NDU-2NX Filter Cart

User Manual



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Filtertechnik 1 Central Park, Lenton Lane, Nottingham, NG7 2NR

Tel: +44 (0)115 9003 600 **Fax:** +44 (0)115 986 8875

Email: sales@filtertechnik.co.uk **Web:** www.filtertechnik.co.uk

Registered in England No: 03969985 VAT No: 760 821 731 Certification No. UK002838

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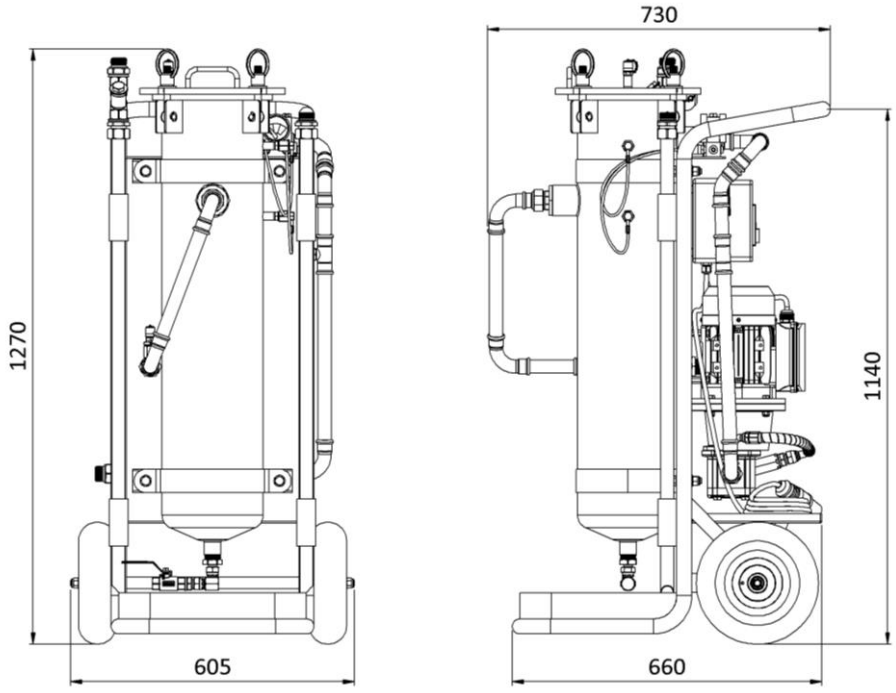
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Specifications

Specification	Detail	
	NDU-2-110	NDU-2-240
Dimensions	(w) 605mm x (d) 730mm x (h) 1270mm	
Weight	105 kg	
Frame	Mild Steel	
Finish	Powder Coated RAL 5004 (Black Blue) Satin	
Voltage	110 VAC (+10% to -6%)	240 VAC (+10% to -6%)
Frequency	50 Hz (+/-2%)	
Current	7 Amps	4 Amps
Power	550 Watts	550 Watts
Pump type	Gear pump	
Flow rate (max)	15 ltr/min	25 ltr/min
Viscosity range	0 - 320 cSt	
Duty Cycle	Continuous	
Filtration	Size 2 filter cell (various ratings available)	
Filter blocked indicator	Visual gauge	
Pump relief	4 bar (58 psid)	
Connections	1" BSP male hydraulic	
Suction hose	3m long x 1" BSP female swivel hydraulic (with strainer)	
Discharge hose	3m long x 1" BSP female swivel hydraulic	
Ambient temperature	-10°C to +60°C	
Maximum humidity	90% relative humidity, non-condensing	
Environment	IP55	



Typical Applications

Typical applications for the filtration unit include:

- Filtering the fluid in a hydraulic reservoir periodically as a supplement to continuous filtration by system filters.
- Cleaning up your hydraulic system before restarting the system following component failure.
- Providing clean fluid when re-filling and adding fluid to the system reservoir.
- Reclaiming contaminated fluid.
- Pre-filling and cleaning up hydraulic systems on new or re-built machinery and equipment.
- Off line contamination of hydraulic systems.
- Emptying waste fluid quickly.

