# Use and Maintenance Manual

## Explosion-proof duct fans

## WP-11/Ex

## Contents:



888W40 WP-11/Ex 04.06.2019/EN

# 1. Introductory Remarks

The purpose of the present Use and Maintenance Manual is to supply User with directions within the range of application, installation, start-up and the use of the **WP-11/Ex explosion-proof duct fans**.

**Installing, start up and operational use are exclusively admissible after getting acquainted with the contents of the Use and Maintenance Manual**.
With regard to continuity of work carried on improvement of our products, we reserve for ourselves the revision possibility of the draft and technological changes improving their functional features and safety.

Construction of the **WP-11/Ex explosion-proof duct fans** meets the requirements of the current state of technology as well as the safety and health assurances included in:

– **2006/42/EC Machinery Directive** of the European Parliament and of the Council of May 17th, 2006 on machinery – amending the 95/16/EC (recast) /*Journal of Laws EC L157 of 09.06.2006, page 24*/

– **2014/35/EC Directive** of the European Parliament and of the Council of February 26th, 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.
/*Journal of Laws EC L96 of 29.03.2014*/

– **2014/34/EC ATEX Directive** of the European Parliament and of the Council of February 26th 2014 on the harmonisation of the laws of Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.
/ *Journal of Laws EC L96 of 29.03.2014* /

Additionally, the appliance meets following harmonized standard:

| | |
|---|---|
| ● **EN ISO-12100:2012** | – "Safety of machinery – Basic concepts, general principles for design. Risk assessment and risk reduction". |
| ● **EN 60204-1:2018-12** | – "Safety of machinery – Electrical equipment of machines. Part 1: General requirements". |
| ● **EN ISO 13857:2010** | – "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs". |
| ● **EN 80079-0:2013/A11:2014** | – "Electrical appliances in areas of gas explosion risk. Part 0: General requirements". |
| ● **EN 60079-7:2016-02** | – "Electrical appliances for areas of gas explosion hazard. Part 7: Increased safety construction "**e**". |
| ● **EN 1127-1:2011** | – "Explosive atmospheres. Explosion prevention and protection. Basic terminology and methodology". |
| ● **EN ISO 80079-36:2016-07** | – "Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres. Methodology and requirements. |
| ● **EN ISO 80079-37:2016-07** | – "Explosive atmospheres – Part 37: Non-electrical equipment for explosive atmospheres. Non-electrical types of protection. Constructional safety "**c**", supervised ignition "**b**", immersion in a liquid "**k**". |
| ● **EN 14986:2017-02** | – "Designing of fans applied in areas of explosion hazard" |
| ● **ISO 14694:2003+AMD1:2010** | – "Industrial fans – Guidelines on the quality of balancing and the vibration level. |
| ● **ISO 14695:2008/AC:2017-10** | – "Industrial fans – Methods of measurements of vibration of fans. |

## 2. Application

Duct fans are designed for general ventilation of the rooms, where explosive atmosphere, (i.e. mixture of flammable substances in form of gas and vapour with the air, whereby after their ignition – in atmospheric conditions – the burning mass would expand within the whole non-burning mixture) is likely to occur.
the whole non-burning mixture) is likely to occur.
The appliances are meant for installing inside the rooms (indoor application), directly in the system of round ventilation ducts. They have been constructed for application within temperature range -20 up to 40°C.
The forwarded air must be of dustiness not exceeding 0,3 g/m$^3$, without viscous pollutants and without aggressive compounds, and maximum temperature 60°C.
According to the 1914/34/EC ATEX Directive and EN ISO 80079-36 the device carries the level of protection: "**HIGH**" – as a device classified for **Group II**, **Category 2**, and it can work in areas where explosive atmospheres are likely to occur. The fan can be applied in zones **1**, **2** (**G**).
**Specification of the operational zones and the knowledge on hazards caused by atmosphere of explosion risk in those zones – belongs to operator of the appliance.**

The appliance is marked on the nominal data plate: **II 2 G c Ex eb IIB T3**
**Marking of the operational conditions of the device**: **group / category / hazard / class**.

