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# HV lines and switchgear equipment

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## Ac voltage detector for outdoor/indoor use

Precise and stable operating threshold. Insensitivity to induced voltages by limiting the operating voltage range. Remarkably resistant to impacts, vibrations, extreme temperatures, humidity. Double signaling.

Voltage presence indicated at the same time by:

- 4 bright red flashing electro-luminescent diodes (visible at more than 50 meters even in direct lighting),
- a powerful rated acoustic signal (60 dB/2 m).

The **CC-245** detectors are available according to the models with end fittings:

**W:** Hexagonal 20 mm,

**C:** Hexagonal 12 mm,

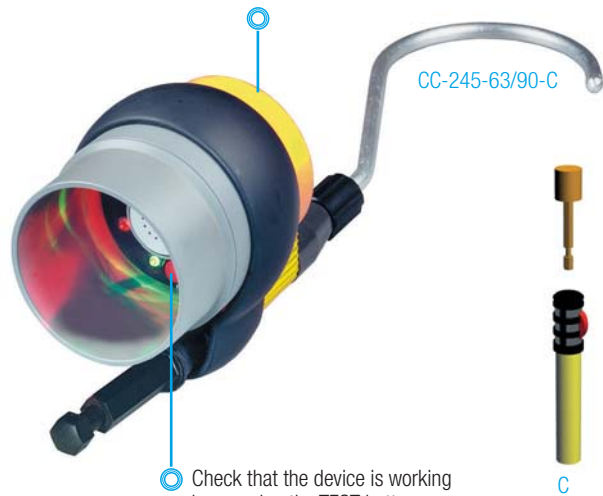
**K:** Universal.

Put on "silent block".

IEC 61243-1 edition 2

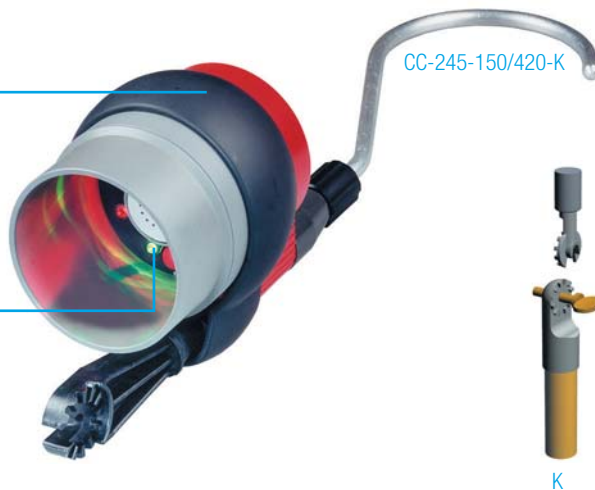






Robust housing made from polycarbonate with high mechanical properties and dielectric strength.



Surrounded by a rubber impact-resistant padding.

Two **GREEN** illuminated lights, indicating that the device is on. These lights turn off, and four **RED** lights illuminate when a voltage is detected.



Reference	IEC 61243-1 edition 2	 (Operating voltage)	Contact electrode	Body colour	 type 6 LR 61		
<b>CC-245-63/90-(*)</b>	•	63 - 90 kV	Ø 120 mm	Yellow	9 V	-25/+55 C°	650
<b>CC-245-150-(*)</b>	•	150 kV	Ø 120 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-225/420-(*)</b>	•	225 - 420 kV	Ø 200 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-60/150-(*)</b>	•	60 - 150 kV	Ø 120 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-63/150-(*)</b>	•	63 - 150 kV	Ø 120 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-90/225-(*)</b>	•	90 - 225 kV	Ø 120 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-150/420-(*)</b>	•	150 - 420 kV	Ø 120 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-225/550-(*)</b>	–	225 - 550 kV	Ø 200 mm	Red	9 V	-25/+55 C°	650
<b>CC-245-315/765-1-(*)</b>	–	315 - 765 kV	Ø 200 mm	Red	9 V	-25/+55 C°	650

Delivered in synthetic case with handle, battery and electrodes 370 x 165 x 145 mm.





(\*) Please specify type of mounting when ordering: C or K.





