



2023/2024

# Access to energy and fraud-preventing

Solutions to simplify and secure  
electrical distribution

Catalogue  
Energy controlling

**MICHAUD**



# 60 YEARS EXPERTISE

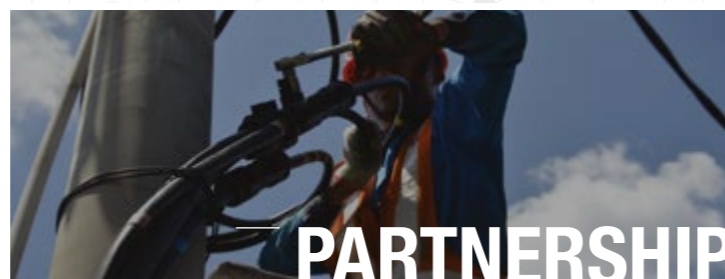
**M**ICHAUD is a French industrial group specialised in energy distribution networks for more than 60 years.

MICHAUD Export, subsidiary dedicated to international markets, develops and sells solutions according to applicable standards thanks to its know-how as well as its relationships with local users.

-  100 Million €
-  + 70 countries
-  100 protected innovations yearly
-  + 300 employees

## PRESCRIPTION & DIAGNOSIS

A strong market understanding and a recognised technical knowledge to serve your projects in order to propose suitable solutions.



**PARTNERSHIP**

## INNOVATION & QUALITY

10% of the work force is dedicated to R&D. We develop tomorrow's solutions and guarantee quality and reliability of products thanks to a COFRAC accredited and independent test laboratory (accreditation n°1-0579).



## FITTERS TRAINING

As preferred technical partner, we encourage learning and knowledge transmission together with product commercialisation.



**SUPPORT**

According to the international standards, MICHAUD designs and develops energy distribution solutions. The product range is focused on two fields of expertise:

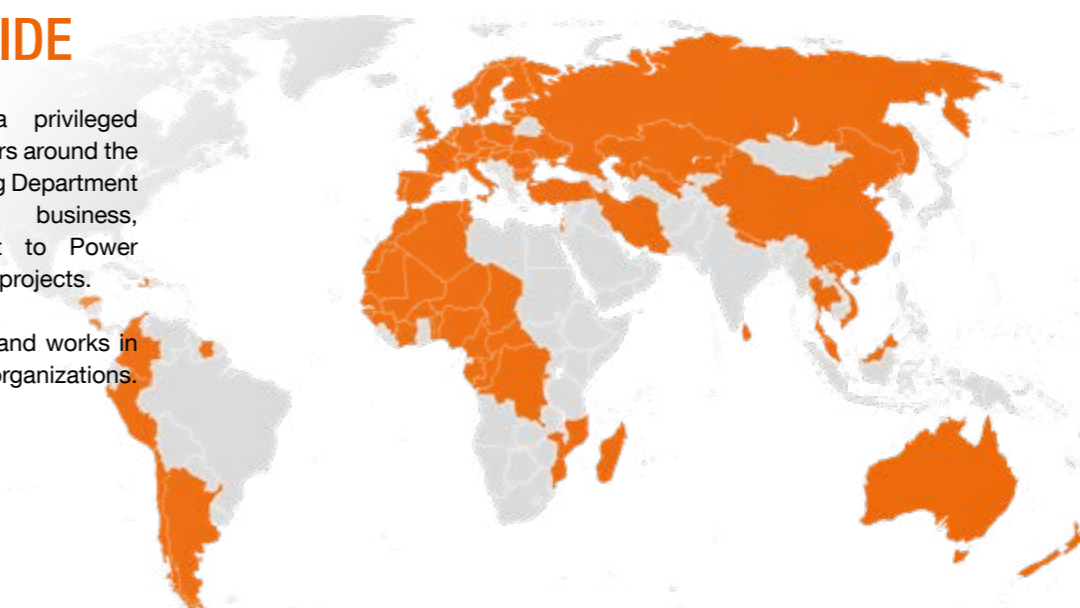
- **Low Voltage Network:** to connect and protect the overhead and underground electrical lines ;
- **Energy Controlling:** to manage and offer easy access to electricity.



## +70 PARTNERS IN THE WORLD-WIDE

MICHAUD benefits from a privileged collaboration with many partners around the world. Thanks to an engineering Department dedicated to international business, MICHAUD provides support to Power Utilities in their grid expansion projects.

Besides, MICHAUD supports and works in partnership with power sector organizations.



## PRODUCTS BRANDS



**QUALITY**

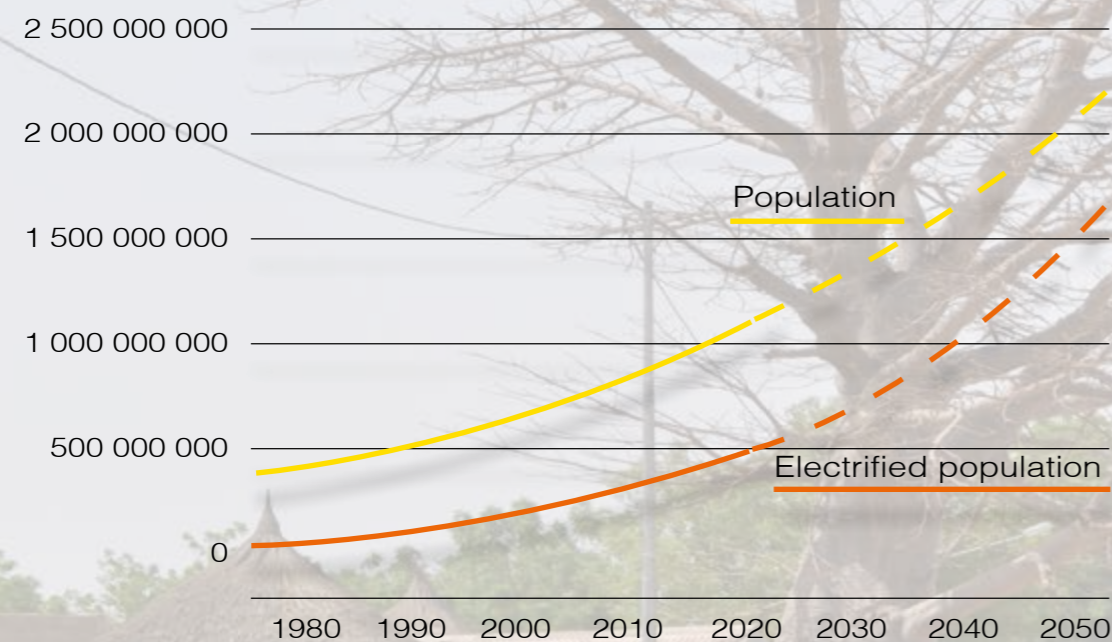
# ENERGY CONTROLLING

The development of electrification in Africa is essential to support the economic growth of the continent countries and to reduce poverty in rural and peri-urban areas. African governments are aware of it and place regularly national power companies at the heart of development strategies.

The major challenges for these companies will be to meet the continent's economic and demographic challenge tomorrow, **to make current and future investments** profitable and thus achieve their **electrification objectives**.

## Population - Sub-Saharan Africa

### Evolution of the population



Data : World Bank and estimation trend until 2050.

In order to support population growth in matter of electrification, substantial investments will be needed for energy production, transmission and distribution. Thanks to the financial involvement of international organizations such as the World Bank, projects can be undertaken. Over the period 2014-2018, the World Bank has released \$ **5 billion** for projects in energy access.

However, the current funds will not be enough to cover all needs and follow the upward trend. It is therefore necessary to support utilities with complementary solutions to **help them electrify** rural areas and **secure revenues** over the long run.

## MICHAUD's challenges

Cost optimization



Adaptation to the local context



Sustainability of systems



Networks safety

MICHAUD offers solutions to significantly the levels of **non-technical losses** through the cleaning of electrical distribution networks. As a result, network security, profitability and sustainability are improved. Working on **network efficiency** is a major challenge and requires the involvement of all stakeholders, especially installers. MICHAUD supports its customers with training sessions dedicated to fitters in order to ensure the proper installation of equipment and avoid early damage.

Installations efficiency

MICHAUD offers solutions which adapt to **the specific context of rural electrification**, from network protection to energy management. This range of products meets local expectations while ensuring the most accurate sizing of equipment. Utilities **handle costs and resources** and ensure a reliable electrification model.

**Through its solutions, MICHAUD participates in a reliable, economical and sustainable electrification model.**



# SUMMARY

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# FRAUD PREVENTING

## Network extension

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## Network rehabilitation

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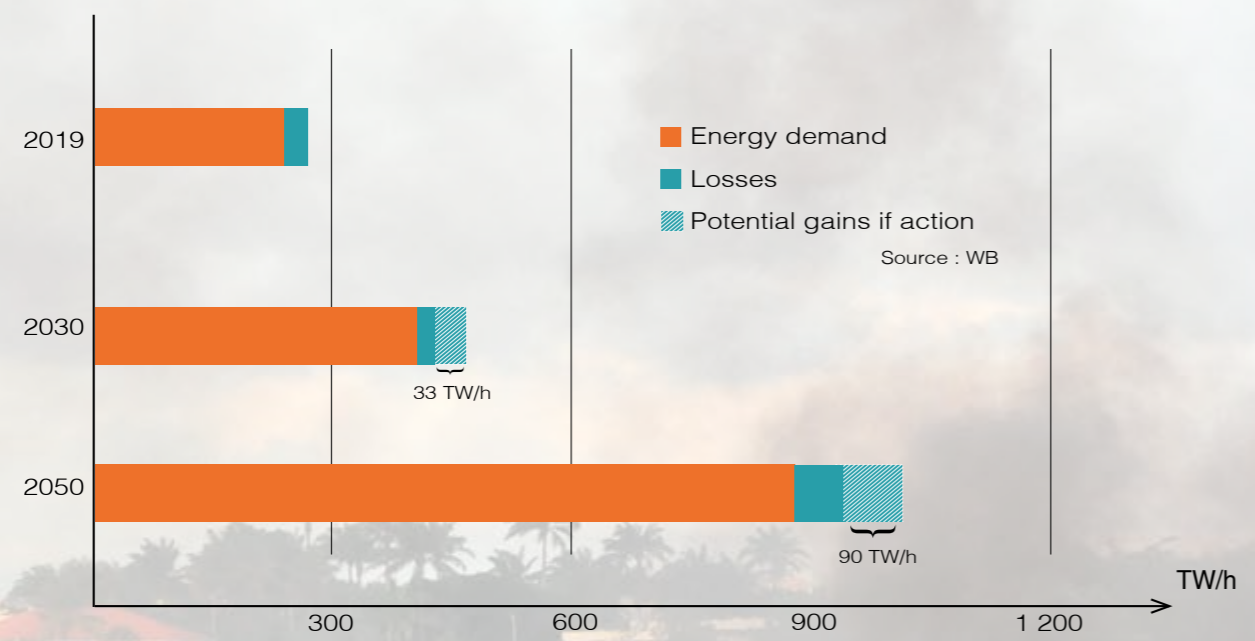
# FRAUD PREVENTING

With a growing consumption in electricity in the coming years, the major challenge for utilities is **to be able to meet the increase of the demand** while maintaining an objective profitability. However, electrical networks suffer high losses, impacting the financial resources of companies.

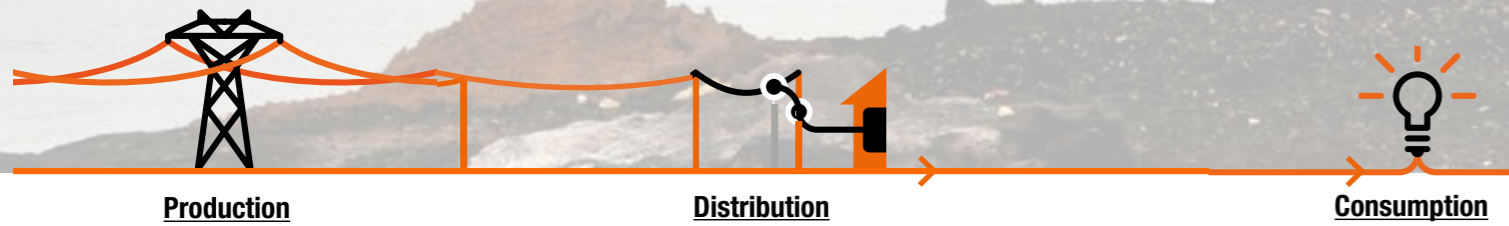
To compensate this lack of resources, public bailouts and price increases are sometimes applied. These very unpopular decisions tend to encourage the development of fraud and thus, fuel the vicious circle of non-technical losses. **Securing facilities is a better strategy for achieving a positive financial impact.**

## Case of the Sub-Saharan Africa

### Evolution of electricity production



This graph enlightens that in 2019, about 260 TWh were generated by the various electricity companies in the region. Of this amount, more than 33 TWh were lost during the production, transmission and distribution of energy, or 12.7% of the loss. Following current trends, by 2050, no less than 160 TWh should be produced in pure financial loss. This represents the equivalent of 23 nuclear reactors. By optimizing transmission and distribution networks, over a 30-year period, **the annual gains could be closed to 90 TWh, or 13 nuclear reactors.**



## MICHAUD's solutions

**To create a control and cut-off spot outside the premise**



**To remove illegal connections on the lines**



**Use theft-proof products**



### Technical losses

Any electrical network is subjected to a normal operating loss rate, due to the transformer efficiency rate or line losses on the cable. If reducing these phenomenon is difficult, **work on the proper use** of the equipment can help eliminate malfunctions:

- Material not adapted to the expected use
- Aging and deficient material

With better training of teams on the field, as well as a proper use of the product adapted to the environment, utilities could extend the service life of the facilities. **Improving the quality of the network** is the first step to realise savings.

### Non-technical losses

The second cause very expensive for power companies is the fraud on the electrical networks at the level of the connections. Through its experience and thanks to a close collaboration with the utilities, MICHAUD has identified **four sources to non-technical losses**:

- Subscriber's manipulation on the meter and circuit breaker
- Pricking out upstream from the meter
- Illegal connection
- Equipment theft

With equipment designed to reduce these phenomena, savings can be made very quickly and allow companies to become profitable and thus enter **a virtuous circle of development.**

**« It is 3 times less expensive to save 1 kWh of electricity by improving the electricity grid efficiency rather than to invest in new production means for the same 1 kWh. »**



## Zoom on pre-payment

Protecting the facilities against fraud becomes essential especially in a context where prepaid meters are more and more present. This efficient payment solution for the power company makes it difficult to manipulate the meter, and **tends to deport fraudulent operations on the service cable**. It is therefore necessary to support the expansion of pre-payment with equipment to prevent non-technical losses.

## Secure new connections

# SOLUTIONS FOR NETWORK EXTENSION

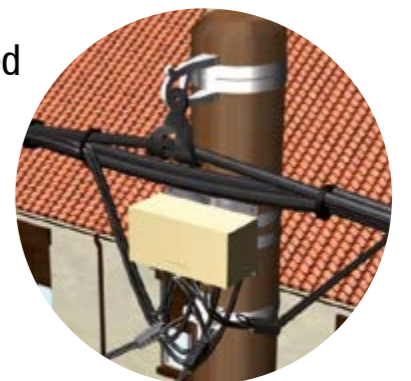
### Issues ?

In the case of new electrification projects, electricity companies must be able to anticipate the installations security in order to prevent non-technical losses. By integrating the **fight against fraud** as soon as the specifications are defined, utilities opt for reliable solutions which are difficult to bypass and facilitate installation and maintenance.

Working in collaboration with African and Asian national power companies, MICHAUD has identified several key points to protect on new installations, from the network to the meter. The use of innovative technologies, to make connections, paired with automatic control systems ensure a **tamper-proof connection**.

### Benefits ?

- + Meters shunt limited
- + Pirate connections restricted
- + Connectors theft for selling avoided
- + Fraudulent manipulations of the circuit breaker reduced



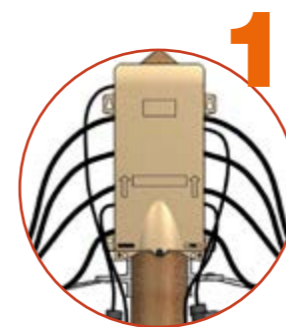
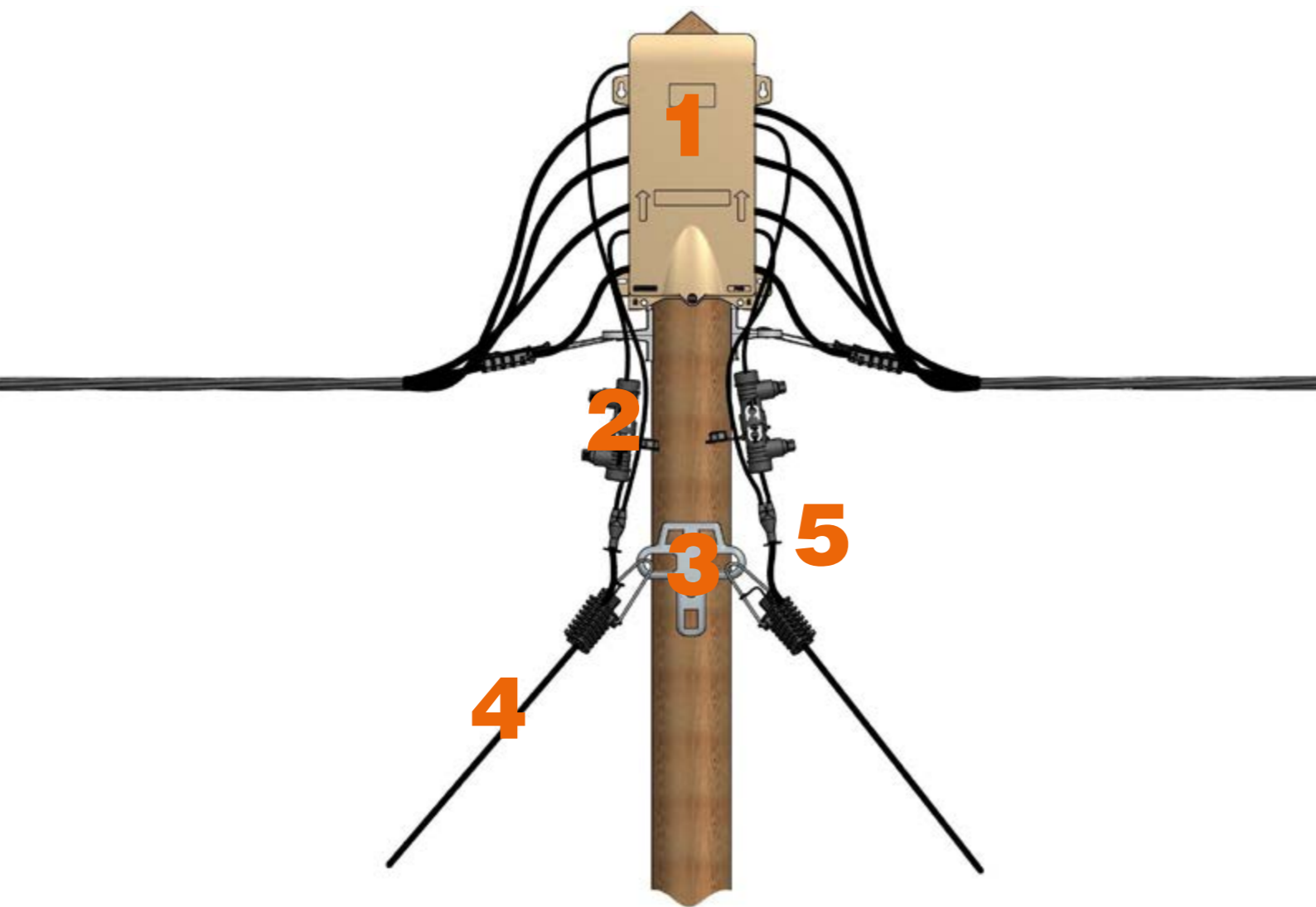
# Solution for network extension

To **secure the network**, a **multiple connections box** limits the use of connectors. Thus, the network is cleaner, more readable and frauds become easily detectable.

