

Self-Cleaning Automatic Filter AW 1200

Manual



0	Preface Pages
0.1	Structure and use of the operating instructions

Self-Cleaning Automatic Filter AW 1200

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The operating instruction is structured in accordance with the stipulations of the Machinery Guidelines 98/37/EG. The pages are sequentially numbered and marked with the issue date in the footer.

The operating instruction describes the Automatic Filter AW 1200 and the operation of the unit.

This operating instruction manual must be stored carefully for future use!

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0.2	Contents	
0	Preface Pages	0-1
0.1	Structure and use of the operating instructions	0-1
0.2	Contents	0-2
0.3	Index of illustrations	0-4
0.4	Index of tables	0-4
0.5	Index of abbreviations	0-4
0.6	Intended use and misuse	0-5
0.7	Duty of care of the operator	0-6
0.8	Personnel requirements	0-6
0.9	Liability	0-7
1	Safety	1-1
1.1	Symbols	1-1
1.2	Fundamental safety notes	1-2
1.3	Accident prevention regulations	1-4
1.3.1	General points	1-4
1.3.2	Assembly and dismantling	1-4
1.3.3	Transport/ site of installation	1-4
1.3.4	Electrical system	1-5
1.3.5	Compressed air system	1-5
1.3.6	Safety when de-commissioning	1-5
1.3.7	Maintenance and repair	1-6
1.4	Operation	1-6
2	Description	2-1
2.1	General description	2-1
2.2	Technical description	2-1
2.2.1	Description of the operating functions	2-3
2.2.2	Control of AW 1200 automaticfilter	2-4
3	General data	3-1
3.1	Notes and identification plates	3-1
3.2	Technical data	3-2
3.2.1	Control unit	3-2
3.2.2	AW 1200 automatic fi lter	3-3
4	Assembly and commissioning	4-1
4.1	Before assembly	4-1
4.2	Unpacking	4-2
4.3	Installation	4-3
4.4	Steps for commissioning	4-4
4.5	Commissioning	4-5
4.6	Testing and setting the operating parameters	4-6
4.6.1	Switching on the control with the mains switch, first fiushing phase/ testing pre-fiush	4-6
4.6.2	Setting the running time of the pneumatic cylinder to suit the operating conditions, second flushing phase / cleaning	4-6
4.6.3	Checking the correct ending of the fiushing	4-7
4.6.4	Setting the fiushing interval T1 on the electronic control system	4-7
4.6.5	Operating parameters	4-8
5	Operation and running	5-1
5.1	Operating elements	5-1
5.2	Programme operation	5-3
5.3	Control sequence	5-4

6	Maintenance	6-1
6.1	Cleaning	6-1
6.2	Flushing disc	6-1
6.3	Pneumatic cylinder	6-2
6.4	Seals	6-2
7	Fault finding and fault rectification	7-1
8	Appendix	8-1
8.1	Terminal occupation	8-1
9	Spare parts list	9-1
10	Additional documentation for use in EX locations (with reference to the order)	10-1
10.1	Application range	10-1
10.2	Main characteristics and intended operation	10-1
10.3	Installation and commissioning	10-2
10.4	Maintenance	10-2

0.3	Index of illustrations	0-4
Abb. 3-1	Identification Standard	3-1
Abb. 3-2	Identification Special (e.g. ATEX)	3-1
Abb. 8-1	Terminal occupation	8-1
Abb. 8-3	Components of the AW 1200	8-3
Abb. 8-2	Operating elements and connections of the control unit	8-2
Abb. 8-4	Air and water connections	8-4

0.4	Index of tables	0-4
Tab. 4-1	Setting the operating parameters	4-8

0.5 **Index of abbreviations**

0.6

AC	Alternating Current
DC	Direct Current
DDS	Differential pressure switch
etc.	et cetera
GND	Ground
LS 1	Proximity switch 1
LS 2	Proximity switch 2
T1	Interval time
T2	Preflush time
T3	Check time for piston stroke

0.6**Intended use**

The AW 1200 automatic filter is for filtering the filter medium referred to in the acceptance document. The permissible operating data quoted on the identification plate must be maintained. The AW 1200 automatic filter complies with the EC guideline 97/23/EC and guideline 94/9/EC.

- > The reading of this instruction manual forms part of the intended use. It is also important to make sure that all the instructions are followed exactly, particularly the ones referring to safety.
- > In addition, all maintenance tasks must be carried out at the prescribed intervals.
- > It is very important immediately to rectify, or have rectified, all faults which affect safety.
- > The filter is designed and laid out for continuous operation. For this reason the strainer insert must be cleaned if necessary when restating after extended periods of operation.

Any other operation or operation outside the stipulations of the operating instructions (e.g. elevated operating temperatures or increased operating pressures) is considered to be not intended use. The manufacturer does not accept liability for any damage caused by this operation. The user of the AW 1200 automatic filter is thus responsible for all personal or material damages which are caused by non-intended use.

The automatic filter is conceived and manufactured in accordance with the state of the art technology and recognised safety regulations. Even so, the operation of the installation can involve danger to life and limb of the user or third parties or it can compromise the operation of the filter or other components.

The following points must be observed to prevent damage or life-threatening injuries when using the AW 1200 automatic filter:

- > The unit must only be used or employed for the intended use in a technically perfect condition.
- > Before the unit is switched on you must inform yourself of the correct method of operation. For this, read the Chapter „Safety“.

0.7 Duty of care of the operator

This operating instruction manual must be stored carefully and readily-accessible at the installation site of the filter. Ancillary to the operating instructions are the universally-applicable legislative and other binding regulations concerning accident prevention and environmental protection. These duties can include, for example, the handling of dangerous materials or the provision of / wearing of personal protection equipment.

Strongly recommended: The operating instructions must be completed by the inclusion of various instructions. These can be: Monitoring and reporting duties for the observance of operational special conditions (e.g. concerning working sequences, sequence organisation and the personnel employed).

The personnel employed on the machine must have read the operating instructions before starting the work. This applies particularly to the safety instructions. This is particularly applicable to the personnel who only work on the machine occasionally (e.g. for setting and maintenance work on the filter). The management must check the safety and danger related work of the personnel as required for this reason with consideration of the operation instructions.

Observe all the safety and danger instructions on the filter. In the event of safety-relevant changes in the filter or its behaviour during operation the filter must be immediately taken out of service. The fault must be reported to the relevant authority.

No modifications to the filter or its ancillary or auxiliary equipment may be undertaken unless ARMATUREN-WOLFF GmbH & Co.KG has given their approval for these modifications. This also applies to the fitting and setting of safety devices and valves and to the welding of pressure-containing vessel components.

Only original spare parts should be purchased. Only by the use of these can the technical requirements stipulated by the manufacturer be ensured.

No programme changes to the programmable control system must be made.

The prescribed intervals detailed in the operating instructions for recurring tests/inspection must always be maintained.

Protective clothing and workshop equipment suited to the type of task involved must always be used for the maintenance operations.

0.8 Personnel requirements

Work on the filter may only be undertaken by responsible personnel. The legal minimum age of operator must be observed.

This means that only trained or instructed personnel may be employed. In addition, the responsibilities of the personnel with regard to operation, setting, maintaining and repair must be clearly identified.

Only under the supervision of an experienced person may the following personnel be allowed to work on the equipment: persons receiving training, instruction, education or personnel within the frame work of general education.

Work on the electrical equipment of the filter may only be carried out by specialist electricians or by trained persons under the control and supervision of an electrician in accordance with the electro-technical regulations.

0.9**Liability**

Our current "General Sales and Supply Conditions" are applicable. Guarantee and liability claims in the case of personal and material damage cannot be validated if one or more of the following causes can be identified:

- > Non-intended use of the automatic filter AW 1200
- > Inappropriate assembly, commissioning, operation and maintenance of the AW 1200 automatic filter
- > Operation of the AW 1200 automatic filter with faulty safety equipment
- > Non-observance of the instructions in the operating instructions concerning operation, maintenance, care and fault-finding
- > Non-observance of the personnel requirements
- > Unilateral structural modifications to the AW 1200 automatic filter
- > Inadequate monitoring of components subject to wear
- > Improperly performed repair work
- > Catastrophes caused by the effects of foreign bodies or excessive force

 **REFERENCE**

The complete guarantee provided by ARMATUREN-WOLFF GmbH & Co.KG incorporates the exclusive use of spare parts ordered from them for the AW 1200 automatic filter. No modifications of any kind may be undertaken to the AW 1200 automatic filter without the approval of ARMATUREN-WOLFF GmbH & Co.KG. For this reason, any modification measures require the written approval of ARMATUREN-WOLFF GmbH & Co.KG.

The following must always be observed: use only original replacement and wear parts from ARMATUREN-WOLFF GmbH & Co.KG. There is no guarantee if spare parts from other sources are used that they have been manufactured to comply with the loading and safety requirements.

