

Instruction Manual

Model:

Identification:

Serial No.:



Cyclone separators

Automatic Filter

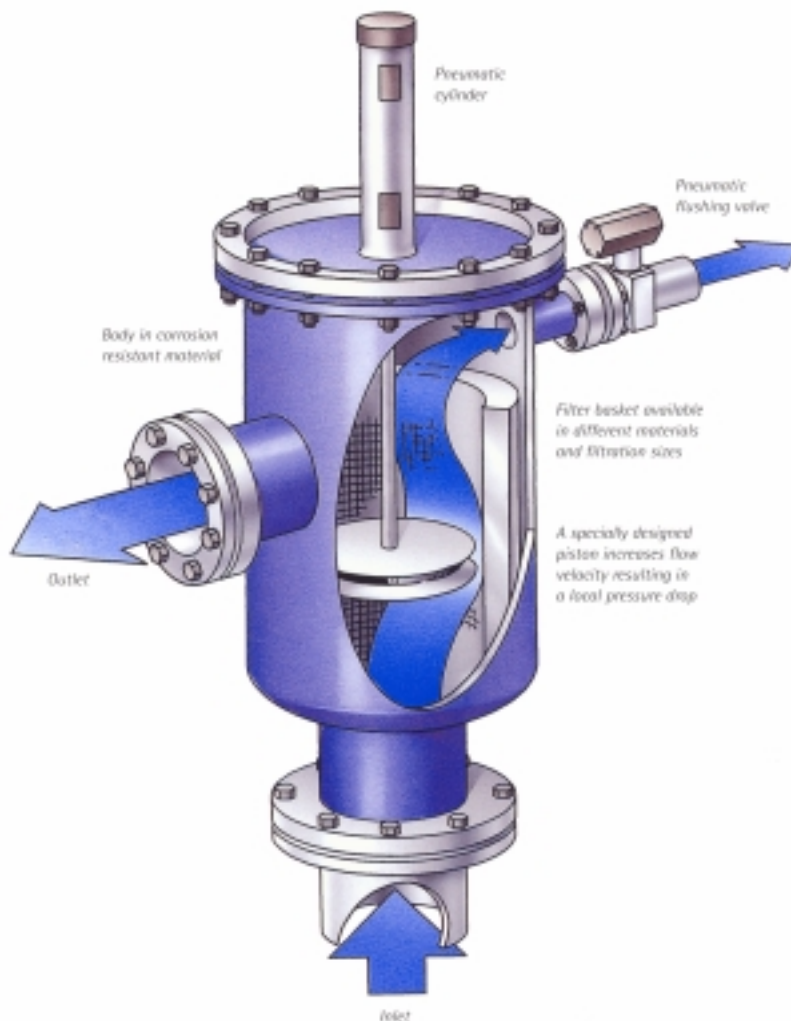


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Many industrial processes need pure water, free from particles and other impurities. Modern water supplies are often severely polluted and this makes heavy demands on purification and filtration equipment. A good system has to be simple, efficient and reliable. What is more, it has to be able to withstand sea water and resist corrosion. The name of this system is Bernoulli.

New filter technology The Bernoulli Strainer is an ingenious design for straining water. The strainer works on Bernoulli's principle, the 250-year-old discovery that an increase in the velocity of flow of a liquid gives rise to a drop in pressure. A specially designed piston is introduced into the strainer basket which creates an increase in the velocity of flow between the piston and the wall of the strainer. The resulting drop in pressure, "vacuums" away the particles which have attached themselves to the inside of the basket. The impurities are flushed out through a flushing valve, and problems due to the clogging of the strainer surfaces are avoided.

Many advantages The design is simple and robust, giving benefits such as increased reliability, ease of maintenance and a high level of operational reliability. Thanks to the right choice of materials and a well-thought-out design, the Bernoulli Strainer offers a long-life solution to corrosion problems, even in salt water systems. Its smooth flow, high capacity characteristics, combined with low flushing losses, make the filter highly efficient, and offer real advantages in process system design

PO no
Date

Customer	Project
Sold through	Use

General data

No/type	Serial nos
Flow rate	Pressure drop
Flushing flow rate	System pressure

Mechanical

Design/test pressure	Design temperature
Basket perforation	Dimension print
Connection in	Assembly drwg
" out	Design drwg
" flushing	Design code
Air connection	Weight
Water connection	Volume

Materials

Body	Basket
Endcover	Flushing valve
Disk	Piston
Painting	

Instrumentation

Control panel/Voltage	Air pressure
Power consumption	Air consumption average
Electrical protection class	Air consumption maximum

