

# Mains Supply Guard

## User Manual



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**Jansen Medicars**

Postbus 49  
3600 AA Maarssen  
Netherlands

Tel. +31 30 2613500  
Fax. +31 30 2616714  
URL [www.medicars.com](http://www.medicars.com)

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# 1 Introduction

The Mains Supply Guard is a monitoring system for mobile medical isolation transformers. These transformers are mainly used for medical carts with multiple medical devices. The Mains Supply Guard (MSG) monitors two important aspects:

1. Temperature of the transformer. If it is too high, the transformer is overloaded and this will be signaled (only when connected to a temperature sensor in the transformer).
2. Impedance between the output of the transformer and the earth (leakage current). An alarm is triggered when it exceeds the limit.

## 1.1 Structure

This manual describes how the MSG (Mains Supply Guard) is used, connected to the transformer, and how it has to be maintained. Read this manual carefully before installing the MSG and take into use.

Jansen Medicars can not be held responsible for damage caused by improper use / act or by negligent maintenance.

## 1.2 Classificatie







The MSG meets the standards of the EN60601-1 and the Medical Devices Directive 93/42/EEC - Medical Devices Directive (MDD).

## 2 Control

The control panel of the MSG is shown below.



	Green LED indicator	Lights when the system is switched on
	Orange LED indicator	Lights in case of temperature alarm
	Red LED indicator	Lights in case of an insulation alarm
	Push button	Switching off the acoustic alarm

### 2.1 Activation the system


The MSG has no on/off switch and is always enabled when the medical isolation transformer is in operation. Once the device is activated, the green LED lights up.

Immediately after power-on, the orange and red LED will shortly light up, indicating that the monitoring has started up correctly. Check this every time the power is turned on.



**If these LEDs do not light at startup, the MSG defective.**


## 2.2 Detection of transformer overload

The MSG monitors the temperature switch inside the medical isolation transformer. If the temperature is too high, this indicates an overload of the transformer. In this case the MSG gives a temperature alarm: the orange LED lights up and an acoustic alarm sounds. The acoustic alarm can be turned off by pressing the  push button on the control panel. The orange LED will be switched on as long as the alarm is active.



**How to act in case of a temperature alarm depends on the guidelines in your organization. Make sure you are aware of these guidelines.**

## 2.3 Detection of insulation faults

In addition to the overload also the insulation between the power supply of the medical equipment and the earth is measured. For a medical isolation transformer a maximum leakage current of 5mA is applicable. When this current exceeds the 5mA, a potentially dangerous situation may arise due to an electric shock hazard. In this case the MSG gives an insulation alarm: the red LED lights up and a acoustical alarm is given. The acoustical alarm can be turned off by pressing the  button on the control panel. The red LED will light up as long as the alarm is active.



**What to do in case of an insulation alarm depends on the guidelines in your organization. Make sure you are aware of these guidelines.**

## 2.4 Passing through an alarm

If the medical room is equipped with a earth leakage monitoring system, such as installed in an operating room, there is the possibility to forward the alarm of the MSG. At the rear side of the MSG an output is located (Alarm Out). See illustration below.



When alarm forwarding is desired, it should be between this output and the monitoring system of the room.

## 3 Installation

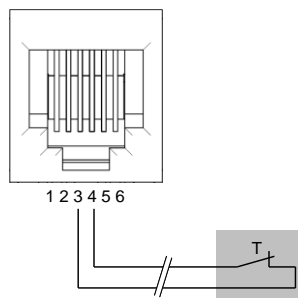
The MSG is connected to the 230 VAC from the secondary side of a medical isolation transformer. Through this connection, the device is powered. This connection is also used to measure the insulation value of the net on the secondary side of the transformer.

In medical areas Ground potential equalization is often prescribed. At the rear side of the MSG an equipotential bonding point is located, which is also the central earthing point of the device.

At the rear there are two RJ11 sockets. These 6-pole connectors are for connecting the temperature sensor in the transformer and the connection to forward an alarm.

### 3.1 Connecting the temperature sensor

The temperature sensor in the medical isolation transformer is a thermal switch, with a normally closed contact. This temperature switch is connected to terminals 3 and 4. See the image below.



Once the temperature is too high, the contact will be broken and the MSG gives a temperature alarm. If there is no temperature alarm is required, or if



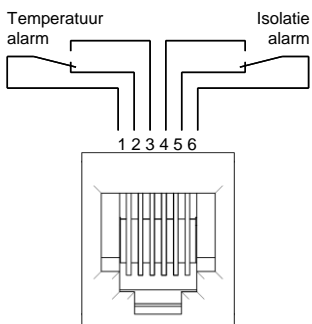
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the transformation is not equipped with a temperature sensor, contacts 3 and 4 of this input should be connected to each other.

### 3.2 Connecting the alarm output

The alarm outputs are galvanically separated contacts (relay). Both the temperature and isolation alarm are available on this output. For both alarms a NO or NC contact can be used. See the image below for connection details.



All contacts are rated at 1.5 A at a maximum voltage of 48VDC.

### 3.3 Test modus

If during power-on of the MSG the push button **X** is pressed, a test mode starts. The table below shows the different stages of the test cycle.

Activate button <b>X</b>	Action/status
1 <sup>st</sup> time (during power up)	Start test modus <ol style="list-style-type: none"> <li>1. Red and orange LED light up shortly</li> <li>2. A short beep sound</li> <li>3. The orange LED blinks and the temperature alarm output is activated..</li> </ol>
2 <sup>nd</sup> time	<ol style="list-style-type: none"> <li>4. The orange LED swiches off and temperature alarm output is deactivated.</li> <li>5. The red LED blinks and the isolation alarm output is activated.</li> </ol>
3 <sup>rd</sup> timer	<ol style="list-style-type: none"> <li>6. The automatic reboot function is tested. (watchdog timer). After a few seconds the MSG will automatically restart. If the push button is not operated during the start of the MSG, it starts the normal monitoring operation. The test cycle is entered again when the push button is pressed during the restart of the system.</li> </ol>

## 4 Maintenance & Inspection

### Proceed as follows for cleaning the MSG:

1. Turn off the power by unplugging the power cord from the wall outlet. This will prevent you from getting an electric shock.
2. Cleaning is only allowed with a damp cloth with mild (household) cleaning solution.
3. Never use strong solvents such as alcohol, thinner and salt for cleaning the device.

### Check the operation of the device:

1. Check at every power-on of the MSG the LED indicators on the front side. The red and orange LED should light up shortly at power on and the green indicator should light on when the system is switched on.
2. Check every six months the insulation and temperature alarm.
  - a. The temperature alarm can be checked by unplugging the thermal switch at the rear side of the MSG.
  - b. The isolation-should alarm can be checked using a tester. This tester applies a  $33\text{k}\Omega$  impedance between the earth lead (or equipotential bonding point) and the secondary winding of the transformer (one of the contacts of the power source). As a result the earth leakage current will be more than 5mA, which will activate the isolation alarm.