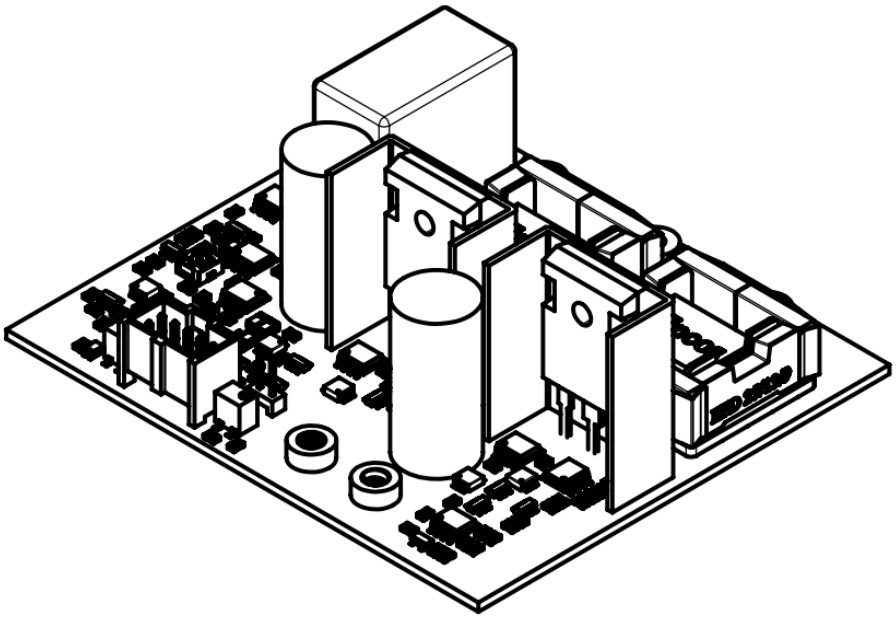
FLD-nano flashlamp driver

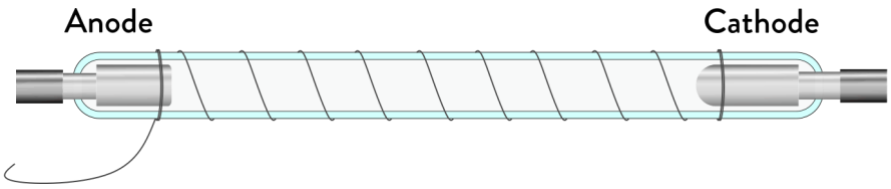
User manual



Warning! This equipment produces high voltages that can be very dangerous.
Please read the entire user manual carefully before using the product.

Overview

FLD-nano is a compact but powerful flashlamp driver designed for air-cooled flashlamps similar to the depicted below.



Driver charges the external capacitor bank up to required voltage and then, following the external TTL signal, initiates the discharge by applying the trigger pulse (400V by default) to the flashlamp.

FLD-nano requires +24 V DC power supply and pulse generator to set an operating frequency.

An output voltage level can be programmed in working range by user either manually (through onboard configuration trimpot) or remotely (applying a DC voltage to the respective pin). The driver maximal output power could be decreased, if needed, by on-board trimpot.

Applications:

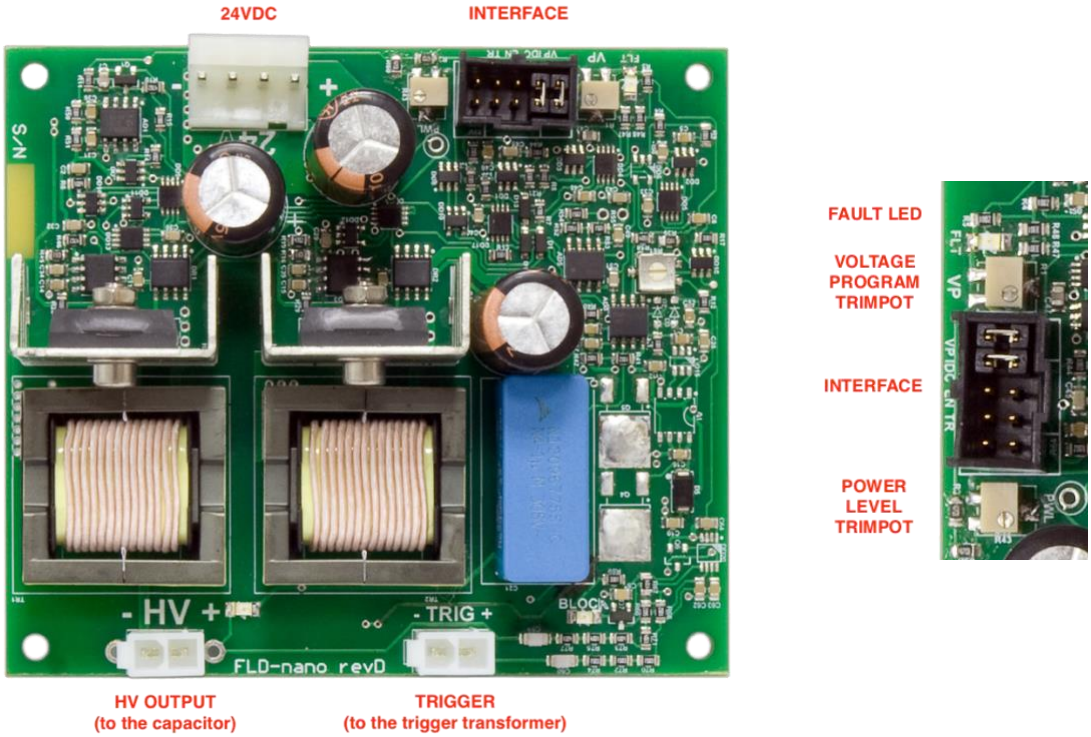
- UV polymerization
- UV sterilization
- Sintering
- Annealing
- Stroboscopy