To **secure the connections**, the use of a **peripheral neutral cable** from the service connection box to the meter box, prevents illegal connections. In case of attempted fraud on this cable, a short circuit is created.

The fuse located in the **cutout sleeve** ensures the safety of the installation.

Located at the top of the pole, the cutout sleeve also creates a cut-off point. If needed, the customer can be disconnected from the network without modification of the connection and without tools.



## 1 Multiple connections box

The box allows to create a false cut and to tap up to 8 connections.

- + Connections protected from weather
- + Removal of the connectors and therefore less stress on the conductors
- + Network readability

SEE SHEET  
FRAUD PREVENTING/ Extension/ Multiple connections .....p20



## 2 Cutout sleeve + fuse cartridge

The cutout sleeve makes it possible to secure the connection by creating a break point at the top of the pole in case of a short circuit due to illegal tap connections.

- + Cut-off spot and protection at the top of the pole

SEE SHEET  
FRAUD PREVENTING/ Extension/ Accessories for fraud preventing aerial cable .....p18



## 3 6-points anchoring bracket

A 6-points bracket makes it possible to limit the fixing points on the pole.

- + Network readability
- + Mutualization of equipment

SEE SHEET  
FRAUD PREVENTING/ Extension/ Accessories for fraud preventing aerial cable ..... p18



## 4 Peripheral neutral cable

Protects against illegal connections with an inaccessible phase, surrounded by a peripheral neutral.

- + Protection against illegal connections
- + Decrease of non-technical losses

SEE SHEET  
FRAUD PREVENTING / Extension/ Fraud preventing service cable .....p16



## 5 Fraud preventing cable fulfilment kit

Restores the neutral to make the connection to the network and to the meter.

- + Ensured watertightness

SEE SHEET  
FRAUD PREVENTING/ Extension/ Fraud preventing service cable .....p16



## Fraud preventing service cable

Fraud preventing

Fraud preventing



**MICHAUD Exclusivity**  
Eliminates fraudulent connections

### Application

The concentric insulated service cable is used for the connection between the low voltage network and the premise. It is designed to limit fraud and thus to reduce non-technical losses thanks to a peripheral neutral cable. Any unauthorised connection to this cable will create a short-circuit and will automatically cut off electricity supply. It is stretched overhead to a maximum range of 40m.

### Description

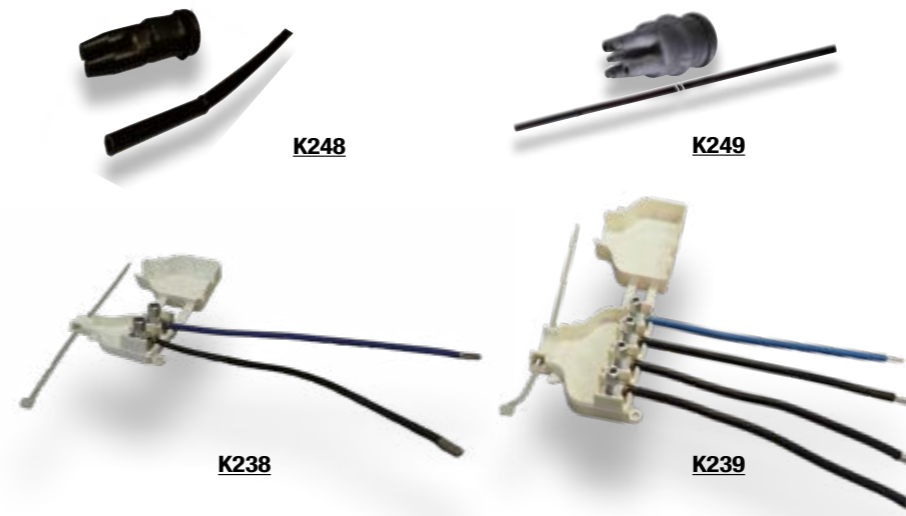
- The single phase or three phases cable comprises:
  - One or three-phase conductor(s) insulated in the central part
  - 1 peripheral insulated neutral conductor.
- Service voltage rate: is 600V.
- The conductor's core is made of aluminium.
- The insulation is made of cross-linked polyethylene.

The cables meet the criteria of the **IEC 60502** and **NFC 33 209** standards.

	U301	U307	U302	U308
Phase conductors section (mm <sup>2</sup> )	1 x 13	1 x 16	3 x 20	3 x 25
Cable diameter (mm)	11.1	11.6	24.5	24.2
Material of the phase insulation	XLPE	XLPE UV	XLPE	XLPE UV
Minimum insulation phase thickness (mm)	1.03	0.98	1.03	0.98
Average insulation phase thickness (mm)	1.14	1.2	1.14	1.2
Neutral conductor section (mm <sup>2</sup> )	13	16	20	25
Material of neutral insulation	UV PE	UV PE	UV PE	UV PE
Minimum insulation thickness of neutral (mm)	0.89	0.89	1.22	1.00
Average insulation thickness of neutral (mm)	≥1.14	1.14	≥1.32	1.40
Operating voltage (V)	600	600 / 1000	600	600 / 1000
Maximum intensity (A)	45	60	60	90
Resistivity at 20°C (Ω/km) ≤2.5	0.045	1.91	0.045	1.2
Breaking strength (daN)	> 150	> 150	> 150	> 150

Code	Designation	Conditioning	Weight (kg)	Sales unit
U301	AERIAL SERVICE CONCENTRIC CABLE 13mm <sup>2</sup> SINGLE PHASE	500m drum	80	1
U307	AERIAL SERVICE CONCENTRIC CABLE 16mm <sup>2</sup> SINGLE PHASE (drum 3000m)	3000m drum	516	1
U302	AERIAL SERVICE CONCENTRIC CABLE 20mm <sup>2</sup> THREE PHASE (drum 950m)	950m drum	200	1
U308	AERIAL SERVICE CONCENTRIC CABLE 25mm <sup>2</sup> THREE PHASES (drum 750m)	750m drum	612	1

## Cable fulfilment



### Application

These accessories enable to realise the fulfilment of the single phase or three phase concentric cable before performing a connection at the top of a pole, inside the cabinet or behind the meter panel. The kits ensure the insulation and the sealing of the anti-fraud conductor. The end connectors receive the fulfilment of the concentric cable and enable the leading-in cables connection to electrical equipment terminals.

### Description

- The fulfilment kit is composed of a sheath and a sealing end. It can be connected to insulation stripping or insulation piercing pads.
- The fulfilment end connector comprises:
  - An IP envelop equipped with a tie to hold the cable,
  - Copper tails of 10 or 16mm<sup>2</sup> cross-section, equipped with sockets for connection to the cabinet.
- The connection of the concentric cable in the end fittings is stripped.
- The tightening efficiency is ensured with shear head screws.
- Once installed, the fulfilment end connector brings an additional protection against fraud because the cable can not be pulled through the cable gland to access the phases.

### Application at the top of a pole



- + Watertightness
- + UV protection

### Application in a cabinet or behind a meter panel



- + Easy implementation and connection
- + Realisation of the copper/aluminium transition

Code	Designation	Match with	Weight (kg)	Sales unit
K248	FRAUD-PREVENTING SINGLE-PHASE CABLE FULFILMENT KIT	U301 and U307	0.040	1
K249	FRAUD-PREVENTING THREE-PHASE CABLE FULFILMENT KIT	U302 and U308	0.040	1
K238	FRAUD-PREVENTING CABLE EBCD KIT MONO	U301 and U307	0.150	1
K239	FRAUD-PREVENTING CABLE EBCD KIT TRI	U302 and U308	0.340	1

## Tool for stripping



**K311**

### Application

This tool is used to strip the cable in order to reconstitute and isolate the neutral for connection.

Code	Designation	Weight (kg)	Sales unit
K311-13	DECLADDING CLAMP 13mm <sup>2</sup>	0.100	1
K311-16	DECLADDING CLAMP 16mm <sup>2</sup>	0.100	1
K311-25	DECLADDING CLAMP 21-25mm <sup>2</sup>	0.120	1

## Accessories for fraud preventing aerial cable

### Protection



#### Application

This cutout sleeve makes it possible to secure the connection of the phase conductor and to protect the installation against electrical faults that may occur during illegal connections on the concentric cable. This cutout sleeve can receive a 22x58 fuse up to 100A or a neutral tube.

#### Description

- The cutout sleeve is installed on the customer service conductor.
- The sleeve uses insulation piercing technology.
- The sleeve receives 6-35mm<sup>2</sup> Al/Cu insulated conductor on both sides.
- At the opening of the sleeve, the elastic tightening of the cartridge ensures that this fuse remains on the customer side, out of potential.
- The single tightening is ensured by two shear head screws sealable after breaking.
- The sleeve has a very good resistance to climatic conditions (humidity, temperature...).
- The cutout function is sealable.

This sleeve meets the criteria of ErDF French specification 69 40 070.

Code	Designation	Weight (kg)	Sales unit
K221	CUTOUT SLEEVE 63A (22x58) PIERCING 6-35	0.235	50

SEE SHEET  
ACCESS TO ENERGY/Protection/Fuses

### Connection



#### Application

This fraud preventing connector is used to make a tap connection between aerial networks. Once implemented, this connector cannot be dismantled.

Code	Designation	Weight (kg)	Sales unit
K325	IPC FRAUD PREVENTING	0.120	12

### Mechanical fixing



#### Application

These accessories allow the concentric cable to be anchored both at the top of the pole and at the foot of the meter. The anchoring clamp U508 is made for three-phase cable whereas the anchoring clamp K310 is made only for single-phase cable.

Code	Designation	Weight (kg)	Sales unit
K310	ANCHORING CLAMP CONCENTRIC CABLE SINGLE PHASE	0.100	25
U508	ANCHORING CLAMP CONCENTRIC CABLE THREE-PHASE	0.180	1
L304	FIXING CLAMP - PF25	0.010	100
F305	MULTIPLE ANCHORING BRACKET - CAM 25	0.220	100

#### Option:

Stainless steel strap is available for the mechanical fixing on a pole.

SEE SHEET  
ACCESS TO ENERGY / Distribution / Tape



## Multiple connections

### Aerial service connections box and network



MICHAUD Exclusivity



#### Application

The box is designed to establish up to 8 single phase or 4 three phases connections as well as the junction of 2 overhead networks. The box can be installed on a facade or a pole. It can also be used at the end of the network.



**P429**  
8 outlets service  
1 inlet / 1 outlet network  
4 connection blocks

#### The benefits:

- + Perform single phase or three phases connections
- + Better spread charges on the network, thanks to the connections visibility
- + Reduce the number of connectors (safer network organisation, strengthened fraud-prevention)
- + Improve the network readability (removal of the "spider's web" effect)
- + Check the potential at the connection terminals (with a test probe)
- + Guarantee the network durability (better resistance to corrosion and humidity)
- + Make the operation easier (sliding cover with stop when used in open mode)
- + Guarantee a better fitters safety (electric shock risk limited)
- + Remove junctions between cables (making false regular cuts)

#### Description

- The 8 outlets box is equipped with 4 connection blocks.
- Each connection block is accessible at the touch of a voltage tester.
- The inlet and outlet of the conductors are realised by elastomer seals.
- The cover is closed by 1 captive stainless steel screw with spring to facilitate the release. An integrated device allows the sealing of all and possibly padlocked.
- The terminal separators in the box allow the connection of the conductors in any order.
- The degree of protection of the enclosure is IP33. Once the lid opened, the degree of protection of the active parts is IP2X.
- The box can be delivered (optional) with a non-corrodible metal fixing plate. The rigidity of this plate allows laying on non-flat surfaces.
- The connection can be realised under voltage but without load.

This box meets the criteria of **HN 62-S-33** and **EN 50483-5** standards.

		INLET		OUTLET		Power flow
		Network	Network	Service	Service	
P426	Capacities	25 - 95mm <sup>2</sup> Al	25 - 95mm <sup>2</sup> Al	6 Cu - 25mm <sup>2</sup> Al/Cu		160 kVA
	Technology	Stripping	Stripping	Stripping		
P429	Capacities	25 - 95mm <sup>2</sup> Al	25 - 95mm <sup>2</sup> Al	6 Cu - 25mm <sup>2</sup> Al/Cu		110 kVA
	Technology	Insulation piercing	Insulation piercing	Insulation piercing		

Code	Designation	Weight (kg)	Sales unit
P426	AERIAL CONNECTIONS BOX (x8) STRIPPING + NETWORK JUNCTION	2.685	1
P429	AERIAL CONNECTIONS BOX (x8) PIERCING + NETWORK JUNCTION	2.685	1

## Aerial service connections box

+ Both models are available with insulation piercing or stripping technology



**P436**  
6 outlets  
4 connection blocks



**P439**  
9 outlets  
4 connection blocks

#### Application

The box is designed to establish up to 6 (P436) or 9 (P439) single phase connections or 3 three-phases connections. The box can be installed on a facade or a pole. It can also be used at the end of the network.

		INLET		Power flow
		Network	Service	
P436-P	Capacities	35 - 150mm <sup>2</sup> Al/Cu	10 - 35mm <sup>2</sup> Al/Cu 16M - 50M Al	110 kVA
	Technology	Insulation piercing	Insulation piercing	
P436-D	Capacities	35 - 150mm <sup>2</sup> Al/Cu	6 - 35mm <sup>2</sup> Al/Cu 16M - 50M Al	
	Technology	Stripping	Stripping	
P439-P	Capacities	50 - 150mm <sup>2</sup> Al/Cu	10 - 35mm <sup>2</sup> Al/Cu 16M - 50M Al	
	Technology	Insulation piercing	Insulation piercing	
P439-D	Capacities	50 - 150mm <sup>2</sup> Al/Cu	6 - 35mm <sup>2</sup> Al/Cu 16M - 50M Al	
	Technology	Stripping	Stripping	

Code	Designation	Weight (kg)	Sales unit
P436-P	AERIAL CONNECTIONS BOX (x6) PIERCING	3.2	1
P436-D	AERIAL CONNECTIONS BOX (x6) STRIPPING	3.2	1
P439-P	AERIAL CONNECTIONS BOX (x9) PIERCING	3.2	1
P439-D	AERIAL CONNECTIONS BOX (x9) STRIPPING	3.2	1

#### Option: Unipolar block

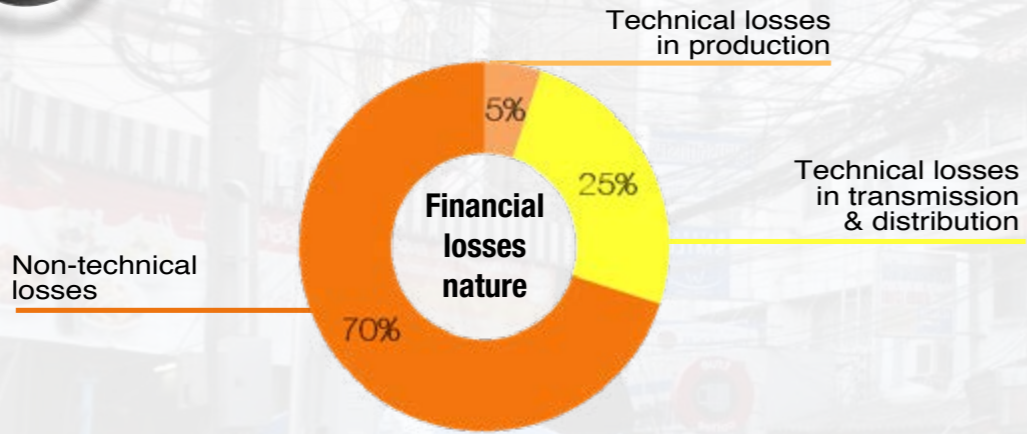
This unipolar aerial pole allows to star one conductor into 8 outlets. The use of the 2 unipolar blocks enable to realise up to 8 single phase connections. To better distinguish the conductor, the block possesses an identification plate. The block can be installed on a facade or a pole.



	INLET		Power flow
	Network	Service	
Capacities	25 - 95mm <sup>2</sup> Al/Cu	6 Cu - 16mm <sup>2</sup> Al/Cu	110 kVA
Technology	Insulation piercing	Insulation piercing	

Code	Designation	Weight (kg)	Sales unit
L437	AERIAL SINGLE POLE STAR CONNECTION BLOCK 8 OUTLETS 95-16	1.160	1
L436	SET OF 2 AERIAL SINGLE POLE STAR CONNECTION BLOCKS 8 OUTLETS 95-16	0.580	8

### Zoom on the financial losses of the utilities



## Stabilize the existing network

# SOLUTIONS FOR NETWORK REHABILITATION

### Issues ?

When a fraud preventing policy is launched for network improvement in order to reduce energy losses during transmission and distribution, the first step is to **rehabilitate existing facilities**.

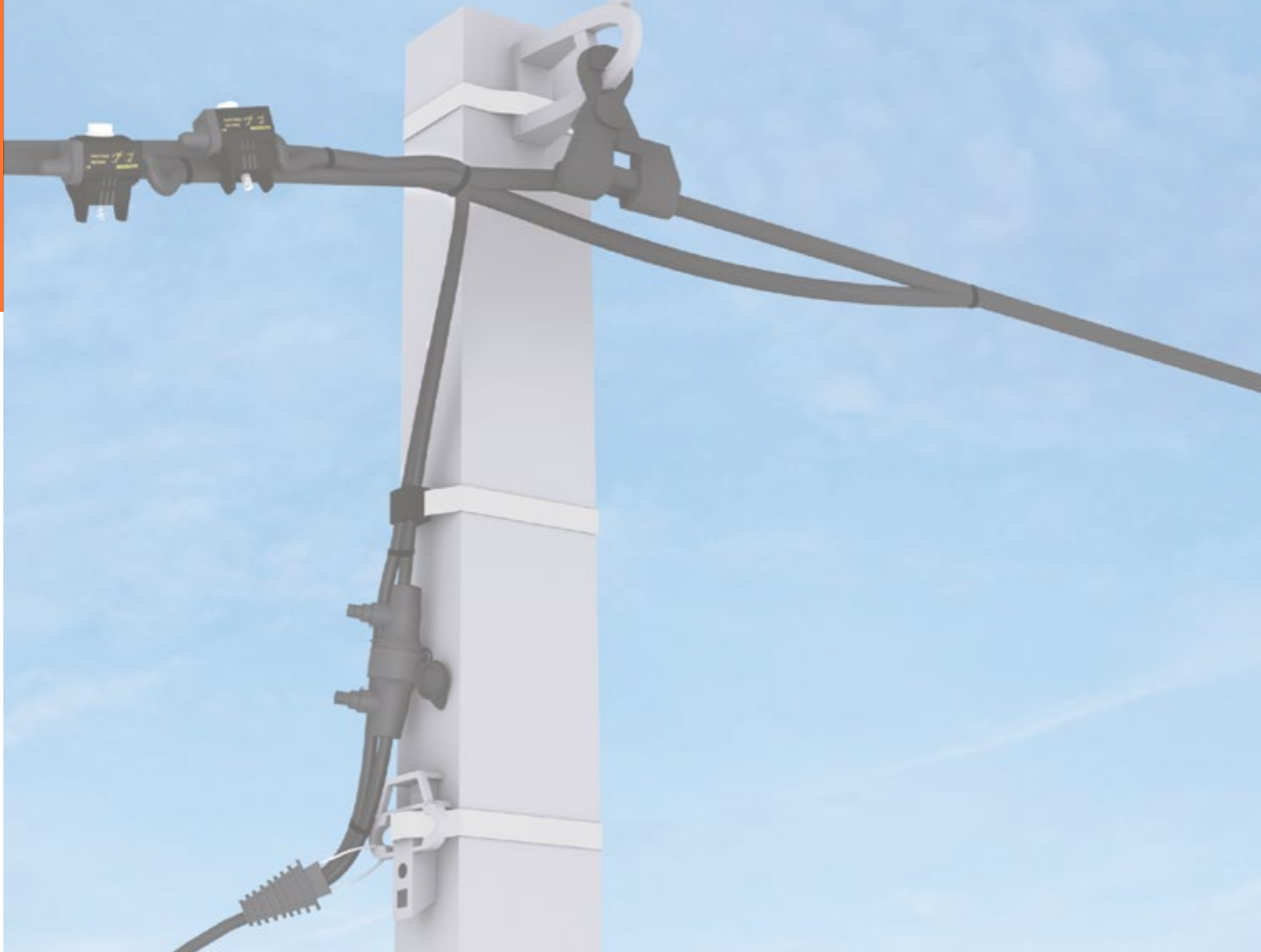
With fraud preventing solutions installed on existing equipment, such as cable, **investments are minimized and benefits observed quickly**.

