Installation sketch of a Bernoulli Filter installed to protect PHE
STOP

BEFORE UNPACKING THE FILTER, PLEASE NOTE:

Never lift the filter by the pneumatic cylinder.
Lift in the flanges or strap it as indicated.

For quick start, see sections 1 and 5.
Instruction manual
Bernoulli Filter

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Appendix drawing 1: General filter assembly.................................... D1
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Bernoulli Filters
The original Swedish filter design from Bernoulli

Bernoulli AB develops and delivers self-cleaning filters for continuous filtration of liquids in pressurised systems. These can be used to remove sediment and debris from natural water sources such as sea or river water, or to remove particles from process liquids. Our filters harness the power of a natural physical phenomenon, which leads to an ingeniously simple but highly reliable filtering operation.

The Bernoulli cleaning principle
In a Bernoulli filter, the bulk of the work is done by a disc mounted on a pneumatic cylinder. The filter basket is cleaned by this disc as water passes through a gap between the disc and the basket. Flow velocity increases locally around the disc and, in accordance with the Bernoulli principle, the static pressure is reduced. It is the vacuum effect of lower static pressure around the edge of the disc that cleans the basket.

Advantages
- Simple and ingenious cleaning system with few moving parts, ensuring high operational reliability and simple maintenance.
- A low and constant pressure drop, the same in both clean and dirty conditions.
- Low flushing pressure: from 0.3 bar g.
- Easy installation: the Bernoulli Filter can be fitted directly to pipelines. Any horizontal or vertical position is possible.
- Good corrosion resistance: filter bodies in PVC and glass fibre reinforced polyester (GRP) are particularly suitable for corrosive sea water, stainless steel filter bodies for fresh water applications.

Normal filtering operation
The flushing valve is closed. The piston remains outside the strainer basket.

Flushing phase one
Cleaning is initiated by a timer or differential pressure control. The flushing valve opens and large particles are flushed out.

Flushing phase two
The piston moves twice into the basket, thereby removing the particles which are stuck to it.
Overview picture of the Bernoulli target application, protection of Plate Heat Exchangers (PHE).

**Specifications**

<table>
<thead>
<tr>
<th>Filter type</th>
<th>Filter body</th>
<th>Design pressure</th>
<th>Max operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSP</td>
<td>PVC</td>
<td>10 bar g</td>
<td>40°C</td>
</tr>
<tr>
<td>BSG</td>
<td>GRP</td>
<td>6/10 bar g</td>
<td>60°C</td>
</tr>
<tr>
<td>BSS</td>
<td>AISI 316L</td>
<td>10 bar g</td>
<td>80°C</td>
</tr>
</tbody>
</table>

Filtration: 0.1-2.0 mm  
Max particle size: 40 mm  
Min flushing pressure: from 0.3 bar g

**Material**

- Filter body: as indicated above
- Filter basket: AISI 316L or titanium
- Driving unit: AISI 316L
- Piston seal: Polyurethane
- Flushing valve: PVC or AISI 316L

**Controls**

- Electronic control
- Double supervision system with timer and differential pressure switch

**Contact for computer supervision**

- Filter in operation
- Flushing
- Alarm

**Flange standard**

- DIN PN 10
- ANSI 150

**Overview picture of the Bernoulli target application, protection of Plate Heat Exchangers (PHE).**
1 Installation

NOTE! See filter body handling instructions on page 2.

1.1 End cover

Note that for transport space reasons the end cover (103) may be reversely mounted on the filter body (101) on delivery. It is recommended first to install the filter body without end cover. Then check that there are no loose objects inside the filter or in the connecting lines before mounting the end cover as indicated in Figure 1a.

![Fig. 1a: Mounting direction of domed end cover on filter.](image)

The end cover (103) with its pneumatic cylinder (104) should be easily accessible for maintenance. Allow free space FS for withdrawal of the filter basket (102) from the filter body. See general product information on page 5.

1.2 Bolts

Note that bolts for PVC and GRP (glass fibre reinforced plastic) flanges should be tightened with care. GRP flanges often require post-tightening.

