AMIAD Automatic Filters

2 x SAF-4500 FILTER SKID SYSTEM
with spring loaded nozzles

| Serial number:   | ___________________________ |
| Order number:    | ___________________________ |
| Catalogue number:| ___________________________ |
| Filtration degree:| ___________________________ |
| Tested by:       | ___________________________ |

Installations, Operation and Maintenance Instructions

Ref. 01.2006
# TABLE OF CONTENTS

Technical specifications ................................................................. 3

Safety instructions .......................................................................... 4

4" SAF-4500 dimensional drawing .................................................. 5

6" SAF-4500 dimensional drawing .................................................. 6

Skid system dimensional drawing ................................................... 7

Description and filter operation ...................................................... 8

Installation ................................................................................... 9-10

Maintenance ................................................................................ 11

Disassembling and reassembling .................................................... 12-13

Parts schedule ............................................................................ 14

Parts drawings ........................................................................... 15-17

Control system, PLC Type "D" ...................................................... 18-20

Wiring diagram, 208V AC ............................................................ 21-23

Wiring diagram, 460V AC ............................................................ 24-26

With any inquiry please quote Filter Serial Number, located on the filter housing.
## TECHNICAL SPECIFICATIONS

### General

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum flow rate</td>
<td>1100 US gpm</td>
</tr>
<tr>
<td>Consult manufacturer for optimum flow depending on filtration degree &amp; water quality.</td>
<td></td>
</tr>
<tr>
<td>Min. working pressure</td>
<td>50 psi</td>
</tr>
<tr>
<td>or lower if pressure is increased for flushing.</td>
<td></td>
</tr>
<tr>
<td>Max. working pressure</td>
<td>150 psi</td>
</tr>
<tr>
<td>16 bar = 240 psi upon request</td>
<td></td>
</tr>
<tr>
<td>Filter area</td>
<td>700 in²</td>
</tr>
<tr>
<td>Inlet/Outlet diameter</td>
<td>4” or 6”</td>
</tr>
<tr>
<td>Flange standards as per request.</td>
<td></td>
</tr>
<tr>
<td>Filter housing</td>
<td>10”</td>
</tr>
<tr>
<td>Epoxy-coated steel or other on request.</td>
<td></td>
</tr>
<tr>
<td>Max. working temperature</td>
<td>140°F</td>
</tr>
<tr>
<td>Weight (empty/full) per unit</td>
<td>4” = 344/508 lb.</td>
</tr>
<tr>
<td>6” = 344/521 lb.</td>
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</table>

### Flushing data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Exhaust valve</td>
<td>2”</td>
</tr>
<tr>
<td>Flushing cycle time</td>
<td>20 seconds</td>
</tr>
<tr>
<td>Wasted water per cycle</td>
<td>22 gallon at 30 psi</td>
</tr>
<tr>
<td>Minimum flow for flushing</td>
<td>66 US gpm at 30 psi</td>
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### Control and electricity

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Control voltage</td>
<td>24V AC</td>
</tr>
<tr>
<td>Electric motor</td>
<td>1/4 HP 60 Hz, 42 Gear output R.P.M.</td>
</tr>
<tr>
<td>Rated operation Voltage</td>
<td>3 phase 208 or 230/460V AV, 60 Hz</td>
</tr>
<tr>
<td>Current consumption</td>
<td>~0.6 Amp. (with 3 phase 460V)</td>
</tr>
</tbody>
</table>

### Construction materials

<table>
<thead>
<tr>
<th>Specification</th>
<th>Material</th>
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<tr>
<td>Filter Housing and Lid</td>
<td>Epoxy-coated carbon steel 37-2</td>
</tr>
<tr>
<td>Screens</td>
<td>Stainless Steel 316</td>
</tr>
<tr>
<td>Cleaning mechanism</td>
<td>Stainless Steel 316, POM</td>
</tr>
<tr>
<td>Exhaust valve</td>
<td>Epoxy-coated cast iron, Natural Rubber</td>
</tr>
<tr>
<td>Seals</td>
<td>Synthetic Rubber</td>
</tr>
<tr>
<td>Control</td>
<td>Aluminum, Brass, Stainless Steel, PVC</td>
</tr>
<tr>
<td>Valves</td>
<td>Epoxy coated cast iron, BUNA-N</td>
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<tr>
<td>Manifolds</td>
<td>Epoxy coated carbon steel piping</td>
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### Standard filtration degrees

