Valid from 01-01-2025 | Rev. 1.1
From Serial No. 9061.1001

NanoFlow RAPID

For fiber dimension 0.8-4.5 mm

Operating manual

Responsible manufacturer: Fremco A/S
Machine: NanoFlow RAPID

This is the original operating manual for NanoFlow RAPID from Fremco.

FREMCO A/S
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3-YEAR EXTENDED WARRANTY

The most expensive machine is the one *not* in use.

Choosing a fiber blowing machine is a big decision and ensuring its durability is crucial for your business. Fremco now offers an exclusive **3-year extended warranty included in the purchase of your Fremco fiber blowing machine**. This warranty gives you peace of mind, knowing that your fiber blowing investment is protected for the long run.

To keep your extended warranty valid, all you must to do is schedule a yearly machine service at your nearest authorized Fremco Service center. On the machine, there is a service sticker reminding you of the machine's last service. Failing to do so will invalidate the extended warranty.

Regular maintenance ensures that your machine runs smoothly and efficiently, preventing potential issues before they become problems. It is a small step that guarantees you getting the most out of your equipment without any unexpected costs.

How to get your machine serviced?

Request a service at the nearest Fremco service center:

SERVICE CENTERS

Important!

Due to possible discharging of batteries please follow the guidelines below.

Please dismount battery from charger when charging is finished.

Please do not insert battery into charger when transporting or storing them.

1. Introduction

Original instructions

These instructions are Fremco A/S' original instructions for the NanoFlow RAPID (hereafter called the machine).

Purpose

The purpose of these instructions is to ensure correct installation, use, handling and maintenance of the machine.

Accessibility

The instructions are to be kept in a location known to the staff and must be easily accessible for the operators and maintenance personnel.

Knowledge

It is the duty of the employer (the owner of the machine) to ensure that everybody operating, servicing, maintaining, or repairing the machine reads and understands the instructions. As a minimum, they should read the part(s) relevant to their work.

In addition to this, everybody operating, servicing, maintaining, or repairing the machine is obliged to seek out information in the operating manual when needed.

2. General

2.1. Manufacturer

The machine is manufactured by:

Company name:	Fremco A/S
Company address:	Ellehammervej 14
	DK-9900 Frederikshavn

2.2. The machine's designation

The machine's complete designation is NanoFlow RAPID.

2.3. Machine plate

The machine plate is situated on the bottom of the machine:

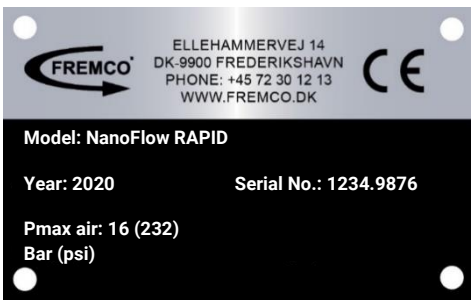


Figure 1: Location of machine plate.

UK CA

Figure 2: Location of the UKCA sticker is placed next to the machine plate.

3. Technical specifications

These specifications cover the NanoFlow RAPID fiber blowing machine.

NanoFlow RAPID

Manufacturer

Fremco A/S
Ellehammervej 14
9900 Frederikshavn
Denmark

Item No.	101-240325001
Fiber diameter	0.8-4.5 mm
Duct diameter	3-12.7 mm
Blowing distance[1]	Up to 1200 m (3940 ft)
Blowing speed[1]	Up to 125 m/min. (410 ft/min)
Pushing force	0-2 kg
Maximum air pressure	Max. 16 bar (230 psi)
Recommended airflow[2]:	Min. 200 l/min. (7.1 cfm)
Ambient temperature	0-40°c (32-104°f)
Clamping force on cable	14-29N
Weight (without battery)	2.9 kg (6.2 lbs)
Weight (Configured)	3.5 kg (7.7 lbs)
Weight (with transport box + parts)	10.8 kg (23.8 lbs)
Length	212 mm (8.3")
Width	104 mm (4.1")
Height	139 mm (5.5")

[1] Depending on type and quality of fiber and microduct
[2] Air must be filtered, cooled and dried

4. Safety instructions

Read and understand this operating manual before operating the NanoFlow RAPID. Follow all safety instructions. Failure to follow the instructions may lead to damage on the machine and mild to severe personal injury.

- Make sure to disconnect the machine from the air compressor and dismount the battery before any kind of adjustment and maintenance takes place.

- Use only batteries that fit NanoFlow RAPID. Do not use damaged batteries.

WARNING: The use of damaged battery or charger may lead to electric shock, superheating or fire.

- Never wear loose Hair, Jewellery, or clothing.

