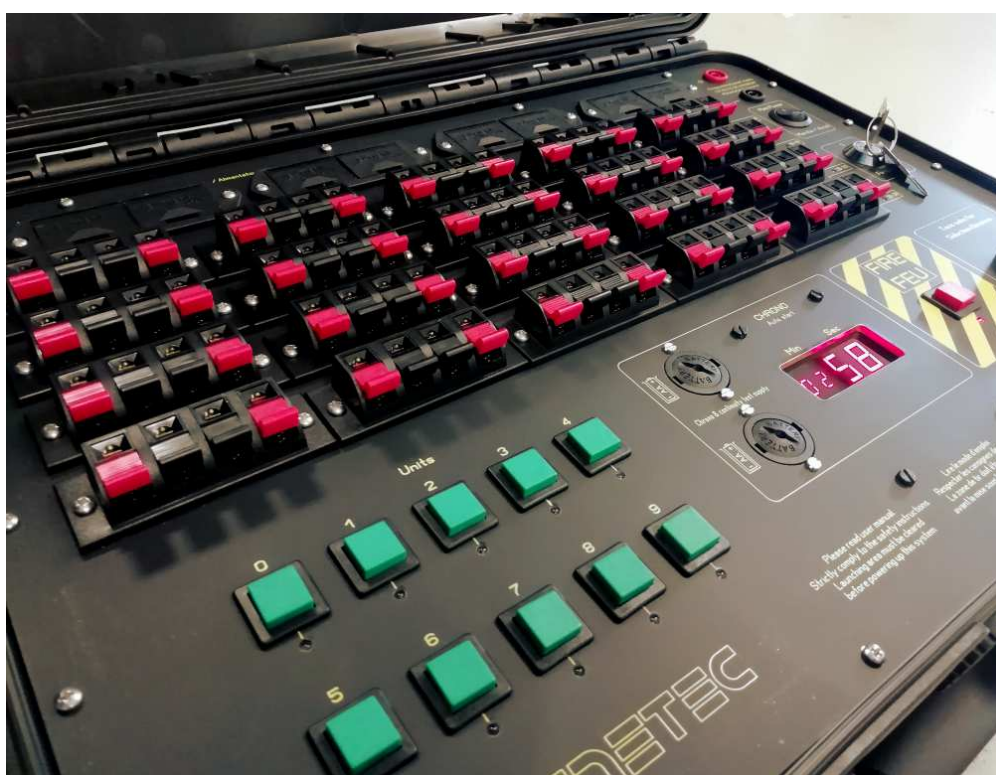


## Firing system 40 cue

# MAF40 serie III



## Manual

July 2020

This operating manual is only valid for products corresponding to the version described in this manual and sold from the date mentioned above.

Before use, carefully read these instructions and you'll be fully satisfied with your new hardware.

Always comply to the safety instructions.

