

User Manual

Concrete Spraying Machine

SSB 05.1 DUO
SSB 05.2 COM-F



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I. Preface

This user manual is necessary to get basic information about safety use of concrete spraying machine SSB 05.2 (further only machine), made by producer FILAMOS, s.r.o., Hate 546, 261 01 Příbram, Czech Republic. Other information, recommendations and technical parameters are mentioned in the Operating and maintenance instructions made by producer. The user manual is obligatory for all users that use this machine.

II. Use

Concrete spraying machine SSB 05.2 is designed for spraying of concrete and refractory mixtures in a so-called dry method.

This machine finds its main applications in the spraying of refractory concrete mixtures during the lining of metallurgic and glassworks furnaces, heating plant boilers, coke-oven batteries, etc.; in the metallurgic, chemical and glass working industries. It is also used to maintain concrete structures (e.g. road and railroad bridges, abutment walls, cooling towers, water reservoirs, sewerage plants, etc.); during the construction and reconstruction of buildings and during the reinforcement and bracing of tunnel vaults and sewers.

The machine is designed for the operation in the places free of a danger from the methane explosion (SNM-0) and other inflammable gasses as stated in CSN EN 1127-2.

The machine may be used in media with temperatures ranging from +5 to +40 °C.

III. Machine Operating

Start operating – opening and adjusting compressed air, then turning on the electric motor.

Presence of the machine operator is not necessary unless during refilling of the mixture and its application.

Finish operating – it is necessary to empty the feeding hopper and blow compressed air distribution system by air. To switch off the electric motor thereafter and close the compressed air cock.

Workmen have to be introduced with:

- User manual
- Operating and maintenance instructions
- Operating rules applied to the construction place

Workmen are obliged to use personal protective equipment stated in Operating and maintenance instructions (crash helmet, ocular protection and respirator

against cement dust, convenient work clothes and shoes, work gloves). Workmen are obliged to do daily notes into the operating diary.

Safety instruction concerning:

- Assembly and the installation – Assembly of the machine is carried out at the producer and the transport to the client is performed in already assembled form of the machine. The check of the machine integrity, complexity of the equipment of the machine is performed in the place of operation. Machine is switch to the electrical supply and to the compressed air supply after setting to the place of application.
- Setting to the operation – Machine and its accessories must be appropriately assembled before setting to the operation. All necessary assembly and following checking operation steps must be carried out according to the Operation and Maintenance Manual provided by the producer.
- Operation of the machine – Machine must be used only in accordance with the Operation and the Maintenance Manual provided by the machine producer. Machine is operated by one operator who is responsible for the faultless conditions of the machine at the same time.
- Manipulation – Machine can be transported by the suitable transport means defined by the site manager. Total weight of the machine is 470 kg (DUO)/560 kg (COM-V) with tolerance $\pm 5 \%$. Each machine is equipped with catching loops for the connection to lifting machine. Manipulation must be careful without any dynamic crashes.
- Assembly and disassembly – Disassembly of the hoses is done in case of each transfer to the other operation place Transfer of the machine in assembled mode is done by mechanical transport means (crane truck, truck). It is necessary so that there is no pressure of the compressed air in the machine as well as the switch off the electric supply is done before any disassembly of the machine.
- Adjustment – It means setting up according to the Operation and the Maintenance Manual. Simple steps without any influence to the safety of the equipment must be done by the operators according to the local conditions. Other procedures must be left to the specialised service according to the Operation and the Maintenance Manual.
- Maintenance – small and operational steps are done by the operators according to the time order in the Operational Manual. Procedures requiring higher specific knowledge are done by the authorised service agencies for those machines.

- Disposal – Disposal of the machine is comprised of decomposition of the parts to:
 - Steel material polluted by the dangerous substances
 - Colour metals
 - Plastics, rubber and the parts polluted by the dangerous substances must be disposed off in accordance to the Act about the liquidation of the dangerous substances

Training Instructions

There are only mentally and physical competent workmen older than 18 years with theoretical and practical skills qualified to operate the machine.

