# User manual
# Furnace electric / oil / gas
# Series
# SLS / SGS / SGP SOS / SOP

Przedsiębiorstwo Produkcyjne **"ROMER"**
ul. Rejowska 99A
26-110 Skarzysko-Kamienna
Poland

http://www.romerpp.pl

romer®

CE

## DECLARATION OF CONFORMITY

Name and address of the manufacturer:

"ROMER" Manufacturing Company
26-110 Skarżysko-Kamienna
st. Rejowska 99A
POLAND

NUMBER OF DECLARATION: 3 Date of issue 21.05.2016

**Identification of product:**

| Type of product | Model | Serial number |
|---|---|---|
| OVEN | SMS-500 | 90B01821811131 |

The above mentioned product is in conformity with the provisions of the Low Voltage Directive 2014/35 / EC and the provisions of the Directive for equipment operating in hazardous areas 94/9 / EC and EMC 2014/30 / EC.
Standards are met:
PN-EN-60204-1 Safety of machinery
PN-EN-60947-1 Switchgear and control Low voltage
BS-EN-50014: 2004 Electrical apparatus for potentially explosive atmospheres
BS-EN-1127-1 Explosion prevention and explosion protection

**This declaration of conformity loses its validity if the machine is modified or rebuilt without our consent.**

A. Ciura, W. Ciura
ul. Rejowska 99, 26-110 Skarżysko-Kamienna
NIP PL 663-1[illegible] REGON 260058335
tel. 509 [illegible]

romer®

CE

## WARRANTY

**Przedsiębiorstwo Produkcyjne "ROMER"**
ul. Rejowska 99A
26-110 Skarzysko-Kamienna
Poland

**Identification of product:**

| Type of product | Model | Serial number |
|---|---|---|
| OVEN | SMS - 200 | 908011824111951 |

1. The "ROMER" company guarantees the above product for a period of 12 months from the date of sale, in case of work in one shift at one day.
2. The manufacturer is exempt from liability under the warranty for defects resulting from improper use of the device, mechanical damage, defects caused by natural wear and tear of materials.
3. Any defects revealed during the warranty period will be repaired free, within 14 days from the date of damage.
4. The Seller guarantees quality and efficient operation of the product.

A. Ciura, W. Ciura
ul. Rejowska 99, 26-110 Skarżysko-Kamienna
NIP PL 663-166-88-11 REGON 260698335
tel. 509 843 098

# Table of contents

# Ovens produced by ROMER®

Ovens for coating paint manufactured by ROMER can be divided due to the use (free-standing, or as part of a complete powder coating line), the number of chambers, the type of power supply (electric, gas, or oil), the type of distribution of temperature, type of control (PLC or conventional - without advanced microprocessor control).

Each furnace is equipped with the anti-explosive locks - meets stringent standards; Polish, European, or the country in which it is to operate (but not relieve the user to verify that the stove meets such standards in the country of operation).
Freestanding stoves are designed to burn the powder coatings in powder coating plants not automated, or semi-automated - they need an operator who will run the furnace; enter details, and after firing takes out from the chamber.

In the version of the PLC controller you can set the time for automatic start of the oven, set the temperature curve, the opportunity to register the firing process, reviewing the history of baking parameters (technology ROMER iCure), MTS, ThPID, and many other functionalities that do not have a version without the PLC.

Ovens in automated paint line can be activated with the start of paint line, or in the case of the version with PLC controllers - automatically.
The line can be activated when the oven reaches the preset temperature parameters, or at a certain time interval from the start across the line, or before start-up.

Configuration options are very wide, they may be furnaces with several chambers (use a movable bulkhead) could have 2 or more sets of doors, the doors can be located in areas proposed by the client (the selection of the configuration advise choosing your ideal parameters). Factors heating may be electricity, gas, or fuel oil.

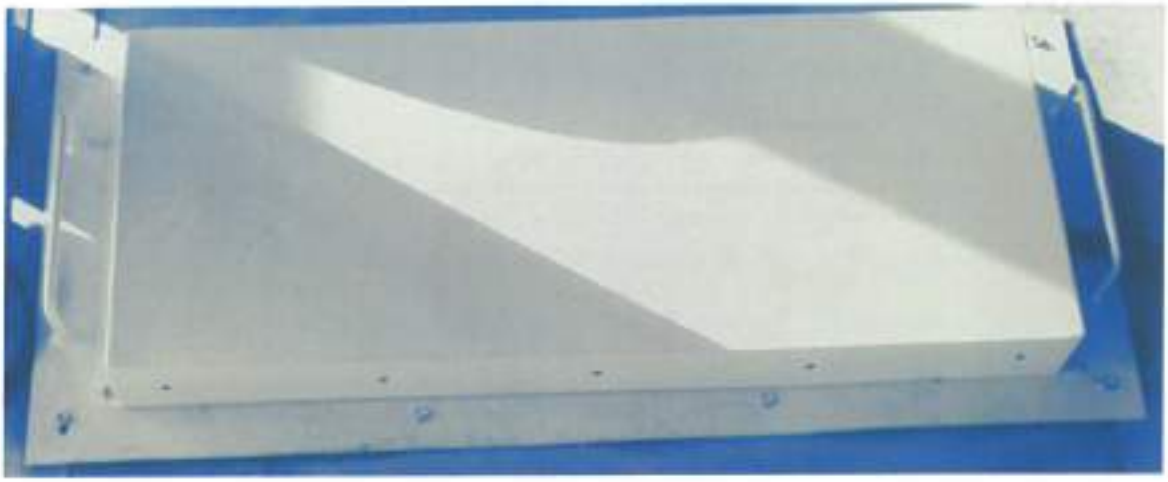
## The burners in furnaces ROMER (gas / oil)

Our furnaces have been used burners manufactured by us. Thanks to working great with the other components of the furnace. They are in version adapted to burn fuel oil, LPG and natural gas. All controlled by the controller SIEMENS and PLC controller brand Xinje.
The burners can be equipped with dust filters that improve their life.

## Heat Exchangers (in oil / gas)

ROMER ovens are equipped in exchangers designed by our constructors. They are characterized by high thermal efficiency . These exchangers have been designed that they can be cleaned without major problems. They have flaps that expand when present gas explosion or mixture of oil and air.

## The panel of heaters (electric furnaces)



Electric furnaces has electric heating panels of different power. They include heaters, which have been produced by world leaders in the field of heating industry. panels placed in an easily accessible place on the top of the furnace (although it is not a rule). Therefore, we can guarantee reliability.

## Thermal strengthening of the ceiling

Places in the near the heat exchangers and heating panels strengthened by the application of temperature-resistant steel.

***WARNING !!!***

*Each furnace ROMER functionality can be extended by ROMER, after consultation with the technical department.*

*During the warranty period should not be on your own to modify the functionality of the oven, as this could result in loss of warranty, damage elements of the furnace, shortening its life, damage to the health of the operator, the danger to the public.*

*Elements that naturally subject to wear must be replaced only with original spare parts ROMER, which will guarantee the continued safe and reliable operation of the furnace.*

*Operation of the furnace only by trained personnel.*

# Production properties of furnaces ROMER®?

Ovens, in which the heating medium is gas or oil require exhaust, and much more frequent inspections, which while maintaining continuity of production requires the use of several ovens - used interchangeably in periods of maintenance.
The gas, and oil furnaces used a special design of the temperature exchanger, which transfers the temperature of the flame into the furnace chamber.
When using gas as a heating; heat exchanger inspections can occur much less frequently than in the case of fuel oil.

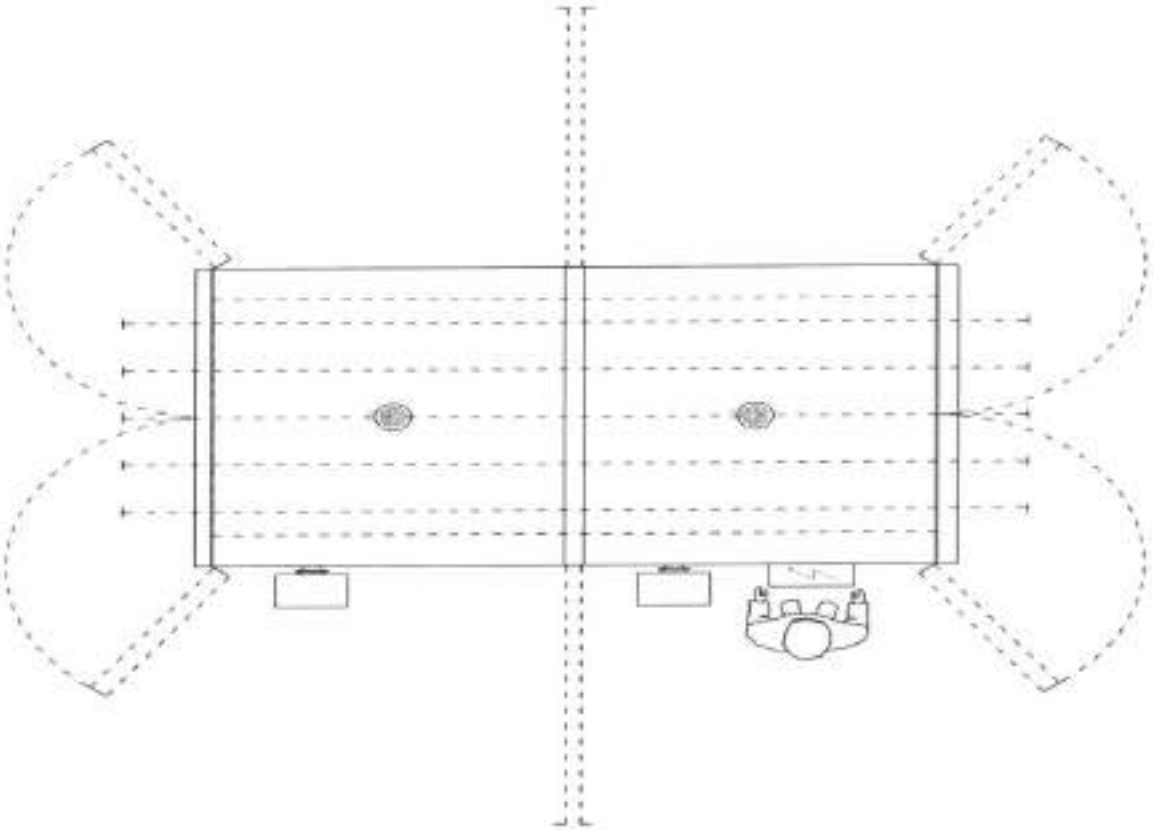
When burning fuel oil (including gas, but in smaller amounts) produce soot and other undesirable compounds, that the frequent use can clog the exchanger - lowering the heating efficiency. Advanced Control of furnaces fueled with oil or gas reduces the emission of carbon to a minimum, however, is not able to effectively suppress the phenomenon, however, these heat exchangers will require periodic cleaning. The signal for the review can be for example. Longer heating of the furnace, and the approaching date in which we recommend to clean.

The electric furnaces require high quality electrical installation and, in some cases, a dedicated power line, and at least once a year, inspection by a qualified electrician to carry out the measurement of insulation resistance and effectiveness of the ground. We get in return equipment that will work reliably for many years. Easy to use and maintain.

A special type of electric furnace is a gravitational furnace. That type is good for less numbers of details, and does not require a large working area due to the smaller number of elements, of which it is built. - electrical components which has is a heater and control - advantage of this furnace is the simplicity, the lack of noise caused by operation of the motors and possible small (less than in the case of other types of ovens) dimensions. What comes with it, it can be used in paint shops experimental, renewing wheels, and other smaller plants that put on the economy, due to the smaller scale of operations, etc.

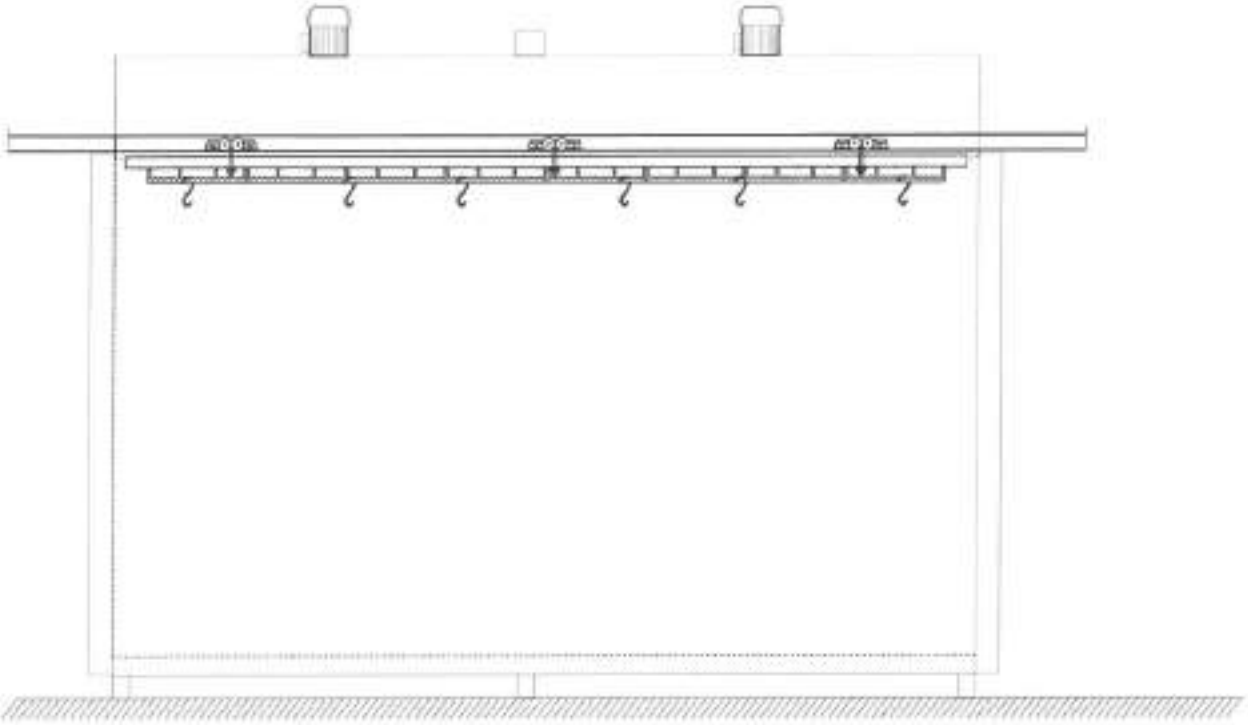
# One oven - many possibilities

## Furnaces single, and multi-chambered



Depending on the application of the furnace, and the specific production conditions, the furnace may be provided with several chambers - usually the two compartments controlled independently, simultaneously or alternately.
The multi-chamber furnace is used partition (bulkhead), which allows different (separate) processes in each section of the furnace. What are the advantages of this solution - the convenience, flexibility and profitability.