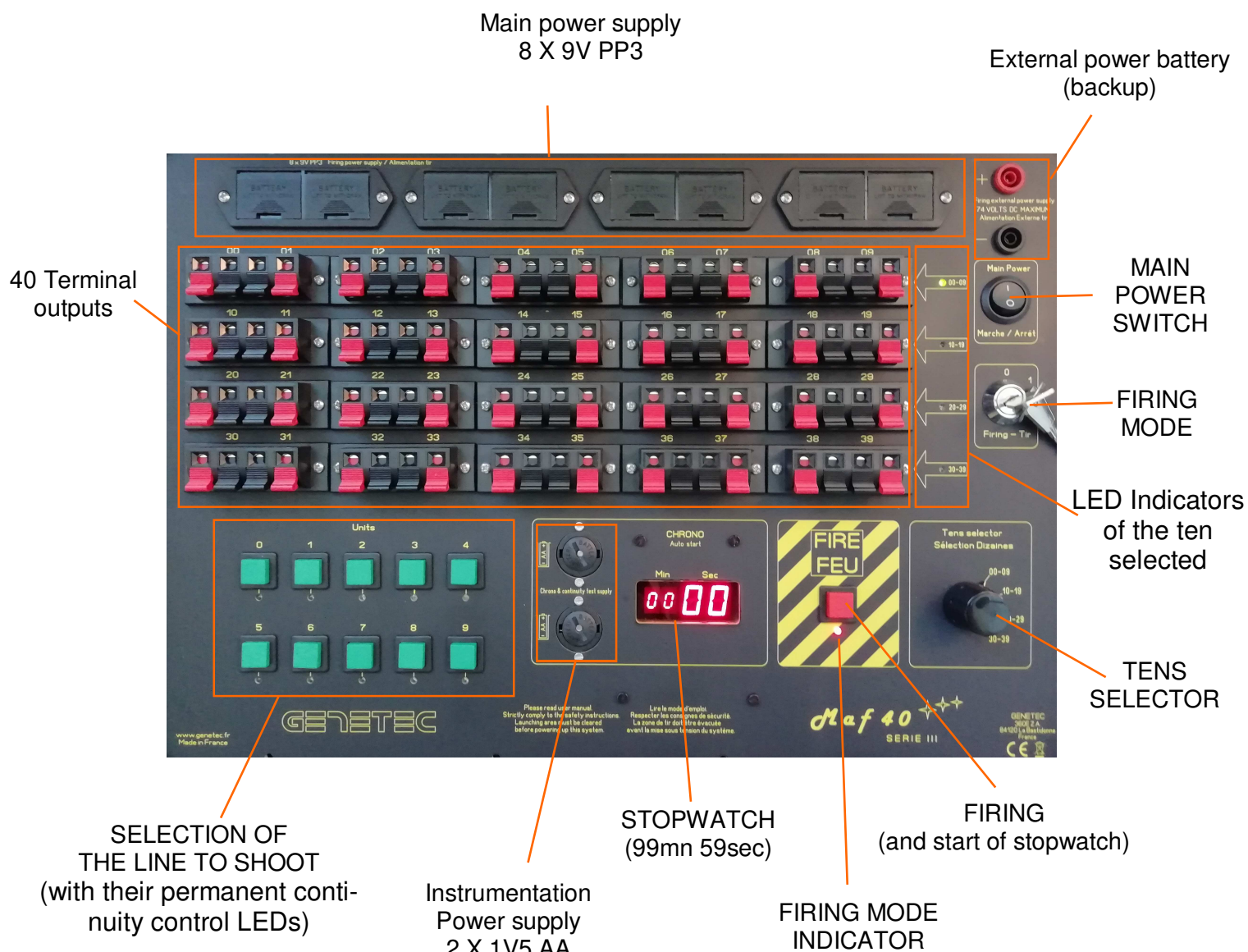
The MAF40 serie III is a 40 cue manual firing console for the pyrotechnic show.

It has a stopwatch with automatic start from the first shot in order to be always synchronized, indicators for a permanent control of the electrical continuity of the lines, a security key to activate the firing mode.

The selection of the lines to be fired is made by 10 push buttons for the units and a rotary switch with 4 positions for the tens. Each shot is energised by a 72V pulse from a capacitive discharge. MAF40 serie III is powered by standard commercial batteries.



## GENERAL PRESENTATION : Control Panel



## **INSTALLATION :**

MAF40 serie III must switched OFF and firing mode key on 0.

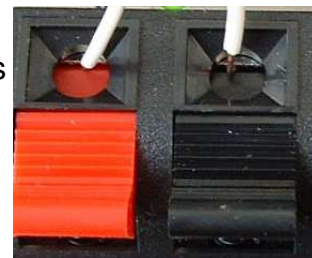
Connect your lines on the clamp terminals outputs.

The outputs are numbered from 00 up to 39. The output 00 is top left, and the 39 down right.

There is no general common on the terminals outputs. At each output corresponding one line (one wire on the red and one wire on the black). Don't try to adapt a multicore cable with a common, and don't try to connect together wires of different lines. Wires must be correctly stripped, no too long, no too short.

The quantity of igniters on each output can be from just one up to several tens assembled in serial (depending the length of wire used, see chart below).

**IMPORTANT : IGNITERS MUST BE WIRED IN SERIAL**



Line length (meters)	Maximal quantity of igniters per line (72V power supply)
500	1
400	1
300	9
200	17
100	26
90	27
80	28
70	29
60	30
50	30
40	31
30	32
20	33

Chart calculated with igniters N28B Davey Bickford wired in serial, and wire 0.17  $\Omega$ /meter.

*This chart is given for information only and may vary depending on the igniters used.*

*Make preliminary tests, consult the data sheet given by your supplier.*

If you put an external battery with a lower voltage (and no internal battery) for the power supply, apply Ohm's law  $R = U / I$  in order to know the maximum number of igniters per line. R being the maximum resistance in ohms ( $\Omega$ ) of your line, U the voltage in volts of the battery, and I the current in amperes (1A is a minimum recommended if several igniters are connected in serial).

Example with a 48V battery : the resistance of the line must be 48 $\Omega$  maximum. In this case a line with 100 meters of wire at 0.17 $\Omega$  / meter, i.e. 17 $\Omega$ , will let 48-17 = 31 $\Omega$  for the igniters. To simplify, count 2 $\Omega$  per igniter : 31/2  $\approx$  15 igniters.



## LINES CHECK :

The MAF40 series III has an LED under each selection push button indicating that the line has electrical continuity, which is the case with wired lines.

**Warning:** to carry out the lines checks, the staff must have previously evacuated the area of pyrotechnic products. Never turn on the firing system while the installation is in progress or there are still people present in the pyrotechnic products area.

So to check if the wired lines are not cut, first make sure that the "FIRING" key switch is on 0, then turn on the MAF40 series III with the 0/1 button.



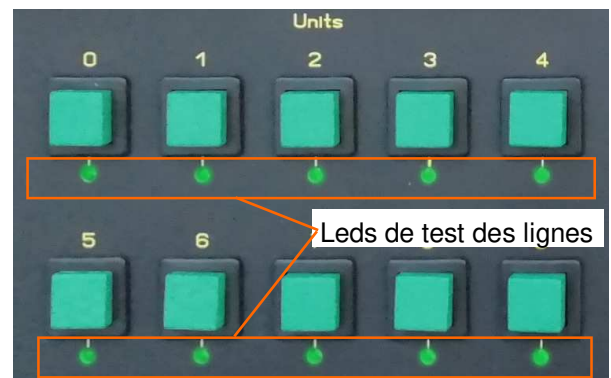
Set the "Select Tens" rotary switch to 00-09, and the green led under each green button should light up. This indicates that the ten lines 00 to 09 are not cut.

Then set the "Select Tens" rotary switch to 10-19, and the green led under each green button should light up. This indicates that the ten lines 10 to 19 are not cut.

Then set the "Select Tens" rotary switch to 20-29, and the green led under each green button should light up. This indicates that the ten lines 20 to 29 are not cut.

And finally set the "Select Tens" rotary switch to 30-39, and the green led under each green button should light up. This indicates that the ten lines 30 to 39 are not cut.

*Note: this test is only a loop check, it allows to check quickly and only if a line is not cut, without taking into account its resistance. This is not a resistance measurement test.*



### Lines ohmic measurement :

If you want to know precisely the resistance of the cable lines: With the case off, On / Off switch on 0, no personnel in the fireworks area. Use a compliant ohmmeter (max test current 10mA), and make contact with the two ohmmeter tips directly on the metal parts of the red and black terminal block of the line to be measured.

*Note: The ohmmeter must be connected to the system only when it is fully powered off.*

Read the value given by the ohmmeter. Repeat for the other lines. No need to operate the rotary switch because the measurement is direct.

In the case of a fully internal power supply (72V with the 8x9 PP3 9V batteries) :

Up to 72 ohms : GOOD (  $I > 1A$  ).

More than 72 ohms : BAD ( $I < 1A$ , the total resistance of the line is too high, it is therefore advisable to split this line into 2 or 3 less loaded lines).

If your ohmmeter indicates infinity, the line displayed has a continuity fault :

Either, it is an unused line, in this case it is normal,

Either a wire is disconnected or an igniter is defective: you must then check the corresponding line point by point.

## FIRING :

Never turn on the FIRING MODE if there are still people present in the pyrotechnic products area.

Switch on the MAF40 serie III using the "On / Off" switch and turn the "Firing mode" validation key to the "On" position.

The red light under the red FIRE button should come on. At this step the system is armed and ready to shot.

Position the "Tens Selector" rotary switch to 00-09, then the green pushbuttons control lines 00 to 09. In addition to the index on the rotary switch button, the green indicator in the arrow to the right of the outputs terminal blocks 00 at 09 will indicate the tens selected.

For firing the cue 00 first press and maintain the unit « 0 » green push button, and press the red push button « FIRE ».

An electric discharge is sent and the line is immediately powered.

Release the both push buttons.

For firing the following line 01 press the green unit push button "1" and proceed in the same way, and so on.

Once line 09 has been fired, to switch to line 10 turn the switch one notch to the right to put it in the 10-19 position. The green pushbuttons will then control lines 10 to 19. The green light in the arrow to the right of terminal blocks 10 to 19 should light up. Proceed in the same way as before to ignite the following lines.