## Insulating sticks for manoeuvring detectors & short-circuiting and earthing systems

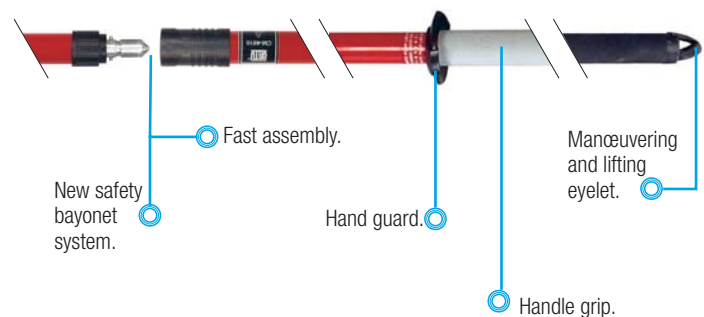
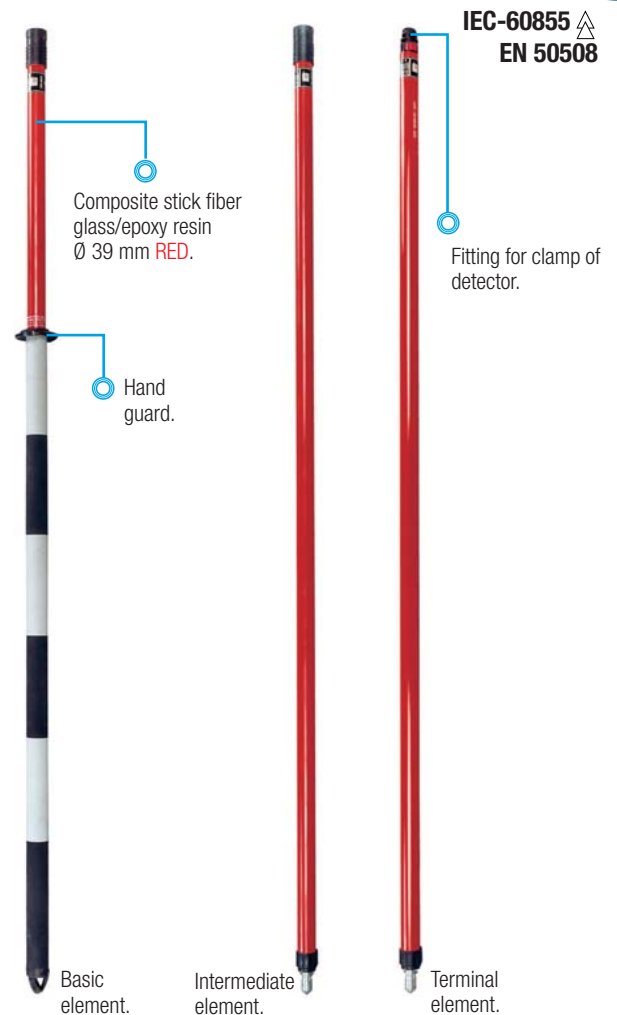
This range thus allows a stick-length limitation in case of space requirements and carrying capabilities.

For common applications a series of complete sets including 2 or 3 elements are made to give simple solutions for working distance from 2 to 6 meters.

	Reference				
		smallest end fitting	biggest end fitting	Insulating	
Basic	CM-4610	1.13	—	0.08	1 350
	CM-4615	1.63	—	0.33	1 800
	CM-4620	2.13	—	0.33	2 800
	CM-4625	2.63	—	0.83	3 300
Intermediate	CM-4610-I	1.165	—	0.8	1 300
	CM-4615-I	1.665	—	1.3	1 700
	CM-4620-I	2.165	—	1.8	2 600
	CM-4625-I	2.665	—	2.3	3 100
Terminal	CM-4610-(* )	1.115	1.21	0.78	1 000
	CM-4615-(* )	1.615	1.71	1.28	1 400
	CM-4620-(* )	2.115	2.21	1.78	2 200
	CM-4625-(* )	2.615	2.71	2.28	2 700
Fixed sticks	CM-4115-(* )	1.575	1.675	0.82	1 350
	CM-4120-(* )	2.075	2.175	1.07	1 800
	CM-4125-(* )	2.575	2.675	1.32	2 800
	CM-4130-(* )	3.075	3.175	1.82	3 300


(\*) Reference to be completed by fitting: C-E-H-K-T-D.