Main parameters:

- 24V DC input
- 100 W average output power
- Up to 1000 V output voltage (to the capacitor bank)
- External triggering, no simmer

Appearance

Connections, signals, signal descriptions



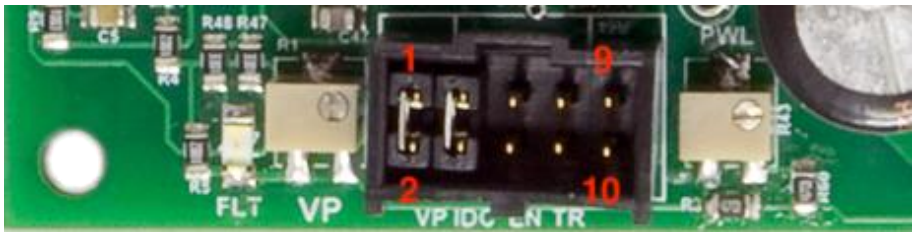
FLD-nano can be controlled in manual mode. In this case, jumper is set between PINs 1 and 2 of INTERFACE connector in order to use VOLTAGE PROGRAM trimpot. To obtain a trigger pulse immediately after charging a storage capacitor to output voltage level (manual autorun mode), set a jumper between PINs 8 and 7. ENABLE jumper between PINs 5 and 6 allows the driver to run. It could be convenient to interconnect PINs 5 and 6 using a button instead of jumper.

Other possibility to control FLD-nano is to use an external controlling device, which sets the storage capacitor voltage level (0-5V to PIN 1) and sends TTL pulses to PIN 8 to initiate pulses to trigger transformer.

24V DC INPUT: Molex SPOX (0965-2048)

PIN (color)	DESIGNATION	DESCRIPTION
1, 2 (black)	**GND**	24V DC negative
3, 4 (red)	**24VDC**	24V DC positive

INTERFACE: Molex C-Grid III (90130-1210)



PIN (color)	DESIGNATION	DESCRIPTION
1 (blue)	**Voltage Program**	0-5V signal applied to PIN 1 sets the output voltage level of FLD-nano. 5V corresponds to V_{MAX} at the output (900V or 1000V in standard versions). In manual mode PINs 1 and 2 should be interconnected with a jumper (the output voltage is regulated by VOLTAGE PROGRAM trimpot).
2 (blue-white)	**VP+**	Should be used in manual mode only. In manual mode PINs 1 and 2 should be interconnected with a jumper (the output voltage is regulated by VOLTAGE PROGRAM trimpot).
3 (transparent)	**IDC**	Interlock door connector pin. PIN 3 inhibits the operations until it is short-circuited to one of the GND pins. To allow the operations a real Door-interlock connection should be organized or, alternatively, a jumper should be placed between PINs 3 and 4.
4 (black)	**GND**	Common ground of FLD-nano circuits.
5 (green)	**Enable**	When pulled to the ground, PIN 5 enables the driver's outputs. One can enable the driver by placing a jumper between PINs 5 and 6.
6 (black)	**GND**	Common ground of FLD-nano circuits.
7 (yellow)	**Ready**	When a storage capacitor is charged up to the required value, the driver sets the state PIN 7 to 5V (TTL). In manual mode PINs 7 and 8 can be interconnected with a jumper for autorun mode.

