

Valid from 01.07.2021 | Rev. 1.0
From Serial No. 9328.1193

MiniFlow RAPID

For fiber dimension 3-12 mm



Operating manual

Responsible manufacturer: Fremco A/S
Machine: MiniFlow RAPID

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



FREMCO A/S
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BEST WARRANTY IN THE BUSINESS

We offer a unique 36 months warranty on all our fiber blowing machines resulting, guaranteeing you the best value for your money.



Our 12 months warranty is automatically included when you purchase your Fremco fiber blowing machine, you automatically get our 12 months warranty. You can then claim your additional 24 months warranty at any point during the following three months in order to obtain the best cost-beneficial warranty in the business.

To maintain your 36 months warranty, you must meet the given annual service and maintenance requirements for each machine as described in the operating manual.

Learn more at www.fremco.dk/warranty and get the best factory warranty in the business today!

1. INTRODUCTION

Original instructions

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

Purpose

The purpose of these instructions is to ensure correct installation, use, handling and maintenance of the machine. Applicable from machine serial number 9328.1193.

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 MiniFlow RAPID.

2.3. MACHINE PLATE

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

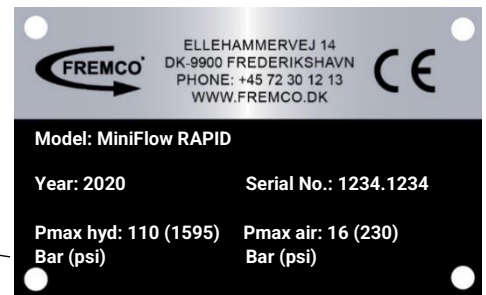


Figure 1: Location of machine plate



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

3. TECHNICAL SPECIFICATIONS

3.1. MINIFLOW RAPID

Manufacturer

Fremco A/S
Ellehammervej 14
9900 Frederikshavn
Denmark

Item No.	101-10031
Micro cable diameter	3-12 mm
Micro duct diameter	7-20 mm
Blowing distance¹	Up to 3.5 km (11485 ft)
Blowing speed¹	Up to 100 m/min. (325 ft)
Pushing force	0-40 kg
Max air temperature.....	60°c (104°f)
Max. pressure and airflow ² :.....	16 bar (230 psi), 1,000 l/min. (35.3 cfm)
Max. hydraulic pressure	110 bar (1595 psi)
Weight	24 kg
Length	650 mm
Width	225 mm
Height	210 mm

¹ Depending on type and quality of fiber cable and microduct

² Air must be filtered, cooled and dried

3.2. HYDRAULIC CONTROL UNIT

Manufacturer

Fremco A/S
 Ellehammervej 14
 9900 Frederikshavn
 Denmark

Item No.	103-10041
Hydraulic connection	0>125 bar, 17 l/min
Max pressure	125 bar
Manometer	160 bar
Hose to fiber blowing machine	1500 mm
Hose to hydraulic pump	1500 mm
Length.....	250 mm
Width	250 mm
Height	310 mm
Weight	5 kg



4. SAFETY DIRECTIONS

- Make sure to disconnect the machine from all power sources, like air compressor and hydraulic pump, before any kind of adjustment and maintenance takes place.
- The hydraulic power supply from the hydraulic pump for cable blowing machines or from other sources may never exceed the specified maximum pressure.
- The air pressure should never exceed the recommendations from the suppliers of microducts and fiber cables. The pressure may never exceed 16 bar, which is the maximum pressure for the blowing junction block.
- Observe that the machine is placed on a stable foundation and secure it before start. Make sure that the blowing junction block is properly connected to the microduct, and that the cable is placed correctly between the chains.
- Make sure you do not touch the cable too close to the machine because you risk getting your fingers injured, and make sure the cable does not make loops that might be dangerous to persons around the machine.
- Use hearing protection if the hydraulic pump or other noisy equipment is placed nearby.
- The joystick on the hydraulic control unit should never be blocked in a way, where it is unable to return to neutral position.
- 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.
- It is always a clear advantage to be well prepared so that you can run the blowing without interruptions. Pausing in the middle of blowing creates a risk of being unable to start again.
- Make sure the working environment is clean and tidy to avoid injuries due to stumbling over cables and equipment.