1.3 Position

A Bernoulli Filter can be mounted in any position, see Figure 1b-e. Filter body (101) connections (A) and (B) for the differential pressure switch (201) should however be directed essentially horizontally to avoid accumulation of air and dirt in the water tubing. See Figure 1c. Note that the filter must be installed downstream the pump to have a positive pressure.

1.4 Supports

The Bernoulli Filter can be directly supported or be supported by connecting pipes/pipe supports only, see Figure 1b-e.

1.5 Flushing line and orifice

Any flushing line mounted to the flushing valve (106) must not be reduced in diameter in relation to the flushing outlet (N3) diameter. Also, the required minimum inlet (N1) water pressure during flushing is affected by the design of the flushing line, e.g. its length, elbows, valves, static height, counter pressure from waste line to which it connects, etc. See also paragraph 3.2. Make sure that the flushing line is well supported and normally filled with water, e.g. by aid of a water lock, see Figure 1d.

The flushing outlet (N3) is supplied with a throttling orifice if your inlet (N1) water operating pressure is high. The orifice is pre-installed according to Figure 1f, or supplied to be mounted according to Figure 1g.
1.6 Control panel
Position the control panel (301) on a wall within sight from the filter.
1.7 **Differential pressure switch**
The differential pressure switch (201) must be mounted (on a wall, e.g.) such that its connections (A) and (B) for water tubing (202, 203) are directed downwards and the vents are directed upwards, see Figure 1h and Drawing 2. The settings of the pressure differential switch are made before delivery and must not be adjusted.

![Differential pressure switch](image)

**Fig. 1h: Differential pressure (DP) switch (201).**

1.8 **Air tubing**
Cut four adequate lengths of the 6 mm (outer diameter) blue air tubing (204, 205, 206, 207) and connect according to Drawing 2 by pushing the ends into the quick couplings at 1-1, 2-2, 3-3, 4-4. Connect a supply of dry and non-lubricated air to the control panel at point (P) by air tubing of minimum 6 mm outer diameter/4 mm inner diameter. Air pressure should normally be 6 barg (min 5 barg, max 8 barg).

1.9 **Water tubing**
Cut two adequate lengths of the 8 mm (outer diameter) transparent water tubing (202, 203) and provide the ends with the fittings provided on exemplary short lengths of transparent water tubing attached to the differential pressure switch (201) on delivery, see Fig. 1h. Connect at A-A and B-B according to Drawing 2.

1.10 **Electric connections**
Connect the filter electrically (L/N/PE and 12-17) as shown in Drawings 2 and 3. **NB!** Connect the correct voltage for your control panel (301), as marked. If applicable, connect optional potential free contacts (10, 11 for limit switch box (308) on flushing valve (106); and 18-24 for operation, alarm and flushing signal) to central supervision.

2 **Filtering operation**
2.1 **Normal filtering operation**
The green operation lamp (L1) on the control panel (301) front and the green test lamp (L5) inside the control panel will be lit during normal filtering operation. No parts of the filter are moving during normal filtering operation.

3 **Flushing operation**
3.1 **General flushing operation**
The yellow flushing lamp (L2) on the control panel (301) front is lit during flushing operation. The flushing valve (106) opens and then a disc (107) on the piston rod (108) makes two strokes into the filter basket (102) whereby it is cleaned by Bernoulli’s principle. There is no scraping. See also general product information on page 4.
3.2 Required flushing pressure

The filter must operate at a certain minimum inlet (N1) water pressure during flushing. This depends on filter size and is shown in the table below. The actual pressure can be measured during flushing by fitting a pressure gauge in connection (A) on the filter body (101).

**Warning!** Pumps with variable frequency drive may give too low pressure at low flow.

<table>
<thead>
<tr>
<th>Filter inlet size, DN (mm)</th>
<th>Min. inlet water pressure during flushing (bar)</th>
<th>Approx. flushing time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0.3</td>
<td>22</td>
</tr>
<tr>
<td>100</td>
<td>0.3</td>
<td>22</td>
</tr>
<tr>
<td>150</td>
<td>0.8</td>
<td>22</td>
</tr>
<tr>
<td>200</td>
<td>0.8</td>
<td>30</td>
</tr>
<tr>
<td>250</td>
<td>0.3</td>
<td>50</td>
</tr>
<tr>
<td>300</td>
<td>0.3</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>0.6</td>
<td>40</td>
</tr>
<tr>
<td>400</td>
<td>0.7</td>
<td>40</td>
</tr>
<tr>
<td>450</td>
<td>1.0</td>
<td>55</td>
</tr>
<tr>
<td>500</td>
<td>0.4</td>
<td>60</td>
</tr>
<tr>
<td>600</td>
<td>0.7</td>
<td>110</td>
</tr>
<tr>
<td>700</td>
<td>1.1</td>
<td>165</td>
</tr>
</tbody>
</table>

