LABOR-ASTER

REDUNDANCY UNIT TYPE RED3

I N S T R U C T I O N M A N U A L

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1. Introduction

The purpose of this instruction manual is to provide the users of Redundancy Unit type RED3 with the general technical data of the device and to explain the basics of its functioning and operation. The installation and maintenance conditions, as well as procedures in case of failure are given.

2. Scope of supply, warranty

The device is dispatched to the recipient in individual and/or bulk containers together with the collective Warranty Card valid for 12 months. The manufacturer guarantees the service within the warranty period and afterwards at the head office.

Instruction Manual and copies of Compliance Statement come with the batch of devices in amounts agreed with the recipient.

3. Application

The redundancy unit RED3 is designed for redundant connection of Current Source Modules type ZPM. Module RED3 connects one out of two ZPM sources to the regulation output according to the algorithm described in chapter 5.

4. Technical data

Supply voltage / Power consumption	-	22...28 V_{DC} / 4 W
Bistate opto-relay outputs N, M, I, H, G	-	resistance in short state: R<10Ω U_{MAX}=30$V_{AC, DC}$, I_{MAX}=100mA
Bistate inputs E, F	-	0/24V_{DC}, U_{MAX}=30V_{DC}

5. Technical characteristics

5.1. Functioning of the unit

For the details of functioning see block scheme in Appendix 1.

RED3 MODULE ALGORITHM DESCRIPTION

The unit is designed on the basis of a microprocessor, which fulfils following functions: measurement of signal in both channels, control of signal switching keys, memory of channels settings, recognition of saving command keys, control of LEDs signaling settings savings.

20ms measurement cycle of the processor enables filtering of the power network derived interference.

Twenty measurements for each channel are performed during each cycle and actual measurement signal is calculated for both channels.

Decision about the switchover is made if the deviation last for at least two full measurement cycles (so after 40…60ms).

Step 1: - Using knobs on the front panel of the ZPM current sources set the values of the currents. Measurement signals directed to the R and S inputs after pressing respectively P1 and P2 are being saved in the non-volatile memory and deviation errors stored in the memory for both channels are removed. Correctness of buttons operating is indicated by a blink of green LED diodes respectively D5 and D6.

Decision: Bigger of the two currents is directed to regulation. Smaller is directed to the load resistor 22-24Ω.

Step 2: - Systematically signal deviation in both channels is checked by comparing it to the saved values (deviation means that ZPM module is damaged). When the deviation is bigger than 16mA [4% ⇒ 0.04•(1.2A-0.8A)= 0.05•0.4A=16mA] red signaling LED diodes D3, D4 are lit up and bistate indication outputs I, H are set.

Step 3: - If there is a first deviation of the chosen bigger current (chosen as a decision from Step 1) by more than ±16mA comparing to the saved value then there will be:

Decision: changing the regulation output to the other channel. The change will occur independently of the current value in this other channel.

Step 4: - If the deviation described above will retreat then it will return to the initial state according to the decision made in Step 1. If the deviation will not retreat then the other channel will stay chosen no matter what its value is.

Step 5: - If there is a second deviation of the chosen bigger current (chosen as a decision from Step 1) by more than ±16mA comparing to the saved value then there will be:

Decision: changing the regulation output to the other channel. The change will occur independently of the current value in this other channel.

Step 6: - Since then, independently of the deviation values in both channel there will not by any more changes of the regulation output. To reset the changing history Step 1 should be proceed.

Note: After double occurrence of switching over to the secondary channel, the canceling of errors is required. This is done by setting new values (Step 1).

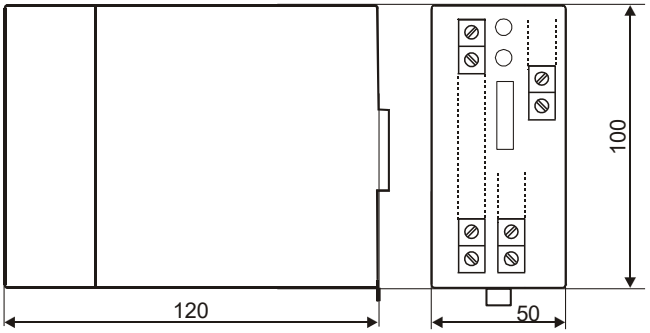
You can return to Step 1 by setting both currents and saving their values by pressing buttons P1 and P2.

After power supply is off the device remembers only the measured values of the currents from the moment buttons P1 and P2 were pressed (check Step 1). But the history of channel changing is lost. It is recommended to repeat Step 1 after power supply was off.

When the power supply is off, current from the ZPM source connected to input A is directed to the regulated output B.

