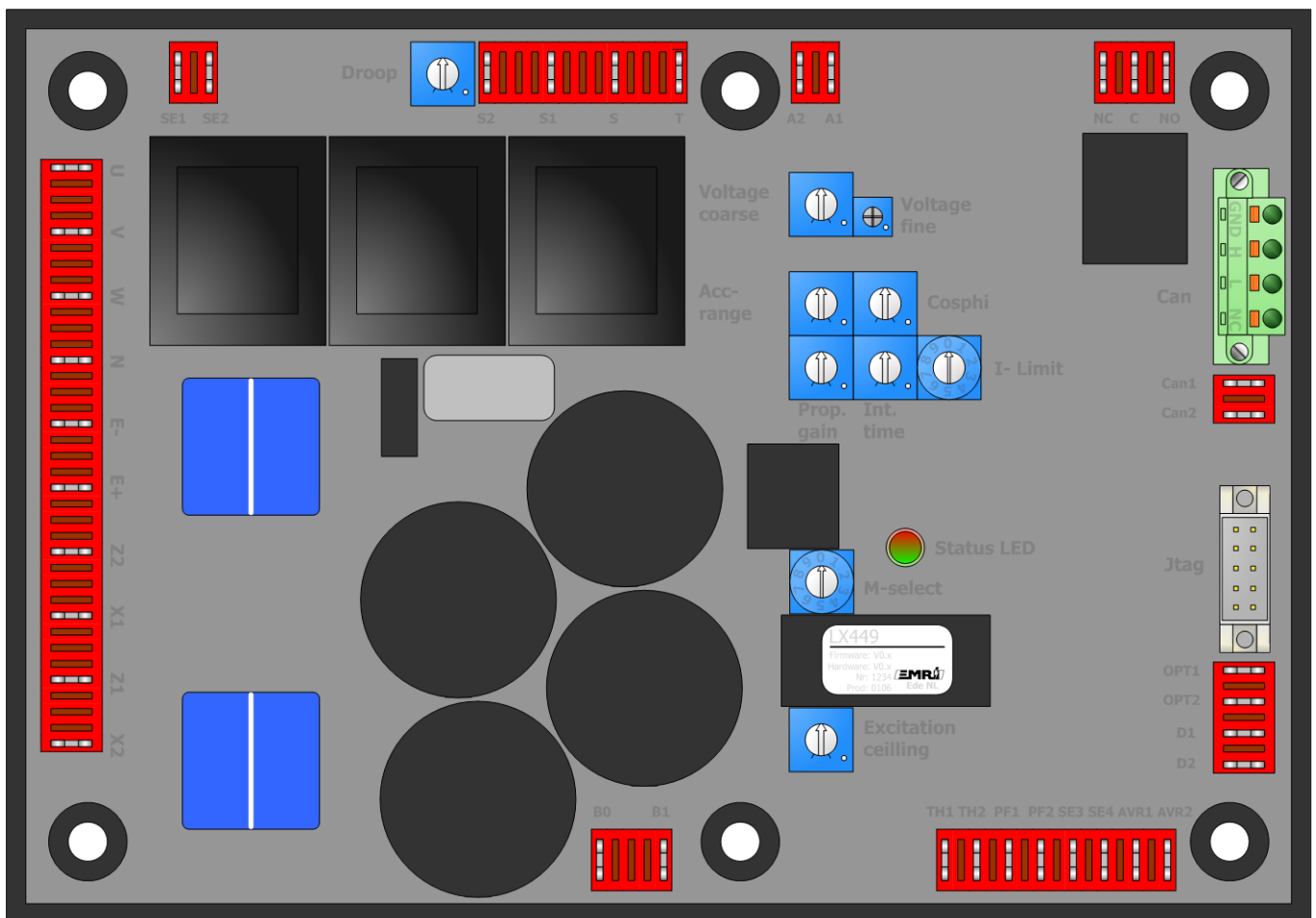


LX449 CAN addendum

Voltage regulator for generators



April 2012

Instruction Manual



WARNINGS



WARNING

The system should not be installed, operated, serviced or modified except by qualified personnel who understand the danger of electric shock hazards and have read and understood the user instructions



WARNING

Never work on a LIVE generator. Unless there is another person present who can switch off the power supply or stop the engine

WARNING

Dangerous voltages are present at the voltage regulator board. Accidental contact with live conductors could result in serious electrical shock or electrocution. Disconnect the power source before making repairs, connecting test instruments, or removing or making connections to the voltage regulator or generator.



**ELECTRICAL HAZARDOUS VOLTAGES
DANGEROUS DO NOT OPERATE WHEN
NOT FAMILIAR WITH GENERATORS**



The manual does not cover all technical details of the product. Specifications may be modified by the manufacturer without notice. For further information, the manufacturer should be contacted.