Health, Safety & Environmental Considerations

- This equipment should only be used for its intended purpose by competent and authorised persons, inappropriate use could cause serious injury or death.
- Prolonged contact with oil can cause damage to the skin. Appropriate PPE (personal protective equipment) should be worn when operating the unit e.g. protective gloves, safety glasses, safety shoes etc. Always observe local health and safety requirements.
- The unit should only be used on a flat, even surface and be attended at all times.
- Do not operate switches with wet hands.
- The unit must always be disconnected from the mains supply before carrying out any routine maintenance or repairs.
- Electrical cables and hoses should be checked for any signs of damage before starting the unit.
- Ensure a spill kit is available in case of any accidental spills.
- Used filters must be disposed of in accordance with local environmental requirements.

Basic Description

The NDU-2NX portable filtration unit is a compact, self-contained filtration system, equipped with a high efficiency, high capacity filter cell capable of removing particulate contaminants and/or water quickly, conveniently and economically. It is designed for on-site preventative maintenance and is fitted with two standpipes and hoses for efficient fluid transfer. The suction standpipe is fitted with a strainer to trap any large contaminants and protect the pump.

Best Efficiency

When used for recirculation filtration (as opposed to transfer filtration) position the ends of both the inlet and outlet standpipe as far apart as possible inside the reservoir to ensure proper recirculation and cleaning.

Cycle the hydraulic system thoroughly to flush the contaminated fluid from the lines and system components, so that all the system fluid will be filtered through the unit.

Operate the filtration cart until the total volume of the system fluid passes through the filtration cart. For recirculation filtration, cycle the reservoir fluid through the filter cart six to eight times to ensure the total system fluid is filtered completely.

Precautionary Measures

- Never start up or run a dry pump. This will cause galling, seizing or destructive wear between the gears, end plates and casing.
- The filtration unit is designed for hydraulic and lubrication oils only.
- It is not to be used for highly volatile fluids, such as gasoline, paint thinners etc.

CAUTION - DO NOT USE THE UNIT WITH THE FOLLOWING FLUIDS:

Fluids not to be used	Related dangers
Gasoline	Fire / Explosion
Inflammable liquids with PM <55°C	Fire / Explosion
Water	Oxidation
Corrosive chemicals	Oxidation / Injury to persons
Solvents	Fire / Explosion / Damage to gaskets

Achieving ISO Cleanliness Codes

Filtertechnik has a wide range of elements available to effectively achieve the required cleanliness level for the intended system. Maintaining the fluid at the required cleanliness level is a cost effective way of extending the service life of system components. The tables below can be used to determine the required micron rating of the filter to achieve the desired cleanliness code, understand the ISO 4406 contamination scale, conversion between the various cleanliness standards and understanding how the ISO 4406 scale relates to the NAS contamination scale.

Desired Cleanliness Level (ISO Code)	Recommended Filtration Media
20/18/15 – 19/17/14	25 µm
19/17/14 – 18/16/13	10 µm
18/16/13 – 15/13/10	5 µm
15/13/10 – 14/12/9	3 µm
14/12/9 – 13/11/8	1 µm

Table 1 – Filter Media Selection Guide

Element	Type	ISO 4406 Cleanliness Code
Pump	Piston (slow speed, inline)	22/20/16
	Piston (high speed, variable)	17/15/13
	Gear	19/17/15
	Vane	18/16/14
Valve	Directional	20/18/15
	Pressure control	19/17/14
	Flow control	19/17/14
	Check valve	20/18/15
	Cartridge valve	20/18/15
	Proportional	18/16/13
	Servo valve	16/14/11
Motor	Axial piston	18/16/13
	Radial piston	19/17/13
	Gear	20/18/15
	Vane	19/17/14
Actuator		20/18/15
Station Nozzle	Worldwide fuel charter cleanliness standard for fuel delivered	18/16/13