These solutions provide means to fight against some problems often encountered such as over-consumption not invoiced due to fraud upstream from meters and illegal connections on the lines.

### Benefits ?

- + Network cleaned at a lower cost
- + Invoicing conform to consumption
- + Increase of the power companies incomes
- + Significant decrease of non-technical losses





### A cut-off and control point at the top of the pole for existing connections

#### Cutout sleeve + mini-switch

The sleeve associated to the mini-switch allows to control the energy consumption of the customer while creating a cut-off point at the top of the pole.

- + Utility intervention facilitated
- + Limitation of the current that can flow in the connection
- + Cut-off point in case of over-consumption

SEE SHEET FRAUD PREVENTING/ Network Rehabilitation/ Power regulator..... p26

### A distribution point to connect new customers on an existing network

#### Multiple connections box

The box secures the network by limiting the use of service connectors. It also makes the network cleaner making frauds more easily detectable.

- + Reduction of the number of connectors
- + Protection of connections against bad weather
- + Network readability

SEE SHEET FRAUD PREVENTING/ Network Extension/ Multiple connections..... p20

## Power regulator



P143

### Application

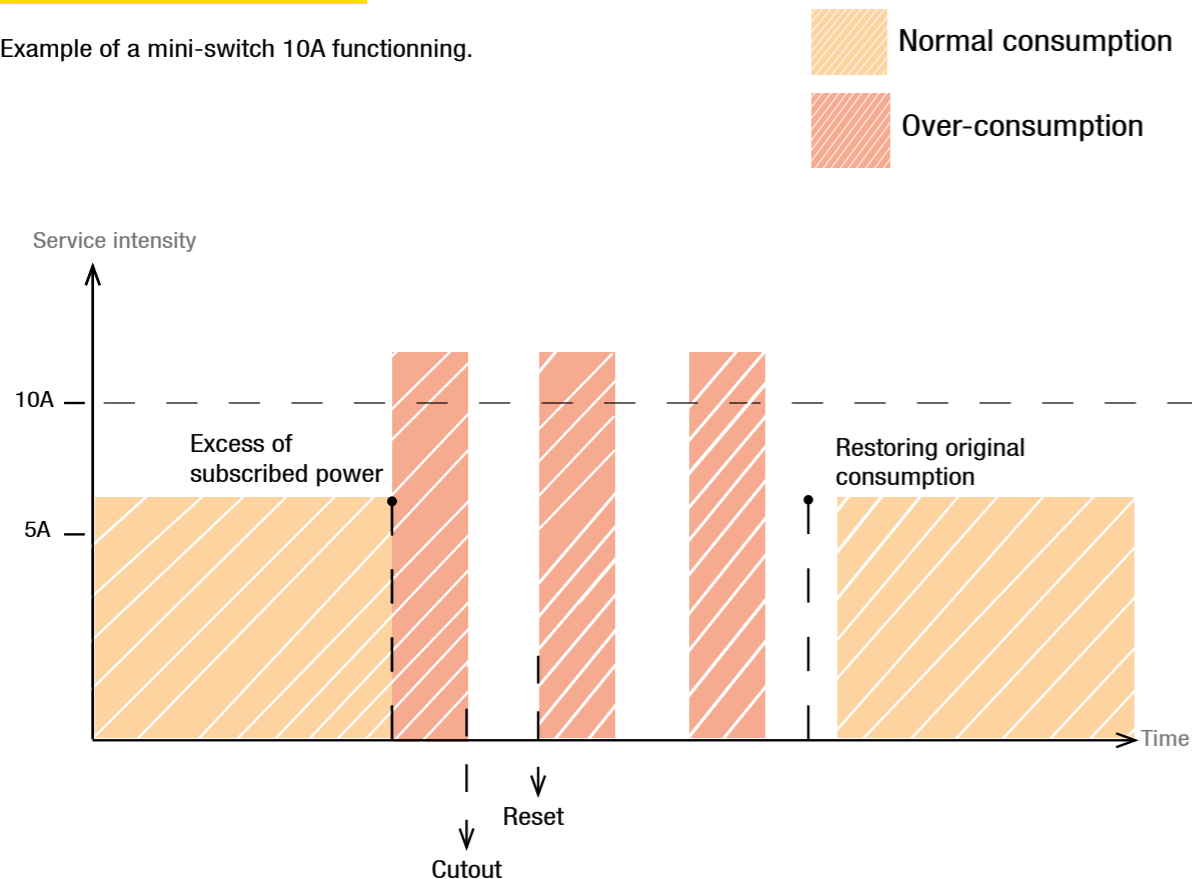
This mini-switch limits the current that can flow permanently through the connection to a certain intensity. It enables the customer's energy consumption to be controlled and limited to the subscribed power, providing excellent protection against fraud, mainly in the event of meter by-pass / shunt. Massive over-consumption due to fraud is significantly reduced.

### Description

- The mini-switch is integrated in a fuse cartridge. It limits the current that can flow permanently through the connection thanks to a rating intensity function on the principle of bimetal (thermal bimetallic strip):
  - Rating: 5A, 10A, 15A, 20A
  - Size: 14x51mm, 22x58mm, T00
  - Reversibility threshold: 45A or 60A depending on rating.
- It possesses a circuit breaker fuse function (AD): power of cut: 20kA.
- Its endurance goes from 5,000 to 15,000 cycles according to the rating.
- It is installed before the meter. Two options are possible for utilities:
  - At the top of poles, out of the customer reach, to better secure the device;
  - In the meter cabinet, for an easier installation.

### Principle of use

Example of a mini-switch 10A functioning.



Normal consumption  
Over-consumption

Code	Designation	Rating (A)	Weight (kg)	Sales unit
<b>SIZE 14x51</b>				
P135	MINI-SWITCH 5A 14x51	5	0.030	10
P125	MINI-SWITCH 10A 14x51	10	0.030	10
P142	MINI-SWITCH 15A 14x51	15	0.030	10
<b>SIZE 22x58</b>				
P136	MINI-SWITCH 5A 22x58	5	0.040	10
P126	MINI-SWITCH 10A 22x58	10	0.040	10
P143	MINI-SWITCH 15A 22x58	15	0.040	10
<b>SIZE 00</b>				
P137	MINI-SWITCH 5A T00	5	0.110	10
P127	MINI-SWITCH 10A T00 REVERS.	10	0.120	10
P144	MINI-SWITCH 15A T00	15	0.120	10

### Application



K220



U607

Shell	Top of pole		Meter cabinet		
	Cutout sleeve		Cutout cabinet		
<b>Technical characteristics</b>	- To be installed at the top of a pole outside. - To be installed on the phase conductor of the customer connection. - When the sleeve is opened, an elastic tightening keeps the cartridge on the customer side, with no load. - Single tightening ensured by shear head screws sealable after breaking. - Very good resistance to weather conditions (humidity, temperature...). - Possibility to seal the opening.		- To be installed nearby the meter, in the house, enabling maintenance at man level. - To be installed on the phase and neutral conductors of the customer connection. - Very good resistance to weather conditions (humidity, temperature...). - Possibility to seal the opening.		
<b>References</b>	<b>K220</b>	<b>K221</b>	<b>U605</b>	<b>U607</b>	<b>P053</b>
<b>Connection</b>	Stripping	Insulation piercing	Stripping	Stripping	Stripping
<b>Capacities</b>	2,5-16mm <sup>2</sup> Al/Cu	6-35mm <sup>2</sup> Al/Cu	6-25mm <sup>2</sup> Al/Cu	6-35mm <sup>2</sup> Al/Cu	6-35mm <sup>2</sup> Al/Cu
<b>Fuse sizes</b>	14x51	22x58	14x51	22x58	T00

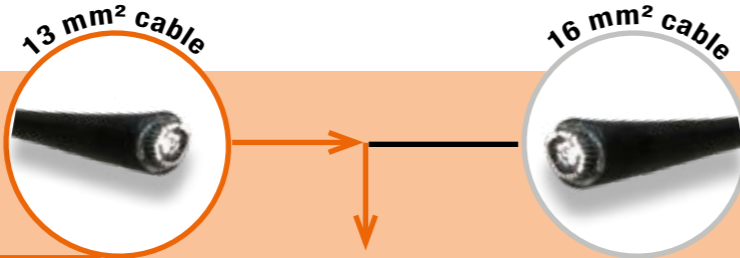
Nota : A three phases version is available.

SEE SHEET  
ACCESS TO ENERGY / Protection / LV network fuse protection



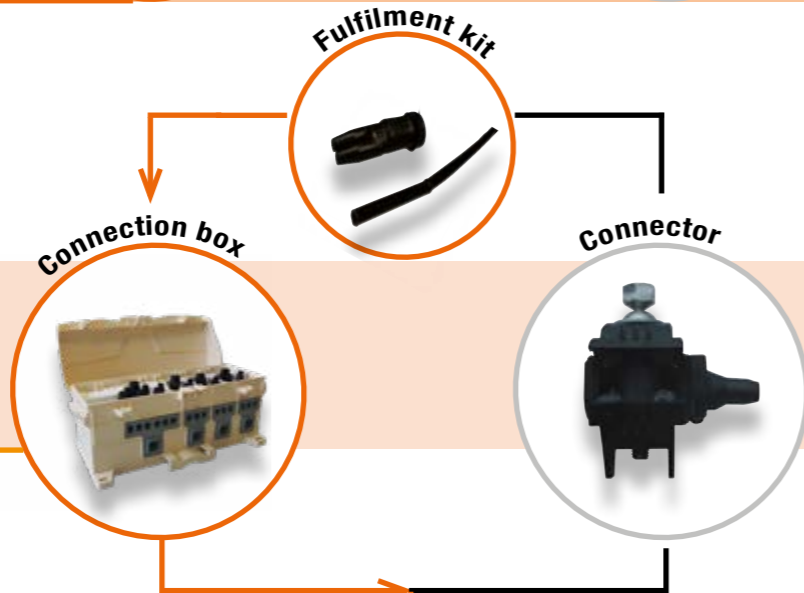
Solution recommended by MICHAUD

## Single phase

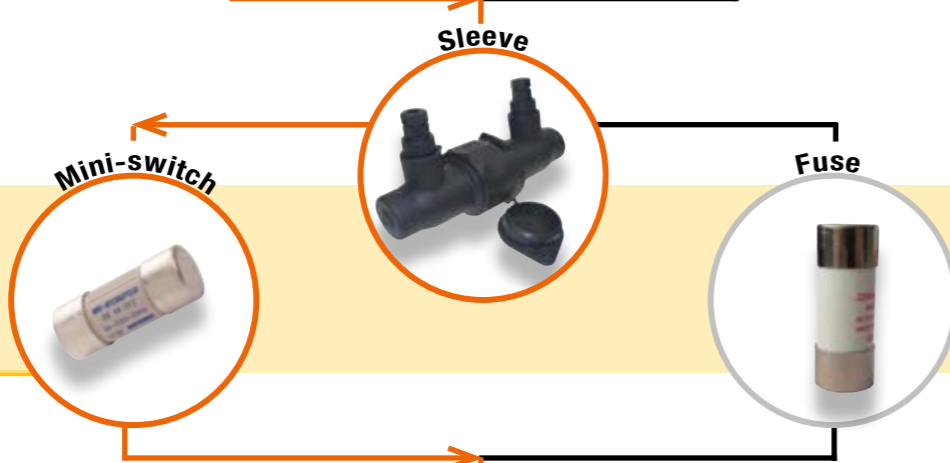


### 1 Cable

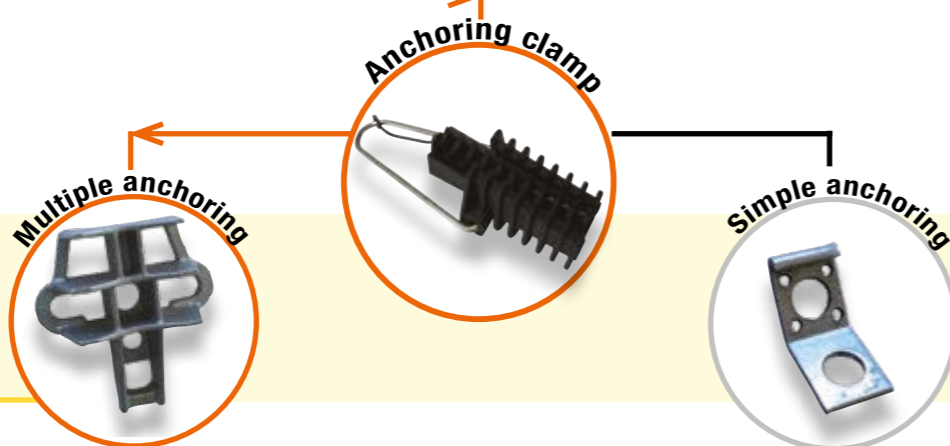
### 2 Connectors



### 3 Protection

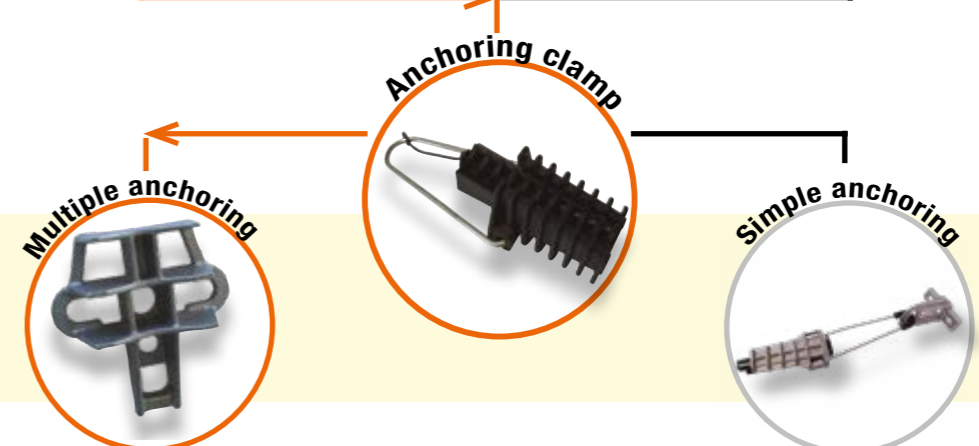
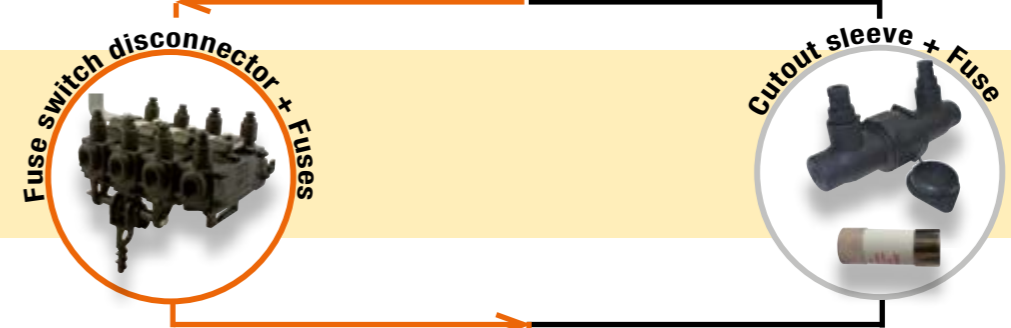
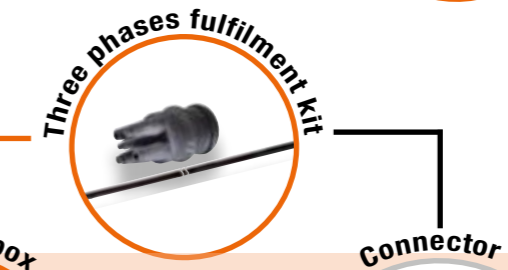
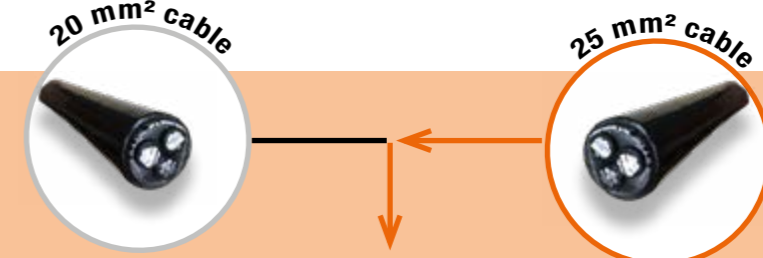


### 4 Anchoring



Solution recommended by MICHAUD

## Three-phase





# ACCESS TO ENERGY

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## Management

In Kenya, 85% of household customers account for 25% of energy sales. In these conditions, an economical and autonomous management system can improve profitability and encourage access to energy.

The **energy flat fee** invoicing simplifies customers management by lowering operating and maintenance costs.

For Income Generating Activities (IGAs), a solution with simplified metering enables to reduce purchase costs for the operator.

## Distribution

**Optimising** cable cross-sections for actual consumption is an effective way to lower the costs of a project.

With a 2x6mm<sup>2</sup> cable cross-section, 30A intensity and a reach of 40m, voltage drop is below 2%.

The 2x6mm<sup>2</sup> cable and corresponding accessories ensure implementation savings up to 30% for the operator.



## Protection

In a context where maintenance costs are very high on electrical networks, materials protection is one of the main way to guarantee the equipment **sustainability**.

The network head-end is a key point of a LV infrastructure. MICHAUD proposes an economical alternative technology using fuses. Their high breaking capacity guarantees the installation security.

In addition, electrical networks must be protected with earth systems for people and goods safety.



