

Products



**Total Farm Equipment Monitoring &
Farm Electrical Network Management System**

About us?

Agrivolt is an internationally known specialist in the evaluation of livestock facility electrical network but also for its electrical network management systems and its farm equipment Monitoring Systems. More than 2000 dairy, hog and poultry farm has already used our service.

Agrivolt has established that a flow of current on the grounding and bonding network of a livestock facility would have an impact on the livestock performance and operation cost.

Sources of current

Agrivolt has identified the sources of current that circulate in the animal environment and classified them in two (2) groups; External sources and Internal sources to the livestock building.

To improve its measurement protocol Agrivolt has divided the sources as:

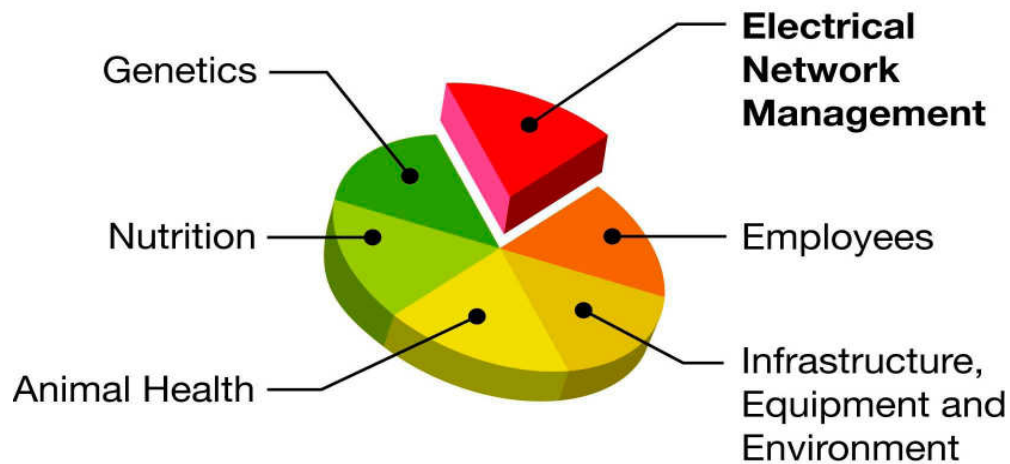
- External Sources:
 - A) Return from a 208 to 600V load
 - B) Return from a 120 to 347V load
 - C) Return from neighbouring load

- Internal Sources:
 - A) Return from a 120 to 347V load
 - B) Leakage currents at medium frequency
 - C) Leakage currents generated by faulty equipment
 - D) Current loops

It is imperative to understand that for an animal, whether the sources are external or internal don't make any difference. A source is a source and it should not be left opened.

Monitoring and Mitigation

Nuvolt Corporation Inc has developed for his subsidiary Agrivolt equipments and techniques to neutralize any current sources that can have a negative impact on the herd performance and monitoring equipment to integrate the electrical network as a management parameter of a livestock facility. All these equipment are under patent and certified for North America.



The Agrivolt System

The Agrivolt system is a modular system designed to neutralize return current at 60Hz from internal and external sources to the livestock facility. It can be installed on any electrical network in North America and any type of livestock facility. You can integrate the following units to your system;

Monitoring Unit

The Monitoring Unit is the brain of the Agrivolt system. This unit will display the values related to the return current flowing on the grounding and bonding network and also any fault on the electrical network. Audible and visual alarms are accessible. It has memory that allows logging the last 20 alarms. It will also send the alarms states if hooked up to a phone line.

Control Unit

The Control Unit manages the electrical parameter in the animal environment. It takes readings of the return current, the faulty current and the electric impulses. It then adjusts the Main Bonding Jumper Unit parameter in order to maintain its residual voltage below 80mV.

Faulty Current Detection Unit

The Faulty Current Detection Unit is the one to which the current transformers are hooked up. It then measured with precision the leakage current at 60Hz for each breaker.

