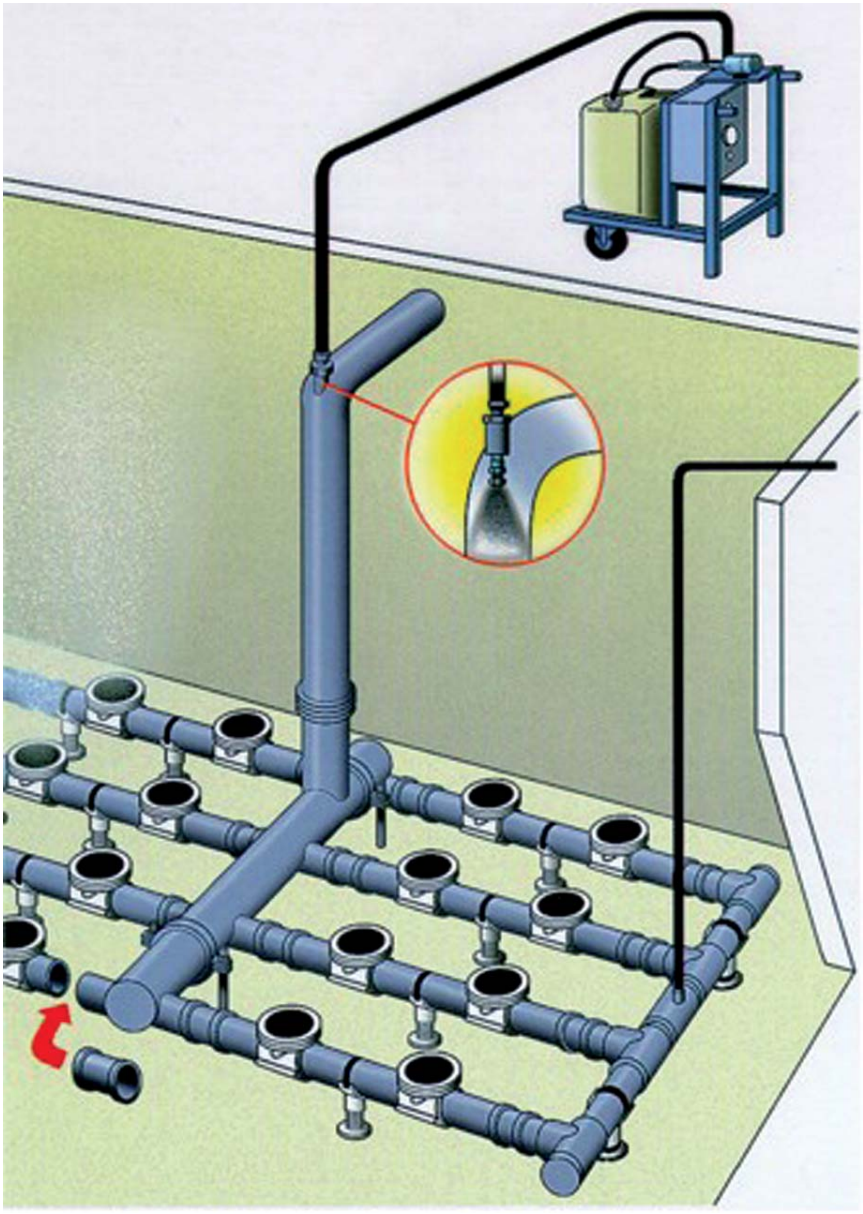
ABS Nopon Clean

40001-0001



40001 GB 02.2007

GB Installation, Operating and Maintenance Instructions

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1 General

ABS holds all rights to make alterations without prior notice.

1.1 Introduction

These **Installation, operating and maintenance instructions** and the separate **ABS Group Products Safety Instructions** contain instructions and safety hints which must be observed during transport, installation and operation. For this reason it is essential that they are read upon receiving the equipment by all persons in any manner involved in handling of the equipment. They should also be always available where the equipment is installed.

This symbol indicates corrosive chemicals.

Safety instructions which might cause danger to life in case of non-observance have been specifically highlighted with the general danger symbol.

The presence of a dangerous voltage is identified with this safety symbol.

1.2 Application restrictions

In case of misleading or wrong information we are always referring to the English version of these instructions.

