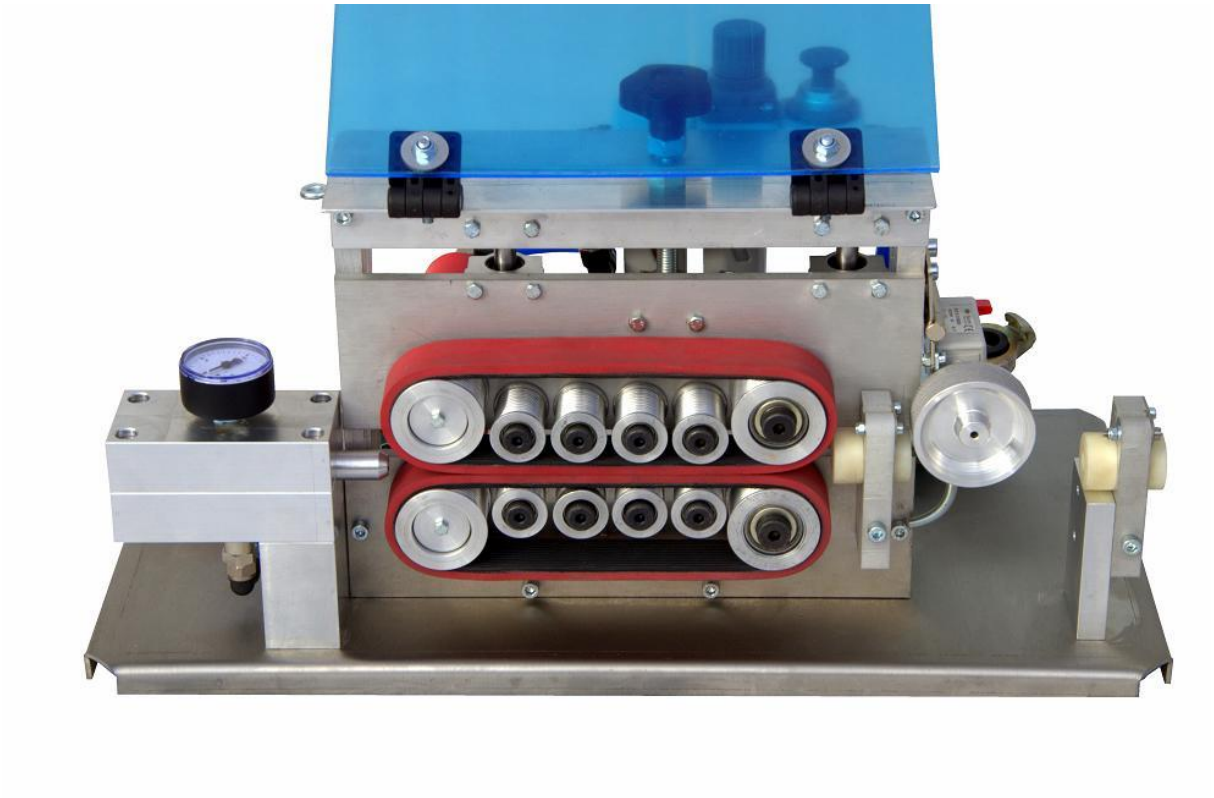
GAMM-BUD®

Operating Manual

Fiber Optic Cable Blowing Machine

Blue Dragon Jet

BDJ 4/10



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The images in this manual are for reference only. The actual appearance of the product may differ from the pictures.

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Safety Precautions

General Safety Precautions

As the general rule, the owner of the machine is responsible for maintaining good technical condition of the machine and safe work environment. The machine is built in accordance with the latest technical knowledge and general safety standards. However, a serious injury may occur to personnel operating the machine or other parties present near it while in operation.

The machine may only be used for its intended purpose, ie. blowing fiber optic cables and only if its technical condition is impeccable.

Prior to operating the machine, its technical specifications must be learnt, as well as the ambient temperature must be measured. The appropriate use of the machine is described in detail on the following pages.

The basic condition for safe operation and proper functioning of the machine is the knowledge of the basic safety instructions and general safety regulations. In the workplace where the machine is operated Health and Safety regulations must be strictly meet at all times. Both, when operating and servicing the machine, good care should be taken to keeping the workplace clean and orderly.

In the event of any modifications to the design of the machine or operating in ways different from those intended, the Manufacturer is exempt from any liability and warranty service.

Liabilities of the machine's owner

It is the owner's responsibility to make sure that only properly trained personnel is allowed to operate the machine. Such persons must be:

- familiar with Health and Safety regulations
- familiar with the operating instructions of the machine
- familiar with manual instructions and aware of warnings related to work safety, and
- whose knowledge of work safety is checked at regular intervals.

Service and repair works may be carried out by only trained personnel and any defect that may affect work safety must be removed immediately.

Liabilities of personnel operating the machine

All persons working with the machine are obliged to:

- comply with generally applicable safety regulations
- learn and comply with the safety precautions while operating the machine.

Warranty and liability of the producer.

Unless stated otherwise, the general terms conditions of sale and delivery by GAMM BUD Ltd apply.

The producer shall have no liability for damage of property or injuries if these occur due to one or more of the following:

- operating the machine in violation of its operating instructions and intended use
- incorrect installation, operation or maintenance of the machine
- operating the machine with defective, incorrectly installed or missing safety guards
- unauthorized design changes to the machine or improper performance parameters of the machine
- allowing for excessive wear and tear of some parts of the machine
- repairs or operations of the machine carried out incorrectly
- accidents due to external factors or force majeure.

Detailed recommendations

Personnel operating the machine must read operating manual beforehand and comply with its provisions while operating the machine.

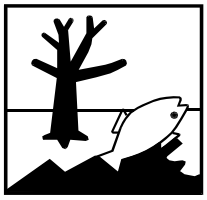
Failure to comply with safety instructions and general Health and Safety regulations can result in accidents or death.

WARNING! Keep hands away from rotating parts of the machine due to possible injury.

Maintenance and repair work on pneumatic equipment may only be performed only by trained personnel.

Compliance with environmental regulations

Oils should not be mixed with any other liquids. They should not be poured into drains or waste or onto the ground. All the oils, greases and other liquids used during repairs or maintenance of the machine should be collected in special containers, stored, transported and disposed of in accordance with the pertaining laws and regulations.



Product Description

Blue Dragon Jet fiber microcable blowing machine is designed to blow fiber optic micro cables into microducts with use of compressed air.

While being blown the fiber optic cable is being moved by the machine's feeder and the blowing head, equipped with gaskets.

Two elastic belts ensure transferring the driving force to the blown cable. The upper belt can be raised and lowered with the knob.

Both belts are driven by pneumatic motors.

Pressed against the cable, belts force it to move forward.

The pushing force transferred from the belts to the cable is being supported by the stream of compressed air entering the microduct through the blowing head.

Blowing speed can be adjusted with the knob of the air valve supplying air to the pneumatic engines.

The mechanical length counter indicates the length of the cable being blown.

Sturdy aluminum frame ensures stiffness and stability of the machine maintaining the low weight.

1) *Blue Dragon Jet*

2) Transport case

3) Air hose

4) Set of seals

5) Set of bushings

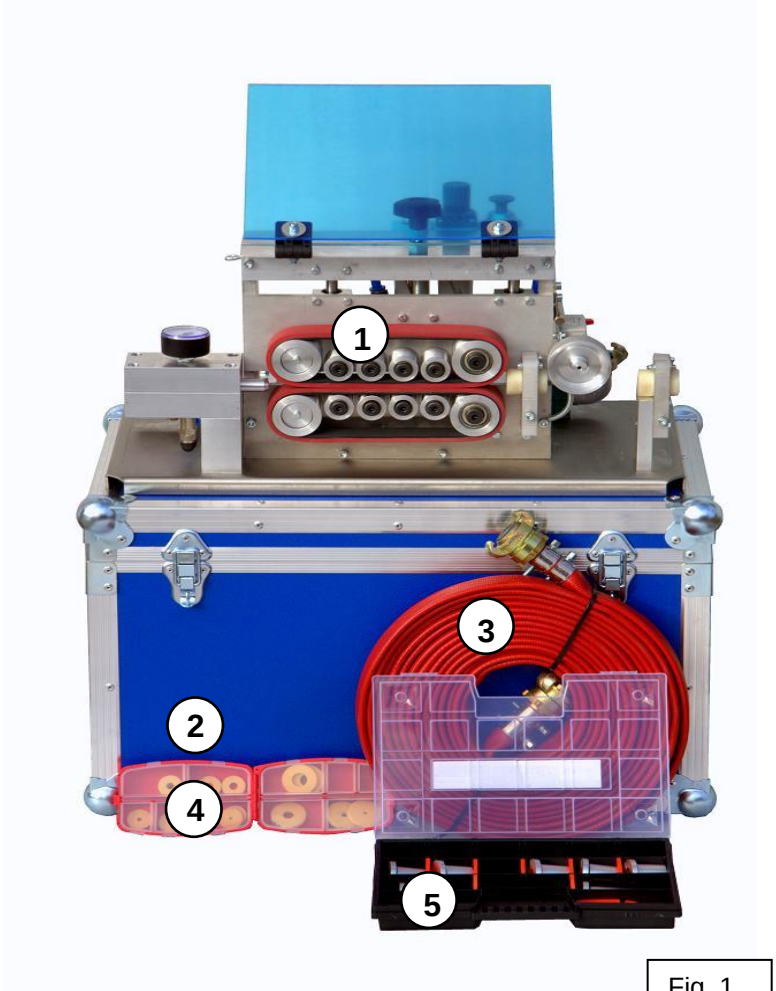


Fig. 1

Cable Blowing

Preparation

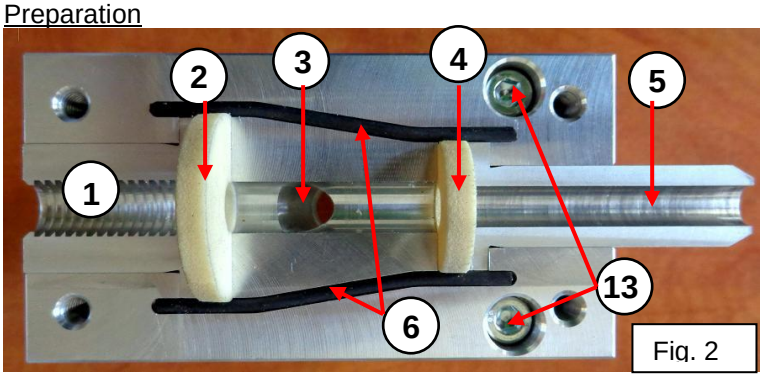


Fig. 2

1) Microduct fastening bushing

2) Micro duct seal

3) Head air inlet

4) Cable gasket

5) Cable guiding bushing

6) Head sealing

If needed, a small amount of the prelube liquid should be applied directly into the microduct.

The cable protection duct for blowing the cable should be installed in the head with removable collets (1 Fig. 2). The micro duct collets should be adjusted to the used micro duct. Note that the seal (2 Fig. 2) should be in its slot in the head and the duct does not block the air inlet to the head (3 Fig. 2). The cable seal (4 Fig. 2) and the cable driving bushing (5 Fig. 2) should be appropriate for the blown cable.

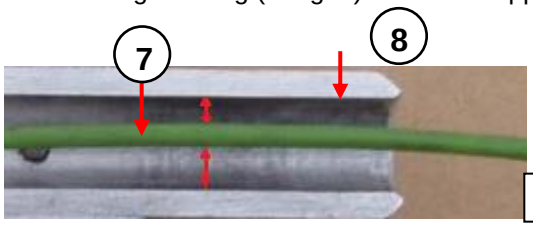


Fig. 3

CAUTION If the diameter of the cable (7 Fig. 3) is significantly smaller than the cable leading bushing (8 Fig. 3), the cable may be damaged by the feeder at the blowing head inlet.

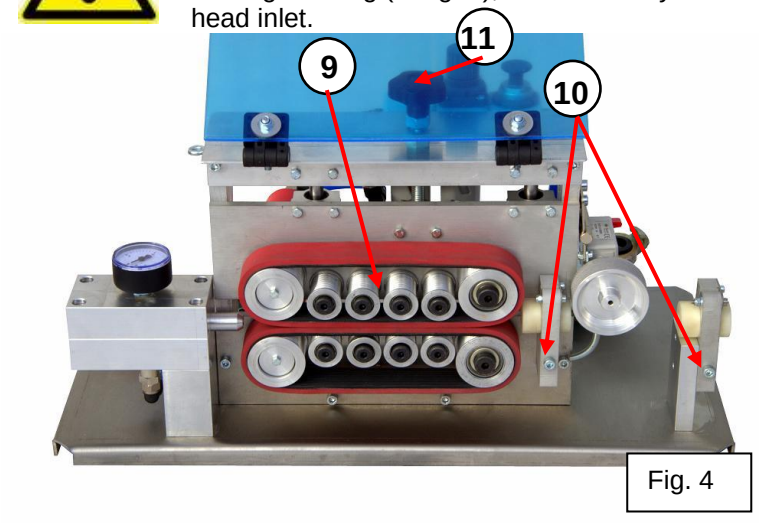


Fig. 4

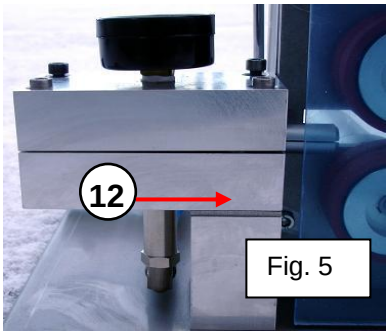


Fig. 5

Unscrew the cable guiding bushing (10 Fig. 4) and open the bushing. Use the knob (11 Fig. 4) to lift the upper drive belt (9 Fig. 4).
Insert the cable between the driving belts and slide in a few meters into the microduct.
Prior to this, put a properly selected gasket onto the cable (4 Fig. 2).

(In case of blowing the cable in two directions, cut the gasket so you can put it on and off anytime).

Place the cable together with a gasket (4 Fig. 2) inside the blowing head. Make sure the gasket is placed centrally in a blowing head. Place the upper part of the head and tighten the fastening screws.

Close the bushing and tighten the fastening screws (10 Fig. 4).Make sure the cable is placed centrally in the head. If needed, adjust the height of the head. Loosen the screws (13 Fig. 2), then set the head by placing the calibration plates (12 Fig. 5) and tighten the screws.

Settings

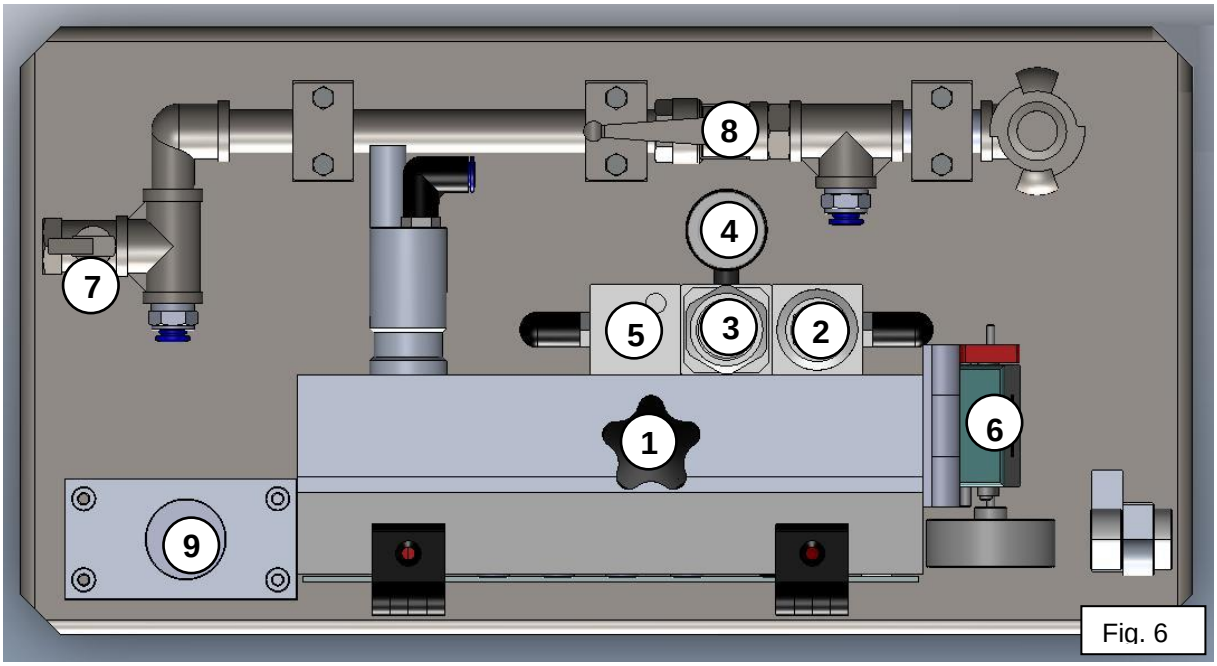


Fig. 6

Connect the air hose with the blower and a compressor.
Make sure that all the connections are properly fitting and secured.

Check, if the upper driving belt is lifted, if it is not, lift it with the knob (1 Fig. 6).

Open the air valve on the compressor. The supplying pressure must not exceed 15 bar.
Both drive engines are being started by pushing the valve (2 Fig. 6).
Use the regulation knob (3 Fig. 6) to set the requested pressure and the cable feeding speed. Initially set pressure should exceed expected working pressure by 2 bars.
Maximum pressure supplied to the pneumatic engines is 7 bar. Exceeding 7 bar pressure may result in damaging the engine.

Unlock the regulation set by lifting up the regulation knob (3 Fig. 6). Then turn it left. Next, turn right to set the pressure. Press in the knob to immobilize it. It is recommend to set up the minimum speed initially.
The pressure of the air supplied to the pneumatic engines is being shown by the manometer (4 Fig. 6).
Make sure that the dropper (5 Fig. 6) supplies about 2 drops of oil per minute. Adjust it, if needed.
Reset the mechanical counter (6 Fig. 6).

Cable blowing

Lower the top driving belt onto the cable and press slightly. Depending on the pressing force and a friction factor between the cable and the belts, the right pushing force is being created.
Too big or too small pressure may result in damaging the cable or wearing off the driving belts.
In order to initiate blowing, start the engines with opening the valve (2 Fig. 6). The cable will be blown into the microduct. Pay attention to the stability of the blowing unit. If required, stabilize the machine with a belt.

The cable should be unwind from the drum without any resistance. If needed, provide manual unwinding.
The blowing speed may be changed by adjusting the air pressure feeding the pneumatic motors.

Depending on the cable stiffness, the pressure can be adjusted up to 7 bar. When the speeds drops significantly, turn on the air supply to the blowing head using the valve (8 Fig. 6).
The manometer (9 Fig. 6) shows the pressure value inside the microduct.

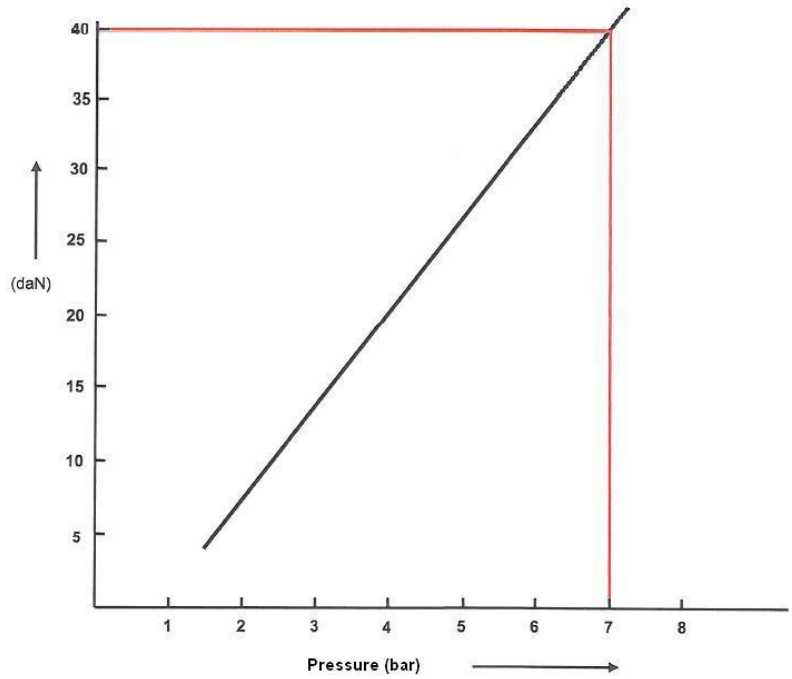
Make sure that nothing gets between the drive belts during operating of the adjusted **unit.**
Under no circumstances should you remove the protective glass!

After blowing session is complete, turn off the pneumatic engine by squeezing the valve (2 Fig. 6), shut down the air supply (8 Fig. 6) and then open the air relief valve (7 Fig. 6).

Technical Data

Cable diameter	2,5-10 mm
Micro ducts diameter	5-16 mm
Engines' power	320 W
Length x Width x Height (machine)	580 x 300 x 320 mm
Length x Width x Height (transport case)	640 x 390 x 410 mm
Weight	20 kg
Weight with equipment	33 kg
Amount of air to engines	3,3 l/s (0,2 m³/min)
Max. air pressure (head)	15 bar
Max. air pressure (engines)	7 bar
Speed	ca. 110 m/min

The correlation between the pushing force and the air pressure in the engines.



Operation

Risk of property damage!

Before every use:

-check the engine's greasing unit
-check the oil level in the tank (3 Fig. 8) and refill it if necessary
-use only ISO V6-10 class oil according to ISO 3948,
-empty tanks (settlers) from the water settled inside

After every use, the entire machine must be thoroughly cleaned, in particular the driving belts, blowing head and the cables.

Follow the operating instructions included in the operating manual!
The machine should be regularly cleaned and adjusted.
The machine may only be operated by a trained personnel!

Risk of injury!

Use only original spare parts.

After performing any repairs or adjustments, check if the bolts and nuts are correctly tightened.
Check all connections and air ducts regularly. Any defects or damages must be repaired immediately.
When changing driving belts, pay special attention to the fastening of the discs.
They must not touch shields and casing.

Greasing and adjusting unit

The lifetime of the engines depends primarily on the correct preparation of the air supply. Thus the machine is equipped with a greasing and adjusting unit consisting of a gear reducer, a filter and a lubricator.
Their condition must be regularly checked.

Air filter
The body of the reducer includes a cartridge filtering the air pollution 50 - 75 μm.
After each use of the machine, remove the water from the tank (settler) (1 Fig. 8).
If necessary, remove the filter cartridge and clean it or replace it.

Reducer
Reducer keeps the air pressure inside the unit at a constant level. The reducer should be dismantled, cleaned and greased at least once a year.

Lubricator
The function of the lubricator (5 Fig. 8) is producing a lubricating mist being. The lubricator should be dismantled, cleaned and greased at least once a year. It is mandatory to keep a required level of oil inside the tank.

During the warranty period, the machine must be subject to mandatory inspection at an authorized service center (after 6-8 months)!