WARNING: Loose Hair, Jewellery and clothing may become entangled in the machine

- The air pressure should never exceed the recommendations from the suppliers of Microducts and Fiber. The pressure may never exceed 16 bar, which is the maximum pressure for the NanoFlow RAPID blowing machine. An overpressure Relief valve will ensure venting in case of an overpressure.

WARNING: Exceeding max. pressure may lead to machine damage and mild to severe personal injury.

- The operator must make sure that no other persons are close to the machine and cable drums in a way that could be dangerous when the machine is started.

- Use hearing protection if the air compressor is placed nearby.

- Observe that the machine is placed on a stable foundation. Make sure that the fiber and duct are placed correctly in the machine.

- Make sure not to touch the fiber too close to the machine due to risk of getting fingers injured. Ensure that the fiber does not make loops that might be dangerous to persons around the machine.

- Operator must ensure nearby persons are informed when operation is initiated.

- Operator must ensure that the exit end of the duct is secured, and discharged air, cable and debris is contained in a safe manner. Operators must pay special attention when blowing sponges and steel pins.

- Make sure the working environment is clean and tidy to avoid injuries due to stumbling over fiber and equipment.

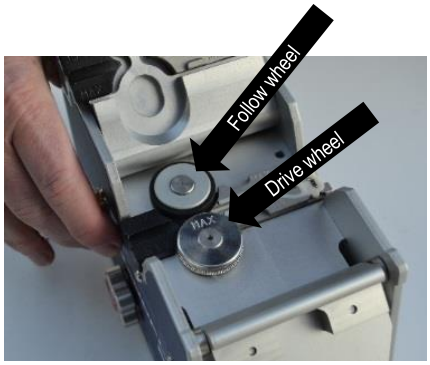
5. Maintenance

The NanoFlow RAPID does not require much maintenance if the following recommendations are followed:
Compressed air must be clean and dry. Use air filter and water separator.

NB: Humid and polluted air may influence machine life and performance and may result in increased wear.

Clean the wheels on a regular basis, at least once a day when the machine is in use. Check duct adaptors and rubber belts on wheels for wear and tear daily, replace if necessary.

NB: Failure to maintain and clean the machine may affect machine reliability.



It is easy to remove and mount the wheels, as they simply can be clicked on and off.

Machine service is required annually or every 350 km depending on what comes first.

NB: To maintain your service agreement with extended warranty, you must meet the given service requirements.

6. Identification

These instructions have been made to support the users of the fiber blowing machine NanoFlow RAPID. The machine type can be identified by the Machine Plate on the machine. The Machine Plate provides information about serial number, year of production and name and address of the manufacturer.

It is recommended to read this instruction carefully and become familiar with the functionality and maintenance of the fiber blowing machine before use.

7. Application

The fiber blowing machine NanoFlow RAPID is constructed for blowing fiber into microducts within the FTTH segment.

It is not recommended to use the machine for other applications.

Always use adaptor plates designed for the actual diameter of fiber and duct. The adaptor plates are marked with the size for which they are intended.

It is very important to use the correct adaptor plates. If the adaptor plates do not fit the duct, dangerous situations may occur.

The machine comes in a carrying case. When the machine is not in use or during transportation, always store it in the carrying case.

Never leave the carrying case open exposed to rain. This will lead to soaking of the foam.

NB: The machine is intended for indoor use and not for use in wet environments, i.e. rainy weather. If the machine is exposed to rain or humidity, it can result in malfunction of the machine and lapse of warranty.

Charge the battery before operation.

8. Mounting

Make sure to place the machine on a stable foundation before blowing.

Alternatively, place the NanoFlow RAPID on the tripod or in the shoulder strap, depending on the working situation. Please see the section in 12 ACCESSORIES for further information.

9. Supply of compressed air

The volume and quality of compressed air is one of the most important parameters in order to achieve good results when blowing fiber. The amount of air needed depends on fiber size, duct size and blowing distance. A capacity less than 200 l/min. is not recommended for long blowing distances.

The compressed air must be filtered, cooled and dried to avoid moisture and dirt in the microduct.

WARNING: Do not use compressed air directly from a compressor unit, since the air can be very hot and can damage microduct, fiber and machinery.

CAUTION: When using a water separator attached to the inlet valve on the NanoFlow RAPID, make sure that the water contained in the separator is discharged through the discharge valve. Failing to empty the water separator may lead to water being discharged through the air valve and into the NanoFlow RAPID machine, causing damage to the electronics.

For short blowing distances, the NanoFlow RAPID can be used without supply of air.

10. FIBER PROTECTION

The NanoFlow RAPID safety system is unique as it protects the fiber from damage. The protection system comprises two functions:

Torque Limitation

The system limits the pushing force on the fiber. It means that the operator can control the maximum load on the fiber during the blowing process. As a main rule: the larger the fiber, the higher load it can withstand. Always run a crash test to verify which settings leads to cable damage.