5.2. Housing description and construction

The Redundancy Unit is placed inside a housing made of a self-extinguishing plastic material (polyamide PA 6.6) designed to be mounted on the standard TS 35mm rail. The protection level for housing and terminals is to IP 20. Electronic circuits are mounted on printed circuits boards. The figure below shows the housing look and dimensions (in mm).

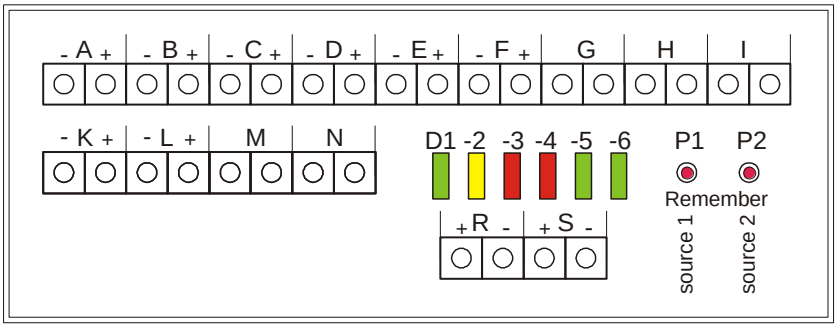


Drawing of the housing

6. Installation, operating conditions

6.1. Assembling and connections

For details of the unit connection in redundant system see the scheme in Appendix 2.



Front panel

Terminals description:

A Input 1 - signal from source number 1
B Output 1 - current 0.8÷1.2A connected to the regulated object
C Input 2 - signal from source number 2
D Output 2 - current 0.8÷1.2A connected to load resistor 22÷24Ω
E Binary input 1 - connect the source number 1 to the regulated object
F Binary input 2 - connect the source number 2 to the regulated object
G Binary output 1 - the source number 2 is working with the regulated object (switch short)
H Binary output 2 - the source number 2 is damaged (switch short)
I Binary output 3 - the source number 1 is damaged (switch short)
K Module supply number 1
L Module supply number 2
M Binary output - supply number 2 is ON (switch short)
N Binary output - supply number 1 is ON (switch short)
R Measurement input - measurement of the ZPM source number 1 output current
S Measurement input - measurement of the ZPM source number 2 output current

LED diodes description:

D1 green - supply
D3 red - channel 1 damaged
D5 green - channel 1 value was saved (lights about 1.5 sec during saving)

D2 yellow - channel 2 is ON
D4 red - channel 2 damaged
D6 green - channel 2 value was saved (lights about 1.5 sec during saving)

Buttons description:

P1 - save channel 1 value
P2 - save channel 2 value

Short pressing of the P1 and P2 buttons light up green LED diodes (respectively D5 and D6). LEDs turn off after about 1.5 sec since the moment of releasing the buttons. Do not press another button when D5 or D6 is still lighting. Holding P1 or P2 button pressed causes repeating saving cycle. Do not press both buttons at once.

Mounting on the standard TS 35mm rail is recommended. The housing strip catch should be placed vertically. Allow a distance of at least 5 mm between the housing and neighboring device side-walls.

External terminals require copper cables with the wire diameter ∅ ≤ 2.5 mm. Wire endings should be protected with clam sleeves or twisted with no tin coating.

Twisted cables for input and output circuits of signal lines and separate tracks for signal and energetic supply lines are recommended. Signal and energetic cables tracks should cross under right angle. Twisted, shielded cables are required in zones with high electromagnetic interference.

6.2. Normal operating conditions

Ambient temperature	- 5°C...+60°C
Relative humidity	- 30...80 %
Atmospheric pressure	- 80...120 kPa
Constant and variable magnetic field	- 0...400 A/m
Sinusoidal vibrations (within range of 5...80 Hz)	- up to 2 g
Ambient atmosphere	- dust and corrosive vapors free
Working position	- housing catch vertically
Warming up time	- 15 minutes

7. Settings and calibrations

Check point 5.1. Functioning of the unit, Step 1.

8. Usage, maintenance, services: surveys, repairs

8.1. Periodical survey

While normal working the device does not demand any special maintenance. Surveys should be carried on periodically according to the users control standards. During the survey external examination of the device condition is required. Wiring terminals and cramps should be controlled and fixed if needed. Attention should be paid to faultfinding falling into subsequent categories:

-mechanical damages,
- loosening of electrical connections and fixing to the mounting board,
- legibility and integrity of the nameplates and labels.

8.2. Non-periodical survey

In case of malfunction make sure that the voltage supply of the unit is in range of 22 ÷ 28 V_{DC}. When the non-stabilized source of power is used make sure that the voltage supply value never drops below 22 V_{DC}.

If the cause of malfunction persists nevertheless voltage supply is correct, contact the manufacturer or his authorized representative. Repairs and interferences into the electronic system of the device by other persons are not permissible. Only the manufacturer or his representative are authorized to carry out repairs and examinations of the device.