1 Safety

Important note

The safety in operation of the AW 1200 automatic filter is guaranteed if the operation is correctly performed. This is because the unit is conceived and manufactured in accordance with the safety and working protection regulations. In the event of misuse there is danger to life and health of persons and materials of the specific user.





All persons who come into contact with the unit for the commissioning, operation and maintenance of the unit must be suitably qualified and trained.

The following safety instructions are to be understood as additional to the already applicable national accident prevention regulations and statutes.

The existing accident prevention regulations and statutes must be observed at all times.

1.1 Symbols

The following symbols are used in this operating instruction manual:

	Indicates an immediately threatening danger which could lead to severe injury or death.
	Indicates a possibly dangerous situation which could lead to severe injury or death.
	Indicates a possibly dangerous situation which could lead to slight injury or damage to property.
	Indicates notes for use and other useful information.

1.2 Fundamental safety notes



Danger from pressure

The AW 1200 automatic filter constitutes a pressure vessel. Therefore, before any maintenance and repair work is undertaken, care must be taken to ensure that the vessel is pressure-free before starting the maintenance work.



Danger from high voltage

The AW 1200 automatic filter must be made potential-free and must be secured against switching on again inadvertently before starting the maintenance and repair work. The potential-free status must be verified. Adjacent components carrying potential must be covered or screened off.

Possible dangers	Measures to avoid this
<p>Functional failure caused by incorrect operation or assembly</p> <p>Explanation: The function of the filter can be taken out of force or considerably inhibited if faulty or not clearly described parts are fitted to or changed in the AW 1200 automatic filter.</p> <p>Injury to the operating and maintenance personnel can be caused during operation and maintenance.</p>	<ul style="list-style-type: none"> > Only parts listed in the operating instructions and in the associated documents may be fitted, added or replaced. > If you are not sure, please consult the manufacturer. > Use only the prescribed tools in good working order for the repair work.
<p>Functional failure caused by incorrect operation or assembly</p> <p>Explanation: The function of the filter can be taken out of force or considerably inhibited if diameter of the infeed and outfeed ducting is not in accordance with the specification of the manufacturer.</p>	<ul style="list-style-type: none"> > Make sure that the infeed and outfeed ducting diameters are in accordance with the manufacturer's requirement.
<p>Functional failure caused by incorrect operation or assembly</p> <p>Explanation: The function of the filter can be taken out of force or considerably inhibited if the AW 1200 automatic filter is not checked and maintained at the specified intervals.</p>	<ul style="list-style-type: none"> > Regular inspection of the AW 1200 automatic filter in accordance to Chapter 6 "Maintenance"

Possible dangers	Measures to avoid this
<p>Functional failure caused by incorrect operation or assembly</p> <p>Explanation: Each AW 1200 automatic filter is built for a specific pressure and temperature range and for a specific medium. The function of the filter can be taken out of force or considerably inhibited if the filter is fitted into a system other than the one it was built for.</p>	<ul style="list-style-type: none"> > Fit the AW 1200 automatic filter exclusively into the system for which it was designed and approved.
<p>Danger of burning! Burning of fingers or hands</p> <p>Explanation: If the AW 1200 automatic filter is operated in a system where the medium reaches a temperature in excess of 50°C there is a danger of burning simply by contact with the filter surface.</p>	<ul style="list-style-type: none"> > Insulate all parts of the system where there is a danger of burning or affix warning signs at the relevant locations.
<p>Danger of burning!</p> <p>Explanation: Depending upon the type of medium, injury, burning, scalding or irradiation can be caused if the AW 1200 automatic filter is inadvertently pressurised during maintenance.</p>	<ul style="list-style-type: none"> > Make sure that the AW 1200 automatic filter is kept completely pressure-free during maintenance.
<p>Trapping danger Danger of trapping fingers, hands or feet.</p> <p>Explanation: The AW 1200 automatic filter has a minimum weight of 17 kg, depending upon the design. During transportation, assembly, dismantling and maintenance there is a danger of trapping injuries to the fingers, hands and feet.</p>	<ul style="list-style-type: none"> > Always wear suitable safety clothing during transportation, assembly, dismantling and maintenance. > Always secure against slipping and dropping during transportation, assembly, dismantling and maintenance.
<p>Danger from high voltages</p> <p>Explanation: There is a danger from contact with voltage carrying components. There are voltages in excess of 48V in the control system of the filter.</p>	<ul style="list-style-type: none"> > Before working on the electrical system, this must be made potential-free and be secured against inadvertent switching on again by prohibition signs. If necessary, additional fuses must be removed for all connection poles and stored or switched off. > Make sure that no metallic components are left behind in the unit after the repair work. These could cause short-circuits. > Please note that the filter must be earthed.

1.3 Accident prevention regulations

1.3.1 General points

A safety test must be performed before starting up after assembly of the AW 1200 automatic filter for the first time (new installation or assembly after transportation).

All machine components must be checked for perfect condition.

Before each commissioning of the AW 1200 automatic filter you must perform an operational safety test (see Chapter 4.4, Pages 4-5).

The instructions given in the operating instruction manual and the generally-applicable local safety and accident prevention regulations must be observed.

Observe the warning and instruction signs. These provide important instructions for operating the equipment safely.

The operating personnel are responsible for their own safety and for the safety of third parties in the working area. This responsibility cannot be delegated.

Any faults which arise compromise safety and must therefore be resolved immediately. Faulty components must be replaced without delay.

1.3.2 Assembly and dismantling

Only the authorised personnel are allowed to be present in the working area during assembly or dismantling of the AW 1200 automatic filter.

Make sure that there is sufficient free space for movement and that the ground is secure.

Secure fixing check: Make sure that, after assembly, all the component parts have been assembled properly.

Check that all cables and connection lines are fitted to the locations intended.

Prescribed check: The operating personnel must make sure that the condition of the AW 1200 automatic filter is perfect before commissioning.

1.3.3 Transport/ site of installation

The transport and location information must always be observed and complied with.

The components of the AW 1200 automatic filter must be carefully and suitably packed before transportation.

The transport safety devices must be checked and secured in position!

1.3.4 Electrical system

Work on the electrical installation may only be carried out by specialist electricians. The basis of this work is to be the circuit diagram.



Danger of accident: The power supply for the AW 1200 automatic filter is to be switched off or the terminals must be disconnected before opening the control unit.



The main switch is to be fitted with a warning sign (" Work in progress on the electrical system") and the main switch must be secured against switching on again.

Disconnected power infeeds are to be marked with a warning sign (" Work in progress on the electrical system"). In addition, you must ensure that unauthorised persons cannot enter the working area. The electrical equipment of the AW 1200 automatic filter must be checked at regular intervals. Loose connections and damaged cables must be rectified immediately.

Danger of fire: Plug connections should never be made or broken when under power. The plug connections must always be protected from moisture. The control unit must always be closed. This will ensure the protection from moisture and dirt ingress.

1.3.5 Compressed air system

The compressed air lines and compressed air connections of the compressed air system should be regularly checked for correct fitting and for leaks. Damaged or badly worn components of the compressed air system must be replaced without delay. All work on the compressed air system of the AW 1200 automatic filter must only be undertaken when the installation is at a standstill.

The electrical system must therefore be switched off and the unit must be pressure-free. In addition, the compressed air system must be secured against unauthorised switch-on and a warning sign (" Work in progress on the compressed air system") must be provided.

1.3.6 Safety when de-commissioning

After de-commissioning, the AW 1200 automatic filter must be secured against unauthorised start-up. For this purpose, the main switch on the control unit must be secured with a warning sign ("Out of commission") and the mains switch must be secured against unauthorised switching on again by a suitable locking device.

In a similar way, the compressed air system must be secured against unauthorised start-up and be marked with a warning sign ("Out of commission").

1.3.7

Maintenance and repair

The prescribed maintenance tasks as described in Chapter 6 "Maintenance" must be carried out. The AW 1200 automatic filter must be taken out of commission before starting the maintenance and repair work.

The preparation work must be properly carried out. For this, read the following chapters: Chapter 1.3.4 "Electrical system", Chapter 1.3.5 "Compressed air system" and Chapter 1.3.6 "Safety when de-commissioning".




Before any maintenance and repair work, the installation must be switched to potential-free and be secured against inadvertent switching on again.

In addition to this, care must be taken to ensure that the filter is pressure-free before starting the maintenance work.

Grease and solvents as well as contaminated cleaning cloths must be disposed of in a proper manner.

The replaced components must be disposed of in a proper manner, in accordance with the factory disposal schedule.

1.4

Operation


If functional faults are experienced during operation of the AW 1200 automatic filter, then the AW 1200 automatic filter must be immediately taken out of service.

For this read the following Chapters:

Chapter 1.3.4. "Electrical system", Chapter 1.3.5. "Compressed air system", Chapter 1.3.6 "Safety when de-commissioning", Chapter 6 "Maintenance" and Chapter 7 "Fault finding and fault rectification".

Any functional faults which arise must be eliminated immediately. These tasks must only be carried out by trained or instructed personnel.