Other Ways of Use

The Machine cannot be used for any other purpose than transport of dry concrete mixes, fire-resistant mixes and similar materials. If used for any other purpose, the manufacturer does not assume any liability for damages caused by or to the Machine. It is not presumed that the equipment should be operated by any unqualified operating staff and, therefore, the Operating and Maintenance Instructions are compiled in a manner and to an extent inevitably necessary for a safe operation of the Machine by a trained member of the staff.

IV. Description

The Machine comprises the following main parts:

- the Machine drive (electromotor, gearbox, speed variator, if any)
- basic frame
- dosing drum (rotor) with wearing plates
- the Machine head with upper sealing plate, lower sealing plate and exhauster,
- feeder and vibrator,
- rippling equipment,
- tightening bolts,
- exhauster with a filtration bag,
- air distribution and manometers,
- electrical installations,
- central lubricating system (if any),
- bantam wheels (rail undercarriage, frame),
- accessories DN 25, DN 32, DN 40, DN 50 (hoses, quick couplers, nozzle, sealing plates, etc.)

The Machine drive is executed by the slipping gear-box with:

- 2-speed electric motor (DUO)
- with 1-speed electric motor equipped with frequency inverter (COM-F)

The bearing part of the dosing part, the Machine drive and air distribution are situated on the frame. The bantam wheels are screwed on the basic frame sides.

The dosing drum is fixed on the top part of the bearing part shaft by a square(end) and tightening nut.

The Machine head is installed on the 4 tightening bolts. The sealing plate is mounted on its bottom side and its bottom side rests on the dosing drum. The air intake is installed on the Machine head upper side as well as the feeder and exhaust with the filtration bag.

The bottom sealing plate is fixed on the frame on which the dosing drum is rested as well as the exhauster and bottom exhaust.

The Machine feeder is complimented by vibrator for acceleration of filling of the transported mix, and a sifter.

The Machine head is mounted on by four tightening bolts serving to control (adjust) thrust of the sealing plates to the dosing drum.

The exhausts with filtration bags serve to capture air remains and dusty particles from the dosing drum cylinders.

The air distribution comprises the main intake and four controlling cocks. The main intake is provided with a controlling cock and quick coupler for connection of the pressured air DN 40 hose. The controlling cocks serve to intake air to the

Machine head (primary (upper) air), to the exhauster (secondary (bottom) air), to clean the Machine and control the pneumatic vibrator. The controlling cocks for the air intake to the head (primary (upper) air) and to the exhauster (secondary (bottom) air) are equipped with manometers.

The central lubrication system comprises the lubricating equipment and tank, controlling automatic system, outputs and pipe. The lubrication system transports the lubricant (grease) or oil between the areas of sealing and wearing plates and so avoids their excessive friction. Type of plastics lubricator – A00 (Mogul, Madit, Slovnaft).

The models without central lubrication system are equipped with the manual lever press lubricator for sealing and wearing plates.

The control of the Machine is concentrated on the electric motor cover side. The compressed air intake is situated on the cover side.

The whole Machine is placed on the frame with bantam wheels. Alternatively can be used a solid frame or a rail undercarriage.

Working Principle

The concrete spraying machine SSB 5.2 works on the principle of pneumatic transport.

Dry-gunning

The dry mixture for spraying or transportation is poured in the machine and smoothly fills the cylinders of the rotor below the hopper. To fill a mixture into the rotor more easily, a vibrator and a rippling are fitted in the hopper.

The rotating movement of the rotor moves the mixture along by 180 degrees in the clockwise direction. The mixture is thus blown out from individual cylinders of the rotor into transport hoses. As the mix passes through the blower into the transport hoses, lower pressure air is added to enhance the continuous flow of the material in hoses. The hoses are equipped with the spraying nozzles at the end, into which the mixing water is fed at the same time to wet the transported mixture. The required wetting of the mixture is controlled with the supply cock.

Drive and Output Control

The Machine is propelled by electric motor.

I. Two-speed Electric Motor (DUO)

The machine is propelled by two-speed electric motor with slide-on gearbox.
The machine output (rotor speed) is controlled by two-position switch.

II. Electric Motor with a frequency inverter (COM-F)

The electric motor is fitted with frequency inverter. It is connected to the frontal gearbox, which is keyed to the bearing part of the dosing drum with an output hollow shaft.

The output is changed by means of the inverter.

V. Technical Data

SSB 05.1 DUO : 4/6 poles electric motor 2,6/1,87 kW.
Rotor revolutions: 8/12 rpms/min.

Performance parameter

Parameter	Rotor 1,9L		Rotor 3,9L		Rotor 6,9L	
Drum volume /dm ³ /	1,9		3,9		6,9	
Drum rpm /min ⁻¹ /	8	12	8	12	8	12
Theoretical output m ³ x h ⁻¹ *	0,8	1,2	1,8	2,7	3,3	5,0

SSB 05.2 COM-F: 4 poles electric motor 3 kW with frequency inverter
Rotor revolutions in the range: 5 - 13 rpms/min.

Performance parameter

Parameter	Rotor 1,9L		Rotor 3,9L		Rotor 6,9L	
Drum volume /dm ³ /	1,9		3,9		6,9	
Drum rpm /min ⁻¹ /	5	13	5	13	5	13
Theoretical output m ³ x h ⁻¹ *	0,6	1,5	1,2	3,0	2,1	5,4

Note: The drum should be selected with a view to the performance required.

The actual output of the machine depends on the kind and composition of the mixture to be transported, its moisture content, transport distance, transport hoses inner diameter, the compressed air pressure and quantity and the way of filling the machine hopper.

Technical parameters

Parameter	
Air consumption [m ³ x min ⁻¹] (distance 40 m)	4-5 (DN 32/DN 40) 6-8 (DN 50)
Air pressure [MPa]	0,5 - 0,6
Minimum water pressure at nozzle [MPa]	0,3
Max. moisture of material [%]	6
Granularity of transported material max. [mm]	8 (DN 25/DN 32) 16 (DN 40/DN 50)
Inner diameter of transport hoses [mm]	DN 25/32/40/50
Water inlet - inner diameter [mm]	DN 20
Horizontal transport distance max. [m]	max. 300
Vertical transport distance max. [m]	max. 100
Mains connection	3x400 V / TN-S
Max. deviation of voltage system	± 10 %
Coverage	IP 55

The transporting distance and height are directly affected by:

- The composition and water content of the conveyed mixture (with mixtures consisting mostly of fine fractions should be tested individually,
- Sufficient amount of compressed air,
- Transport hoses or piping (for larger distances these must be straight with no bends).

The compressed air must be always dry!

Principal dimensions

SSB 05.2 COM-F

Parameter	
Length [mm]	1540
Width [mm]	710
Height [mm]	1230
Weight (with no accessories) [kg]	420

SSB 05.1 DUO

Parameter	
Length [mm]	1370
Width [mm]	710
Height [mm]	1230
Weight (with no accessories) [kg]	410

VI. Accessories

The machine is delivered with optional accessories set corresponding with required output.

Each type of accessories set differs from each other by an inner diameter of transport hose. Marking DN xx (e.g. DN 40 = transport hose with an inner diameter 40 mm).

Accessories	Rotor 1,9L	Rotor 3,9L	Rotor 6,9L
DN 25	X	---	---
DN 32	X	X	---
DN 40	X	X	---
DN 50	---	---	X

Standard set of accessories consists of:

- End hose with the nozzle – 20 m
- Extension hose – 20 m
- Water hose – 20 m
- Upper sealing plate – 3 pcs
- Lower sealing plate – 3 pcs
- Nozzle ending – 2 pcs

The set of accessories can be adjusted according to the customer's requirements (length of hoses, number of sealing plates etc.).

VII. Material

The material used in manufacturing the machine conforms to the valid manufacturing documentation as regards chemical composition and mechanical properties.

Aggregate properties for sprayed concrete conform to standards ČSN EN 12620 a ČSN EN 13055-1.

VIII. Executions

All parts have been manufactured according to production blue-prints. Intolerance dimensions conform to standards CSN ISO 2768-1.

The electric wiring conforms to standards CSN EN 60204-1. Protection against the dangerous touch voltage is secured by an automatic switch off the source.

Metal-coating of parts performed in accordance with manufacturing documentation and standards CSN EN 12 329. Before assembly, the coreless parts were treated with primer on contact surfaces.

Welds were performed in accordance with blue-prints and standards CSN EN ISO 9692-1.

The product has the surface treatment of 3rd degree of rust aggressive surroundings protection and the paint complies with CSN ISO 3864.

IX. Markings

The machine has a rating plate with the following data:

- Name and residence of manufacturer,
- CE mark – declaration of conformity,
- manufacturer's number and year of production,
- rated air pressure,
- rated water pressure,
- input,
- rated voltage,
- weight of machine.

Electric motor and gearbox have their own rating plates.

X. Testing

The properties of the machine are checked in the manufacturing plant by means of a functional test: running empty and under pressure of 0,3 MPa with sealing in operation mode. Each machine has been tested.

The test consists of the following checks:

- functionality and tightness of the dosing drum and sealing plates (with exhaust sealed, tightened clamping bolts and machine at the rest),
- loading of the electric motor at idle run with tightened clamping bolts,
- direction of dosing drum rotation (the direction of clock hands). The direction is marked by the arrow-head on the machine head,
- functionality and tightness of the air distribution system,
- functionality of the vibrator and the rippling.

The execution of the tests is recorded in the „CERTIFICATE OF QUALITY AND COMPLETENNES“.

XI. Delivery

Each product is delivered assembled with the following documentation:

- User manual
- Operating and maintenance instructions
- Report of initial control of electric equipment
- Certificate of quality and completeness – Warranty certificate
- Spare parts catalogue

XII. Warranty

The warranty period is 12 months from the date of the machine delivery. Otherwise according to conditions in purchase contract.

The manufacturer provides no warranty:

- If the product is used for purposes or in a manner other than specified in the User manual and Operating and Maintenance Instructions,
- If the product is not being given proper care (poor storage, assembly, incorrect operating),
- If the product has been changed, modified or repaired without the manufacturer's previous consent,
- If the machine has been damaged by incorrect electrical connection,
- If the product has been damaged by a third person or vis major,
- If warranty is being claimed without Warranty Certificate,
- On the sealing plates, wearing plates, dosing drum, blower, transport hoses and the nozzle since their lifetime depends on the abrasiveness of the transported material.

XIII. Packaging

The machine is supplied on standard pallets, covered with plastic foil. If different packaging is requested, this must be included in the purchase contract. The standard accessories are placed on the pallet with the machine, or placed in the machine loading hopper. All casings are disposable and charged to the customer.

XIV. Transport

The machine is transported by usual transportation means. When being transported, the machine should be fixed to avoid spontaneous movement and damage.

XV. Storing

The machine and accessories must be stored in spaces protected against the elements, excessive dampness, acid vapours, oils and fungi.

XVI. Servicing

Servicing is carried out in accordance with the servicing conditions given in the Operating and Maintenance Instructions.

XVII. List of Standards

At the Machine design and conformity review the following Standards have been used: Directive of the European Community No. 98/37/ES – Mechanical Equipment, Basic Requirements according to Appendix No. 1 to NV 24/2003 Sb., Czech National Standards (ČSN) EN ISO 12100-2, ČSN EN 294, ČSN EN 418, ČSN EN 811, ČSN EN 953, ČSN EN 983, ČSN EN 1037, NV 178/2001 Coll., NV 502/2000 Coll., ČSN EN 1127-2, ČSN EN 12620, ČSN EN 13055-1, ČSN ISO 2768-1, ČSN EN 60204-1, ČSN EN 12329, ČSN EN ISO 9692-1 and ČSN ISO 3864.