8 (white)	**Pulse**	When 5V (TTL) has been applied to PIN 8, FLD-nano sends one pulse (400V by default) to trigger transformer. If flashlamp is triggered successfully, a flash occurs. In manual mode PINs 7 and 8 can be inter-connected with a jumper for autorun mode.
9 (-)	**N/C**	-
10 (orange)	**Fault**	When an internal fault of FLD-nano occurs, the driver stops the operations and sets PIN 10 to 5V (TTL) to indicate the failure. To start the operations again, the cause of the failure should be eliminated and after then, FLD-nano should be disabled and enabled again using PIN 5. FLD-nano sets Fault state in the next cases: • Overheating

HV OUTPUT: Molex MiniFit (3928-1023) or flying leads

PIN (color)	DESIGNATION	DESCRIPTION
1 (red)	**HV OUTPUT**	HV OUTPUT positive
2 (black)	**GND**	HV OUTPUT negative

TRIGGER: Molex MiniFit (3928-1023) or flying leads

PIN (color)	DESIGNATION	DESCRIPTION
1 (red)	**TR+**	To the trigger transformer primary winding positive
2 (black)	**TR-**	To the trigger transformer primary winding negative

Other elements

VOLTAGE PROGRAM trimpot – sets output voltage in Stand-alone mode
POWER LEVEL trimpot – allows to adjust the maximum output power of the driver (for example to reduce input current in low power applications)
FAULT LED – indicates the drivers failure (overheating)

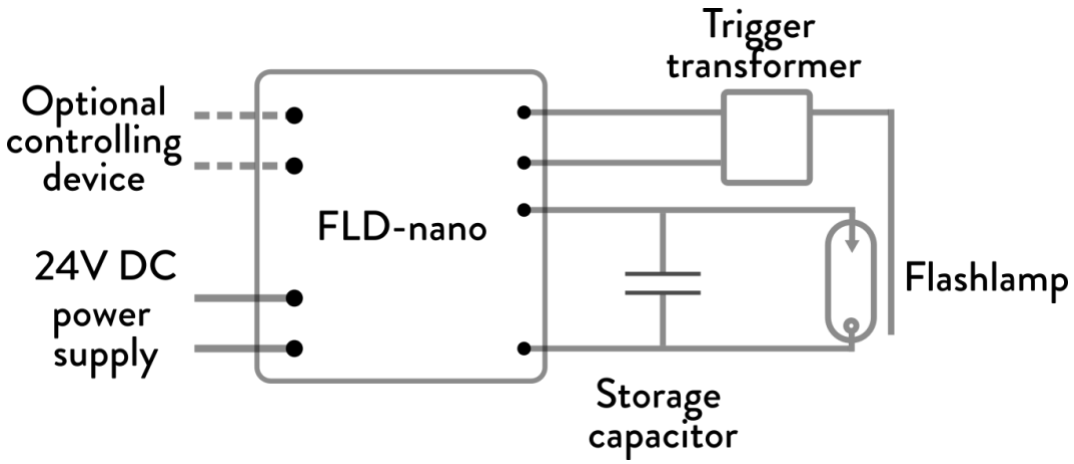
Grounding and mounting

Grounding policy
By default INTERFACE return, 24VDC INPUT negative, HV OUTPUT negative are interconnected to each other.

Driver is to be mounted with four M3 screws.

System layout

Recommended system layout is shown below:



Operations (in manual regime)

- Ensure that FLD-nano is disconnected from the power source.
- Connect storage capacitor (e.g. 33uF/1000V) to FLD-nano.
- Connect your flashlamp to storage capacitor.
- Connect trigger transformer to FLD-nano and to flashlamp.
- Ensure that all jumpers of FLD-nano are removed.
- Connect 24V DC power supply to FLD-nano and apply 24V DC power to FLD-nano.
- Set on VOLTAGE PROGRAM jumper (i.e. place jumper between PINs 1 and 2 of INTERFACE), now the output voltage to storage capacitor is regulated by VOLTAGE PROGRAM trimpot.
- Set on a jumper between PINs 3 and 4 of INTERFACE to short-circuit IDC signal and allow the operations.
- Set on a jumper between PINs 7 and 8 of INTERFACE to switch FLD-nano in autorun mode when the flash is initiated immediately after the capacitor bank is charger up to the required voltage.
- Interconnect PINs 5 and 6 of INTERFACE by any way (a jumper, a button) to enable the outputs of FLD-nano and start flashes.

Important note

Power/Enable start-up sequence is important. FLD-nano must be powered first and enabled after then only. If FLD-nano is already enabled at the moment of power-up, this will be considered as a fault and the driver won't start the operations.

