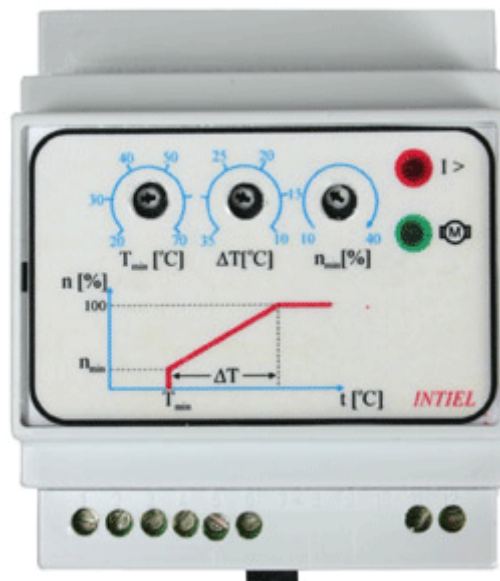


INTIEL

THE ELECTRONICS ON YOUR SIDE

Revolutions Thermo Regulator
with a phase control
INT0086A

User's Manual



1. Application

The Revolutions Thermo Regulator is designed to control the power supply of single phase alternating current units in relation of the temperature of the thermo sensor by means of a proportional law. The regulation is provided by a phase control of the regulation element (semistor). The Revolutions Thermo Regulator is optimized to operate with asynchronous and universal ventilation motors, rotational pumps, etc, but also it can regulate heating elements. On the other hand, it must be paid attention that it is not suitable for a control of piston compressors.

2. Elements location

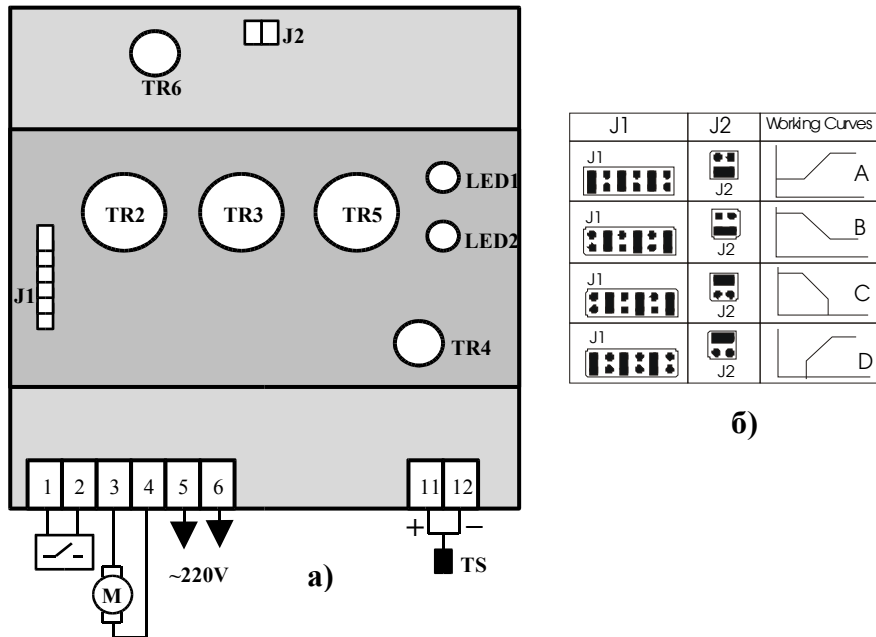


Figure 1

J1 – Jumper for inverting the slope of the regulation diagram

J2 – Jumper for switching off the motor at minimal revolutions level n_{\min}

TR2 – Element for setting the lower level of the regulation temperature interval T_{\min}

TR3 – Element for setting the width of the regulation temperature interval ΔT

TR4 – Element for a compensation of the current semistor angle, in order to keep the adjusted revolutions during the variation of the supply voltage and the loading current.

TR5 – Element for setting the minimal revolution level

TR6 – Element for adjusting the protection against current overloading

LED1 – Light indication for overloading, red (**overloading**)

LED2 – Light indication for motor operation, green

TS – Temperature sensor

3. Operation

The Thermo Regulator changes the motor revolutions depends on the difference between the assigned temperature level T_{\min} and the measured one by the thermo sensor “TS” in accordance with the chosen regulation diagram.

The possible regulation diagrams are shown on Figure 2 bellow. For each of them it can be fixed T_{\min} , ΔT and n_{\min} . The motor keeps operating at curves A and B after reaching the minimal level of the revolutions (n_{\min}) and it stops if the motor reaches the minimal level

of the revolutions (n_{\min}) if curves C and D are selected. The type of the regulation curve can be chosen and fixed by jumpers J1 and J2, according the table shown at Figure 1b.