In the event of serious functional faults, which cannot be handled by trained or instructed personnel, ARMATUREN-WOLFF GmbH & Co.KG must be informed.

Changes in the noises made (squeaks, rattles, vibration) can point to impending functional faults. If changes in the noises produced by the installation occur, the cause must be traced immediately.



The functional fault arising must only be rectified when the AW 1200 automatic filter is switched off. Only after the fault has been rectified can the AW 1200 automatic filter be re-started. A safety check and a functional check must be carried out.

2 Description

2.1 General description

The AW 1200 automatic filter is a self-cleaning largely maintenance-free filter for the removal of particulate contamination which has a wide range of applications. These contaminants arise, for example, from highly-stressed liquids (200 mg/l), natural water sources (e.g. lake and river water), heating or cooling circuits and processes. The filter operates from an operating pressure of only 0.3 bar and is characterised by the following points: low pressure losses at high through-flow rates, simple and robust construction, high output and weight and space-saving construction.

2.2 Technical description

(See also Chapter S.2.2.1.)

The contaminated medium flows into the filter through the flange marked as the inlet. After flowing through the strainer insert from inside to outside, it exits as clean medium through the flange marked as the outlet. Then the flushing phase takes place: this is activated either by reaching the differential pressure set on the pressure monitor or after a set time interval. The flushing valve then opens to allow a continuous flow of medium to flush away the larger contaminants. Then the piston generally performs two strokes in the filter basket in order to produce a speed increase between the piston and the strainer wall. The local pressure drop provides for the suction out of the contamination, which is swilled away through the open flushing valve and the resulting pressure gradient.

The AW 1200 automatic filter is fitted with a monitoring system. The background: The flushing process takes place automatically before possible blocking of the strainer insert can lead to a marked reduction in through-flow. The filter flow is not interrupted by this process. The flushing time can be adjusted via the control system as shown in the operating instructions. The frequency of flushing depends upon the contamination of the medium.

Components of the AW 1200

1. Pneumatic cylinder
2. Compressed air throttle cylinder downwards
3. Compressed air throttle cylinder upwards
4. Cover
5. Housing
6. Outlet
7. Inlet
8. Differential pressure connections
9. Pneumatic flushing valve/flushing line
10. Compressed air throttles flushing valve (damping/closing speed)
11. Differential pressure switch
12. Solenoid valve battery
13. Control system
14. Flushing disc
15. Screen

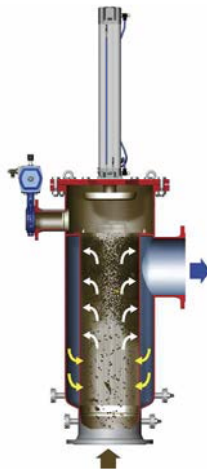
Fig. 8-4, Page 8-3 Components of the AW 1200

Connections: See Fig. 8-6

2.2.1

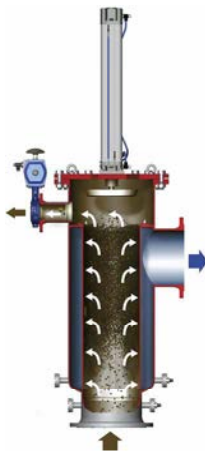
Description of the operating functions

The operation of the AW 1200 automatic filter can be split into two areas: Normal operation and the flushing phase.

**Normal operation**

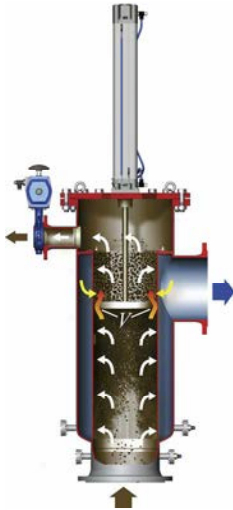
The filter is in the normal filtration phase. The flushing valve is closed and the piston mounted in the cover is outside the filter basket in its starting position. The flow characteristics in the strainer cause the particles to deposit from the top to the bottom. The duration of the filtration phase depends upon the degree of contamination of the medium.

There are two reasons why particles are not deposited in the filter inlet during this phase: one is because of the design, and the other is because of the flow characteristics.

**Filtration and first flushing phase**

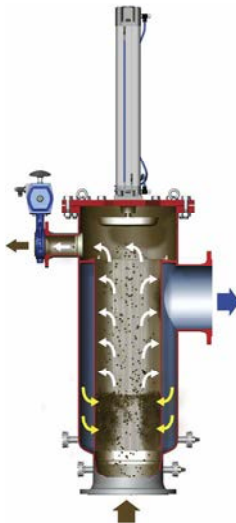
The flushing valve opens in this phase. This creates a pressure gradient with respect to the system pressure in the piping. This pressure gradient causes the coarser and easily removable particles to be flushed out of the strainer insert. The filtration continues during this phase and the flushing volume is defined and limited by a restrictor in the flushing drain spigot. Flushing is initiated by the differential monitor or by the time interval control system.

Filtration and second flushing phase



The flushing interval is open. The pneumatically-actuated piston with the flushing disc moves into the strainer and creates a large local increase in speed within the gap between the flushing disc and the strainer insert. This causes a static pressure drop – this is known as the Bernoulli Effect. The external pressure on the clean side of the filter then is higher in the area of the flushing disc than in the area of the flushing disc and the strainer. Together with the greatly increased flow speed, this causes “suction” on the filter element. The contaminants are flushed out of the filter as a result of the flushing valve being open, creating a pressure gradient.

Filtration and final flushing phase



The flushing disc returns to the starting position but the flushing valve remains open. This allows the remaining particles to exit the filter. In addition, the lower section of the filter insert is cleaned during the upwards movement of the flushing disc. The flow characteristics returning to what they were has a self-cleaning effect, according to Bernoulli.

2.2.2

Control of AW 1200 automatic filter

The AW 1200 automatic filter is controlled by the electronic control unit. The programmable control system monitors the pressure in the inlet area of the filter at specific points. In this way, the flushing process is initiated either by time control or under differential pressure control.

The flushing process can also be initiated manually. The button on the right hand side of the housing is used for this purpose.

3 General Data

3.1 Notes and identification plates

The AW 1200 automatic filter is equipped with notes and identification plates. The notes, instructions and operating data given on the notes and identification plates are always to be observed.


	
Bau.-Nr.:	
<i>comp. no.:</i>	
Typ:	
<i>type:</i>	
min./max. zul. Druck (PS):	
<i>min./max. pressure (PS):</i>	<i>bar</i>
Prüfdruck:	
<i>test pressure:</i>	<i>bar</i>
min./max. zul. Temperatur (TS):	
<i>min./max. temperature (TS):</i>	<i>°C</i>
Volumen:	
<i>volume:</i>	<i>L</i>
Baujahr:	
<i>year of construction:</i>	
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ABB. 3-1 STANDARD IDENTIFICATION PLATE

Abb. 3-2 SPECIAL IDENTIFICATION PLATE

3.2 Technical data

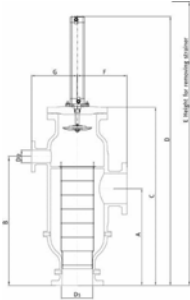
3.2.1 Standard control unit

Mains connection:	230 V +/-10 % 50/60 Hz
Valve output 1:	24 V DC, max. 0,6 A
Valve output 2:	24 V DC, max. 0,6 A
Operating condition:	Single pole potential-free relay contact, normally-open load max. 230 V AC, 1 A
Fault output:	Single pole potential-free relay contact, normally-open load max. 230 V AC, 1 A
Dimensions:	B 220 x H 200 x T 110 mm
Weight:	Ca. 1,8 kg
Fusing:	Control unit (F1) 2 A slow-response 24 V DC Valve outputs (F2) 1,25 A slow-response



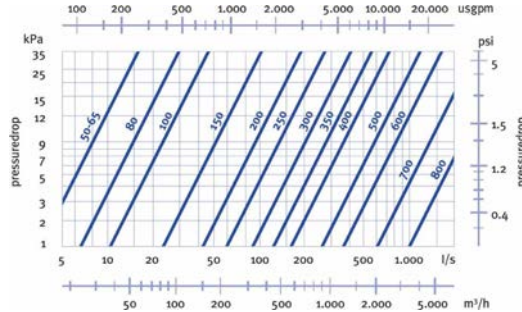
Burned-out fuses must be replaced by ones adequate in value and design. The original fuses are to be used as examples. The repair and bridging of fuses is prohibited, as is the use of repaired melting inserts.

3.2.2 AW 1200 automatic filter



Flange complying with DIN 2632 / 2633
PN10-16 or ANSI B 16.5 150 lbs

Dimensioning Chart



Sample dimensions (0.2 mm filter mesh)/selection diagram,
at 500 m³/h with 200 µm using a DN 200 or DN 250 is recommended.