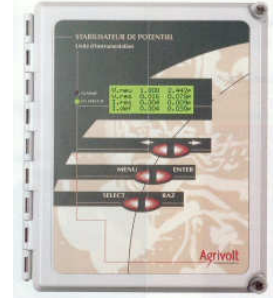
Main Bonding Jumper Unit

The Main Bonding Jumper Unit is composed of a transformer generating a variable and adjustable magnetic field in the grounding. Moreover it induces a voltage on the grounding network that cancels the voltage present in the bonding and grounding network.

Current Transformer (CT)

The CT are current transformer that when hooked up on the Control or the Faulty Current Detection Unit allow to measure the leakage current. CTs are available in 4 models.

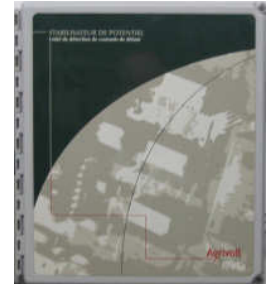
Monitoring Unit



Control Unit



Faulty Current Detection Unit



Main Bonding Jumper Unit

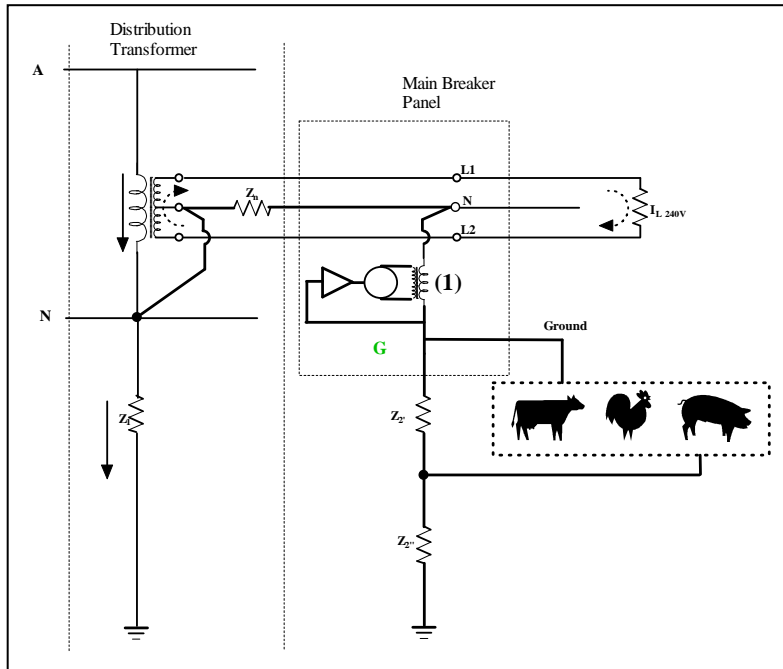


Current transformer

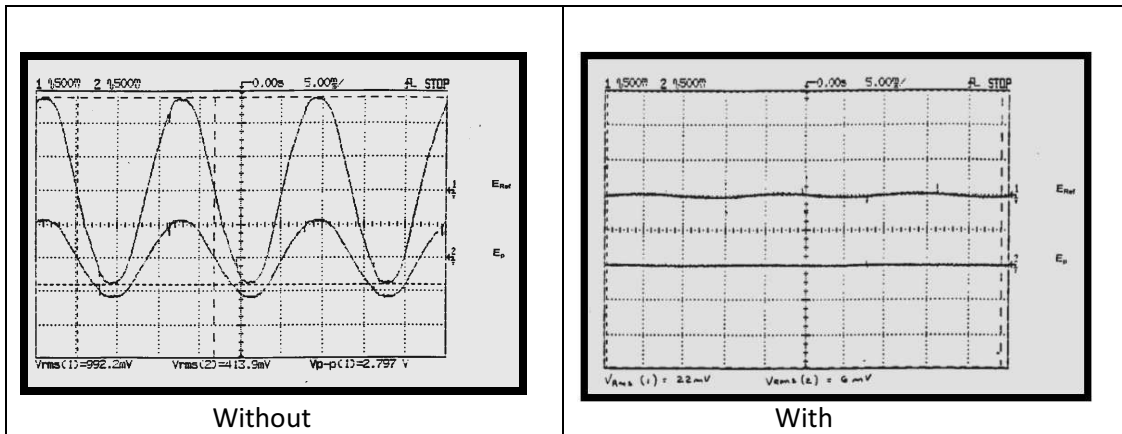


Operating principle

The Agrivolt system controls the flow of current at 60Hz from External and Internal sources in the grounding and bonding network. It does so by injecting a current inverted by 180° opposed to the current flowing on the ground. A coupling transformer(1) is installed between the distribution network neutral(N) and the ground(G) of the livestock facility. The following figure shows the location of the Main Bonding Jumper.

