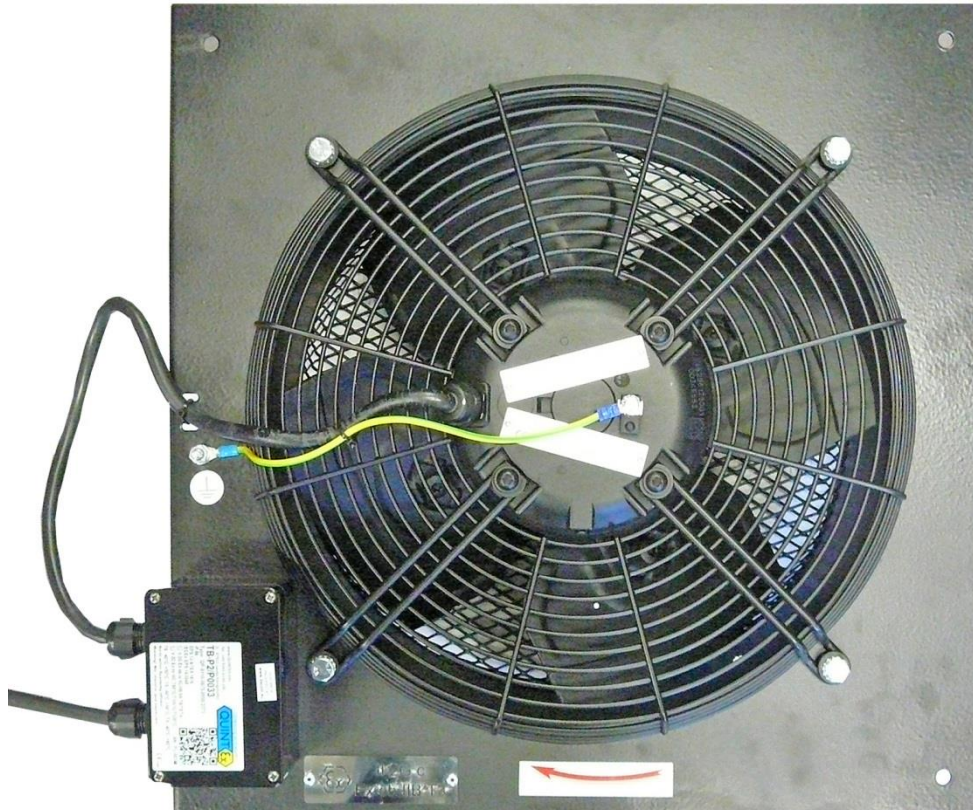


Use and Maintenance Manual



Explosion-proof axial fans **WOK/Ex**

ATEX marking:  **II 2 G c Ex eb II T3**

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808W15 WOK-350/Ex 04.06.2019/EN
 808W16 WOK-450/Ex 04.06.2019/EN
 808W17 WOK-550/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 **WOK/Ex Explosion-proof axial 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.

The construction of the **WOK/Ex Explosion-proof axial 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* /

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

WOK/Ex explosion-proof axial fans have been developed for function in areas of explosion hazard, where explosive atmosphere (as a mixture of flammable substances in the form of gases, mist and vapour with the air) is likely to occur. They can be applied for general ventilation of the production halls, workshops, storehouses – according to the explosiveness group.

The fans are installed directly in the openings in the walls or in windows as extraction applications. They have motors integrated with external impellers of increased safety protection, against ignition “e”, as well as a built-in PTC element, for cooperation with an external device controlling the windings temperature.

The fans can work within temperature range -20°C up to +40°C. They are meant for forwarding the dry air of dustiness not exceeding 0,3 g/m³ without viscous contaminants and aggressive compounds.


According to the ATEX 94/9/EC Directive and EN ISO 80079-36 the device features level of protection:

HIGH as appliance classified in **group II, category 2**; and it can work in areas where **explosive atmospheres are possible to occur**. It can be applied in **zones 1, 2 (G)**.



