



# **ROOF-MOUNTED CENTRIFUGAL SMOKE EXTRACTION FAN**



***Tower-SV  
Tower-SH***

**EN**

**USER'S MANUAL**



**BLAUBERG**  
Ventilatoren

**CONTENTS**

Safety requirements..... 2  
 Purpose..... 4  
 Delivery set..... 4  
 Designation key..... 5  
 Technical data..... 6  
 Mounting and set-up..... 9  
 Connection to power mains ..... 11  
 Commissioning..... 13  
 Technical maintenance..... 14  
 Storage and transportation regulations..... 16  
 Manufacturer’s warranty ..... 17  
 Certificate of acceptance..... 18  
 Seller information..... 18  
 Installation certificate..... 18  
 Warranty card..... 18

This user’s manual is a main operating document intended for technical, maintenance, and operating staff. The manual contains information about purpose, technical details, operating principle, design, and installation of the Tower-SV/Tower-SH unit and all its modifications. Technical and maintenance staff must have theoretical and practical training in the field of ventilation systems and should be able to work in accordance with workplace safety rules as well as construction norms and standards applicable in the territory of the country. The information in this user’s manual is correct at the time of the document’s preparation. The Company reserves the right to modify the technical characteristics, design, or configuration of its products at any time in order to incorporate the latest technological developments. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means in any information search system or translated into any language in any form without the prior written permission of the Company.

## SAFETY REQUIREMENTS

- Please read the user's manual carefully prior to installing and operating the unit.
- All user's manual requirements as well as the provisions of all the applicable local and national construction, electrical, and technical norms and standards must be observed when installing and operating the unit.
- The warnings contained in the user's manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the rules and safety precautions noted in this user's manual may result in an injury or unit damage.
- After a careful reading of the manual, keep it for the entire service life of the unit.
- While transferring the unit control, the user's manual must be turned over to the receiving operator.

### UNIT INSTALLATION AND OPERATION SAFETY PRECAUTIONS



- Disconnect the unit from power mains prior to any installation operations.



- Unpack the unit with care.



- The unit must be grounded!



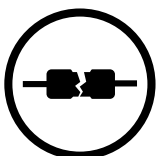
- While installing the unit, follow the safety regulations specific to the use of electric tools.



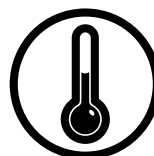
- Do not change the power cable length at your own discretion. Do not bend the power cable. Avoid damaging the power cable. Do not put any foreign objects on the power cable.



- Do not lay the power cable of the unit in close proximity to heating equipment.



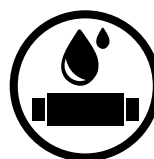
- Do not use damaged equipment or cables when connecting the unit to power mains.



- Do not operate the unit outside the temperature range stated in the user's manual. Do not operate the unit in aggressive or explosive environments.



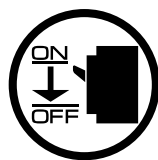
- Do not touch the unit controls with wet hands. Do not carry out the installation and maintenance operations with wet hands.



- Do not wash the unit with water. Protect the electric parts of the unit against ingress of water.



- Do not allow children to operate the unit.



- Disconnect the unit from power mains prior to any technical maintenance.



- Do not store any explosive or highly flammable substances in close proximity to the unit.



- When the unit generates unusual sounds, odour, or emits smoke, disconnect it from power supply and contact the Seller.



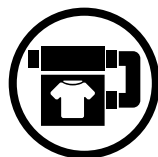
- Do not open the unit during operation.



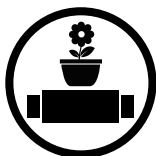
- In case of continuous operation of the unit, periodically check the security of mounting.



- Do not block the air duct when the unit is switched on.



- Use the unit only for its intended purpose.



- Do not sit on the unit and avoid placing foreign objects on it.



**THE PRODUCT MUST BE DISPOSED SEPARATELY AT THE END OF ITS SERVICE LIFE.  
DO NOT DISPOSE THE UNIT AS UNSORTED DOMESTIC WASTE.**

## PURPOSE

The Tower-S series fan is designed for roof mounting in industrial, public, residential, administrative and other premises (except for categories A and B of explosive fire hazard in accordance with NPB 105-03) and is used for forced removal of smoke, heated gases and the simultaneous removal of heat generated in a fire outside the premises where the fire occurs.

The fan is intended to protect the building structure and equipment against high temperature influence, remove combustion gases outside the serviced space and prevent fire propagation to neighbouring premises and areas.

The fan can be designed for moderate (U) or tropical (T) climate conditions.

The fan handles smoke and air mixtures with temperatures up to +600 °C for 120 minutes.

The Tower-S fan design features an impeller with backward curved blades, an electric motor placed off the transported air flow path, a welded casing with powder coating, a hood made of painted galvanized steel and double-side smoke removal.

There are two types of roof-mounted smoke extraction fans: with horizontal air discharge and vertical air discharge.

The models with vertical air discharge are equipped with a backdraft damper.

Several fans are allowed to be installed on one roof close to each other.



**THE UNIT SHOULD NOT BE OPERATED BY CHILDREN OR PERSONS WITH REDUCED PHYSICAL, MENTAL, OR SENSORY CAPACITIES, OR THOSE WITHOUT THE APPROPRIATE TRAINING.**

**THE UNIT MUST BE INSTALLED AND CONNECTED ONLY BY PROPERLY QUALIFIED PERSONNEL AFTER THE APPROPRIATE BRIEFING.**

**THE CHOICE OF UNIT INSTALLATION LOCATION MUST PREVENT UNAUTHORIZED ACCESS BY UNATTENDED CHILDREN.**

## DELIVERY SET

Name	Number
Fan	1 pc.
User's manual	1 pc.
Packing box	1 pc.

