Dental Application Installation Guidelines

For FX2 Original Extraction Arm 75mm and MFS High Efficiency Filter System

PREFACE

Read all product documentation and product identification plate carefully before installation, use, and service of this product. Replace documentation immediately if lost. Nederman reserves the right, without previous notice, to modify and improve its products including documentation.

This product is designed to meet the requirements of relevant EC directives. To maintain this status, all installation, maintenance and repair is to be done by qualified personnel using only Nederman original spare parts and accessories. Contact the nearest authorized distributor or Nederman for advice on technical service and obtaining spare parts. If there are any damaged or missing parts when the product is delivered, notify the carrier and the local Nederman representative immediately.

This installation guide makes reference to materials and supplies that may not be supplied by Nederman or distributor and its related products. Materials not supplied by Nederman must be sourced by the installer where not ordered through Nederman and/or its distributors.

For Terms and Conditions of Sale visit the link below:

https://www.nederman.com/en-us/about-us/us-terms-conditions

Nederman

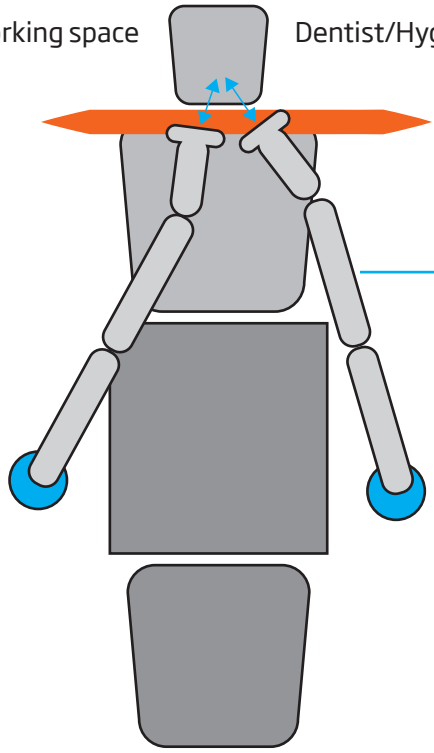
Dental Clinic Application Installation Guide

Table of Contents

Arm Location Within Room and Capture Zone

Dentist/Hygienist/Assistant working space

Dentist/Hygienist/Assistant working space



Approximately 300 mm / 12" distance

We recommend placing the extraction arm approximately where the patients knees would align when on chair.

The target range position for the mini-hood should be in the range of 12" away from where the patients mouth would be located.

