

Fraud preventing

Solutions to simplify and secure electrical distribution

Catalogue Energy controlling





ccording 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.

60 YEARS Expertise

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.



PRESCRIPTION & DIAGNOSIS

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



INNOVATION & QUALITY

Investing near 8% of the turnover in R&D, we develop tomorrow's solutions and guarantee quality and reliability of products thanks to a COFRAC and ASEFA accredited and independent test laboratory (accreditation n°1-0579 / www.cofrac.fr).



FITTERS TRAINING

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



+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













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 heart of development strategies. at the

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



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.

Installations model. efficiency

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

MICHAUD's challenges

Cost optimization



Adaptation to the local context

Sustainability of systems

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.

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

Utilities handle costs and resources and ensure a reliable electrification



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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



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

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

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.

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-

- Subscriber's manipulation on the meter and circuit breaker

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



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

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

SOLUTIONS FOR NETWORK EXTENSION





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.





Multiple connections box

- Connections protected from weather
- Network readability

SEE SHEET FRAUD PREVENTING/ Extension/ Multiple connections

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

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

Peripheral neutral cable

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

- Protection against illegal connections
- Decrease of non-technical losses
- SEE SHEET SEE SHEET FRAUD PREVENTING / Extension/ Fraud preventing service cable.....

Fraud preventing cable fulfilment kit

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

Ensured watertightness

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

Removal of the connectors and therefore less stress on the conductors

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Network extension

Fraud preventing service cable

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:

U302

U301

- One or three-phase conductor(s) insulated in the central part • 1 peripheral insulated neutral conductor.
- Service voltage rate: is 600V.

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- 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 ²)	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 ²)	13	16	20	25
Material of neutral insulation	UV PE	XLPE UV	UV PE	XLPE UV
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) \leq 2.5	0.045	1.91	0.045	1.2
Breaking strengh (daN)	> 150	> 150	> 150	> 150

Code	Designation	Conditioning	Weight (kg)	Sales unit
U301	AERIAL SERVICE CONCENTRIC CABLE 13mm ² SINGLE PHASE	500m ring	80	1
U307	AERIAL SERVICE CONCENTRIC CABLE 16mm ² SINGLE PHASE	500m ring	100	1
U302	AERIAL SERVICE CONCENTRIC CABLE 20mm ² THREE PHASES	3000m ring	200	1
U308	AERIAL SERVICE CONCENTRIC CABLE 25mm ² THREE PHASES	750m ring	250	1

Cable fulfilment



1	K248 + UV protection + Realise	ation of the coppe	r/aluminiu	m transitio
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 SINGLE-PHASE CABLE FULFILMENT END CONNECTOR	U301 and U307	0.110	1
K239	FRAUD-PREVENTING THREE-PHASE CABLE FULFILMENT END CONNECTOR	U302 and U308	0.250	1

Tool for stripping



Code	Designation	Weight (kg)	Sales unit
K311-13	DECLADDING CLAMP 13mm ²	0.100	1
K311-16	DECLADDING CLAMP 16mm ²	0.100	1
K311-25	DECLADDING CLAMP 21-25mm ²	0.120	1
21.12	Non contractual pictures and drawings. MICHAUD Export reserves the right to modify specifications without any	y prior notice	. 17

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.

Application in a cabinet or behind a meter panel

Easy implementation and connection

Application

	This tool is used to strip the cable in order
<u>K311</u>	to reconstitute and isolate the neutral for connection.

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Energy controlling

Network extension

Accessories for fraud preventing aerial cable

Protection



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

	<u>U508 and K310</u> <u>F305</u>
Code	Designatio
K310	ANCHORING CLAMP CONCENTRIC CABLE SINGLE PHASE
U508	ANCHORING CLAMP CONCENTRIC CABLE THREE-PHASE
L304	FIXING CLAMP - PF25

MULTIPLE ANCHORING BRACKET - CAM 25

F305

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.

B

L304

The anchoring clamp U508 is made for single
and three-phase cable whereas the anchoring
clamp K310 is made only for single-phase cable.

Weight (kg)	Sales unit
0.100	25
0.180	1
0.010	100
0.220	100



Option:

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

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SEE SHEET

ACCESS TO ENERGY / Distribution / Tape

Energy controlling

Network extension

Multiple connections

Multiple service connections box and network



CENF

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.