1) NB! The min. flushing pressure must be further increased by the size of any backpressure in the flushing line.

2) Approximate total flushing time at 6 barg air pressure.

3.3 Flushing initiation

- **Manual:** Flushing operation starts each time the main switch (S) on the control panel (301) front is switched on. (With delay if (T3) ≠ 0, see paragraph 4.1.)
- **On timer:** Flushing operation starts as the cycle time as set by timer (T1) is reached. See paragraph 4.1.
- **On differential pressure:** Flushing operation starts when the differential pressure switch (201) signals to the control panel (301). Note that the differential pressure switch does not measure the total pressure drop over the filter but rather indicates a degree of clogging.

3.4 Flushing steps

1. Pre-flushing: the flushing valve (106) opens and large particles are flushed out.
2. The piston rod (108) starts to move from its initial position (drawn out of filter basket (102)) and into the filter basket as the pre-flushing time set by (T2) is completed. The piston rod makes two strokes before returning to its initial position. Particles clogging the filter basket are thereby “vacuum cleaned” from the filter basket and flushed out.
3. The flushing valve closes.

4 Timer settings

4.1 Timer setting possibilities

Two, or optionally three, timer settings (T1, T2, T3) can be set in the control panel (301). Default settings are made before delivery and are noted on the inside of the control panel. Adjustments are normally not required.

T1 is time interval between timer initiations of flushing.

T2 is pre-flushing time, i.e. time from the flushing valve (106) starts to open until the piston rod (108) begins to move. T3 is an option for delayed start only used for filters working in parallel.
T3 enables subsequent start of flushing of a number of filters working in parallel. For example, set:

<table>
<thead>
<tr>
<th>Filter</th>
<th>T3 setting</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>first filter</td>
<td>0</td>
<td>starts to flush immediately when power is switched on</td>
</tr>
<tr>
<td>second filter</td>
<td>1</td>
<td>delays flushing start by 2 minutes</td>
</tr>
<tr>
<td>third filter</td>
<td>2</td>
<td>delays flushing start by 4 minutes</td>
</tr>
</tbody>
</table>

Accordingly, flushing on timer will start at 2 minutes interval for the different filters if all filters are powered simultaneously, e.g. after a power failure.

### 4.2 Recommended timer settings

The following settings are for general guidance only. Actual values may differ.

<table>
<thead>
<tr>
<th>Filter size</th>
<th>80-200 setting</th>
<th>250-450 setting</th>
<th>500 setting</th>
<th>600 setting</th>
<th>700 setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>4</td>
<td>1 hr</td>
<td>4</td>
<td>1 hr</td>
<td>4</td>
</tr>
<tr>
<td>T2</td>
<td>2</td>
<td>4 s</td>
<td>3</td>
<td>6 s</td>
<td>4</td>
</tr>
<tr>
<td>FV</td>
<td>-</td>
<td>3 s</td>
<td>-</td>
<td>4 s</td>
<td>-</td>
</tr>
</tbody>
</table>

1) “FV” is preset time for the flushing valve (106) opening or closing.

