SANDMASTER JUNIOR

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Contents

The Conformity Assessment for Sandmaster PRO sandblasting machine has been carried out and the CE marking has been affixed.

Attention!
Read this manual before you start to operate the machine.
The operator is obliged to read the manual and follow the instructions.

1. Introduction

The following manual includes the information about technical description, structure, maintenance, repairs and safety work rules. The following persons are obliged to follow the manual: operators of sandblasting machine, the supervisor and maintenance service workers. Reliable and trouble-free performace depends to a large extent on proper operation and use.

1.1 Subject and destination of the manual

The scope of the manual are the operation rules of **Sandmaster Junior Plus** sandblasting machine. The manual is destined for the operators, supervisors, maintenance service staff and managers. It includes basic information about the structure and safety rules which must be followed during the operation and repairs.

1.2. Destination of the product

The machine is destined for professional operation with the use of the technical knowledge and specific skills in order to achieve the assumed results.

The dust-free sandblasting unit SANDMASTER Junior Plus has a closed abrasive circuit. It is destined for sandblasting flat surfaces of such materials as stone, glass, wood, metal or plastics. It is dedicated to companies dealing with stone and glass industry. It is also used in other market sectors where dust free sandblasting is required.

It is not allowed to use sand which contains silica in sand processing. The machine has been designed and produced according to the machine and device operation rules. In spite of that we need to remember that careless operation and ignoring potential danger may cause accident or failure. The machine is destined for continuous operation in the presence of an operator. The area near the machine must be kept clean and tidy, with no obstacles hindering the access to the machine and technological operation.
The machine must stand on a flat and stable surface, in the open area and should be operated under the roof. In case of other conditions in the working place of the machine the proper general lightning (the parametres are specified by safety rules) is required.
The machine can be operated only by authorised people or by those who have a permission to do the particular work.

ATTENTION!
The producer shall not be liable for any misuse of the machine.

1.2.1 Structure and principle of operation

The dust-free sandblasting unit SANDMASTER Junior Plus has a closed circuit of an abrasive. The abrasive is passed from the pressure tank to the nozzle and is thrown out of it by means of compressed air. After operation the abrasive is sucked back into the unit where the separation of pollution from abrasive takes place. Pure abrasive returns to the circuit.

The sandblasting unit filled with abrasive passes the abrasive in the stream of compressed air by means of an elastic hose to the nozzle situated at the end of that hose. Handling the nozzle that is settled in the sandblasting head, results in sandblasting a given surface with an intensive abrasive stream. After operation the abrasive along with the pollution produced during sandblasting is sucked back into the supply tank where occurs the separation of the used abrasive into three fractions: large pollution, actual abrasive and dusty pollution. Large pollution is kept on the sieve and periodically

removed. Pure abrasive, after having gone through the sieve, falls down to the bottom of the tank. While the process of sandblasting is interrupted the abrasive returns to the pressure tank by means of a poppet valve which is used in the pressure tank.

Dusty fractions are gathered in the industrial vacuum cleaner; they must be periodically removed and the purified air is thrown out into the atmosphere. The sandblasting unit is operated electropneumatically and is equipped with a valve which regulates the air inflow and with a pneumatic actuator controlled by the electropneumatic valve which opens and closes the abrasive circuit controlling a disk valve which proportions the abrasive. The head of the sandblasting unit is made in the form of a cast which guarantees its long life. At the end of it there is a brush that prevents from splashing of the abrasive during the operation of the unit. The sandblasting unit should cooperate with the compressor which has the required parameters. Using a compressor with lower parameters (than recommended) will result in lowering the efficiency of the sandblasting unit and longer process of sandblasting.

1.2.2 Technical data

Turbine in Volt/Watt	~230V / 50 Hz
Power	1200 W
Air requirement	600 l/min
Working pressure	1,5 –3,5 Bar
Max. pressure	4 Bar
Weight without abrasive	50 kg
The amount of abrasive in the circuit	25 kg
Loudness of working engine	79 dB
Average level of loudness	83,6 [dB]
Measurements	500x400x1400 mm
Nozzle diameter	3-5 mm
Granulation of abrasive (recommended)	40'
Working temperature	-20 C / +50 C

1.3 Standards

The following instruction have been prepared on the basis of the standards concerning the machines and devices service rules and on the basis of the appropriate rules concerning the safety of machines.