<table>
<thead>
<tr>
<th>Micron</th>
<th>500</th>
<th>300</th>
<th>200</th>
<th>130</th>
<th>100</th>
<th>80</th>
<th>50</th>
<th>25</th>
<th>10</th>
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<tr>
<td>mm</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
<td>0.13</td>
<td>0.1</td>
<td>0.08</td>
<td>0.05</td>
<td>0.02</td>
<td>0.01</td>
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<tr>
<td>mesh</td>
<td>30</td>
<td>50</td>
<td>75</td>
<td>120</td>
<td>155</td>
<td>200</td>
<td>300</td>
<td>450</td>
<td>600</td>
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</table>
SAFETY INSTRUCTIONS

General
1. Prior to installation or work on the filter, please read the installation and operation instructions, carefully.
2. While working on the filter, please observe all conventional safety instructions in order to avoid danger to the workers, the public or nearby property.
3. Please note, the filters may flush automatically, without prior warning.
4. No changes or modification to the equipment is permitted without express authorization from the manufacturer or its representative.

Installation
1. Install the filter according to the instructions in this manual.
2. Leave enough clearance for easy access to all components and safe maintenance operations.
3. Electric wiring should be performed by an authorized electrician only, using standardized and approved components.
4. Install a main power cut-off switch close to the control panel.
5. If the control panel cannot be seen from the filter(s), a power cut-off switch should be installed near each filter unit.
6. The filter should be installed in a manner that avoids splashing water on the electrical components or the control panel.
7. Extra safety devices should be installed on hot water applications to avoid scalding.

Operation, control and maintenance
1. Disconnect the filter from power supply before maintenance or working on the unit(s).
2. Release pressure from the unit(s) before loosening or unscrewing bolts.
3. Try to keep the work area as dry as possible to prevent mishaps, possible electrocution or damage to the equipment caused by moisture.
4. Always open and close valves slowly and gradually.
5. Remove grease and fat material residues in order to avoid slipping.
6. Always re-assemble the protective covers of the drive mechanism.
7. When using a high pressure water or steam cleaner to clean a screen manually, follow the device’s operation and safety instructions carefully.
8. When using acid or other chemical agents to clean a screen manually, follow the appropriate safety instructions provided by the chemical manufacturer.

Use of lifting equipment
1. While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
2. Avoid working below lifted equipment.
3. Wear a safety helmet while working around lifted equipment.
DESCRIPTION OF FILTER OPERATION

Filtering process:
The SAF 4500 is a sophisticated yet easy-to-operate automatic filter, with a self-cleaning mechanism driven by an electric motor. The SAF 4500 is designed to work with various types of screens in filtration degrees from 10 to 500 micron, and is available in 4", 6" and 8" inlet/outlet diameter.
The water enters through the inlet pipe into the coarse screen from outside in, and through the fine screen from inside out. The "filtration cake" accumulates on the fine screen surface and creates head loss to develop. The coarse screen is designed to protect the cleaning mechanism from large dirt particles. Usually, it does not accumulate large quantities of suspended solids and is not cleaned automatically.

Self-cleaning process:
The SAF 4500 initiates the self-cleaning process when either the pressure differential across the screen reaches a pre-set value or the flush timer reaches its preset timed interval.
The fine screen filter element is cleaned by the suction scanner, which rotates in a spiral movement while removing the filtration cake from the screen, and expels it out through the exhaust valve.
A 2-way (fwd/rev) drive unit that is attached to the scanner by a threaded shaft rotates the scanner and provides the linear movement.
The exhaust valve is activated for the duration of the cleaning cycle by a 3-way solenoid. During the 20 seconds self-cleaning process, filtered water continues to flow downstream.

System Operation modes:
The filtration system may be found in one of the following modes:
1. Filtering mode: This is the normal operating status. The flush mode is idle and the power light on the control board is lit.
2. Flush mode: The motor and exhaust valve activate according to the previously described self-cleaning process.
3. Continuous flushing mode: It is possible to activate the self-cleaning mechanism continuously by setting the SW1 switch in the control board to "CONT." position.
4. Malfunction mode: If the filter malfunctions, the self-cleaning operation stops, the malfunction light on the control board is turned on and a 24V AC external output is activated.