At a point in a typical blowing process, the fiber blowing speed will decrease due to friction between the duct and the Fiber. The higher setting of torque, the later this will happen.

At a point the blowing will stop, as it is no longer possible to push the fiber with the chosen torque setting.
The display on the machine shows “FIB OFF” (fiber stop).

Wheel Spin Supervision

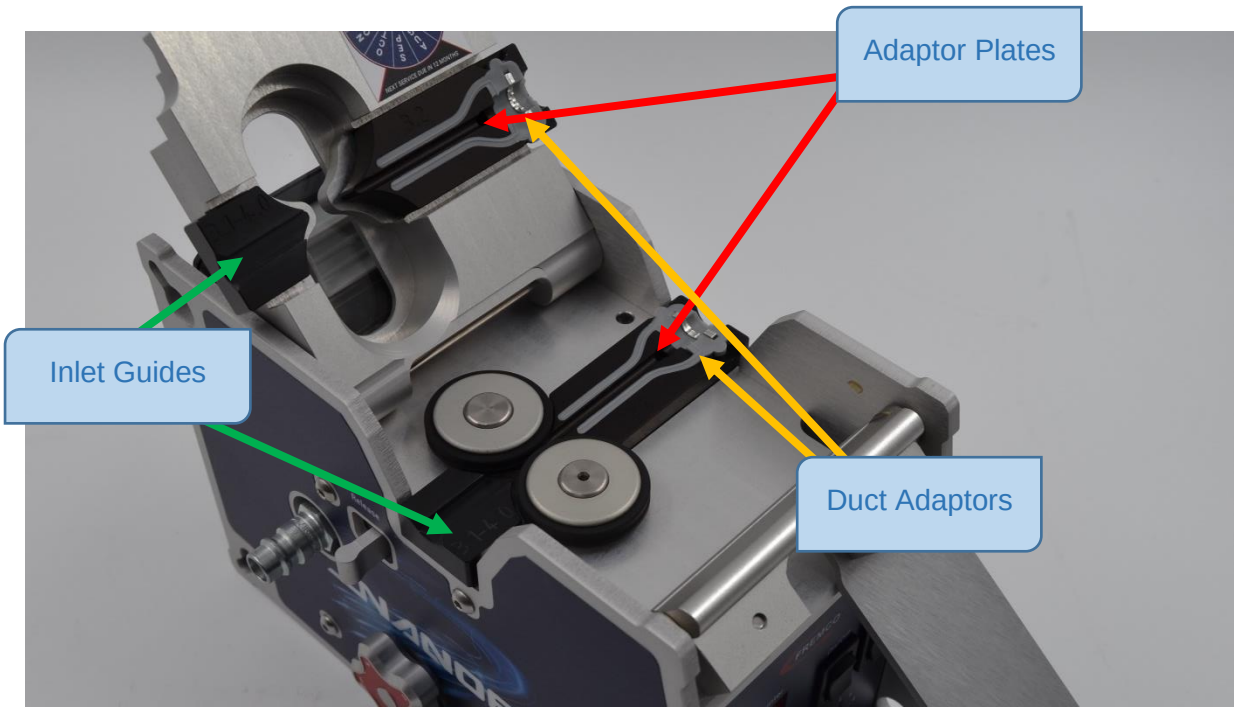
The system continuously monitors if drive wheel and support wheel run with the same speed, this features works independently from torque and speed settings. If there is a difference in speed, it means that the drive wheel is spinning on the fiber, and the system immediately stops the blowing process.
The display on the machine shows “FIB OFF” (fiber stop).