User ought to establish the work zones for the device and must be conscious about the hazard caused by atmosphere of explosion threat in those zones.

The appliance is marked on the Ex classification board:  **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 work on-ground, in factories in areas where explosive atmospheres occur, **but this cannot be methane risk (firedamp)** neither carbon dust occurrence,
- **category 2** – the device is designed for application in areas where **explosive atmospheres are sporadically likely to occur**,
- **gas hazard G**,
- “c” – refers the constructional protection,
- “b” – protection by means of controlling the ignition sources,
- **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)
- gas explosion **group IIB** – occurring in factories located on ground – the fans are constructed according to the PN-EN 14986:2009, whereby they can be applied for gas in explosion groups **IIB** and (**ethylene group**),
- **temperature class T3** – the surface temperature of any part of the appliance should not exceed **200°C**; the device can be used safely in explosive atmospheres belonging to classes **T3, T2, T1**.

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 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.  **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.**
- F.  **Neither use it for forwarding the air with aggressive pollutants which will destructively effect the device structure.**
- G. During operation, the maximum impeller rotations should not exceed the nominal rotations.
- H. **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	Rota- tional speed	Supply voltage	Motor rate	Acoustic pressure level		Maximum volume flow	Maximum vacuum	Weight
				from distance				
				1m	5m			
	[r.p.m.]	[V]	[W]	[dB(A)]		[m ³ /h]	[Pa]	[kg]
WOK-350/Ex	1400	3 x 400	130	69	60	2500	86	9
WOK-450/Ex	1370	3 x 400	290	75	66	4450	112	10
WOK-550/Ex	890	3 x 400	340	73	64	6400	72	13

- Ingress protection:
 - motor: **IP44**
 - fan: **IP20**
- Insulation class: **F**
- Range of operational temperature: **-20°C ÷ +40°C**
- Explosiveness group: **II**
- Explosiveness zone: **1 and 2**
- Temperature class: **T3**

