PORTABLE DPF CLEANER

K-Line Special Service Tools

Product No. KL22020

OPERATING INSTRUCTIONS

A self-contained machine, designed for cleaning Diesel Particulate Filters, that may be transported, set up, and operated in the field.

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Introduction

This manual contains information to help you to learn about the safe and proper use of the KL22020 Portable DPF Cleaner. K-Line® Industries, Inc cannot anticipate all conceivable or unique situations. The instructions and warnings included in this manual are not necessarily all-inclusive. You must make sure all conditions and procedures do not jeopardize your personal safety.

DISCLAIMER: All information, images, and specifications contained in this manual are based on the latest information available at the time of publication. K-Line® reserves the right to make changes at any time without notifying any person or organization of such revisions or changes. K-Line® is not liable for incidental or consequential damages (including lost profits) in connection with the furnishing, performance, or use of this material.

Objective

The KL22020 Portable DPF Cleaner is designed to quickly and efficiently remove built up ash from diesel particulate filters (DPFs). This is required in one of two situations: (1) Routine service required by your DPF warranty, (2) Indicated by your on-board Emissions Device Monitor (EDM) or other filter service monitor.

This user manual provides cleaning instructions for after-treatment diesel particulate filters (DPFs).

- The after-treatment diesel oxidation catalyst and the after-treatment diesel particulate filter housing must be free of dents.
- Mounting flanges must be free of dents, cracks, or gouges in order to seal correctly.
- After-treatment diesel particulate filters should be inspected prior to cleaning using appropriate OE technical procedures.
- DPF cleaning machines are not designed to clean DPF filters that are plugged as a result of excessive fluids in the exhaust system, such as coolant, fuel, or oil.
- K-Line is not liable for a pre-existing condition in the DPF that would render the filter unstable, if using the cleaning machine identifies such a condition exists.

Particulate filters that do not pass these criteria should be replaced and not cleaned.

Table of Contents

Safety Precautions

Before using the KL22020 Portable DPF Cleaner, read, understand, and follow the safety precautions and operating instructions outlined in this manual. This equipment must be operated by qualified personnel. The operator should be familiar with diesel particulate filters.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION: Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Personal Protection/ Important Information

⚠ WARNING

To avoid personal injury, carefully read and understand all instructions before attempting to operate any equipment or tools. If the operator cannot read these instructions, operating instructions and safety precautions must be read and discussed in the operator's native language.

To avoid eye injury, always wear protective glasses or face shield. If there is eye contact with ash, flush eyes with cold water for 30 minutes.

Use the KL22020 Portable DPF Cleaner in a well ventilated area. Wear a dust mask to avoid breathing the ash. If visible dust escapes the machine during cleaning procedure, immediately stop the process and check all connections.

Wear protective gloves. If there is skin contact with the ash, thoroughly wash the skin with soap and water.

To prevent possible damage to your hearing, always wear ear protection when working around noise generating tools. The noise made during the cleaning cycle is within the acceptable decibel rating for unprotected ears; however, ear protection is recommended.

Hazard Avoidance

⚠ WARNING

Inspect both the KL22020 Portable DPF Cleaner and the DPF prior to each use for dents, cracks, gouges or worn parts. If damage is found, discontinue use until inspected and released by an approved inspector.

It is important that the DPF is cooled completely prior to cleaning. Never clean a DPF that is too hot to touch.

Unplug the KL22020 Portable DPF Cleaner prior to any service work. Do not operate on a wet surface. Improper use can result in electrical shock.

Extension cords may overheat, resulting in a fire. If you must use an extension cord, use shortest possible cord.

Personal injury can result from pinch points. Use caution when using the KL22020 Portable DPF Cleaner

Prohibited Action

⚠ WARNING

To avoid damage to the tooling, do not weld on the components. Do not modify the KL22020 Portable DPF Cleaner in any way by welding, heating with a torch, drilling or grinding.

Setup Procedure - Install the Neoprene Ring Seal

1. Remove the diesel particulate filter (DPF) from the vehicle according to the appropriate OE technical manual or bulletin regarding DPFs.
2. Place DPF Cleaner on a sturdy and level surface.
3. Loosen the tie straps and remove the lid from the canister. (Figure 1)

Figure 1

4. Use the tape measure provided in the tool kit to measure the diameter of the DPF at the widest point where it will interface with the neoprene ring seal.
5. Select the proper Neoprene Ring Seal based on the measurement. The KL22020 is shipped with the small neoprene ring seal installed.

NOTE: *If using the large or medium neoprene ring seal, the steel compression ring under the small seal must be removed. (Figure 2)*

- ➲ For DPF's with a canister diameter of 400 mm – 325 mm use the large ring.
- ➲ For DPF's with a canister diameter of 325 mm – 235 mm use the medium ring.
- ➲ For DPF's with a canister diameter of 235 mm – 165 mm use the small ring including the metal supporting ring.

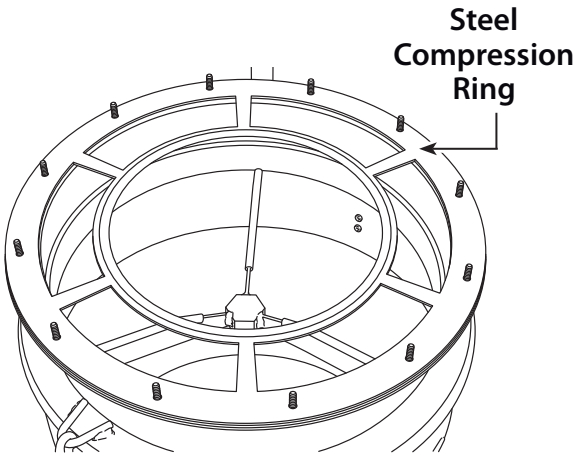


Figure 2

NOTE: *The thumb knobs holding the neoprene ring seal may become loose after time. Periodic tightening may become necessary.*