XVIII. Supplements

Appendix No. 1: Machine Assembly

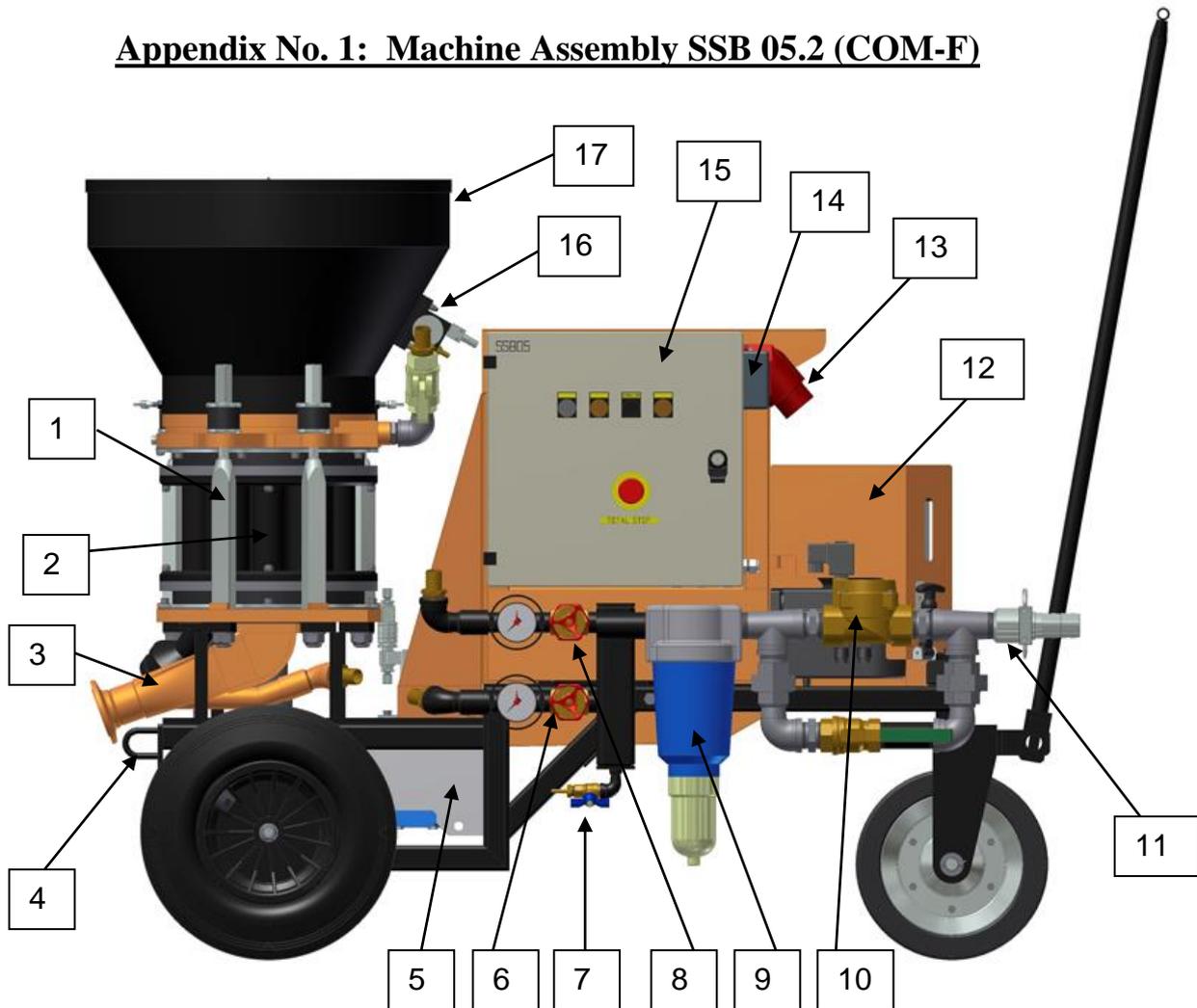
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Pribram – November 2006

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Appendix No. 1: Machine Assembly SSB 05.2 (COM-F)



1. Tightening bolts
2. Dosing drum
3. Blower
4. Eyes for lifting-up with the crane
5. Gearbox
6. Lower air regulation
7. Vibrator regulation
8. Upper air regulation
9. Water separator
10. Electromagnetic valve
11. Main Air source
12. Automatic lubrication system
13. Electric energy connection
14. Remote control connection
15. Controlbox
16. Air vibrator
17. Hopper

Optional components such as frequency inverter, remote controller, water separator, electromagnetic valve, automatic lubrication system are not mounted in the standard configuration of the machine. Machine is being equipped with such components on customers demand.