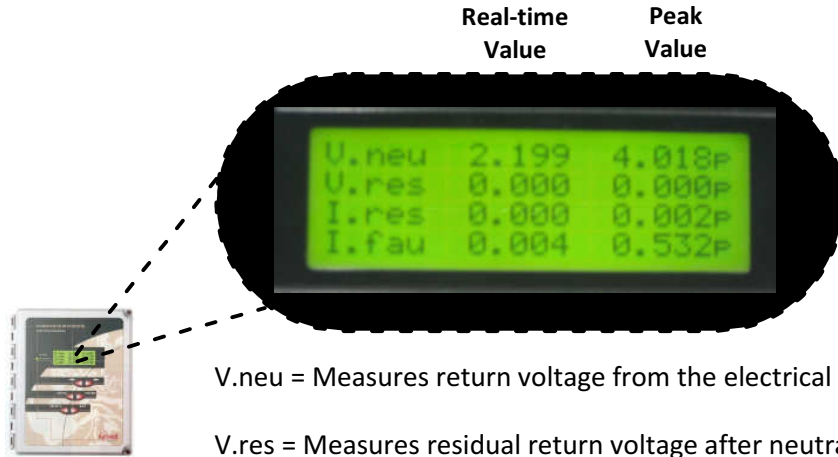


Motor start-up: On a daily basis, in a livestock facility there is a few hundred motor start-ups. At start-up there is a sudden rise of the current that flows on the grounding and bonding network. The Agrivolt System reduces the impact of motor start-ups to a level that will not impact the animal.



The Agrivolt system as a Managing System

A display is integrated in the Monitoring Unit of the Agrivolt System. It constantly provides you voltage and current readings related to the return current from External and Internal sources. You have access to real-time and peak measurement.



V.neu = Measures return voltage from the electrical network

V.res = Measures residual return voltage after neutralization

I.res = Quantity of return current remaining after neutralization

I.fau = Quantity of current originating from electrical equipment defect

Audible and visual alarms will get your attention in the event that an anomaly occurs on the electrical network. The system will display any alarm state related to a 60Hz ground fault.