Image for reference only. Image is not to scale

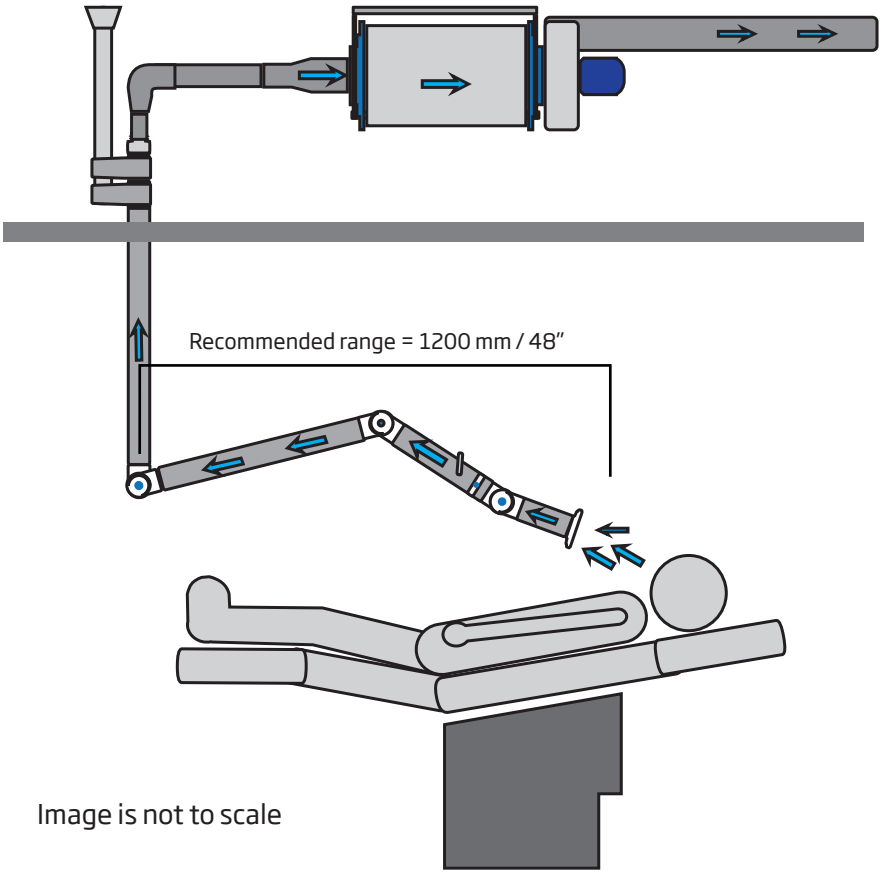


Image is not to scale

Up Plus Installation

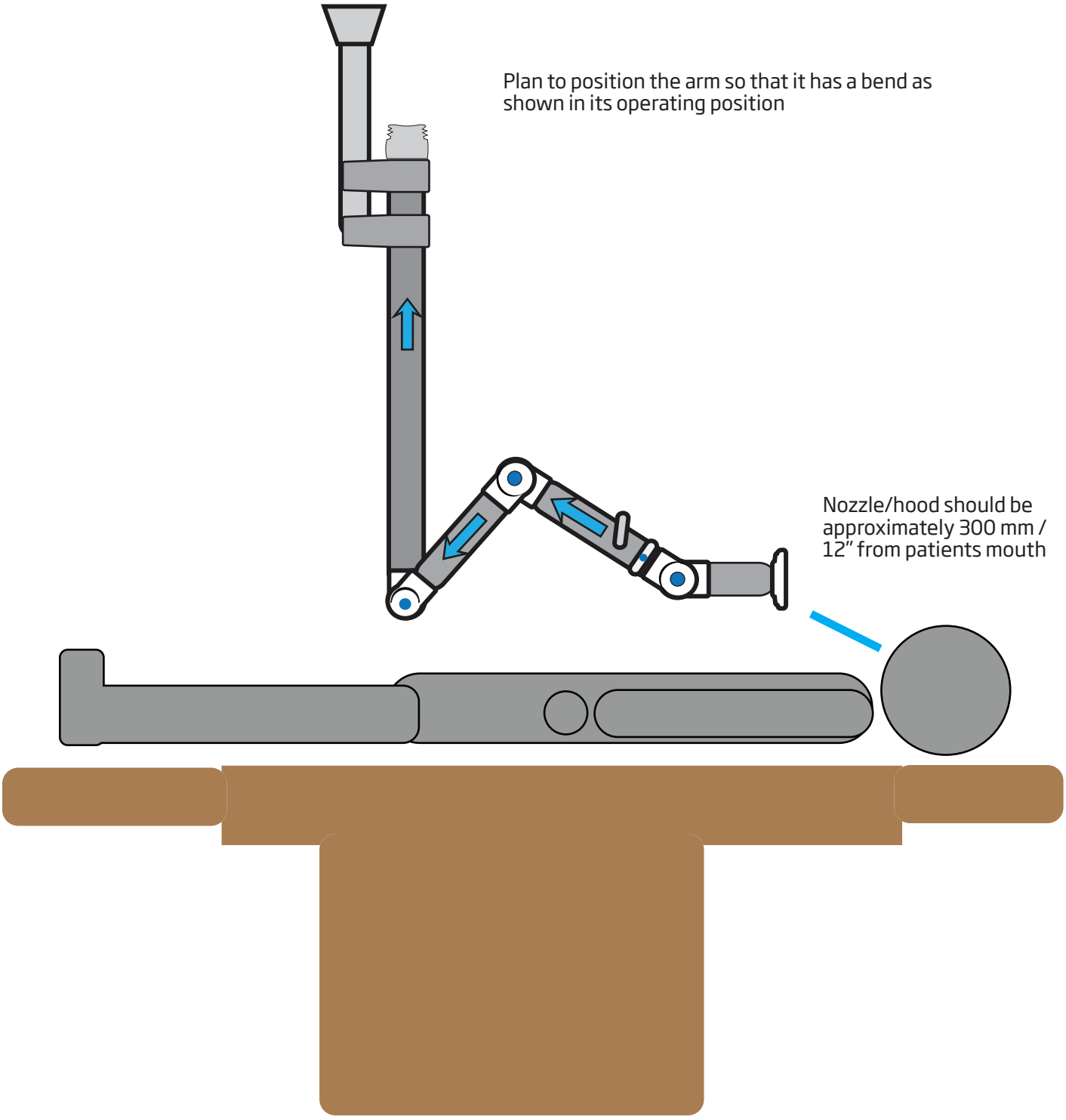
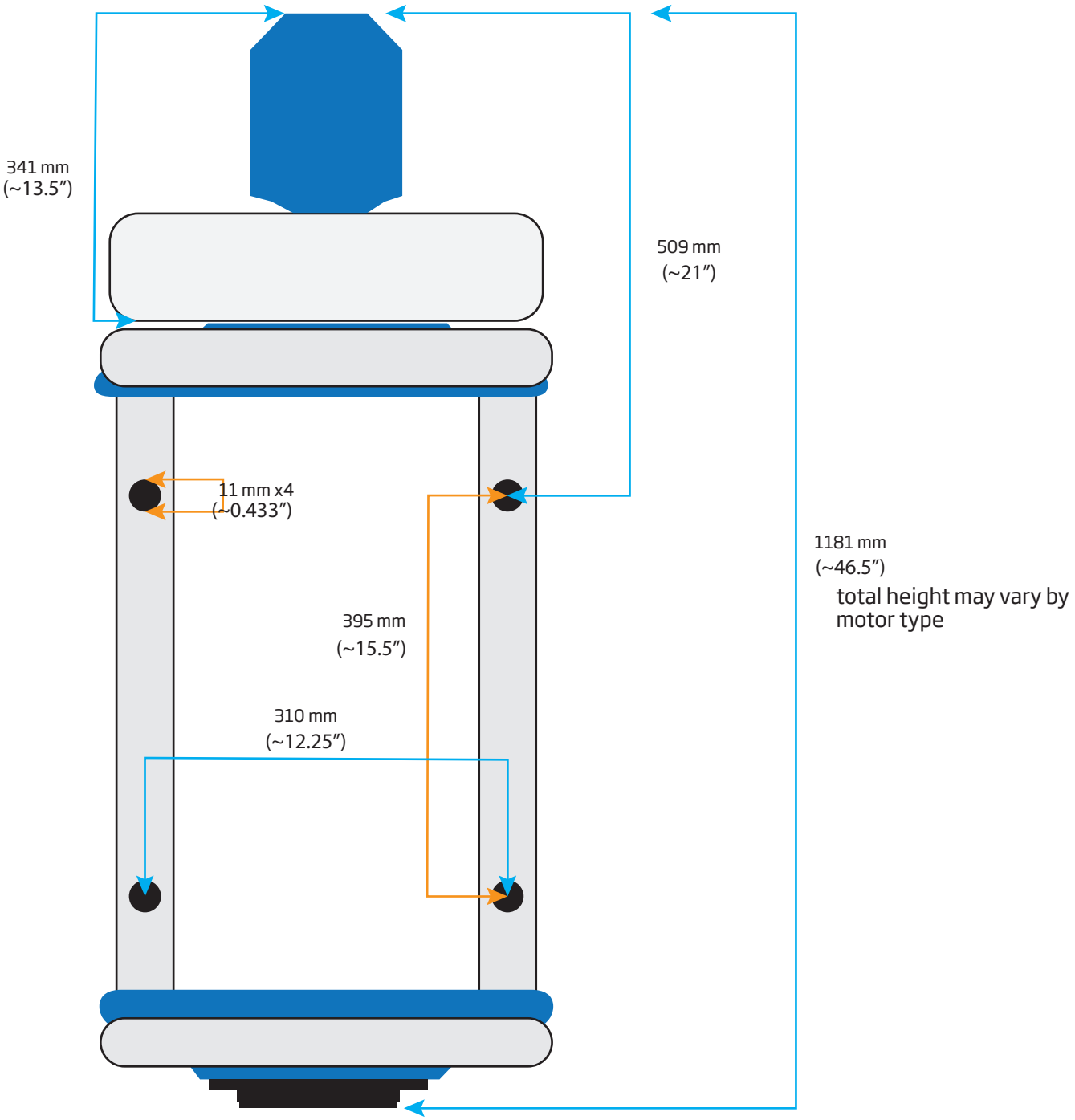


image for illustrative purposes only and is not to scale.

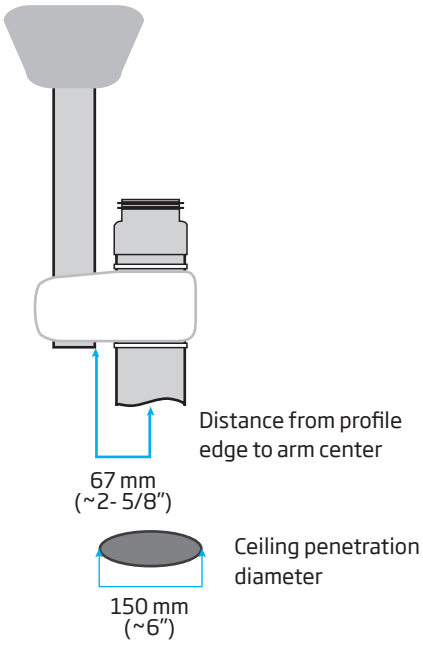
Structural Guidance: MFS Console

Ensure that the MFS console assembly is installed on a structural frame securely.
Use the dimensions shown to determine best positioning of the unit in the space or build secure structure as necessary.

