

TABLETOP MODELS UP TO 9kW RACK-MOUNTED MODELS UP TO 9kW – ON REQUEST

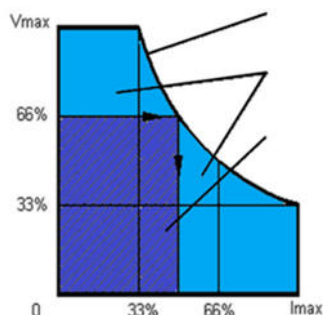


PRODUCT PROPERTIES AND DATA

FUNCTION:

The MCA series power supplies (**M**edium **V**oltage-**C**hopper-**A**utoranging-**P**ower Supply) are switch-mode power supplies with continuous automatic range adjustment. They provide the full output performance over a wide voltage and current range. Due to the automatic power limit, their working range compared to other power supplies is about three times wider.

The high switching frequency achieves a low residual ripple in the generated output voltage with high stability, good control dynamics, and at the same time only a low amount of stored energy.



CHARACTERISTICS:

- Autoranging characteristic with fixed power limit
- For power supplies up to 1500V: floating output
- Compact design (19" housing), low weight and high efficiency
- Permanent short circuit and flashover proof
- Can be operated indefinitely with rated current in case of a short circuit
- Voltage and constant current control with automatic transition and control mode display with LEDs, plus additional power limit
- Voltage and current are set using a ten-turn potentiometer with a lockable precision dial
- Set-point display via a button
- Set-point adjustment possible with disabled output
- Push-button switch for output voltage (OUTPUT)
- Any load type, in principle, any passive two-terminal network is possible

We will be pleased to advise you – contact us at: sales@fug-elektronik.de or +49 8039 400 77 0.

POSSIBLE OPTIONS:

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage and / or current
- Analog programming/interface
- Analog programming/interface, floating
- Power adjustment with additional DVM and potentiometer
- Computer interfaces -IEEE 488, RS 232, RS 422, Profibus DP, USB, LAN (more on request)
- Signal for output voltage < 50V

More options and special solutions are possible on request. Some options may involve further changes to the properties of the unit -especially concerning the mechanical design.

HIGH-VOLTAGE POWER SUPPLY OPERATING MODES:

The power supplies can be operated in the LOCAL, ANALOG (optional) and DIGITAL (optional) operating modes.

TECHNICAL SPECIFICATIONS

All data given here apply for voltage and current control during internal operation (LOCAL) and refer to the maximum value of the output data.

DIMENSIONS:

With a desktop housing, the width is 19" up to 9kW rated power. The height and depth of the DC power supply depends on its power rating and output voltage. Detailed information can be found in the type table at the end of this document. A special version as 19" rack-mounted or with optional rack adapter is available.

ELECTRICAL SPECIFICATION:

Mains connection:	Up to 1500W rated power 230V $\pm 10\%$ 47 - 63Hz From 3000W rated power 400V $\pm 10\%$ 3-phase 47 - 63Hz, also refer to the details on the type plate. The N and PE (protective earth) connections are always required!
Protection class:	I
Overvoltage category:	II
Output:	Output values, voltage / current, see type table at the end of this document
Short-circuit resistance:	The power supply is short-circuit and flash-over proof. The maximum current can be drawn at any output voltage, even in the event of a short circuit.
Efficiency:	approx. 85%
Output isolation/output polarity:	Depending on the output voltage and output power, the power supply units of the MCA series have either floating or unipolar output with one high-voltage carrying and one grounded pole. Versions: <ul style="list-style-type: none"> → Up to 400V nominal voltage: Output floating, either the positive or the negative pole can be earthed. Insulation against earth $\pm 500V$ → At 750V nominal voltage: output floating, either the positive or the negative pole can be earthed. Insulation against earth $\pm 1000V$ → At 1500V nominal voltage and up to 3000W nominal power: output floating, either the positive or the negative pole can be earthed. Insulation against earth $\pm 2000V$ → With 3000V nominal voltage (all power classes) and 1500V with 6000W or 9000W nominal power: One pole carries high voltage, the other is firmly grounded. The desired output polarity must be specified when ordering. Power supply units with built-in potential-bound analog programming in all voltage and power classes: One pole carries high voltage, the other is firmly grounded. The desired output polarity must be specified when ordering.
Power range and power limitation:	Autoranging Factor 1:3: Three-times output voltage at 1/3 of output current or Three-times output current at 1/3 of output voltage
Voltage setting range:	Using the VOLTAGE potentiometer, approx. 0.1% to 100% of the rated value
Current setting range:	Using the CURRENT potentiometer, approx. 0.1% to 100% of the rated value
Setting resolution:	$< \pm 1 \times 10^{-3}$ of rated value with potentiometer on front panel $< \pm 1 \times 10^{-5}$ of rated value with fine potentiometer 1×10^{-4} of rated value with option interface
Displays:	DVM for voltage and current, range ± 20000 LEDs for status messages voltage control / current control.
Reproducibility:	$\pm 1 \times 10^{-3}$ of rated value with potentiometer on front panel $\pm 1 \times 10^{-4}$ of rated value with option interface
Residual ripple:	$< 2 \times 10^{-4}pp + 200mVpp$ (measuring bandwidth 30Hz to 10MHz) $< 6 \times 10^{-5} + 70mV$ of rated value RMS