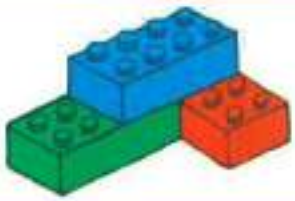
## Ovens with conveyor



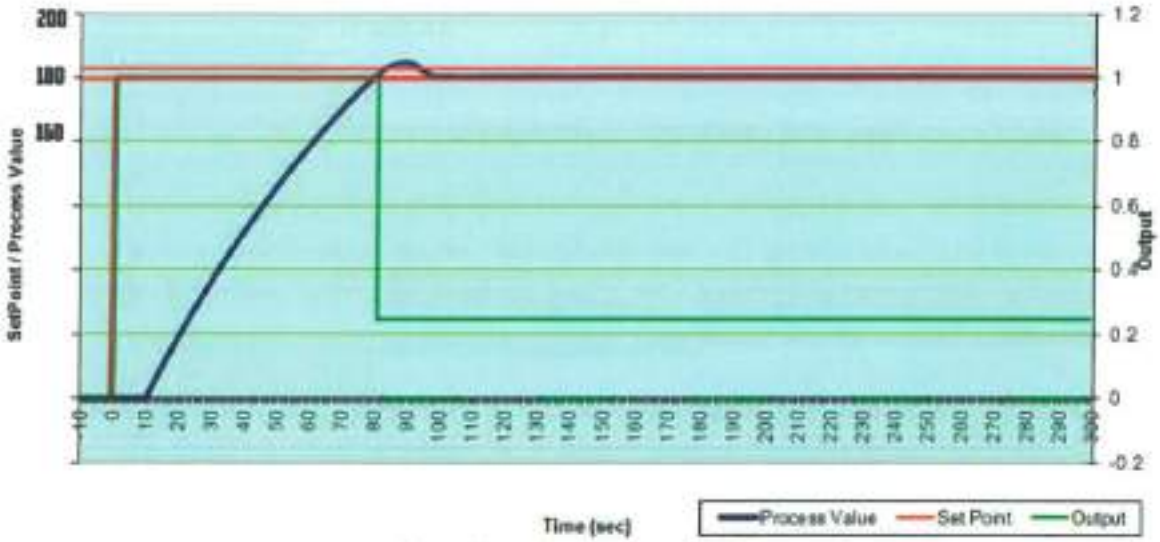
This type of furnace used in automatic lines within the track of the conveyor. The conveyor path can pass through the furnace (furnaces sides open), or "wrapped" in the oven, and return the same way (ovens unilaterally open). Forms can be more.

# Advanced Furnace Control - PLC

*We used logic controller in conjunction with a panel HMI, through which it became possible to introduce technologies such as MTS, ThPID (compensation for loss hysteresis) and ROMER iCure.*

| **Possibilities of PLC + HMI** | PLC + HMI - Advanced control over the process |
|---|---|
|   | The history of this process without time limits.<br>Firing curve after firing - invaluable help in case of errors in coating and designing the process of the firing . |
|  | Read / Write story stick. |
|  | Many other features that can be added. |

# MTS (+ThPID - electric stove)
# ROMER® iCure




Temperature measurement in hand ous locations of the oven (two or more thermocouples), sampling by the controller PLC, the actions taken. Maintaining the desired temperature of ± 5 ° C. Registration parameters of firing, detailed statistics - temperature, time, and consumption of the heating medium.

# Elements included in the ROMER® furnace

Ovens can have an advanced protection system components (as ordered) which includes:

Protection of engine of mixing fan, sensors failure / phase sequence, thermal protection of elements the furnace - including burners, electrical and mechanical components.

If you have a problem with the furnace, the PLC controller by using special algorithms determines whether the firing process can be completed in spite of faults, whether it should be stopped immediately; cutting off power to the furnace, to avoid electric shock, damage the stove, and its elements.

After a power failure, the controller can resume the cycle automatically. Each event is recorded (temperature, which 2min, significant change - when she registered mistakes - immediately).

The operator is informed by means of light, sound, and other communication channels provided.

Technology ROMER iCure save the event log, and thanks to the program on the PC supplied together with a stove, you can view the whole story at any time.

The media on which it is located can be moved between computers with the application iCure installed.

# Standard and optional items in ROMER® furnace (depends the order)

Thermal protection

Thermocouples


Emergency STOP

Dust filters

Main switch

Socket USB

Adjustable hinges

Protective locks

PLC controler

Phase sequence detectors

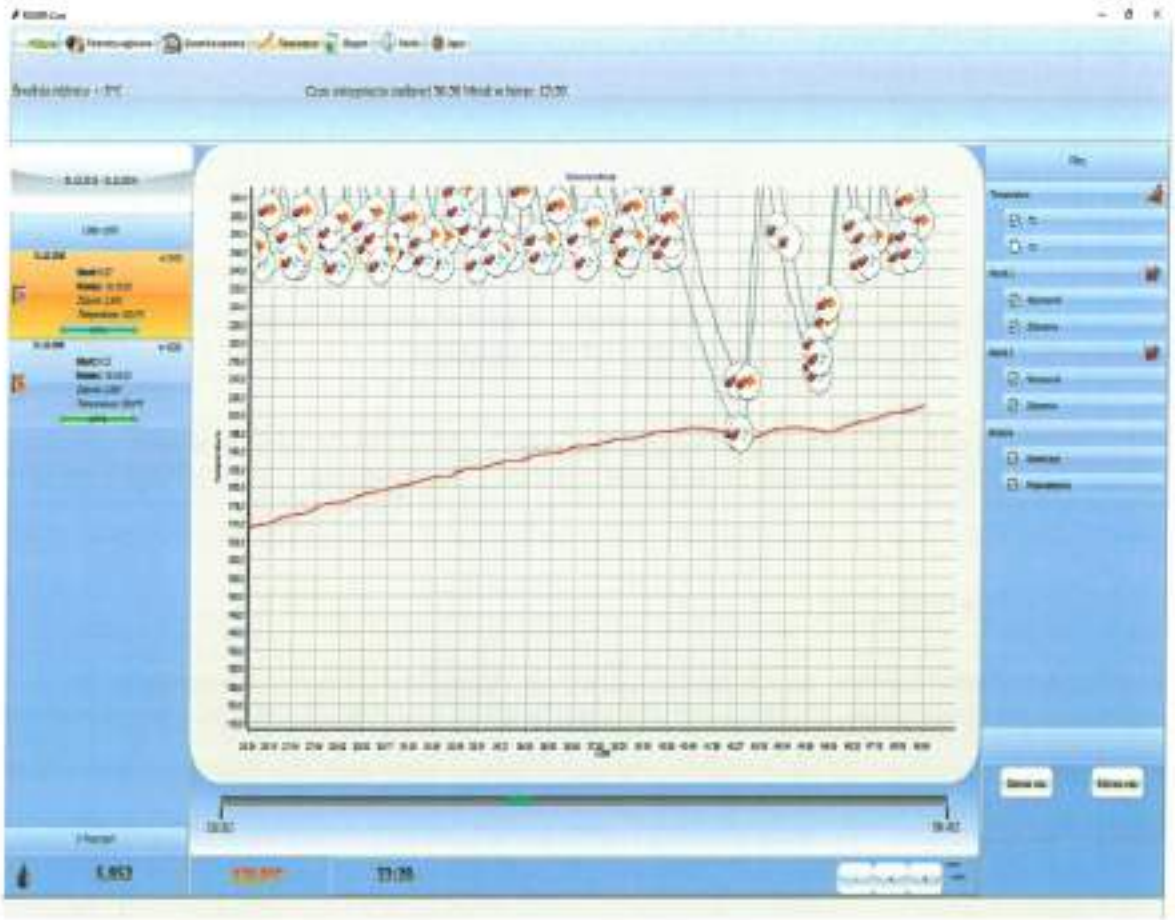
Touch panel

Automatic chimney

Buttons and indicators

Our Motors

# iCure



**iCure** - the story of the process in your PC.

# How does iCure?

**The system iCure includes:**

1. Firmware (firmware PLC + HMI)
2. Software (on the PC)
3. USB memory

Is the USB device must have a specific parameters?

No, you can use any popular USB flash drive - the data recorded by the system iCure are so small, that drive 2GB should be enough even for the hundreds of burn (depending on the length and complexity of the process).

After installing the memory stick into the USB port - both the cabinet and the computer, it could be detected by the software and then take the appropriate action.

In the case of the computer

insert the USB flash drive, run ROMER iCure app - supplied with the furnace.
This program detects iCure system data and will automatically load and then put on the chart.

**Filtering results**

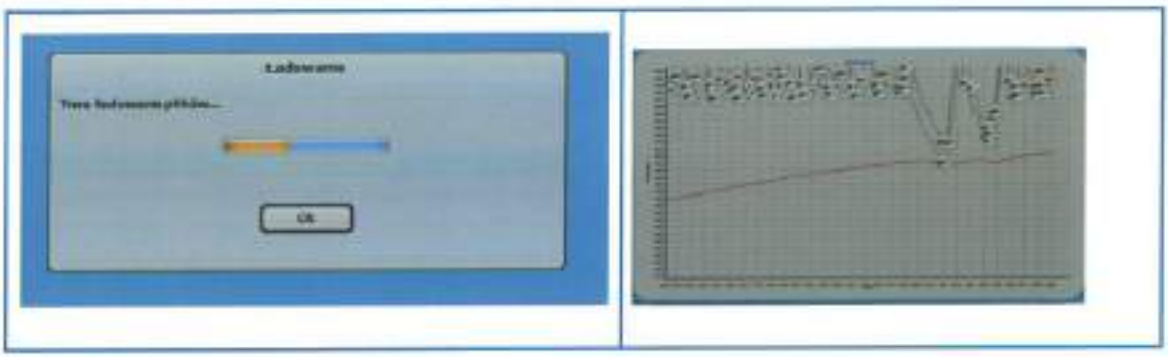
The data loaded into the program can be viewed using various types of filters.
Data can sort depending on the time (date, hour, minute), where the firing (the stove; first chamber, second chamber, or one selected chamber)

The program on the basis of historical data, and the calculation of the whole process - shows all events (what, where, and when). What was the temperature in a given year, day, month, hour - stove worked,or not - how many times during any period was working. Costs of burning process (quantitative fuel consumption), what could disrupt the process; when elements has not been well coated. Interruptions in the supply of heating agent, burner errors, loss of electricity, and many other statistical data are recorded by the iCure system.

*Are these data will need me for something?*

*These data are helpful in diagnosing errors, forecasting spending, and verifying the profitability of production.*

## A computer program - iCure



First, the data are loaded into the program, then the program places them on a graph, you can freely manipulate them using appropriate filters

*Note!!!*

*The graph is a lot of images that obscure the relevant information, if we can do something about it?*

*If a monitoring period is long, or have many events that the chart may appear multiple pictograms - that restrict some visibility chart / events that interests You.*

*In this case, just use the zoom button (change the scale of the preview) and interesting data will be clearly visible.*

# On the side of PLC + HMI

*in cabinet - control box of furnace*

| The USB port located on the control cabinet | Enable iCure technology |
| --- | --- |
|  |  |

# Touch screen - HMI

*PLC is the brain of the furnace, he controls all the processes. Thanks to the cooperation with touch panel (HMI) the service is pleasant, simple, and intuitive.*

## Control of the burner, seen at the touch panel - HMI

| | |
|---|---|
|  | The burner ready to work |
|  | The burner is purged |
|  | Ignition active |
|  | Burner is working (in case if return – working signal) |
|  | Burner is not working – oven is cooling |
|  | Burner not connected or connection error error |
|  | Burner is failing error |
|  | If gas supply |

| | | |
|---|---|---|
|  | If oil supply | |
|  | If eletrical supply | |
|  | Chimney is open | if ventilation is active then the function inactive<br>When acting on the icon stack icon appears with a hand - this means that the chimney was opened manually - only manually, you can close it. |
|  | Chimney closed (press for open) | |
|  | Fatal error prevented further work | |
|  | Heating: colorful - active, | grey - inactive |
|  | A circulating fan colorful - active, | grey – inactive |
|  | If working – green | If not working - red |
|  | Bulkhead - active | If inactive – image not present |

| | | |
|---|---|---|
|  | Ventilation - active | If inactive – image not present |

# Settings applied by touch panel

*example*

*WARNING !!!*

*All changes of parameters is done by using the touch panel on the keyboard appears, which allows you to enter data in a fixed range (by us).*

The **keyboard is induced** by pressing the point where the value is modified.


"X" indicates the place to be pressed to change the value.
When you press the text that can be edited, appears on the screen keyboard (as pictured above)

***For example:***

modifying the date - first press element to be modified, from the keyboard select desired value and confirm with **ENT** button.

However, if during the introduction we feel that we do not want to save the changes, then press **ESC** button get out of the input mode.

If you committed any mistake, you can undo it by pressing **CLR** button.

**Button functions:**

".", "**0..9**" - determining the value

"**+/-**" - Change sign an entry, eg. change "1" to "-1
(In this case it will remain untapped - because the time, or date does not take a negative value - set by us range is 0..59)
"**CLR**" - Clean data introduced
"**ENT**" - Approve changes
"**ESC**" - Allows you to exit the keyboard without modification.

