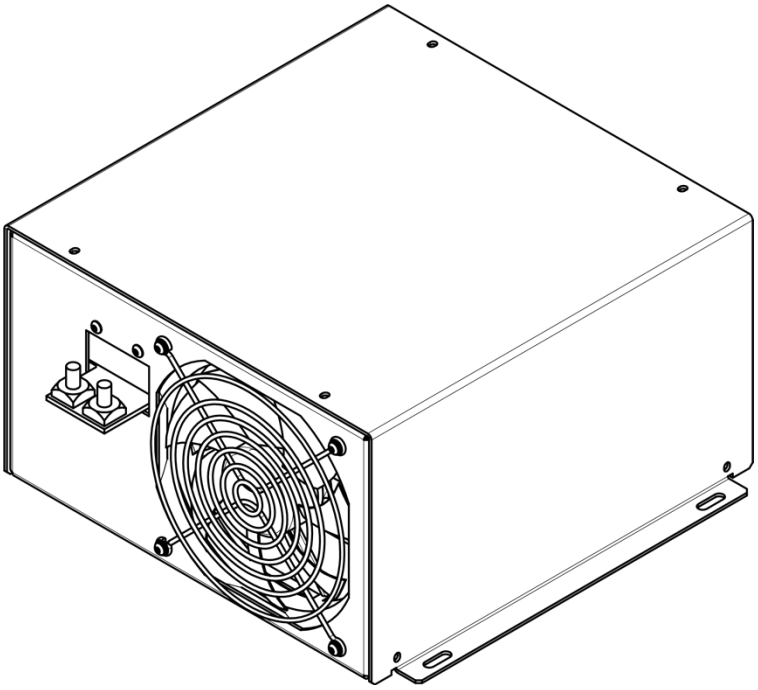
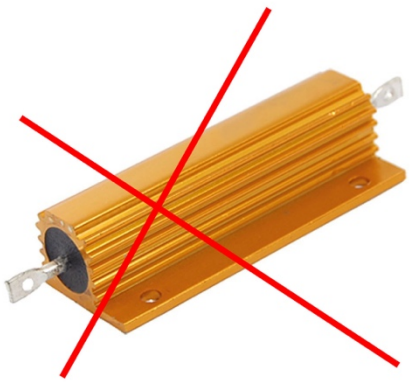
PDD-1600 pulsed diode driver

User manual (preliminary)



Warning! This equipment may be dangerous.
Please read user manual before starting operations.

Important note. Please measure output with adequate load only (diodes). Resistive load connected to the output won't destroy the driver, but will severe distort its behavior.	
	

Warnings

	**Warning!** The equipment is CLASS I ME EQUIPMENT. To avoid risk of electrical shock, the equipment must be protectively grounded.
	**Warning!** There is no user-serviceable parts inside the device. Do not self-repair the driver. Do not even open the enclosure, because of risk of electrical shock with residual high voltage.
	**Warning!** Equipment is not suitable for use in presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Overview / Applications

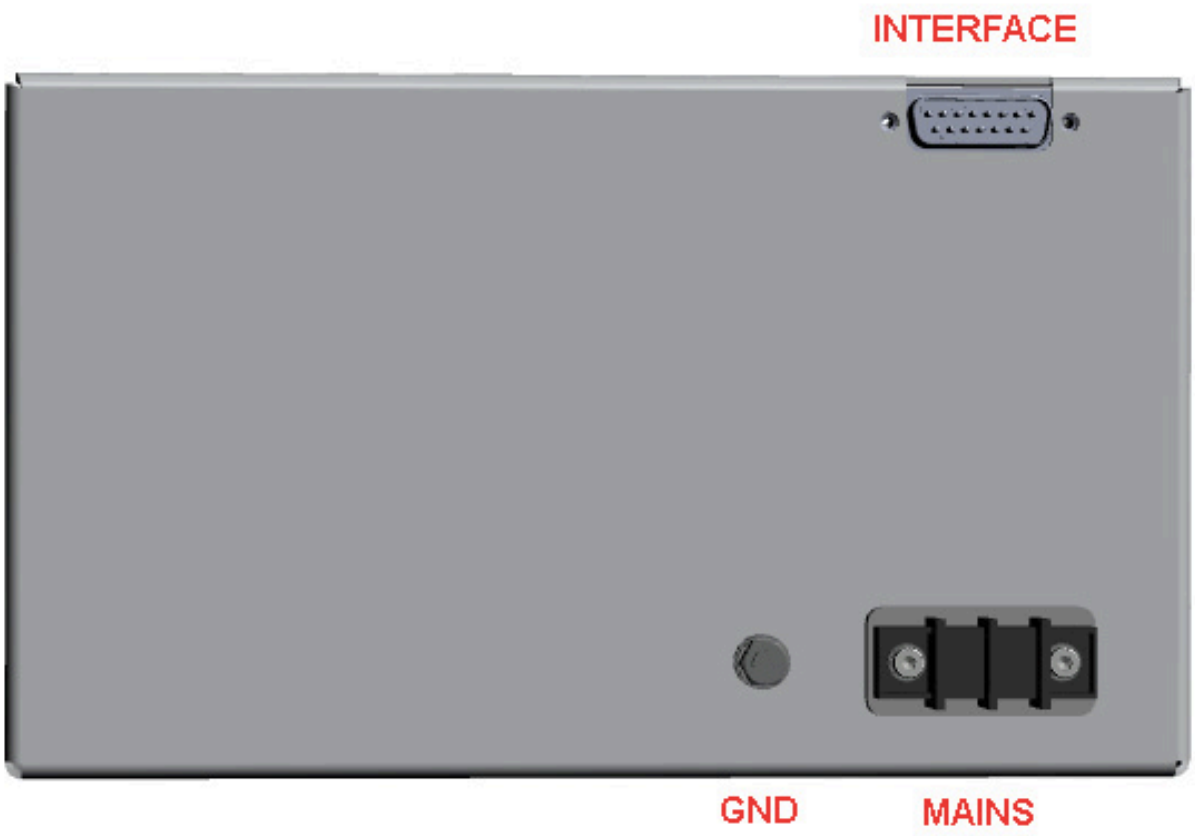
PDD-1600 is a series of high power pulsed diode drivers. Peak output power is up to 10kW (with user selectable I_{MAX} and V_{MAX}), averaged output power is up to 1600W.