## Simplified management of the consumption

# SOLUTIONS FOR THE ENERGY MANAGEMENT

### Issues ?



In developing countries and more particularly in Sub-Saharan Africa, the electrical network according to its infrastructure usually only reaches 20% of localities. This deficiency does not enable an **economic, and social development** of those territories.



Knowing this context and being focused on electricity distribution toward the end customer, MICHAUD designed **innovative solutions to optimize connection and business management.**



Operating and selling difficulties of the electrical service in rural areas, sometimes isolated, have been integrated into a global thinking. That is why MICHAUD's innovations take into account **every components of the connection, from cable to customer interface**, through **solutions for consumption management.**

### Benefits ?

- + Support for economic development
- + Minimize implementation, maintenance operating costs
- + Simplify customers' management



# FLAT FEE INVOICING

## How does the flat fee invoicing system work ?



**Operator:**

- + Reliable and profitable business plan
- + Planned and regular incomes
- + Incomes collected before production
- + Anticipation of energy production
- + Automatic consumption management
- + Cancelled of meter reading costs
- + Easy to recover



**End customer:**

- + Monthly fixed cost
- + Flexible payments in agreement with the operator
- + Flat fee limited by time or energy quantity
- + Daily consumption management
- + Progressive awareness to energy management

## How does the payment operate ?

In the rural electrification context, end customer's payment management is one of the major difficulties. The flat fee system brings some **flexibility to the operator** by offering various possibilities for payments. According to the economic and social environment of connected villages, customers can pay:

- through **mobile banking solutions**
- through **money transfer solutions**
- with **fiduciary money**

Depending on the end customers number, payments can be settled using a classic IT spreadsheet, easy to manage.

## An adapted solution to rural electrification projects

With the **energy manager**, MICHAUD designed a solution which answers to this invoicing system. The energy manager can be set up according to the end customer contract and so frame the consumption.

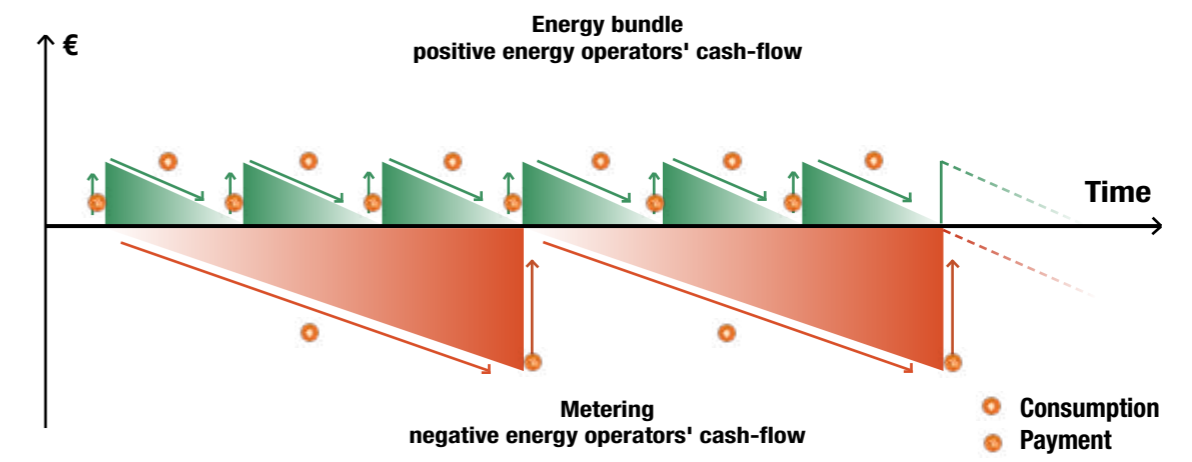
The flat fee invoicing system remains the most suitable way for tiny consumptions.



# FLAT FEE SYSTEM WORTHY ADVANTAGES

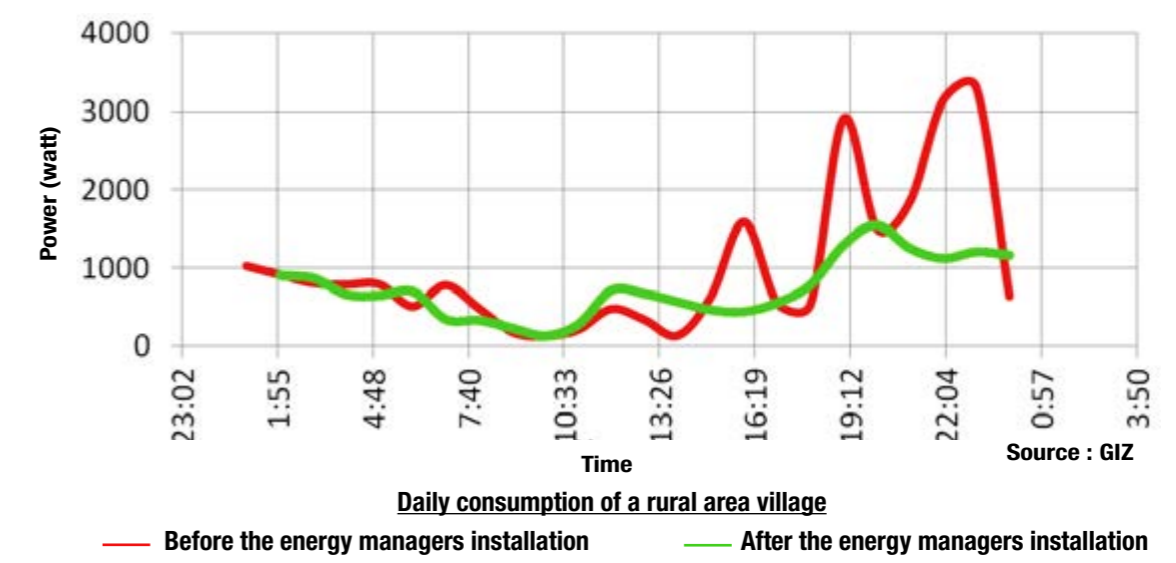
The flat fee invoicing system allows the operator to collect incomes **before** engendering production costs.

- + Cash flows optimised
- + Limited recovery faults
- + Easy going investments and financing



*Financial advantage: better cash flows management*

*Structural advantage: energy production anticipated*



Thanks to an electricity consumption ceiling, the flat fee system enables to know the end customers' maximum consumption. The operator **anticipates production needs** avoiding network failures and demand peaks.

The flat fee invoicing system tends to standardize inhabitants consumptions. It is a **didactic system**, perfectly suitable for end customers electrified for the first time.

**Energy manager**



**K497**  
cabinet version



**K498**  
module version

**Application**

The energy manager is provided with an electronic regulator, controlling power and managing energy automatically without user/operator intervention. It is perfectly suitable for flat fee energy invoicing. It replaces the meter and cancels the requirement of consumption reading. The cabinet can be installed outside thanks to the UV resistant IP34 property. It is designed for a single phase connection.

**Description**

The energy manager is programmable according to the criterias chosen by the operator:

**MANAGEMENT MODE**



**Time**

Allocated time quantity is adjustable down to the last hour

**Energy**



Allocated energy quantity is adjustable down to the last watt



**SETTINGS**



The energy manager setting can be performed on site

**Power**

Maximum instant power allowed (1500W)

**Observation period**

Period while allocated time or energy quantity is defined. This gives a daily or weekly control of the used energy (1 day up to 1 week)

**Transfer**

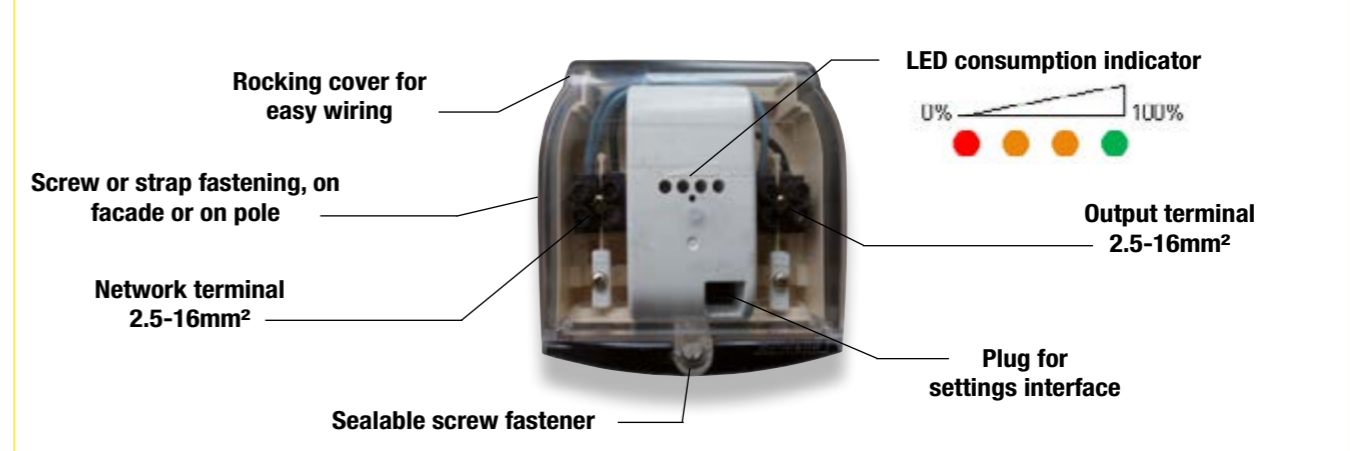
Possibility to transfer the remaining time or energy quantity to the next period (1 period maximum)

**Shut down time after overage**

Time during which energy is shutting down due to a power overage (up to 3600 seconds)

**Accepted overage time**

Time during which the maximum authorized instant power can be overcome (up to 60 seconds)



The energy manager is provided with 4 LED allowing to see the consumption progress through:  
- an intuitive tracking method of colors  
- the blinking LED speed



← Remaining time or energy rate.

The settings can be modified according to flat fee contract set up by the operator, following households evolution.

Code	Designation	Weight (kg)	Sales unit
K497	PROGRAMMABLE ENERGY MANAGER CABINET 20 - 1 500W	0.360	1
K498	PROGRAMMABLE ENERGY MANAGER MODULE 20 - 1 500W	0.150	1

To fit the environment, the module can be set in different holders, as the modular interface below. **Please enquire.**

SEE SHEET ACCESS TO ENERGY/ Management/ Modular cabinets: make up your own solution



# Energy manager accessories

## Configuration

### PC kit

The kit comprises a USB key containing the configuration software and a USB cable to connect energy manager to PC.

It is the best solution for the operator to set the energy manager at the office before the installation. Moreover, it allows to program the different flat fees levels offered by the operators.



**K499**



### Application

The energy manager configuration is performed through a software available on PC or tablet.

The last ten settings are kept in memory for a better subscriber follow up.

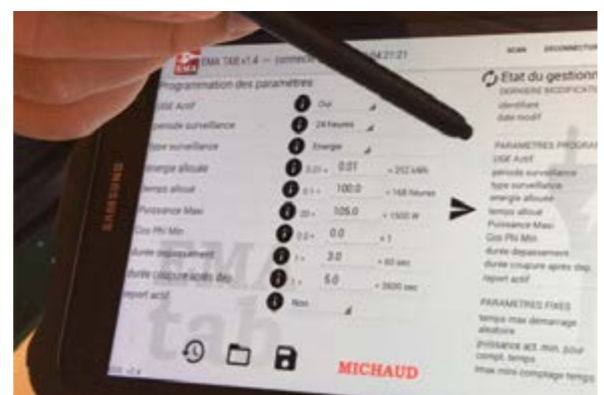
### Tablet kit

The tablet kit includes a safe bluetooth system (dongle) and a digital tablet.

It allows an easy access to the energy manager on site.



**K488**



### Option:

The EM (K487) bluetooth extension is available. Please enquire.



Code	Designation	Weight (kg)	Sales unit
K499	PC ENERGY MANAGER KIT	0.710	1
K488	PROGRAMMABLE ENERGY MANAGER BLUETOOTH DONGLE + TABLET	1.150	1

The connectors allow a safe phase and neutral connection thanks to a cutout function, protecting in this way the energy manager.

## Connection

### Application

To allow the connection of a single customer as part of a new installation, the energy manager can be associated to connectors.

### Description



**K223**

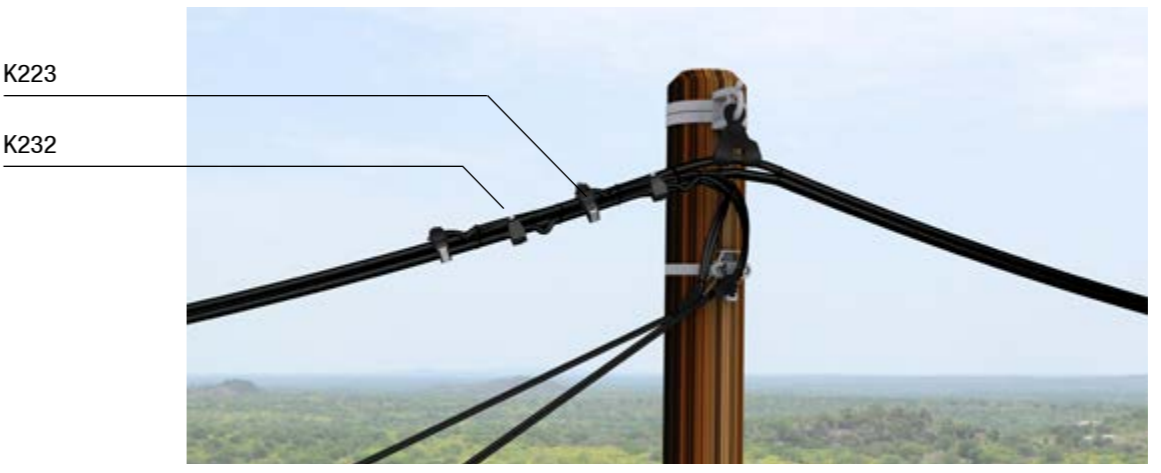


**K232**

	Fuse IPC (K223)	IPC (K232)
<b>Function</b>	It is designed to offer safe phase connection and protect both of the electrical installation and the energy manager against electrical faults.	It is designed to offer a watertight and safe connection of the neutral conductor.
<b>Technical specifications</b>	<ul style="list-style-type: none"> <li>- Cable sections: 16-95 / 1.5-16mm².</li> <li>- Insulation piercing technology.</li> <li>- Simultaneous tightening.</li> <li>- Potential free shear head screw.</li> <li>- Very good resistance to harsh weather (humidity, heat...).</li> <li>- IP2X during implementation</li> <li>- IP33 after installation.</li> <li>- Integrated and sealable cutout.</li> <li>- Fuse: size 10.3x38mm gG.</li> </ul>	<ul style="list-style-type: none"> <li>- Cable sections: 16-95 / 2.5-35mm².</li> <li>- Insulation piercing technology.</li> <li>- Simultaneous tightening.</li> <li>- Potential free shear head screw.</li> <li>- Very good resistance to harsh weather (humidity, heat...).</li> </ul>

Code	Designation	Weight (kg)	Sales unit
K223	FUSE CONNECTOR PIERCING 95/16	0.130	10
K232	CONNECTOR CBS / CT 95	0.148	20

**VOIR FICHE**  
ACCESS TO ENERGY/ Protection / Fuses



# Load limiter



**Cabinet version**

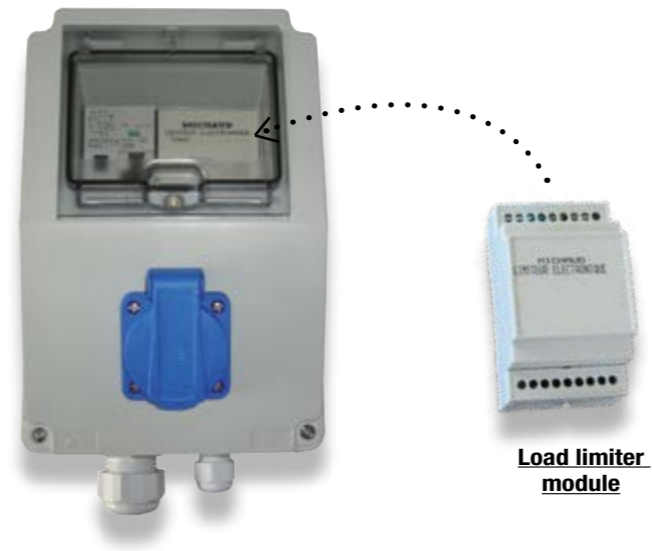


**Module version**

### Application

The load limiter is provided with an electronic regulator which controls intensity and manages power automatically without user/operator intervention. It is perfectly suitable for flat fee invoicing. It replaces the meter and cancels the requirement of consumption reading. The cabinet can be installed at the top of the pole or on the outside facade with the help of screws and strap. The cabinet resists to UV and to water or insect penetration (IP34D). Its closing cover can be sealed providing an excellent fraud protection. This cabinet limiter can receive a single phase connection with 2.5-16mm<sup>2</sup> cable sections.

## Integrated version into modular interface



**Load limiter module**

### Application

The load limiter module can be placed into an interface. It comprises a cutout and a differential circuit-breaker to ensure goods and people protection. It is equipped with an input through a cable gland for power supply and 2 outputs :  
- an electrical outlet for simple access to energy  
- a second output through a cable gland and a insulating screw joint for home wiring. The whole set is pre-wired and is suitable for a single-phase connection. Ideally, it can be installed inside the home or in an outdoor shelter.

### Description

**Envelope:**

- Synthetic materials.
- Dimensions (LxWxD): 220(260)x150x120mm.
- Mounted / connected: cut-out 10.3x38 (hidden) / differential circuit-breaker / modular electronic load limiter / earthing terminal block / power socket and black domino terminal.
- Cable gland at the bottom used to route power cables (2x6-16mm<sup>2</sup> - diameter 13 up to 18mm).
- Movable window on the front side making the access to modular devices easier.
- First outlet with power socket having closed protection cover IP54
- Second outlet with cable gland allowing leading-out cable (2x2.5mm<sup>2</sup> - diameter 5 up to 10mm).
- IP43 device with conductors.
- Fitted with precuts at the bottom enabling the fixing of the envelope with screws, on every kind of material.
- Anti-fraud: sealing possibility preventing access to the live areas.

**Cut-out:**

- Disconnection: Phase and Neutral.
- Equipped with a fuse 16A gG 10.3x38mm.
- Hidden cut-out, inaccessible from the user.

**Differential circuit-breaker:**

- Nominal current: 5A.
- Nominal voltage application: 230V / 240V, 50Hz.
- Breaking capacity: I<sub>cn</sub> = 3kA.
- Differential sensitivity: I<sub>Δ</sub> = 300mA.
- Breaking curve: type C.
- Differential breaking: instantaneously.

**Power socket:**

- Bipolar plug + earthing (type NF C 61-314).
- Female type.