5. IDENTIFICATION

These instructions have been made to support the users of the cable blowing machine MiniFlow RAPID. The machine type can be identified by the type plate on the machine. The type 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 cable blowing machine before use.

6. APPLICATION

The cable blowing machine MiniFlow RAPID is constructed for blowing fiber optic cables into microducts.

Always use adaptor plates designed for the actual diameter of cable 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.

7. MOUNTING

Make sure to place the machine on a stable foundation and to fasten it to withstand the forces, which occur during use. With the MiniFlow RAPID it is possible to purchase a trolley, which gives the machines a stable foundation during use.

8. SUPPLY OF COMPRESSED AIR AND HYDRAULIC PRESSURE

The volume and quality of compressed air is one of the most important parameters in order to achieve good results when blowing fiber optic cables. The minimum capacity needed is 1,000 l/min. The compressed air must be filtered, cooled and dried to avoid moisture and dirt in the microduct.



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

The supply of hydraulic pressure must be 110 bar, 17 l/min. It is recommended to use the hydraulic power unit that is designed specifically for use with the Fremco cable blowing machines.

9. FIBER CABLE BLOWING

Having set up and connected the hydraulic pump and the air compressor, tighten the chains with the chain hand wheel so that the chains do not skid on the cable. The best result is achieved by not tightening too hard.

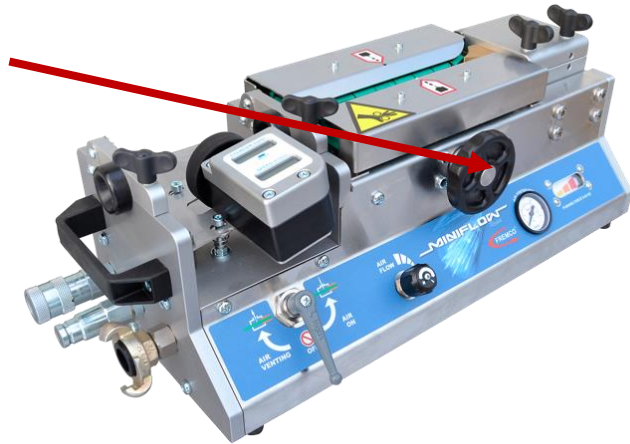
The hydraulic control unit is used to control direction (forward/back), speed and push/pull force. Use the joystick on the hydraulic control unit to control start/stop and direction.

The speed can be adjusted by turning the valve handle marked "Speed".

With the valve handle marked "Power" you can adjust the maximum force to be transferred to the cable. The pressure, and with it the force, is increased when the handle is turned to the right.

When installing the cable, it is important to make sure not to push the cable too hard into the duct, because it is the supplied compressed air that must lead the cable forward inside the duct.

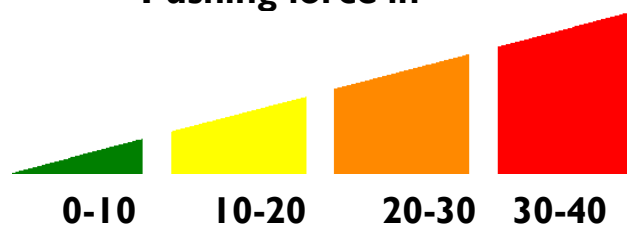
Use the Pushing Power Indicator (PPI) on the MiniFlow RAPID to monitor the pushing force on the fiber cable.



CABLE DAMAGE SAFETY

Miniflow RAPID has a unique monitoring system, which continuously monitors the pushing force applied on the fiber cable, making it possible to stop before cable damage.

Pushing force in



There are several things to consider when blowing cables, because they influence the different settings of speed and pressure. For instance, the diameter and stiffness of the cable, the force needed to pull the cable forward to the MiniFlow RAPID cable blowing machine as well as the force needed to overcome friction from seals and air pressure inside the blowing junction block.

It is not possible to give exact directions on adjusting the different pressures because it depends on the conditions of the specific job.

Please be aware of the maximum load on the cable and allowed force on the duct as specified by the manufacturers.

