

nano



F² high capacity flanged filter
user guide

Experience.

Our team is comprised of and supported by individuals spanning all disciplines from research & development, engineering & manufacturing, marketing & sales and service & support. Our backgrounds are in air and gas purification and our experience in this field spans a wide range of industries. We combine this knowledge and experience to ensure our products and services are designed and provided to meet the objectives and expectations of you - our Customer.



Customer.

We recognize that our Customers are not only our valuable distribution partners who sell and support our products or the machine builders who depend on them as protection for their equipment. They are the contractors who install them, the manufacturers who use them in their processes and the service people who maintain them. At nano we have developed our products, packaging and support materials to ensure they exceed all of our Customers' expectations.



Service.

At nano we recognize that world-class customer service is the most important component to any successful business. Your business needs to exceed your customers' expectations to stand out from your competitors and our service must positively impact your business so you can be successful in doing so. Our commitment is simple... we will stand behind our products and ensure that our customer service is unrivaled in the industry.

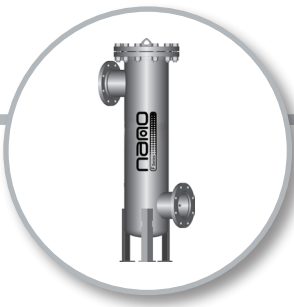


Experience. Customer. Service.

The logo for nano, consisting of the word "nano" in a bold, lowercase, sans-serif font. The logo is centered within a large, light gray circular frame.

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high capacity flanged filter

1.1 general information

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range: F² high capacity flanged filters
models: NFZ 2500 - NFZ 10000; NFT 1700 - NFT 10000
doc no: 17-110-8000
issue: 002

1.2 manufacturers details and support

nano-purification solutions

address: 5509 david cox road
charlotte, nc 28269
usa
telephone: 704.897.2182
fax: 704.897.2183
internet: www.n-psi.com
e-mail: support@n-psi.com

nano-purification solutions ltd

address: dukesway
team valley trading estate
gateshead
ne11 opz
united kingdom
telephone: +44 (0) 191 497 7700
internet: www.n-psi.co.uk
e-mail: enquiries@n-psi.co.uk

nano-purification solutions

address: unit 8b
188 bunting road, unit 8B
st catharines, ontario
l2m 3y1
canada
telephone: 704.897.2182
internet: www.n-psi.com
e-mail: support@n-psi.com



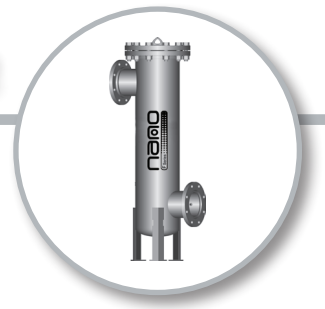
annotations



CAUTIONS: indicate any situation or operation that may result in potential damage to the product, injury to the user or render the product unsafe.



NOTES: highlight important sections of information where particular care and attention should be paid.



1.3 document introduction

This manual provides factory prescribed installation and maintenance procedures for a F² high capacity flanged filter. The procedures illustrated in this document are only to be performed by authorized personnel. For further information regarding the procedures outlined in this document contact the manufacturer before proceeding. Be sure to read this document carefully before attempting to install or operate the filter. This document should be permanently available at the filter installation site and be kept in an easily accessible place alongside the filter.

1

1.4 warranty guidelines

All products are supplied with an 18 months manufacturer's warranty from the date of shipment from the factory or 12 months from date of installation/start up, whichever occurs first and installed and maintained in accordance with the manufacturer's guidelines. Only genuine service parts should be used and no modifications made.

1.5 packaging

All products are securely fastened to skid in horizontal position with inlet and outlet flanges covered. Automatic float drain (where applicable) will be shipped loose for installation the field.

1.6 damage to packaging

Check immediately to establish whether damage has occurred to the external packaging and if the damage extends to the product inside. If there is damage to a product, contact the relevant supplier immediately.



In no circumstances must a damaged product be used in operation. Using damaged products can lead to irreparable functional faults or cause serious physical harm.