Components

Cylinder	Cylinder disc
Flushing valve	Valve actuator
D P switch	Orifice plate
Solenoid valves	

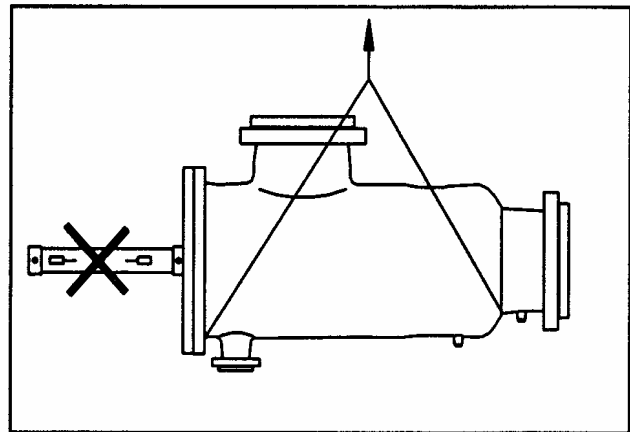
Spare parts

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STOP

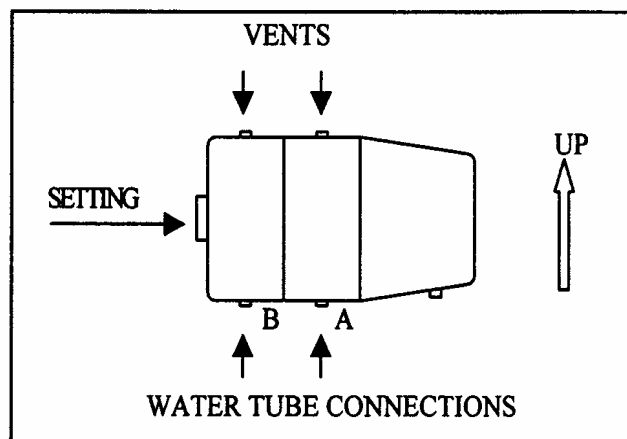
BEFORE UNPACKING THE STRAINER, PLEASE NOTE :

Never lift the strainer in the piston.
Lift in the flanges or strap it as indicated.



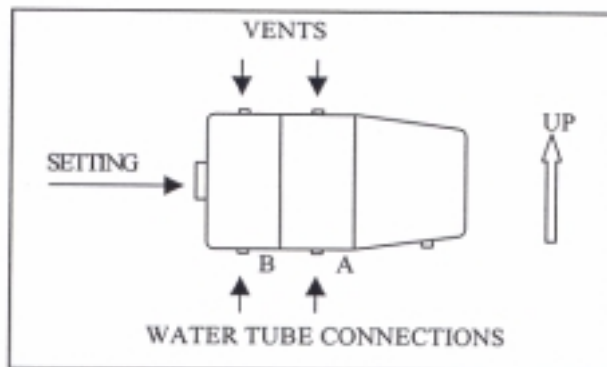
BEFORE INSTALLING THE STRAINER PLEASE NOTE :

The differential pressure switch must be mounted horizontally with the water tubing entering from below.



The flushing outlet pipe should normally be filled with water. Fatal vibrations may occur if a high system pressure is combined with an open outlet of the flushing line.

Reduction of the flushing line may also reduce the cleaning ability. The pressure differential between the strainer inlet and flushing valve outlet must exceed 0.3 bar.



- 1.3 Locate the control panel and the differential pressure switch on a wall within sight from the strainer.

The differential pressure switch must be mounted horizontally with the water tubing entering from below and the two vents on the top.

- 1.4 Connect the 6 mm blue air tubing between the control panel flushing valve and pneumatic cylinder. Connect the air supply to the control panel with minimum 6/4 mm air tubing. Air pressure should normally be 6 bar (max 9 bar).
- 1.5 Connect 8 mm transparent water tubing between the strainer body and the differential pressure switch as marked A and B. Make sure the tubing are connected according to the schematic diagram in this manual. If the tubes are mixed up the automatic cleaning control will be disrupted.
- 1.6 Connect the strainer electrically as shown in the circuit diagram.

If required, connect the potential free contacts for central supervision of the Bernoulli Strainer, i.e. OPERATION, ALARM and FLUSHING.

2 OPERATION

The flushing operation is initiated in any of the following three ways:

2.1

Manually by switching the main switch in the control panel off/on. Flushing operation starts at each switching on (Note the delay if T3*0).