10. MAINTENANCE

The chains must be kept well lubricated and free from sand and dust. It is recommended to use a chain spray with water-repellent oil.

The chains should be tightened to an extent that they can be lifted only 3-5 mm from the chain support rail.

The chains and the chain support rails must be replaced timely.

It is very important to avoid any kind of dirt in the hydraulic connectors when mounting the hydraulic hoses.

If the machine is not to be used for a longer period of time, it should be cleaned and the chains should be lubricated. It is also recommended to spray the machine with an anti-corrosion oil. Store the machine in a dry and dust-free environment.

It is strongly recommended to use original spare parts. Repairs should be performed by the manufacturer. Errors and damage caused by unauthorized use and changes or adjustment of the machine are not covered by warranty.

Machine service is required annually.

NB: To maintain your 36-months warranty, you have to meet the given service requirements.

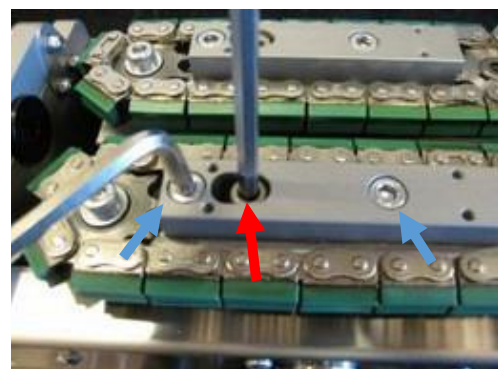
10.1. CHAIN MAINTENANCE AND ADJUSTMENT

Keep the chains well adjusted and clean from dust and dirt. Lubricate regularly with a waterproof chain oil spray

Please follow below instructions on both chains.

A **Tighten the chains**

- Remove the chain covers
- Loosen the two Allen screws
- Turn the Allen screw to tighten the chains
- Tighten the two Allen screws



B

Check Chain Tension

- The chains should be tightened to an extent that they can be lifted only 3-5 mm from the chain support rail
- Chain tension can vary on different positions on the chain
- Rotate chain and check in several positions