1.7 general safety

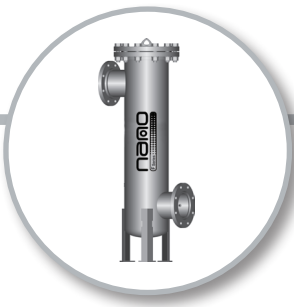
No modifications must be made to the product. Any modifications may reduce the operational safety of the product and invalidate the manufacturer's warranty. This could potentially result in damage to the product and serious personal injury.



For your own safety, when carrying out work on this product, all relevant national safety regulations must be complied with relating to pressurized and electrical systems.



WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.



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high capacity flanged filter

1.8 intended use of the product

The filter is exclusively intended for the treatment of compressed air or some gases (consult factory) with the removal of bulk water, oil and solid matter constituents.

1

The filter must be operated only in accordance with the data on the rating plate. Any operations that do not comply with those stated on the product rating label will render the warranty void.



This product is only designed to operate at pressures stated in the technical specification. Do not exceed the maximum working pressure.



Ensure that filter has been evaluated and its materials of construction deemed suitable and safe for the type of gas being filtered.

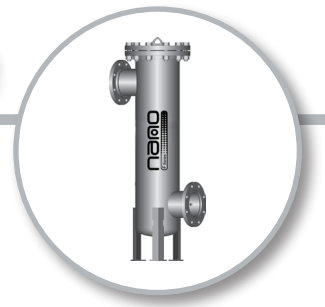


Adhere strictly to rules for safe handling of gas to be filtered.

1.9 personnel

Only authorized, competent and trained personnel are permitted to work on this product. This user guide is intended solely for such personnel and is to be used only as a reference; it should not be used to replace conventional training.





1.10 safe handling

Please ensure the relevant safe engineering practices and handling procedures are employed when handling, installing and operating this product. Ensure that the equipment is depressurized prior to carrying out any of the scheduled maintenance instructions specified within this user guide.



In no circumstances must a damaged product be used in operation. Using damaged products can lead to irreparable functional faults or cause serious physical harm.



A suitable lifting aid must be used to minimize the risk of physical injury or damage to the product.



Do not remove, repair or replace any item on the filter housing while it is under pressure. Any faults or defects that could affect safety must be corrected before using the unit.



Do not loosen flange bolts while the filter is under pressure.



Do not operate if there is a leak in filter housing. Immediately remove pressure and repair leak.



Standard filter housings may contain combustible substances (grease) and are therefore not suitable for oxygen and oxygen rich service. Filters for oxygen service may be available upon request.





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high capacity flanged filter

1.11 technical description

A high quality complete range of high capacity filters capable of handling flow rates up to 10,000 scfm. Applications include manufacturing, automotive, oil & gas, paint applications, pneumatic conveying, textiles and many more industries. Built in accordance to ASME, CRN & international standards, these housings fit a variety of applications around the world.

1

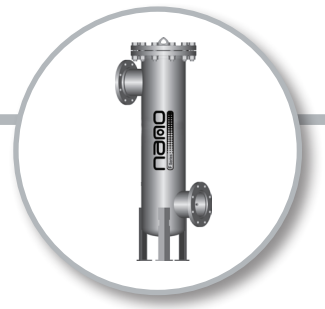
1.12 product contents

when ordering a F² high capacity flanged filter you will receive the following;

- 1 x F² high capacity flanged filter with element(s) installed
- 1 x differential pressure indicator
- 1 x automatic float drain as appropriate
- 1 x user guide



high capacity flanged filter



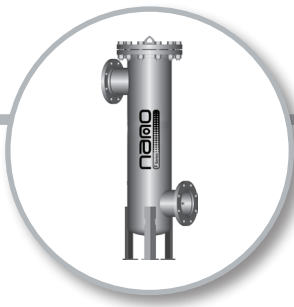
2.1 technical specification

specifications	NFZ type	NFT type
design operating pressure range	0 to 150 psig	0 to 150 psig
condensate drain(s) included	automatic float	automatic float
differential pressure indicator	standard on all models except AC grade and high temperature applications	standard on all models except AC grade and high temperature applications
ASME VII & U stamp	standard	standard
Canadian Registration Number	standard	consult factory