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AUTORANGING POWER SUPPLIES – MCA SERIES



Regulation time:	
Constant voltage mode:	<1ms with load changes from 10% to 100% or 100% to 10%, respectively
Constant current mode:	<10ms with load changes that effect a change of less than 10% in the output voltage.
Setting time at full load:	<300ms for changes in the output voltage from 10% to 90% or 90% to 10%, respectively
Discharge time constant:	With output free of load max. 10 s (Discharge time to < 50V max. 1 minute)
Control deviation:	with $\pm 10\%$ mains change: $< \pm 1 \times 10^{-5}$ of the rated value, with no load / full load: 5×10^{-4} of the rated value, over 8 hours: $< \pm 2 \times 10^{-4}$ of the rated value, with temperature deviation $< \pm 1 \times 10^{-4}/K$ of the rated value

AMBIENT CONDITIONS:

Operation:	
Operation location:	Only for use in dry indoor areas
Temperature:	0°C bis +40°C
Humidity:	Max. relative humidity 80% up to 31°C, linearly decreasing down to 50% relative humidity at 40°C
Altitude:	Up to 2000m above sea level
Pollution degree:	1
Protection type:	IP20
Cooling:	The heat generated in the power supply unit is dissipated by convection or, in the case of high-power units, by forced ventilation.
Transport / Storage:	
Temperature:	-20°C bis +50°C
Humidity:	No precipitation and max. relative humidity of 80%
Storage rooms:	Dust-free and dry

DC POWER SUPPLY COMPONENTS

FRONT VIEW WITH CONTROLS:

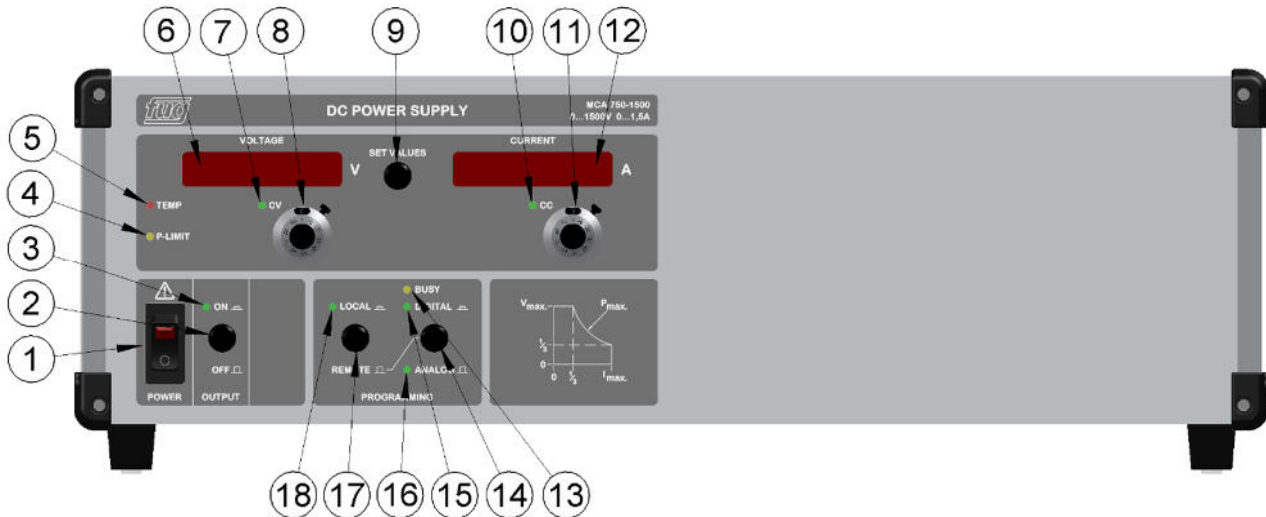


Figure: Sample Front panel MCA 750 – 1500. Different dimensions apply for DC power supplies with higher power

