

**Demo kit by Cedrat Technologies
PRODUCT AND WARRANTY INFORMATION**



CAUTION: READ BEFORE OPENING

For safety purposes these instructions must be read before use of this product.

Piezoelectric products are not warranted against mechanical damage resulting from improper use, wherein excessive forces or voltages that are outside specified ranges are applied.

High voltage is present in this product.

Only qualified personnel should work on or around this equipment and only after becoming thoroughly familiar with all warnings, safety notices, and procedures contained herein.

The successful and safe operation of this equipment is dependent on proper handling, installation and operation.

A "qualified person" is one who is familiar with the installation, construction and operation of the equipment and the hazards involved. In addition, he/she has the following qualifications :

- is trained and authorized to energize, de-energize, clean, and ground equipment in accordance with established practices,
- is trained in the proper care and use of protective equipment in accordance with established safety practices.

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1. GENERAL

Piezoelectric Actuators from CEDRAT TECHNOLOGIES SA consists in a wide range of actuators, divided in three categories :

- Multilayer actuators, that are not mechanically prestressed,
- Parallel prestressed actuators, that are mechanically prestressed multilayer actuators and offer mechanical interfaces,
- Amplified piezo actuators, that use an elastic amplifier to both prestress the multilayer actuator and amplify the displacement.

Piezoelectric Actuators must be handled carefully. Lifetime of Piezoelectric Multilayer actuators is not limited by wear. They can perform millions of cycles without loss of performance provided they are operated under suitable conditions.

The lifetime of a Piezoelectric Multilayer Actuators is a function of many combined parameters ; the most influencing being the applied voltage, the temperature and the humidity. For maximum lifetime, operating voltage should be minimized, especially when they are used in static conditions.

Tests have shown that the lifetime is reduced significantly, if the actuator is maintained continuously at the maximal operating voltage. For instance, a Piezoelectric Multilayer Actuator can be definitively damaged, if submitted to the maximal operating voltage (e.g. : high electrical field up to 1.5 kV/mm) during more than one hour.

A high self heating of the piezo ceramic may occur during a long use in dynamic (high frequency) operation. This can lead to depolarization or electrical breakdown of the piezo ceramic.

When driving the piezo actuator, it is important not to create over voltages through improper drivers or parasitic inductances.

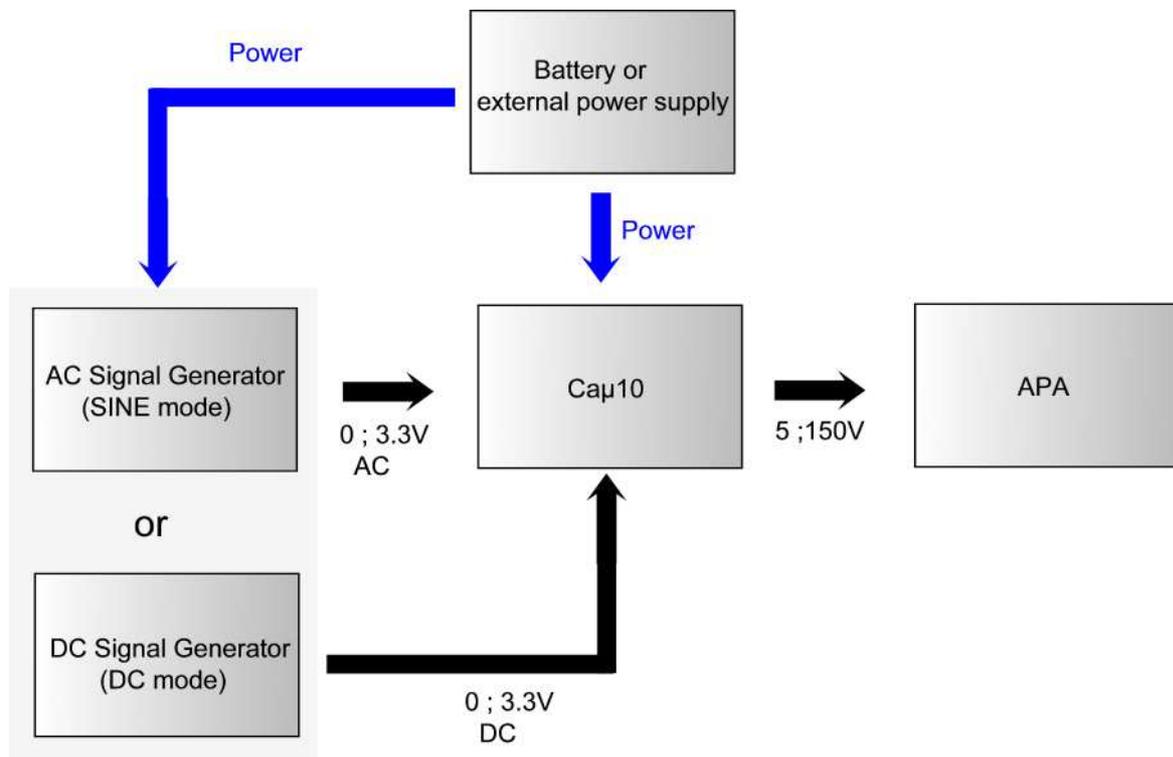
The mechanical installation or the induced moments under operation by the mechanism are the main sources of failure.

