

# RMC-142D

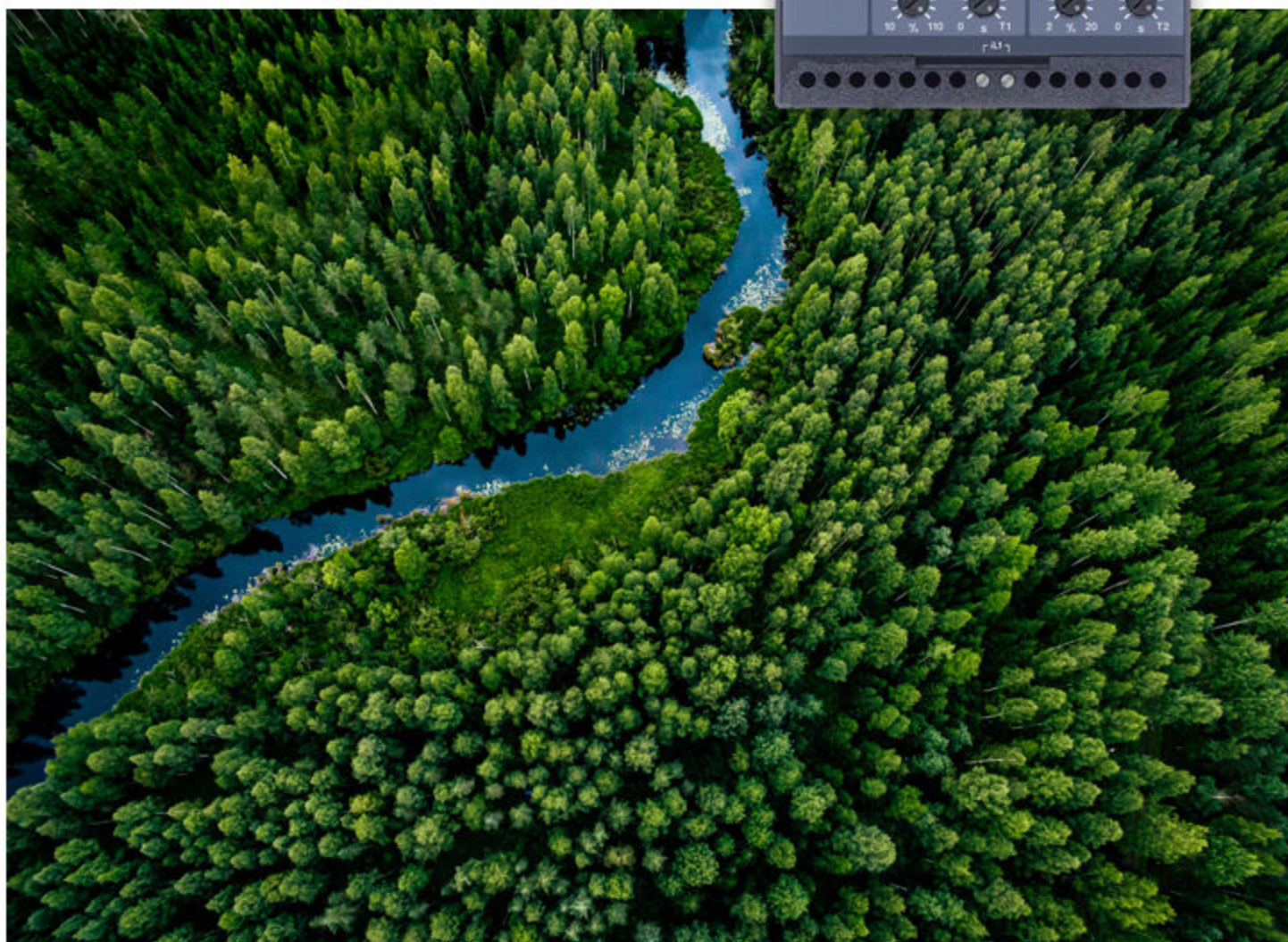
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Stator earth fault relays, ANSI codes 50N/51N, 50G/51G

## Data sheet



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# 1. General information

- Earth fault protection at 2 levels
- Built-in filter for 3rd harmonic
- LED indication of fault condition
- Timer-controlled tripping
- LED indication for activated relay

## 1.1 Application and features

### 1.1.1 Application

The protective stator earth fault relay type RMC-142D forms part of a complete DEIF series of relays for protection and control of generators. The RMC-142D is primarily designed for land-based installations. Also available are short circuit relays (RMC-111D), combined short circuit and over-current relays (RMC-122D) and double over-current relays (RMC-132D).

The RMC-142D is CE-marked and is applied for protection of voltage sources and load networks against earth fault in a solid earthing or a low-resistance earthing system.

### 1.1.2 Measuring principle

The relay measures the leakage or a short circuit from one or more of the phases to earth.