## DESIGNATION KEY

Tower-S V XXXX -XXX -XX/XXXX -X -X

**Paint colour:**

\_ : gray RAL7040 by default

**RALxxxx:** colour according to RAL

**Zn:** galvanized steel

**Terminal box**

\_ : no terminal box

**M:** with a terminal box

**Motor power [kW] / Motor speed [RPM]**

**Maximum transported air temperature [°C]**

**Turbine size [mm]**

**Air discharge direction**

**V:** vertical;

**H:** horizontal

**Fan series**

Roof-mounted centrifugal smoke extraction fan

**Fan designation example:**

The Tower-SH 630-600-1.5/930 roof-mounted smoke extraction fan with horizontal air discharge, impeller diameter of 630 mm, designed for transportation of air up to +600 °C, motor power 1.5 kW and motor speed 930 min<sup>-1</sup>.

## TECHNICAL DATA

Fan model	Type of connection to power mains*	Voltage [V] at 50 Hz	Generating capacity [kW]	Current [A]	RPM [min <sup>-1</sup> ]	Maximum transported air temperature [°C]	Index of protection
Tower-SV / Tower-SH 630 1.5/930	DOL or VFD	3~400	1.50	3.7	930	600	IP54
Tower-SV / Tower-SH 630 2.2/940	DOL or VFD	3~400	2.20	5.6	940	600	IP54
Tower-SV / Tower-SH 630 3.0/960	DOL or VFD	3~400	3.00	7.4	960	600	IP54
Tower-SV / Tower-SH 630 4.0/1440	Only VFD	3~400	4.00	8.8	1440	600	IP54
Tower-SV / Tower-SH 630 5.5/1450	DOL or VFD	3~400	5.50	11.3	1450	600	IP54
Tower-SV / Tower-SH 630 7.5/1440	DOL or VFD	3~400	7.50	15.5	1440	600	IP54
Tower-SV / Tower-SH 710 2.2/940	DOL or VFD	3~400	2.20	5.3	940	600	IP54
Tower-SV / Tower-SH 710 3/960	DOL or VFD	3~400	3.00	7.4	960	600	IP54
Tower-SV / Tower-SH 710 4/950	DOL or VFD	3~400	4.00	8.4	950	600	IP54
Tower-SV / Tower-SH 710 5.5/960	DOL or VFD	3~400	5.50	11.2	960	600	IP54
Tower-SV / Tower-SH 710 7.5/1455	Only VFD	3~400	7.50	15.1	1455	600	IP54
Tower-SV / Tower-SH 710 11/1460	DOL or VFD	3~400	11.00	21.2	1460	600	IP54
Tower-SV / Tower-SH 800 4/960	DOL or VFD	3~400	4.00	9.2	960	600	IP54
Tower-SV / Tower-SH 800 5.5/950	DOL or VFD	3~400	5.50	12.3	950	600	IP54
Tower-SV / Tower-SH 800 7.5/970	DOL or VFD	3~400	7.50	15.7	970	600	IP54
Tower-SV / Tower-SH 800 11/960	DOL or VFD	3~400	11.00	21.2	960	600	IP54
Tower-SV / Tower-SH 800 15/1460	DOL or VFD	3~400	15.00	29.5	1460	600	IP54
Tower-SV / Tower-SH 800 18.5/1470	DOL or VFD	3~400	18.50	36.4	1470	600	IP54
Tower-SV / Tower-SH 900 4/720	DOL or VFD	3~400	4.00	10.0	720	600	IP54
Tower-SV / Tower-SH 900 5.5/960	Only VFD	3~400	5.50	12.3	960	600	IP 54
Tower-SV / Tower-SH 900 7.5/970	DOL or VFD	3~400	7.50	15.7	970	600	IP54
Tower-SV / Tower-SH 900 11/970	DOL or VFD	3~400	11.00	23.0	970	600	IP54
Tower-SV / Tower-SH 900 15/960	DOL or VFD	3~400	15.00	31.0	960	600	IP54
Tower-SV / Tower-SH 900 18.5/960	DOL or VFD	3~400	18.50	36.4	960	600	IP54
Tower-SV / Tower-SH 900 22/960	DOL or VFD	3~400	22.00	44.0	960	600	IP54
Tower-SV / Tower-SH 1000 5.5/720	Only VFD	3~400	5.50	13.6	720	600	IP54
Tower-SV / Tower-SH 1000 7.5/730	DOL or VFD	3~400	7.50	18.0	730	600	IP54
Tower-SV / Tower-SH 1000 11/970	Only VFD	3~400	11.00	23.0	970	600	IP54
Tower-SV / Tower-SH 1000 15/970	DOL or VFD	3~400	15.00	31.0	970	600	IP54
Tower-SV / Tower-SH 1000 18.5/970	DOL or VFD	3~400	18.50	36.5	970	600	IP54
Tower-SV / Tower-SH 1000 22/970	DOL or VFD	3~400	22.00	44.6	970	600	IP54
Tower-SV / Tower-SH 1000 30/970	DOL or VFD	3~400	30.00	59.6	970	600	IP54
Tower-SV / Tower-SH 1100 11/730	Only VFD	3~400	11.00	25.1	730	600	IP54
Tower-SV / Tower-SH 1100 15/730	DOL or VFD	3~400	15.00	32.3	730	600	IP54
Tower-SV / Tower-SH 1100 18.5/970	Only VFD	3~400	18.50	36.5	970	600	IP54
Tower-SV / Tower-SH 1100 22/970	Only VFD	3~400	22.00	44.6	970	600	IP54
Tower-SV / Tower-SH 1100 30/970	DOL or VFD	3~400	30.00	59.6	970	600	IP54
Tower-SV / Tower-SH 1100 37/980	DOL or VFD	3~400	37.00	70.0	980	600	IP54