2.2 When the time as set on timer T1 is reached.

2.3 The differential pressure switch signals to the control panel to start flushing. Note that the diff pressure switch doesn't measure the total pressure drop over the strainer but rather indicates the degree of clogging.

Flushing operation takes place as follows:

2.4 Timed flushing

The flushing valves opens .

The piston starts to move into the strainer basket as the pre-flushing time set on timer T2 is reached. The piston makes two full strokes before returning to its normal position (drawn out of basket). Finally the flushing valve closes.

2.5 Flushing initiated by the differential pressure switch

The diff pressure switch signals that the basket is clogged. The flushing starts and operates in the same way as described under 2.4.

2.6 Alarm function 1 . The piston cannot make full strokes (for instance due to low air pressure

Say that the piston doesn't reach the limit switch LS2 which is as far as the piston shall travel into the basket. Then the piston will after one minute try to return to its normal position where after it restarts in a new attempt to make a full number of strokes.

Red alarm lamp and corresponding potential free contact will indicate if the second attempt fails.

2.7 Alarm function 2. the strainer remains clogged after flushing. The diff pressure signals continuously

The piston will try to make four attempts to clean the basket. The red alarm lamp and the corresponding signal contact will indicate if this fails.

3 RECOMMENDED TIMER SETTINGS

All settings are made at delivery. These are noted inside the control panel. The following settings are for general guidance only. Actual values may differ.

Strainer size	80/100	150/200	250-400	500/600
T1 Flushing interval 1 hr	----- 1 hr -----			
T2 Pre flushing	4 sec	4 sec	6 sec	10 sec
Flushing valve	3 sec	3 sec	4 sec	8 sec
Piston	5 sec	7 sec	10 sec	20 sec
Diff pressure switch	----- 0.11 bar -----			

T3 delayed start (optional) T3 enables subsequent start of a number of filters. Set the first filter T3=0 which means it starts immediately when the power is turned on. Set the second filter T3= 1 which will delay the start 2 minutes, set the third filter T3=2 and so on. The timed flushing will now start with 2 minutes interval.

4 COMMISSIONING

4.1 The flushing operation is tested **without** water

Connect the air pressure and power. Start automatic operation by switching on the main switch on the control panel front.

The flushing operation is now initiated. Check that the flushing valve first opens - and that the piston makes two strokes.

Check the following after the cycle is finished:

- The flushing valve shall be closed
- Open the control panel and check that a green signal lamp on the electronic card marked TEST is on. This lamp indicates the control has initiated the flushing valve to close and that the piston is in normal position (drawn out of the basket) just at the limit switch LS 1.
- Should the test fail check pneumatic and electrical wiring.

4.2 test **with** water

Start main pumps and start the Bernoulli strainer by switching on the main switch in the front of the control panel.

Remove air in the diff pressure switch and tubing's by opening of two small vent screws on top of the switch.

Check that the piston makes two strokes before returning to rest position (drawn out of the basket).

Check operation of diff pressure switch by removing snap in connection in the body marked B. A flushing cycle shall now start.

If not check wiring and that sufficient water inlet pressure is available. Minimum 0,3 bar.

