

## Diodes Failure Detector

## Installation and maintenance

# Diodes Failure Detector

## TABLES OF CONTENT

1. INTRODUCTION
  - 1.1 GENERALITIES
  - 1.2 SPECIFICATIONS
2. OPERATING PRINCIPLE
3. INSTALLATION
  - 3.1 FITTING
  - 3.2 INTERCONNECTIONS
4. STARTING
  - 4.1 TESTING THE DETECTOR USING PUSH BUTTON S01 :
  - 4.2 TESTING THE DETECTOR BY DISCONNECTING ONE OF THE RETATING DIODES :
5. WIRING DIAGRAM
6. MAIN DIMENSIONS

### WARNING

**TO PREVENT PERSONAL INJURY OR EQUIPMENT DAMAGE,  
ONLY QUALIFIED TECHNICIANS / OPERATORS SHOULD  
INSTALL AND OPERATE THE MATERIAL.**

### CAUTION

**MEGGERS AND HIGH POTENTIAL TEST EQUIPMENT MUST  
NOT BE USED.  
INCORRECT USE OF SUCH EQUIPMENT COULD DAMAGE THE  
SEMICONDUCTORS CONTAINED IN THE DETECTOR.**

### NOTE

**THE WITING DIGARAM IS PROVIDED FOR INFORMATION  
ONLY. FOR FINAL CONNECTION, PLEASE REFER TO THE  
SCHEMATICS PROVIDED WITH THE ALTERNATOR.**

# Diodes Failure Detector

## 1. INTRODUCTION

### 1.1 GENERALITIES

The diode failure detector is an electronic unit designed to detect the failure of a shaft mounted diode in the brush-less generator. It ensures that the consequences of a failure are minimized and possible damage to the machine is prevented.

The detector consists of transistors, transformers, silicon diodes, resistors and capacitors. The detector is relatively unaffected by temperature, humidity, vibration and shock.

#### Failure Detector References

Current Range	Input voltage	
	100V / 290V	220V / 400V
0,5A / 6A	C5 197 0402	C5 197 0400
5A / 10A	C5 197 0404	C5 197 0403
10A / 15A	C5 197 0405	C5 197 0406

### 1.2 SPECIFICATIONS

Supply input : Un +/- 15% 50Hz or 60Hz isolated by internal transformer.

Input power :	<10VA
Sensing :	serie with exciter
Diode failure output :	contact NO & NC 250V 4A
Dissipating power :	< 20W
Exciter frequency :	100 to 150Hz
Operating temperature :	-20 to +60°C
Storage temperature :	-30 to +80°C

#### Overall dimensions :

height :	70mm
width :	160mm
length :	220mm
weight :	1,25 kg

# Diodes Failure Detector

## 2. OPERATING PRINCIPLE

When one or several rotating diodes become faulty, two cases are possible:

- Open diode :

In this case the field current increases a little but the machine can continue to run quite normally. On this type of failure, the generator is not at any immediate risk so operation during limited time is still possible.

- Short-circuit Diode :

In this case it is a much more severe fault condition which requires a very large increase in exciter's field current to maintain the alternator voltage.

The exciter and/or the voltage regulator could be damaged if this condition persists so the detector's output would be used to trip and shut down the system.

Unfortunately this case of failure is the most frequently observed.

The two cases of fault will be seen by the detector and the output contacts will be activated.

### CAUTION

**THE OUTPUT CONTACTS OF THE DETECTOR ARE ACTIVATED ON THE SAME ANNER BY AN OPEN DIODE OR SHORTED DIODE FAULT.**

## 3. INSTALLATION

### 3.1 FITTING

The detector will operate when mounted in any position, however be sure that air can circulate freely around it. The detector can be mounted in any location where the ambient temperature does not exceed its ambient operational limits.

### 3.2 INTERCONNECTIONS

#### **Supply input : 1, 2, 3**

0-100V (0402, 0404, 0405) or 0-220V (0400, 0403, 0406) between 1, 2  
0-290V (0402, 0404) or 0-400V (0400, 0403) between, 1,3

#### **Failure output contact NO : 4, 5**

this contact is closed after a fixed delay of some seconds when a failure of one or several diodes occurs. Its maximum capacity is : 4Amp with 250VAC or 2Amp with 50VCC.

# Diodes Failure Detector

**Failure output contact NC : 6, 7**

this contact is open after a fixed delay of some seconds when a failure of one or several diodes occurs. Its maximum capacity is : 4Amp en 250VAC or 2Amp en 50VCC.

**Sensing input : 8, 9**

Must be connected in serie with the + exciter. Check in case of booster configuration that all the field current is seen by the detector.

Range 0,5 to 6 Amp : C5 197 0400 & C5 197 0402

Range 5 to 10 Amp : C5 197 0403 & C5 197 0404

Range 10 to 15 Amp : C5 197 0406 & C5 197 0405

## **4. STARTING**

Connect the detectors as indicated in the following diagram.

### **4.1 TESTING THE DETECTOR USING PUSH BUTTON S01 :**

Push the button S01. The L01 light should come on and a few seconds afterwards, the detector relay comes into effect, resulting in either a warning or trip and shutdown.

**NOTE :**

**As the detector is powered by the alternator, the fault output is not maintained after voltage shutdown nor alternator is stopped**

**The detector must be out of service during start-up and shutdown phases.**

### **4.2 TESTING THE DETECTOR BY DISCONNECTING ONE OF THE ROTATING DIODES :**

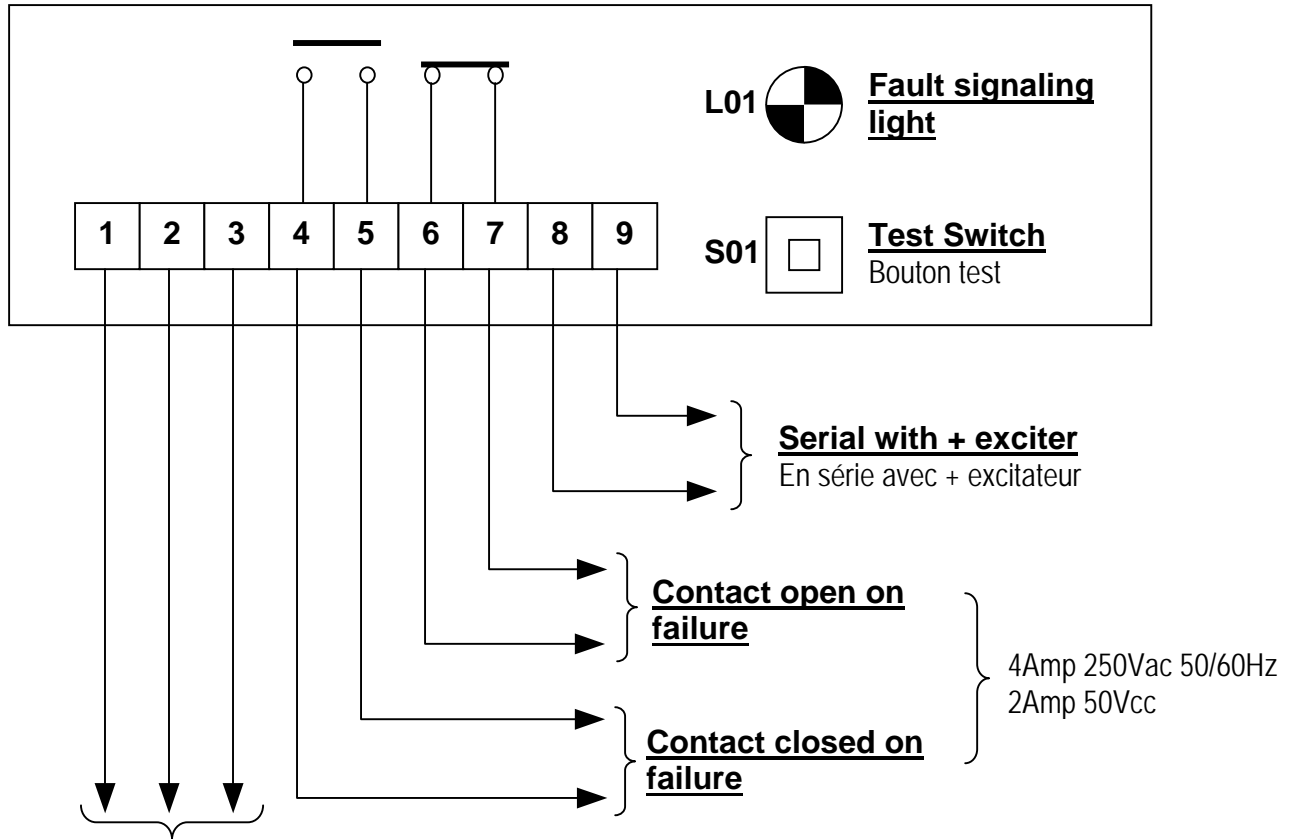
Disconnect the end of one of the rotating diodes and fix it mechanically onto another part of the bridge, so that its anode and cathode are at the same potential.

Disconnect the detector outputs 4, 5, 6, 7 in order to avoid shutdown. Run the generator at its nominal speed and voltage but with no load.

Adjust P1 just up until L01 lights up. The detector is operational.

# Diodes Failure Detector

## 5. WIRING DIAGRAM



References	Terminal	50Hz	60Hz
C5 197 0400	1 --- 2	220V	254V
C5 197 0403	1 --- 3	400V	440V
C5 197 0406			
C5 197 0402	1 --- 2	100V	120V
C5 197 0404	1 --- 3	290V	348V
C5 197 0405			

# Diodes Failure Detector

## 6. MAIN DIMENSIONS