The filtration system enters a malfunction mode under any of the following conditions:
1st. A continuous signal from the pressure differential switch longer than the PD fault time-out (default value=15 minutes) indicates that the filter is unable to clean itself.
2nd. The motor Over Load protector was activated, either manually or due to actual over load.
3rd. Limit Switch malfunction – (usually, simultaneous activation of both limit switches).

Initiation of self-cleaning:
The filter initiates the self-cleaning process under any one of the following conditions:
1. PD flush – The Pressure Differential Switch (PDS) closes a free potential contact signal when the pressure differential across the screen reaches the pre-set value (usually 0.5 bar =7 psi). The control board registers the signal and activates the flushing cycle.
2. Test flush - Manually pressing the "TEST" push button on the control board door activates a single flushing cycle.
3. Timed flush – SW1 must be in the DP/Time position. The T1 timer in the control panel activates the flushing cycles at time intervals, regardless of the pressure differential. The timer resets after every flushing cycle. The PD flush mode is active in this mode as well.
4. Continuous flush – SW1 must be in cont position. In this mode the filter will flush continuously. This mode is for use in extraordinary circumstances and for a limited time. Please consult with the manufacturer regarding the uses of this mode.
INSTALLATION

Design recommendations:
1. Often, flow increases and pressure drop dramatically during fill-up of a water system. In this case, a pressure-sustaining valve installed downstream of the filter will ensure the minimum required pressure for the filter and a controlled filling-up of the line.
2. If constant water flow is required even during maintenance, it is recommended that a manual or automatic by-pass be installed. Isolating valves will be used to isolate each filter unit.
3. In applications where the water quality periodically worsens, it is possible to operate an emergency flush program. In order to do so, an automatic Down Stream valve must be installed. For details, please consult the manufacturer.

Installation instructions:
1. Install the filter system in a manner that will allow convenient access and enough space to dismantle the filter for maintenance purposes.
2. Check the direction of flow according to the arrows marked on the filter housing.
3. The exhaust line (minimum 2” diameter) should be designed so that it creates minimal resistance to flow of 50 US gpm.
4. If the system is designed to operate with working pressure higher than 85 psi), it is recommended that a manual throttling valve be installed on the exhaust line, in order to enable regulation of the flushing flow rate.
5. The user should arrange suitable lighting at the area of the filter to enable good visibility and safe maintenance.
6. The user should arrange suitable platforms and safety barriers to enable easy access to the filter without climbing on pipes and other equipment.

IMPORTANT !!
- Prevent static back-pressure or reverse flow through the filter.
- Install a manual or a hydraulic valve downstream of the filter.

Electric wiring
1. Install the control board in a dry and protected place (It is possible to order a special control board for severe out-door installation).
2. Power connection to the control board:
   a. Connect a three-phase power source through a semi-automatic switch, or 16 Amp. fuse to the L1 L2 L3 connectors at the terminal strip in the control board.
   b. Ground the control board.
Start-up and first operation
1. Make sure all the electric wiring is correct, according to the enclosed drawings.
2. Switch ON the control & 24V circuit breakers and the motor protector O.L. The motor will start operating *.
3. **CHECK ROTATION:** The suction scanner shaft should turn clockwise (CW) and move towards the filter housing until it reaches limit switch "A". If the motor rotates in the opposite direction (CCW), turn off the electricity immediately and change the direction of the motor rotation by changing between two phases.
4. The motor must stop when the limit switch plate reaches limit switch "A" (opening the NC circuit).
5. Operate a "dry" flushing cycle by pressing on the "TEST" push button. Check that the flushing cycle runs as described in the “Self-cleaning process” paragraph in this manual.
6. Open the inlet valve to the filter, leaving the outlet valve closed or with an open by-pass valve (This will keep the flow through the filter to a minimum), and operate a flushing cycle.
7. Check that the exhaust valve opens and all stages of the flushing cycle perform properly. Attend to leakage, if any.
8. Close the 1/4" valve at the low pressure sensing port of the pressure differential switch for 5 seconds. The PDS hand will move to the red area and the filter will start the flushing process. **Re-open** the 1/4" valve.
9. Gradually open the outlet valve and/or close the by-pass valve. Operate the filter under the designed hydraulic conditions.
10. Set the flushing interval timer (T1) for 6-8 hours.
11. Check and re-tighten all bolts after the first week of operation.
MAINTENANCE

General inspection
Initiate a flush cycle by closing the 1/4" valve at the low pressure sensing port of the pressure differential switch for 5 seconds. Check that the exhaust valve opens, that the scanner moves properly, and when it reaches the limit switch – verify that the exhaust valve closes.