\* DOL (direct on line) — direct connection to power mains  
VFD (variable frequency drive) — connection via frequency converter

Overall dimensions

Fan model	H	H1	L1	L2	L3	L4	ØD	ØD1	ØD2	Ød1	Ød2	n	Weight [kg]	MRDL/MIRDL mounting frame compatibility
Tower-SV(H) 630-600-1.5/930	1038	302	1424	750	955	1153	503	541	634	10	21	12	200	MRDL/MIRDL 630
Tower-SV(H) 630-600-2.2/940													210	
Tower-SV(H) 630-600-3/960	1043	307											225	
Tower-SV(H) 630-600-4/1440	1038	302											216	
Tower-SV(H) 630-600-5.5/1430	1043	307											230	
Tower-SV(H) 630-600-7.5/1440	1134												255	
Tower-SV(H) 710-600-2.2/940	1181	317	1508	840	1040	1238	633	674	730	12	21	16	242	MRDL/MIRDL 710-800
Tower-SV(H) 710-600-3/960	1186	322											252	
Tower-SV(H) 710-600-4/950													253	
Tower-SV(H) 710-600-5.5/960													280	
Tower-SV(H) 710-600-7.5/1455													281	
Tower-SV(H) 710-600-11/1460													292	
Tower-SV(H) 800-600-4/960			1239	345	1543	840	1040	1238	633	674	784	12	21	16
Tower-SV(H) 800-600-5.5/950	305													
Tower-SV(H) 800-600-7.5/970	312													
Tower-SV(H) 800-600-11/960	1335	355	390											
Tower-SV(H) 800-600-15/1460			390											
Tower-SV(H) 800-600 18.5/1470			395											
Tower-SV(H) 900-600-4/720	1379	363	1871	1050	1200	1398	713	751	874	12	21	16	376	MRDL/MIRDL 900
Tower-SV(H) 900-600-5.5/960	1398												376	
Tower-SV(H) 900-600-7.5/970		372											380	
Tower-SV(H) 900-600-11/970													418	
Tower-SV(H) 900-600-15/960	1491	433												
Tower-SV(H) 900-600-18.5/960	1565	398											482	
Tower-SV(H) 900-600-22/960			566											
Tower-SV(H) 1000-600-5.5/720	1365	403	2111	1240	1430	1628	803	837	974	12	23	24	467	MRDL/MIRDL 1000-1100
Tower-SV(H) 1000-600-7.5/730	1573												588	
Tower-SV(H) 1000-600-11/970													590	
Tower-SV(H) 1000-600-15/970													595	
Tower-SV(H) 1000-600-18.5/970													639	
Tower-SV(H) 1000-600-22/970													670	
Tower-SV(H) 1000-600-30/970													690	
Tower-SV(H) 1100-600-11/730		1721	441	2236	1240	1430	1628	903	934	1075	12	23	24	720
Tower-SV(H) 1100-600-15/730	775													
Tower-SV(H) 1100-600-18.5/970	763													
Tower-SV(H) 1100-600-22/970	794													
Tower-SV(H) 1100-600-30/970	812													
Tower-SV(H) 1100-600-37/980	1773	930												

