USER GUIDE

Pre-identify LV and MV off line Cables and feeders

JUPITER+

CAUTION: Read this manual before using the device

GU_JUPITER+_V1_08EN

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MODIFICATION'S DIRECTORY

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This manual is important for your safety. Read it carefully in its entirety before using the equipment and keep it for future reference.

SUMMARY

This document is the JUPITER+ User's Guide. It describes the implementation of the device, as well as the different modes of operation to facilitate its use.

1.SAFETY INFORMATION

1.1.Safety recommendations

Please read this guide carefully before unpacking, configuring or using this equipment. Note all indications of danger and other warnings. Failing to observe these recommendations could result in serious injury to the operator or could damage the equipment. To ensure that the protection provided by this equipment is appropriate, do not use or install it other than in accordance with the conditions indicated in this manual.
Dismantling the cases is forbidden. This operation is limited exclusively to personnel qualified by MADE.

1.2.Following the safety recommendations

DANGER: Indicates a dangerous or potentially dangerous situation which, if not avoided, could cause serious or deadly injuries.

WARNING: Indicates a potentially dangerous situation which could cause superficial to moderate injuries.

Remark*:* Information requiring particular attention.

1.3.**Warning labels**

Read all labels and wordings shown on the instrument. Injuries or equipment damage could occur if these instructions are not respected.

	Symbol requiring reference to the instruction manual for instructions concerning operation or safety recommendations.
	Dangerous Voltage
	Ac current
IP 21	IP standard – Protection against dust and water : TRANSMITTER
IP 54	IP standard – Protection against dust and water : RECEIVER
	Do not throw away with household waste

2.OVERVIEW

2.1.Working Principle

- **Identification** of cables in a trench, gutter and in cable shelf.
  ➔**With short-circuited ends**

- **Identifying the phases and checking cable continuity to transmitter S1**

➔**With short-circuited ends** (closed circuit)
➔**With open-circuit ends**.

The configuration required for each of these modes is described in this document.

Each of the functions is usually carried out on unpowered MV & LV cables (customer loads on-line).

The signals and the physical principles used are common for each function.

The **JUPITER** system is made up of a Transmitter and a Receiver.

The Transmitter is in a shock-proof carrying case which also contains the various accesories. The connector for the current injection clamps is on the front face of the Transmitter.

The Receiver is in a soft carrying case which fits into the Transmitter case. This also contains the 3 sensors used for cable and conductor/phase identification:

- **Cable identification**
- **Continuity and core identification in open circuit.**
- **Continuity and core identification in short circuit**

Option:

- **Core identification in short circuit adapted for LV 4 conductor cables, with visually unidentifiable neutral**

2.2.**Composition**

2.2.1.**Transmitter**

- 3 current clamps with their connecting cable*
- 220V~ supply cable
- 1 Short-Circuiting cable

2.2.2.Receiver

2.2.2.1. Standard Sensors

- **Sensor for « Core identification, short-circuited ends » :**

- **Sensor for « Core identification, open circuit ends » :**

- **Sensor for identification :**

2.2.2.2.Optional Sensor

- **Sensor for core identification, short-circuited ends, adapted for LV 4 conductor cables, with unidentifiable neutral visually**.

3.IMPLEMENTATION

3.1.JUPITER+ TRANSMITER

From turn-on by the operator, the Transmitter is activated and generates the frequency signals necessary for identifying unpowered MV & LV cables.

It is possible to turn the **JUPITER+** Transmitter on S2 mode (with different frequencies) for a utilization with two Transmitters at the same time at the ends of a cable, one in S1 mode and the second on S2 mode.

The type of utilization allows cores identification in open circuit once the cable is cut at both ends without moving the Transmitter (useful operation with replacing a joint or example).This Transmitter allows only an utilization in S1 mode, or S2 mode with another Transmitter in S1 mode.

Only one JUPITER+ Transmitter in S2 mode does not allow core identification in open and short circuit function!