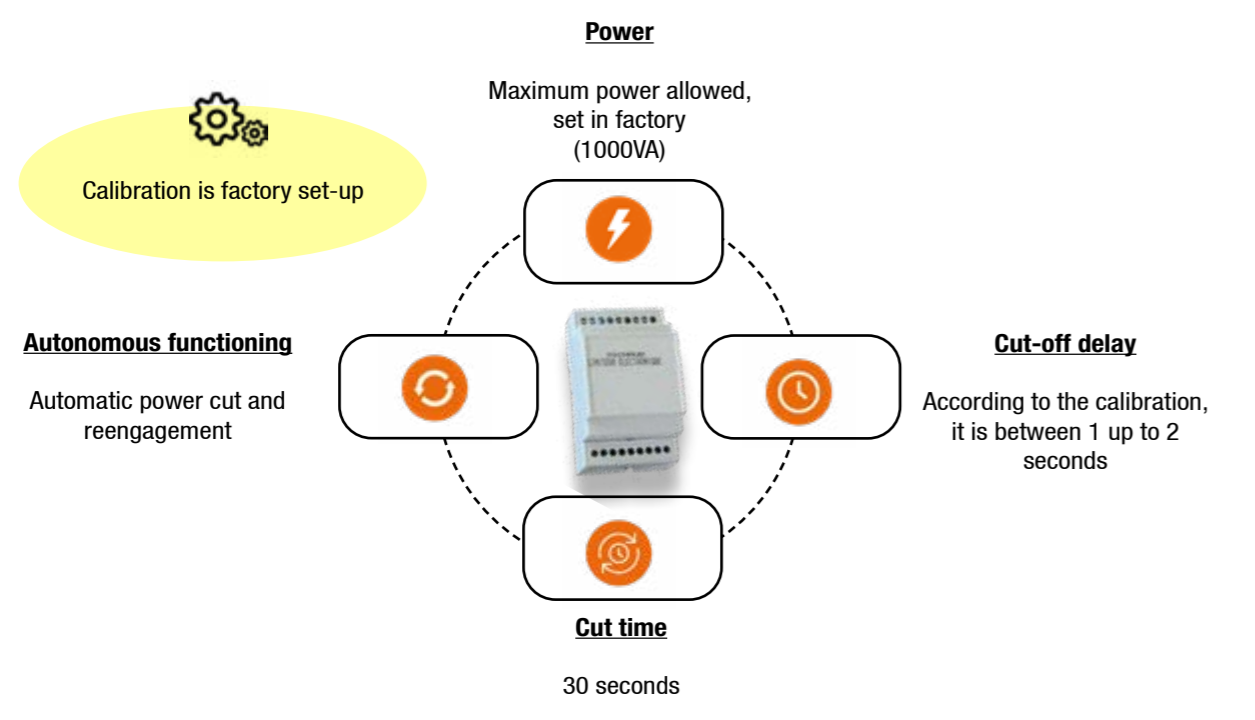
**Option:**

As an alternative to the electronic load limiter, another interface is available with a 1A thermal limiter. (K832)

**Please enquire.**



### Description

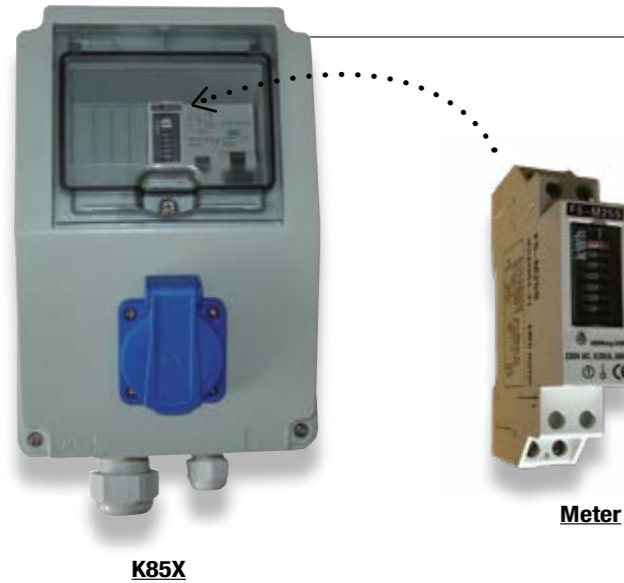


Code	Designation	Weight (kg)	Sales unit
K480	ELECTRONIC LIMITER CABINET 50-75VA	0.380	1
K481	ELECTRONIC LIMITER CABINET 75-250VA	0.380	1
K482	ELECTRONIC LIMITER CABINET 250-1000VA	0.380	1

Code	Designation	Weight (kg)	Sales unit
K811	CUSTOMER BOARD 50-75VA	1.000	1
K812	CUSTOMER BOARD 75-250VA	1.000	1
K813	CUSTOMER BOARD 250-1000VA	1.000	1

**SEE SHEET**  
ACCESS TO ENERGY / Management /  
Modular cabinets : make up your own solution

## Meter cabinet RE for IGA's



### Application

This 2 outputs meter cabinet is a solution perfectly suitable for Rural Electrification (RE) and particularly Income Generating Activities (IGA's).  
It comprises an internal circuit breaker, a meter and a differential circuit breaker to ensure goods and people protection.  
It is equipped with an input through a large cable gland for power supply and 2 outputs:  
- An electrical outlet for simple access to energy,  
- Second outlet through a smaller cable gland and black domino terminal for home wiring.  
The whole set is pre-wired.  
Ideally, it can be installed inside the home or below a shelter.

### Description

#### Envelope:

- Synthetic materials.
- Dimensions (L x W x D): 220(260)x150x120mm.
- Mounted / connected: cut-out 10.3x38 (hidden) / meter / differential circuit-breaker / earthing terminal / power socket and terminal black domino terminal.
- Cable gland at the bottom used to route power cables (2x6-16mm<sup>2</sup> - diameter 13 up to 18mm).
- Movable window on the front side making the access to modular devices easier.
- First outlet with power socket having closed protection cover IP54.
- Second outlet with cable gland allowing leading-out cable (2x2.5mm<sup>2</sup> - diameter 5 up to 10mm).
- IP43 Device with conductors.
- Fitted with precuts at the bottom enabling the fixing of the envelope with screws, on every kind of material.
- Anti-fraud: sealing possibility preventing the access to the live areas.

#### Cut-out:

- Disconnection: Phase and Neutral.
- Equipped with a fuse 16A gG 10.3x38mm.
- Hidden cut-out, inaccessible from the user.

#### Differential circuit-breaker:

- Nominal current: 1A, 3A, 5A, 10A or 15A.
- Nominal voltage application: 230V / 240V, 50Hz.
- Breaking capacity: I<sub>cn</sub> = 3kA.
- Differential sensitivity: I<sub>Δ</sub> = 300mA.
- Breaking curve: type C.
- Differential breaking: instantaneously.

#### Power socket:

- Bipolar plug + earthing (type NF C 61-314).
- Female type.



#### Meter:

- Single phase type meter of 1 module size (18mm width).
- Class of measure: 1.
- Voltage rate: 230VAc ±10%.
- Frequency: 50Hz.
- Maximal current: 30A.

Code	Designation	Weight (kg)	Sales unit
K851	METER CABINET 2.0 1A	1.000	1
K853	METER CABINET 2.0 3A	1.000	1
K855	METER CABINET 2.0 5A	1.000	1
K856	METER CABINET 2.0 10A	1.000	1
K857	METER CABINET 2.0 15A	1.000	1
K858	METER CABINET 2.0 32A	1.000	1

### Option:

As an alternative, the meter cabinet is proposed with one output (1.0), access to energy being possible only through the power socket on the front side.



Code	Designation	Weight (kg)	Sales unit
K841	METER CABINET 1.0 1A	1.000	1
K843	METER CABINET 1.0 3A	1.000	1
K845	METER CABINET 1.0 5A	1.000	1
K846	METER CABINET 1.0 10A	1.000	1
K847	METER CABINET 1.0 15A	1.000	1



### SEE SHEET

ACCESS TO ENERGY / Management /  
Modular cabinets: make up your own solution



## Modular cabinets : make up your own solution

To support you in the choice of your system, consult us.

### Benefits ?

- + Customized solution
- + Wide range of customers' management
- + Possibility to combine different management modules
- + Several protection technologies
- + Components implemented in serie and/or in parallel

### 1. Choose your cabinet

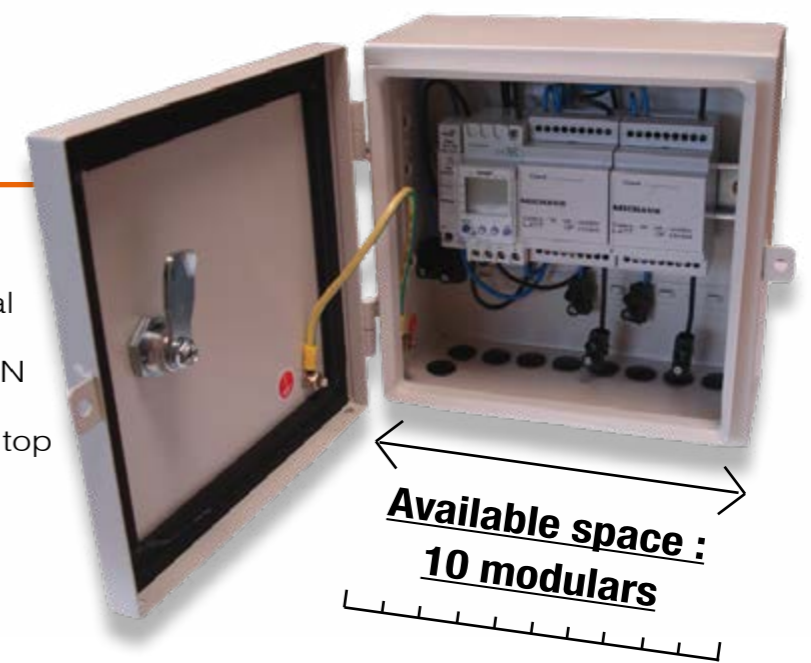
#### Individual cabinet

The transparent front door enables a clear readability of components like LED. Modules are fixed on DIN rail. It is implemented in a shelter or inside the premise.



#### Collective cabinet

The cabinet enables to gather equipment to optimize costs of several connections. Modules are fixed on DIN rail. It is implemented at the top of a pole.



### 2. Select your functions

#### Management

#### Protection

<p><b>Load limiter</b></p> <p>3 MODULARS</p>	<p><b>Thermal limiter</b></p> <p>1 MODULAR</p>	<p><b>Clock</b></p> <p>2 MODULARS</p>	<p><b>Energy manager</b></p> <p>3 MODULARS</p>	<p><b>Mechanical and electronical meters</b></p> <p>1 MODULAR</p>	<p><b>Cut-out</b></p> <p>1 MODULAR</p>	<p><b>Circuit breaker</b></p> <p>1 MODULAR</p>	<p><b>Differential cut-out</b></p> <p>2 MODULARS</p>
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## Reliable and optimized electricity distribution

# SOLUTIONS FOR THE ENERGY DISTRIBUTION

### Issues ?



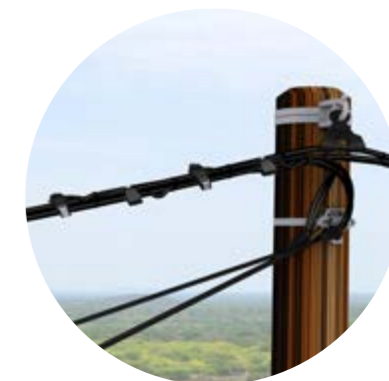
As a part of rural electrification programs, **electricity distribution costs** represent a significant budget and are often undervalued. In most cases, those additional charges are due to the transposition of traditional electrification models, without taking care of the economic, social and cultural context of developing countries.



MICHAUD proposes simplified solutions for low voltage connections, following international standards, from the HV/LV transformer avar post to the end customer. The result is **15% to 30% savings** enabling to connect more households and villages with the allocated budget !

### Benefits ?

- + Costs reduction
- + Adaptation to local context
- + Optimized access to energy



## Aerial service cable

IEC 60502



**MICHAUD Exclusivity**  
6mm<sup>2</sup> optimized  
section

### Application

This single phase or three-phase aerial cable is used for the connection between the low voltage network and the home. It is perfectly suitable for electrification applications in rural and suburban areas thanks to its optimized 6mm<sup>2</sup> section. It is stretched to a maximum range of 40m.

### Description

- This single phase or three-phase cable respectively consists of 2 or 4 twisted insulated conductors, phase(s) and neutral.
- Service voltage rate: 600V.
- Conductors core made of aluminium:
  - Conductors section: 6mm<sup>2</sup>
  - Diameter over core: 3.12mm
  - Number of strands: 7
  - Diameter of strands: 1.04mm
  - Mechanical strength of strands: 18.5daN/mm<sup>2</sup>
  - Minimum strain of strands: 1.2%
  - Step factor: 10 - 16
  - Step direction: right
- Conductors insulation made of polyethylene:
  - Nominal insulation thickness: 1.2mm
  - Minimum insulation thickness: 0.98mm
  - Diameter over insulation: 5.52mm
- Cable characteristics:
  - Phase identification: marking
  - Twist step factor: 25 - 60
  - Twist step direction: right
  - Twist weight: 75kg / km
  - Dielectric test / water: 2.5kVac / 1 min
  - Linear strength to 20°C: 4.5Ω/km
  - Maximum intensity in permanent capacity in the open air: 30A
  - Maximum short circuit current for 1s: 637A
  - Maximum temperature in service: 90°C

This cable meets the acceptance criteria of the **IEC 60502** standard.

Code	Designation	Packaging	Weight (kg)	Sales unit
U300	AERIAL SERVICE CABLE 2x6mm <sup>2</sup>	200m ring	15	1
U304	AERIAL SERVICE CABLE 4x6mm <sup>2</sup>	200m ring	30	1



Other cable sections available.  
**Please enquire.**

## Accessories dedicated to the 6mm<sup>2</sup> cable

EN 50483 CE



This insulation piercing connector is used to perform a tap connection from a network from 16 up to 95mm<sup>2</sup> with the 6mm<sup>2</sup> aerial service cable.

L227



Cable ends are used to facilitate the insertion of cables into terminals like breaker. The retention of the cable is performed thanks to crimping.

F62x

Code	Designation	Weight (kg)	Sales unit
L227	CONNECTOR CES/CT 95	0.060	200
F625	CABLE END FOR 6mm <sup>2</sup> (Batch of 100)	0.100	1
F627	CABLE END FOR 16mm <sup>2</sup> (Batch of 100)	0.120	1



L306

L304

This accessory is used for supporting service network of type 2x6 up to 4x25mm<sup>2</sup>.



U500

This anchoring clamp is used to fix 2x6mm<sup>2</sup> service cable between the pole and the home. It can be associated with the fixing clamp (L304) for implementation on a wall or a pole, thanks to a screw M10 (L306) or strap.



K265

Code	Designation	Weight (kg)	Sales unit
U500	ANCHORING CLAMP 2x6mm <sup>2</sup> - PA6	0.100	100
U500_4x6	ANCHORING CLAMP 4x6mm <sup>2</sup> - PA4x6	0.120	100
L304	FIXING CLAMP - PF25	0.010	100
L306	SCREW M10	0.048	50
K265	BELT SUSPENSION WITH RING	0.020	25



SEE SHEET  
ACCESS TO ENERGY / Distribution / Stainless steel strap



This tool is perfectly adapted to strip 6mm<sup>2</sup> section cables to facilitate wiring to equipment.

Code	Designation	Weight (kg)	Unit sale
F493	STRIPPING TOOL 6mm <sup>2</sup>	0.150	1

## Low voltage twisted insulated cable

### Network



U096

#### Application

This cable is used for low voltage electrical distribution (0.6 / 1kV, 50Hz). The cable comprises a neutral messenger which is twisted with the rest of the conductors. One or several street light conductors are possible, consult us.

#### Description

- This cable has a working temperature of -60 °C to +50 °C.
- The minimum installation temperature is -20 °C.
- The maximum allowed conductor temperature is +90 °C.
- The bend radius of curvature corresponds to 10 times the diameter of the conductor.

This cable meets the criterias of the **NF C 33-209** standard.

Cable (mm <sup>2</sup> )	Insulation thickness (mm)		Diameter of the cable (mm)	Maximum resistance at 20 ° C	
	Phase	Neutral		Phase	Neutral
3 x 16 + 54.6	1.2	1.6	28	1,91	0.63
3 x 25 + 54.6	1.4	1.6	30	1.2	0.63
3 x 35 + 54.6	1.6	1.6	33	0.868	0.63
3 x 50 + 54.6	1.6	1.6	36	0.641	0.63
3 x 70 + 54.6	1.8	1.6	37.5	0.443	0.63
3 x 70 + 70	1.8	1.5	41	0.443	0.50
3 x 25 + 54.6 + 16	1.4	1.6	30	1.2	0.63
3 x 35 + 54.6 + 16	1.6	1.6	33	0.868	0.63
3 x 50 + 54.6 + 16	1.6	1.6	36	0.641	0.63
3 x 70 + 54.6 + 16	1.8	1.6	37.5	0.443	0.63

Code	Designation	Weight (with the drum, kg)	Sales unit
<b>NEUTRAL MESSENGER</b>			
U096-3x16+54.6	INSULATED CABLE LOW TENSION 3x16 + 54.6mm <sup>2</sup> (drum 1100m)	500,95	1
U096-3x25+54.6	INSULATED CABLE LOW TENSION 3x25 + 54.6mm <sup>2</sup> (drum 1000m)	570,17	1
U096-3x35+54.6	INSULATED CABLE LOW TENSION 3x35 + 54.6 mm <sup>2</sup> (drum 1000m)	700,04	1
U096-3x50+54.6	INSULATED CABLE LOW TENSION 3x50 + 54.6mm <sup>2</sup> (drum 750m)	621,16	1
U096-3x70+54.6	INSULATED CABLE LOW TENSION 3x70 + 54.6mm <sup>2</sup> (drum 570m)	614,81	1
U096-3x70+70	INSULATED CABLE LOW TENSION 3x70 + 70mm <sup>2</sup> (drum 550m)	622,21	1
<b>NEUTRAL MESSENGER + STREET LIGHT CONDUCTOR</b>			
U096-3x25+54.6+16	INSULATED CABLE LOW TENSION 3x25 + 54.6mm <sup>2</sup> + 16mm <sup>2</sup> (drum 670m)	444,30	1
U096-3x35+54.6+16	INSULATED CABLE LOW TENSION 3x35 + 54.6mm <sup>2</sup> + 16mm <sup>2</sup> (drum 650m)	509,17	1
U096-3x50+54.6+16	INSULATED CABLE LOW TENSION 3x50 + 54.6mm <sup>2</sup> + 16mm <sup>2</sup> (drum 700m)	635,22	1
U096-3x70+54.6+16	INSULATED CABLE LOW TENSION 3x70 + 54.6mm <sup>2</sup> + 16mm <sup>2</sup> (drum 500m)	580,50	1

Others dimensions are available, [consult us](#).

### Service



U313

#### Application

This cable is used for the low voltage electricity overhead distribution. The conductor core is aluminium of wired type, covered with XLPE insulation.

#### Description

- The cable is delivered on wooden drums.
- The cable is available in single phase 2x16mm<sup>2</sup> and 2x25mm<sup>2</sup> or three-phase 4x16mm<sup>2</sup> and 4x25mm<sup>2</sup> bundles.
- Each conductor is composed of 7 strands.

This cable meets the criteria of the **NF C 33-209** standard.

Nominal section (mm <sup>2</sup> )	Nominal insulation thickness (mm)	External diameter (mm)	Approximate weight (kg/km)	Maximum resistance at 20 ° C (Ω/km)
2 x 16	1.20	15	140	1.91
4 x 16	1.20	18	280	1.91
2 x 25	1.40	18	213	1.20
4 x 25	1.40	22	426	1.20

Code	Designation	Sales unit
U305	Al 2x 16mm <sup>2</sup> ABC CABLE (drum 3000m)	1
U306	Al 4x 16mm <sup>2</sup> ABC CABLE 1m	Consult us
U312	METER OF TWISTED CABLE 2x25mm <sup>2</sup>	
U313	METER OF TWISTED CABLE 4x25mm <sup>2</sup>	

For implementation of aerial bundled cables, accessories for pulling are available, [consult us](#).

