CE

STEINLE

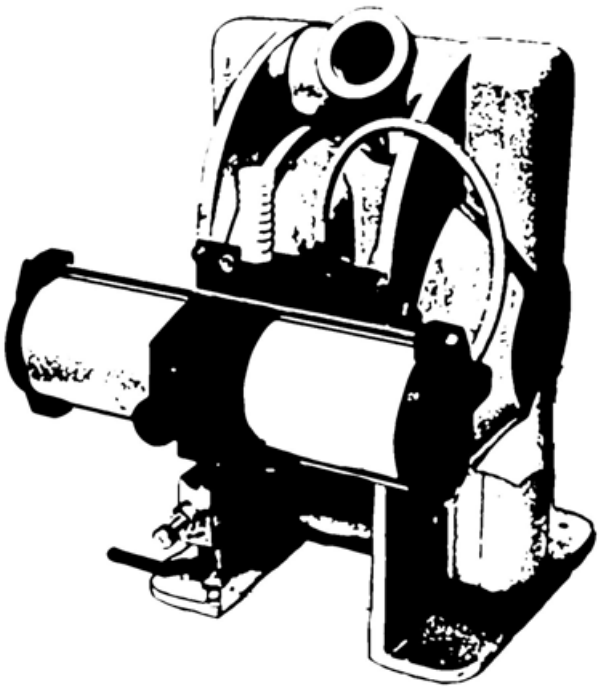
INSTRUCTION MANUAL

Pump models:
TF70
TF120
TF220
TF420

Filter Press Pumps TF
Cast Metal series

Model No

Serial No



Aluminium
Grey Iron
Stainless Steel

CE CERTIFICATE
INSTALLATION
OPERATION
MAINTENANCE
SPARE PARTS
DATA
WARRANTY & REPAIR

NOTE!

Read this instruction manual carefully before installing the pump. If something is obscure, please consult us. The user shall also read and understand the warninglabels and safety instructions for the pumped media.

CONTENTS

STEINLE

INTRODUCTION

The STEINLE TF filter press pump is very compact pump system, which can be installed directly at the filter press. The pumps are designed to be safe simple and easy to use and maintain. The construction is sealless and without rotating parts. The pumps are suitable for almost all different kinds of non aggressive slurries used by the industry today. It is air driven and needs no further equipment to control the flow rate when the pressure in the filter press rises up. Pressure regulator and needle valve are already installed at the pump.

The pumps are based on the aproved Tapflo-pumps, which are exceptionally qualified for this application.

With proper attention to maintenace, the TF-series will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining the pump.

CE CERTIFICATE

STEINLE

Declaration of conformity

Machinery directive 98/37/EG

STEINLE Industriepumpen declares that:

Product name: **Filter Press Pumps**
Models: **TF...**

Is in conformity with the essential health and safety requirements and technical construction file requirements of the EC Machinery directive 98/37/EG.

Manufacturer: **STEINLE Industriepumpen GmbH**

Address: **Varnhagenstr. 42**
D-40225 Düsseldorf
Germany

Düsseldorf, August 1st 2003

Michael Steinle
Managing director

1.1 Receiving inspection

Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accesories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to STEINLE .

1.2 Storage

If the equipment is to be stored prior to installation, place it in a clean location. Do not remove the protective covers from the suction, discharge and air connections which have been fastened to keep pump internals free of debris. Clean the pump thoroughly before installation.

1.3 Foundation

The pump will operate properly without being fixed to a foundation. If fixation is needed for an installation, make sure the foundation is able to absorb vibrations. Use the fixing holes on the foot of the pump housings.
It is essential for the operation of the pump to mount the pump with the feet in a downward direction (see sketch).

1.4 Suction and discharge pipings

Suction and discharge piping should be fully supported and anchored near to but independent of the pump. The piping to the pump should be a hose, to prevent undue stress and strain on the pump connections and the pipings.

1.4.1 Turnable connections

The suction and discharge connections are turnable 180°. This simplifies the assembling and installation considerably. If you wish to turn the connections, slightly release the pump housing screws, then screw a threaded nipple into the connection and turn.

1.4.2 Connection of suction pipe

Remember that the suction pipe/connection is the most critical point, especially if the pump is priming. Just a small leakage will dramatically reduce the suction capability of the pump. When connecting the suction pipe, following is recommended.