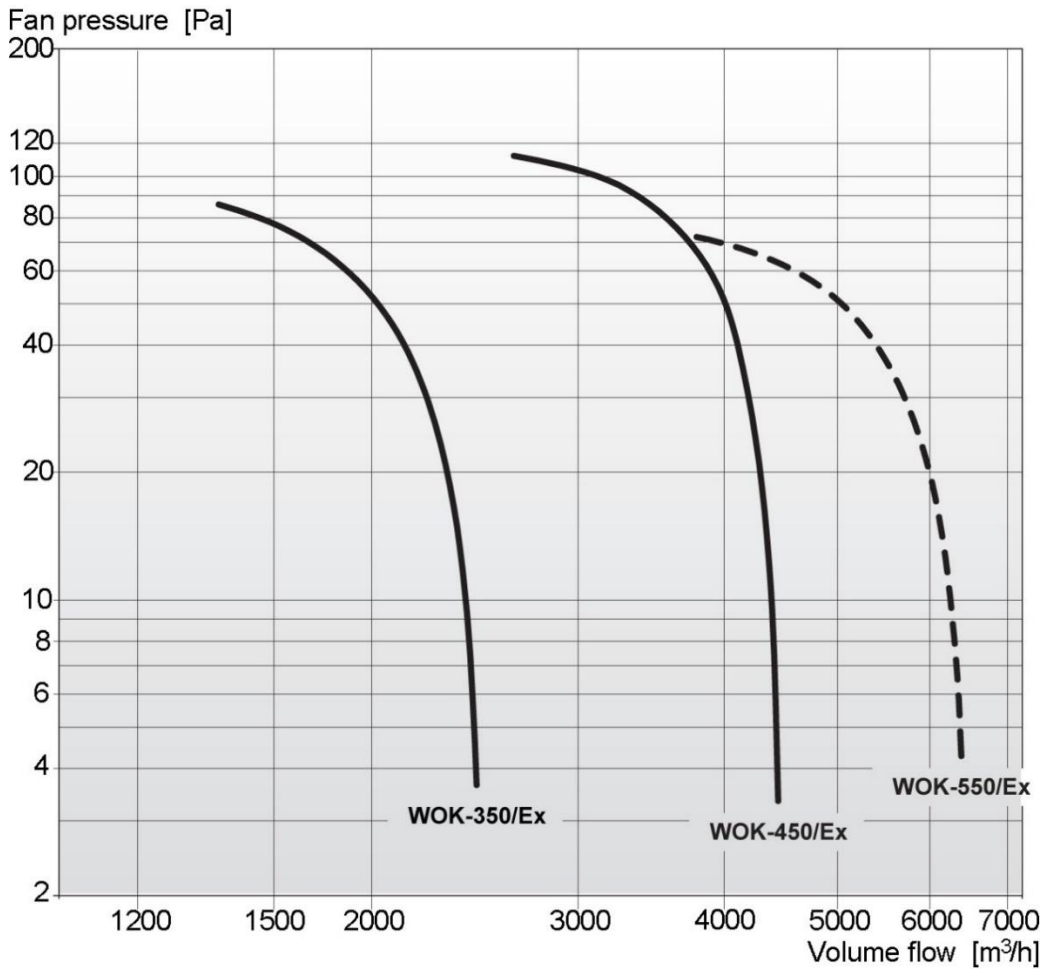


Fig. No.1 – Flow charts – Explosive-proof axial fans – WOK/Ex

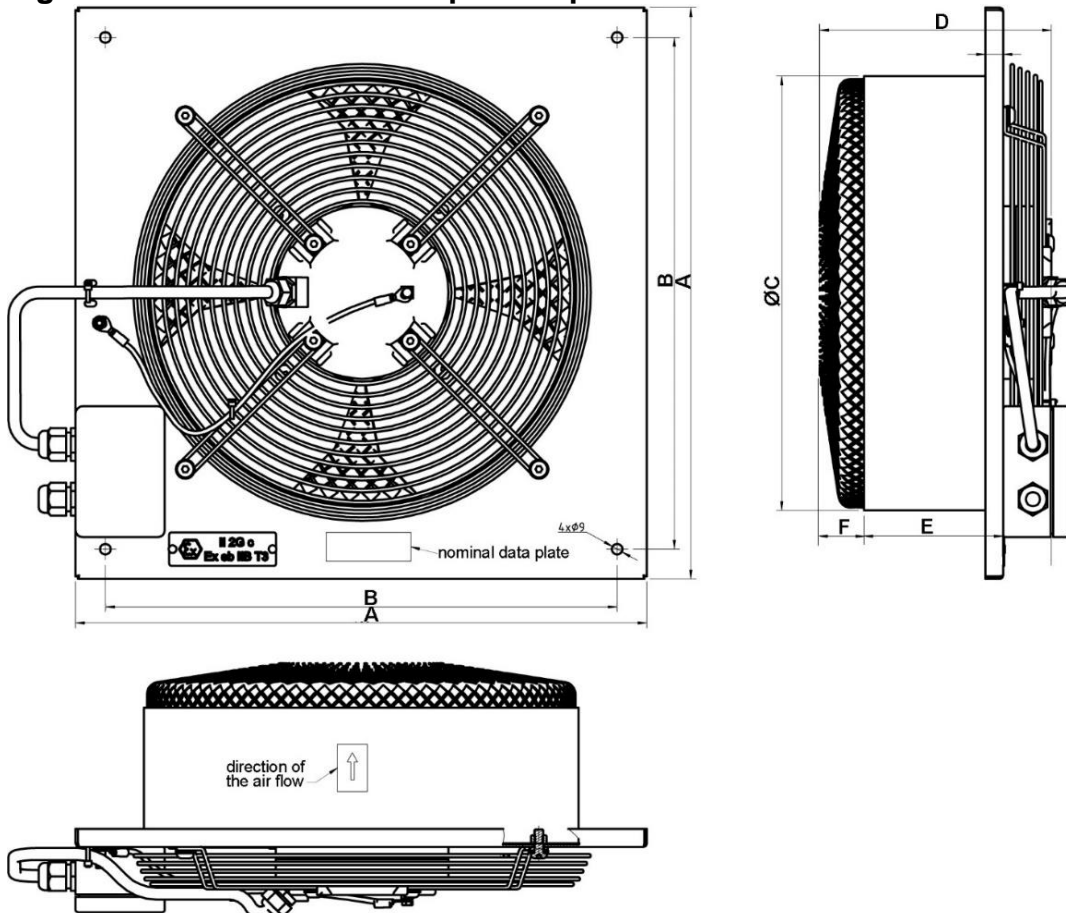


Fig. No.2 – Structure and Dimensions – Explosive-proof axial fans – WOK/Ex

Table No.2 – Dimensions – Explosive-proof axial fans – WOK/Ex

Type of the fan	Dimensions [mm]					
	A	B	ØC	D	E	F
WOK-350/Ex	480	430	365	195	117	37
WOK-450/Ex	605	555	460	185	132	50
WOK-550/Ex	730	680	560	185	132	50

5. Structure and Function

The steel fan housing has a shape of cylinder with a bent outside flange, to which is fastened a square steel plate (as a mounting element of the fan).

The Inlet is equipped with a protective inlet grill of concentric rings. In the housing is located a motor with a directly mounted axial impeller. The fan outlet is protected with a steel wire-mesh guard.

The motor is equipped with a PTC element to cooperate with an external device controlling the motor windings temperature. The fan with its guards are coated with a special non-conductive paint, creating in this way insulation – to avoid accumulating the electrostatic loads on the fan. The impeller is statically and dynamically balanced, according to the ISO 14694:2003 standard carrying the quality degree G 2,5.

6. Assembly and Start-up

The fans have been developed for operation in the industrial rooms. They have to be installed directly in the walls or windows and can work in extraction- or air supply applications.

Before installing in the opening in a wall, ceiling or window, make sure if the load capacity would bear the weight of the installed fan.

The installing height of the fan should be selected in such a way to observe safe distances to avoid people (other than the operational, servicing staff) from touching the fan during the operation.