### 5 Commissioning

#### 5.1 Test without water

Before start-up with water, make a test without water:

1) Check that installation has been performed according to section 1 above.
2) Start automatic operation by switching on the main switch (S) on the control panel front. Flushing operation is now initiated and lasts approximately the total time shown in the table in paragraph 3.2.
3) During the flushing operation:
   a) Check that the yellow lamp (L2) on the control panel front is lit.
   b) Check that the flushing valve (106) opens, i.e. check that the visual indicator on the valve actuator (109) moves from closed to open position.
   c) Check that the piston rod (108) makes two full strokes. This can be done by listening or by use of a small magnet (the piston is magnetic).
4) After completed flushing operation:
   a) Check that the red alarm lamp (L3) on the control panel front is lit.
   b) Check that the flushing valve is closed.
5) Open the control panel and check that the green lamp marked TEST (L5) is lit.
6) Now test alarm function 1 (see paragraph 7.1):
   a) Switch off the main switch on the control panel front.
   b) Remove electric wire no. (17) from control panel (see Drawing 3).
c) Switch on the main switch on the control panel front. The piston rod should now make two strokes, each searching (during one minute) for contact between the magnetic piston and limit switch 2 (LS2) on the cylinder (104).

d) Check after a few minutes that the red alarm lamp on the control panel front lights up, indicating that (LS2) has not been found.

Check pneumatic and electrical wiring if the tests fail.

5.2 Test with water
When the test without water has succeeded, make a test with water:
1) Start the main pump(s).
2) Release air from the differential pressure switch (201) via the two small vent screws on the top of the switch. See Figure 1h.
3) Start automatic operation by switching on the main switch (S) on the control panel (301) front. Flushing operation is now initiated and lasts approximately the total time shown in the table in paragraph 3.2.
4) During the flushing operation:
   a) Check that the yellow lamp (L2) on the control panel front is lit.
   b) Check that the flushing valve (106) opens, i.e. check that the visual indicator on the valve actuator (109) moves from closed to open position.
   c) Check that the piston rod (108) makes two full strokes. This can be done by listening or by use of a small magnet (the piston is magnetic).
5) After completed flushing operation:
   a) Check that the red alarm lamp (L3) on the control panel front is off.
   b) Check that the flushing valve is closed.
   c) Open the control panel and check that the green lamp marked TEST (L5) is lit.
6) Now check operation of the differential pressure switch:
   a) Release quick coupling marked (B) on the filter body (101).
   b) Flushing operation should now start. Check that the yellow lamp on the control panel front lights up.
   c) Check that the red alarm lamp on the control panel lights up (after four strokes of the piston rod) and that the red DP lamp (L4) inside the control panel lights up.

Check pneumatic and electrical wiring if the tests fail. Check that sufficient air supply pressure (P) is available, 5-8 barg, and that there is no air leakage. Also, check that sufficient inlet (N1) water pressure is available, see paragraph 3.2.

5.3 Notes of conditions at start-up of the filter
It is recommended to take notes of start-up conditions, for future reference:

Date of start-up
Timer settings:
   (T1) Flushing interval
   (T2) Preflushing
   (T3) Optional delayed start
Inlet (N1) water pressure:
   During normal operation
   During flushing
Inlet (N1) water flow
Air supply (P) pressure
6 Maintenance

6.1 General maintenance
Planned maintenance is not required for the filter. It is however recommended to replace gaskets for end cover (103) and flanges (N1, N2, N3) as well as U-seals for cylinder (104) regularly or if any leakage is observed. It is also recommended to check the filter functions annually in accordance with section 5 above and to open the filter and remove the filter basket (102) in order to clean it manually and check that it is undamaged.

Note that only original spare parts must be used! If needed, ask for individual spare parts mounting instructions for items not covered here. Contact Bernoulli System AB if you require the assistance of experienced maintenance personnel.

6.2 Filter basket
The filter basket is secured by a number of screws (110a), nuts (110b) and washers (110c) that can be accessed once the filter’s end cover (103) has been removed, see Figure 6a. You can pull out the filter basket by its handles after having removed the nuts and washers (don’t lose them!). It has a tight fit so quite some pulling force may be needed. A slide hammer puller can be used in the handles, see Figure 6b.

Fig. 6a: Filter basket attachment

Fig. 6b: Example of slide hammer puller

6.3 End cover gasket
Order new end cover gasket from Bernoulli System AB, if needed. Mount properly and make sure it is not folded. Do not tighten bolts excessively if the filter body (101) is made of PVC or glass fibre reinforced plastic (GAP).

