

ROTORFLUSH FILTERPUMPS

Models: RUBI 80SFQ23.7-400AR

USE AND MAINTENANCE INSTRUCTION MANUAL

TO BE KEPT BY THE USER

For three phase pumps it is imperative that electrical connections are made so that the impellers rotate in the correct direction. If the pumps are run in the wrong direction for more than a few seconds serious damage may result which will invalidate the guarantee.

Read paragraphs 10.3 before installation for the method of checking correct direction of rotation.

Although the filters are self-cleaning there may over time be a build-up of detritus in the pores of the mesh which the self-cleaning mechanism cannot remove.

For stainless steel filter mesh use a pressure washer to very thoroughly clean the outside of the mesh.

If the pump is run with the filter screen clogged it may cause the pump to overheat and seriously damage the motor invalidating the guarantee. The use of appropriate cos phi load monitoring and dry running protection is essential with all models.

In most conditions the filter should be inspected every 2 months. In some situations, it may require more frequent inspection and if required cleaning.

Stainless steel screens should be thoroughly cleaned with a pressure washer at least every year, but may need to be cleaned more frequently depending on conditions

ROTORFLUSH FILTERPUMPS Models RUBI 80SFQ23.7-400AR

1. MANUFACTURER & PRODUCT IDENTIFICATION DATA (as per EEC98/37 p.1.7.4a)

1.1. Manufacturer Data

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DT6 6BU
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1.2. Filterpump Data

Description: Submersible Pump with integral Self-cleaning Intake screen.
Referred to as a 'Filterpump' within this document.

Models: 80SFQ23.7-400AR

2. TECHNICAL ASSISTANCE INFORMATION

If a malfunction of the Filterpump is not covered in the TROUBLESHOOTING table (Section 14) contact Rotorflush Filters at the above address.

3. INTRODUCTION

This publication contains all necessary information and instructions for the use and maintenance of your Rotorflush Filterpump.

Follow the advice given to ensure correct operation and optimum performance of the Filterpump. For any other information, please contact Rotorflush Filters

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4. GENERAL SAFETY WARNINGS

FAILURE TO OBSERVE THESE WARNINGS AND/OR ANY TAMPERING WITH THE FILTERPUMP EXEMPTS ROTORFLUSH FILTERS FROM ALL RESPONSIBILITY IN THE EVENT OF PERSONAL INJURY OR DAMAGE TO EQUIPMENT OR PROPERTY AND/OR TO THE FILTERPUMP

Read this manual carefully and check to ensure that the Filterpump has been properly installed and connected in accordance with relevant safety standards before starting the Filterpump.

There are no RESIDUAL RISKS with Rotorflush Filterpumps.

No particular technical skills are required to use Rotorflush Filterpumps, although installation should be carried out by a qualified electrician.

No personal safety devices (precaution devices) are required to use Rotorflush Filterpumps.

4.1. Preventive Measures to be Taken by the User



- a) The user must specifically comply with all the accident prevention regulations in force in the respective countries in which the Filterpump is being used; the indications given in Section 7 must be scrupulously followed.



- b) **During operation make sure that nobody is in the water**
- c) Before undertaking any repairs or maintenance to the Filterpump, isolate the electricity supply by removing the plug from the socket and/or turning off the switch (if provided). This will prevent accidental starting which could cause personal injury or damage to equipment or property.
- d) Any maintenance operation, installation or moving the Filterpump with the electrical system live may cause serious injury and could prove fatal.
- e) During operation, avoid moving the Filterpump.
- f) Before using the Filterpump, always check that the cable and all electrical devices are in perfect working order.
- g) When starting up the Filterpump (by turning on the switch, if provided, or by inserting the plug in the socket) ensure (i) you do not have wet hands (ii) you are not standing in water and (iii) you are not barefoot.
- h) The user must not carry out under his/her own initiative any operations or tasks not contemplated in this manual.

4.2. Significant Protection and Precautions (as per EEC 98/37 p. 1.1.2 and 1.7.2; EN 292-2 p.5).



Rotorflush Filterpumps are designed so that all moving parts are shrouded by protective casings. Rotorflush Filters Ltd declines all responsibility in the event of injury or damage caused as a result of tampering with these devices.



Each lead or live part is electrically insulated to earth; there is also a further safety device in that the accessible conductive parts are connected to an earth lead so that the parts within reach cannot become dangerous in the event of failure of the principal insulation.