1) For satisfactory operation, use reinforced hose or corresponding (the suction power may otherwise shrink the hose). The internal diameter of the hose should be the same as on the suction connection (at the bottom of the pump) to have best suction capability.

2) Make sure that the connection hose - pump is completely tight, otherwise the suction capability will be reduced.

3) Always use as short suction pipe as possible. Avoid air pockets which can arise with long pipings.

1.4.3 Connection of discharge pipe

For this connection it is only recommended a simple and positive flow connection. Use a hose or flexible piping (minimum one meter) between the discharge connection and any rigid fixed piping. Coil the hose at least one turn. All components (hose, pipe, valves etc) on the discharge piping must be designed for minimum PN 10.

1.5 Air connection

Screw the air hose into the air intake on the center block of the pump with for example a bayonet coupling. For best efficiency, use the same hose diameter as the internal diameter of the connection on the air intake. The maximum air pressure for TF 70/120 is 8 bar, for TF 220/420 7 bar. For the TFF-version the maximum pressure is the half of above.

1.5.1 Air treatment system

The air valve is constructed for oilfree air. Lubrication of the air is ***not allowed.*** Maximum air pressure is 8 bar. As prevention purpose some sort of filtration of the air is recommended. Dirt in the air can under unfortunate circumstances be the cause of breakdown. ***Dry air*** is also essential. Ice may appear in the air valve if the air is humid.

To facilitate the operation of the pump we recommend an air treatment system connected to the air supply. These components should be included:

1) Regulator to adjust the air pressure
2) Manometer to read the actual pressure
3) Filter with 5 µm mesh

These components are included our **Air treatment system** which can be ordered from STEINLE Industriepumpen.

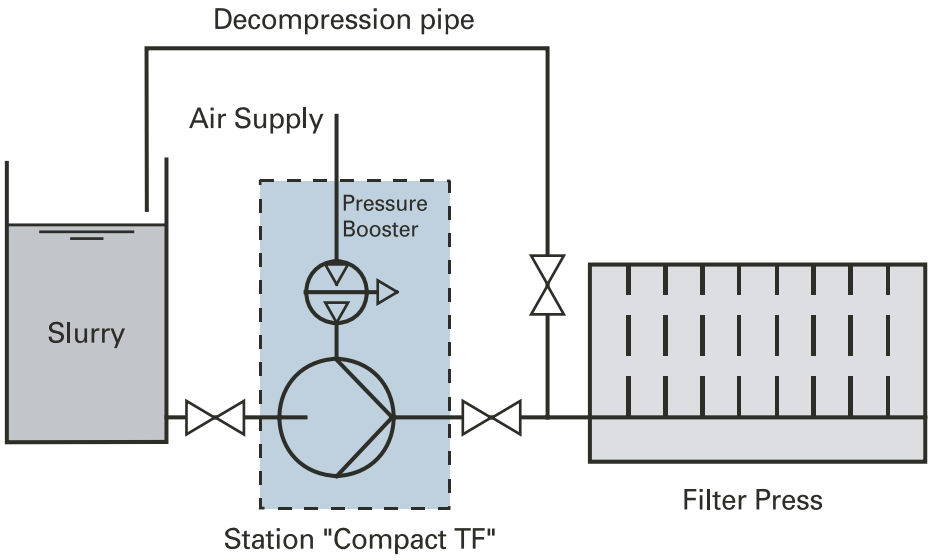
1.5.2 Version TFF with pressure transmission 1 : 4

- The first pressure booster, which is supplied as a single part, has to be installed external. This booster is connected with the air supply.
- Between this external booster and the booster mounted at the pump, the air connection hose has to be plugged in. Please leave at least a length 1m of the hose.
- The end pressure of the pump has to be adjusted at the booster mounted on the pump.