Table of contents

1. CAN-bus addendum LX449

1.1	CAN-bus	4
1.1.1	Introduction	4
1.1.2	Can connector layout	4
1.1.3	CAN heartbeat	5
1.1.4	CAN AVR measurements & status	5
1.1.5	CAN control	7

Appendix

A.1	Contact	8
------------	----------------	----------

1. CAN-bus addendum LX449

1.1 CAN-bus

1.1.1 Introduction

The LX449 AVR is equipped with a CAN bus interface. The CAN interface enables the user to obtain detailed information about the AVR status, measured quantities and to adjust AVR control setpoints.

The interface complies with CAN specification 2.0B. The AVR communication operates at a transfer rate of 250kBit/s and uses standard frame (11-bit) message identifiers.

1.1.2 CAN connector layout

Terminate header next to the CAN connector. Shorting this header enables an 120Ω termination resistor.

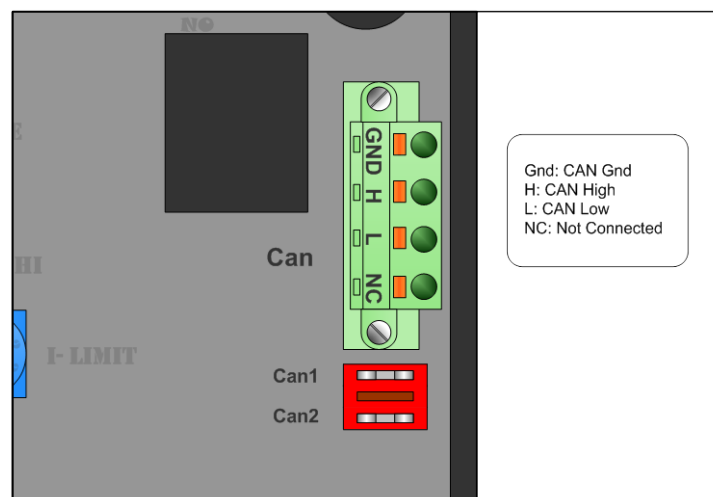


Diagram 1. CAN Connector

1.1.3 CAN heartbeat

The AVR sends a heartbeat signal when the CAN bus interface is enabled and the AVR is powered. This signal may be used to assess the proper functioning of the CAN bus communication.

The heartbeat consists of a message with ID 0x70A and is sent every 250ms. The message content is 1 byte long and alternating 0x05 or 0x85 .

<i>Heartbeat</i>		<i>ID:0x70A</i>	
Byte	Description	Value	Remarks
0	Alternating heartbeat	0x05 ~ 0x85	

Table 1. CAN heartbeat

1.1.4 CAN AVR measurements & status

When the CAN bus is enabled and the AVR is powered a message containing AVR measurements and the present AVR status is sent. The message with ID 0x18A is sent every 500ms. The definition of the 8 byte content is described in table 2 onwards.

<i>AVR measurements & status</i>				<i>ID:0x18A</i>
Byte	Description	Value	Unit	Remarks
0	Data Page	1-2		Indicates Data Page
1 - 7	Dependant on page number (see tables below)			

Table 2. CAN measurements & status

<i>AVR measurements & status – Page 1</i>				<i>ID:0x18A</i>
Byte	Description	Value	Unit	Remarks
0	Data Page	1		Indicates Data Page
1	Generator Voltage MSB	0 - 65535	0.0 V	
2	Generator Voltage LSB			
3	Generator Current Phase U MSB	0 - 65535	0 A	Valid for 1000A:1A CT.
4	Generator Current Phase U LSB			
5	Generator Current Phase W MSB	0 - 65535	0 A	Valid for 1000A:1A CT.
6	Generator Current Phase W LSB			
7	Generator Temperature	0-255	0 °C	KTY 84-130 on terminals TH-TH

Table 3. CAN measurements & status – Page 1

AVR measurements & status – Page 2

ID:0x18A

Byte	Description	Value	Unit	Remarks
0	Data Page	2		Indicates Data Page
1	Excitation Current MSB	0 - 65535	0 mA	Excitation current
2	Excitation Current LSB			
3	Generator Frequency	0-255	0 Hz	
4	Generator Power Factor	0-255	-	0-127 = 0 – 1 capacitive 127-255 = 1 – 0 inductive
5	Protections			Bitwise register
bit 0	Overvoltage	0-1	bit	1 = protection triggered
bit 1	Overcurrent	0-1	bit	1 = protection triggered
bit 2	Overexcitation	0-1	bit	1 = protection triggered
bit 3	Loss of Voltage Sensing	0-1	bit	1 = protection triggered
bit 4	Overtemperature AVR	0-1	bit	1 = protection triggered
bit 5	Overtemperature Generator	0-1	bit	1 = protection triggered
bit 6	Loss of Excitation	0-1	bit	1 = protection triggered
bit 7	Loss of Current Sensing	0-1	bit	1 = protection triggered
6	AVR status			Bitwise register
bit 0	Status LED	0-7		0 = off 1 = green 2 = green blink 3 = orange 4 = orange blink 5 = red 5 = red blink
bit 1				
bit 2				
bit 3	Controlled Quantity	0-7		0 = idle 1 = voltage control 2 = current control 3 = transition U-I 4 = power factor control
bit 4				
bit 5				
bit 6	Mode of Control	0-3		0 = idle 1 = build-up 2 = normal control
bit 7				
7	AVR temperature	0-255	0 °C	