## Overhead connectors

### Network

EN 50483 CE

#### Application

These connectors are used to perform a tap connection from one overhead network to another.  
The connection is realised by means of insulation piercing technology.  
Three models are available:



L256-EC

Network connector used to perform a tap connection between 2 overhead networks (capacities: 16-95 / 16-95mm<sup>2</sup>)



U529

Network connector used to perform a tap connection between 2 overhead networks (capacities : 25-150 / 25-150mm<sup>2</sup>)



L356

Network connector used to perform a tap connection between 2 overhead networks (capacities: 35-150 / 35-150mm<sup>2</sup>)

Code	Designation	Capacities main (mm <sup>2</sup> )	Capacities tap (mm <sup>2</sup> )	Weight (kg)	Sales unit
L256-EC	CONNECTOR CDRS / CT 95 EC	16-95	16-95	0.159	20
U529	CONNECTOR CDRS / CT 150 (25-150/25-150) EC	25-150	25-150	0.195	50
L356	CONNECTOR CDRS / CT 150	35-150	35-150	0.411	30

### Service

#### Application

These connectors are used to perform a tap connection from the network to the customer. Four models are available :



L227

Street light connector for powering street light lamp and performing tap connections of small section cables from a network.  
The connection is realised by means of insulation piercing technology.  
(capacities: 16-95 / 1.5-10mm<sup>2</sup>)

K232



Service connector used to perform a tap connection from the insulated network to the customer. The connection is realised by means of insulation piercing technology.  
(capacities: 16 -95 / 2.5 -35mm<sup>2</sup>).  
In general, the capacities of the connector are 16-95/2.5-35mm<sup>2</sup>. In some specific applications, these capacities can be 6-95/6-35mm<sup>2</sup>.



L259

Service connector used to perform a tap connection from an aluminium or copper bare conductor to an insulated one to connect the customer.  
(capacities: 6-35 / 7-95mm<sup>2</sup>)

U533



Service connector used to perform a tap connection from the insulated network to the customer.  
The connection is realised by means of insulation piercing technology.  
(capacities : 35-150 / 6-35mm<sup>2</sup>)

Code	Designation	Capacities main (mm <sup>2</sup> )	Capacities tap (mm <sup>2</sup> )	Weight (kg)	Sales unit
<b>Insulated conductors</b>					
L227	CONNECTOR CES / CT 95	16-95	1.5-10	0.056	200
K232*	CONNECTOR CBS / CT 95	16-95	2.5-35	0.148	20
U533	CONNECTOR CBS / CT 35-150 / 6-35 A	35-150	6-35	0.140	100
<b>Bare conductors</b>					
L259	CONNECTOR RDP / CN ABC 6-35 / AI 7-95	7-95	6-35	0.130	20

\*Add "- G" to reference K232 to get a connector with grease



Installation video available on the website [www.michaud-export.com](http://www.michaud-export.com)

# Mechanical fixing

## Anchoring



### Application

The anchoring assembly is used for single or double dead-ending of A.B.C (Aerial Bundled Conductors) with insulated neutral messenger. Two different sections of neutral messenger are available: 54.6mm<sup>2</sup> and 70mm<sup>2</sup>.

Code	Designation	Weight (kg)	Sales unit
U501	ANCHORING CLAMP 54.6mm <sup>2</sup> - PA 54.6	0.410	30
U501-70	ANCHORING CLAMP 70mm <sup>2</sup> - PA 70	0.530	25
U502	ANCHORING BRACKET 54.6mm <sup>2</sup> - CA 54.6	0.235	50
U502-70	ANCHORING BRACKET 70mm <sup>2</sup> - CA 70	0.300	60
U501-EAD	DOUBLE ANCHORING ASSEMBLY EAD 54	0,980	10
U501-EAS	SINGLE ANCHORING ASSEMBLY EAS 54	0,610	15

## Suspension



### Application

The suspension assembly is used to suspend a twisted isolated network. It is available in two versions: for a 54.6 mm<sup>2</sup> section neutral or for a 70mm<sup>2</sup> section neutral. The bracket is available for 54.6 mm<sup>2</sup> carrier neutral suspension clamps.

Code	Designation	Weight (kg)	Sales unit
U503	SUSPENSION ASSEMBLY 54.6mm <sup>2</sup> - ES 54.6	0.510	20
U503-70	SUSPENSION ASSEMBLY 70mm <sup>2</sup> - ES 70	0.650	20
U504	SUSPENSION ASSEMBLY 54.6 mm <sup>2</sup> - CS 54,6	0.490	50

## Service anchoring

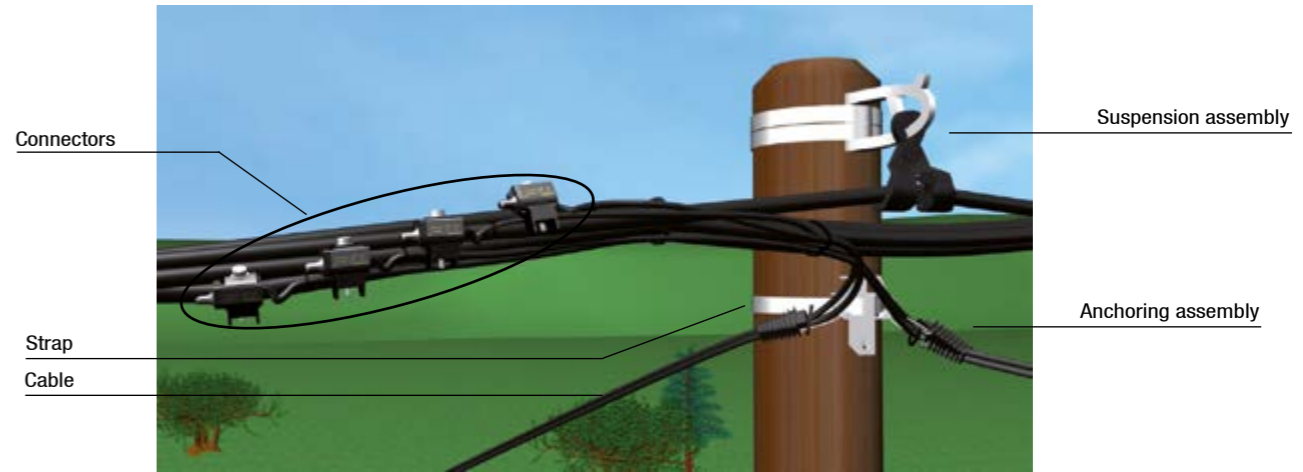


### Utilisation

This accessory is used for anchoring service cable.

Code	Designation	Weight (kg)	Sales unit
U500_4x25*	SERVICE ANCHORING CLAMP - PA 25	0.105	80
F027	ANGULAR CLAMP RA25	0.080	100
L304	FIXING CLAMP - PF25	0.010	100
F305-9	MULTIPLE ANCHORING BRACKET (X9) - CAM 25	0.500	50

Nota : For pole hardware (BQC) supply, **please enquire**.  
\* Add "-XT" to U500\_4x25 for a 4x35 compatible version



SEE SHEET  
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# Junction sleeve

## Network

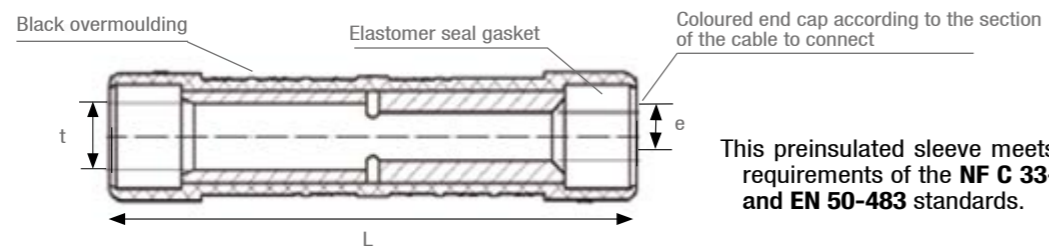


U507

### Application

This preinsulated sleeve is designed for the junction of low voltage overhead insulated conductors to other ones. The junction can be established between two conductors of equal or unequal sections. All combinations of sections are possible.

### Description



This preinsulated sleeve meets the requirements of the **NF C 33-021** and **EN 50-483** standards.

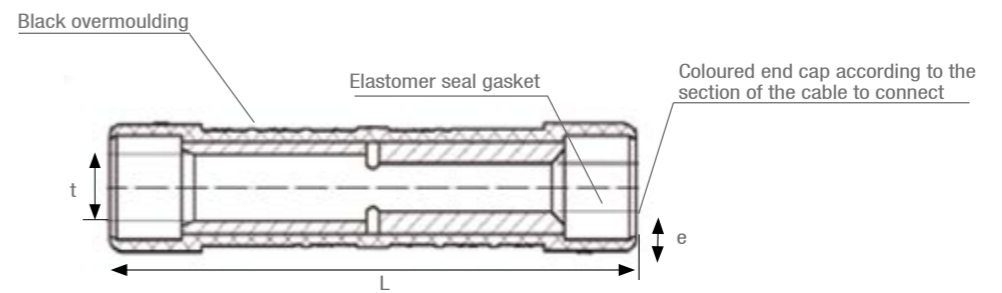
Code	Designation	Leading-in cable (mm <sup>2</sup> )	Leading-in colour	Leading-out cable (mm <sup>2</sup> )	Leading-out colour	Dimensions (mm)			Weight (kg)	Sales unit
						t	e	L		
<b>PHASE SLEEVE REQUIRING A E173 CRIMPING DIE</b>										
U507_16-16	MJPT SLEEVE 16-16	16	Blue	16	Blue	5.3	5.3	98.5	0.060	10
U507_25-25	MJPT SLEEVE 25-25	25	Orange	25	Orange	6.5	6.5		0.060	10
U507_35-25	MJPT SLEEVE 35-25	35	Red	25	Orange	7.9	6.5		0.050	10
U507_35-35	MJPT SLEEVE 35-35	35	Red	35	Red	7.9	7.9		0.060	10
U507_50-25	MJPT SLEEVE 50-25	50	Yellow	25	Orange	8.8	6.5		0.060	10
U507_50-35	MJPT SLEEVE 50-35	50	Yellow	35	Red	8.8	7.9		0.060	10
U507_50-50	MJPT SLEEVE 50-50	50	Yellow	50	Yellow	8.8	8.8		0.055	10
U507_70-25	MJPT SLEEVE 70-25	70	White	25	Orange	10.4	6.5		0.050	10
U507_70-35	MJPT SLEEVE 70-35	70	White	35	Red	10.4	7.9		0.050	10
U507_70-50	MJPT SLEEVE 70-50	70	White	50	Yellow	10.4	8.8		0.050	10
U507_70-70	MJPT SLEEVE 70-70	70	White	70	White	10.4	10.4		0.050	10
U507_95-35	MJPT SLEEVE 95-35	95	Grey	35	Red	12.2	7.9		0.050	10
U507_95-50	MJPT SLEEVE 95-50	95	Grey	50	Yellow	12.2	8.8		0.050	10
U507_95-70	MJPT SLEEVE 95-70	95	Grey	70	White	12.2	10.4		0.050	10
U507_95-95	MJPT SLEEVE 95-95	95	Grey	95	Grey	12.2	12.2		0.050	10
<b>NEUTRAL SLEEVE REQUIRING A E215 CRIMPING DIE</b>										
U507_120-120	MJPT SLEEVE 120-120	120	Pink	120	Pink	14.3	14.3	136.8	0.050	10
U507_150-70	MJPT SLEEVE 150-70	150	Purple	70	White	15.5	10.4		0.050	10
U507_150-95	MJPT SLEEVE 150-95	150	Purple	95	Grey	15.5	12.2		0.050	10
U507_150-150	MJPT SLEEVE 150-150	150	Purple	150	Purple	15.5	15.5		0.050	10
<b>NEUTRAL SLEEVE REQUIRING A E173 CRIMPING DIE</b>										
U507_54N-54N	MJPTN SLEEVE 54-54	54.6	Black	54.6	Black	10.2	10.2	173.5	0.090	10
U507_54N-70N	MJPTN SLEEVE 54-70	54.6	Black	70	White	10.2	10.6		0.090	10
U507_70N-70N	MJPTN SLEEVE 70-70	70	White	70	White	10.2	10.6		0.080	10
<b>NEUTRAL SLEEVE REQUIRING A E215 CRIMPING DIE</b>										
U507_95N-95N	MJPTN SLEEVE 95-95	95	Grey	95	Grey	10.2	13.4	175.5	0.150	10
<b>SET OF SLEEVES E173</b>										
U960	SET OF SLEEVES (E173) EJPT 35-35/54,6N-54,6N	3x U507_35-35 + 1x U507_54N-54N							0,250	50
U961	SET OF SLEEVES (E173) EJPT 70-35/54,6N-54,6N	3x U507_70-35 + 1x U507_54N-54N							0,234	50
U962	SET OF SLEEVES (E173) EJPT 70-70/54,6N-54,6N	3x U507_70-70 + 1x U507_54N-54N							0,247	50

# Service



U509

### Description



This preinsulated sleeve meets the requirements of the **NF C 33-021** and **EN 50-483** standards.

Code	Designation	Leading-in cable (mm <sup>2</sup> )	Leading-in colour	Leading-out cable (mm <sup>2</sup> )	Leading-out colour	Dimensions (mm)			Weight (kg)	Sales unit
						t	e	L		
<b>SERVICE SLEEVE E140</b>										
U509_4-4	MJPB SLEEVE 4-4	4	Ivory	4	Ivory	2.9	2.9	74	0.050	10
U509_4-6	MJPB SLEEVE 4-6	4	Ivory	6	Brown	3.3	2.9		0.050	10
U509_4-10	MJPB SLEEVE 4-10	4	Ivory	10	Green	4.3	2.9		0.050	10
U509_4-16	MJPB SLEEVE 4-16	4	Ivory	16	Blue	5.3	2.9		0.050	10
U509_4-25	MJPB SLEEVE 4-25	4	Ivory	25	Orange	6.5	2.9		0.050	10
U509_6-6	MJPB SLEEVE 6-6	6	Brown	6	Brown	3.3	3.3		0.050	10
U509_6-10	MJPB SLEEVE 6-10	6	Brown	10	Green	4.3	3.3		0.050	10
U509_6-16	MJPB SLEEVE 6-16	6	Brown	16	Blue	5.3	3.3		0.050	10
U509_6-25	MJPB SLEEVE 6-25	6	Brown	25	Orange	6.5	3.3		0.050	10
U509_6-35	MJPB SLEEVE 6-35	6	Brown	35	Red	7.9	3.3		0.050	10
U509_10-10	MJPB SLEEVE 10-10	10	Green	10	Green	4.3	4.3		0.050	10
U509_10-16	MJPB SLEEVE 10-16	10	Green	16	Blue	5.3	4.3		0.050	10
U509_10-25	MJPB SLEEVE 10-25	10	Green	25	Orange	6.5	4.3		0.050	10
U509_10-35	MJPB SLEEVE 10-35	10	Green	35	Red	7.9	4.3		0.050	10
U509_16-16	MJPB SLEEVE 16-16	16	Blue	16	Blue	5.3	5.3		0.050	10
U509_16-25	MJPB SLEEVE 16-25	16	Blue	25	Orange	6.5	5.3		0.050	10
U509_16-35	MJPB SLEEVE 16-35	16	Blue	35	Red	7.9	5.3		0.050	10
U509_16-50	MJPB SLEEVE 16-50	16	Blue	50	Yellow	8.8	5.3		0.050	10
U509_25-25	MJPB SLEEVE 25-25	25	Orange	25	Orange	6.5	6.5		0.050	10
U509_25-35	MJPB SLEEVE 25-35	25	Orange	35	Red	7.9	6.5		0.050	10
U509_25-50	MJPB SLEEVE 25-50	25	Orange	50	Yellow	8.8	6.5		0.050	10
U509_35-35	MJPB SLEEVE 35-35	35	Red	35	Red	7.9	7.9		0.050	10
U509_35-50	MJPB SLEEVE 35-50	35	Red	50	Yellow	8.8	7.9		0.050	10

# Lugs

## Preinsulated lug

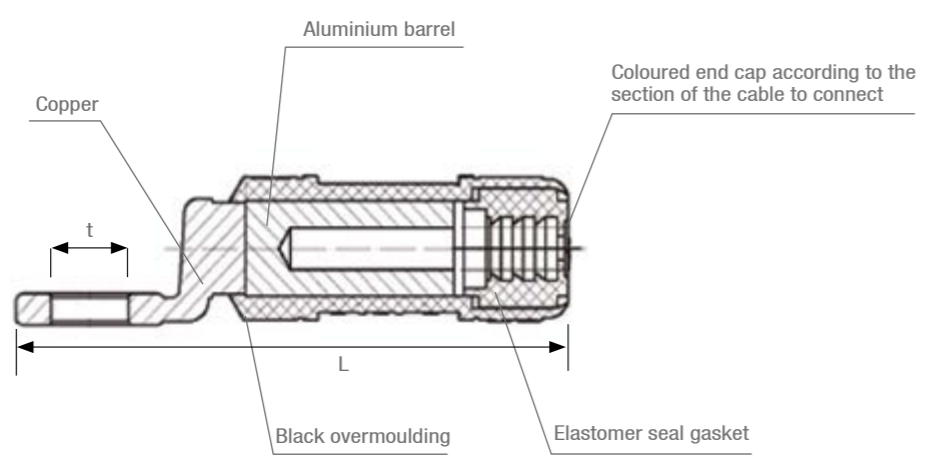


**U506**

### Application

This spin-welded preinsulated lug is designed to connect low voltage copper or aluminium overhead insulated conductors to copper equipment terminals. The cable sections range that the lug can receive goes from 16 to 150mm<sup>2</sup>.

### Description



This preinsulated lug meets the requirements of the **NF C 33-021** and **EN 50-483** standards.

