



## DATA SHEET



### Differential current relays, RMC-131D ANSI code 87

- Measurement of 3-phase currents
  - Non-stabilised measurement
  - Timer-controlled tripping
- Extra change-over relay contact for signalling



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# 1. General information

## 1.1 Application and features

### 1.1.1 Application

The protective differential current relay type RMC-131D forms part of a complete DEIF series of relays for protection and control of generators, and is primarily designed for marine applications. 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-131D is type-approved by major classification societies and is applied for protection of for example generators in 3-phase networks against leakage currents.

### 1.1.2 Measuring principle

The relay compares the differential current of each of the three phases, providing an RMS measurement at sinusoidal currents.

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

The differential currents are obtained by connecting the external current transformers for each winding in parallel with inverse polarity.

The measurement is not stabilised, implying that the relay contact is activated for disconnection of the supervised unit when the differential current of the individual phases exceeds its set point, irrespective of the amperage of these.

The three differential currents are measured by the relay and the highest of these is selected. If this 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 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 output

The RMC-131D is provided with one relay coil with two maximum contacts. The relay can be configured either to normally energised or normally de-energised. The contacts may be set to open or to close on activation (same function on both contacts).

#### Normally energised contact

Recommended for marine installations for warning and alarm purposes.

In case of an auxiliary supply dropout, 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 contact can be locked in its warning position, even if the input currents return 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 RMC-131D 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-131D 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 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.) (Lowest meas. range: 0.3 A)
<b>Frequency range</b>	40 to <u>45</u> to <u>65</u> to 70 Hz
<b>Differential current</b>	0.04 to $0.4 \times I_n$
<b>Max. input current</b>	$4 \times I_n$ , continuously $20 \times I_n$ for 10 s (max. 75 A) $80 \times I_n$ for 1 s (max. 300 A)
<b>Load</b>	Max. 0.3 VA per phase
<b>Output</b>	1 maximum contact
<b>Contact type</b>	Contact B, contact C: Normally energised ("NE"), or normally de-energised ("ND") with or without latch circuit ("L")
<b>Relay contact</b>	2 sets of change-over switches
<b>Contact ratings</b>	250 V AC/24 V DC, 8 A ( $200 \times 10^3$ change-overs at resistive load) UL/cUL Listed: Resistive load only
<b>Contact voltage</b>	Max. 250 V AC/150 V DC
<b>Hysteresis</b>	Minimum set point: >2 % Medium set point: >6 % Maximum set point: >18 %
<b>Response time</b>	<50 ms
<b>Temperature</b>	-25 to 70 °C (-13 to 158 °F) (operating) 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) 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
<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) 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 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

## 2.1.2 Settings and indication

Setting of	LED/relay
<b>Differential current set point:</b> (4 to 40 %) of $I_n$	"I>" yellow LED is lit when the set point has been exceeded, but the contact not yet activated.
<b>Time delay:</b> (0 to T1) in seconds 0 to 1/0 to 5/0 to 10 s	Contact is activated and red LED lit after the timer has expired.

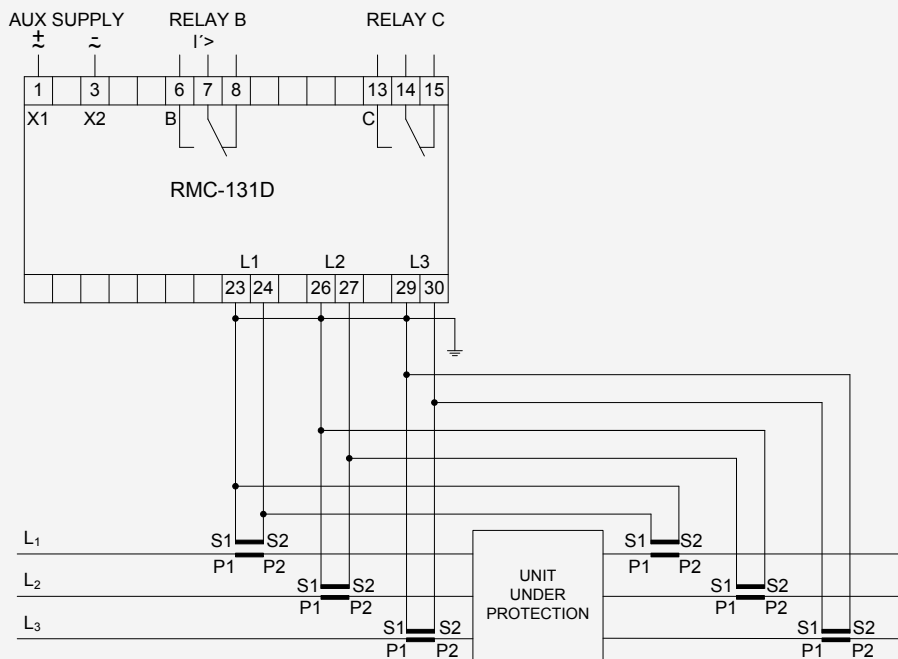
The relay is furthermore equipped with a green LED marked "POWER" for indication of power ON. Once the relay has been mounted and adjusted, the transparent front cover may be sealed to prevent unwanted change of the setting.

## 2.1.3 Connections/dimensions (in mm)

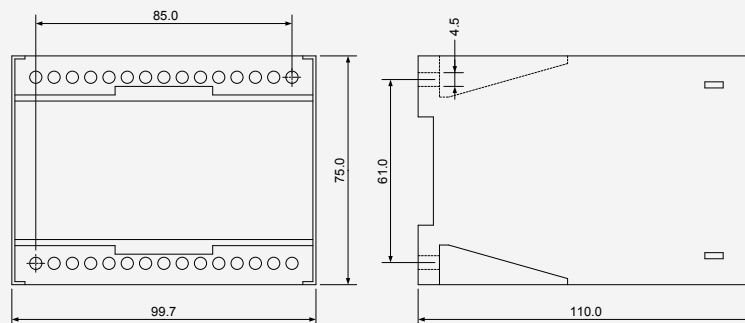


### INFO

Current transformers with the same characteristics must be used on both sides. The cable burden must be the same on both sides. Current transformers must be used for RMC-131D only.



Shown contact positions: Auxiliary 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
2913160660	01	RMC-131D - DC supply
2913160660	02	RMC-131D - 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 ( $I_n$ )	Relay	Time delay T1	Supply voltage

Example:

Mandatory information						
Item no.	Type	Variant no.	Measuring current ( $I_n$ )	Relay	Time delay T1	Supply voltage
2913160660-02	RMC-131D	02	5 A AC	ND	5 s	440 V AC

#### 3.1.3 Disclaimer

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