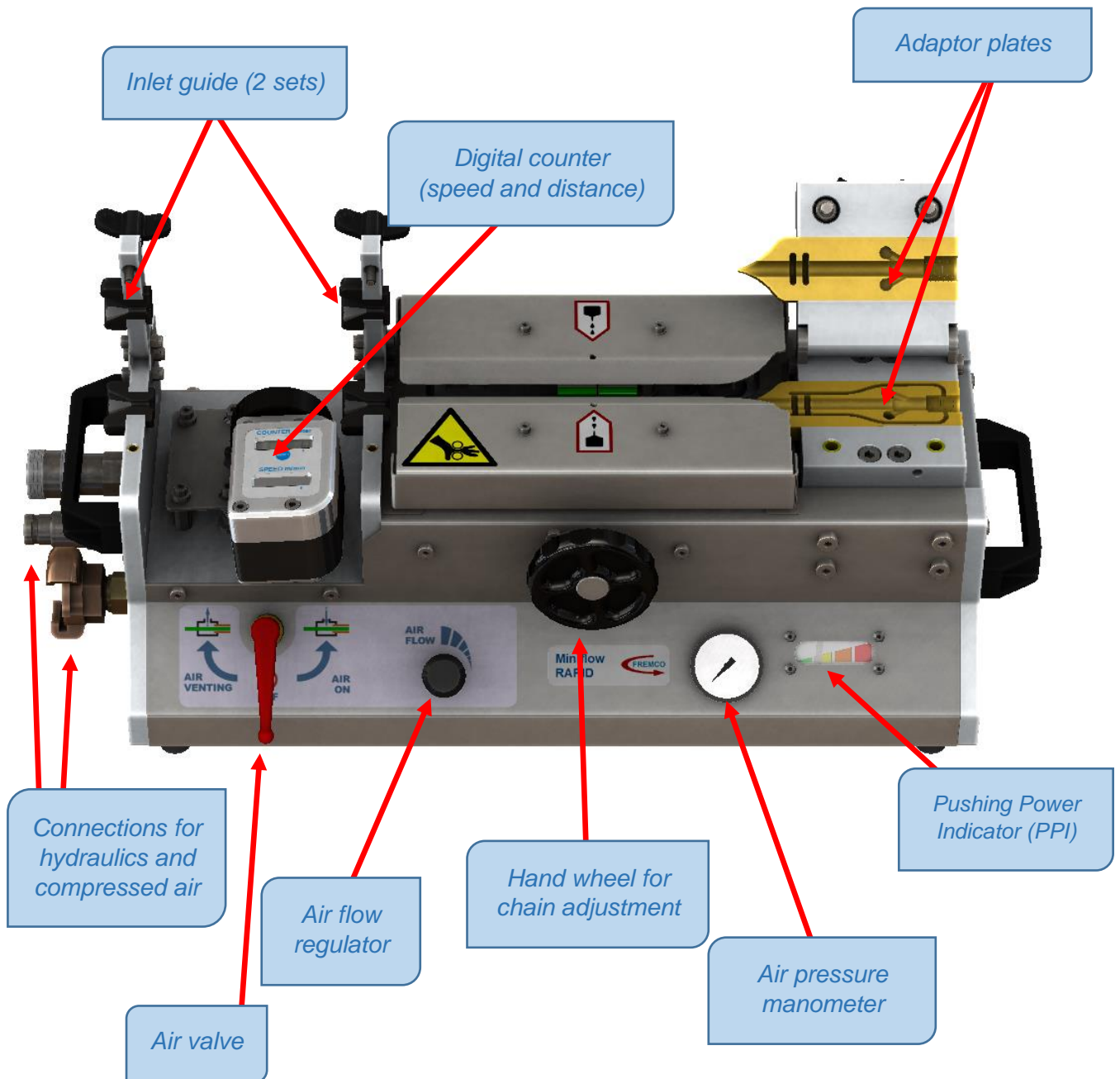
C

Lubricate the Chain

- Use a good quality water resistant chain oil spray
- Remove the chain cover
- Turn on the machine and let it run slowly without load
- Spray between the chain and the chain support rail
- Be careful not to spray oil onto the chain rubber surface



11. MACHINE OVERVIEW

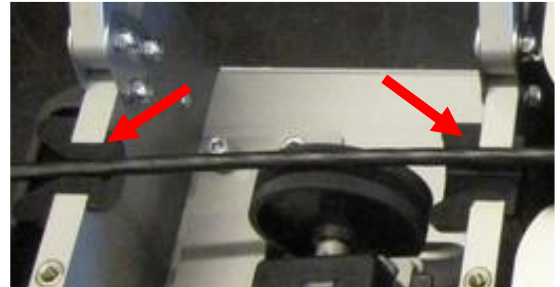


12. OPERATION

Before Operation

Does the diameter of the nylon inlet guide bush fit the actual fiber cable, ensuring fiber cable entry in the middle of the chain groove?

- Size can be wrong
- Extensive wear can make the hole oval



Is chain tension correct? Chains should be tightened to an extent that they can be lifted only 3-5 mm from the chain support rail.

- Chain tension can vary on different positions on the chain. Please rotate chain and check in several positions.



Is the chain support rail worn in a way that geometry is odd?