ABS Nopon Clean is a cleaning system designed for cleaning of ABS Nopon disc diffuser systems with formic acid HCOOH in waste water treatment plants. Formic acid dissolves deposits in the membrane slits or diffuser pores during operation The equipment cannot be used for any other purpose without the manufacturer's written consent.

1.3 Receiving and name plate identification

After receiving the equipment, check packaging and equipment for transportation damage, and verify that the product name plate matches the equipment ordered. Check the packaging materials for printed material and small components before discarding. If the equipment you receive does not match what you ordered, please contact your local sales reprentative immediately. If damage occurred during shipping, please contact the shipper and inform your local sales representative immediately.

2 Safety

Read the separate **ABS Group Products Safety Instructions** and these instructions carefully upon receiving the equipment. Obey local safety regulations. If anything is not clear or you have any questions as to safety, contact your local sales reprensentative.

Read the **formic acid safety data sheet** carefully and follow all the instructions given there. Always have new users to familiarise with the safety data sheet before operating the ABS Nopon Clean equipment.

Check the formic acid supplier for their safety instructions and follow them.

3 Warranty

Any warranty concerning the mechanical construction of the equipment is valid if all instructions have been obeyed. This warranty will not cover damages caused by hits of external objects or damages caused by careless installation work. In case of warranty issues, contact your local sales representative.

4 ABS Nopon Clean equipment

ABS Nopon Clean consists of a pump unit, a distribution manifold, a control box, valves and nozzles. The pump unit draws formic acid from a container and supplies it through the distribution manifold to the nozzles, which spray it into the air supply pipework (see drawing on front page). Electric current to the pump is supplied through the control box. The equipment is mounted on a push-cart for easy transportation. ABS Nopon Clean is supplied complete with the following:

- push-cart
- pump and motor unit
- control box
- suction hose with strainer
- relief valve
- three-way valve
- feeding hose, 5 m
- return hose from relief valve
- quick-disconnect fitting (female), 1 pce
- quick-disconnect (male), 1 pce per aeration group
- nozzles, 1 pce per aeration group
- bushing for connecting the nozzles to the air supply pipes, 1 pce per aeration group
- power cable
- protective gear: rubber gloves, goggles and safety visor
- plugs for quick- disconnect fittings, 1 pce per fitting
- bottle of oil, 0,5 l


40001-0002

Figure 1 Front view


40001-0003

Figure 2 Rear view

Formic acid container is not included in the delivery.

The lid of the control box is shown in Figure **3**. The following features can be found there:

- Starter switch S1 **(3/2)**
- Signal light, which is on whenever the switch is on **(3/3)**
- Reset button **(3/1)**
- Emergency switch D2 (red) **(3/4)**

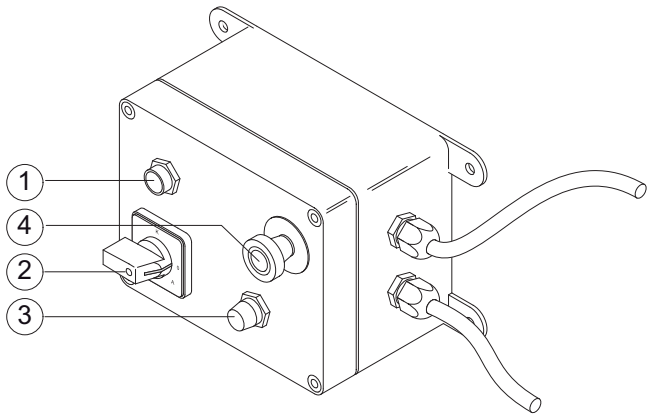

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Figure 3 Control box

5 Chemicals

The chemical used for cleaning of the diffusers usually consists of 85 % technical formic acid because it is sufficiently strong to dissolve most of the deposited matter. An acid with a higher concentration may also be used. Formic acid is biodegradable and does not interfere with the biological processes.

Formic acid is not aggressive to the **ABS Nopon Clean** system components and **ABS Nopon** diffusers. Nor does the acid damage air supply tubes made of acid-proof or stainless steel. Large quantities of acid combined with prolonged exposure may, however, attack galvanised air supply tubes. A number of materials such as polyamide (nylon), which is commonly used in hose connections and in some pumps, are, with time, embrittled by exposure to formic acid. PE, PVC and PP have a high resistance to formic acid, with certain limitations. Even zinc-coated pipes can withstand the action of formic acid to a limited extend.

