



- ◀ Power density max. 916 W/dm<sup>3</sup> (15 W/in<sup>3</sup>)
- ◀ 2 year warranty
- ◀ Output current max. 60 A, rated output power up to 500 W
- ◀ Input voltage ranges 100...264 VAC; 187...242 VAC; 81...138 VAC
- ◀ Low-profile design (35 mm) with blade contacts or connector block
- ◀ Case operating temperature range -40...+85°C, -50...+85°C
- ◀ Single or dual output models
- ◀ Galvanic output isolation
- ◀ Fan power output (12 V; 0,2 A)
- ◀ Overvoltage, short-circuit and thermal protection
- ◀ Typical efficiency 85% (U<sub>out</sub>=27 VDC)
- ◀ Remote off/on
- ◀ Voltage output adjustment
- ◀ Parallel operation, external feedback
- ◀ Parallel or series mode
- ◀ Polymer potting sealing
- ◀ Maximum capacity 1800 uF (U<sub>out</sub>=5 VDC)
- ◀ Recommended for application in a new designs

## DESCRIPTION

Power supply modules of MAA400, MAA500 Series are designed for industrial and special equipment. These compact units (175×93×35 mm) have output power up to 500 W and wide case operating temperature range between -50...+85°C. Depending on the version there are models with one, two or three galvanically isolated output channels, remote off/on mode, over current, overvoltage and thermal protection. They can be operated in parallel or series mode.

To compensate the voltage drop in load conductors there is a utility function of external feedback, allowing to accurately maintain the voltage at the load remote from the converter. The function of an active leveling of output current in parallel operation of several modules on a common load.

Polymer potting sealing ensures reliable environmental protection and eliminates possible vibration-caused breakdown of the converter or injuries caused by dirt and salt-fog contamination. Module case is designed as a U-shaped aluminum base. The PCB is protected from mechanical and climatic influences by a thin-walled steel cover.

## COMPLIANCE

Designed to meet MIL-STD-810G

Designed to meet MIL-STD-461E with additional circuit

### ORDERING INFORMATION

MAA 500 - 2 S 15 15 S D N  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① - MAA series
- ② - Rated output power, W
- ③ - Quantity of output channels (1, 2)
- ④ - Index of nominal input voltage
  - C - 220 VAC, extend (100...264 VAC)
  - S - 220 VAC (187...242 VAC)
  - K - 115 VAC (81...138 VAC)
- ⑤ - Nominal output voltage, VDC (two signs per channel)
- ⑥ - Polymer potting sealing
- ⑦ - Index of design type
  - G - compact metal case with cover and terminal blocks
  - D - compact metal case with cover and blade contacts
- ⑧ - Index of case operating temperature range
  - N - from -40 to +85°C
  - P - from -50 to +85°C