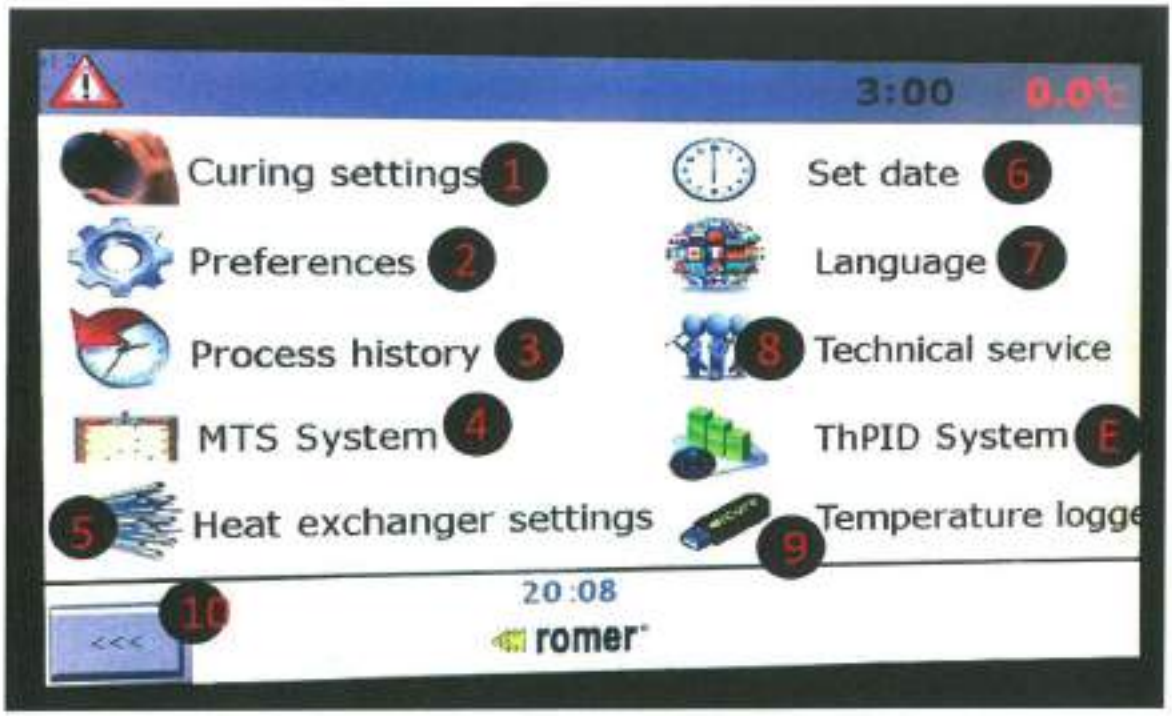
This rule applies to all possible editing data, such as parameters of time and temperature. In any case, we carry out the steps analogous to the above situation.

# Elements placed in this (HMI) panel


1. The upper beam indicator
2. Time to reach the desired temperature
3. Programmed until the end of the cycle (Chamber 1)
4. The current temperature in the working chamber (chamber 1)
5. Errors and failures
6. Current operating parameters
7. Icons of burners (on the right shows the current temperature of the heat exchanger)
8. Status of the furnace
9. Amount of fuel during the current cycle
10. Programmed operating parameters
11. Go to the settings menu
12. From right to left - starting, stopping, and mutting alarm (buzzer)
13. When active bulkhead, and separate processes - "button (CH2)" allows you to switch to the second compartment (*)
14. When active bulkhead and separate processes shows here the current temperature,and the time until the end of the cycle (chamber 2) (*)

(*) These items are not placed in the picture - will appear when you use a bulkhead

**Main settings screen.**




1. Setting of burning
2. Setting the bulkhead (*), ventilation, separate processes (*), ventilation (*)
3. History of operating parameters of the last cycle
4. Spread the temperature in the chamber (reading of several probes - thermocouples)
5. Setting operating parameters of exchangers
6. Date and time settings
7. Language settings
8. Technical service (for service only - options available after entering the code)
9. System Settings iCure
10. Return to the previous menu.

E. option is available for an electric furnace
(*) Optional components, if purchased can be used.

**Language settings screen**


**Selecting language - available languages are:**

1. Polish
2. English
3. German
4. French
5. Russian
6. Spanish
7. Italian

# The scope of work the exchanger

1. High temperature range, which will warm up exchanger
2. Low range of temperature, to which the heat exchanger is cooled
3. Return to the main menu

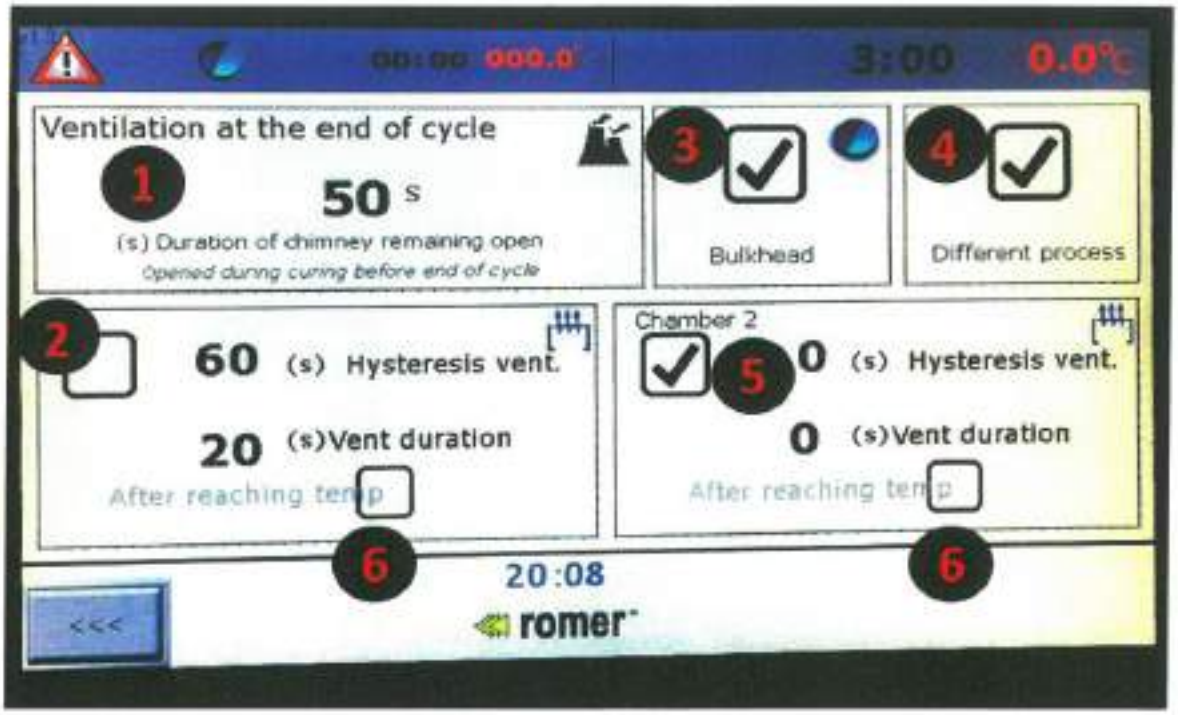
## Description

Exchanger operates at the set temperature range, if it reaches the upper range PLC disconnects the burner - in the case of two-stage burner reduces the power, and starts after cooling to the lower range.

Higher temperature - faster heating, but higher consumption of heating medium - lower efficiency.

Working at high temperatures is not recommended, it shortens the life of the heat exchanger.

# Settings of the chimney



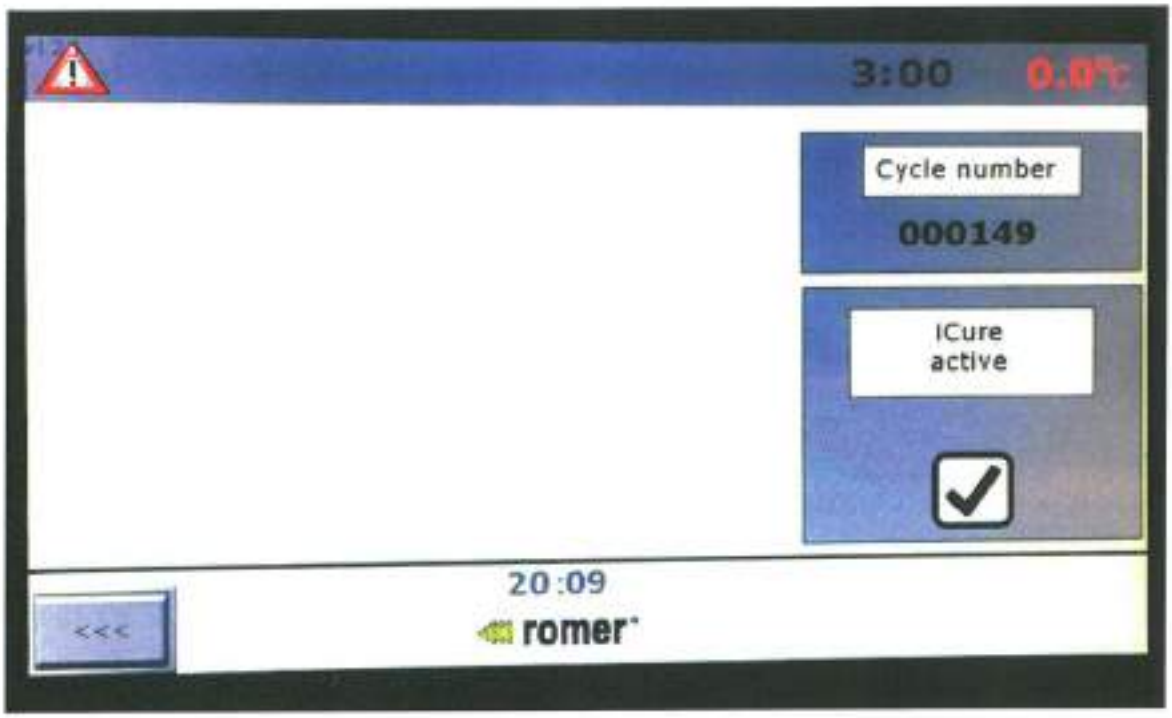

1. Activation of ventilation at the end of the cycle - the time that the chimney to be open.
2. Hysteresis of ventilation - chamber I
3. Information for the PLC - bulkhead active, or not.
4. Information for the PLC - separating processes, or not.
5. Setting a parameter in the chamber II
6. This option allows you to activate the ventilation only when heated oven (using bulkhead - separately for each chamber)

Settings ThPID (*) - minimizing the differences oven temperature from the desired temperature of the process - carried out smoothly.

*(*) Only available in an electric furnace*

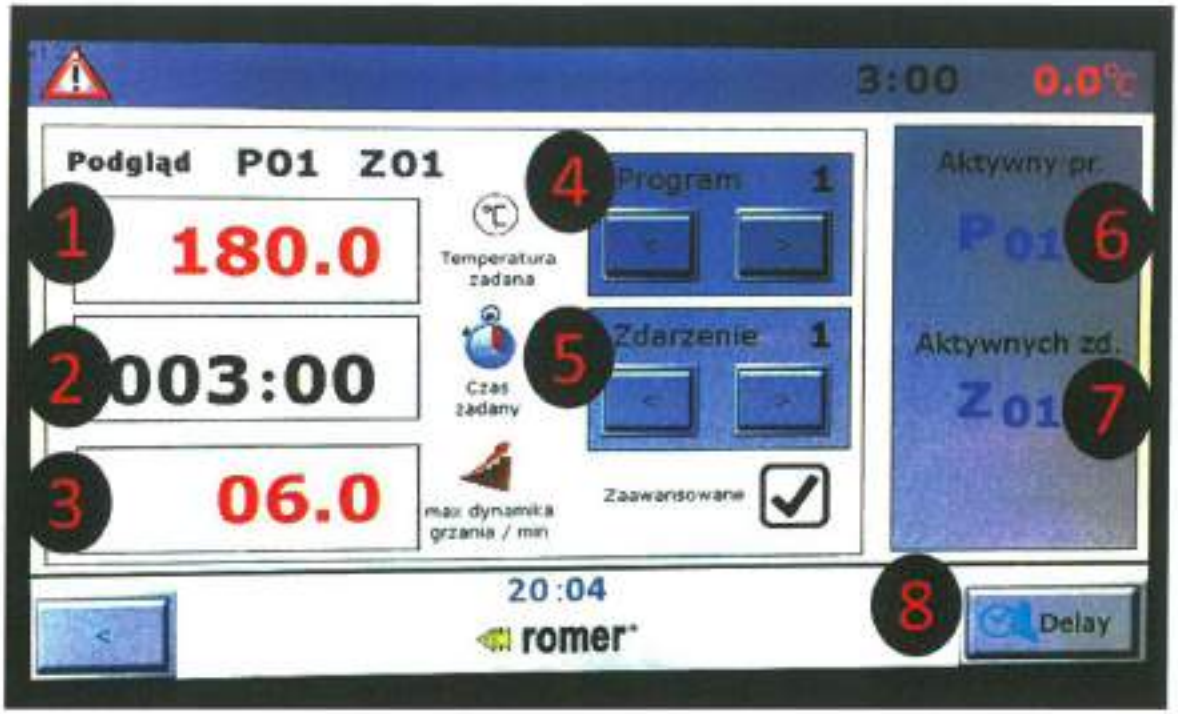
# iCure control

*recording of process parameters*




- The possibility of inclusion or exclusion of the registration process cycle.
- If iCure option is active - controller begins the registration of process parameters.
- USB Flash Drive does not have to be specially formatted, the device does not remove data on it.
- If iCure data are detected - latest will be automatically added.

# Burning settings

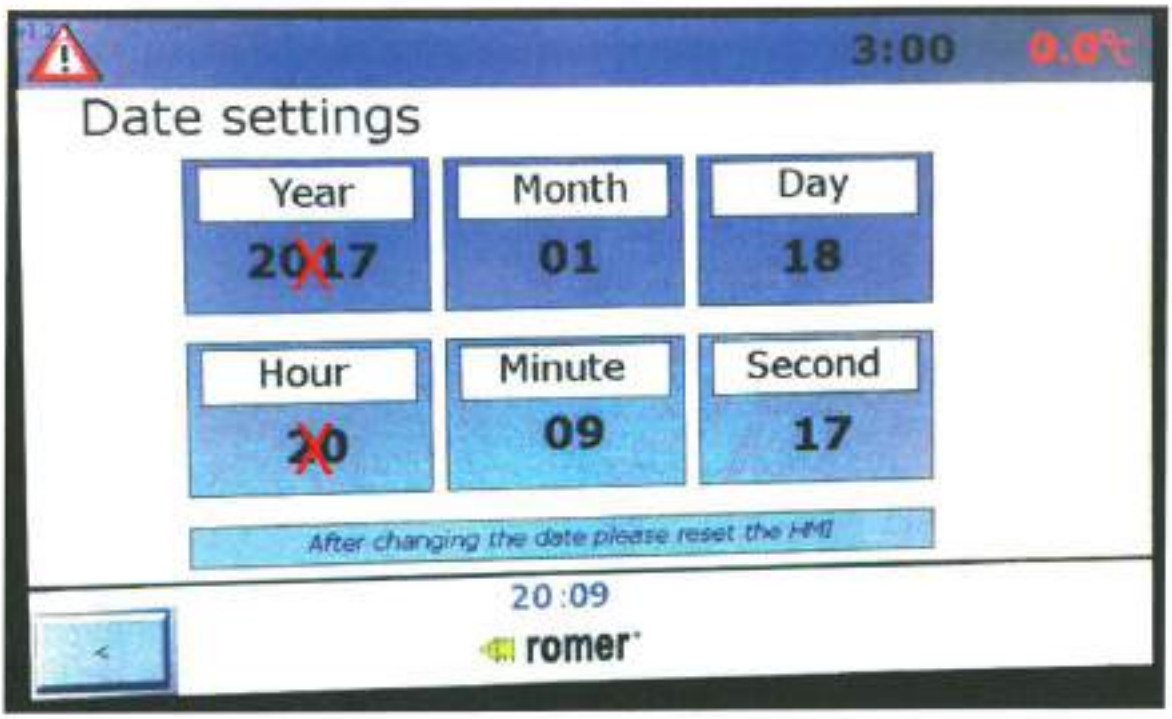



**Currently viewed event (1) of program (1)**

1. Set temperature (currently viewed event)
2. Set time (currently viewed event)
3. The maximum growth rate determines the maximum heating temperature increase per minute
4. Change the viewed program
5. Change the viewed events
6. Active program
7. The amount of active events (If the program are using 10 events - must have 10 active events)
8. Using a delayed start (estimated time when the furnace has to run automatically)

The controller can store 5 programs and up to 50 events, if the number of events is greater than one, they will be released one after the other until the counting of the time and temperature - determined by the heating curve

# Setting the date/time

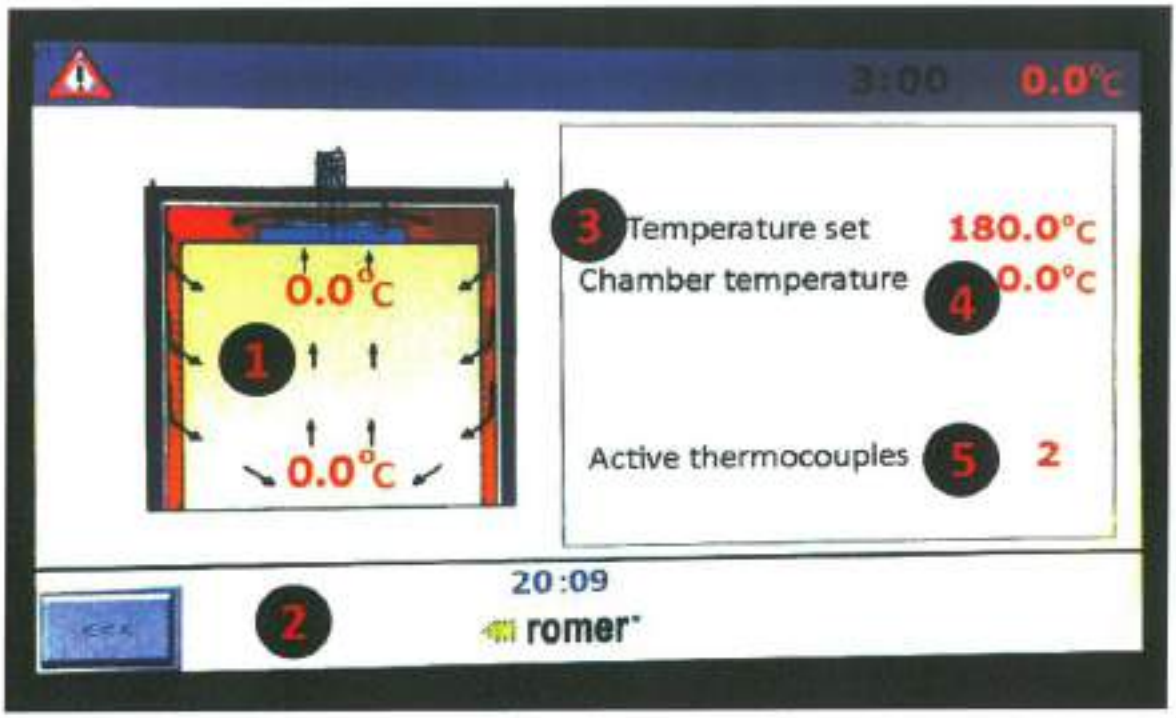



**Changes are saved automatically after each modification.**

To set the date / time, press on the element you want to modify - if modified to be year - press in a place where the year is presented (in the picture "2017")

After setting the desired date and time should be carried out to restart the PLC.

# Temperature spread

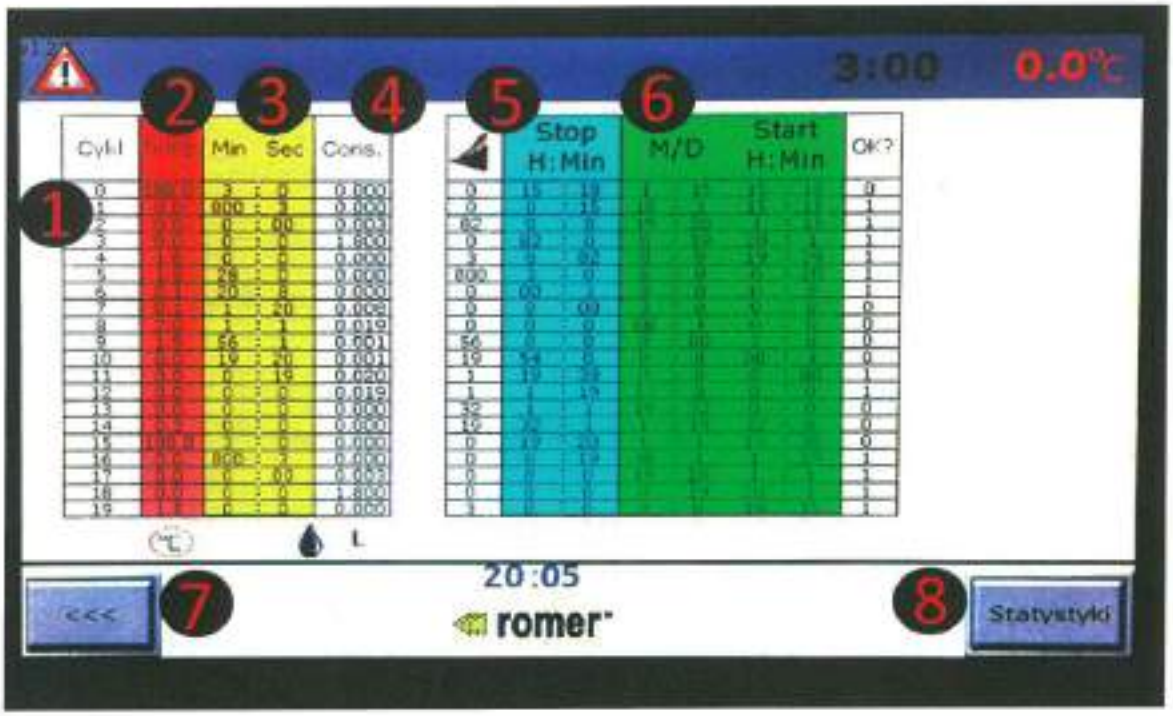



1. The temperature at the ceiling, and the floor
2. Return to the previous menu
3. Set temperature
4. Temperature reading
5. How many thermocouples are taken for sampling temperature

**INFO!!!**

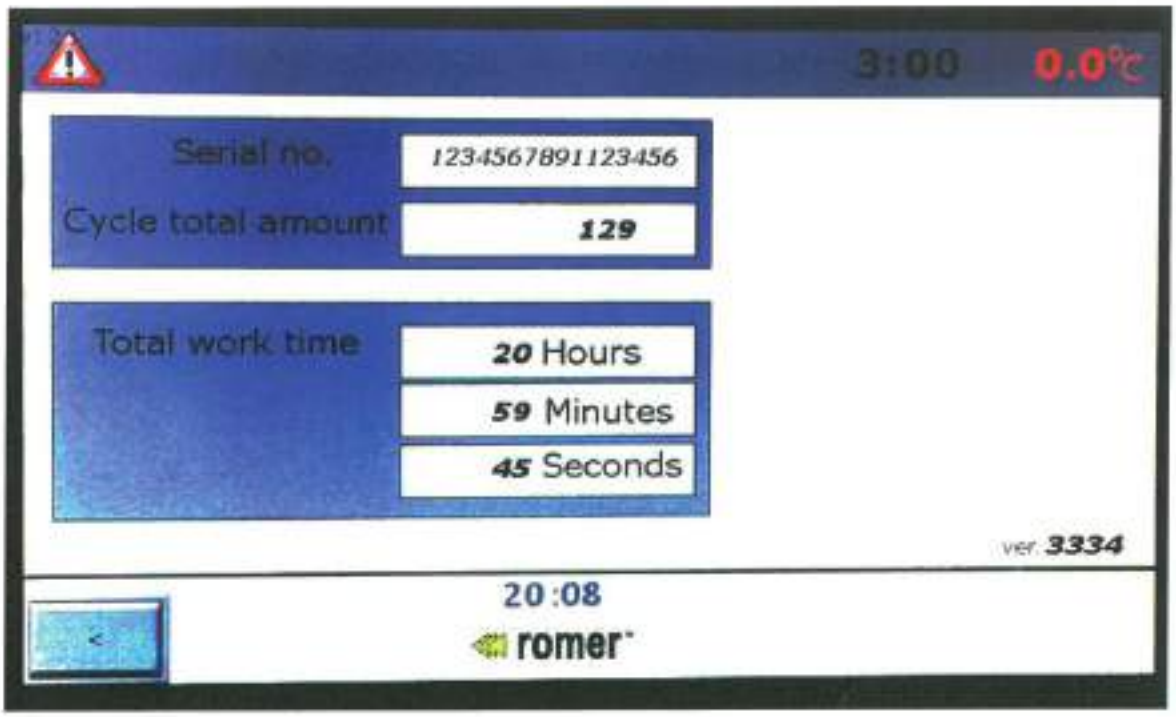
*Symbol red cross / green "check" means a cycle interrupted or completed successfully.*

# Details of the cycle




1. Number of the cycle
2. Temperature of the cycle
3. Time foreseen for the cycle
4. Consumption of heating medium
5. Stop time
6. Start time
7. Return to the previous menu
8. A more general statistics - total operating time of the furnace, how many cycles were performed.

## Time statistics of the furnace




Information about the total time of the furnace and the amount held in the cycles

# Technical description

### Installation requirements

Operating temperatures and humidity:

- above the dew point.
- absolute prohibition storing the furnace in conditions of relative humidity higher than 70-80% - this will result in loss of warranty!

**For example:** exposed in rain or pouring water.

# For what furnace is designed

Chamber the furnaces are designed for curing surfaces painted with powder painting method.
Details coated in this method must be warmed for a certain time at a certain temperature. During the heating the powder on the surface of the object are forming a homogeneous structure well-bonded to the substrate. These furnaces are designed for indoor use.
They can also be used for drying metal objects after washing the neutral washing baths.

The furnaces can not be dry objects painted with wet containing flammable solvents.

The wide adjustment range, and a stable temperature during the melting of the powder makes the furnace useful for any kind of powder paint.

### Description of construction

Ovens are made up of three basic units:

- working chamber,
- heat exchanger,
- electric/electronic circuit.

## Working chamber

Working chamber (chamber melting powder paint). In a ceiling is mounted heat exchanger. In its upper part is exhaust outlet formed during the melting paint.

The ceiling of the melting chamber is a centrifugal fan which provides a uniform distribution of hot air throughout the chamber. The side walls of the melting chamber are finished in metal plate equipped in semi-circular openings to better air flow (adjustable air flow), the air is expelled walls and sucked back to the ceiling (vertical circulation - more common solution) or drawn in one wall and thrown the other (circuit levels).

In the case of the so-called lower transport. "Standard" on the floor there are two beams forming the track, followed by carriages are introduced with elements painted with powder paint. In the case of the so-called transport. "Rails in the floor" in the floor of the chamber are grooves which pulls the truck. In the case of upper transport - the ceiling contain mounted conveyor. Back part of the melting chamber is closed by a wall.

Ovens-shaped "P" does not have a rear wall, but have a second set of doors, and the front door can be opened manually.

The space between the melting chamber and the outer shell is filled with insulating material, resistant to elevated temperatures, which protects the outer wall of the chamber during the heating process.

Temperature sensor controls temperature in the chamber.

On the side wall of the furnace is a control box with electrical apparatus and touch panel - HMI.

On the desktop of the touch panel are arranged controls, buttons and regulators the parameters of the furnace.

## Heat exchanger

Mounted in the ceiling of the working chamber is equipped with anti-explosive flaps automatically expanding to prevent the exchanger. Exchanger is responsible for efficient use of the heat produced by combustion of gas or oil. It is made of heat resistant steel and the remainder stainless steel resistant to high temperatures. In the version of the oil heat exchanger may be partially disassembled to allow for cleaning with the soot formed during the combustion process.

## Electrical system

Furnace it contains controls, placed on the wall (but is not the rule).

Oven with PLC, controll system on the wall.

Control cabinet has controls, buttons, flash signal, touch panel (most soluciones, but not rule), and all others electrical components sufficient for best control of furnace.

The chimney is controlled automatically by electric actuator (option).

# Service and warranty conditions.

ROMER® provides the user with warranty and post-warranty service for the all products manufactured by our company.

We provide warranty service under the terms of the warranty, and post-warranty service on terms agreed between you and our company.

All repairs covered as warranty including damages that have arisen as a result of faulty workmanship: parts, components and assembly, or formed due to defects in the materials from which they are made parts and components of the device we repair free of charge.

We do not take responsibility for damage resulting from the following reasons:

- use of the device incorrectly,
- improper operation and maintenance,
- improper use of powder paints,
- the impact of chemical or electrical damage if not created our fault,
- does not meet the conditions to install the device,
- natural wear and tear of consumables

*WARNING!!!*

*DAMAGES ARISING OUT OF THE FOREGOING REASONS, ARE NOT COVERED. IN THE CASE OF CLAIMS FOR WARRANTY THE "ROMER" COMPANY MUST BE NOTIFIED. BUGS DISCLOSED IN THE PERIOD COVERED BY THE WARRANTY WILL BE REPAIRED FOR FREE WITHIN 14 DAYS FROM THE DATE OF NOTIFICATION OF DAMAGE. WARRANTY IS VALID FOR 12 MONTHS FROM THE DATE OF SALE, AND IN CASE THE FURNACE IS WORKING IN CICLE SINGLE SHIFT. IF YOU DETERMINE THAT THE DAMAGE WAS ESTABLISHED WITH FAULT PROVIDED BY YOU, YOU ASSUME THE ALL COST OF REPAIR.*

# Installation Guide

## the place and setting the oven

*(Legally)*

Curing with the equipment should be installed in a hall that meets the requirements of the current regulations, which are given in section "requirements" of this document.