Table 2 – Required Cleanliness Codes for Fluid Power Components

Number of Particles per 1ml of Fluid		ISO Scale Number
More Than	Up to and Including	
1,300,000	2,500,000	28
640,000	1,300,000	27
320,000	640,000	26
160,000	320,000	25
80,000	160,000	24
40,000	80,000	23
20,000	40,000	22
10,000	20,000	21
5,000	10,000	20
2,500	5,000	19
1,300	2,500	18
640	1,300	17
320	640	16
160	320	15
80	160	14
40	80	13
20	40	12
10	20	11
5	10	10
2.5	5	9
1.3	2.5	8
0.64	1.3	7
0.32	0.64	6
0.16	0.32	5
0.08	0.16	4
0.04	0.08	3
0.02	0.04	2
0.01	0.02	1
0.00	0.01	0

Table 3 – ISO 4406 Contamination Scale

ISO 4406 Code 4µm / 6µm / 14µm	Mil Std. NAS 1638	Mil Std. 1246A	ACFTD Gravimetric Level mg/L	SAE Level
21/19/16	10			
20/18/15	9			6
19/17/14	8	300		5
18/16/13	7		1	4
17/15/12	6			3
16/14/12		200		
16/14/11	5			2
15/13/10	4		0.1	1
14/12/9	3			0
13/11/8	2			
12/10/8		100		
10/10/7	1			
12/10/6			0.01	
11/9/6				

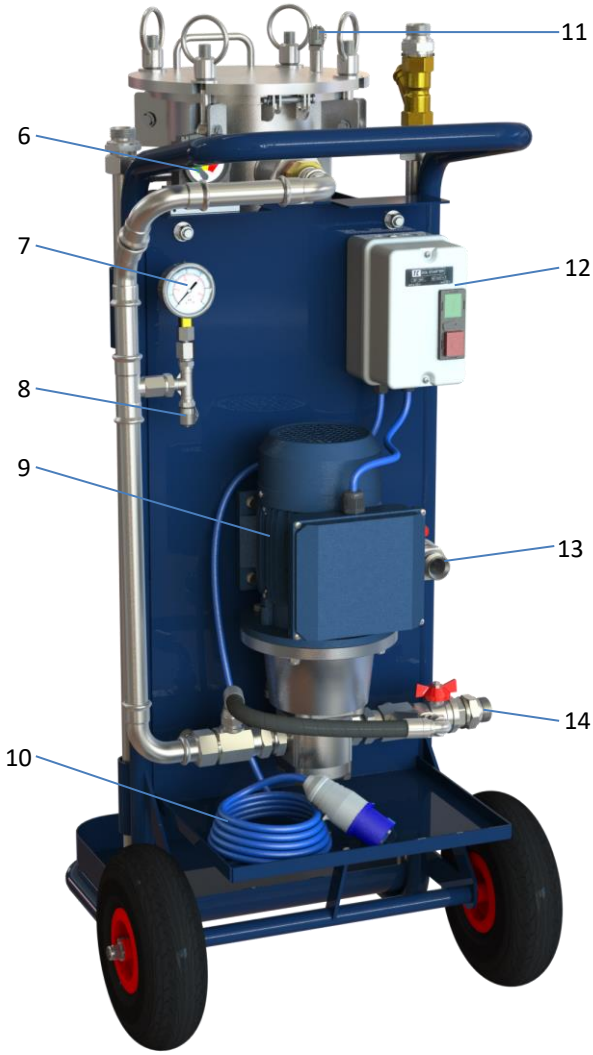
Table 4 – Cleanliness Standards Conversion

Equivalent ISO 4406 Code (approx.)	NAS Code	Size Range in Microns (µm)				
		5-15	15-25	25-50	50-100	>100
-	00	125	22	4	1	0
-	0	250	44	8	2	0
10/12/7	1	500	89	16	3	1
13/11/8	2	1,000	178	32	6	1
14/12/9	3	2,000	356	63	11	2
15/13/10	4	4,000	712	126	22	4
16/14/11	5	8,000	1,425	253	45	8
17/15/12	6	16,000	2,850	506	90	16
18/16/13	7	32,000	5,700	1,012	190	32
19/17/14	8	64,000	11,400	2,025	360	64
20/18/15	9	128,000	22,800	4,050	720	128
21/19/16	10	256,000	45,600	8,100	1,440	256
22/20/17	11	512,000	91,200	16,200	2,880	512
23/21/18	12	1,024,000	182,400	32,400	5,760	1,020