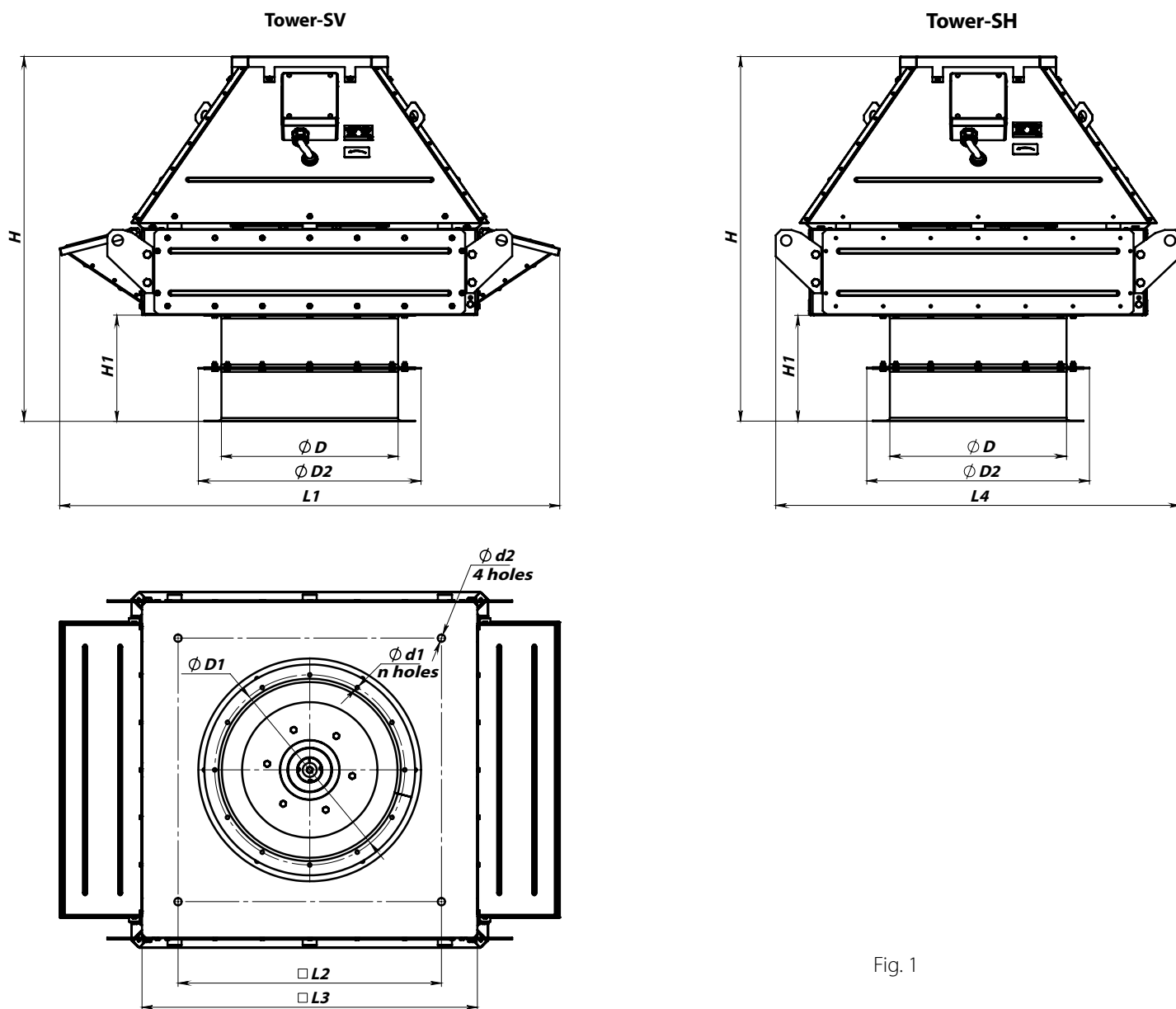


Fig. 1



## MOUNTING AND SET-UP



**READ THE USER'S MANUAL BEFORE INSTALLING THE UNIT.**

### Prior to mounting the fan:

- Read the present User's manual carefully.
  - Make sure that the fan impeller rotates freely.
  - Make sure there is no condensate on the motor.
  - Check the electrical resistance of insulation between the motor windings and between each winding and the motor casing.
- Follow the safety regulations during the make-ready procedures and fan operation.

### Fan mounting:

- Install the fan on the building roof, out of possible fire areas.
- Check the roof frameworks for sufficient rigidity in installation places.
- The fan is designed for vertical installation only (vertical fan shaft) on a concrete or steel base plate of min 250 mm height (with respect to possible level of precipitation).
- Remove the side shields and fix the fan to the mounting frame with four anchor bolts at the frame corners.
- Check that the fan components do not get deformed during mounting.
- Provide free and unhampered air extraction from the fan.

The fan delivery set may include a mounting frame (available separately).

Install the mounting frame on a load carrying roof section true-vertical inside a prepared opening.

The opening size must be sufficient to ensure free passage of air ducts with connecting flanges of the corresponding diameter in accordance with DIN 24154 Series 3. Fix the mounting frame to the load-carrying roof surface in compliance with construction norms and standards applicable for standard building designs. Attach the backdraft damper or the first air duct section directly to the fan prior to its installation. The backdraft damper is delivered separately.

Provide additional fixing of the air ducts to the building structures to avoid load transfer from the air ducts to the fan.

### Do not put the fan on the air duct while mounting to avoid its deformation.

Fastening the fan to the mounting frame is carried out with bolts and washers of the appropriate size.