The temperature of the place for the furnace may not be lower than +15° C.

The location of the furnace relative to the power source should be such that the elements of the connections and cables are not exposed to mechanical damage.

Parameters of power sources should be consistent with consumption of the furnace.

Ensure effective grounding of the furnace.

The oven should be set directly on the floor of the building, on a flat surface, non-flammable, non-sparking, anti-slip and easy to clean.

Distance of 5 meters from the walls of the furnace may include: holes, grooves or damage, which could accumulate and spread the powder paint.

In the workplace, the furnace must be met conditions and regulatory requirements - given in section "requirements" of this document.

Moreover, they should meet the following specific technical conditions:

1. The room should have a height about 1 meter higher than the overall external dimensions of the furnace.
2. The oven should be placed in distance 2.5 meters from the danger zone (coating booths etc).
3. Furnace need free space on the width min. 1,2 m.
4. The width of technical transitions near the oven should be at least. 1.2 m
5. Installation, equipment and apparatus in the room where the stove works should comply with the degree of protection IP-54
6. The room should have ventilation and lighting to provide comfort to use the oven in accordance with the applicable regulations. In addition, if the stove is installed close the spray booth - direction of air flow should be oriented

so as to avoid formation of an explosive mixture in the oven area.

## Electrical connection

The electrical installation of the furnace must be connected to the power supply in accordance with the diagrams.

If the electrical installation of powder coating plant is made in the **four-wire** system the connection should be performed as follows:

Phase conductors L1, L2, L3, the itch or C to the terminal according to the colors; black, red, brown.

Protective PEN to the terminal blue.

In the case there is a **five-wire** electrical connection to the furnace should be performed as follows:

Phase conductors L1, L2, L3, the itch or C to the terminal according to the colors black, red, brown.

Neutral wire N to the terminal blue.

Wire PE to the terminal yellow-green.

***WARNING!!!***

*PHASE WIRES SHOULD BE MADE OF COPPER, THEIR DIMENSION IS DETERMINED BY THE WIRING TABLE*

*GROUND WIRE PE SHOULD BE MADE OF COPPER SHOULD HAVE A DIAMETER NOT LESS THAN THE DIAMETER OF THE PHASE CONDUCTORS AND MUST BE SECURED AGAINST MECHANICAL DAMAGE.*

*POWER CABLE SHOULD BE CONNECTED TO THE HERMETIC JUNCTION BOX. DO NOT USE PLUGS AND SOCKETS.*

| Electric power of furnace (kW) | Diameter of power cord ($mm^2$) |
|---|---|
| 3 - 10 | 4 |
| 11 - 25 | 6 |
| 26 - 41 | 10 |

## Connecting of the ventilation duct

After setting the oven at a designated place in the plant,you must connect the ventilation duct, with a diameter similar to that which is directly conneced with the atmosphere.

In the case of connections drainage channels gases from heat exchangers, each must be discharged separately, not allowed to join the same channel. In the case of connection channels, the exhaust gas will be withdrawn on the burner as explosive. If you change the channel parameters - exchangers and burners require re-regulate the combustion parameters.

## Adjusting locks

The gap between the latch and the lock should be between 3 and 4 mm.
Gap too large will cause the lock will return to the position in a semi-open to the closed position blocking the door.

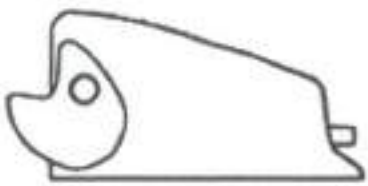
*WARNING!!!*

*After relocation of the furnace may be necessary regulation of locks and door hinges*

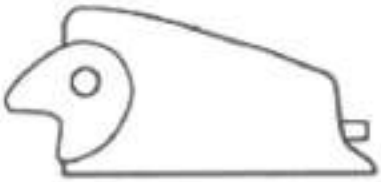
- *adjustment is done using the Allen key type.*

Lock in a **bad position** - because of improper installation (closed - not locked)

Lock in the **open position**



Lock in the **closed position**



Power adjustment clamp lock is carried out key type "Allen" and regulates only the power of spring's pressure. The more tightened the screw, the more power you have to use that door opened.

**Precautions:**

1. slamming is prohibited - possible damage of lock
2. always make sure that the lock is in the correct position, violent attempt to close in the closed position it can irreversibly damage.
3. adjusting the lock of the doors is not enough, you must re-adjust the hinges.

## Adjusting the door wings

The hinges on the doors are equipped with "beans".

Adjusting the wings is possible by loosening the bolts and movement the doors on the hinges. Slightly loosen the screws on one side of the hinge to allow the adjustment. After adjusting the hinge, tighten the screws.

***NOTE!!!***

*Be careful with this - the wings are threaded internally, the damage will be irreversible.*

# Instructions and safety

## general requirements and regulations

Roast with the equipment should meet the requirements specified in this documentation and other applicable technical regulations for construction, commissioning, operation and testing of control.

Ovens oil, gas in the design, materials and workmanship meet the requirements of health and safety contained in following these standards and regulations:

1. **PN-92 / N-01255**: the colors and characters of safety.
2. **PN-84 / Z-04030.01**: protection and air quality control.
3. **PN-92 / E-05203**: protection against static electricity.

- products used in buildings and hazardous areas desired explosive atmospheres.
- materials and methods of test for electrical resistance for areas desired explosive.

4. **BS EN 60529: 2003**: degrees of protection provided by enclosures.
5. **PN-EN 50274: 2004**: low-voltage switchgear and control gear.

- protection from electric shock.
- protection against accidental direct touch of hazardous components.

6. **BS EN 60947-1: 2002**: switchgear and low voltage control - part 1.

# General provisions

**specific**

1. The room in which the stove is installed should be closed tightly and properly ventilated, and the concentration of dust and gases do not exceed the emission limit values. In addition, the room may not be exposed to draughts which cause discomfort or gusts of air that may cause spray powder paint, which are covered with painted items, and the temperature of the air in the workplace the oven should not be lower than + 150 c.
2. Wall surfaces and floors should be constructed so as to allow the cleaning at the appropriate level, to prevent fire or explosion hazard. The above also applies to clothing support that may not be the source of the contamination. Cleaning should be carried out by means of a suitable industrial vacuum cleaner, suitable for working in explosive.
3. Floor in place install a furnace and a 5 m from its walls must be non-flammable, not sparkling , slip-resistant. On the surface there should be holes, grooves, or damage, which could accumulate and fall behind the powder paint.
4. The danger zone. During operation the oven inside and outside at a distance of 2.5 m from the input objects covered with powder, may occur explosion hazard zone. Fire hazard zone may occur within a distance of 5 m from the furnace (from the input objects coated with powder). In this connection, that the size of the fire hazard zone depends on is also from other devices operating in the room install oven, it must be determined in accordance with the applicable law, having regard to the liked what is installed in the furnace and equip it in suitable extinguishing media. The danger zone should be appropriately labelled. In explosion hazard zone may not be the source of ignition in the form of open flames, sparks, or electrostatic discharge and hot items to the temperature:

    a. 2/3 of the ignition temperature of the mixture air-paint
    b. temperature of smoldering the powder paint reduced by 75º C.

5. The storage of powder coatings and other flammable material in the fire hazard.
6. Personal protective equipment. Attendant staff bake must be equipped with protective clothing and footwear with proven properties of anti-electrostatic.

    a. The resistance the soles of footwear should be less than or equal to 1MΩ.

b. Clothing, lingerie, headwear, respiratory and eye protection must be made of material anti-static, gloves must be resistant to high temperature (250°C).

7. Wires and connection elements must be of adequate mechanical strength appropriate to the media used in the oven.

   a. In addition, should not accumulate static electricity, able to call unsafe discharge spark ignition.

8. Cleaning the oven and the place in which he works should be carried out at set intervals depending on the amount of powder used in the unit of time. The operator must regularly clean the surfaces of floors in the furnace chamber and the fan impeller if needed (may not be necessary).

9. The user is obliged to comply strictly with the provisions contained in this manual (devices and procedures). Painting procedures shall draw up on the basis of User Manual of devices and existing legislation taking into account the requirements imposed by the local conditions, in which you have installed the stove.

10. Powder coating oven service personnel must be trained in health and safety related to the workplace, exactly know and comply with the provisions of the operating instructions and procedures. Training and checking the news personnel should be repeated at least once a year. The person conducting the training must have the appropriate qualifications for health and safety in construction, maintenance and safe operation.

11. Oven is designed for powder painting only.

# Risks

During operation of the furnace for heating objects painted with powder paint, you may experience the following hazards:

1. Electrical shock
2. The outbreak of a mixture of powder paint with the air.
3. Fire.
4. Pollination.
5. High temperature.

## Preventive measures

To avoid hazardous conditions, place the installation and operating personnel, are equipped with adequate protection, the use of which prevents these threats.

### Preventive measures against electric shock

The construction of the furnace together with the equipment must be good grounded. Periodic testing ground resistance, insulation resistance, and checking the status of equipment and electrical connections, provide effective protection against electric shock, and many other hazards.

## Precautions against explosion

1. The stove and its equipment, including electrical equipment installed in an explosive atmosphere are dust-proof (IP54).
2. Prohibition of the use in potentially explosive atmospheres, open flames and sparks emitting devices.
3. Daily cleaning of the oven and the space around it as well as protective clothing prevents excessive concentration of powder in the air.
4. The floor and walls of the building, installation of the stove, made of materials with appropriate resistance to prevent static discharge.
5. The use by the operating personnel, appropriate clothing prevents electrostatic discharge.
6. The use of temperature sensors that will automatically stop operating the heating unit when the air temperature inside the working chamber reaches a predetermined value. This prevents overheating of the furnace.

7. Effective ventilation provides ten times the exchange of indoor air furnace operation, prevents the formation of an explosive mixture of air and powder paint.
8. In the event of a failed start of the burner, make sure that the combustion chamber is not in arrears fuel.
9. Servicing burner according to the instructions.
10. Before starting the cycle, make sure that the burner is operational.

**Preventive measures the occurrence of fire**

In the hall of the furnace must be installed permanent and portable extinguishing accordance with the general requirements of fire protection, and other relevant national legislation.

Precautions against dust
Effective ventilation of the hall where the stove is working to prevent the formation of dust.

In an emergency, the staff are obliged for personal respiratory protection by using masks and other types the personal protecion.

**Preventive measures against increased temperature**

- The housing of the working chamber is lined with a suitable insulating material, which effectively protects the outer walls of the furnace from heating up.
- The channel is protected by a suitable cover.
- Wear appropriate clothing and gloves protects heater use against elevated temperatures during the removal of the working chamber painted items.
- Maintain at least 1m of free space above the oven.

**Preventive measures against carbon monoxide poisoning**

- Service the burner according to the instructions.
- Mount carbon monoxide detector around the installation.
- Make sure that the chimney is the way

# Programming firing admission

An event is the parameter of the time and temperature. The cycle time is counted down after the fulfillment of the temperature parameter, the tolerance range of usually ±5 degrees Celsius.

For example: if the target temperature is 180 degrees, the time will be counted down only at the moment when the temperature will amount to a minimum of 175 degrees. This prevents the countdown to the moment when the temperature is too low.

## Programming of multistep burning

To program the firing multistep (with more than 1-number of events)

Set the number of active events on this amount.

To edit an event, you preview them using the navigation preview.

WARNING! If we want a cooling of the oven or decrease the temperature at a specific time, then you should report it to the appropriate sales representative. The oven then be equipped with a ventilation system, and special software for cooling at a specified time, standard software does not include such options.

# Operation of the control box

1. Buzzer - completed process or alarm event
2. Main switch (0/1)
3. Reset failure (button-indicator)
4. Touch panel
5. Stop failure (emergency stop)
6. Power indicator

1) To turn off the buzzer, press mute on the touch panel (4). Buzzer is activated in two cases; when the process has been finished normally - or when the burner failure - interrupted the firing process (or not, depends the failure type).

2) Main switch is used to on/off the main power supply. In the vertical position (OFF) is switched off - in horizontal (ON), the power is supplied.

3) When there is a failure of one of the components, operation of the furnace will be interrupted and the button is highlighted in blue indicating reset the fault needed.

The button will be activated only at the moment when the fault is removed. After removing the fault, press the button to resume operation.

4) Touch panel - HMI is responsible for communication with the user and partly for the execution of the program, as it cooperates with the controller PLC complementing its functionality.

5) General "Emergency Stop" button , press to turn off the unit - totally cutting the power. Turn clockwise to release it.
Release "Emergency Stop" requires the reset of failure with button "reset" - blue (3).

6) Power indicator - indicates that the device is energized.

## Signal tower light


1. White color - signals the end of the cycle
2. Red - indicates the work state
3. Green - signals the furnace is ready for operation (live)

# Operation with bulkhead (Optional)

To start the bulkhead, go to the parameter menu -> "Preference" and check the option "bulkhead", the bulkhead is activated and the top bar will appear on this information.

Before inserting the bulkhead wall, remove the side plug.
Insert the bulkhead to the side walls while maintaining the necessary precautions - weight of the bulkhead is more than 30kg. To carry out the operation you need a minimum two people . In order to work without partition, in a place the bulkhead put a plugs, and the option "bulkhead" on the touch panel should be un-checked (without "pipe")

# Operation ventilation and chimney opening

1. If selected, the airing of the first chamber is active
2. If checked, the ventilation will take place only after reach the set temperature, if unchecked - ventilation will take place from the start the oven.
3. If selected, the ventilation of the second chamber is active
4. If selected, the ventilation of the second chamber will take place only after reach the set temperature, if unchecked - ventilation will take place from the start the oven.

**The chimney is opened in the following moments of the curing:**

1. Automatically at the end of the cycle, if you set the number of seconds "chimney-opened" to the end of the cycle is the same or less.
2. Automatically, if the automated system is installed.
3. Manually after pressing the "chimney" icon on the main screen of the chimney options, which is indicated by a icon with cloud

# Operation with separate processes

To run separate processes, you must first activate the bulkhead (1), if the stove is equipped in ventilation - the option to purge the second chamber is present. Now on the main menu will show a button that can control second chamber independently.