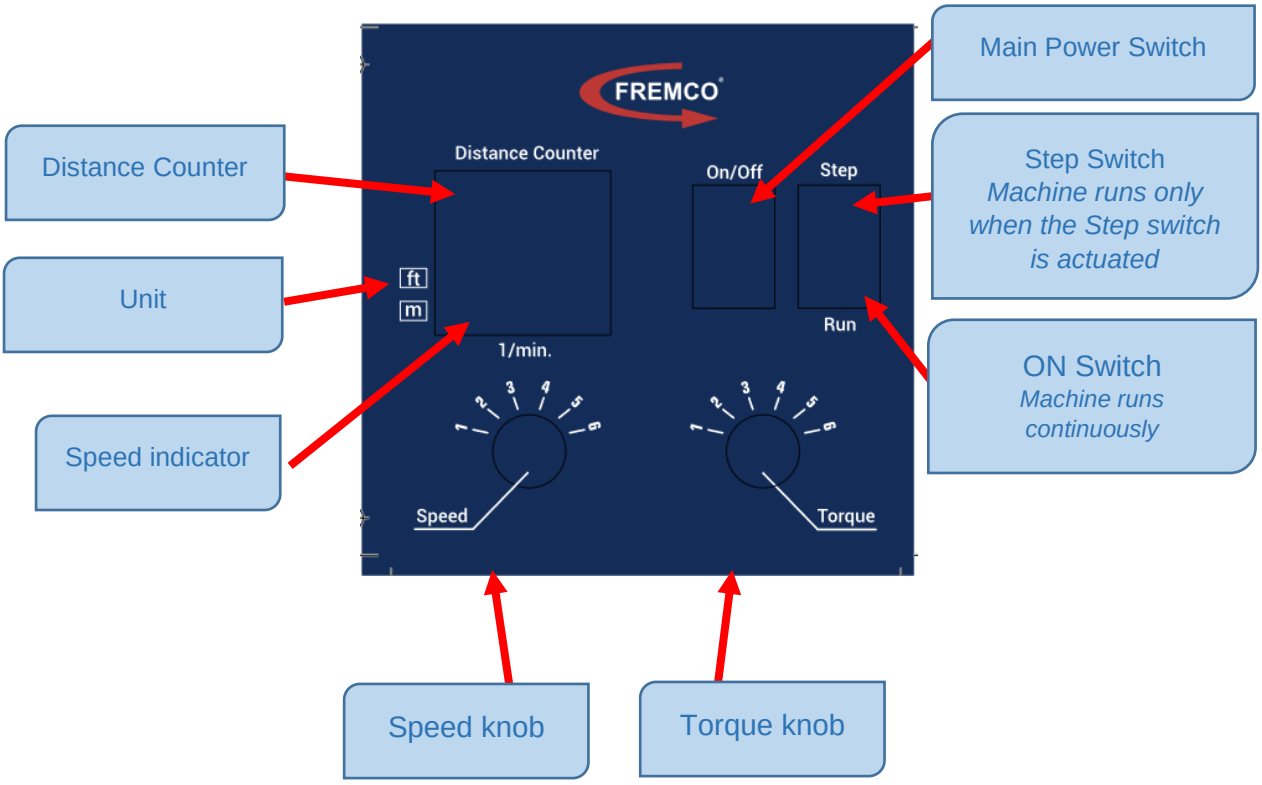
Typically, this situation will occur if torque is set too high for the fiber in question.

Automatic Stop Function

The protection system can be used to make the machine stop automatically when it has reached the goal. All you need to do is to mount a fiber stop at the end of the duct. See 12 ACCESSORIES.

11. MACHINE OVERVIEW



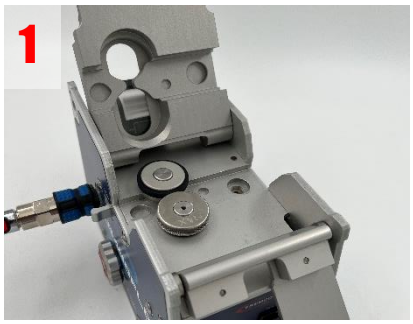


Knob Position	Clamping Force N
1	14
2	18
3	22
4	25
5	29

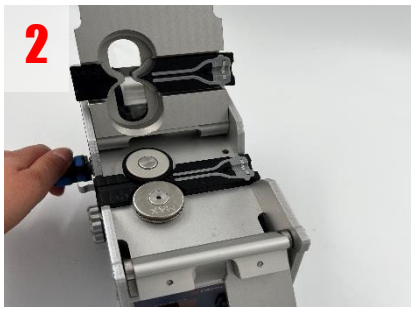
NB: Too high clamping force can cause fiber damage.

After every fiber blowing deployment job, the clamping force has to be reset to 1. This secures a longer life of the machine.

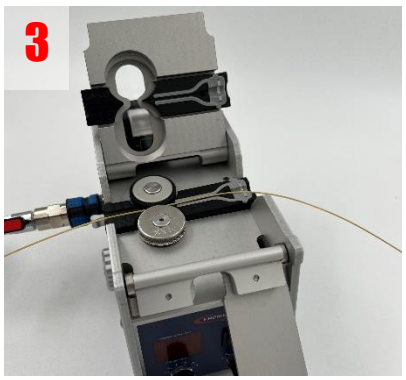
11.1. RUNNING THE FIBER BLOWING MACHINE



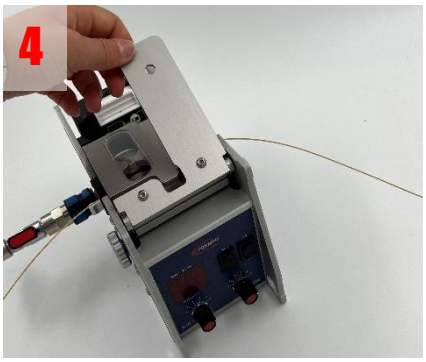
Mount the charged battery and open the machine.