5. DESCRIPTION

5.1. General Description

Rotorflush RUBI - 400 Series Filterpumps are all similar from the functional and constructive point of view; the only differences are the following:

- Power
- Flow Rate
- Head
- Weight
- Dimensions
-

Rotorflush RUBI Filterpumps are used for handling water containing total suspended solids not greater than 2,000 mg/litre dry weight at temperatures up to 40°C (Section 7.1). Unwanted solids are separated by a self-cleaning filter which is continuously backwashed with filtered water pumped through a dual-headed rotor by a secondary impeller mounted on an extended impeller shaft attached to the pump.

Thanks to their relatively compact bulk and ease of transport, they may be used for fixed or temporary installations, with or without automatic start.

Rotorflush Filterpumps are designed for long life and constant performance if used according to the instructions given in Sections 7 and 14.

5.2. Technical and Construction Characteristics

Rotorflush Filterpumps are designed and built to the following design and construction standards:

Machine 98/037/EEC; EN292 standard

Low Voltage 73/23/EEC and relative additions EN60335-1 and EN 60335-2-41 standards Electromagnetic

Compatibility 89/336/EEC and relative additions EN50081-1 and 2 standards

6. TECHNICAL DATA CARD (as per EEC 98/37 p.1.1.2 and 1.7.2; EN 292-2 p.

6.1. Pump Technical Data

THE RUBI LH33-400 AND RUBI LH23-400 FILTERPUMPS ARE BASED ON TSURUMI LH/LH-W SERIES SUBMERSIBLE GENERAL DEWATERING PUMPS. PLEASE REFER TO TECHNICAL SPECIFICATIONS IN APPENDIX 1 FOR PUMP MOTOR OPERATIONAL AND TECHNICAL DATA.

6.2. Self-cleaning Filter Technical Data

Filter Area	2500 cm ²
Filter Mesh	Stainless steel 115 or 300 microns; Stainless Steel woven mesh 1, 1.5 or 2mm Perforated stainless steel mesh 3mm or 6mm
Materials: Filter cage	316 Stainless Steel
Backwash rotor	Acetal Copolymer
Rotor thrust bearing	Silicon Carbide
Rotor impeller	316 Stainless Steel
Rotor impeller extension shaft	316 Stainless Steel

7. CONTEMPLATED AND NON-CONTEMPLATED USE

WARNING

Failure to respect the prescribed limits constitutes a situation of use that is technically improper and may endanger the safety of persons and thus EXEMPTS ROTORFLUSH FILTERS FROM ANY RESPONSIBILITY IN THE EVENT OF ACCIDENTS TO PERSONS OR DAMAGE TO EQUIPMENT OR PROPERTY AND/OR TO THE FILTERPUMP, THEREBY RENDERING THE GUARANTEE INVALID.

7.1. Contemplated Conditions of Use

Rotorflush Filterpumps are suitable for pumping water, non-aggressive and compatible with materials used to construct the pump. Max density 1.1 kg/dm³ with a total suspended solids loading not exceeding 2000mg/litre dry weight. Oily/fatty/sticky solids will reduce filter performance. They can be used with pressurisation units. Use the Filterpump in keeping with its technical characteristics (Section 7).

7.2. Non-Contemplated Conditions of Use

Rotorflush Filterpumps must not be installed in swimming pools, garden ponds and similar environments where and when people are in the water. For pumping fluids having a total suspended solids loading of more than 2,000 mg/litre dry weight. **Rotorflush Filterpumps must never be run without water.**

8. HANDLING AND TRANSPORT (as per EEC 98/37 p. 1.7.4.a; EN 292-2 p.5 1.1.a)

8.1. Unpacking

Check that there are no breakages or severe dents in the packing; if there are, point this out immediately to the person who delivers the material. After removing the Filterpump from the package, check that it has not suffered any damage during transit; if damage is found, inform the dealer within 8 days of delivery. Check that the specifications stated on the plate of the Filterpump are the same as you requested in your order.