6. Install the ring seal, the clamping ring, and the thumb knobs. Align the tabs in the clamping ring with the straps.

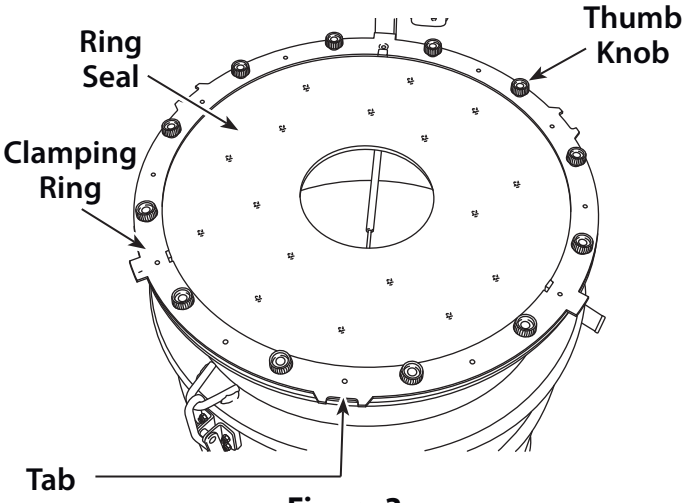


Figure 3

Setup Procedure - Install the DPF

1. Carefully place and center the DPF into the stretch Neoprene Ring Seal with the exhaust exit end in the upward position. (Figure 4)

NOTE: *Be sure the neoprene ring is sealing against the canister body.*

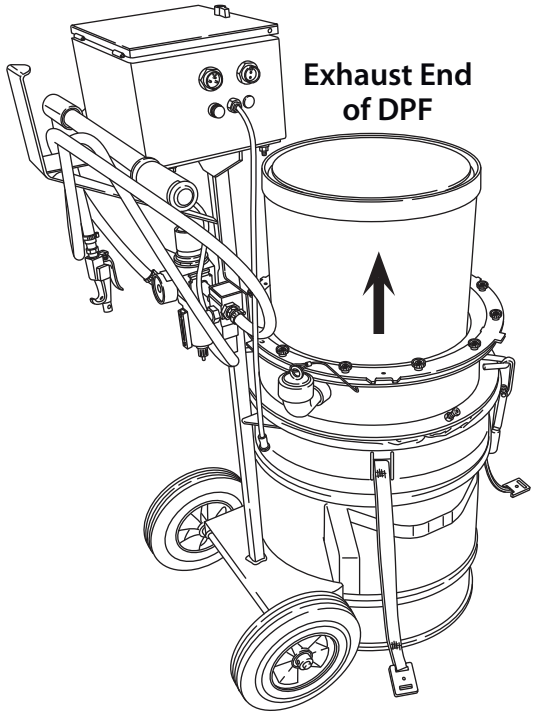


Figure 4

2. Select the proper Neoprene Skirt based on the DPF measurement.

- ➲ 400 mm – 285 mm = Beige Velcro
- ➲ 285 mm – 165 mm = White Velcro

3. Place the Neoprene Skirt over DPF with the beige/white Velcro facing up and towards the control box. (Figure 5)

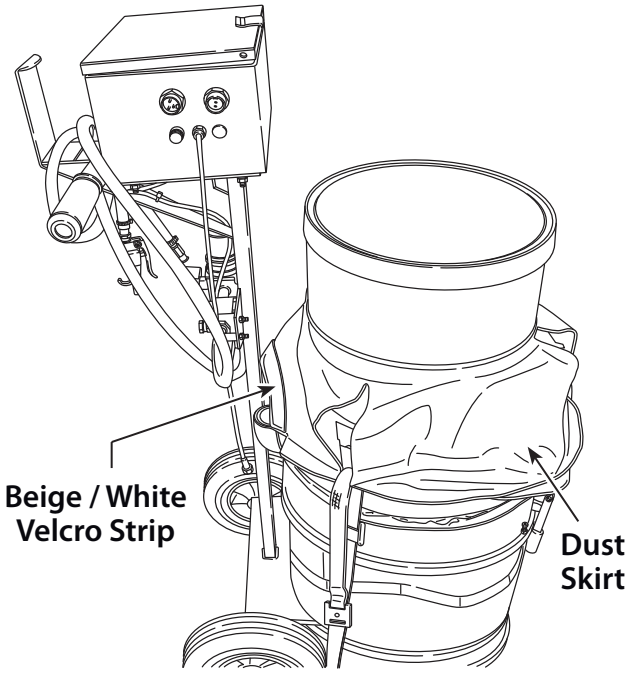


Figure 5

Setup Procedure - Assemble the Fixture

1. Assemble the three legs to the fixture as shown in Figure 6.
2. Use the tape measure provided in the tool kit to measure the outer diameter of the DPF at the uppermost edge where the fixture will rest.
   - ➲ If the depth is deeper than 87.5 mm (3.444"), use the Long Reach Nozzle Package. **See Appendix A**
   - ➲ If cleaning a Flanged Filter use the Flanged Filter Nozzle Kit. **See Appendix B**

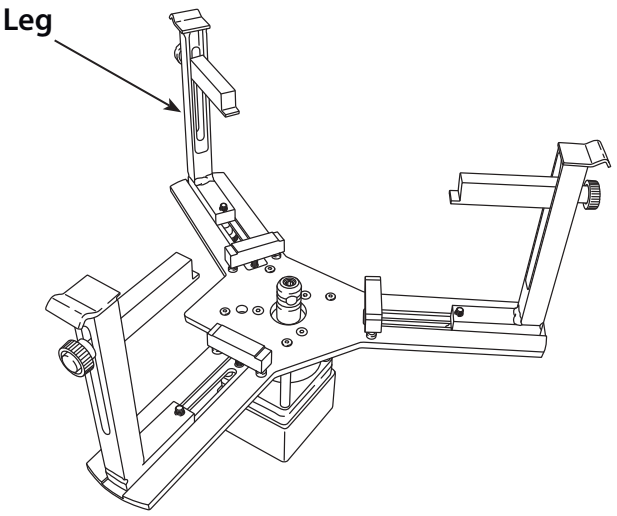


Figure 6

3. Lock the legs into position at the distance measured in Step 2. Legs cannot be smaller than the measured length as the fixture will not fit on the filter. (Figure 7)

NOTE: *Use this edge to determine the location of the leg based on the measurement taken from the filter.*