Mount adaptor plates (if not already mounted). See detailed mounting guide in section "Photo Guide – Changing Adaptor Plates"



Lift the support wheel and push the fiber in between the wheels, approx.15 cm. Release the support wheel to let it fall into place, thus fixing the fiber between the wheels. Check that the fiber is placed correctly in the grooves of the wheels. Mount the duct in over the fiber and into the adaptor plate.

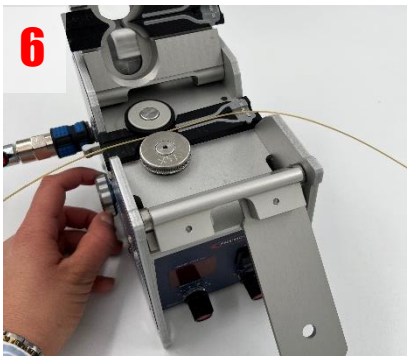


Close the lid and lock it with the lever. Check that the fiber is not stuck and runs smoothly in the machine by lifting the support wheel and pulling the fiber a little back and forth

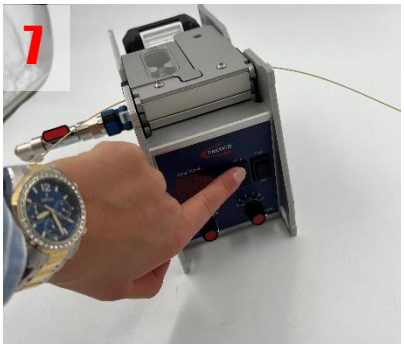
Set speed, torque and clamping force (pictures 5 and 6).

Start with low values for both speed, torque and clamping force, and gradually increase to a suitable level.

The machine has two fiber protection systems – torque limitation and spinning protection.



Please see the section on Fiber Protection on page 7 for further information.



Toggle the Machine on and off by pressing the main power switch ON/OFF.
Press Step, the machine keeps running as long as you actuate the switch.
Press Run to have the machine run continuously.

When fiber safety is activated, the display shows FIB OFF.
Press STEP or RUN to continue if needed.
To reset the counter for a new job, switch off the machine and then on again on the ON/OFF switch.

NB: Each fiber blowing job is different, depending on fiber, duct, quality of compressed air, blowing length, weather conditions etc.

11.2. SWITCHING BETWEEN METERS AND FEET

It is possible to run the machine in either a Meter or Feet configuration.

Switching between Meters or Feet is done when the machine is Powered on.

1. Turn off machine (If the machine is powered on).
2. Hold the Main Power switch until the display shows mtr/ft.

3. While still holding the Main Power Switch, toggle between Meters and Feet by pressing the STEP button.

When desired configuration is set, release the Main Power switch.
The NanoFlow is now set to run in either meter (m) or Feet (ft).

The front display will indicate to the operator which state the machine is in.

12. ACCESSORIES

We offer of number of accessories for use with the NanoFlow RAPID:

Aluminum tripod incl. quick connector
Mount the NanoFlow RAPID on the tripod and get a good and stable foundation for fiber blowing. The tripod comes with a quick connector, facilitating mounting of the NanoFlow RAPID. The tripod is easy to move around from job to job.

Reel holder arm
Reel holder arm for preconnected fiber. For mounting on the NanoFlow RAPID, facilitating the installation of preconnected fiber.

Fiber stop end kit
To be placed at the end of the fiber so that the fiber can move towards a stop and activate the fiber safety.