2.2 element performance

specifications	grade M1	grade M1 HT	grade M01	grade AC
maximum particle size (ISO Class) ⁽¹⁾	2	2	1	1
maximum oil content (ISO Class) ⁽¹⁾	2	2	1	1
particle removal (microns)	1	1	0.01	-
max oil carry over at 68°F (20°C) (ppm or mg/m ³)	0.1	0.1	0.01	0.003
recommended operating temp range	35 to 212°F (2 to 100°C)	35 to 450°F (2 to 232°C)	35 to 212°F (2 to 100°C)	35 to 77°F (2 to 25°C)

(1) per ISO 8573.1:2001 (E)



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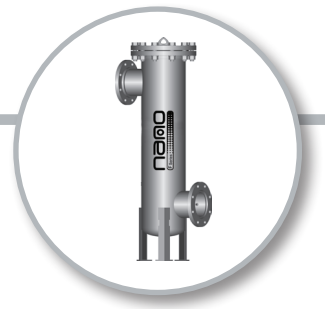
high capacity flanged filter

2.3 flow rates

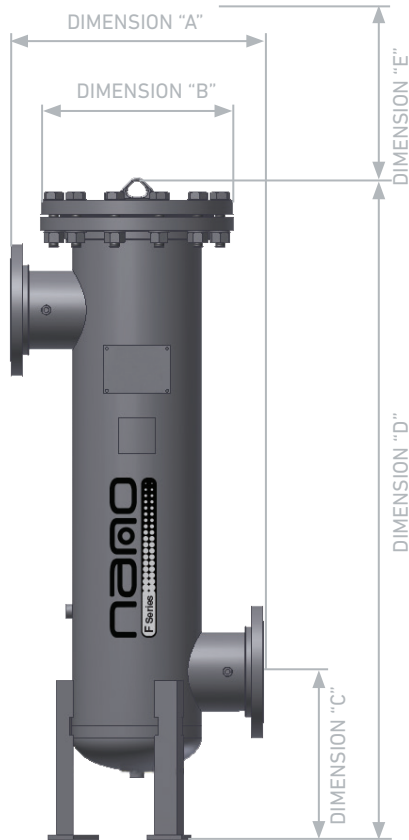
model	nominal flow		connection inlet & outlet
	scfm	Nm ³ /hr	
NFZ (Z Flow) type			
NFZ 2500	2500	4248	4" Flg
NFZ 3000	3000	5097	4" Flg
NFZ 3500	3500	5947	6" Flg
NFZ 4000	4000	6796	6" Flg
NFZ 5000	5000	8495	6" Flg
NFZ 6000	6000	10194	6" Flg
NFZ 7500	7500	12743	8" Flg
NFZ 8500	8500	14442	8" Flg
NFZ 10000	10000	16990	10" Flg
NFT (T Flow) type			
NFT 1700	1700	2888	4" Flg
NFT 2500	2500	4248	6" Flg
NFT 3500	3500	5947	6" Flg
NFT 4000	4000	6796	6" Flg
NFT 5000	5000	8495	6" Flg
NFT 7000	7000	11893	8" Flg
NFT 8500	8500	14442	8" Flg
NFT 10000	10000	16990	10" Flg

2.4 correction factors

operating pressure	psig	60	70	85	100	115	145
	barg	4	5	6	7	8	10
correction factor		0.76	0.84	0.92	1.00	1.07	1.19



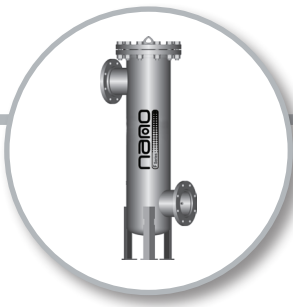
2.5 product dimensions for NFZ (Z flow) type