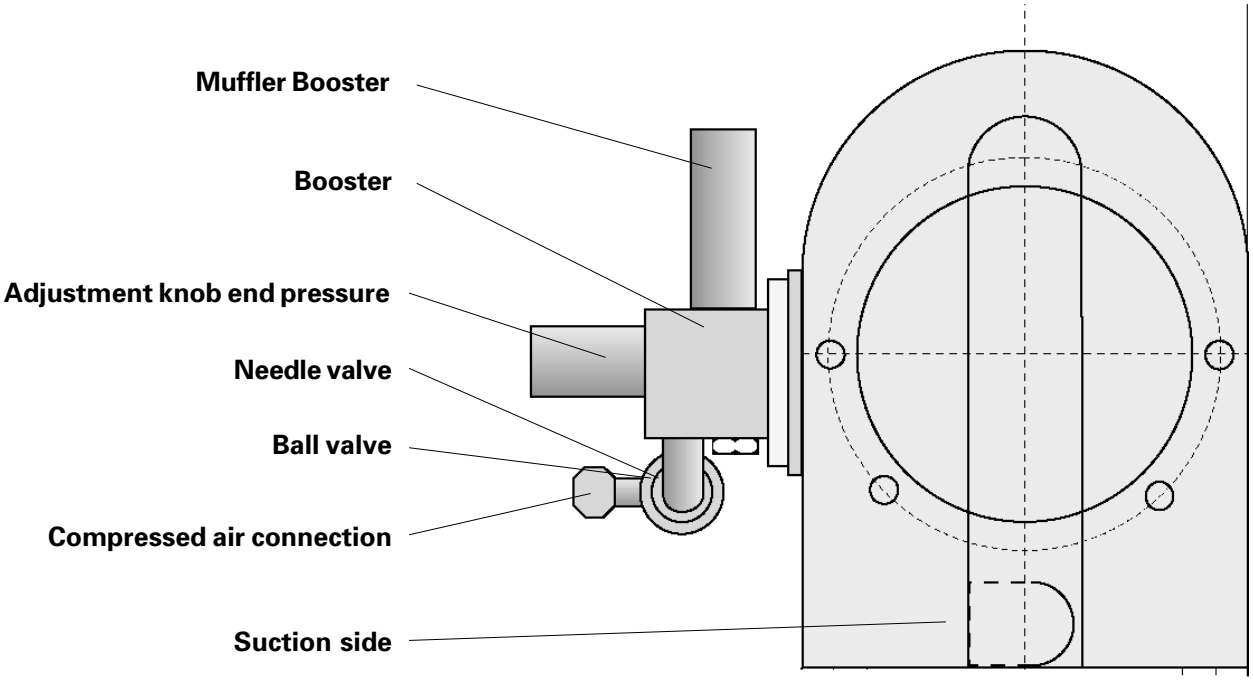
1.6 Muffler

The muffler for the pressure booster is supplied as a single part because of transport safety. This muffler has to be screwed into the hole on the top of the booster.

1.7 Example of installation



1.8 Scope of supply



2.1 Health and safety

The pump must be installed according to local and national safety rules.

The pumps are constructed for particular applications. Do not use the pump on applications different from that for which it was sold without consulting us to ascertain its suitability.

2.1.1 Protection

In the interest of health and safety it is essential to wear protective clothing and safety goggles when operating, and/or working in the vicinity of STEINLE pumps.

2.1.2 Environments in danger of explosion

For use in environments in danger of explosion, the pump series TXF with ATEX certification must be used and it must be properly earthed. Follow the explosion safety rules applicable at the location for the pump. Consult us for further information. Incorrect installation or use may cause injury or death to personel in vicinity of the pump.

2.1.3 Air pressure

The maximum air pressure for STEINLE pumps is shown in chapter 1.5. Higher air pressure than 8 bar can damage the pump and may cause injury to personel in vicinity of the pump.

2.1.4 Noise level

At tests, the noise level from a TF pump has not exceeded 80 dB(A). Under some circumstances, for example if the pump is operating under high air pressure at low discharge head, the noise can be inconvenient or hazardous for personel staying for long periods in vicinity of the pump. This hazard can be prevented by:

- using suitable ear protection
- lower the air pressure and/or raise the discharge head
- lead the outcomming air from the place by connecting a hose from the muffler connection of the pump.
- use elastomer valve balls EPDM or NBR instead of PTFE or stainless steel, provided that the elastomer is compatible with the pumped liquid.

2.1.5 Temperature hazards

Raised temperature can cause damage on the pump and/or pipings and may also be hazardous for personel in the vicinity of the pump/pipings. Avoid quick temperature changes and do not exceed the maximum temperature specified when the pump was ordered. See also general max temperatures based on water in chapter 5 "Data".

2.2 Before starting the pump

- Make sure the pump is installed accordning to the installation instruction (section 1).
- Filling of the pump with liquid before start is not necessary.
- When installing is new or reinstalled, a test run of the pump with water should be conducted to make sure the pump operates normally and does not leak.
- Make sure that the maximum pressure for the pump and the piping is not exceeded.

2.3 Starting and operating

– Open the discharge valve.