- marking for explosion proof properties of the appliance,
- **group II** – the device is designed for on-ground work, in factories, in areas of explosion hazard, **but this cannot be methane** (**firedamp**) **hazard** neither carbon dust occurrence,
- **category 2** – the device is designed for application in areas where **explosive atmospheres are likely to occur**,
- **gas hazard G**,
- "**c**" – category of protection against the ignition – **constructional protection**,
- **Ex** – mark of the electrical device – constructed and tested according to the European Standards for work in areas of explosion hazard,
- **execution** "**e**" – type of construction of the motor (a motor of increased safety)
- "**b**" – protection by means of controlling the ignition sources,
- gas explosion **group IIB** – occurring in on-ground factories – the fans are constructed according to the PN-EN 14986:2009, whereby they can be applied for gases in explosion groups **IIA** and **IIB** and **hydrogen**,
- **temperature class T3** – the surface temperature of any part of the appliance should not exceed **200ºC** (during the normal operation). The device can be used safely in explosive atmospheres belonging to temperature classes **T1**, **T2**, **T3**.

## 3. Reservations of Producer

| | |
|---|---|
| **A**. | Manufacturer accepts no liability for any consequences following from the operational use that is in contradiction to the purpose of application. |
| **B**. | Installing of any additional elements not belonging to the normal device structure (or accessory set) is not acceptable. |
| **C**. | Do not undertake any structural changes or constructional modifications on the device on one's own. |
| **D**. | Protect the appliance's housing from mechanical damage. |
| **E**. | Prior to installing check the load carrying capacity of the building structure where the device will be mounted. Unsure mounting could cause hazard to personnel/people in vicinity and effect in damage of the device. |

**F. Do not use the fan for conveying the air containing viscous impurities that could deposit (build up) on the device surface, especially on the impeller.**

**G. Neither use it for forwarding the air with aggressive pollutants which will destructively effect the device structure.**

**H.** During operation, the maximum impeller rotations should not exceed the nominal rotations.

**I. Manufacturer is not responsible for wounds, injuries, body laceration experienced by User or personnel during the improper operational use.**

# 4. Technical Data

**Table No.1**

| Type | Rotations | Supply voltage | Motor rate | Acoustic pressure level [dB(A)] from distance | | Maximum volume flow | Maximum vacuum | Weight |
|---|---|---|---|---|---|---|---|---|
| | | | | 1m | 5m | | | |
| | [r.p.m.] | [V] | [W] | 1m | 5m | [m³/h] | [Pa] | [kg] |
| WP-11/Ex | 1320 | 3 x 400 | 120 | 47,4 | 33,4 | 1885 | 245 | 6,5 |

1. ingress protection of the motor: IP 44
2. operational temperature range: -20°C ÷ 40°C
3. explosion group: II
4. explosion zone: 1 and 2
5. temperature class: T3