8.2. Handling and De-installing



WARNING



FAILURE TO FOLLOW THESE INSTRUCTIONS MAY CAUSE THE FILTERPUMP TO FALL AND SUFFER SEVERE DAMAGE. NEVER UNDER ANY CIRCUMSTANCES USE THE POWER CABLE TO LIFT OR DRAG THE FILTERPUMP. USE THE CORRECT LIFTING GEAR REQUIRED FOR WEIGHT IN EXCESS OF 65 KGS DRY WEIGHT

To handle or de-install the Filterpump you must:

- remove the plug from the power socket and/or switch off the switch, if provided;
- roll up and hold the electric power cable to avoid cable damage;
- lift the Filterpump and the delivery pipe using appropriate PPE and lifting gear.

If the Filterpump is set up for fixed applications, perform the following operations before handling it:

- remove the plug from the power socket and/or switch off the switch, if provided;
- unscrew any clamps and remove the delivery pipe;
- roll up and hold the electric power cable to avoid cable damage;
- lift the Filterpump and the delivery pipe using appropriate PPE and lifting gear.

8.3. Transport

The Filterpump is packed on a pallet for transport; check the gross weight before moving or transporting these filterpumps

9. PREPARATION FOR USE (as per EEC 98/37 p.1.7.4.a, EN 292-2 p.5.1.3).

9.1. General information

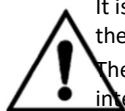


Before beginning to work on the electrical pump, make sure that you have disconnected the electricity from the power supply mains and that it cannot be accidentally reconnected.

The voltage variation allowed +/- 5% (3-phase 380-415 V)

9.2. Electrical Connections

Connections must only be performed by an authorised electrician in compliance with the law in force. Verify that the data on the name plate match the nominal values for the power line. Make the connection after verifying the existence of a working grounding circuit.



It is the Installer's responsibility to perform the connection in compliance with regulations in force in the country of installation.

The 3-phase versions need external protection (rapid disconnect magnetic overload cut-out) with intervention time calibrated to:

- Less than 10 seconds with 5 times IN
- Less than 10 minutes with 1.5 times IN

IN = maximum value of current shown on the name plate

The installation of a differential switch is highly recommended

9.3. Checking the Direction of Rotation

After connecting the power supply, the direction of rotation can be inverted in the three phase versions; in this case performance will be significantly lower than the nominal values **and will cause substantial damage to the Filterpump if run in the wrong direction for more than a few seconds and will invalidate any guarantee.**

To verify a correct connection, proceed as follows:

Start the pump before it is installed. By reaction, it must tend to rotate ("kick") in an **ANTI-CLOCKWISE** direction viewed from above (discharge end).

CAUTION! This operation will be performed dry and must not last more than a few seconds.

10. INSTALLATION (as per EEC 98/37 p. 1.7.4.a; EN 292-2 p.5.1.1b)

WARNING

TO LIFT OR LOWER THE FILTERPUMP, USE A STRONG ROPE OR CHAIN AND APPROPRIATE LIFTING GEARFIXED TO THE EYELETS; NEVER USE THE ELECTRIC POWER CABLE.

Before beginning to work on the electrical pump make sure that you have disconnected the power supply from the power supply mains and that it cannot be accidentally reconnected.

The installation of the electrical pump can involve a certain amount of complexity. For this reason, it must be performed by competent and authorised installers.

The Delivery Pipe

The diameter of the delivery pipe depends on the flow rate and pressure available at the points of use. For installations with long lengths of delivery pipe, friction loss can be reduced by using a pipe diameter larger than the discharge outlet of the pump. It is advisable to install a check valve after the discharge outlet to avoid dangerous water hammers in the event the electrical pump should stop suddenly.

Do not use excessive force when screwing the pipe to the discharge outlet in order to avoid damage. The electrical pump can be installed for use with either a metal pipe (which can be used to support the pump) or flexible tubing. In the latter case the electrical pump must be supported by a cable made of a material with long lasting resistance, passing through the eyelets at the top of the pump. Fix the power cable to the delivery pipe using suitable straps.

CAUTION! Do not underestimate the risk of drowning if the installation must be performed in a well of a certain depth. Make sure there is no danger of toxic vapours or harmful gases in the work atmosphere.

10.1. Fixed Installation

We strongly recommend that the pump is fitted with dry run protection, so that if the filter blocks for any reason or there is insufficient water the pump is automatically stopped to prevent damage from dry running

10.1.1. The Filterpump may be installed upright or horizontally although the self-cleaning filter will work better in the upright position.