PN-EN ISO 12100-1	2005	Safety of machinery. Basic concepts, general principles for design. Basic terminology, methodology
PN-EN ISO 12100-2	2005	Safety of machinery. Basic concepts, general principles for design. Technical principles
PN-EN 1050 **PN-EN ISO 14121-1**	1999 2008	Safety of machinery. Principles for risk assessment Safety of machinery. Risk assessment. Principles
PN-EN 60204-1	2001	Safet of achinery - Electrical Equipment of Machines - Part 1: General Requirements

2. Safety measures

ATTENTION !
The producer shall not be liable for any body injuries or injuries resulting from not using the following safety rules or the improper installation, use, maintenance or repair of the machine even if these recommendations are not clearly specified.

General safety measures

1. Follow general and local safety work rules.
2. If one of the following rules is not in agreement with local rules follow the more restrictive rule.
3. Installation, use, maintenance and repairs can be carried out only by authorised and well-qualified staff.
4. Before maintenance, repairs or controls (not regular ones) the electric and pneumatic supply must be turned off and make sure that the pressure tank is depressurised.
5. Do not start the machine when you are not sure about the pneumatic connections or in case of improper installation of the nozzle.
6. Do not direct the stream from the sandblasting unit onto people and animals
7. People in the place where acoustic pressure level is more than 90 dB should wear hearing protectors.
8. The machine must be kept away from children.
9. Follow the producer's recommendations as regards the work parameters.
10. Machines must be used as intended.
11. In case of any abnormalities in the operation of the sandblasting unit please contact the service staff.

2.1 Safety measures during installation

1. Make sure that the sandblasting machine is standing on a stable and even surface.
2. Before operation make sure that all protective elements used during transport are removed and the machine elements are stable.
3. Conductors must fulfill local requirements.
4. Pneumatic connections should be carefully made in a safe way.
5. Before starting the machine fill the sandblasting machine with abrasive – the recommended corundum of granulation is 40.
6. After operation turn off the power supply and cut off the compressed air

2.2 Safety measures during operation

1. Use only good operational materials of the right type, recommended by the producer. Do not use normal sand for sandblasting.
2. People who turn on the sandblasting machine should follow appropriate safety rules to make sure that there is no danger for third parties.
3. Do not use the machine when you think it is not working properly.
4. The operator should wear hearing protectors and safety goggles.
5. The following things must be controlled periodically:
   - stability of the fittings of the sandblasting machine components
   - the state of all pneumatic connections
   - cleanness and abrasive granulation (it must be replaced as soon as it has lost its properties)
6. Do not put your hands close to the abrasive stream and do not direct the stream towards people and animals.

2.3 Safety measures during maintenance and repairs

1. Use proper tools.
2. Use only original spare parts.

3. Maintenance and repairs can be done only after the electric and pneumatic power supply are turned off.
4. Do not use explosive solvents for cleaning elements.
5. Keep the place where maintenance is taking place clean. Cover the parts and holes to protect them from dirt.
6. Do not modify the machine in any way.
7. The machine must be stopped when we think that it is not working properly.
8. Before starting the machine after maintenance or repairs check whether all parts are in their places and are fitted properly.
9. Do not start the machine without the sandblasting nozzle on.

3. Power supply

Mains supply: 1-phase 230 VAC. It should be supplied with a minimum conductor size of 1,5 mm2. Before turning on the machine make sure that turning on the machine does not pose any danger to the life or health of third parties. Turning on / off should be done only by authorised people.

3.1 Air compressor power supply

The sandblasting machine should work with the compressor with the capacity of minimum 900 litres per minute. Using a compressor with lower parameters than recommended will result in lower performance and longer sandblasting process.
Working pressure should be regulated. The user ought to equip the network of compressed air with a filtro-strain which will additionally allow for catching the water from the circuit. All pneumatic connections must be made in a careful and safe way.

4. Work environment

Sandmaster Junoor Plus sandblasting machine is not destined for working on industrial scale. The machine's surroundings must be kept clean and with no obstacles hindering the access to the machine and maintenance services. The machine should stand on an even and stable surface, in an open space and should be operated under the roof.

4.1 Lighting

Proper lighting in the working place of the machine is required. The parameters are specified by the safety rules.