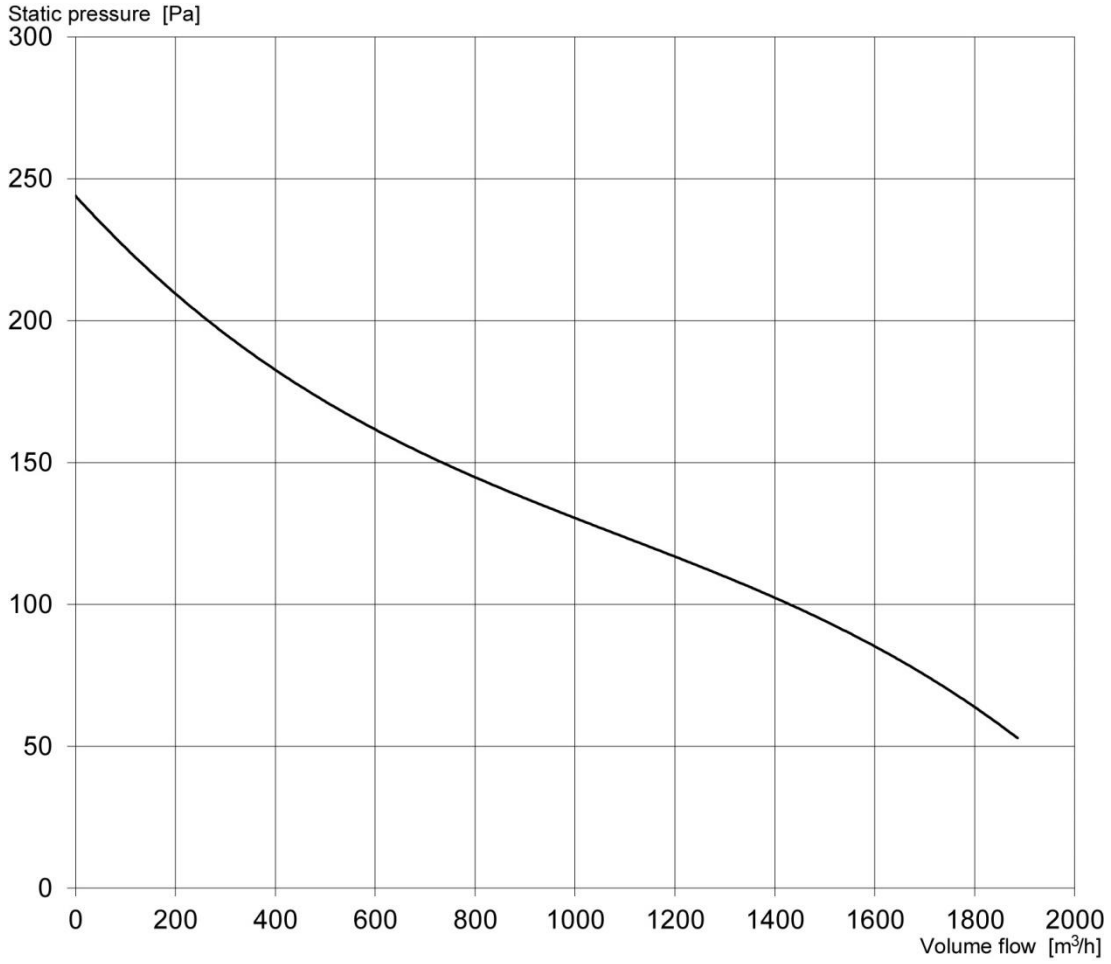



**Fig. No.1 – WP-11/Ex – Flow chart**

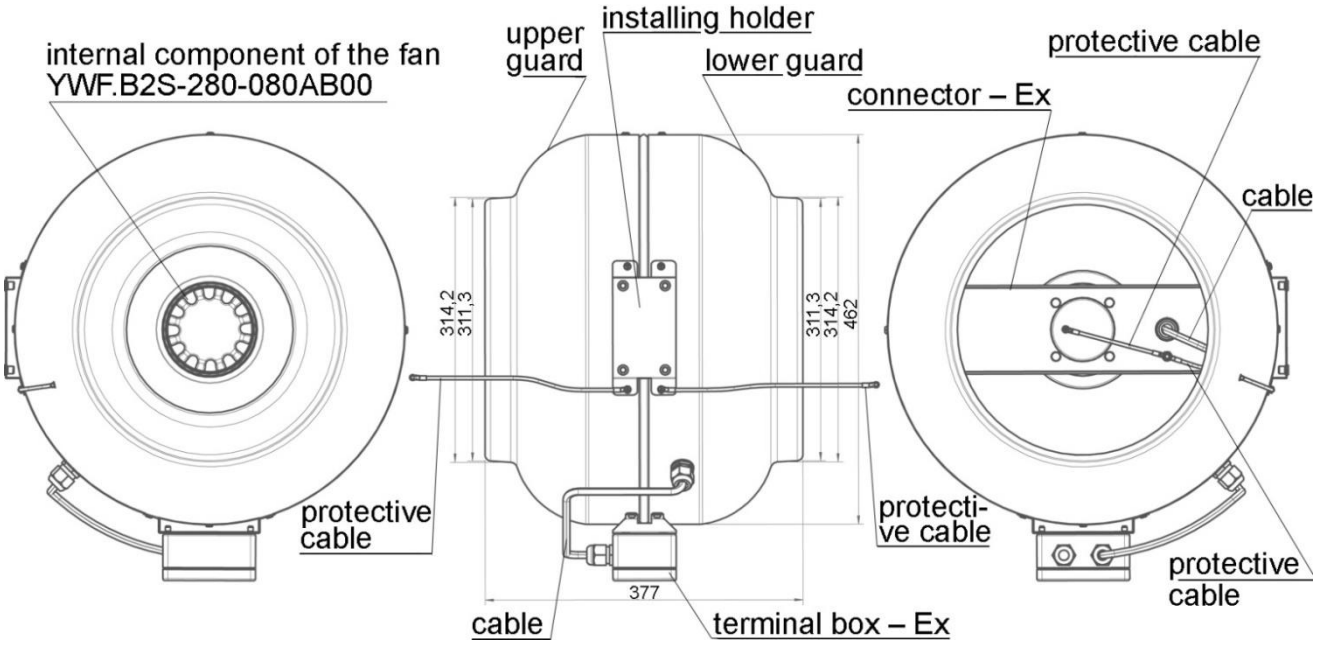



**Fig. No.2 – WP-11/Ex – Structure and dimensions**

## 5. Structure and Function

WP-11/Ex consists of two bell-shape plastic (HIPS conducting) draw pieces. Both elements are crewed together with larger perimeters, forming the area for the motor with a rotary stator. The radial impeller is fastened to the stator. Free ends (of the two housing parts are suitable to the standard diameters of rigid round ventilation ducts.

Outside the housing is located a terminal box (Ex execution) for connection to the 3x400V power supply. Additionally, the housing is equipped with a mounting plate, to install the fan at the supporting structure – by means of four M6 bolts.

Flow direction is indicated with an arrow on the fan housing. The fans have to be installed between the round ventilation ducts of appropriate diameter. The appliances feature small dimensions and very silent work.

Isolating switches are additional equipment and are delivered upon separate order.