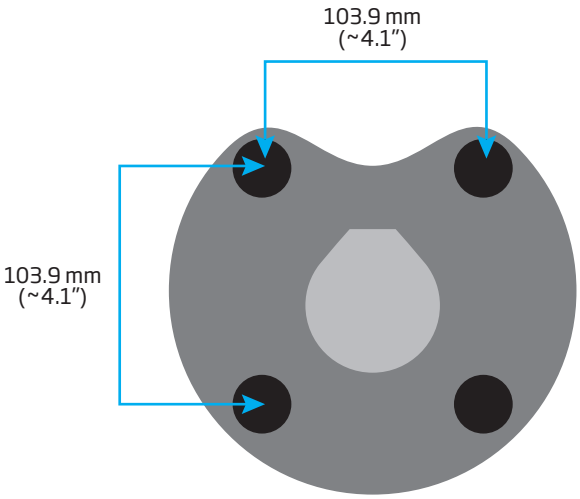


Structural Guidance: FX2 Extraction Arm

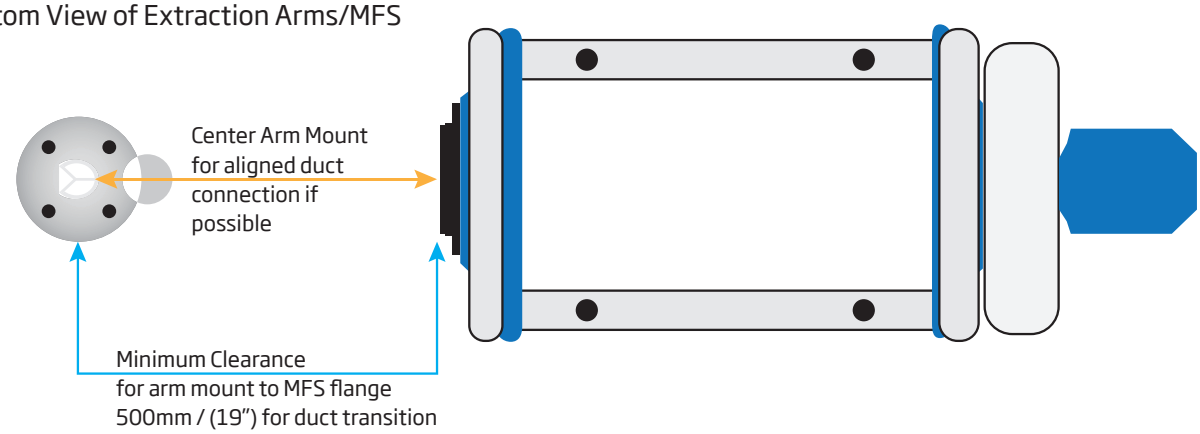
Ensure that the FX2 Extraction Arm mount is installed on a structural frame securely.
Use the dimensions shown to determine best positioning of the bracket in the space or build secure structure as necessary. Consider using steel strut to secure to roof or across joists.



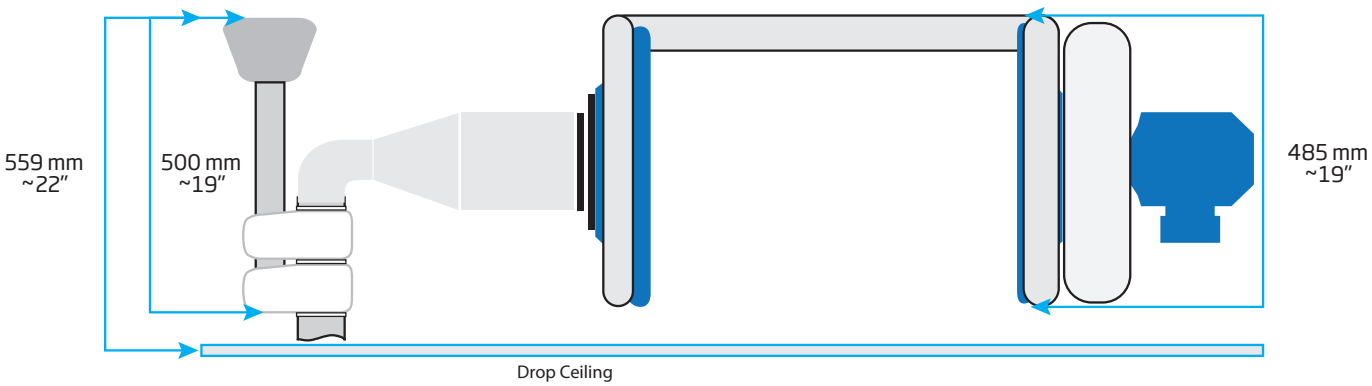
Ceiling/Wall Bracket Hole Pattern



Bottom View of Extraction Arms/MFS



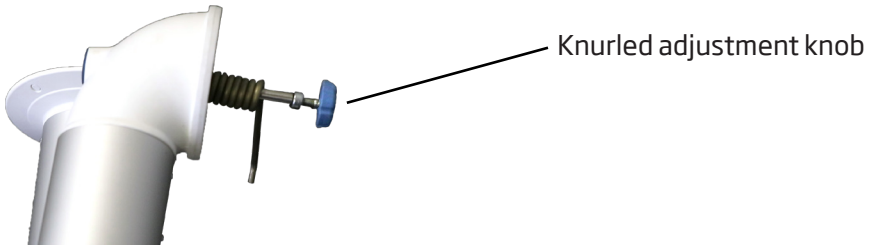
Side View of Extraction Arms / MFS



Mounting the Extraction Arm

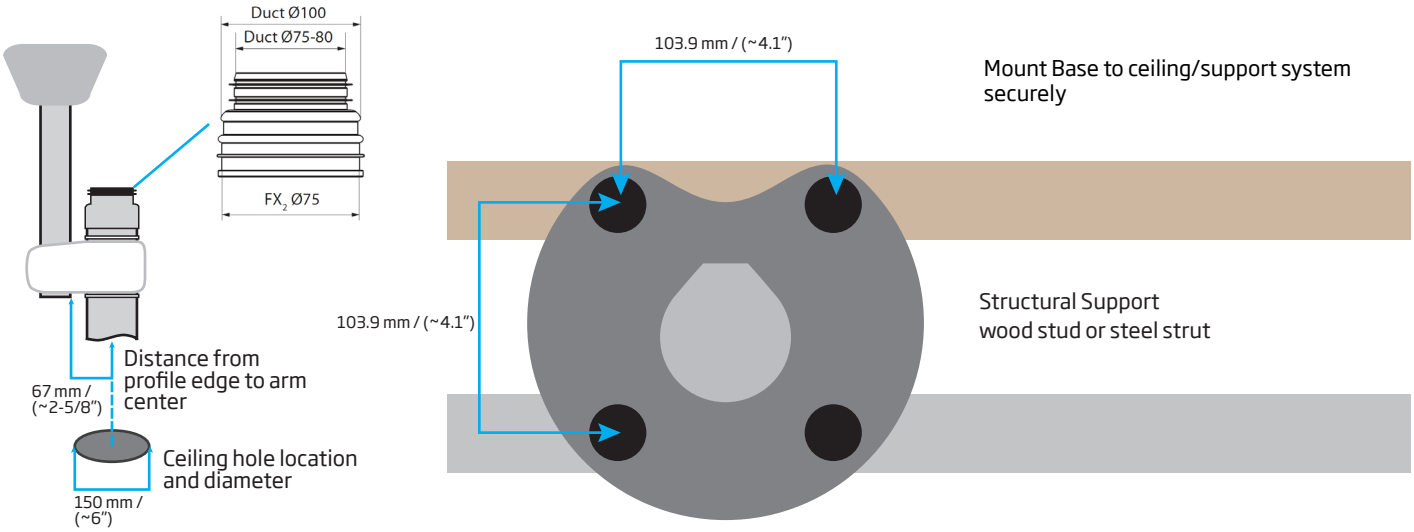
Step 1 - preparing the arm for installation

!Up-Plus installation tip! - Disassemble first and second arm section from the up pipe by unscrewing the knurled adjustment knobs. !Carefully remove the first section of the up pipe and be aware of the spring under tension in the elbow!



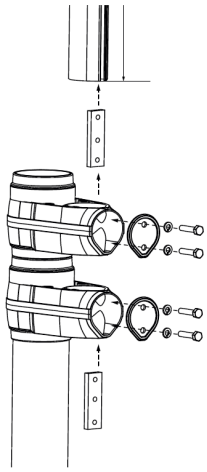
Step 2 - installing the mounting bracket

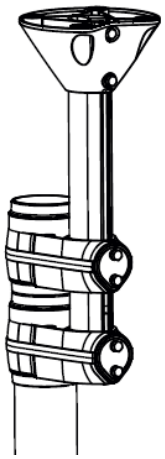
Determine appropriate mounting location based on suggestion in this guide. Ensure mounting location does not interfere with any other equipment in the room through the arms full range of motion.
Cut hole in ceiling tile as indicated below.



Step 3 - installing the arm to the bracket

Insert bottom section of arm through ceiling hole. Connect the Up-Plus swivels to the aluminum profile as shown and secure with hardware included.



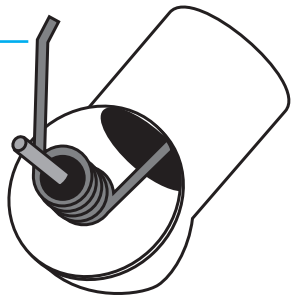


Step 4 - re-assembling the arm

Re-attach lower section of extraction arm ensuring that you feel some tension on the extraction arm as you are re-assembling. The adjustment knobs must be on your right had side when you are looking directly at the arm.