Reference		
CM-3900-J	0.36	950



## Set of sticks

Complete sets of sticks for common applications.

Reference	Composition	
CM-4220-(* )	2 elements: CM-4610+CM-4610-(* )	2
CM-4230-(* )	2 elements: CM-4615+CM-4615-(* )	3
CM-4240-(* )	2 elements: CM-4620+CM-4620-(* )	4
CM-4345-(* )	3 elements: CM-4615+CM-4615-I+CM-4615-(* )	4.5
CM-4360-(* )	3 elements: CM-4620+CM-4620-I+CM-4620-(* )	6


(\*) Reference to be completed by fitting: C-E-H-K-T-D.

 Total length

 Weight

**CATU**

## HV and EHV clamps manoeuvrable by insulating stick

\* IEC 61230 

Body in aluminium alloy with trapezoidal threaded screw. Interposed elastic washers in the clamping system improve efficiency and ensure a higher withstand in case of electrodynamic shock. Manoeuvring by CM-6 insulated stick of appropriate length and characteristics.



MT-731-E



MT-732-E



MT-734 \*



MT-735-H \*



MT-737-H \*

Manoeuvrable clamps									
	MT-732-A MT-731-A	MT-732-B MT-731-B	MT-732-E MT-731-E	MT-732-H MT-731-H	MT-734 MT-735	MT-734-A MT-735-A	MT-734-B MT-735-B	MT-734-E MT-735-E	MT-734-H MT-735-H

Reference	Rating (kA/1 s)		Copper connection				
			Copper cables **	Contact range width	Stud		
MT-731-(*)	40	200 x 200 x 50	150 mm <sup>2</sup> max.	45 mm	M 12	Ø 5-60	1 450
MT-732-(*)	40	200 x 200 x 50	150 mm <sup>2</sup> max.	45 mm	M 12	Ø 40-120	1 450
MT-734-(**)	40	145 x 125 x 52	150 mm <sup>2</sup> max.	40 mm	M 12	Ø 5-40	800
MT-735-(*)	40	178 x 175 x 60	150 mm <sup>2</sup> max.	40 mm	M 12	Ø 15-60	1 450
MT-737-H	40	340 x 200 x 55	150 mm <sup>2</sup> max.	40 mm	M 12	Ø 20-120	1 350

(\*) Add type of connection A - B - E - H.

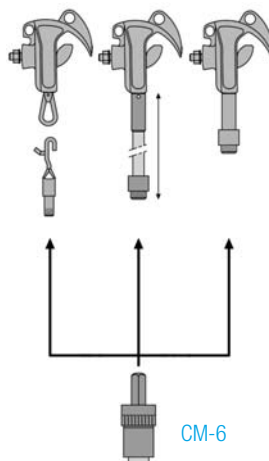
(\*\*) Add type of connection B - E - H.

\*\* Other cable sections: see page 139 or 140.

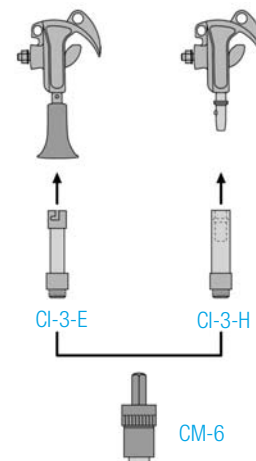
Attachment of MT-735 or MT-734 clamps with MT-717-3-B hook.



Direct connection.



Connection adaptor.