Weekly maintenance:
1. Perform a general inspection as described above.
2. Clean the 3/4" filter connected to the exhaust solenoid. (Close the 3/4" valve and activate a flush cycle in order to release pressure and then unscrew the filter bowl).
3. Check that there is grease on the drive shaft, and drive bushing. Add grease if necessary.
4. Check for any leakage from the scanner shaft. If necessary, replace the sealing nut internal O-Ring (9.1)

Changing the sealing nut internal O-ring:
1. Close the inlet valve to the filter and release the pressure.
2. Remove the cover (23) from the drive shaft housing (8) by unscrewing the wing nuts (23.6).
3. If the Suction Scanner is in the outer position, operate a flush cycle and bring it to the inner position.
4. Remove the Split pin (22.2) and pull out the connecting pin (22.1).
5. Operate a flush cycle.
6. Power down the unit when the drive shaft is half way through its cycle. The drive shaft is now separated from the Suction Scanner.
7. Unscrew the sealing nut (9).
8. Remove the used internal O-ring and clean the O-ring seat.
9. Insert a new O-ring (9.1)
10. Apply some grease on the external O-ring and on the shaft.
11. Tighten the sealing nut (9).
12. Re-connect the drive shaft to the suction scanner shaft.
13. Operate the control board and open the filter inlet valve.

Maintenance prior to long term shutdown (end of season):
The following must be done if the filter will not be in operation for longer than a month.
1. Perform a flush cycle (If possible, with a closed downstream valve).
2. Release pressure from the filter.
3. Power down the unit when the drive shaft is half way and none of the limit switches is pressed.
4. Disconnect the power supply to the control board.
5. Grease the drive shaft and the drive bushing.
6. Clean the 3/4" control filter.
7. Clean the coarse screen.

Maintenance prior to renewing filter operation:
1. Connect the control board to the power supply.
2. Check proper operation of the filter, especially noting proper rotation.
3. Grease the drive shaft and the drive bushing.
4. If necessary, change the Sealing nut internal O-Ring.

IMPORTANT!!
THE DRIVE SHAFT MUST BE LUBRICATED WITH HEAVY-DUTY, WATER RESISTANT GREASE THAT WILL NOT OXIDIZE. (SHELL, DARINA EP-2 OR SIMILAR).

Cleaning the coarse screen:
1. Close the filter inlet valve.
2. Release pressure from the filter by performing a flush cycle.
3. Remove the service lid (4.8) by disconnecting the bolts (4.10) from the nuts (4.12)
4. Clean the coarse screen:
   - To remove large particles insert your hand into the coarse screen area.
   - To remove fine particles and organic matter rinse the screen. Afterwards, partially open the inlet valve and let water flow out.
Dismantling and Assembling the Filter Components

Prior to opening the filter perform a flush cycle by pressing the "TEST" push button.

**Fine Screen:**
Dismantling:
1. Close the filter inlet and outlet valves and release the pressure.
2. Release the lid bolts (1.5) from their nuts and remove the lid (1).
3. Pull the screen (3) out of the filter housing.
4. Remove the screen seals (3.1) from the screen.

Assembly:
1. Put the screen seals (3.1) on the screen edges (3).
2. Insert the screen into the filter housing (4) while the support legs point upwards. After pushing the screen all the way in, rotate the screen so the legs will support it and lead it to its position.
3. Clean and apply some grease on the suction scanner pipe and on the o-ring of the lower bearing (1.3).
4. Assemble the lid on the filter housing. Make sure the screen and seal are correctly positioned in the lid seat.
5. Tighten the bolts (1.5) in a controlled and balanced method. The bolts seats of the lid should touch the bolts seats of the filter housing.
1. Open the filter inlet and outlet valves and operate the control board.
2. Check proper operation of the filter.