The possible operations are:

- **Identification of cables** (Short-circuited ends)
- **Continuity and identifying the cores with open circuit ends (after cutting the cable)**
- **Identifying the cores with short circuited.**

Once the Transmitter is started, no further action by the operator is necessary to activate the functions described below.

When turned-on, the Transmitter is on S1 mode. A press on S1/S2 button activates S2 mode. Another press turn the Transmitter back to S1 mode.

These functions are possible on an unpowered MV or LV network and for all types of cables:

HN, Paper, PE.

When used on an LV network, it is not necessary to disconnect the customer loads.

3.1.1.Overview of the Transmitter

3.1.2.Transmitter general functioning

3.1.2.1.Power supply

The JUPITER+ Transmitter runs on 7,2Ah 12V DC batteries.

When turned on, the charge level of the battery is indicated on the front face.

The minimum autonomy of the transmitter is 8h.

The transmitter can run on internal batteries or during the charge when using the external charger connected to the front connector closed to the case handle.

The charger operates in three modes (RED – ORANGE – GREEN LEDs):

- **BOOST Mode**, starts automatically on connecting the charger to the mains if the battery is discharged. The current delivered by the charger is then at maximum. The BOOST mode enables the supply of up to 80% of the battery capacity and can support the impact of loads due to transmission when the Transmitter is active.
- **ABSORPTION Mode**, starts as soon as the battery voltage has reached the maximum value of the BOOST. The current then begins to reduce. The duration of the two phases together (BOOST + ABSORPTION) will be a function of the initial discharge state of the battery and whether the Transmitter is activated or not. At the end of the absorption phase, the battery is recharged to 95%.
- **FLOATING Mode**, at the finish of the two initial phases (BOOST + ABSORPTION), the charger automatically configures in FLOATING mode. The value of the current delivered by the charger becomes asymptotic as it approaches zero. This phase corresponds to holding the batteries in charge (trickle current).

The continuous use of this type of charger enables the long term storage of the Transmitter, whilst maintaining the battery in optimum charged condition (charger connected).

3.1.2.2. Transmitter functions

The JUPITER+ Transmitter consists of:

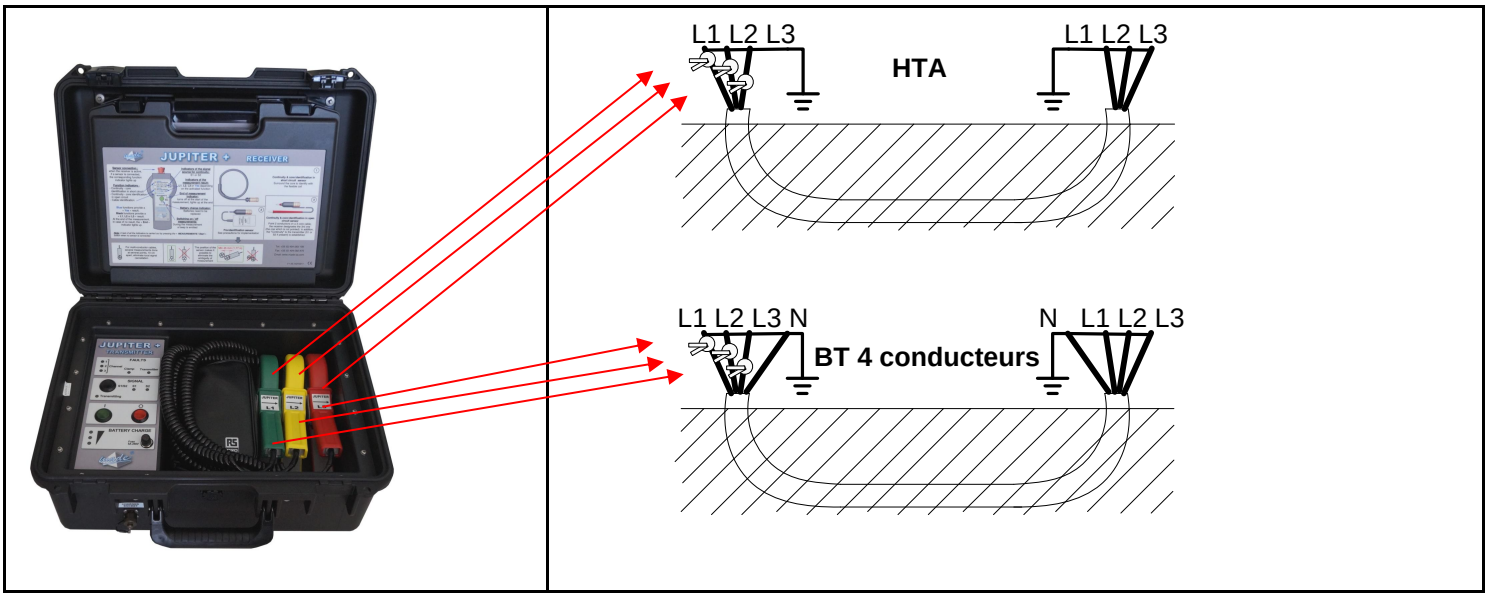
- Three synthesized power generators
- A monitoring unit for the internal components which :
  - Detects any faults in the transmission circuits (over-currents or low currents) and indicates which clamp is concerned.
  - Monitors the discharge level of the battery – the transmission is automatically stopped if the battery reaches a discharge level that could affect its life time.
- A front face – instrument panel with 4 different zones:
  - Faults zone
  - S1 or S2 signal selection button
  - ON/OFF button
  - Battery zone : Battery charge indicator and protection fuse
- An external plug for charging the battery

3.1.2.3. Transmitter connection

- The transmitter is connected on the near end of the cables using the current clamps on the connection case. Both cable ends are short-circuited and can be earthed (Do not include the cable screen).
- Ensure that both cable ends are short-circuited, using the appropriate connection wires.
- Turn on the transmitter.

It is better to place the current clamps before starting the transmitter.

If not, opening the clamps during transmitter causes the clamp fault lights to illuminate.



3.1.3.Precautions for using the transmitter

THE CURRENT CLAMPS MUST ALL HAVE THE SAME ORIENTATION WITH RELATION TO THE CABLE END (Indicated by the arrows on the clamps).

CHECK THAT THE CLAMPS ARE ON AN UNSCREENED LENGTH OF CABLE. IF NECESSARY, USE WOODEN CLAMPS OR TAPE TO HOLD THEM IN POSITION.

TO AVOID RISK OF ERROR IN CABLE DESIGNATION, USE ONLY ONE JUPITER+ TRANSMITTER ON A SITE.

AFTER TURN-ON, CHECK ON THE FRONT FACE:

- **THAT THERE ARE NO TRANSMISSION CIRCUIT FAULTS**
- **THE BATTERY CHARGE LEVEL**

3.2.**JUPITER+ RECEIVER**

The JUPITER+ Receiver assembly consists of:

- **The Receiver to which are connected the sensors**
- **Inductive sensor for identification**
- **Probes for core identification and continuity with open circuit.**
- **Flexible Identifying loops for short-circuited core identification**
- **On option: a double flexible loop for core identification on a 4 conductor LV cable.**

The Receiver and its sensors are supplied in a carrying case, which itself fits into the lid of the Transmitter case.

The JUPITER+ Receiver is used to **identify** a cable of which the extremities are in short-circuit and earthed, to **identify the cores** in an **open or closed circuit** cable.

This is done in normal operation on **unpowered** HV & LV networks.

The JUPITER+ Receiver is equipped with sensors dedicated to each function to « extract » the signals emitted by the JUPITER+ Transmitter.

The results obtained, by the Receiver, require no interpretation, the detection algorithms assure safety.