2. DESCRIPTION OF THE DEMO KIT

The demo kit is made of different sub-systems:

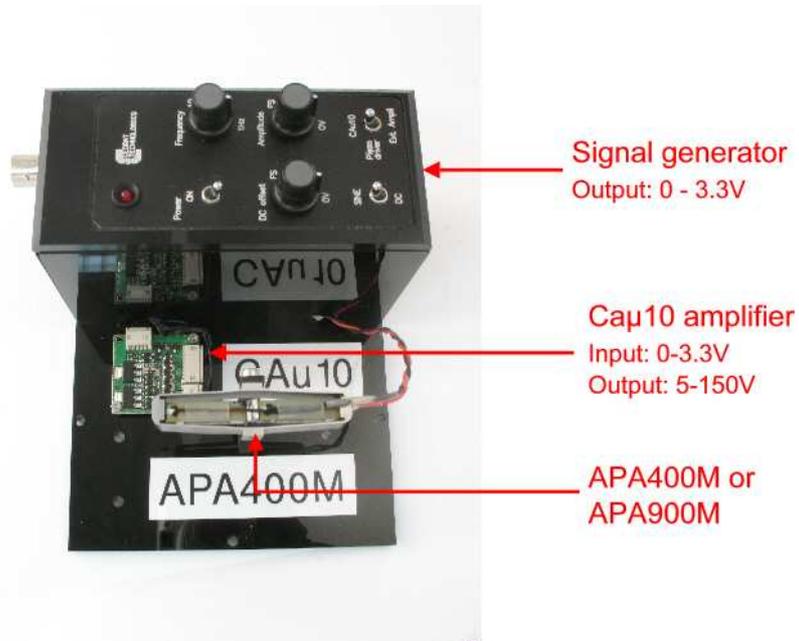
- An APA400M or an APA900M
- A linear micro amplifier Cap10: converts a voltage from [0; 3.3V] to [5; 150V]
- An internal AC signal generator: generates a periodic signal between [0; 3.3V]
- An internal DC voltage generator: generates a DC signal between [0; 3.3V]
- An battery or external power supply: generate the power.