Installing of the fan is carried out by four anchor plugs and screws or four bolts M8.

User who is carrying out the installing of the fan, is obliged to observe strictly the resolutions of PN-EN ISO 13857 standard.

6.1. Guidelines of installing:



a/ **VENTILATION INSTALLATION** – should be designed and carried out in accordance with the being in force valid regulations and standards, with reference to the local explosion hazard.



b/ **ELECTRICAL INSTALLATION** – where the WOK/Ex axial fans shall be connected – ought to be designed and executed according to the being in force valid regulations and standards – with reference to the local explosion hazard.

- Prior to connection to the power supply – make sure if the parameters of the existing system are corresponding the parameters on the nominal data plate. If those are not suitable, do not make the connections.
- Any activities referring the connection to the power supply have to be carried out by an authorised person with electrical qualifications and according to the valid regulation and standards (as illustrated in Fig. No.5).
- The whole ventilation system must be equipped with an efficient and correctly executed discharging installation to lead the electrostatic charges away. (The fan housing should be equipped with a terminal to the protective cable with grounding).
- Carry out the grounding of the motor housing through a protective cable between the terminal on the motor housing and the grounding.
- Having completed all the connections, examine the conductivity between all the assemblies of the device – the maximum resistance should not exceed 10^6 Ohm.