**After installing the unit, you need to make sure that the fan impeller rotates freely.**

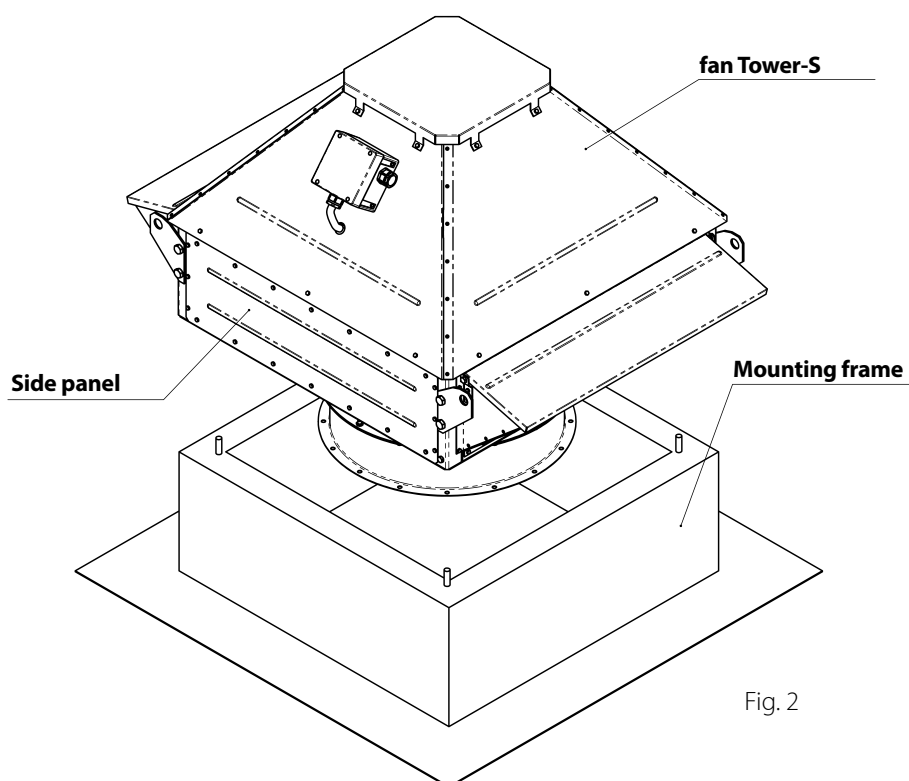


Fig. 2

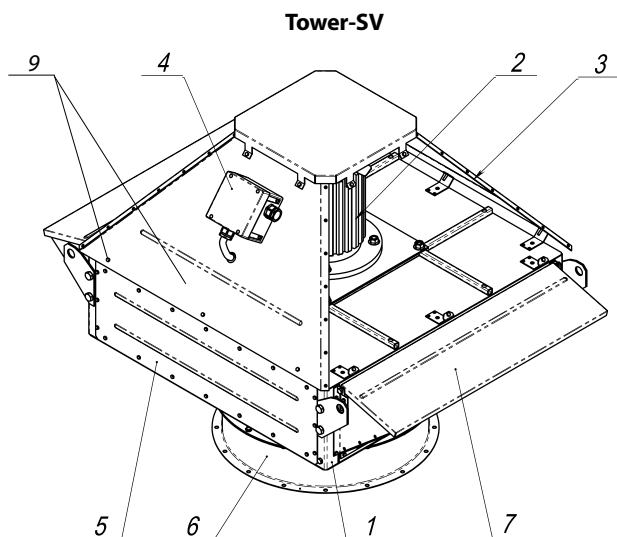


Fig. 3

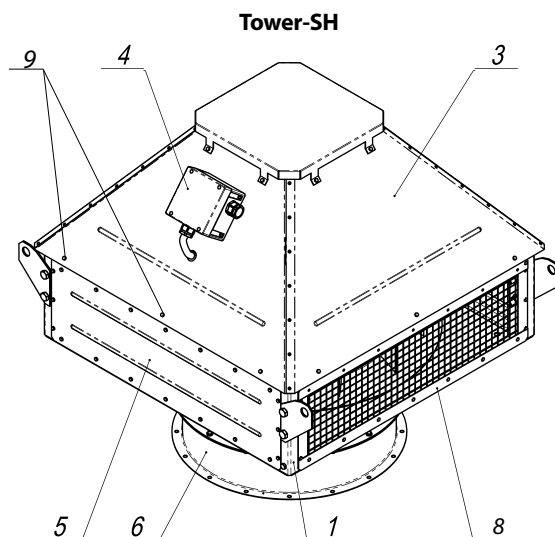


Fig. 4

1. Mounting frame
2. Electric motor
3. Protecting hood
4. Terminal box
5. Side panel
6. Intake spigot with a connecting flange
7. Backdraft damper (only for the Tower-SV model)
8. Protecting screen (only for the Tower-SH model)
9. Fixing screws for the protecting hood

The roof-mounted smoke extraction fan consists of the welded support frame 1 to which are attached:

- The electric motor 2 covered with a protective hood 3.
- The terminal box 4 located on the protective hood (optionally, the model without a terminal box is available).
- The impeller is located inside the support frame and is covered with the side panels 5.
- Intake spigot 6 with a connecting flange.

The Tower-SV fan is equipped with a backdraft damper 7. The Tower-SH fan is equipped with a protective grid 8.

The motor with the impeller is rigidly fixed to the mounting frame. The mounting frame of the fan is made of profile rolled metal.

Welded sheet steel construction. The hub and clamping screw are connected directly to the motor shaft. Motor: standard fan models are equipped with three-phase electric motors rated for 400 V, 50 Hz, protection class: IP54, insulation class: F (IEC).

## CONNECTION TO POWER MAINS



**DISCONNECT THE POWER SUPPLY PRIOR TO ANY OPERATIONS WITH THE UNIT. CONNECTION OF THE UNIT TO POWER MAINS IS ALLOWED BY A QUALIFIED ELECTRICIAN WITH A WORK PERMIT FOR THE ELECTRIC UNITS UP TO 1000 V AFTER CAREFUL READING OF THE PRESENT USER'S MANUAL. THE RATED ELECTRICAL PARAMETERS OF THE UNIT ARE GIVEN ON THE MANUFACTURER'S LABEL.**

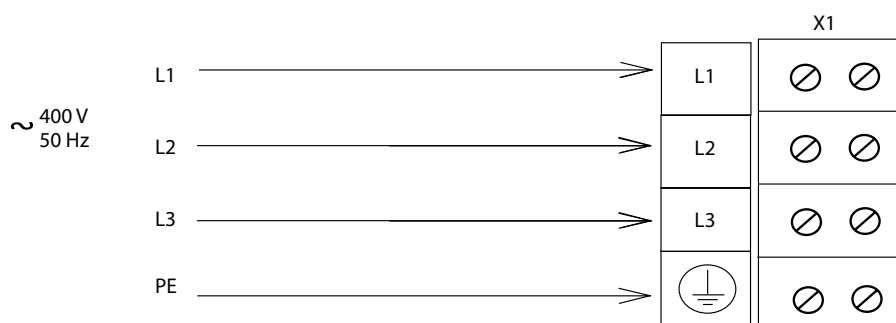


**ANY TAMPERING WITH THE INTERNAL CONNECTIONS IS PROHIBITED AND WILL VOID THE WARRANTY.**

- The unit is rated for connection to 3~400 V/50 Hz power mains according to the wiring diagram.
- The connection must be made using insulated conductors (cables, wires).
- The actual wire cross section selection must be based on the maximum load current, maximum conductor temperature depending on the wire type, insulation, length and installation method.
- The unit must be connected to power mains in accordance with applicable standards.

**Caution! The type of connection to power mains is stated in the technical data table.**

**Electrical connections diagram**



The electric parameters of the fan are shown on the label on the fan casing.

For the fan modifications without a terminal box, connect the cable directly to the fan motor.

Connection sequence: remove the protective hood (item 3, fig. 3, 4) after removing the screws (item 9, fig. 3, 4) which fix it.

After finishing wireworks re-install the protective hood.

**The fan motor is not equipped with an integrated thermal protection. Consider that while selecting a starter or a closing relay.**



**MAKE SURE THAT THE FAN IMPELLER ROTATES IN THE DIRECTION MARKED BY THE ARROW ON THE FAN CASING. IF NECESSARY, CHANGE THE IMPELLER ROTATION DIRECTION BY ALTERING THE PHASE SEQUENCE ON THE ELECTRIC MOTOR TERMINALS.**

## ASYNCHRONOUS ELECTRIC MOTOR STARTING METHODS

There are several methods for starting asynchronous squirrel-cage electric motors. The most common methods are: direct-on-line (DOL), with a soft starter (SS) or with a frequency converter (FC).