Material	D1	D2	A	B	C	D	E	F	G	Weight *	Flow ***	Ex. Amount of flushing liquid/flushing (adjustable)
	DN	DN	mm	mm	mm	mm	mm	mm	mm	appr.kg	m³/h	m³
VA/steel **	50	25	310	385	520	1020	1100	200	135	25	8–45	0,04
	65	25	310	385	520	1020	1100	200	135	30	8–45	0.04
	80	40	405	510	620	1100	1200	235	190	35	15–80	0.06
	100	40	430	480	680	1305	1400	240	240	40	40–120	0.09
	150	40	490	680	810	1450	1550	260	255	80	50–300	0.2
	200	80	590	790	1010	1950	2050	290	280	110	100–500	0.54
	250	100	740	980	1250	2180	2280	345	330	165	160–800	1.2
	300	100	890	1155	1440	2510	2610	375	385	200	200–1100	2.2
	400	100	1010	1325	1535	3010	3100	485	465	450	400–2000	4.5
	500	150	1590	2205	2350	3800	3900	695	555	1400	800–3000	9.5
	600	200	1540	3055	3490	4650	4750	900	805	1600	1200–4000	13.5
700	200	2650	3255	3750	5650	5750	1200	1100	1800	1500–5000	17.0	

GRP	40/50	25	420	535	720	1200	1300	165	165	15	8–45	0.04
	65	25	420	535	720	1200	1300	165	165	17	8–45	0.04
	80	40	465	595	800	1300	1400	200	175	20	20–90	0.06
	100	40	490	630	870	1370	1450	225	220	25	40–120	0.09
	150	40	580	750	1030	1680	1750	260	235	30	70–300	0.2
	200	80	660	870	1200	2000	2100	325	300	60	150–500	0.54
	250	100	785	1030	1410	2300	2400	395	350	90	200–700	1.2
	300	100	895	1190	1620	2800	2900	500	400	180	300–1000	2.2
	400	100	1260	1600	2100	3600	3700	575	500	260	500–1800	4.5
	500	150	1750	2170	2760	4300	4400	675	580	715	800–2500	9.5
	600	200	1900	2300	2900	4500	4600	780	640	1100	1200–4000	13.5
700	200	2200	2600	3100	4750	4850	870	700	1400	1500–5000	17.0	

* depending on design pressure. ** rubberised on request, *** depends on filter mesh size

4 Assembly and commissioning

Always read the operating instructions carefully and completely before assembly and commissioning.

4.1 Before assembly

Requirement s of the ducting system

The following requirements must be fulfilled and maintained to ensure that the AW 1200 automatic filter is completely ready for operation:

- > The infeed and outfeed lines must be laid out in a method which does not impede the flow.
- > The cross-sections of the infeed and outfeed lines must at least be equivalent to the cross-sections of the inlet and outlet of the filter.
- > The infeed and outfeed lines must be laid without mechanical tension with respect to the automatic filter. This also applies when the lines are under thermal load.

Requirements of the filter configuration

The following requirements must be fulfilled to ensure proper cleaning and function of the filter:

- > The various operating parameters must be taken into account and correctly implemented in the design of the system. This refers to operating parameters such as nominal filter size, through-flow volume, pressure or the associated pump characteristic curve.
- > Above all, the bore of the screen and the diameter of the flushing disc influence the cleaning process.
- > If the operating parameters change (e.g. diameter/volume flow), the relevant components must be matched by the manufacturer ARMATUREN-WOLFF GmbH & Co. KG.

Requirements of the compressed air system

The following requirements must be fulfilled in order to ensure the correct function of the filter:

- > Pressure 6 bar, air hose min. 10/1 mm
- > Safety unit, maintenance unit
- > Air volume requirement (see Table 4-1, Pages 4-8)

4.2

Unpacking

Read the following subject ranges before starting: Chapter 1 "Safety" and Section 4.1 "Before assembly".

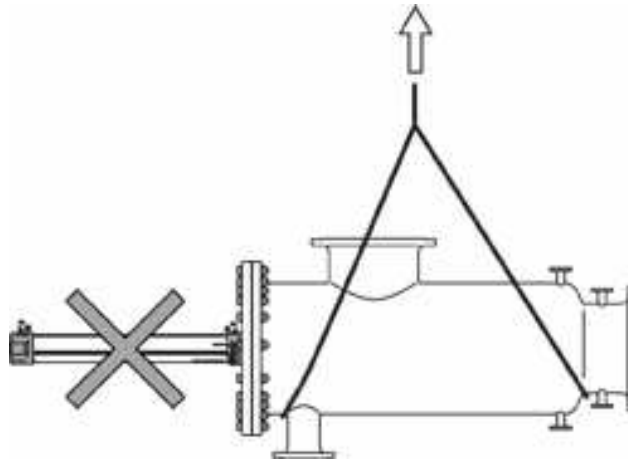
WARNING**Danger of trapping!**

The AW 1200 automatic filter has a weight of at least 15 kg. There is therefore a possibility of trapping injuries to the fingers, hands or feet during transport and assembly.

- > The AW 1200 automatic filter must be secured against slipping and falling during transport, assembly and dismantling.
- > Wear safety shoes.

REFERENCE

The following must be taken into account when unpacking the filter:



Never lift the filter using the pneumatic cylinder, use the flanges or a lifting belt as shown in the illustration.

Check whether

- > The AW 1200 automatic filter has external damage
- > The connections are damaged
- > The flanges are contaminated with dirt

If any transport securing devices or flange covers are fitted, these must be removed.
Do not assemble the AW 1200 automatic filter if it is damaged.
Any dirt contamination should be removed.

4.3

Installation

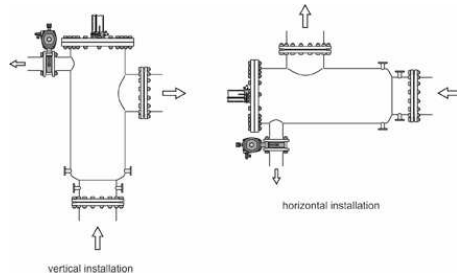
REFERENCE

Install the filter so that it is not under mechanical tension

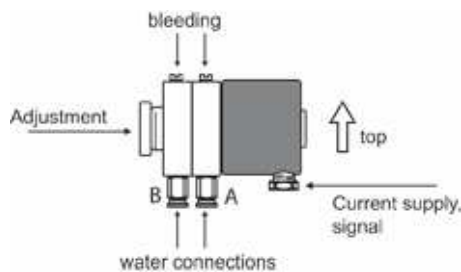
The filter must be mounted in the piping so that it is not under mechanical tension in order to ensure proper operation and optimum service life.

1.

The cylinder head can be supplied separately from the filter body. If this is the case, we recommend that the filter be first installed without the cylinder head and that the head be fitted subsequently.

**2.**

The filter can be installed horizontally or vertically with the connections in any required direction. Support is to be provided for the filter either by a pipe support directly on the filter or by supports on the pipe connections. The cylinder head and air cylinder must be easily accessible for possible service work. The size of the connection from the flushing valve to the flushing pipe must not be reduced since otherwise the self-cleaning facility of the filter can be reduced. In addition, the filter must operate with a pressure difference of at least 0.3 bar between the filter inlet and the flushing pipe. The flushing pipe should be filled with medium. Harmful vibrations can be caused by a combination of high system pressure and a free-running flushing pipe.

**3.**

Install the control and the pressure monitor on the wall in view of the filter. When doing this, please note that the differential pressure monitor must be mounted horizontally with the pressure connections pointing downwards and with the two bleeding nipples pointing upwards in accordance with the adjacent details. The differential pressure switch must be bled correctly using the bleeding screws before commissioning.

4. The air lines for the pneumatic cylinder are to be connected in accordance with the enclosed connection plan (see Fig. 8-4, Page 8-4) The air infeed the compressed air station must be via an air hose with at least 10/1 mm. The air pressure must be around 6 bar, the maximum being 8 bar.
5. The hoses for the differential pressure switch must be connected to connections A and B in accordance with the connection diagram. Please note that the automatic operation sequence of the filter will not function if the connections are swapped over.
6. The potential-free connections for OPERATION and ALARM or the serial interface for an external monitoring system must be connected.
7. The connection to the power supply and to the external components (e.g. the flushing valve) is made on the screw terminals in a separately accessible terminal box.



Functional failure by incorrect action

Avoiding damage to the strainer insert: As long as the filter is switched off, or the contact OPERATION is open, you must make sure that the AW 1200 automatic filter is not under pressure.

4.4

Steps for commissioning

The following working steps must be carried out before commissioning:

1. The proper condition of the electrical lines must be checked.
2. Check the compressed air connections. The compressed air distributor must be supplied with 4-8 bar (pressure gauge). You must also check that the compressed air distributor, the solenoid valve and the drive for the flushing disc are properly provided with compressed air before commissioning.
3. Check the differential pressure connections (DDA). The differential pressure hoses must be connected to the lower section of the filter (inlet) and to the relevant differential pressure switch, and the differential pressure switch must be properly bled using the bleed screws.