2



model	dimension										weight	
	A		B		C		D		E		lbs	kg
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm		
NFZ 2500	21.0	533.4	10.8	273.1	12.4	316.0	54.7	1389.1	30.0	762.0	340	154
NFZ 3000	21.0	533.4	10.8	273.1	12.4	316.0	54.7	1389.1	30.0	762.0	340	154
NFZ 3500	21.0	533.4	10.8	273.1	13.9	354.1	58.7	1490.7	30.0	762.0	370	168
NFZ 4000	23.0	584.2	12.8	323.9	16.8	427.0	61.4	1559.1	30.0	762.0	410	186
NFZ 5000	24.3	616.0	14.0	355.6	17.4	443.0	62.0	1574.8	30.0	762.0	460	209
NFZ 6000	24.3	616.0	14.0	355.6	17.4	443.0	62.0	1574.8	30.0	762.0	460	209
NFZ 7500	28.3	717.6	18.0	457.2	19.9	505.0	69.4	1763.8	30.0	762.0	560	254
NFZ 8500	28.3	717.6	18.0	457.2	19.9	505.0	69.4	1763.8	30.0	762.0	560	254
NFZ 10000	28.3	717.6	18.0	457.2	17.8	452.4	70.1	1781.3	30.0	762.0	640	290



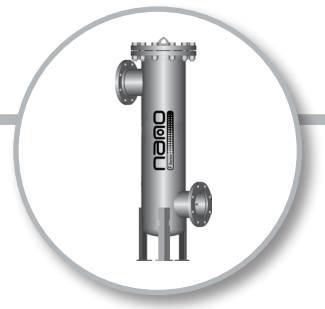
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high capacity flanged filter

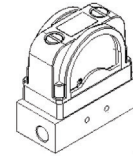
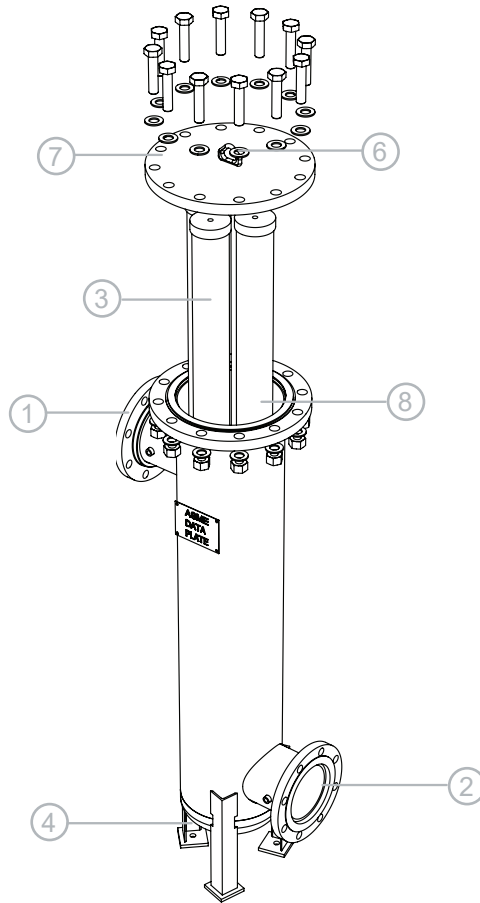
2.6 product dimensions for NFT (T flow) type



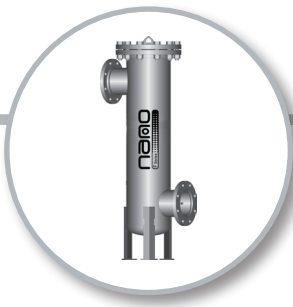
model	dimension										weight	
	A		B		C		D		E		lbs	kg
	inches	mm	inches	mm	inches	mm	inches	mm	inches	mm		
NFT 1700	21.0	533.4	10.8	273.1	11.5	292.1	49.0	1244.6	30.0	762.0	330	150
NFT 2500	21.0	533.4	10.8	273.1	8.8	223.5	49.0	1244.6	30.0	762.0	330	150
NFT 3500	23.0	584.2	12.8	323.9	12.8	325.1	55.4	1407.2	30.0	762.0	360	163
NFT 4000	23.0	584.2	12.8	323.9	12.9	327.7	55.4	1407.2	30.0	762.0	360	163
NFT 5000	24.3	616.0	14.0	355.6	13.4	340.4	53.7	1364.0	30.0	762.0	410	186
NFT 7000	28.3	717.6	18.0	457.2	15.8	401.3	57.4	1458.0	30.0	762.0	500	227
NFT 8500	28.3	717.6	18.0	457.2	15.8	401.3	63.3	1607.8	30.0	762.0	500	227
NFZ 10000	28.3	717.6	18.0	457.2	14.1	358.1	55.4	1407.2	30.0	762.0	625	284