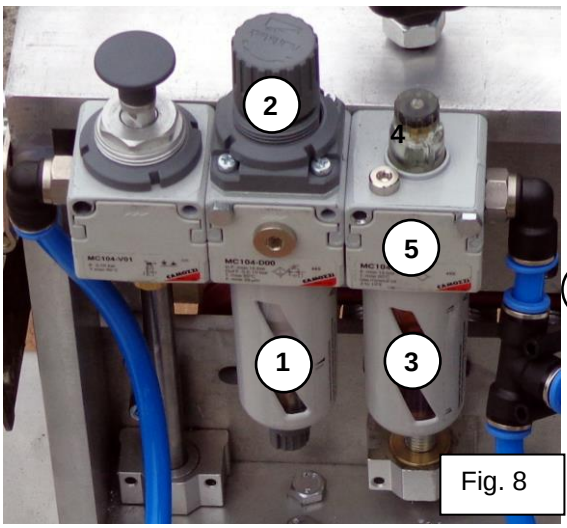


Fig. 8

1) Water settler (tank)
2) Pressure regulator
3) Oil tank
4) Dropper
5) Lubricator

Tensioning the drive belts

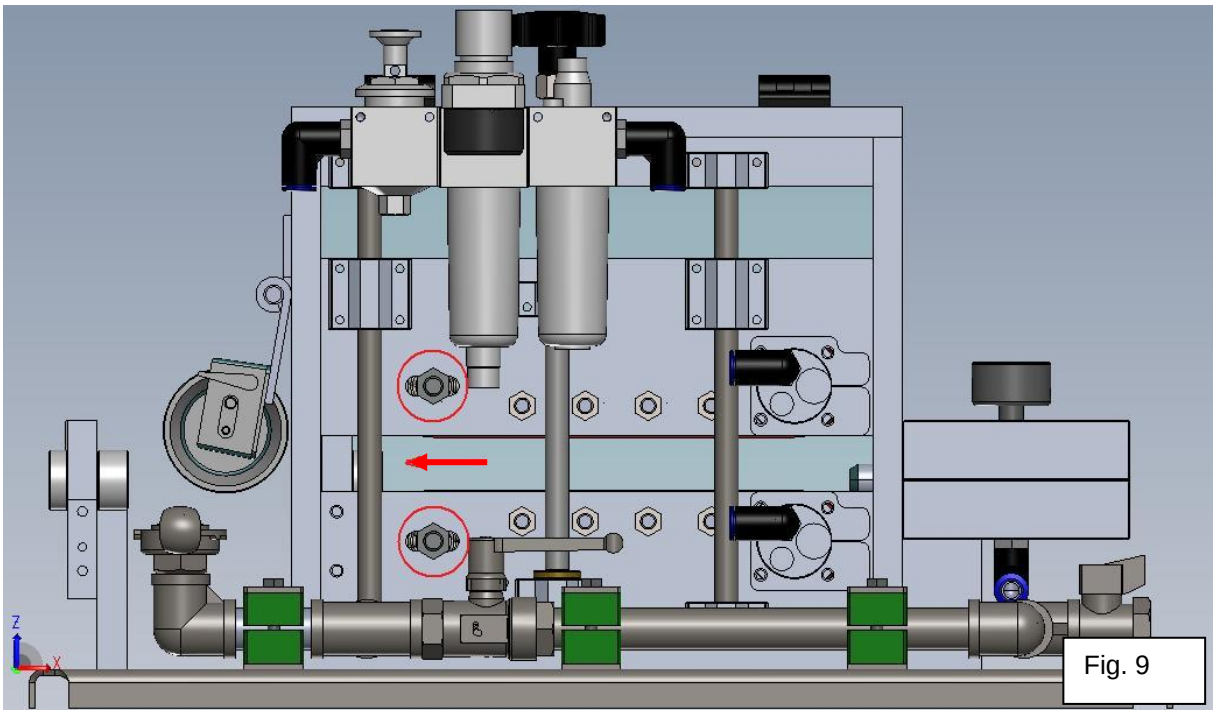


Fig. 9

Always keep the driving belts properly tensioned. Insufficient tensioning may result in falling off the belt, which can lead to both: cable and a belt damage.
In order to tension the belt, loosen the fastening screw and move the roller by tightening the belt. Then tighten the screw.

Pneumatic motor with planetary gear

Pneumatic motor service

The pneumatic engine must not be operated if the pressure exceeds 7 bar. During operation, the engine must be lubricated with oil mist generated inside the greasing unit.
The planetary gear and all bearings must be lubricated during engine's operation. The engine must be subject to mandatory inspection every 1000 operating hours or at least once a year.

Electronic counter (supplementary equipment)

In order to initiate the counting, it is necessary to put the counter wheel in motion.
If the screen is blank, the measurement will start automatically and the display will be switched on.
The counter displays the current distance (DISTANCE [m]) and the average speed (SPEED [m/min]) of blowing. To reset the current data, press the reset button briefly. If you press the button for a longer while, the display will show the total distance counted with this device (this value cannot be reset).
The blowing speed is averaged over time, so after the measuring wheel is stopped, the average speed will be displayed on the screen.