No operation without control

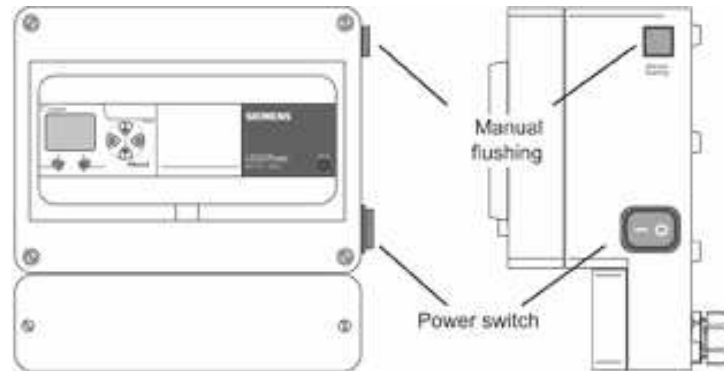
Avoiding damage to filter and installation: Never operate the filter without the control system. It is, however, not harmful to operate without liquid. This means that when taking pipes out of commission, or when draining, the filter does not necessarily need to be taken out of commission.

4.5

Commissioning the filter

REFERENCE

The electrical control system is ready for operation after actuating the mains switch on the control unit. This must always be undertaken before commissioning the filter for actual filtration operation.



REFERENCE

OPERATION WITHOUT LIQUID IS NOT **HARMFUL TO THE FILTER!**

The cleaning cycle is automatically initiated by switching the control system on. The cleaning process can, however, be initiated manually at any time by actuating the button "FLUSH" on the right hand side of the housing.

Check that the flushing valve opens and that the piston then performs two strokes – this involves one forwards and one backwards movement.

Check the times for the stroke of the cylinder in accordance with the Table "Setting values".

The system pressure and the through-flow require a certain time for a full stroke of the piston. For this reason, the test of the piston function should always be carried out under operating conditions.

Check the function of the differential pressure switch

Check the function of the differential pressure switch by releasing the connection on the filter body (snap connection) on the low pressure side of the differential pressure switch (connection marked B).

This should take place during the operation of the filter since the flushing cycle must be activated. If this is not the case, the cause can be traced back to a faulty connection of the line between the filter and the differential pressure switch. Make sure that the connection is made in accordance with the connection plan in this operating instruction manual.

REFERENCE

The differential pressure arising must not exceed 1 bar – otherwise the membranes in the differential pressure switch may be damaged.

The standard value for the differential pressure resistance of the strainer insert is 1 bar. Differential pressure in excess of this can cause it damage.

4.6 Testing and setting the operating parameters

In order to check the proper function of the filter, the following steps must be carried out:

4.6.1 Switch on the control system with the mains switch, testing the first flushing phase / pre-flushing

The first flushing phase starts automatically as soon as the mains switch is actuated.

The dirt drain valve opens against “atmospheric” or a **system pre ssure** which is at least 0.5 bar lower (pressure drop in the piping to be taken into account). The flushing disc is located in the starting position at the top position in the filter housing during the entire flushing phase.

Settings which may be required:

1. Set the pre-flushing time T2 (in seconds) on the electronic control system to correspond to the size of the filter (see Table 4-1 on Page 4-8).
2. Adjust the opening speed of the dirt drain valve **by using the compressed air throttles**. Turning the throttle in a clockwise direction slows the opening speed down.

Caution! Opening too quickly can cause knocking in the pipes!

4.6.2 Setting the running time of the pneumatic cylinder to the operating conditions, second flushing phase / cleaning

REFERENCE

This setting cannot be carried out in the factory. For this reason it must always be set before commissioning under realistic operating conditions.

The pneumatic drive starts its movement in the second flushing phase and the flushing disc moves along the strainer. The arrival at the end-point is indicated by the LEDs on the Reed contacts.

Setting the running time of the pneumatic cylinder (piston stroke):

1. Adjust the time for the piston stroke of the pneumatic drive using **the compressed air throttles** located on the drive. The running times shown in the Table “Setting values” are definitive. The movement is slowed down by turning the throttles in a clockwise direction (screwing in).

REFERENCE

There will be a negative effect on the cleaning process if the stroke movements of the pneumatic cylinder are performed too quickly, thus moving the flushing disc along the strainer too quickly.

Check time for piston stroke T3:

2. This only needs to be altered if the “Fault cylinder” signal is created. The check time is pre-set in the factory. The check time for the piston stroke T3 must be set on the control unit.

REFERENCE

The check time determines how many seconds after the start of a piston stroke this must be completed. If this does not occur in the prescribed time a warning signal is created. The piston stroke itself is set on the compressed air throttles (compare Point 1 in this Chapter).

4.6.3 Checking the correct ending of the fiushing

The valve in the fiushing pipe closes a few seconds after the fiushing disc is in the starting position.

4.6.4 Setting the fiushing interval T1 (in hours and minute s) on the electronic control system

Factory setting 1 hour!

REFERENCE

The factory setting should only be changed if optimisation is desired. It is necessary to **await operating experience** to do this.

The fiushing interval should be set in accordance with the **relevant operating experience**. We recommend **50% of the time fiushing initiated by differential pressure** (see also note, Tip for cleaning optimisation). The time intervals between the fiushing operations initiated by differential pressure can be read off from the differential pressure accumulator (see Table 4-1, Chapter 4.6.5. Page 4-8).

REFERENCE

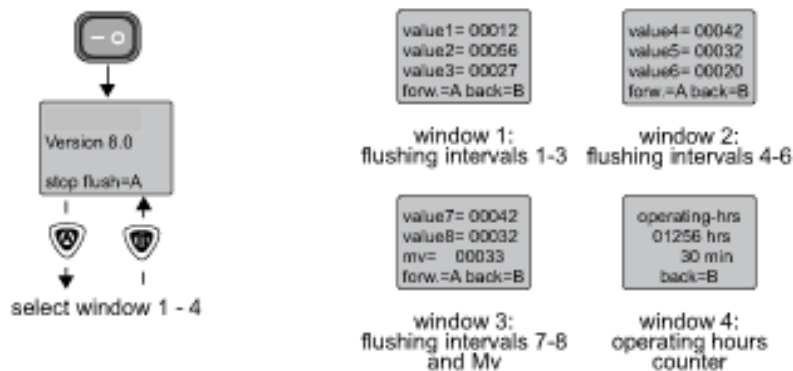
Tip for cleaning optimisation

If the intervals of the fiushing operations initiated by differential pressure are relatively constant in operation, then we recommend that the fiushing intervals initiated by time be reduced to approximately **50% of this time** (example: Initiation by differential pressure every 6 hours, reduce the time-controlled cleaning to 3 hours). This prevents severe coating of the strainer insert and means that manual cleaning of the strainer (e.g. by a high-pressure cleaner) is needed considerably less often.

Read out of the differential pressure accumulator / operating hours counter

The time intervals of the last differential pressure initiated fiushing operations (increased level of contamination) can be called up by using the button A (MEM).

In addition, you can read off the previous operating hours in this location



REFERENCE

When cleaning the strainer with a high-pressure cleaner make sure that a suitable distance is maintained. If the pressure intensity is too great the strainer can be damaged.

4.6.5 Operating parameters

The recommended settings of the operating parameters are simply reference values – they can vary depending upon the operating conditions (the values on the grey background must be set under operating conditions).

SETTING VALUES

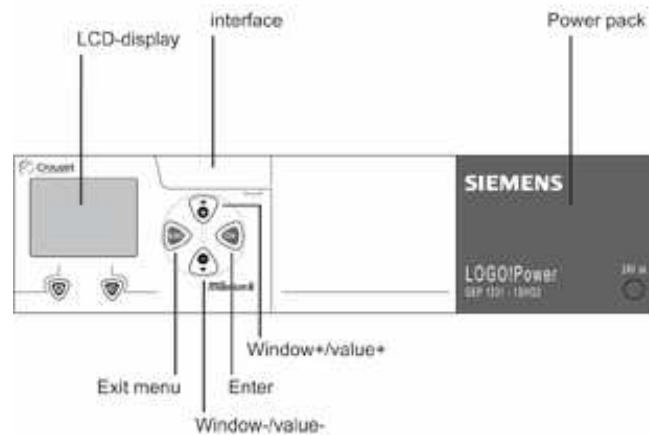
Filter size	50/60	80/100	150/200	250/300	350/400	600
T1 Flushing interval	60 min (can be optimized)					
T2 Pre-flushing	4s	4s	4s	6s	6s	6s
Opening time/closing time *	3s	3s	3s	4s	4s	6s
Time for piston stroke **	5s	5s	7s	10s	15s	20s
T3 Check time for piston stroke	10s	10s	15s	18s	25s	30s
Compressed air requirement in l/s	0,2	0,3	0,8	4	8	18
Differential pressure switch	0,11 bar (must not be altered)					

Table 4-1 Factory settings and values of operating parameters

5 Operation and running

The AW 1200 automatic filter is controlled by an electronic control unit. The input of the parameters is by the use of a keypad. Make sure that you do not make any unwanted changes caused by the slow response of the switches.