– ***Note! Considering the suction capacity when air is still in the suction pipe, it is recommended to start with low air pressure/flow in the beginning. This is not necessary if the pump is filled with liquid before start.***

– When the pump has been filled with liquid, the air pressure/flow may be raised to increase the suction capacity of the pump.

– The performance of the pump can be adjusted through the air supply by adjusting the needle valve and a pressure regulator. The performance can also be adjusted by normal flow control on the discharge side of the system.

2.3.1 Dry running

The pump may run dry without any problem for a shorter time. Dry running for a longer period causes an increase of wear due to the high stroke frequency.

2.3.2 Optimizing the pump lifetime

Running at full frequenzy (maximum air pressure/flow) continiously will cause premature wear of the components. As a general rule, we recommend to run at half of the maximum capacity of the pump. For instance, a TF120 pump should run continious maximum at 5 m³/h.

2.4 Pump stopping

When the filter press is filled and the maximum pressure is reached, the must be stopped by closing the air supply. Before the filter press is opended, the pressure has to drop down to 0.

To stop the pump automatically, various solenoid valves are available.

Stroke sensors can register the frequency of the pump. When the end pressure is reached, the pump moves slowly and a signal for stopping the filtration can be given.

3.1 Performance test

When installation is new, a test run of the pump should be conducted. Gauge the capacity at specific air pressure/flow. This information is for use in checking performance as wear takes place. You will be able to set schedules for maintenance of the pump and to select spare parts to be kept on stock.

3.2 Routine inspection

Frequent observation of the pump operation is recommended to detect problems. A change in sound of the running pump can be an indication of weared parts (see below "location of faults"). Leaking liquid from the pump and changes of performance may also be detected. Routine inspections should be conducted frequently.

3.3 Complete inspection

The intervals for a complete inspection depend upon the operation conditions for the pump. The characteristics of the liquid, temperature, materials used in the pump and running time decide how often a complete inspection is necessary.

If a problem has occured, or if the pump is in need of a complete inspection, see later this chapter "location of faults" and "dismantling of the pump". You are of course warmly welcome to consult us for further help.

Weared parts should be carried in stock, see chapter 4 "stocking recommendations".

3.4 Location of faults

Problem	Possible fault
The pump does not run	The air pressure is to low The air connection is blocked Muffler is blocked Air valve is defect Dirt in the pump chamber Diaphragm breakdown
The suction is bad	Suction connection is not tight Suction connection is blocked Muffler is blocked Valve balls are blocked Valve balls are damaged
The pump runs irregularly	Valve balls are blocked Sealings are defect in air valve or center block Diaphragm breakdown
Bad flow/pressure	Pressurefall in incomming air Suction or air connection blocked Muffler is blocked Air valve is defect Valve balls worn out/broken Air in liquid Diaphragm breakdown
Liquid leaks from the pump	Screws on the housing not properly fastened
Liquid comes out of the muffler	Diaphragm breakdown

3.5 Dismantling the pump

3.5.1 Before the dismantling procedure

Be sure to drain all liquid from the pump. Cleanse or neutralize the pump thoroughly. Disconnect the air connection and then the suction and discharge connections.

3.5.2 Mainparts

1) Unscew the steel plate with the pressure booster and unscrew the screws on one side of the pump housing, place the pump on the side that still has the screws, and lift off the "loose housing".

2) Turn and lift the suction and discharge connections.

3) Upend the pump and unscrew the other housing. Now the housings are free from the center block.

4) In order to take out the valve balls, unscrew the valve ball stop in the housing - and the valve ball is free.

3.5.3 Center block

1) Unscrew one of the diaphragms while pressing the other one towards the center block, then pull out the second diaphragm together with the diaphragm shaft.

2) Dismantle the circlips which keep the air valve on it's place, press out the air valve with for instance a wood shaft of a hammer.

3.6 Assembling of the pump

3.6.1 Center block

The center block is assembled in the same way as dismantling it but in opposite direction.

1) Mount the circlip on one side, then turn and push the air valve into the housing.

2) Put the circlip on the other side.

3) Put the diaphragm with shaft into the center block.

4) Screw the next diaphragm onto the shaft and fix the holes. Sometimes you have to turn the diaphragms a little back to get the holes fixed.

3.6.2 Housing

The housing is assembled in opposite order to dismantling.

1) Turn the suction and discharge connection to a position so that the in/outlet is in the direction that you wish.