6.4 U-seals for cylinder
Order new U-seals and back up-rings from Bernoulli System, if needed.
1) Dismount end cover (103) from the filter body (101).
2) Dismount disc (107) from the cylinder (104) piston rod (108), i.e. screw off nut and disc.
3) Remove cylinder from the end cover. It is secured according to one of Figures 6c-e, depending on filter model.
4) Replace two old (blue) U-seals in the through hole in the “hub” in the end cover. Two back-up rings and one circlip/locking ring (if your model has one) can normally be reused. Sequence and orientation as shown in Figure 6f.

5) Reverse order of steps 3 to 1.

7 Alarm functions
7.1 Alarm function 1 - uncompleted piston strokes
Limit switch 2 (LS2) on the cylinder (104) will detect if the piston rod (108) is unable to make a full stroke during flushing operation. A second attempt to make a full stroke will be initiated and if that fails too, the red alarm lamp (L3) on the control panel (301) front will light up. The corresponding potential free contacts (20, 21, 22) will, if in use, give alarm signal to central supervision.

7.2 Alarm function 2 - insufficient cleaning
The differential pressure switch (201) will detect if flushing operation fails to clean the filter basket (102) by two piston (108) strokes. A second flushing operation will now make four piston strokes. After that, the red alarm lamp (L3) on the control panel (301) front and the red DP lamp (L4) inside the control panel will light up if the differential pressure switch still detects and signals that the filter basket is clogged. The corresponding potential free contacts (20, 21, 22) will, if in use, give alarm signal to central supervision.
7.3 Alarm function 3 - flushing valve does not close
The limit switch box (308, optional) will detect if the flushing valve (106) fails to close after a flushing operation. The red alarm lamp (L3) on the control panel (301) front will then start to flash. The corresponding potential free contacts (20, 21, 22) will, if in use, give flashing alarm signal to central supervision.

7.4 Operation in alarm mode
Operation in alarm mode, i.e. when the red alarm lamp (L3) on the control panel front is lit, is not recommended. The filter will however flush on timer (T1) as set if operation is continued, (see section 4 above).

8 Trouble shooting
8.1 What to do in case of troubles
Enter the table below, by symptom, to see possible reasons and actions to solve your problem. If you are not helped by the table, please contact Bernoulli System AB at the below e-mail address or by telephone. Do not continue operation if you fail to solve the problem.

On contact with Bernoulli System AB, please have the following information at hand, if known:
- Filter type denotation (BSG, BSS or BSP plus three digits)
- Filter serial number (four digits), or Bernoulli System AB order number (B plus six digits)
- Year and month that filter was first taken into operation
- Inlet (N1) water pressure during normal operation
- Inlet (N1) water pressure during flushing
- Inlet (N1) water flow
- Air supply (P) pressure
- Settings of (T1), (T2) and optionally (T3), in control panel (301)
- Configuration of flushing line (diameter, length, number of elbows/valves, static height, backpressure)

8.2 Trouble shooting table
Original Bernoulli Filters are provided with a supervision system controlled by 1) a differential pressure (dp) switch (201), 2) limit switches (LS1, LS2) on pneumatic cylinder, and as an option 3) limit switch (308) on flushing valve actuator (109).

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cause</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady red alarm lamp (L3) on control panel (301)</td>
<td>The filter cannot remain clean but continues to operate in alarm position. Cleaning operation now only on timer set on T1 (usually 1 hour). The dp switch (201) is disconnected. See separate table below for causes of insufficient cleaning.</td>
<td>1/ First try to restore normal automatic operation by initiating manual cleaning cycles. This is done by switching off/on main switch (S) on control panel (301). 2/ If this fails, eliminate possible faulty connections by checking filter operation acc to section 5 and in particular that green TEST lamp (L5) on electronic board inside control panel is lit after finished cycle. This is a test for correct operation. 3/ Finally, open filter and remove basket (102) for manual cleaning and inspection.</td>
</tr>
<tr>
<td>Flashing red lamp* (L3) on control panel (301)</td>
<td>Indicates that flushing valve (106) is not closing</td>
<td>Inspect flushing valve and remove possible obstructions.</td>
</tr>
<tr>
<td>Air leaks - external</td>
<td>Leak in fittings or seals</td>
<td>Locate leak with soap water. Replace seals or tighten fittings.</td>
</tr>
</tbody>
</table>
**Air leaks - internal**