**Suction Scanner:**
Dismantling:
1. Begin the dismantling procedure as per 1-4 in the chapter "dismantling the fine screen".
2. Remove the cover from the drive shaft housing (23) by unscrewing the wing nuts (23.6).
3. Remove the Split pin (22.2) and pull out the connecting pin (22.1).
4. Pull the suction scanner (2) in a spiral movement out of the filter housing.
5. Unscrew the sealing nut (9).

Assembly:
1. Apply some grease on the smooth side of the suction scanner (2) and insert it into the screen (3). Make sure the scanner (2) passes through the flushing chamber (7). When the suction scanner shaft appears from its port, apply some grease on it and tighten the sealing nut (9).
2. Insert the suction scanner shaft (2.2) into the drive shaft (22). Make sure the holes in the above shafts are parallel.
3. Insert the connecting pin (22.1) to the parallel hole of the suction scanner shaft (2.2) and the drive shaft (22) and lock it with the split pin (22.2).

**Drive Shaft Housing and Coarse Screen:**
Dismantling:
1. Close the inlet and outlet valves of the filter and release pressure.
2. Disconnect power supply from the control board.
3. Dismantle the suction scanner and fine screen as described previously.
4. Pull out the plug from the solenoid coil (15).
5. Remove the limit switch sling (10) from the drive shaft housing by unscrewing the bolts (10.1). Carefully put the limit switch sling near the filter to avoid any damage to the electrical wires.
6. Disconnect the tube (16.4) from the solenoid valve (15) and from connector (16.3).
7. Disconnect the drain pipe from the exhaust valve.
8. Remove the drive shaft cover by unscrewing wing nuts (23.6)
9. Remove the drive unit (12) from the drive shaft housing (8) by unscrewing the nuts (12.7) from the bolts (12.3). By doing so the drive shaft key (13) will be pulled out.
10. Dismantle the drive shaft housing (8) from the flushing chamber flange (7) by unscrewing the bolts (7.5).
11. Remove the rest of the flange bolts and pull out the flushing chamber assembly which includes: flushing camber (7), coarse screen (6), screens adapter 5) and screens adapter seal (5.1).