10.1.2. The Filterpump should be fully submerged if possible although this is not necessary except for frost protection. The Filterpump will operate continuously if at least 500mm of the filter unit and suction end of the pump are submerged in water at a temperature of less than 40°C.

There must be a gap of at least 200mm around and 100mm underneath the filter unit, although there is no need for a gap under the Filterpump when operated in the upright position if there is a flow of fluid past the filter pump to take detritus away from the screen (e.g., when installing in a flowing river or flume the filter unit at the suction end of the Filterpump) at all times to allow solid particles to fall or be washed clear of the filter screen. Due allowance must be made to allow for any build-up of solids underneath the filter and any detritus, sludge etc must be removed from time to time to ensure this does not come within 100mm of the filter

When lowering the Filterpump into a well or tank, ensure that it is at least 300mm above the bottom.

Be careful with the power cable when lowering the Filterpump. It is advisable to tie the power cable to the delivery pipe every two or three metres.

10.1.3. When positioning the Filterpump, observe the minimum required distances (fig. 2) from walls, from the sides of the drain, tank or other location, so as to allow functioning, use and maintenance operations in safe conditions (as per EN 292-2 p.5.5.1.b).

10.1.4. It is recommended that standard size rigid pipes (metal or plastic) be attached to the Filterpump with clamps of a suitable size

- 10.1.5. Anchor the pipes to the edge of the basin or tank with a pipe clamping bracket.
- 10.1.6. If there is the need to install a non-return valve onto the delivery pipes, make sure it is placed away from the Filterpump filter screen to avoid priming problems when first starting or after emptying.

10.2. Temporary Installation (for Temporary Use)

- 10.2.1. The Filterpump may be installed upright or horizontally. (As above).
The Filterpump should be fully submerged if possible (as above) but it will operate continuously if at least 700mm of the filter unit and suction end of the pump are submerged in water at a temperature of less than 40°C
- 10.2.2. There must be a gap of at least 200mm around and 100mm underneath the filter unit, although there is no need for a gap under the Filterpump when operated in the upright position if there is a flow of fluid past the filter pump to take detritus away from the screen (e.g., when installing in a flowing river or flume at the suction end of the Filterpump) at all times to allow solid particles to fall or be washed clear of the filter screen. Due allowance must be made to allow for any build-up of solids underneath the filter and any detritus, sludge etc must be removed from time to time to ensure this does not come within 100mm of the filter.
- 10.2.3. When lowering the Filterpump into a well or tank, ensure that it is at least 100mm above the bottom.
- 10.2.4. Be careful with the power cable when lowering the Filterpump. It is advisable to tie the power cable to the delivery pipe every two or three metres.
- 10.2.5. When positioning the Filterpump, observe the minimum required distances (fig. 2) from walls, from the sides of the drain, tank or other location, so as to allow functioning, use and maintenance operations in safe conditions (as per EN 292-2 p.5.5.1.b).
- 10.2.6. It is recommended that standard size rigid pipes (metal or plastic) be attached to the Filterpump with clamps of a suitable size.
- 10.2.7. If there is the need to install a non-return valve onto the delivery pipes, make sure it is placed away from the Filterpump filter screen to avoid priming problems when first starting or after emptying.

11. ASSEMBLY AND DISASSEMBLY (as per EEC 98/37 p.1.7.4.a).

The basic Filterpump has no separate parts or accessories, so no assembly is required for installation. If the Filterpump is to be used with the Rotorflush Valve Control System, the assembly instructions provided with the Control Valve system must be followed.

The user must not attempt to disassemble any other component not covered in these instructions and should contact Rotorflush Filters for advice if any further disassembly is required.

FAILURE TO COMPLY WITH THIS RULE RENDERES THE GUARANTEE INVALID.

12. ADJUSTING AND REGISTERING (as per EEC 98/37 p.1.7.4.a; EN 292-2 p.5.5.1.d)

The only thing that needs checking once installation is complete is the length of the cable with float (in installations that have one) with respect to the minimum and maximum water level.

13. USE AND START-UP (as per EEC 98/37 p.1.7.4.a; EN 292-2 p. 5.5.1.d)

The water level must never be lower than the filter screen, even when the pump is not being used. If you fail to observe this, the Filterpump will run out of water and you will have great difficulty starting the Filterpump again.