Code	Designation	Insulated Al/Cu cable (mm <sup>2</sup> )	Dimensions (mm)		Weight (kg)	Sales unit
			t	L		
<b>SPIN-WELDED PREINSULATED LUG REQUIRING A E140 CRIMPING DIE</b>						
U506_16-10	CPTAU SPIN-WELDED LUG 16mm <sup>2</sup> - DIAM 10	16	10.3	75	0.040	10
<b>SPIN-WELDED PREINSULATED LUG REQUIRING A E173 CRIMPING DIE</b>						
U506_25-10	CPTAU SPIN-WELDED LUG 25mm <sup>2</sup> - DIAM 10	25	10.3	100	0.040	10
U506_35-13	CPTAU SPIN-WELDED LUG 35mm <sup>2</sup> - DIAM 13	35	13	100	0.070	6
U506_50-13	CPTAU SPIN-WELDED LUG 50mm <sup>2</sup> - DIAM 13	50	13	100	0.070	6
U506_54-13	CPTAU SPIN-WELDED LUG 54.6mm <sup>2</sup> - DIAM 13	54.6	13	100	0.070	6
U506_70-13	CPTAU SPIN-WELDED LUG 70mm <sup>2</sup> - DIAM 13	70	13	100	0.070	6
U506_95-13	CPTAU SPIN-WELDED LUG 95mm <sup>2</sup> - DIAM 13	95	13	100	0.070	6
<b>SPIN-WELDED PREINSULATED LUG REQUIRING A E215 CRIMPING DIE</b>						
U506_120-13	CPTAU SPIN-WELDED LUG 120mm <sup>2</sup> - DIAM 13	120	13	118	0.220	10
U506_150-13	CPTAU SPIN-WELDED LUG 150mm <sup>2</sup> - DIAM 13	150	13	118	0.220	5

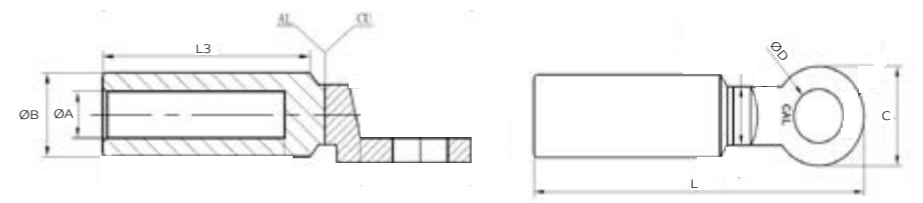
## Bimetallic lug



### Application

This Al/Cu lug is used to connect aluminium bare conductors to copper equipment terminals. It is applied with a deep crimping.

### Description



Code	Designation	Dimensions (mm)					Weight (kg)	Sales unit
		ØA	ØB	ØC	ØD	L		
U553_16-10	BIMETAL LUG CAL 16mm <sup>2</sup> - DIAM 10 C0AU16	5.8			10.5		0.037	10
U553_25-10	BIMETAL LUG CAL 25mm <sup>2</sup> - DIAM 10 C0AU25	6.7	16	20	10.5	76	0.036	10
U553_35-13	BIMETAL LUG CAL 35mm <sup>2</sup> - DIAM 13 C0AU35	8.2			13		0.033	10
U553_50-13	BIMETAL LUG CAL 50mm <sup>2</sup> - DIAM 13 C1AU50	9.2			13		0.061	5
U553_70-13	BIMETAL LUG CAL 54&70mm <sup>2</sup> - DIAM 13 C1AU70	11.2	20	24	13	80.7	0.058	5
U553_95-13	BIMETAL LUG CAL 95mm <sup>2</sup> - DIAM 13 C1AU95	12.7			13		0.055	5
U553_120-13	BIMETAL LUG CAL 120mm <sup>2</sup> - DIAM 13 C2AU120	13.9			13	105.1	0.124	5
U553_150-13	BIMETAL LUG CAL 150mm <sup>2</sup> - DIAM 13 C2AU150	15.7	25	30	13	60.8	0.119	5
U553_185-13	BIMETAL LUG CAL 185mm <sup>2</sup> - DIAM 13 C4AU185	17.5			13		0.220	5
U553_240-13	BIMETAL LUG CAL 240mm <sup>2</sup> - DIAM 13 C4AU240	19.7	32	35	13	113.1	0.213	5
U553_300-17	BIMETAL LUG CAL 300mm <sup>2</sup> - DIAM 17 C5AU300	23.5			17		0.350	4
U553_400-17	BIMETAL LUG CAL 400mm <sup>2</sup> - DIAM 17 C5AU400	26.5	40	36	17	154.3	0.420	4

# Stainless steel strap cardboard winder



EN 10088 CE

### Application

This stainless steel strap is mainly used to fix the suspension or anchoring clamp brackets on all types of poles (wooden, metal or concrete).

### Description

- This strap packaged in a 50m or 25m winder is available in four dimensions:
  - 10 x 0.4mm - 3/8"
  - 10 x 0.7mm - 3/8"
  - 20 x 0.4mm - 3/4"
  - 20 x 0.7mm - 3/4"
- The strap edges are deburred.
- The strap delivered in a roll inside a strengthened cardboard winder.

Code	Designation	Winder length (m)	AISI	Weight (kg)	Sales unit
<b>Dimensions 10x0.4 - 3/8"</b>					
K920	50m CARDBOARD WINDER STAINLESS STEEL STRAP 10x0.4mm - 3/8" - AISI 201	50	201	1.740	5
K920-304	50m CARDBOARD WINDER STAINLESS STEEL STRAP 10x0.4mm - 3/8" - AISI 304	50	304	1.740	5
K940	50m CARDBOARD WINDER STAINLESS STEEL STRAP EC 10x0.4mm - 3/8" - AISI 430	50	430	1.740	5
<b>Dimensions 10x0.7 - 3/8"</b>					
K919	25m CARDBOARD WINDER STAINLESS STEEL STRAP 10x0.7mm - 3/8" - AISI 201	25	201	1.500	4
K921	50m CARDBOARD WINDER STAINLESS STEEL STRAP 10x0.7mm - 3/8" - AISI 201	50	201	2.840	5
K924	25m CARDBOARD WINDER STAINLESS STEEL STRAP EC 10x0.7mm - 3/8" - AISI 430	25	430	1.500	5
K941	50m CARDBOARD WINDER STAINLESS STEEL STRAP EC 10x0.7mm - 3/8" - AISI 430	50	430	2.840	5
<b>Dimensions 20x0.4 - 3/4"</b>					
K922	50m CARDBOARD WINDER STAINLESS STEEL STRAP 20x0.4mm - 3/4" - AISI 201	50	201	3.340	5
K942	50m CARDBOARD WINDER STAINLESS STEEL STRAP EC 20x0.4mm - 3/4" - AISI 430	50	430	3.340	5
<b>Dimensions 20x0.7 - 3/4"</b>					
K918	25m CARDBOARD WINDER STAINLESS STEEL STRAP 20x0.7mm - 3/4" - AISI 201	25	201	2.980	5
K923	50m CARDBOARD WINDER STAINLESS STEEL STRAP 20x0.7mm - 3/4" - AISI 201	50	201	5.690	5
K936	25m CARDBOARD WINDER STAINLESS STEEL STRAP EC 20x0.7mm - 3/4" - AISI 430	25	430	2.980	5
K943	50m CARDBOARD WINDER STAINLESS STEEL STRAP EC 20x0.7mm - 3/4" - AISI 430	50	430	5.690	5

### Tools



### Description

The carrying case with ergonomic inside trim is made of synthetic material. It includes a cutting tool, binding tool ratchet type and buckles (to be ordered separately).

### Implementation

- Cut the required length of strap using the cutting tool.
- Fix the strap around the pole and bracket using a binding tool and attach a buckle.
- Keep the cutting tool and binding tool in the suitable carrying case.

Code	Designation	Weight (kg)	Sales unit
L950	YOKES EC FOR 10mm STRAP (x100)	0.320	1
L951	YOKES EC FOR 20mm STRAP (x100)	0.610	1
K960	BINDING TOOL RATCHET TYPE FOR STRAP	1.950	1
K961	CUTTING TOOL FOR STRAP	0.550	1
K963	CARRYING CASE FOR STRAP TOOLS	0.550	1

### Anti-climbing buckles



### Application

These stainless steel buckles are fixed onto the strap to prevent climbing on the pole and the fraud attempt.

Code	Designation	Weight (kg)	Sales unit
K956	SET OF 25 ANTI-CLIMBING STAINLESS STEEL BUCKLES	0.580	1



Video implementation available on the website [www.michaud-export.com](http://www.michaud-export.com)



## Source, network and safety protection

# SOLUTIONS FOR THE NETWORK PROTECTION

### Issues ?



Harsh climates of many developing countries create regularly disruptions on the lines. In order to protect people, the electrical production sources and networks, MICHAUD offers some **economical and enduring alternatives** to traditionnal solutions.



Mostly used in Europe, the thermal image circuit-breaker, installed at the top of the pole, causes inopportune power cuts in case of phases imbalance on the network. To avoid this inconvenience, MICHAUD has designed a very **economical fuse switch disconnecter equipped with fuses of high breaking capacity (HBC)**. This system has the advantage to add protection and breaking points, making easier the network operating and maintenance.



MICHAUD also proposes **earth system solutions** for people and installations protection.

### Benefits ?

- + Safe and sustainable installations
- + Medium and long term profitability
- + Easier networks operating and maintenance



# Reduced urban panel



**F750 + F752**

### Application

This reduced urban panel (TUR) is used to protect low voltage distribution networks. It can be installed into the distribution station.

### Description

- The reduced urban panel (TUR) is made of a three-poles switch with abrupt interlock and trigger, an aluminium set of bars (Phases 1-2-3 and neutral).
- The whole set is installed on a metal chassis.
- The inlets can receive cables with mechanical tightening terminal lug (up to 630mm<sup>2</sup>).
- The outlet is ensured by a 400A monobloc feeder including: 3 circuit breakers, 1 cut-out blade for neutral, 3 bars of feeder (Phases 1-2-3) and 1 bar of neutral outlet.
- The switch circuit breaker has a breaking capacity of 400A under load with a tension of 250V and a Cos  $\varphi$  of 0.9.
- It is made to receive fuses size 2, 115mm. The monobloc feeder allows the connection of an unipolar cable with maximal cross-section 240mm<sup>2</sup> (aluminium or copper).
- A street light connection for the station is located before the switch (breakout bipolar fuse 10.3x38 10A with a neutral tube).
- This low voltage panel is equipped of 4 mounting brackets.

#### T4 - 800A :

- This panel can be equipped with 4 monobloc feeders which can be implemented with size 2 fuses, 115mm.
- It is equipped with a general cutting device.

#### Characteristics:

- Intensity : 800A.
- Nominal tension : 440V.
- Test tension : 50Hz, 1 minute, 10kV compared to earth.
- Shock wave tension : 20kV.
- Breaking capacity of the switch with a nominal intensity on 440V cos  $\varphi$  = 0.9.
- Closing capacity of the switch : 16 000A effective and 32 000A peak with cos  $\varphi$  = 0.35.

#### T8 - 1 200A / 1 800A :

- This panel can be equipped with 8 monobloc feeders which can be implemented with fuses size 2, 115mm.
- It is equipped with a general cutting device.

#### Characteristics:

- Intensity : 1 200A / 1 800A.
- Nominal tension : 440V.
- Test tension : 50Hz, 1 minute, 10kV compared to earth.
- Shock wave tension : 20kV.
- Breaking capacity of the switch with a nominal intensity on 440V cos  $\varphi$  = 0.9.
- Closing capacity of the switch :
  - 25 000A effective et 52 000A peak with cos  $\varphi$  = 0.25 for T8 - 1 200A.
  - 32 000A effective et 72 000A peak with cos  $\varphi$  = 0.20 for T8 - 1 800A.

These reduced urban panels meet the criteria of the **HN 63-S-61** standard.

#### Insulated operation wrench:

- Hexagonal made of forged steel.
- Insulated for 10kV.

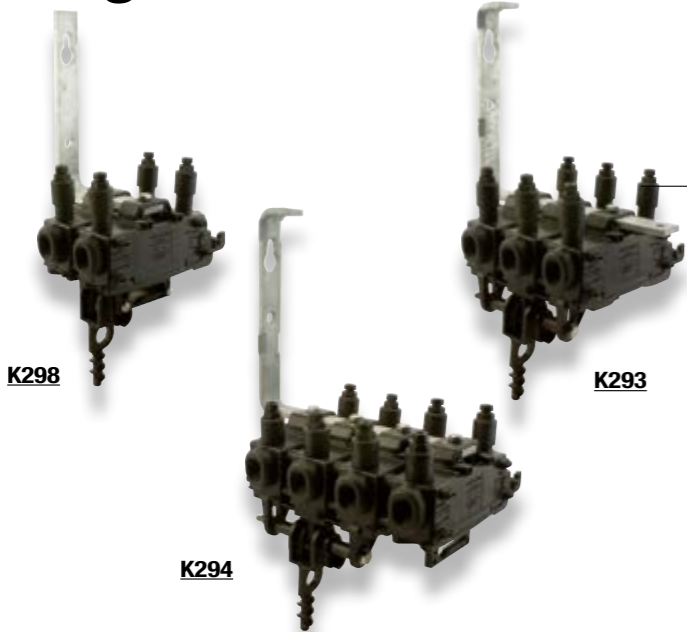
#### Closing panel for short-circuiting and test:

- This panel, made of insulated material blocks out one outlet, the three fuses being removed.
- It is lockable with 3 horizontal screws for each outlet.

Code	Designation	Sales unit
F750	REDUCED URBAN PANEL TUR T4 - 800	1
F749	REDUCED URBAN PANEL TUR T8 - 1200	1
F751	REDUCED URBAN PANEL TUR T8 - 1800	1
F752	MONOBLOC FEEDER 400A + FEEDER SCREEN	1
F753	CIRCUIT-BREAKER PROTECTOR	1
F754	INSULATED OPERATION WRENCH	1
F755	TUR CLOSING PANEL FOR 1 MONOBLOC FEEDER	1

Note: Fuses are sold separately. Please **consult us**.

# LV network fuse protection Gang fuse switch disconnecter



### Application

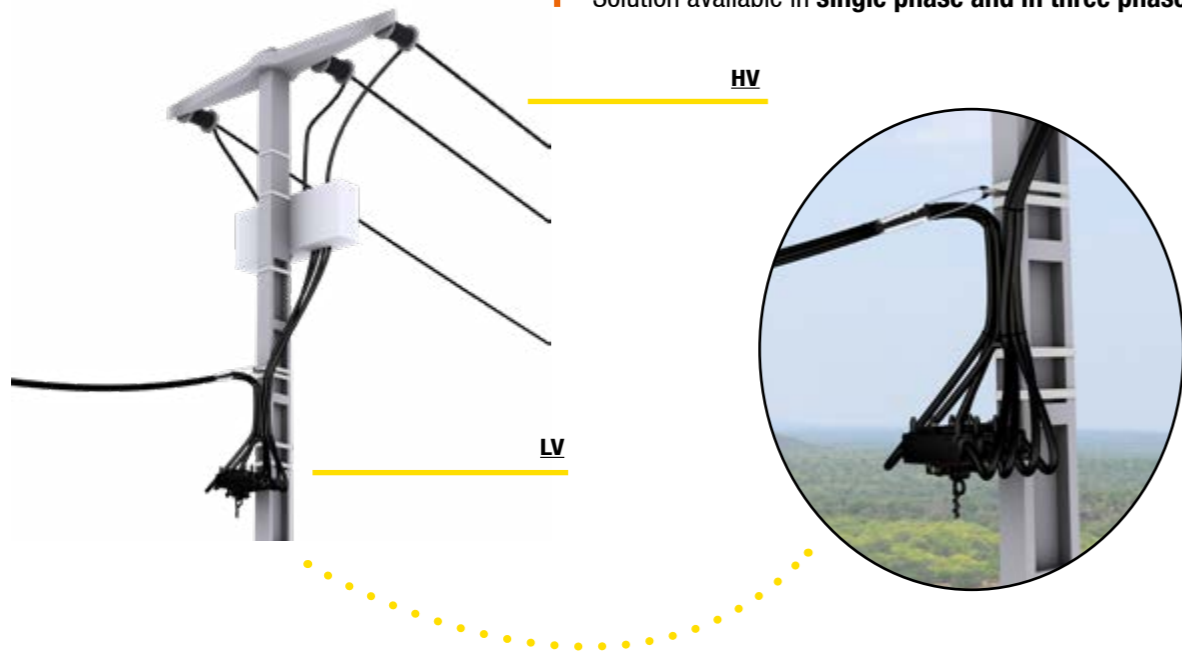
This multi-pole fuse switch disconnecter device is installed below a transformer at the top of the pole. It provides protection up to 160A or cut-off up to 240A. It is attached to the pole and thus protects the transformer and the low-voltage network below it. It protects single phase and three-phase transformers.

### Description

- The switch disconnecter is installed downstream:
  - Of the transformer 50kVA with fuses 80A,
  - Of the transformer 100kVA with fuses 160A,
  - Of the transformer 160kVA with neutral blade contacts, in order to create a breaking point on the network, each network outlet being possibly and independently protected with a disconnecter.
- This protection system is designed to secure the opening with cable energised and loaded.
- The terminals authorise a connection up to 95mm<sup>2</sup>. The connection is performed with insulation piercing technology, insuring a reliable and secured contact.

### The benefits :

- + 50 to 80% more economical than a circuit breaker
- + Strong solution, very little sensitive to charge imbalances
- + Solution available in single phase and in three phases



K098



### Option: Double Departure

A double start can be achieved thanks to the two insulating perforation derivatives with a capacity of 6-35mm<sup>2</sup>.

Code	Designation	Weight (kg)	Sales unit
K298	DOUBLE POLE FUSE SWITCH DISCONNECTOR 160A (Size 00)	1.850	1
K293	TRIPLE POLE FUSE SWITCH DISCONNECTOR 160A (Size 00)	2.710	1
K294	QUADRUPLE POLE FUSE SWITCH DISCONNECTOR 160A (Size 00)	3.240	1
K098	DOUBLE TAP END CONNECTOR (6-35 mm <sup>2</sup> )	0.115	12

Fixing with 2 galvanized steel screws of 10mm diameter is supplied with the disconnecter console.

SEE SHEET  
ACCESS TO ENERGY / Protection / Fuses

### Operating stick



### Application

This stick, when equipped with an end, enables to manipulate the fuse carrier from the ground. Its length is 2.65m folded and 5m unfolded.

Code	Designation	Weight (kg)	Sales unit
F203	STICK 2E - 5M (TERMINAL U)	3.000	1
F213	TERMINAL END TYPE L DISCONNECTOR / STICK	0.180	1
F209	BORED TERMINAL END DISCONNECTOR / STICK	0.105	1
F208	PROTECTIVE COVER FOR OPERATING STICK	0.600	1



Installation video available on the website [www.michaud-export.com](http://www.michaud-export.com)



# Fuses

## Cartridge fuse gG

- Available in:
- 10.3x38
  - 14x51
  - 22x58



U66x

### Application

These gG cartridge fuses are designed to protect goods. They are implemented in a cut-out sheltered from outside weather conditions.

### Description

- They are type gG HPC (High Breaking Capacity).
- They are not equipped with light indicator .

These fuses meet the criteria of the **NF/EN/IEC 60269-1**, **NF HD/IEC 60269-2**, **NF C 60200-1** et **NF C 60200-2** standards.

Code	Designation	Available model	Weight (kg)	Sales unit
U66X	FUSE CARTRIDGE 10.3x38 gG	1A to 32A	0.007	10
U66X	FUSE CARTRIDGE 14x51 gG	1A to 50A	0.021	10
U64X	FUSE CARTRIDGE 22x58 gG	2A to 32A	0.021	10

## Cartridge fuse AD

- Available in :
- 10.3x38
  - 14x51
  - 22x58



U61x

### Application

These AD cartridge fuses are used together with the circuit-breaker installed on the individual service tap connection. They perform the cut-off for high short-circuit currents and thereby extend the service life of the associated circuit-breaker, which is not overloaded up to the limit.

### Description

- Low power loss limits heating of the device holding the fuse and extends its service life.
- It is specified for a nominal voltage of 440V in alternating current with nominal frequency of 50Hz.
- The nominal breaking capacity is 20kA.

These fuses meet the criteria of the **HN 62-S-83**, **NF/EN/IEC 60269-1**, **NF HD/IEC 60269-2** et **NF C60200-2** standards.