**Assembly:**
1. Place the coarse screen (6) in its seat in the flushing chamber.
2. Place the screens adapter (5) on the flushing chamber and the coarse screen.
3. Attach the screens adapter seal (5.1) to its place with its flat side, using some grease (as adhesive material).
4. Attach the flushing chamber o-ring (4.1) to its place using some grease (as adhesive material).
5. Apply some grease on the o-ring of the upper bearing (7.2).
6. Insert the flushing chamber assembly into its place. Use the centering pin (4.2) to locate the flange in its position.
7. Tighten the flange to the filter housing with the side bolts only (7.5).
8. Apply some grease on the o-rings (9.1 & 9.2) of the shaft sealing nut (9) and tighten to its place.
9. Install the drive shaft housing, using the rest of the flange bolts (7.5).
10. Insert the suction scanner (2) and the fine screen (3) as described previously.
11. Connect the drive shaft (22) to the scanner shaft using the connecting pin (22.1) and split pin (22.2).
12. Make sure the drive shaft key (13) is fitted properly in the gear box. Thread the drive shaft through the drive unit and make sure that the drive shaft groove is adjusted in accordance with the drive shaft key.
13. Connect the drive unit (12) to the drive shaft housing (8) with the bolts (12.3) and tighten them.
14. Connect the pilot tube between the solenoid valve (15) and the control filter connector (16.3).
15. Assemble the limit switch sling (10) in its place and push in the plug of the solenoid coil.
16. Connect the drain pipe to the exhaust valve (14).
17. Operate the control board and make sure the filter is operating properly.
18. Open the inlet and outlet valves and recheck filter operation.
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Cat. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lid (SAF-4500)</td>
<td>53-2071-1100</td>
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<tr>
<td>1.1</td>
<td>Hydraulic seal AM-08</td>
<td>81-41-4300-3050</td>
</tr>
<tr>
<td>1.2</td>
<td>Suction scanner bearing</td>
<td>63-2081-0013</td>
</tr>
<tr>
<td>1.3</td>
<td>O-Ring 60 x 4</td>
<td>81-41-4100-0460</td>
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<tr>
<td>1.4</td>
<td>Locking spring ring</td>
<td>84-32-00-0111</td>
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<tr>
<td>1.5</td>
<td>Bolt M20 x 120 [x4]</td>
<td>85-1112-20-120</td>
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<td>1.6</td>
<td>Washer 3/4&quot; [x4]</td>
<td>85-1311-12-000</td>
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<tr>
<td>1.7</td>
<td>Nut M20 [x4]</td>
<td>85-1212-20-000</td>
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<tr>
<td>2</td>
<td>Suction scanner (SLN)</td>
<td>13-2074-5800</td>
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<tr>
<td>2.1</td>
<td>Suction scanner nozzle (SLN)</td>
<td>53-2074-5804</td>
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<tr>
<td>2.1.1</td>
<td>Spring Loaded Nozzle Cap Ass.</td>
<td>13-2074-5801</td>
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<tr>
<td>2.2</td>
<td>Suction scanner shaft</td>
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<td>2.3</td>
<td>Slotted pin 5 x 50 (St.St.)</td>
<td>84-32-11-0550</td>
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<td>2.4</td>
<td>Slotted pin 5 x 30 (St.St.)</td>
<td>84-32-11-0330</td>
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<td>Weave-wire screen (SAF-4500)</td>
<td>13-2083-0XXX</td>
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<td>Hydraulic seal AM-05</td>
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<td>Housing (SAF-4500)</td>
<td>13-20XX-11XX</td>
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<td>2.11</td>
<td>O-Ring P2-452</td>
<td>81-41-4000-0452</td>
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<td>2.12</td>
<td>Centering pin</td>
<td>84-32-11-1030</td>
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<tr>
<td>2.13</td>
<td>Pressure check point - complete (steel)</td>
<td>12-0100-0012</td>
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<td>2.14</td>
<td>Washer M6 (St.St.) [x2]</td>
<td>85-2312-06-000</td>
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<td>2.15</td>
<td>Nut M6 (St.St.) [x2]</td>
<td>85-2212-06-000</td>
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<td>2.16</td>
<td>Instrumentation bracket (SAF)</td>
<td>63-7044-0023</td>
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<td>Bolt M6 x 20 [x2]</td>
<td>85-2112-06-060</td>
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<td>2.18</td>
<td>Service port lid (SAF-4500)</td>
<td>54-0202-1111</td>
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<td>2.19</td>
<td>Service port lid AM-12</td>
<td>81-41-4300-3022</td>
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<td>2.20</td>
<td>Bolt M12 x 80 [x3]</td>
<td>85-1112-12-080</td>
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<td>2.21</td>
<td>Washer M12 [x3]</td>
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<td>2.22</td>
<td>Nut M12 [x3]</td>
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<td>2.23</td>
<td>Screens adaptor</td>
<td>13-2071-0002</td>
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<td>2.24</td>
<td>Flushing chamber seal AM-10</td>
<td>81-41-4300-3055</td>
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<td>2.25</td>
<td>Coarse screen (SAF-4500)</td>
<td>53-2074-2020</td>
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**Note:** Refer to drawing on pages 15 - 17
APPENDIX A.
"PLC" CONTROL SYSTEM (TYPE "D" – SAF SERIES)

Description of control panel components:

1. **Pilot lights:**
   - Yellow - Indicates power on.
   - Red - Indicates malfunction mode.

2. **Push buttons:**
   - TEST Manual operation of a flushing cycle.
   - RESET - clears the malfunction mode.

3. **Flushing counter:**
   - Counts the flushing cycles. Used for monitoring system operation. Can be manually reset.

4. **Timer T1 (0-30 hours):**
   - Allows timed flushing cycles. The timer is reset with each flushing cycle.
   - To cancel timed flushing, set selector SW1 to "PD ONLY".
   - Changing the switch to "CONT." will cause the filter to flush continuously regardless of pressure differential or time.

5. **Motor protector:**
   - This switch protects the motor in case of short-circuit or overload. It is important to set amperage according to the label of the motor. When this switch is tripped, the fault light will blink.

6. **Contactors CU and CD:**
   - Controls direction of motor rotation.

7. **Transformer:**
   - Electric supply to the various control components.

8. **Circuit breakers:**
   - 2 x 6 Amp. and 1 x 4 Amp.
   - Short-circuit protection for the control system.

9. **PLC:**
   - A Programmable Logic Controller responsible for the control panel operation according to a preset program.

