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## Power supply supervision relay – RUT 4

### User's handbook





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## Chapter 1. Object

This manual is intended to help users to operate the **RUT-4** power supply supervision relay.

## Chapter 2. Range

The new family of power supply supervision relays is represented with an **OP** and comprises the following models:

- **RUT-4 OP:** Supervision relay of the power supply with correct operation signalization.
- **RUT-4 OP:2:** Supervision relay of the power supply with both correct operation and under voltage signalization.

## Chapter 3. Operating principles

The **RUT-4 OP** relay is designed to supervise the voltage supply level. When the voltage level matches the relays pick-up voltage level the relays contacts close and the green LED lights.

In the case of the **RUT-4 OP:2** relay, there is also a red LED that signalises that the voltage level is under the operational level.

## Chapter 4. Reception & Storage

The **RUT-4 OP, (RUT-4 OP:2)** supervision relay is supplied with packaging capable of protecting it during normal handling for equipment of this type.

If it is not to be installed immediately, it should be kept in the packaging, properly closed and in indoor conditions, protected from rain, dust, vibration, etc.

If the packaging is damaged or it is believed that the unit may have been incorrectly handled in transit, the carrier, the relevant insurance company and the manufacturing plant should be informed forthwith.

Check also that the data on the ID plate matches the order data.

## Chapter 5. Operational characteristics

### 5.1. Supervision Functions

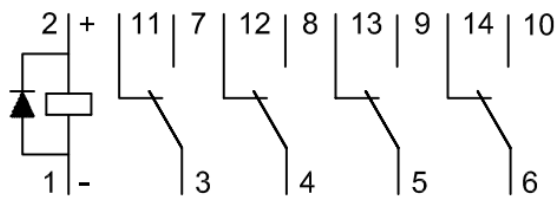
The **RUT-4 OP** relay monitors the supply of the circuit. It will initiate an alarm if the supply falls below the assigned drop-out voltage (see table on page 8).

The supervision is done by an electromagnetic relay that will operate as long as the supply of the circuit is over the assigned drop-out voltage of the relay. When the supply falls below the operational range of the relay the four contacts will open and return to their release condition. The **RUT-4 OP** has release time of more than 150ms. If the supply voltage interruption is less than 150ms the **RUT-4 OP** will not perform any action.

### 5.2. Relay indicators

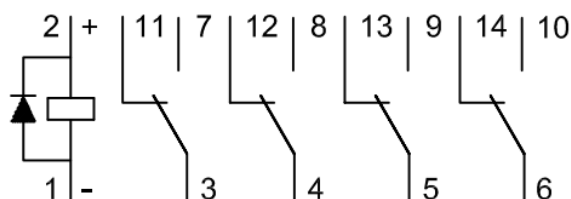
Correct operation of the **RUT-4 OP** is shown via:

- An illuminated green LED when the supply is over the minimum operational range.
- Four potential-free change-over contacts:



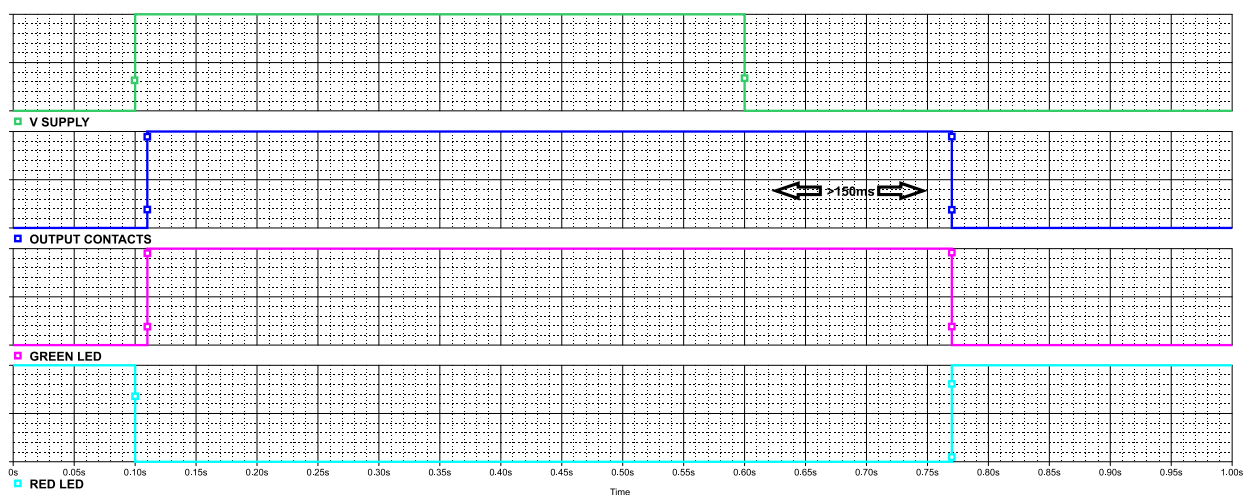
Correct operation of the **RUT-4 OP:2** is shown via:

- An illuminated green LED when the supply is over the minimum operational range.
- An illuminated red LED when the supply is below the drop of voltage.
- Four potential-free change-over contacts:

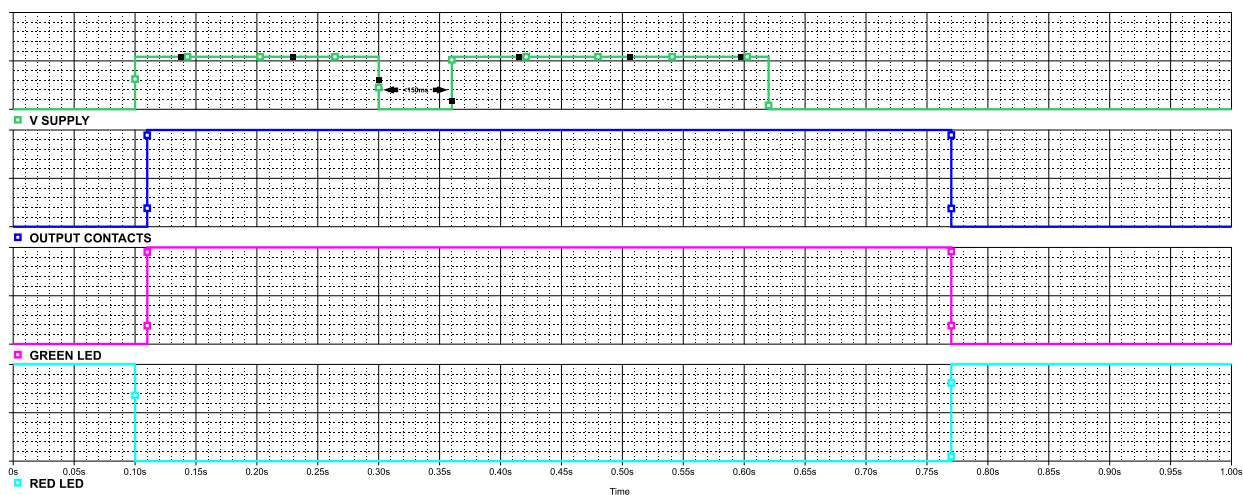


## Chapter 6. Functional diagram.

The graphic below shows the pick-up and drop-off of the **RUT-4 OP** and the corresponding effect in the output contacts and the green and red LEDs. Note that the red LED is only available in the **RUT-4 OP:2**.



This other graphic shows how an interruption in the supply of less than 150ms has no effect nor in the contact outputs nor in any of the signalisation LEDs:



## Chapter 7. Operation

The **RUT-4 OP** does not need any previous to use preparation. In the other hand, the **RUT-4 OP:2** does have a before first use operation to do.

To be able to signalize with a red LED when there is no enough voltage in the circuit, the red LED is supplied with a long-life battery installed inside the relay. **When first installed, the front switch must be activated in order to close the battery circuit. This is done so the battery life is not reduced during transport or when is stocked.**

Once the switch is activated the battery will only supply the red LED when there is an under voltage, assuring a very long life for it. The battery life has been severely tested and can withstand continuously supplying the red LED for more than a month in all the temperature range that the relay withstands.