2.7 product overview for NFZ (Z flow) type



number	description	number	description
1	compressed air connection	6	lifting lug
2	compressed air connection	7	blind flange
3	element(s)	8	element(s) removal
4	automatic float drain		
5	differential pressure indicator		

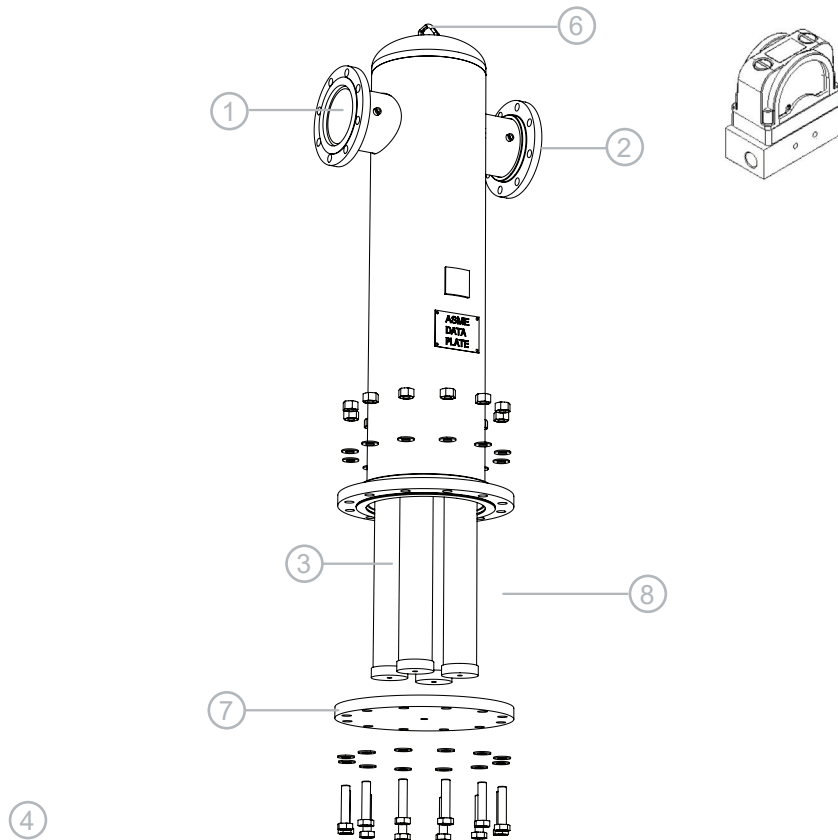


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high capacity flanged filter

2.8 product overview for NFT (T flow) type

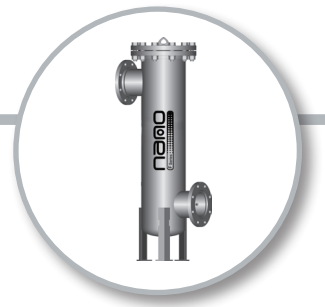
2



number	description	number	description
1	compressed air inlet	6	lifting lug
2	compressed air outlet	7	blind flange
3	filter element(s)	8	element(s) removal
4	automatic float drain		
5	differential gauge indicator		