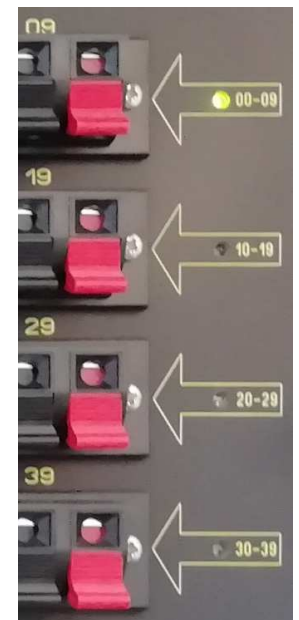
At the end of the show, put the firing mode key on 0, and the main On / Off switch on 0.

- *The MAF40 serie III supplies firing pulses from a pure capacitive discharge: when the firing pushbutton is released a capacitor is charged electrically from the eight 9V batteries (or the accessory external battery) and when presses the firing push button, only this capacitor provides the energy necessary for firing. It is therefore necessary to release the firing pushbutton between two shots. This process saves batteries and protects circuits more effectively in the event of a shot, for example in a short-circuited line. The reload time between shots is very short, around a tenth of a second.*
- *This device is equipped with a firing capacitor discharge function, to do this always return the key to position 0 as indicated for the automatic and rapid total emptying (between 5 and 10 seconds) of this capacitor through an internal resistive load. If this is not done, it may continue to retain residual energy for a while (even if the batteries have been removed in the meantime).*
- *Only fire one line at a time.*

## STOPWATCH :

The stopwatch starts automatically from the first shot, regardless of the line (Firing mode key on 1, the first press on the "FIRE" button is taken into account). The maximum timing is 99 minutes and 59 seconds, after which the stopwatch pass to zero and continues to count.

*Observation : If necessary, it is always possible to reset the chronometer to zero simply by switching off and relighting the MAF40 serie III with the 0/1 button. The timing will then restart from zero automatically as soon as the next line is fired. If the main power supply (for exemple in case with an external battery only) is too low (<48V), the stopwatch will not start automatically.*



## ELECTRIC SUPPLY :

The MAF40 Series III has two separate and independent power sources:

- The 72V main power supply made by eight 9V batteries (PP3 alkaline), or the external battery, intended to supply the firing pulse generator. In addition, it is also used to power the green tens index LED and the red LED of the "FIRE" pushbutton. This power supply is essential.
- A secondary power supply made by two 1V5 (AA alkaline) batteries intended for supplying the instrumentation (the stopwatch and the 10 green leds for the line continuity test). This accessory power supply is separate in order to preserve the main batteries intended for firing.

All the batteries are quickly accessible and mounted in drawers.

To install the 9V batteries, remove the eight black plastic drawers located at the top of the control panel (you can help yourself with a coin or more simply with the rim of the ignition key). Place the batteries observing the polarity. Replace the drawers, push them in until they "click".

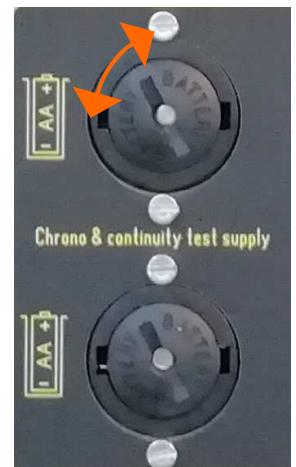


To install the 2 x 1V5 AA batteries: insert the batteries in the compartments to the left of the stopwatch, respecting the polarity indicated (the + facing up). Take the 2 black round closing caps supplied with the case (in the plastic bag) and lock them by turning them 1/5 turn to the right (you can help yourself with a coin or more simply with the rim of the key of contact).

The autonomy of these batteries is of the order of ten hours.

### *Notes :*

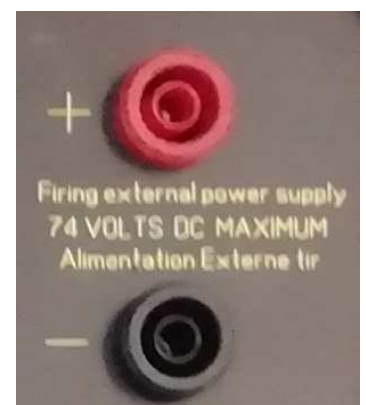
- *The wear of the two AA batteries for instrumentation (only) is indicated by the flashing commas of the stopwatch display.*
- *The absence of the two AA instrumentation batteries would not prevent the MAF40 series III from operating in firing mode: only the chronometer and the continuity test LEDs would then be inoperative.*



If only the stopwatch and the lines leds light up, and the led of selected tens and the firing led remain off (or weak), check the main power supply.