4.2 Sound emission

In order to measure the sound produced by the **Sandmaster Junior Plus** sandblasting machine we used the inspection carried out in the following conditions:

- We used a sound level meter, octave filters and third octave filters included in sound analyser type 945 no. 3560 with a preamplifier type SV11 no. 1585 made by SVANTEK with the microphone type AN40 no. 15830 made by G.R.A.S. with a valid legalisation certificate.
- The room where the measures were made had the following dimensions: 5,6-7,5 x 4 x 3,3m. The sandblasting machine was in the middle of the room. One of the walls was made of cavity bricks whereas the walls and a ceiling were made of cardboard-plaster slabs. A concrete floor. The room had two doors.
- During the measurement the sandblasting machine was working with a sandblasting nozzle made of boron carbide (5 mm diameter and 3 atm. working pressure).
- The measurement was made in agreement with the valid rules.

Loudness declaration:

The measured level of acoustic power corrected according to A characteristics:

LWA, referred to pW [dB]	94,9
Uncertainty, KWA, [dB]	3

The average level of acoustic pressure of emission corrected according to A characteristics:

LpA, referred to 20 µPa [dB]	83,6
Uncertainty KpA [dB]	2

ATTENTION!
Wearing hearing protectors while operating Sandmaster PRO sandblasting machine is recommended.

5. Manual

The manual's users are operational staff, supervisors and maintenance staff. One copy of the manual is always added to the machine. More copies may be ordered. The manual reflects the state of the machine at the moment of its production. The manual is valid throughout the whole period of its operation. Copying the whole manual or its parts in order to avoid using partial documentation which has not been updated or accepted is prohibited. The producer is not obliged to update manuals in case of modifications of the devices made later. The producer updates manuals if some mistakes or some missing information have been found or in case of the modification of original system. Small mistakes or omissions which might be important for the safety and proper functioning of the machine will be published as “amendments”.
Updated manual will replace the former copies which should be sent to the producer in order to destroy them.
Updated copies will be marked with the successive letters (A, B...). The letter A means the first edition.
In case of ceding the machine the producer must be informed about transferring property rights.
All suggestions useful for better understanding of this manual should be directed to the producer.

ATTENTION!
The producer shall not be liable for any misuse of the machine and not following the manual.

5.1 THE FIRST START

The installation of the machine is carried out by the producer. It is preceded by the machine operation training. When the installation is carried out by the user and when the machine is sent fully assembled, the user must familiarise himself with the manual and follow all the information included in the manual.

Before you start the machine:

- transport the machine to the working place
- the surface in the working place must be stable
- check the fittings of the machine elements
- fill the sandblasting machine with abrasive
- plug in the machine
- conduct “a tentative start”
- check whether the machine is working without any disturbances. During the “tentative work” turn on and off the machine a few times.
- after successful first start you can begin work
- in case of any problems contact the producer

When trying the machine watch the sandblasting process carefully. Pay special attention if there are no chokes of abrasive stream during a normal work.

If there are no abnormalities you can sign an acceptance act.

REMEMBER !!!
After shutting the air inflow the sandblasting is still (for a few seconds) passing the abrasive until the pressure in the pressure tank is levelled. The process of sandblasting is finished when only the stay of the machine is working.

5.2 Start

The start of **Sandmaster Junior Plus** sandblasting machine should be conducted according to the technological procedures set by the user. Special attention must be paid to the proper sequence of actions ensuring the right technology of production and safe operation.
The start of the machine means turning on / off the machine which is done by means of a control valve situated near the sandblasting head (the dust stay works independently and must be turned on before sandblasting).
In case of any abnormalities stop the work and eliminate the cause of the disturbance.

5.3 Sandblasting process

Sandblasting is conducted by leading a sandblasting head perpendicular to the material in such a way that the head brush adheres to the material being sandblasted. The movements of sandblasting head must be done in a smooth way. It must be remembered that the abrasive stream goes out (at high pressure) of the head and carelessness may cause serious consequences.
There are a few factors which influence the sandblasting efficiency. The most important are working pressure, the diameter of nozzle and compressor capacity.

Working pressure adjustment. When having a compressor with a larger capacity than given on a data plate the increase of the working pressure of the machine makes the sandblasting time shorter and also makes the wear of the nozzlez and brushes faster. The decrease of the pressure works the other way round. The diameter of the nozzle has a large influence on the amount and the diameter of the abrasive stream coming out of the head. The smaller the diameter of the nozzle the smaller the amount of the stream which results in less efficient sandblasting process. The diameter of the nozzle has an influence on the air requirement. (see the table below)