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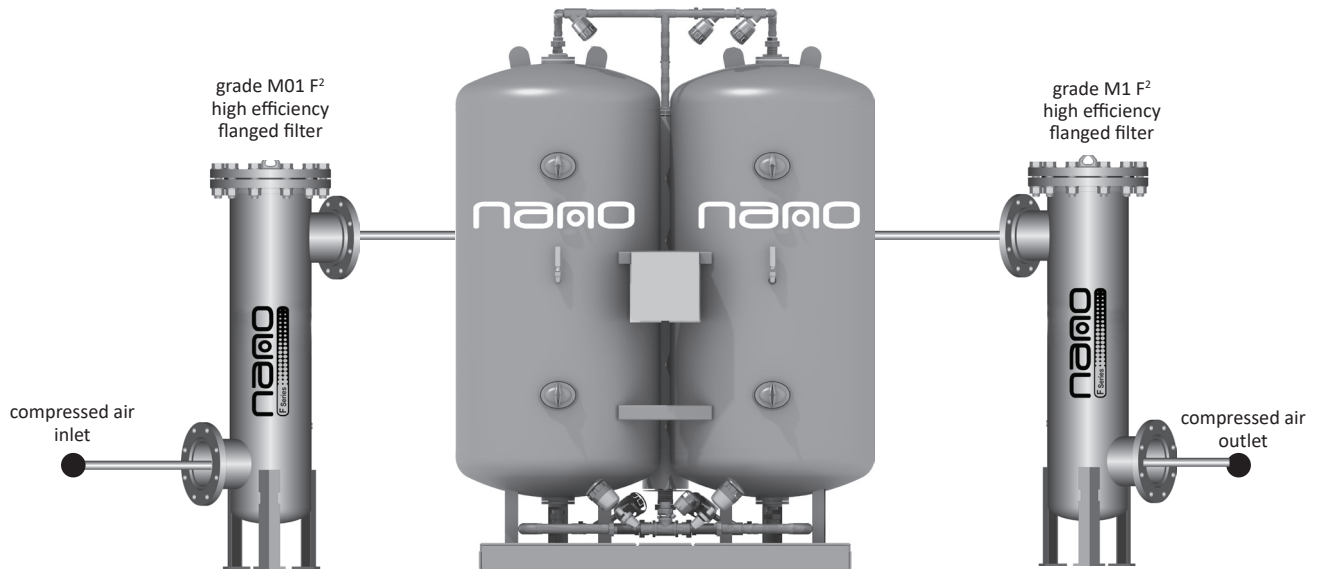
high capacity flanged filter



2.9 typical system layout



with refrigerated air dryer



with desiccant air dryer

2





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high capacity flanged filter

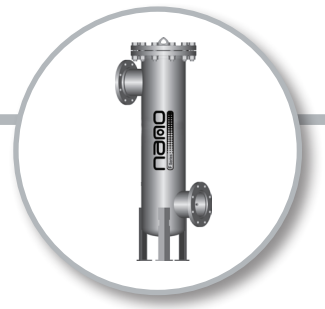
2.10 site location

When selecting an installation site for the F² high capacity flanged filter, ensure the following conditions are met:

2

- Installation site is recommended for indoors. If installed in outdoor location, it must be protected from ambient conditions.
- The ambient temperature must not drop below 32°F (0°C). If installed where ambient temperature will reach 32°F (0°C) or below, the bottom of the housing must be heat traced to prevent filter and drain valve freeze ups.
- The installation site should be able to support the weight of the NFT models.
- Ensure sufficient space around the product to allow access for operation and maintenance.



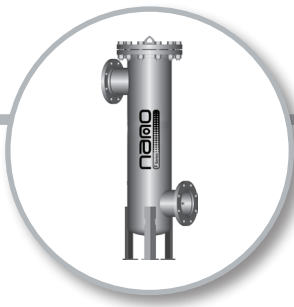


2.11 filter housing installation

- Position filter in the air line at the point of lowest operating temperature to minimize the amount of water and oil that may condense after the filter.
- Place filter as close to the point of use as possible to keep pipe scale and dirt from re-contaminating the system.
- Take care to protect filter from reverse flow conditions. If a reverse flow cannot be avoided, check valves may be required.
- Check pressure, flow and temperature conditions at point of installation to verify that they are within the ranges specified on the filters' data label.
- If actual application flow rates exceed the rated flow capacity of the filter, the pressure loss across the filter will increase. Avoid using reducers to match filter inlet / outlet size to system piping. The resulting restriction may result in elevated pressure loss.
- Install inlet and outlet shut off valves to facilitate replacement of elements. By-pass piping is recommended.
- Take care to install elements so that air flows inside to outside for coalescing and liquid removal; outside to inside for particulate removal.
- New filters are typically shipped from factory with elements installed. If elements are not installed, please refer to element replacement instructions (*see section 2.10*).
- Filters include two drain connections, one in the center of the bottom blind flange and one through the lower side. The side drain employs piping inside the vessel so that it can discharge all accumulated liquids.
- Carefully inspect filter housing before slowly reapplying pressure. It is recommended to slowly apply pressure while checking for leaks. If leaks are found, immediately depressurize and repair.



