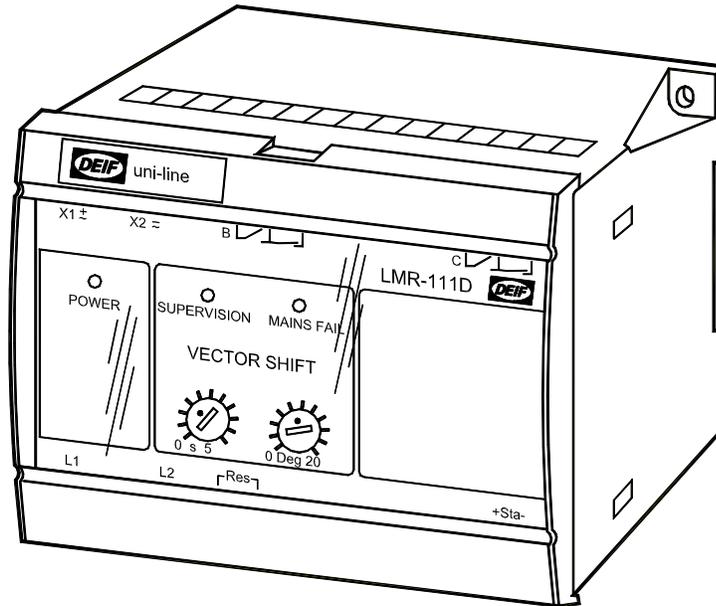


## Loss of mains relay type LMR-111D

uni-line

4189340235C (UK)



- Detection of vector shift
- Generator disconnection on mains failure
- Ensures no asynchronous reconnection
- LED indication of fault condition
- LED indication for activated relay
- 35 mm DIN rail or base mounting



DEIF A/S  
Frisenborgvej 33, DK-7800 Skive  
Denmark

Tel: (+45) 9614 9614  
Fax: (+45) 9614 9615  
E-mail: [deif@deif.com](mailto:deif@deif.com)



## 1. Description

This loss of mains relay type LMR-111D forms part of a complete DEIF series (the *uni-line*) of relays for protection and control of generators.

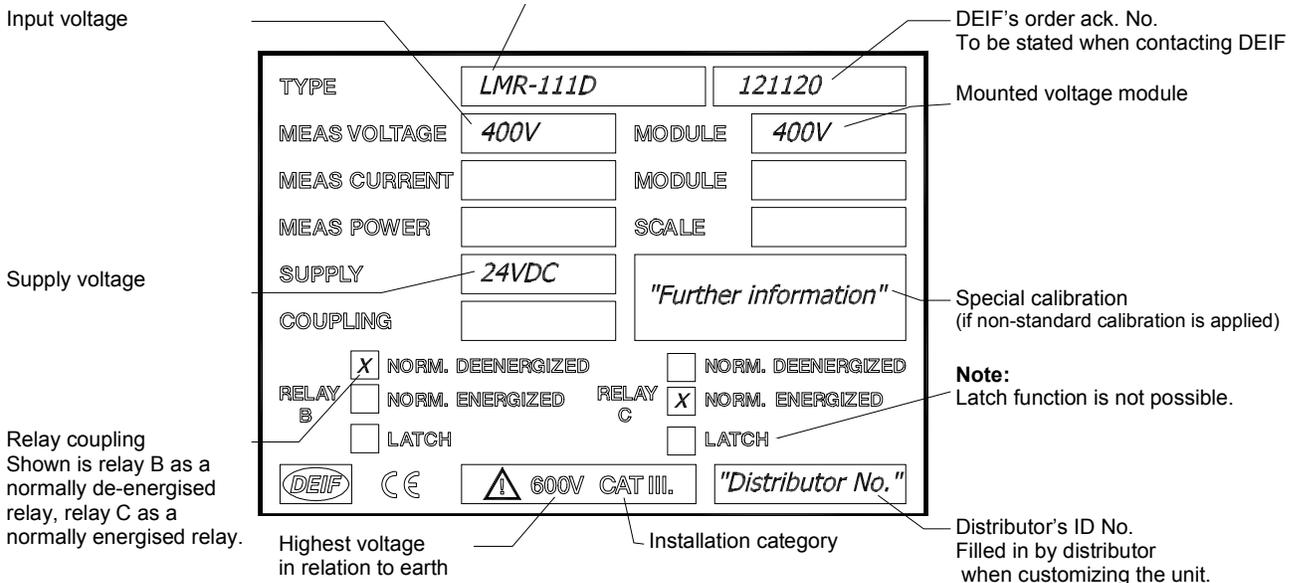
The LMR-111D is applied to protect synchronous generators running in parallel with a high-voltage network (the mains) against damages caused by automatic reconnection to the network.

The LMR-111D will detect a mains failure, provided that a disconnection at an arbitrary point of the network results in a swift change of the generator frequency (vector shift). It should not to be confused with df/dt (ROCOF) relays.

The LMR-111D detects the sudden change of the load angle of the generator, arising the moment the external mains circuit breaker is opened momentarily on mains failure, thus disconnecting the generator. Basically a momentary 5% change of the load results in a 4.5 electr. degr. change of the load angle of the generator. If the "SENS" potentiometer of the LMR-111D is set to 4 electr. degr., the relay will thus open its mains circuit breaker, ensuring that the generator remains disconnected, until the mains has been restored, and the generator has been resynchronised.