| | Can be leak in seals in pneumatic cylinder (104), flushing valve actuator (109) or possibly solenoid valves (SV1, SV2)** | This leak will appear in air release under control panel (301). Test cylinder (104) first and then flushing valve actuator (109) by connecting compressed air to one port with the other port open. A leak in the opposite port is an indication of worn seals. Replace the leaking component(s). |
| 1/ | Worn U-seals in end cover | Replace U-seals. See paragraph 6.4. |
| 2/ | Cylinder disc (107) hits an obstruction inside filter | Open filter and inspect. |
| 3/ | Heavy vibrations | Often caused by clogged filter basket (102). Open filter and inspect. |

**Water leaks between pneumatic cylinder (104) and end cover (103)**

| | | |
| 1/ | Worn U-seals in end cover | Replace U-seals. See paragraph 6.4. |
| 2/ | Cylinder disc (107) hits an obstruction inside filter | Open filter and inspect. |
| 3/ | Heavy vibrations | Often caused by clogged filter basket (102). Open filter and inspect. |

**Filter operation does not start when main switch (S) is switched on**

| | | |
| 1/ | No power or wrong voltage | Check voltage and power supply. |
| 2/ | Damaged electronic board | |
| 3/ | Short circuit on secondary side (lower side of electronic board) | |
| 4/ | Terminals 4 and 5 on electronic board are open. | |

**Damages in filter basket (102)**

| | | |
| 1/ | The filter basket is not properly tightened with nuts and washers (110b, c) | Replace basket |
| 2/ | Water surges or water hammers | |
| 3/ | Corrosion in filter basket | |

*) option for Bernoulli Filters with limit switch box (308) mounted on flushing valve actuator (109).

**) Important: The compressed air should be dry and non-lubricated instrument air.

<table>
<thead>
<tr>
<th><strong>Cause of insufficient cleaning</strong></th>
<th><strong>Action (after action 1-3 in table above)</strong></th>
</tr>
</thead>
</table>
| a/ Insufficient inlet (N1) pressure = system pressure during flushing | Check inlet system pressure in technical specification and compare with actual operating data. Cause for low system pressure can be:
1/ Variable frequency drive of pump(s)
2/ Flow regulation up-stream filter
3/ No back pressure down-stream filter
Low system pressure can sometimes be balanced by changing orifice in the flushing outlet, see paragraph 1.5. Contact Bernoulli System AB. |
| b/ Obstructions inside filter prevents unhindered operation of pneumatically operated cleaning disc (107) | Open filter and check |
| c/ Low air pressure | Recommended air pressure is 5-8 barg. Check gauge inside control panel (301) |
| d/ Too high load of solids for selected basket | |
| e/ Too high back pressure from flushing line | |
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 AIR SHUT OFF VALVE WITH SECONDARY RELEASE
S MAIN SWITCH
SV1 SOLENOID VALVE, FLUSHING VALVE
SV2 SOLENOID VALVE, PISTON
TE TERMINAL’S MAINS CONNECTION
Ω AIR PRESSURE GAUGE

A-A
AIR INLET 6 mm

4 x 6 mm PLASTIC TUBING CONNECTION

L1 L2 L3

301
338
262
Ø7 x 4
400
300
200

308
4 5

TIMERS
T1 FLUSHING INTERVAL
T2 PREFLUSHING
T3 DELAYED START

<table>
<thead>
<tr>
<th>SET. T1</th>
<th>SET. T2 sec</th>
<th>SET. T3 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
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<tr>
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<tr>
<td>5</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1 h</td>
<td>10</td>
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</tr>
<tr>
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</tr>
<tr>
<td>30 min</td>
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</tr>
<tr>
<td>0</td>
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</tr>
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</table>

AN OPEN FLUSHING VALVE GIVES A FLASHING ALARM AFTER 5 MINUTES

4 6
UNIT SWITCH FLUSHING VALVE

308

L N E
WASH SUPPLY VALVE
INTERLOCKING

D3

Drawn AB Project - Date 100128 Scale -

LOCAL CONTROL PANEL IB 10

Drawing number 0 First issue 100128 AB

Rev. Description Date Drawn