### Direct-on-line starting

In case of direct-on-line starting (i.e. by connecting the motor to the electric mains with a simple line contactor), the motor starting time significantly increases due to high inertia of the impeller, which, in turn, results in high in-rush starting currents in the circuit. These currents of long duration may cause voltage slumps (especially if the feed line section falls short of the requirements), which may affect load operation.

The in-rush current consumed by an electric motor in case of DOL starting is 5-8 times larger than the rated value (or even 10-14 times larger in some rare instances). It should be noted that the torque developed by the motor also significantly exceeds the rated value. Upon energisation the motor operates as a transformer with a squirrel-cage secondary winding formed by the rotor cage with a very low resistance.

The rotor develops high induced current causing a rush of current in the feed line.

The startup torque during starting averages 0.5-1.5 of the rated torque value.

Despite such advantages as simple construction, high startup current, quick start and low cost, direct-on-line systems are suitable only in the following cases:

- the motor power is low compared to the mains power which limits the adverse effect of the rush of current
- the driven mechanism does not require gradual speed build-up or is equipped with a damping device to smooth out the inrush
- the high startup torque has no adverse effects on the operation of the driven mechanism

### Soft start. SS starting.

A soft starter gradually increases the voltage supplied to the motor – from the initial to the rated value.

This starting system can be used to meet the following goals:

- limit the motor current
- regulate the torque

Regulation by limiting the current sets the maximum in-rush current equal to 300-400 % (or 250 % in some rare instances) of the rated current and reduces torque characteristics. This type of regulation is especially suited for turbomachinery such as centrifugal pumps and fans.

Regulation by variation of torque optimizes the torque during startup and reduces in-rush current in the circuit. These conditions are suitable for mechanisms with constant load resistance.

This type of soft starting may differ in the implementation pattern:

- motor start
- motor start and stop
- device bridging at the end of start sequence
- start and stop of several motors in stage circuits

### Soft start. FC starting.

During the starting the FC raises the frequency from 0 Hz to the electrical mains frequency (50 or 60 Hz). As the frequency is increased gradually, the motor can be assumed to operate at its rated speed for a given frequency value. Furthermore, on the assumption that the motor runs at its rated speed the nominal torque should be immediately available whereas the current will be approximately equal to the rated value.

This starting system is used for speed control and regulation and can be used in the following cases:

- start with high-inertia load
- start with high load and limited-capacity power supply source
- optimization of electric power consumption depending on turbomachinery speed

The aforementioned starting system can be used for all types of mechanisms.

### Problems associated with DOL starting

The problems caused by DOL starting may be divided into two groups:

1. An abrupt start causes mechanical shock, jolts in the mechanism, shock removal of free play etc.
2. A heavy start cannot be completed.

### Let us review three variations of a heavy start:

1. The feed line performance is barely sufficient or insufficient to maintain the induced current.

**Typical symptoms:** Upon starting the circuit breakers at the system input are tripped; the lights, certain relays and contactors go off, and the supply generator shuts down.

**Solution:** In the best-case scenario an SS device may help reduce the in-rush current to 250 % of the motor rated current. If this is insufficient, an FC is necessary.

2. The motor cannot start the mechanism with DOL starting.

**Typical symptoms:** The motor fails to turn or "freezes" at certain speed which is maintained until actuation of the protection suite.

**Solution:** This problem may not be solved with an SS device. The motor develops insufficient shaft torque. However, this problem can be addressed by using an FC, but each case may be different.

3. The motor spins up the mechanism with authority, but fails to reach the rated rotation speed.

**Typical symptoms:** The input automatic circuit breaker is tripped during spin-up. This often happens with heavy-weight fans with a considerable rotation speed.

**Solution:** Such problems may be addressed with an SS device, but not with 100 % certainty. The closer the motor speed to the rated value during the actuation of the protective equipment, the higher the chances of success. The use of an FC in this case helps solve the problem fundamentally.

**Standard switching equipment (automatic circuit breakers, contactors and motor starters) is not designed to withstand prolonged overloads normally causing the fan to shut down automatically DOL starting that continues for a long period of time.**

**Using switching equipment with a higher maximum current rating renders the electric motor protection system less sensitive. As a result the switching equipment will not be able to detect motor overload in time due to a high current sensing threshold.**

**Such problems as mentioned above can only be addressed by utilizing a soft starter or a frequency converter to start the fan.**

## COMMISSIONING



**THE ORGANISATION RESPONSIBLE FOR THE COMMISSIONING SHALL BE RESPONSIBLE FOR PROPER MOTOR PHASING AND STARTING PATTERN SELECTION.**



**DURING STARTING THE IN-RUSH CURRENTS OF THE FAN MAY SEVERAL TIMES EXCEED THE RATED VALUES.  
SEE "ASYNCHRONOUS ELECTRIC MOTOR STARTING METHODS" IN THE "CONNECTION TO POWER MAINS" SECTION**

- After fan starting make sure that the motor rotates properly without undue vibration and abnormal noise.
- Make sure that the fan impeller rotates in the direction marked by the arrow on the fan casing. If necessary, change the impeller rotation direction by changing the phase sequence on the electric motor terminals.
- Make sure that the fan energy consumption complies with the value given on the equipment nameplate and check the motor for overheating.
- The phase current should be checked once the fan reaches the rated operating conditions.
- Do not switch the fan on and off several times without pauses as this may result in damage to the winding or insulation due to overheating.