## Chapter 8. Technical characteristics

→ Standard voltages and consumption:

UN [Vdc]	Voltage range [Vdc]	Consumption	Pick up • Drop out voltage [Vdc]
48	38.4-52.8	83 mA	between 19.2 and 31.2V
125	100-137.5	32 mA	between 50 and 82V

→ Drop-out time: >150 ms

→ Contacts:

→ Permanent current: 10A

→ Instantaneous current:

→ 30 A during 1s

→ 80 A during 200 ms

→ 200 A during 10 ms

→ Making capacity:

→ 40A 0,5s 110Vdc

→ 30A 1s 36Vdc 30.000 operations (1op/15seconds)

→ Breaking capacity:

Non inductive			Inductive Load 20 ms	
VDC	1 Contact (A)	2 Contacts in series (A)	1 Contact (A)	2 Contacts in series (A)
24	6,6	12,7	3,2	6,0
60	2,6	4,9	1,4	2,7
125	1,2	2,2	0,6	1,1
220	0,6	1,1	0,3	0,6

- U<sub>max</sub>, opened contact: 250 V<sub>dc</sub>/400 V<sub>ac</sub>
- Mechanical life: 10<sup>7</sup> operations
- Operating temperature: -10°C +55°C
- Storage temperature: -30°C +70°C
- Operating humidity: 93%/40°C

## Chapter 9. Tests

### 9.1. EMC Tests

→ High frequency 1MHz burst disturbance test:

**EN 60255-22-1**

1 MHz, 400 imp/s, 2 s

→ Common mode:

2,5 kV

→ Dif. mode:

1 kV

→ Electrical Fast transient burst

**EN 61000-4-4**

4 kV / 2,5 kHz, 1min

2 kV / 5 kHz, 1min

→ Impulse test voltage (surge)

**EN 61000-4-5**

1,2/50 μs.(voltage)

8/20 μs.(current)

1,2/50 μs.(voltage)

→ Common mode

2 kV

→ Differential mode

1 kV

→ Radiated electromagnetic field

**EN 61000-4-3**

80-1000 MHz, 10V/m,

80% AM (1 kHz)



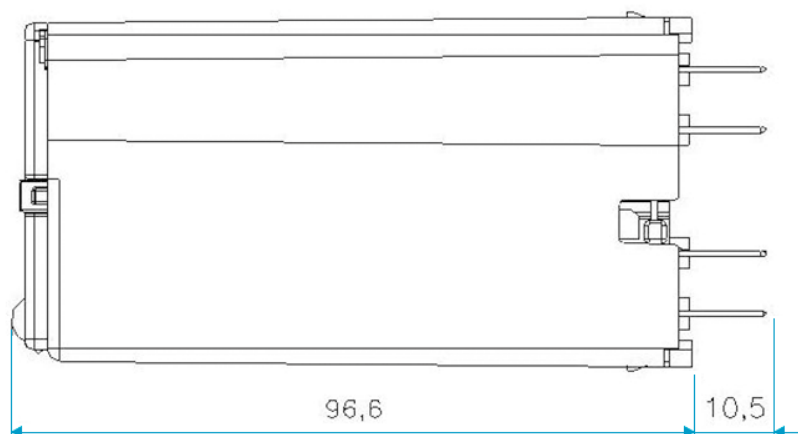
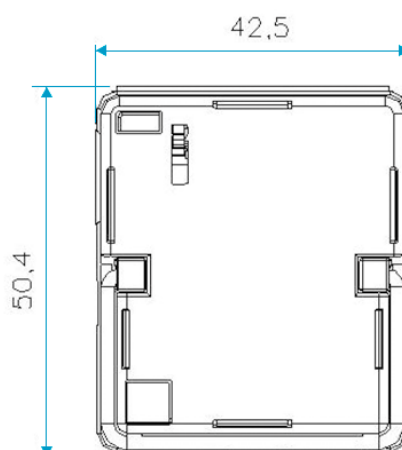
→ Radiated electromagnetic field from digital radio-telephones	<b>EN 61000-4-3</b> 900 MHz $\pm$ 5 MHz, 10 V/m, 50%(200 MHz) 1.89 GHz $\pm$ 10 MHz, 10V/m, 50%(200 MHz)
→ Conducted disturbances induced by Radio-frequency fields	<b>EN 61000-4-6</b> 0,15-80 MHz 80% AM (1kHz) 10 V
→ Electrostatic discharges	<b>EN-61000-4-2</b>
→ Contact	$\pm$ 15 kV
→ Air mode	$\pm$ 15 kV
→ Power frequency magnetic field	<b>EN 61000-4-8</b>
→ During 1min	100 A/m
→ During 1 s	1000 A/m
→ Emissivity test	<b>EN 55011 / A Class</b>
→ Cover:	30-230 MHz, 40dB( $\mu$ V/m) (quasi peak)-10m 230-1000 MHz, 47dB( $\mu$ V/m) (quasi peak)-10m
→ Power supply:	0,15-0,5 MHz, 79dB( $\mu$ V)(peak)/66dB med. value 0,5-5 MHz, 73dB( $\mu$ V) (peak)/60dB med. value 5-30 MHz, 73dB( $\mu$ V) (peak)/60dB med. Value