9. Labeling and types of device

The device is labeled with type name: RED3 and it comes in only one version.

10. Packing, storage and transport

10.1. Packing

Individual packaging or bulk containers are equally recommended, provided they prevent damages of the device during the transport. Indoor space, air temperature above 15°C and relative humidity below 85% are required for packing of the device.

10.2. Storage

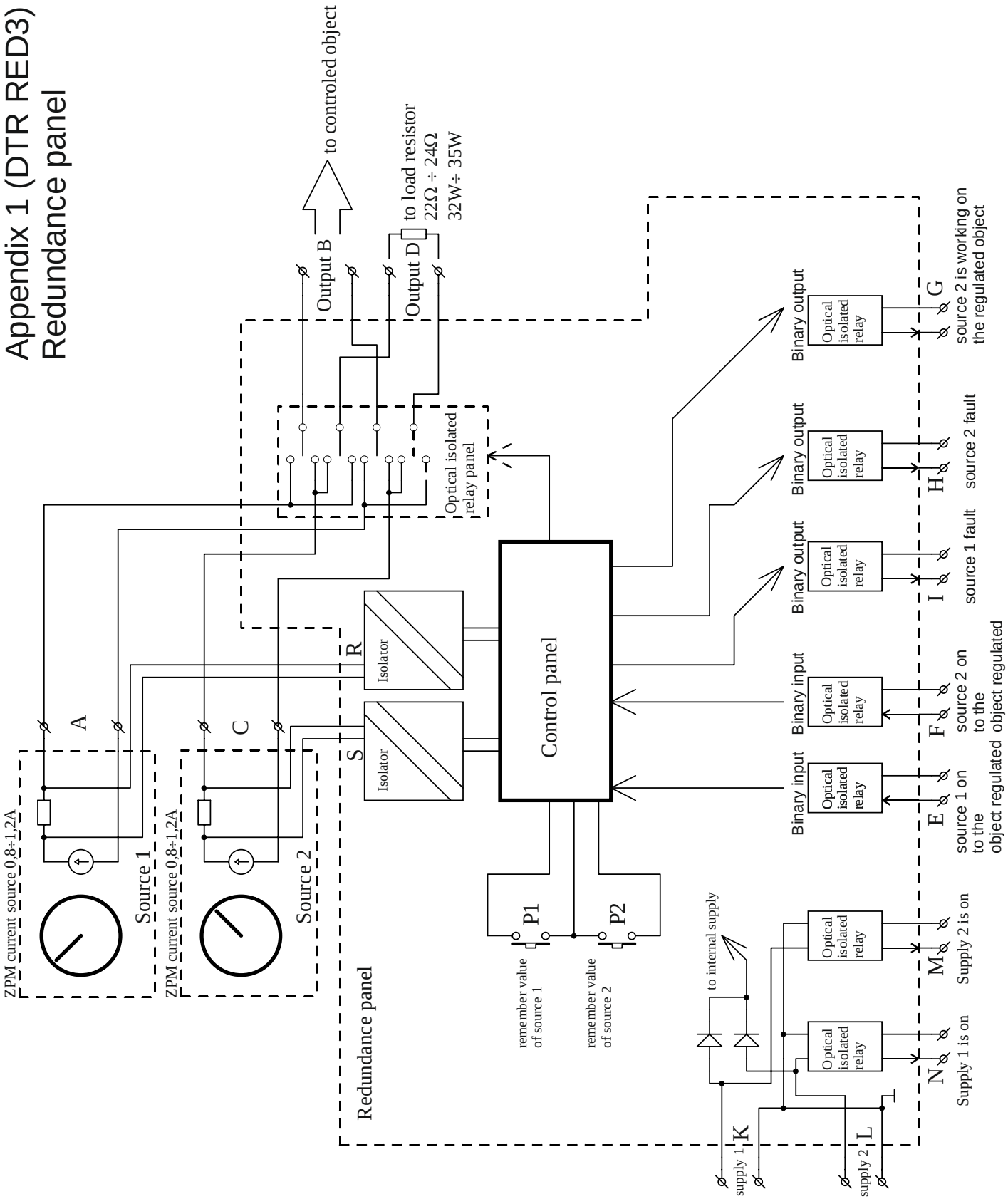
The devices should be stored in bulk containers. Indoor space, ambient atmosphere free of corrosive vapors and substances, with temperatures ranging from +5°C to +40°C are required for storage of the devices.

10.3. Transport

Individual packaging or bulk container are equally appropriate for transport. The packaging should prevent the translocation of the device during the transport. Air, see and surface transport are suitable, provided the direct influence of atmospheric factors on the device is eliminated.

THE END

Appendix 1 (DTR RED3)
Redundance panel



Appendix 2. RED3 REDUNDANCY UNIT
Scheme of connections in redundant system