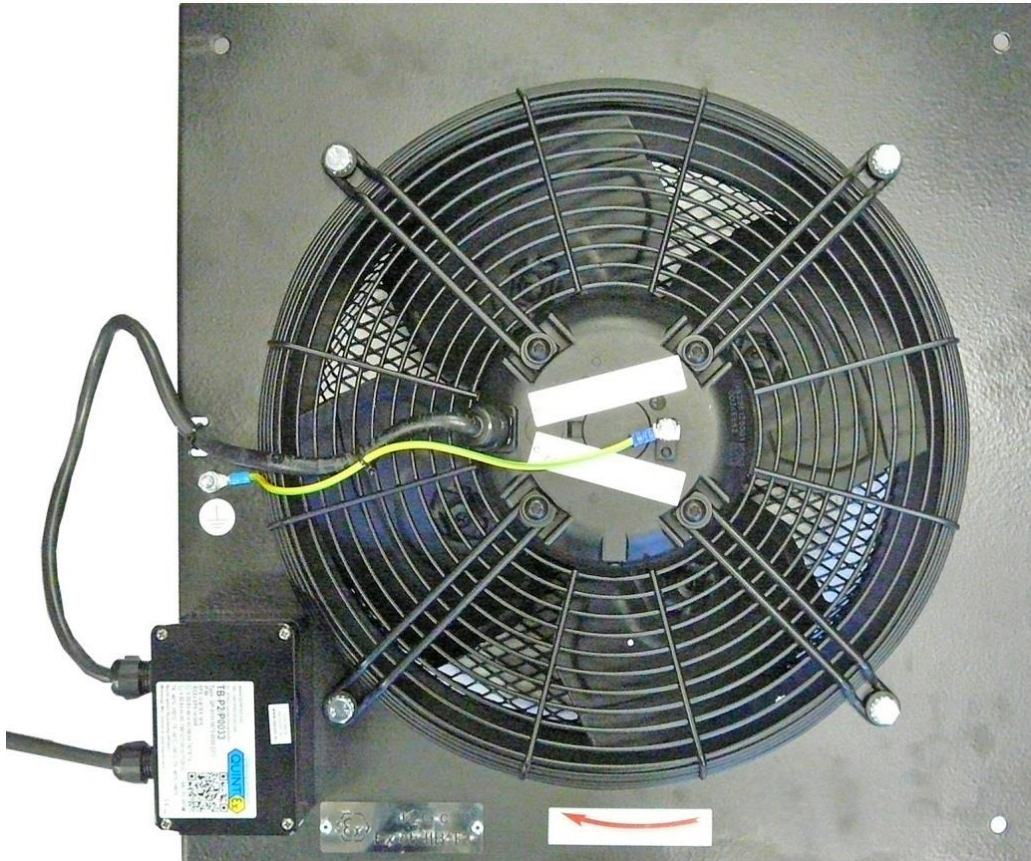


Fig. No.3 – Placement of the grounding cable and the power supply unit of the motor of the fan WOK/Ex

6.2 Safety inspection before the start up:

- a/ Examine if all the mechanical connections are performed correctly,
- b/ Examine the correctness of the electrical connections, phases sequence,
- c/ Check the correctness of the connection of the motor and the fan housing with the PE protective cable.

After the start up, check the impeller rotation sense which should be according to the arrow on the housing (see Fig No.3).