Specifications

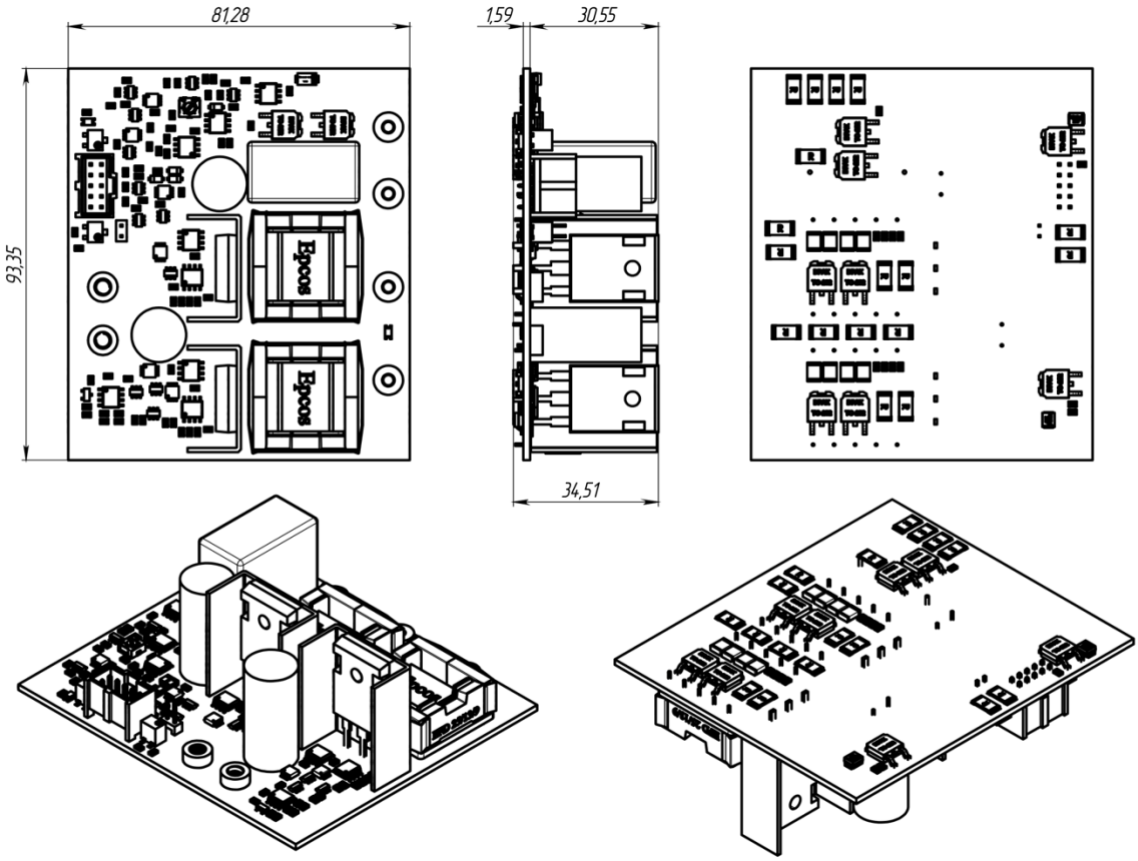
ELECTRICAL SPECIFICATION

Input	
Input voltage	24V DC, 10A max.
HV Output	
Output voltage (V_{MAX})	Model dependent 900V or 1000V in standard models, other on request
Load capacitor	External (not included) For example, 33uF/1000V or other on customer's choice
Output power	>100J/s
Flashlamp	
Flashlamp	External (not included) For example, FG 1901 MTC3D(H) by Excelitas or similar
Triggering	
Triggering method	External only
Trigger capacitor	400V/470uF by default, other on request
Trigger transformer	External (not included) For example, ZS1031-11(H) by Excelitas or similar
Pulse	
Pulse width	Not regulated, defined by flashlamp and wiring inductance only
Pulse repetition rate	From single shot and up to 20Hz
Protections	From overheating Door-interlock protection Safety discharge resistor – 200kOhm
Cooling	Passive at small output power Forced air cooling with external fan might be needed at full output power
Environmental	
Operating temperature	+10…+40C, non-condensing

MECHANICAL SPECIFICATION

Size (LxWxH)	94x82x40mm (see also the dimensional drawing below)
Weight	Approx. 0.2 kg

DIMENSIONAL DRAWINGS



How to order?

There are several standard modifications of the driver.

Part number	Description
FLD-nano-900V	Maximum output voltage (V_{MAX}) – 900V Voltage program calibration – 5V : 900V Trigger capacitor – 400V/470uF HV Output – Molex MiniFit Trigger – Molex MiniFit
FLD-nano-900V-FL	Maximum output voltage (V_{MAX}) – 900V Voltage program calibration – 5V : 900V Trigger capacitor – 400V/470uF HV Output – flying leads Trigger – flying leads
FLD-nano-1000V	Maximum output voltage (V_{MAX}) – 1000V Voltage program calibration – 5V : 1000V Trigger capacitor – 400V/470uF HV Output – Molex MiniFit Trigger – Molex MiniFit
FLD-nano-1000V-FL	Maximum output voltage (V_{MAX}) – 1000V Voltage program calibration – 5V : 1000V Trigger capacitor – 400V/470uF HV Output – flying leads Trigger – flying leads

Custom modifications are available on request.