

Description

The MCA600 are modular, user configurable power supplies offering unrivalled performance and flexibility.

Delivering 600 W from a 600 g, 5" x 3" x 1U package, the MCA600 is the smallest commercially available configurable power solution.

Each system consists of an input module together with up to four isolated output modules.

The series carry full UL60601 and UL60950 safety approvals and comply with EN61000-3, EN61000-4 and EN55022 class B EMC standards.



2 Year Warranty

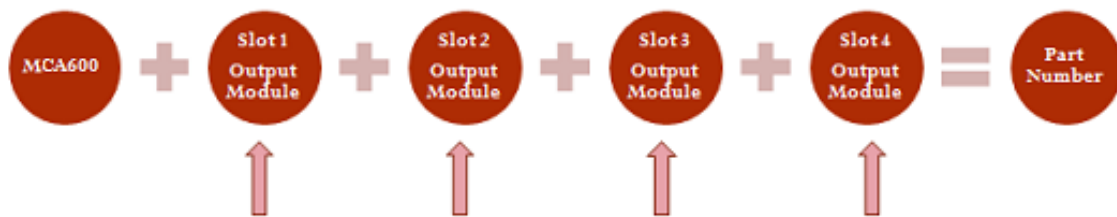
KEY FEATURES

- Universal input voltage
- Active power factor correction
- High power density (25 W/in³)
- 600W output in 5"x3"x1U footprint
- Field configurable
- Medical safety approved
- High reliability
- High efficiency
- Parallel operation
- Accurate wired current share
- Current output signal
- N+1 redundant (external diodes)
- Global 5 V, 200 mA bias supply
- RoHS-6 compliant
- Remote voltage programming
- Remote current programming

MARKET SEGMENTS AND APPLICATIONS

- Industrial Electronics & Computers
- Test and Measurement Equipment
- Automation and Drives
- Broadcast & Entertainment
- Printing
- Industrial & Process Controls
- Medical Applications
- Telecommunications

MODELS AND ORDERING INFORMATION



Output Module	Nominal Voltage	Rated Current	Voltage Adjustment	Load Regulation	Line Regulation	OVP	Output Power
A	5V	25.0 A	1.5V to 7.5V	±50mV	±0.1% Vnom	9.5V	125 W
B	12V	15.0 A	4.5V to 15V	±100mV	±0.1% Vnom	18V	150 W
C	24V	7.5 A	9V to 30V	±150mV	±0.1% Vnom	36V	150 W
0 (zero)				Unused slots			

Example: For an MCA600 with 5V at 25A (Module A in slot 1), 12V at 12.5A (Module B in slot 2) and 24V at 12.5A (Module C x 2 in slot 3 and slot 4), use **"MCA600-ABCC"**.

Input Specifications

Parameter	Details	Min	Typ	Max	Units
AC input voltage	Nominal range is 100 to 240 V _{RMS}	85		264	V _{RMS}
AC input frequency		47	50/60	63	Hz
DC input voltage		120		300	Vdc
Power rating	Derate by 0.55%/Vrms below 180 V _{RMS} (402W at 120Vrms, 303W at 90 V _{RMS})			600	W
Input current	At 600 W output and 180 V _{RMS} input			4	A
Inrush current	265 V _{RMS} , cold start			20	A
Fusing	5x20 fast acting fuse			5	A
Input current limit	Maintains power factor		6		A
Efficiency	Configuration dependent		86	89	%
Idle power	All outputs fitted and enabled		24		W
	All outputs fitted and disabled		19		
Power factor	Typical value at 300 W output at 240 V _{RMS}		0.96	0.99	
Hold up	600 W output at 180 V _{RMS} input	17	20	21	ms
UVLO	Turn on only	78		84	V _{RMS}
Over temperature	Internally monitored. Latching	115		125	°C
Reliability	Demonstrated at 40°C, 80% load			2	FPMH

Signals

Parameter	Details	Min	Typ	Max	Units
Bias voltage		4,8	5	5,2	V
Bias current		0		200	mA
Power Good Voltage	PNP open collector with internal 10 KΩ pull down resistor	8	10	15	V
Power Good Current		0		20	mA
Inhibit voltage		2		15	V
Inhibit current	10KΩ input impedance	0.2		1.5	mA
Global inhibit voltage		3		15	V
Global inhibit current	5KΩ input impedance	0.6		3	mA
AC_OK voltage		1		4	V
AC_OK current		-10		20	mA
AC_OK warning	See user manual for exceptions	5			ms