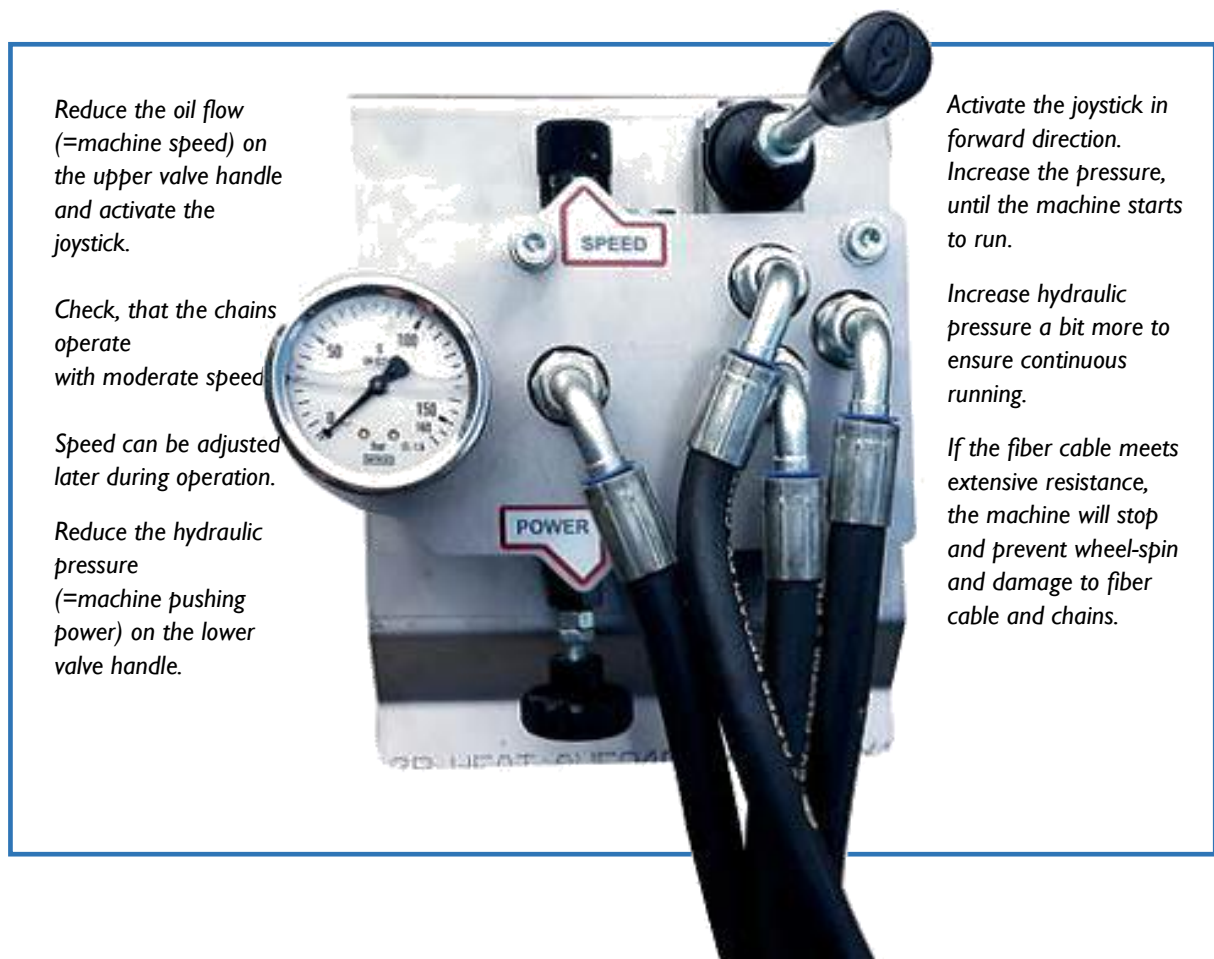
- Change wear parts, if necessary



12.1. PREPARING OPERATION

The microduct that the cable is blown into, should be without sharp corners or bends. Before blowing it is recommended to blow a sponge through the duct. This ensures that the fiber cable can get all the way through the duct without getting stuck.

Cleaning the duct	Lubricating the duct
<ol style="list-style-type: none"> 1. Apply one or multiple sponges in the duct. 2. Add air pressure and blow sponge. 3. Make sure the ponge arrives at the other end of the duct. 4. Check that the sponge looks clean after it arrives at the other end - or repeat with new sponges until its clean. 	<ol style="list-style-type: none"> 1. Remember to clean the duct prior to lubricating it. 2. Apply one sponge at the desired depth (See guideline on FlowLUB). 3. Add desired amount of FlowLUB 4. Apply one more sponge (creating three layers with sponges and lubrication) 5. Add air pressure pushing sponges and FlowLUB all the way through to the end.



12.2. DURING OPERATION

The chain pressure on the fiber cable should be sufficient to create enough friction.

- Too low pressure can cause “wheel-spin”, damaging fiber cable and chains.
- Too high pressure can deform the fiber cable and rubber on chains.

Check the chain pressure on the fiber cable regularly.

