DEIF

-power in control

CE

DATA SHEET

Excitation relays, RMQ-111D, RMQ-121D
ANSI code 40

- Loss of excitation/over-excitation
- Protection of generators
- Single phase measurement
- Timer-controlled tripping
- LED indication of fault/activ. relay

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1. General information

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1. General information

1.1 Application and features

1.1.1 Application

The protective loss of excitation relay type RMQ-111D and the over-excitation relay type RMQ-121D form part of a complete DEIF series of relays for protection and control of generators.

The relays are type-approved by major classification societies and are applicable to both marine and land-based installations.

Loss of excitation relay type RMQ-111D (ANSI code 40)
This relay is applied to protect a generator running in parallel with other generators from running as an induction generator due to under-excitation.

The RMQ-111D will thus protect the generator against damages caused by excessive heating due to slip frequency current flow, at the same time preventing transfer of reactive load from a faulty generator.

The RMQ-111D is especially applied in cases where applying an under-voltage relay for protection does not suffice, because the remaining generators of the system can supply sufficient reactive power to magnetise the faulty generator, thus maintaining the terminal voltage of the generators.

Over-excitation relay type RMQ-121D (ANSI code 40/O)
This relay is applied to protect a generator against over-excitation and will prevent it from generating too high currents in case of heavy inductive loads.

The RMQ-121D will thus protect the generator against damages caused by excessive heating of its windings, at the same time preventing transfer of reactive load to a faulty generator.

1.1.2 Measuring principle

The applied TDM (Time-Division-Multiplication) principle ensures an accurate measurement of the RMS value of the reactive power (U × I × sin-φ), irrespective of wave form. The relays are available with connection 1var3(4), that is 1-element 3-phase 3-wire (4-wire), balanced load.

If the reactive power exceeds the set point, the output is activated. The set point value is set on the front of the relay by means of a potentiometer. If the reactive power exceeds this, a fault signal is generated, and the associated yellow LED is lit.

1.1.3 Timer functions

When the set point is exceeded, the associated timer starts and will run as long as the fault condition prevails. The delay does not depend on the exceeding of the set point.

If the fault disappears, the timer is reset. When the timer expires, the contact is activated and the associated red LED is lit.

1.1.4 Relay outputs

The relays are provided with outputs as follows:

RMQ-111D	-Q>	1 minimum contact
RMQ-121D	Q>	1 maximum contact

These are either normally energised or normally de-energised.

The contact may be set to open or to close on activation.

Normally energised contact
Recommended for land-based installations for warning and alarm purposes.

In case of an auxiliary supply drop-out, the contact is immediately activated.

Normally de-energised contact
Recommended for marine installations for regulating and control purposes.

An auxiliary supply failure will not result in an unwanted activation of the contact.

Latch circuit
The contacts can be locked in their warning position, even if the input returns to normal (add "L" to contact type in order specifications if this is required).

The latch circuit is reset by disconnecting the auxiliary supply.

Hysteresis
In order to avoid "chatter" on the relay contacts the contact functions are provided with a hysteresis, that is a difference of 2 % of full scale between energising and de-energising of the relay.

Power-up/power-down circuits
The relays are provided with a 200 ms power-up circuit, ensuring the correct function of the relay on connection of the auxiliary voltage.

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

Likewise, the relays are provided with a 200 ms power-down circuit, ensuring supervision and maintenance of any set point exceedings for 200 ms after disconnection of the auxiliary voltage.

2. Technical information

2.1 Technical specifications and dimensions

2.1.1 Technical specifications

Meas. range (I_n)	0.3-0.4-0.5-0.6-0.8-1.0-1.3-1.5-2.0-2.5-3.0-4.0-5.0 A AC UL/cUL Listed: 0.4 to 5.0 A AC
Adjusted range	75 to 100 % of I_n (for example 0.4, 0.45, etc.) (lowest meas. range: 0.3 A)
Overload	4 × I_n, continuously, 20 × I_n for 10 s (max. 75 A) 80 × I_n for 1 s (max. 300 A)
Load	Max. 0.5 VA per phase
Meas. voltage (U_n)	57.7-63.5-100-110-127-200-220-230-240-380-400-415-440-450-480-660-690 V AC
Overload	1.2 × U_n, continuously, 2 × U_n for 10 s
Load	2 kΩ/V
Frequency range	40 to 45 to 65 to 70 Hz
Outputs	1 minimum contact
Contact type	Relay B: Normally energised ("NE"), or normally de-energised ("ND") with or without latch circuit ("L")
Relay contact	1 change-over relay
Contact ratings	250 V AC/24 V DC, 8 A (200 x 10^3 change-overs at resistive load) UL/cUL Listed: Resistive load only
Contact voltage	Max. 250 V AC/150 V DC
Hysteresis	2 % of full scale (F.S.)
Response time	<400 ms
Temperature	-25 to 70 °C (-13 to 158 °F) (operating) UL/cUL Listed: Max. surrounding air temp. 60 °C/140 °F
Temperature drift	Set points: Max. ±0.2 % of full scale per 10 °C/50 °F
Galv. separation	Between inputs, outputs and aux. voltage: 3250 V - 50 Hz - 1 min.
Supply voltage (U_n)	57.7-63.5-100-110-127-220-230-240-380-400-415-440-450-480-660-690 V AC ±20 % (max. 3.5 VA) 24-48-110-220 V DC -25/+30 % (max. 2 W) UL/cUL Listed: Only 24 V DC and 110 V AC DC supply must be from a class 2 power source
Climate	HSE, to DIN 40040
EMC	To IEC/EN 61000-6-1/2/3/4
Connections	Max. 4.0 mm^2 (single-stranded) Max. 2.5 mm^2 (multi-stranded)