## 6. Assembly and Start-up

Before the installing, and after the fan is taken out of the transport package, check the state of the fan (if there are no damages that occurred during the transport). WP-11/Ex duct fans are installed inside the rooms (indoor application), in vertical and horizontal round rigid ventilation ducts of round section (see Table of dimensions).

The air flow is indicated by an arrow on the fan housing. The arrow shows how should the fan be installed in the ventilation ducting (as a positioning). The fan housing should be fastened to the ventilation ducts with rivets or plate screws.

Additionally, the connection “fan-duct” ought to be sealed with “silicone” or a sealing adhesive tape. Apart from the “fan-duct” fastenings, it is important to attach the fan to the supporting construction (4 bolts M6). This ought to be performed by User on one’s own, with reference to local conditions.

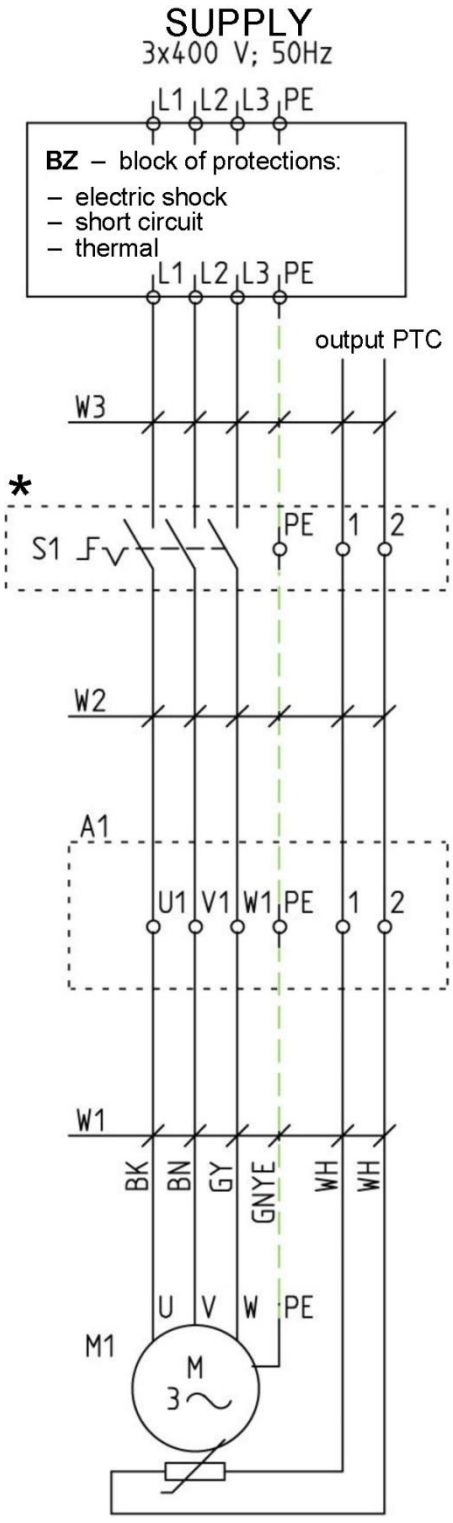
Prior to the connection to the power supply system, make sure if the parameters of the existing system is in accordance with the parameters on the nominal data plate. In case of difference it is not possible to carry out the connection.