## 2. Label

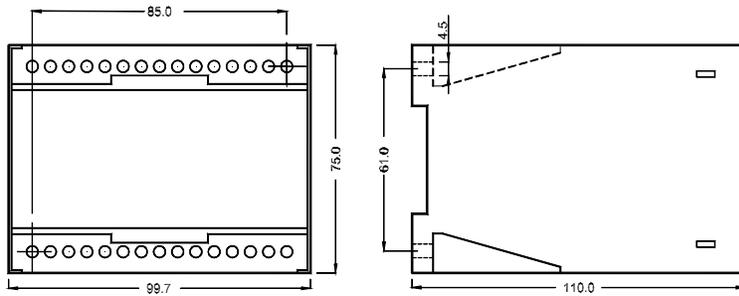
The relay is provided with a label with the following data:



**Note:** The relay is provided with a 200 ms power-up relay, ensuring correct function of the relay on connection of the auxiliary voltage.

Normally energised contacts ("NE") are not activated (contact does not open/close) until 200 ms after connection of the auxiliary voltage.

### 3. Mounting instructions



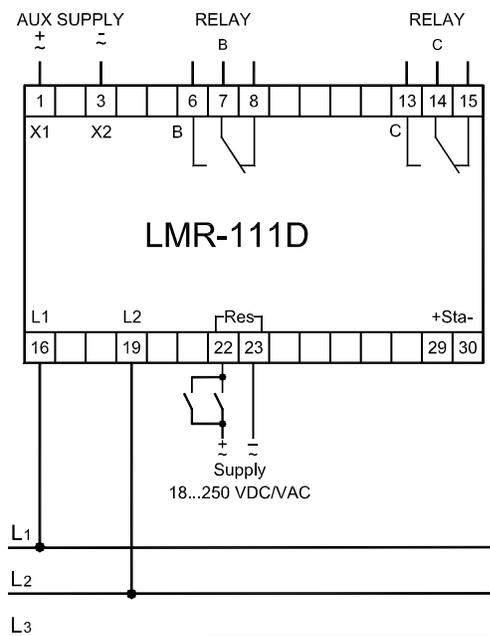
The LMR-111D is designed for panel mounting, being mounted on a 35 mm DIN rail, or by means of two 4-mm screws.

Weight: Approx. 0.650 kg

The design of the relay makes mounting of it close to other *uni-line* units possible, however make sure there are min. 50 mm between the top and bottom of this relay and other relays/units.

The DIN rail must always be placed horizontally when several relays are mounted on the same rail.

### 4. Connection diagram



A 2A fuse may protect all voltage inputs.

The relay is protected against ESD (electrostatic electricity), and further special protection against this during the mounting of the relay is not necessary.

The LMR-111D may be connected between 2 phases or between 1 phase and neutral.

The LMR-111D is to be configured so that the input of the relay corresponds to the connected voltage.

The RESET input marked "RES" is connected to an auxiliary contact, at the generator circuit breaker and at the mains circuit breaker respectively and 18...250VAC/VDC. These contacts should close when their associated circuit breakers open, thus ensuring that the LMR-111D will only be activated when both

circuit breakers are closed, and the generator is running in parallel with the mains.

The 2 relay outputs are activated simultaneously when the set point is exceeded.

The unit is equipped with a self-monitoring function. The self-monitoring function supervises the microprocessor and hereby verifies if the programme is running correctly.

	Power LED	Status output
Supply voltage not connected or not acceptable.	OFF	OFF
Supply voltage is accepted and the unit is running correctly.	Constant green light	ON
Supply voltage is accepted but the unit is running wrongly.	Flashing green light 2-3Hz	OFF



## 5. Start up instructions

### 5.1 Setting and indication

Setting of	LED/relay
<b>Delay (initialising):</b> (0.5...5 s)	Yellow LED "SUPERVISION" is lit after the timer has expired.
<b>Sensitivity ("SENS"):</b> (2...20 electr. degr.)	Red LED "MAINS FAIL" is lit during fault condition.

The delay timer is started, when the contacts connected to the "RES" input open. It is typically set to 1 s, however, a longer delay is selected if unwanted disconnections occur immediately upon synchronisation of the generator to the mains.

During start up, the following setting procedure is recommended:

- a. Generators operating as emergency generators (much of their power is used locally, and simulating change of generator load is possible):
  1. Remove connections to "RES"
  2. Adjust potentiometer mrk. "SENS", so that an opening signal is transmitted to the mains circuit breaker at a load variation of 5...10%.
- b. Generators of a co-generation plant, supplying all their power to the mains (change of generator load is only with difficulty simulated)
  1. Set potentiometer mrk. "SENS" to 5
  2. If necessary, adjust this on the basis of practical experience.

## 6. Technical specifications

Overload, voltages:	1.2 x $U_n$ , continuously 2 x $U_n$ for 10 s
Load:	2k $\Omega$ /V
Frequency range:	40... <u>45</u> ... <u>65</u> ...70Hz
"RESET" inputs:	Input voltage: 18...250V AC/DC for "activated" condition Input impedance: 100k $\Omega$
Relay contacts:	2 change-over switches
Contact ratings:	250V-8A-2000A (AC), 24V-8A-200W (DC)
Contact voltage:	Max. 250V (AC). Max 150V (DC)
Response time:	<30 ms
Galv. separation:	Between inputs and outputs: 3250V-50Hz-1 min.
Consumption:	(Aux. supply) 4VA/3.5W
Status output:	Open: 10...30V DC Closed: max. 5mA