Materials	All plastic parts are self-extinguishing to UL94 (V1)
Protection	Case: IP40. Terminals: IP20, to IEC 529 and EN 60529
Type approval	The Uni-line components are approved by the major classification societies. For current approvals see www.deif.com or contact DEIF A/S.
UL markings	UL Listed only on request UL Listing will be lost if the product is re-customised outside DEIF DK's production plant Wiring: Use 60/75 °C (140/167 °F) stranded copper conductors only Wire size: AWG 12-16 or equivalent Installation: To be installed in accordance with the NEC (US) or the CEC (Canada)

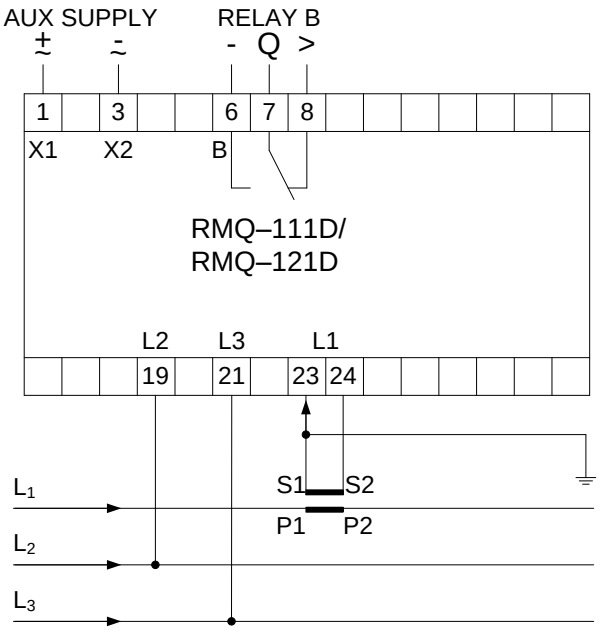
2.1.2 Settings and indication

Setting of	LED	Relay
Reactive power set point: RMQ-111D: (0 to 25 %) of Q_n	"-Q>"	Yellow LED is lit when the reactive power has dropped below the set point, but the relay not yet activated.
Reactive power set point: RMQ-121D: (25 to 125 %) of Q_n	"Q>"	Yellow LED is lit when the reactive power exceeds the set point, but the relay not yet activated.
Time delay: (0 to 20 s) in seconds	"RELAY"	Contact is activated and red LED lit after the timer has expired.

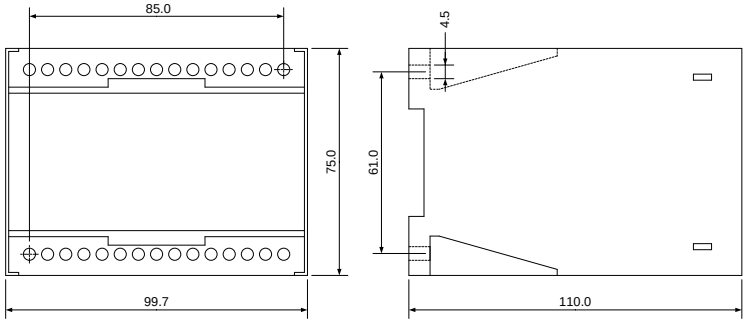
The relay is furthermore equipped with a green LED marked "POWER" for indication of power ON. Once the relay has been mounted and adjusted, the transparent front cover may be sealed to prevent unwanted change of the setting.

2.1.3 Connections/dimensions (in mm)

1var3(4)



Shown contact positions: Aux. voltage not connected



Weight: Approx. 0.650 kg

3. Ordering information

3.1 Order specifications and disclaimer

3.1.1 Available variants

Item no.	Variant no.	Variant description
2913320060	01	RMQ-111D - DC supply
2913320060	02	RMQ-111D - AC supply
2913320520	01	RMQ-121D - DC supply
2913320520	02	RMQ-121D - AC supply

3.1.2 Order specifications

There are no additional options to the standard variant.

Variants

Mandatory information						
Item no.	Type	Variant no.	Measuring power (Q_n)	Measuring voltage	Relay B	Supply voltage

Example:

Mandatory information						
Item no.	Type	Variant no.	Measuring power (Q_n)	Measuring voltage	Relay B	Supply voltage
2913320060-02	RMQ-111D	02	0 to 100 var	110 V AC	NDL	220 V AC
2913320520-01	RMQ-121D	01	0 to 1000 var	660 V AC	NE	24 V DC

Measuring power (Q_n) = Primary power / (CT ratio × VT ratio)

3.1.3 Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.