### SINGLE OUTPUT MODELS

MODEL	INPUT VOLTAGE RANGE	OUTPUT POWER	OUTPUT VOLTAGE / RATED OUTPUT CURRENT	EFFICIENCY
MAA400-1C05 SXX	100...264 VAC	300 W	5 VDC / 60 A	78%
MAA400-1C09 SXX	100...264 VAC	400 W	9 VDC / 44,4 A	80%
MAA400-1C12 SXX	100...264 VAC	400 W	12 VDC / 33,3 A	82%
MAA400-1C15 SXX	100...264 VAC	400 W	15 VDC / 26,67 A	82%
MAA400-1C24 SXX	100...264 VAC	400 W	24 VDC / 16,67 A	84%
MAA400-1C28 SXX	100...264 VAC	400 W	28 VDC / 14,81 A	85%
MAA400-1S05 SXX	187...242 VAC	300 W	5 VDC / 60 A	78%
MAA400-1S09 SXX	187...242 VAC	400 W	9 VDC / 44,4 A	80%
MAA400-1S12 SXX	187...242 VAC	400 W	12 VDC / 33,3 A	82%
MAA400-1S15 SXX	187...242 VAC	400 W	15 VDC / 26,67 A	82%
MAA400-1S24 SXX	187...242 VAC	400 W	24 VDC / 16,67 A	84%
MAA400-1S28 SXX	187...242 VAC	400 W	28 VDC / 14,81 A	85%
MAA400-1K05 SXX	81...138 VAC	300 W	5 VDC / 60 A	78%
MAA400-1K09 SXX	81...138 VAC	400 W	9 VDC / 44,4 A	80%
MAA400-1K12 SXX	81...138 VAC	400 W	12 VDC / 33,3 A	82%
MAA400-1K15 SXX	81...138 VAC	400 W	15 VDC / 26,67 A	82%
MAA400-1K24 SXX	81...138 VAC	400 W	24 VDC / 16,67 A	84%
MAA400-1K28 SXX	81...138 VAC	400 W	28 VDC / 14,81 A	85%
MAA500-1C05 SXX	100...264 VAC	300 W	5 VDC / 60 A	78%
MAA500-1C09 SXX	100...264 VAC	500 W	9 VDC / 55,5 A	80%
MAA500-1C12 SXX	100...264 VAC	500 W	12 VDC / 41,6 A	82%
MAA500-1C15 SXX	100...264 VAC	500 W	15 VDC / 33,3 A	82%
MAA500-1C24 SXX	100...264 VAC	500 W	24 VDC / 20,8 A	84%
MAA500-1C28 SXX	100...264 VAC	500 W	28 VDC / 18,5 A	85%
MAA500-1S05 SXX	187...242 VAC	300 W	5 VDC / 60 A	78%
MAA500-1S09 SXX	187...242 VAC	500 W	9 VDC / 55,5 A	80%
MAA500-1S12 SXX	187...242 VAC	500 W	12 VDC / 41,6 A	82%
MAA500-1S15 SXX	187...242 VAC	500 W	15 VDC / 33,3 A	82%
MAA500-1S24 SXX	187...242 VAC	500 W	24 VDC / 20,8 A	84%
MAA500-1S28 SXX	187...242 VAC	500 W	28 VDC / 18,5 A	85%
MAA500-1K05 SXX	81...138 VAC	300 W	5 VDC / 60 A	78%
MAA500-1K09 SXX	81...138 VAC	500 W	9 VDC / 55,5 A	80%
MAA500-1K12 SXX	81...138 VAC	500 W	12 VDC / 41,6 A	82%
MAA500-1K15 SXX	81...138 VAC	500 W	15 VDC / 33,3 A	82%
MAA500-1K24 SXX	81...138 VAC	400 W	24 VDC / 20,8 A	84%
MAA500-1K28 SXX	81...138 VAC	400 W	28 VDC / 18,5 A	85%

Modules with non-standard output voltage from 5 to 60 VDC with maximal output current up to 68 A, could be delivered by request.