Table 4. CAN measurements & status – Page 2

1.1.5 CAN control

For special applications it is possible remote control the AVR setpoints and limits over the CAN bus referred to as CAN control. This option is not enabled by default and must be factory configured.

To realize CAN control a message with ID 0x40A must be sent at least every 1 seconds complying with the content definition described in table 5.

When CAN control is activated, but the AVR has not received a valid control message for the last 1 seconds, CAN control is automatically disabled and normal AVR control is resumed.

Active CAN control is visualized by the CAN status LED signaling continuous orange.

Be aware that when the user enables CAN control over the voltage and/or excitation setpoints, adjustments to the respective potentiometers on the AVR will have no immediate effect. The adjustments will only then be effective when CAN control is disabled and AVR control is resumed again.

<i>CAN control</i>		<i>ID:0x20A</i>		
Byte	Description	Value	Unit	Remarks
0	Generator voltage setpoint	0-255	V	Phase - Neutral
1	Excitation current ratio setpoint	0-100	%	Overexcitation limit
2	-	-	-	not used
3	-	-	-	not used
4	CAN control			Bitwise CAN commandregister
bit 0	Activate CAN voltage setpoint	1 - 0	bit	1 = active
bit 1	-	0	bit	not used
bit 2	-	0	bit	not used
bit 3	-	0	bit	not used
bit 4	Activate CAN excitation ratio setpoint	1 - 0	bit	1 = active
bit 5	-	0	bit	not used
bit 6	-	0	bit	not used
bit 7	-	0	bit	not used
5	-	-	-	not used
6	-	-	-	not used
7	-	-	-	not used

Table 5. CAN control

A.1 Contact

Manufacturer:

EMRI Electronics B.V.
 Morsestraat 10
 6716 AH, Ede, Netherlands
 Tel: (+31) 0318 620427
 Fax: (+31) 0318 634615
 Website: www.emri.nl
 E-mail: info@emri.nl

<p>Rafeining ehf Hafnarfjordur - Iceland Tel: +354 565 3049 Fax: +354 565 3048 E-mail: rafeining@rafeining.is Internet: www.rafeining.is</p>	<p>Myren & Co. AB Askim - Sweden Tel: +46 317481860 Fax: +46 317481870 E-mail: myren@myren.com Internet: www.myren.com</p>	<p>Marel Serwis Szczecin-Mierzyn - Poland Tel: +48 91 48 58 388 Fax: +48 91 48 79 948 E-mail: handel@marel.szczecin.pl Internet: www.marel.szczecin.pl</p>
<p>Frydenbø Electric A/S Bergen - Norway Tel: + 47 55 34 91 00 Fax: + 47 55 34 91 10 E-mail: firma.fel@frydenboe.no Internet: www.frydenbo.no</p>	<p>KDU Technical Services Sharjah - United Arab Emirates Tel: +971-6-5575480 Fax: +971-6-5575490 E-mail: kdutech@kdutech.ae Internet: www.kdutech.ae</p>	<p>An-Elec Sp. z o.o. Gdynia - Poland Tel: +48 58 668 44 00 Fax: +48 58 668 44 66 E-mail: info@an-elec.pl Internet: http://an-elec.pl</p>
<p>Yneldo Electronics Roodepoort - South Africa Tel: +27(0)117637053 Fax: +27(0)117634212 E-mail: yneldo@yneldo.com Internet: www.yneldo.com</p>	<p>Cyclelect Electrical Engineering Singapore Tel: +65 6868 6013 Fax: +65 6863 6260 E-mail: heng.p@cyclelect.com.sg Internet: www.cyclelect.com.sg</p>	<p>MJR Controls Stockton on Tees - United Kingdom Tel: +44 1642 762 151 Fax: +44 1642 762 502 Email: chris.milner@mjrcontrols.com Internet: www.mjrcontrols.com</p>
<p>Stavros Kassidiaris S.A. Piraeus - Greece Tel: +30 210 4636000 Fax: +30 210 4624471 E-mail: info@kassidiaris.gr Internet: www.kassidiaris.gr</p>		



See our website www.emri.nl for local suppliers