13.1. Starting



Never continuously run the Filterpump until it is placed and installed in its final operational position. It is possible to have leakage of the Filterpump oil into the pumped liquid; however, this is not harmful to health.

To start up the Filterpump, connect the plug and/or turn on the switch. When the water level reaches the minimum level (fig. 2), disconnect the plug and/or turn off the switch.

14. MAINTENANCE AND REPAIRS (as per EEC 98/37 p.1.6; EN 292-2 p.5.5.1.e)



**BEFORE CARRYING OUT ANY MAINTENANCE OPERATIONS, DISCONNECT THE PLUG AND/OR SWITCH OFF.
FOR ANY REPAIR JOBS DURING THE GUARANTEE PERIOD, THE USER MUST CONTACT ROTORFLUSH FILTERS**



FAILURE TO OBSERVE THIS RULE RENDERES THE GUARANTEE INVALID.

AFTER THE GUARANTEE PERIOD, ALL MAINTENANCE OPERATIONS, REPAIR JOBS AND/OR REPLACEMENTS, MUST BE CARRIED OUT BY SKILLED TECHNICIANS ONLY.

IMPORTANT

Rotorflush filterpumps are designed to be used and are rated for continuous running. If the Filterpump is going to be unused for more than a week Rotorflush **strongly** advise removing the pumps from the water whilst not in use to help prevent possible corrosion, scaling or a build-up of bio-film. The Filterpump must be cleaned, flushed and stored in a dry place until ready for its next use. This applies whether the Filterpump use is a temporary or permanent installation.

To ensure correct functioning and long life of the Filterpump, the Rotorflush filter unit should be inspected every two – six months, depending on mesh type and water conditions. The amount of cleaning required will depend on the liquid being pumped in some instances more frequent manual cleaning of the filter screen may be required, for example where biological growth occurs on the filter screen or oily/fatty deposits are found to build up on the filter screen).

Stainless steel screens should be thoroughly cleaned with a pressure washer.

Stainless steel screens: **These should be pressure washed at least every year, but may be more frequently depending on conditions.**

Check the condition of the electric power cable; if it is damaged, contact the dealer or Rotorflush Filters Ltd to have it replaced.

Units fitted with sacrificial aluminium anodes should have the anodes inspected periodically, the anodes should be replaced when their mass is approximately half their original weight.

14.1. Troubleshooting

TYPE OF FAULT: The pump does not work (the motor does not turn over)

CAUSE	REMEDY
No electric power	Check the contactor on the electric line
Plug not inserted	Check power connection to the line
Automatic switch has tripped	Reset the switch and check the cause
Thermal protection has tripped	This resets automatically
Protection fuses are burnt out (three-phase)	Replace the fuses with same type
Faulty motor	Contact Rotorflush Filters

TYPE OF FAULT: The pump does not work (the motor turns over)

CAUSE	REMEDY
Intake filter blocked	Clean the filter
Non-return valve blocked	Clean the valve and check its operation
The pump does not start up	Check minimum water level Check function of delivery gate valve
Hole in filter screen causing pump to block with detritus	Return to Rotorflush Filters for repairs