Do not remove, repair or replace any item on the filter housing while it is under pressure. Any faults or defects that could affect safety must be corrected before using the unit.



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high capacity flanged filter

2.12 filter element installation

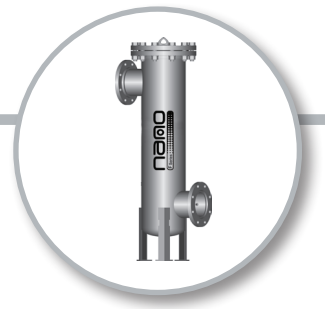


Fully depressurize filter housing before servicing.

2

- The blind flange, attached at the bottom of the filter housing on T Style Models and top of the filter housing on Z Style Models, must be removed to provide access to the filter elements. Please note that blind flanges are extremely heavy. Extreme care should be taken to safely support the blind flange as it is removed.
- Remove bolts from blind flange. The gasket may stick to freshly painted surfaces. If necessary, take care to safely support the blind flange as it is pried loose.
- Elements have threaded bottom endcaps. Twist the elements counter-clockwise to remove and clockwise to tighten. Take care to grease element o-ring so that it slips on the baffle plate as it is tightened. When removing elements, ensure that o-ring is attached to element and that it does not stick to the baffle plate.
- Reinstall blind flange using a fresh flange gasket (see section 3.5 for part number).
- Carefully inspect filter housing before slowly reapplying pressure. It is recommended to slowly apply pressure while checking for leaks. If leaks are found, immediately depressurize and repair.





3.1 shutdown, maintenance and element replacement procedure



Fully depressurize filter housing before servicing.

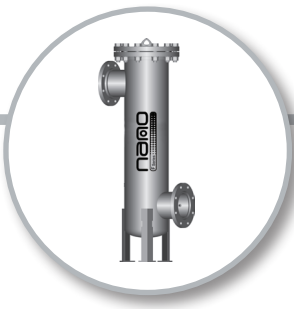
- Close isolation valve before and after filter.
- Open the valve on drain to relieve pressure from housing.
- Once pressure is relieved, remove nuts, bolts and blind flange to open housing.
- Ensure that accumulated liquids are removed from filters on a daily basis. Automatic drains are recommended.



Be sure to comply with all applicable regulations pertaining to the disposal of accumulated fluids.

- Welded filter housings come equipped with a differential pressure indicator. Filter elements should be replaced when the needle remains in the red area for an extended period during operation at normal flow or using element replacement service schedule (section 3.4), whichever comes first. Please note that the dial will not indicate unless there is flow passing through the filter.
- Inspect filter housing periodically. Immediately remove from service if any damage or excessive corrosion is found.





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3.2 cleaning

Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical connections. If required a mild detergent may be used, however do not use abrasives or solvents as these may cause damage.

3

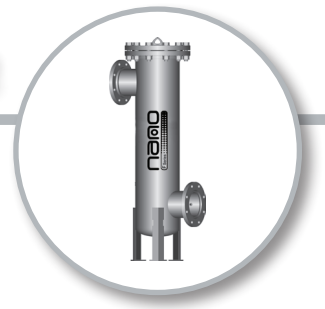
3.3 daily checks

- Check the filters for any external damage. *Assess and eliminate any defects found.*
- Check the differential pressure indicator for excessive differential pressure.
- Check the automatic float drain.

3.4 servicing guidelines

- Maintenance operation should only be conducted when the system has been shut down and fully depressurized.
- Isolate the filter from the compressed air by closing the isolation valve before and after the filter ensuring the system is in a safe condition for maintenance to be carried out on.
- All connections must be removed with care, paying particular attention to the areas that become pressurized.
- All gasket seals removed during maintenance operations must be replaced with new gaskets.
- Only certified and approved replacement parts should be used.
- Always check all connections and sealing faces for cleanliness and secure seating prior to assembly.
- Ensure all components are re-fitted to the product before operation.
- Always check all connection and sealing faces for any leakage if any found resolve and check again.
- Ensure the filter is left operating in a safe working condition after completion of maintenance.