Lubricate the chains regularly. Use a chain oil spray of good quality. Spray the chains with oil through the holes in the chain covers. Be careful not to add

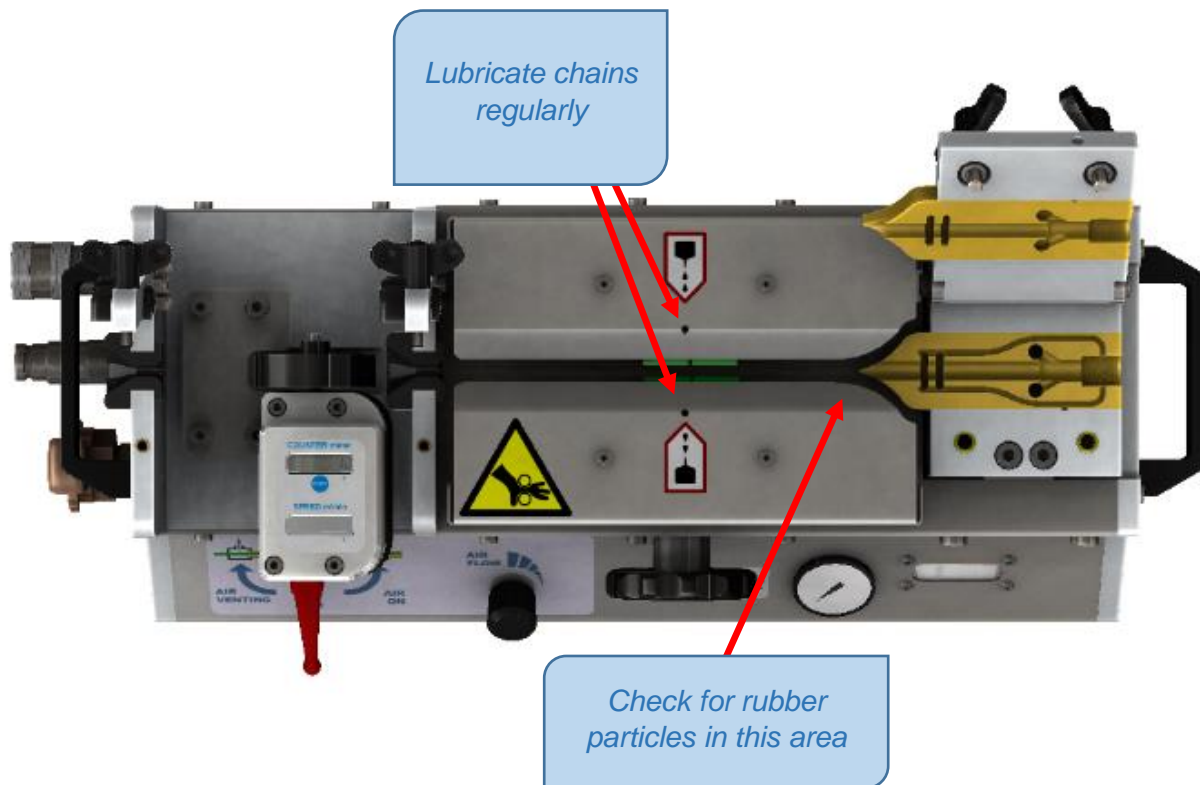
too much, since lubricant on the chain rubber profile decreases friction between chain and fiber cable dramatically.

Many rubber particles on the machine surface can be a sign of excessive wear.

Check the air pressure regularly. Use the airflow regulator to adjust pressure, if necessary.

In general, it is recommended to adjust the hydraulic pressure and thereby the pushing power to the lowest level possible, with just enough power to draw the fiber from the drum.

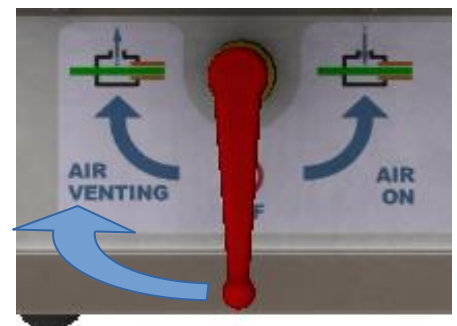
The main work to get the fiber cable through the duct should be done by the compressed air flow.