TYPE OF FAULT: The pump works at a low flow rate

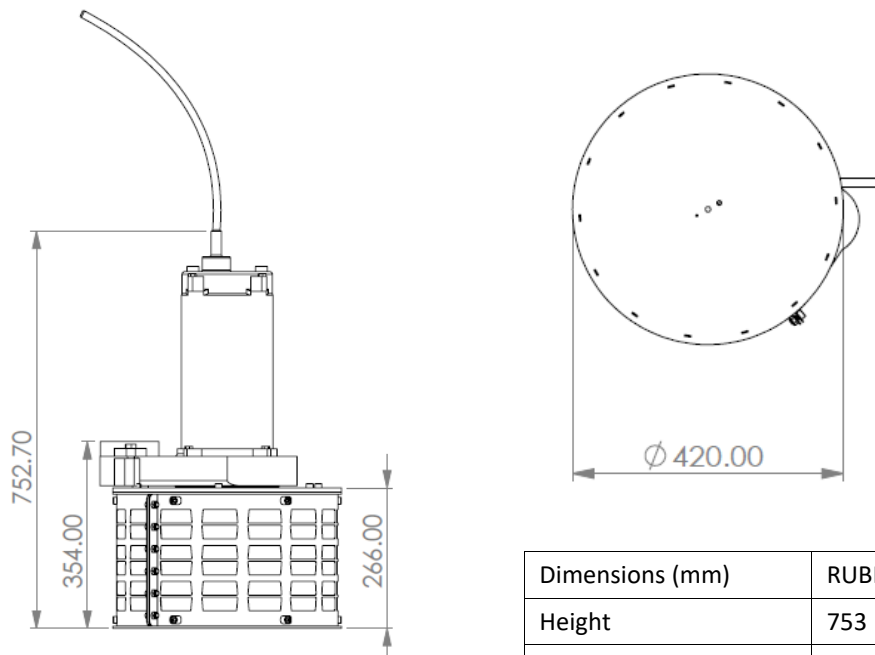
CAUSE	REMEDY
Dirty deliver pipe	Clean pipe
Clogged filter screen	Clean, if continues to be a problem, fit control valve (available from Rotorflush Filters)
Dirty Impellers	Check filter screen for damage. If damaged contact Rotorflush Filters for replacement screen)
Non-return valve blocked	Clean the valve and check its operation
Water level too low	Switch off the pump
Wrong direction of rotation	Check the direction of rotation (three-phase only, section 10.3)
Wrong supply voltage	Feed the pump with the voltage indicated on the rating plate

TYPE OF FAULT: The pump stops after brief periods of operation (tripping the thermal protection)

CAUSE	REMEDY
Liquid temperature too high	The temperature exceeds the technical limits of the pump
Internal defect	Contact Rotorflush Filters

15. TECHNICAL INFORMATION

15.1. Diagram of Filterpump Dimensions and Weights



Dimensions (mm)	RUBI 80SFQ23.7-
Height	753
Filter Diameter	420
Weight (Kg)	70

Figure 1
RUBI SFQ 400 'AR' Range Dimensions

15.2. Diagram for Installation with Minimum Functional Distances

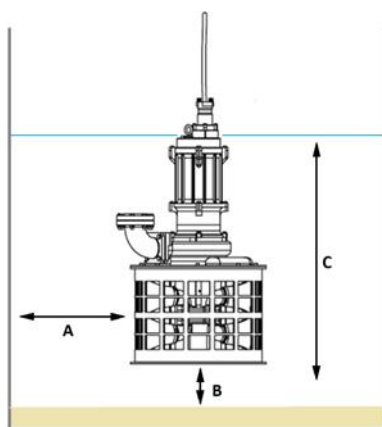


Fig 2

- A. 200mm min gap to side of tank
- B. 100 min gap to top of sediment or detritus at bottom of tank
- C. 700mm minimum immersion from bottom of filter

15.3. Rating Plate Example

		ROTORFLUSH FILTERS LTD The Workshop, Langmoor Manor Charmouth, DT6 6BU. UK 0044 (0) 1297 560229			 Made in the UK	
Type Filterpump				(2)	FPE	
Q max		(4)	H max		(5)	H min
						(6)
MOT	(7)	V		(8)	Hz	(9)
						
					(10)	
HP		(11)	kW		(12)	Mesh
						(13)
A	(14)	ICL. F	(15)	DN:	(16)	IP
						(17)
						rpm
						(18)
Continuous duty Thermally protected Max. liq. Temp						
Weight				(20)	P/N:	
						(21)

KEY

(1)	Date	Date of Manufacture
(2)	Model No.	Filterpump model reference number
(3)	Serial Number	Unique Identifier
(4)	"Q"	Max capacity of duty point in litres / minute
(5)	"Hmax"	Max total head (corresponds to shut-off head)
(6)	"Hmin"	Min total head in metres
(7)	Phase	Type of motor (single or three phase)
(8)	"V~"	Nominal voltage
(9)	"Hz"	Frequency in Hertz
(10)	"m"	Max operational depth in metres
(11)	"HP"	Nominal horse power of the motor
(12)	"P2"	Nominal power of the motor (shaft power) in kW
(13)	Mesh	Intake mesh type and aperture
(14)	"A"	Nominal current in Amps
(15)	"Ins. C. F S1"	Insulation class and duty type
(16)	"DN"	Outlet diameter (ID) in mm
(17)	"IP"	Protection classification (IP rating)
(18)	"min-1"	Revolution speed rpm
(19)	"TMAX"	Rating and maximum water temperature Celsius
(20)	"Weight"	Weight in kgs
(21)	"P/N"	Part Number

16. INFORMATION ON AIR-BORNE NOISE (as per EEC 89/392 p. 1.7.4.f)

The weighted sound pressure level A produced by the Filterpump does not exceed the value of 70 dB(A)

17. WARRANTY

The warranty period is 12 months from delivery. Under the terms of the Warranty, where it applies:

I. Supply of spare parts.

Spare parts will be delivered without charge, within the warranty period, to mainland UK addresses only.