3.5 service schedule and breakdown

service	3-6 months	year 1 (12 months)	year 2 (24 months)
A	✓		
B		✓	
C	✓	✓	
D			✓*

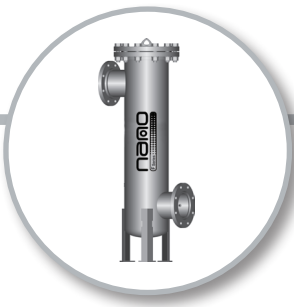
3



When contacting your service provider be sure to provide the part number and serial number of your filter, this can be found on the rating plate.

- **Service A** - Every 3-6 months
Replace grade AC element(s) where installed
- **Service B** - Every 1 year (12 months)
Replace grade M1, M1 HT and M01 element(s) where installed
- **Service C** - Every 3, 6 or 12 months depending on when elements(s) are replaced
Replace gasket.
- **Service D** - Every 2 year (24 months) or as needed*
Replace automatic float drain.





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3.6 replacement elements and spares

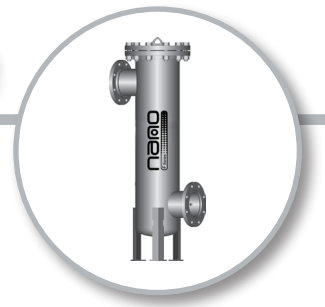
model	replacement element	qty required
NFZ (Z Flow)		
NFZ 2500	E 0853 (grade) - AL	3
NFZ 3000	E 0853 (grade) - AL	4
NFZ 3500	E 0853 (grade) - AL	4
NFZ 4000	E 0853 (grade) - AL	5
NFZ 5000	E 0853 (grade) - AL	6
NFZ 6000	E 0853 (grade) - AL	7
NFZ 7500	E 0853 (grade) - AL	9
NFZ 8500	E 0853 (grade) - AL	10
NFZ 10000	E 0853 (grade) - AL	12
NFT (T Flow)		
NFT 1700	E 0853 (grade) - AL	2
NFT 2500	E 0853 (grade) - AL	3
NFT 3500	E 0853 (grade) - AL	4
NFT 4000	E 0853 (grade) - AL	5
NFT 5000	E 0853 (grade) - AL	6
NFT 7000	E 0853 (grade) - AL	8
NFT 8500	E 0853 (grade) - AL	10
NFT 10000	E 0853 (grade) - AL	12

3



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3.7 service record

part number	serial number
--------------------	----------------------

installed by	installation date
---------------------	--------------------------

installed by	installation date
---------------------	--------------------------

installed by	installation date
---------------------	--------------------------

installed by	installation date
---------------------	--------------------------

service interval	hours run (if applicable)	date	serviced by		comments / observations
			print	sign	

year 1					
--------	--	--	--	--	--

year 2					
--------	--	--	--	--	--

year 3					
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year 4					
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year 5					
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year 6					
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year 7					
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year 8					
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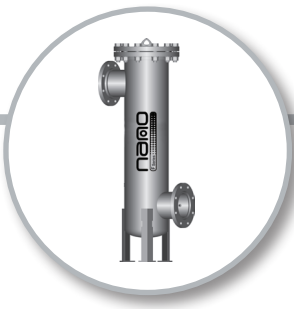
year 9					
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year 10					
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year 11					
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year 12					
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3



F²

high capacity flanged filter

4.1 trouble shooting

4

problem	problem caused	solution
Poor filtration	Contaminant carryover	Check filter element(s) and replace if necessary
	Differential pressure indicator in red	Check filter element(s) and replace
	Contaminant carryover	Check autodrain operation
	Automatic float drain clogged	Clean out and/or replace internals with service kit



additional nano products



F-series industrial filters

D-series desiccant dryers



B-series breathing air purifiers

GEN₂-series nitrogen generators



R-series refrigerated dryers

V-series oil vapor removal systems



S-series oil water separators



nano



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