Formic acid must be stored in a cool well-ventilated place. Formic acid may not be kept near an open flame or other sources of heat. Ignited formic acid can be put out with a powder or carbon-dioxide extinguisher.

Formic acid containers must not be stored at sub-zero temperatures and the vessels must not be damaged. When making hose and other similar connections, special care must be taken to ensure that the connections are fully sealed. Spilled formic acid can be neutralised with sodium carbonate and flushed into the sewer using a lot of water.

85 % formic acid is a potent and easily volatile acid. It burns the skin and its vapour can irritate the eyes and mucous membranes. Acid vapour is dangerous when inhaled. It is harmful if swallowed. Formic acid must always be handled in a well-ventilated space. If necessary, wear a respirator. To protect yourself from splashes, use protective goggles, visor and gloves made of natural rubber or neoprene. Adequate instructions for protective gear and first aid must be available at the workplace, accompanied by a formic acid safety bulletin. Read the formic adic safety data sheet carefully for more information.

6 Installation instructions

1. Install the bushings for connecting the nozzles to the air supply pipes, one for every aeration group. The method of installation for straight and curved pipe is slightly different, see figure 4. The bushings are mounted to the dropleg. The acid application point cannot be placed further upstream because formic acid may damage seals and certain valve components. The bushings must not be fixed where a seal or joint is located. The nozzle is fixed into the bushing with a connector.

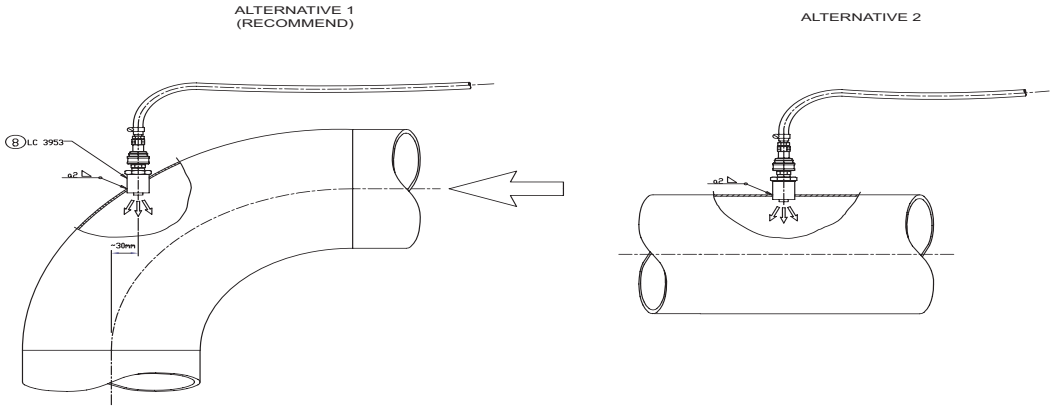

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Figure 4 Installation into a curved and straight air supply pipe

2. Normally the pump case and gear box are filled with oil when the equipment is delivered. The oil amount should anyway be checked before use, since oil might have leaked out through the breather valve on the oil entry cover during transportation. Detailed instructions for this are in the pump manual.
3. Check the equipment for leakage by operating it first with clean water instead of formic acid:
   Put the suction hose into water. The delivery piping must be depressurised to make sure that the pump can draw the fluid to be distributed.

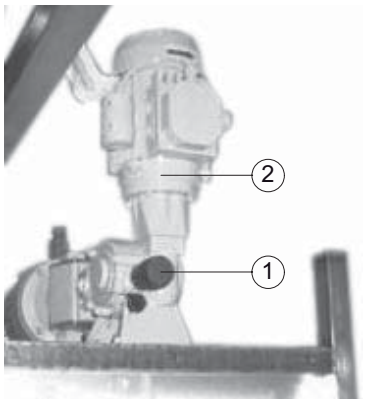
Turn the stroke control knob which is located on the lower part of the pump (see item 1 in figure 5). Then start the motor by turning the starter switch form 0 to K (see figures 3 and 6).

Starter switch S1 **(3/2)** in the control box has three positions

K manual **(6/1)**
0 stop **(6/2)**
A automatic **(6/3)**

When starter switch is turned from 0 to K, the motor runs as long as switch is kept turned to K.

When starter switch is turned from 0 to A, the motor starts immediately. The switch does not stay at A, it jumps immediately back to 0. Running time is controlled by timer.



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1 Stroke control knob

2 Pump with motor

Figure 5 Stroke control

NOTE ***Always check / adjust timer setting before operating on automatic mode!***

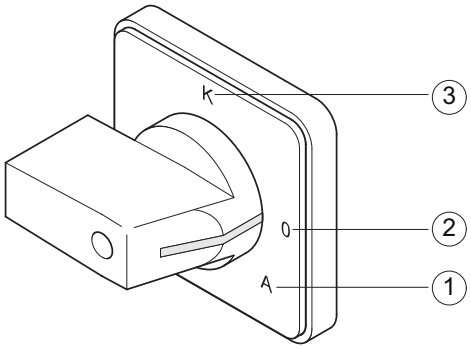


Figure 6 Starter switch

4. When it has been assured that there are no leakages, the acid container can be put into its place in the push-cart. The suction hose and return hose are connected to the acid container. The container is not included in the delivery. The container in which the acid is delivered, usually a 35 kg plastic canister, is used as the supply vessel.

Formic acid is corrosive. Read the formic acid safety instructions.

Protective, fire retardant clothing, safety shoes, goggles, helmet and gloves must be worn during installation, operation and maintenance.

5. Make sure that the return hose leads back to the acid container from the three-way valve.
During normal operation, the valve in Figure 7 is in position 1 and the acid passes from the pump to the nozzle. To drain the feeding hoses, turn the valve to position 2 to direct the acid from the nozzle to the acid container via the return line.

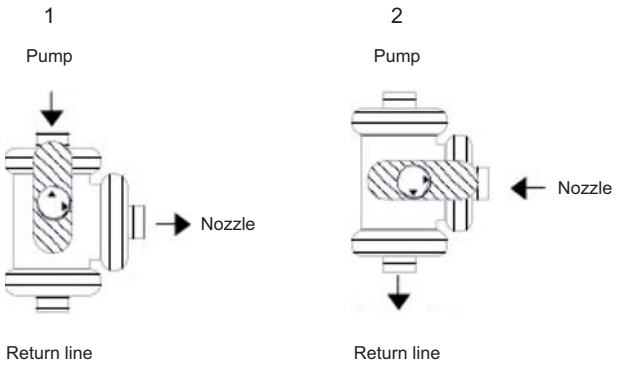


Figure 7 Using the 3-way valve

7 Cleaning interval and dosage

Clogging of the diffusers increases back pressure and power consumption. To determine when the diffusers should be cleaned, watch the back pressure. Check the back pressure regularly and enter the values in plant records. Back pressure must always be measured at a constant air flow rate or known air flow rate.

With the **ABS Nopon Clean** system, it is advisable to clean the diffusers frequently and whenever back pressure reaches 20 mbar. The cleaning interval is specific to each plant and may range from one week to one year depending on local conditions.

Clogging is usually caused by calcareous or ferrous deposits such as ferro-sulphate or particles trapped by membrane slits and diffuser pores. Clogging may be accompanied by slime formations on the diffuser surface if the activated sludge has a high soluble BOD content (typically industrial waste waters). Slime alone does not increase back pressure but it affects the aeration efficiency. Power failures cause clogging of porous diffusers. Clogging of the diffusers on air supply side is prevented by filtering the inlet air.

Air flow rate has to be stepped up from low air flow and increased according to clogging grade. Formic acid is dispensed in proportion to the air flow rate. During cleaning, the air flow rate should be as close to the permissible maximum as possible to ensure that mixture of air and formic acid effectively penetrates throughout the diffuser slits or pores. Recommended air flow rates for various types of diffusers are given in the following table.

Diffuser	HKL 215	KKI 215	PRK 300	PIK 300	DS 20
m^3/h	5	4	8	8	14

Table 1: Maximum air flow rates for diffusers during cleaning

Quantity of dispensed formic acid per cubic metre of air and duration of cleaning is determined by type of blockage involved. Table 2 lists dispensing rates and cleaning times for different types of blockage. However, these values, particularly concerning cleaning time, are only indicative. The required plant-specific cleaning time can be established by starting with shorter cycles and increasing their duration as required. The cleaning process can be monitored by watching the change in back pressure.

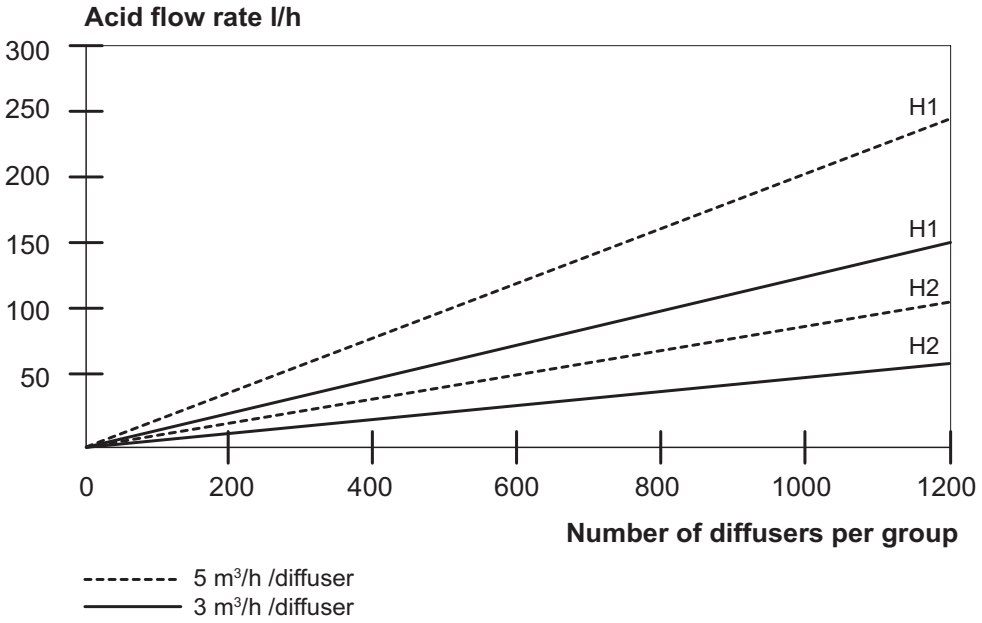
	g HCOOH / diffuser	g HCOOH / m³ of air	Chemical feed time (min)	Cleaning interval
Calcareous deposits	5 – 10	20	5 - 10	1 week
Ferrous deposits	50 – 250	50	30 - 60	1 - 2 months
Slime formation	5 – 10	20	10	2 - 7 d
Industrial waste water	5 – 250	10 – 50	5 - 60	1 d - 1 month

Table 2: Formic acid dispensing rates and times for various types of blockages

It is advisable to divide the total cleaning time into several shorter sequences. For example, first clean one group of diffusers for 2 min, then switch to the next group. Repeat this procedure as often as necessary. If the aeration groups are thoroughly cleaned at one go, most of the air will escape via diffusers that have already been cleaned. As a result, cleaning of the last diffusers may fail because the amount of supplied air is too low.

At major waste water treatment plants, where cleaning is carried out at short intervals, it is advisable to install an automatic system that supplies acid to each aeration group one at a time (for 1 to 5 min) and repeats this sequence often enough (5 to 10 times).

The dispenser pump delivery rate is determined by the size and air flow rate of the aeration group to be cleaned and the quantity of acid supplied to it. Figure 1 shows the required acid pump delivery rate (l/h) for different aeration group sizes at different air and acid flow rates.



H1 Formic acid supply rate 50 g/m³, ferrous deposits

H2 Formic acid supply rate 20 g/m³, calcareous deposits

Figure 8 Acid delivery rate for different aeration group sizes at different air and acid delivery rates

8 Operating instructions

Clean the diffusers one aeration group per time. Move the equipment next to the supply point.

1. Drain any condensed water from the air supply pipes. Remember to close the drain valve.

2. Secure the acid feeding hose to the nozzle with care. Remove any impurities from the connection.

Formic acid is corrosive. Read the formic acid safety instructions

Use protective gear

3. Make sure to allow replacement air into the acid container during pumping. Otherwise the acid may vaporise.

4. Make sure that the return hose leads back to the acid container from the three-way valve.

5. Set the pump operation time with the timer in the control box

Timer is located inside the control box. It has three adjuster knobs **(9/1-3)**. The middle knob **(9/2)** is for setting run time in hours (1 –10 h), minutes (1 –10 min) or seconds (1 – 10 s). The upper knob **(9/1)** is for setting the exact run time as 0.05…1 x middle knob setting. The lower knob **(9/3)** is for timer relay setting. **It has to be set to R.**

If one wants, for example, the pump to run for 2 minutes, one has to set the middle knob at 10 min and the upper knob at 0.2, thus 0.2 x 10 min = 2 min.

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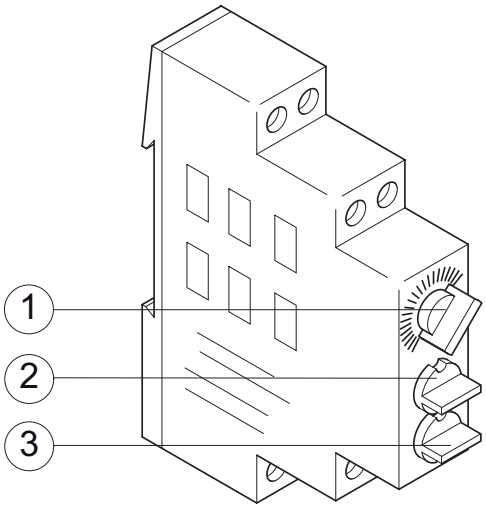


Figure 9: Timer

6. Regulate the acid flow by turning the stroke control knob

To get the formic acid to flow, the black stroke control knob on the lower part of the pump must be turned. This knob controls the stroke of pump piston. Regulating the capacity from 0 to the maximum capacity of the pump is done by turning the adjustment knob 10 turns. The required dosage can thus be regulated by turning the knob. When ABS Nopon Clean is supplied, the knob is turned to 0 to prevent accidental pumping. The knob should be turned back to 0 when pumping is finished.

Pump adjustments are explained in greater detail in the pump manual.

7. Start the pump

When starter switch is turned from 0 to K, the motor runs as long as switch is kept turned to K.

When starter switch is turned from 0 to A, the motor starts immediately. The switch does not stay at A, it jumps immediately back to 0. Running time is controlled by timer.

NOTE ***Always check / adjust timer setting before operating on automatic mode!***

If the pump suction and delivery piping are empty, the delivery piping must be depressurised to make sure that the pump can draw the fluid to be distributed. This type of situation may arise when the acid container has been unobtrusively emptied and the pump has drawn air.

8. When the pump stops, remove the acid supply hose from the nozzle

9. Remember to replace the quick-disconnect fitting.

10. Drain the feeding hose by turning the 3-way valve so that acid is carried by compressed air from the nozzle to the acid container.

In control box there is a black push button with letter R (reset). In case contactors jump off, they can be reset by this button.

Pump can be switched off by pushing the red emergency switch D2. If the emergency switch has been used, it can be switched off by first turning the starter switch S1 to 0 and then turning the emergency switch counter-clockwise.

9 Maintenance and spare parts

Monitor the condition of the valves, nozzles and quick-disconnect fittings. If any leaks are found in the connections or similar locations, replace the seals and other components where necessary. When servicing the valves, quick connectors and nozzles, remember that all materials do not withstand formic acid.

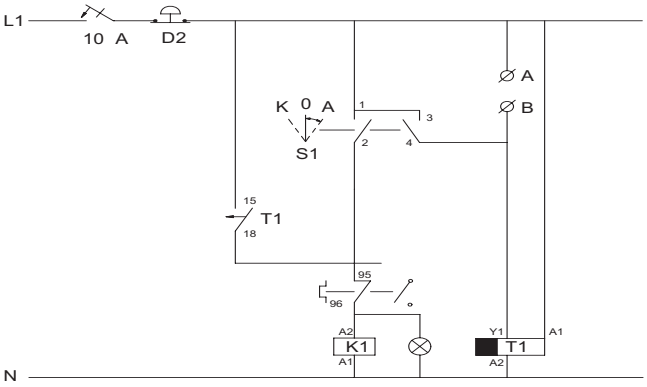
When the quick-disconnect fittings are not in use, they must be capped. When making connections, check that the fittings are clean and in proper condition.