The appliance ought to be connected to the supply by operator on one’s own – whereby it is important to select the sort and section of the supply cables and the protection from the short-circuit- and overload effect, according to the local conditions.

**WARNING** **Connection to the power supply ought to be executed by an authorised person with confirmed qualifications, according to the valid regulations of Occupational and Health Safety and with the instructions given in Fig. No4.**

CAUTION: The fan is equipped with protective cables, that should be connected to the ventilation ducts. Additionally, the ventilation ducts ought to be grounded too. In this way the whole ventilation system is protected against the accumulation of electric loads.


**Fig. No.3 – Protective cables placement**




**CAUTIONS**:
1. supply voltage 3x400V; 50Hz
2. continuous work **S1**
3. ingress protection **IP44**
4. ambient temperature: **-20** up to **+40ºC**
5. systems and appliances used in areas of explosion hazard should be manufactured in conformity with:
   - 2014/34/EC ATEX Directive
   - valid standards and regulations

In case of WP-11/Ex fans, the motor housing ought to be connected with the fan housing by means of the **G-Y: Kol 6/6 + H05V-K + Kol 6/6** according to the mechanical documentation

A1 – terminal box in Ex execution
TB-P2/P0048 QUINTEX

Cables **W1** and **W2** ought to be selected by the investor. The way of connection and the target connection of the motor windings should be performed by investor too.

*** S1** – isolating switch in Ex execution
It is suggested to install the isolating switch in a place near the fan. Its purchase and installing have to be carried out by the investor.

**CAUTION**:
The windings of the motor should be connected in accordance with the data on the nominal plate of the motor and with the Connection Diagram that is placed on the fan.

**Fig. No.4 – WP-11/Ex – Connection Diagram**

**Prior the fan start-up check subsequent aspects**:
**a/** if all mechanical connections are performed correctly
**b/** correctness of electrical connection, sequence of phases
**c/** correctness of the connections of the motor and the housing to the PE protective cable

After the fan is started, check the impeller rotation sense with reference to the arrow.

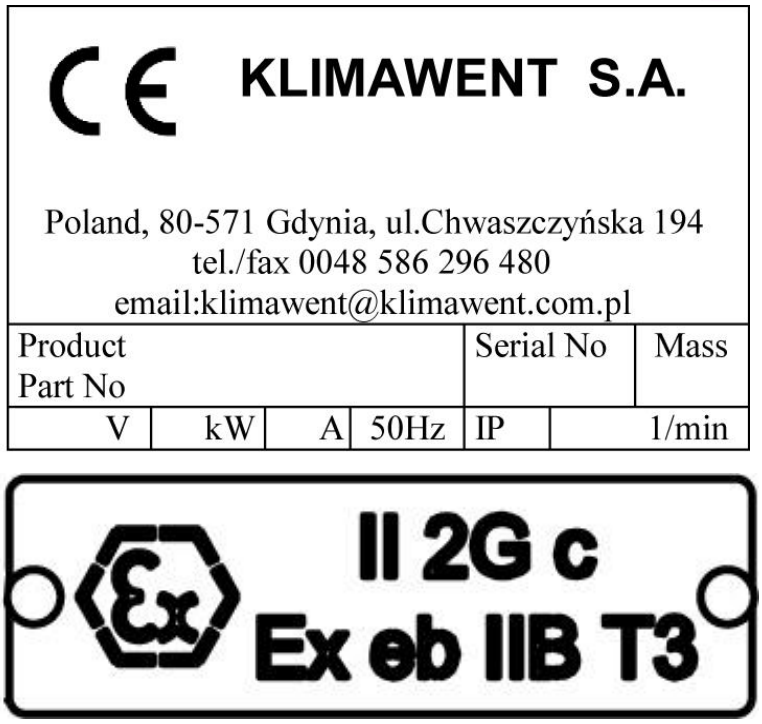



**Fig. No.5 – Nominal data plate and the plate of the Ex classification**

The overload protection of the motor should feature such time-current characteristics that ensures the motor disconnection from the supply in a time that is shorter than the **tE** time (as specified for the given motor), while the current equals the start-up current of the motor.