If a customer exports the filter outside the United Kingdom there will be a charge for delivery of the spare parts.

II. Return of Filter to Rotorflush Filters Ltd.

If within the warranty period the customer returns the Filter(s), to Rotorflush Filters Ltd then Rotorflush will undertake repairs without charge.

Rotorflush will deliver the repaired filter without charge within the warranty period to mainland UK addresses only.

If the customer exports the filter outside the United Kingdom, there will be charge to return the filter to the customer.

Please note that the Warranty does not cover damage caused by corrosion. Full details of cover can be found in Rotorflush Filters Ltd Terms and Conditions. [<https://www.rotorflush.com/terms>]

18. WASTE DISPOSAL

Before scrapping the Filterpump, make sure the lubricating oil is separated from the other components. Do not dump lubricating oil in the environment. It must be disposed of properly.

19. DECLARATION OF CONFORMITY

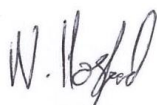
DECLARATION OF CONFORMITY

We, ROTORFLUSH FILTERS LIMITED, declare under our own responsibility that our product Filterpump Model 80SFQ23.7-400AR conforms to the Directives and Standards indicated below:

Machinery Directive 2006/42/EC

Directive RoHS II 2011/65/EU

Harmonized technical standards: EN ISO 12100:2010, EN 809:1998/A1:2009,
EN 60204-1:2006/A1: 2009, EN 60335-1:2012/A11: 2014, EN 60335-2-41:2003/A2:2010
EN 60529/1991/A2:2013, EN 62233/2008/AC:2008, EN 61000-6-1:2007, EN 61000-6-2:2005
EN 61000-6-3:2007/A1:2011, EN 61000-6-4:2007/A1:2011, EN50581:2012



N Hosford

Proprietor Rotorflush Filters

Daily and Periodic Inspection

	Interval	Inspection Item	Judgment Criteria
Daily Inspection	Daily	Measuring the operating current	To be within the rated current
		Measuring the power voltage	Within $\pm 5\%$ of the rated voltage
Periodic Inspection	Monthly	Measuring the insulation resistance	Insulation resistance reference value = 1M Ω minimum *The motor must be inspected if the insulation resistance is considerably lower than last inspection.
		Pump appearance	Inspection for damage, corrosion
		Pump piping	Inspection for vibration, noise, water leakage
		Lifting chain	Inspection for twist, damage, corrosion, fracture
	Yearly	Inspecting oil	6,000 hours or 12 months, whichever comes first [Should be used specified oil: Turbine Oil ISO VG32]
		Pump section	Inspection for damage, corrosion
		Power cable	Inspection for cutoff, induration, swelling, crack
	Once every 2 years	Changing oil	9,000 hours or 24 months, whichever comes first [Should be used specified oil: Turbine Oil ISO VG32]
		Changing the mechanical seal	The inspection and replacement of the mechanical seal requires specialized equipment. *To have this operation performed, contact the dealer where this equipment was purchased, or the Tsurumi sales office in your area.
	Once every 2 to 5 years	Overhaul	The pump must be overhauled even if the pump appears normal during operation. Especially, the pump may need to be overhauled earlier if it is used continuously. *To overhaul the pump, contact the dealer where it was purchased, or the Tsurumi sales office in your area.

Recommended Replacement Cycle of General Submersible Sewage Pumps or Parts (Operating time: 6hours per day)

Part	Recommended Cycle
Whole of a pump	Once every 7 to 10 years
Impeller (Grey iron casting)	Once every 3 years
Mechanical seal	Once every 2 years
Oil seal, Packing etc.	Each time pump is disassembled
Bearing	Once every 3 to 4 years
Power cable	Once every 3 to 4 years
Motor	Once every 7 to 10 years