5.1 Operating elements



The control system is switched on and off by the mains switch. This is located on the right hand side of the housing. The installation is ready for operation after the main switch (Figure 8-5, Page 8-2) is switched on.

Starting the installation immediately initiates a fiushing operation. That means that the pneumatic fiushing valve opens and the cylinder performs two stroke s after the pre-set pre-fiushing time (time T2).

The interval fiushing operations are subsequently started in time intervals of time T1.

This time (T1) is the **interval time between two initiated fiushing operations. This can be set in both hours and minutes.**

A fiushing operation initiated by differential pressure with four strokes is started immediately you activate on input 15 between the interval times of the differential pressure switch.

This process repeats until the differential pressure switch once again signals a free condition. If this has not happened **after 4 cleaning cycles of each 4 strokes** the alarm output "O1" is activated and the fault is shown in clear text as **"Continuous fiushing"** on the display.

Using the button located on the right hand side of the housing you can start a manual fiushing operation at any time. This process is started manually. The warning light in the button lights up and the display shows "Manual fiushing".

The cylinder is fitted with limit switches at the top and bottom end positions.

Programme operation



Menu point	Explanation
Interval time T1	Interval time between two time-controlled flushing operations. This time can be set in hours and minutes.
Pre-flushing time T2	Time between the opening of the flushing valve and the first downwards stroke of the pneumatic piston. This time can be adjusted from 1 second.
Operating hours	The operating hour's counter of the control is shown here. A maximum of 9,999 hours can be recorded here. This is a value which cannot be changed.
Stroke time T3 (check time for piston stroke)	The maximum time for the pneumatic piston to reach an end position (LS1, LS2) (MONITORING TIME). This time can be set between 15 sec and 9,999 sec.

5.3**Control sequence**

With the control system switched on and ready for operation there are three types of flushing operation:

- > **Flushing after a time interval**
The flushing operation is initiated after the set time T1 has expired. After expiration of the set time T2 (pre-flushing normally 3-5 seconds) the pneumatic cylinder performs 2 strokes and the interval timer is restarted.
- > **Manual flushing:**
The flushing operation is started by the button located on the side of the housing. After the set pre-flushing time T2 has expired, the pneumatic cylinder once again performs 2 strokes.
- > **Automatic flushing:**
The flushing operation starts as soon as the contact of the differential pressure switch is activated. After the set pre-flushing time T2 has expired, the pneumatic piston moves up and down 4 times. The flushing valve remains open. If the differential pressure switch contact does not open during this process, then 4 more cleaning cycles of each 4 strokes are performed. If the differential pressure switch contact does not open again then "Continuous flushing" is displayed and an alarm is initiated.

This fault signal is only reset after a successful flushing cycle and the control system returns to normal condition. The alarm signal can be switched off with ESC.

The differential pressure switch does not monitor the entire pressure drop in the filter, it just indicates the internal degree of contamination. With a clean strainer insert the differential pressure tends to 0 bar.

If the pneumatic piston does not reach its end position (LS1, LS2) within the prescribed time T3, a fault signal "Fault cylinder" is created and the alarm is initiated.

This fault signal can also be turned off with ESC.

6

Maintenance



The following chapter describes in detail all the maintenance work needed for the AW 1200 automatic filter.

The AW 1200 automatic filter is considered to be a pressure vessel. It is therefore essential to make sure that the vessel is in a pressure-free condition before starting the maintenance work.



The AW 1200 automatic filter is maintenance-free as far as possible. Depending upon the operating conditions, we recommend thorough cleaning of the strainer insert and checking the wear parts and replacing them if necessary. This should take place at least once a year. Please state the order number (build number on the identification plate) when ordering spare and wear parts.

6.1

Cleaning

- > Remove the compressed air hoses and the proximity switches (LS1 and LS2) from the pneumatic cylinder.
 - > Release the cover screws. Lift the cover, together with the pneumatic cylinder and flushing-disc, carefully with a lifting device.
 - > Place the unit carefully on the ground.
 - > Release the strainer nuts. The strainer insert can then be removed and cleaned.
-

6.2

Flushing disc

- > When the filter is open the flushing disc can be inspected. If there is any damage it must be replaced immediately
-

6.3

Pneumatic cylinder

- > The pneumatic cylinder can be completely dismantled and checked for damage after removing the flushing disc and releasing the four flange bolts on the cover.

6.4

Seals

- > The cover seal is accessible after opening the filter. It can then be checked for damage and be replaced if necessary.
- > The seals on the piston rod aperture are accessible after removing the pneumatic cylinder. They can then be checked for damage and replaced if necessary.

REFERENCE

Take care with the spacing washer when fitting the rod seal.

The subsequent assembly of all the components described above takes place generally in the reverse order.

7

Fault finding and fault rectification



Before maintenance and repair work the unit must be switched potential-free and be secured against inadvertent switching on again. The potential-free condition must be verified. Adjacent parts under voltage are to be covered or screened off.



Possible faults and measures to rectify them

Fault	Possible cause	Measures
Fault cylinder	Throttle valves on cylinder closed	Open throttle valves (Fig. 8-3 / 2, 3) until the running time is equivalent to operating instruction manual (see Table 4-1, Page 4-8)
	Stroke time not set correctly in the control system (check time)	Set time T3 in the control system in accordance with the operating instruction manual



T3 should not be confused with the running time of the cylinder. T3 is the time within which the cylinder has to have reached its end-point. If the end-point is not reached within this time a fault signal is created.

The running time is adjusted using the compressed air throttles.



Fault	Possible cause	Measures
Fault cylinder	Running time of the cylinder not set correctly (running is too long)	Open throttle valves (Fig. 8-3 / 2, 3) until the running time agrees with the operating instruction manual (see Table 4-1, Page 4-8)
	Level of the system pressure of the compressed air too low or volume flow too high	Design pressure is 5-6 bar. If the air pressure is too low this will have an effect on the running time of the cylinder. Also, the counter pressure in the lower section of the strainer cannot be overcome. At an air pressure which is too low a larger cylinder is therefore required. This must show a minimum air pressure of 4 bar. Under certain conditions the volume flow is also too high.

Fault	Possible cause	Measures
Fault cylinder	Screen is no longer in position or incorrectly dimensioned	Check screen (Fig. 8-3 / 15) for presence or dimensioning. ARMATUREN-WOLFF calculates the screen diameter using the through-flow in m ³ /h and the pump characteristic curve.
	Proximity switches faulty/incorrectly wired	Check proximity switches for function: LEDs (Fig. 8-3) must indicate the starting and end positions of the cylinder upon arrival. Wiring in accordance with the terminal occupation (Page 8-1).
	Compressed air hoses swapped over on the cylinder	Check the compressed air hoses for correct connection (Fig. 8-3 and Fig. 8-4)
	Solenoid valves faulty	Check function of solenoid valves (Fig. 8-3 to Fig. 8-4) and replace if necessary
	Knocking in the flushing pipe	Run the flushing pipe (Fig. 8-3 / 9) with a gradient: Care must be taken to ensure that the pipes do not run empty. The opening speed of the isolation diverter should be reduced in steps.
Continuous flushing	Isolation diverter will not open	Check throttle valves and open if necessary. Check compressed air hoses for correct connection in accordance with graphic "Air and water connections" (Fig. 8-4)
	Running time of the pneumatic drive set incorrectly (running time too short)	Check running time length in accordance with Chapter 4.6 (see Table 4-1, Page 4-8) and adjust if necessary. Clean strainer insert with high-pressure cleaner.



Fault	Possible cause	Measures
	Air in differential pressure switch	Bleed the differential pressure switch (Fig. 8-3 / 11) using the bleed screws (Fig. 8-5 / 8c).
	Differential pressure switch faulty	Check the function of the differential pressure switch in accordance with Chapter 4.6. To do this, release the differential pressure hose under operating conditions (Fig. 8-4) from the pressure measuring point on the clean side of the filter (Fig. 8-4). If the flushing operation is not initiated the differential pressure switch may be faulty.
	Contacts incorrectly connected	Check wiring in accordance with terminal occupation (Page 8-1) in the appendix
	Contacts in the control system/differential pressure switch has become loose	Check wiring for correct connections
	Differential pressure switch line contaminated	Clean and dismantle the differential pressure switch line
	Back-flush line laid incorrectly	The back-flush line should be laid pressure-free. All pressure losses must be taken into account when dimensioning the screen (Fig. 8-3 / 15) since the counter-pressure has an effect on the back-flush volume. The screen diameter may have to be increased.
	Screen diameter too small, strainer insert contaminated	Check dimensioning since the diameter will have an effect on the back-flush volume and thus on the cleaning behaviour.
Bad cleaning behaviour	Running time of the cylinder set incorrectly (running time too short)	Check the running time length in accordance with Chapter 4.6 and set correctly if necessary (see Table 4-1, Page 4-8)



Fault	Possible cause	Measures
	Back-flush line incorrectly laid	The back-flush line must be laid pressure-free. All pressure drops must be taken into account in the dimensioning of the screen (Fig. 8-3 / 15) since the diameter has an effect on the back-flush volume and thus the cleaning behaviour. The diameter of the screen may have to be increased.
	Flushing disc not correctly dimensioned or pump pressure changed	Match the flushing disc (Fig. 8-3 / 14) and possibly also the screen (Fig. 8-3 / 15) to the operating instruction manual. For this purpose contact ARMATUREN-WOLFF.
	Differential pressure switch faulty	See "Continuous flushing" in this table
	Control system has failed *	*It is possible that there was a power failure. This caused the cleaning not to be performed at the specified intervals. Thus: Remove strainer insert and clean using a high-pressure cleaner.