Customer Service

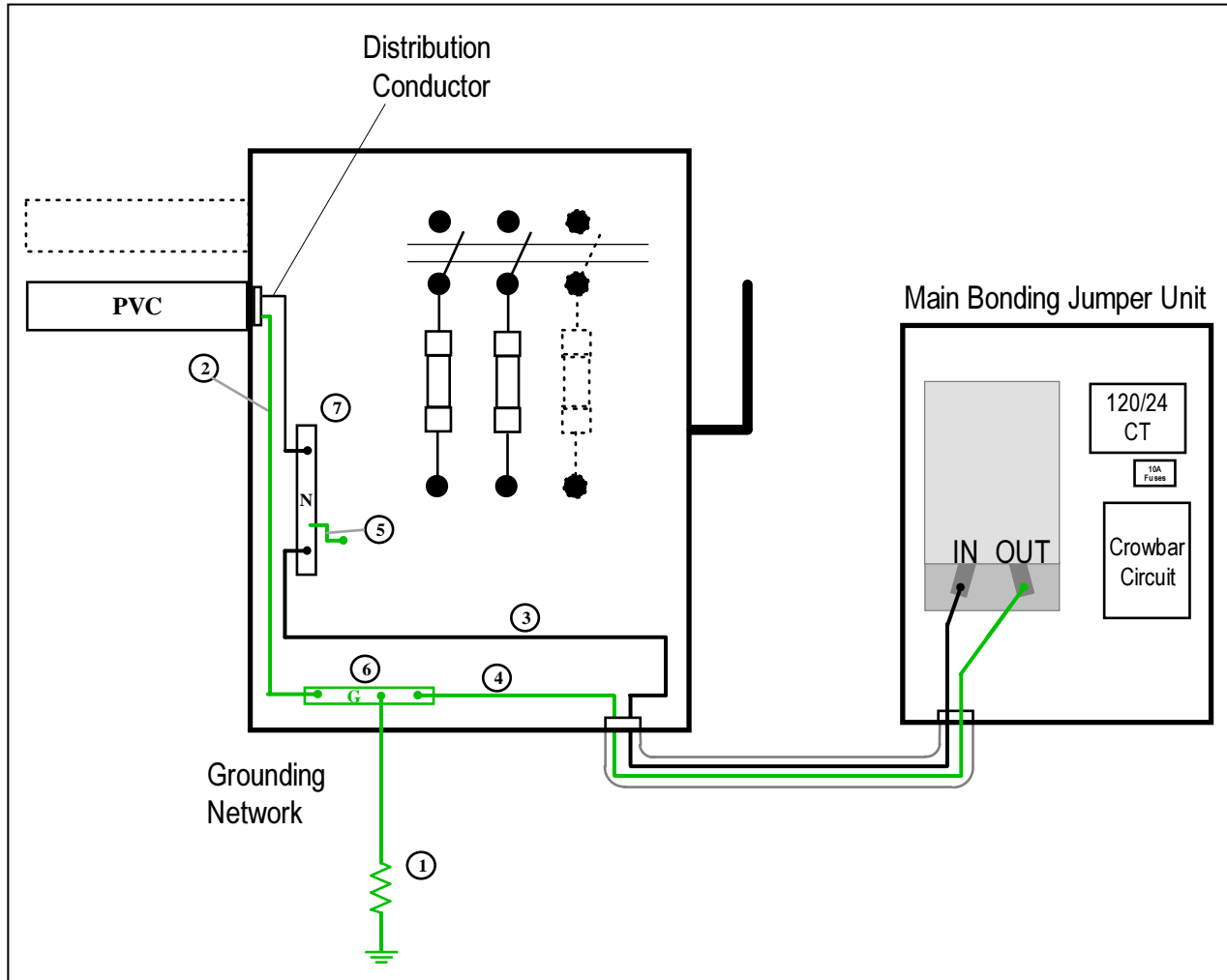
The Agrivolt system comes with a modem integrated and when hooked up to a phone line, allows for a remote transfer of the readings of your display and the stored alarms. For example the data can be transfer to a technical team. The complexity of an electrical network often requires that professionals analyse the situation prior to fixing it. Agrivolt has a technical team that offer remote support to the owner or his electrician in managing and fixing the electrical network. Annual fees for this service are affordable.



The Agrivolt System does not require any particular maintenance. In the event of a fault over 30V, the Main Bonding Jumper bypasses itself. It is essential in such a situation to prevent any important rise of voltage and ensure the operation of protective devices. The system will reset itself when the fault is resolved.

Connection

The Main Bonding Jumper Unit is installed at the main distribution between the neutral (N) and the grounding (G) on the livestock facility. The following figure shows the location of the Main Bonding Jumper.



- 1 Ground rod hooked up to the terminal strip (G).
- 2 Bonding for metallic structures.
- 3 Link between the N terminal strip and the input of the Main Bonding Jumper.
- 4 Link between the G terminal strip and the output of the Main Bonding Jumper.
- 5 Remove the existing bonding jumper (at start-up of the Agrivolt system)
- 6 Grounding and bonding terminal strip.
- 7 Isolated neutral terminal strip.

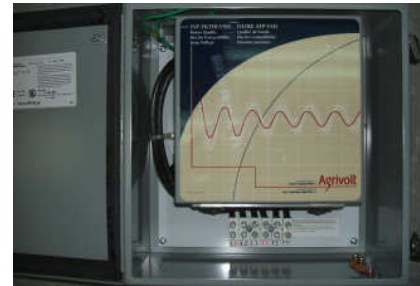
Note : Connection schematic may vary according to the type of electrical network.

Agrivolt Filter

Nuvolt Corporation has designed for its subsidiary Agrivolt a wide range of Filters for electronic noise to be used in livestock facilities. Agrivolt Filters prevent any excessive current flow at medium frequencies on the grounding and bonding network. These currents are produced by various noise generators such as **Variable Speed Drives, electronic ventilation, electronic lighting ballasts, and electrical fences**, among others. These equipments are often used in livestock facilities. From an electrical point of view, the problem is that a portion of the leakage current is in the animal environment by flowing on the grounding and bonding network.

By design, the medium frequency generators must be controlled at the source. The Agrivolt Filters, as well as EMI Filters, protect the motor and eliminate electromagnetic incompatibility issues between equipment. **However, the Agrivolt Filter prevents that an excessive amount of current at medium frequency flows on the grounding and bonding network and affect the herd performance.**

Agrivolt Filter



Electric Fence Agrivolt Filter



*No certification

Electrified controller
Agrivolt Filter



*No certification

Agrivolt Filter selection table

Variable Speed Drives (1Ø & 3Ø)

F11B3Q-AM
600VMax 3 Phases 11Amps

F22B3Q-AM
600VMax 3 Phases 22 Amps

F32B3Q-AM
600VMax 3 Phases 32 Amps

F52B3Q-AM
600VMax 3 Phases 52 Amps

F68B3Q-AM
600VMax 3 Phases 68 Amps

F80B3Q-AM
600VMax 3 Phases 80 Amps

F110B3Q-AM
600VMax 3 Phases 110 Amps

F136B3Q-AM
600VMax 3 Phases 136 Amps

Applications:

Well Pumps
Vacuum Pumps
Milk Pumps
etc.

Installation - Single and Three Phase

Installation recommendations:

- Distinct Circuit per VSD
- PVC Conduit and THHN Wire (or equivalent)
- Do not use any shielded, teck or extension cord type wiring
- Remove any EMI type Filters (internal or External)
- Reduce the Carrier Frequency
- Install the Agrivolt Filter between the VSD and the Motor
- Locate the VSD as close to the motor as possible
- See full specification sheet for more details

Ventilation

F11B1Q-AM
600VMax 1 Phase 11Amps

F22B1Q-AM
600VMax 1 Phase 22Amps

F11B3Q-AM
600VMax 3 Phases 11Amps

F22B3Q-AM
600VMax 3 Phases 22Amps

Applications:

Large Electronic Fans
Tunnel Fans
Variable Speed Thermostats
etc.

Installation (Thermostat) - Single Phase

Installation (VSD) - Single and Three Phase

Installation recommendations (Thermostat):

- Install the Agrivolt Filter between the Breaker and the Thermostat
- Multiple Thermostats may be controlled with one Agrivolt Filter as long as it is not overloaded
- See full specification sheet for more details

Installation recommendations (VSD):

- Distinct Circuit per VSD
- PVC Conduit and THHN Wire (or equivalent)
- Do not use any shielded, teck or extension cord type wiring
- Remove any EMI type Filters (internal or External)
- Reduce the Carrier Frequency
- Install the Agrivolt Filter between the VSD and the Motor
- Locate the VSD as close to the motor as possible
- See full specification sheet for more details

Lights

F22B1Q-AM
600VMax 2 wires 22Amps

F22B3Q-AM
600VMax 3 wires 22Amps

F22B4Q-AM
600VMax 4 wires 22Amps

Applications:

Compact Lighting
Electronic Ballasts
Dimmers
etc.

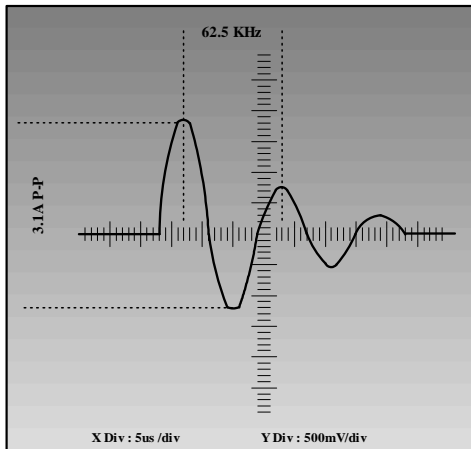
Installation (Electronic Lighting)

Installation recommendations:

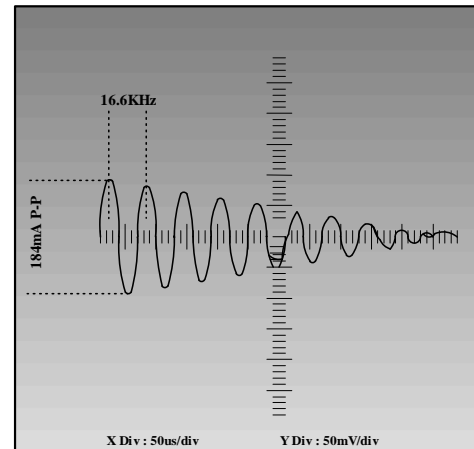
- Install the Agrivolt Filter between the Breaker and the light fixtures
- Multiple light fixtures may be controlled with one Agrivolt Filter as long as it is not overloaded
- Remove any EMI type Filters
- Keep wiring of the lighting away from RF ID antennas and data cables.
- See full specification sheet for more details

Principle of operation

Agrivolt Filter, by design, modifies the characteristics of the impulse produced by noise generator because of its high impedance at medium frequency in differential and common mode and not having any bond with the grounding network. By avoiding redirecting this capacitive leak to the grounding and bonding networks, contrary to an EMI Filter, the Agrivolt Filter protects the animal and the equipment in livestock facilities. Moreover, it prevents the problems of electromagnetic incompatibility between various equipment components.



Before Agrivolt Filter



After Agrivolt Filter

Residual value

It is completely impossible to reduce the amount of electronic noise to zero in the animal environment with Agrivolt Filters. AGRIVOLT considers that a 200 mA current at 1KHz frequency or above, measured at the noise generating equipment, is a safe threshold. This threshold is based on the IEC standard 1479-2.

Electric Fence

FF3A00 120VMax 3Amps

Installation

insulated wire at the voltage of the electrified controller

insulated wire isolated according to the voltage of the controller

3 feet minimum

The first ground rod must be at 150 feet minimum from fence control and from any grounding network

3 ground rods in a straight line with there length used as spacing (Clayey Soil if possible)

Insulator

Holding post

Farm
120 Volts OUTLET (Ground Continuity must be valid)
SVF Filter 3A 120V
Fence

Installation recommendations:

- Insulators must be in good shape
- The fence must always be 3 feet away from any building
- The fence should not be touching the earth
- Do not use trees or anything else than the posts to hold the fence wire

Shocker

10-600 5000VMax

Installation

The Shocker Neutralizer is developed to minimize the leakage current generated by a fence controller used with a cow trainer, an electrified gate or from a shocker on a feeder. It reduces the detrimental impact on the herd's performance.

1. Operation Method

The primary function of the Shocker Neutralizer is to remove the electrified controller from the circuit to which it is connected. When a cow comes in contact with the trainer, the gate or the feeder cart the Shocker Neutralizer put back the controller in the circuit.

The electric impulse of the controller is then applied for 10 seconds each time a cow complete the circuit. By limiting the impulse for 10 seconds we minimise the stress impact to the animal.

2. Operation Compliance

We have integrated LED indicators to the Shocker Neutralizer to check the operation compliance.

- Green LED: (flash) Unit is ON.
- Yellow LED: - An electrical pulse has been generated;
- A cow is actually touching the electrified circuit.
- Red LED: There is a fault in the electrified circuit.

3. Connection Diagram

A - Electric fence controller
B - Electrical outlet
C - Voltage reducer (<5000V)
D - Shocker Neutralizer
E - 5000V rated wire
F - Ground rod
G - Wire hangers
H - Bare electrified conductor
I - Trainers hangers
J - Floor

4. Installation Instructions

When installing the Shocker Neutralizer a few basic check-ups are required:

- The electrified wire (H) should be mounted on an isolator (G);
- Recommended voltage is 2 500V;
- Maximum voltage is 5 000V;
- The installation procedure of the fence controller, the cow trainer and the shocker on a feeder should be in compliance with the manufacturer's installation specifications.

5 000V Maximum

Make sure that there is a voltage reducer in place. A Shocker Neutralizer Filter cannot be used when the voltage is over 5 000V.

Installation Check-up

To get the maximum from a Shocker Neutralizer Filter, check the following:

- The insulation rating of the electrical wires (E) should be over 5 000V.
- The lowest possible impedance of the grounding electrodes is required, ± 10 ohms.
- Comply with the connection polarity.

On a livestock facility, **Monitoring** the electrical network is a must. It is a really harsh environment for the equipment due to the high levels of ammonia and humidity. The multiplication of production equipment to improve productivity will increase the chance of equipment failure and therefore justifies the importance of preventive maintenance to control operation cost. Furthermore, a portion of the leakage current generated by faulty equipment, or by an improper installation, circulates on the grounding and bonding network therefore goes directly to the animal.

Relax System

RELAX is an electrical network Monitoring System designed for livestock facilities. It detects ground fault at 60Hz on the electrical network of the livestock building at the circuit breaker.

Relax detects the 60Hz ground fault at an early stage and alert you. Indeed, its display notifies you with an audible and visual signal. It will indicate you the faulty equipment, its breaker, the level of current and the time and date the fault occurs.

User Friendly equipment

The Relax System measures an unbalanced load at the circuit breaker and sends the reading to the Monitoring Unit thru a communication network. This communication network can be hardwired or wireless. As soon as the unbalanced level (ground fault) reaches an intervention threshold, the system displays the fault thru visual and audible alarm.

One of the major qualities of the Relax is that you do not have to entirely rewire your electrical network because it will let you know where the fault is. Moreover, you are not left alone with your electrical problem. A modem is integrated to the Relax, and when hooked up on a phone line, allow for the transfer of alarms to a technical support network which can help you prepare an action plan to fix that fault.

Monitoring Unit

The Monitoring Unit is the brain of the Relax System. It is the unit that displays the electrical network anomaly. Audible and visual alarms are integrated. It's log allows you to keep track of the last 80 alarms states. It is also the unit that will transfer the alarms where you want.

Relax Monitoring Unit



Fault Detector 08/16/24/32

The Fault Detector is the unit to which the CTs are hooked up and allows to measure with high precision, the leakage current, at each breaker. The Fault Detector unit is available in four configurations, 08, 16, 24 or 32 circuits. It can measure 8, 16, 24 or 32 circuit breakers according to the size of your breaker panels.

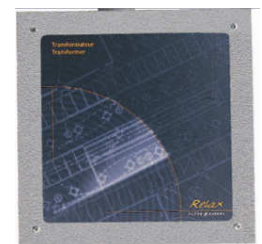
Fault Detector 08/16/24/32



Power Supply

Relax operates on 24VAC. The use of a power supply is needed to lower the voltage to 24VAC.