Spare Parts

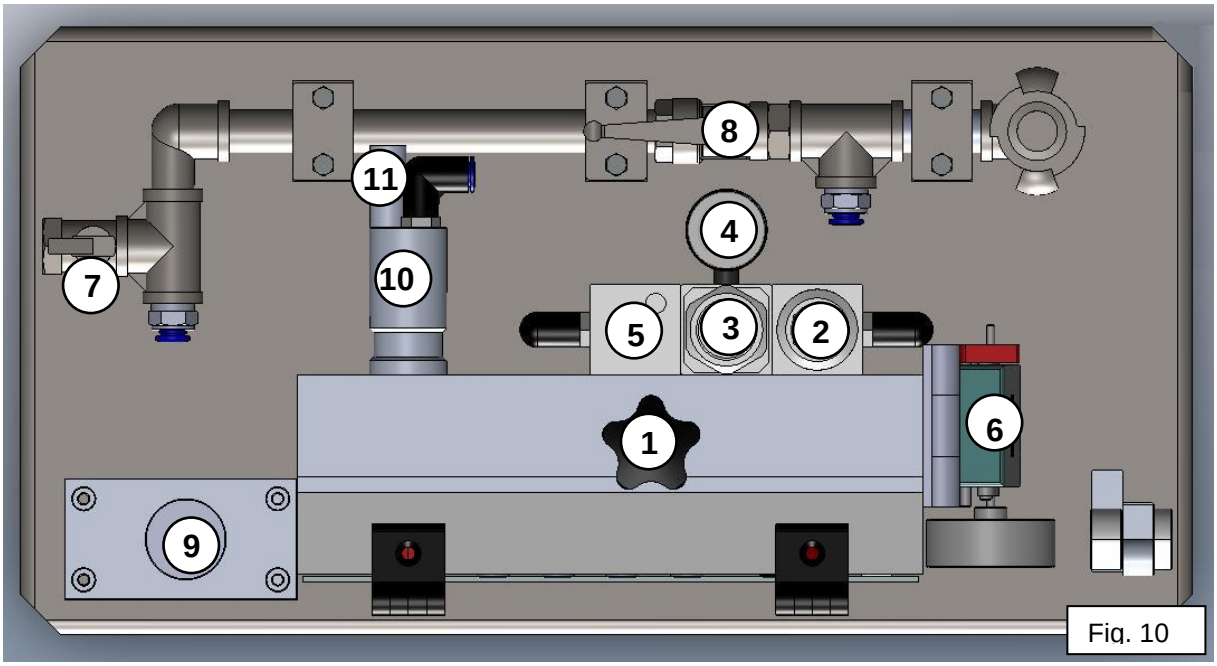


Fig. 10

Item	Name	Catalog No.
1	Knob	B-W POKR
2	Valve	B-W ZPP04
3	Regulation set	B-W ZPP02
4	Engine's manometer	B-W MANOMETR
5	Greasing unit	B-W ZPP03
6	Mechanical counter	B-W LICZNIK MECH
7	Air relief valve	B-W ZAW ODP
8	Valve	B-W ZAW GŁOW
9	Blowing head manometer	B-W MANOMETR2
10	Pneumatic engine motor	B-W SILNIK PNEU
11	Pneumatic engine's silencer	B-W TŁUMIK

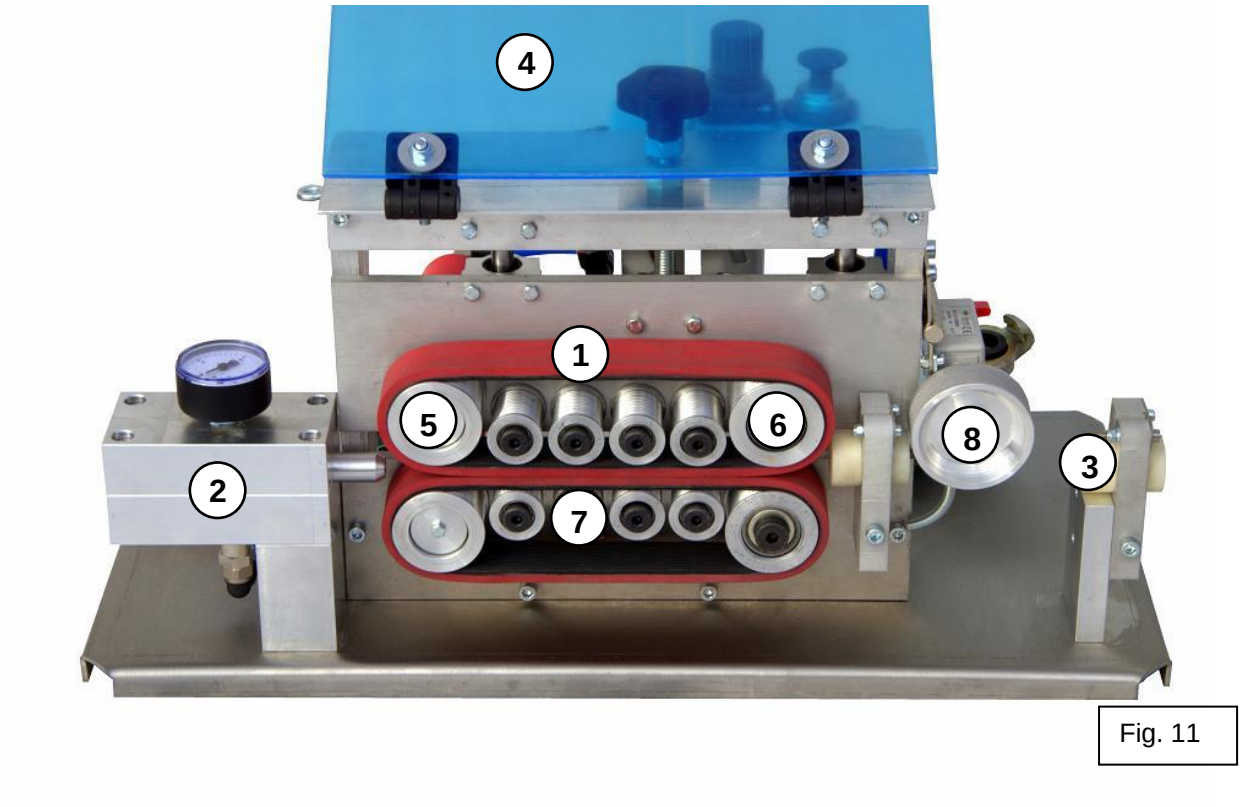


Fig. 11

Item	Name	Catalog No.
1	Driving belt: - with a groove - without a groove	 B-W PASEK 1 B-W PASEK 2
2	Blowing head	B-W GŁOWICA
3	Cable guiding bushing	B-W TUL K
4	Safety shield	B-W PLEXI
5	Engine’s driving wheel	B-W K SILNIK
6	Big driving wheel	B-W K PASYWNE
7	Small driving wheel	B-W K MAŁE
8	Counter's wheel	B-W KÓŁKA

Accessories:

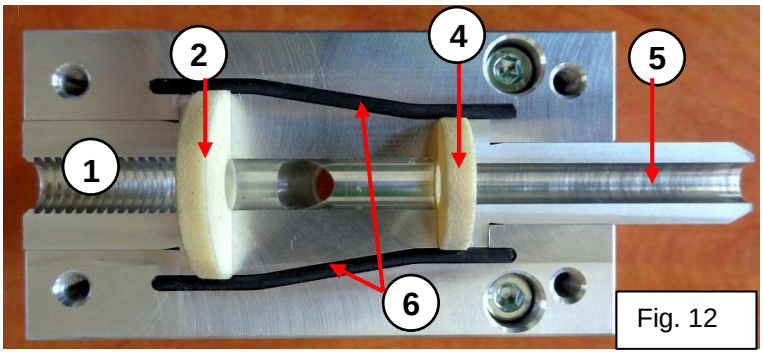


Fig. 12

Item	Name	Catalog No.
1	Microduct bushing: 5 mm 7 mm 10 mm 12 mm 14 mm 16 mm	 B-W MOCOW 4 B-W MOCOW 6 B-W MOCOW 9 B-W MOCOW 11 B-W MOCOW 13 B-W MOCOW 15
2	Microduct gasket: 5 mm 7 mm 10 mm 12 mm 14 mm 16 mm	 B-W USZCZ M 4,5 B-W USZCZ M 6,5 B-W USZCZ M 9,5 B-W USZCZ M 11,5 B-W USZCZ M 13,5 B-W USZCZ M 15,5
4	Cable gasket: 2.5 mm 3.5 mm 4.0 mm 5.0 mm 6.0 mm 7.0 mm 8.0 mm 8.5 mm 9.0 mm 9.5 mm	 B-W USZCZ P 2,5 B-W USZCZ P 3,5 B-W USZCZ P 4 B-W USZCZ P 5 B-W USZCZ P 6 B-W USZCZ P 7 B-W USZCZ P 8 B-W USZCZ P 8,5 B-W USZCZ P 9 B-W USZCZ P 9,5
5	Cable bushing: 4 mm 6 mm 8 mm 10 mm	 B-W PROW 4 B-W PROW 6 B-W PROW 8 B-W PROW 10
6	Head sealing	B-W USZCZ LIN 3,2
7	Allen key	B-W IMBUS