The next figure shows how they link each other/



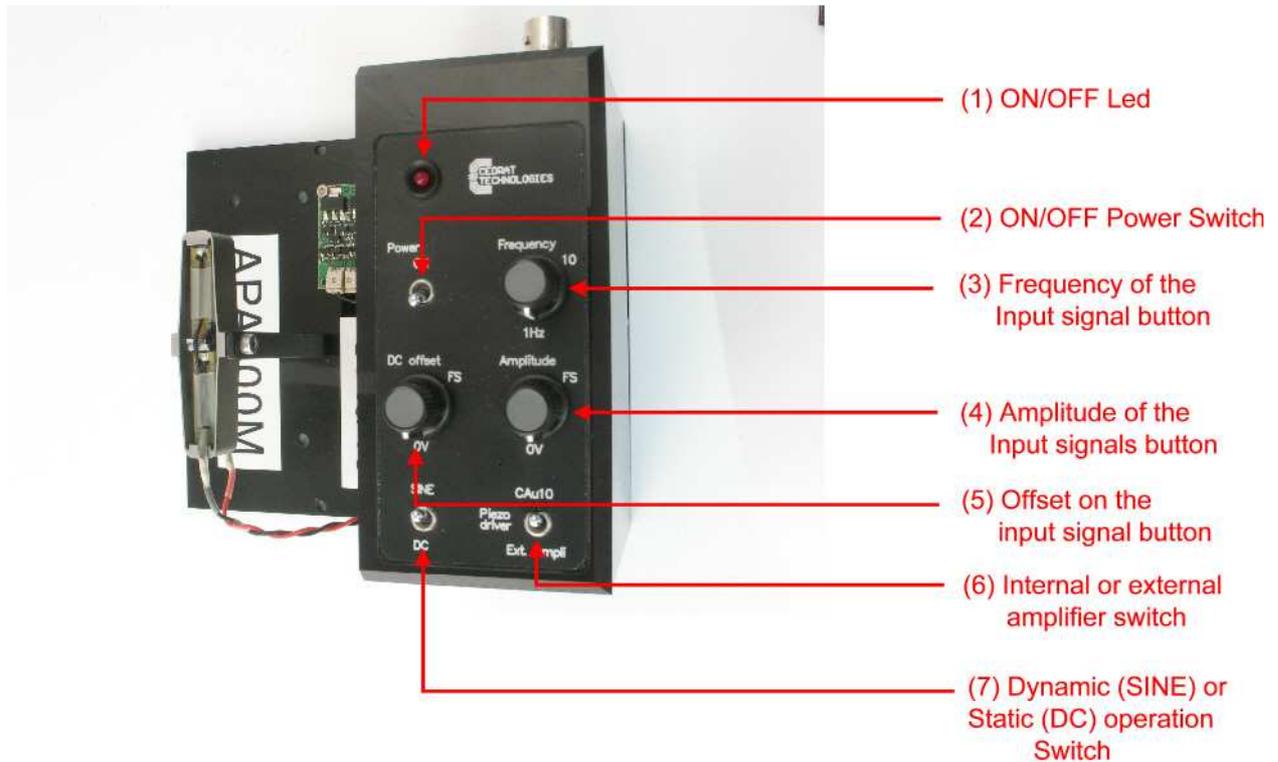
The sub-systems of the demo kit.

2.1. MAIN PARTS



Main parts of the Demo Kit

2.2. CONTROL BUTTONS AND CURSORS



(1): On/Off Led: indicates if the power is ON or OFF. Red: ON, Dark: OFF. When the system is On, the period of the flashing led indicates the frequency of the input signal

(2): ON/Off Power: Sets the power from OFF to ON or inversely.

(3): Frequency of the Input signal: Frequency of the input signal sent as a command on the amplifier CA μ 10: from 0 to 5 Hz.

(4): Amplitude of the Input signal: Amplitude of the input signal sent as a command on the amplifier CA μ 10: from 0 to 3.3V

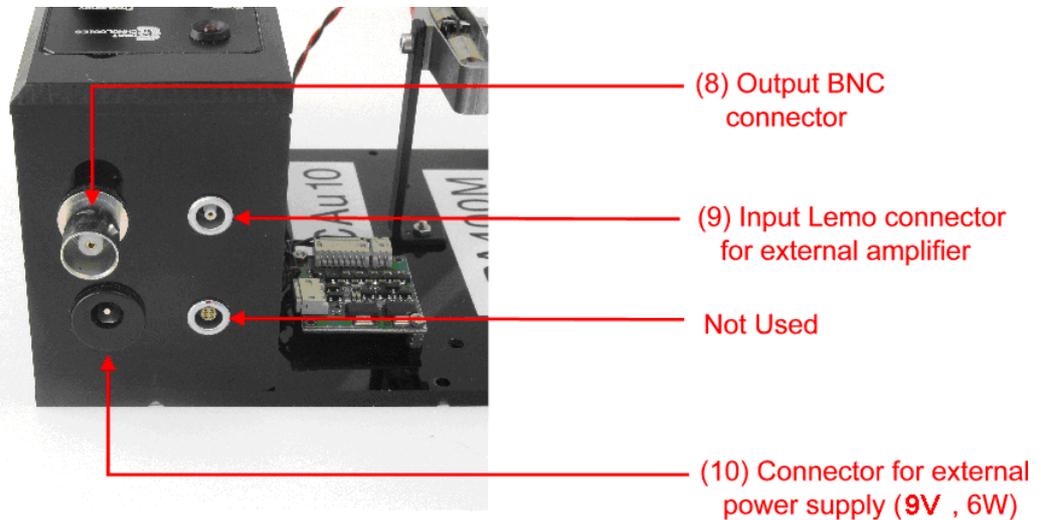
(5): Offset on the input signal: Active when (7) is on DC. Generates a DC voltage to the CA μ 10 input from 0V to 3.3V.