12.3. AFTER OPERATION

When the fiber cable is through the duct, turn off the hydraulic power.

The air pressure inside the duct is released by turning the air valve to the left.



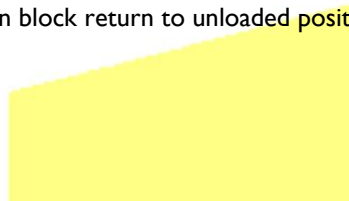
13. ADJUSTMENT OF PUSHING POWER INDICATOR (PPI)

The offset point of the PPI indicator can be adjusted. This can be necessary when the machine has been in operation for some time.

- Use a 5 mm hex key to adjust the Allen screw placed behind the hole above the lifting handle
- Adjust until the indicator is placed at the start of the scale
- Push the blowing junction block in direction away from chains
- Let the blowing junction block return to unloaded position
- Re-adjust, if necessary



0-10



10-20



20-30



30-40

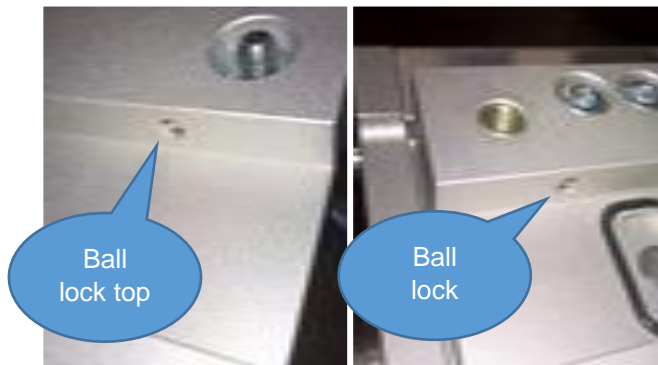


14. CHANGING ADAPTOR PLATES

- The brass adaptor plates can be changed without the use of tools



- The adaptor plates are locked at the top and bottom by a spring loaded ball lock



- Check that the groove in the adaptor plate is aligned with the ball lock



- Click the adaptor plates into position



15. CHANGING CHAINS AND CHAIN SUPPORT RAILS

- Remove the chain covers
- Remove the upper part by unscrewing the two Allen screws



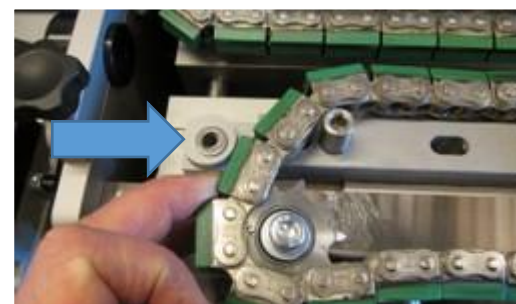
- Remove the chain support rail
- Check for wear and replace, if necessary



- Unscrew the Allen screw in the middle of the chain wheel



- Remove the chain wheel from its position



- Replace the chain
- Revert all operations
- Follow the instructions in *Chain Maintenance and Adjustment*



16. INITIAL ADJUSTMENT OF JOYSTICK

16.1. PREPARATION

- Check that there is no fiber cable in the blowing machine
- Check that the chains are not in contact with each other



- Connect the hydraulic MultiPower Pack to the control valve



- Connect the control valve to the machine



- Start the hydraulic power unit according to operating instructions



16.2. ADJUSTMENT

1

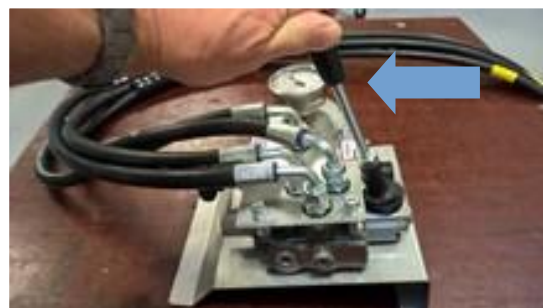
Turn the SPEED valve handle clockwise to full stop (= zero speed)