In order to obtain a short response time on a fault condition, the measurement is based on peak values.

The earth fault current protection is for example obtained by connecting an external current transformer in the star point of the protected voltage source.

In order to prevent malfunction due to 3rd harmonic, the RMC-142D is equipped with a special filter cutting off frequencies higher than 50/60 Hz.

The set point values are set on the front of the relay by means of potentiometers. If exceeded, a fault signal is generated, and the associated yellow LED is lit.

### 1.1.3 Timer functions

When the set point is exceeded, its timer starts and will run as long as the fault condition prevails.

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 RMC-142D is provided with two outputs with maximum contacts either normally energised or normally de-energised. The contact may be set to open or close on activation.

#### **Normally energised contact**

Recommended for warning and alarm purposes.

In case of an auxiliary supply dropout, the contact is immediately activated.

#### **Normally de-energised contact**

Recommended for installations for regulating and control purposes.

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

### **Latch circuit**

The contact can be locked in its warning position, even if the earth faulty current (leakage current) 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 delay.

### **Power-up/power-down circuits**

The RMC-142D is provided with a 200 ms power-up circuit, ensuring the correct function of the relay on connection of the auxiliary voltage.



#### **INFO**

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

Likewise, the RMC-142D is 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

|                                          |                                                                                                                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Meas. range (<math>I_n</math>)</b>    | 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<br>UL/cUL Listed: 0.4 to 5.0 A AC                                                                                                                                              |
| <b>Adjusted ranges</b>                   | 75 to 100 % of $I_n$ (for example 0.4, 0.45, etc.)<br>(Lowest meas. range: 0.3 A)                                                                                                                                                       |
| <b>Frequency range</b>                   | 40 to <u>50/60</u> to 70 Hz                                                                                                                                                                                                             |
| <b>Nominal freq.</b>                     | 50 Hz or 60 Hz                                                                                                                                                                                                                          |
| <b>3rd harmonic reject.</b>              | Better than 18 db                                                                                                                                                                                                                       |
| <b>Max. input current</b>                | $4 \times I_n$ , continuously<br>$20 \times I_n$ for 10 s (max. 75 A)<br>$80 \times I_n$ for 1 s (max. 300 A)                                                                                                                           |
| <b>Load</b>                              | Max. 0.3 VA per phase                                                                                                                                                                                                                   |
| <b>Output</b>                            | 2 maximum contacts                                                                                                                                                                                                                      |
| <b>Contact type</b>                      | Relays B + C: Normally energised ("NE"), or normally de-energised ("ND") with or without latch circuit ("L")                                                                                                                            |
| <b>Relay contact</b>                     | 1 change-over switch per relay                                                                                                                                                                                                          |
| <b>Contact ratings</b>                   | 250 V AC/24 V DC, 8 A (200 x 10 <sup>3</sup> change-overs at resistive load)<br>UL/cUL Listed: Resistive load only                                                                                                                      |
| <b>Contact voltage</b>                   | Max. 250 V AC/150 V DC                                                                                                                                                                                                                  |
| <b>Hysteresis</b>                        | Minimum set point: >2 %<br>Medium set point: >6 %<br>Maximum set point: >18 %                                                                                                                                                           |
| <b>Response time</b>                     | <50 ms                                                                                                                                                                                                                                  |
| <b>Temperature</b>                       | -25 to 70 °C (-13 to 158 °F) (operating)<br>UL/cUL Listed: Max. surrounding air temp. 60 °C/140 °F                                                                                                                                      |
| <b>Temperature drift</b>                 | Set points: Max. 0.2 % of full scale per 10 °C/50 °F                                                                                                                                                                                    |
| <b>Galv. separation</b>                  | Between inputs, outputs and aux. voltage: 3250 V - 50 Hz - 1 min.                                                                                                                                                                       |
| <b>Supply voltage (<math>U_n</math>)</b> | 57.7-63.5-100-110-127-220-230-240-380-400-415-440-450-480-660-690 V AC $\pm 20$ % (max. 3.5 VA)<br>24-48-110-220 V DC -25/+30 % (max. 2 W)<br>UL/cUL Listed: Only 24 V DC and 110 V AC<br>DC supply must be from a class 2 power source |
| <b>Climate</b>                           | HSE, to DIN 40040                                                                                                                                                                                                                       |
| <b>EMC</b>                               | To IEC/EN 61000-6-1/2/3/4                                                                                                                                                                                                               |
| <b>Connections</b>                       | Max. 4.0 mm <sup>2</sup> (single-stranded)<br>Max. 2.5 mm <sup>2</sup> (multi-stranded)                                                                                                                                                 |
| <b>Materials</b>                         | All plastic parts are self-extinguishing to UL94 (V1)                                                                                                                                                                                   |
| <b>Protection</b>                        | Case: IP40. Terminals: IP20, to IEC 529 and EN 60529                                                                                                                                                                                    |
| <b>Type approval</b>                     | The Uni-line components are approved by the major classification societies. For current approvals see <a href="http://www.deif.com">www.deif.com</a> or contact DEIF A/S.                                                               |
| <b>UL markings</b>                       | UL Listed only on request<br>UL Listing will be lost if the product is re-customised outside DEIF DK's production plant                                                                                                                 |

