ppm/°C 0.05 ppm/°C
DC output isolation resistance	> 50 Mohm
Output polarity (optional)	Remote controllable
Current setting resolution: Standard Optional	16 bit (15 ppm) 18 bit (4 ppm)
Absolute calibration of current	< 100 ppm
Current readback resolution: Standard Optional	8 bit (3906 ppm) 16 bit (15 ppm)
Efficiency (current-voltage dependent)	Typical 95%
Total harmonic distortion on AC input	< 10%
Power factor	< 0.95
Acoustic noise within 0.75 m	f = <20 kHz < 50 dB

### INPUT/OUTPUT INTERFACES

OPERATOR CONTROL PANEL
Current setting by knob control with a digital bit generator. Three resolution ranges for the control of 1/10, 1/1000, and 1/100,000 per rev. of full scale.
Alphanumeric LCD display - with push-button selection of: Preset output current (%) Actual output current (%) - Amp (optional) Output output voltage (%) - Volt (optional) Transistor passbank voltage Interlock status text string
Regulation system status readback: Polarity (LED) Local remote (LED)

COMPUTER INTERFACE	
RS 232C/RS 422	
RS 422 Multidrop	
IEEE 488 (GPIB) (optional)	
Customer specified interface	

TEMPERATURE RATINGS	
OPERATING	
Ambient, °C	15 to 35
Water, °C	5 to 35
STORAGE, °C	-20 to 50
MAIN COOLING	water
COOLING WATER PRESSURE:	
Minimum diff., bar	3
Max. absolute, bar	12
Test pressure, bar	15
Flow, ltr./min.	approx. 0.08 x kW

AC INPUT	
CONTROL VOLTAGE	
single phase, 50-60 Hz, standard	Europe 220 V (+/- 5%) USA 115 V (+/- 5%)
available on request	110 V 240 V
MAINS VOLTAGE,	
3 phase, 3 or 4 wire, 50-60 Hz, standard	Europe 380 V (+/- 5%) USA 480 V (+/- 5%)
available on request	208 V 415 V 565 V

CABINET DIMENSIONS	
Steel cabinet, W x H x D, 80 - 500 kW	1230 x 1800 x 1200 mm

OPERATOR CONTROL PANEL	
Removable W x H x D	483 x 88 x 75 mm

## Short form description

Please refer to Schematic 82403A. The power supply is assembled of the following major parts:

### 1. Mains Input

The power input is controlled by a mains circuit breaker with thermal overload relay. Inrush current is limited by soft start circuitry with a double circuit breaker, limiting resistors and a voltage charging sensor circuit.

### 2. Mains Transformer

The 3 phase mains transformer provides galvanic isolation from the mains and reduces the voltage to a level necessary for the step down regulator.

The mains transformer is water cooled to limit the heat transfer to the surrounding environment.

### 3. Rectifier

A three-phase, bridge coupled rectifier converts the AC to DC with 600 Hz (720 Hz) ripple which is fed into the filter assembly. The rectifiers are water cooled.

### 4. Filter

A double L-C filter with very low magnetic stray fields from the chokes smooths the ripple before entering the regulator. The chokes are water cooled. The filter gives both differential mode and common mode isolation between the bucking regulator and the mains transformer. In this way noise fed back to the mains is reduced to a minimum.

### 5. The SMRM - Switch Mode Regulation Modules

Standardized 300 Amp regulator modules with IGBT's are used as the series regulator with up to 8 modules operating in phase shifted parallel operation. The individual modules are current controlled. All IGBT's and rectifiers are water cooled.

The technology of the SMRM results in AC load currents following a sinusoidal form. The well-known distortion from SCRs is thus avoided.

### 6. ULTRASTAB Current Transducer

The current feed back signal to the regulation loop is generated in the Ultrastab current transducer system; a patented Danfysik product.

### 7. Electronics

The standard System 8500 electronics performs all regulation, current setting and communication. The power supply can be controlled, either from the operator control panel, or via a RS-232C/422 port. An optional IEEE-488 interface is available.