### DUAL OUTPUT MODELS

MODEL	INPUT VOLTAGE RANGE	OUTPUT POWER	OUTPUT VOLTAGE / RATED OUTPUT CURRENT	EFFICIENCY
MAA400-2C1212 SXX	100...264 VAC	400 W	12 VDC / 16,67 A; 12 VDC / 16,67 A	78%
MAA400-2C1515 SXX	100...264 VAC	400 W	15 VDC / 13,3 A; 15 VDC / 13,3 A	80%
MAA400-2C2424 SXX	100...264 VAC	400 W	24 VDC / 8,3 A; 24 VDC / 8,3 A	82%
MAA400-2C2828 SXX	100...264 VAC	400 W	28 VDC / 7,4 A; 28 VDC / 7,4 A	82%
MAA400-2S1212 SXX	187...242 VAC	400 W	12 VDC / 16,67 A; 12 VDC / 16,67 A	78%
MAA400-2S1515 SXX	187...242 VAC	400 W	15 VDC / 13,3 A; 15 VDC / 13,3 A	80%
MAA400-2S2424 SXX	187...242 VAC	400 W	24 VDC / 8,3 A; 24 VDC / 8,3 A	82%
MAA400-2S2828 SXX	187...242 VAC	400 W	28 VDC / 7,4 A; 28 VDC / 7,4 A	82%
MAA400-2K1212 SXX	81...138 VAC	400 W	12 VDC / 16,67 A; 12 VDC / 16,67 A	78%
MAA400-2K1515 SXX	81...138 VAC	400 W	15 VDC / 13,3 A; 15 VDC / 13,3 A	80%
MAA400-2K2424 SXX	81...138 VAC	400 W	24 VDC / 8,3 A; 24 VDC / 8,3 A	82%
MAA400-2K2828 SXX	81...138 VAC	400 W	28 VDC / 7,4 A; 28 VDC / 7,4 A	82%
MAA500-2C1212 SXX	100...264 VAC	500 W	12 VDC / 20,8 A; 12 VDC / 20,8 A	78%
MAA500-2C1515 SXX	100...264 VAC	500 W	15 VDC / 16,6 A; 15 VDC / 16,6 A	80%
MAA500-2C2424 SXX	100...264 VAC	500 W	24 VDC / 10,4 A; 24 VDC / 10,4 A	82%
MAA500-2C2828 SXX	100...264 VAC	500 W	28 VDC / 9,2 A; 28 VDC / 9,2 A	82%
MAA500-2S1212 SXX	187...242 VAC	500 W	12 VDC / 20,8 A; 12 VDC / 20,8 A	78%
MAA500-2S1515 SXX	187...242 VAC	500 W	15 VDC / 16,6 A; 15 VDC / 16,6 A	80%
MAA500-2S2424 SXX	187...242 VAC	500 W	24 VDC / 10,4 A; 24 VDC / 10,4 A	82%
MAA500-2S2828 SXX	187...242 VAC	500 W	28 VDC / 9,2 A; 28 VDC / 9,2 A	82%
MAA500-2K1212 SXX	81...138 VAC	500 W	12 VDC / 20,8 A; 12 VDC / 20,8 A	78%
MAA500-2K1515 SXX	81...138 VAC	500 W	15 VDC / 16,6 A; 15 VDC / 16,6 A	80%
MAA500-2K2424 SXX	81...138 VAC	500 W	24 VDC / 10,4 A; 24 VDC / 10,4 A	82%
MAA500-2K2828 SXX	81...138 VAC	500 W	28 VDC / 9,2 A; 28 VDC / 9,2 A	82%

Modules with non-standard output voltage from 5 to 60 VDC with maximal output current up to 68 A, could be delivered by request. For input voltage 220 V (extended) maximum output power decreases for input voltage 100...187 VAC according to the power reduction diagram of module to input voltage.

### SPECIFICATIONS OF AC/DC POWER SUPPLIES MAA400, MAA500\*

#### Input specifications

Input voltage range**	C	100...264 VAC (141...372 VDC)
	S	187...242 VAC (263...340 VDC)
	K	81...138 VAC (113...198 VDC)
Input frequency	C, S	47...53 Hz
	K	360...440 Hz

#### Output specifications

Output voltage adjustment	10%
Line and load regulation	max 2% for first channel max 10% for second (third) channel
Ripple and noise (peak-to-peak)	<2% U <sub>out, nom.</sub>
Short circuit protection***	automatic repair
Overload protection level***	<125% U <sub>вых ном</sub>
Remote on/off	Off at 3...5 VAC (5 mA) output «Contr»

#### General specifications

Case temperature	operating "N"	-40...+85°C
	operating "P"	-50...+85°C
	storage	-50...+85°C
	power derating (free convection) without power derating using heatsink	diagram (dashed, dash-dotted curve) diagram (solid curve)
Humidity		93...95% / 25°C
Efficiency		80% U <sub>out</sub> =5 VDC 86% U <sub>out</sub> =24 VDC
Switching frequency, constant		140 kHz
Isolation voltage	in./case	1500 VAC
	in./out.	1500 VAC
	out./case, out./out.	500 VAC
	isolation resistance @ 500 VDC	20 Mohm min
EMC standards		IEC 60950, EN55022 (CISPR22), Class B
Thermal resistance case-ambient		0,8°C/W
Typical MTBF		2000 kWhrs
Cooling		conductive (baseplate-cooled)
Weight		max 1100 g

It is important to note that the information herein is not full.

More detailed information (specific requirements, basic connection circuits, rules of operations etc.) can be found on our web-site: [www.kwsystems.ru](http://www.kwsystems.ru).

