Use and Maintenance Manual

Explosion proof stationary fan

WPA-S-N/Ex

ATEX marking: II 2 G c Ex e II T3

Contents:

1. Introductory Remarks

The purpose of the present User's Manual is to supply User with directions within the range of application, installation, start-up and the operational use of the **WPA-S-N/Ex explosion proof stationary fans**.

Installing, start up and operational use are exclusively admissible after getting acquainted with the contents of the User's 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 **WPA-S-N/Ex explosion proof stationary fans** meets the requirements of the current state of technology and 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 Member States relating to the making available on the market of electrical equipment designed 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 device has been constructed and produced on the basis of following harmonized standards:

- **PN-EN ISO 12100:2012** – "Safety of machinery – Basic concepts, general principles for design – Risk assessment and risk reduction".
- **PN-EN 60204-1:2010** – "Safety of machinery – Electrical equipment of machines. Part 1: General requirements".
- **PN-EN ISO 13857:2010** – "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs".
- **PN-EN 60079-0:2013/A11:2014E** – "Electrical appliances in areas of gas explosion risk. Part 0: General requirements".
- **PN-EN 60079-7:2010** – "Electrical appliances for explosive gas atmospheres. Part 7: Increased safety "e".
- **PN-EN 1127-1:2011P** – "Explosive atmospheres. Explosion prevention and protection. Basic terminology and methodology".
- **PN-EN 13463-1:2010** – "Non-electric appliances in areas of explosion risk – Part 1 – Basic concepts and requirements".

- **PN-EN 14986:2009** – "Designing of fans used in areas of explosion risk.
- **ISO 14694:2003+AMD1:2010** – "Industrial fans – specifications for balance quality and vibration levels".
- **PN-ISO 14695:2008** – "Industrial fans – Method of measurement of fan vibration.

2. Application

WPA-S-N/Ex explosion proof stationary fans are intended for use in areas of explosion risk, where explosive atmosphere, {i.e. mixture of flammable substances in form of gas, and vapour with the air, whereby (after ignition), the burning mass would expand within the whole non-burning mixture} can occur.
Increased fan pressure of the device makes possible to apply it in a system cooperating with local exhausts, filtering units, as well as in a ventilation system of significant flow resistances.

The fans can work in 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 impurities, aggressive compounds and of maximum temperature +60°C.

According to the ATEX 2014/34/EC Directive and the standard PN-EN 13463-1 the appliance provides level of protection:
HIGH as appliance classified in **group II**, **category 2** and designed for application in areas where **explosive atmospheres are possible to occur**. It can be applied in **zones 1**, **2** (**G**).

The appliance is marked on the Ex classification board: **II 2 G c Ex e II T3**
Marking of the operational conditions of the device – **group/category/hazard/temperature class.**

- marking for explosion proof properties of the device,
- **group II** – the device is designed for work as on-ground application, in places where explosive atmospheres occur, **but this cannot be methane risk (fire-damp)**, neither carbon dust,
- **category 2** – the device is designed for application in areas where explosive atmospheres **are likely to occur**,
- **gas hazard G**,
- "**c**" – refers the constructional protection,
- **Ex** – mark of the electrical device – constructed and tested according to the European standards for work in areas of explosion risk,
- **execution** "**e**" – type of construction of the motor (a motor of increased safety)
- gas explosion **group II** – occurring in plants on ground – the fans are constructed according to the PN-EN 14986:2009, whereby they can be applied for gas in explosion group **IIA**, **IIB** and **hydrogen**,

- **temperature class T3** – the temperature of any part of the device should not exceed **200ºC**; 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. Any structural changes or device modifications on one's own are not permitted.

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 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. **Producer 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	Ingress protection	Acoustic pressure level [dB(A)] from distance		Maximum volume low	Maximum vacuum	Weight
	[r.p.m.]	[V]	[kW]	IP	1m	5m	[m³/h]	[Pa]	[kg]
WPA-3-S-N/Ex	3000	3 x 400	**0,25**	56	78/70*	64/56*	1020	990	**22,5**
WPA-5-S-N/Ex	3000	3 x 400	**0,55**	56	76/67*	62/53*	1900	1250	**27**
WPA-6-S-N/Ex	3000	3 x 400	**0,75**	56	83/75*	69/61*	2500	1700	**31**
WPA-7-S-N/Ex	3000	3 x 400	**1,1**	56	86/74*	72/60*	3100	1800	**32**
WPA-8-S-N/Ex	3000	3 x 400	**1,5**	56	88/78*	74/64*	3900	2050	**45**
WPA-9-S-N/Ex	3000	3 x 400	**2,2**	56	91/82*	77/68*	4500	2400	**47**
WPA-10-S-N/Ex	3000	3 x 400	**4,0**	56	91/87*	77/67*	7400	2600	**79**
WPA-11-S-N/Ex	3000	3 x 400	**5,5**	56	97/88*	83/74*	8050	2950	**104**
WPA-13-S-N/Ex	3000	3 x 400	**7,5**	55	99/90*	85/76*	10800	3300	**140**

***** Noise measurement has been conducted with the TK L=500 mm silencer fastened at the inlet and outlet of the fan (for WPA-3-S-N/Ex is applied TK L=370 mm silencer).

1. Maximum temperature of the conveyed air is +60ºC, whereas maximum temperature within the work zone +40ºC.

2. Maximum dustiness of the conveyed air should not exceed 0,3 g/m³.

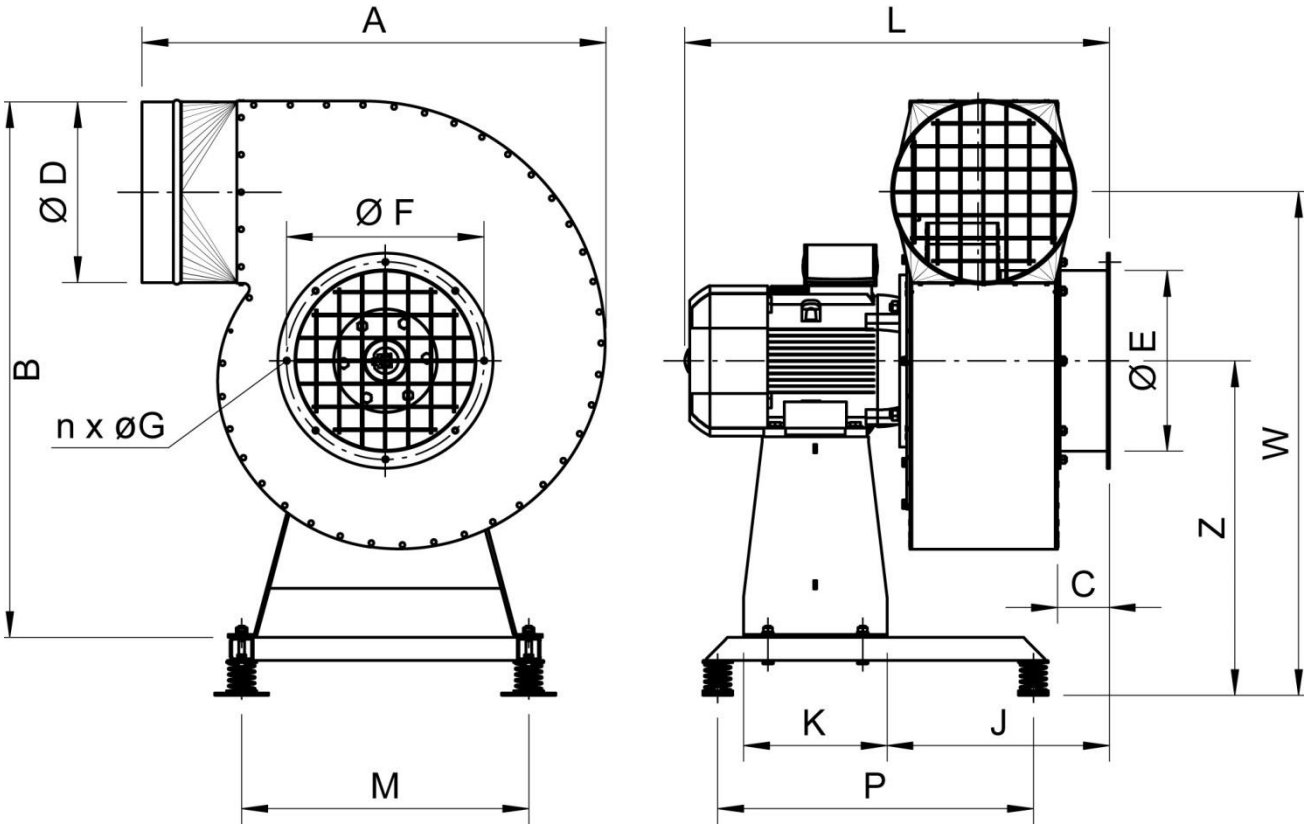
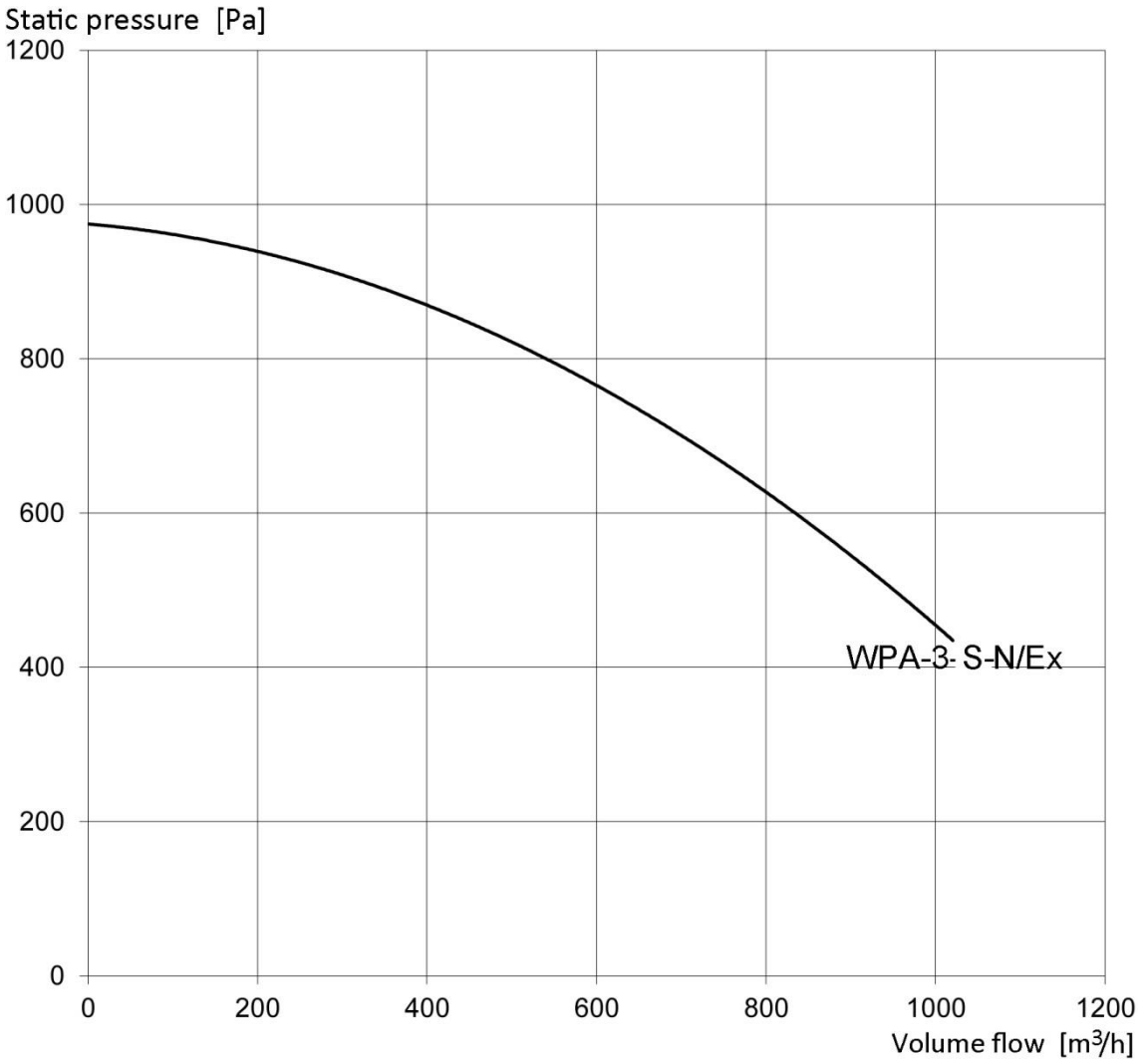


Fig. No.1 – Fan of series WPA-S-N/Ex – Structure and dimensions

Table No.2 – Dimensions of fans

Type of the fan	A [mm]	B [mm]	C [mm]	W [mm]	Z [mm]	D [mm]	E [mm]	F [mm]	n [pcs]	G [mm]	M [mm]	P [mm]	K [mm]	J [mm]	L [mm]
WPA-3-S-N/Ex	415	520	50	555	405	125	125	155	6	7,0	345	400	200	170	400
WPA-5-S-N/Ex	485	575	60	595	405	160	160	194	6	7,0	345	400	200	195	420
WPA-6-S-N/Ex	500	600	60	620	410	160	160	194	6	7,0	345	400	200	205	445
WPA-7-S-N/Ex	550	605	60	605	410	200	160	194	6	7,0	345	400	200	220	460
WPA-8-S-N/Ex	570	685	60	685	480	200	200	224 234 246	8 6 8	9,0 7,0 9,0	425	450	220	215	490
WPA-9-S-N/Ex	615	730	60	725	480	200	200	224 234 246	8 6 8	9,0 7,0 9,0	425	450	220	215	510
WPA-10-S-N/Ex	655	810	80	780	550	250	250	274	8	9,0	500	550	250	325	650
WPA-11-S-N/Ex	675	830	80	805	565	250	250	274	8	9,0	500	550	250	335	665
WPA-13-S-N/Ex	805	940	90	880	585	315	315	344	8	9,0	500	550	250	390	775

Flow chart


Static pressure [Pa]
1200
1000
800
600
400
200
0
0
200
400
600
800
1000
1200
Volume flow [m³/h]
WPA-3-S-N/Ex

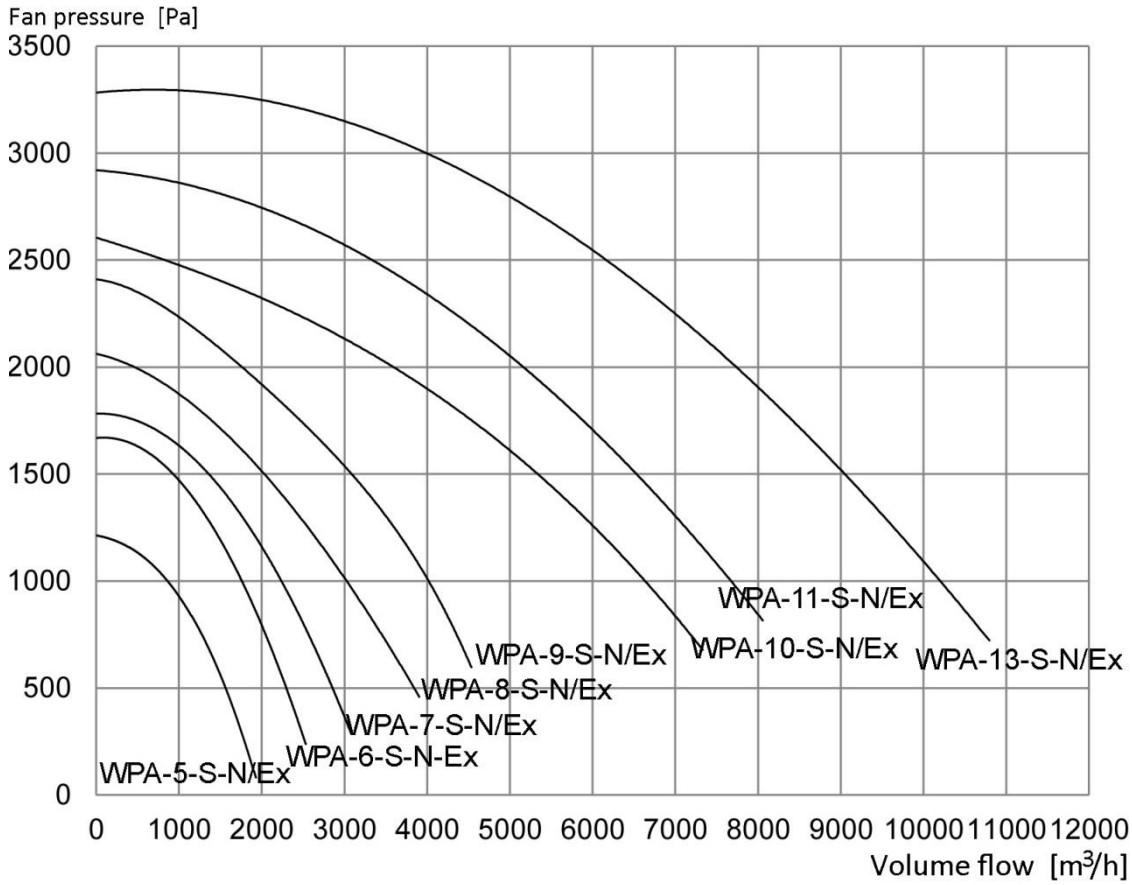


Fig. No.2 – Flow charts of the fans type WPA-S-N/Ex

5. Structure and Function

The fan consists of a spiral steel housing, motor with installed on its shaft aluminium radial impeller. The impeller blades remind the airplane wing cross-section and provide low acoustic pressure level of the fan. The fan is mounted on a stand which is placed on a vibro-isolating base frame (see Fig. No.1).
Vibro-isolating frame protects from transmission of the fan vibrations to the floor. The fan inlet is equipped with a flange, whereas the outlet is ended with a round connection adapted for a safe fastening of the spiral-seam duct or flexible connections.
For safety reasons, both openings – inlet and outlet are equipped with protective grill.
Additionally, it is recommended to install TK type silencers at the inlet and outlet (see acoustic data in the Table No.1).

ADDITIONAL EQUIPMENT – delivery on separate order:

- motor protective switches WS – with short-circuit- and overload protection,
- isolating switches,
- silencers.

6. Assembly and Start-up

The fans are designed for function inside industrial rooms (indoor application). **They should be mounted stably in the site of use, indicated by User.**

The fans can be mounted in 8 positions. As standard, it is installed in position RD90, according to PN-M-43011:1992, with its outlet directed to the right (see Fig. No.3).

Connect the fan outlet with the discharge ductwork, through a hose section of antistatic material. Ways of mounting of the connections, (depending on the accepted technologies on execution of installations), should be specified during the installing. It is recommended to apply silencers at the inlet and outlet of the fan.

User who is executing the installing, is responsible for complete fulfilling of the provisions of the standard PN-EN ISO 13857.

After the stationary fan is installed at the workplace, it is time to connect it to the ventilation ducting. To connect the fan with rigid conduits it is important to use flexible connectors, as the conduits should not charge the fan with their weight.

The whole ventilation system should be equipped with a correctly prepared installation, leading the electrostatic charges away (dissipation). The connections between the ventilation ducts should be secured with electrostatic joints of protective cables.

Examine whether the metal ducts are adequately grounded. Additionally, the motor housing should be grounded by means of a protective cable (fastened to the terminal on the housing).

Any activity related to connection to the power supply system, should be executed by a person with adequate qualifications, according to the valid regulations. Prior to connection, check if the parameters of the existing installation is according to corresponding parameters on the nominal data plate.

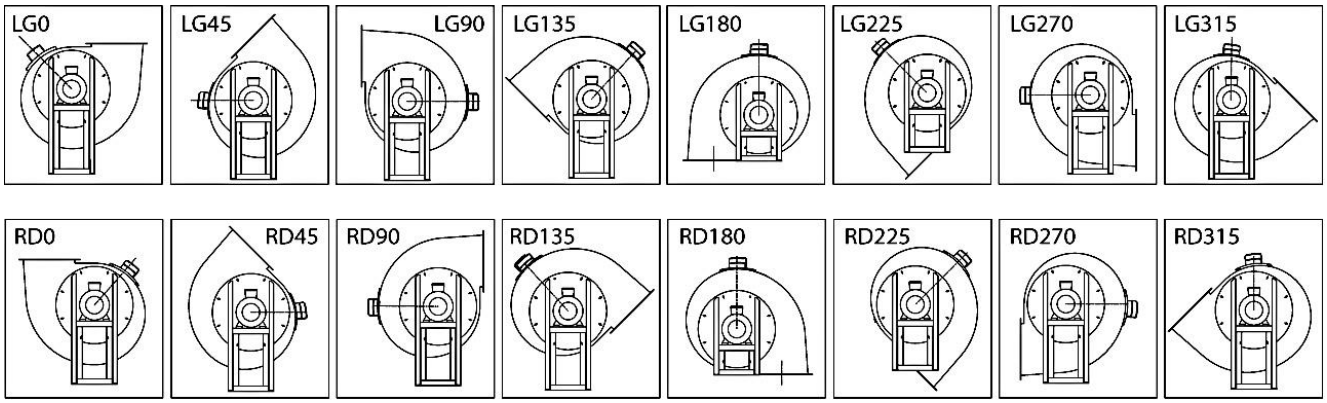
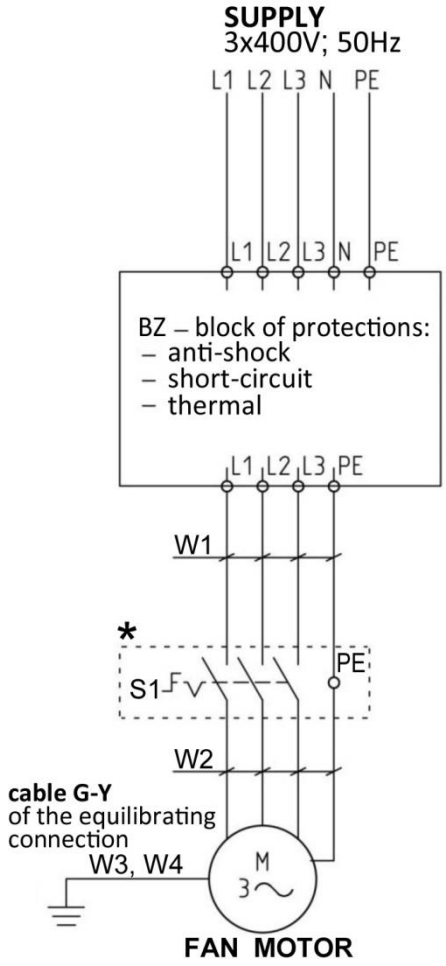


Fig. No.3 – Mounting positions of the fan WPA-S-N/Ex

Fan	Motor rate [kW]	Current [A]	Motor type Ex II 2 G Ex e II T3	Cable W1, W2	Protective cable G-Y W3, W4
WPA-3-S-N/Ex	0,25	0,9	SLh 63-2B; 3x400V; 50 Hz 2870 r.p.m.; BESEL	to be selected by User	H05V 1G6
WPA-5-S-N/Ex	0,55	1,4	SLh 71-2B; 3x400V; 50 Hz; 2720 r.p.m.; IMB35; BESEL		
WPA-6-S-N/Ex	0,75	1,8	SLh 80-2A; 3x400V; 50 Hz; 2760 r.p.m.; IMB35; BESEL		
WPA-7-S-N/Ex	1,1	2,4	SLh 80-2B; 3x400V; 50 Hz; 2780 r.p.m.; IMB35; BESEL		
WPA-8-S-N/Ex	1,5	3,5	SLh 90S-2; 3x400V; 50 Hz; 2850 r.p.m.; IMB35; INDUKTA		
WPA-9-S-N/Ex	2,2	4,7	SKg 90-2; 3x400V; 50 Hz; 2860 r.p.m.; IMB35; INDUKTA		
WPA-10-S-N/Ex	4,0	7,5	SKg 112M-2; 3x400V; 50 Hz; 2875 r.p.m.; IMB35; INDUKTA		
WPA-11-S-N/Ex	5,5	10,4	SKg 132S-2A; 3x400V; 50 Hz; 2915 r.p.m.; IMB35; INDUKTA		
WPA-13-S-N/Ex	7,0	12,7	SLg 132S-2B; 3x400V; 50 Hz; 2875 r.p.m.; INB35; INDUKTA		



Caution:

1. Supply voltage: 3x400V; 50Hz
2. Continuous work S1
3. Ingress protection: IP56, {IP55 WP-13-S-N/Ex}
4. Ambient temperature: -20ºC up to +40ºC
5. Insulation class F
6. Connect the grounding cable of length 400mm, (ended with a **KOI** terminal), to the fan housing.
7. Installations and devices for use in areas of explosion risk – should be executed according to
   – arrangements of the 2014/34/EC ATEX Directive,
   – valid regulations and standards.

* **S1** isolating switch – in Ex execution.
It is recommended to install it near the fan.
The application of the isolating switch is not obligatory and depends on the decision of Investor.

Cables **W1**, **W2** have to be selected by Investor, with reference to the fan motor rate, cable length, outline of the cable, voltage drop.

W3, **W4** are cables for local equilibrating connections of cross-section 6mm^2, length 300 mm, ended with adequately selected eye terminals, designed for connection to the fan fitting pieces.

CAUTION:
The motor windings must be connected according to the data on the nominal data plate of the motor and the connection diagram (placed on the cover of the motor terminal box).

Fig. No.4 – Connection diagram of the fan WPA-S-N/Ex

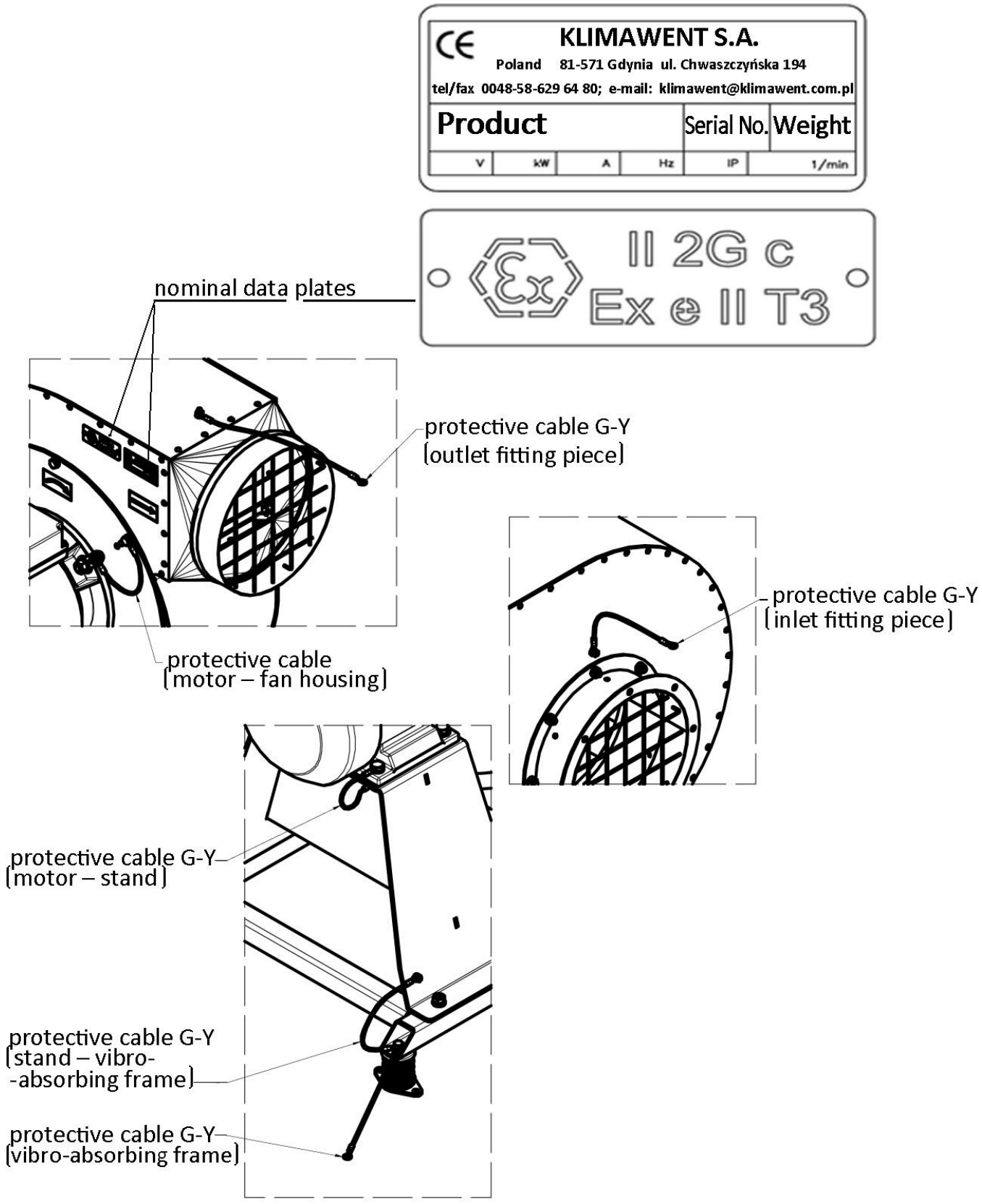


Fig. No.5 – Placement of the protective cables and nominal data plates

7. Operational Use

Construction of the fan and its robust execution assures a longlife reliable function without continuous technical supervision.

Periodically, it is important to check the mechanical and electrical connections, the state of grounding and also to guarantee the efficient cooling for the motor.

Examples of incorrect operational use:

- forwarding the media of temperature exceeding the admissible temperature (+60°C),
- conveying aggressive media,
- conveying the media of high dustiness or with high content of pollution particles,
- use of the fan in a place where the ambient temperature (of the motor) exceeds +40°C.

Consequences of 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 or other defects caused by:
  - burst of the impeller,
  - break of the shaft,
  - fatigue crack of the material,
  - fire and explosion caused by sparks.

In case when any symptoms of incorrect device function (examples are given in Section 8), or a sudden noise increase, drop in the volume flow efficiency – disconnect the device from the power supply system, examine thoroughly and follow steps as in the instructions in Section 8. Additionally, find out the reasons of the malfunction.

WARNING **In case of every repair or spare part replacement (according to 2014/34/EC ATEX) 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!**

A list of frequent functional disturbances and ways of their elimination, is exposed below.

8. Troubleshooting Guide

Table No.3

	Problem	Possible reason	Corrective action
1.	Significant, sudden decrease of intake air volume.	Pollutants, objects reducing the air flow deposited at the inlet grill.	Clean the inlet grill.
2.	Sudden vibrations of the fan occur.	Obstacle objects got stuck in the impeller.	Disconnect the fan from the power system, and remove the obstacle.
		Damage of the impeller	Replace the impeller and the motor for new.
3.	It is not possible to switch on the fan.	Fade of one of the phases or low voltage.	Adjust to gain the correct voltage.
4.	The motor worms up excessively, intense unpleasant smell is perceptible.	Damage of the motor windings.	Disconnect the motor, dismantle the fan and and send it to producer or their representative.
5.	Noisy work of the fan along with small volume flow efficiency.	Incorrect impeller rotation sense.	Change the impeller rotations, by swapping the phase sequence.

9. Maintenance

The construction and a solid execution of the fan, guarantee its operational use, without the routine constant everyday maintenance. 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.
In the course of technical inspection check the function of the fan and the technical state of its elements.

Technical revisions on the fan must be executed by a qualified person with adequate authorization. Additionally, the fan necessarily should be disconnected from the power supply system.
During the technical revisions, follow the recommendations included in the User's Manual of the motor, that constitute integral part of the main User's Manual of the fan.

Within the scope of the technical revision are:

- Systematically, keep clean the inlet grill.
- Periodically, check the mechanical and electrical connections. Moreover, when defective function is by noise or visually spotted – undertake the technical revision of the assembly.
- Examine the fan (motor – according to the instructions of motor manufacturer). Within the scope of maintenance, clean the fan from the deposited impurities.

Before the start-up, follow subsequent steps:

- **Disconnect the fan from the power supply. Exemption from this are activities that must be executed at the running fan, i.e. vibration measurements (especially here are important Occupational Health and Safety regulations).**
- **Wait until the fan impeller stops rotating.**

The fan can be restarted after the control steps are carried out, 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 mounted to the floor and to the ventilation system.

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 a qualified person, according to the being in force regulations.

The fan motor must be protected from 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 fan is disconnected from the power supply system.
Approaching in “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

WPA-S-N/Ex fans are transported on pallets. It is important to put wooden beams or pieces of wood of such thickness, that the springs (of vibro-absorbing frame) would not touch the pallet. The vibro-absorbing frame along with the beams must be firmly fastened to the pallet. Additionally, protect the device with foil, to separate from weather factors and to avoid damage. Protect the fan from overturn. Do not put any load on the device.

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:

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

Infringement of the Section 3 “Reservations of Producer” of the present Use and Maintenance Manual and especially modifications undertaken by User on one’s own shall cause the loss of warranty validity.

DECLARATION OF CONFORMITY No. .....

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

A person authorized for issuing the technical documentation:
name and address:

hereby declares that the appliance:
name: **Explosion proof stationary fan**

type/model: **WPA-S-N/Ex**
serial number: ..... year of production: .....

meets the requirements of the subsequent European Directives:

- **2006/42/EC Directive** of the European Parliament and of the Council of May 17th, 2006 – for machines – amending the 95/16/EC Directive (recast); */ Journal of Laws EC L 157 of 09.06.2006, page 24 /*
- **2014/35/EC Directive** of the European Parliament and of the Council of February 26th, 2014 on harmonisation the laws of the Member States – relating to 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 equipment and protective systems intended for use in areas of explosion risk */ Journal of Laws EC L96 of 29.03.2014 /*

meets the requirements of following harmonized standards:

● **EN ISO-12100:2012**	Safety of machinery – Basic concepts, general principles for design Risk assessment and risk reduction.
● **EN 60204-1:2010**	Safety of machinery – Electrical equipment of machines. Part 1: General requirements
● **EN ISO 13857:2010**	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs.
● **EN 60079-0:2013-03E**	Electrical appliances in areas of gas explosion risk. Part 0: General requirements
● **EN 60079-7:2010**	Electrical appliances in areas of gas explosion risk. Part 7: Reinforced construction "**e**"
● **EN 1127-1:2011**	Explosive atmospheres. Explosion prevention and protection. Part 1: Basic terminology and methodology
● **EN 13463-1:2010**	Non-electric appliances in areas of explosion risk. Part 1. Basic concepts and requirements.
● **EN 14986:2009**	Designing of fans used in areas of explosion risk.
● **ISO 14694:2003+AMD1:2010**	Industrial fans – specifications for balance quality and vibration levels
● **ISO 14695:2008**	Industrial fans – Method of measurement of fan vibration

Marking of the product: Ex **II 2G c Ex e II T3**

.....	.....	.....
place, date	signature of authorised person	name, surname, function of the signatory

KLIMAWENT S.A.
Supported Employment Enterprise
81-571 Gdynia, ul. Chwaszczyńska 194
phone: +49 58 629 64 80; fax: +49 58 629 64 19;
email: klimawent@klimawent.com.pl
www.klimawent.com.pl

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56 1500 1025 1210 2007 8845 0000

NOTES:

Producer:
KLIMAWENT S.A.
81-571 Gdynia, ul. Chwaszczyńska 194
tel. 058 629 64 80
fax 058 629 64 19
e-mail: klimawent@klimawent.com.pl
www.klimawent.com.pl

888W19	**WPA-3-S-N/Ex**	**15.02.2017/EN**
888W20	**WPA-5-S-N/Ex**	**15.02.2017/EN**
888W21	**WPA-6-S-N/Ex**	**15.02.2017/EN**
888W22	**WPA-7-S-N/Ex**	**15.02.2017/EN**
888W23	**WPA-8-S-N/Ex**	**15.02.2017/EN**
888W24	**WPA-9-S-N/Ex**	**15.02.2017/EN**
888W25	**WPA-10-S-N/Ex**	**15.02.2017/EN**
888W26	**WPA-11-S-N/Ex**	**15.02.2017/EN**
888W27	**WPA-13-S-N/Ex**	**15.02.2017/EN**