Operating recommendations

- Before starting the machine check whether the floor is stable.
- Every time you turn on the machine check whether the air and abrasive pipes are in good technical condition, whether the nozzle joints are properly connected to the pipe. Check the technical condition of nozzle threads, tightness of the machine and make sure that the start / stop switches work properly.
- Sandblasting machine must be equipped with a remote controller.
- It is not allowed to use other hoses than a special blast hose.
- The machine cannot work with more than 5 bar pressure.
- The filled abrasive cannot cover the the closing cone.
- Do not use dry silica sand as abrasive
- Do not change nozzles, disconnect conductors, change the machine adjustments without prior shutting the air inflow and decompressing the tank.
- Always keep the end of the sandblasting conductor on the side of the nozzle and direct it towards the thing that is to be sandblasted.
- If the operator has to leave the working place it is not allowed to leave the machine under pressure.
- Filling and starting the machine must be conducted by the same person.
- The type of abrasive must be carefully chosen. The abrasive must be dry and has a proper granularity.
- The machine should not be installed in dusty, humid and not ventilated places.
- Cleaning air filter before starting and after finishing work by means of a pneumatic system of filter dust off. The switch of the system is located on the power box in the front part of the device.

REMEMBER!!!
Always use pneumatic system of filter dust off option before starting and just after finishing sandblasting. It will prolong life of air filter and extractor's engine.

The humidity in the compressed air might be in the form of a condensate which is produced in the process of air compression. Therefore, the proper choice of the compressor capacity is important. The table shows the values of the flow depending on the diameter of the nozzle.

Nozzle diameter	Air consumption (6 bar pressure)	Material granulation
3mm	500 l/min	0,20 max.
4mm	850 l/min	0,30 max.
5mm	1300 l/min	0,50 max.
6mm	2200 l/min	0,80 max.
8mm	3700 l/min	1,00 max.
9,5mm	5500 l/min	1,50 max.
11mm	7200 l/min	2,20 max.
12mm	9500 l/min	2,50 max.

5.4 Stopping the machine

The stopping of the machine takes place after finishing the work cycle by means of closing pneumatic valve situated near the head.
Emergency shut-down takes place by means of cutting off the air.

The user is obliged to install a cutting-off valve on the pneumatic network and situate it near the operator.

5.5 Operation

Sandmaster Junior Plus sandblasting machine should be operated by a qualified worker. The operator is responsible for keeping the machine clean and following the working safety rules by himself and his co-workers. The operator is in charge of:

- preparing the sandblasting machine to work
- installing nozzles and brushes, changing abrasive
- turning on / off the sandblasting process
- removing the dust from the stay, cleaning the filter and preparing for the next sandblasting process
- checking the state of nozzles and brushes, pneumatic connections and other elements of the machine
- keeping the machine clean

5.6 Transport instruction

From the moment of production to the assembly conducted by the user the machine is treated as an immobile thing. All loading / unloading and transport activities must be planned and conducted according to the appropriate rules.
After unpacking the machine you must check if it is not broken and if some parts are not missing. In such case do not plug in the machine but inform the transport company immediately and contact the supplier.
Machine must be transported as fully assembled, in a horizontal or vertical position with proper protection against transport damages.

5.7 Taking out of service

After the machine has been taken out of service it must be disconnected, all the tanks must be emptied, and the machine must be disassembled and scrapped.

5.8 Misuse

Misuse means:

- not following the latest safety rules;
- not following the manual;
- inappropriate assembly and installation of the machine;
- inappropriate installation of the machine after the maintenance;
- inappropriate maintenance of the machine;
- modification of the machine without prior authorization from the producer;
- using spare parts which are not original or not recommended by the producer;
- operating the machine by an inexperienced operator who is not familiarised with the rules;
- random events such as fire, flood, etc. which may cause the loss of the original properties of the machine;
- damage to the machine or its construction;
- presence of unauthorized people in the danger area when the machine is working;

6. Maintenance

Attention!
The electric and pneumatic power supply must be turned off during the inspection, maintenance and repairs.

In order to ensure the trouble-free operation of the sandblasting machine the maintenance must be carried out carefully and systematically. Special attention must be paid to the state of nozzles and brushes.
Change the abrasive as often as necessary in order to avoid the situation when the machine stops working properly.
It is recommended to clean the filter after each use. If the machine is equipped with a normal industrial vacuum cleaner its bag must be blown through with compressed air at least once a week.
The machine was built in such a way that the user's interference (as regards operation and inspection) is reduced to the minimum.
Paying special attention to the periodical cleaning of the machine and following the simple rules mentioned above will result in safe work and longer life of the machine.
Routine maintenance should be carried out by the operator during the intervals.