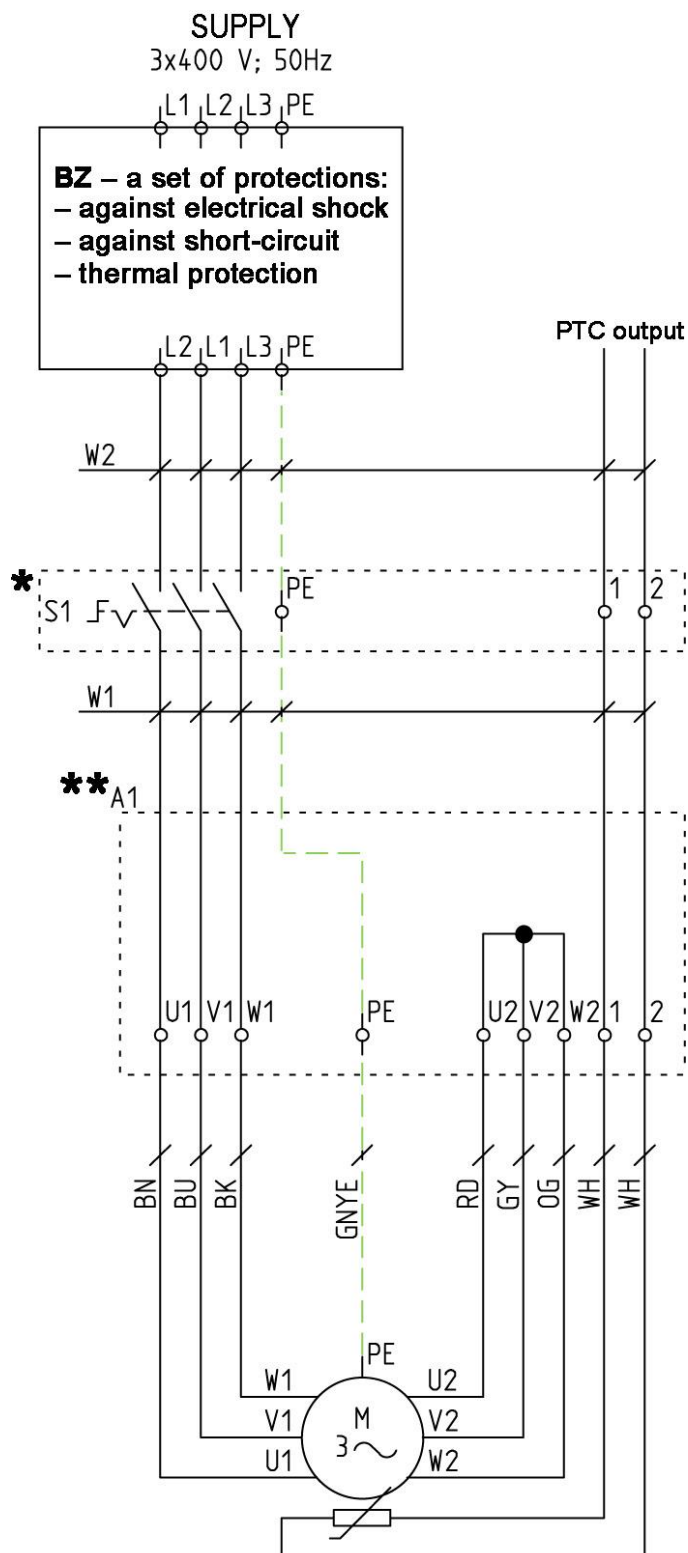
 KLIMAWENT S.A.					
Poland, 80-571 Gdynia, ul.Chwaszczyńska 194 tel./fax 0048 586 296 480 email:klimawent@klimawent.com.pl					
Product			Serial No		Mass
Part No					
V	kW	A	50Hz	IP	l/min



Fig. No.4 – Nominal data plate and explosion-proof plaque

The motor overload protection ought to have such time-current performance providing proper function, even while the motor is disconnected from the supply voltage for the shorter time than specified for it – “t_E”, and at current that equals the starting current.

Fan	Motor rate	Current	Supply	Type of the motor with integrated impeller
WOK-350/Ex	0,13 kW	0,25 A	3x400V	II 2 G c Ex eb II B T3 FB035-4DW,4Y.A4P
WOK-450/Ex	0,29 kW	0,51 A	3x400V	FB042-4DW,4Y.A4P
WOK-550/Ex	0,34 kW	0,75 A	3x400V	FB056-6DW,4Y.A4P



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

* **S1** – isolating switch – in explosion-proof execution. The suggested installing place – near the fan. Purchase and installing have to be carried out by the investor.

** **A1** – terminal box in explosion-proof execution

Connect the windings of the motor according to the data nominal place of the motor and with reference to the Connection Diagram that is placed on the fan.