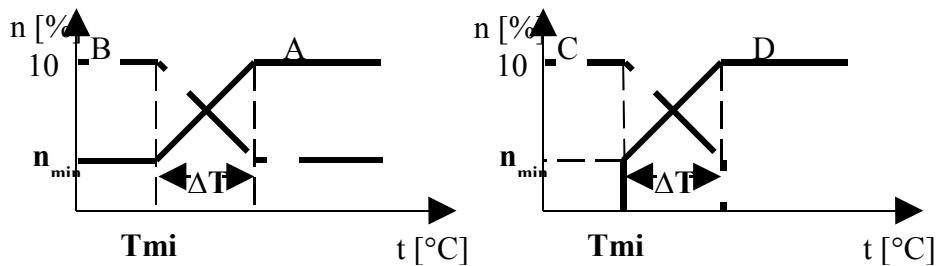


Figure 2

The core of the control process is in the provided additional compensation of the semistor current angle. In fact each voltage increasing will decrease the current angle and on the other hand, each increasing of the loading current will increase the semistor current angle. Actually that prevents decreasing of the revolutions during increasing of the shaft mechanical loading, as well increasing of the revolutions during increasing of the power supply. The compensation effect is getting bigger during turning TR4 element counterclockwise. Such a control is very suitable for motors with variable loading, for temperature control pumps in heating systems with thermo-valves, where it provides permanent pressure level at variable flow.

The protection against current overloading is provided at two levels – In and $1.4In$. If the loading current reaches the level In , the LED1 "I>" indication will be activated without stopping the motor. If the loading current keeps increasing until it reaches the level $1.4In$, the motor will go into minimal revolutions regime fixed by TR5. On the other hand, after decreasing of the loading current down to $0.5In$ the LED1 "I>" indication stops and the motor is automatically restarted with a smooth start-up.

The adjusting of the current protection can be done by turning TR6 element clockwise to the end. The motor is settled by force in maximum revolutions regime (that correspond to current level In .) by switching off the thermo sensor "TS" of its terminals 11 and 12, and placing the jumper J1 at a position related to curve A (Figure 1b). After that TR6 element must be turned smoothly counterclockwise, until LED1 "I>" light indication appears, afterwards TR6 must be turned back slowly until the light indication stops remaining it in that position.

Adjusting of the minimal revolutions level is provided by switching off the sensor "TS" from terminals 11 and 12, and placing the jumpers J1 and J2 according curve B (Figure 1b). The minima level of the revolutions can be adjusted by means of TR5 element.

The motor can be stopped or started by remote circuit closer placed outside the Regulator body. The motor operates if the circuit closer is closed and it stops if the circuit closer remains open.

4. Technical data

- | | |
|---|-------------------|
| 1. Power supply: | 220V/50Hz/AC |
| 2. Nominal capacity of the electrical consumer: | 1kW |
| 3. Input for remote starting and stopping: | 50mA |
| 4. Range of temperature measuring: | (0°C) –(+100°C) |
| 5. Range of temperature regulation: | (+20°C)-(+100°C) |
| 6. Time for a smooth start-up: | 6 sec. |
| 7. Range of revolutions minimal level: | 10-40% |

8. Wiring

The proper wiring of the Revolutions Thermo Regulator is shown on the Figure 1a.

- Terminals 1 and 2 – are designed for a remote circuit closer for a start/stop.
- Terminals 3 and 4 – outputs a for motor control
- Terminals 11 and 12 – input for a connection of the temperature sensor type LM335, provided by INTIEL. Take into account the sensor correct polarity during its connection.

9. Warranty period

The warranty period is 24 months following the purchase date of the unit or its installation by an authorized Engineering Company, but not exceeding 28 months after the production date. The warranty is extended to the malfunctions that occur during the warranty period and are result of the production reasons or defective used parts.

The warranty does not relate to malfunctions corresponding to not-qualified installation, activities directed to the product body interference, not regular storage or transport.

The repairs during the warranty period can be done after correct filling of the manufacturer warranty card

Warranty Card

Manufacturer: INTIEL	
Product type	
Production number	
Production date	
Dealer confirmation	
Purchase date	
Invoice number	
Dealer's name, address and stamp	
Seller's name and signature	
Installation Date	
Date	
Company (address, stamp)	
Installer's name and signature	