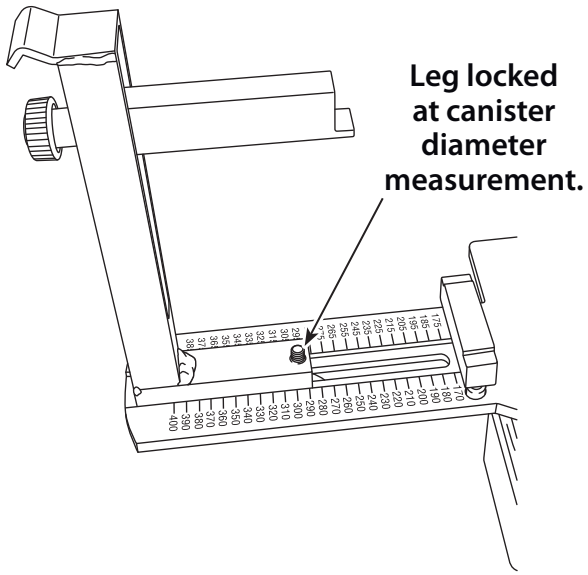


Figure 7

4. Place the Tripod Setting Gage on the top center of the DPF. (Figure 8)

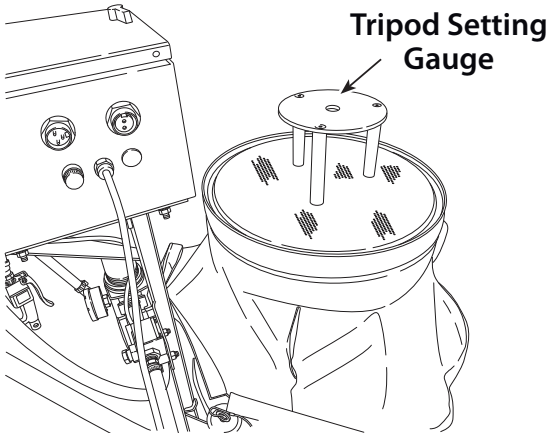


Figure 8

Setup Procedure - Assemble the Fixture contd.

5. Place the fixture on top of the gauge. Slide the feet down onto the lip of the DPF and lock them, centered and evenly, into place. (Figure 9)

6. Remove the fixture and gage from the DPF.

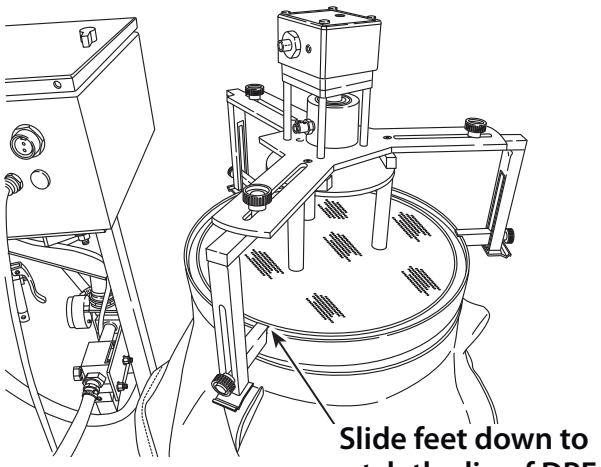


Figure 9

7. Select the longest nozzle arm that will clear the legs of the fixture but still reach the outer diameter of the DPF. Connect the nozzle arm to the spindle shaft using an "align, push and twist" movement. The spring-loaded ball should snap into the spindle detent. (Figure 10)

NOTE: *Make sure the mating parts are free from debris.*

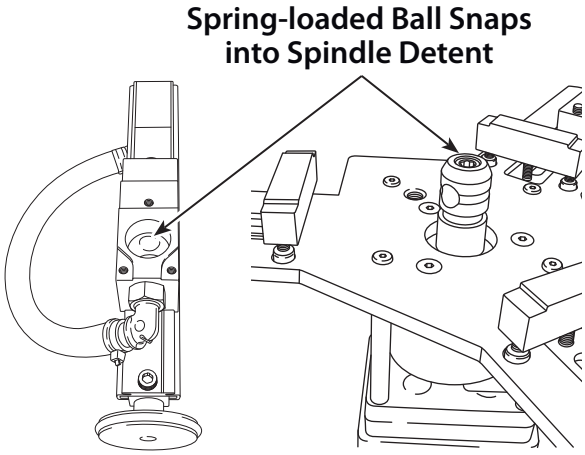


Figure 10

8. Thread the nozzle onto the arm. A Nozzle Wrench (4422010-6) is supplied to securely fasten it in place. (Figure 11)

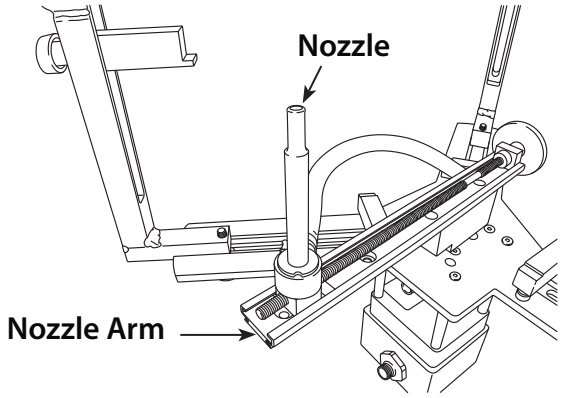


Figure 11

Setup Procedure - Assemble the Fixture contd.

9. Slide the nozzle puck onto the nozzle. (Figure 12)

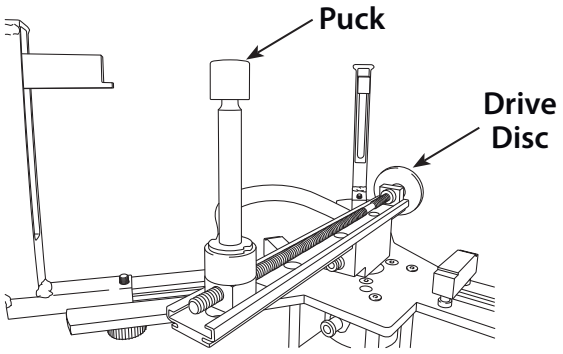


Figure 12

10. Manually rotate the drive disc to ensure the swing of the nozzle clears the feet.

11. Position the fixture on top of the DPF with connecting receptacles pointing toward the control box. (Figure 13)

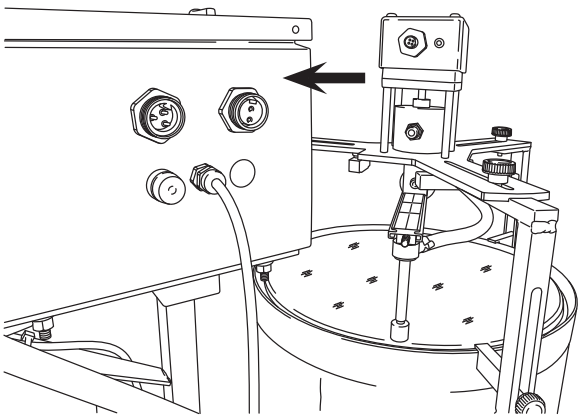


Figure 13

Setup Procedure - Seat the Nozzle Arm

1. Slide the three straps from the DPF Cleaner thru the Neoprene Skirt slots and secure the straps to the fixture. (Figure 14)