Fig. No.5 – Connection Diagram

7. Operational Use

Construction of the device assures a reliable function without continuous technical supervision. It is important to check systematically the mechanical and electrical connections, the state of grounding and also to ensure the efficient cooling for the motor.

Incorrect use of the device:

- a) conveying the aggressive media,
- b) forwarding the media of high dustiness or with high fraction of pollution particles,
- c) use of the fan in a place where the ambient temperature of the motor is higher than +40°C.

Consequences of the incorrect use:

- damage of the bearings,
- damages caused by corrosion,
- loss in balance of the rotating elements,
- vibrations,
- deformations,
- damages caused by friction.

Risks which can occur due to improper use:

- damages and other defects caused by
 - burst of the impeller,
 - break of the shaft,
 - fatigue crack of the material,
 - ignition and explosion caused by sparks.

In case when symptoms of incorrect function (increased noise level, vibrations, reduced volume flow efficiency) of the device are noticed, disconnect the fan from the power supply system and undertake technical revision in order to spot the causes of faulty function.

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

Specification of the frequent malfunctions, failures and the ways of their elimination are given below.

8. Troubleshooting Guide

Table No.3

	Problem	Possible reason	Corrective action
1.	Sudden drop of the intake flow efficiency.	Obstacle objects, pollutants reducing the air flow got stuck at the inlet guard.	Clean the inlet guard.
2.	Sudden vibrations of the fan occur.	Obstacle objects reducing the air flow got stuck in the impeller.	Disconnect the fan from the power system, and remove the obstacle.
		Impeller is defective.	Replace the impeller and the motor for new.
3.	It is not possible to start the fan.	Fade of one of the phases or the voltage is too low.	Adjust to gain the correct voltage.
		The block of protections got activated.	Adjust the correct settings of protections.

9. Maintenance

Start up and servicing can be executed only after getting acquainted with the present Use and Maintenance Manual. To obtain correct functional performance of the fan and to meet the Occupational Health and Safety rules, it is recommended to carry out technical revisions at regular periods.



Technical revisions on the fan must be executed by an authorised person with qualifications. Additionally, the fan necessarily should be disconnected from the power supply system.

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



Before the activities undertaken on the fan, follow subsequent steps: – disconnect the fan from the power supply. Exemption from this are activities carried out on the running fan, e.g. measuring of the vibrations. In this case especially it is important to follow the regulations of Occupational Health and Safety. Wait until the impeller stops rotating.

The fan can be restarted after the control steps are carried out, strictly 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 mechanical hazard under the condition it is correctly and firmly installed within the ventilation system or to the supporting structure.

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 User's Manual.



Connection to the power supply system ought to be carried out by an authorised person with qualifications, according to being in force regulations. The fan motor must be protected from the short-circuit and overload effects.

In the course of operational use, examine the connection to the PE protective cable.



Any revision activity and repair must be executed after the device 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 risk of accident and severe disability.

11. Transport and Storage

WOK/Ex fans are wrapped in foil and placed in cardboard packages. On the package surface is placed its weight. During the transport / reloading the package should not be thrown or knocked down or charged with a load at the top. The packages must not be placed one on top of another (no stacking).

During the transport protect it from weather conditions and from damage.

The fan must be stored in dry rooms and 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:

- device failures caused during use which was in contradiction with the purpose of operational use and with the present Use and Maintenance Manual,
- mechanical damages and malfunctions caused by User,
- 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 axial fans**

type/model: **WOK/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 ISO-12100:2012 | – “Safety of machinery – Basic concepts, general principles for design. Hazard 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 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” |
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place, date

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signature of authorised person

District Court Gdańsk-Północ
in Gdańsk, VII Wydział Gospodarczy
of the National Register of Court
KRS 0000308902 company stock
13.779.200 zł paid in total

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name, surname, function
of the signatory

NIP: 958 159 21 35
REGON: 220631262
Bank Account: **Santander Bank Polska S.A.**
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NOTES: