

# OPERATING MANUAL

## PAINT COAT DRYING UNIT



230V

### Immediate heat where and when it is required

Portable infrared radiators are used both industrial painting processes and in renovations for drying and hardening paint coats, primers and ground coats of acrylic, polyurethane, polyester and other materials.

The infrared wave beam is directed to a surface to be dried and due to absorption the wave energy is converted into heat over the entire volume of the heated layer. The drying process proceeds without participation of air - from internal layers to the outside.

A distinctive feature of these units is relatively simple operation, high drying rate, simple design, no need to use a fan, high stability under correct operation.

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## **The operating manual is an integral part of the product.**

The manual is to instruct the user how to operate properly the unit. It contains practical hints and recommendations which should be known to the user. In order to ensure safe operation, before connecting it for the first time to a 230 V AC socket, one should read the manual, get acquainted with it and keep it for later use.

**NOTES AND WARNINGS** The unit may be supplied only from the 230 V AC network. Its could not be used if the supply cord or another its element is damaged.

## **CONTENTS**

- I. INTRODUCTION**
- II. APPLICATION - workplace**
- III. VERSIONS - type of series, technical specification**
- IV. TYPICAL APPLICATIONS**
- V. DESIGN**
- VI. OPERATION - principles of safe operation and safety guidelines**
- VII. STORAGE AND TRANSPORTATION.**
- VIII. WARRANTY**
- IX. GUARANTEE CERTIFICATE**

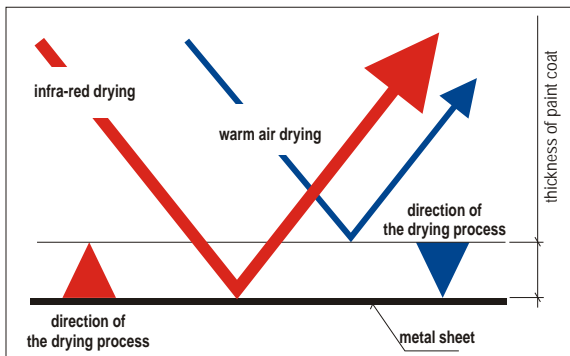
## **I. INTRODUCTION**

**Immediate heat precisely where and when it is required.**

**The unit may operate both continuously and intermittently.**

Portable infrared radiators are used both industrial painting processes and in renovations for drizingand hardening paint coats, primers and ground coats of acrylic, polyurethane, polyester and other materials. They may be used extensively in paint shops - those large ones provided with painting booths because of drying economy for partial repairs of automotive bodies and the small ones which should polish the paint coat at the same time allowing to close the hardening process of filling and barrier coats which results in the so-called "guarantee calmness".

The distinctive feature of this unit is a relatively simple operation and design, high drying rate, high output capacity, no need to use fans (thus no dust is deposited on drying paint), high stability under correct operation, ecological purity.



## **DESCRIPTION OF THE DRYING PROCESS**

Infra-red wave beam from the IZOTERMA wide-angle reflector is directed towards the surface to be dried and here, as a result of absorption, the wave energy is converted into heat over the entire volume of the heated layer. The drying process proceeds from the internal layers to the outside. Infra-red radiation penetrates the thin layer of paint straight to the base. Some energy is absorbed by the painted component, raising up its temperature and starting the drying process. The remaining part of energy is absorbed uniformly over the paint thickness, directing the drying process from the base to the outside. Both the surface and the entire structure of the paint material are dried and hardened.

The last drying layer is the external layer and, therefore, we are sure that the bottom layers are properly hardened, adhere very well to the substrate and the coat has no cracks. The surfaces dried by this method are of high quality and extremely stable. The infra-red radiators do not emit UV radiation which is harmful for the eyes and skin.