Receiver with its various sensors

Socket for sensor connection

Indication of the transmitter source of the signal

Measurement display in core identification mode

Measurement display in identification and continuity mode

End of measurement indicator

On and measurement initiation button

Battery fault indication

3.2.1. Use of receiver

Connecting a sensor to the Receiver automatically sets the operating mode which is indicated by a LED.

These modes are:

- Continuity and Identification in short-circuit
- Continuity and Identification in open-circuit
- Pré-identification

One press of the « **Measurements** » button turns on and illuminates the LED corresponding to the mode selected by the chosen sensor, which confirms to the operator the type of measurement to carry out.

After 30 seconds with no press of the « **Measurements** » button, the Receiver switches off until a new button press.

If there is no sensor connected, one press on « **Measurements** » button illuminates during 1 second all LEDs to be sure they are all operational.

Certain modes are only available when the Transmitter is in S1 mode or when two Transmitters, one in S1 mode and the second on S2 mode are connected to the ends of the same cable. A transmitter in S2 mode only does not allow core identification in open-circuit or short-circuit. This kind of utilization automatically appears when two transmitters in S1 and S2 mode are connected to the same cable and that this cable is cut after pre-identification.

3.2.1.1.Pre-identification mode

A pre-identification sensor for all type of cable.

Mode only usable with a transmitter in S1 mode or two transmitters in S1 and S2 mode.

- Connect the sensor to the receiver, the pre-identification light illuminates.
- Place the sensor on the cable, so that the groove under the sensor fits around the cable.
- Press the « measurement » button, the « **end of measurement** » light turns off.
- Wait for the result (6 seconds) without moving the sensor, the « **end of measurement** » light illuminates and if the cable is pre-identified, then the YES LED illuminates.
- If the cable is not pre-identified, repeat the operation on other points of the cable with 10cm of distance between them.
- If the answer is YES, it is always good to confirm this by repeating the measurement at several points along the cable.

The receiver indicates by « YES » the identification of the cable.

3.2.1.2. Core identification in open circuit and continuity to S1 Transmitter mode

Mode usable in all cases.

- Connect the red probes to the receiver, press the « measurement » button, the "**Open circuit identification and S1 continuity**" LED illuminates.
- The cable being cut, probe any 2 cores of the 3.
- Press the « measurement » button, the « end of measurement » LED turns off.
- Wait for the result (3 seconds), the « end of measurement » LED turns on.
- The result will depend on the probed cores and on the cable extremity they are connected to :
  - If the probe is connected towards S1, the LED "YES" for the S1 continuity turns on.
  - If the phase is identified, the **L1**, **L2** or **L3** LED illuminates.
- Repeat the operation to identify the other cores.

The receiver designates the free conductor.

3.2.1.3. Core identification and continuity in short circuit mode

Mode usable in all cases

- Connect the loop for core identification in short circuit to the receiver, press the « measurement » button, the "**Short circuit identification and S1 continuity**" LED switches on.
- Put the loop around the core to identify, and close it.
- Press the « measurement » button, the « end of measurement » turns off.
- Wait for the result (3 seconds), the « end of measurement » turns on.
- If the core is identified, the L1, L2 or L3 and the **YES** LED illuminates.
- Repeat the operation to identify the other cores.

The receiver designates the core within the loop.

3.2.1.4. Location in short circuit for 4 drivers of identical section mode (option)

Mode usable in all cases

The sensor intended for this function has two flexible loops, of which one serves as a reference and the other for the measurement (marked **red**).

- Connect the short circuit for 4 drivers to the end of the cable
- Connect the double loop to the Receiver; a press of the « measurements » button lights the LED which indicates the mode
- Put the loop marked **red** around the core to identify, and close it
- Put the unmarked loop around any other core and close it. This core serves as a reference during the identification of the other cores. This reference core will then be identified by the **red** loop using one of the previously identified cores as reference
- Press the « measurements » button
- Wait for the result (3 seconds), either L1, L2 or L3 or NEUTRAL (**blue** LED on the connector), **THE IDENTIFIED CORE IS THE ONE PASSING THROUGH THE LOOP MARKED RED**
- Repeat the operation to identify the other two cores
- Switch the loops after the last core has been identified, to be able to identify the core which has served as reference.