## TECHNICAL MAINTENANCE



**DISCONNECT THE UNIT FROM POWER SUPPLY BEFORE ANY MAINTENANCE OPERATIONS!**



**PRIOR TO COMMENCING ANY TECHNICAL MAINTENANCE PUT UP A PROHIBITORY SIGN ON THE FAN STARTING PANEL: "DO NOT SWITCH ON! MEN AT WORK!"**



**AVOID LIQUID SPILLS ON THE MOTOR! DO NOT USE AGGRESSIVE SOLVENTS AND SHARP OBJECTS FOR CLEANING!**

Technical maintenance and repair of the fan may commence only after its disconnection from the power mains and after all rotating parts are at a complete standstill.

Prior to commencing any technical maintenance put up a prohibitory sign on the fan starting panel: «Do not switch on! Men at work!»

The technical maintenance includes periodic cleaning of the surfaces from accumulated dust and dirt.

Technical maintenance must be carried out at least once a year.

- Check the grounding screw terminals and electric connectors for proper tightness and tighten them up if necessary.
- Check the fastening screws for tightness and tighten them up if necessary.
- Check the bolt connecting the motor shaft to the hub for proper tightness and tighten it up if necessary.
- Check the fan impeller for contamination and clean it up if necessary. To clean the impeller, remove the side cover.

Cut off power supply when doing work related to the safety of maintenance. Other work related to electrical characteristics must be performed with the power supplied.

### POSSIBLE MALFUNCTIONS AND THEIR ELIMINATION

Problem	Possible reasons	Elimination
The fan will not start.	No power supply.	Check the mains switch. Check the electrical connections against the wiring diagram.
	Jammed motor.	Carefully check the fan impeller for possible seizure and eliminate it, if necessary. If the impeller is in order, replace the electric motor.
The switching equipment activates upon fan start-up.	Short circuit in the fan or the electric circuit between the fan and the switching equipment.	Eliminate the cause of a short circuit.
	Excessive current consumption due to an overload in the electric mains.	Eliminate the cause of excessive current consumption.
	Improper fan starting method.	Use a soft starter or frequency converter to start the motor <b>(see "Asynchronous Electric Motor Starting Methods" in the "Connection to power mains" section)</b> .
	Improper switching equipment.	Re-select the switching equipment in accordance with the current regulations and equipment specifications.
	The installed switching equipment is of poor quality or its actual performance falls short of the rated values stated by the manufacturer.	Re-select the switching equipment by choosing a unit which successfully passed commutation and load tests and has a technical compliance certificate. The selection should be limited to the top five foreign switching equipment manufacturers.

The fan fails to reach the required rotation speed due to serious overheating of the fan motor.	Fan motor overloaded.	Eliminate the overload.
	Improper fan starting method.	Use a soft starter or frequency converter to start the motor <b>(see "Asynchronous Electric Motor Starting Methods" in the "Connection to power mains" section)</b> .
The fan motor runs at overload capacity with current consumption in excess of the rated value.	The fan supplies more air than expected upon motor capacity selection.	Measure network resistance. Throttle down the network (add aerodynamic resistance to the air duct network).
	Wrong motor phasing. The impeller rotates in the opposite direction of the arrow on the fan casing.	If necessary, change the impeller rotation direction by changing the phase sequence on the electric motor terminals.
	Air ducts clogged.	Clean the air duct or the impeller.
The fan supplies more air than expected.	The resistance values used during the ventilation network calculations are too conservative.	Check the air ducts for proper shape and cross section as well as for any dampers present.
	The cross section of air ducts increased and their number reduced during the installation.	Throttle down the network (add aerodynamic resistance to the air duct network).
	Wrong choice of the fan.	Replace the fan with a unit of proper standard size.
The fan supplies less air than expected.	Wrong calculation of the ventilation network and wrong selection of the fan.	Re-calculate the network parameters and select a matching fan.
	The network resistance exceeds the design calculations.	Re-arrange the ventilation network to decrease its aerodynamic resistance.
	Wrong direction of the impeller rotation.	If necessary, change the impeller rotation direction by changing the phase sequence on the electric motor terminals <b>(see the "Commissioning" section)</b> .
	Air leak through a loose air duct connection.	Eliminate the air leak. Seal the air duct connection.
	Impeller or air duct contamination with foreign objects or debris.	Clean the impeller or the air ducts from foreign objects or debris.
Excessive noise or vibration both inside the fan and in the circuit.	Loose screw connections.	Check the screw connections for proper tightness.
	No flexible joints between the fan and the ventilation network on the suction and discharge sides.	Install flexible joints.
	Loose connection of valves and dampers to the air ducts.	Tighten up the fasteners of valves and dampers.
	Impeller or air duct contamination with foreign objects or debris.	Clean the impeller or the air ducts from foreign objects or debris.
	Worn bearings.	Replace the bearings.
	Unstable power supply, unstable motor operation.	Check the stability of power supply parameters and electric motor operation.

## STORAGE AND TRANSPORTATION REGULATIONS

- Store the unit in the manufacturer's original packaging box in a dry closed ventilated premise with temperature range from +5 °C to + 40 °C and relative humidity up to 70 %.
- Storage environment must not contain aggressive vapors and chemical mixtures provoking corrosion, insulation, and sealing deformation.
- Use suitable hoist machinery for handling and storage operations to prevent possible damage to the unit.
- Follow the handling requirements applicable for the particular type of cargo.
- The unit can be carried in the original packaging by any mode of transport provided proper protection against precipitation and mechanical damage. The unit must be transported only in the working position.
- Avoid sharp blows, scratches, or rough handling during loading and unloading.
- Prior to the initial power-up after transportation at low temperatures, allow the unit to warm up at operating temperature for at least 3-4 hours.



## MANUFACTURER'S WARRANTY

The product is in compliance with EU norms and standards on low voltage guidelines and electromagnetic compatibility. We hereby declare that the product complies with the provisions of Electromagnetic Compatibility (EMC) Directive 2014/30/EU of the European Parliament and of the Council, Low Voltage Directive (LVD) 2014/35/EU of the European Parliament and of the Council and CE-marking Council Directive 93/68/EEC. This certificate is issued following test carried out on samples of the product referred to above.

