RESISTRON

Replacing RES-225/RES-445

Replacement Instructions

The RESISTRON temperature controller RES-445 can be used as an alternative to the RES-225 controller.

The steps that are necessary to convert from RES-225-0-x (standard model without modifications) to RES-445 are described below.

These instructions only provide a brief overview of the two controllers. If in doubt, please refer to the latest version of the controller documentation, which is always binding.

The convertion from controller types RES-2xx-1-x is not described here. Please contact ROPEX for further informations.

Comparison of RES-225 / RES-445

Dimensions

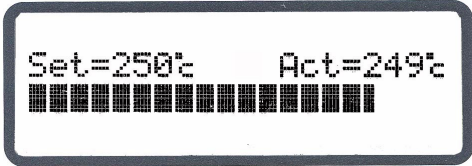The front panel cutout dimensions of the RES-225 and RES-445 controllers are identical. The RES-445 features a protective film to IP42 instead of the transparent hood. A transparent front cover featuring IP65 is available as a option.
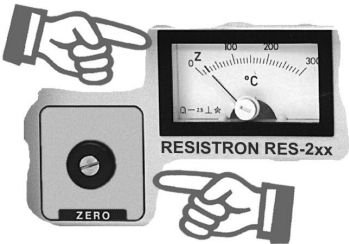
RES-225	RES-445

Set point selection

RES-225	RES-445
Selection by applying a 0…10VDC voltage to the analog input at terminals 16+17 (Corresponding to 0…300°C, RES-225-0-5: 0…500°C).	Selection by applying a 0…10VDC voltage to the analog input at the terminals 20+23 (Corresponding to 0…300°C or 0…500°C).

Temperature indication (actual value)

RES-225	RES-445
Indication on a analog instrument (ATR-x)	Indication on the 4-line display (dynamic bar and digital value).
	Set=250°c Act=249°c

Zero calibration

RES-225	RES-445
Zero calibration by means of a 10-turn potentiometer. The pointer of the indicating instrument must be set to „Z".	Automatic zero calibration (AUTOCAL) with step 7 in the software menu.
	SETTINGS 7 Autocal to 20°c Start with ENTER
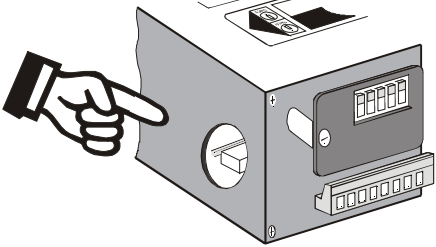
Alarm output / reset

RES-225	RES-445
Indicated by means of a red ALARM LED on the front panel. Reset by pressing the RESET key.	Indicated on the display. The error is identified by a numeric code (⮫ RES-445 documentation). Reset by pressing the RESET key ([ENTER HAND RESET]).

Manual mode

RES-225	RES-445
Selected by pressing the HAND key. The red ON LED is lit continuously.	Selected by pressing the HAND key (ENTER HAND RESET) while the Home position is displayed.

Line frequency setting (50/60 Hz)

RES-225	RES-445
Configured with plug-in jumper.	Detected automatically in the 47…63 Hz range.
	Automatic detection

Installation and setup

⚠️ **Installation and startup may only be performed by technically trained, skilled persons who are familiar with the associated risks and warranty provisions.**

The information provided here offers no more than a brief overview. If in doubt, please refer to the latest version of the controller documentation, which is always binding (⤷ see also section „Safety and warning notes" of the RES-445 documentation).

Proceed as follows to replace the RES-2xx controller and install/start up the RES-445:

1. Switch off the line voltage and verify the safe isolation from the supply.

2. Remove the existing RES-2xx controller.

3. The supply voltage specified on the nameplate of the RES-445 controller must be identical to the line voltage that is present in the plant or machine. The line frequency is automatically detected by the temperature controller in the range from 47 to 63 Hz.

4. Set the DIP switches on the RES-445.

⚠️ **The settings of the DIP switches on the RES-445 are NOT the same as on the RES-225. Please set these switches in accordance with the ROPEX Application Report in order to avoid malfunctions.**

Old setting ranges on the RES-225:

U$_2$(V)	3- 10	8- 30	20-60	50-80	I$_2$ >>
Switch No.	1	2	3	4	5
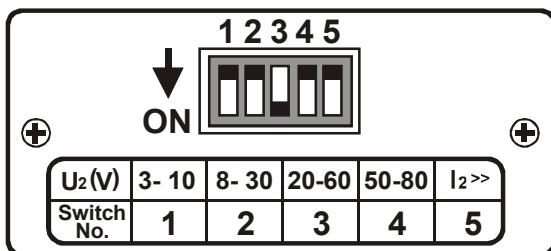
New setting ranges on the RES-445:
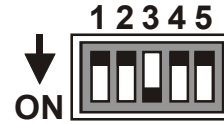
DIP-SWITCH ON ▶	1	2	3	4	5	I$_2$ (A)
U$_2$ (V)	1-10	6-60	20-120	OFF / ON / ON	OFF / OFF / ON	30 - 100 / 60 - 200 / 120 - 400