External power supply : Your MAF40 serie III is equipped with an input allowing an external battery to replace the 8 batteries of 9V. Be careful not to exceed 74 volts continuous. Respect the polarity (red +, black -). The application of the  $\Omega$  law for the calculation of the currents in the lines is done with the voltage that you will then use as an external power supply (see page 3). A too low voltage will reduce the brightness of the fire led and of the tens index led, the firing capacity, and under 48V the stopwatch will not start.

*Note : Whether you choose to fire with an external battery or not, the most powerful battery will power the system. It is not necessary to remove the internal batteries if you wish to use an external battery. Like the 8 x 9V batteries, this external battery will not power the instrumentation part.*



## **MAIN FEATURES :**

- Dimensions : 464 x 360 x 176 mm, weight : 4,8 kg. Case IP67 (closed).
- Supply : 8 alalin 9V PP3 batteries and 2 alalin batteries 1V5 AA
- Instrumentation average consumption (2x1V5) : 0.5 Watts
- Average consumption while firing waiting (8x9V) : 0.2 Watts
- Voltage output (with 8x9V) : 72 volts pulses by pure capacitive discharge.
- Average recharge time from 0% to 100% between two shots : 0.1 à 0.2 second.
- Input voltage external battery : 48VDC to 74VDC
- 40 cues numbered from 00 to 39 (*with a - common different by each tens*)
- Maximum value of the current delivered for the line resistance test : 2 mA.
- Instrumentation autonomy : 10 heures environ.
- Timing : up to 99 minutes 59 seconds.
- Temperature range : +5°C to +45°C.
- Warranty : 1 year.

## **ADVICES, OBSERVATIONS :**

- Before first use, in order to familiarize yourself with this shooting set, simulate fireworks with igniters alone or with "visulamp" test bulbs.
- Regularly check that the batteries are in good condition. If used with only internal batteries, we recommend that you replace them at each time. Always have back-up batteries readily available. Remove the batteries in case of prolonged non-use (eg out of season) to prevent them from sulphating or leaking into their compartments.
- To remove easily and without any tools the 2 round caps of the AA battery compartment when the batteries are not inserted (and therefore do not spring to push them back automatically): unlock the caps by putting their groove horizontally, close the cover and simply turn upside down the case.
- Always remember to stop the MAF40 completely after the show and set the key to 0.
- If used in very cold weather (ski station, for example), protect your batteries from freezing by only installing them at the last moment (risk of total or partial loss of power).
- In the event of rain, protect your MAF40 (for example with a transparent plastic cover).
- Do not use solvents (acetone, methylated spirits, white spirit, etc.) to clean your firing system, but only water or a product to wash the windows on a soft cloth.
- At the end of the show, or if you do not want to fire, always reset the key to position 0 to activate the rapid automatic discharge (a few seconds) of the firing capacitor, otherwise it can continue to conserve energy for a while (even if the batteries have been removed).
- Do not let metallic objects (keys, wires, etc.) free in the case in order to avoid any risk of damage or short-circuit.
- Never inject voltage directly into the output terminal blocks (for example in the event to force firing directly by battery. Always disconnect the line beforehand).
- Do not route the wires of the lines along potential sources of noise (mains or lighting power supplies, radio systems, motors, etc.)

## **SAFETY :**

Never work on fireworks items when the system is in operation. Switch the devices off completely during installation, tests, or in the event of an intervention.

Always put the key to position 0 for rapid discharge of the firing capacitor.

**ABSOLUTELY NO STAFF IN THE HAZARDOUS AREA WHEN POWERING ON THE SYSTEM. THE FIRING MANAGER MUST ENSURE THAT THESE INSTRUCTIONS ARE OBSERVED.**

The control post must be sufficiently away from the firing area, even during tests.

The FIRE push button must be pressed only to fire.

Put the "Firing mode" key in position 1 only to fire.

Comply to the usual safety and common sense guidelines of the profession.

DECLARATION OF  
CONFORMITY



We, Genetec, declare under our own responsibility that the following device :

MAF40 serie III

Complies with the essential requirements listed below:

EN301 489-1 , EN61000-4-3, EN61000-4-2

This product complies with the EMC directive 2014/30 / EU on the rapprochement of the laws of the member states relating to ElectroMagnetic Compatibility.

The products have been tested in a normal configuration.

La Bastidonne, January 30, 2020.

Jean-Louis Vincent, Genetec,  
co manager

A handwritten signature in black ink, appearing to be 'Jean-Louis Vincent', written over a horizontal line.