8 Appendix

8.1 Terminal occupation

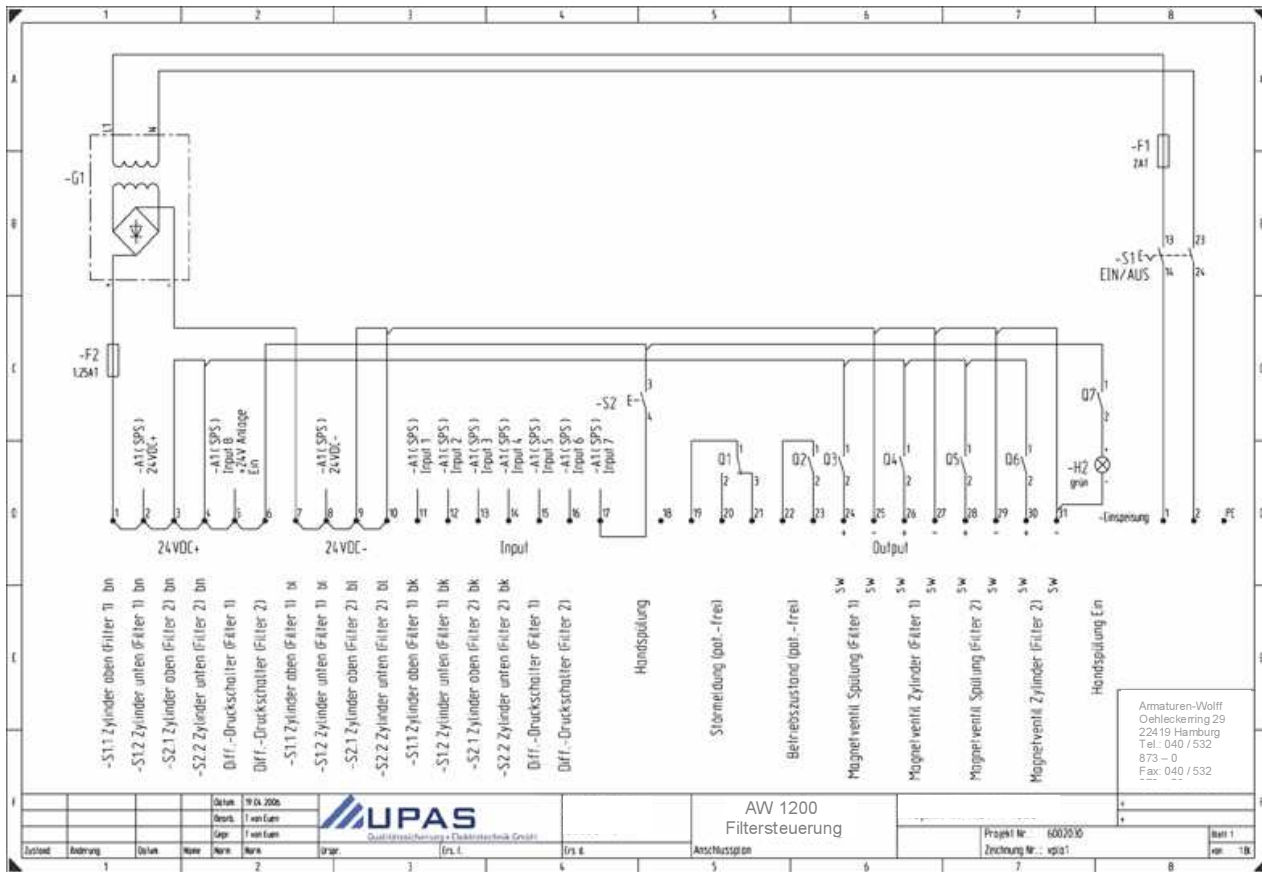
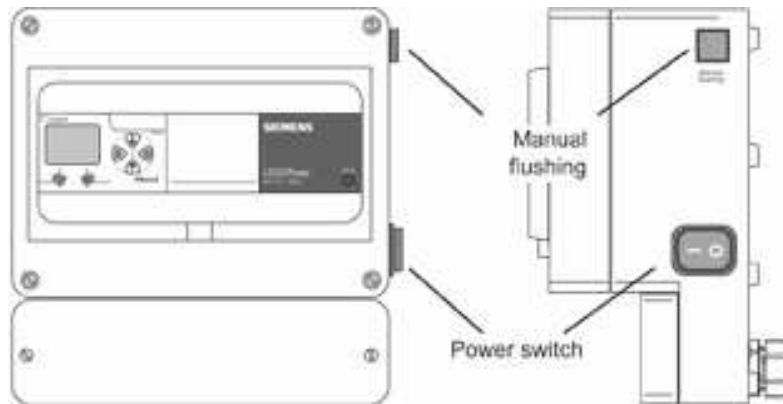