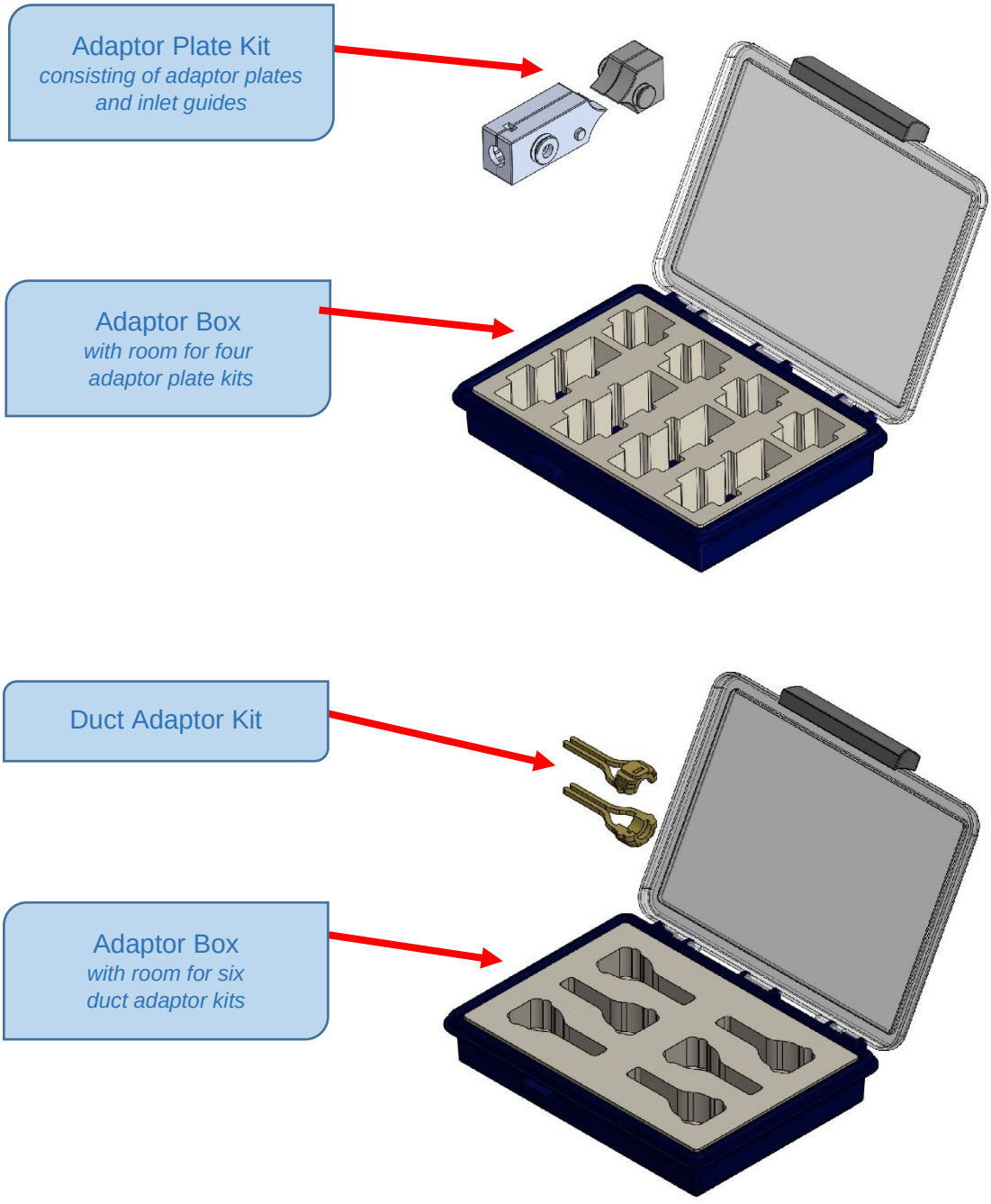
Filter and water separator
To be placed in the air supply line from compressor to machine. Orient the bottom valve facing downwards to ensure water is collected in the container, empty regularly.

Valve for reverse airflow
For removal of fiber from a duct, use the valve to blow compressed air through the duct so that the fiber can be pulled out.

Shoulder strap
The user can operate the NanoFlow RAPID while carrying it in a shoulder strap, so there is no need for a table or tripod. Specifically, well suited for preconnected fiber.

13. ADAPTOR PLATES AND DUCT ADAPTORS

It is important that the adaptor plates and duct adaptors fit the actual size of the fiber and the duct. Below is an overview of the different adaptor components for NanoFlow RAPID.



Many different sizes of adaptor plates and duct adaptors for many different combinations of fiber and duct.

13.1. CHOOSING THE CORRECT ADAPTOR PLATES

A rule of thumb is that the adaptor plate must be at least 0.2 mm larger than the fiber.
Example: If the fiber is 1.1 mm, choose a 1.3 mm adaptor plate.

13.2. 14.2. PHOTO GUIDE, CHANGING ADAPTOR PLATES

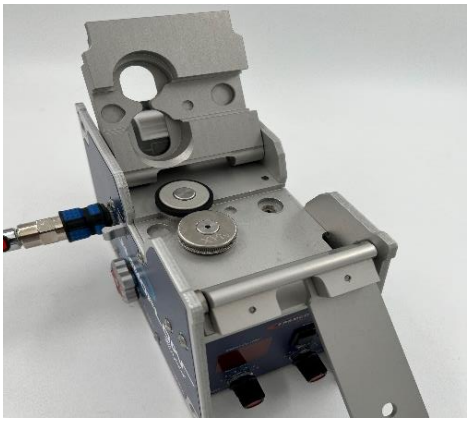
Preparation of adaptor kit for correct fiber and duct size

- Choose the correct size of adaptor plate to suit the fiber.
- Choose the correct size of duct adaptor to suit the duct.