2) Mount the housing and finally turn the screws equally. Mount the steel plates with the booster.

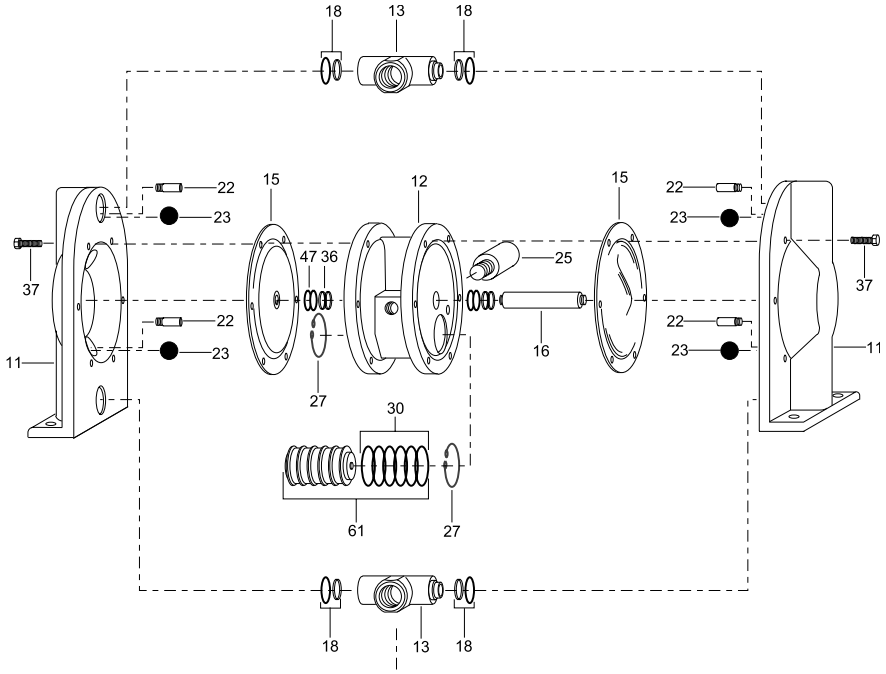
3.6.3 Suction and discharge connection

Always make sure that the o-rings and gaskets are fresh, and that they are placed in the housing before all assembling of the pump.

3.6.4 Test run

We recommend you to conduct a test run of the pump before installing it to the system so no liquid gets wasted if the pump leaks or perhaps does not start according to wrong assembling of the pump.

4.1 Spare part drawing TF70, TF120, TF220 and TF420



Spare parts for the pressure booster are available in a complete kit, listet as item 70 in the spare parts list

4.2 Sparepart list TF70

Pos	Description	Material	Qty	Article No
11	Housing	Alu	2	6-070-11
		Cast Iron	2	6-070-11-9
		SS316L	2	6-070-11-5
12	Center block	Alu	1	6-070-12
13	In/outlet	Alu	2	6-070-13
		Cast Iron	2	6-070-13-9
		SS316L	2	6-070-13-5
15	Diaphragm	EPDM	2	6-050-15
		PTFE		6-050-15-1
		NBR		6-050-15-3
16	Diaphragm shaft	AISI 316	1	6-050-16
18	O-ring/gasket (in/outlet)		4	6-070-18
	for SS316 pumps:			*6-072-18*
22	Valve ball stop	AISI 316	4	6-070-22
	for SS316 pumps:	*Spring*	*4*	*6-072-22*

Pos	Description	Material	Qty	Article No
23	Valve ball	EPDM	4	6-050-23
		PTFE		6-050-23-1
		NBR		6-050-23-3
		PP		6-050-23-4
		PU (polyurethane)		6-050-23-7
		AISI 316		6-050-23-5
25	Muffler	PP	1	6-050-25
27	Circlip	Phosph. br.	2	6-050-27
30	O-ring	NBR	6	6-050-30
36	Center block sealing	PE	4	6-050-36
37	Screw	Steel	12	6-070-37
47	O-ring (back up for 36)	NBR	4	6-050-47
61	Air valve complete		1	6-050-61
70	Service Kit Booster		1	KTVBA1110

