

DATASHEET

AUTORANGING POWER SUPPLIES – MCA SERIES



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

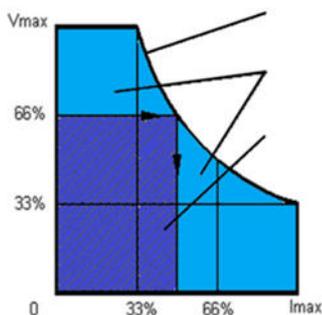


PRODUCT PROPERTIES AND DATA

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 characteristics with a fixed power limit
- Compact design (19" housing), low weight and high efficiency
- The output is floating up to 1500V
- Permanently short-circuit and flash-over proof
- Can be operated indefinitely with rated current in case of a short-circuit
- Voltage and constant current control with automatic transfer and control mode display with LEDs, plus additional power limit
- Voltage and current are set using a ten-turn potentiometer with a lockable precision knob
- 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

POSSIBLE OPTIONS:

- Coarse/fine-potentiometers (99% / 1%) for more accurate adjustment of voltage and / or current
- Analog programming/interface
- Analog programming/interface, floating
- Computer interfaces -IEEE 488, RS 232, RS 422, Profi-bus DP, USB, LAN (more on request)
- Lower ripple
- Higher stability
- Lower stored energy

More options and special solutions on request. Some options may involve changes to the description 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 front panel or the equipment card
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:	Devices with max. 150V and 400V output voltage are isolated against earth for $\pm 500V$; devices with max. 750V output voltage for $\pm 1000V$; and devices with max. 1500V output voltage and power class up to 3kW for $\pm 2000V$. For these power supplies either the positive or negative output can be connected to earth. For power supplies with max. 1500V output voltage in the power classes 6kW and 9kW as well as power supplies with max. output voltage of 3000V, one output is generally connected to earth. These power supplies cannot be operated in floating mode. The required polarity has to be mentioned with the order. The same applies for power supplies with ordered standard analog programming/interface (non-floating version).
Power range and power limitation:	Autoranging Factor: 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:	$< 2 \times 10^{-4}ss + 200mVss$ (measuring bandwidth 30Hz to 10MHz) $< 6 \times 10^{-5} + 70mV$ of rated value RMS
Control time:	
Voltage control:	$< 1ms$ with load changes from 10% to 100% or 100% to 10%, respectively
Current control:	$< 10ms$ with load changes that effect a change of less than 10% in the output voltage.
Setting time at rated 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 sec Discharge time to $< 50V$ max. 1 minute

DATASHEET

AUTORANGING POWER SUPPLIES – MCA SERIES



Control deviation:	with $\pm 10\%$ network change: $< \pm 1 \times 10^{-5}$ of the rated value, with open circuit / full load: 5×10^{-4} of the rated value, over 8 hours: $< \pm 2 \times 10^{-4}$ of the rated value, with temperature deviations $< \pm 1 \times 10^{-4}/K$ 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, decreasing linearly 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:

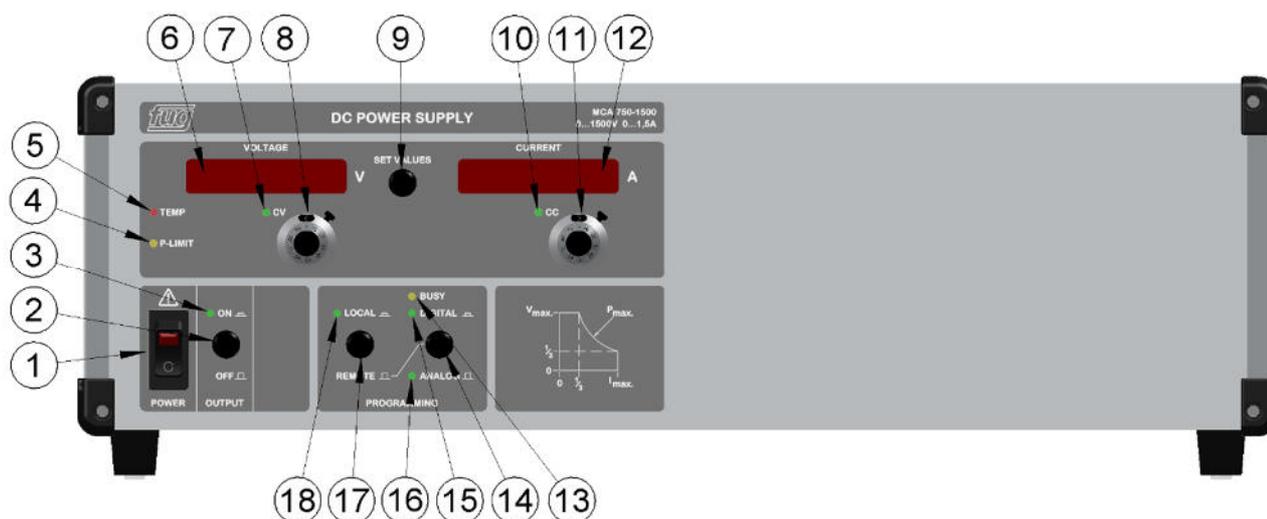


Figure: Sample Front panel MCA 750 – 1500. Different dimensions apply for DC power supplies with higher power

1	AC power switch with indicator light Disconnects the power supply from the mains, two-pole switching	10	LED for constant current control mode (Constant Current)
2	DC output ON (OUTPUT) There is no mains disconnection!	11	Lockable ten-turn potentiometer for current adjustment
3	DC output ON LED Lights up green when the controller and therefore the power stage is operating (OUTPUT ON)	12	Current display flashing: Set point not flashing: Actual value
4	LED P-LIMIT display for power limit	13	(Optional) LED BUSY displays data traffic on the digital interface
5	LED TEMP for over-temperature: Internal device temperature too high, fan failed or contaminated. (Use is type-dependent)	14	(Optional) Switching the operation mode between REMOTE/ANALOG and REMOTE/DIGITAL
6	Voltage display flashing: Set point; not flashing: Actual value	15	(Optional) LED indicating digital programming active
7	LED for constant voltage control mode (Constant Voltage)	16	(Optional) LED indicating Analog programming/interface active
8	Lockable ten-turn potentiometer for voltage adjustment	17	(Optional) Switching the operation mode set-point between LOCAL and REMOTE
9	SET VALUES Switch displays between Set-point mode and Actual output mode, displays flash when in set-point mode.	18	(Optional) LED LOCAL control mode active

REAR VIEW WITH SINGLE-PHASE AC INPUT:

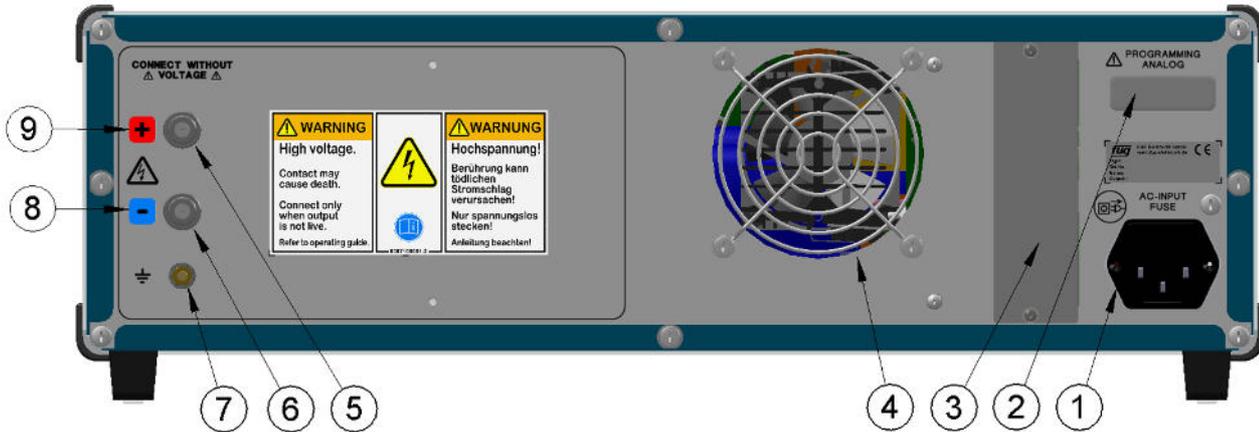


Figure: Rear panel – MCA 750 – 400. For DC power supplies with higher power or other voltages, other dimensions may apply. The elements' layout may vary from that shown here.