(6): Internal or external amplifier: What will control the actuator APA: the integrated CA μ 10 or another external amplifier (could be a CA45, a LA75A...)

(7): Dynamic or Static operation:

- Dynamic (SINE): the APA is driven by a sinus wave whose features are given by (3) and (4)
- Static (DC): the APA is driven by a DC voltage whose amplitude is given by (5).

2.3. CONNECTORS



(8): Output BNC connector: the output of the BNC connector corresponds to the signal of the internal signal generator.

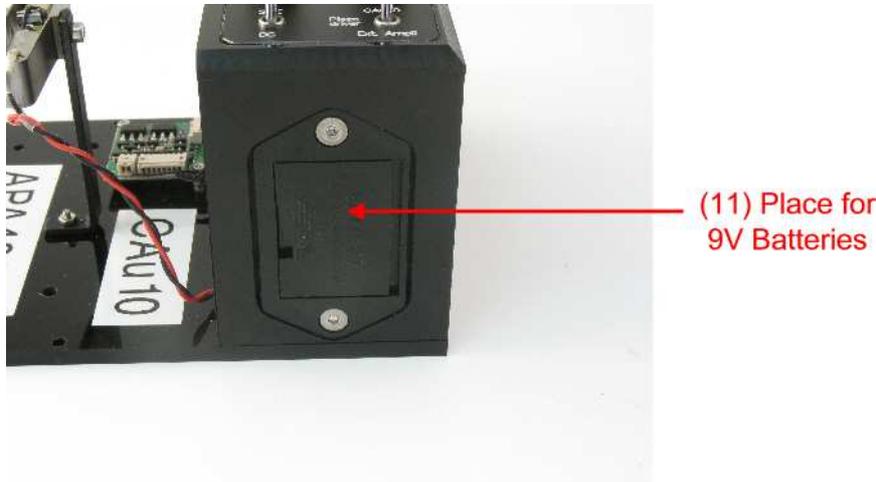
Voltage: periodic between 0 and 3.3V.

(9): Input Lemo Connector: connected on the output of a possible external generator (LA75, CA45...). Allow to control the APA from an external amplifier.

Voltage : between -20V and 150V

(10): Connector for external power supply: A (9V output, 6W, AC/DC) transformer can be connected as an alternative to the battery.

2.4. BATTERY



(11): Place for batteries: Standard PP3 9V squared batteries.

3. OPERATION OF THE DEMO KIT

3.1. MODE 1: WITH CA μ 10 AMPLIFIER/ AC MODE

1. Put batteries (11) or connect an external power supply (10)
2. Set all cursors (3), (4), (5) to 0 value.
3. Set the external amplifier (10) as CA μ 10.
4. Set power ON (2)
5. The led (1) turns ON and blinks slowly.
6. Set (7) on SINE: the AC mode is activated.
7. Set the amplitude to the full scale (FS) (5). The actuator starts moving slowly.
8. Increase the frequency progressively (6). The actuator accelerates and the LED blinks faster
9. Play around...

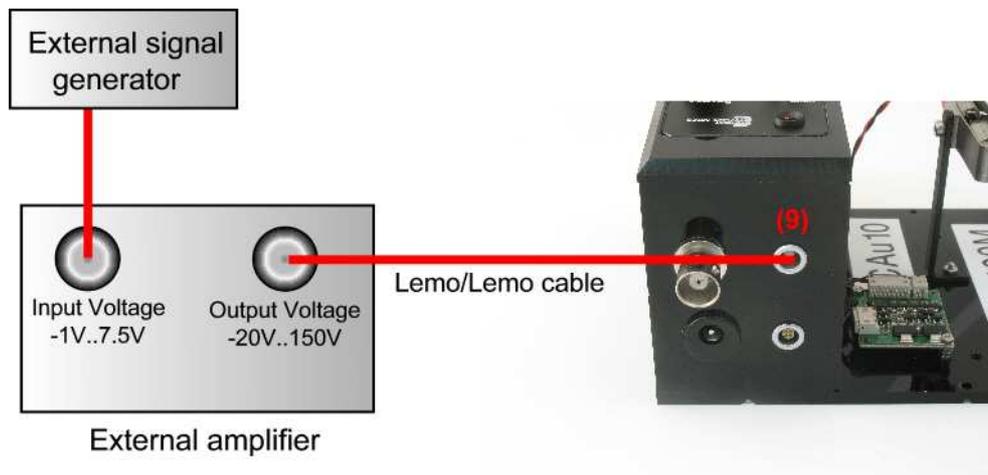
3.2. MODE 2: WITH CA μ 10 AMPLIFIER/ DC MODE

1. Put batteries (11) or connect an external power supply (10)
2. Set all cursors (3), (4), (5) to 0 value.
3. Set the external amplifier (10) as CA μ 10.
4. Set power ON (2)
5. The led (1) turns ON and blink slowly.

6. Set (7) on DC: the DC mode is activated.
7. Set the amplitude to the full scale (FS) (4).
8. Increase the offset progressively (5). The actuator moves while you are turning the cursor and remains standstill when you stop.
9. Have fun...

3.3. MODE 3: WITH EXTERNAL AMPLIFIER/ AC AND DC MODES

1. Put batteries (11) or connect an external power supply (10)
2. Set all cursors (3), (4), (5) to 0 value.
3. Set the amplifier (10) as Ext. Ampli. (Bypass the Caμ10 amplifier. The cursors on the top of the demo kit are no more active.)
4. Connect the external amplifier to the Demo kit:



5. Set the external signal generator to 0V
6. Turn ON the External amplifier
7. Set power ON (2) on the demo kit
8. The led (1) turns ON and blink slowly.
9. Set an input signal on the external signal generator: sinus, triangle, square... and vary the frequency and amplitude of this signal to modify the movement of the APA.
10. Amuse yourself....

CAUTION: If an external device is used to drive the piezo, the frequency must not exceed 10 Hz for a safe operation!

4. WARRANTY CONDITIONS AND EXCEPTIONS

The equipment is warranted for a period of one year from date of shipment, including parts and labor, and only under standard technical conditions as outlined above and expressly mentioned in the technical data sheet. Repairs will be carried out at Cedrat Technologies or through your vendor. During the warranty period, Cedrat Technologies will, at its option, either repair or replace products which prove to be defective.

Interventions or attempts to service or repair the Actuators by any unauthorized persons will invalidate this warranty. The box must not be opened without a prior consent by Cedrat Technologies.

In addition, this warranty will not apply if the actuator is subjected to any of the following:

- improper handling, including, but not limited to, shocks and abrasions
- improper installation, including, but not limited to, excessive mechanical forces and moments, failure to use the standard electrical and mechanical interfaces
- excessive voltage, including, but not limited to, peak values outside the recommended operating range, DC values applied for excessive time periods
- inappropriate environmental conditions, including, but not limited to, high temperatures or high humidity
- attempt to modify the standard electrical connection of the APA (soldering out of electrical wires, plugs change,...) or the standard mechanical interfaces

No other warranty is expressed or implied. Cedrat Technologies specifically disclaims the implied warranties of merchantability and fitness for a particular purpose

5. INSPECTION UPON RECEIPT

This product has been inspected and shown to operate correctly at the time of shipment, as verified by the Factory Verification form that accompanies the actuator.

Immediately upon receipt of the product, it should be inspected carefully for any signs of damage that may have occurred during shipment. If any damage is found, a claim should be filed with the carrier.

The package should also be inspected for completeness according to the enclosed packing list. If an order is incorrect or incomplete, contact your distributor.



6. AFTER-SALE SERVICE

If a device requires service, please contact Cedrat Technologies or your local vendor. Please include the device model and serial number in all correspondence with Cedrat Technologies or your vendor.



ANNEX 1 : TROUBLE SHOOTING FORM

In case of trouble or breakdown with the piezo actuator,

- please check the electrical impedance (capacitance and insulation resistance) of the actuator and communicate it to your vendor.

This form must be completed by the customer in order to :

- allow Cedrat Technologies to authorise the product return back to the factory,
- help Cedrat Technologies in repairing it.

Product: Please give mention here the references and delivery date,

History: Please summarise here every action which has been performed with the device since the delivery,

Problem description: Please describe here the problems