Monitor the condition of the acid distribution hoses. Replace them if any sign of embrittlement is detected. All the acid hose connections must be sealed to avoid accidents.

Maintenance instructions and spare parts for the pump are given in the separate pump manual.

10 Circuit diagrams

10.1 Electric diagram



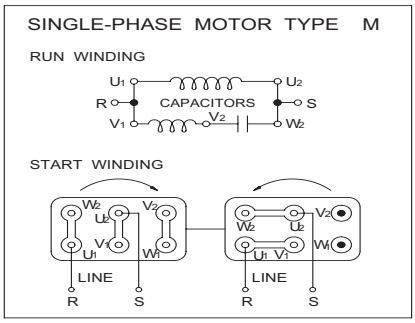


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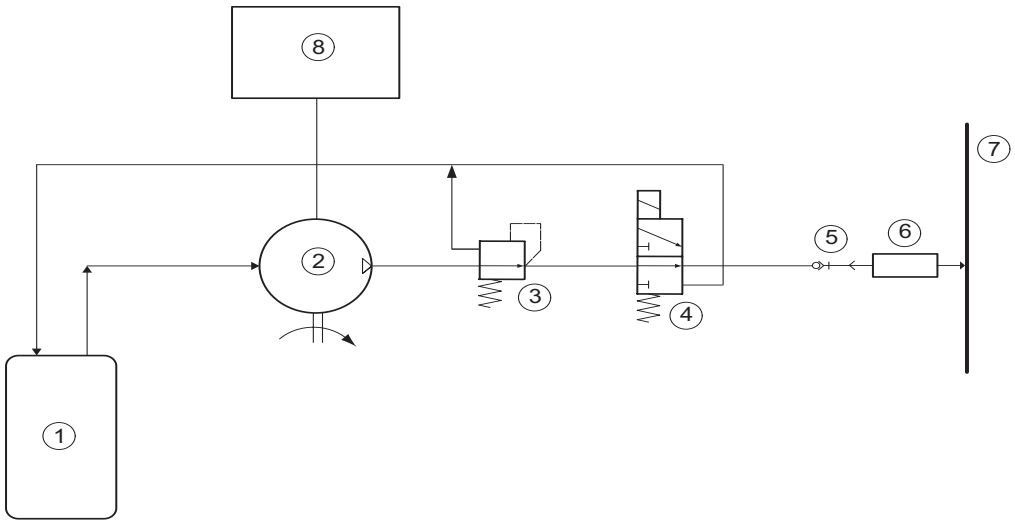
Figure 10 Electric diagram

Electrical installation must be performed by a qualified electrician.

10.2 Pneumatic diagram



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1	canister for HCOOH	4	3-way valve	7	air pipe
2	pump	5	quick disconnect	8	control box
3	relief valve	6	nozzle		

Figure 11 Flow chart

11 EC Declaration of Conformity

Försäkran om överenstämmelse
Dichiarazione di conformità
Overensstemmelseerklæring
Erklæring om overensstemmelse
Szabványmegfeleltségi nyilatkozat
Declarație de conformitate
Сертификат соответствия

Declaration of conformity
Declaración de conformidad
Vaatimustenmukaisuusvakuutus
Декларация за съответствие
Atitikimo deklaracija
Izjava o skladnosti
符合标准的声明

Konformitätserklärung
Declaração de conformidade
Δήλωση συμμόρφωσης
Prohlášení o shode
Atbilstības apliecinājums
Prehlásenie o zhode

Déclaration de conformité
Vastavusdeklaratsioon
Overeenskomstigheidsverklaring
Izjava o usklađenosti
Deklaracja zgodnosci
Uygunluk beyanatı

ABS Finland Oy, Turvekuja 6, FIN-00700 HELSINKI, Finland

Försäkrar under eget ansvar att produkterna:
Erklären in alleiner Verantwortung daß die Produkte:
Dichiariamo sotto la nostra esclusiva responsabilità che il prodotto:
Declaramos sob nossa única responsabilidade que o produto:
Erklærer på eget ansvar, at følgende produkter:
Δηλώνουμε με αποκλειστική μας ευθύνη ότι τα προϊόντα:
Erklærer på eget ansvar, at følgende produkter:
Prohlašujeme na vlastní odpovědnost, že výrobky:
Kizárólagos felelősségünk birtokában kijelentjük, hogy a termékek:
Ar pilnu atbildību apliecinām, ka produkti:
Declarăm pe propria răspundere că produsele:
Prehlasujeme na vlastnú zodpovednost', že výrobky:
Заявляем под свою личную ответственность, что товарьI:

Declare under our sole responsibility that the products:
Déclarons sous notre seule responsabilité que le produit :
Declaramos bajo nuestra exclusiva responsabilidad la conformidad del producto:
Käesolevaga võtame omale ainuvastutuse toodete:
Vakuutamme omalla vastuullamme, että seuraavat tuotteet:
Verklaren geheel onder eigen verantwoordelijkheid dat her produkt:
Декларираме на наша собствена отговорност, че продуктът:
Ovime izjavljujemo na našu isključivu odgovornost da su proizvodi:
Prisiimdami visišką atsakomybę, užtikriname, kad produktai:
Oświadczamy z pełną odpowiedzialnością, że produkty:
Zaradi naše izključne odgovornosti izjavljamo, da so izdelki:
Sorumluluğu yalnızca tarafımıza ait olmak üzere beyan ederiz ki, ürünler:
我们负责地声明，这些产品：

NOPON CLEAN

Som omfatttas av denna försäkran är i överenstämmelse med följande standarder eller andra regelgivande dokument:
To which this declaration relates is in conformity with the following standards or other normative documents:
Auf das sich diese Erklärung bezieht, mit den folgenden Normen oder normativen Dokumenten übereinstimmt:
Auquel se réfère cette déclaration est conforme à aux normes ou autres documents normatifs :
Al quale questa dichlarazione si riferisce è conforme alla seguente norma o ad altri documenti normativi:
Al que se refiere esta declaración, con las normas u otros documentos normativos:
Aque se refere esta declaraçáo está em conformidade com as Normas ou outros documentos normativos:
Vastavuse eest järgmistele standarditele ja muudele normatiivdokumentidele:
Som er omfattet af denne erklæring, er i overensstemmelse med følgende standarder eller andre normative dokumenter:
Johon tämä vakuutus liityy, ovat seuraavien standardien tai muiden asiakirjojen mukaiset:
GTα οποία αφορά η παρούσα δήλωση είναι σύμφωνα με τα ακόλουθα πρότυπα ή άλλα κανονιστικά έγγραφα:
Waaraop deze verklaring betrekking heeft, in overeenstemming is met de volgende normen of andere:
Som dekkes av denne erklœringen, er i overensstemmelse med følgende standarder eller andre normative dokumenter:
за които се отнася тази декларация е в съответствие със следните стандарти или други нормативни документи:
Na které se vztahuje toto prohlášení, jsou v souladu s následujícími standardy nebo jinými dokumenty normativního charakteru:
Na koje se ova izjava odnosi sukladni sa sljedećim standardima ili drugim normativnim aktima:
A jelen nyilatkozat által leirtak megfelelnek a következő szabványoknak vagy más normativ okiratoknak:
Su kuriais yra susijusi ši deklaracija, atitinka visus šiuos standartus ir kitus normatyvinius dokumentus
Uz kuriem ir attiecināms šis apliecinājums, atbilst šādiem standartiem vai normatīviem dokumentiem:
Których dotyczy niniejsza deklaracja, są zgodne z wymienionymi poniżej obowiązującymi standardami lub dokumentami normatywnymi:
la care se referă această declarație corespund următoarelor standarde şi altor documente normative:
Izjava, na katere se nanaša, ustreza naslednjim standardom ali drugim predpisanim dokumentom:
Na ktoré sa vzťahuje toto prehlásenie, sú v súlade s následujúcimi štandardmi alebo inými dokumentmi normatívneho charakteru:
Bu beyanatın ilgili olduğu ürünler aşağıdaki standartlarla ve diğer kuralsal belgelerle uygunluk içerisindedir:
К которым относится этот сертификат соответсвуют следующим стандартам и другим нормативным документам:
此声明是关于符合以下标准和标准化文件的:

EC-Machinery directive 98/37/EEC, Low voltage directive 73/23/EEC,
EN ISO 12100-1:2003, EN ISO 12100-2:2003, EN 60204-1:1997

Helsinki 2007-03-19

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