GAMM-BUD®

Blue Dragon Jet®

Operation and maintenance manual

Operating manual

Blue Dragon Jet

Fibre Optic Cable Blowing Machine

BUDGET
BUDGET Plus
BUDGET EasySet
BUDGET Plus EasySet

ISO 9001:2015

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The photos here are published for reference purposes only. The actual appearance of the product may differ from the appearance in the photo.

Refer to the operating manual before using the machine.

The operating manual must always be at the machine!

Contents

Operating manual version history

Version	Date	Comment	Author
1.0.0	2022.07.26	First version of the manual	PK

Introduction

This manual applies to the blowing machines for micro-cables of BUDGET type manufactured by GAMM-BUD Sp. z o.o. The manual contains information on the correct operation of the device.

Before using the machine, strictly refer to the operating manual. Knowledge and acting on the recommendations, comments and proposed solutions contained in it will allow you to avoid damage resulting from improper use of the device and enable long-term and trouble-free operation.

Non-compliance with the instructions in this operating manual and safety notices may result in damage to the equipment and hazardous situations for the operator or other persons.

GAMM-BUD is not liable for damage to the device or for any other damage resulting from failure to comply with the provisions of this manual.

Symbols used in this manual

Information essential for the correct installation and functioning of the device

Information relevant for the safety of persons and the protection of the environment

Warning: danger of moving parts

Device description

The Blue Dragon Jet BUDGET micro cable blowing machine is used to introduce fibre optic cables for microchanneling using compressed air. The fibre optic cable is moved during blowing through the machine feeder and the blowing head, equipped with gaskets.

The two feed wheels ensure that the drive force is transferred to the blown cable. The upper part of the feeder can be raised and lowered using the knob. The lower wheel is driven with a cordless screwdriver. The wheels pressed against the cable force its forward movement.

The pushing force transmitted by the wheels to the cable is assisted by a stream of compressed air introduced into the microchannel by the blowing head.

The blowing speed can be adjusted by the speed of the cordless screwdriver. In addition, the correct setting of the screwdriver clutch protects the cable against breaking in the event of a sudden stop of the cable.

The machine is available in 4 different versions depending on the customer's needs:

1) **Blue Dragon Jet Budget** - basic version of the machine
2) **Blue Dragon Jet Budget Plus** - machine equipped with a split head
3) **Blue Dragon Jet Budget EasySet** - basic version of the machine equipped with a cordless screwdriver
4) **Blue Dragon Jet Budget Plus EasySet** - a machine equipped with a split head and a cordless screwdriver

Application of the device as intended

In standard conditions, BDJ BUDGET is used for blowing cables at a speed of up to 60 m/min at a distance of up to 700 m. Range of micro-cables to be blown:

	Budget	Budget Plus	Budget EasySet	Budget Plus EasySet
Cable diameters	0.5 - 8 mm	0.5 - 6 mm	0.5 - 8 mm	0.5 - 6 mm
Micro tubes diameters	5 - 16 mm	5 - 10 mm	5 - 16 mm	5 - 10 mm
Split head	NO	YES	NO	YES

Using this appliance to blow other types of micro-cables will void the warranty and may cause irreparable damage.

All activities related to the disassembly, assembly and service of the device should be carried out with the power switched off and by qualified personnel or service of the manufacturer.

Read the operating instructions of the device carefully and pay particular attention to the safety instructions before starting. **In addition to the instructions given in the manual, general occupational health and safety regulations must also be observed.**

Device construction and specifications

Fig. 1 Illustrative photo of the Blue Dragon Jet Budget blowing machine (all equipment)

Fig. 2 Illustrative photo of the Blue Dragon Jet Budget Plus blowing machine (all equipment)

Fig. 3 Illustrative photo of the Blue Dragon Jet Budget EasySet blowing machine (all equipment))

Fig. 4 Illustrative photo of the Blue Dragon Jet Budget EasySet blowing machine

Fig. 5 Illustrative photo of the Blue Dragon Jet Budget Plus EasySet blowing machine (all equipment)

Fig. 6 Illustrative photo of the Blue Dragon Jet Budget Plus EasySet blowing machine

	Budget	Budget Plus	Budget EasySet	Budget Plus EasySet
Cable diameters	0.5 - 8 mm	0.5 - 6 mm	0.5 - 8 mm	0.5 - 6 mm
Micro tubes diameters	5 - 16 mm	5 - 10 mm	5 - 16 mm	5 - 10 mm
Split head	NO	YES	NO	YES
Screwdriver included	NO	NO	YES	YES
Dimensions of the machine L x W x H	260 x 100 x 140 mm	260 x 100 x 140 mm	260 x 100 x 140 mm	260 x 100 x 140 mm
Dimensions of the box L x W x H	445 x 400 x 155 mm	445 x 400 x 155 mm	445 x 400 x 155 mm	445 x 400 x 155 mm
Weight	2 kg	2 kg	2 kg	2 kg
Weight with accessories	8 kg	8 kg	10 kg	10 kg
Max. air pressure. (head)	15 bar	15 bar	15 bar	15 bar
Speed	ca. 60 m/min.	ca. 60 m/min.	ca. 60 m/min.	ca. 60 m/min.

Construction and description

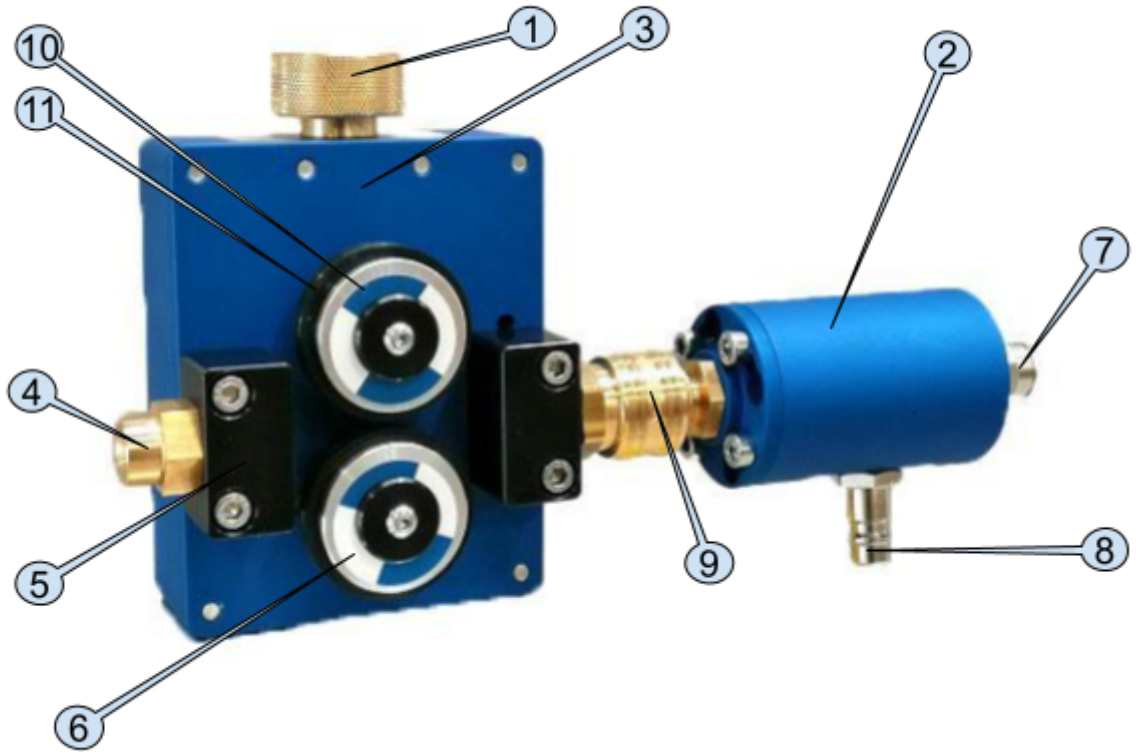


Fig. 7 Front view of the BUDGET MACHINE

1. *top roller height adjustment knob,*
2. *blowing head,*
3. *feeder for the blowing machine,*
4. *cable inlet sleeve,*
5. *fastening cube of the feeder sleeve,*
6. *low roller of the feeder,*
7. *micro tube quick coupling,*
8. *pneumatic connector of the blowing head,*
9. *connection between the feeder and the blowing head,*
10. *top roller of the feeder,*
11. *rubber band on the feeder roller*

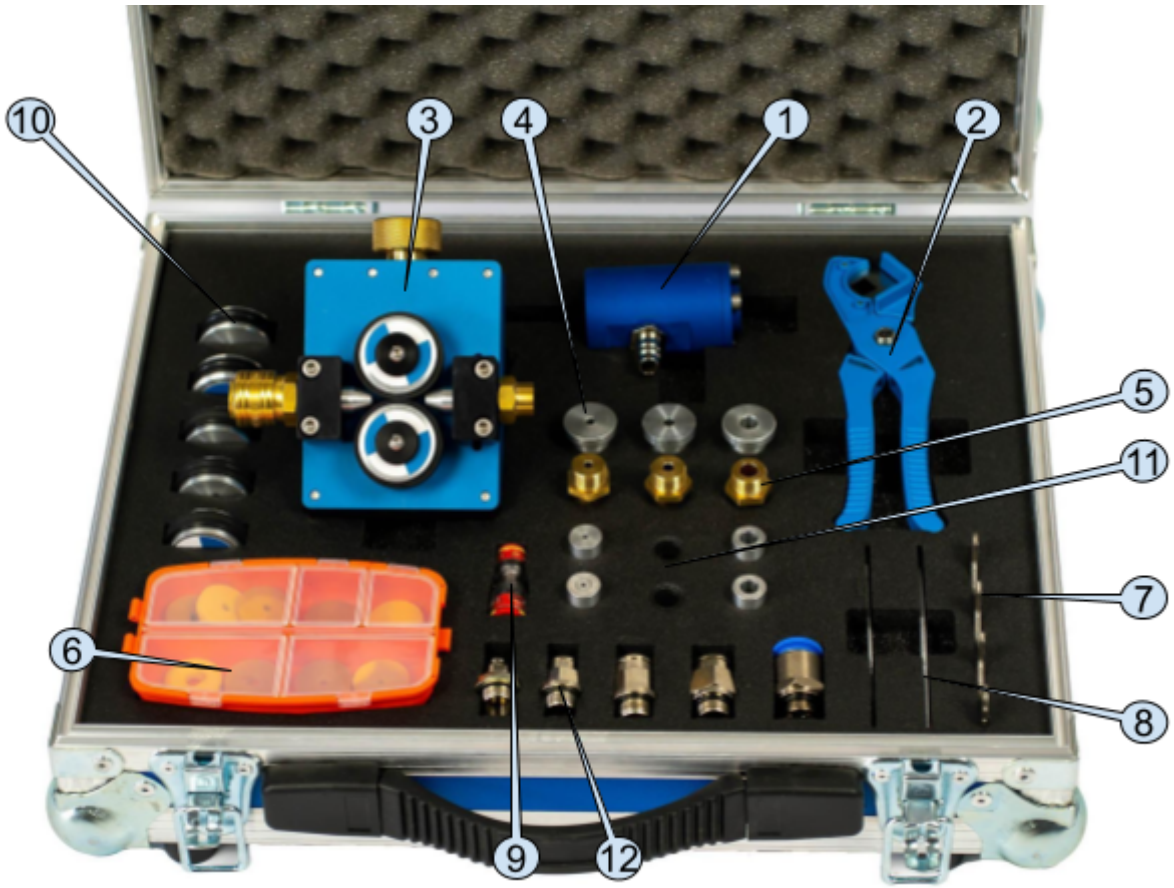


Fig. 8 Equipment of the Blue Dragon Jet BUDGET machine

1. *blowing head,*
2. *micro tube cutter,*
3. *feeder for the blowing machine,*
4. *insert for the blowing head,*
5. *sleeve for introducing the cable into the blowing head,*
6. *seals set,*
7. *universal wrench,*
8. *allen wrenches to operate the machine,*
9. *reducing nipple 10/7 mm,*
10. *replaceable rollers of the feeder,*
11. *replaceable cable guide sleeves in the drive,*
12. *micro tubes quick couplings,*

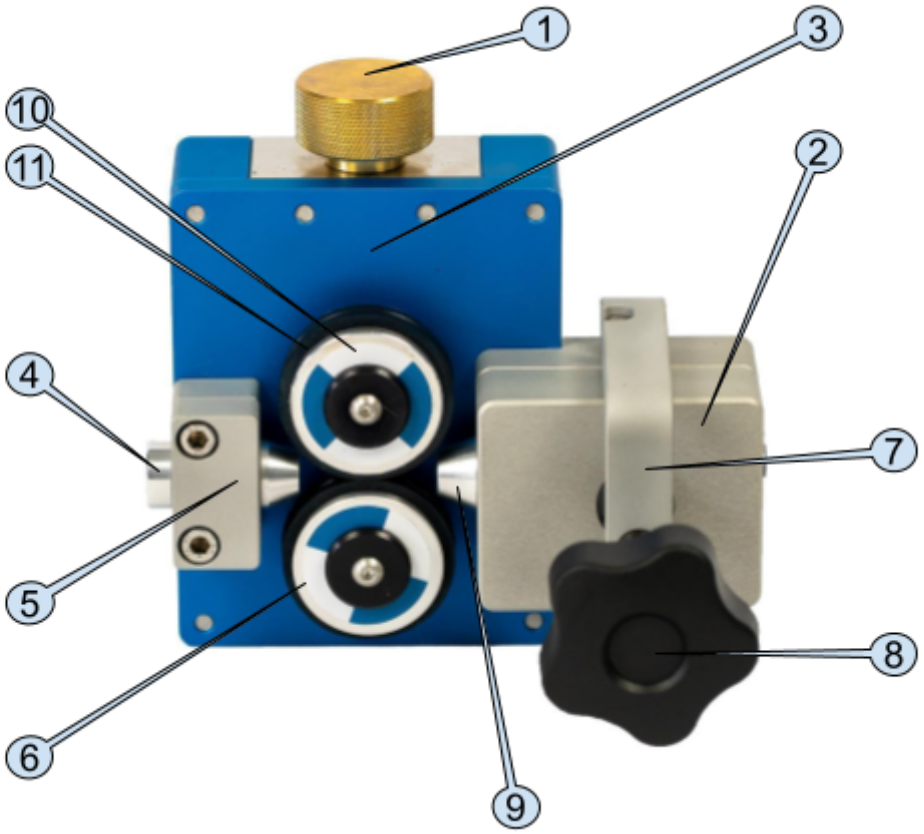


Fig. 9 Front view of the Plus BUDGET machines

1. *top roller height adjustment knob,*
2. *blowing head,*
3. *feeder for the blowing machine,*
4. *cable inlet sleeve,*
5. *fastening cube of the feeder sleeve,*
6. *low roller of the feeder,*
7. *head pressure channel,*
8. *head pressure channel knob,*
9. *replaceable sleeve for introducing the cable into the head,*
10. *top roller of the feeder,*
11. *rubber band on the feeder roller*

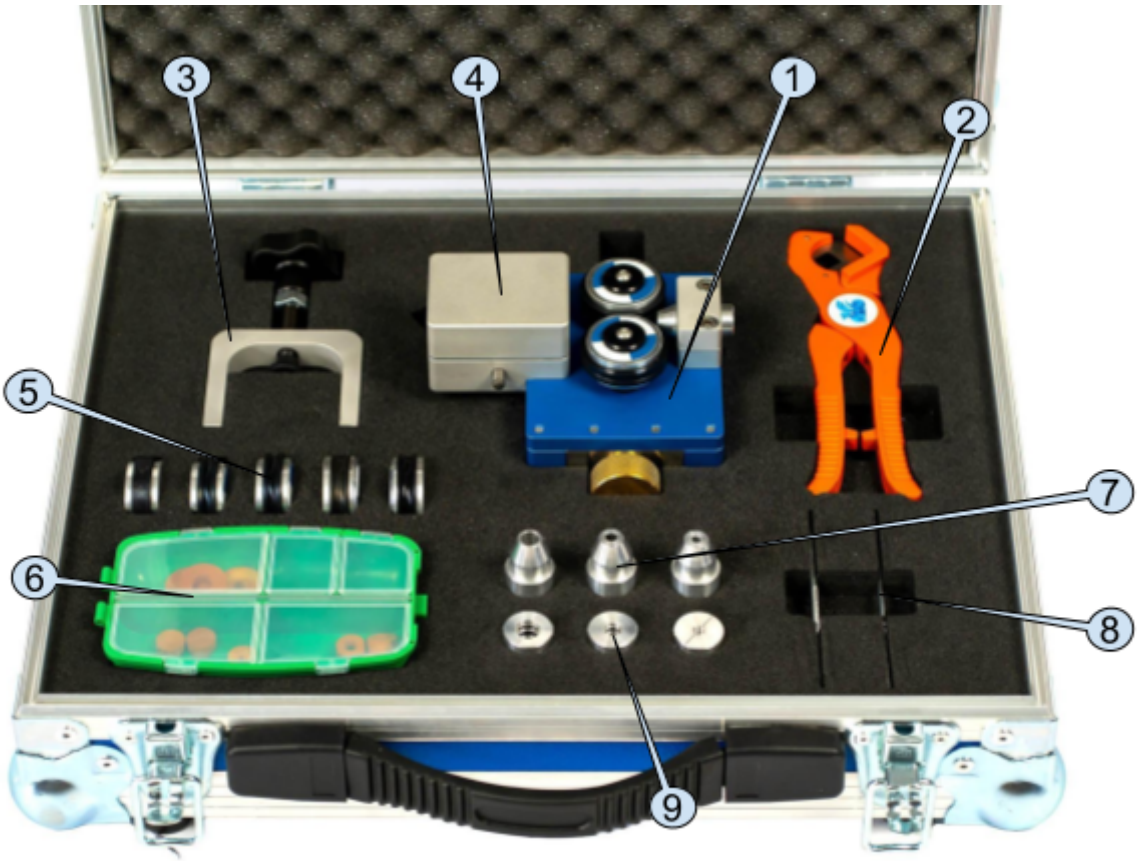


Fig. 10 Equipment of the Blue Dragon Jet BUDGET machine

1. *feeder for the blowing machine,*
2. *micro tube cutter,*
3. *blowing head pressure channel,*
4. *blowing head,*
5. *replaceable rollers of the feeder,*
6. *seals set,*
7. *replaceable inserts for the head,*
8. *allen wrenches to operate the machine,*
9. *micro tube holders*

Operational safety

It is not allowed to start or use the device if any component or part is malfunctioning or damaged.

Only trained personnel may operate this machine.

- The space around the machine is the workplace of the machine operator.
- The person using the device may not be under the influence of alcohol or other intoxicants.
- Do not operate the device in the vicinity of flammable, toxic and highly corrosive substances.
- Replace damaged components with new, original ones.
- All activities related to the disassembly and assembly of the device should be carried out with the power off.
- The air supply temperature of the machine should be in the range of 20-30 degrees Celsius, and the air humidity in the range of 40-60%. In other cases, use a radiator and an air dryer.

Operating the BDJ Budget head

The BDJ Budget blowing machine can blow micro-cables into micro tubes with diameters of 5, 10, 12, 14, 16 mm, and by applying a reduction also to micro tubes with a diameter of 7 mm. Before starting to blow, the blowing head must be properly configured by installing the appropriate micro tube connector.

Fig. 11 Micro tubes connectors of the Blue Dragon Jet BUDGET machine

Use the supplied wrench to install the required connector.

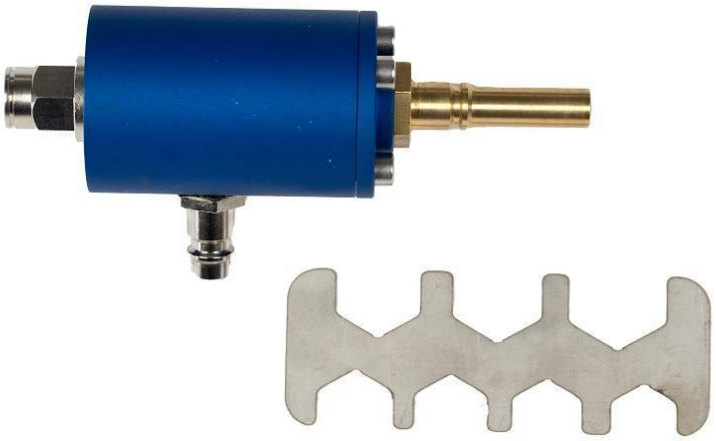


Fig. 12 Blue Dragon Jet BUDGET head with installed micro tube connector and outer sleeve leading the cable from the drive

An inner sleeve must be installed inside the head, the inner bore of which must be aligned with the blown-in cable. Properly selected sleeve should allow free movement of the cable and at the same time the clearance between the cable and the sleeve should not be too large. Too much clearance between the cable and the sleeve can lead to damage to the cable during blowing (the cable can be broken).

To install the inner sleeve, unscrew the head with the supplied 4mm allen wrench.

Fig. 13 Installing the inner sleeve of the BDJ Budget head

After installing the inner sleeve, select the seal under the cable. Properly selected seal should move freely over the cable without resistance. The seal should be placed on the inner sleeve.

Fig. 14 Installing the cable seal in the of the BDJ Budget head

Then install the head cover and tighten it securely with a 4mm allen wrench. A suitable outer sleeve must also be installed to guide the cable from the drive to the blowing head. The bore in the outer sleeve should be suitable for the inner sleeve. To facilitate the operation of the machine, all sleeves are arranged in groups in the case according to their use.

Fig. 15 Sleeves arranged in groups depending on the diameter of the cable

Operation of the BDJ Budget Plus head

The BDJ Budget PLUS blowing machine can blow micro cables into micro tubes with diameters of 5, 7, 10 millimetres.

Before starting to blow, the blowing head must be properly configured by installing the appropriate sleeves and seals.

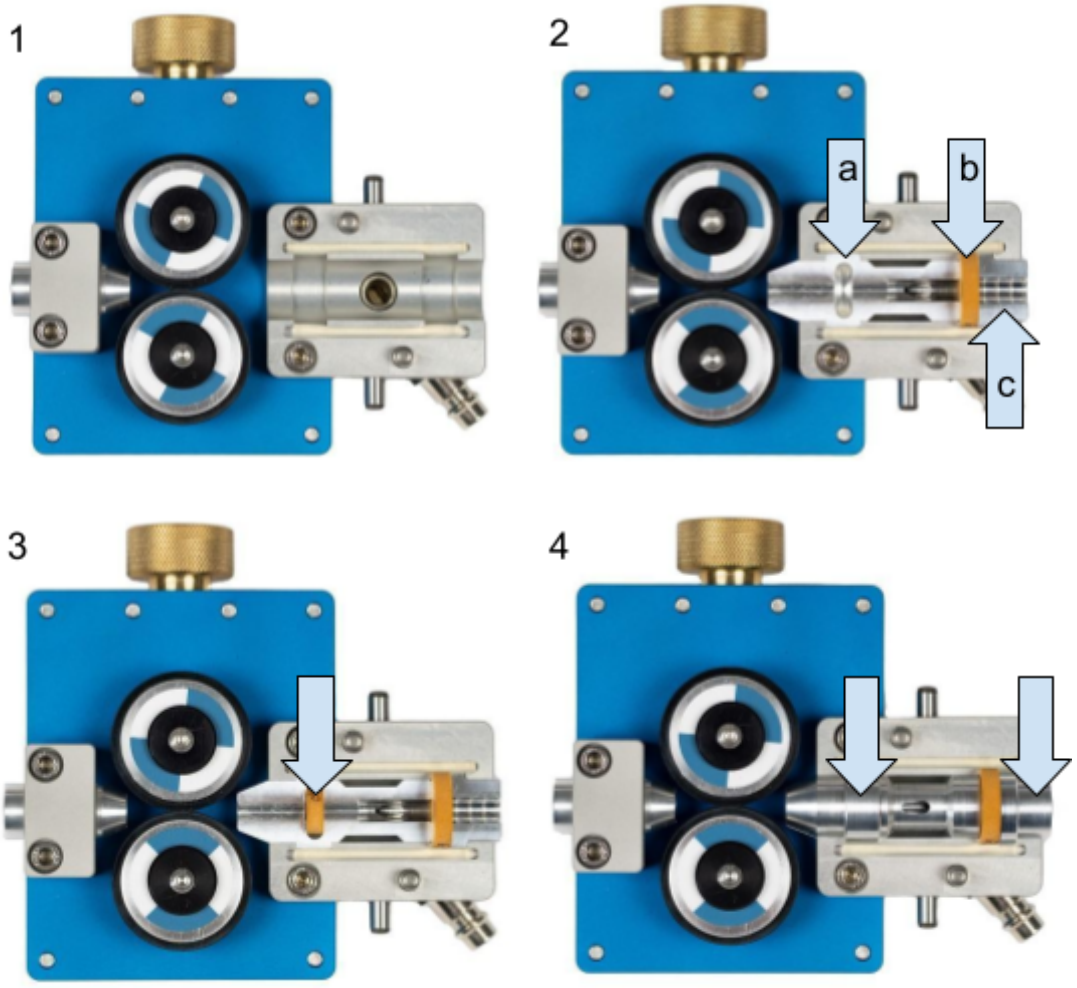


Fig. 16 Installation of sleeves and seals inside the BDJ Budget Plus head

Inside the head, an inner sleeve leading the cable to the feeder (Fig. 16.2a), the inner hole of which should be adjusted to the blown-in cable, must be installed. Properly selected sleeve should allow free movement of the cable and at the same time the clearance between the cable and the sleeve should not be too large. Too much clearance between the cable and the sleeve can lead to damage to the cable during blowing (the cable can be broken). A suitable micro tube holder must also be installed (Fig. 16.2c). Between the sleeves, the seal matched to the micro tube must be applied (Fig. 16.2b).

After installing the inner sleeve and the micro tube holder, select the seal under the cable. Properly selected seal should move freely over the cable without resistance. The seal should be placed in the inner sleeve (Fig. 16.3).

If the cable is blown in two directions, the seal must be cut. Then you can put it on and off at any time.

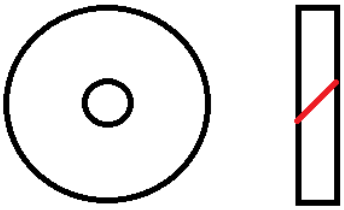


Fig. 17 Optimal way of cutting the seal at an angle of 45 degrees to the middle of the seal.

Finally, the other half of the inner sleeve and the micro tube holder should be installed (Fig. 16.4). Then close the head with the top cover and press down with the set screw so that the head is tight.

Operation of the drive

Before blowing, the appropriate drive wheels must be selected. The set includes wheels with a 2, 4, 6 mm wide groove and one pressure wheel without a groove.

To replace the drive wheel, use the 2.5mm allen wrench provided to unscrew the screw, remove the drive lock, and replace the drive wheel.

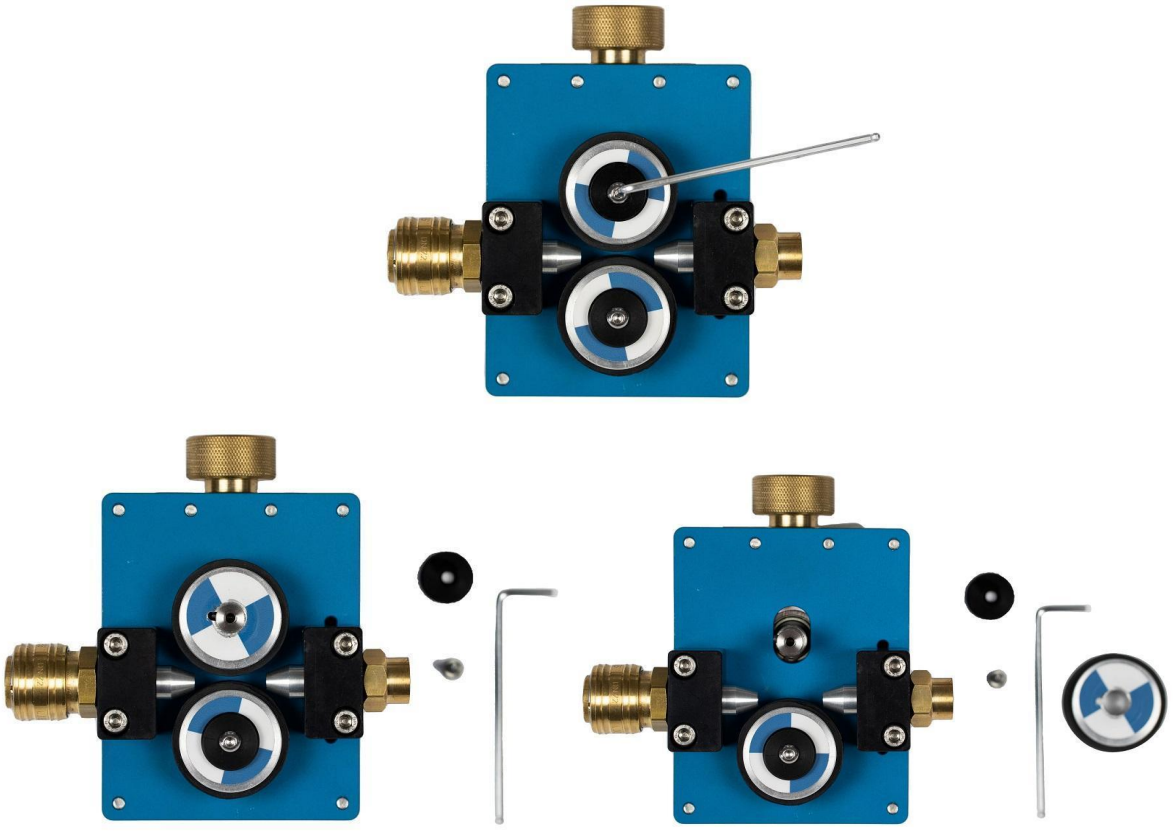


Fig. 18 Replacing the drive wheels

The next step in setting up the drive for the BDJ Budget machine is to select the cable guide sleeves at the drive wheels. Here, the sleeves arranged in groups visible in Figure 15 must be used.

The supplied wrench unscrews the cable routing on both sides and the connector connecting the drive to the blowing head. Then insert the appropriate cable guide sleeves at the drive wheels and fasten the elements that have been unscrewed.

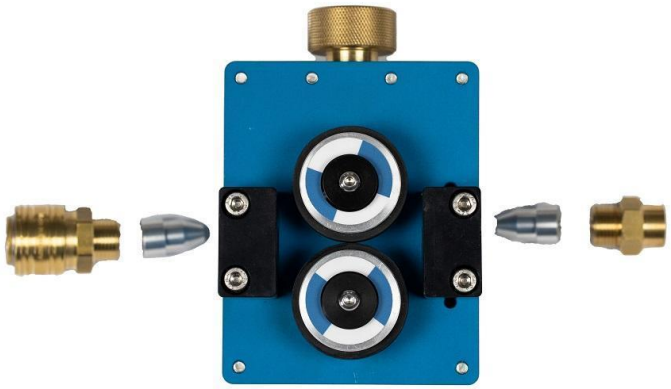


Fig. 19 Installation of cable guide sleeves at the drive wheels

Blowing the cable

- Before starting to blow, the head and the blowing machine drive must be properly configured as described above (operation of the head, operation of the drive).
- Then introduce the cable into the drive through the drive rollers and slide it into the head. Insert a few meters of cable into the micro tube. Connect the pneumatic hose to the head, close the valve on the hose and connect the hose to the compressor.
- Lower the top drive roller onto the cable and press lightly. Depending on the clamping force and the coefficient of friction between the cable and the rubber bands on the drive wheels, a suitable force will be created to push the cable. Too strong or too weak pressure can damage the cable or cause too fast wear of the drive rollers.
- In order to start blowing, a cordless screwdriver must be mounted to the lower drive roller. Then start the screwdriver (pay attention to the correct rotation, clockwise) and the cable will be pushed into the covering tube. Pay attention to the stable position of the machine, if necessary, fix it with the safety belt. The cable from the drum should unwind without any resistance. If necessary, manually assist unwinding.
- Gradually open the air valve on the compressor. The supply pressure may not exceed 15 bar**.** With a significant decrease in cable speed, gradually turn on the air supply to the blowing head with the valve. It is recommended to increase the pressure gradually by approximately 1-2 bar.
- The blowing speed can be adjusted by the rotational speed of the cordless screwdriver. To assist the blowing process, gradually increase the air pressure applied to the blowing head.
- When blowing is complete, turn off the cordless screwdriver and close the air supply to the blowing head.

Pay attention to the stable position of the machine, if necessary, fix it with the safety belt.

Special care must be taken to ensure that nothing gets between the drive rollers during operation.

Applying all pressure to the blowing head at the beginning will result in a backflow that can push the cable out of the machine.

The cable from the drum should unwind without any resistance. If necessary, manually assist unwinding.

When blowing is complete

- turn off the cordless screwdriver,
- close the air supply to the blowing head,
- bleed the blowing head with the tube connected to it,
- wait until the pipe connected to the blowing head is vented.

Before opening the blowing head, make sure that there is no air pressure inside!

Transport

The device must be transported in the provided transport box. The total weight of the device is 8 kg (10 kg for EasySet seta). Lift the device using the aluminium housing.

Device maintenance

Before each use

- After each use, clean the entire machine, especially the drive rollers, the head and the hoses thoroughly with compressed air
- If the machine worked in the rain, it should be thoroughly wiped and cleaned

Do not clean the device with a direct stream of water, solvents and corrosive substances, this may cause permanent damage to the device.

List of tools supplied with the machine

- LIST OF ALLEN WRENCHES
- MICRO TUBES KNIFE/CUTTER

RISK OF INJURIES! Residual risk

After carrying out any repairs or adjustments, check the correct tightening of the bolts and nuts.

Check all connections and air lines regularly, repair any damage immediately.

When replacing the drive rollers, pay special attention to the wheel mounting so that they do not rub against the covers or housing.

During the warranty period, the machine must be subjected to a mandatory inspection by an authorized service (after a period of 12 months or 1000 working hours)!

The possibility of identification of the machine on the basis of the nameplate is the condition to make warranty repairs. Removing the nameplate results in the inability to identify the machine and not accepting the costs of warranty repair!

Special care must be taken to ensure that nothing gets between the drive rollers during operation. Rotating elements pose a health hazard.

Noise emission

The machine operator should wear ear protection. We recommend that the operator should wear ear muffs even if the noise is below the specified value.

The risk of noise and hearing damage is related to the intensity of the noise source and the duration of exposure. The risks related to noise should be assessed on a case-by-case basis, taking these two factors into account. Measures must be taken to prevent hearing damage in accordance with applicable health and safety regulations.

Personal protective equipment

The machine operator should be equipped with the following personal protective equipment:

1) Hearing protection - ear protection
2) Limb protection - safety footwear
3) Protective clothing
4) Hands protective equipment

Diagnosis and removing failures

Repairs should be commissioned to the service of GAMM-BUD Sp. z o.o. The most common failures, malfunctions and their causes are described below, which can be checked and possibly removed by the user of the device. Only factory spare parts or those recommended by the manufacturer should be used for replacement.

Problem:	Problem description:	Solution:
1	Leaky head	- check seals size - select a smaller cable seal - check BDJ Budget Plus head linear seals
2	I cannot get pressure on the head	- check head tightness - use a more efficient compressor
3	The cable is pushed out of the head at the beginning of blowing	- do not apply pressure to the head at the start of blowing - feed with the feeder only
4	The feeder does not grasp the cable	- check the condition of the feeder rollers - replace the roller tires if they are worn out
5	The tyre on the roller wears out too quickly	- reduce the pressure on the cable. - use harder tires

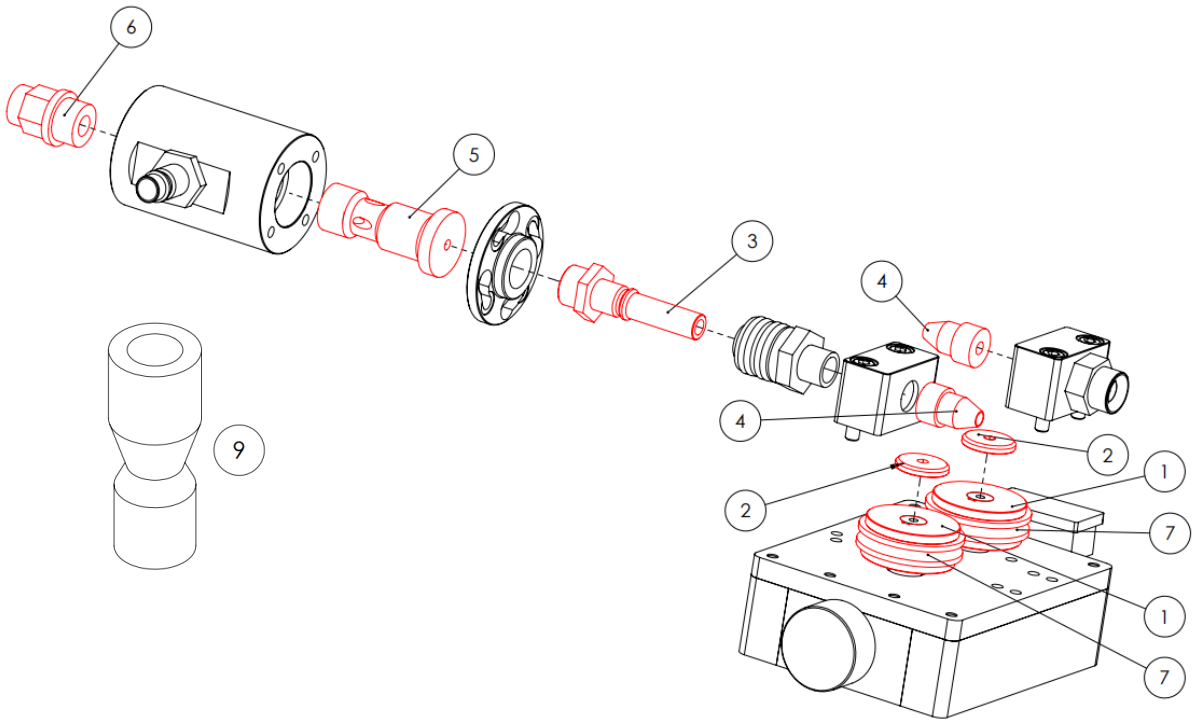
Warranty and liability of the manufacturer

The warranty period is 12 months. The basis for the warranty is the purchase invoice and the visible serial number of the device on the nameplate. It is possible to extend the warranty by another 12 months in the event of a paid warranty inspection, which must take place during the warranty period. The maximum duration of the warranty may not exceed 36 months.

Unless expressly stated otherwise, the general terms of sale and delivery of GAMM-BUD Sp. z o.o. apply. Any liability for damage to property and persons is excluded if it resulted from one or more of the following reasons:

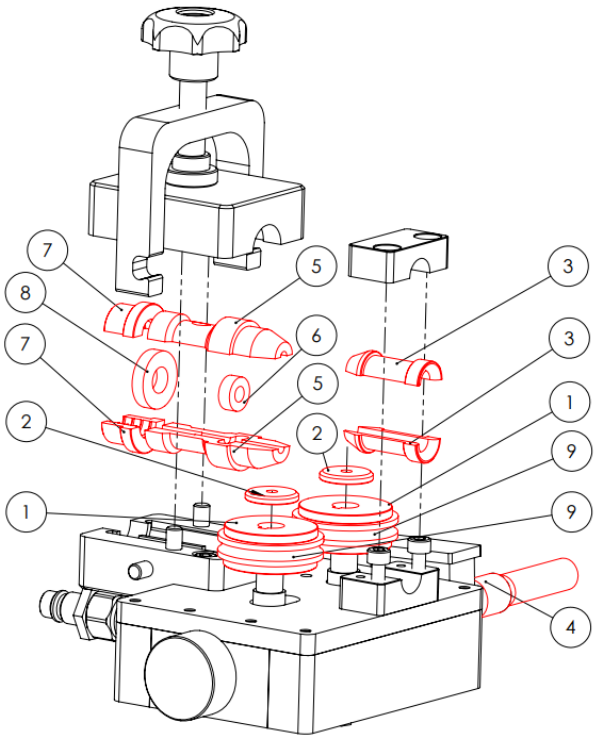
- **using the machine for purposes other than the intended use or not in accordance with the operating manual**
- **incorrect assembly, commissioning, operation or service of the machine**
- **working on the machine with damaged or incorrectly installed or without protective covers**
- **independent design changes or incorrect operating parameters of the machine**
- **admission to excessive wear of machine parts**
- **improperly performed repairs or operation of the machine**
- **accidents due to external factors or force majeure.**
- **lack of the nameplate allowing to identify the machine**

Spare parts



Id	Code	BUDGET
1.1	BUD-ROL	Aluminum roller for 0/2/4 mm rubber band
1.2	BUD-ROL-WYS-RAN	Aluminum roller for 6mm rubber band
2	BUD-BLO-KOL	Drive wheel lock (1 shield with 1 screw)
3.1	BUD-SZY-TOC-4	Turned quick coupler- 4
3.2	BUD-SZY-TOC-5	Turned quick coupler- 5
3.3	BUD-SZY-TOC-8.3	Turned quick coupler- 8.3
4.1	BUD-TUL-PRO-2	Cable leading bushing-2
4.2	BUD-TUL-PRO-5	Cable leading bushing-5
4.3	BUD-TUL-PRO-8.3	Cable leading bushing-8.3
5.1	BUD-GLO-WST-4	Blowing head insert -4
5.2	BUD-GLO-WST-5	Blowing head insert -5
5.3	BUD-GLO-WST-8.3	Blowing head insert -8.3
6.1	SZY-DO-MIK-PNE-5MM-G1/4	Quickcoupling to microduct 5 mm
6.2	SZY-DO-MIK-PNE-10MM-G3/8	Quickcoupling to microduct 10 mm
6.3	SZY-DO-MIK-PNE-12MM-G3/8	Quickcoupling to microduct 12 mm
6.4	SZY-DO-MIK-PNE-14MM-G3/8	Quickcoupling to microduct 14 mm
6.5	SZY-DO-MIK-PNE-16MM-G3/8	Quickcoupling to microduct 16 mm
7.1	BUD-GUM-PLA	Rubber band-flat for drive roller
7.2	BUD-GUM-FI2-R1	Rubber band with 2 mm groove for drive roller
7.3	BUD-GUM-FI4-R2	Rubber band with 4 mm groove for drive roller

7.4	BUD-GUM-FI6-R3	Rubber band with 6 mm groove for drive roller
8.1	UGD-D22X5-4.5	Microduct seal 4.5 mm to BDJ BUDGET PLUS
8.2	UGD-D22X5-6.5	Microduct seal 6.5 mm to BDJ BUDGET PLUS
8.3	UGD-D22X5-9.5	Microduct seal 9.5 mm to BDJ BUDGET PLUS
9	ZLA-RED-10-7	Microduct's adaptor /reduction 10/7 mm



Id	Code	BUDGET PLUS
1.1	BUD-ROL	Aluminum roller for 0/2/4 mm rubber band
1.2	BUD-ROL-WYS-RAN	Aluminum roller for 6mm rubber band
2	BUD-BLO-KOL	Drive wheel lock (1 shield with 1 screw)
3	BUD-GLO-DZI-TUL-WPR-KAB	Cable entry sleeve-half BUDGET PLUS
4	BUD-SRU-MOC-MAS-M12	BUDGET- M12 mounting bolt (optional)
5.1	BUD-GLO-DZI-WST-4	Blowing head bushing-half-4 to BDJ BUDGET PLUS
5.2	BUD-GLO-DZI-WST-5	Blowing head bushing-half-5-to BDJ BUDGET PLUS
5.3	BUD-GLO-DZI-WST-8.3	Blowing head bushing-half-8.3-to BDJ BUDGET PLUS
6.1	UGD-D13X5-1	Cable seal 1 mm to BDJ BUDGET PLUS
6.2	UGD-D13X5-2	Cable seal 2 mm to BDJ BUDGET PLUS
6.3	UGD-D13X5-3	Cable seal 3 mm to BDJ BUDGET PLUS
6.4	UGD-D13X5-4	Cable seal 4 mm to BDJ BUDGET PLUS
6.5	UGD-D13X5-5	Cable seal 5 mm to BDJ BUDGET PLUS
6.6	UGD-D13X5-6	Cable seal 6 mm to BDJ BUDGET PLUS
7.1	BUD-GLO-DZI-TUL-MOC-RUR-5	Microduct handle-half -5 mm to BDJ BUDGET PLUS

7.2	BUD-GLO-DZI-TUL-MOC-RUR-7	Microduct handle-half -7 mm to BDJ BUDGET PLUS
7.3	BUD-GLO-DZI-TUL-MOC-RUR-10	Microduct handle-half -10 mm to BDJ BUDGET PLUS
8.1	UGD-D22X5-4.5	Microduct seal 4.5 mm to BDJ BUDGET PLUS
8.2	UGD-D22X5-6.5	Microduct seal 6.5 mm to BDJ BUDGET PLUS
8.3	UGD-D22X5-9.5	Microduct seal 9.5 mm to BDJ BUDGET PLUS
9.1	BUD-GUM-PLA	Rubber band-flat for drive roller
9.2	BUD-GUM-FI2-R1	Rubber band with 2 mm groove for drive roller
9.3	BUD-GUM-FI4-R2	Rubber band with 4 mm groove for drive roller
9.4	BUD-GUM-FI6-R3	Rubber band with 6 mm groove for drive roller