Table 5 – ISO 4406 vs NAS 1638 Contamination

Component Identification



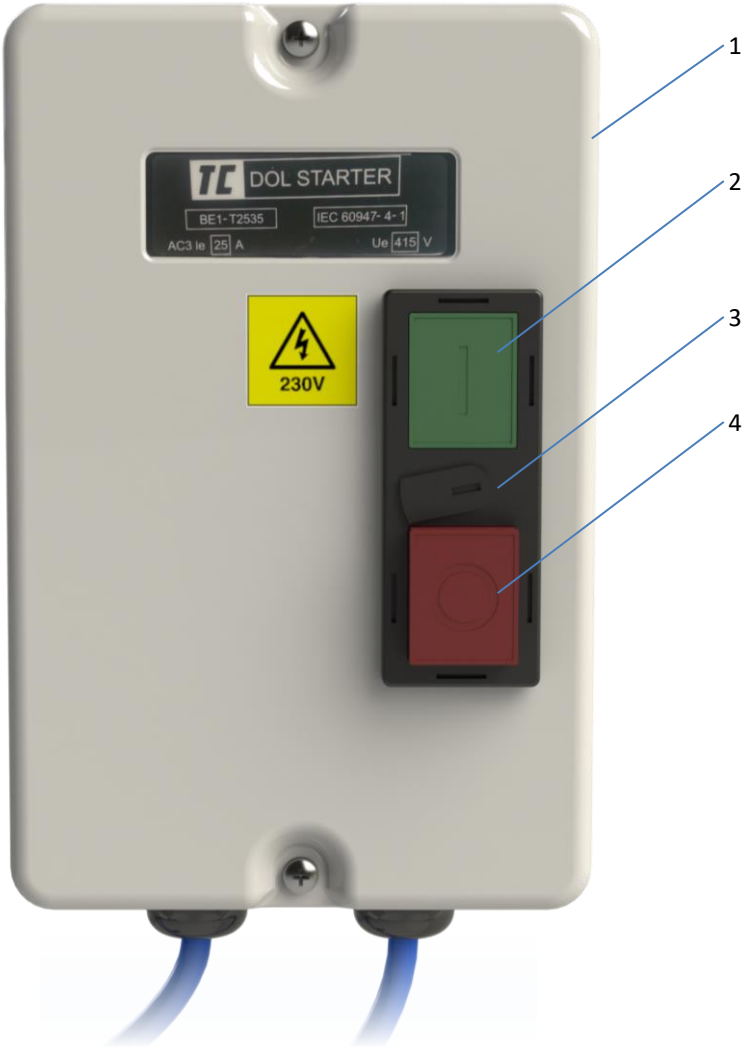


Key:

1.) Suction lance (with strainer)	8.) Sampling point / gauge connection
2.) Filter housing	9.) Pump / motor
3.) Sampling point / gauge connection	10.) Mains power lead
4.) Drain valve	11.) Vent valve
5.) Discharge lance	12.) Electrical box
6.) Differential pressure gauge	13.) Outlet
7.) System pressure gauge	14.) Inlet

Starting & Stopping – DOL (Direct-On-Line)

To start the unit, make sure it's plugged into a fused supply (with RCD when used outdoors) of the correct voltage rating and that the inlet and outlet hoses have been correctly attached. Before switching on the unit ensure hoses are connected to the supply pipework and/or lances are securely inserted into the barrel/tank.