Power Supply Unit



Current Transformer (CT)

The CTs are current transformer that when hooked up on the Fault Detector unit allows measuring the leakage current. CTs are available in 3 models.

Current Transformer

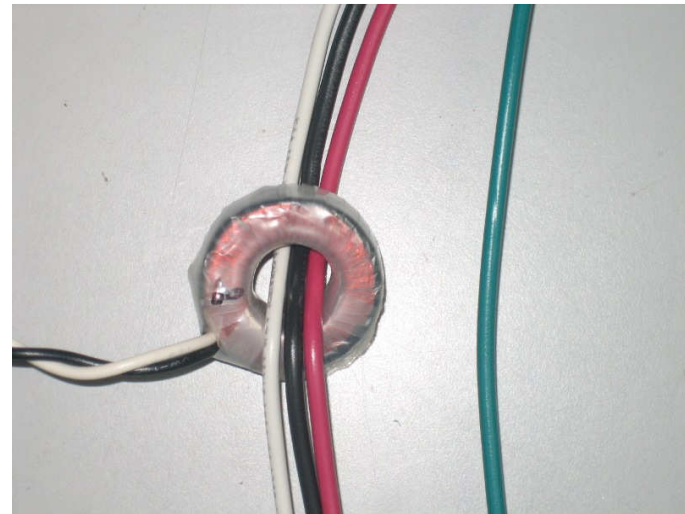


Installation



The Monitoring Unit has to be located at sight. The CTs are installed at the breaker, inside the panel or in a trough. The System is fed 24VAC, requiring only 16 gauge AWG, which limit the installation costs. The communication network can be hardwired or wireless.

When installing the CTs make sure that all the conductors for that circuit, except the ground, goes through it. The CT is to be chosen according to the size of the conductor to be monitored. It is very important that the circuit be well identified at the installation to ensure a proper identification of the fault.



Fast pay-back

The Relax System gives you a return on investment within months. First by preventing a decrease in livestock performance caused by an electrical failure, secondly by protecting your equipment from costly breakdown since you can intervene at an early stage of a defect. Finally, it is a management tool that helps in the planning of your preventive maintenance and decreases the production downtime and very expensive emergency repairs. Moreover it reduces the chances of fire caused by leakage current which according to insurers are responsible for about 50% of livestock facility fires. The Relax System has the recognition from the majority of insurers.

AGRIVOLT TECHNICAL SERVICE

Warranty



WARRANTY

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WARRANTIES OF NUVOLT CORPORATION INC.

- 1 Nuvolt Corporation Inc. guarantees that all of its products are free from defects in material and workmanship for a period of one (1) year from the date of original purchase.
 - 2 If a product proves to be defective within this period, Nuvolt Corporation Inc. shall replace the same by an identical or equivalent product. In this event, the substituted product will remain under warranty for the remainder of the one year period running from the date of original purchase. In order for this warranty to be enforceable, Nuvolt Corporation Inc. must receive written notice within five (5) working days following the first appearance of the defect .
 - 3 Save and except Nuvolt Corporation Inc.'s obligation to replace any defective product under the terms set forth in section 2 other warranty express or implied applies to Nuvolt Corporation Inc.'s products. Nuvolt Corporation Inc. shall not be liable for damages of any nature, direct or indirect suffered by the customer or third parties, resulting from any defects or its products or parts of such product or any other cause.
 - 4 This warranty shall not apply to any Nuvolt Corporation Inc.'s product improperly installed or subjected to misuse, abuse, neglect or anything other than normal and ordinary use. Shall be deemed improperly installed any Nuvolt Corporation Inc. product which is not installed in strict compliance with Nuvolt Corporation Inc.'s instructions.
- The terms of this warranty shall be governed and construed in accordance with the laws of the Province of Québec, Canada.

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