Code	Designation	Available model	Weight (kg)	Sales unit
<b>Size 10.3x38</b>				
U61X	FUSE CARTRIDGE 10.3x38 AD	5A - 10A	0.009	10
U620	NEUTRAL TUBE 10.3x38		0.012	10
<b>Size 14x51</b>				
U61X	FUSE CARTRIDGE 14x51 AD	15A - 30A - 45A	0.021	10
U621	NEUTRAL TUBE 14x51		0.016	10
<b>Size 22x58</b>				
U61X	FUSE CARTRIDGE 22x58 AD	15A - 30A - 45A - 60A - 90A	0.056	10
U622	NEUTRAL TUBE 22x58		0.028	10

## Cartridge fuse size 00 AD



P24x

### Application

This AD cartridge fuse is used together with the circuit-breaker installed on the individual service tap connection. It performs the cut-off for high short-circuit currents and thereby extend the service life of the associated circuit-breaker, which is not overloaded up to the limit.

### Description

- The size of this blade cartridge fuse is 00 according to the **IEC 60269-2-1** standard.
- The fixing brackets are made of insulating synthetic materials.
- The accessible metal parts (screws), with the exception of the blades, are potential free and also have the degree of protection IP2X according to the **NF EN 60529** standard.
- Low power loss limits heating of the device holding the fuse and extends its service life.
- It is specified for a nominal voltage of 440V in alternating current with nominal frequency of 50Hz.
- The nominal breaking capacity is 20kA.

This fuse meets the criteria of the **HN62-S-83** standard.

Code	Designation	Available model	Weight (kg)	Sales unit
P24X	FUSE CARTRIDGE SIZE 00 AD	30A to 90A	0.150	10
P240	NEUTRAL BLADE CONTACT SIZE 00		0.060	10

## Cartridge fuse NH



U664

P238

U25x

### Application

These low voltage cartridge fuses NH00, NH1 or NH2 are type gG. They are used as protection unit of the low voltage public electricity supply networks and works. They are installed in:

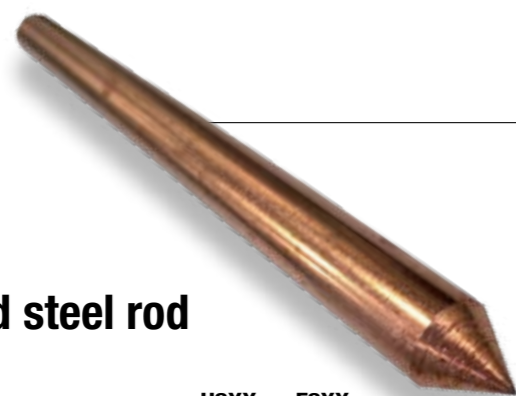
- Low voltage switchboards of the public electricity supply substations,
- Cut-out boxes, inside or outside supply switches,
- Switch cabinets for subsurface networks,
- Metering boxes and cabinets for different uses.

### Description

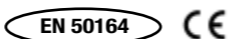
- The size of these blade cartridge fuses are NH00, NH1 or NH2 according to the **IEC 269-2-1** standard.
- It is type gG HPC (High Breaking Capacity).
- It is specified for a nominal voltage of 440V in alternating current with nominal frequency of 50Hz.
- The nominal breaking capacity is 50kA minimum.

Code	Designation	Available model	Weight (kg)	Sales unit
U664	FUSE CARTRIDGE NH00 gG 500V	2A to 160A	0.180	3
U665	NEUTRAL BLADE CONTACT NH2 115mm		0.100	1
U25X	FUSE CARTRIDGE NH1 115mm	63A to 250A	0.400	5
U25X	FUSE CARTRIDGE NH2 115mm	125A to 400A	0.650	3
P238	NEUTRAL BLADE CONTACT NH2 115mm		0.210	1
P13X	FUSE CARTRIDGE NH2 160MM	125A to 400A	0.780	3
P239	NEUTRAL BLADE CONTACT NH2 160mm		0.290	1

# Earth system



U2XX ou F2XX



### Application

These earth rods are used for earth system power networks. The copper coating made by an electrolytic process gives a resistance to corrosion as well as a good conductivity. The reference standard is **EN 50 164-2**.

## Copper plated steel rod

Code	Designation	Nominal diameter (mm)	Real diameter (mm)	Length (m)	Weight (kg)	Sales unit
<b>50µm COPPER COATING</b>						
U203	EARTH ROD COPPER 50µm L = 1m DIAM 12.7	14	12.7	1	1.025	10
U204	EARTH ROD COPPER 50µm L = 1.5m DIAM 12.7	14	12.7	1.5	1.537	10
U205	EARTH ROD COPPER 50µm L = 2m DIAM 12.7	14	12.7	2	2.050	10
F226	EARTH ROD COPPER 50µm L = 1m DIAM 14	16	14	1	1.250	10
F244	EARTH ROD COPPER 50µm L = 1.5m DIAM 14	16	14	1.5	1.900	10
F245	EARTH ROD COPPER 50µm L = 2m DIAM 14	16	14	2	2.400	10



Other earth rod dimensions are available (from 1m to 3m) as well as other treatments and thicknesses

Please enquire

### Option



Earth rod ends threading available for a potential extension with screwed sleeves.

Please enquire

## Clamps



F234

### Application

This clamp enables to establish a connection between the earth rod and the conductor.

Code	Designation	Nominal rod diameter (mm)	Maximal conductors section (mm²)	Screw	Weight (kg)	Sales unit
F234	CONNECTION CLAMP ROD DIAM 12.7 AND 14mm	14 - 16	16-35	M8	0.050	50

## Bare copper cable



U05X



The copper cable is available:

- in other dimensions
- in insulated version

Please enquire

### Application

These cables allow to conduct the electricity into the earth system and to guarantee the default current runoff.

Code	Designation	Section (mm²)	Number of strands	Strand diameter (mm)	Weight (kg/km)
U051	BARE COPPER CABLE 16mm² - 500m DRUM	16	7	1.67	138
U052	BARE COPPER CABLE 25mm² - 500m DRUM	25	7	2.09	216
U053	BARE COPPER CABLE 29mm² - 500m DRUM	29	19	1.40	250
U054	BARE COPPER CABLE 35mm² - 500m DRUM	35	7	2.48	304
U055	BARE COPPER CABLE 50mm² - 500m DRUM	50	19	1.76	415

## Connectors



U001\_X-X-C



U02X

### Application

These connectors establish a mechanical and electrical connection between two conductors to guarantee the equipotentiality of the system, to make a tap connection or to fix a severed conductor.

Code	Designation	Main conductor (mm²)	Secondary conductor (mm²)	Weight (kg)	Sales unit
U001_25-10-C	"C" SHAPE CONNECTOR 10-25 / 2.5-10	10 - 25	2.5 - 6	0.04	10
U001_25-25-C	"C" SHAPE CONNECTOR 16-25 / 16-25	16 - 25	16 - 25	0.05	10
U020	JUMPER CLAMP 6-16mm²	6 - 16	6 - 16	0.028	100
U021	JUMPER CLAMP 16-50mm²	16 - 50	16 - 50	0.061	100



U030



U034



U035



U036

### Application

This earth system disconnection kit, as well as these cutting blades, allows the opening of the earth circuit in order to perform an earth resistance measure.

Code	Designation	Conductor section min (mm²)	Conductor section max (mm²)	Weight (kg)	Sales unit
U030	TUBULAR LUG 25-29	25	29	0.020	50
U031	EARTH SYSTEM DISCONNECTION KIT 25-29	25	29	0.060	20
U034	"T" SHAPE GROUND CUTTING BLADE	10	35	0.180	10
U035	HIGH GROUND CUTTING BLADE	16	35	0.310	3
U036	LOW GROUND CUTTING BLADE	16	35	0.150	3

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U055		BARE COPPER CABLE 50MM <sup>2</sup>	72-73	
U096-3xXX+54.6		INSULATED LOW VOLTAGE CABLE 3xXX + 54.6MM <sup>2</sup>	52-53	
U096-3xXX+54.6+16		INSULATED LOW VOLTAGE CABLE 3xXX + 54.6MM <sup>2</sup> + 16MM <sup>2</sup>	52-53	
U203		EARTH ROD COPPER 50 M L = 1M DIAM 12.7	72-73	
U204		EARTH ROD COPPER 50 M L = 1.5M DIAM 12.7	72-73	

## U

U205	EARTH ROD COPPER 50 M L = 2M DIAM 12.7	72-73
U25X	FUSE CARTRIDGE NH1 115MM	70-71
U25X	FUSE CARTRIDGE NH2 115MM	70-71
U300	AERIAL SERVICE CABLE 2X6MM <sup>2</sup>	50-51
U301	AERIAL SERVICE CONCENTRIC CABLE 13MM <sup>2</sup> SINGLE PHASE	16-17
U302	AERIAL SERVICE CONCENTRIC CABLE 20MM <sup>2</sup> THREE PHASES	16-17
U304	AERIAL SERVICE CABLE 4X6MM <sup>2</sup>	50-51
U305	METER OF TWISTED CABLE 2X16MM <sup>2</sup>	52-53
U306	METER OF TWISTED CABLE 4X16MM <sup>2</sup>	52-53
U307	AERIAL SERVICE CONCENTRIC CABLE 16MM <sup>2</sup> SINGLE PHASE	16-17
U308	AERIAL SERVICE CONCENTRIC CABLE 25MM <sup>2</sup> THREE PHASES	16-17
U312	METER OF TWISTED CABLE 2X25MM <sup>2</sup>	52-53
U313	METER OF TWISTED CABLE 4x25MM <sup>2</sup>	52-53
U500	ANCHORING CLAMP 2X6MM <sup>2</sup> - PA6	50-51
U500_4x25	ANCHORING CLAMP 4X6MM <sup>2</sup> - PA4X6	56-57
U500_4x6	SERVICE ANCHORING CLAMP - PA 25	50-51
U501	ANCHORING CLAMP 54.6MM <sup>2</sup> - PA 54.6	56-57
U501-EAD	DOUBLE ANCHORING ASSEMBLY EAD 54	56-57
U501-EAS	SINGLE ANCHORING ASSEMBLY EAS 54	56-57
U501-70	ANCHORING CLAMP 70MM <sup>2</sup> - PA 70	56-57
U502	ANCHORING BRACKET 54.6MM <sup>2</sup> - CA 54.6	56-57
U502-70	ANCHORING BRACKET 70MM <sup>2</sup> - CA 70	56-57
U503	SUSPENSION ASSEMBLY 54.6MM <sup>2</sup> - ES 54.6	56-57
U503-70	SUSPENSION ASSEMBLY 70MM <sup>2</sup> - ES 70	56-57
U504	SUSPENSION ASSEMBLY 54,6 MM <sup>2</sup> - CS 54,6	56-57
U506_XX-13	CPTAU SPIN-WELDED LUG XXMM <sup>2</sup> - DIAM 13	60-61
U506_XX-10	CPTAU SPIN-WELDED LUG XXMM <sup>2</sup> - DIAM 10	60-61
U507_XX-XX	MJPT SLEEVE XX-XX	58-59
U508	ANCHORING CLAMP CONCENTRIC CABLE THREE PHASES	18-19
U509_XX-XX	MJPB SLEEVE XX-XX	58-59
U529	CONNECTOR CDRS / CT 150 (25-150/25-150) EC	54-55
U533	CONNECTOR CBS / CT 35-150 / 6-35 A	54-55
U553_XX-13	BIMETAL LUG CAL XXMM <sup>2</sup> - DIAM 13 C2AU120	60-61
U553_XX-10	BIMETAL LUG CAL XXMM <sup>2</sup> - DIAM 10 C0AU16	60-61
U553_XX-17	BIMETAL LUG CAL XXMM <sup>2</sup> - DIAM 17 C5AU300	60-61
U61X	FUSE CARTRIDGE	70-71
U620	NEUTRAL TUBE 10.3x38	70-71
U621	NEUTRAL TUBE 14x51	70-71
U622	NEUTRAL TUBE 22x58	70-71
U64X	FUSE CARTRIDGE 22x58 GG	70-71
U664	FUSE CARTRIDGE NH00 GG 500V	70-71
U665	NEUTRAL BLADE CONTACT NH2 115MM	70-71
U66X	FUSE CARTRIDGE	70-71
U960	SET OF SLEEVES (E173) EJPT 35-35/54,6N-54,6N	58-59
U961	SET OF SLEEVES (E173) EJPT 70-35/54,6N-54,6N	58-59
U962	SET OF SLEEVES (E173) EJPT 70-70/54,6N-54,6N	58-59

## INSTALLATION

These products must be implemented and used in **compliance with the applicable regulations** with a skilled, qualified professional undertaking to do so following the generally accepted rules of the trade.

For **live-line** implementation or handling, the electrician must comply with the requirements for live-line work conditions and must be equipped with the necessary personal protection equipment. The implementation temperature limits are: -10°C to +40°C.

Live-line work is carried out under the responsibility of the ordering customer in compliance with the applicable rules.

Before powering up the equipment, all the required verifications must be carried out.

## TOOLS

The product should be installed and used with **suitable tools**.

The screw heads should be tightened with the appropriate tool: **Spanner** for hexagonal cap screws, **flat screwdriver** for slotted screw heads of the right size, **Phillips screwdriver** for cruciform screw heads, **HSHC screw head (awls)** for hollow hexagonal screw heads, etc. The screw heads with no torque-limiting device must be tightened to the recommended torque and must not be tightened again.

## RECOMMENDATIONS

The installation instructions must be read carefully before using the product.

The product must be used and implemented in compliance with these recommendations for use and installation instructions. It must be used for the applications for which it was defined by the operator/manager of the network and on an electrical installation that is compliant and compatible with the product.

Never exceed the capacities indicated on the device and in the instructions sheet.

Unless explicitly indicated, products are designed for no-load connection.

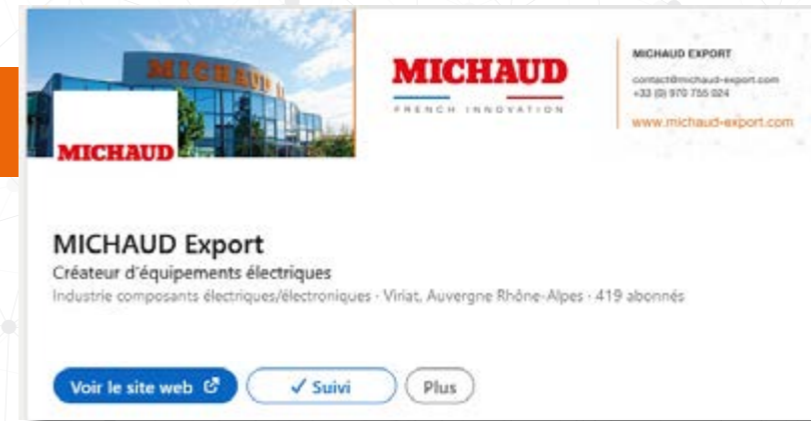
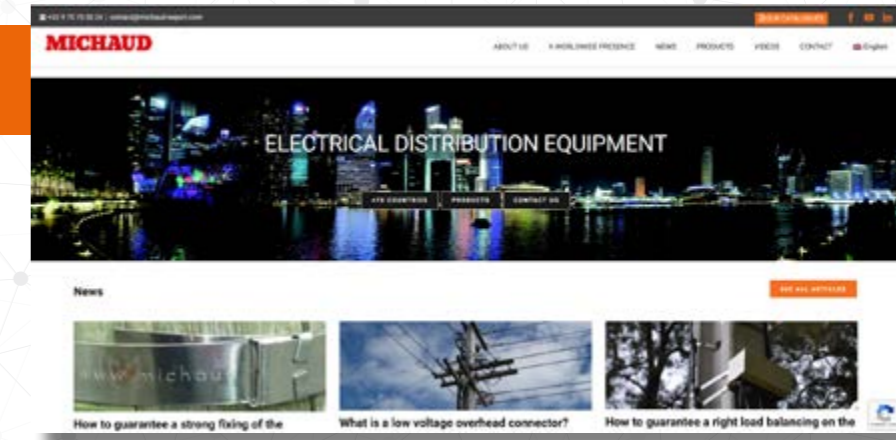
## ENVIRONMENT

Please gather your waste together and follow the recycling and destruction instructions before leaving the worksite.

## WEBSITE



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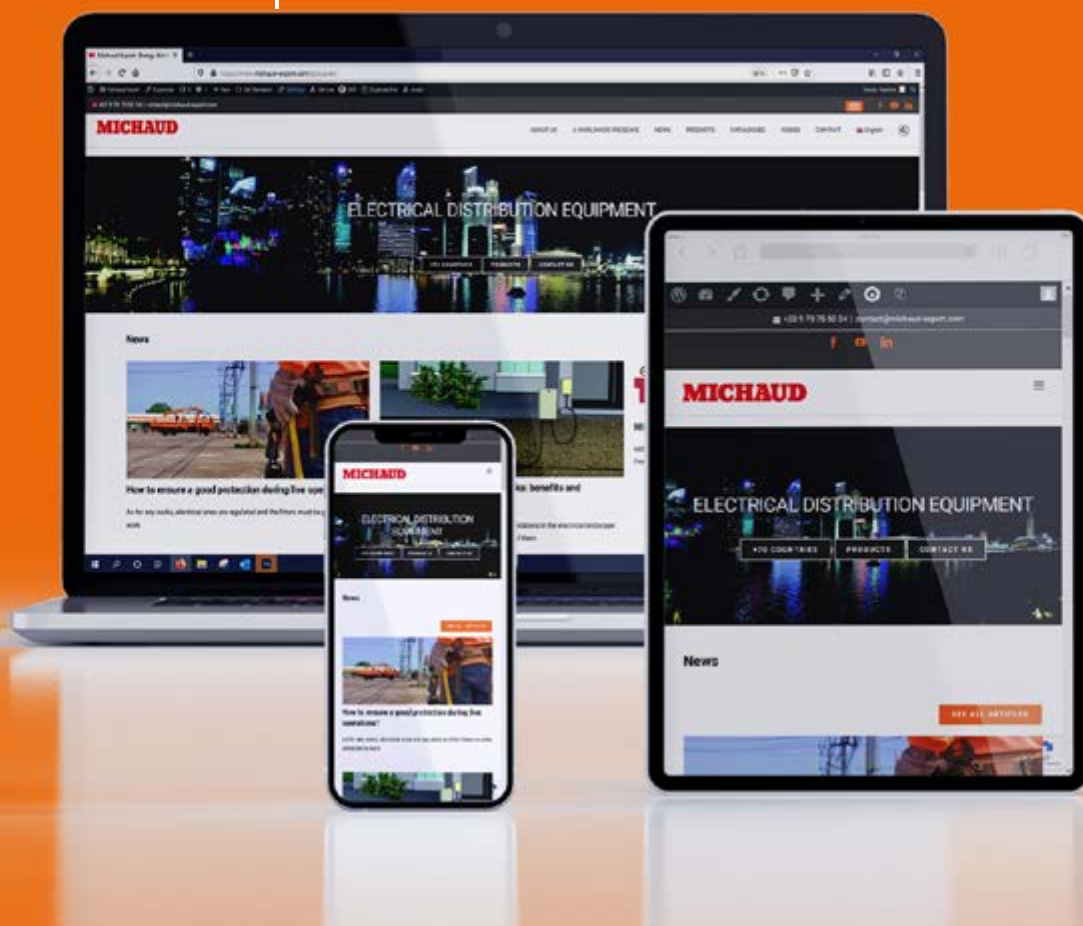
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