Key:

1.) D.O.L starter box case	3.) Off button locking tab
2.) "On" push button	4.) "Off" push button

The unit is supplied with a DOL (Direct-On-Line) starter box. Once connected to the mains supply the unit can be switched on and off via the two push buttons. If for any reason the power supply cuts out, the internal contactor will unlatch to prevent accidental spillage once power is restored.

Pressure Gauge

Filtration

The unit is equipped with a single filter cell housing which can be fitted with a range of media for removing large quantities of particulate and water contamination from oil.

Differential Pressure Gauge

The unit comes with a differential pressure gauge that gives an indication of the filter condition via a green, yellow and red visual indication.



Colour	Pressure Range	Notes
Green	0-15 psid	Indicates a clean and healthy filter
Yellow	16-22 psid	Indicates the filter is starting to become blocked and requires more frequent monitoring
Red	23-30psid	Indicates the filter is now fully blocked and requires changing

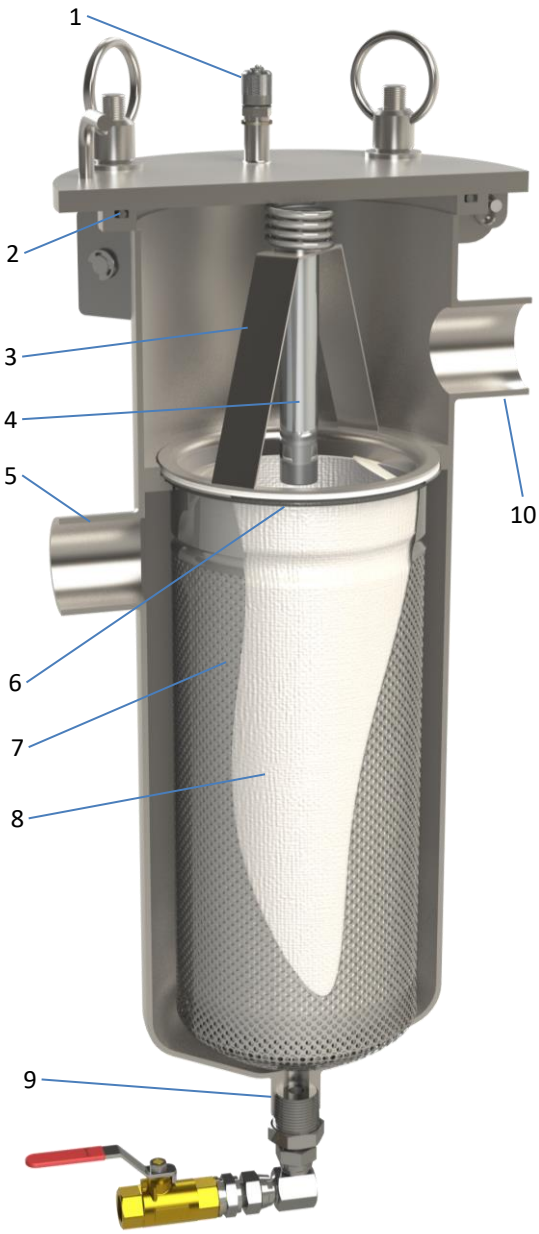
The filter cell housing is monitored by a visual differential pressure indicator, displaying the filter's condition via a green, yellow and red traffic light system.

Filter Cell Housing

Changing a Filter Cell

As a guideline the following procedure can be used for changing a filter cell:

1. Ensure inlet and outlet pipework has been closed off to prevent siphoning.
2. Relieve any excess pressure by briefly opening the drain valve or vent.
3. Loosen the 4 swing bolts and open the lid.
4. Remove the filter securing bracket (if the optional magnet is included, clean off any rust).
5. Lift out the filter cell via the strap handle. It is likely the filter basket will also come out.
6. Remove the filter cell from the basket and replace with a clean filter.
7. Refit the filter basket, making sure the basket O-ring is still in place and correctly seated.
8. Refit the filter securing bracket, making sure the spring is attached.
9. Close the lid, making sure the lid O-ring is correctly seated.
10. Gradually tighten each of the 4 swing bolts in a typical star/cross sequence to allow even seating of the lid onto the O-ring seal.