Tension knobs to balance arm.
DO NOT OVER-TIGHTEN!

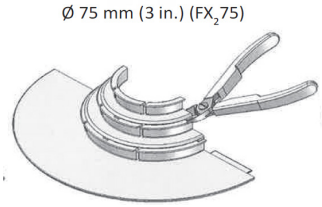
Ensure bend of spring is contacting inner wall of arm



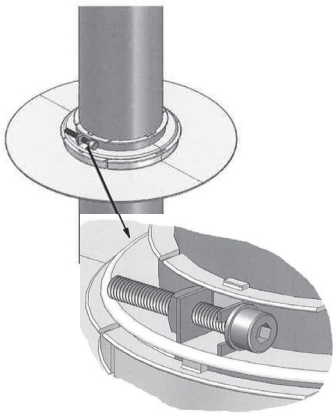
Step 5 - installing the ceiling cover plate

Install ceiling cover plate on upper extraction arm and slide up into place.

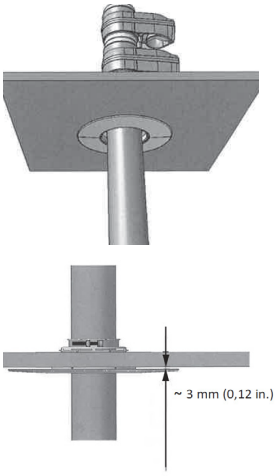
1



2



3



Ceiling Plate will rotate with the extraction arm.

Step 6 - Verify your arm installation

Correctly Installed FX2 Extraction can be identified with the following:

First section of the arm directs to the left hand side

Damper control located at the top of the arm

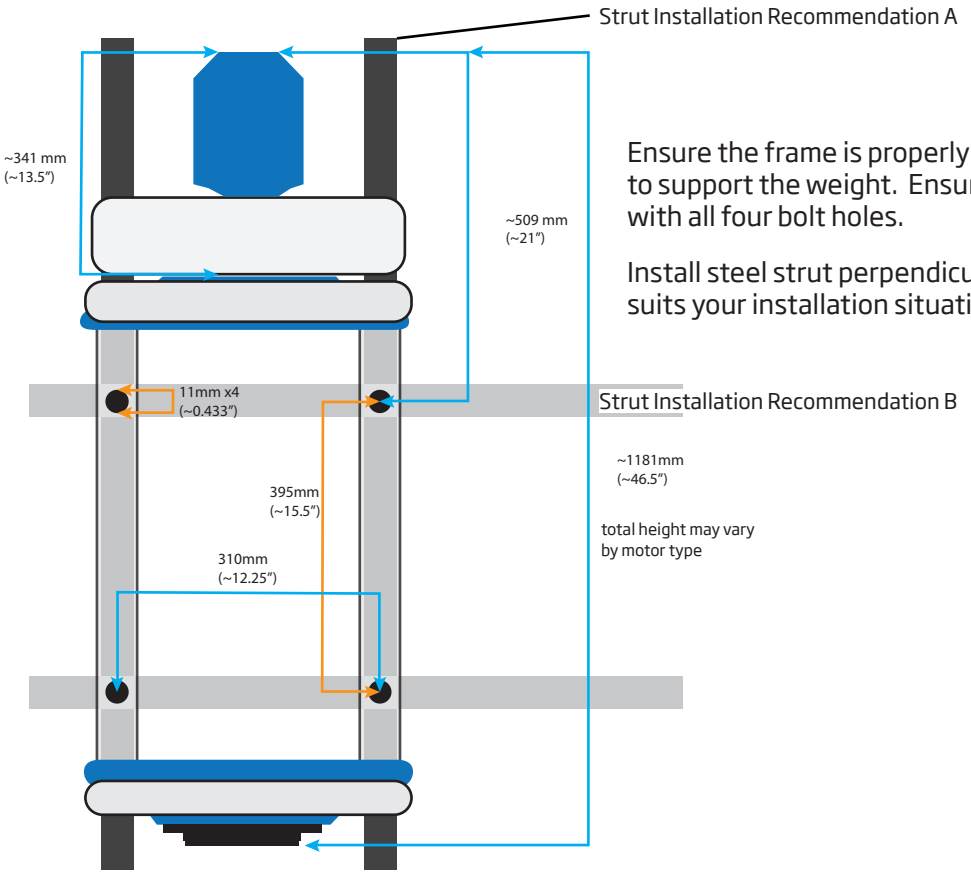
Adjustment knobs located on the right hand side for all three sections

For optional hood installation, see installation instructions included with hood.

For Installations with Filters

Installing the MFS Filter in a Horizontal Position.
Ensure that the MFS console and mounted motor are properly supported.

Step 1 - Supporting the MFS Console



Ensure the frame is properly supported, steel strut recommended to support the weight. Ensure support structure properly aligns with all four bolt holes.

Install steel strut perpendicular or parallel to MFS frame, whichever suits your installation situation best.

Step 2 - Installing the flange adapter

Install the flange adapter to the inlet side of the MFS console. The Inlet side is the blue support WITHOUT the integrated mesh.

Step 3 - mounting the MFS Console to your structural support

2 PERSON TASK!
Install the MFS frame to the structure.

Ensure that the inlet side points towards the direction that the air will be coming from the extraction arm duct.

Install 4 bolts to loosely hold the frame in place for installation of maintenance straps in step 4.

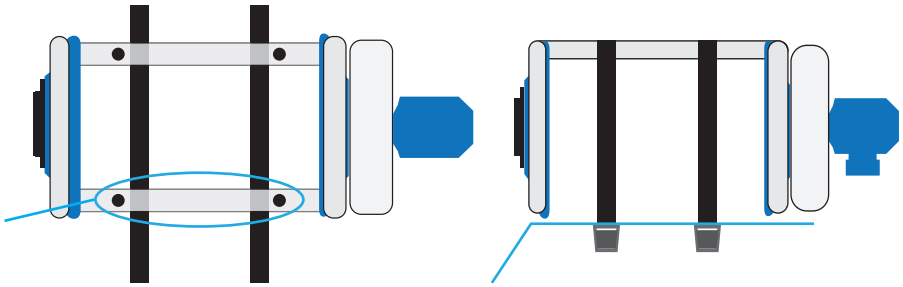
Step 4 - installing the maintenance straps

Install the two (2) maintenance straps over the frame of the MFS.

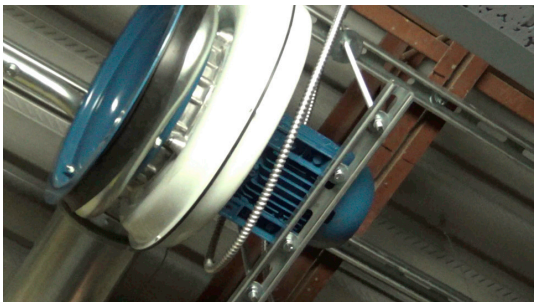
Position the straps to the inner side of the bolt holes.

Loosely connect strap through clasp creating a loop. The clasp should be positioned approximately just below the lowest point of the MFS frame.

Tighten the four MFS frame bolts down securely.