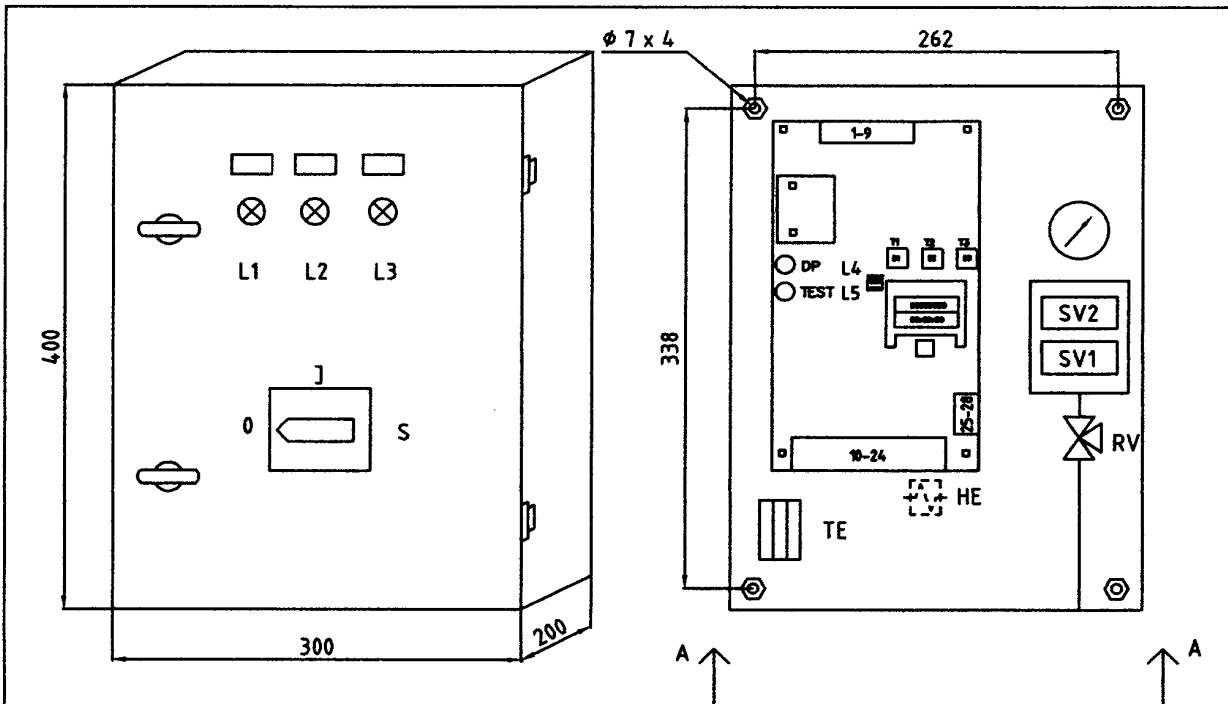
5 TROUBLESHOOTING

The Bernoulli Strainer is provided with a differential pressure switch which will cause the strainer to flush immediately on reaching the preset differential pressure.

Failure to clean the basket will give a delayed external alarm. This may occur if the piston cannot move the whole way for instance due to insufficient air pressure or too much clogging of the basket. The force required to move the piston increases rapidly when the basket clogs.

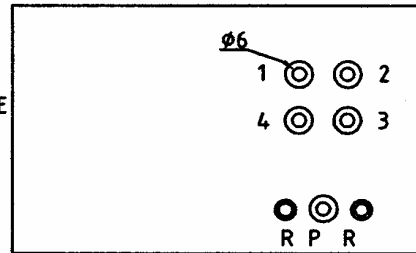
WHAT TO DO AT AN ALARM CONDITION!

- Try to operate the Bernoulli Strainer manually by switching off/on the main switch for the corresponding strainer a number of times. It may not work the first time if the strainer is heavily clogged.
- Open the strainer only if you fail to clean it by repeated manual operation.
- Do not continue operation of the strainer if you fail to clean it by manual operation.



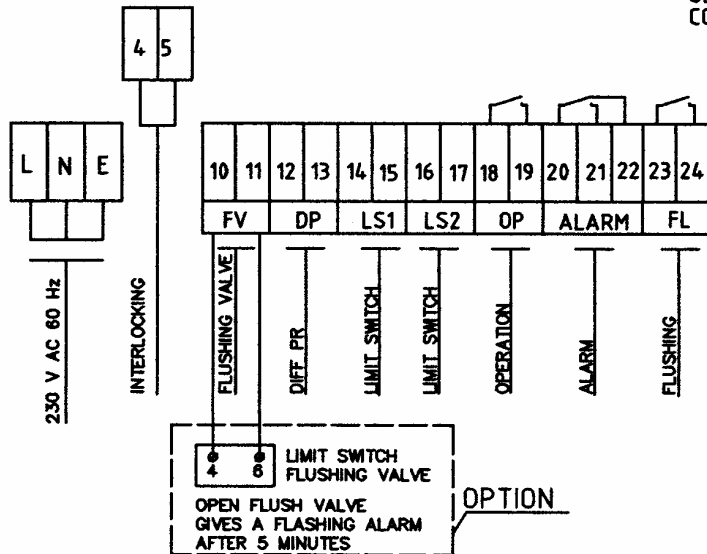
LEGEND

- HE HEATING ELEMENT
- L1 "OPERATION" GREEN LAMP
- L2 "FLUSHING" YELLOW LAMP
- L3 "ALARM" RED LAMP
- L4 "DIFF PRESSURE SWITCH" RED=HIGH DIFFERENTIAL PRESSURE
- L5 "TEST" GREEN LAMP
- RV SHUT OF VALVE WITH SECONDARY RELEASE
- S MAIN SWITCH
- SV1 SOLENOID VALVE FLUSHING VALVE
- SV2 SOLENOID VALVE PISTON
- TE TERMINALS MAINS CONNECTION
- PRESSURE GAUGE



A-A AIR CONNECTIONS
SEE "AIR AND WATER CONNECTIONS"