Key:

1.) Vent (1620 test point)	6.) Filter basket O-ring
2.) Lid O-ring	7.) Filter basket
3.) Filter securing bracket	8.) Filter cell
4.) Magnet (optional)	9.) Drain port
5.) Outlet port	10.) Outlet port

Cleaning the Magnet

An optional magnet can be installed into the filter housing basket clamp for removal of ferromagnetic material, extending the useful life of the filter cell.



Removal of ferromagnetic material can be carried out using a suitable tool as shown above (Filtertechnik part number FT-RRT01).

The tool is to be located at the top of the magnet and downward force applied to push the material off the magnet. This waste material can then be disposed of or recycled.

Purging Air from the Filter Housing

When starting the system for the first time or after a filter cell change air will be trapped within the upper section of the filter housing and require purging. Failure to remove all the air can result in aeration of the oil and reduced system performance.



When the system is turned on the sampling / vent tube can be screwed onto the vent port, where the remaining air will be pushed out of the filter housing. The end of the tube should be inserted into a sample bottle or cloth to prevent any fluid from spraying towards the operator.

Once all the air has been removed make sure the sampling / vent tube is disconnected to prevent siphoning or spillage of fluid.

Sampling



The filter housing incorporates ports either side of the filter cell which are used for monitoring the differential pressure. These ports are fitted with 1620 minimess test points, where the existing tube connections can be removed, and the sampling tube can be attached for pre and post filtration sampling.

When taking a fluid sample ensure the tube has already been inserted into the sampling container before attaching to the 1620 minimess test points to avoid accidental spillage.

The upper port will provide pre-filtration sampling, while the lower port will provide post-filtration sampling.

Pressure Monitoring



A pressure gauge is fitted to the rear of the unit monitoring pressure on the discharge side of the pump.

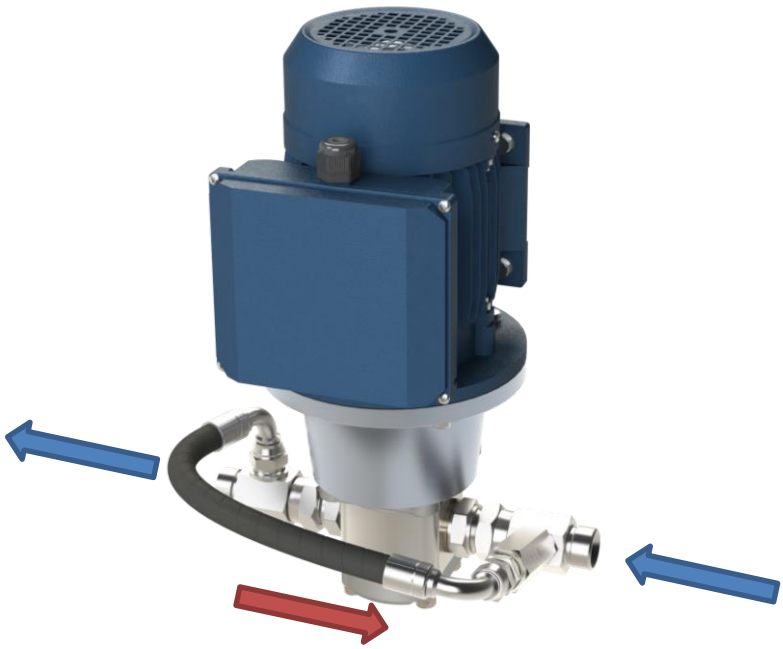
Connected using minimess test points, it's possible to connect the gauge to the sampling ports on the filter housing to monitor pre and post filtration pressure.

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Pump

The unit is fitted with a continuously rated pump capable of delivering up to 20 ltrs/min and a maximum pressure of 4 bar, after which point the bypass valve across the pump will open.



The pump can achieve a suction lift height of 2m (up to 4m when pipework is fully primed). Prior to the initial start-up phase the pump should be wetted which will aid in suction performance and prevent galling and serious damage to the internal gears.