# 7. Operational Use

In general, the construction and the reliable execution of the fan, guarantees its operational use without constant routine maintenance. Nevertheless, check periodically the mechanical and electrical connections, the state of grounding and efficient cooling for the motor.

**Following use of the fan is treated as incorrect**:

**a**) conveying the aggressive media,
**b**) forwarding the media of high dustiness or contaminant particles content,
**c**) use of the fan in area where the ambient temperature of the motor exceeds +40ºC.

**Consequences of incorrect use**:

**a**) breakage of bearings,
**b**) damage caused by corrosion,
**c**) balance loss of the rotary elements,
**d**) vibrations,
**e**) deformations,
**f**) damages caused by friction.

**Hazards caused due to incorrect use** – damages or other effects caused by:

- burst of the impeller,
- crack / burst due to wear of material,
- fire and explosion induced by sparks,
- vibrations,

**In case when any defective device function is detected (e.g. increased noise level, vibrations, reduced flow efficiency), it is important to disconnect the fan from the power supply, and to undertake its technical revision in order to reveal the reason of the functional disturbance.**

**In case of every repair or spare part replacement (according to 2014/34/EC ATEX Directive) it is important to apply an adequate information on an additional plate or in the enclosed documentation (a register log of repair activities, etc.). This is the duty of User!**

Typical disturbances and their reasons are exposed below.

# 8. Troubleshooting Guide

**Table No.2**

| | Problem | Possible reason | Corrective action |
|---|---|---|---|
| **1**. | sudden vibrations of the fan are occurring | hindrance objects, pollutants reducing the air flow got stack in the duct or in the inlet | spot the barrier object / pollutant and remove it |
| | | the impeller is damaged | replace the impeller with motor for new |
| **2**. | the fan does not start | fade of one of the phases or the supply voltage is too low | adjust the correct voltage |
| | | the block of protection activated | make correct settings of the protections |

# 9. Maintenance

Construction of the fan guarantees its longevity and reliable function without the constant routine technical supervision.

To obtain correct functional performances and to meet the safety rules, **it is recommended submit the fan to technical revision in regular periods of time**.

**Technical revisions on the fan must be executed by a qualified person with adequate authorization. Additionally, the fan necessarily should by disconnected from the power supply system.**

**During the technical revisions, follow the recommendations and instructions included in the User's Manual of the motor, that constitute integral part of the main User's Manual of the fan.**


**Before any revision activities on the fan, follow subsequent steps**:

- **disconnect the fan from the power supply system. Exclusion from it are activities that must be carried out on the running fan, i.e. vibration measurements. Whereby, observe strictly the Occupational and Health Safety regulations**
- **wait until the impeller stops its rotations**

**Within the scope of technical revision carry out following steps**:

- examine and tighten up the mechanical- and electrical connections; moreover check if any malfunctions are by noise or visually perceptible – if this is the case, undertake its control.
- undertake the inspection of the fan (radial impeller of the fan motor – according to the instructions of the manufacturer). During the technical inspection, clean the fan from deposited impurities.

Restart of the fan is possible, after the control steps as described in Section 6 "Assembly and Start-up".

# 10. Occupational Health and Safety

**Start-up and the operational use of the fan are admissible after getting acquainted with the contents of the present Use and Maintenance Manual**. The fan shall not cause any hazard under the condition it is correctly and firmly installed within the ventilation system or other structural element of the building.
Any installation activities related to the power supply system, have to be carried out strictly according to the enclosed Connection Diagram and in accordance with the instructions given in Section 6 of the present Use and Maintenance Manual.