# Start firing process

### The first burn - Precautions

If you do not have experience with specific detail to burn out, or changed the type or species of powder paint, is very important to run the test of burn before you get to the destination charge.

### Starting firing process

Before you begin, make sure the latches of the door are in the correct position. Set the temperature and firing time according points of User Manual. Using the main screen, boot the cycle by pressing "START".

After pressing the button, the cycle will start.
During the cycle, the burner will switch on and off while working within the set range.

After reaching the set temperature the countdown will begin. After the time,if the cycle is complete is indicated by the buzzer, that can be muted by pressing "MUTE" which appears next to the "RESTART" or 'START'. Then the "START" button will take the word "RESTART", which means a new start a cycle in the range of parameters of the previous cycle. The cycle can be stopped by pressing "STOP" (or "Emergency stop" in case of emergency) after approved the operation by pressing the confirm button.

# After work

After work, oven must be cleaned from the powder which lies in the different parts of the furnace and near.

Regular cleaning of the oven will keep its longer life.
Residual powder paint in the chamber can have a significant impact on the quality of the surface of the cured coating and the life of the heat exchanger.

These activities should be done with a vacuum cleaner, adapted for use in hazardous areas.

To safely perform these operations make sure in advance that the stove is not hot in the middle while maintaining the necessary precautions. For properly perform these steps, the oven must be turned off with the main switch.

# How to choose firing parameters

Each package / box of the paint, have a specific firing parameters, ie. polymerization time and the polymerization temperature. Producers of the powder paint are indicating parameters for curing plates with a thickness of 1mm.

For different thickness of parts, these values will changing. The thicker detail, the longer it will absorb the heat and the more time may be needed for good polymerization.

The temperature of the workpiece and the temperature in the chamber is a very important factor, which means that it has a significant influence on the heat of the oven, the cooling and the residence time of the burnt parts.

Details should be segregated - introduced into the furnace in batches of similar weight, size, color and thickness of the coating. These conditions will ensure a well-cured coatings and all carried out in the optimum for the paint and detail time.

# Maintenance and repairs

## Cleaning the heat exchanger

Cleaning the heat exchanger is necessary. During combustion produces soot, which narrows the channel through the heat exchanger, significantly influencing the parameters of agility. Exchanger was designed so that the cleaning was possible. Exchanger should be cleaned as needed - it depends on the individual parameters of the burner, altitude installations, atmospheric pressure, impurities are burned media, etc. As a rule, it is a period once every 6 to 12 months in case 8-hour working day. Monitor the combustion parameters and the content of carbon monoxide in the exhaust gas is good idea and/or necessary for proper work of the burner and heat exchanger.

Exchanger can be cleaned in two ways.

Easy - with special powder for exchangers (You can buy it from us)
Hard - by disassembling the the oven and exchanger - mechanical cleaning

Less invasive (easy - which should be considered as a temporary maintenance) by special powder for heat exchangers (ask our sellers), which burns soot. Its application is carried out in a simple manner, take off the torch and spray the powder in the combustion chamber, maintaining the personal precautions - a highly corrosive substance.

In case its application, follow the instructions contained in User Manual - section "heat exchanger cleaning" - here it is only the information about possibility of application this method temporally.

Hard (more invasive), removing the interior trim around the ceiling of the furnace heat exchanger and opening your screws on the air mixer (triangles) carefully cleaning each of the tubes and the combustion chamber.

We recommend using both methods - easy in shorter intervals and more difficult at least once a year or if is necessary.

# Inspections of burner

Inspections of burner are required and recommended.

Systematic reviews have a positive impact on costs of operation and safety.

Schedule not observed burner may be an emergency, and consequently installation dangerous.

Improper combustion parameters, clogged heat exchanger, threatening an explosion or poisoning personnel with carbon monoxide.

To the inspection of the burner should be selected outside local company specialized in the gas/oil burning installations or contact for this purpose with us.

**Overview of electrical system**

After the first year of operation, and then every 6 months check the condition of connections and equipment in the control cabinet and on the stove. In case of excessive wear, equipment or electrical components (eg. contacts) must be replaced. All cables should be rigidly clamped in the terminal strips and equipment. Connections high-power control with extreme accuracy because it may cause fire, burns, or a dangerous electric shock (maximum current 32 - 64A - too wide range of operating currents to effectively able to work differential protection)

*Important !!!*

*Unused furnace absorbs moisture, then requires heating in order to get rid of moisture from electrical components and insulation.*

*Short circuit may be result of moisture.*

Measure the resistance between the main earth terminal and the furnace:

1. the door and the housing of furnace,
2. the walls of working chamber (melting).

The value of this resistance must not be greater than 1M Ohm.
Also, once a year, check the insulation resistance, the value of which can't be lower than 0.1 M Ω.

# The most common problems and defects

| Symptom | Cause | Solution |
|---|---|---|
| The burner at the start seems very loud sounds "shoots" | Too much air or clogged exchanger | Adjust the burner, check the condition of the combustion chamber - especially when the furnace oil |
| "No burner signal " | Protruding plug, broken wire, broken control unit | Plug the plug, check the cable, or replace the burner control unit |
| "Failure burner" | Burner does not start. Defective magneto. | Reset by button on the burner housing and try to start it again<br><br>Replace the spark arrester |
| "Failure burner" (Oil) | Clogged nozzle. | Clean the burner nozzle |

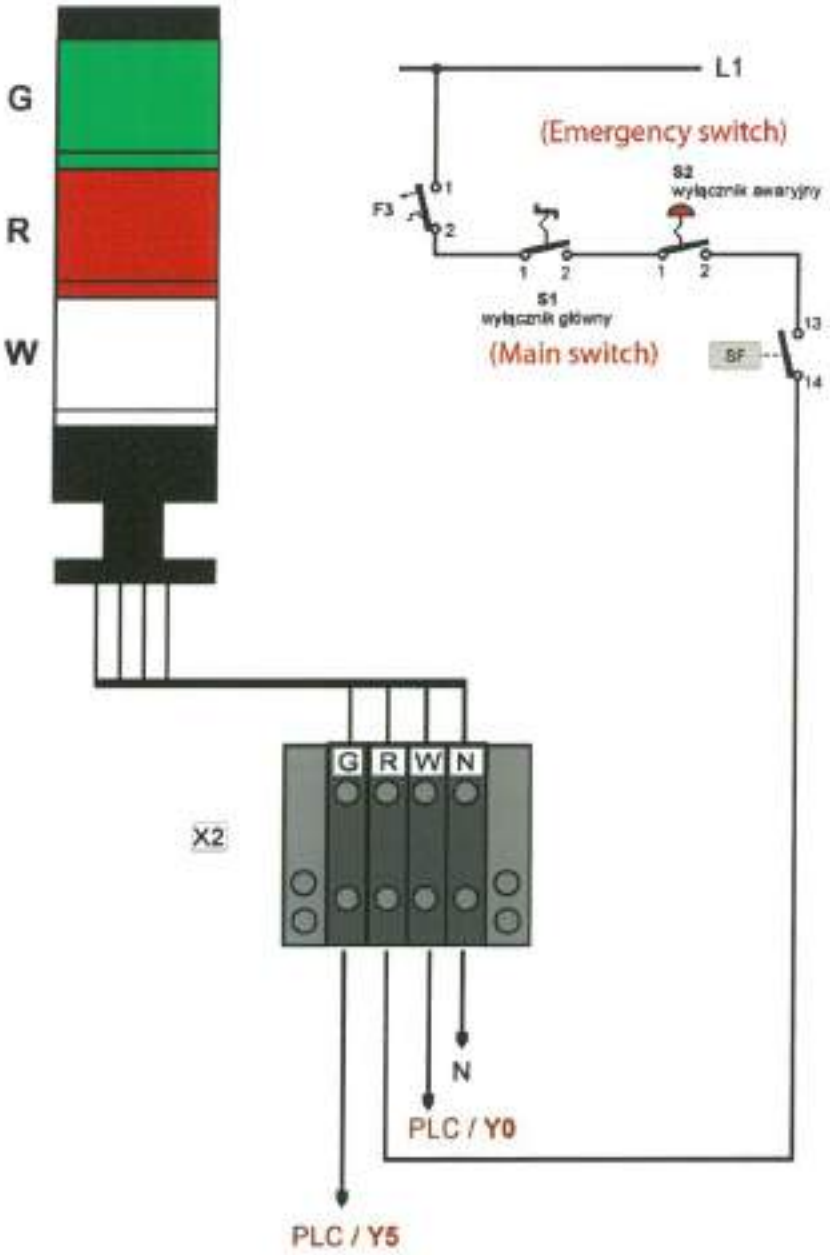
| | | |
|---|---|---|
| | No oil hoses - defective oil pump, hose or protection zone. | Reset the burner and try again, you try to pour oil hose, replace the pump<br><br>On elements appear soot Check for leaks exchanger Seal exchanger - the joints may loosen the screws |
| Smells due to the escape gas | | Check the tightness of the gas.<br><br>Seal the gas system |
| The door does not close | The lock has been the deregulation door or dropped | Adjust the hinges and locks |

# Oven and components

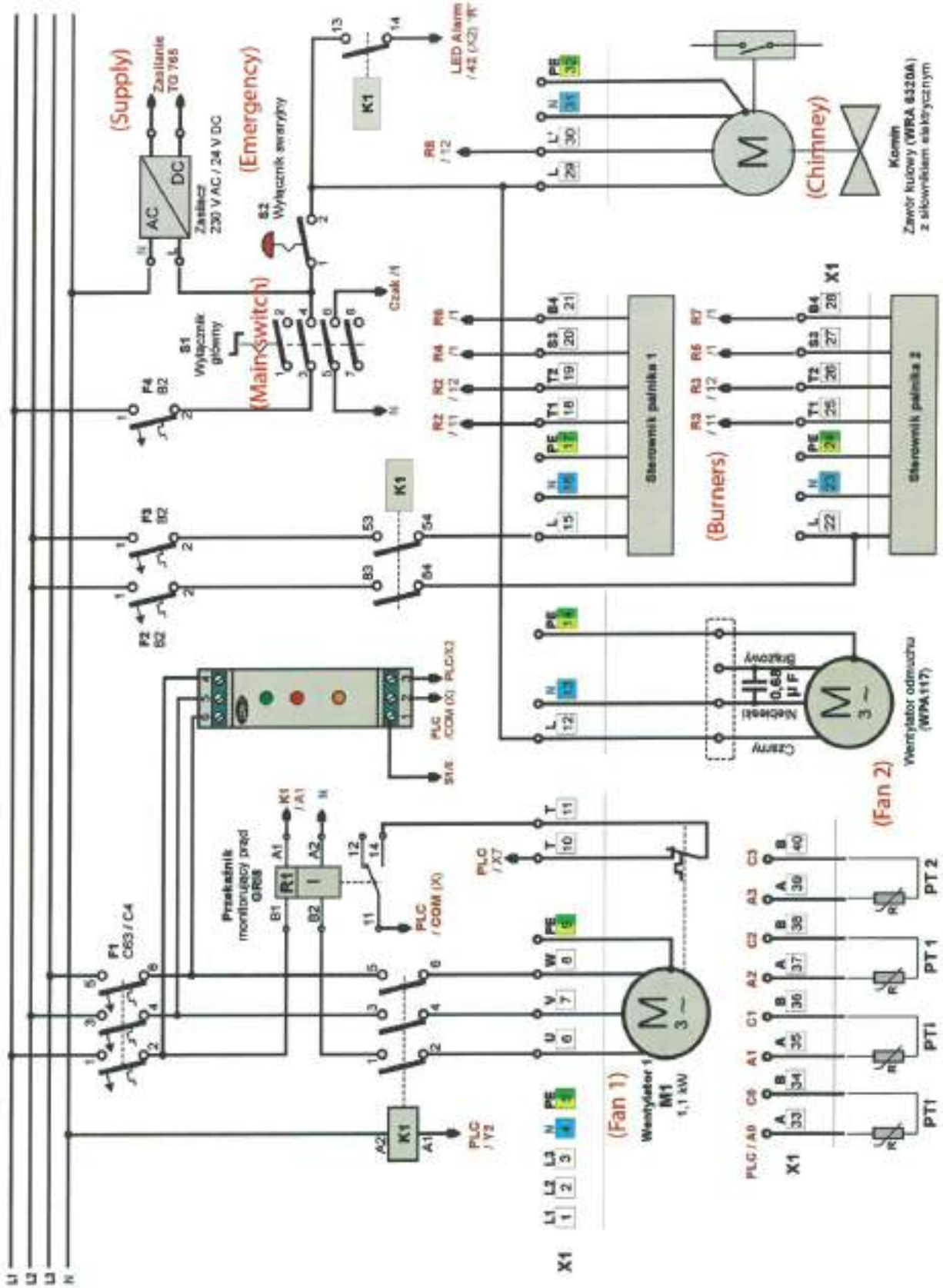
| | |
|---|---|
| The heater | |
| Heating power | 30 kW |
| Electrical power | 31.1kW |
| Power type | 3P 380 - 400 V 50/60 Hz |
| Max temperature | 230 ° C |
| | |
| Exterior dimensions | |
| Interior dimensions (chamber) | |
| | |
| Parameters of the fan motor (mixing) | |
| Electrical power | 1.1kW |
| Power type | 3P 380 - 400 V 50/60 Hz |
| | |
| Motor the chimney | |
| Electrical power | 2W |
| Power Type | 2P 240 V 50/60 Hz |
| | |
| The motor parameters strengthening of AGU chimney | |
| Electrical power | |
| Power Type | 240V 50/60 Hz |
| | |
| Cooloing motor parameters | |
| Electrical power | |
| power Type | 3P 400V 50/60 Hz |