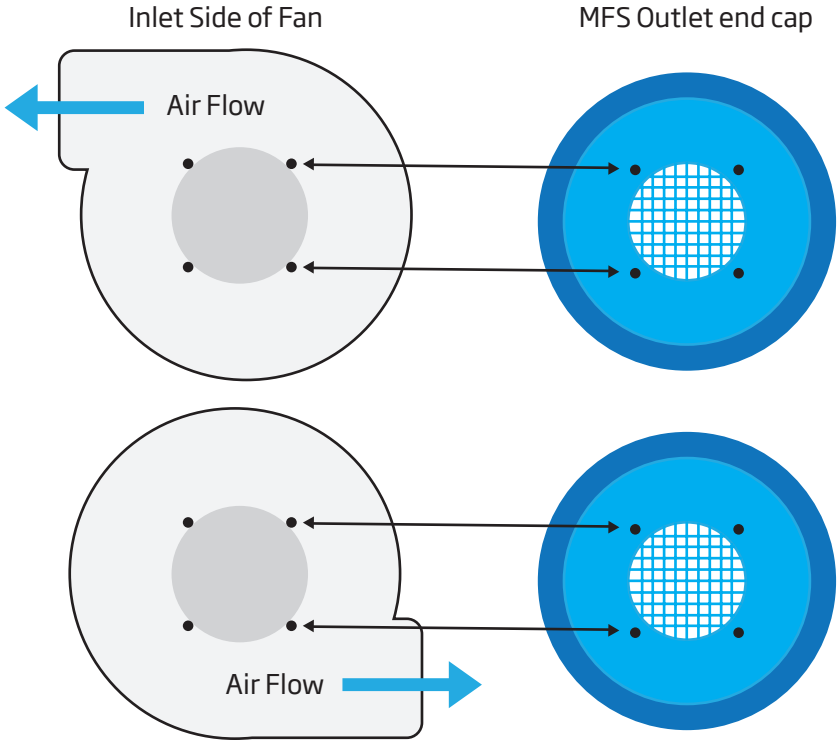


Step 5 - installing the fan assembly



For fans direct mounting to MFS Console!
Create support structure for fan to assist during installation and support motor weight during normal operation.

Electrical connections must be performed by a qualified electrician.



Mount the fan to the MFS frame outlet end cap (blue with integrated mesh).

Ensure the fan outlet is pointed in the direction of where you plan to connect exhaust duct.

Tighten four bolts to securely old the fan in place.

Step 6 - installing the filter gaskets

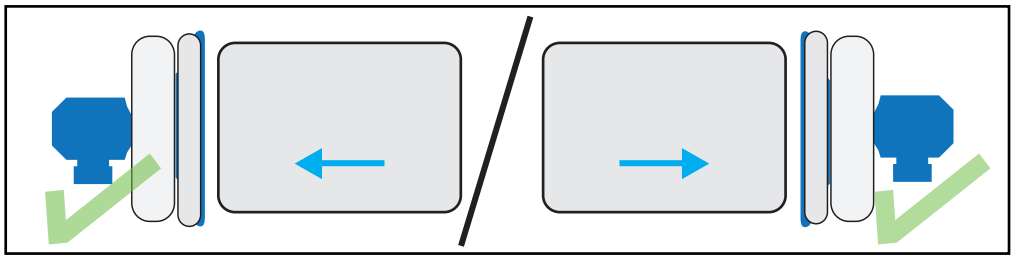
Preparing to Install the filter

Install the rubber gaskets to the blue end caps of the MFS console.

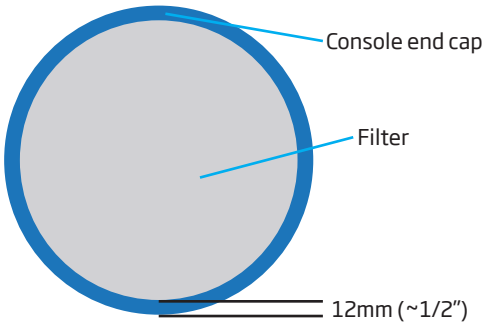
Position the rubber gasket so that the top is installed to the ridge and the bottom of the console is open to accept the filter.

Step 7 - installing the filter to the MFS console

Cradle the filter into the maintenance support straps.



Ensure the arrow on the filter points towards the fan.



Adjust each strap evenly as you guide the filter into the filter console.

Filter must be centered with each end cap prior to installing the gasket for proper sealing.

Close the bottom half of the gasket to the blue end caps

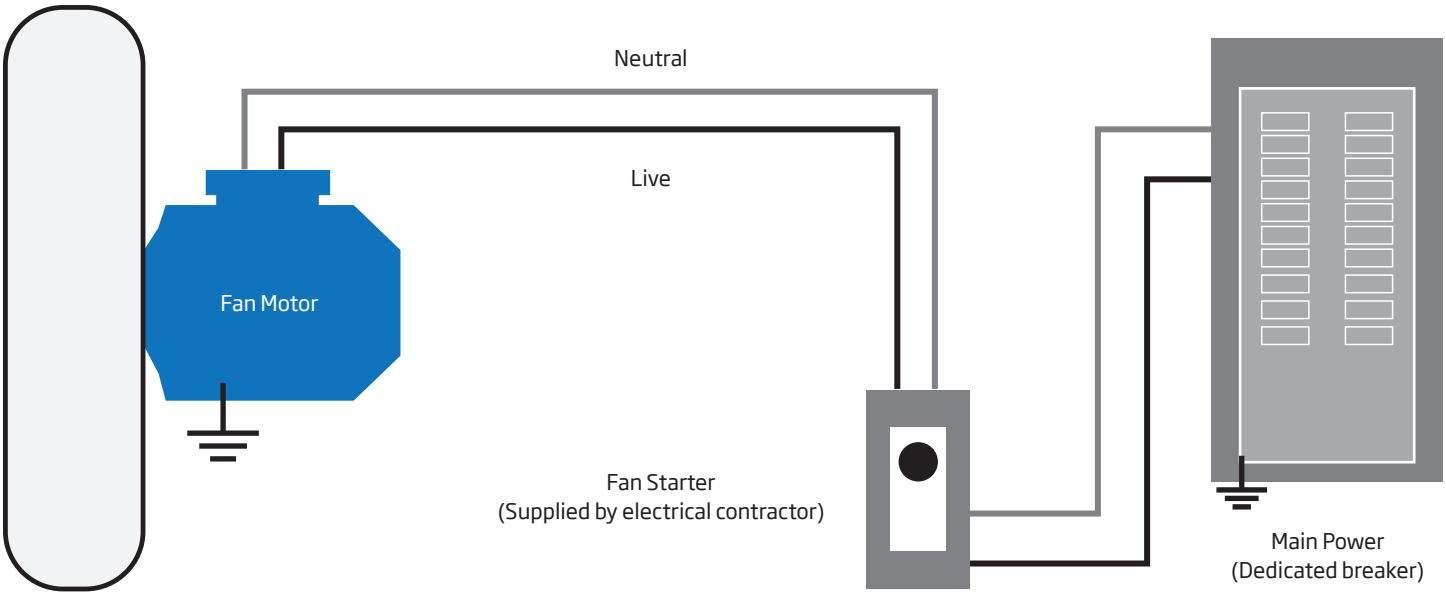
Tuck loose ends of maintenance strap on top of filter.

Installation of MFS filter is complete.

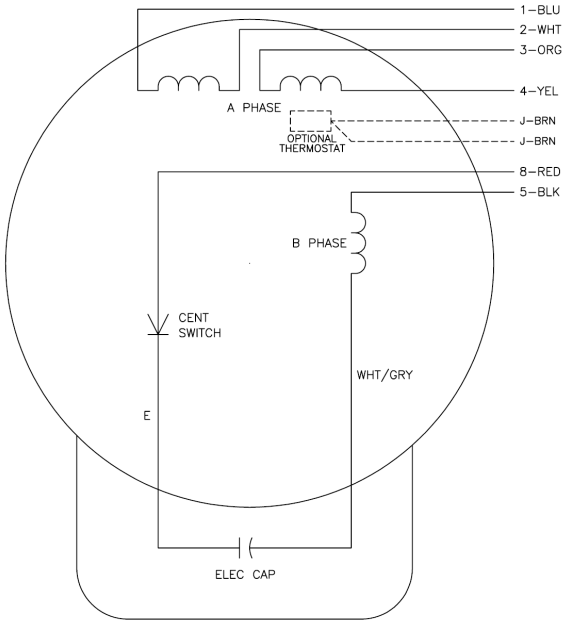
Electrical Information

Fan must be connected to a power source by a qualified electrician.