Driver was especially designed for direct diode hair removal application. Driver's input is 100-240VAC.

Cooling

Module is cooled with embedded fans. No additional cooling is required.

Appearance / Layout



Connections, signals, signal description

INTERFACE: 15-pin D-SUB Female

PIN (color)	DESIGNATION	DESCRIPTION
1 (green)	**ENABLE**	+5V DC applied to this pin enable PDD. While 0V are applied to this pin or pin is unconnected module is disabled. Once *Fault* has occurred module is blocked till you eliminate fault cause, then d*isable* module and *enable* it again.
2 (orange)	**FAULT**	If module is *enabled* and some trouble has occurred, module automatically stops operations and sets *Fault* status (*Fault* loop is "closed"). **Module rises Fault in the next cases:** **- overheating** **- mains voltage interruption** **- maximal pulse energy exceeded** To remove Fault state one should *disable* driver and *enable* it again In case of normal operations *Fault* loop is "opened". Maximal allowed current in *Fault* loop is 50mA.
3 (transparent)	**PULSE 1**	+5V TTL pulse should be applied to pin 3 and to pin 8 to apply pulsed current to the output of PDD-1600. While 0V are applied to one of these pins or one of these pins is unconnected there is no current at the output of PDD-1600.
4 (black)	**PULSE 2 RETURN**	Return of Pulse 2 signal
5 (yellow)	**PULSE 1 RETURN**	Return of Pulse 1 signal
6	**N/C**	
7 (blue)	**CURRENT PROGRAM**	Voltage applied to this pin sets output current. 0-10V DC are linear with 0-I_{MAX}.
8 (white)	**PULSE 2**	+5V TTL pulse should be applied to pin 3 and to pin 8 to apply pulsed current to the output of PDD-1600. While 0V are applied to one of these pins or one of these pins is unconnected there is no current at the output of PDD-1600.
9 (purple)	**ENABLE RETURN**	Return of Enable signal
10, 11, 12, 13	**N/C**	
14 (red)	**+15VDC AUXILIARY OUTPUT**	Auxiliary +15VDC output. Maximal output current 50mA.

15 (white/blue)	**INTERFACE RETURN**	Return of other Interface signals (namely Fault, Current program and +15VDC)

AC POWER INPUT: Screw terminal

OUTPUT POSITIVE AND OUTPUT NEGATIVE: M6 studs

PIN (color)	DESCRIPTION
DIODE "+" (red)	To laser diode anode
DIODE "–" (black)	To laser diode cathode

GROUND: M5 stud

Module should be grounded using this stud.
Grounding should be done before powering the system.

Grounding policy

By default OUTPUT POSITIVE and OUTPUT NEGATIVE are isolated from the chassis' ground (i.e. output is floating).

Modifications with grounded anode or grounded cathode are available on request.

Operations notes

1. The proper sequence of driver's start up procedure is 'power -> enable -> pulse'. Other sequences are considered as improper
2. When driver is powered but disabled fans operate at lower speed; once driver is enabled fans accelerate to higher speed
3. Fault state is set when fault condition is met AND driver is enabled
4. To remove fault state one should disable driver and enable it again