**2**

Turn the POWER valve handle clockwise to full stop (= full power)

**3**

Activate the joystick to forward operation

**4**

Turn the SPEED valve handle counterclockwise until the chains run smoothly (approx. 1/3-1/2 turn)



5 Turn the POWER valve handle counterclockwise until the machine stops



6 Turn the POWER valve handle clockwise until the machine starts to run smoothly (between 40 and 50 bar on the manometer)



7 Release the joystick to neutral



8 Turn off the hydraulic MultiPower Pack



17. OPERATING THE JOYSTICK

Preparation

- Make sure that the fiber cable and the duct are in place in the blowing machine



- Make sure air supply is connected

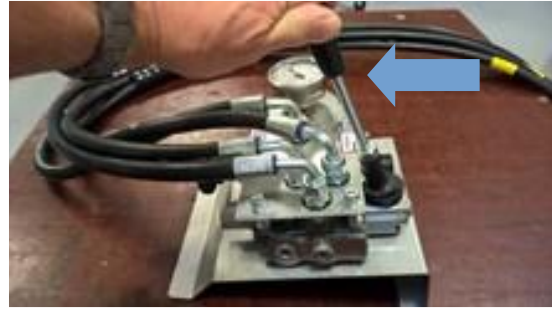


- Start the hydraulic MultiPower Pack according to operating instructions



Start-Up

- 1 Activate the joystick to forward operation



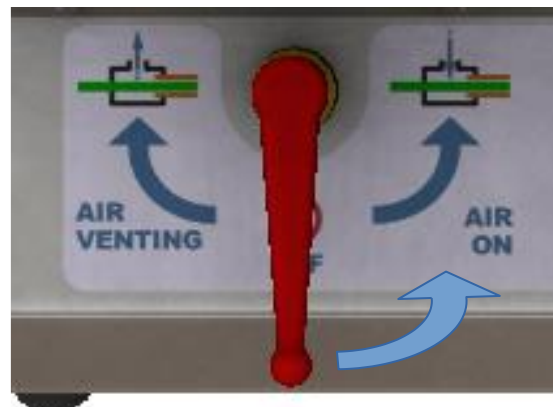
- 2 If necessary, turn the POWER valve handle clockwise to add power.
Only add power, when the cable loses speed.



- 3 Adjust to appropriate speed by turning the SPEED valve handle (look at speed m/min read-out).
The operator needs to adjust the speed in accordance with the blowing job specifications (fiber and duct ratio)



- 4 Open the compressed air valve on the machine after appropriate time.
Only add air when the cable starts to lose speed.



17.1. IMPORTANT NOTE REGARDING POWER AND SPEED ADJUSTMENT

Please be aware that POWER (oil pressure) and SPEED (oil flow) can vary during operation due to various factors like:

- Oil type/viscosity
- Oil temperature
- Variations in hydraulic power source
- Etc.

18. EC DECLARATION OF CONFORMITY

Manufacturer:

Fremco A/S
Ellehammervej 14
DK-9900 Frederikshavn
Denmark

We hereby declare that

101-10031 Miniflow RAPID Blowing Machine for mini cables
From serial No.: 9328.1193

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.

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.

DS/EN ISO 4413:2010 - Hydraulic fluid power

ISO 4413:2010 deals with all significant hazards associated with hydraulic fluid power systems and specifies the 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, 01.01.2021



Kasper Mikkelsen
R&D Manager

Frederikshavn, 01.07.2021

19. UKCA DECLARATION OF CONFORMITY

Manufacturer:

Fremco A/S
Ellehammervej 14
DK-9900 Frederikshavn
Denmark

We hereby declare that

101-10031 Miniflow RAPID Blowing Machine for mini cables
From serial No.: 9328.1193

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'

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.

DS/EN ISO 4413:2010 - Hydraulic fluid power

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Technical file responsible:

Kasper Mikkelsen
Research & Development Manager
Ellehammervej 14, DK-9900 Frederikshavn

Attested by:



Kim Lindblad Carlsen
Managing Director

Frederikshavn, 01.07.2021



Kasper Mikkelsen
R&D Manager

Frederikshavn, 01.07.2021