Safety

Parameter	Details	Min	Max	Units
Isolation voltage	Input to Output		4000	V _{RMS}
	Input to Chassis		1500	V _{RMS}
	Output to Chassis		250	Vdc
	Output to Output		250	Vdc
Isolation clearance	Primary to Secondary (Reinforced)	7		mm
	Primary to Chassis (Basic)	2.5		mm
Isolation creepage	Primary to Secondary (Reinforced)	12		mm
	Primary to Chassis (Basic)	4		mm
Leakage current	265 Vac, 63 Hz, 25°C		300	µA
Agency Approvals	cUR _{US} , Demko, CB Certificate			
Standards	IEC/EN60950-1; UL60950-1/CSAC22.2No.60950-1-03; IEC/EN60601-1; CE Mark: LVD 73/23/EEC.			
Agency File Numbers	UL : E316486			

Environmental

Parameter	Details	Min	Max	Units
Storage				
Temperature		-40	+85	°C
Humidity	Relative, non condensing	5	95	%
Altitude		-200	5000	m
Air pressure		54	106	kPa
Operating				
Temperature	Full power	-20	50	°C
	Derate by 2.5%/°C above 50°C	50	70	°C
Humidity	Relative, non condensing	5	95	%
Altitude		-200	2000	m
Air pressure		78	106	KPa
Noise level	Measured at 1 m from fan intake		45	dB(A)
Shock	3000 bumps at 10 g (16 ms) half sine wave			
Vibration	1,5 g 10 to 200 Hz sine wave, 20 g for 15 min in 3 axes random vibration			
Installation				
Equipment class	I			
Installation	Category II			
Pollution Degree	2			
Material Group	IIIb (Indoor use only)			
Flammability	94V-2			
IP Rating	IP10			
RoHS Compliance	2002/95/EC			

Electromagnetic compatibility EMC

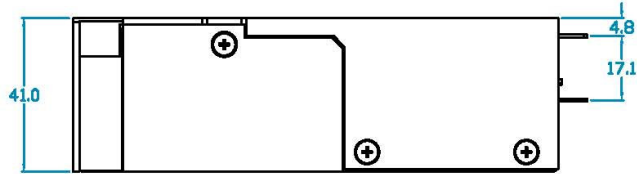
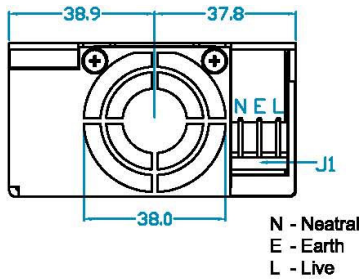
Parameter	Standard	Level
Emissions		
Radiated electric field	EN55011, EN55022, FCC	B
Conducted emissions	EN55011, EN55022, FCC	B
Harmonic distortion	EN61000-3-2	Compliant
Flicker and fluctuation	EN61000-3-3	Compliant
Immunity		
Electrostatic discharge	EN61000-4-2 (15 kV air, 8 kV contact)	4
Radiated RFI	EN61000-4-3 (10 V/m)	3
Fast transient burst	EN61000-4-4 (4 kV)	4
Input line surges	EN61000-4-5 (1 kV L-N, 2 kV L-E)	3
Conducted RFI	EN61000-4-6 (10 V)	4
Power freq. Magnetic field	EN61000-4-8 (10 A/m)	3
Voltage dips	EN61000-4-11 (EN55024)	Compliant

Reliability

Component	Details	Max	Units
Fan	Mag. Lev. Standard	3.8	FPMH
Input	Excluding Fan	2	FPMH
Output	See output specifications	1	FPMH
Warranty		2	Years

Mechanical Specifications and Connections

Specification	Details	Nominal	Units
Dimensions	Height is 1U	76.7 x 129.7 x 41.0	mm
		3.02 x 5.11 x 1.61	in
Weight	Chassis + input	360	g
	Output modules	60	g
	Chassis + input	0.794	lb
	Output modules	0.132	lb
Mounting	Bottom or side mounting through M4 screws	M4	



SCREWS:

MH1, MH2, MH3, MH4, MH5

- Screw type - M4
- Tightening - Tighten to 1.5 N.m torque
- Penetration depth - 4.00mm max including chassis

OUTPUT MODULES x 8

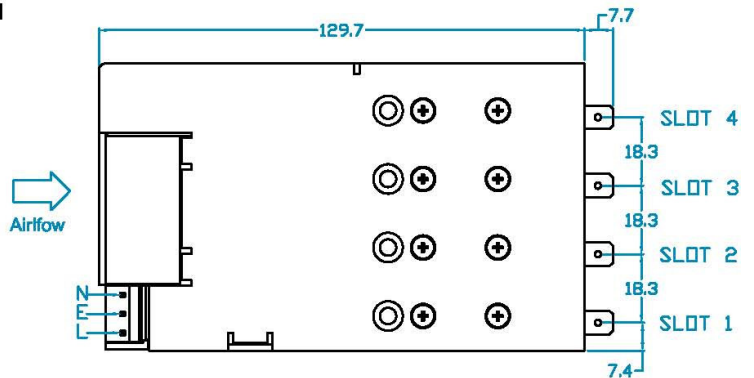
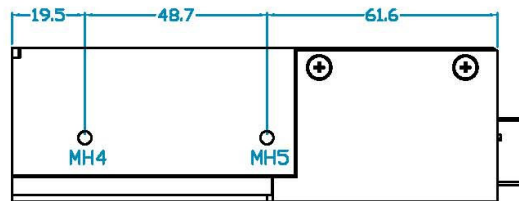
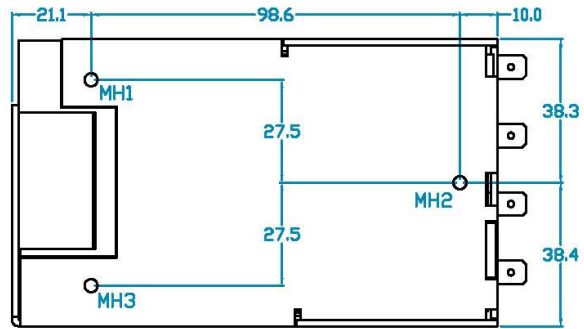
- Screw type - M3 x 5, C/sink, Posi, Stainless Steel
- Tightening - Tighten to 0.75 N.m torque
- Penetration depth - Defined by screw

CHASSIS x 5

- Screw type - M3 x 5, C/sink, Posi, Stainless Steel
- Tightening - Tighten to 0.75 N.m torque
- Penetration depth - Defined by screw

FAN x 2

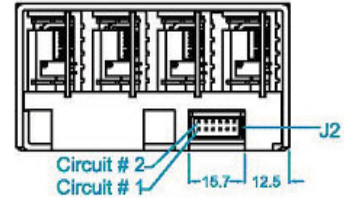
- Screw type - M3 x 24, C/sink, Posi, Stainless Steel
- Tightening - Tighten to 0.75 N.m torque
- Penetration depth - Defined by screw



Mechanical Specifications and Connections

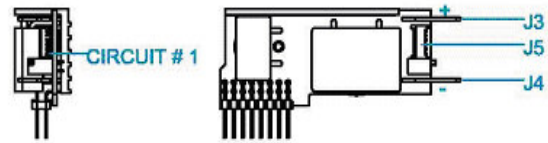
J1 - Mains Input

- Housing** - Molex - Part # - 0010013036
 - 5.08mm (0.200"), 3Way Housing with Friction Lock
 - or any direct equivalent
- Terminal** - Molex - Part # - 0008701031
 - Crimp terminal, 18-24 AWG
 - or any direct equivalent



J2 - Global Signal

- Housing** - Molex - Part # - 0511101260
 - 2.00mm (0.079"), 12Way Housing with Friction Lock
 - or any direct equivalent
- Terminal** - Molex - Part # - 0503948051
 - Crimp terminal, 24-30 AWG
 - or any direct equivalent
- Housing** - Molex - Part # - 0875681273
IDT - 2.00mm (0.079"), 12Way IDT Housing with Lock
 - or any direct equivalent



J2 - Global Signal

Pin	Signal
1	Module Power Good Slot 1
2	Module Inhibit Slot 1
3	Module Power Good Slot 2
4	Module Inhibit Slot 2
5	Module Power Good Slot 3
6	Module Inhibit Slot 3
7	Module Power Good Slot 4
8	Module Inhibit Slot 4
9	Global Inhibit
10	AC OK
11	Global Bias Supply +5V
12	COM

J3/J4 - Output Power Terminal

- Terminal** - Various - Tab size - 0.80mm x 6.35mm
 - Crimp terminal must have current rating higher than short circuit current of output module e.g.
 $I_{sc} OP A = 25Amp * 1.25 = 31.25Amp$
 Always use appropriate wire size, see Instruction Manual

J5 - Output Signal

- Housing** - Molex - Part # - 01510210600
 - 1.25mm (0.049"), 6Way Housing
 - or any direct equivalent
- Terminal** - Molex - Part # - 050058800
 - Crimp terminal, 28-32 AWG
 - or any direct equivalent

J5 - Output Signal

Pin	Signal
1	- Sense
2	+ Sense
3	Voltage Control
4	Current Out / Current Control / Current Share
5	COM
6	Module Bias Supply +5V

Output Specifications – Module A

Parameter	Test conditions / Notes	Min	Nominal	Max	Units
Output voltage range		1.5	5	7.5	V
Rated current				25	A
Average output power				125	W
Peak output power	<5 s, 50% duty cycle			187.5	W
Initial voltage accuracy	Factory set units, Measured at sense terminals	-0.5		0.5	% V _{SET}
Output adjustment	Manual: 11-turns potentiometer		0.545		V/turn
Load regulation	Measured at sense terminals	-50		50	mV
Line regulation	Measured at sense terminals	-0.1		0.1	%V _{NOM}
Cross regulation	Measured at sense terminals	-0.2		0.2	%V _{NOM}
Minimum load			0		A
Output temperature drift		-0.02		0.02	%/°C
Ripple and Noise	20 MHz bandwidth, peak-peak			1	%V _{NOM}
Transient response	25 to 75% load transient, at 1A/μs, recovery to within 10% of V _{SET}			100	μs
Turn on rise time	Monotonic, 10% to 90%	1.5		3.5	ms
Turn on overshoot				0.1	%V _{SET}
Turn on delay	From AC on to Power Good From Enable to Power Good		600 15	750 20	ms ms
Current sharing accuracy				5	%I _{MAX}
Open sense offset	Open sense, voltage offset due to bias currents			2	%V _{NOM}
Hold-up voltage				6	V
Isolation to ground	Each terminal			250	V
Over current protection	% of rated current	105		125	%I _{RATED}
Reverse current protection	% of rated current	-6		0	%I _{RATED}
Short circuit protection (Hiccup mode)	Period Duty cycle Voltage threshold (at sense)		125 3 1		ms % V
Over voltage protection	Latching		9.5		V
Over temperature protection	Internally monitored, latching	115		125	°C
Sense cable protection	On positive terminal On negative terminal	-1 none		2 1	V V
Power good threshold	Low threshold only		90		%V _{SET}
Output current signal	$I_{SGN} = 0.6 + I_{OUT}/(I_{RTD} * 1.25)$	0		110	%I _{RATED}
Current limit control	$I_{LMT} = (V_{CTRL} - 0.6) * I_{RTD} * 1.25$	0		110	%I _{RATED}
Remote voltage control	$V_{OUT} = V_{SET} ((1.8 - V_{CTRL}) / 0.6)$	0		300	%V _{SET}
Bias supply	10 mA max	4.5	5	5.2	V
Reliability	Demonstrated at 40°C, 80% load			1	FPMH
Warranty				2	Years
Wire size	Power cables	12	10		AWG
Weight				60	g
Size	60 mm x 35 mm x 17 mm, or, 2.36 in x 1.38 in x 0.67 in				

Output Specifications – Module B

Parameter	Test conditions / Notes	Min	Nominal	Max	Units
Output voltage range		4.5	12	15	V
Rated current				15	A
Average output power				150	W
Peak output power	<5 s, 50% duty cycle			225	W
Initial voltage accuracy	Factory set units, Measured at sense terminals	-0.5		0.5	% V _{SET}
Output adjustment	Manual: 11-turns potentiometer		0.954		V/turn
Load regulation	Measured at sense terminals	-100		100	mV
Line regulation	Measured at sense terminals	-0.1		0.1	%V _{NOM}
Cross regulation	Measured at sense terminals	-0.2		0.2	%V _{NOM}
Minimum load			0		A
Output temperature drift		-0.02		0.02	%/°C
Ripple and Noise	20 MHz bandwidth, peak-peak			1	%V _{NOM}
Transient response	25 to 75% load transient, at 0.5A/μs; recovery to within 10% of V _{SET}			1.5	V
Turn on rise time	Monotonic, 10% to 90%	1.5		3.5	ms
Turn on overshoot				0.1	%V _{SET}
Turn on delay	From AC on to Power Good From Enable to Power Good		600 15	750 20	ms ms
Current sharing accuracy				5	%I _{MAX}
Open sense offset	Open sense, voltage offset due to bias currents			2	%V _{NOM}
Hold-up voltage				12.5	V
Isolation to ground	Each terminal			250	V
Over current protection	% of rated current	105		125	%I _{RATED}
Reverse current protection	% of rated current	-6		0	%I _{RATED}
Short circuit protection (Hiccup mode)	Period Duty cycle Voltage threshold (at sense)		125 3 2		ms % V
Over voltage protection	Latching		18		V
Over temperature protection	Internally monitored, latching	115		125	°C
Sense cable protection	On positive terminal On negative terminal	-1 none		2 1	V
Power good threshold	Low threshold only		90		%V _{NOM}
Output current signal	I _{SGN} = 0.6 + I _{OUT} /(I _{RTD} *1.25)	0		110	%I _{RATED}
Current limit control	I _{LMT} = (V _{CTRL} - 0.6) * I _{RTD} *1.25	0		110	%I _{RATED}
Remote voltage control	V _{OUT} = V _{SET} ((1.8- V _{CTRL}) / 0.6)	0		300	%V _{SET}
Bias supply	10 mA maximum	4.5	5	5.2	V
Reliability	Demonstrated at 40°C, 80% load			1	FPMH
Warranty				2	Years
Wire size	Power cables	16	14	10	AWG
Weight				60	g
Size	60 mm x 35 mm x 17 mm, or, 2.36 in x 1.38 in x 0.67 in				

Output Specifications – Module C

Parameter	Test conditions / Notes	Min	Nominal	Max	Units
Output voltage range		9	24	30	V
Rated current				7.5	A
Average output power				150	W
Peak output power	<5 s, 50% duty cycle			225	W
Initial voltage accuracy	Factory set units, Measured at sense terminals	-0.5		0.5	% V _{SET}
Output adjustment	Manual: 11-turns potentiometer		1.9		V/turn
Load regulation	Measured at sense terminals	-150		150	mV
Line regulation	Measured at sense terminals	-0.1		0.1	%V _{NOM}
Cross regulation	Measured at sense terminals	-0.2		0.2	%V _{NOM}
Minimum load			0		A
Output temperature drift		-0.02		0.02	%/°C
Ripple and Noise	20 MHz bandwidth, peak-peak			1	%V _{NOM}
Transient response	25 to 75% load transient, at 0.25A/μs; recovery to within 10% of V _{SET}			3	V
Turn on rise time	Monotonic, 10% to 90%	1.5		3.5	ms
Turn on overshoot				0.1	%V _{SET}
Turn on delay	From AC on to Power Good From Enable to Power Good		600 15	750 20	ms ms
Current sharing accuracy				5	%I _{MAX}
Open sense offset	Open sense, voltage offset due to bias currents			2	%V _{NOM}
Hold-up voltage				25	V
Isolation to ground	Each terminal			250	V
Over current protection	% of rated current	105		125	%I _{RATED}
Reverse current protection	% of rated current	-6		0	%I _{RATED}
Short circuit protection (Hiccup mode)	Period Duty cycle Voltage threshold (at sense)		125 3 3.5		ms % V
Over voltage protection	Latching		36		V
Over temperature protection	Internally monitored, latching	115		125	°C
Sense cable protection	On positive terminal On negative terminal	-1 none		2 1	V
Power good threshold	Low threshold only		90		%V _{SET}
Output current signal	I _{SGN} = 0.6 + I _{OUT} /(I _{RTD} *1.25)	0		110	%I _{RATED}
Current limit control	I _{LMT} = (V _{CTRL} - 0.6) * I _{RTD} *1.25	0		110	%I _{RATED}
Remote voltage control	V _{OUT} = V _{SET} ((1.8- V _{CTRL}) / 0.6)	0		300	%V _{SET}
Bias supply	10 mA max	4.5	5	5.2	V
Reliability	Demonstrated at 40°C, 80% load			1	FPMH
Warranty				2	Years
Wire size	Power cables	20	18	10	AWG
Weight				60	g
Size	60 mm x 35 mm x 17 mm, or, 2.36 in x 1.38 in x 0.67 in				

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