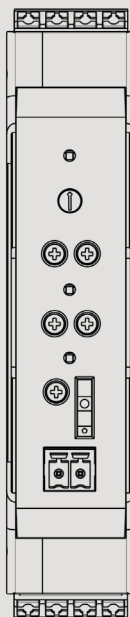
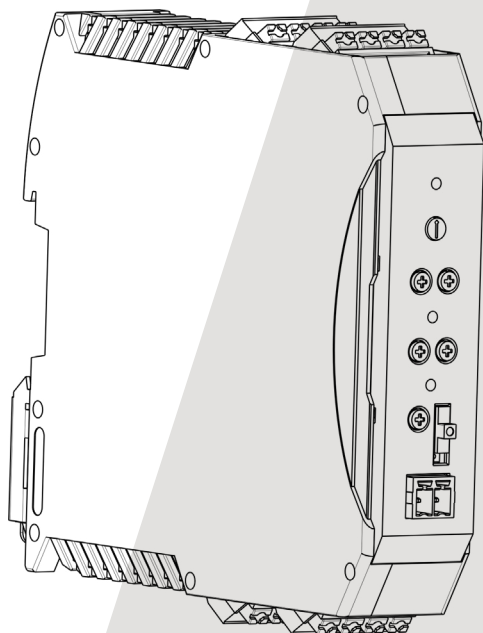




Power



LEROY-SOMER™

EMR

Excitation Monitoring Relay

Installation and maintenance

This manual concerns the EMR which you have just purchased.
We wish to draw your attention to the contents of this maintenance manual.

SAFETY MEASURES

Before using your EMR for the first time, it is important to read the whole of this installation and maintenance manual.
All necessary operations and interventions on this machine must be performed by a qualified technician.
For field applications relative to for instance nonlinear loads, transformers magnetizations or huge load impacts and load shedding, it is highly recommended to contact our technical support service in order to fine tune the factory settings of the voltage regulator. Our technical support service will be pleased to provide any additional information you may require.
The various operations described in this manual are accompanied by recommendations or symbols to alert the user to potential risks of accidents. It is vital that you understand and take notice of the following warning symbols.



Warning symbol for an operation capable of damaging or destroying the machine or surrounding equipment.



Warning symbol for general danger to personnel.



Warning symbol for electrical danger to personnel.



All such operations performed on the EMR should be undertaken by personnel trained in the commissioning, servicing and maintenance of electrical and mechanical components.

WARNING

The EMR can be incorporated in a EC-marked machine.

© 2026 Moteurs Leroy-Somer SAS
Share Capital: 32,239,235 €, RCS Angoulême 338 567 258.
We reserve the right to modify the characteristics of this product at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.
This document may not be reproduced in any form without prior authorization.
All brands and models have been registered and patents applied for.

CONTENTS

0 - TERMS AND DEFINITIONS	4
1 - GENERAL INSTRUCTIONS	5
1.1. - Product Identification	5
1.2. - General Description	5
1.3. - Technical Specifications	6
1.4. - General Safety Devices and Instructions	7
1.5. - General Information	8
1.6. - Intended Use	8
1.7. - Transportation and Storage	9
1.8. - Installation	9
1.9. - Electrical Connections	9
1.10. - Operation	9
1.11. - Servicing and Maintenance	9
2 - MOUNTING AND CONNECTION INSTRUCTIONS	10
2.1. - Module Installation Clearances	10
2.2. - Installation Warning Symbols	10
2.3. - Connections	11
2.4. - Wiring Precautions	14
3 - OPERATION DESCRIPTION	15
3.1. - Measurement Range	15
3.2. - Underexcitation	16
3.3. - Overexcitation	16
3.4. - Simulation	16
4 - SETTINGS	17
4.1. - Before Start-Up	17
4.2. - Adjustment Steps	17

5 - MAINTENANCE INSTRUCTIONS.....	18
5.1. - Maintenance Warning Symbols.....	18
5.2. - Instructions de maintenance préventive	18
5.3. - Faults and Troubleshooting	18
6 - RECYCLING INSTRUCTIONS	19

0 - TERMS AND DEFINITIONS

- IF : Excitation current
- IF RANGE : Excitation Current Range
- IF MIN : Minimum Excitation Current
- IF MAX : Maximum Excitation Current
- IF SIMULATOR : Excitation Current Simulator