Isolation Valves



Isolation valves are fitted to the inlet and outlet ports. These should be closed off when the system is not in use, or when filter cells are being change out. It is also advisable to cap off ends of the pipework to prevent contaminants from entering the system.

Hoses & Lances

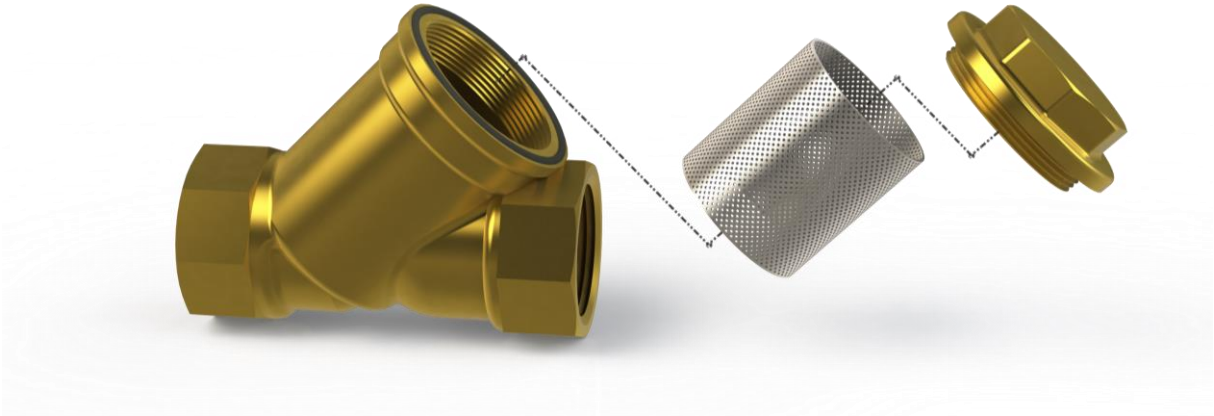
The unit is supplied with two 1" lances, a suction lance with strainer to protect the pump and a discharge lance. Each lance is 1000mm long.

When not in use it is advisable to plug the hoses and cap off the lances to prevent ingress of dust or other contaminants.

Lances should be cleaned prior to inserting in the tank/barrel being cleaned.



Suction Strainer



The suction strainer will periodically need cleaning by unscrewing the cap, removing the mesh strainer and cleaning this out with a fluid suited for the units intended purpose e.g. hydraulic oil.

Troubleshooting

Symptom	Problem	Solution
Does not start	On/Off switch No electrical power	Press switch on control box and check off switch locking tab is not engaged Check fuses
Erratic motor noise	Defective motor Motor overheated Worn pump gears	Replace motor Allow motor to cool Replace pump gears
Intermittent start/stop operation	High viscosity fluids	H.V fluids cause the motor to overheat intermittently. Thermal overload may trip and take some time to cool before resetting itself
Hot motor	Pumping heavy load	Motor will heat up, allow to cool
No flow	No fluid in filter housing Blockage in pipework	Run the unit for a few seconds Check all pipework and isolation valves
Erratic pump noise	Suction leak	Check inlet fittings and hoses
No suction	Blocked strainer	Clean or replace strainer
Reduced flow	High viscosity Filter cell dirty Obstruction in hoses Suction leak Worn gears	Check fluid compatibility Replace filter cell Clean hoses Check tightness of fittings Replace gears
Differential pressure indicator shows yellow/red	Filter cell dirty	Replace or clean filter cell
Differential pressure indicator does not move	No filter cell fitted	Install filter cell
Hoses discolour	Fluid compatibility	May occur over time, should not impair performance
Hoses becoming rigid	Fluid compatibility	Brittle hoses would require replacement
Spills under unit	Defective shaft seal Hose leaks	Replace seals where necessary Tighten all joints