6.1 Schedule of inspections and repairs

One of the basic rules of proper operation of the sandblasting machine is inspection. Even the small abnormalities which are found and eliminated on time may prevent serious consequences. Besides the above mentioned operational and maintenance activities it is recommended to carry out more detailed periodical inspections at least once a year. The aim of the periodical inspection is to visually check all the parts whether they function properly and whether they are worn due to difficult work conditions. The inspection should include:

- checking leaktightness of the pneumatic system
- checking the state of pneumatic hoses, abrasive and stay

When the user finds repairable defects he may change the parts or do small repairs by himself. In case of any abnormalities concerning the work of the machine contact the maintenance staff.

Inspection			
	Period	Contents	Remarks
1	After first 20 hours of operation	□ check all the mechanic connections □ check the nozzle and brush □ check the hoses, abrasive and stay □ check conductors	
2	After 1 month of operation	□ check the same things as in the case of the inspection after 20 hours of operation	

Repairs			
	Period	Contents	Remarks
1	Minor repairs every 1200 hours of operation	□ check all the mechanic connections □ check the nozzle and brush □ check the hoses, abrasive, air and stay □ check conductors	
2	Major repairs every 2400 hours or every 3 years	□ machine disassembly □ clean and wash all the parts □ verification of components □ change air hoses, abrasive and stay □ machine assembly, machine adjustment □ paint the machine	

After the major repair acceptance of the sandblasting machine is required. The period between repairs might be prolonged only if its condition allows for further work after minor repairs.

6.2 Operation

The operator must be experienced in operating similar machines or at least in operating pneumatic machines. Inexperienced workers may operate the machine only under supervision of competent workers. Besides, the operator must familiarise himself with the dangers resulting from operating the machine and with this manual.

7. Troubleshooting

POSSIBLE TECHNICAL PROBLEMS AND SOLUTIONS

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Sandblasting machine is not sandblasting	No abrasive The regulating valve under the pressure tank is closed. Air inflow is closed.	Check if there is an abrasive in the pressure tank. Check the positioning of the valve that regulates the abrasive which is under the pressure tank. The correct adjustment is open 2/3. Turn off the air power supply.
Machine is choking during the	Improper positioning of the	Check the positioning of the

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
operation	regulating valve under the pressure tank.	regulating valve under the pressure tank.
I can see dust under the head while sandblasting	Stay is not open Decalibrated nozzle Dirty filter Worn-out brush	Turn on the stay Change the nozzle Clean the filter Change the brush
Sandblasting machine stops during sandblasting	Dirt in the regulating valve Abrasive is wet	Unscrew the valve and clean it Remove the abrasive, add new one or dry the old one. Install a pneumatic filtro-strain.
The sandblasting machine is working less efficiently than at the beginning.	The abrasive is broken. The power supply pressure is too low. The valve which regulates the abrasive is out of adjustment.	Change the abrasive. Set the desired pressure value. Set and adjust the valve.
Problems with stay power supply	The engine is broken.	Change the engine.

8. The list of parts

Code	The list of parts of Sandmaster Junior Plus
0509	AIR FILTER ELEMENT Junior Plus
0063	VALVE
0513	HEAD (casting)
0058	COMPLETE HEAD (without a nozzle, without a brush)
4061	fi4 BORON CARBIDE NOZZLE
4062	fi5 BORON CARBIDE NOZZLE
0073	5/4” PIPE (connecting the tank with the disc)
0620	NIPPLE 1” 5/4”
0569	19mm ABRASIVE HOSE
0667	GBS2931 HOSE BAND
0671	BLUE POLYURETHANE CABLE
0566	19mm AIR HOSE
0695	Y-BRANCH 1”
0563	EXHAUST LEAD 50
0656	ELECTRIC LEAD (control lead)
4107	CIRCUIT-BREAKER (with handle)
0066	MUSHROOM VALVE WITH PACKING (tank)
0661	COMPLETE ELECTROVALVE
0571	VALVE 5/2 (controlling the actuator)
0551	ACTUATOR
0118	COMPLETE FI 19 LANCE WITH THE HEAD

9. Warranty

The warranty terms are included in the Warranty Card which is attached to this document.
The warranty does not cover the following consumables:

- brush for collecting abrasive
- nozzle for feeding abrasive (boron carbide)
- short nozzle (tool steel)
- rubber head protection
- head casting
- nozzle fitting
- hose for feeding abrasive
- hose for collecting abrasive

10. Declaration of acceptance

We, the undersigned, certify that we familiarised ourselves with the instruction which we are obliged to follow in our daily work.

No.	*Date*	*Name*	*Position*	*Signature*