The benefits:

P429

8 outlets service

1 inlet / 1 outlet network

4 connection blocks

Fraud preventing

- + 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		
		Network	Network	Service	Power flow
D496	Capacities	25 - 95mm² Al	25 - 95mm² Al	6 Cu - 25mm² Al/Cu	
P420	Technology	Stripping	Stripping	Stripping	160 kVA
D420	Capacities	25 - 95mm² Al	25 - 95mm² Al	6 Cu - 25mm² Al/Cu	
P429	Technology	Insulation piercing	Insulation piercing	Insulation piercing	

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

Multiple service connections box









4 connection blocks

		INLET	OUTLET	
		Network	Service	Power flow
P436-P	Capacities	35 - 150mm² Al/Cu	10 - 35mm² Al/Cu 16M - 50M Al	
	Technology	Insulation piercing	Insulation piercing	
9436-D	Capacities	35 - 150mm² Al/Cu	10 - 35mm² Al/Cu 16M - 50M Al	
	Technology	Stripping	Stripping	110 kVA
9439-P	Capacities	35 - 150mm² Al/Cu	10 - 35mm² Al/Cu 16M - 50M Al	
	Technology	Insulation piercing	Insulation piercing	
439-D	Capacities	35 - 150mm² Al/Cu	10 - 35mm² Al/Cu 16M - 50M Al	
	Technology	Stripping	Stripping	

Code	Designation	Weight (kg)	Sales unit
P436-P	MULTIPLE CONNECTIONS BOX (x6) PIERCING	2.780	1
P436-D	MULTIPLE CONNECTIONS BOX (x6) STRIPPING	2.780	1
P439-P	MULTIPLE CONNECTIONS BOX (x9) PIERCING	3.000	1
P439-D	MULTIPLE CONNECTIONS BOX (x9) STRIPPING	3.000	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	OUTLET			
	Network	Service	P	ower flow	
Capaciti	25 - 95mm² Al/Cu	6 Cu - 16mm² Al/Cu		110 kVA	
Technolo	gy Insulation piercing	Insulation piercing			
Code	D	esignation		Weight (kg)	Sales unit
L437	AERIAL SINGLE POLE STAR CONNECTION BLOC	K 8 OUTLETS 95-16		1.160	1
L436	SET OF 2 AERIAL SINGLE POLE STAR CONNECT	ION BLOCKS 8 OUTLETS 95-16		0.580	8
21.12	Non contractual pictures and drawings. MICHAL	JD Export reserves the right to modify specific	ations without	any prior not	ice. 21

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.





the existing network

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 overconsumption 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



p20

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Energy controlling

Network rehabilitation

Power regulator



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: 14×51mm, 22×58mm, 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.



Restoring original consumption	Referenc
	Connecti

		Dating	Waight	
Code	Designation	(A)	(kg)	Sales unit
SIZE 14x	51			
P135	MINI-SWITCH 5A 14×51	5	0.030	10
P125	MINI-SWITCH 10A 14×51	10	0.030	10
P142	MINI-SWITCH 15A 14×51	15	0.030	10
SIZE 22x58				
P136	MINI-SWITCH 5A 22×58	5	0.040	10
P126	MINI-SWITCH 10A 22×58	10	0.040	10
P143	MINI-SWITCH 15A 22×58	15	0.040	10
P146	MINI-SWITCH 20A 22×58	20	0.040	10
SIZE 00				
P137	MINI-SWITCH 5A TOO	5	0.110	10
P127	MINI-SWITCH 10A TOO REVERS.	10	0.120	10
P144	MINI-SWITCH 15A TOO	15	0.120	10

Installation



	Тор о	f pole	Meter cabinet			
Shell	Cutout sleeve		Cutout cabinet			
Technical characteristics	 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. 			
References	K220	K221	U605	U607	P053	
Connection	Stripping	Insulation piercing	Stripping	Stripping	Stripping	
Capacities	2,5-16mm² Al/Cu	6-35mm² Al/Cu	6-25mm² Al/Cu	6-35mm² Al/Cu	6-35mm² Al/Cu	
Fuse sizes	14x51	22x58	14x51	22x58	Т00	

Nota : A three phases version is available.

SEE SHEET

ACCESS TO ENERGY / Protection / LV network fuse protection



U607





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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.



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.

WEBSITE







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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 (awis) 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.



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

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International expert in electrical distribution, **MICHAUD** designs, develops and implements reliable systems reducing maintenance operations on distribution. networks.

As the architect of your solution, the company focuses on on-going innovation and leverages on the worldwide renowned expertise of the 300 employees at **MICHAUD Group**, leader in the industry for systems and connection fittings for electrical installations.

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