4.3 Sparepart list TF120

Pos	Description	Material	Qty	Article No
11	Housing	Alu	2	6-120-11
		Cast Iron		6-120-11-9
		SS316L		6-120-11-5
12	Center block	Alu	1	6-120-12
13	In/outlet	Alu	2	6-120-13
		Cast Iron		6-120-13-9
		SS316L		6-120-13-5
15	Diaphragm	EPDM	2	6-100-15
		PTFE		6-100-15-1
		NBR		6-100-15-3
16	Diaphragm shaft	AISI 316	1	6-100-16
18	O-ring/gasket (in/outlet)		4	6-120-18
	SS316L pumps			*6-122-18*
22	Valve ball stop	AISI 316	4	6-120-22
	for SS316L pumps:	*Spring*	*4*	*6-122-22*

Pos	Description	Material	Qty	Article No
23	Valve ball	EPDM	4	6-100-23
		PTFE		6-100-23-1
		NBR		6-100-23-3
		PP		6-100-23-4
		PU (polyurethane)		6-100-23-7
		AISI 316		6-100-23-5
25	Muffler	PP	1	6-050-25
27	Circlip	Phosph. br.	2	6-050-27
30	O-ring	NBR	6	6-050-30
36	Center block sealing	PE	4	6-100-36
37	Screw	Steel	12	6-120-37
47	O-ring (back up for 36)	NBR	8	6-100-47
61	Air valve complete		1	6-050-61
70	Service Kit booster		1	KTVBA1110

4.4 Sparepart list TF220

Pos	Description	Material	Qty	Article No
11	Housing	Alu	2	6-220-11
		Cast Iron		6-220-11-9
		SS316L		6-220-11-5
12	Center block	Alu	1	6-220-12
13	In/outlet	Alu	2	6-220-13
		Cast Iron		6-220-13-9
		SS316L		6-220-13-5
15	Diaphragm	EPDM	2	6-200-15
		PTFE		6-200-15-1
		NBR		6-200-15-3
16	Diaphragm shaft	AISI 316	1	6-200-16
18	O-ring/gasket (in/outlet)		4	6-220-18
	SS316L pumps:			*6-222-18*
22	Valve ball stop	AISI 316	4	6-220-22
	for SS316 pumps:	*Spring*	*4*	*6-222-22*

Pos	Description	Material	Qty	Article No
23	Valve ball	EPDM	4	6-200-23
		PTFE		6-200-23-1
		NBR		6-200-23-3
		PP		6-200-23-4
		PU (polyurethane)		6-200-23-7
		AISI 316		6-200-23-5
25	Muffler	PP	1	6-100-25
27	Circlip	Phosph. br.	2	6-400-27
30	O-ring	NBR	6	6-400-30
36	Center block sealing	PE	4	6-200-36
37	Screw	Steel	12	6-120-37
47	O-ring (back up for 36)	NBR	4	6-200-47
61	Air valve complete		1	6-400-61
70	Service Kit booster		1	KTVBA2100

4.5 Sparepart list TF420

Pos	Description	Material	Qty	Article No
11	Housing	Alu	2	6-420-11
		Cast Iron	2	6-420-11-9
		SS316L		6-420-11-5
12	Center block	Alu	1	6-420-12
13	In/outlet	Alu	2	6-420-13
		Cast Iron		6-420-13-9
		SS316L		6-420-13-5
15	Diaphragm	EPDM	2	6-400-15
		PTFE		6-400-15-1
		NBR		6-400-15-3
16	Diaphragm shaft	AISI 316	1	6-400-16
18	O-ring/gasket (in/outlet)		4	6-420-18
	SS316L pumps:			*6-422-18*
22	Valve ball stop	AISI 316	4	6-420-22
	for SS316L pumps:	*Spring*	*4*	*6-422-22*

Pos	Description	Material	Qty	Article No
23	Valve ball	EPDM	4	6-400-23
		PTFE		6-400-23-1
		NBR		6-400-23-3
		PP		6-400-23-4
		AISI 316		6-400-23-5
		PUR cored	4	6-400-23-7
25	Muffler	PP	1	6-100-25
27	Circlip	Phosph. br.	2	6-400-27
30	O-ring	NBR	6	6-400-30
36	Center block sealing	PE	4	6-400-36
37	Screw	Steel	12	6-420-37
47	O-ring (back up for 36)	NBR	4	6-400-47
61	Air valve complete		1	6-400-61
70	Service Kit booster		1	KTVBA4100

4.6 Stocking recommendation

Even at normal operation some details in the pump will be weared. In order to avoid expensive breakdowns we recommend having a few spare parts in stock.

Depending on the severity of the operation and the importance of not having a breakdown we offer two different spare part sets.