Abb. 8-1 Terminal occupation

Abb. 8-2 Operating elements and connectiona of the control unit



Operating elements of the control system

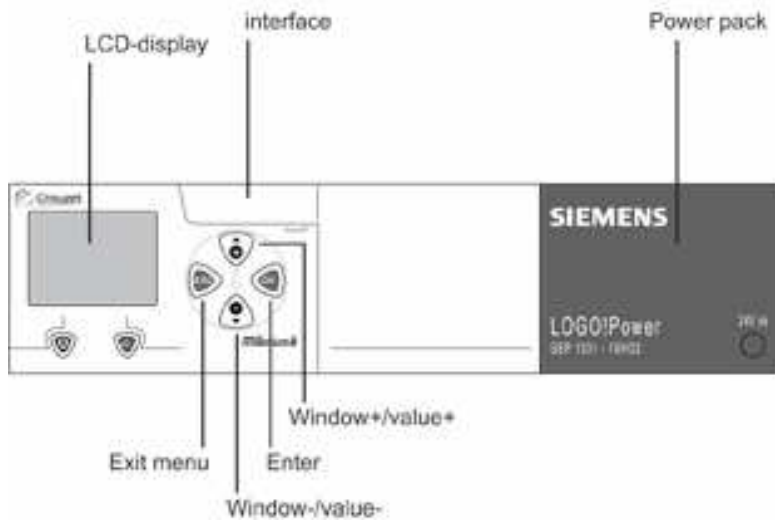


Abb. 8-3 AW 1200 components

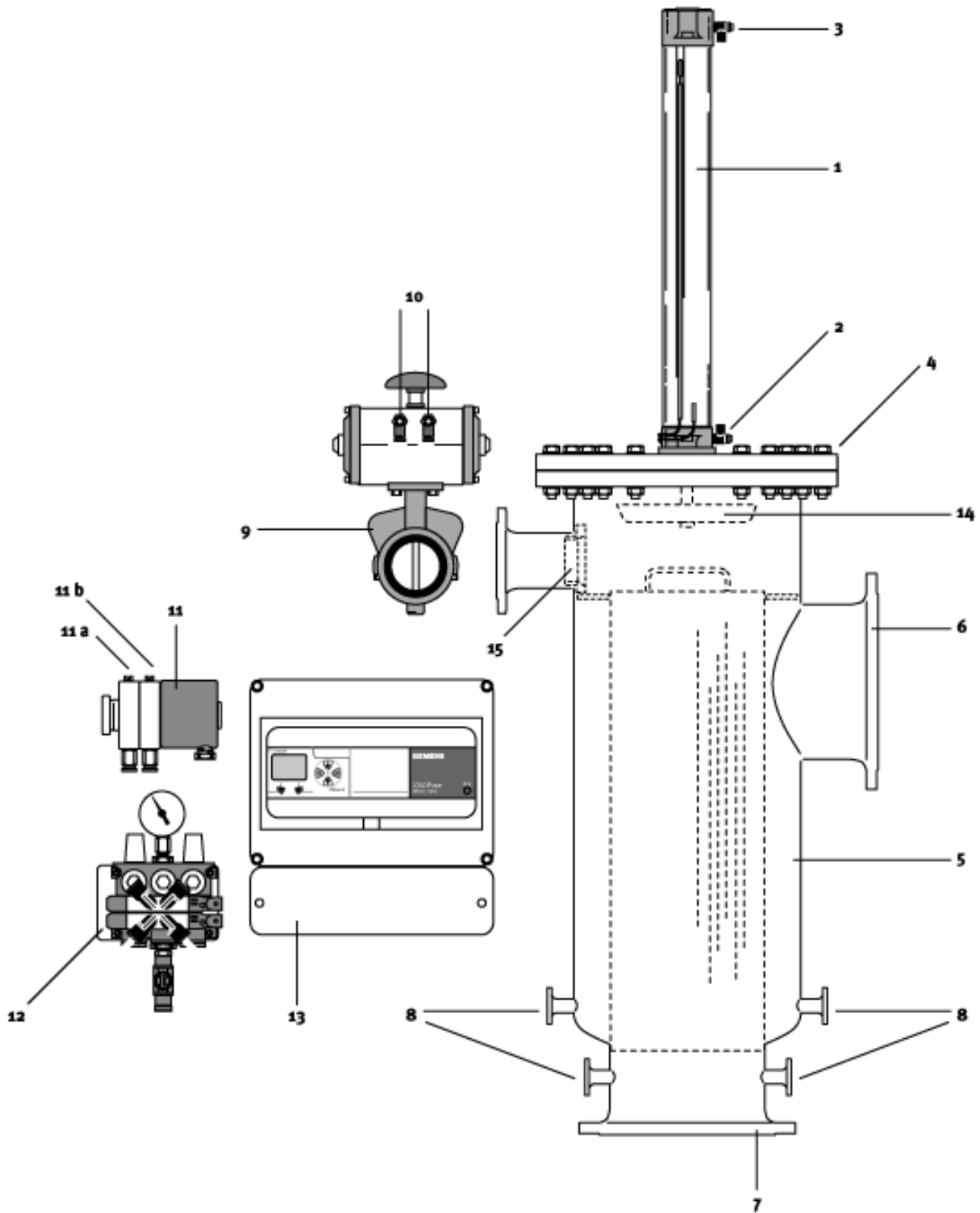
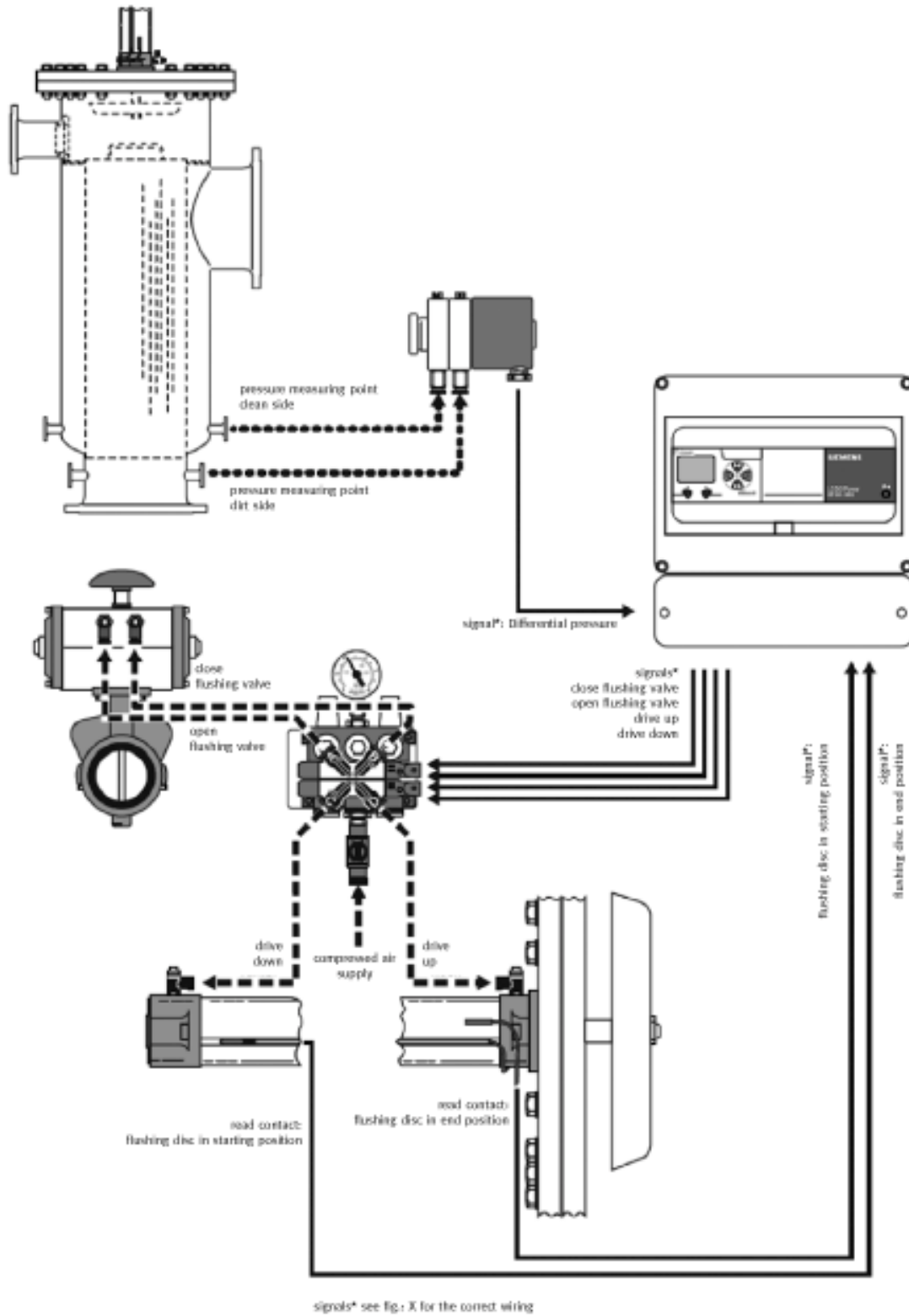


Abb. 8-4 Air and water connection



9

Spare parts list

Depends upon the order

10 Additional documentation for use in EX locations (with reference to the order)

Documents also having validity

Conformity statement
Possibly: TÜV 05 ATEX 2804 X
Equipment category II 2 G c

10.1 Application range

- > The filter is approved for use in explosion endangered areas with gases, vapours, mists, which require operating equipment of category 2.
 - > Outside the filter, zone 1 is permitted. Within there is no zone, however. The operator must ensure that the inside is always zone-free.
 - > The filter represents a heat source. For this reason, no temperature range is specified. The actual maximum surface temperature depends upon the separately described units and must be taken into account by the operator.
 - > The ambient temperature should be taken from the operating instruction manual. The filter is not marked with the range of ambient temperatures.
-

10.2 Main characteristics and intended operation

The planning of the application and the operation of the filter in explosion-endangered areas must be undertaken in accordance with the general regulations of the technology. Operation must be undertaken in compliance with the markings on the equipment, the operating instructions and the conformity statement.

10.3 Installation and commissioning

Before commissioning, the filter and pneumatic cylinder must be earthed. The piston rod must not be electrically insulated.

The work must be undertaken by an electrician with a relevant qualification. If included with the supply, the electrical connection in the EX approved terminal box must take place outside the explosion-endangered area. Operation is only permitted with fully closed and undamaged enclosures, if the housing is damaged, operation is completely prohibited.

CAUTION: The electrical circuits must be switched when they are potential/current free, even before you open the terminal box and start the work on the electrical circuits. In explosion-endangered areas only the authorised tools and measuring instruments may be used. In the event of a fault the line connections and the power supply must be checked for correct function outside the explosion-endangered area.

Modifications and repairs to the electrical components are not permitted.

If only the proximity switches and differential pressure switch are supplied with the unit, these are to be connected to intrinsically safe power circuits (e.g. using an isolating switching unit with intrinsically safe input power circuit). Care must be taken to ensure that the isolation switching amplifier is set up outside the explosion-endangered area.

If the filter is supplied without electrical operating equipment, all the electrical equipment provided by the customer comply with the requirements of Guideline 94/9/EG (Atex 100a).

The pneumatic cylinder and all other electrical ancillary equipment of the filter must comply with the Guideline 94/9/EC. When installing and operation of these units their operating instruction manuals and EN 60079-14 must be observed.

Important: The unit is only approved for use with compressed air which is produced and prepared outside the Ex area. The relevant requirements are to be taken from the enclosed operating instruction manual for the pneumatic valves made by Festo.

If the filter is operated outside the atmospheric conditions in explosive atmospheres, the approval is to be used only as a guideline. We recommend, however, additional tests for the specially provided operating conditions. These tests are within the area of responsibility of the operator.

10.4 Maintenance

The electrical components fitted must be regularly maintained and cleaned in accordance with the supplied documentation. The operator must specify the individual intervals. Important note: Replacement of components must only be with original spare parts, which are also approved for use in EX areas.

Notes