1 - GENERAL INSTRUCTIONS

1.1. - Product Identification

This Excitation Monitoring Relay has been designed and manufactured by:
MOTEURS - LEROY-SOMER
Boulevard Marcelin LEROY
16000 ANGOULÊME
France
LEROY-SOMER Internal Reference:
40083965

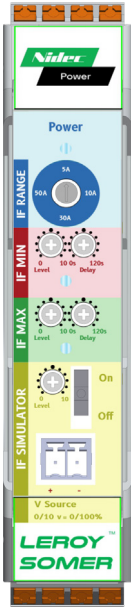
1.2. - General Description

This manual describes the installation, operation, adjustment, and maintenance instructions for the excitation current monitoring module. The purpose of this module is to indicate whether the excitation current is above or below a preset threshold. Underexcitation and overexcitation conditions are signaled by two time-delayed relay outputs. The module is supplied as a compact unit featuring front-mounted connectors, potentiometers, and LEDs, and is designed for mounting on a 35 mm DIN rail.

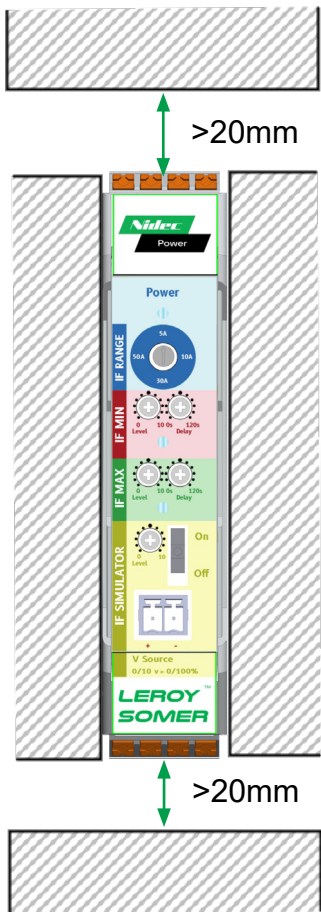
The module must be connected in series within the excitation circuit.

The module consists of several functional sections:

- A 4-position switch for selecting the excitation current range,
- A switch for enabling the excitation current simulator used for setting adjustments,
- A potentiometer for simulating the excitation current level,
- A simulated excitation current monitoring output,
- A set of potentiometers for adjusting current thresholds and time delays,
- A set of LEDs indicating the operating status of the module,
- A set of connectors.



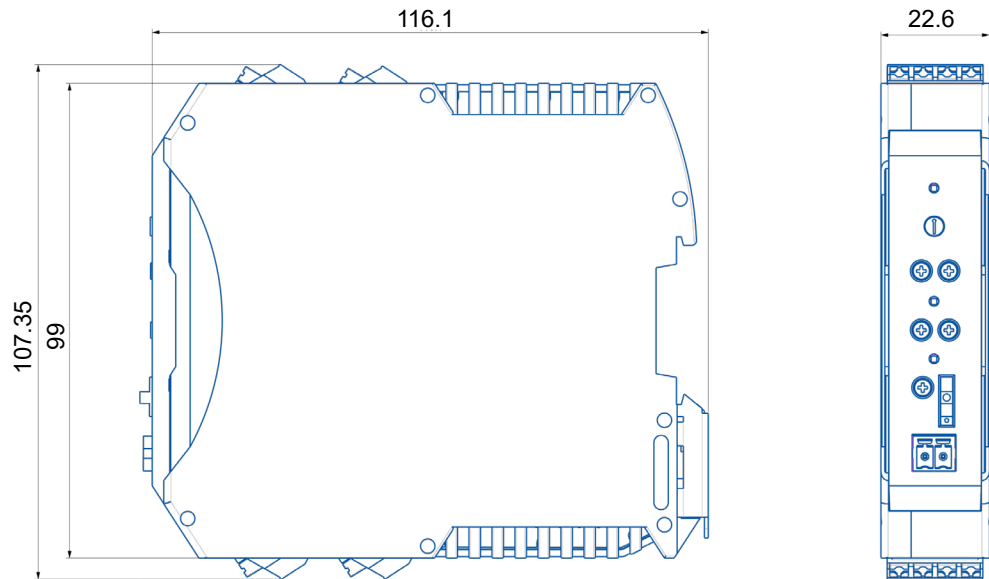
This module is designed for vertical mounting on a 35 mm DIN rail inside a terminal box or an electrical control and power cabinet. The installation enclosure must provide, as a minimum, the protection and safety requirements applicable at the installation site. The module is cooled by natural air circulation and must therefore be installed in accordance with the mounting position and clearances specified below:



1.3. - Technical Specifications

- **Excitation current ranges:**
 - 0 - 5A
 - 0 - 10A
 - 0 - 30A
 - 0 - 50A
- **Minimum and maximum excitation current threshold range:** 0% - 100% of the selected range
- **The delay range:** 0 - 120s
- **Simulator current level range:** 0% - 100% of the selected range
- **Simulator output:** 0V at 0% - 10VDC at 100%
- **Maximum relay contact voltage and current:** 250VAC - 6A (maximum switching capacity: 1500VA max)
- **Power supply:** 24VDC (18V min to 35V max), protected against reverse polarity
- **Power consumption:** <2VA
- **Environment:** installed in a control cabinet or in the alternator terminal box
 - Operating conditions: ambient temperature between -40°C and +65°C, with relative humidity below 93%, non-condensing.
 - Storage conditions: ambient temperature between -55°C and +85°C, with relative humidity below 95%, non-condensing.
- **Weight:** 150g

• Dimensions (mm)



This module must be mechanically mounted on a 35 mm DIN rail inside a terminal box or control cabinet.

1.4. - General Safety Devices and Instructions

It is essential to comply with the power wiring diagrams provided in this manual. The excitation current monitoring module includes current inputs capable of carrying currents up to 50 A. The relay outputs may be used to initiate alternator de-excitation in the event of an underexcitation or overexcitation condition.

The excitation current monitoring module is equipment intended for incorporation into an electrical installation or machine and

must under no circumstances be considered a safety device. It is therefore the responsibility of the machine manufacturer, installation designer, or user to take all necessary measures to comply with applicable standards and to provide the devices required to ensure the safety of persons and property (particularly against direct contact with the connectors while the regulator is operating).

Failure to comply with these requirements shall release MOTEURS LEROY-SOMER from any liability whatsoever.

Nidec Power	Installation and maintenance	6782 en - 2026.07 / a
EMR Excitation Monitoring Relay		

The various operations described in this manual are accompanied by recommendations or symbols intended to make the user aware of potential hazards. It is essential that all safety instructions be fully understood and observed.

This symbol indicates warnings in the manual concerning the consequences of improper use of the excitation current monitoring module, electrical hazards that may result in personal injury or property damage, and fire hazards.



This symbol indicates a safety instruction warning personnel of an electrical hazard.



1.5. - General Information

During operation, the excitation current monitoring module may contain exposed live parts as well as hot surfaces. Unjustified removal of protective covers, improper use, incorrect installation, or inappropriate operation may result in serious risks to persons and property. For additional information, refer to the documentation.

All work related to transportation, installation, commissioning, and maintenance must be carried out by qualified and authorized personnel (see IEC 364, CENELEC HD 384 or DIN VDE 0100, as well as national installation and accident prevention regulations). For the purposes of these basic safety instructions, qualified personnel are persons who are competent in the installation, assembly, commissioning, and

operation of the product and who possess the appropriate qualifications for their activities.

1.6. - Intended Use

The excitation current monitoring module is a component intended for incorporation into electrical installations or machines. When incorporated into a machine, commissioning is prohibited until the conformity of the machine with the provisions of Directive 2006/42/EC (Machinery Directive) has been verified. Compliance with EN 60204 is required, in particular the provision stating that electrical actuators (including voltage regulators and the module) cannot be considered as switching devices, and even less as isolating devices. Commissioning is permitted only if the requirements of the Electromagnetic Compatibility Directive (EMC 2014/30/EU) are met.

The excitation current monitoring module complies with the requirements of the Low Voltage Directive 2014/35/EU. The harmonized standards of the DIN VDE 0160 series, in conjunction with VDE 0660 Part 500 and EN 60146 / VDE 0558, are applicable.

The technical characteristics and the information relating to the connection conditions specified on the nameplate and in the supplied documentation must be strictly observed.

Nidec Power	Installation and maintenance	6782 en - 2026.07 / a
EMR Excitation Monitoring Relay		

1.7. - Transportation and Storage

The instructions regarding transportation, storage, and proper handling must be observed. The climatic conditions specified in this manual must be respected.