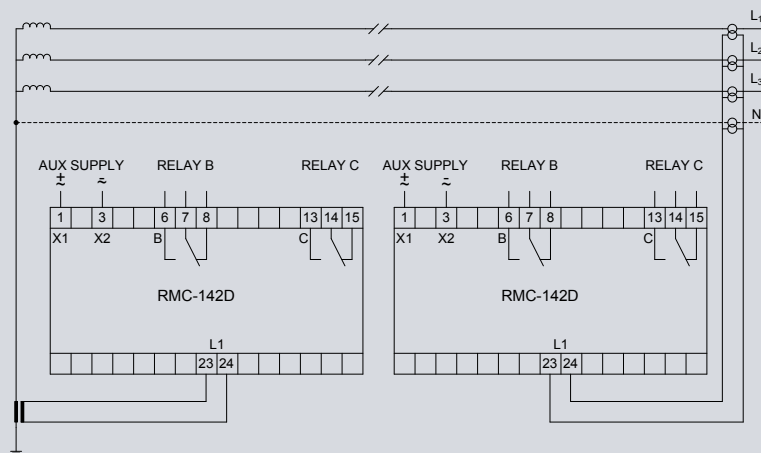
Wiring: Use 60/75 °C (140/167 °F) copper conductors only  
 Wire size: AWG 12-16 or equivalent  
 Installation: To be installed in accordance with the NEC (US) or the CEC (Canada)

## 2.1.2 Settings and indication

| Setting of                                                                                                                              | LED  | LED/relay                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Earth current set point:</b><br>(10 to 110 %) of $I_n$<br><br><b>Time delay:</b><br>(0 to T1) in seconds<br>0 to 1/0 to 5/0 to 10 s  | iE>> | Yellow LED is lit when the set point has been exceeded, but the output contact not yet activated.<br><br>Contact is activated and red LED lit after the timer has expired. |
| <b>Earth current set point:</b><br>(2 to 20 %) of $I_n$<br><br><b>Time delay:</b><br>(0 to T2) in seconds<br>0 to 20/0 to 60/0 to 120 s | iE>  | Yellow LED is lit when the set point has been exceeded, but the output contact not yet activated.<br><br>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.

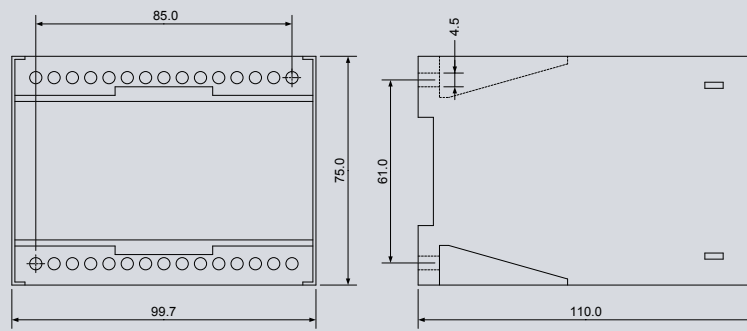
## 2.1.3 Connections/dimensions (in mm)



Protection of the voltage source and the load network

Only protection of the load network

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  |
|------------|-------------|----------------------|
| 2913160760 | 01          | RMC-142D - DC supply |
| 2913160760 | 02          | RMC-142D - AC supply |

#### 3.1.2 Order specifications



##### INFO

There are no additional options to the standard variant.

##### Variants

| Mandatory information |      |             |                             |            |         |         |               |               |              |
|-----------------------|------|-------------|-----------------------------|------------|---------|---------|---------------|---------------|--------------|
| Item no.              | Type | Variant no. | Measuring current ( $I_n$ ) | Nom. freq. | Relay B | Relay C | Time delay T1 | Time delay T2 | Supply range |
|                       |      |             |                             |            |         |         |               |               |              |

Example:

| Mandatory information |          |             |                             |            |         |         |               |               |              |
|-----------------------|----------|-------------|-----------------------------|------------|---------|---------|---------------|---------------|--------------|
| Item no.              | Type     | Variant no. | Measuring current ( $I_n$ ) | Nom. freq. | Relay B | Relay C | Time delay T1 | Time delay T2 | Supply range |
| 2913160760-01         | RMC-142D | 01          | 5 A AC                      | 50 Hz      | ND      | ND      | 1 s           | 20 s          | 440 V AC     |

#### 3.1.3 Disclaimer

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