

## Device for a fully automatic check of the scoring machine – September 2020

### 1) Introduction

In order to proceed with the gradual renewal of laboratory equipment, the executive committee of the FIE has decided to organize a request for proposals for a new device for the automatic check of the scoring machine.

### 2) Regulations

An initial draft for proposals should be sent to the FIE no later **than November 14th**.

The FIE workgroup consisting of: Jacek Bierkowski, Pascal Tesch (executive committee) and Semen Rikhtman, Giandomenico Varallo and Gamil Elzeftawi (SEMI-commission) will determine the best proposed device.

### 3) Presentation specifications

- a. be written in English
- b. describe the concepts of the device
- c. full descriptions and sources of the protocols used
- d. include schematics/drawings on architecture
- e. an indication of cost
- f. expected date for the delivery
- g. Flexibility to adjust the figures in terms of time, resistance, etc.
- h. After sale support proposal
- i. warranty

### 4) Purpose of the device

The device has to be designed to automatically measure the characteristics of the scoring machine specified in the FIE technical regulations, with the subsequent saving of the result and its printing (see below). The software has to run automatically the procedures for the below conditions and the device have also to run manually the single procedure.

The principle of operation is based on imitation with the function of successive approximation, temporal and physical characteristics of the scoring machine on all types of weapons.

### 5) Final production

- Nr. 1 one device for the laboratory with the with the full features above described.
- Nr. 4 pieces of portable simplified self-powered device for monitoring the main parameters of the entire system directly on the piste.

## Specifications for the testing device of scoring apparatus

Below the conditions that have to be tested and reported:

### Foil signalling evidences

Key to diagrams:

A - B = fencers

F = Foil scoring machine

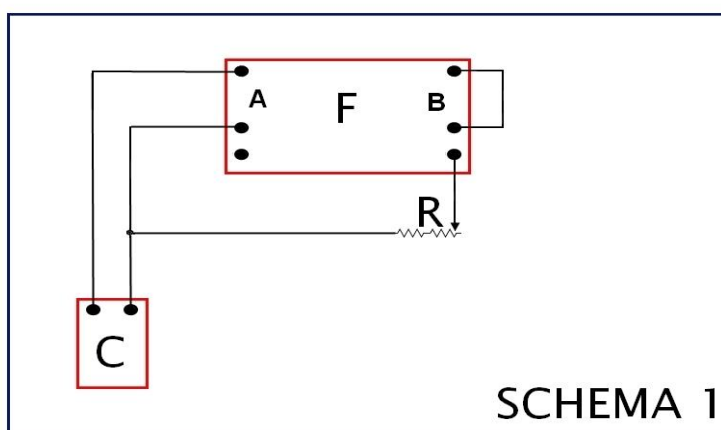
R = adjustable resistance from 1 to 1,000  $\Omega$

C = Dynamic testing apparatus accurate  $\leq 1$  ms

P = piste

1. FL § 1 b)1 ex art. 714-2

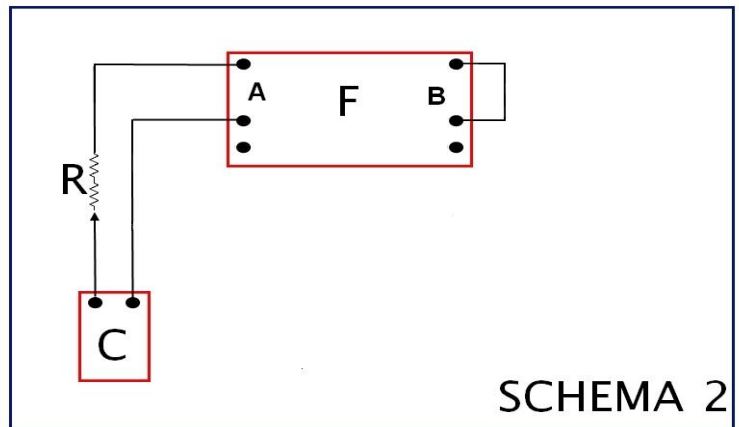
**Recording speed in ms (milliseconds) of the valid hit (T.V.)**



R ( $\Omega$ )	Requirement	Measured speed		Comments
		Green side	Red side	
0	$13 \leq \Delta t \text{ (ms)} \leq 15$	Result	Result	
250	idem			
400	$13 \leq \Delta t \text{ (ms)} \leq 15$			
499 adding this step as the rules mentioned below 500 ohm or we can remove the 400 ohm & left only 499 ohm	$13 \leq \Delta t \text{ (ms)} \leq 15$			