Spare Parts List

Description	Part Number
1 µm disposable polypropylene	FT-19PP001-2GYEP
5 µm disposable polypropylene	FT-19PP005-2GYEP
10 µm disposable polypropylene	FT-19PP010-2GYEP
25 µm disposable polypropylene	FT-19PP025-2GYEP
50 µm disposable polypropylene	FT-19PP050-2GYEP
100 µm disposable polypropylene	FT-19PP100-2GYEP
200 µm disposable polypropylene	FT-19PP200-2GYEP
10 µm recleanable nylon	FT-19NM010-2GYEP
25 µm recleanable nylon	FT-19NM025-2GYEP
50 µm recleanable nylon	FT-19NM050-2GYEP
75 µm recleanable nylon	FT-19NM075-2GYEP
100 µm recleanable nylon	FT-19NM100-2GYEP
200 µm recleanable nylon	FT-19NM200-2GYEP
300 µm recleanable nylon	FT-19NM300-2GYEP
400 µm recleanable nylon	FT-19NM400-2GYEP
600 µm recleanable nylon	FT-19NM600-2GYEP
800 µm recleanable nylon	FT-19NM800-2GYEP
1 µm absolute rated pleated polypropylene	EPO-522-P2G
1 µm high efficiency disposable polypropylene	FT-19HE001-2GYEP
5 µm high efficiency disposable polypropylene	FT-19HE005-2GYEP
1 µm FiltaSorb2 water removal cell	FT-FA-02-001
1 µm absolute rated pleated element (requires filter clamp FT-AFC-01)	FT-CE-02-Z01

Warranty Statement

All products manufactured or distributed by Filtertechnik Ltd are subject to the following, and only the following, Limited Express Warranties, and no others:

For a period of one (1) year from and after the date of delivery of a new Filtertechnik product, Filtertechnik warrants and guarantees only to the original purchaser/user that such a product shall be free from defects of materials and workmanship in the manufacturing process. The warranty period for pumps and motors is specifically limited to ninety (90) days from the date of delivery. A product claimed to be defective must be returned to the place of purchase. Filtertechnik, at its sole option, shall replace the defective product with a comparable new product or repair the defective product. This express warranty shall be inapplicable to any product damaged or impaired by external forces or used for any purpose other than that for which it was originally sold.

THIS IS THE EXTENT OF WARRANTIES AVAILABLE ON THIS PRODUCT. FILTERTECHNIK SHALL HAVE NO LIABILITY WHATSOEVER FOR CONSEQUENTIAL DAMAGES FOLLOWING THE USE OF ANY DEFECTIVE PRODUCT OR BY REASON OF THE FAILURE OF ANY PRODUCT. FILTERTECHNIK SPECIFICALLY DISAVOWS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE (EXCEPT FOR THOSE WHICH APPLY TO PRODUCT OR PART THEREOF THAT IS USED OR BOUGHT FOR USE PRIMARILY FOR PERSONAL, FAMILY OR HOUSEHOLD PURPOSES), WARRANTIES OF DESCRIPTION, WARRANTIES OF MERCHANTABILITY, TRADE USE OR WARRANTIES OF TRADE USAGE.

EC Declaration of Conformity

Filtertechnik
Filtration, Purification & Separation Solutions

EC DECLARATION OF CONFORMITY

Machinery Description

Machine Type	NDU FILTER CART
Serial Number	

Applicable Directives

Low voltage Directive 73/23/EEC (as ammended by 93/68/EEC)
Electromagnetic Compatibility Directive 2004/108/EC
Machinery Directive 98/37/EC

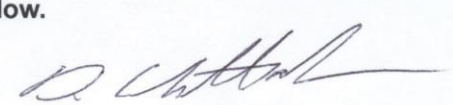
Declaration

We, Filtertechnik Limited, decalre that the above referenced product(s), to which the declaration relates, is in conformity with the provisions of the Directives listed above

IMPORTANT

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with the applicable Installation, Operation and Maintenance Instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.

The technical construction file for this product is maintained at the address given below.



Mr D Whittaker, Engineering Director
Filtertechnik Limited, 1 Central Park, Lenton Lane, Nottingham, NG7 2NR England.