- T1 FLUSHING INTERVAL
- T2 PREFLUSHING
- T3 DELAID START



SETTING	T1	T2 SEC	SETTING	T3
1	7 min	1	1	2
2	15 min	2	2	4
3	30 min	3	3	6
4	1 h	4	4	8
5	2 h	5	5	10
6	4 h	6	6	12
7	8 h	7	7	14
8	12 h	8	8	16
9	24 h	9	9	18
10	48 h	10	A	20
			B	22
			C	24
			D	26
			E	28
			F	30

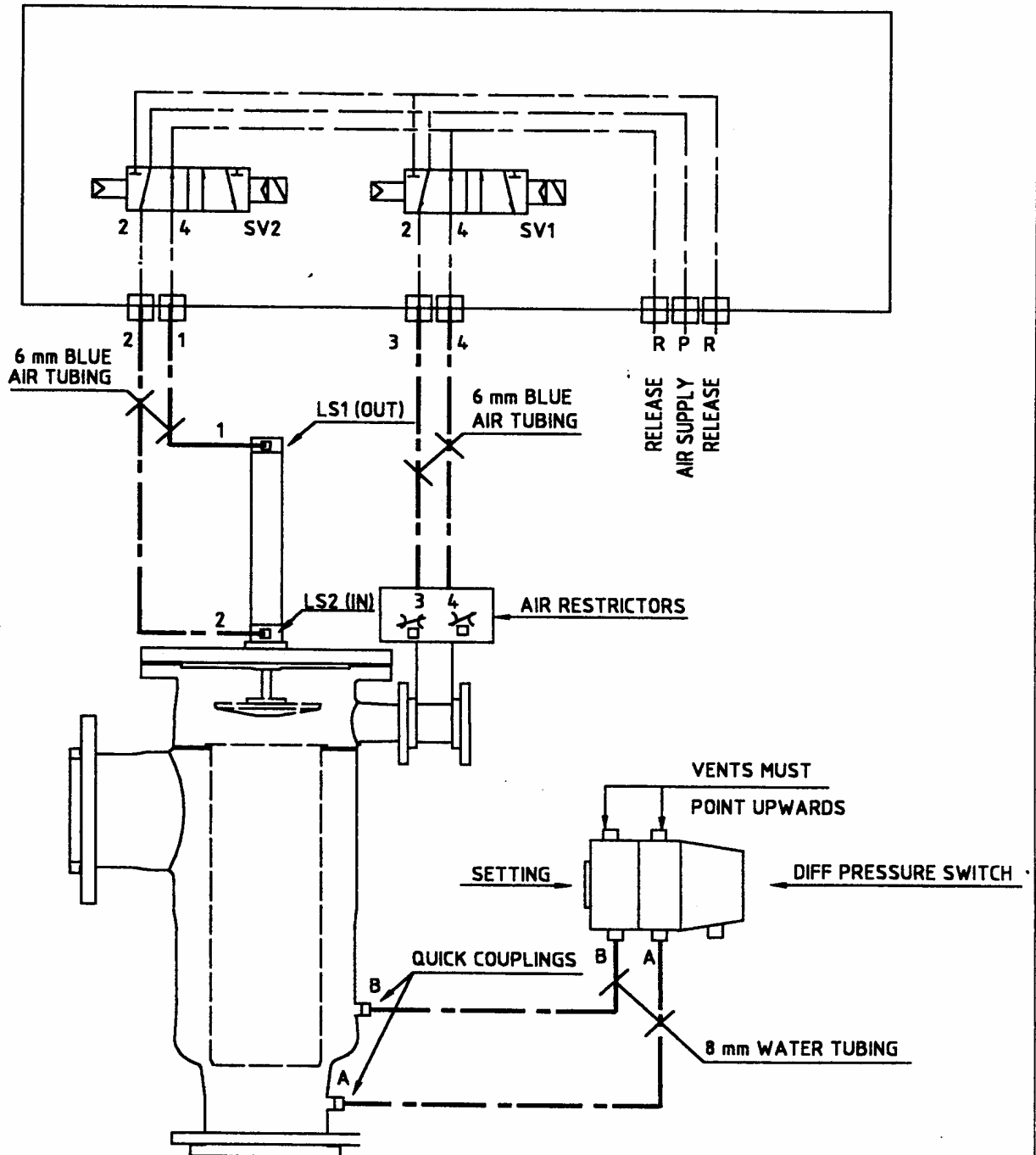
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BERNOULLI FILTER CONTROL PANEL

IB08.1




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BERNOULLI FILTER CONTROL PANEL AIR AND WATER CONNECTIONS

	
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