**Applications of infra-red radiators:** for heating, drying and skin-drying; heating of premises where people spend some time, sacred buildings, open-air catering facilities, terraces, umbrella shelters, etc., in manufacturing processes of paints, textile coatings, plastics, carpets, floorings, paper and overprints on various materials, in the shoe-making, printing, heating industry, heat-shrinkable films, shaping and shrinking plastics, veneering wood, in railway work, aircraft industry, animal farms, etc.

## **II. APPLICATION - WORKPLACE**

Infra-red radiators are extensively used not only in the industry but also in daily life, for instance, for temporary and immediate heating of men and animals (radiation is transmitted with the speed of light), in closed and open premises (sacred buildings, show-rooms, warehouses, umbrella roofs, etc).

In the industry infra-red radiators, depending on the wavelength transmitted, are used in many manufacturing processes where drying or skin-drying is required as well as thermal treatment, for instance, in the painting, printing, shoe-making industry, and especially in automotive painting shops and others.

The paint-drying unit was designed to serve these purposes.

These units may operate both in closed and open-air places.

Infra-red radiators are particularly useful in drying and skin-drying the paint coats on small parts and automotive bodies without using paint booths, thus reducing the drying time and power consumption and provide huge financial savings as compared to drying in paint booths.

The only costs involved in infra-red drying is the purchase of the unit while in traditional drying one must spend money for constructing the painting booth, supervision and maintenance.

**Comparison of drying costs for a component coated with acrylic paint by infra-red radiators and conventional booth**

| <b>Typical drying costs for a component coated with acrylic paint</b> | <b>Shortwave infra-red radiator IZOTERMA</b> | <b>Booth (filter replacing costs not included)</b> |
|---|--|--|
| Average price of a unit required to dry one element                   | PLN 2600 net                                 | PLN 95,000 net (entire body may be dried)          |
| Utility   | Electric power                               | Fuel oil, gas                                      |
| Heating power rating (average)  | 3 kW   | About 160 kW + fan power rating (about 12 kW)      |
| Consumption per one hour operation                                    | 3 kW   | About 14 kg, 18 m.                                 |
| Warming-up time   | About 1 sec                                  | 30 min up to 60°C                                  |
| Drying time   | 9 min  | 45 min   |
| Drying costs (for one element)  | About PLN 0.2                                | About PLN 35                                       |
| Output increase (shorter drying time)                                 | Max. 5-fold                                  | -----  |

\* Price of 1 kWh was assumed at PLN 0.2 (second tariff)

As shown above, the use of a drying booth is very non-economical in case of small repairs (drying small amounts of components).

### III. VERSIONS - type of series, technical specifications

Paint coat drying unit Types A, B,C

| Data  | Version - Type |               |                |                |               |  |
|---|----------------|---------------|----------------|----------------|---------------|--|
|   | A              |               | B              |                | C             |  |
|   | 2 P            | 4 P           | 2 P            | 4 P            |               |  |
| Supply voltage ( V )  | 230            | 230           | 230            | 230            | 230           |  |
| Power rating ( kW )   | 2              | 2 + 2         | 2              | 2 + 2          | 1             |  |
| Number of glowers ( pcs )   | 2              | 2 + 2         | 2              | 2 + 2          | 1             |  |
| Number of heating units ( pcs )   | 1              | 2             | 1              | 2              | 1             |  |
| Surface to be dried ( m )   | 0,6 x 1,1      | 0,6 x 2,2     | 0,6 x 1,1      | 0,6 x 2,2      | 0,3 x 0,55    |  |
| Distance from dried surface ( m )   | 0,6            | 0,6           | 0,6            | 0,6            | 0,6           |  |
| Universal operation (vertical, horizontal)  | +              | +             | +              | +              | +             |  |
| Max.length of heating unit in horizontal position ( m )   | 1,07           | 1,07          | 1,17           | 1,17           | 0,46          |  |
| Max.height of heating unit - from the floor ( m )   | 2,1            | 2,1           | 2,68           | 2,68           | 0,5           |  |
| Max.length of reach from heating panel central line to vertical stand measured in horizontal position (m) | 1,25           | 1,25          | 1,25           | 1,25           | -             |  |
| Overall dimensions of unit width x height x depth ( m )   | 1,07x2,1x1,25  | 1,07x2,1x1,25 | 1,17x2,68x1,25 | 1,17x2,68x1,25 | 0,46x0,5x0,42 |  |
| Number of working movements   |                |               |                |                |               |  |
| ? vertical  | 2              | 2             | 2              | 2              | 2             |  |
| horizontal  | 2              | 2             | 2              | 2              | 2             |  |
| angular   | 2              | 2             | 2              | 2              | 2             |  |
| Angular displacement 180 °  |                |               |                |                |               |  |
| vertically  | 2              | 2             | 2              | 2              | 2             |  |
| horizontally  | 2              | 2             | 2              | 2              | -             |  |
| Timer   | 1              | 2             | 1              | 2              | -             |  |
| Breaker switch  | 1              | 2             | 1              | 2              | 1             |  |
| Control indicator   | 1              | 2             | 1              | 2              | 1             |  |
| Length of supply cord with 16 A plug ( m )  | 3,0            | 3,0           | 3,0            | 3,0            | 2,0           |  |
| Weight ( KG )   | 21,5           | 30,0          | 27,0           | 36,0           | 4,0           |  |
| Overall dimensions of transport packing (dismantled unit) width x length x height ( m )                   | 1,0x1,35x0,35  | 1,0x1,35x0,35 | 1,0x1,35x0,32  | 1,0x1,35x0,32  | 0,43x0,5x0,2  |  |

Note:

1. 1000W radiant elements were used, optionally 500W to 2000W elements may be used.

#### **IV. TYPICAL APPLICATIONS**

Paint coat drying unit is used for technological processes, in this case for drying painted automotive parts or complete motor vehicles and other painted coatings.

The unit eliminates the need of a painting booth.

Drying time of painted surfaces is much shorter than in case of drying in a painting booth. A similar situation exists in case of heating and drying costs and the cost of investment is much lower. Having in mind these problems, we can find that drying with infra-red radiators is unsurpassable.

##### **Version A** - in varieties 2P and 4P

Variety 2P consists of two heating panels mounted on a common arm and forms a heating unit. The heating unit is fixed to the stand.

Variety 4P consists of two heating units fixed to the stand one below another.

It is used for motor cars.

The stand is standard in both varieties.

##### **Version B** - in varieties 2P and 4P

It is similar to the A version but it has longer heating panels and a stand which makes possible processing larger vehicles, for instance, delivery vans.

The stand is standardized in both varieties.

##### **Version C**

Hand-operated portable unit for workshop jobs.

**Typical applications are shown on page 11**

#### **V. DESIGN**

##### **1. Type A, variety 2P and 4P**

###### **Design**

The stand is made from steel sections, welded to the horizontal part with two running wheels and a vertical extending outrigger used for fixing the heating unit. The outrigger is mounted as moving part and is connected to the horizontal part. The heating unit consists of two heating panels. Heating panels are made of a reflector and housing, the reflector includes a quartz halogen heating tube which is a source of infra-red radiation. The quartz tube is protected by a safe-guarding grid. The heating unit is provided with an outrigger which in turn is fixed to the vertical outrigger.

Each heating unit has a 3 m long supply cord with the 16A, 230 V plug.

###### **Control**

A timer set up to 15 minutes with the audible signal is installed in the heating unit. By setting the timer, the unit starts operation, an additional switch may switch on and off one of the heating panels if both panels should not operate. An indicating light signals that the unit is working.

The heating unit is provided with a supply cord with the 16A, 230 V plug.

Both vertical and horizontal outriggers may control the movement of heating units and their rotation under a suitable angle.

###### **Corrosion protection**

Stainless, galvanized coating, electrostatic painting.