Spare part set No 1

Qty	Description	Pos
2	Diaphragm	15
4	Valve ball	23
1	Muffler	25
4	O-ringset	18

Spare part set No 2

Qty	Description	Pos
2	Diaphragm	15
4	Valve ball	23
1	Muffler	25
4	O-ringset	18
1	Diaphragm shaft	16
2	Circlip	27
4	Centerblock seal	36
4/8*	O-ring	47
1	Air valve complete	61

**** = only TF120***

4.7 How to order parts

When ordering spare parts it will simplify if you give the ***model number*** from the nameplate of the pump. The model number tells the size of the pump and materials of the components.

Please include this in your order to us:

1) Model number of the pump (See nameplate)
2) Article number of the detail
3) Description of the detail
4) Quantity of the detail

4.8 Pump code

The model number on the pump and on the front page of this instruction manual tells the pump size and materials of the pump components.

Example: **TFF 70 - A N N**

1 2 3 4 5 6

1 = Filter press pump model TF

2 = Special executions:
F = Pressure transmission 1:4
S = Air valve SS316/Viton

3 = Pump size

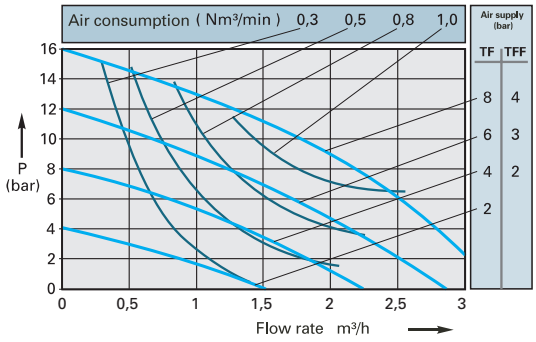
4 = Material of the pump (housings, center block and in/outlets):
A = Aluminium
C = Cast Iron
S = SS316L

5 = Material of the diaphragms:
T = PTFE
N = NBR (Nitrile rubber)
E = EPDM

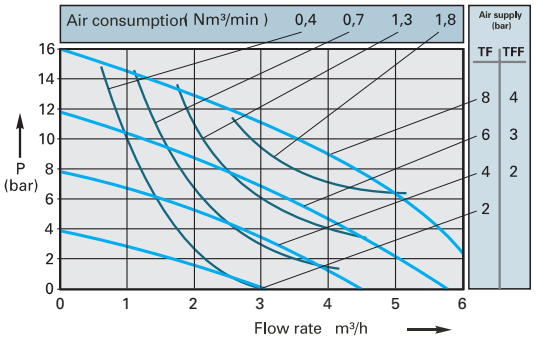
6 = Material of the valve balls:
T = PTFE
N = NBR (Nitrile rubber)
E = EPDM
P = PP
S = Steel
U = Polyurethane (PU)

5.1 Performance curves

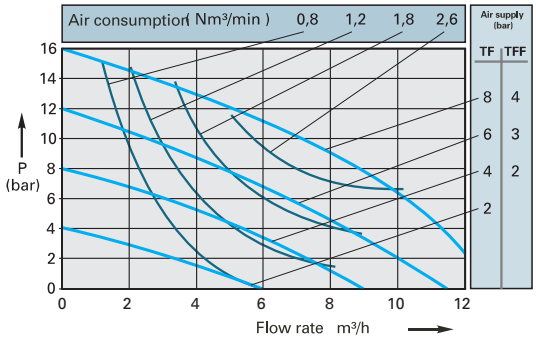
The performance curves are based on water at 20°C. Other conditions such as higher viscosity and/or higher specific gravity or higher temperature will change the pump performance.



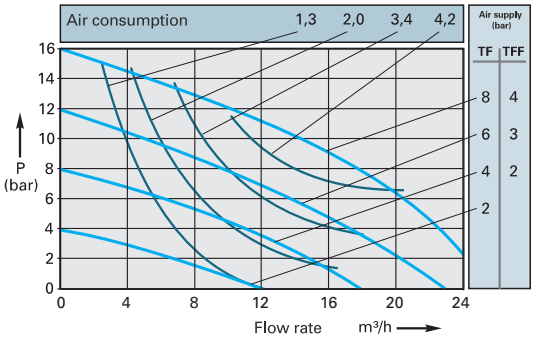
Performance curver Station TF / TFF 50/70