The manufacturer hereby warrants normal operation of the unit for 24 months after the retail sale date provided the user's observance of the transportation, storage, installation, and operation regulations. Should any malfunctions occur in the course of the unit operation through the Manufacturer's fault during the guaranteed period of operation, the user is entitled to get all the faults eliminated by the manufacturer by means of warranty repair at the factory free of charge. The warranty repair includes work specific to elimination of faults in the unit operation to ensure its intended use by the user within the guaranteed period of operation. The faults are eliminated by means of replacement or repair of the unit components or a specific part of such unit component.

### The warranty repair does not include:

- routine technical maintenance
- unit installation/dismantling
- unit setup

To benefit from warranty repair, the user must provide the unit, the user's manual with the purchase date stamp, and the payment paperwork certifying the purchase. The unit model must comply with the one stated in the user's manual. Contact the Seller for warranty service.

### The manufacturer's warranty does not apply to the following cases:

- User's failure to submit the unit with the entire delivery package as stated in the user's manual including submission with missing component parts previously dismantled by the user.
- Mismatch of the unit model and the brand name with the information stated on the unit packaging and in the user's manual.
- User's failure to ensure timely technical maintenance of the unit.
- External damage to the unit casing (excluding external modifications as required for installation) and internal components caused by the user.
- Redesign or engineering changes to the unit.
- Replacement and use of any assemblies, parts and components not approved by the manufacturer.
- Unit misuse.
- Violation of the unit installation regulations by the user.
- Violation of the unit control regulations by the user.
- Unit connection to power mains with a voltage different from the one stated in the user's manual.
- Unit breakdown due to voltage surges in power mains.
- Discretionary repair of the unit by the user.
- Unit repair by any persons without the manufacturer's authorization.
- Expiration of the unit warranty period.
- Violation of the unit transportation regulations by the user.
- Violation of the unit storage regulations by the user.
- Wrongful actions against the unit committed by third parties.
- Unit breakdown due to circumstances of insuperable force (flood, earthquake, war, hostilities of any kind, blockades).
- Missing seals if provided by the user's manual.
- Failure to submit the user's manual with the unit purchase date stamp.
- Missing payment paperwork certifying the unit purchase.

### The manufacturer shall not accept any claims with regards to the condition of the paint-and-lacquer coating (hereinafter PLC) in the following cases:

- Dents, cracks, scratches and abrasions of the PLC sustained during handling, mounting and assembly operations.
- Progress of corrosion on areas damaged with stones, sand, and roof coat tar during the performance of roofing work.
- Signs of direct exposure of the PLC to excessive temperatures, which occurred during the performance of roofing work.
- Violation of regulations on transportation, storage, installation, and operation of the unit.
- Presence of damage caused by exposure to industrial and chemical emissions, acidic or alkaline pollution, sap or other factors not related to normal operating conditions.



**FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE UNIT.**



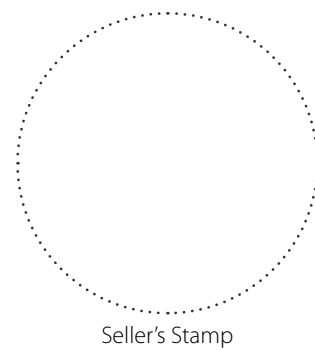
**USER'S WARRANTY CLAIMS SHALL BE SUBJECT TO REVIEW ONLY UPON PRESENTATION OF THE UNIT, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE PURCHASE DATE STAMP.**

**CERTIFICATE OF ACCEPTANCE**

<b>Unit Type</b>	Roof-mounted centrifugal smoke extraction fan
<b>Model</b>	Tower-S_____
<b>Serial Number</b>	
<b>Manufacture Date</b>	
<b>Quality Inspector's Stamp</b>	

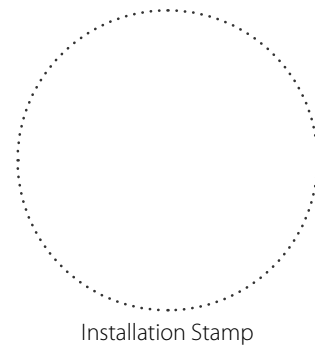
**SELLER INFORMATION**

<b>Seller</b>	
<b>Address</b>	
<b>Phone Number</b>	
<b>E-mail</b>	
<b>Purchase Date</b>	
This is to certify acceptance of the complete unit delivery with the user's manual. The warranty terms are acknowledged and accepted.	
<b>Customer's Signature</b>	



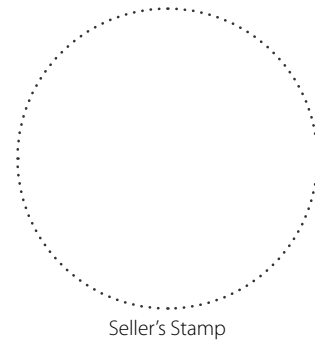
**INSTALLATION CERTIFICATE**

The Tower-S_____ unit is installed pursuant to the requirements stated in the present user's manual.	
<b>Company name</b>	
<b>Address</b>	
<b>Phone Number</b>	
<b>Installation Technician's Full Name</b>	
<b>Installation Date:</b>	<b>Signature:</b>
The unit has been installed in accordance with the provisions of all the applicable local and national construction, electrical and technical codes and standards. The unit operates normally as intended by the manufacturer.	
<b>Signature:</b>	



**WARRANTY CARD**

<b>Unit Type</b>	Roof-mounted centrifugal smoke extraction fan
<b>Model</b>	Tower-S_____
<b>Serial Number</b>	
<b>Manufacture Date</b>	
<b>Purchase Date</b>	
<b>Warranty Period</b>	
<b>Seller</b>	







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