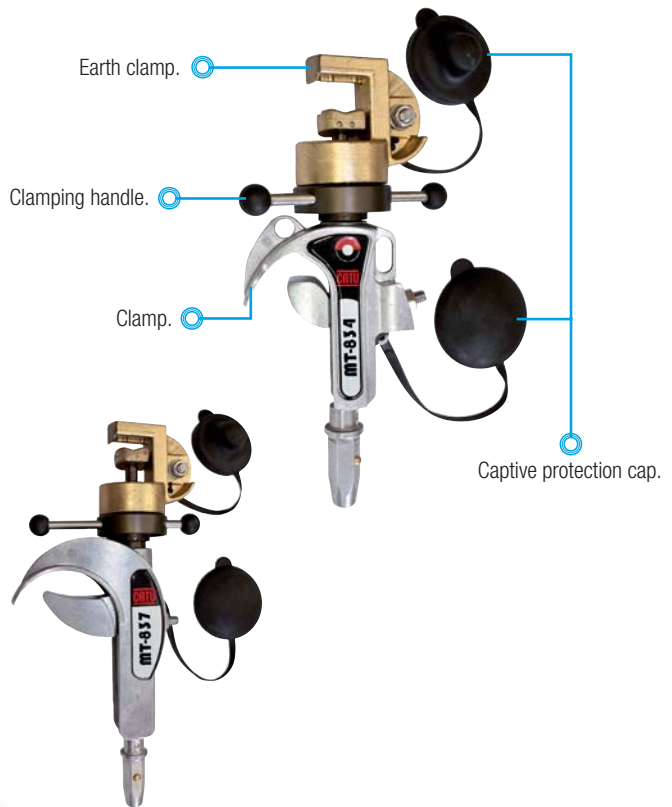
## Earthing system with clamp interlocking




The APE is a grounding system with an interlocking system between earthing clamp and line clamps. It is used for safe and accurate installation (earthing clamp and then line clamp) and removal (line clamp and then earthing clamp).



### SPECIAL FEATURES

- Locking system using a patented system with more than 30,000 possible combinations.
- Easy installation and removal without additional accessories.
- Automatic trip at the recommended torque on support withstand the short circuit current.
- System security (unable to be unlocked without the associated clamp).






Reference	Rating	Use	Fitting	Connection				
				Range	Stud			
MT-834-H*	31.5 kA/1 s	Substation	H hexagonal	width 38 mm	M 12	360 x 200 x 85	5 - 40	9 600
MT-834-E*	31.5 kA/1 s	Substation	E bayonet	width 38 mm	M 12	360 x 200 x 85	5 - 40	9 600
MT-834-T*	31.5 kA/1 s	Substation	T bayonet	width 38 mm	M 12	360 x 200 x 85	5 - 40	9 600
MT-835-H*	31.5 kA/1 s	Substation	H hexagonal	width 38 mm	M 12	390 x 200 x 85	15 - 60	10 440
MT-835-E*	31.5 kA/1 s	Substation	E bayonet	width 38 mm	M 12	390 x 200 x 85	15 - 60	10 440
MT-835-T*	31.5 kA/1 s	Substation	T bayonet	width 38 mm	M 12	390 x 200 x 85	15 - 60	10 440
MT-837-H*	31.5 kA/1 s	Substation	H hexagonal	width 38 mm	M 12	470 x 220 x 85	20 - 120	11 640
MT-837-E*	31.5 kA/1 s	Substation	E hexagonal	width 38 mm	M 12	470 x 220 x 85	20 - 120	11 640
MT-837-T*	31.5 kA/1 s	Substation	T hexagonal	width 38 mm	M 12	470 x 220 x 85	20 - 120	11 640
MT-934*	31.5 kA/1 s	Line	ring	width 38 mm	M 12	360 x 200 x 85	5 - 40	9 600
MT-935*	31.5 kA/1 s	Line	ring	width 38 mm	M 12	390 x 200 x 85	15 - 60	10 440

\*One reference including 3 phases, so 3 clamps equipped.

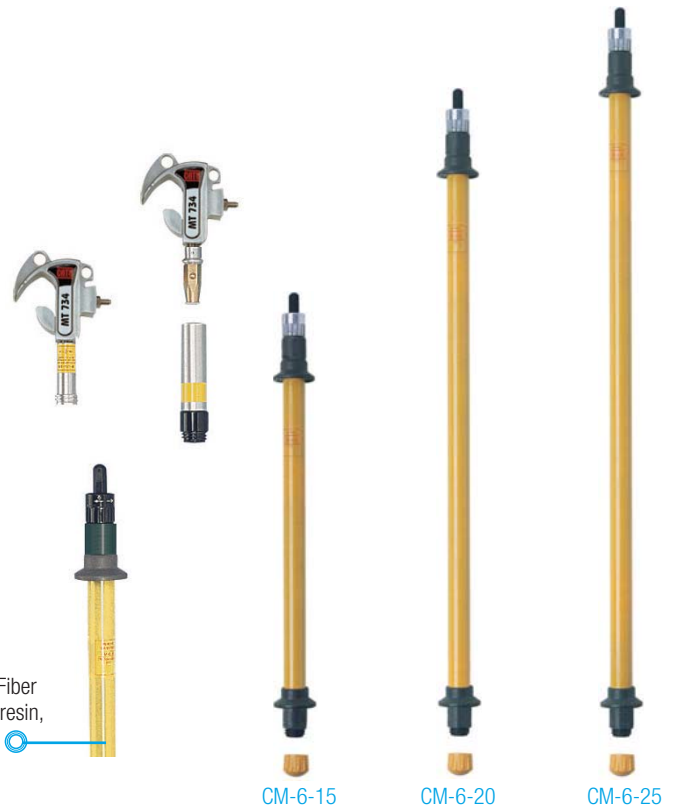


## Insulating sticks for short circuiting and earthing systems

For cables  $\geq 95 \text{ mm}^2$  **CM-6** series is recommended.  
Yellow colour elements, with superior characteristics, they are connected between them without any prior order of assembly. These elements allow "long length" assemblies which can support short-circuit systems with large cross-section cables.  
Shockproof guard and pole end cap.




Reference	 mm	 mm	 g
<b>CM-6-15</b>	1.5	47	2 400
<b>CM-6-20</b>	2.0	47	3 200
<b>CM-6-25</b>	2.5	47	4 000
<b>CM-6-30</b>	3.0	47	4 800

Composite tube Fiber glass and epoxy resin, yellow colour.



## Earth clamps

Copper aluminium bronze earth clamps.

Reference	Rating	Use	Connection $\emptyset$ (mm)	 mm	 mm	 g
<b>MT-843</b>	40 kA/1 s	Substation/ Overhead line	Hole: $\emptyset$ 12.5	45 x 106 x 165	<ul style="list-style-type: none"> <li><math>\bullet</math> <math>\emptyset</math> 6 -25</li> <li><math>\text{—}</math> 0 - 35</li> </ul>	950
<b>MT-843-P</b>	40 kA/1 s	Substation	3 Holes: $\emptyset$ 12.5	45 x 106 x 165	<ul style="list-style-type: none"> <li><math>\bullet</math> <math>\emptyset</math> 6 -35</li> <li><math>\text{—}</math> 0 - 35</li> </ul>	950
<b>MT-847</b>	30 kA/0.5 s	Overhead line	Hole: $\emptyset$ 13	45 x 106 x 170	$\text{—}$ 0 - 30	1 000
<b>MT-852</b>	63 kA/0.5 s	Substation	Hole: $\emptyset$ 13	70 x 125 x 155	Fixed points	1 400
<b>MT-853</b>	40 kA/0.5 s	Substation	Hole: $\emptyset$ 13	65 x 130 x 135	Fixed points	1 000





## Equipotential Lines

### USE

Conductive line connecting two pieces of metallic pieces in order to give them the same potential.

IEC-61230



### Cable composition and features:

35 mm<sup>2</sup> copper cable insulated in a green silicone sheathing.  
Double crimped lugs at the cable ends.

Reference	Characteristics
ZCESSV3502C1240	Cable 35 mm <sup>2</sup> L = 2 m crimped lug Ø 12
ZCESSV3503C1240	Cable 35 mm <sup>2</sup> L = 3 m crimped lug Ø 12
ZCESSV3504C1240	Cable 35 mm <sup>2</sup> L = 4 m crimped lug Ø 12
ZCESSV3505C1240	Cable 35 mm <sup>2</sup> L = 5 m crimped lug Ø 12
ZCESSV3506C1240	Cable 35 mm <sup>2</sup> L = 6 m crimped lug Ø 12
ZCESSV3507C1240	Cable 35 mm <sup>2</sup> L = 7 m crimped lug Ø 12
ZCESSV3510C1240	Cable 35 mm <sup>2</sup> L = 10 m crimped lug Ø 12
ZCESSV3512C1240	Cable 35 mm <sup>2</sup> L = 12 m crimped lug Ø 12
ZCESSV3515C1240	Cable 35 mm <sup>2</sup> L = 15 m crimped lug Ø 12
ZCESSV3550C1240	Cable 35 mm <sup>2</sup> L = 50 m crimped lug Ø 12



### Equipotential line composition and characteristics:

400 mm insulating stick.

Light alloy **EMCC-3735** clamp attached to the stick with a tightening capacity of Ø 15 to 60 mm. Copper cable see above. Earthing clamp **MT-847** made from copper and aluminum.

Reference	Characteristics
ZLEQ3735L04	Clamp <b>MT735</b> short stick + Cable <b>GREEN</b> 35 mm <sup>2</sup> L = 4 m crimped lug Ø 12
ZLEQ3735L06	Clamp <b>MT735</b> short stick + Cable <b>GREEN</b> 35 mm <sup>2</sup> L = 6 m crimped lug Ø 12
ZLEQ3735L010	Clamp <b>MT735</b> short stick + Cable <b>GREEN</b> 35 mm <sup>2</sup> L = 10 m crimped lug Ø 12
ZLEQ3735L15	Clamp <b>MT735</b> short stick + Cable <b>GREEN</b> 35 mm <sup>2</sup> L = 15 m crimped lug Ø 12

## Copper cables

\*\*\* IEC-61230



Extra flexible braided multi-strand cables. Available on transparent PVC sheath **A** or transparent silicone sheath **B\*\*\***.

Reference		Rating (kA/1 s)	Cable		Section (mm <sup>2</sup> )
A*	B**		Weight (kg/m)	Ø (mm)	
M-24-70	M-24-70-S	16	0.768	12	70
M-24-75	—	20	0.800	12	75
M-24-95	M-24-95-S	20	1.000	14	95
M-24-120	M-24-120-S	30	1.280	17	120
M-24-150	M-24-150-S	40	1.630	19	150

\* Transparent PVC sheath, with cable section identification.

\*\* Transparent silicone sheath according to IEC-61230. Resistant to temperature variations (-40 °C to +70 °C) with double IEC triangle marked on cable section.



## Aluminium cables



Extra flexible braided multi-strand cables.  
Transparent PVC sheath, with cable section identification.

Reference	Rating (kA/1 s)	Cable		Section (mm <sup>2</sup> )
		Weight (kg/m)	Ø (mm)	
<b>M-28-70</b>	10.0	0.240	13.4	70
<b>M-28-120</b>	17.5	0.430	19.00	120
<b>M-28-150</b>	20.0	0.510	21.00	150



## Adjustable access points



For large vertical or oblique heavy duty conductors.

Reference	Characteristics	Rating (kA/1 s)		Conductor		
				Type	Ø mm	
<b>MT-790</b>	Copper/Alu alloy Ø 18 mm	30	255 x 105 x 50	Copper	Ø 12 - 60	1 400
<b>MT-792</b>	Light alloy Ø 20 mm	30	270 x 105 x 60	Aluminium	Ø 12 - 60	855
<b>MT-797</b>	Light alloy Ø 20 mm	30	240 x 170 x 60	Aluminium	Ø 60 - 120	1 200



## Earthing kit support

Welded steel assembly with galvanization surface treatment.  
Writing zone available.

Reference		
<b>MT-895</b>	230 x 230 x 150	900






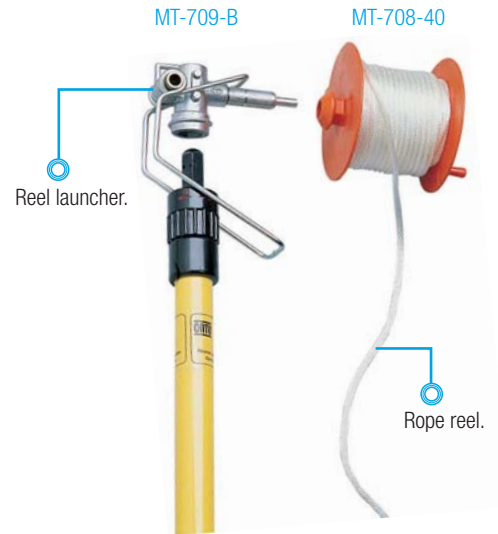




## Rope operated clamp

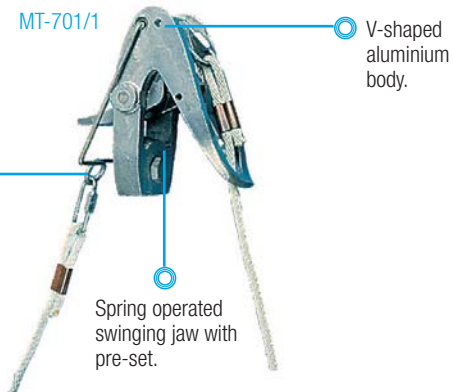
Attachment and removal is carried out from the ground or from the cross-arm, using a rope passed previously over the conductor to be earthed. Up to 10 m: by using **MT-709-B** reel launcher placed on a **CM-6** SERIE Stick (see page 94) that passes the rope over the conductor; - up to 20 m: by using a **MF-60** wire projector. This projector fires an arrow carrying a braided nylon wire which sets the rope. The clamp is then fixed to the rope and attached onto the conductor.

Reference		Icc (kA/1 s)	I asym. (A)	 mm	 g
<b>MT-701/1</b>	Ø 12 - 48	30	72	195 x 120 x 175	2 000
Earthing cable: cable 120 mm <sup>2</sup> with crimped lugs on <b>M12</b> screw (x3)					



**Attachment:** the clamp is pulled up by the rope. Pulling on the rope triggers the spring and closes the jaw

**Removal:** pulling on the rope attached to the hinged saddles causes the clamp to pivot and free the jaw.

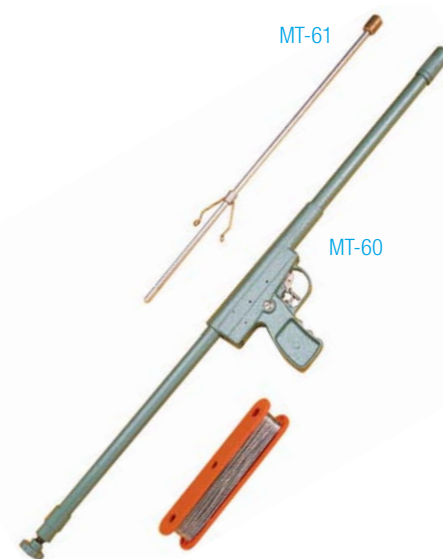


## Wire Gun Tester

An extremely simple way to test the voltage in an overhead line without leaving the ground. Just shoot a weighted arrow over the line - up to 18 m high - forming contact between the conductors through a very lightweight braided steel cable.



If they are both live, this produces a sparkover and alerts the user. The **MF-60** gun can also be used to shoot an insulating cord for handling **MT-701** contact clamps.

Reference	Characteristics
<b>MF-60</b>	Complete cable-launcher projector delivered in a waterproof bag with 2 spare arrow and 2 spool of 30 m fuse wire. 3.500 kg.
<b>MF-61</b>	Spare arrow.
<b>MF-62</b>	Spool of 30 m of fuse wire.
<b>MF-63</b>	Spool of 100 m of fuse wire.
<b>MF-66</b>	Spool of 30 m of nylon lead isolated hoisting cord.



## Short-circuiting and earthing system carrying bags

Can receive earthing system equipment (clamps and cables).

Reference	 mm	 g
<b>M-87-53</b>	380 x 250 x 400	2 000
<b>M-87-153</b>	380 x 250 x 600	2 500
<b>M-87-295</b>	550 x 300 x 300	1 500



M-87-295



M-87-53