1	AC power switch with indicator light Isolates the power supply from the mains, two-pole switching	2	DC output ON (OUTPUT) No isolation from mains!
3	LED: DC output ON Green when control loop is closed and power stage is operating (OUTPUT ON)	4	LED: P-LIMIT display for power limit
5	LED: TEMP for over-temperature; Internal temperature too high, fan failed or contaminated. (Use depends on type)	6	Voltage display: flashing: Set point not flashing: Actual value
7	LED for constant voltage control mode (Constant Voltage CV)	8	Ten-turn potentiometer with lockable precision dial for voltage adjustment
9	SET VALUES Switch displays between Set-point mode and Actual output mode, displays flashes when in set-point mode.	10	LED for constant current control mode (Constant Current CC)
11	Ten-turn potentiometer with lockable precision dial for current adjustment	12	Current display: flashing: Set point not flashing: Actual value
13	(Optional) LED BUSY displays data traffic on the digital interface	14	(Optional) Switching the operation mode between REMOTE/ANALOG and REMOTE/DIGITAL
15	(Optional) LED indicating digital programming active	16	(Optional) LED indicating Analog programming/interface active
17	(Optional) Switching the operation mode set-point between LOCAL and REMOTE	18	(Optional) LED LOCAL control mode active

REAR VIEW WITH SINGLE-PHASE AC INPUT:

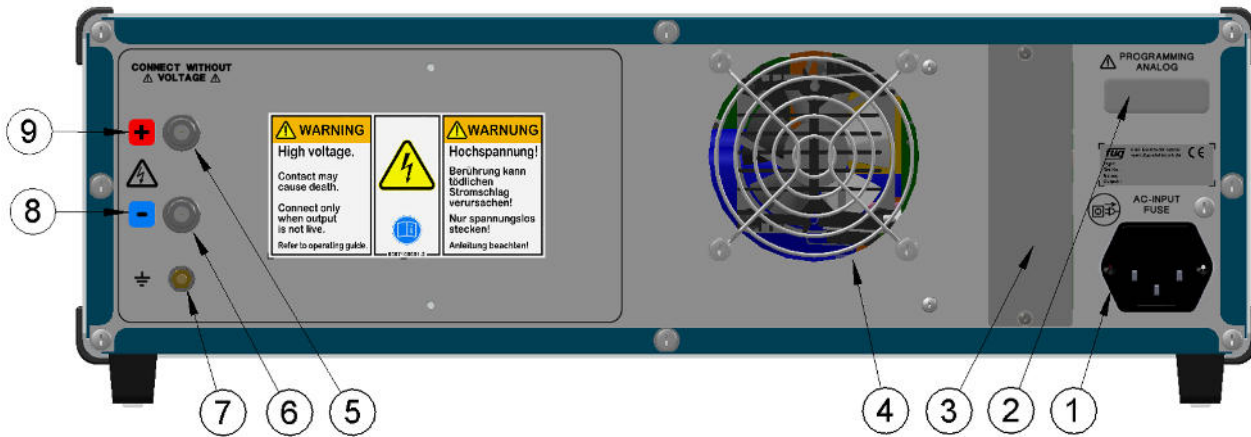


Figure: Rear panel – MCA 750 – 400. For DC power supplies with higher power or other voltages, other dimensions may apply. The arrangement of the elements may be different from that, shown here.