Performance curver Station TF / TFF 100/130



Performance curver Station TF / TFF 200



Performance curver Station TF / TFF 400

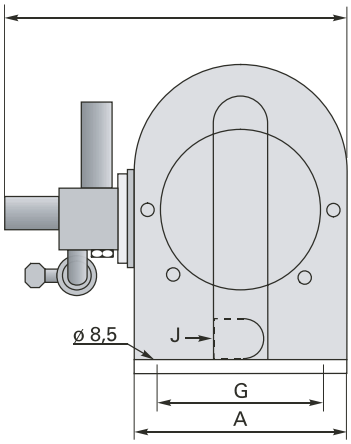
Example:

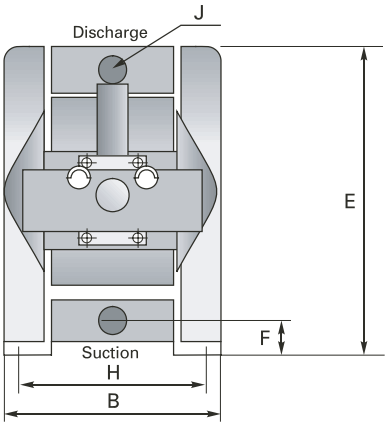
A flow rate of 6 m³/h is required and a pressure of 12 should be achieved. A TF 100 (100 l/min = 6 m³/h) is recommended, which has to be supplied with 6 bar compressed air.

When 16 bar should be achieved, the same pump must have an air supply of 8 bar. A TFF 100 is recommended, when 8 bar air pressure are not available. In this case only 4 bar air pressure are suitable.

5.2 Dimensions

Aluminium pumps TF 70 – TF 420





	A	B	C	D	E	F	G	H	J
TF 70	150	167	260	230	230	20	116	130	3/4"
TF 120	200	200	356	223	223	27	160	160	1"
TF 220	270	270	400	412	412	35	220	220	1 1/2"
TF 420	350	350	564	586	586	40	290	290	2"

5.3 Technical data

	TF70	TF120	TF220	TF420
* Max air pressure (bar)	8	8	7	7
Capacity (m^3/h)	4	10	24	32
Max head (bar)	16	16	14	14
Weight (kg)	6	10	25	54
Max suction lift without liquid (m w c)	3	4	5	5
Max suction lift with liquid (m w c)	8	8	8	8
Max size of solids (mm)	4	6	10	15
Max temperature (°C) NBR/PTFE diaphm.	120 / 90	120 / 90	120 / 90	120 / 90

6.1 Returning parts

When returning parts to STEINLE Industriepumpen please follow this procedure:

– Consult STEINLE for shipping instructions.

– Cleanse or neutralize and rinse the part/pump. Make sure the part/pump is completely empty from liquid.

– Pack the return articles carefully to prevent any damage under transport.

Goods will not be accepted unless the above procedure has been complied with.

6.2 Warranty

STEINLE Industriepumpen warrants products* of it's own manufacture will be free from defects in raw material and manufacture under normal use and service for a period of not more than one year. STEINLE's obligation under this warranty being limited to repair or replacement of its products which shall be returned to STEINLE Industriepumepn. Follow the procedures above "returning parts". If a pump or part is received defected, report to STEINLE immediately. Parts returned to our company must have written authorisation from STEINLE. This warranty will not apply to any of our products which shall have been used other than for their intended use.

**** Even when products such as diaphragm pumps operate under normal conditions, some parts are subject to wear and may have to be replaced within one year. Examples of such parts in our diaphragm pumps are; diaphragms, valve balls, o-rings and gaskets etc. This warranty will not apply to these parts being subject to wear.***

6.3 Warranty form

Company: _____

Telephone: _____ Fax: _____

Address: _____

Country: _____ Contact name: _____

E-mail: _____

Delivery date: _____ Pump was installed (date): _____

Pump type: _____ Serial No (stamped on the pump housing): _____

Description of the fault: _____

_____

_____

The installation

Liquid: _____

Temperature (°C): _____ Viscosity (cPs): _____ Spec. grav. (kg/m^3): _____ pH-value: _____

Contents of particles: _____ %, of max size (mm): _____

Flow (l/min): _____ Duty (h/day): _____ No of starts per day: _____

Discharge head (mwc): _____ Suction head/lift (m): _____

Air pressure (bar): _____ Quality of the air (filter, micron?, lubrication?): _____

Other: _____

_____

_____

Place for sketch of the installation

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