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	For power supplies with 1250V or 2000V output voltage: HV output + (designated for screened output cable with grounded screen. To let the current flow back via the screen, the other (negative) output must be shorted) For power supplies up to 650V output voltage: HV-output with SLB (german abbreviation, safety-laboratory-socket)
6	For power supplies with 1250V or 2000V output voltage: HV output + (designated for screened output cable with grounded screen. To let the current flow back via the screen, the other (negative) output must be shorted) For power supplies up to 650V output voltage: HV-output with SLB (german abbreviation, safety-laboratory-socket)
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:

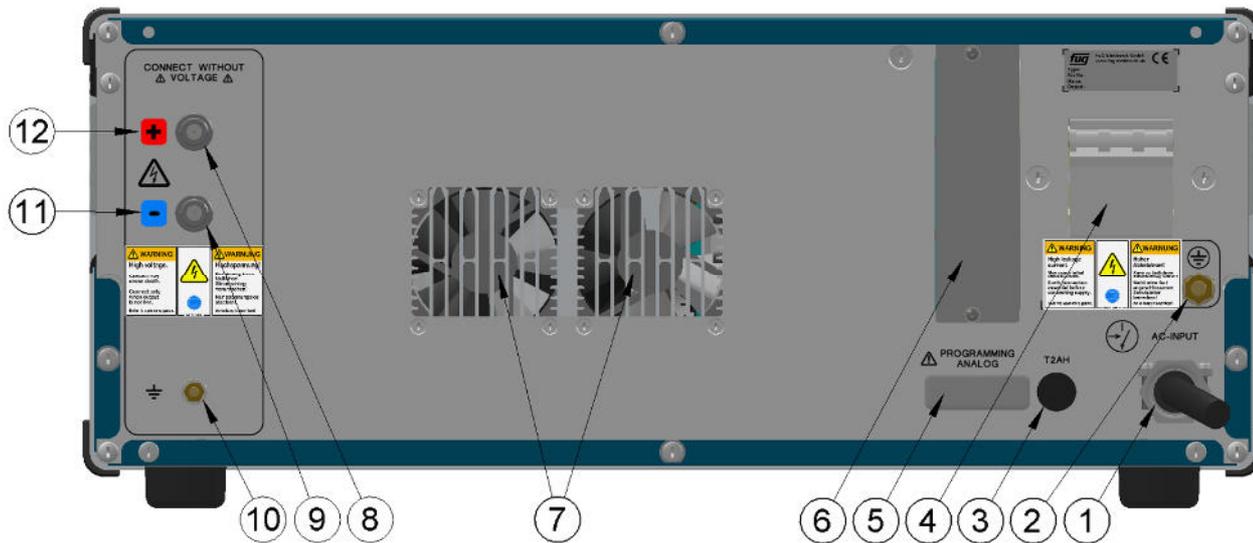


Figure: Sample MCA 750 – 400. For DC power supplies with higher power or other voltages, other dimensions may apply. The elements' layout may vary from that shown here.

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	For power supplies with 1250V or 2000V output voltage: HV output + (designated for screened output cable with grounded screen. To let the current flow back via the screen, the other (negative) output must be shorted) For power supplies up to 650V output voltage: HV-output with SLB (german abbreviation, safety-laboratory-socket)
6	For power supplies with 1250V or 2000V output voltage: HV output - (designated for screened output cable with grounded screen. To let the current flow back via the screen, the other (negative) output must be shorted) For power supplies up to 650V output voltage: HV-output with SLB (german abbreviation, safety-laboratory-socket)
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

DATASHEET

AUTORANGING POWER SUPPLIES – MCA SERIES



TYPE TABLE

Type	Power (max.)	Voltage	Current	Width	Height	Depth	Weight
NCA 750 - 55	750 W	0 - 55 V	0 - 40 A	19" / 443 mm	3 HE / 133 mm	350 mm	12 kg
NCA 1500 - 55	1500 W	0 - 55 V	0 - 80 A	19" / 443 mm	3 HE / 133 mm	550 mm	20 kg
NCA 3000 - 55 3)	3000 W	0 - 55 V	0 - 160 A	19" / 443 mm	3 HE / 133 mm	650 mm	25 kg
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

*) With polarity reversal switch these units will be 2 HU higher.

**) With polarity reversal switch these units will be 100mm deeper.

***) The dimensions are valid for the power part. The high voltage part is housed in a separate oil filled container. Weight stated: Power part / High voltage container

All specifications are subject to change without further notice.