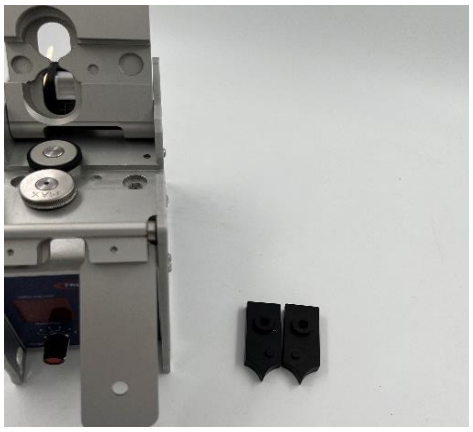
- Mount duct adaptors in both adaptor plates.
- Carefully press in the duct adaptors.

- Check that the position of the duct adaptors is correct. They must fit completely towards the bottom of the adaptor plates.
- The adaptor plates are now ready for mounting in the NanoFlow RAPID.

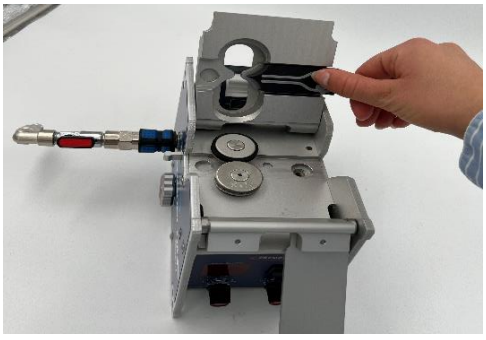
Mounting Adaptor Plates



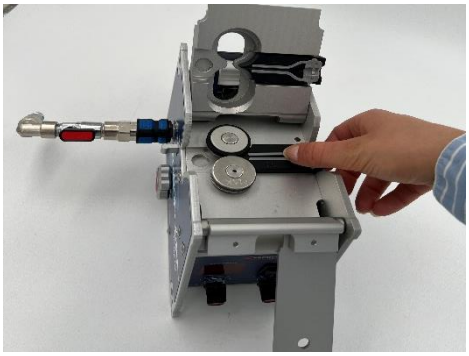
- Check that the wheels are mounted correctly.
- Make sure that machine and wheels are clean and free from grease and dirt



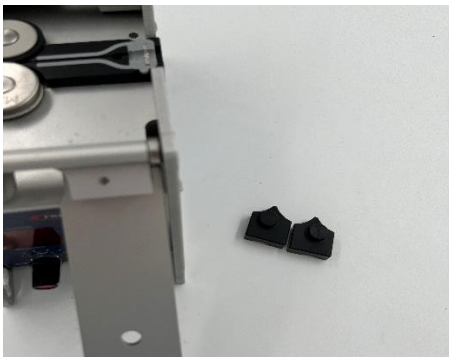
- The adaptor plates are not identical. One is for the top and one is for the bottom.
- The design of the adaptor plates ensures that it is not possible to mount them the wrong way.



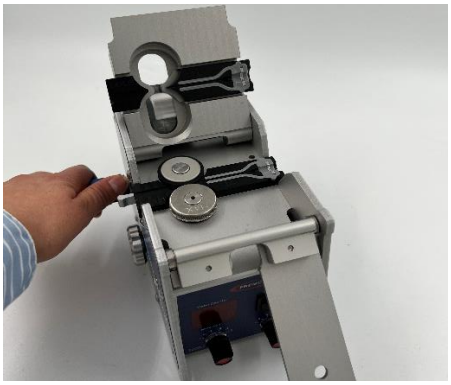
- Click the top adaptor plate into position in the lid.



- Click the bottom adaptor plate into position.



- Like the adaptor plates, the inlet guides are not identical. One is for the top and one is for the bottom.
- Like the adaptor plates, the inlet guides must be at least 0.2 mm larger than the fiber. Example: If the fiber is 1.1 mm, choose 1.3 mm inlet guides.