# Schematic diagram of the elements of the furnace

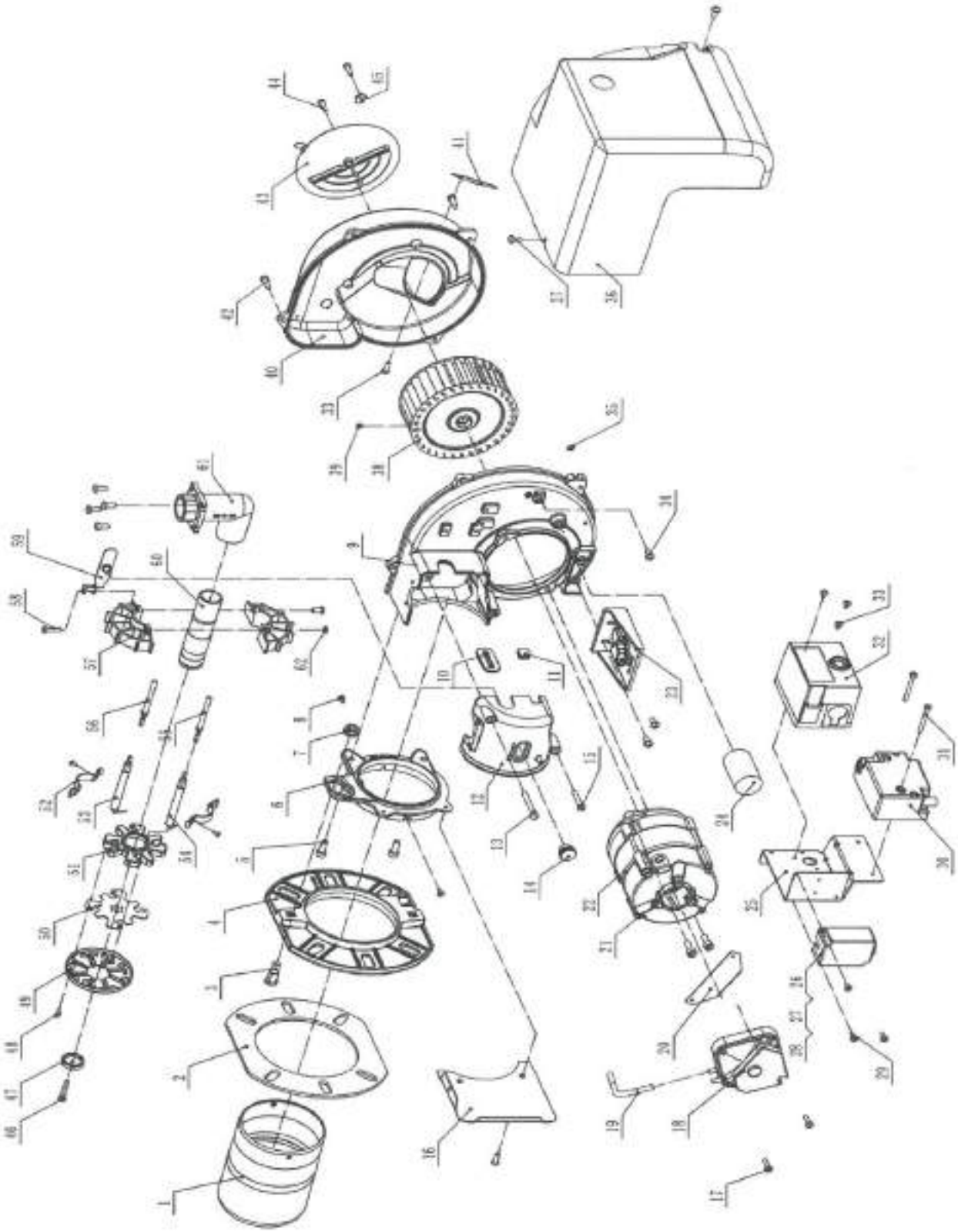
## Elements (diagrams) common to all furnaces



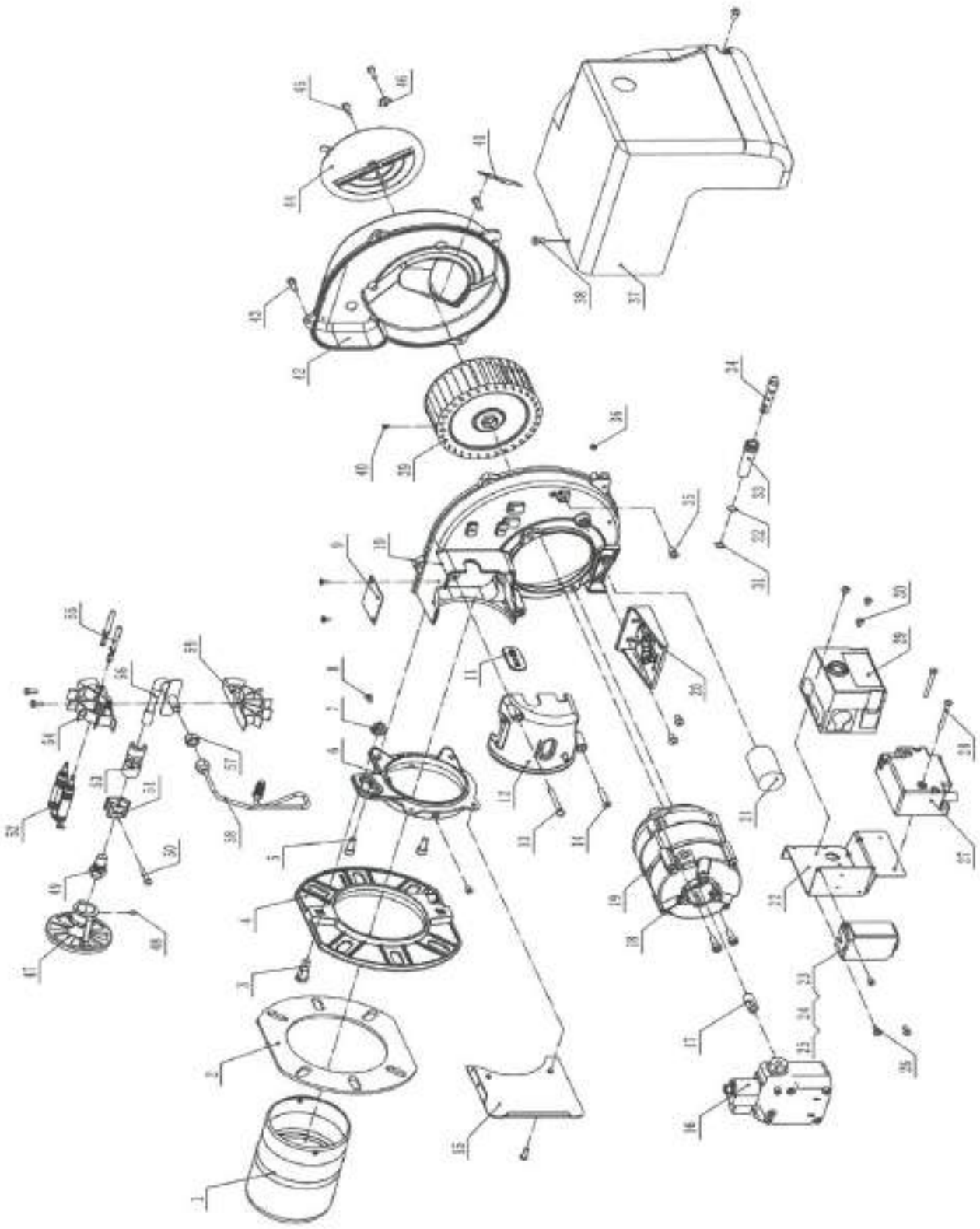
## Elements (diagrams) of the furnaces of oil / gas



Gas burner diagram

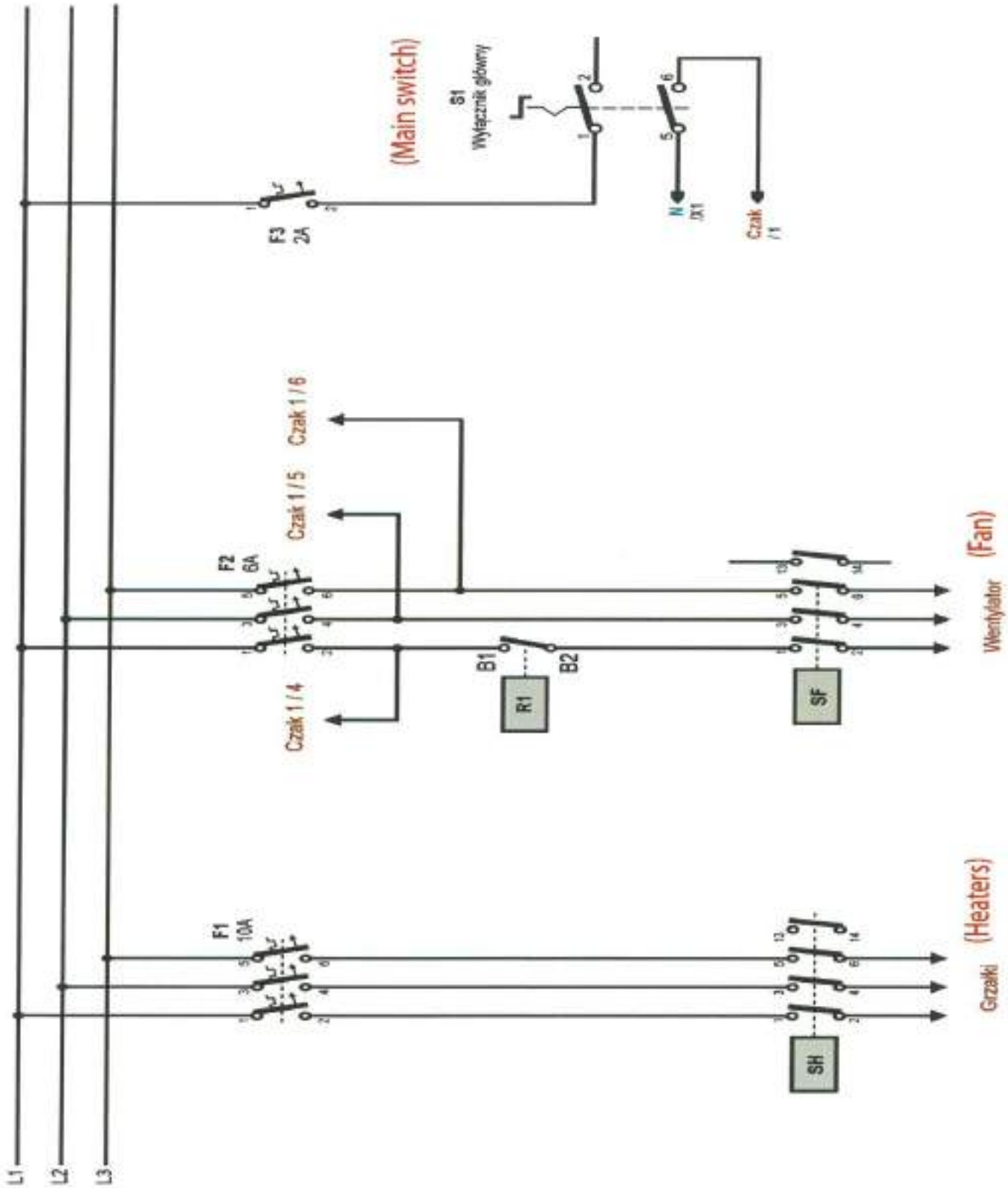


Oil burner diagram



## Elements (diagrams) of the electrical furnaces

Heater, fan, main switch
Note:



# Replacement parts

Ordering of replacement parts occurs through contact with e-mail:

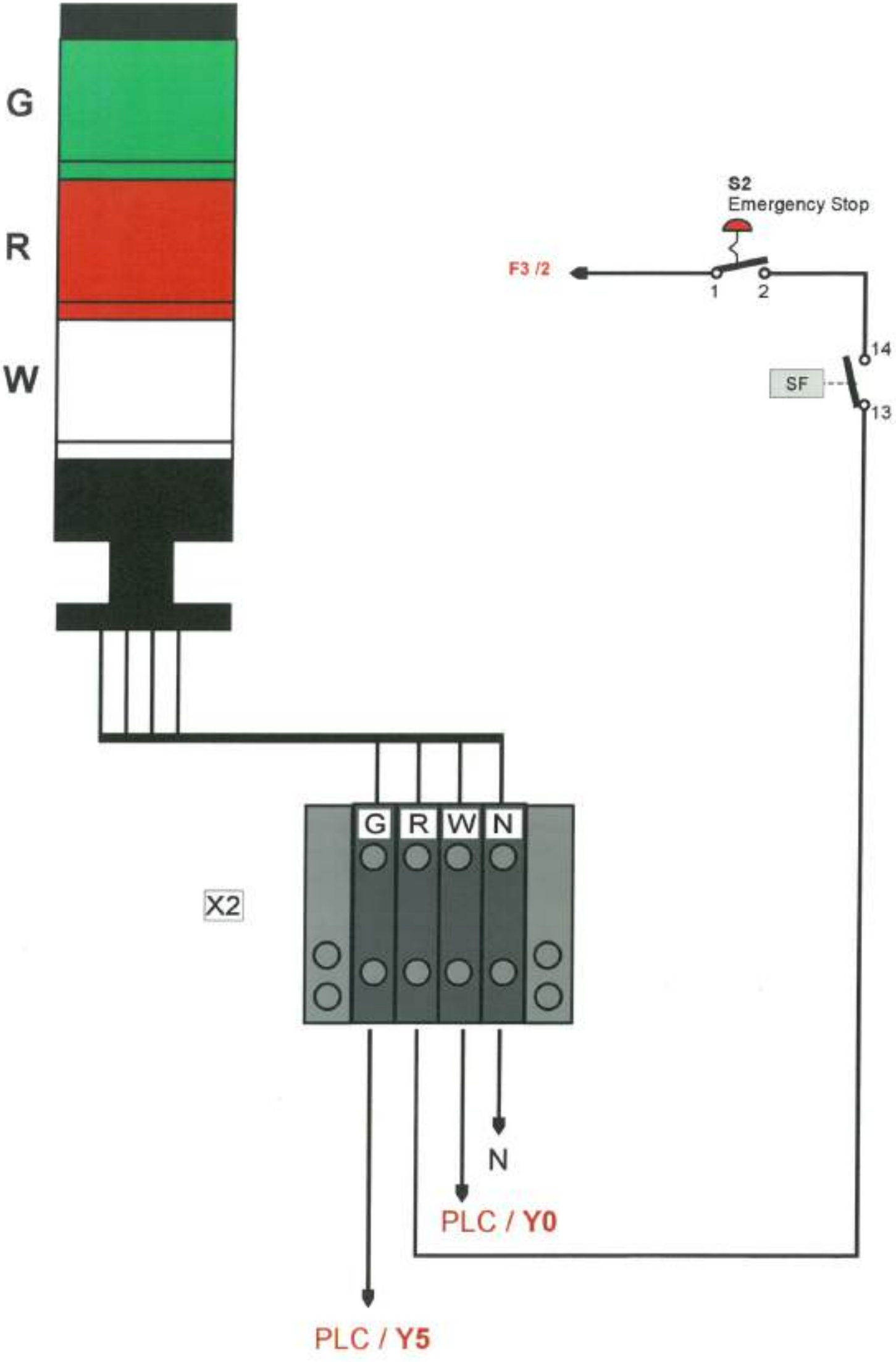
kontakt@romerpp.pl

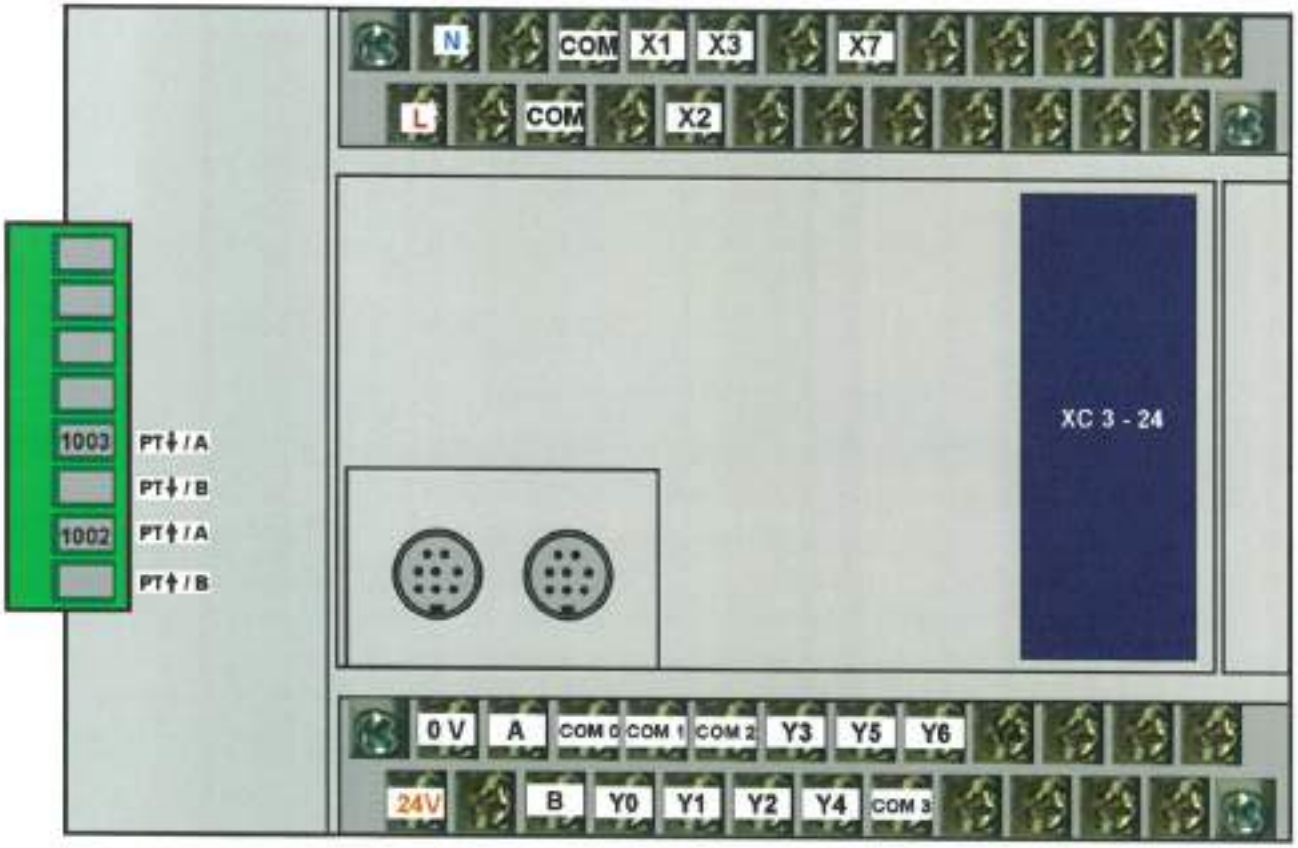
Orders can also be made through our online store:

http://romerpp.pl/lang-en/products/46/shop.html

Note:

Note:

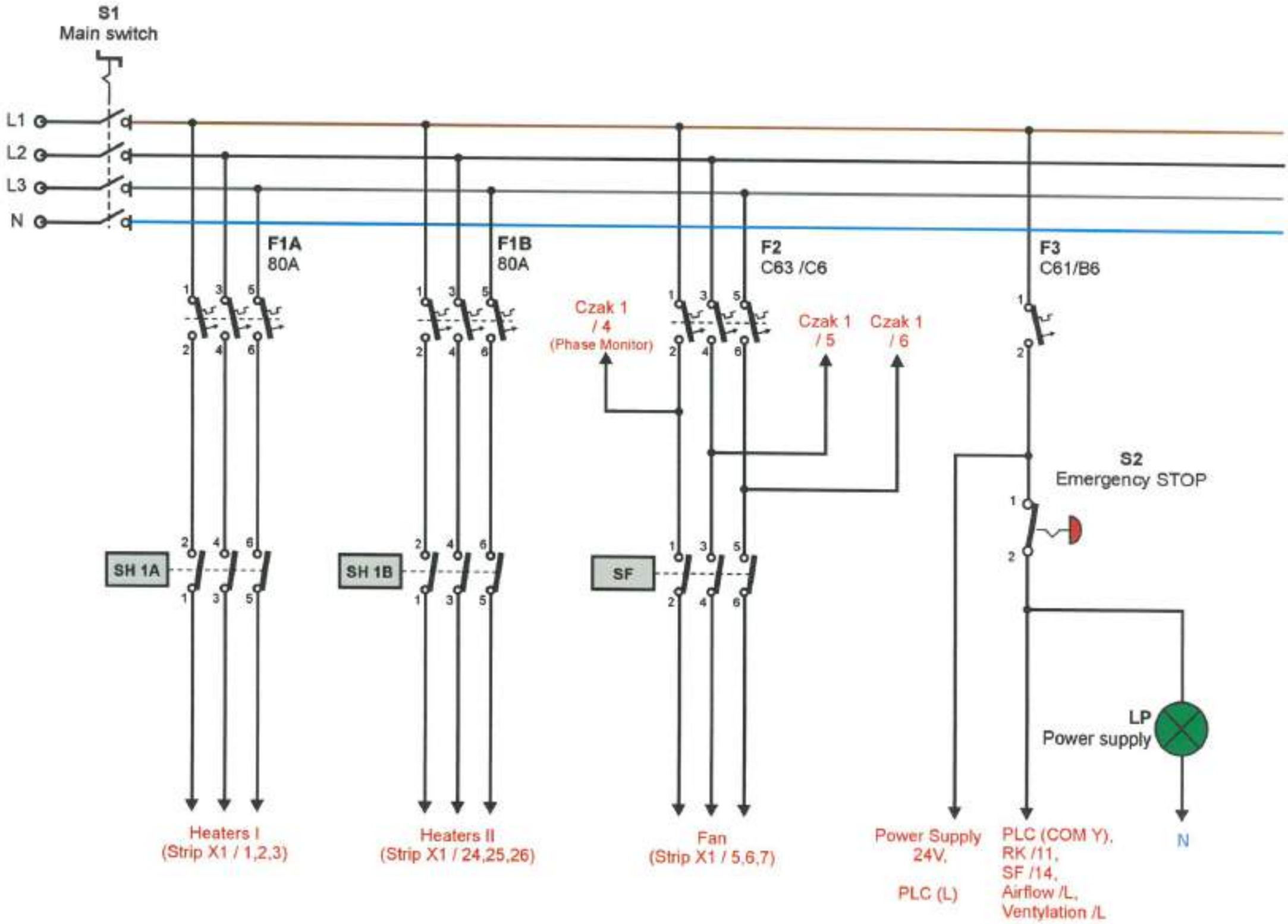

G
R
W
S2
Emergency Stop
F3 /2
1
2
14
SF
13
G
R
W
N
X2
N
PLC / Y0
PLC / Y5

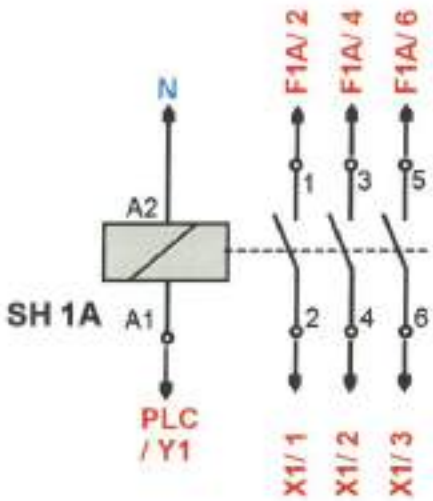



**N, L** - Power supply ( 230 V AC)
**X1** - **S2 / 4** (Emergency STOP)
**X2** - **Czak / 2** (Phase monitor)
**X3** - **S3 / 4** (reset of the Emergency STOP)
**X7** - Strip **X1 / 10** ("**T**") (Fan therm. Switch)

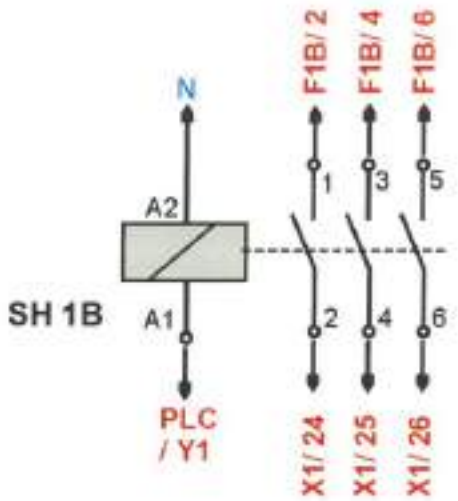
**Y0** - Strip **X2 /** (LED Alarm Tower / W)
**Y1** - Contactor **SH 1A & SH 1B / A1** (Heaters)
**Y2** - Contactor **SF / A1** (Fan)
**Y3** - **RK / 1** (Ventylation)
**Y4** - Buzzer (**BZ** / X1)
**Y5** - **X2 /** (**LED Alarm Tower / G**)
**Y6** - Lamp of the S3 pushbutton (Reset)

RS485 COM port
A is "+" signal, B is "-" signal


S1
Main switch
L1
L2
L3
N
F1A
80A
F1B
80A
F2
C63 /C6
F3
C61/B6
Czak 1
/ 4
(Phase Monitor)
Czak 1
/ 5
Czak 1
/ 6
S2
Emergency STOP
SH 1A
SH 1B
SF
LP
Power supply
Heaters I
(Strip X1 / 1,2,3)
Heaters II
(Strip X1 / 24,25,26)
Fan
(Strip X1 / 5,6,7)
Power Supply
24V,
PLC (L)
PLC (COM Y),
RK /11,
SF /14,
Airflow /L,
Ventylation /L
N

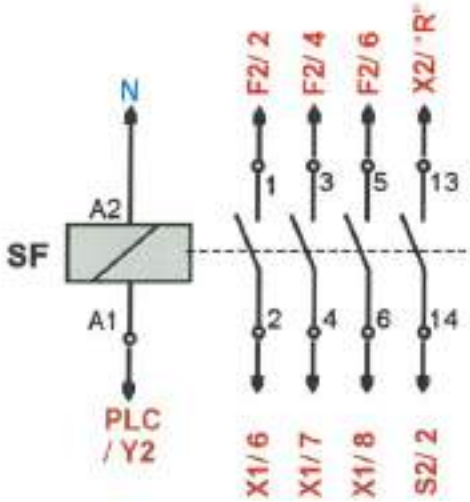



- Control of the Heaters I

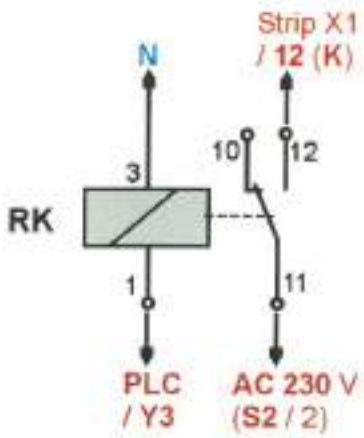



- Control of the Heaters II

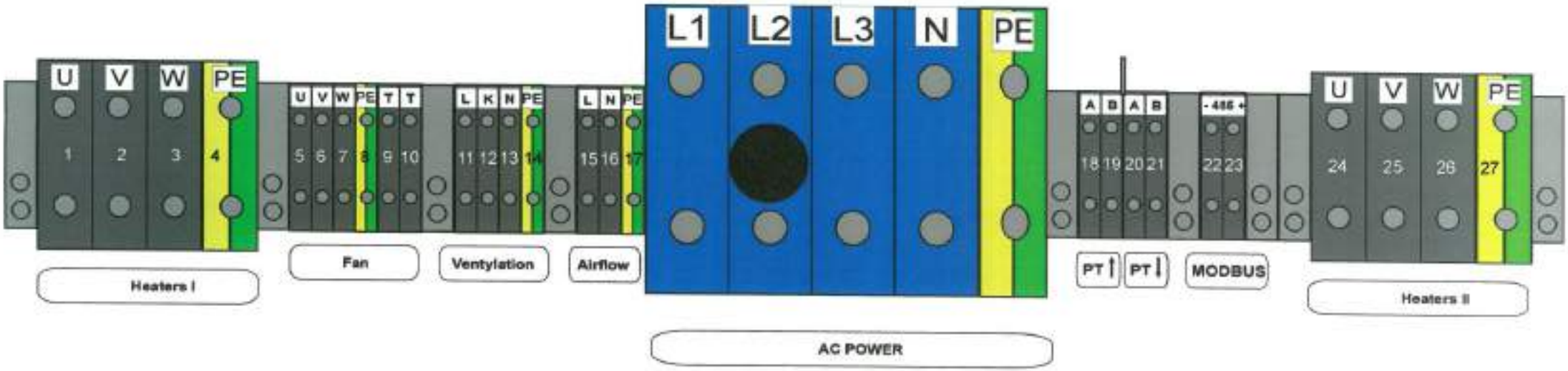

- **Czak1** (Phase Monitor)




- Control of the Fan




- Control of the Ventylation


U
V
W
PE
1
2
3
4
Heaters I
U V W PE T T
5 6 7 8 9 10
Fan
L K N PE
11 12 13 14
Ventylation
L N PE
15 16 17
Airflow
L1
L2
L3
N
PE
AC POWER
A B A B
18 19 20 21
PT
PT
- 485 +
22 23
MODBUS
U
V
W
PE
24
25
26
27
Heaters II