2. FL § 1 b)3 ex art. 714-2

**Recording speed in ms (milliseconds) of the non-valid hit (T.N.V.)**



R (Ω)	Requirement	Measured speed		Comments
		Green side	Red side	
0	$2 \leq \Delta t \text{ (ms)} \leq 10$			
250	idem			

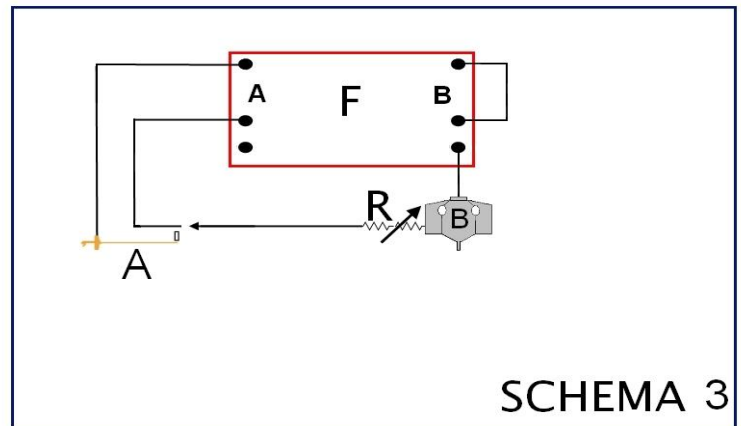
3. FL § 1 b) ex art. 714-4

**Resistance value limit for the reporting of the non-valid hit (T.N.V.)**

Signal	Requirement	Measured speed		Comments
		Green side	Red side	
T.N.V.	$R \geq 200 \Omega$			

4. FL § 1 b) 1 and 2 ex art. 714-1

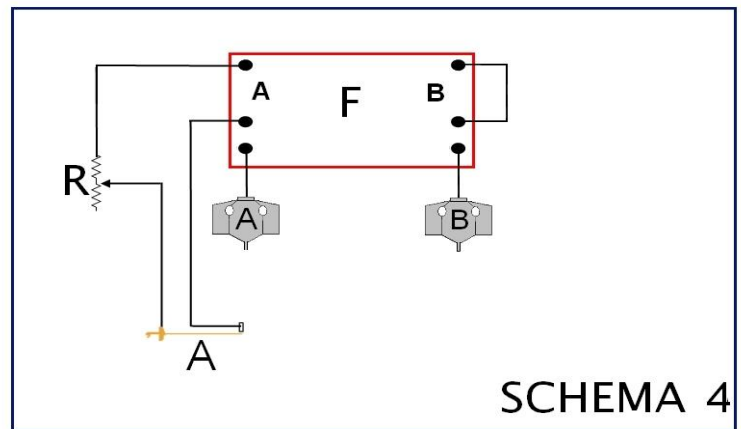
Signal obtained when the pointe A hits in non-valid hit the sweating equipments of B



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
TV <del>↔</del> B I think it should be Touch valid for A not B am I right & the same for all the below.	$R < 500 \Omega$			
TV+TNV <del>↔</del> B	$R_{(TV)} < R < 500 \Omega$ I think that this option should be deleted as we didn't have valid touch & non valid touch at the same time for the existing machines			
TNV <del>↔</del> B	$R_{(TV + TNV)} < R < \infty$			
NO	Never			

5. FL § 1 b)5 ex art. 714-5

Beginning of the resistance value with which it's possible that the fencer A may hit the opponent on T.V. even brushing his jacket with the not insulated foil tip, when a series variable resistor intercalated on the ground wire on the A foil



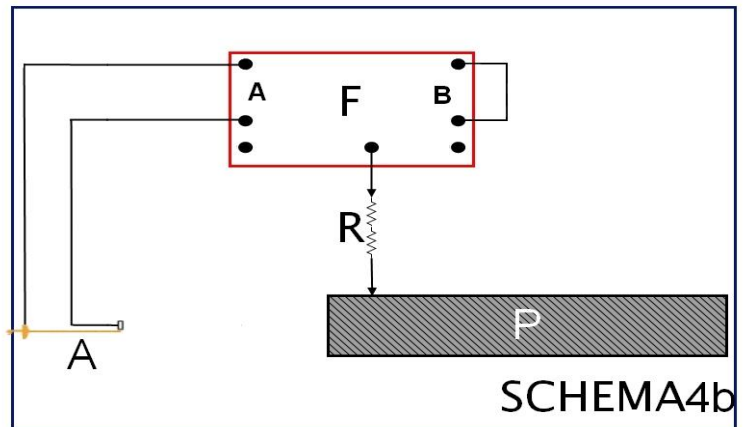
Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
NO	$R \leq 100 \Omega$			
TV $\rightarrow$ B	$R > 100 \Omega$			

Beginning of the resistance value with which it's possible record a TNV on the A fencer guard

Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
NO	$0 \leq R \leq 100 \Omega$			
TNV $\rightarrow$ A	$R > 100 \Omega$			

5 bis. FL § 1 b)5

Beginning of the resistance value with which it's possible to record a non-valid hit on the metallic piste, when a series variable resistor is intercalated from the scoring machine to the piste

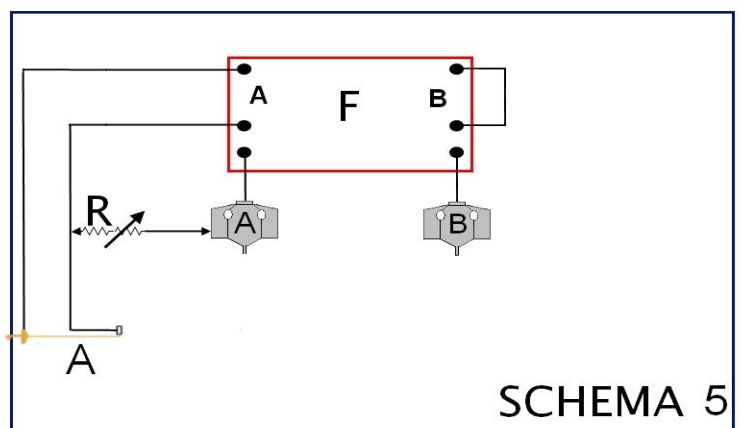


Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
NO	$0 \leq R \leq 100 \Omega$			
TNV $\rightarrow$ B	$R > 100 \Omega$			

6. FL § 1 b)5 ex art. 714-6

Conditions occurring in a fencer insulation failing causing a current leakage from the electric jacket to the tip of his weapon:

- The fencer A hits the fencer B with a non-valid hit
- The fencer A hits the fencer B with a valid hit
- Signal if the A tip hits the B guard
- Signal if the A tip hits the metallic piste
- Resistance limit within which the A fencer yellow lamp turn on



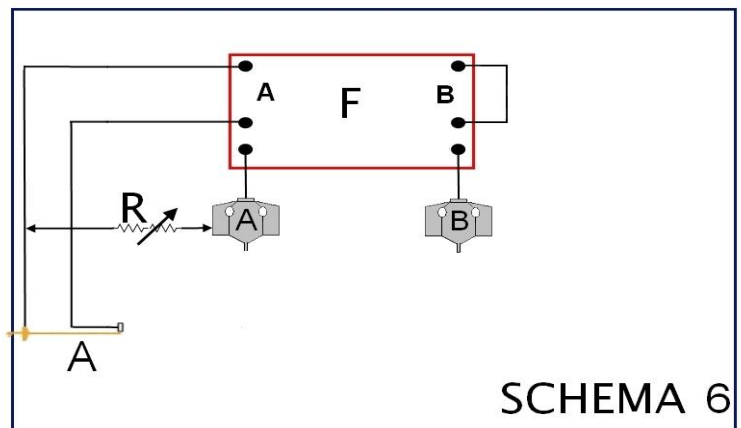
Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	TNV $\rightarrow$ B	$R \geq 250 \Omega$			
b	TV $\rightarrow$ B	$R \geq 250 \Omega$			
c	NO	ALWAYS			




<b>d</b>	NO	ALWAYS			
<b>e</b>	YELLOW LAMP ON	$R \leq 450 \Omega$			
	YELLOW LAMP OFF	$R > 475 \Omega$			



6 bis .FL § 2

Conditions occurring in a fencer insulation failing causing a current leakage from the electric racket to the tip of his weapon:

- The fencer A hits the fencer B with a non-valid hit
- The fencer A hits the fencer B with a valid hit
- Signal if the A tip hits the B guard
- Signal if the A tip hits the metallic piste
- Resistance limit within which the A fencer yellow lamp turn on
- The fencer B hits the fencer A with a valid hit
- Signal if the B tip hits the A guard
- The fencer B hits the fencer A with a non-valid hit
- Signal if the B tip hits the metallic piste