Specifications

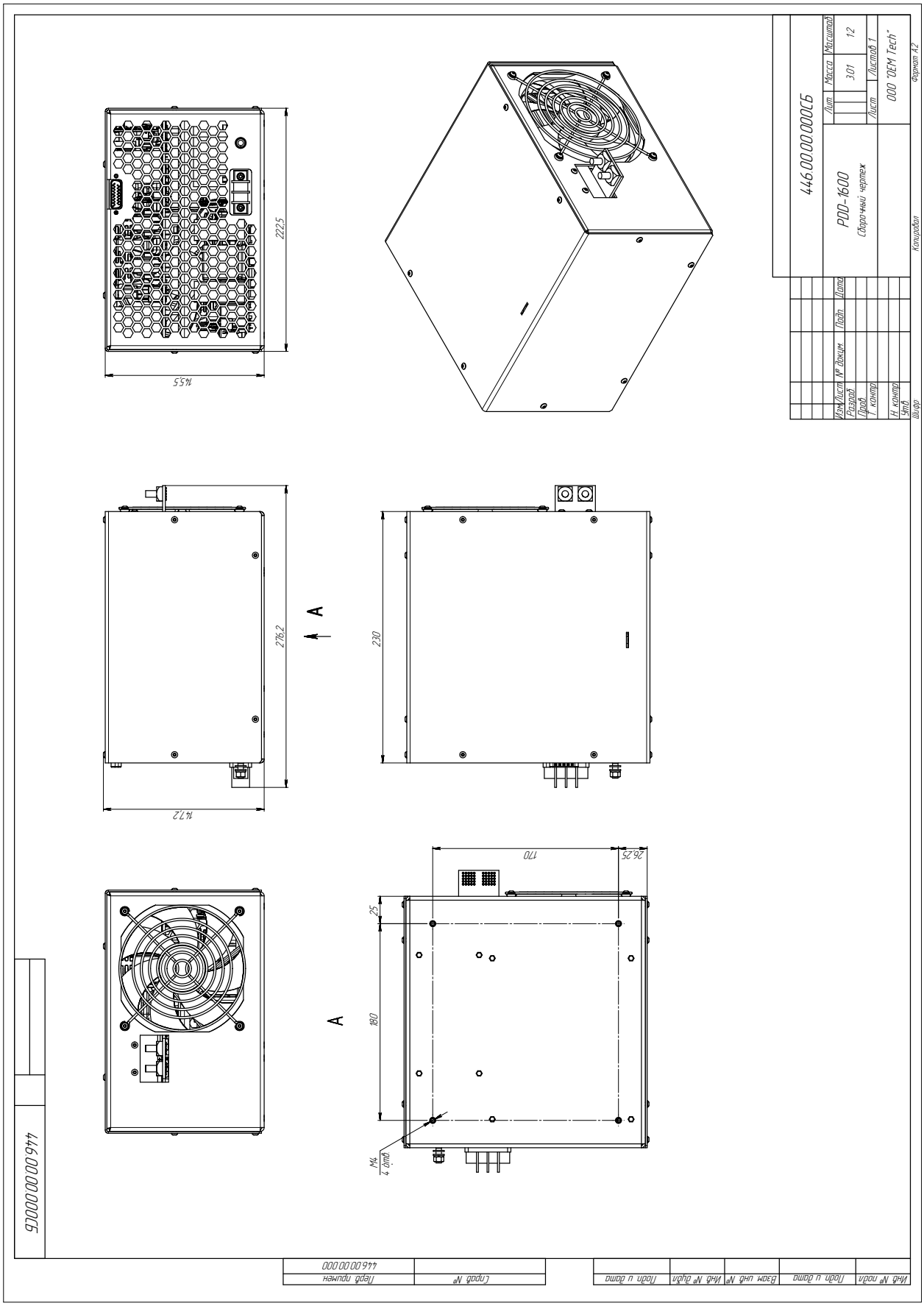
ELECTRICAL

INPUTS	
Input voltage	100-240VAC 50/60Hz
Input current	<20A
OUTPUT	
Maximal output voltage (V_{MAX})*	50V by default (up to 100V on request)
Maximal output current (I_{MAX})*	200A by default (other on request)
Peak power (P_{PEAK})*	Up to 10kW (other on request)
Pulse width (t)*	1ms - 100ms (other on request)
Maximal pulse energy (E_{MAX})*	500J
Risetime/falltime	<1ms (10-90% level)
Averaged power (P_{AV})*	1600W
Pulse repetition rate (f)*	>10Hz
*) Not at the same time. There are the next limitations: 1. $V_{MAX} * I_{MAX} < P_{PEAK}$ 2. $V_{MAX} * I_{MAX} * t < E_{MAX}$ 3. $V_{MAX} * I_{MAX} * t * f < P_{AV}$	
Current accuracy	<1% of I_{MAX}
Current overshoot	<1% of I_{MAX}
SAFETY	Safety as per IEC 60601-1 EMC as per IEC 60601-1-2
COOLING	No external cooling is required
ENVIRONMENT	
Operation temperature	0 … +40 °C
Storage temperature	-20 … +60 °C
Humidity	90%, non-condensing

MECHANICAL

Dimensions	See dimensional drawing below
Weigth	Approx. <5kg

Dimensions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PDD-1600
Сборочный чертеж
ООО "DEM Tech"
Масса
3.01
Масштаб
1:2
Лист
Листов 1
Формат А2
Копировал
455
222.5
472
276.2
230
170
26.25
25
180
M4
4 отв.
А