NOTE: *Be sure the straps are applied with equal tension.*

2. Rotate the nozzle arm so the drive disc on the end of the arm is off the three cam blocks.

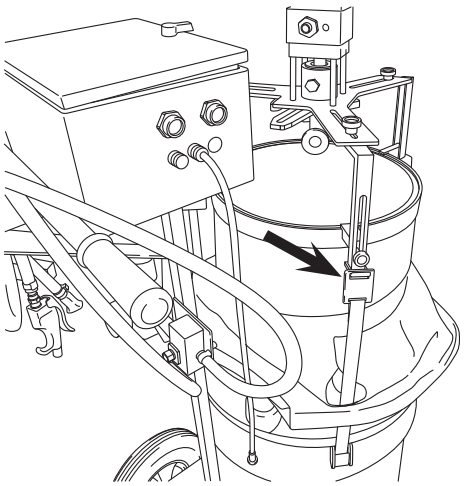


Figure 14

3. Manually rotate the drive disc counterclockwise (CCW) until the nozzle and puck are as close to the outer edge of the DPF substrate as possible without touching the canister inner wall, flange wall, or until the puck is fully rested in the filter substrate. (Figure 15)
4. Manually rotate the arm one full revolution to verify it is clear of any obstructions.
5. Rotate the nozzle arm by hand until the spring loaded ball snaps into the spindle detent.
6. Inspect the puck to ensure there is not a bind and that it is fully rested on the filter substrate.

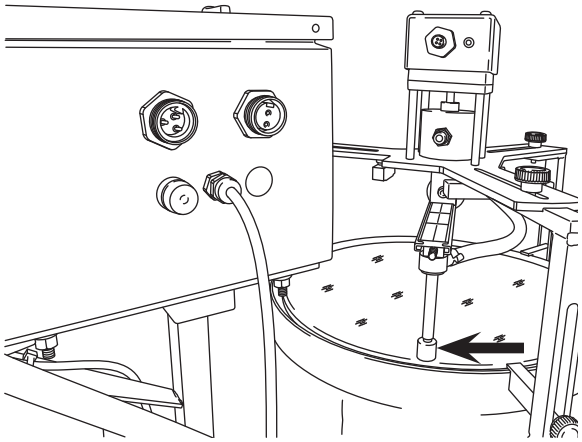


Figure 15

Setup Procedure - Assemble the Containment Hood

1. Attach the 90° elbow to the polycarbonate panel of the Containment Hood. (Figure 16)

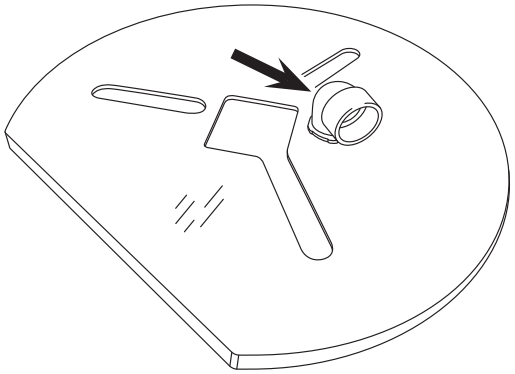


Figure 16

2. Place the hood on top of the fixture with flat side toward the control box.
3. Raise the dust skirt and start attaching the Velcro strip to the hood at a point 180° from the flat edge of the hood. (Figure 17)
4. Continue to attach the dust skirt to the hood, working around both sides and ending at the flat edge of the hood.
5. Attach the HEPA vacuum to the 90° elbow.

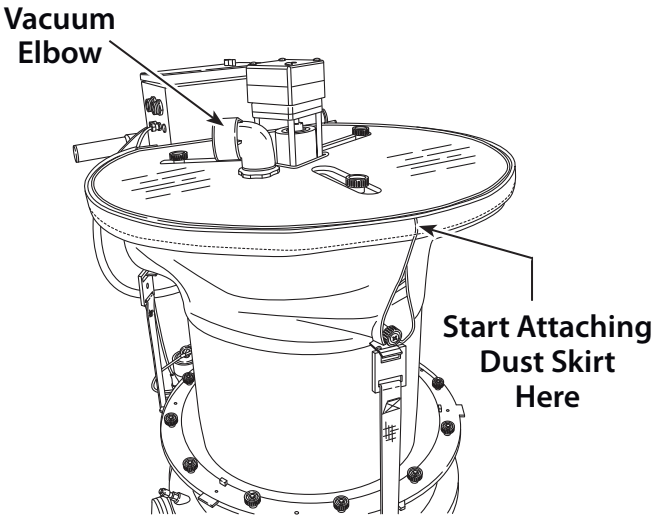


Figure 17

Setup Procedure - Air and Electrical Connections

1. Attach the wire lead from the Control Box onto the motor fixture. (Figure 18)
2. Attach the quick connect air line from the valve onto the fixture.

NOTE: *Carefully check that all wires and hoses are out of the rotation range of the nozzle arm.*

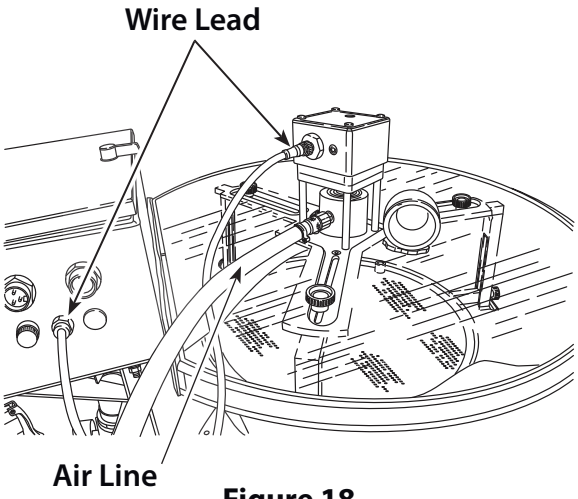


Figure 18

3. Attach a compressed air line into the pneumatic filter/regulator input. Be sure that there is 100 PSI sustained compressor capability. A 3/8 minimum I.D. hose size will be needed and a minimum of 20 CFM compressed air capacity. (Figure 19)

NOTE: The air MUST be clean and free from moisture.

4. Select the preferred input voltage cord and attach it onto the control box and into the power source.

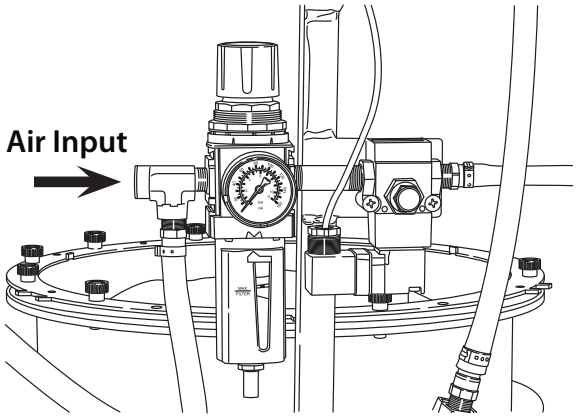


Figure 19

This completes the Setup Procedure

Control Box

1. Once a DPF has been loaded into the DPF Cleaner according to the instructions in the Setup section of this manual, open the cover of the Control box. (Figure 20)
2. Refer to Figure 21 for explanations of panel button functions.

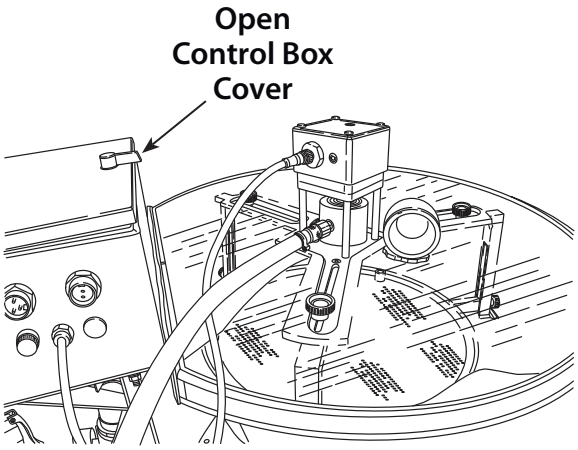
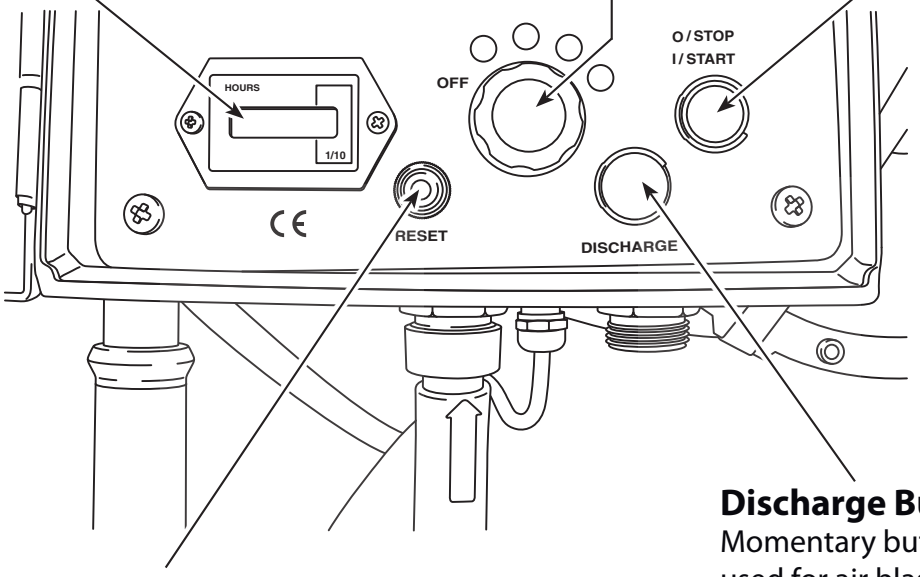


Figure 20

Selector Switch –
Sets the speed of the cleaning cycle based on the location of the nozzle.

Hour Meter –
Shows time elapsed while the cleaning cycle is running.

Stop / Start Button –
Begins / halts the cleaning cycle



Reset Button –
If the nozzle gets stuck during the cleaning cycle, press this button to reset the circuit and continue.

Discharge Button –
Momentary button used for air blast during teardown procedure.

Figure 21

Cleaning Cycle

⚠ CAUTION

To avoid eye injury, always wear protective glasses or face shield. If there is eye contact with the ash, flush eyes with cold water for 30 minutes.

To prevent possible damage to your hearing, always wear ear protection when working around noise generating tools.

Wear protective gloves. If there is skin contact with the ash, thoroughly was the skin with soap and water.

Wear a dust mask to avoid breathing the ash. If visible dust escapes the machine during cleaning procedure, immediately stop the process and check all connections.

1. There are color ranges on the nozzle arm. (Figure 22) Determine the color range where the nozzle is resting under the nozzle arm. Set the Selector Switch on the Control Panel at the same color.
2. Verify the vacuum hose was attached during the Setup procedure. Start the vacuum.
3. Press and release the Stop/Start Button on the control panel.
4. As the nozzle moves toward the center of the DPF and into a different color on the nozzle arm, change the Selector Switch on the control panel to match the color.

NOTE: *This speeds up the cleaning cycle. If this is not done, the cycle will still continue at the starting speed but take longer to complete the cycle.*

5. The nozzle rotates to the center of the DPF and will dwell there until the machine is turned off.

NOTE: *If there appears to be ash blowing out of the top of the DPF during the cleaning process, it could mean the DPF is cracked.*

NOTE: *If the nozzle sticks in one spot during the cleaning cycle, it may trip the reset button.*

1. *Move the selector switch back to the OFF position to free the nozzle.*
2. *Press the Reset Button.*
3. *Change the location of the Selector Switch, if needed.*
4. *Press and release the Stop / Start Button.*

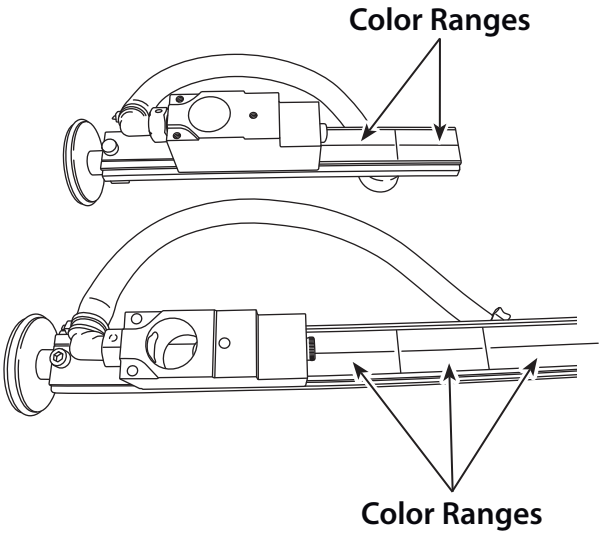


Figure 22

Tech Tip

The DPF Cleaner can help protect the DPF from the elements. Engage the pin on the underside of the lid into the pin hole located on top of the motor enclosure. This helps protect the DPF from moisture.

Teardown Procedure

1. Detach the air line and wire lead from the fixture base. (Figure 23)
2. Remove the hood, dust skirt, and fixture base from the DPF.

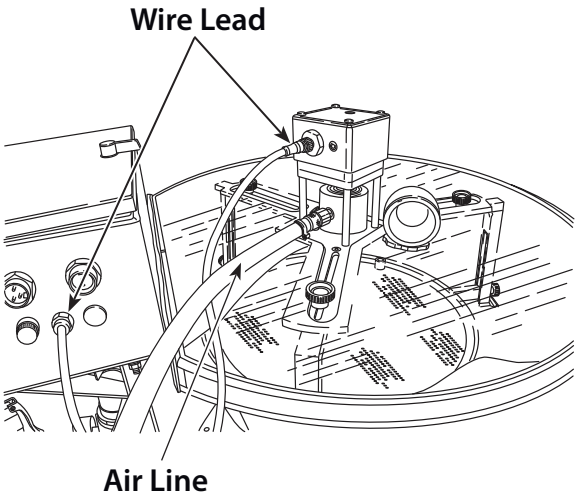


Figure 23

3. Attach the air line that was removed from the fixture to the air blast port on the intermediate base. (Figure 24)

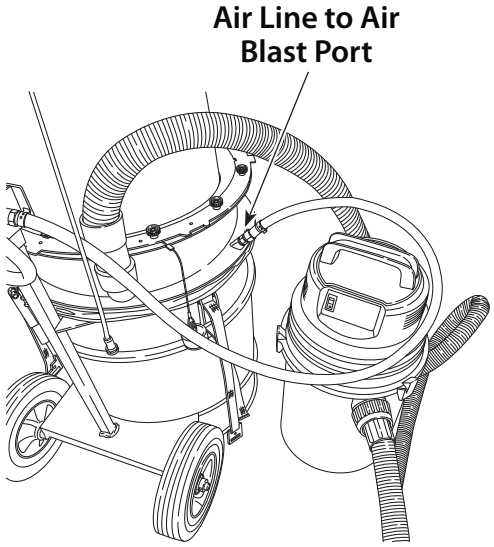


Figure 24

Teardown Procedure contd.

4. Use the compressed air nozzle to lightly blow through the top of the DPF, covering the entire area of the substrate face. (Figure 25) This exercise helps to dislodge the ash that clings to the underside of the DPF.
5. Apply five (5) quick blasts of air by pressing the discharge button on the control panel five (5) times. Use a quick (one second) press and release motion.

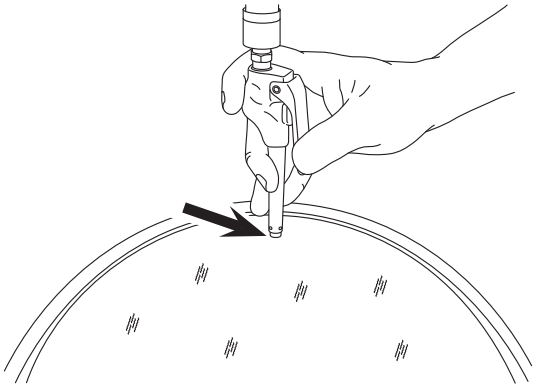


Figure 25

⚠ CAUTION

To prevent personal injury, use five quick (one second each) blasts of air. If the blasts of air are too long, or if too many are applied, it may pressurize the canister, forcing ash to escape from the sealing areas. Wear an N95-rated dust mask to avoid breathing the ash.

6. Remove the rubber plug from the intermediate base and insert the hose from the vacuum. (Figure 26)
7. Turn on the vacuum and slowly lift the DPF from the machine.
8. Once the DPF has been removed, turn off the vacuum and replace the rubber plug.
9. Install the lid on the DPF Cleaner and fasten the straps to keep ash from escaping.
10. Disconnect the DPF Cleaner from the power supply.

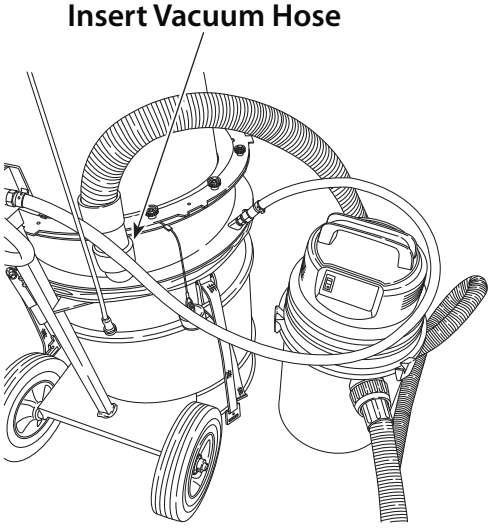


Figure 26

This completes the Teardown Procedure

TROUBLESHOOTING GUIDE

SYMPTOM	SOLUTION
Ash is observed leaking from the DPF Cleaner.	**1.** Stop the cleaning cycle. Look for damage on DPF sealing surface and cracks in the DPF. **2.** Stop the cleaning cycle. Verify all ports on DPF have been plugged. **3.** Stop the cleaning cycle. Check all connections. **4.** Thumb knobs will loosen over time. Check and tighten all thumb knobs.
Ash is observed leaking from the DPF.	**1.** Stop the cleaning cycle. Remove the DPF from the machine and inspect for cracks.
Ash is observed leaking from the vacuum cleaner.	**1.** Verify the ash collection cover is securely closed and latched. **2.** Look for damage in the cover seal.
DPF is not clean after performing a cleaning cycle.	**1.** Check the orientation of DPF to verify the exhaust end of the DPF is positioned correctly. Refer to the section of this user manual named Setup Procedure - Install the DPF. **2.** Look for other DPF conditions that may prevent successful cleaning.
Nozzle sticks in one spot.	If the nozzle sticks in one spot during the cleaning cycle, it will trip the reset button. Follow these steps to continue the cleaning cycle : **1.** Move the selector switch back to the OFF position to free the nozzle. **2.** Press the reset button. **3.** Change the location of the selector switch, if needed. **4.** Press and release the stop / start button.
Puck is suspended above the DPF substrate.	**1.** Refer to the Setup Procedure - Assemble the Fixture section of this user manual and seat the puck back onto the DPF surface.

MAINTENANCE - SCHEDULE

COMPONENT	SCHEDULE
Air Filter / Regulator	Inspect before each use of the DPF Cleaner. Clean as needed if water or dirt are found.
Air Hoses	Inspect for cracks and other damage after every 50 hours of operation. Replace as needed.
Ash Bag	Replace after every 10 hours of operation.
Electrical Cords	Inspect for cracks and other damage after every 50 hours of operation. Replace as needed.
Neoprene Ring Seals	Inspect for rips and other damage after every 10 hours of operation. Replace as needed.
Tie Straps	Inspect for rips and other damage after every 50 hours of operation. Replace as needed.

Maintenance - Replace the Ash Bag

⚠ CAUTION

To avoid eye injury, always wear protective glasses or face shield. If there is eye contact with the ash, flush eyes with cold water for 30 minutes.

Wear protective gloves. If there is skin contact with the ash, thoroughly was the skin with soap and water.

Perform this procedure in an enclosed area free of air movement. Wear a dust mask (rated N95) to avoid breathing in the ash.

Never operate the DPF Cleaner without an ash bag installed in the canister.

This procedure is written for using Ash Bag Replacement Kit No. 442204.

Removal

1. Disconnect the DPF Cleaner from the power source.
2. Unclamp and remove the intermediate ring from the canister. (Figure 27)

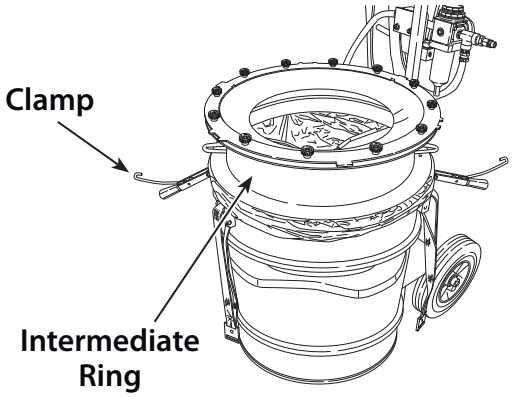


Figure 27

3. Remove the backing from the sealing membrane and adhere the membrane to the top of the ash bag. (Figure 28)
4. Lift the ash bag from the canister.

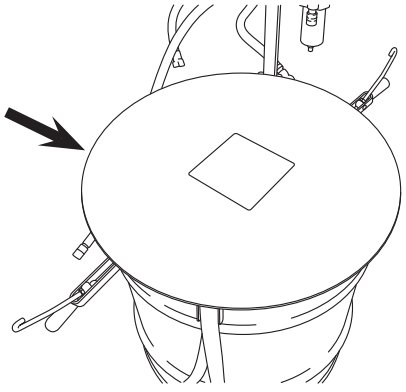


Figure 28

Maintenance - Replace the Ash Bag contd.

5. Slowly and gently press the air out of the ash bag. (Figure 29)
6. Insert and seal the ash bag into the reclose-able bag provided in the replacement kit.

Figure 29

Installation

1. Install the new ash bag into the canister, folding the bag evenly around the outside edge.
2. Reinstall the intermediate ring and clamp it to the canister, ensuring a tight seal to the ash bag. (Figure 30)
3. Vacuum clean the DPF Cleaner and the surrounding area as needed.
4. Dispose of the used ash bag according to federal, state, and local regulations regarding hazardous waste.

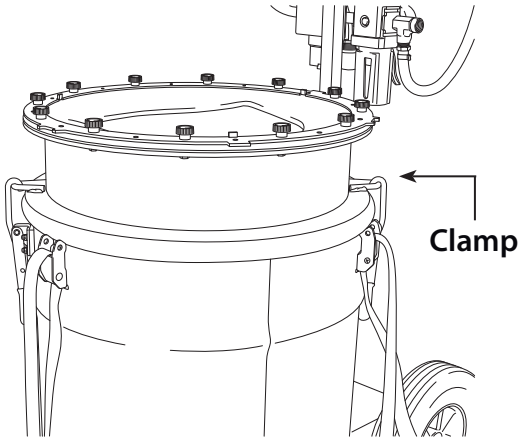


Figure 30

Replacement Parts

PART #	DESCRIPTION
KL22050A	Small Neoprene Skirt
KL22050B	Large Neoprene Skirt
KL22051	Wet / Dry Hang Up HEPA Vacuum
KL22052	Small Seal and O-Ring Kit (165 mm - 235 mm)
KL22053	Medium Seal and O-Ring Kit (235 mm - 325 mm)
KL22054	Large Seal and O-Ring Kit (325 mm - 400 mm)
KL22056	Ash Disposal Kit
KL22057	Replacement HEPA Filter for KL22051
KL22058	Long Knife Kit
KL22059	Short Knife Kit
KL22060	Strap Assembly Kit
KL22061	Hardware Kit
KL22062	Hose/Plug Assembly Kit

PART #	DESCRIPTION
KL22063	Fixture Leg Assembly Kit
KL22064	Short Nozzle Kit
KL22065	Long Nozzle Kit
KL22066	Flange Filter Nozzle Kit
KL22067	Adjustment Foot Kit
KL22068	Flange Filter Adjustment Foot Kit
KL22069	Wheel Kit
KL22070	Pull Action Clamp Kit
KL22071	Cover Assembly Kit
KL22072	Filter Ring Kit
KL22073	Intermediate Base Kit
KL22074	Rubber Stop Assembly Kit
KL22075	Dust Cover Assembly Kit
KL22076	Valve Package/Filter Regulator Kit
KL22077	Electrical Box Kit
KL22078	Rotating Base Kit

For product descriptions and to order replacement parts visit us online at www.klineind.com

Appendix A - Long Reach Nozzle Kit

The following instructions are for use on filters having a substrate depth **GREATER** than 87.5 mm (3.444").

NOTE: *DO NOT use on filters having substrate depths of 87.5 mm and less.*

1. Prior to setting the tripod setting gauge on filter, install three (3) shoulder screw extensions (provided). (Figure 1A)
2. Continue with Steps 5 - 7 in the Setup Procedure - Assemble the Fixture.

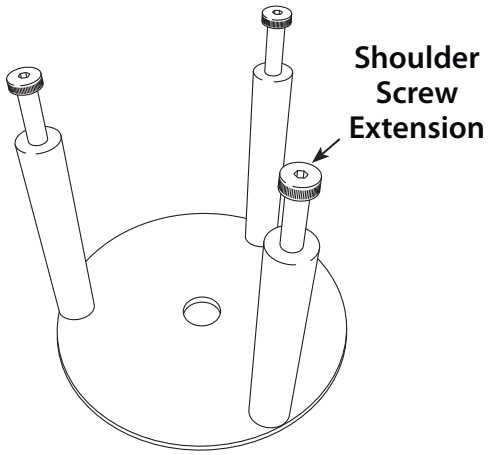
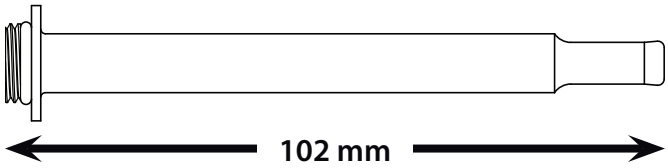


Figure 1A



3. Thread the Long Reach Nozzle onto the arm and use the wrench provided to fasten it in place. (Figure 2A)
4. Continue with the Setup Procedure.

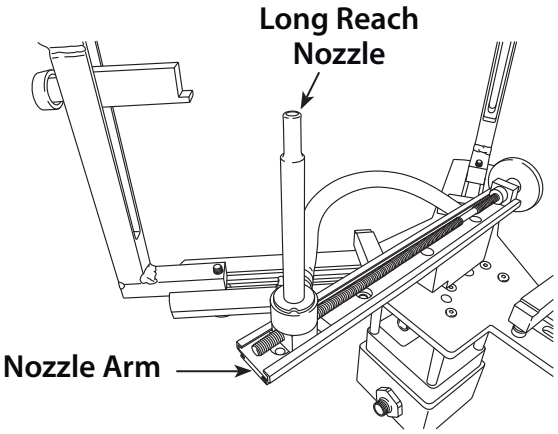


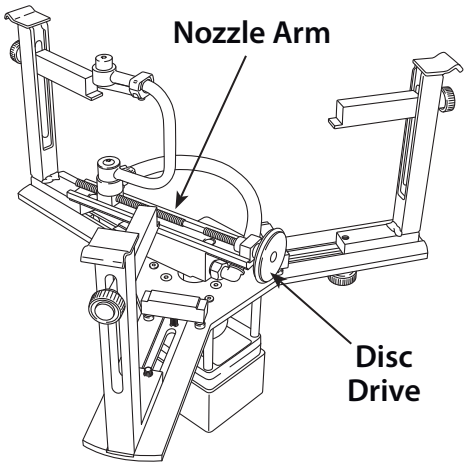
Figure 2A

Appendix B - Flanged Filter Nozzle Kit

1. Install three (3) shoulder screw extensions (provided) on the tripod setting gauge. (Figure 1B) Place the gauge on top of and centered on the DPF.
2. Replace the feet on the fixture with the longer feet provided in the kit. (Figure 2B)
3. Place the fixture on top of the gauge with the legs locked at the flange canister measurement.

NOTE: *When measuring the outer diameter of the flange add 50 mm to the measurement.*

4. Slide the feet down to catch the lip of the DPF, and lock them evenly in place.
5. Remove the fixture and gauge from the DPF.
6. Select the longest nozzle arm that will clear the legs of the fixture but still reach the outer diameter of the DPF. Connect the nozzle arm to the spindle shaft using an "align, push, and twist" movement. The spring-loaded ball should snap into the spindle detent. (Figure 3B)
7. Install the flange nozzle onto the nozzle arm using the supplied mounting nut. Install with the bent part of the nozzle parallel to the nozzle arm and pointing toward the center of the unit. Tighten the nut with the supplied hex key wrench. (Figure 4B)
8. Continue with the Setup Procedure.



Complete Assembly

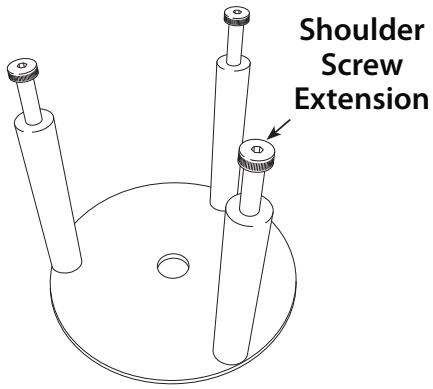


Figure 1B

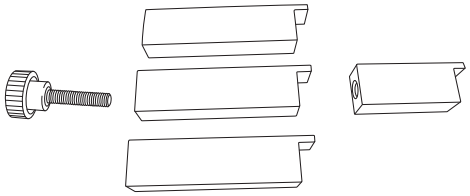


Figure 2B

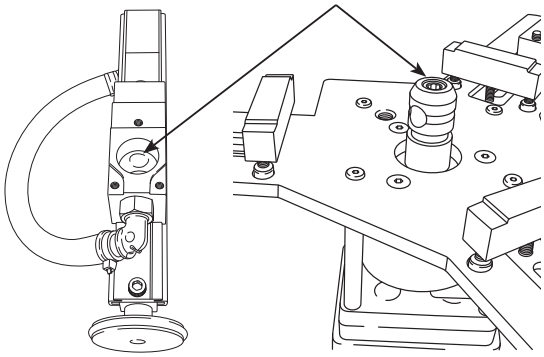


Figure 3B

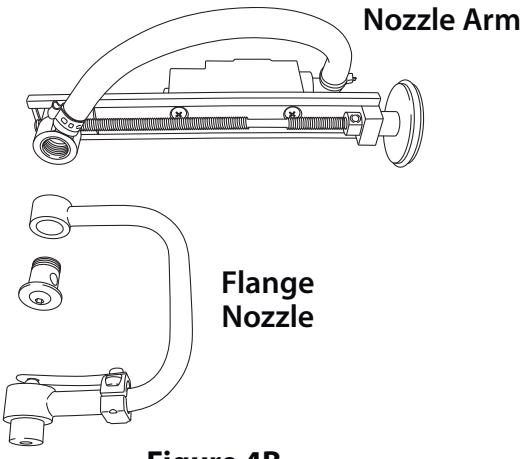


Figure 4B

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