## 9.2. Climate & Electrical Safety Tests

→ Electrical tests:	<b>IEC 60255-5</b>
→ Dielectric test	2 kV / 50 Hz / 1 min
→ Surge withstand	5 kV / 1,2 / 50 $\mu$ s
→ Insulation	> 2000 M $\Omega$ / 500 Vcc
→ Inflammability tests:	<b>IEC 60692-2-1</b>
→ Materiales plásticos	<b>UL94: VO</b>
→ Cover protection degree:	<b>IEC 60529, EN 60529: IP 40</b>
→ Climate tests:	<b>IEC 60068-2</b>
→ Cold temperature	-10° C
→ Dry heat test	+55° C
→ Heat shock	-25° C, +70° C

## Chapter 10. Dimensions and types of sockets

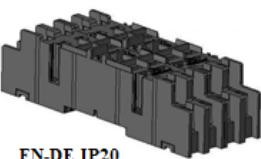
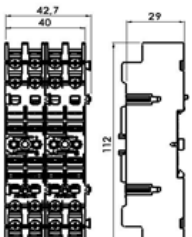
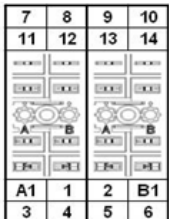
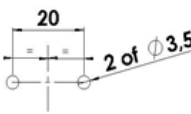
### 10.1. Relay RUT OP RUT-OP:2 dimensions

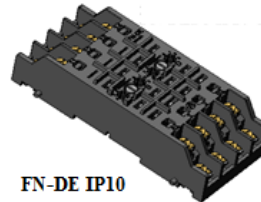
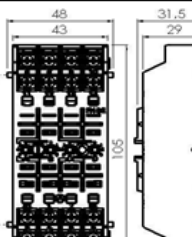
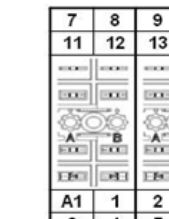
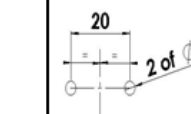


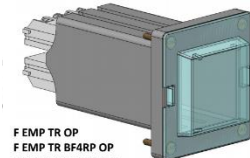
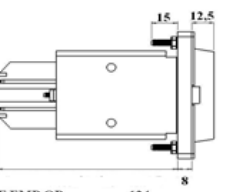
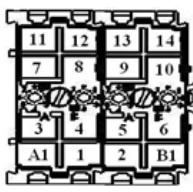
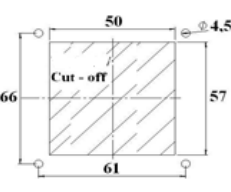
## 10.2. Sockets


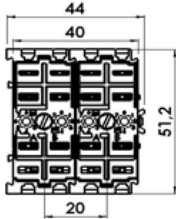


### RUT OP AND RUT OP:2

	Screw	Double Faston
Front connection	FN-DE IP10	FN-DE2C IP10
Rear connection	F-TR OP	FN-TR2C OP
Flush mounting	F-EMP OP	F-EMP2C OP

 <p>FN-DE IP20 FN-DE2C IP20 (*)</p>				<p>RF OP TDF OP VDF10 OP BF RTU-4</p>
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 <p>FN-DE IP10 FN-DE2C IP10 (*)</p>				<p>RF OP TDF OP VDF10 OP BF RTU-4</p>
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SOCKET	DIMENSIONS	INTERNAL CONNECTIONS (Vista superior/Top view)	FIX DRILLING	IP	RELAYS
 <p>F EMP TR OP F EMP TR BF4RP OP F EMP TR CORTA OP F EMP TR CORTA RF OPXXX1X F EMP TR2C OP (*)</p>	 <p>F EMP OP = 124</p>			<p>10</p>	<p>F EMP OP TDF OP VDF10 OP BF RTU-4</p>

<p>F-TR OP F-TR2C OP *</p> 			<p>Vaciado / Cut-off</p> 	<p>10</p>	<p>RF OP TDF OP VDF10 OP BF RTU-4</p>
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