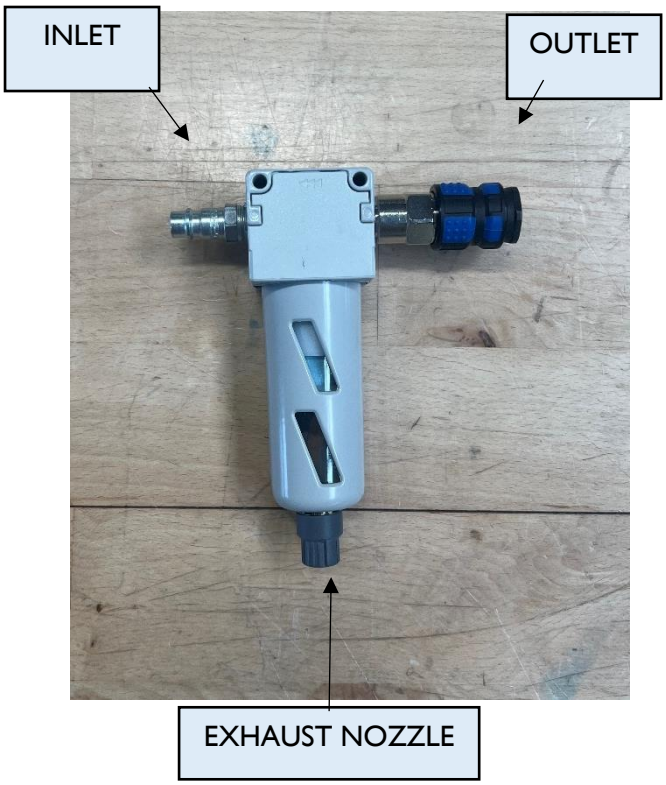


- Click the inlet guides into position at top and bottom.
- The machine is now ready for use.

14. AIR FILTER AND WATER SEPARATOR

If the used compressor is not equipped with a filter and water separator, it is recommended to use a separate filter. See 12 ACCESSORIES for water filter.

The Fremco filter and water separator is ready to use and preconfigured with quick connects for both inlet and outlet.



1.

The filter and water separator are intended as an inline filter in the connection between the compressor and the machine.
Important, position the filter and water separator in a fixed position and ensure that the exhaust nozzle is facing down.

2.

During usage, regularly inspect the filter and water separator. If water level raises exhaust water by untightening the exhaust nozzle and press it.

NB: Installation of the filter and water separator decreases moisture condensation generated from the airflow of the compressor. To obtain greater fiber blowing performance and equipment durability, we also recommend the use of a dryer/cooler during fiber blowing deployment jobs.

15. EC DECLARATION OF CONFORMITY

Manufacturer:

Fremco A/S
Ellehammervej 14
DK-9900 Frederikshavn
Denmark

We hereby declare that

101-240325001 NanoFlow RAPID fiber blowing machine
from Serial No. 9061.1001

is manufactured in conformity with the EC Directives
EC Directives:
2006/42/EC – the Machinery Directive
The directive has the dual aim of harmonising the health and safety requirements applicable to machinery on the basis of a high level of protection of health and safety, while ensuring the free circulation of machinery on the EU market.
2014/30/EU - Electromagnetic Compatibility (EMC) Directive
The directive ensures that electrical and electronic equipment does not generate, or is not affected by, electromagnetic disturbance.
2014/35/EU – The Low Voltage Directive
The directive ensures that electrical equipment within certain voltage limits provides a high level of protection for European citizens, and benefits fully from the Single Market

International standards:
DS/EN ISO 12100:2011- Safety of machinery
The standard specifies basic terminology, principles and a methodology for achieving safety in the design of machinery. It specifies principles of risk assessment and risk reduction to help designers in achieving this objective.

European standards:
DS/EN ISO 4414:2010 - Pneumatic fluid power
ISO 4414:2010 deals with all significant hazards associated with pneumatic fluid power systems and specifies principles to apply in order to avoid those hazards when the systems are put to their intended use.

Technical file responsible:
Kasper Mikkelsen
Research & Development Manager
Ellehammervej 14, DK-9900 Frederikshavn

Attested by:

Kim Lindblad Carlsen
Managing Director

Frederikshavn, 15.10.2019

Kasper Mikkelsen
R&D Manager

Frederikshavn, 01.07.2021

16. UKCA DECLARATION OF CONFORMITY

Manufacturer:

Fremco A/S
Ellehammervej 14
DK-9900 Frederikshavn
Denmark

We hereby declare that

101-240325001 NanoFlow RAPID fiber blowing machine
from Serial No. 9061.1001

Is manufactured in conformity with
UK Directives:
2008 No. 1597 – Supply of Machine (safety) regulations 2008
The purpose of the legislation is to ensure safe machinery is placed on the market or put into service by requiring manufacturers to show how their machinery meet the 'essential health and safety requirements'.
2016 No. 1091 - Electromagnetic Compatibility regulations 2016
The purpose of the legislation is to ensure safe products are placed on the GB market by requiring manufacturers to show how their products meet the 'essential requirements'.
2016 No.1101 – Electrical Equipment (Safety) regulations 2016

International standards:
DS/EN ISO 12100:2011- Safety of machinery
The standard specifies basic terminology, principles and a methodology for achieving safety in the design of machinery. It specifies principles of risk assessment and risk reduction to help designers in achieving this objective.

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Frederikshavn, 01.07.2021

Kasper Mikkelsen
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