1.8. - Installation

The installation and cooling of the equipment must comply with the instructions provided in the documentation supplied with the product. The excitation current monitoring module must be protected against excessive mechanical stress. In particular, parts must not be deformed and/or the insulation clearances between components must not be altered during transportation and handling. Avoid touching electronic components and contact parts. The excitation current monitoring module contains components that are sensitive to electrostatic discharge and can be easily damaged by improper handling. Electrical components must not be mechanically damaged or destroyed (otherwise, there is a risk of injury and/or electric shock when power is applied). If you have any doubts regarding the product, please contact technical support.

1.9. - Electrical Connections

When work is carried out on the energized excitation current monitoring module, national accident prevention regulations must be observed. The electrical installation must be carried out in accordance with applicable regulations (for example, conductor cross-sections, fuse protection, and protective conductor connection). More detailed information is provided in this manual.

The instructions for an installation compliant with electromagnetic compatibility (EMC) requirements, such as shielding, grounding, the use of filters, and proper routing of cables and conductors, are also provided in this manual. These instructions must be observed in all cases, even when the excitation current monitoring module bears the CE marking. Compliance with the EMC limits imposed by applicable legislation remains the responsibility of the manufacturer of the installation or machine.

1.10. - Operation

Installations incorporating excitation current monitoring modules must be equipped with the additional protection and monitoring devices required by the applicable safety regulations, such as technical equipment legislation, accident prevention regulations, and other relevant standards. During operation, all doors and protective covers must remain closed.

1.11. - Servicing and Maintenance

The manufacturer's documentation must be taken into consideration. Our technical support department is available to provide any information you may require. **This manual must be passed on to the end user.**

2 - MOUNTING AND CONNECTION INSTRUCTIONS

2.1. - Module Installation Clearances

Dimensions: see Section 1.3 Technical Specifications. The product must be installed with sufficient clearance around the air inlet and outlet openings to ensure proper cooling.



When the excitation current monitoring module is installed in a cabinet, it must be positioned so that air can circulate freely through the air inlet and outlet openings. Therefore, the module must be mounted vertically on a DIN rail.

A ventilation, cooling, or heating system must be provided to ensure that the module operates within the environmental limits previously specified.

Note: If you intend to install the module under conditions that do not meet the above requirements, please contact technical support.

2.2. - Installation Warning Symbols

See Section 1.4 General Safety Precautions and Instructions.

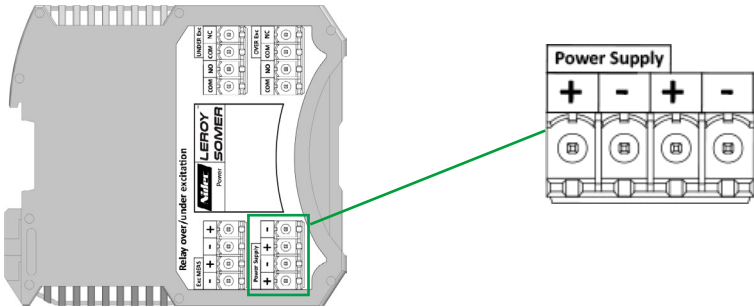


Do not disconnect wires or modify the wiring while the alternator is energized. Failure to follow this instruction may result in electric shock and/or damage to the module and/or the alternator voltage regulator.

2.3. - Connections

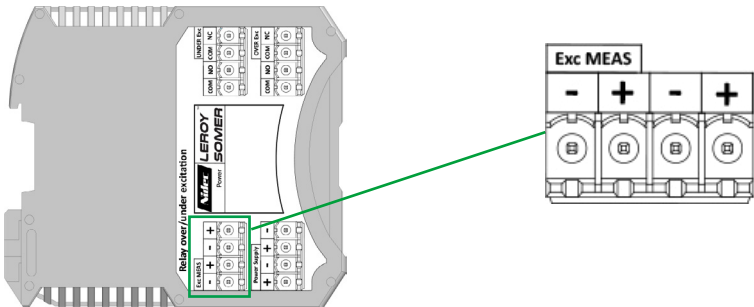
The excitation current monitoring module shall be connected as shown below:

- Power supply:**



This input is used to power the module. The nominal supply voltage is 24 VDC and the power consumption is 2 VA. The module is equipped with two "+" terminals and two "-" terminals connected internally, allowing power to be distributed to another device.