WARNING **Connection to the power supply system ought to be carried out by an authorised person with qualifications, according to the being in force regulations.**
The fan motor ought to be protected against the short-circuit- and overload effects. During the use, check the fan connection to the PE protective cable.
**In the course of operational use, examine the fan connection to the PE protective cable**.

**Any revision activity and repair must be executed after the fan is disconnected from the power supply system.**
**Approaching with "loose garment/clothing" or putting the hand towards the open inlet of the running fan can cause hazard of accident and severe disability.**

# 11. Transport and Storage

WP-11/Ex ought to be wrapped in foil and placed into the cardboard package. Put the weight description on the package. During loading re-loading and transporting, the fans should not be thrown neither knocked down. Do not put any additional load on its top.
It is inadmissible to put one device on top of another (no stacking). During the transport, protect the device from atmospheric factors (weather conditions) and from mechanical damage. The device should be stored in dry rooms and in areas of efficient ventilation.

# 12. Terms of warranty

The period of warranty for the purchased device is indicated in the "Card of Warranty". The warranty does not comprise:

- mechanical damages and malfunctions caused by User,
- device failures caused during use which was in contradiction with the purpose of application and with the present Use and Maintenance Manual,
- any damages being caused during improper transport, storage or incorrect maintenance.

Infringement of the Clause G Section 3 "Reservations of Producer" of the present Use and Maintenance Manual and especially modifications undertaken by User on one's own or use in contradiction with the purpose of application – shall result in the loss of warranty validity.

# 13. Sample of the Declaration of Conformity

**Declaration of conformity EC No. ……..**

Manufacturer (eventually the authorized representative / importer):
name: **KLIMAWENT S.A.**
address: **81-571 Gdynia, Chwaszczyńska 194**

A person, authorized for issuing the technical documentation: Teodor Świrbutowicz, KLIMAWENT S.A.

hereby declares that the appliance:
name: **Explosion-proof duct fan**

type/model: **WP-11/Ex**
serial number: …….. year of production: ……..

meets the requirements of the subsequent European Directives:

- **2006/42/EC Machinery Directive** of the European Parliament and of the Council of May 17th, 2006 on machinery – amending the 95/16/EC (recast) /*Journal of Laws EC L157 of 09.06.2006, page 24*/
- **2014/35/EC Directive** of the European Parliament and of the Council of February 26th, 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits. /*Journal of Laws EC L96 of 29.03.2014*/
- **2014/34/EC ATEX Directive** of the European Parliament and of the Council of February 26th, 2014 on the harmonisation of the laws of Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres. / *Journal of Laws EC L96 of 29.03.2014* /

The appliance meets following harmonized standard:

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| ● **EN 60204-1:2018-12** | – "Safety of machinery – Electrical equipment of machines. Part 1: General requirements". |
| ● **EN ISO 13857:2010** | – "Safety of machinery – Safe distances to prevent hazard zones from being reached by upper and lower limbs". |
| ● **EN 80079-0:2013/A11:2014** | – "Electrical appliances in areas of gas explosion risk. Part 0: General requirements". |
| ● **EN 60079-7:2016-02** | – "Electrical appliances for areas of gas explosion hazard. Part 7: Increased safety construction "**e**". |
| ● **EN 1127-1:2011** | – "Explosive atmospheres – Explosion prevention and protection. Basic terminology and methodology". |
| ● **EN ISO 80079-36:2016-07** | – "Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres. Methodology and requirements. |
| ● **EN ISO 80079-37:2016-07** | – "Explosive atmospheres – Part 37: Non-electrical equipment for explosive atmospheres. Non-electrical types of protection. Constructional safety "**c**", supervised ignition "**b**", immersion in a liquid "**k**". |
| ● **EN 14986:2017-02** | – "Designing of fans applied in areas of explosion hazard" |
| ● **ISO 14694:2003+AMD1:2010** | – "Industrial fans – Guidelines on the quality of balancing and the vibration level. |
| ● **ISO 14695:2008/AC:2017-10** | – "Industrial fans – Methods of measurements of vibration of fans. |

The appliance is marked on the nominal data plate: **II 2 G c Ex eb IIB T3**

| | | |
|---|---|---|
| …… | …… | …… |
| place, date | signature of authorised person | name, surname, function of the signatory |

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REGON: 220631262
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**NOTES**: