Use and Maintenance Manual

Radial roof fans SMART-N

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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 operational use of the **SMART-N radial roof 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 **SMART-N radial roof 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*/

The appliance meets the requirements included in:

– **2009/125/EC (ErP) Directive** of the European Parliament and of the Council of October 21th, 2009 establishing a framework for the setting of ecodesign requirements for energy-related products / *Journal of Laws L 285 of 31.10.2009* /

– **327/2011** (**EU**) **Regulation** of March 30th, 2011 on implementing the **2009/125/EC Directive** of the European Parliament and of the Council with regard to ecodesign requirements for fans driven by motors with an electric input power between 125W and 500 kW / *Journal of Laws L No. 90 of 06.04.2011* /

The device has been constructed and produced on the basis of following harmonized standards:

- **EN ISO-12100:2012** – "Safety of machinery. Basic concepts, general principles for design. Risk assessment and risk reduction"
- **EN 60204-1:2018-12** – "Safety of machinery – Electrical equipment of machines. Part 1: General requirements"
- **EN 60034-1:2011** – "Rotating electrical machines – Part 1: Rating data and parameters"
- **EN ISO 5802:2008/A1:2015-07** – "Industrial Fans – Performance testing in situ of installing
- **EN ISO 13857:2010** – "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs".

2. Application

SMART-N radial roof fans are meant for general ventilation of rooms, in common- and industrial buildings. Moreover, they can also be applied in the technological ventilation installations (local exhausts). Due to their disposable pressure, they can be connected to a system of ventilation ducts.

The fans are meant for forwarding the dry air of dustiness not exceeding 0,3 g/m³ and of maximum temperature 60°C, without viscous impurities, aggressive compounds or substances creating explosion hazard.

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. It is unacceptable to install on the device structure any additional elements not belonging to its normal construction or accessory set.

C. Do not introduce any structural changes or modification of the appliance on one's own.

D. Protect the housing from mechanical damage.

E. Prior to installing, check the load capacity of the constructional elements where the fan will be mounted. Unsure installing could cause hazard to personnel / people in vicinity and effect in damage of the device.

F. **SMART-N fans cannot be used for conveying the air contaminated with a mixture of flammable substances in form of gas, vapour, mist and dust, that in connection with the air could create the explosive atmosphere.**

G. **Do not use the fans for conveying the air containing viscous impurities that could accumulate on the device surface, especially on the impeller.**

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

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

J. 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 of the fan	Synchronous rotations	Supply voltage	Motor rate	Maximum volume flow	Maximum fan pressure	Weight
	[r.p.m.]	[V / Hz]	[kW]	[m³/h]	[Pa]	[kg]
SMART-160/3000-N	3000	3 x 400 / 50	0,55	2300	820	20
SMART-200/3000-N	3000	3 x 400 / 50	0,55	2800	820	20
SMART-200/1500-N	1500		0,55	2800	710	40
SMART-200/1000-N	1000		0,37	2100	345	40
SMART-250/3000-N	3000	3 x 400 / 50	0,55	2900	520	20
SMART-250/1500-N	1500		1,1	4600	790	44
SMART-250/1000-N	1000		0,37	3160	370	42
SMART-315/3000-N	3000	3 x 400 / 50	0,55	3400	520	20
SMART-315/1500-N	1500	3 x 400 / 50	1,5	7800	890	60
SMART-315/1000-N	1000	3 x 400 / 50	0,55	5000	390	55
SMART-400/1500-N	1500	3 x 400 / 50	3,0	11100	1000	70
SMART-400/1000-N	1000	3 x 400 / 50	0,75	7000	400	59
SMART-400/750-N	750	3 x 400 / 50	0,37	5200	240	58
SMART-500/1000-N	1000	3 x 400 / 50	2,2	14900	530	94
SMART-500/750-N	750		1,1	10700	290	87
SMART-630/1000-N	1000	3 x 400 / 50	4,0	22500	670	163
SMART-630/750-N	750		2,2	18100	390	151
SMART-710/1000-N	1000	3 x 400 / 50	5,5	31000	740	174
SMART-710/750-N	750		2,2	20500	390	155

Caution: **1.** Ingress protection **IP54**

2. In order to reduce the noise level, it is recommended to apply sound absorbing roof bases – type **TPD-N** and **TPDC-N**

Flow charts

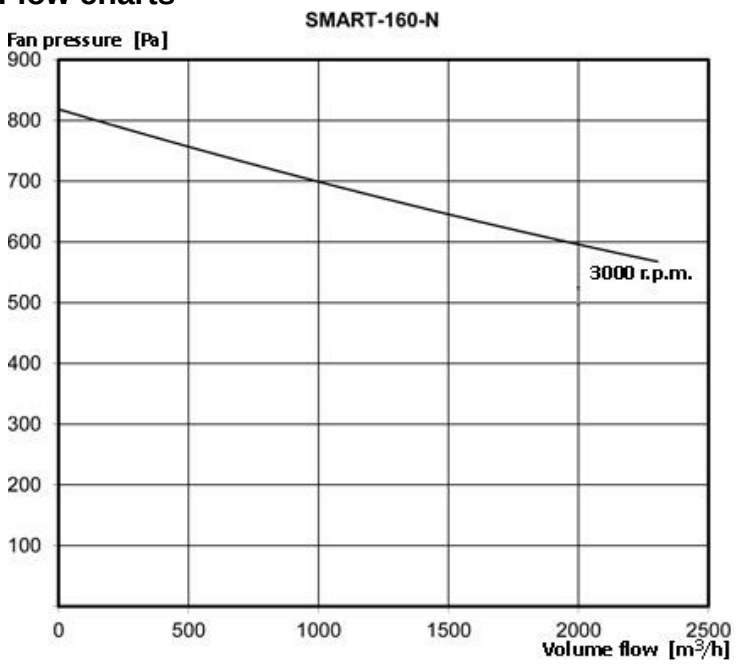

Table No.2

SMART-160/3000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
79	69	62	59	71

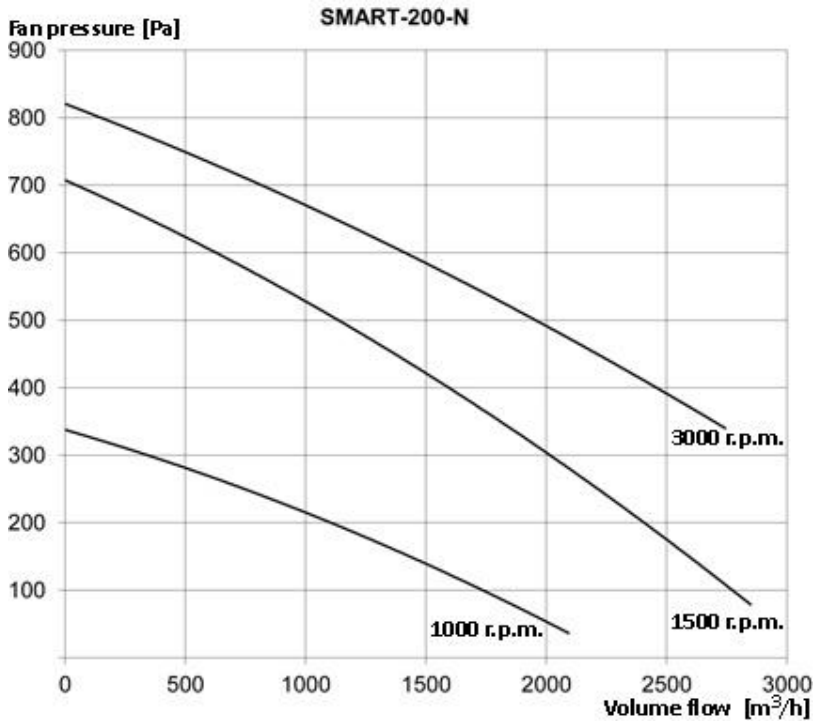

Table No.3

SMART-200/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
67	56	50	46	51

SMART-200/1500-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
74	64	57	54	60

SMART-200/3000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
79	69	62	59	71

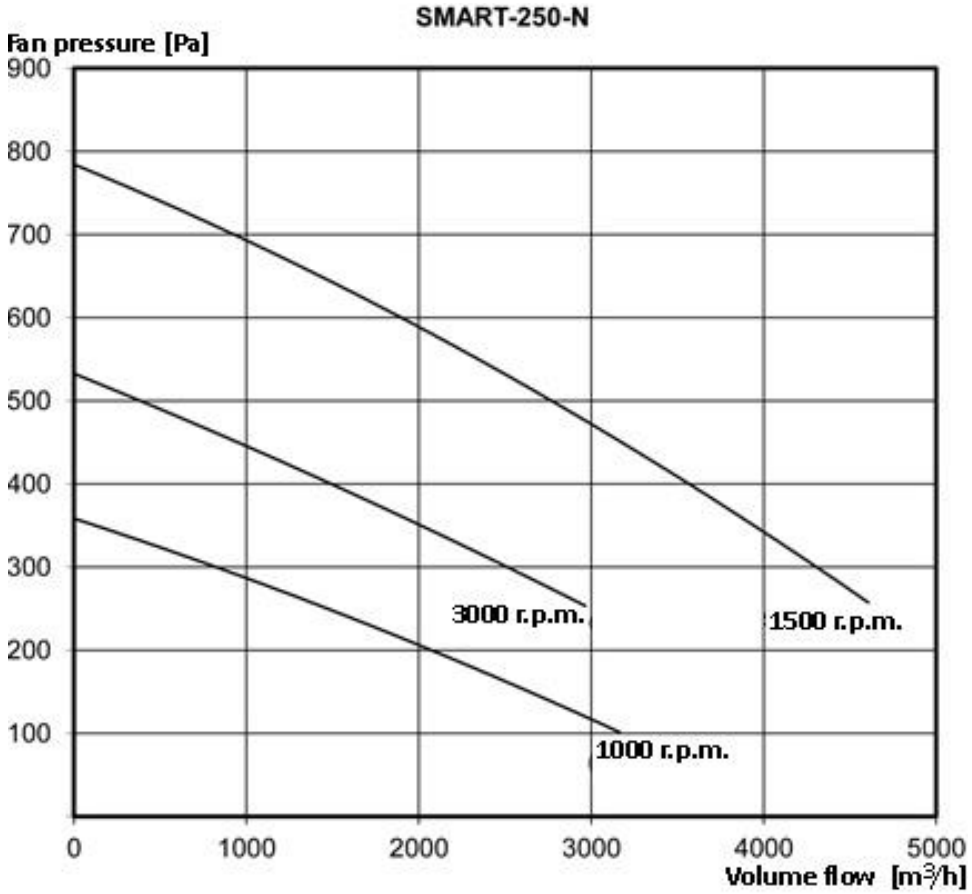

Table No.4

SMART-250/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
65	56	48	44	53

SMART-250/1500-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
75	66	58	55	65

SMART-250/3000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
80	70	63	60	74

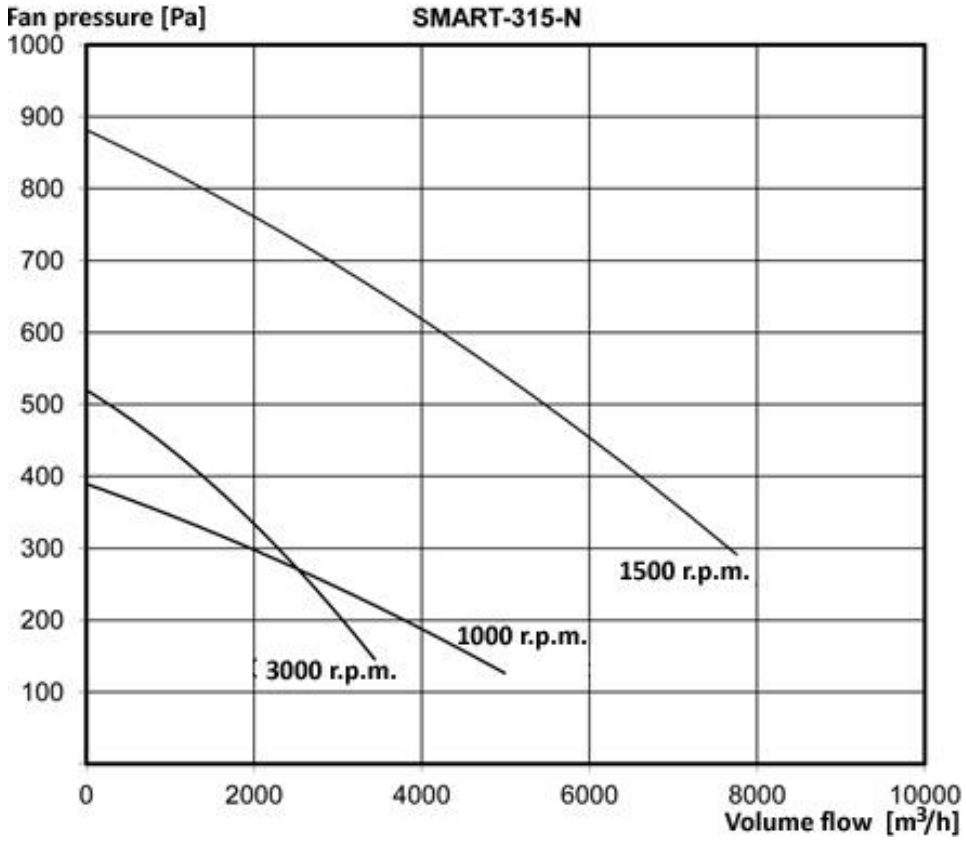

Table No.5

SMART-315/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
68	59	51	48	59

SMART-315/1500-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
80	70	63	60	70

SMART-315/3000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
80	70	63	60	74

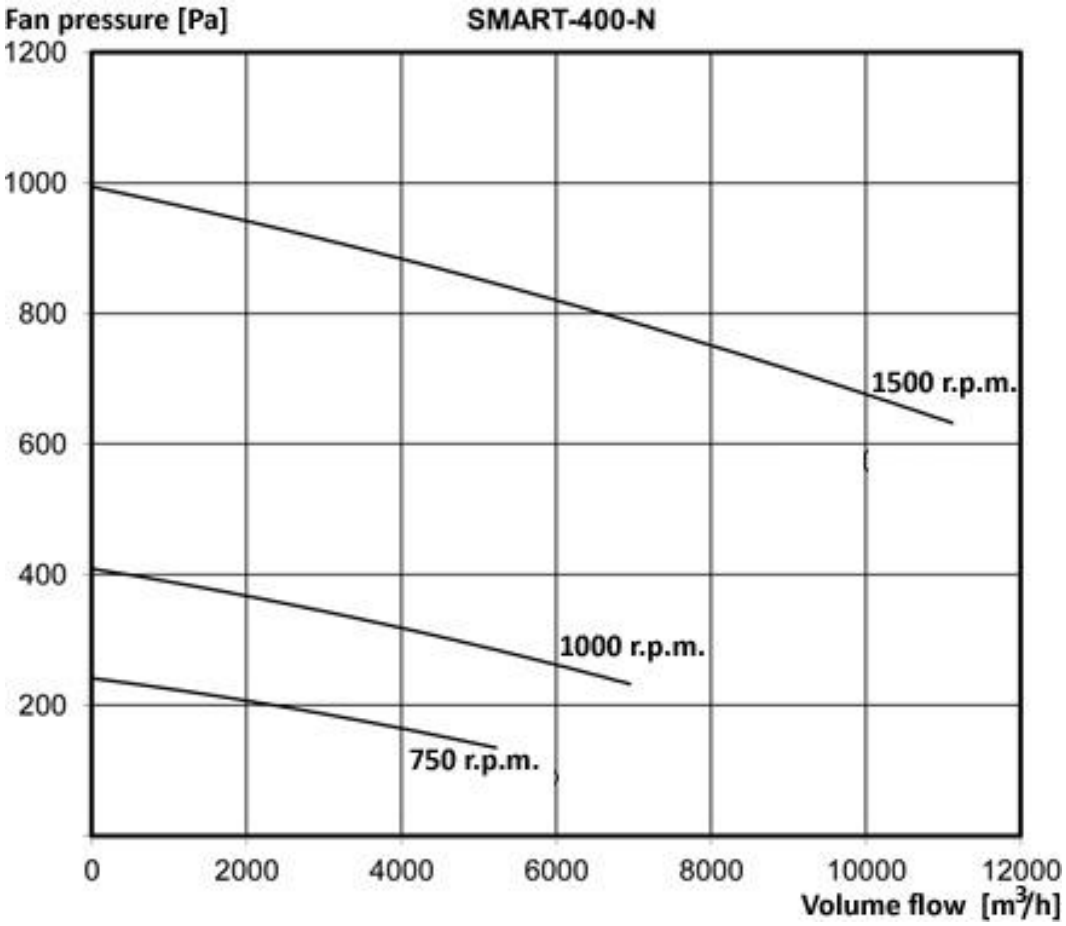

Table No.6

SMART-400/750-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
63	55	46	43	53

SMART-400/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
73	62	56	52	62

SMART-400/1500-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
85	75	68	64	72

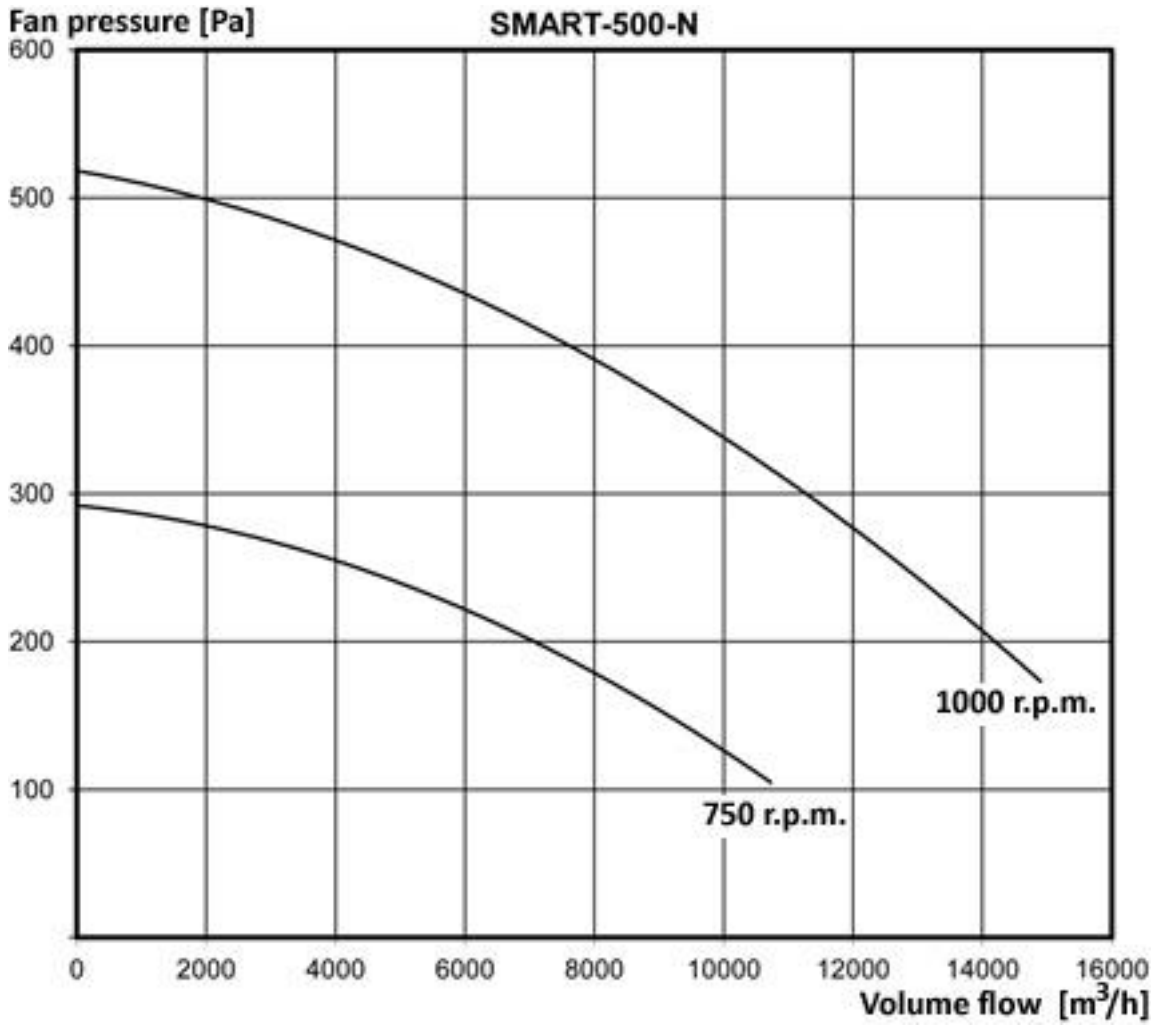

Table No.7

SMART-500/750-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
69	59	52	49	61

SMART-500/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
78	68	61	58	69

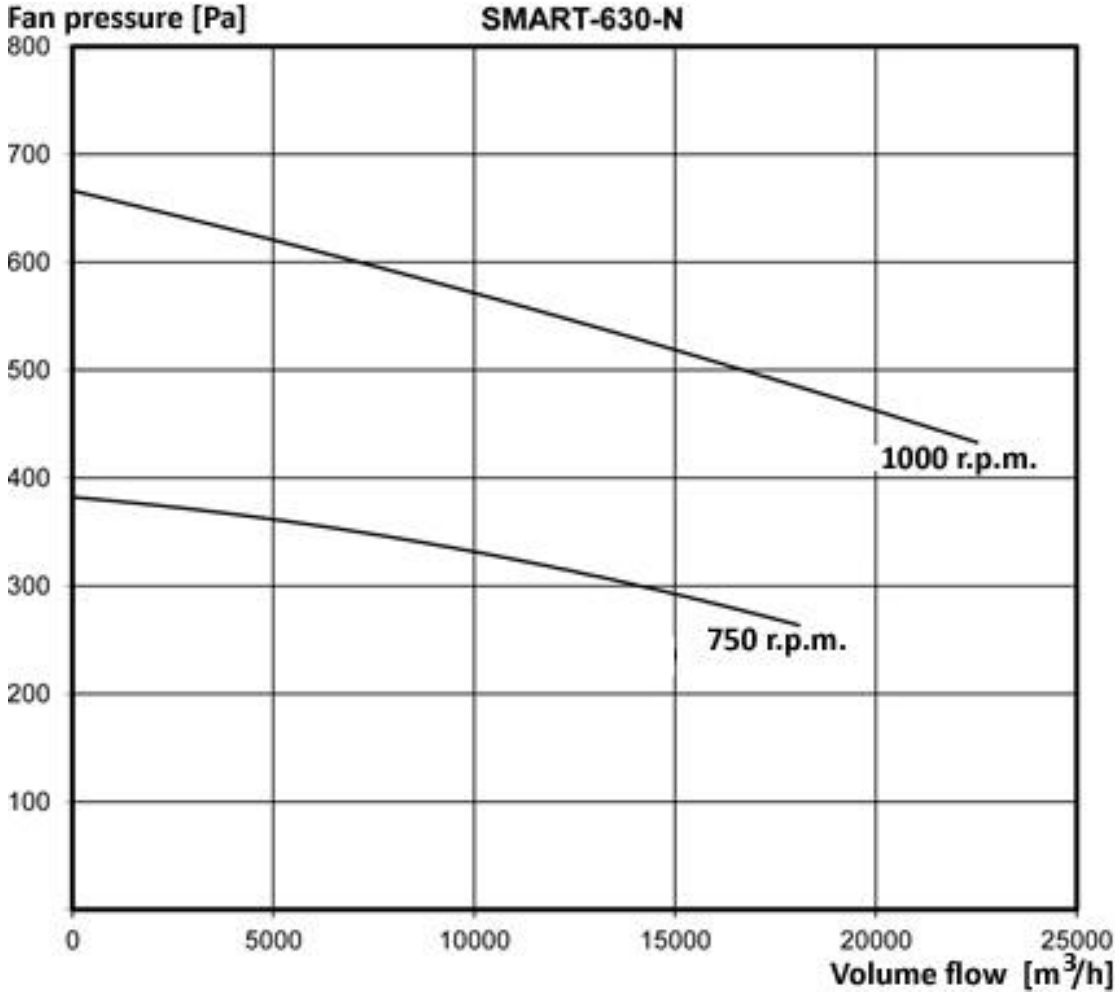

Table No.8

SMART-630/750-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
77	67	60	56	70

SMART-630/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
84	74	67	64	77

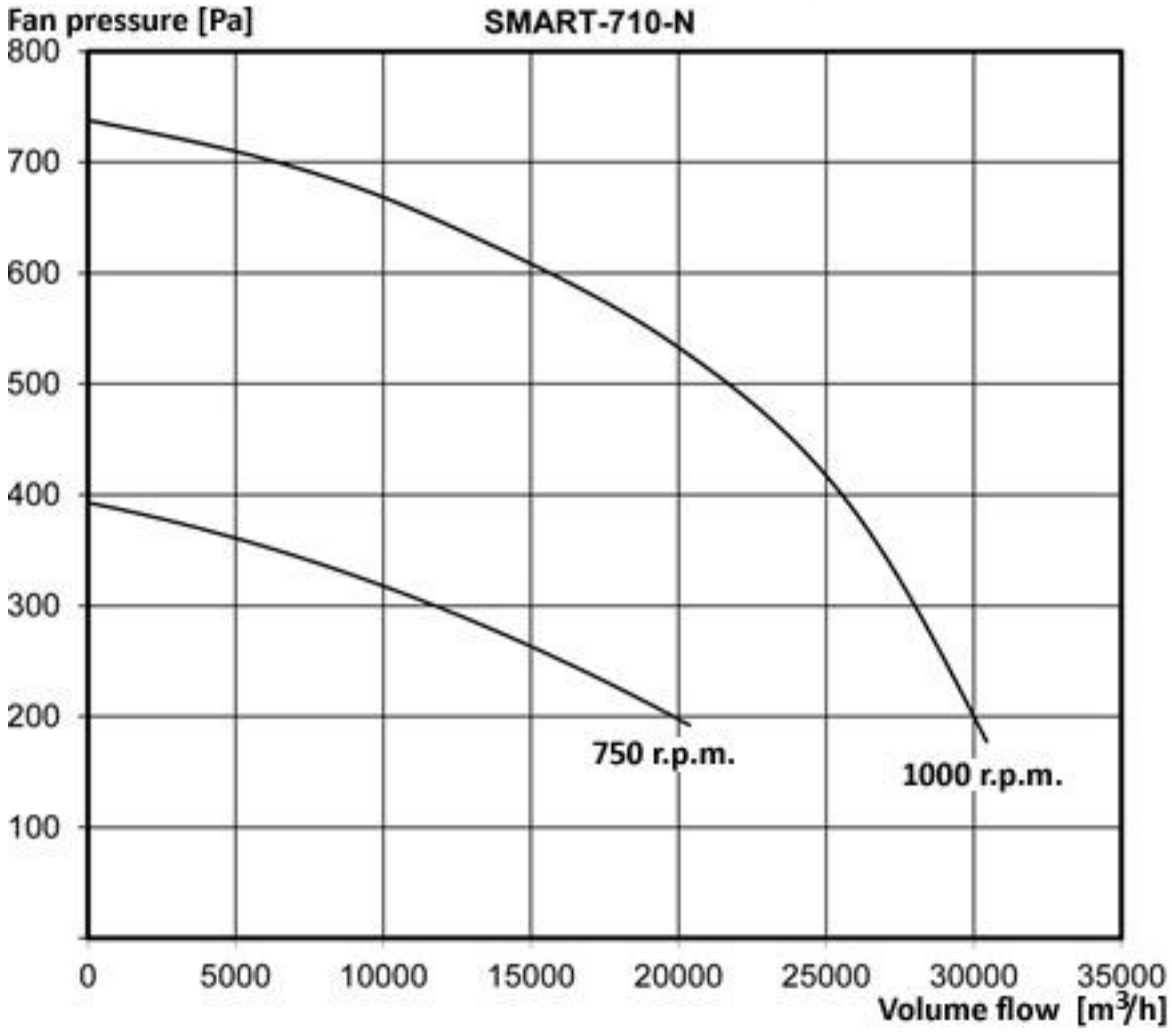

Table No.9

SMART-710/750-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
81	71	64	61	71

SMART-710/1000-N

Acoustic pressure level [dB(A)]				
outlet				inlet
1 [m]	5 [m]	10 [m]	15 [m]	1 [m]
87	77	70	66	78

5. Structure and Function

SMART-N radial roof fans are of original construction of bent steel profiles, making up a skeleton of streamline and robust properties.

Inside is located a motor with a radial impeller. Impeller is statically and dynamically balanced according to ISO 14694:2003+AMD1:2010 gaining the **G 2,5 class**.

Lower skeletons (of the 3000 r.p.m synchronous rotation fans) are surrounded with a circumferential wire net, providing an openwork structure, through which the air is discharged (see Fig. No.2). In case of the other fan types, their lower skeleton is of steel rods (see Fig. No.1). Upper parts of the fan are shielded by a plastic hood.

The fan has to be mounted on a roof base. It is recommended to apply a sound absorbing roof base **TPD-N** or **TPDC-N** of suitable size, adapted to the given fan.

On separate order, are delivered isolating switches, that are required to disconnect the power supply during installing and servicing.
In the Fig. No.1 are displayed dimensions of the **SMART-N** fans in subsequent sizes (except for fans of 3000 r.p.m.).

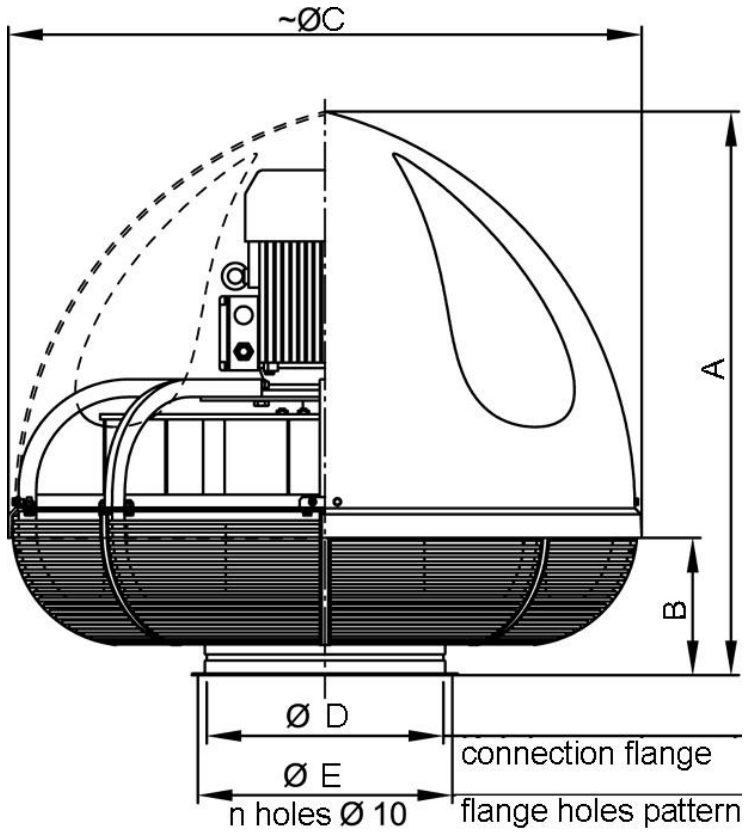

Fig. No.1 – Fans of SMART-N types – structure and dimensions

Table No.10 – Dimensions of the fans type SMART-N (except for fans of rotational speed 3000 r.p.m.)

Type of the fan	**A**	**B**	**ØC**	**ØD**	**ØE**	Quantity of holes Ø10
SMART-200-N	720	180	785	200	224	8
SMART-250-N	720	180	785	250	274	8
SMART-315-N	800	200	885	315	344	8
SMART-400-N	815	210	885	400	430	8
SMART-500-N	955	230	1075	500	530	8
SMART-630-N	1135	250	1325	630	660	12
SMART-710-N	1135	250	1325	710	740	12

In the Fig. No.2 are displayed dimensions and structure of the fans SMART-N of rotational speed 3000 r.p.m.

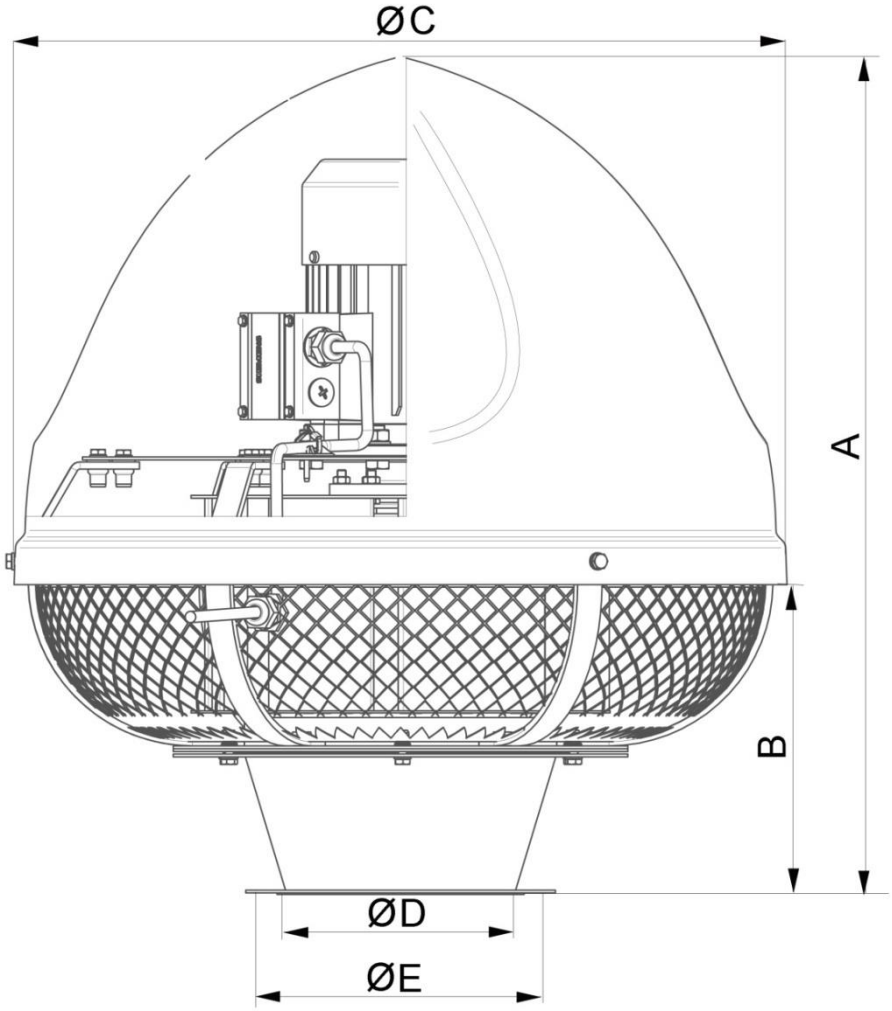

Fig. No.2 – SMART-N fans of 3000 r.p.m. – structure and dimensions

Table No.11 – Dimensions of the fans type SMART-N of rotational speed 3000 r.p.m.

Type of the fan	**A**	**B**	**ØC**	**ØD**	**ØE**	Quantity of holes Ø10
SMART-160/3000-N	590	220	540	160	194	6
SMART-200/3000-N	590	220	540	200	224	8
SMART-250/3000-N	590	220	540	250	274	8
SMART-315/3000-N	590	220	540	315	344	8

6. Assembly and Start-up

To mount the fan on a roof (of the industrial building) it is important to install it on a pedestal with a suitable roof base.

It is recommended to apply the TPD-N or TPDC-N sound absorbing roof bases (**delivery on separate order** – **below, in Fig. No.4 and No.5 are given their dimensions**).

The application roof bases itself, reduces the noise coming into the process room by 12 up to 18 dB(A).

In order to reduce more the noise level, install a silencer beneath the roof base, suspending inside the room.

Before lifting and installing the fan (**onto the roof base**) **it is important to use special lifting eye bolts, screwed up to the disk underneath the motor – before doing this, take off the fan hood. Do not use the motor eye-bolt handle for transporting the whole fan**!

Having placed the fan on the roof base, screw up precisely all the bolts between the fan connection flange and the roof base (see Fig. No.3) and finally install the hood.

WARNING **As the impeller is uncovered and unprotected, handle with care while the fan is lifted (transported vertically) and positioned at the place of operation.**

Connection flange

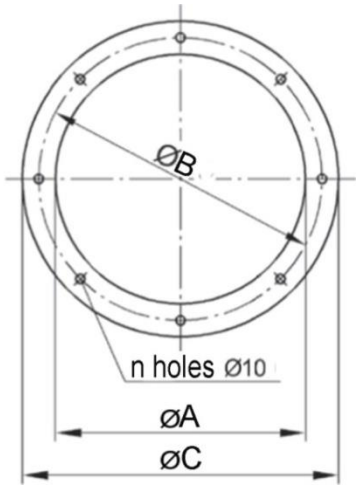

Fig. No.3 – Connection flange of the fan – dimensions

Table No.12 – Dimensions of the connection flanges

Type of the fan	Connection flange			
	ØA [mm]	**ØB** [mm]	**ØC** [mm]	quantity of holes Ø10
SMART-160-N	160	194	218	6
SMART-200-N	200	224	250	8
SMART-250-N	250	274	300	8
SMART-315-N	315	344	365	8
SMART-400-N	400	430	450	8
SMART-500-N	500	530	550	8
SMART-630-N	630	660	680	12
SMART-710-N	710	740	760	12

Sound absorbing roof base
TPD-xxx-N

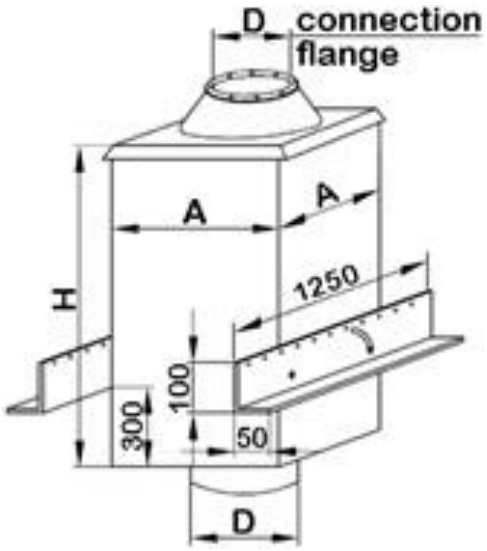

Fig No.4 – Roof bases type TPD-N – dimensions

Table No.13 – Dimensions of sound absorbing roof bases TPD-N

Type of the fan	Sound absorbing roof base			
	Type	**D** [mm]	**A** [mm]	**H** [mm]
SMART-160-N	**TPD**-160-N	160	430	625
SMART-200-N	**TPD**-200-N	200	430	625
SMART-250-N	**TPD**-250-N	250	530	950
SMART-315-N	**TPD**-315-N	315	530	950
SMART-400-N	**TPD**-400-N	400	790	1200
SMART-500-N	**TPD**-500-N	500	790	1200
SMART-630-N	**TPD**-630-N	630	890	1200
SMART-710-N	**TPD**-710-N	710	890	1200

Sound absorbing roof base TPDC-xxx-N

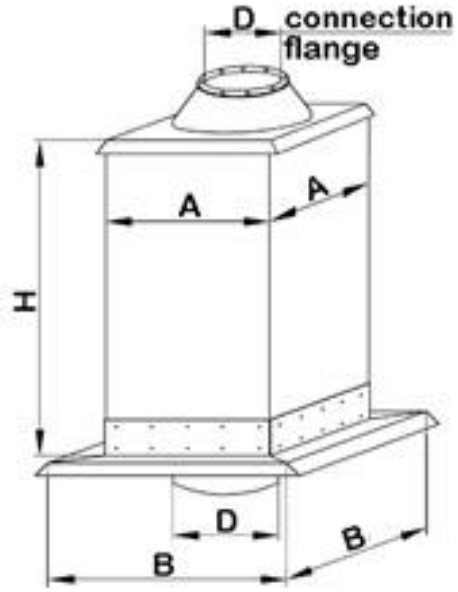

Fig. No.5 – Roof bases type TPDC-N – dimensions

Table No.14 – Dimensions of sound absorbing roof bases TPDC-N

Type of the fan	Sound absorbing roof base				
	Type	**D** [mm]	**A** [mm]	**B** [mm]	**H** [mm]
SMART-160-N	**TPDC**-160-N	160	430	630	625
SMART-200-N	**TPDC**-200-N	200	430	630	625
SMART-250-N	**TPDC**-250-N	250	530	730	950
SMART-315-N	**TPDC**-315-N	315	530	730	950
SMART-400-N	**TPDC**-400-N	400	790	990	1200
SMART-500-N	**TPDC**-500-N	500	790	990	1200
SMART-630-N	**TPDC**-630-N	630	890	1090	1200
SMART-710-N	**TPDC**-710-N	710	890	1090	1200

The roof fan has to be connected to the power supply line by User on one's own. **According to the regulations, any activities related with connection to the power supply system ought to be carried out exclusively by a person with qualifications.**

It is important to install the isolating switch (IS), to cut off the power supply for the time of servicing / maintenance. Isolating switch is an additional accessory – KLIMAWENT S.A. delivers it on separate order. User installs the switch on one's own in a convenient place.

The way of connection is shown in the Fig. No.6.

Before this, remove the fan hood to get free access to the connection box of the fan motor. Having completed all the connections, reinstall the fan hood.
Additionally, it is important to select the suitable sort and section of the supply cable and protection from short-circuit- and overload effects, according to the local conditions.

Before the start-up of the fan check following aspects:
- nominal voltage of the supply system and of the motor,
- correct and durable connections of the PE protective cable,
- installing of correct protection within the supply circuit system.

Before the first start-up, check the correctness of the impeller rotation sense referring the arrow on the fan housing – if it is incorrect, change the phase connection sequence. Do not start the fan (even for a check) before the hood is reinstalled.

CAUTION:
1. Insulation class I
2. Ingress protection IP54
3. Setting of the motor protective switch **Q1**:

It = **1,1** x **In**

where **In** means rated current o the motor.

The motor windings ought to be connected according to the connection diagram on the cover of the terminal box.

* S1 – isolating switch
The suggested installing place – near the fan.

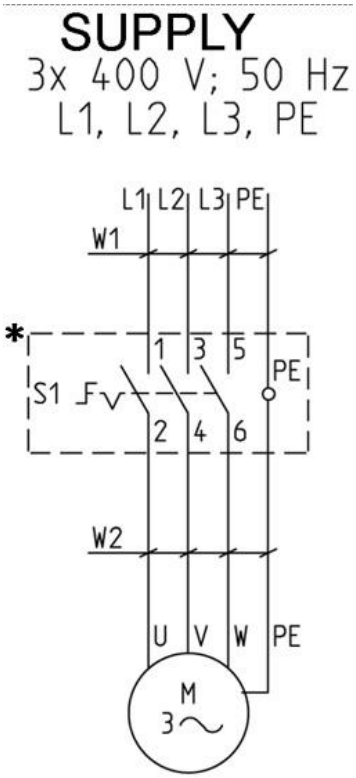

Fig. No.6 – Connection diagram of the fans and of the isolating switches

7. Operational Use

The construction and a solid execution of the fan guarantees its operational use without constant routine maintenance.
As inappropriate use is considered application of the fan that is in contradiction with its purpose (**see Section 2 of the present Use and Maintenance Manual**) **and when the reservations of manufacturer are not observed** (**see Section 3 of the Use and Maintenance Manual**).
Consequences of improper use:
- breakage of bearings,
- balance loss of the rotary elements,
- vibrations,
- deformations,
- damages caused by friction.

In case when any defective device function is noticed (increased noise level, vibrations, reduced flow efficiency), disconnect the fan from the power supply, and to undertake its technical revision in order to spot the reason of the functional disturbance.
Most typical disturbances and their reasons are exposed in the Section 8.

8. Trouble Shooting Guide

Table No.15

	Problem	Possible reason	Corrective action
1.	The fan cannot be switched on	Fade out of one of the phases is observed or voltage is too low or the impeller is blocked.	Supply correct voltage, check the protection. Remove the object blocking he impeller.
2.	Sudden vibrations of the fan are occurring	Obstacle objects reducing the air flow got stack in the fan	Disconnect the fan from the power supply system, take off the hood and remove the obstacle
		The impeller is faulty	Replace the impeller for new
3.	The fan is working too noisy or its flow efficiency is too weak	Improper impeller rotation sense	Change the impeller rotation sense by swapping phase connection sequence

9. Maintenance

Construction provides operational longevity, robustness, reliable function, under the condition of appropriate operational use and correctly executed maintenance.
To obtain correct functional performances and to meet the safety rules, it is recommended to submit the fan to technical revisions in regular periods of time (i.e. once a year). During the check take into account the function of the fan as well as its technical state.

WARNING **All the activities connected with technical revisions on the fan have to be carried out by an authorised person with adequate qualifications and necessarily after disconnection from the power supply system**.

To disconnect the fan from the power supply system, use an isolating switch (IS), which should be ordered and installed by User. Isolating switch ought to be installed within reach of the servicer.

IS isolating switches are offered by KLIMAWENT S.A. as additional accessory. The way of connection is shown in the operation manual of the insolating switch (IS).

There are subsequent activities within the range of technical revision:

- examine and tighten up the mechanical- and electrical connections,
- check the mounting of the motor and fan, mind the clearance between the bent profiles and the impeller is equalised in the whole circumference,
- remove the impurities (eventually) deposited inside the fan.

Prior to the re-start of the fan carry out the revision steps listed in the Section 6 “Assembly and Start-up” of the present Use and Maintenance Manual.

Exemption from this are tests that need to be carried out on the device being in run, along with the strictly followed safety regulation – as an example – measuring of vibrations.

In the course of the revision activities it is important to follow the safety regulations – otherwise the personnel / User can be at risk. Construction of the fan guarantees its operational use when it is submit to proper maintenance.

10. Occupational Health and Safety

Start up and the operational use is only admissible exclusively after getting acquainted with the contents of the present Use and Maintenance Manual. The fan will not cause any hazard to User / personnel, if it is stably installed on the roof base or another supporting structure of appropriate load carrying capacity.
Connect the fan to the power supply system, strictly according to the enclosed Connection Diagram and the guidelines shown in Section 6 of the present Use and Maintenance Manual.

WARNING **Connection to the power supply system ought to be carried ou by an authorised person with qualifications, according to the valid regulations within the range of Occupational Health and Safety**.
In the course of operational use, examine the connection of the PE protective cable. Any revision activity and repair can be executed after the device is disconnected from the power supply.

11. Transport and Storage

The fans have to be transported on pallets and protected with foil. During loading/reloading and transport the device must not be neither thrown nor knocked down. Do not put any additional load on the device. It is inadmissible to put one device on top of another (no stacking).
During the transport protect them from atmospheric factors and from mechanical damage.
The fan should be stored in dry rooms and in areas of efficient ventilation.
The vertical transport to the site of use (roof of the building) has to be carried out after the hood is taken off. For lifting and horizontal transport, connect the carrying lines to the transport eyes.
As the impeller is uncovered (without the hood), lifting and vertical transport have to be carried out especially with precautions.

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,
- any damages being caused during the improper transport, storage or incorrect maintenance.

Infringement of the Section 3 “Reservations of producer” of the User’s Manual and especially modifications undertaken by User on one’s own or operational use that is in contradiction with its purpose shall cause 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: **Radial roof fan**

type/model: **SMART-N**
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 17 May, 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 26 February, 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*/

The appliance meets the requirements included in:

- **2009/125/EC (ErP) Directive** of the European Parliament and of the Council of October 21th, 2009 establishing a framework for the setting of ecodesign requirements for energy-related products /*Journal of Laws L 285 of 31.10.2009*/
- **327/2011** (**EU**) **Guideline** of March 30th, 2011 on implementing the **2009/125/EC Directive** of the European Parliament and of the Council with regard to ecodesign requirements for fans driven by motors with an electric input po-wer between 125W and 500 kW /*Journal of Laws L No. 90 of 06.04.2011*/

The device has been constructed and produced on the basis of following harmonized standards:

- **EN ISO-12100:2012** – "Safety of machinery. Basic concepts, general principles for design. Risk assessment and risk reduction"
- **EN 60204-1:2018-12** – "Safety of machinery – Electrical equipment of machines. Part 1: General requirements"
- **EN 60034-1:2011** – "Rotating electrical machines – Part 1: Rating data and parameters"
- **EN ISO 5802:2008/A1:2015-07** – "Industrial Fans – Performance testing in situ of installing
- **EN ISO 13857:2010** – "Safety of machinery – Safe distances to prevent hazard zones being reached by upper and lower limbs".

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

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District Court Gdańsk-Północ
in Gdańsk, VII Wydział Gospodarczy
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KRS 0000308902 company stock
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NIP: 958 159 21 35
REGON: 220631262
Bank Account: **Santander Bank Polska S.A.**
56 1500 1025 1210 2007 8845 0000

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