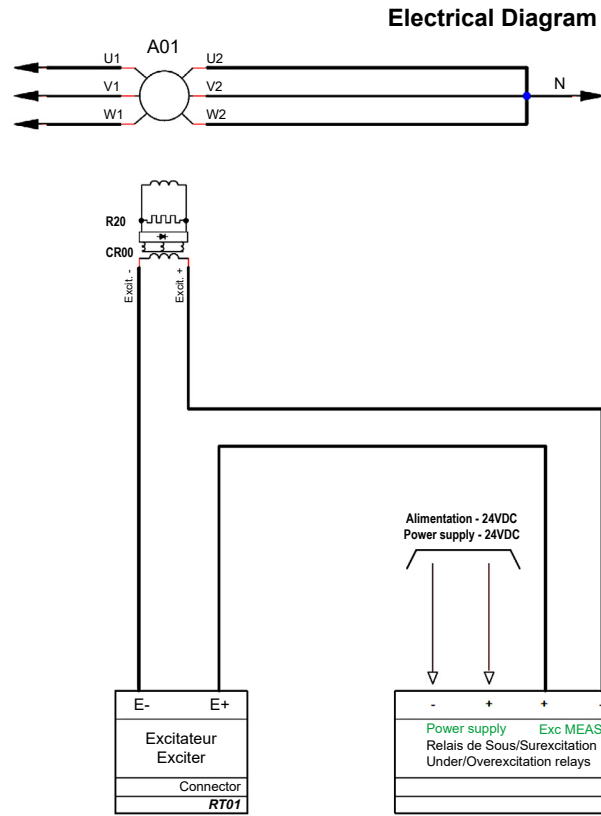
- Excitation Current Measurement:**



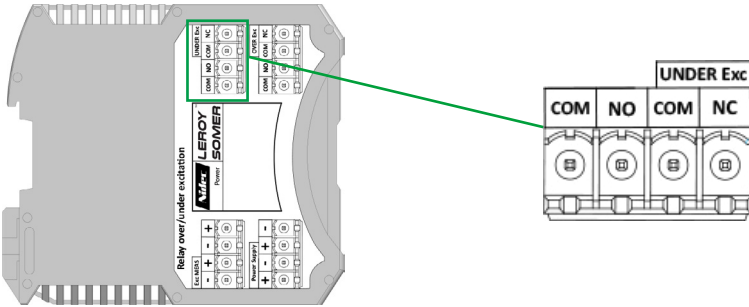
These terminals allow the module to directly measure the excitation current supplied to the alternator. The E+ (or F+) output of the voltage regulator must be connected to the "+" terminal of the module. The "-" terminal of the module must be connected to the "+" terminal of the alternator exciter.

For nominal excitation currents greater than 10 A, parallel connections must be used by linking all "+" terminals together and all "-" terminals together on the module.

Warning: Particular care must be taken when wiring the excitation current measurement circuit. The current flowing in this circuit is the alternator excitation current and may reach high levels.

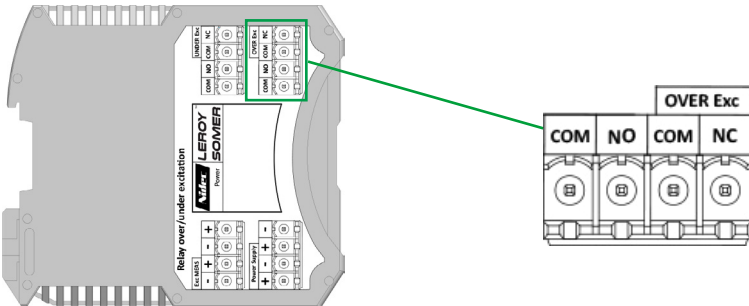


Underexcitation Output:



This relay output consists of volt-free normally open (NO) and normally closed (NC) contacts, with two common terminals. The relay is activated when the excitation current measurement is below the configured threshold for longer than the set delay time.

Overexcitation Output:



This relay output consists of volt-free normally open (NO) and normally closed (NC) contacts, with two common terminals. The relay is activated when the excitation current measurement is above the configured threshold for longer than the set delay time.

2.4. - Wiring Precautions

The maximum conductor cross-section that can be connected to the terminals is 4 mm². In all cases, cable length must not exceed 100 m. To ensure compliance with IEC 61000-6-2, IEC 61000-6-4, and IEC 60255-26 standards, shielded cables are mandatory when the module is installed outside the terminal box.