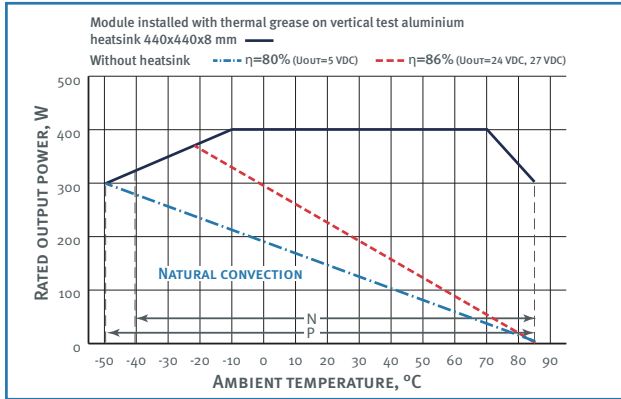
\* All specifications are valid for normal climatic conditions, U<sub>in, nom.</sub>, I<sub>out, nom.</sub>, unless otherwise noted.

\*\* Maximum output power for input voltage C (wide circuit) at U<sub>out</sub> 100...187 VDC is reducing according to Power reduction diagram of module according to input voltage.

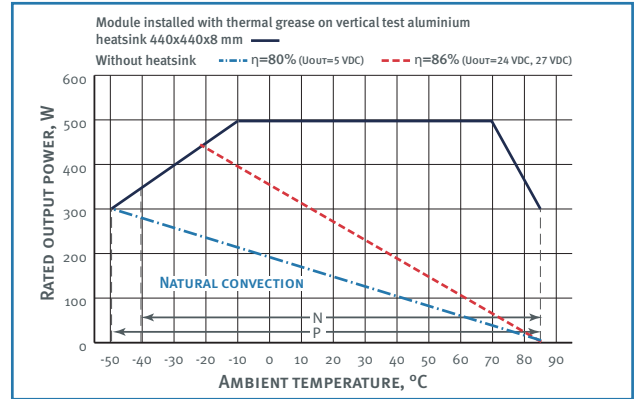
\*\*\* Parameters are stated for the information purposes and could not be used at long term work, exceeding maximum output current, operating outside of a working temperatures range or when output voltage is over the range of adjustment.

## POWER DERATING VS AMBIENT TEMPERATURE DIAGRAM FOR INPUT VOLTAGE 187...242 VAC

MAA400



MAA500

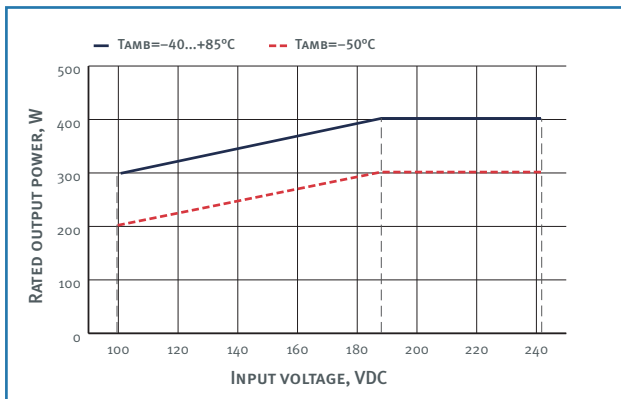


Decreasing parts of the curves correspond to the maximum case temperature. Output power must not exceed the values limited by curve for a given ambient temperature.

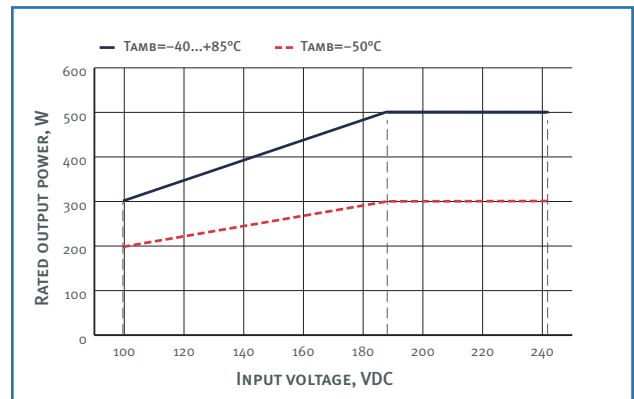
Modules can be used without the heatsink only on condition of installation with thermal grease on heat-distribution baseplate with length and width not less than case's and with thickness not less than 8 mm.

## POWER DERATING VS INPUT VOLTAGE DIAGRAM

MAA400



MAA500



### PIN OUT (DESIGN WITH BLADE CONTACTS)

PIN #	1	2	3	4	5	6	7
SINGLE CHANNEL	L	N	⊕	-ADJ	+ADJ	+RS	-RS
DUAL CHANNEL	L	N	⊕	-ADJ	+ADJ	+U FAN	-U FAN

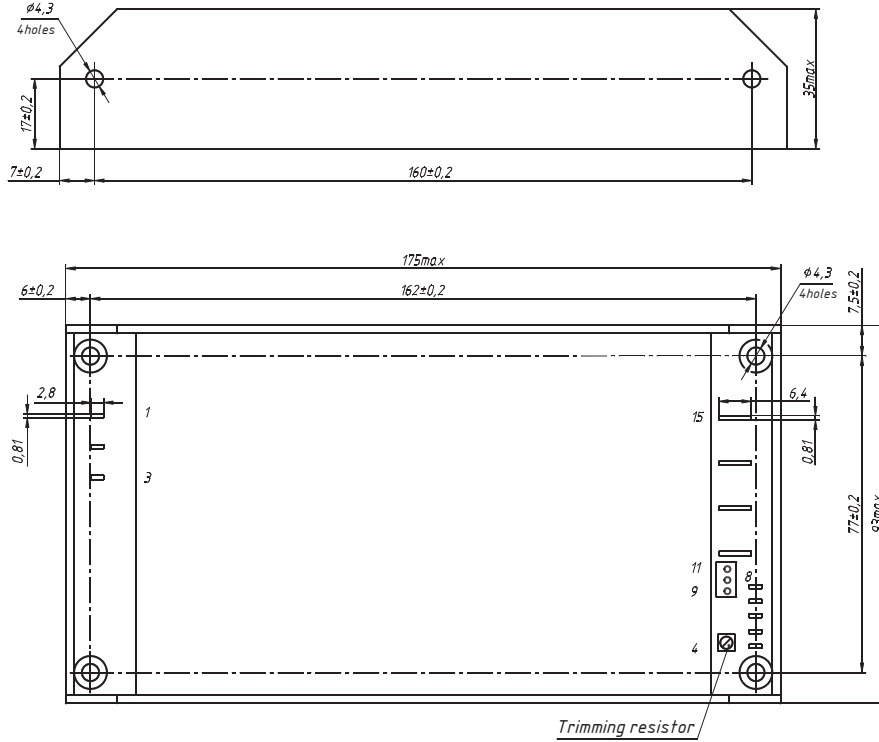
PIN #	8	9	10	11	12	13	14	15
SINGLE CHANNEL	PARAL	NOT USE	-U FAN	+U FAN	-TRIM	+TRIM	+RS	-RS
DUAL CHANNEL	NOT USE	+OUT1	-OUT1	-OUT2	+OUT1	—	—	—

### PIN OUT (DESIGN WITH CONNECTOR BLOCKS)

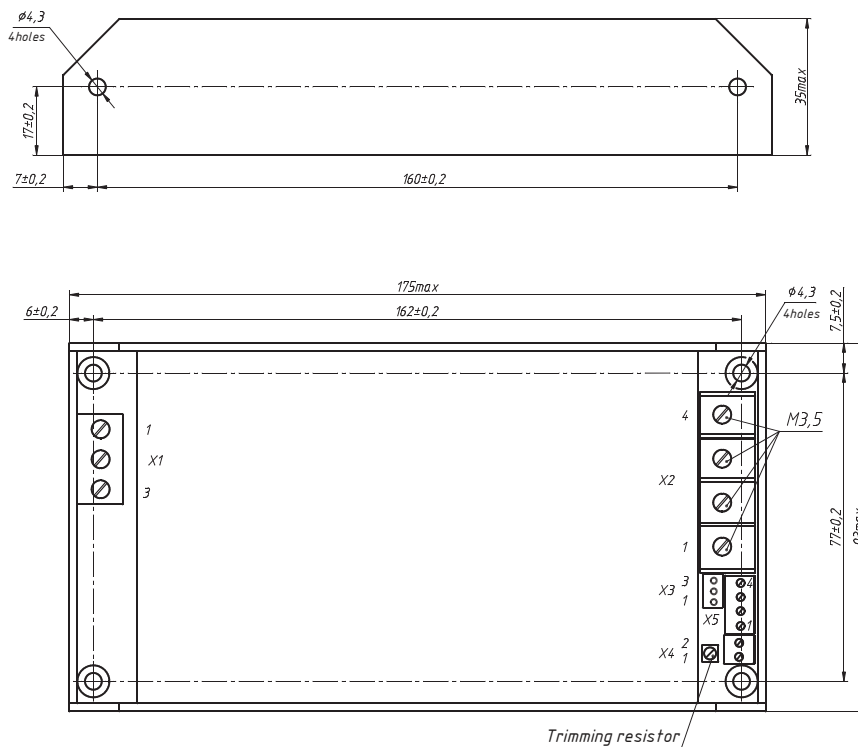
PIN #	X1.1	X1.2	X1.3	X2.1	X2.2	X2.3	X2.4
SINGLE CHANNEL	L	N	⊕	+OUT1	+OUT1	-OUT1	-OUT1
DUAL CHANNEL	L	N	⊕	+OUT1	-OUT1	-OUT2	+OUT2

PIN #	X3.1	X3.2	X3.3	X4.1	X4.2	X5.1	X5.2	X5.3	X5.4
SINGLE CHANNEL	NOT USE	-U FAN	+U FAN	-TRIM	+TRIM	+RS	-RS	PARAL	NOT USE
DUAL CHANNEL	+ U FAN	-U FAN	NOT USE	-TRIM	+TRIM	—	—	—	—

### SINGLE CHANNEL DESIGN WITH BLADE CONTACTS

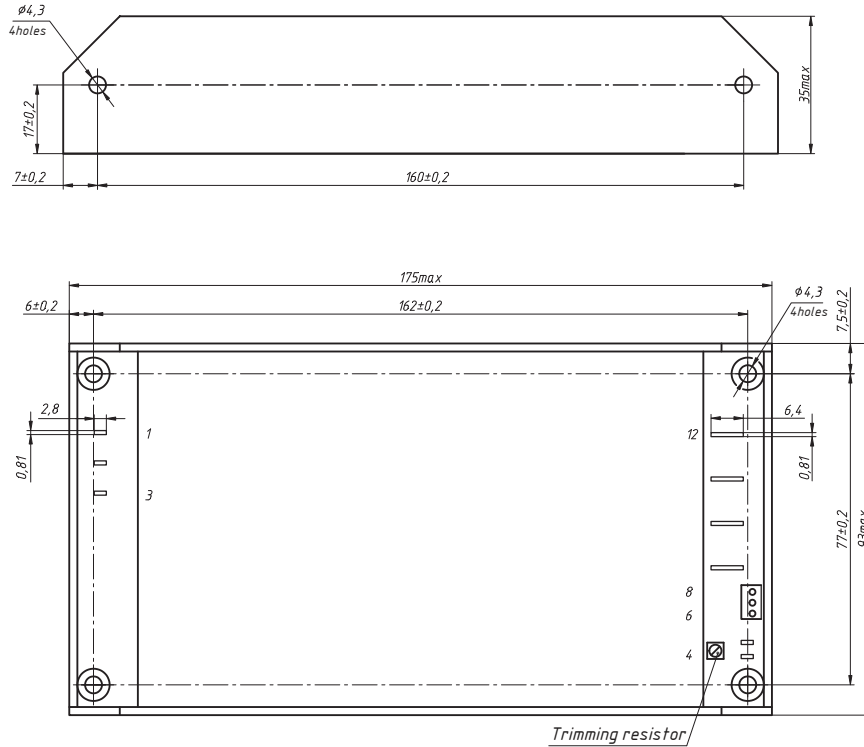


### SINGLE CHANNEL DESIGN WITH CONNECTOR BLOCKS





### DUAL CHANNEL DESIGN WITH BLADE CONTACTS



### DUAL CHANNEL DESIGN WITH CONNECTOR BLOCKS

