



## VMS Contact User Documentation

1- Présentation .....	1
2- Cabling installation.....	2
3-Use .....	3
4 Error messages.....	4
4.1 Before the shooting .....	4
4.2 After the shooting.....	5
5 PC software.....	6
6 Functional parameters.....	6

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## 1- Présentation


VMS Contact is a wired speed measurement system. It carries out chronometry of the short-circuiting process between three contact probes.

Knowledge of the system's geometry and recording of the three short-circuit moments allow to establish two mid-process speed values and one average speed value.

VMS Contact is connected to three wire probes. These probes are made with wires which are first insulated, then squashed and cut by the projectile. At this point, the contact probes are short-circuited to the launcher ground potential. The measurement system takes the event's instants, and displays the measured speed.



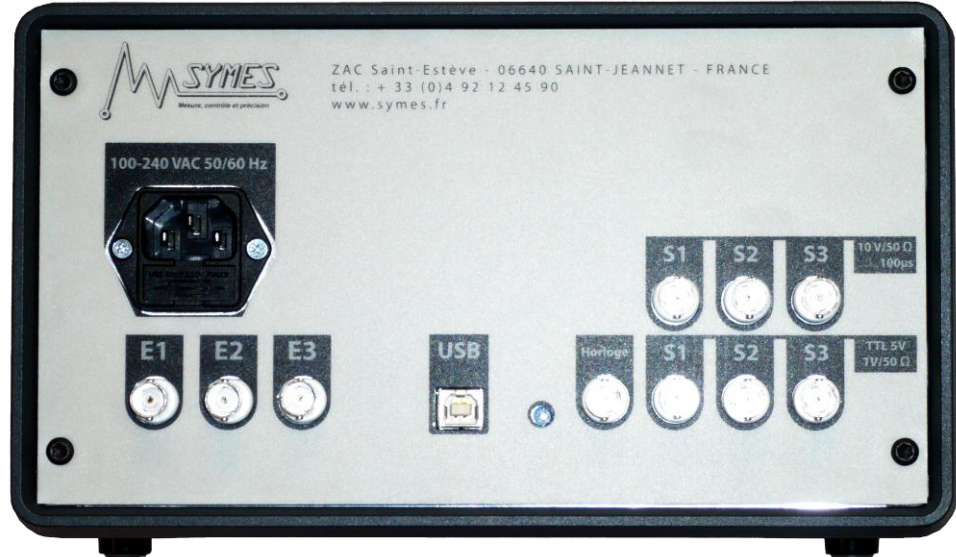
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## 2- Cabling installation

The connectors are behind the rack, on the left top, we can find the AC power supply input socket. On the bottom and on the right, 10 BNC connectors and an USB plug are available for the user.



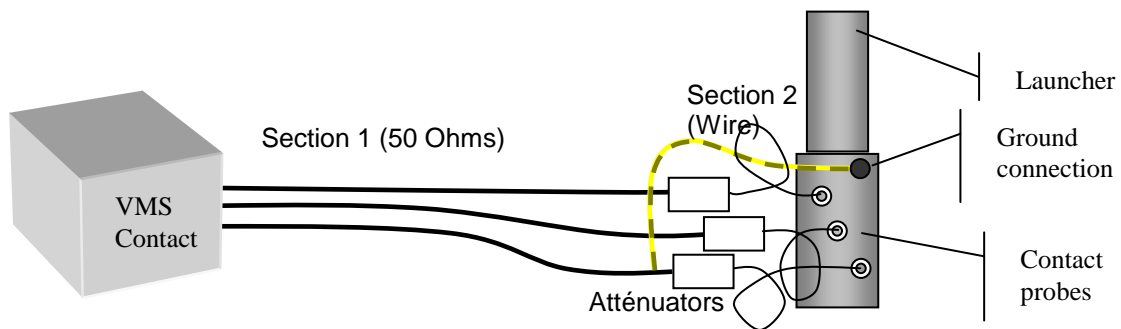
- The **E1 to E3** BNC connectors give the event of the contact probes.

Connection to the contact probe is separated in two different sections:

Section 1: from the rack to the launcher. Connection is done directly via three 50 Ohm adapted coaxial cables. That cable section can measure up to 50 meters.

Section 2: from the launcher to the probe holder. That cable section must stay short (less than 5 meters). It is done via the electric cable of the probe after the attenuator. These wires will be squashed by the projectile in the probe holder.


The coaxial cable ground potential must be connected to the probe holder **directly and with care**, in order to keep low impedance during the deflagration.



E1 is the first probe to be cut, and E3 the last one. The attenuators must be 6dB 50 Ohms,  $\geq 1$ Watt. The shields of the three coaxial cables have to be grounded to the launcher. This connection **must not** be done **via** any mechanical link, but directly to the probe holder with a terminal screwed into the probe holder, and protected from oxidation.

The system can also work with only two contact probes. In this case, they must be connected to E2 and E3.

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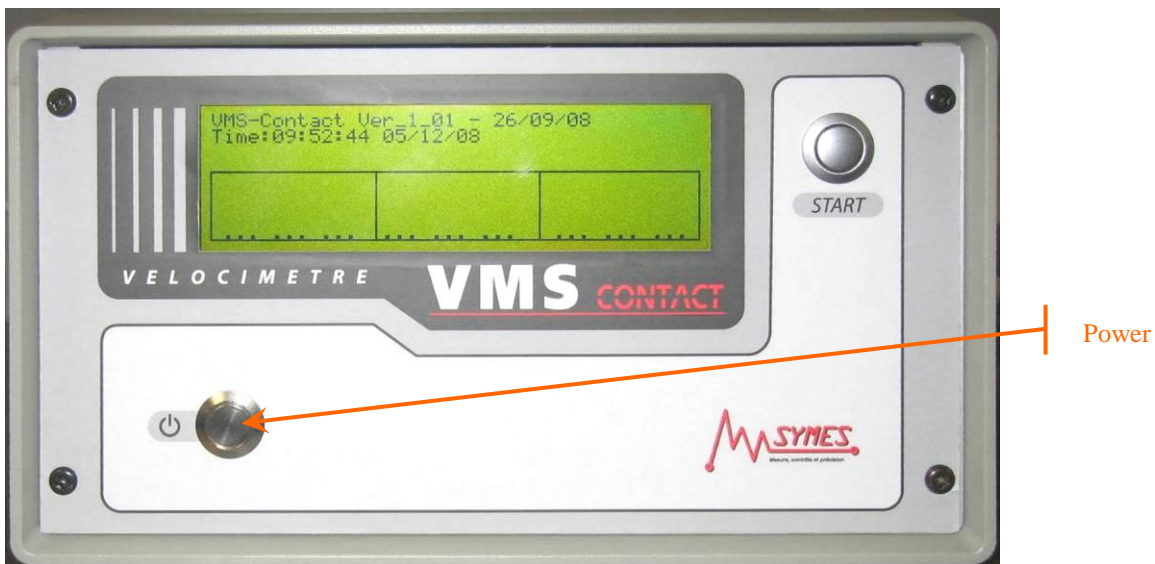
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- The **USB** port serves to connect to a PC
  - The BNC **"Horloge"** is used to check the chronometer's timebase, which must be 1MHz +/- 20Hz
  - The six BNCs **S1 to S3** allow to register the very moment of the short circuit or to synchronize an appliance on the strip of wire when short circuiting.
- These outputs are of two types: at the top, pulse 100  $\mu$ s 10V / 50 Ohms; at the bottom, TTL when open or 1 Volt when 50 Ohms short.

### 3-Use

Power on is obtained by pressing on the bottom button. Once switched on, the appliance will display its name, the firmware version, the date and time of day.  
The display contrast can be changed thanks to the trimmer at the back of the appliance, between USB port and clock.



Maintaining the start button pressed for a few seconds allows placing the system in « Measure ready » mode.



The system is ready for measuring when « Ready for a new cycle ... » message appears.

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After the shooting, measure values are displayed on the screen and will stay put until the Start button is pressed again for a few seconds. « Cycle done ... » message indicates that measuring is over.



## 4 Error messages

### 4.1 Before the shooting

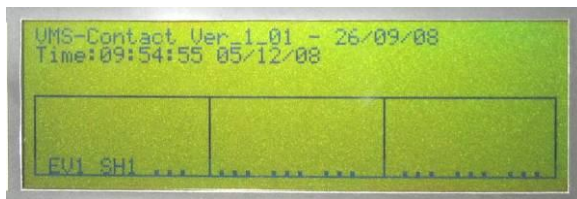
Cable integrity is permanently checked. Nevertheless disconnection in section 2 can't be monitored.

Error type	Checked	Standard display	Error display
Probe output not connected or open contact	YES	...	CO1 (or CO2 or CO3)
BNC rack input short-circuited	YES	...	EV1 SH1 (or 2 or 3)
Section 1 cable cut	YES	...	CO1 (or 2 or 3)
Section 1 cable short-circuited	YES	...	EV1 SH1 (or 2 or 3)
Missing attenuator	YES	...	CO1 (or 2 or 3)
Short-c ircuituited attenuator	YES	...	EV1 SH1 (or 2 or 3)
Section 2 cable unplugged	NO	...	...
Section 2 cable short-circuited	YES	...	EV1 (or 2 or 3)



Example for path 1:

Open circuit in section 1:



Short circuit in section 1

Short-circuited wired probe 1



## 4.2 After the shooting

The speed result appears after the shooting. In case of problem, an error message is displayed.

### ***Degraded mode: Measure V(2-3)***

If the case of probe 1 being missing or not having been short-circuited, speed between probes 2 and 3 appears in the middle box of the screen. This operating mode is valid in the case one has decided to practice a measure with only two wires.

### ***Error message after wrong connections:***

WARNING : if contact moment are in wrong order, the measure can't be done.

In the case when probes 1 and 3 have been short-circuited before probe 2, the message: « Cycle Error, Check connections » message is displayed.

If the probes 3 is short-circuited in first, « Cycle Done » message is displayed. Measure chart stay empty.

**It is therefore imperative to respect the order of the three probes.**



### ***Waiting for the end***

WARNING : If the 3rd probe has not been shorted, the measure cannot be displayed. The system is waiting. If this event is unintentional, you must short the third probe in order to see the available speed displayed : V(1-2)



Note : After the shooting, the probes can be indifferently short-circuited or not, this is not important for the appliance.

## **5 PC software**

VMSContact PC software connects itself to the USB port. It allows to define AB and BC measures lengths, to set the current time and date of the appliance and to display the measure. The PC can read the last measure recorded by the system, as well as distance, date and time of the shooting parameters.

### **5.1 Software installation**

Prior to installing VMSContact PC software, you must ensure that Microsoft .net Framework has been installed on your PC. If that is not the case, you can install it via the CD provided by clicking on the « FrameWork3.5 SP1 » icon.

Once the Framework is installed, you can install VMSContact by double clicking on the « SetupVmsContact\_1\_01.msi » icon.

## **6 Functional parameters**

**Accuracy:** Time uncertainty, timer is set to 20MHz +/- 20 ppm, time resolution is 50ns.

**Timer capacity:** Timer is of large capacity, 32bits at 20MHz, which means that the longest time interval between two events may reach three minutes without risking surpassing the timer.

**Distance uncertainty:** The interval between probes is measured by the operator. Unit of distance is the micron.

**Measure range:** unit is the m/s, largest measure displayable is 99.000 m/s

**Real-time clock:** it synchronizes with the PC time and date.