## 2. Type B, variety 2P and 4P

Its design is similar to Type A, with differences in overall dimensions of a larger heating unit and the vertical and horizontal outrigger which makes possible processing larger vehicles, for instance, delivery vans and lorries.

Each heating unit is provided with a power cord, 3 m long with a 16 A plug.

## 3. Type C

The heating panel consists of a parabolic reflector and a housing, the reflector is provided with a quartz tube protected by a safe-guarding grid.

The heating panel housing is provided with a power cord with the 16A plug which has break-out switch and light indicator. In addition, the panel has a manual handle used to set up the panel rotation angle in the stand. The panel may be removed from the stand, thus making possible manual panel control, directing the radiator towards a specific surface to be dried.

The power cord is 2 m long, 16A plug.

### Note

All types A, B and C make possible the heating panels to operate in vertical or horizontal positions.

**Pictures of products are shown on page 11**

## VI. OPERATION - principles of safe operation and safety guidelines

**Type A** used for minor and medium repairs of paint coatings, motor cars.

**Type B** medium and large repairs paint coats, delivery vans.

**Type C** portable (hand-operated) or stationary units for minor paint repairs.

Makes possible fast drying of hardly accessible places.

**Advantages of infra-red drying:** increased capacity of the workshop with better through-drying, lower power consumption, higher economics, time saving.

### Important hints:

**Drying times may differ, depending on the type, size and design of the unit. When using an infra-red radiator, each paint layer should be dried separately in order to prevent formation of craters and tearing away the paint layers.**

**Distance of the heating panel from the components to be dried 0.6 m** - is given as a minimum distance from the dried components, any increase in distance would result in increasing the drying surface with a slight increase of the drying time.

## Comparison of drying times for basic paint materials in booths and with infra-red radiators

| Material to be dried<br>(two-component paints) | Booth        | IZOTERMA Infra-Red<br>Radiator |
|--|--------------|--------------------------------|
| Filler   | 45 min.      | 2- 3 min.                      |
| Undercoat                                      | 45 min.      | 3- 6 min.                      |
| Prime coat                                     | 15 - 30 min. | 5- 8 min.                      |
| Base lacqueur                                  | 35 min.      | 4- 8 min.                      |
| Acrylic lacquer                                | 45 min.      | 6- 10 min.                     |
| Transparent lacquer                            | 35 - 45 min. | 5- 10 min.                     |

### **Principles of safe operation of the quartz halogen glower:**

1. One should not touch the quartz tube with naked hands. If the tube becomes dirty (with fat or chemicals) it should be wiped with a soft rag saturated with alcohol before switching the radiator on.
2. Prolonged looking into the glower during operation is harmful.
3. One should observe the working position of the glower as recommended by the manufacturer (universal operation may be vertical or horizontal)
4. One should avoid the voltage in excess of 230 V.
5. The glower should not vibrate even if not at work.
6. Glowlers should not be wet or in contact with water drops.

### **Safety guidelines:**

1. Before use one should check if the unit is not damaged. In case of any defect it should not be used.
2. The unit should never be connected to the network other than 230 V.
3. Power cord of the unit should be connected to a socket provided with a neutral pin.
4. It is forbidden to use the unit in premises where fires or explosions may occur.
5. The unit should be placed on a dry, flat and even surface.
6. The unit should be operated in a safe distance from inflammable objects.
7. The unit should not be left unattended if there are children, disabled persons or animals nearby.
8. No foreign objects should be put or hung on the energized unit.
9. The power cord should not touch the heating panel during use.
10. Before each cleaning the power cord should be disconnected from the network, allow the unit to cool down and then clean with a wet rag using gentle chemicals.
11. If the power cord or plug is damaged, it should be replaced with a new one by an authorized person in order to avoid dangers.
12. In dangerous situations the supply unit should be disconnected by removing the plug from the supply socket.

### **VII. STORAGE AND TRANSPORTATION.**

There are no special recommendations regarding safe storage and transportation. One should take care that both during storage and transportation the product should be stored safely in order to prevent any mechanical damage. The products may be stacked up to 5 pcs.