Stages of cleaning cycle:

1. The exhaust valve opens to atmosphere.
2. Five seconds delay.
3. The motor starts rotating the suction scanner shaft until it reaches limit switch "B" (T.L.S).
4. The exhaust valve closes.
   - The suction scanner remains at limit switch B until the next flushing cycle. In the next flushing cycle, it will move from L.S B to L.S "A" (B.L.S).
   - In some versions of control panels, the suction scanner automatically returns to position "A" at the end of the flushing cycle. In this case the flushing cycle always begins from L.S. "A" (B.L.S).
   - NOTE: The limit switches are wired as Normally Closed contacts (NC). Therefore, when the "Limit Switch Plate" reaches the limit switch, the contact releases and the PLC input circuit opens.

Requests for flushing cycle:

a. PDS (Pressure Differential Switch)
b. Timer 0-30 Hr.
c. TEST button activation
d. Continuous flushing

PDS operation:

The PDS constantly monitors the pressure differential between the inlet and outlet of the "SAF" filter. When the PDS senses a preset value (usually 0.5 bar=7 PSI) there is a delay of three (3) seconds before the flush cycle begins.

At the end of the cleaning cycle, if the pressure differential signal remains, the filter will continue to clean itself for 15 minutes before entering into “DP Fault” mode.

Timer operation:
Flush according to time is available through a built-in timer (T1). The recommended default is from 6-8 hours. In order to cancel the timer operation, simply turn the timer selector SW1 to its middle position.

"TEST" operation:
The "TEST" button activates a manual self-cleaning cycle, in order to test the filter operation.

Continuous flushing:
The filter flushes continuously regardless of pressure differential or time. It is recommended that this mode be used for a limited duration only - in order to overcome extreme dirt load situations.

Malfunction modes:
The system recognizes two malfunction modes:
1) Mechanical fault
2) Clogging fault (DP Fault).

Mechanical fault:
Mechanical fault definitions: (In mechanical fault mode, the fault light blinks.)

a. The motor protector overload circuit breaker is tripped. Find and correct the problem, clear the fault by pressing the O.L. motor protector ON button.
b. Both limit switches are activated simultaneously. This may be the result of a limit switch failure, improper wiring or a loose wire. Find and correct the problem, clear the fault mode by pressing the RESET push-button.
c. Drive motor time-out. This occurs if the drive motor is activated and there is no signal from either limit switch within 35 seconds. The problem may be with one of the limit switches or the drive mechanism. Find and correct the problem; clear the fault mode by pressing the RESET push-button.
d. Drive motor rotation - wrong direction.

The PLC recognizes this mode when CD (contactor down) is ON and a signal is received from the outer limit switch (limit switch “B”).

The following procedure will rectify this situation:
Manually activate whichever Contactor forces the limit switch plate to rotate towards the halfway point between the two limit switches. (Pressing the plastic bridge on the contactor with a small screwdriver can do this).
Turn off power to the control panel and reverse any two phases to change direction of rotation. (In a DC controller, reverse the two wires to the motor).
Power up the controller and press the RESET button.
Note: Pressing the RESET button or turning power off and then back on without performing the above-mentioned instructions will NOT eliminate this fault condition!

Clogging fault (DP Fault):
DP fault occurs when there is a continuous PDS signal for longer than 15 minutes. In this case the flush cycle stops, the fault light turns on and the fault output is activated. The 24 VAC fault output can activate an alarm system, automatic bypass, pump shut-off, etc.
The controller will also enter a DP fault when the filter is in a mechanical fault mode and receives a flush request.
In order to clear the malfunction mode, press the "RESET" button.
Bridging positions 7A and 7B at the terminal strip will cause the controller to ignore a DP fault. After 15 minutes of continuous PD signal, the red light will be lit but the fault output will not be activated. The filter will continue the cleaning cycle as long as the PDS sends a signal.
Disconnecting the bridge between 7A and 7B will clear the fault mode and the filter will return to normal operation.