The receiver designates the core within the measurement loop marked with red.

3.2.2. Batteries

The Receiver is powered by two 9 Volt batteries.

When the battery charge level is insufficient for correct operation of the Receiver, a LED indicates the fault.

Each battery is monitored individually and the fault LED indicates the battery which is placed immediately beneath in the battery compartment.

4.TECHNICAL FEATURES

Characteristic.	Transmitter	Receiver
Dimensions	**Transmitter in rigid carrying case:** 540mm x 390mm x 240 mm	**Receiver in soft case :** 400mm x 300mm x 80mm
Total weight	**Transmitter and receiver:** 16 kg	
Supply	**Battery** : 12V - 7,2Ah **Minimum autonomy** : 8h for continuous use **Charger** : 100 - 240 V AC 50/60 Hz The Transmitter can be used while the battery is being charged.	2 PP3 9V batteries **Minimum autonomy** : 2000 measurements

Marks : CE

Standards applied : NF EN50081 et NF EN 50082-1

5.MAINTENANCE, RECYCLING AND GARANTEE

5.1.Maintenance

Dismantling systems is forbidden. This operation is limited exclusively to personnel qualified by MADE.
Never use solvent, or a solvent-based product, to clean the system and / or its accessories.
For cleaning and maintenance of JUPITER+, it is sufficient to:

- Check that the **sensors** are clean : wipe off with a dry cloth
- Do not use corrosive products to clean the instrument faces
- Use only the accessories delivered with the system
- Follow a training programme by a qualified person

5.2.Recycling

In accordance with the decree n° 2005-829 of July 20, 2005 relating to the waste disposal of electrical equipment and electronic (WEEE), the user ensures and takes responsibility for the collection and the elimination of the WEEE under the conditions of the articles 21 and 22 of this decree.

5.3.Garantee

MADE guarantees this product, to the initial purchaser, against all material or functional failure during a period of one year from the date of delivery, unless otherwise indicated in the product manual. If a defect is discovered during the period of the guarantee, MADE agrees, at its choice, to either repair or replace the deficient part, excluding the expenses of handling and of initial delivery. All parts repaired or replaced under the terms of this agreement will be guaranteed only for the remainder of the period of initial guarantee of the system.

5.3.1.Limitations

This guarantee does not cover:

• Damage caused by a "cause beyond control", natural disasters, strikes, wars (declared or not), terrorism, social conflicts or any acts under governmental jurisdiction

• Damage due to misuse, to carelessness, to any accident or an unsuitable application or installation
• Damage caused by a repair or an attempted repair not authorized by MADE
• Any product that is not used in accordance with the instructions provided by MADE
• Cost of transport back to MADE
• Cost of transport by express delivery of parts or products under guarantee
• Cost travel for a repair on site under guarantee

This guarantee constitutes the unique explicit guarantee established by MADE for its products. All implied guarantees, including, but not limited to, guarantees on the commercial value of the product and its suitability for a particular use are positively rejected.

The present guarantee confers certain rights: the legislation of the country or jurisdiction can grant others. This guarantee constitutes the final declaration, complete and exclusive, of the terms of the guarantee and nobody is allowed to give other guarantees or promises on MADE's account.

5.3.2. Claims limitations

Claims having for object repair or replacement are the only allowable claims in case of the breaking of this guarantee. The MADE Company cannot be held responsible, whether on the basis of strict responsibility or any other legal basis, of any incidental or consecutive damage resulting from a violation of the guarantee or from carelessness.

5.4. Copyright

MADE declines all responsibility for mistakes or inaccuracies that the present document may contain.