### **VIII. WARRANTY**

Warranty terms and information on servicing is contained in the guarantee certificate. The guarantee certificate is the only document authorizing the customer to take advantage of the guarantee service. The unit may be repaired by an authorized person with suitable qualifications.



**Note:**

Only the manufacturer has the right and duty to replace a defective product or to repair it in case of justified claim.

**GUARANTEE CERTIFICATE**

1. ZPUG IZOTERMA guarantee correct operation of the paint coat drying unit on the basis of specific Consumers' Sale Conditions Act of July 27, 2002 and Civil Code.
2. The guarantee period for the unit is 36 months from the date of sale recorded on the guarantee certificate, except for glowers which are given a guarantee period of 5,000 working hours.
3. In case of any defects due to manufacturer's faults are revealed, the manufacturer shall ensure free repairs. The unit to be repaired should be dispatched with the guarantee certificate to the manufacturer, that is, ZPUG IZOTERMA, ul.Odrzanska 14, 55-002 Aany, or to the retail organization where the unit was purchased. The seller shall be obliged to deliver the product to the manufacturer. The claimant has the right to be refunded the shipping costs by the means of transportation recommended by the manufacturer.
4. Guarantee repairs should be completed within 14 days from the date of delivery to the manufacturer. The guarantee shall be prolonged by the repair time.
5. The guarantee does not apply to any mechanical damage and also defects resulting from improper storage and transportation, improper operation, incorrect supply voltage, arbitrary repairs.
6. The guarantee certificate is the only basis for performing a guarantee repair free of charge. The guarantee is valid if it is provided with the date of sale and company stamp. The guarantee certificate with corrections and deletions is invalid.
7. Detailed duties of the guarantor and customer s rights resulting the guarantee are set forth in the Civil Code.

**Date of sale:** .....

**Seal of the retail shop:** .....

**Claims:** .....

## TYPICAL APPLICATIONS



Type A - 4P



Type B - 4P



Type B - 4P



Type C



Type C



Type A - 4P



Type A - 4P



Type B - 4P



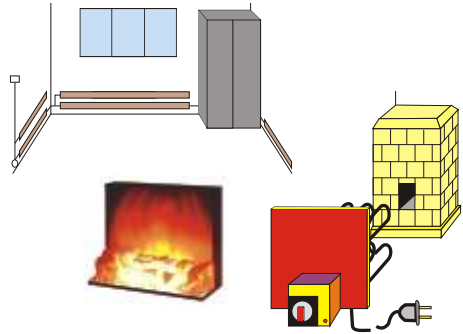
Type C

# HEATING UNITS

**ZPUG IZOTERMA** has been in the manufacturing business since 1979. The subject of our business are products in the field of electrical heating engineering (various types of electrical heating equipment). Our products are used for heating and additional heating of residential, office, amenities, technical and industrial premises. We design and make special heating equipment.

We make:

- IZOTERMA infrared cabins
- Technological equipment:
  - paint coat drying units for automotive painting shops
  - paint coat drying units for printing purpose
- ceramic furnaces
- work clothing drying cabinets
- Electrical fireplaces
- Fire place's real flame effect
- Electrical cookers
- Accumulative stoves
- Floor heaters (strip-, module- and panel-type)
- Electrical heating inset for tile furnaces, for central heating
- Ceramic profiles rollers, plates, etc
- Heating tubes for domestic and industrial appliances
- Flat plugs and sockets
- Materials and elements for electrical heating



ZPUG IZOTERMA products was favoured the "Diploma of the Medal of Niemen River" on Polish National Exhibition POLEXPORT Kaliningrad 2004r for innovative and high technologies. Products have certificates: CE B GOST R WE INVITE TO COOPERATION - We proceed mail-order sale.

ZPUG IZOTERMA

**IZOTERMA** PRODUCER  
Rok zał. 1979

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