The table below compares the two controllers. These settings can be taken as a guide (e.g. when the controller is started up for the first time):

	RES-225	RES-445
	DIP switch **ON**	
U$_2$	1	1
	2	2
	3	3
	4	3
I$_2$	5	4

5. Install the RES-445 controller in place of the RES-2xx.

⚠️ **The terminals of the two controllers are NOT identical. The wiring must be changed according the wiring diagram described section "Wiring diagram of the RES-445" on page 8.**

6. Switch on the line voltage.

7. A power-up message appears on the display when the controller is switched on to indicate that it has been started up correctly.

8. One of the following states then appears:

DISPLAY	ACTION
Home position Shows the SET and ACTUAL temperatures and the dynamic bar	Go to 9
Shows error code 104, 106, 109 or 211	Go to 9
Shows error code 101…103, 201…203, 801 or 9xx	Fault diagnosis (↳ RES-445 documentation)

9. Select the language and reset the controller to the factory settings.
Press the ⟳ key for at least 2s (to open the Configuration menu). Step 20 is displayed. Select the desired language with the [▲][▼] keys. Confirm your selection by pressing 🔲. Press the ⟳ key to display step 21 (factory settings). Press the 🔲 key to confirm the factory settings (an acknowledgment message appears). Step 22 is displayed next.

10. Set the temperature range to 500°C
(Only if you have so far been using an RES-2xx-0-5 controller)
Then set "Alloy 20, max 500°C" with the [▲][▼] keys in step 22. Confirm your selection by pressing 🔲.

11. Return to the Home position
Press the ⟳ key for at least 2s (to return to the Home position or Alarm menu).

12. Calibrate the zero point
Activate the AUTOCAL function while the heatsealing band is still cold.
Press the ⟳ key repeatedly until step 7 is displayed. Then select the AUTOCAL funtion by pressing the 🔲 key. If this function is executed correctly, the Home position is displayed again

automatically.
If the zero has not been calibrated successfully, an error message appears on the display. In this case the controller configuration is incorrect (↳ see section „Controller configuration" of the RES-445 documentation and the ROPEX Application Report). Configure the controller correctly and repeat the AUTOCAL function.

13. Set the heatsealing temperature (select the set point)
The heatsealing temperature can be set on the RES-445 controller in two ways:
- By means of the setting menu step 1
- By appliying a 0…10VDC voltage to the analog input at terminals 20+23

When substituting a RES-225 the analog input is used. Therefor the preset temperature in the setting menu step 1 must be set to 0°C.
This must be done as followed:
Press the ⟳ key briefly (to display step 1 in the Setting menu). Set the temperature with the [▲][▼] keys to 0°C. Confirm your selection by pressing 🔲. Press the ⟳ key for at least 2s (to return to the Home position).

Preset the heatsealing temperature by applying a 0…10VDC voltage to the analog input at terminals 20+23 then. The set heatsealing temperature is displayed in the Home position.
Then activate the "START" signal (HEAT). The indication on the display (actual value and dynamic bar) permits the heating and control process to be observed:
If an error code is displayed, please proceed as described in section „Error messages" of the RES-445 documentation.

The controller is now ready

Substituting a RES-225-0-5 (temporarily with MOD 16) in a PMB-UVA machine

⚠️ **When substituting a RES-225-0-5 in a PMB-UVA machine the following additional guideline must be carried out in order to avoid malfunctions.**

A RES-225-0-5 installed in a PMB-UVA machine has a special configuration for the temperature preset via the analog input (temporarily with MOD 16). A analog voltage of 0…6.66VDC is used for a temperature preset of 0…400°C. The new RES-445 uses a 0…10VDC voltage for presetting 0…500°C (↳ Section „Installation and setup", point 10).

Because of this the following two guidelines must be carried out:

1. The maximum heatsealing temperatur of the RES-445 must be limited to 400°C as followed:
   Press the ⟳ key for at least 2s (to open the Configuration menu). Step 20 is displayed. Press the ⟳ key repeatedly until step 23 is displayed. Then set "400°C" with the ▲▼ keys. Confirm your selection by pressing [ENTER/HAND/RESET]. Press the ⟳ key for at least 2s (to return to the Home position or Alarm menu).

2. When applying a 0…10VDC voltage at the analog input in this application a correction factor of 1.2 must be used for recalculating the correct heatsealing temperature. This must be done via the temperature preset in the PLC terminal.

<u>Sample:</u>
When applying a voltage of 3.0VAC at the analog input of a temperature controller the old RES-225 has a set temperature of 180°C. The new RES-445 has 150°C only.
For a set temperature of 180°C a voltage of 3.6VDC (3.0VDC x 1.2) must be applied at the analog input of the RES-445. This will be done by a temperature preset of 216°C (180°C x 1.2) in the PLC terminal.

The following diagram shows the different temperature curves of the old RES-225 and the new RES-445:
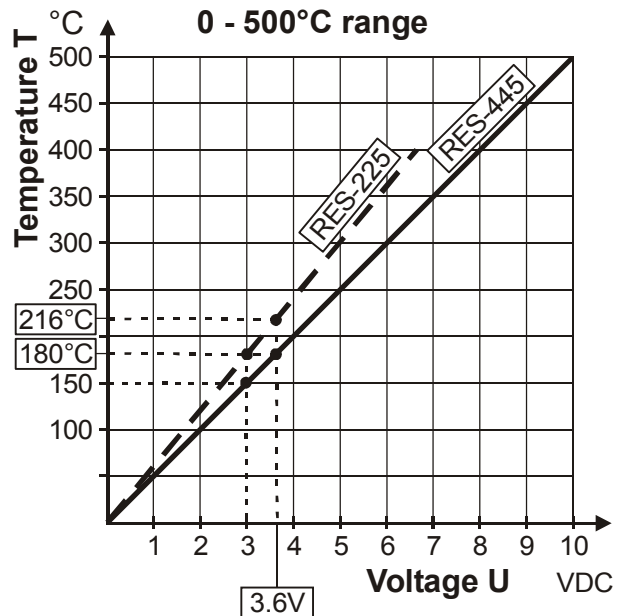
The following table shows some sample values for comparison:

Function	RES-contr. sealing temp.	PLC Temp. preset for RES-225	PLC Temp. preset for RES-445
PRE-HEAT	100°C	100°C	120°C
MAIN HEAT	180°C	180°C	216°C

⚠️ **This are overview guidelines only. The machine documentation and the retrofitting documentation of the machine manufacturer are valid in order to avoid malfunctions.**

RES-445 factory settings / as-delivered condition

If you accept the factory settings (step 21 in the software menu, see step 9 above), the following defaults are restored:

Menu step	Function	Value
1	Heatsealing temperature	0 °C
6	Hold mode	OFF
22	Alloy/range	Alloy A20, max. 300 °C

23	Maximum temperature	300 °C
30	Cycle counter	0
31	Alarm relay	Closed by alarm

The selected language (step 20 in the software menu) remains set regardless of the factory settings.

As-delivered condition:

The RES-445 controller is delivered with the above factory settings and with the language set to "German".

Wiring diagram of the RES-445

Line filter LF-xx480

LINE

RES-445
(also with MOD 01)

RELAY K1
100VDC/1.5A
240VAC/1.5A

K1
2x 47nF/560R

ALARM OUTPUT
max. 50V/0.2A

Contact closed or opened by ALARM (see configuration)

OUTPUT "TEMP. OK"

GND

PREHEAT (CH1)
with 24VDC signal

START (HEAT)
with 24VDC signal

GND

Ground for 24VDC signals. Must be grounded externally to prevent electrostatic charging!

AUTOCAL
with 24VDC signal

RESET
with 24VDC signal

TEMP. IN
0 - 10VDC

TEMP. OUT
0 - 10VDC

+ BOOSTER OUTPUT

0V

U_1 prim.

Impulse transformer

U_2 sec.

Heat-sealing band

U_R R

twisted

I_R

Current transformer PEX-W2

0V
(Intern. ground)
No external grounding allowed!

0V (Internal ground)
Terminal ②

START (HEAT)
with contact

PREHEAT (CH1)
with contact

Ⓧ Terminal blocks RES-225

Menu structure of the RES-445

Settings

- Power-up message
- Home position
- **1** Heatsealing temp.
- **2** Preheating temp.
  - 1) 2)
- **3** Starting delay
- **4** Sealing time
- **5** Cooling value
- **6** Hold mode
- **7** Autocal?
  - Autocal

Fault ⚡

- Alarm
- **7** Autocal?
  - Autocal

Configuration

- **20** Language
- **21** Factory settings
- **22** Alloy/range
- **23** Max. temperature
- **24** Set point reached
- **25** Set point exceeded
- **26** Time control
  - 1) 2)
- **27** Cooling mode
- **28** Start of sealing time
- **29** Relay K1 function
- **30** Cycles
- **31** Alarm relay
- **32** Meas. imp. length
- **33** Analog output

1) Time control ON
2) Time control OFF

MOD 1 only