1	AC input with mains fuses Up to 750W: IEC connector (as shown) with integrated fuse, at 1500W, C20 mains cable in accordance with IEC60320-C20, equipped with automatic circuit breaker.
2	(Optional) 15-pin Sub-D connector for Analog programming/interface
3	(Optional) Slot for digital interface (e.g.: IEEE-488, RS232, USB, LAN, ...)
4	Air outlet (depending on device type)
5	HV Output+ (positive) For power supplies with nominal voltage up to 750V: SLB (german abbreviation, safety-laboratory-socket) For power supplies with nominal voltage 1500V an 3000V: SHV (designated for screened output cable with grounded screen.)
6	HV Output- (negative) For power supplies with nominal voltage up to 750V: SLB (german abbreviation, safety-laboratory-socket) For power supplies with nominal voltage 1500V an 3000V: SHV (designated for screened output cable with grounded screen.)
7	Earth bolt (is permanently connected to the protective conductor (PE): This connection must be connected to the ground of the load!
8	Polarity indication: BLUE: NEGATIVE
9	Polarity indication: RED: POSITIVE

REAR VIEW WITH THREE-PHASE AC INPUT:

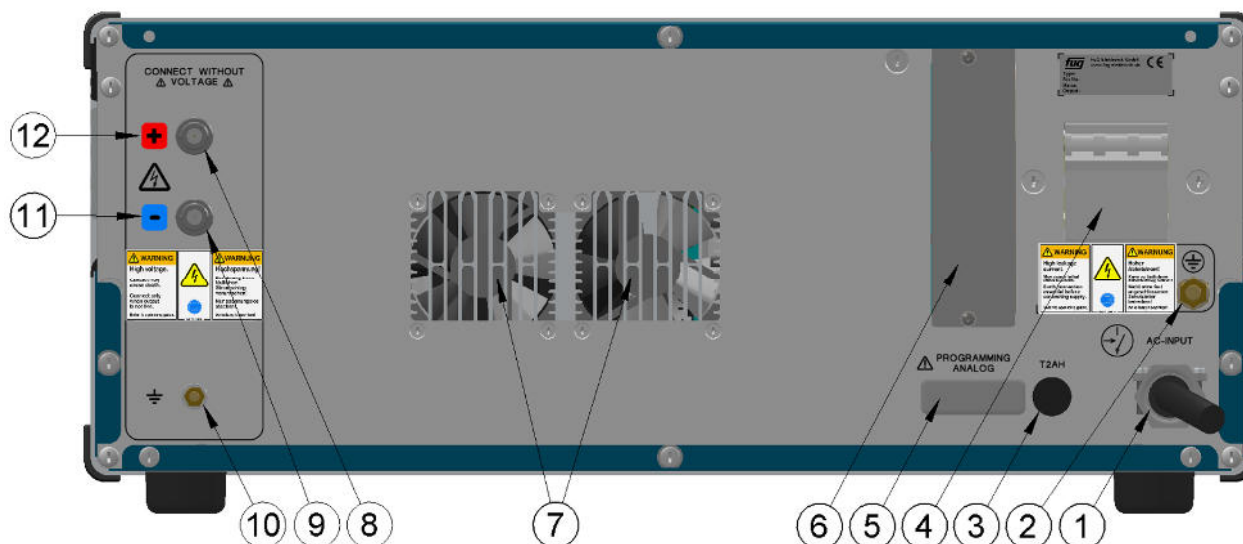


Figure: Sample MCA 3000 – 400. For DC power supplies with higher power or other voltages, other dimensions may apply. The arrangement of the elements may be different from that, shown here.

1	AC input with permanently installed cable for 3-phase mains connections.
2	Earthing bolt, only for units with three-phase AC power connection. The DC power supply must be professionally earthed using 10mm ² cable to the earthing bolt provided
3	Fuse holder for internal control fuse
4	Automatic circuit breaker, fuse holder
5	(Optional) 15-pin Sub-D connector for analog programming.
6	(Optional) Slot for digital interface (e.g.: IEEE-488, RS232, USB, LAN, ...)
7	Air outlet for the power output stage
8	HV Output+ (positive) For power supplies with nominal voltage up to 750V: SLB (german abbreviation, safety-laboratory-socket) For power supplies with nominal voltage 1500V an 3000V: SHV (designated for screened output cable with grounded screen.)
9	HV Output- (negative) For power supplies with nominal voltage up to 750V: SLB (german abbreviation, safety-laboratory-socket) For power supplies with nominal voltage 1500V an 3000V: SHV (designated for screened output cable with grounded screen.)
10	Earthing bolt: This connection must be connected to the ground of the load!
11	Polarity indication: BLUE: NEGATIVE
12	Polarity indication: RED: POSITIVE

SCOPE OF DELIVERY

- Power supply
- Safety instruction brochure (paper) and operation manual (cloud based in digital form)
- Mains input cable (For single phase mains: with CEE-7/7, for 3 phase mains: open end)
- Mating connectors for control inputs and outputs (Excluded comm. available cables for digital interfaces)
- For power supplies with output voltage 1500V or more: Set of one or two screened HV output cables, 3m with mating connectors assembled on one end, other end open (For delivery short circuited for safety reasons)

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AUTORANGING POWER SUPPLIES – MCA SERIES



TYPE TABLE

Type	Power (max.)	Voltage	Current	Width	Height	Depth	Weight
MCA 750 - 150 ●	750 W	0 - 150 V	0 - 15 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
MCA 1500 - 150	1500 W	0 - 150 V	0 - 30 A	19" / 443 mm	4 HE / 177 mm	450 mm	17 kg
MCA 3000 - 150 3)	3000 W	0 - 150 V	0 - 60 A	19" / 443 mm	4 HE / 177 mm	650 mm	37 kg
MCA 6000 - 150 3)	6000 W	0 - 150 V	0 - 120 A	19" / 443 mm	8 HE / 355 mm	650 mm	61 kg
MCA 9000 - 150 3)	9000 W	0 - 150 V	0 - 180 A	19" / 443 mm	12 HE / 535 mm	650 mm	90 kg
MCA 750 - 400 ●	750 W	0 - 400 V	0 - 6 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
MCA 1500 - 400	1500 W	0 - 400 V	0 - 12 A	19" / 443 mm	4 HE / 177 mm	450 mm	17 kg
MCA 3000 - 400 3)	3000 W	0 - 400 V	0 - 24 A	19" / 443 mm	4 HE / 177 mm	650 mm	35 kg
MCA 6000 - 400 3)	6000 W	0 - 400 V	0 - 48 A	19" / 443 mm	8 HE / 355 mm	650 mm	61 kg
MCA 9000 - 400 3)	9000 W	0 - 400 V	0 - 72 A	19" / 443 mm	12 HE / 535 mm	650 mm	90 kg
MCA 750 - 750 ●	750 W	0 - 750 V	0 - 3 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
MCA 1500 - 750	1500 W	0 - 750 V	0 - 6 A	19" / 443 mm	4 HE / 177 mm	450 mm	16 kg
MCA 3000 - 750 3)	3000 W	0 - 750 V	0 - 12 A	19" / 443 mm	4 HE / 177 mm	650 mm	33 kg
MCA 6000 - 750 3)	6000 W	0 - 750 V	0 - 24 A	19" / 443 mm	8 HE / 355 mm	650 mm	61 kg
MCA 9000 - 750 3)	9000 W	0 - 750 V	0 - 36 A	19" / 443 mm	12 HE / 535 mm	650 mm	90 kg
MCA 750 - 1500 ●	750 W	0 - 1500 V	0 - 1,5 A	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
MCA 1500 - 1500	1500 W	0 - 1500 V	0 - 3 A	19" / 443 mm	4 HE / 177 mm	450 mm	17 kg
MCA 3000 - 1500 3)	3000 W	0 - 1500 V	0 - 6 A	19" / 443 mm	4 HE / 177 mm	650 mm	32 kg
MCA 6000 - 1500 3)	6000 W*	0 - 1500 V	0 - 12 A	19" / 443 mm	8 HE / 355 mm	650 mm	61 kg
MCA 9000 - 1500 3)	9000 W*	0 - 1500 V	0 - 18 A	19" / 443 mm	12 HE / 535 mm	650 mm	90 kg
MCA 750 - 3000 ●	750 W*	0 - 3000 V	0 - 750 mA	19" / 443 mm	3 HE / 133 mm	350 mm	10 kg
MCA 1500 - 3000	1500 W*	0 - 3000 V	0 - 1,5 A	19" / 443 mm	4 HE / 177 mm	450 mm	17 kg
MCA 3000 - 3000 3)	3000 W*	0 - 3000 V	0 - 3 A	19" / 443 mm	4 HE / 177 mm	650 mm	32 kg
MCA 6000 - 3000 3)	6000 W*	0 - 3000 V	0 - 6 A	19" / 443 mm	8 HE / 355 mm	650 mm	61 kg
MCA 9000 - 3000 3)	9000 W*	0 - 3000 V	0 - 9 A	19" / 443 mm	12 HE / 535 mm	650 mm	90 kg

3) Three phase mains connection

All specifications are subject to change without further notice.

Please feel free to contact our sales team for any further questions:

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