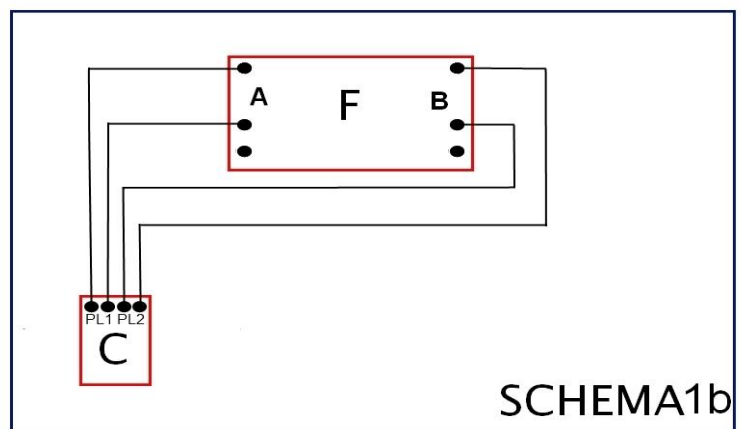
Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
<b>a</b>	TNV  B	$R \geq 250 \Omega$			
<b>b</b>	TV  B	$R \geq 250 \Omega$			
<b>c</b>	NO	ALWAYS			
<b>d</b>	NO	ALWAYS			
<b>e</b>	YELLOW LAMP ON	$R \leq 450 \Omega$			
	YELLOW LAMP OFF	$R > 475 \Omega$			
<b>f</b>	TV  A	ALWAYS			






<b>g</b>	NO	$R > 150 \Omega$			
	TV  A	$R \leq 150 \Omega$			
<b>h</b>	TNV  A	ALWAYS			
<b>i</b>	NO	ALWAYS			

7. FL § 1 a) 6 ex art. 713-1

**Value of recorded time between:**

- a) switching between the first and second hit
- b) limit value for the second hit is not recorded



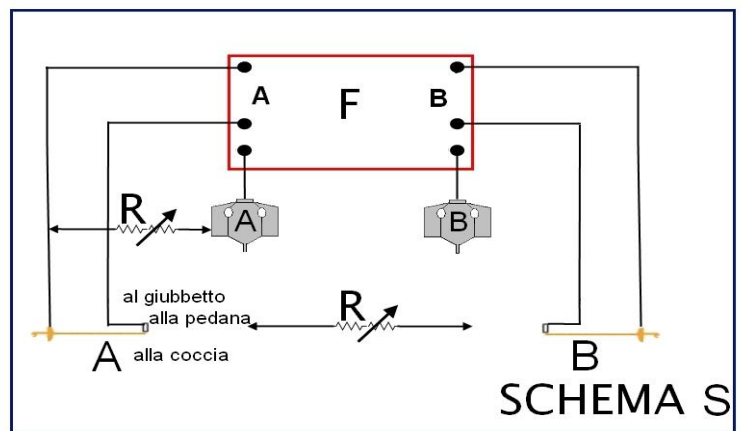
Test	Signal	Requirement	Measured Time (ms)		Comments
			Green side	Red side	
<b>a1</b> Send two valid signals to machine with time difference max of 325 ms	$\Delta t$ TV  B TV  A	$0 \geq \Delta t(\text{ms}) < 325$			
<b>a2</b> Send two non-valid signals to machine with time difference max of 325 ms	$\Delta t$ TNV  B TNV  A	$0 \geq \Delta t(\text{ms}) < 325$			
<b>b1</b> Send two valid signals to machine with time difference more than 325	TV  B only the first hit should be recorder	$\Delta t(\text{ms}) > 325$			



ms of time of max of 325					
b <sup>2</sup> Send two non-valid signals to machine with time difference more than 325 ms	TNV $\rightarrow$ B only the first hit should be recorder	$\Delta t(\text{ms}) > 325$			

8.

Conditions occurring for  $R = 0$  (jacket and guard of the A fencer in short-cut) when the tip B hits the jacket A:



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
TV $\rightarrow$ A	$R_1 \leq 200 \Omega$			
TV $\rightarrow$ A or TNV $\rightarrow$ A	$200 \Omega < R_1 \leq 350 \Omega$			
TNV $\rightarrow$ A	$R_1 > 150 \Omega$			
NO	NEVER			

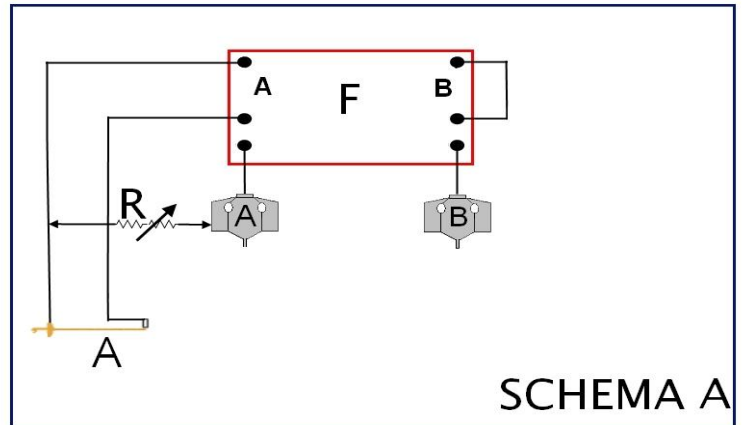
Conditions occurring for  $R_1 = 0$  when:

- The tip B hits the guard A
- The tips A and B hit the piste at the same time

Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	TV $\rightarrow$ A	$R \leq 100 \Omega$			

	TV $\rightarrow$ A or NO	$100 \Omega < R \leq 150 \Omega$			
	NO	$R \geq 150 \Omega$			
<b>b</b>	NO	ALWAYS			

9.  
Beginning of the resistance value which turns on the yellow lamp:



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
Yellow Lamp < A	$R \leq 450 \Omega$			
NO	$R > 475 \Omega$			

- Epee signalling evidences

Key to diagrams:

A - B = fencers

E = Epee scoring machine

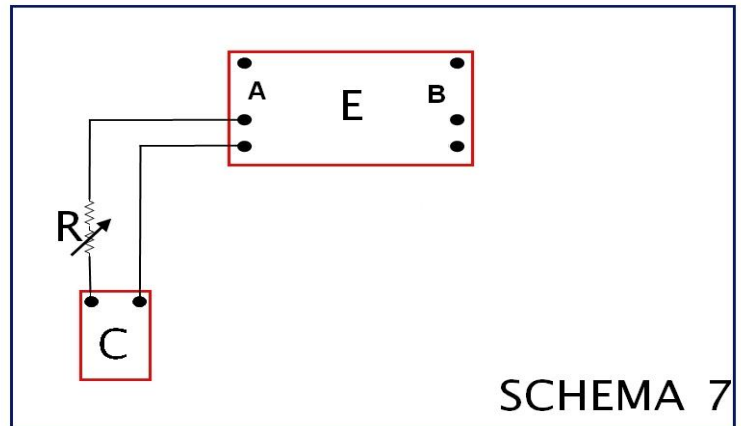
R = adjustable resistance from 1 to 1.000  $\Omega$

C = Dynamic testing apparatus accurate  $\leq 1$  ms

P = piste

1. EP c) ex art. 725

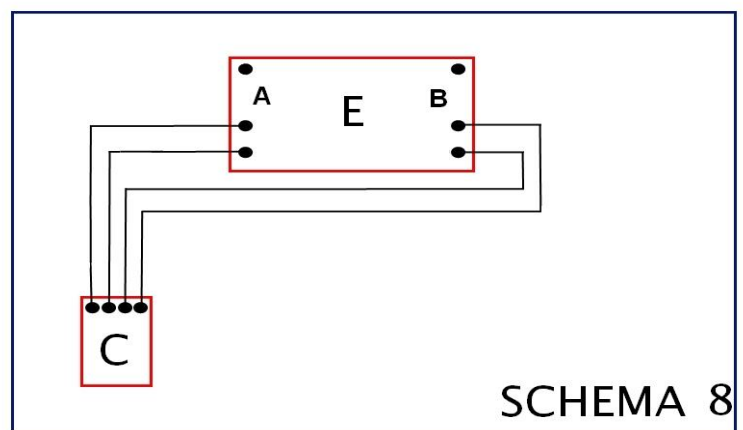
Recording speed in ms (milliseconds) of the valid hit (T.V.)



R ( $\Omega$ )	Requirement	Measured speed		Comments
		Green side	Red side	
10	$2 \leq \Delta t$ (ms) $\leq 10$			
100	NO TIME			

2. EP b) ex art. 724

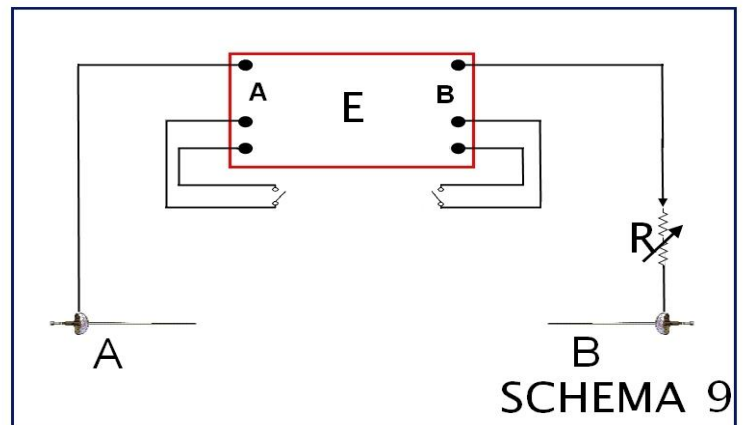
Conditions occurring when you have two hits almost simultaneously:




Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
TV $\rightarrow$ B, $\Delta t$ , TV $\rightarrow$ A	$\Delta t < 40$ ms			
TV $\rightarrow$ B, $\Delta t$ , NO	$\Delta t > 50$ ms			

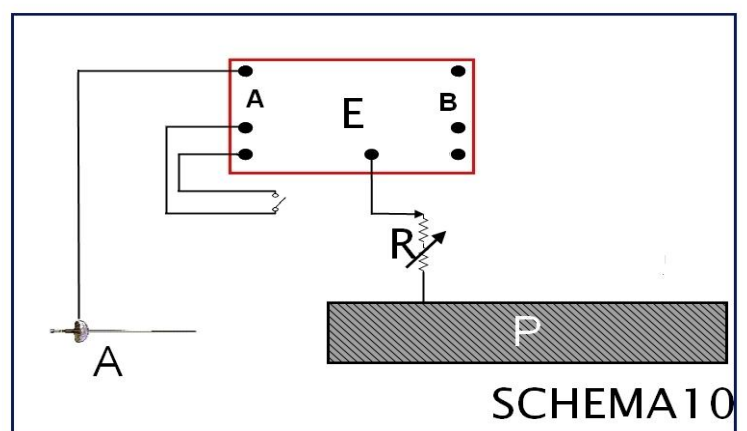
3. EP d) ex art. 726


Beginning of the series resistor value on the B epee ground wire with which it's possible to record a valid hit on the B guard



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
NO	$R \leq 100 \Omega$			
TV  B	$R > 100 \Omega$			

Beginning of the series resistor value on the piste P ground wire with which it's possible to record a hit on the piste



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
NO	$R \leq 100 \Omega$			
TV  B	$R > 100 \Omega$			

- Sabre signalling evidences

Key to diagrams:

A - B = fencers

S = Saber scoring machine

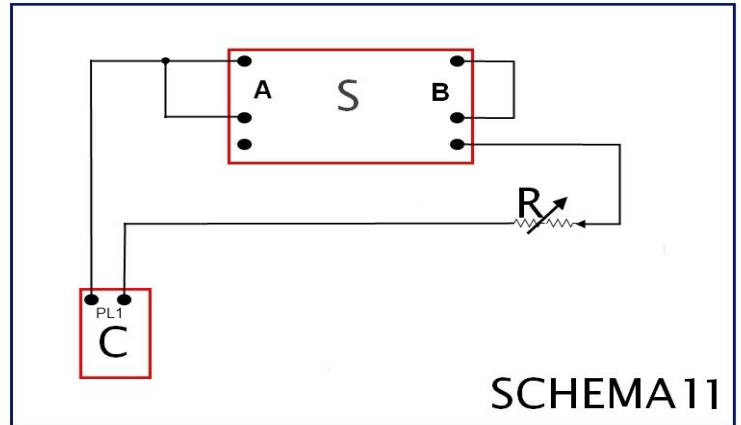
R = adjustable resistance from 1 to 1.000  $\Omega$

C = Dynamic testing apparatus accurate  $\leq 1$  ms

P = piste

1. SA b) 1 e 2 ex art. 762/1 e 762/2

**Recording speed (contact duration sabre-target) in ms (milliseconds) of the valid hit (T.V.)**

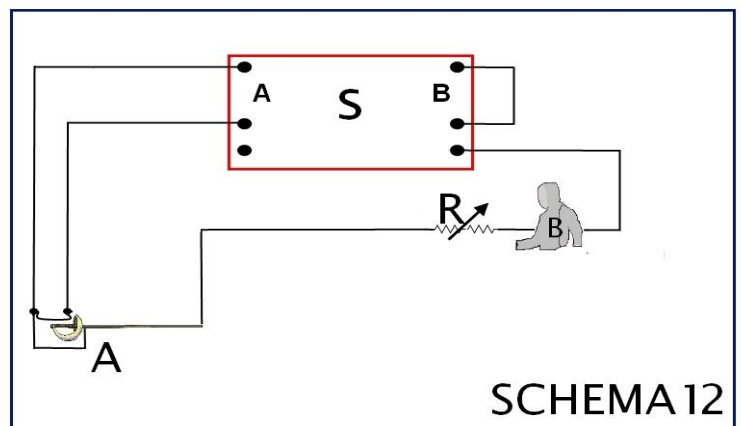


R ( $\Omega$ )	Requirement	Measured speed		Comments
		Green side	Red side	
0	$0,1 \leq \Delta t \text{ (ms)} \leq 1$			
100	IDEM			

2. SA b) 1 e 2 ex art. 762/2

**Conditions to be tested:**

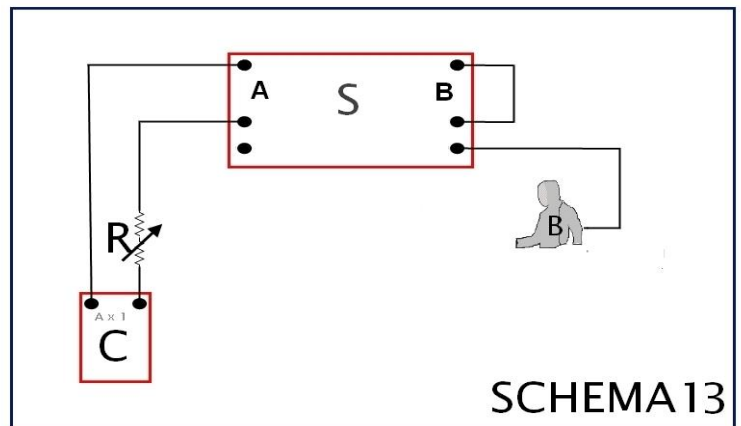
- The A fencer touches with the tip or the blade the B fencer
- What's happen if the R resistance increases
- Chance to record a valid hit on the B fencer with the insulated guard of the A fencer
- Chance to record a valid hit on the B fencer with the **non**-insulated guard of the A fencer



Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	TV $\rightarrow$ B	$R \leq 250 \Omega$			
b	TV $\rightarrow$ B or NO	$250 \Omega < R \leq 350 \Omega$			
	NO	$R > 350 \Omega$			
c	NO	ALWAYS			
d	TV $\rightarrow$ B	$R \leq 250 \Omega$			
	TV or NO	$250 \Omega < R \leq 350 \Omega$			

3. SA b) 7 ex art. 761/6 e 762/7

Beginning of the series resistor value in the A sabre external connexions with which the white lamp lights up



Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
Lamp B $\rightarrow$ A	$R \geq 250 \Omega$			

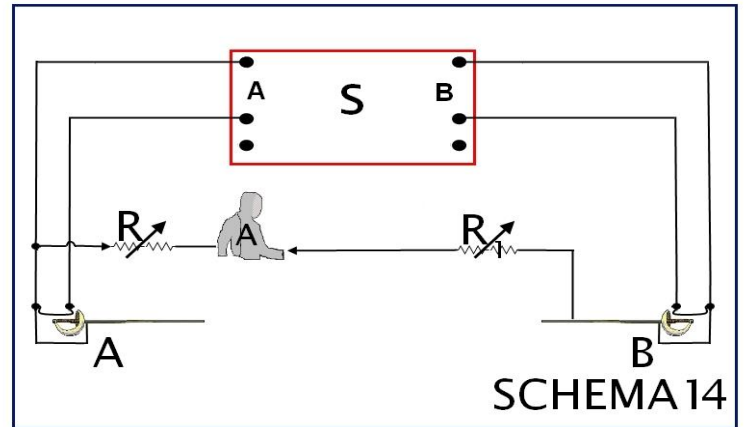
Lighting speed of the white lamp in ms (milliseconds) when R gets to 250  $\Omega$


Signal R ( $\Omega$ )	Requirement	Measured speed		Comments
		Green side	Red side	
NO	$\Delta t \text{ (ms)} < 1$			
Lamp B $\rightarrow$ A or NO	$1 < \Delta t \text{ (ms)} < 3$			
Lamp B $\rightarrow$ A	$\Delta t \text{ (ms)} > 3$			

4. SA b) 3 ex art. 762/3

Event of insulation lack of a shooter (A) that causes a drain current between his weapon and the mask (or the jacket).


Beginning of the resistance value  $R_1$  with which it's possible to record a valid B hit on the A fencer for  $R = 0$



Signal R ( $\Omega$ )	Requirement	Measured speed		Comments
		Green side	Red side	
TV  A	$R_1 \leq 250 \Omega$			
NO	$R_1 > 250 \Omega$			

Conditions occurring for  $R_1 = 0$  when :

- The B blade touches the insulated A guard
- The B blade touches the non insulated A guard

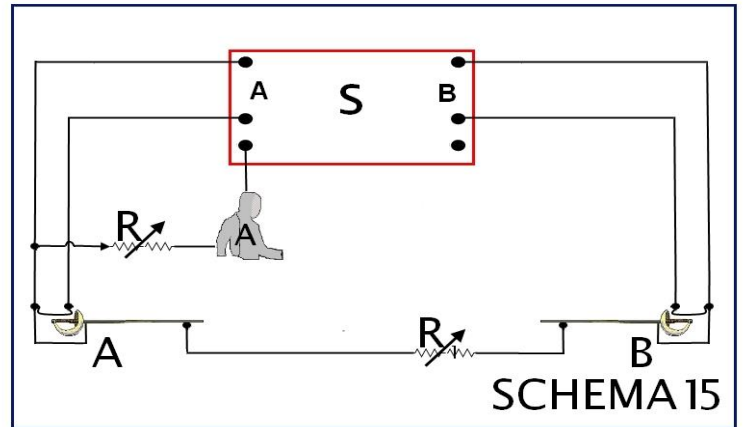
Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	NO	ALWAYS			
b	TV  A	$R \leq 250 \Omega$			
	NO	$R > 250 \Omega$			




5. SA b) 4 ex art. 762/4

Event of contact between the blades, the A fencer is in anti-lock position

Conditions occurring for  $R = 0$  when:




- The A fencer hits with the tip or the blade the B fencer
- The A blade hits the blade or the guard of B
- The B fencer hits the A fencer in TV
- Chance to record a valid hit when the B blade touches the blade or the guard of the A fencer



Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	TV  B	ALWAYS			
b	NO	ALWAYS			
c	TV  A	ALWAYS			
d	TV  A	ALWAYS			

Conditions occurring for  $R_1 = 0$  when:

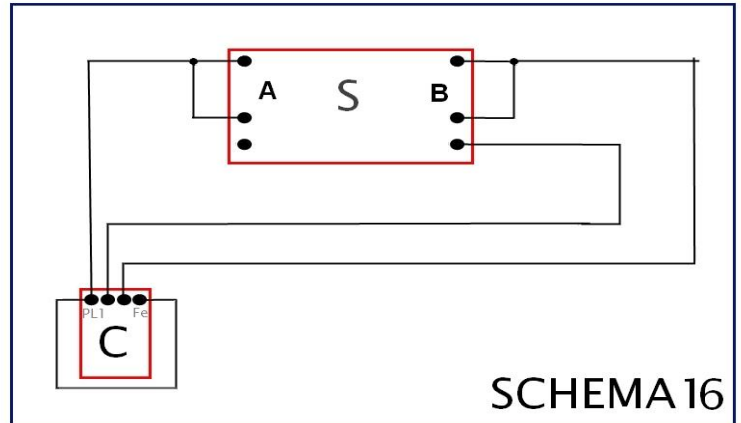
- The A fencer hits with the tip or the blade the B fencer
- The A blade hits the blade or the guard of B
- The B fencer hits the A fencer in TV
- Chance to record a valid hit when the B blade touches the blade or the guard of the A fencer





Test	Signal	Requirement	Measured resistance		Comments
			Green side	Red side	
a	TV  B	ALWAYS			
b	NO	ALWAYS			
c	TV  A	ALWAYS			
d	TV  A	$R_1 \leq 250 \Omega$			
	NO	$R_1 > 250 \Omega$			



6. SA b) 5 ex art. 762/5

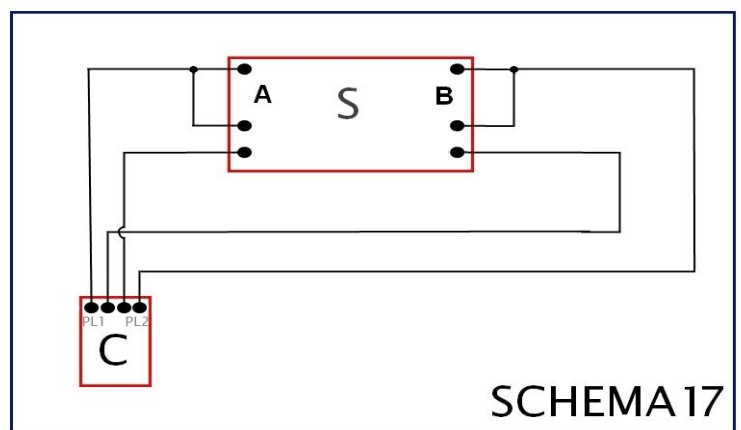
Interdiction speed of the alert in ms (milliseconds) when generating a contact between the blade of the A fencer and the B opponent's valid surface with the B blade






Signal	Requirement	Measured resistance		Comments
		Green side	Red side	
TV  B	$0 \leq \Delta t \text{ (ms)} < 4$			
TV  B o NO	$4 \leq \Delta t \text{ (ms)} \leq 6$			
NO	$6 \leq \Delta t \text{ (ms)} \leq 14$			
TV  B or NO	$14 \leq \Delta t \text{ (ms)} \leq 16$			
TV  B	$\Delta t \text{ (ms)} > 16$			

7. Section 761/8

Value of recorded time between:  
a) switching between the first and second hit  
b) limit value for the second hit is not recorded



Test	Signal	Requirement	Measured Time (ms)		Comments
			Green side	Red side	
<b>a</b>	$\Delta t$ TV  B TV  A	$0 < \Delta t \text{ (ms)} \leq 120$			
<b>b</b>	TV  B	$\Delta t \text{ (ms)} > 120$			