Automatic by-pass upon fault
When a DP fault occurs a fault signal will be sent to a bypass valve. This bypass valve will open insuring continuous flow to the downstream equipment. When the fault condition is cleared, the signal to open this bypass valve will be turned off and the bypass valve will close.
General information:
1. When power is first turned on, the PLC will check limit switch “A” to be sure it is "OPEN", if not the motor will operate to move the “Limit Switch Plate” until it reaches the limit switch.
2. The flush counter will advance at the end of each cleaning cycle. “Zero” the counter by pressing its red button.
3. PAUSE: Bridging positions 6A and 6B on the terminal strip pauses the cleaning cycle immediately. This function should be used only for special applications. Please consult the manufacturer or an authorized dealer for further information.
4. “END OF CYCLE” SIGNAL: (Output O/1+ Input I/9 = OFF, terminals 10 & 11).
   This 24VAC output closes at the end of each flush cycle for 5 seconds. With this pulse it is possible to daisy chain multiple controllers enabling sequential flushing. In this case, connect terminals 10 & 11 to the PDS input in the next controller of the series. If one of the filters in the series is in malfunction mode the signal will be automatically transmitted to the next filter in line.
5. “CYCLE ON” SIGNAL: (Output O/1 + Input I/9 = ON, terminals 10 & 11).
   This configuration allows the integration of a downstream pressure regulating valve or peripheral pump operation during the flush cycle. Output O/1 is activated one second before the onset of the flush cycle. This short delay allows a timer and relay (optional) to activate the PAUSE circuit (input I/6) for the duration required by the downstream valve or the peripheral pump.
   Both optional features of output O/1 may also be used for transmitting information to a remote control center.

Startup Procedure
1. Check that wiring between the filter and the control panel is done according to the provided wiring diagram.
2. Verify that the “Limit Switch Plate” is located halfway between the two limit switches and that the motor protector (Over Load) is switched off.
3. Switch “ON” all circuit breakers (except the motor O.L.).
4. Set selector SW1 to the middle position (PD only).
5. Switch “ON” the motor O.L. and check the rotation direction of the motor. If the motor rotates counterclockwise i.e. the suction scanner moves upward (outward from the filter), stop it immediately by switching OFF the O.L. Change motor direction by switching any two phases.
   If the motor rotates clockwise i.e. the suction scanner moves downward (inward towards the filter), let it continue until it reaches the Inner limit switch and stops.
6. Press the “TEST” push button and verify that the filter is functioning according to the above description.
7. Open the water supply and pressurize the system. It is highly recommended that first “wet” operation is done with static pressure and no flow through the filter, i.e. the outlet valve is closed and the by-pass of the system is open.
8. Operate a flush cycle by pressing the test push-button. Verify that everything is working properly as described above.
9. Operate a flush cycle by closing the 1/4” Manometer Valve of the PD switch for 5 seconds and then reopening.
10. If everything functions as described, open the outlet valve of the filter, and gradually close the by-pass valve.
11. Set T1 to 4 - 8 hours and turn selector SW1 to the upper position (PD & Time). Monitor the operation of the filtration system, change T1 setting if required.
### HIMEL CRN-75/200

#### TERMINALS

- L1, L2, M1, M2, W1, W2

#### POWER

- L1, L2, M1, M2, W1, W2

#### CONTROL

- C1, V1, C2, V2

#### LABELS

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#### LEGEND OF COMPONENTS ON DOOR

- **Push Buttons:** Green, Black
- **Pilot Lights:** Green, Red, Yellow

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**GALCON**

**Type:** D, SAF, 3PH, 2 Filters+Bypass Valve

**Page:** 1 of 3

**Job No.:** 1019

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**Program Version:** 2 UNITS

**Cat No.:** 82-81-6000-0127

**Item No.:** EAF521M3CAA0000033

**Order No.:** 20.811

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**Planned:** NAAMAN 18-12-06

**Drawn:** NAAMAN 18-12-06

**Approved:** 4927/8LW

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**Blocks:** LOC, MICROLOGIX 1000

**Units:** 1761-L32BWA
TERMINAL'S LEGEND
- POWER TERMINAL
- CONTROL TERMINAL
- ITEMS IN FIELD
- ITEM MOUNTED ON THE DOOR

TRANSFORMER CONNECTIONS

WIRING COLOR CODE
BROWN - MAIN POWER 460V
RED   - 120VAC
BLACK - NEUTRAL
BLUE  - 24VAC, 24VDC
GN/YL - GROUND
GREY  - EXTERNAL VOLTAGE
ORANGE - COUNTER CONNECTIONS

BY-PASS VALVE - BIFL ACTUATOR

(To page 3) (To page 3)