Article No.	Description	Voltage	FLA - 115V	FLA - 230V
89160050	NIF 314 1/2 HP	115/1/60 230/1/60	7	3.5
87000429	NIB 2000 3/4 HP	115/1/60 230/1/60	9.6	4.8
87000433	NIF 200 1-1/2 HP	115/1/60 230/1/60	16	8
14510222	N24 1 HP	115/1/60 230/1/60	11.4	5.7
87000432	NIB 2150 1-1/2 HP	115/1/60 230/1/60	16	8



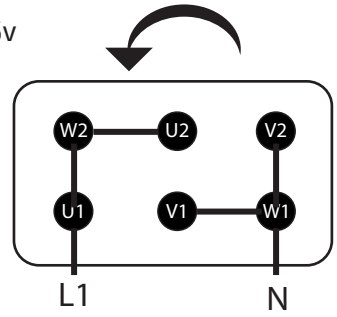
89160050 - NIF 314 1/2 HP
87000429 - NIB 2000 3/4 HP
87000433 - 200 1-1/2 HP
87000432 - NIB 2150 1-1/2 HP

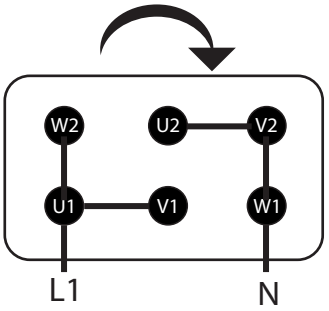


	LINE A	LINE B	JOIN
HIGH STD	1	4,5	2,3,8
HIGH OPP	1	4,8	2,3,5
LOW STD	1,3,8	2,4,5	–
LOW OPP	1,3,5	2,4,8	–

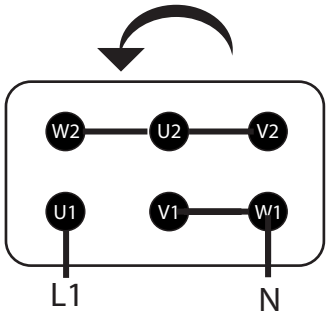
14510222 - N24 1 HP

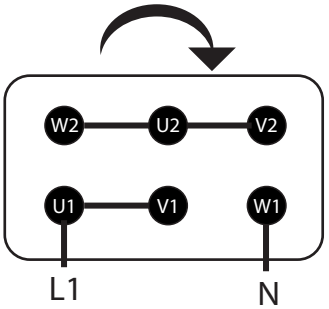
115v



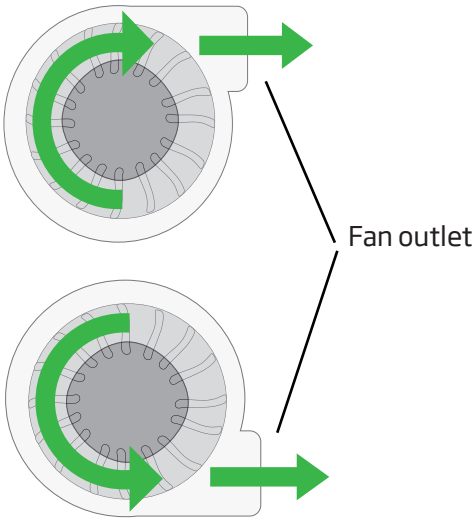


230v



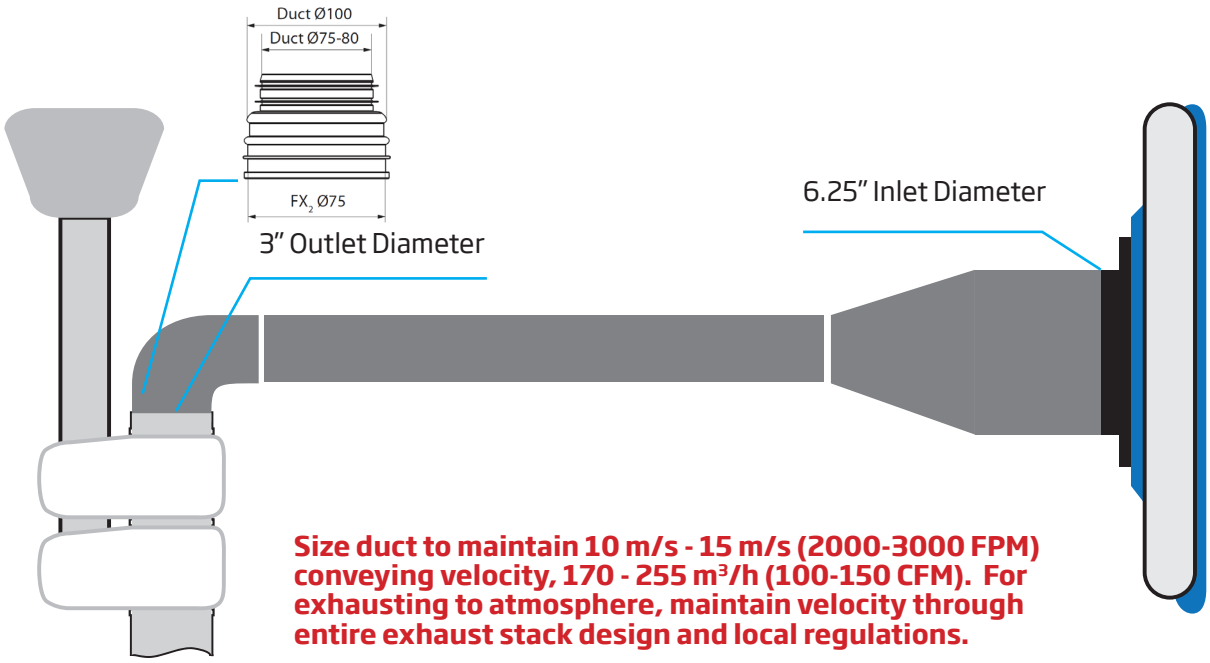


Ensure that the correct direction is wired for the fan.
While facing the shaft, confirm the fan rotates in the direction where the fan blades throw the air towards the outlet of the fan.



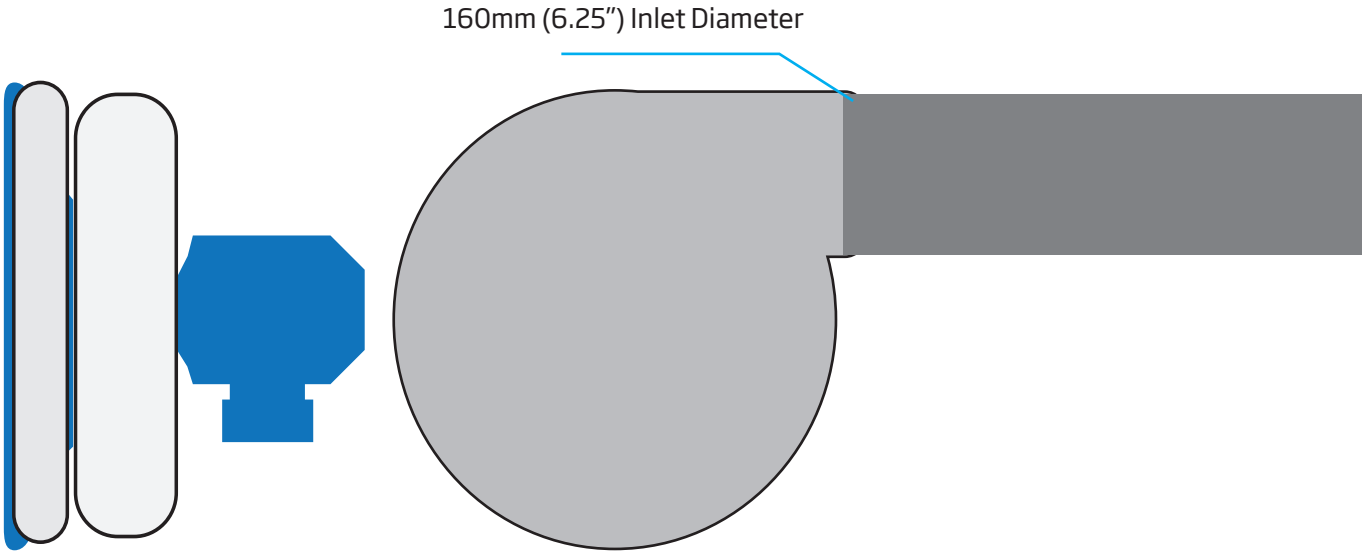
Duct Connection for MFS Console and Fan Exhaust

Inlet Side of MFS Filter



Size duct to maintain 10 m/s - 15 m/s (2000-3000 FPM) conveying velocity, 170 - 255 m³/h (100-150 CFM). For exhausting to atmosphere, maintain velocity through entire exhaust stack design and local regulations.

Outlet Side of Filter/Fan



For filtered systems, it is acceptable to open duct to full 160 mm (6.25") exhaust diameter at the fan exhaust.

For unfiltered systems, duct must be sized to maintain 15 m/s (3000 FPM) to the end of the outlet pipe.

Duct Design Guidance

These system configurations are design for no more than 100 ft of total duct length. This guidance has been created for the specific application of aerosol generating procedures in a dental clinic application. Please contact your local Nederman distributor to ensure your fan will provide the adequate performance should your total duct length exceed 100 ft.

Industrial grade duct of minimum 24 gauge must be used to accommodate the necessary vacuum pressure generated.

The duct must be sealed. Do not use flex duct or hose anywhere for unfiltered systems. Flex duct can be used in filtered system ONLY on the filtered air side of the system

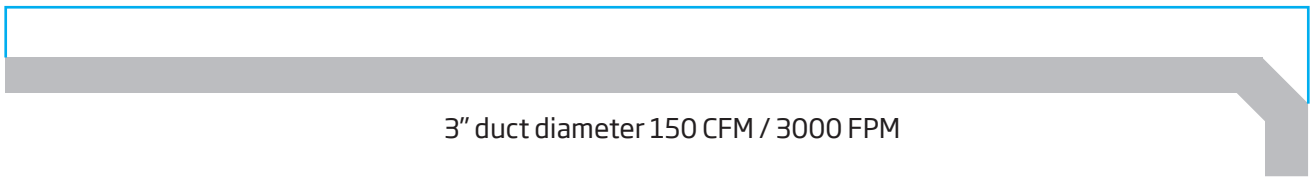
The basic duct design examples shown here use industrial ventilation principals and may vary from your specific installation scenario.

As air volume is "consumed" at each extraction point in the system, conveying velocity slows down due to the reduced vacuum pressure from air volume lost. It is important to reduce duct sizes appropriately after each extraction point in order to re-balance the air pressure after each point of air volume consumption to maintain adequate air speed throughout the entire duct system.

Manual blast gates must be used at each arm branch to balance air volume to 170-255 m3/h (100-150 CFM) and conveying velocity of 10-15 m/s (2000-3000 FPM)! DO NOT USE INTEGRATED DAMPERS ON ARM TO BALANCE AIR SYSTEM!

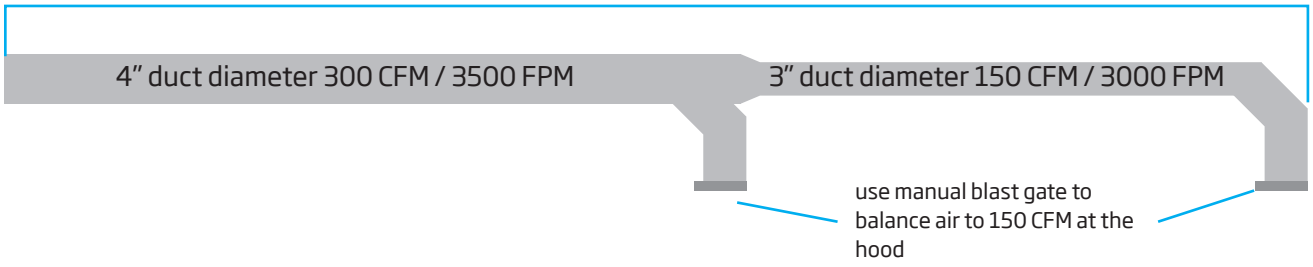
Single Arm System

total linear feet of duct must be less than 100 ft.



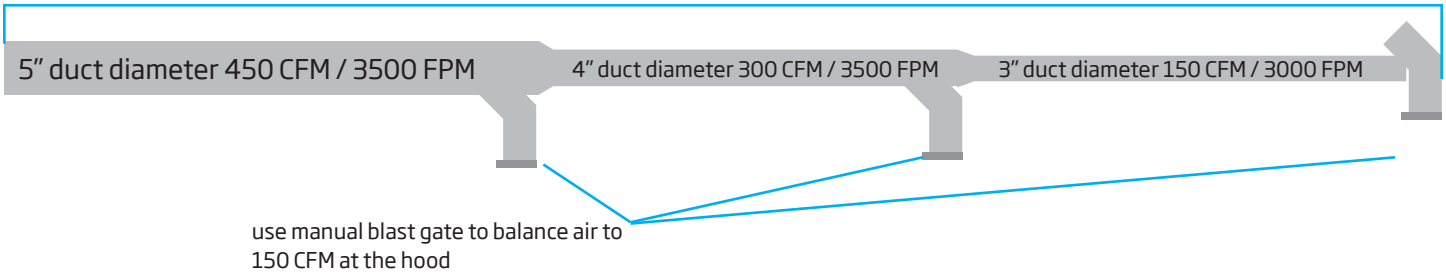
Two Arm System

total linear feet of duct must be less than 100 ft.



Three Arm System

total linear feet of duct must be less than 100 ft.



Effect of 90 degree elbows in duct

The duct design can have an impact on both air flow and conveying velocity performance. It is important to understand best practices on using 90 degree elbows in your duct design and reduce the number of 90 degree turns in your system design as much as possible. Below is a table that assists in determining the total linear length of duct in your system from the fan to the furthest point.

Duct Bend Equivalent Resistances

in feet of round straight duct

Duct Size	(A) 90 deg elbow 1.5 diam. radius = ft. of straight duct	(B) 90 deg elbow 2 diam. radius = ft. of straight duct	(C) 30 deg branch = ft. of straight duct
3″	5	2	1
4″	5	3	2
5″	6	4	3
6″	12	7	5
7″	13	9	6
8″	15	10	7

X(A) + X(B) +X(C) + Y = Total Linear Feet of Duct

where **X** is the number of types of bends in the duct system, **Y** is the length of physically straight duct in feet

All 4 Inch Duct Design Example:

Straight Duct (Y)  X 30 ft.

90 deg. elbow 1.5 diam. radius (A)  5 pieces @ 5 ft = 25 ft

30 deg. branch (C)  X 3 pieces @ 2 ft = 6 ft

Total Linear Feet of Duct — 61 ft.

Maintaining your FX2 Extraction Arm

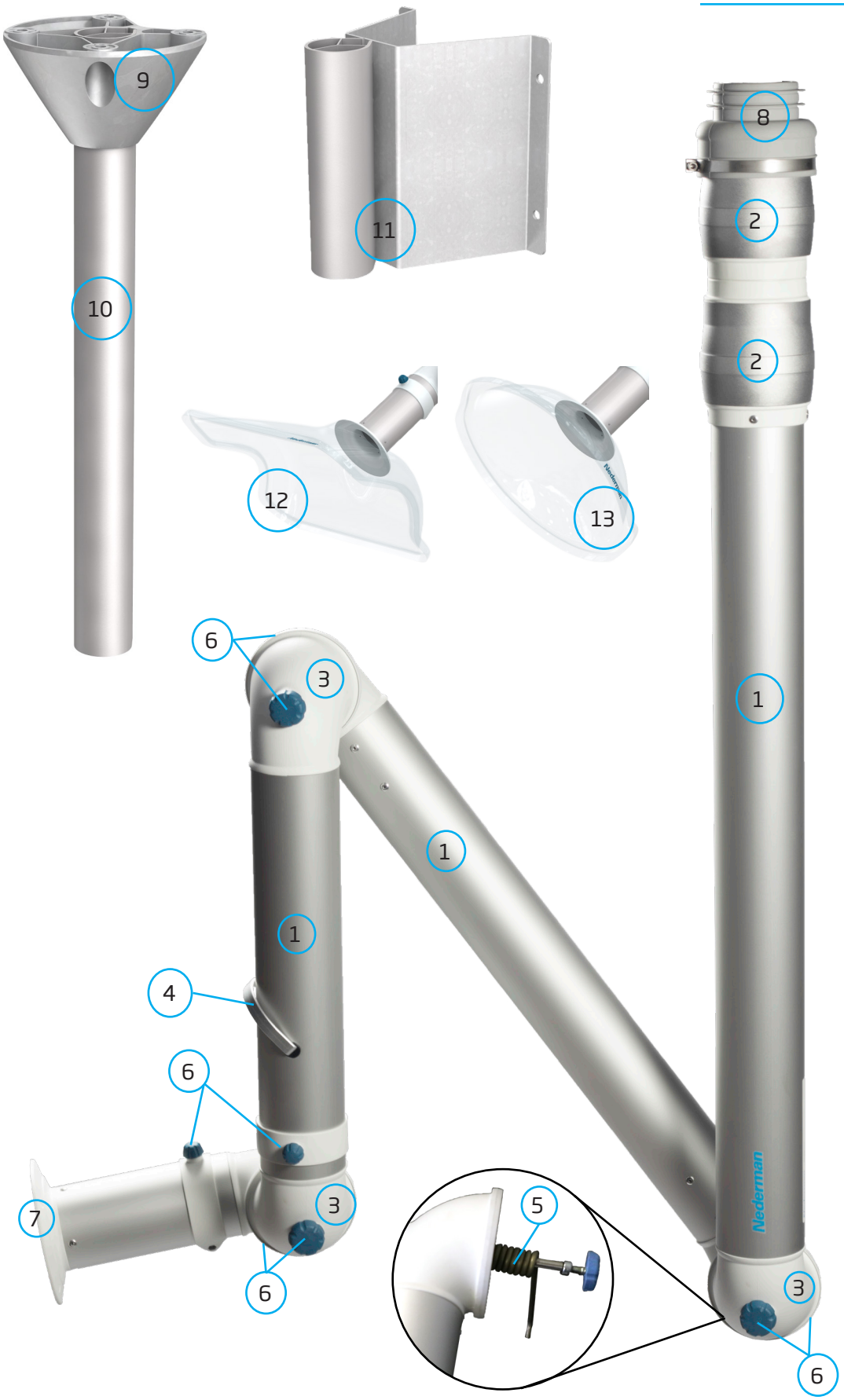
FX2 Extraction Arm Material Construction

The FX2 Original extraction arm is constructed using various materials that may react to certain cleaning agents. Please ensure that the cleaning agent that you use is suitable for use with the material in the extraction arm that it will make contact with.

REF	FX_2 Original Extraction Arm	Material Construction
1	Arm Sections	Aluminum with anodized coating
2	Mounting swivel	White powder coated hi-grade cast aluminum
3	Jointed elbows	Polypropylene with glass fiber reinforcement
4	Damper Blade	Thermoplastic elastomer with anodized aluminum adjustment handle
5	Support Spring	Stainless Steel
6	External locking rings and locking knobs	Glass fiber reinforced polypropylene
7	Integral Hood (Mini-Hood)	Polypropylene
8	Duct Transition	EPDM Rubber
9	Classic Base Bracket	High-grade cast aluminum
10	Extension Profile	Anodized structural extruded aluminum
11	Wall Plus Bracket	Powder coated steel
	Optional Hoods	
12	FX_2 Combi Hood - Clear	PET-G plastic with plated steel hardware
13	Dome Hood - Clear	PET-G plastic with plated steel hardware

Known Compatible Cleaning Agents

Agent	Note
Isopropyl Alcohol	Compatible with PETG, Polycarbonate. Use alcohol-based wipes, sprays or soaked cloths containing at least 70% alcohol. Do not dilute. Allow alcohol to remain on surface for at least 30 seconds or longer to disinfect.
Ethyl Alcohol	Compatible with PETG, Polycarbonate. Use alcohol-based wipes, sprays or soaked cloths containing at least 70% alcohol. Do not dilute. Allow alcohol to remain on surface for at least 30 seconds or longer to disinfect.
Hydrogen Peroxide	Compatible with Acrylic, PETG, Polycarbonate. Use 3-5% hydrogen peroxide. Do not dilute. Allow to remain on the plastic for several minutes.


9
10
11
8
2
2
12
13
1
6
3
1
1
4
6
7
3
6
5
3
6
Nederman

Common System Operational Topics

Topic	Guidance
Air Flow is lower than expected	• Air Flow directly in front of the extraction arm hood should be 100-150 CFM • Ensure motor connection are correct for voltage • Ensure that the fan impeller is spinning in the correct direction. • For single phase fans, where jumpers for direction are available, ensure the jumpers are properly placed to direct the air towards the outlet of the fan. • Ensure there are no obstructions anywhere in the arm or duct system. • Ensure the integrated damper is fully open on the extraction arm. • Ensure the fan's performance specification are adequate for your system, contact your local Nederman distributor or fan supplier.
Extraction arm does not hold position	• Adjust the tension knobs on each section of the extraction arm until desired balance of movement and position hold is found.
Extraction arm does not rotate	• Ensure the extraction arm is correctly connected to the duct system using the EPDM rubber duct transition supplied with the extraction arm. • Ensure that the duct connected to the arm has not be secured to the extraction arm swivel using screws or bolts that would have to drill through the aluminum swivel or any other of the swivel components.
Extraction arm is stiff or does not allow for adjustments	• Loosen the adjustment knobs on the section of the arm that is difficult to maneuver until you find a desired balance between stability and maneuverability.
Extraction arm seems to push downwards	• Ensure that the extraction arm is positioned so that the adjustment knobs are on the right hand side when facing the extraction arm. • The damper lever should be positioned on the top side of the arm when the extraction arm is positioned correctly.
Fan does not start	• Ensure that the fan is correctly connected to power source. • Contact your local electrician to verify electrical connections.

Fan starts then immediately stops	• Ensure the fan is able to spin freely
	• Ensure that you fan is wired to an appropriately sized breaker.
	  • DO NOT attempt to force start the fan by continually throwing the switch, permanent damage can be made to the fan by doing so.
	• Contact your local electrician to ensure you panel breaker is appropriately sized for the fan specifications.
	  • It is recommended that the system should have its own dedicated breaker.

Moisture is dripping from extraction arm	• Ensure the integrated damper is fully open. • Confirm correct motor rotation • Ensure the air flow is adequate for the extraction arm. • For the FX_2 75mm extraction arm, air flow must be 100-150 CFM to achieve the necessary conveying velocity to carry the aerosols through the system to the filter and/or exhaust point. • Ensure your fan is appropriately sized for the system

Noise from extraction arm is louder than expected	• Ensure the air flow of the FX_2 75mm extraction arm is 100-150 CFM. Higher levels of air flow will significantly increase noise levels at the extraction arm hood.
	  • Use manual blast gates on the duct system to balance air.
	  • Do not use integral damper to balance air.