To ensure that the module measures the excitation current accurately without affecting the excitation circuit, the total cable resistance of the exciter wiring (outgoing and return conductors) must not exceed 5% of the exciter resistance, regardless of cable length. For information, the resistance of copper conductors at 20°C is:

Section (mm²)	Resistance (mΩ/m)
1.5	13.3
2.5	7.98
4	4.95
6	3.3
10	1.91

Example:

- Exciter resistance = 10 ohms,
- Maximum allowable cable resistance = 5% of 10 ohms = 0.5 ohms (2x0.25 ohms)
- Recommended conductor cross-section according to the distance between the regulator and the alternator:

Distance (m)	Section (mm²)
30	2.5
50	4
75	6
100	10

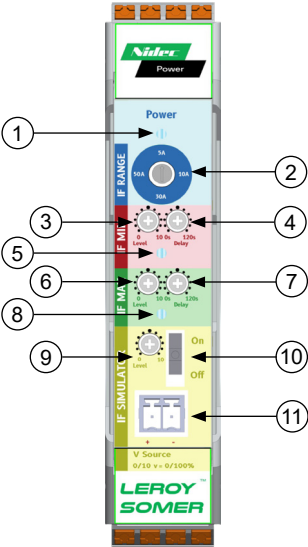


Warning: Particular care must be taken when wiring the module. Conductors used for module wiring must have a minimum cross-section of 1.5 mm² and a maximum cross-section of 4 mm². The use of ferrules is not recommended.

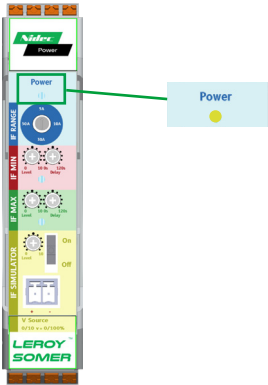
For nominal excitation currents greater than 10 A, the connections must be doubled by installing jumper links between all "+" terminals and all "-" terminals.

3 - OPERATION DESCRIPTION

When the 24 VDC power supply is applied, the EMR module is energized. The green "POWER" LED illuminates.



- 1. "POWER" LED
- 2. "IF Range" Rotary Switch
- 3. "IF Min level" Potentiometer
- 4. "IF Min delay" Potentiometer
- 5. "IF Min" LED
- 6. "IF Max level" Potentiometer
- 7. "IF Max delay" Potentiometer
- 8. "IF Max" LED
- 9. "IF Simulateur Level" Potentiometer
- 10. "IF Simulator ON/OFF" Switch
- 11. "IF Simulator" Voltage Output



The module consists of four sections:

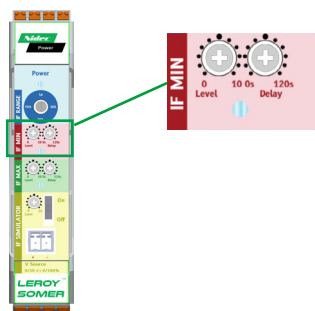
- Measurement Range: "IF RANGE"
- Underexcitation: "IF MIN"
- Overexcitation: "IF MAX"
- Simulation: "IF SIMULATOR"

3.1. Measurement Range

"IF RANGE" section is used to select the appropriate measurement range according to the alternator excitation current. The maximum excitation current (ceiling value) of the alternator must fall within the selected range.

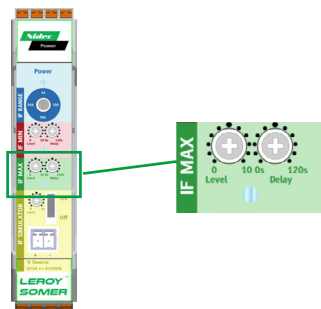
3.2. Underexcitation

The "IF MIN" section allows the minimum excitation current threshold to be set. This section consists of 2 potentiometers and 1 LED. One potentiometer is used to adjust the minimum excitation current threshold at which the relay output is activated. The other is used to adjust the delay between the detection of the minimum excitation current and the activation of the relay. The red LED flashes as soon as the current falls below the preset minimum value and before the delay has elapsed. The red LED remains permanently lit once the delay has elapsed. The underexcitation relay is then activated.



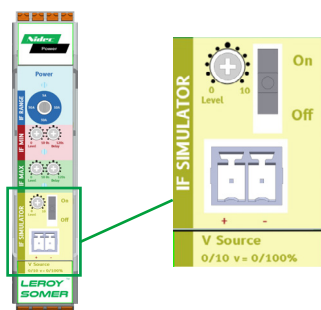
3.3. Overexcitation

The "IF MAX" section allows the maximum excitation current threshold to be set. This section consists of 2 potentiometers and 1 LED. One potentiometer is used to adjust the maximum excitation current threshold at which the relay output is activated. The other is used to adjust the delay between the detection of the maximum excitation current and the activation of the relay. The red LED flashes as soon as the current exceeds the preset maximum value and before the delay has elapsed. The red LED remains permanently lit once the delay has elapsed. The overexcitation relay is then activated.



3.4. Simulation

The "IF SIMULATOR" section allows an excitation current to be simulated for module pre-setting. This section consists of a potentiometer, a switch, and a 0-10 V output with a connector. The switch is used to enable the simulator ("ON" position) or disable it ("OFF" position). The potentiometer is used to adjust the simulated excitation current level. The 0-10 V output allows the current level set by the potentiometer to be measured as a voltage proportional to the adjusted current.



Note: Warning, this module must never be considered as a protective device.

4 - SETTINGS

4.1. Before Start-Up

Before starting the adjustments, the following information must be known:

- The nominal excitation current of the alternator
- The maximum and minimum excitation current values used to set the thresholds
- The time delays for tripping when these thresholds are exceeded

4.2. Adjustment Steps

• **Step 1:** Check the module wiring to ensure that it is correct.

• **Step 2:** Power the module with a 24 VDC supply and verify that the "POWER" LED is illuminated.

• **Step 3:** Select the appropriate range according to the alternator ceiling (short-circuit) excitation current. For example, if the short-circuit excitation current is 17.2 A, select the "30 A" range.

• **Step 4:** "IF MIN" adjustment:

- Set the simulator switch to the "ON" position.
- Turn the potentiometer in the "IF SIMULATOR" section while measuring the 0-10 V output until the desired minimum excitation current value is reached, according to the following rule:

$$V_{\text{simulateur}} = \frac{I_{\text{exc. Min}} * 10 \text{ V}}{I_{\text{F Range}}}$$

For example, if you want to set 0.5 A and the rotary switch is set to the "30 A" range, the simulator output value must be: $0.5 \text{ A} \times 10 \text{ V} / 30 \text{ A} = 0.167 \text{ VDC}$

- Turn the level potentiometer in the "IF MIN" section until the "IF MIN" LED illuminates,
- Turn the delay potentiometer in the "IF MIN" section until the desired delay is reached.

• **Step 5 :** "IF MAX" adjustment:

- Turn the potentiometer in the "IF SIMULATOR" section and, while measuring the voltage output, reach the maximum excitation current value,

$$V_{\text{simulateur}} = \frac{I_{\text{exc. Max}} * 10 \text{ V}}{I_{\text{F Range}}}$$

For example, if you want to set 18 A and the rotary switch is set to the "30 A" range, the simulator output value must be: $18 \text{ A} \times 10 \text{ V} / 30 \text{ A} = 6 \text{ VDC}$.

- Turn the level potentiometer in the "IF MAX" section until the "IF MAX" LED illuminates,
- Turn the delay potentiometer in the "IF MAX" section until the desired delay is reached,
- Disable the simulator using the switch.

• **Step 6 :** Fine-tune the settings during alternator testing.

5 - MAINTENANCE INSTRUCTIONS

5.1. - Maintenance Warning Symbols



See Section 1.4 General Safety Precautions and Instructions. Preventive maintenance of the excitation current monitoring module must be carried out with the alternator stopped and all power sources switched off and isolated.

5.2. - Preventive Maintenance Instructions

During alternator shutdown periods for preventive maintenance, check the tightness of the wires in the connectors and blow dry air to remove any dust that may have accumulated on and around the module.

5.3. Faults and Troubleshooting

Several faults may occur on the module and may require its replacement. The main faults are listed in the table below:

FAULTS	CAUSES	REMEDIES	RESTART
No power supply to the module	Wrong power supply wiring	Check the wiring	Restart the power supply and verify that the "POWER" LED is illuminated
	Faulty internal component	Replace the module	Follow the instructions in Section 2 "Mounting and Connection Instructions" and Section 4 "Settings"
No active relay outputs	Incorrect measurement	Chech the wiring	Restart the power supply and check the alternator voltage
	Incorrect "IF RANGE" selection	Chech the "IF RANGE" setting	Follow the instructions in Section 4 "Settings"
	Incorrect current level adjustment	Chech the module settings	Follow the instructions in Section 4 "Settings"

FAULTS	CAUSES	REMEDIES	RESTART
	Incorrect "Delay" level setting	Check the module settings	Follow the instructions in Section 4 "Settings"
	Relay Fault	Replace the module	Follow the instructions in Section 2 "Mounting and Connection Instructions" and Section 4 "Settings"

6 - RECYCLING INSTRUCTIONS

MOTEURS LEROY-SOMER™ is committed to protecting the environment and strives to minimize the impact of its manufacturing processes and products throughout their life cycle. To achieve this goal, we operate an Environmental Management System (EMS) certified in accordance with the international ISO 14001 standard.

The excitation current monitoring modules manufactured by NIDEC LEROY-SOMER™ contribute to energy savings, as well as to the reduction of raw material consumption and scrap throughout their service life (through improved machine/process efficiency). In typical applications, these positive environmental effects more than compensate for the negative impact associated with product manufacturing and end-of-life disposal. At the end of their service life, products must not be discarded as waste but should be recycled by a specialist in electronic equipment recycling, who can easily dismantle the main components and recycle them efficiently. Many parts are clipped together and can be removed without tools, while others are secured using standard fasteners. Nearly all parts of the product can be recycled.

The packaging is of high quality and can be reused. Large products are packed in wooden crates, while smaller products are packaged in cardboard boxes made largely from recyclable fibers. If not reused, this packaging can be

recycled. Polyethylene, used for the protective plastic film and packaging bags, is also recyclable. When recycling or disposing of a product or its packaging, please comply with local regulations and use the most appropriate disposal and recycling methods.

Nidec Power	Installation and maintenance	6782 en - 2026.07 / a
EMR Excitation Monitoring Relay		

Nidec Power	Installation and maintenance	6782 en - 2026.07 / a
EMR Excitation Monitoring Relay		

Nidec Power	Installation and maintenance	6782 en - 2026.07 / a
EMR Excitation Monitoring Relay		

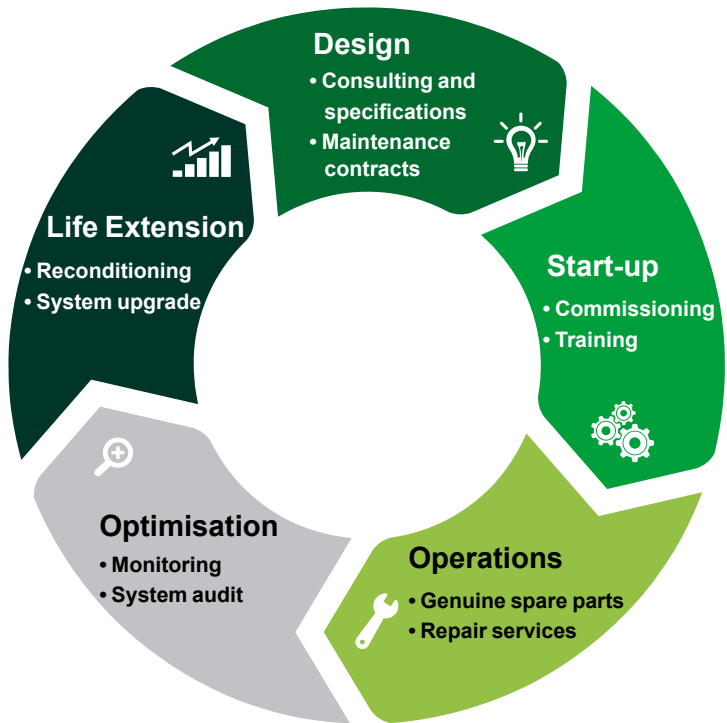
Service & Support

Our worldwide service network of over 80 facilities is at your service. Our local presence is your guarantee for fast and efficient repair, support and maintenance services.

Trust your alternator maintenance and support to electric power generation experts. Our field personnel are 100% qualified and fully trained to operate in all environments and on all machine types.

We have a deep understanding of alternators operations, providing the best value service to optimize your cost of ownership.

How can we help:



Contact us:
Americas: +1 (507) 625 4011
EMEA: +33 238 609 908
Asia Pacific: +65 6250 8488
China: +86 591 8837 3010
India: +91 806 726 4867

✉ service.epg@leroy-somer.com



Scan the code or go to:
www.lrsn.co/support



www.nidecpower.com

Connect with us at:

