

FLUID MANAGEMENT

Instructions manual for the Shakers

Types:

SO-30m, SO-30ex and SO-40a



Illustrated model:
SO-40a
1860464-uk

We, **Fluid Management Europe B.V.**
A Unit of IDEX Corporation
Hub van Doorneweg 31
2171 KZ SASSENHEIM

herewith declare, on our own responsibility, that the products

Shakers / Gyromixers
SO-10m / SO-20a / SO-30m / SO-30ex / SO-40a / SX-40m / SX-40a

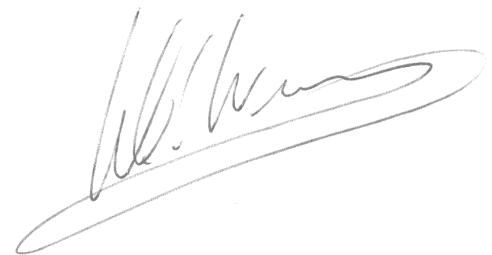
which this declaration refers to, are in conformity with the following standard(s) or other such specifications

NEN 3544, May 1984
NEN 2446, December 1976
EN 55024-2
EN 55024-4
NEN-EN 60204, September 1993
NEN-EN 292-1, September 1992
NEN-EN 292-2, September 1992
NEN 418, November 1990

according to the conditions of the Machinery-, Low Voltage- and the EMC-directive.

The Netherlands
Sassenheim, 5-5-1999

W. Van Westerop
Vice President Manufacturing



Fluid Management Europe B.V.
A Unit of IDEX Corporation

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By selecting a Fluid Management shaker you have opted for a product which is the result of intensive research. Top-quality components, craftsmanship and a modern ergonomic design all serve to guarantee a long service life and a high degree of user friendliness.

The machine complies with Council Directives 89/392/EEC on machines, 89/336/EEC on electromagnetic compatibility, and 73/32/EEC on electrical equipment intended for use within given voltage limits, as enacted by the Council of Ministers of the European Community. The machine is furnished with a CE mark.

Keep this manual in a safe place

In these guarantee conditions, 'FM' is understood to mean Fluid Management Europe.

The guarantee conditions incorporated into FM's general conditions of sale are summarized as follows (for free general conditions you can apply to FM):

1. FM guarantees the proper operation of any goods which it supplies, for a period of one year, except where a breakdown is the result of normal wear and tear. The cost of any inspection activities carried out by FM, with the aim of establishing whether or not a breakdown is covered by the guarantee, will be reimbursed by the other party if it transpires that the breakdown is not covered by the guarantee. If it transpires that a breakdown is covered by the guarantee, then FM will supply identical or equivalent goods under the conditions referred to in point 6 of the general conditions of sale. The guarantee obligation described in this article only applies if the goods supplied by FM have been used in accordance with the manual. Time spent on guarantee-related activities, including travel time, travel costs and accommodation costs, are charged at current rates.
2. In contrast to the above, FM will not be held to any guarantee obligation if
 - a) repairs have been carried out, or attempted, by the other party or a third party, unless FM had previously declined to repair the goods for a fair price;
 - b) FM demonstrates that the defect did not emerge during testing;
 - c) the other party fails to inform FM of the defect immediately, if possible either by letter and/or by fax, providing full, accurate details and/or has failed to comply fully with FM's instructions;
 - d) the other party has failed to use or treat the goods properly or in accordance with FM's instructions;
 - e) the damage has been caused by incidents, beyond FM's supervision, which have occurred either during transport or installation.
3. In the following text, the expression "Software" will be understood to mean the standard computer software supplied by FM to the other party, recorded on a computer-readable storage medium, plus the accompanying documentation (Software Manual) and including any improved and/or new versions supplied. The expression "processing unit" (PU) is understood to mean the machine for which and with which the Software is supplied, and which is the sole machine on which the Software may be used.
4. The other party is authorized to copy the Software either in its entirety, or in part, (up to a maximum of 2 copies) for purposes of internal security. These copies will be furnished with the same marks, designations relating to copyright and other registration numbers as the original version of the Software.
5. The other party will neither amend, translate, decompile nor adapt the Software, nor convert it into source code, without express written permission from FM. If the other party so requests, FM will provide that party with the information required to render the Software interoperable with other software.
6. In the event that the PU experiences a breakdown, the other party may use the software on another processing unit until the PU is again operational. The other party will inform FM of this within 5 days.
7. If it is a requirement that the Software be definitively transferred from the PU to another processing unit then the other party shall request permission from FM, which will not withhold such permission on unreasonable grounds.

Before installing the machine and setting it in operation, read the instructions for use carefully. This is safer for you and prevents any needless damage to the machine.

Fluid Management Europe B.V. will not accept any liability if the instructions below are not followed:

- If a machine has been damaged (during transport, for example), do not attempt to set it in operation. When in doubt, first contact either the Service department (see section 6.4) or your supplier.
- Place and connect up the machine exclusively in accordance with the installation instructions.
- All local safety rules and regulations should be observed.
- Depending on the type, the machine must be connected up in accordance with the following specifications.

Type:	- SO-30m	: 230 V, 16 A.
	- SO-30ex	: compressed-air line at 6.2 bar (19 m ³ /hour).
	- SO-40a	: 230 V, 16 A.
- The machine must on no account be operated when empty. The total weight to be shaken must on no account exceed that specified below:

Type:	- SO-30m	: 30 kg
	- SO-30ex	: 30 kg
	- SO-40a	: 40 kg
- Users should ensure that the machine is kept in good condition. Defective components should be replaced.
- All service activities (other than routine adjustments) may only be carried out by qualified technicians. Ensure that the mains lead is always kept unplugged while repairs are being carried out.
- Do not place any damaged containers in the machine. Such containers are shaken entirely at the user's own risk.

4.1 Conditions for correct installation

When installing the machine make sure that the following conditions are observed:

- Make sure the machine is level on a stable and even floor.
- Make sure that the machine is properly connected to the supply voltage or compressed-air line (see Section 3, Safety instructions and warnings).

4.2 Installing the machine

4.2.1 Removal from the pallet

- Remove the two bolts (see figure 1, number 1) which are underneath the pallet.
- Remove the two blocks of wood by pushing them backwards (number 2).

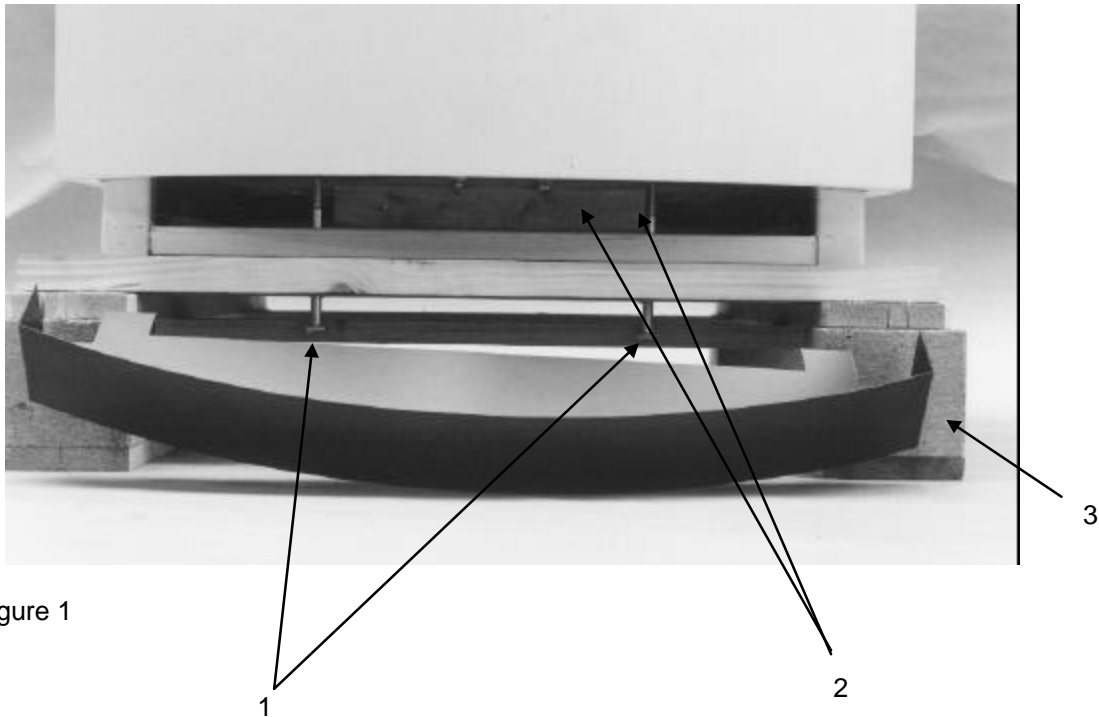


figure 1

- ? Adjust the adjustable feet until the machine stands on its wheels (figure 2).
- The machine can now be pushed off the pallet by two people until the rear adjustable feet touch the ground (see figure 3).
 - Tilt the machine so the pallet can be removed.
 - Place the machine carefully on its wheels (see figure 4).
 - Roll the machine into position. (Taking into account paragraph 4.1.)
 - When the machine is placed, the front skirt can be mounted with the two screws in the frame (see figure 1, number 3)
 - Ensure that the machine is level by raising or lowering the adjustable feet. For the machine to work properly, it is necessary for this to be done carefully.
 - Secure the adjustable feet with the lock nuts.



figure 2

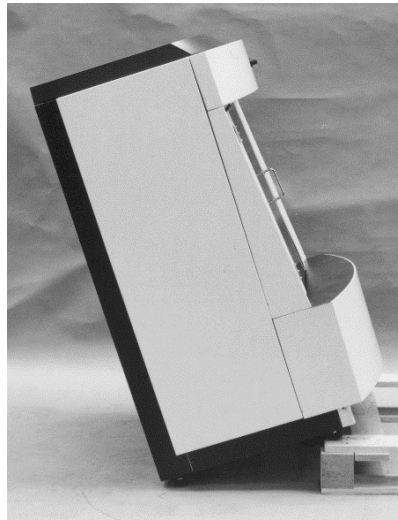


figure 3

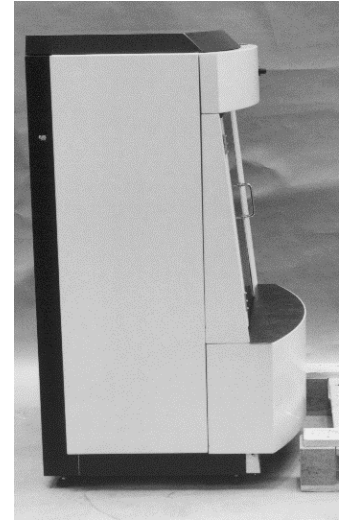


figure 4

4.2.2 Connecting up the machine

Before connecting up the machine, check the following where applicable:

- SO-30m : The emergency stop is pushed in (see figure 8, number 3), and the ON/OFF-switch at the back of the machine is in the <O>-position.
- SO-30ex : The start/stop-button is pushed in.
- SO-40a : The emergency stop is pushed in (see figure 9), and the ON/OFF-switch at the back of the machine is at <O>.

- The main lead of the SO-30m and SO-40a can now be plugged into a 230 V power point.
- In the case of the SO-30ex, the compressed-air line must be connected up to the machine's compressed-air connection (see figure 5, number 4). Make sure that the shut-off valve (number 3) is turned in the direction of the air flow. Using the pressure reducing valve (number 1), you can set the pressure to 6,2 bar. The pressure set can be read off on the pressure gauge (number 2).

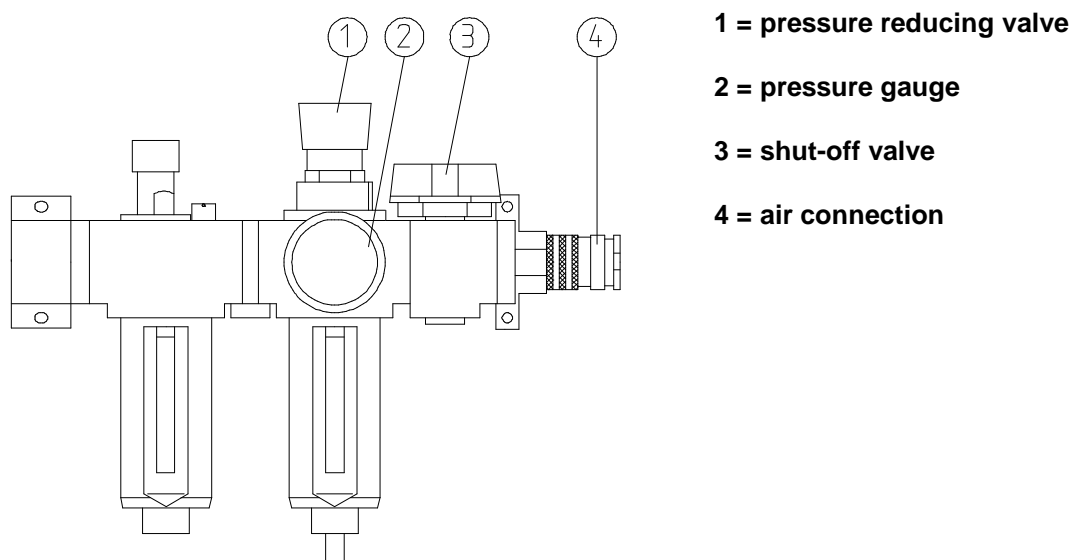


figure 5

5.1 Starting up for the first time (all types)

- Check whether the machine has been correctly placed and connected up.
- On the SO-40a and SO-30m, turn the emergency stop in the direction of the arrow so that it is released. The SO-30ex machines do not have an emergency stop.
- Remove the filler discs from in front of the machine door. The machine is now ready for use.

5.2 Placing containers inside

To keep the inside frame in equilibrium during shaking, it is necessary for the combined centre of gravity of the containers to lie in the middle of the shaking platform (between the lead screws) as far as possible. Otherwise, the machine can be damaged by extreme vibrations. The correct distributions of containers are shown in Figure 6. It is also possible, for example, to place a box holding six 1litre containers in the machine. To prevent the handle of the container hitting against the container and damaging the container during shaking, the handle must be secured. With smaller containers, this can be done using the spring which is attached to the shaking platform. With larger containers, the handle must be fastened to the container with tape.

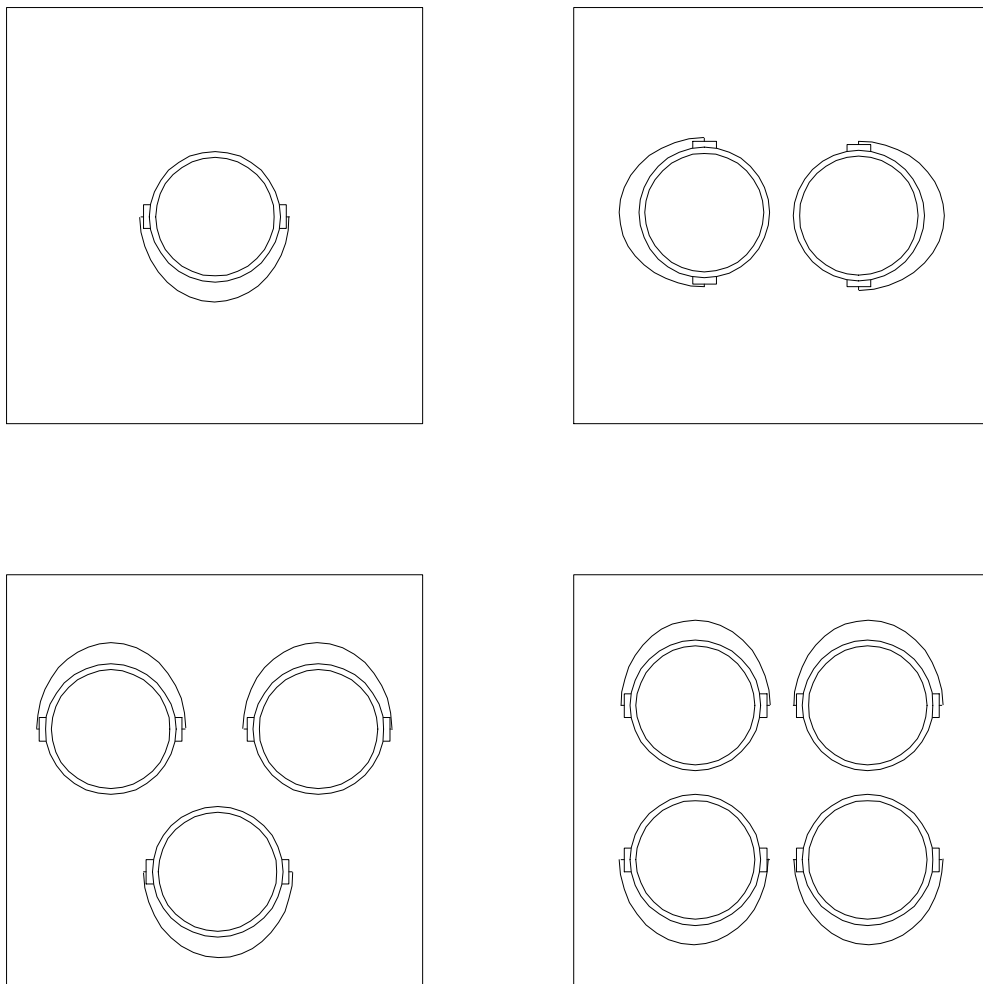


figure 6

5.3 Use of filler discs (see Figure 7)

Two soft rubber filler discs (a thin one and a thick one) are supplied with the machine. Fluid Management recommends the use of filler discs to guarantee proper operation of the machine and to prevent damage to the machine and its surroundings. Failure to use the filler discs may result in cracking of the containers and leakage.

For containers with a deep lid, lay the filler disc on the lid. This prevents the lid from having a pumping effect during shaking.

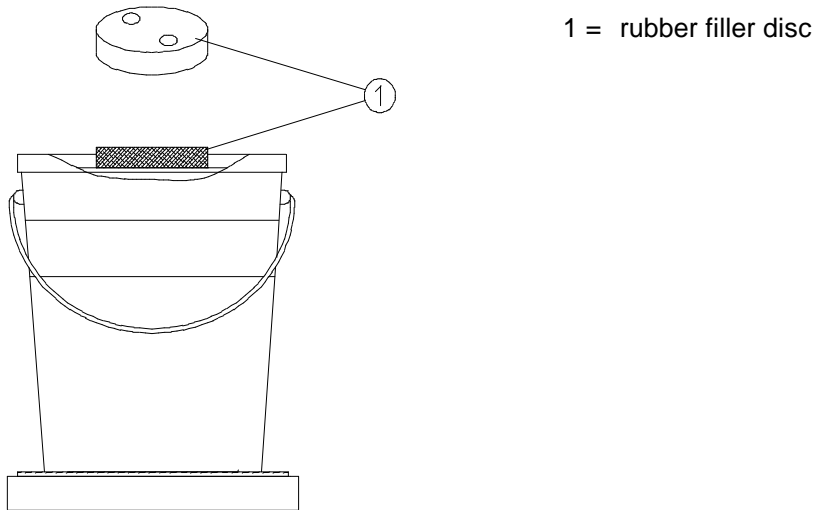


figure 7

5.4 Operating the shaker

5.4.1 Type: SO-30m (Figure 8)

1. Check for yourself that the machine has been correctly installed and connected up as stated in 4.2.1 and 4.2.2.
2. Press the ON/OFF-switch at the back of the machine into the <I>position .
3. Open the door of the shaker.
4. Place the container(s) inside as described in 5.2 and 5.3.
5. Using the crankhandle, turn the clamping plate downwards so that the container(s) is (are) secured. *Place the crankhandle back in its holder on the right-hand side of the machine!*
6. Close the door of the machine.
7. Set the timer (number 1) to the desired shaking time.
8. Push the start button (number 2); the shaking cycle will now start.
9. Turn the clamping plate up again with the crankhandle till the container is released and can be removed. If there is another container, place it inside and clamp it in. *Place the crankhandle back in its holder.*

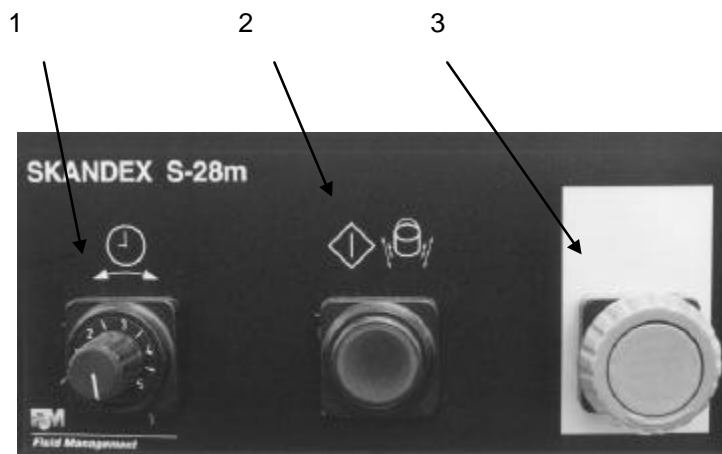


figure 8

1 = Timer

2 = Start

3 = Emergency stop

Note:

Should it be necessary to interrupt the shaking cycle while it is in progress, this can be done by pushing the emergency stop.

After having pushed the emergency stop, it is necessary to wait 15 seconds before releasing it.

You can release the emergency stop by turning it a quarterturn to the left.

WARNING: Do not reach into the machine until it has come to a complete standstill!

5.4.2 Type: SO-30ex

1. Check for yourself that the machine has been correctly installed and connected up as stated in 4.2.1 and 4.2.2.
2. Open the door of the shaker.
3. Place the container(s) inside as described in 5.2 and 5.3.
4. Using the crankhandle, turn the clamping plate downwards so that the container(s) is (are) secured. *Place the crankhandle back in its holder on the right-hand side of the machine!*
5. Close the door of the machine.
6. Turn the start button (at the front of the machine) a quarter turn so that it springs out. The shaking cycle will now start.
7. The machine does not have a timer, which means that the operator has to keep an eye on the shaking time. After the desired shaking time has elapsed, depress the start button to stop the machine.
8. Turn the clamping plate up again with the crankhandle till the container is released and can be removed. If there is another container, place it inside and clamp it on. *Place the crankhandle back in its holder.*

Note:

Should it be necessary to interrupt the shaking cycle while it is progress, this can be done by depressing the start button.

WARNING: *Do not reach into the machine until it has come to a complete standstill!*

5.4.3 Type: SO-40a (Figure 9)

1. Check for yourself that the machine has been correctly installed and connected up as stated in 4.2.1 and 4.2.2.
2. Set the ON/OFF-switch (at the back of the machine) into the <I> position.
3. Release the emergency stop (figure 9, number 4).
4. Open the door of the shaker.
5. Place the container(s) inside as described in 5.2 and 5.3.
6. Close the door of the machine.
7. Set the timer (figure 9, number 1) or one of the start buttons (figure 10, numbers 1, 2, 3) to the desired shaking time.
8. Press the START button (figure 9, number 2); the clamping plate will automatically move down and the shaking cycle will start. At the end of the shaking cycle the clamping plate will automatically move back up again. In case the machine has been fitted with timer buttons, these are also the start buttons (see figure 10, numbers 1, 2 and 3).
9. After the shaking cycle has finished, open the door, and remove the container. If there is another container, place it on the platform, close the door and proceed again from point (7).
10. Should a container not fit between the platform and the clamping plate, the latter can be moved upwards using the UP-button (figure 9, number 3).
11. At the end of the day, de-energise the machine by setting the ON/OFF-switch in the <O> position.

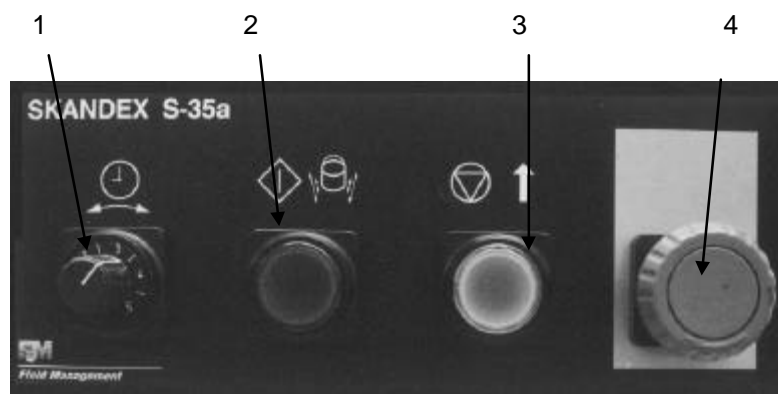


figure 9

1 = Timer

2 = Start-button

3 = Stop/Up-button

4 = Emergency stop

Notes:

The shaking cycle can be interrupted while it is in progress by pressing the UP button (figure 9, number 3). The clamping plate will then automatically move upwards.

In an emergency, the shaking cycle can also be interrupted by pressing the emergency stop (figure 9, number 4). In this case it is necessary to wait 15 seconds before releasing the emergency stop. The emergency stop can be released by turning it a quarter turn to the left.

WARNING: Do not reach into the machine until it has come to a complete standstill!

Warning:

In the course of 1997 the SO-40a machine will be fitted with a new control panel (see figure 10). The machine will then have three start buttons (figure 10, numbers 1, 2 en 3): to shake automatically for 30, 60 of 180 seconds. When simultaneously pressed, the shaking times will automatically add up. (Button 1 and 2 pushed will give a shaking time of 90 seconds.)

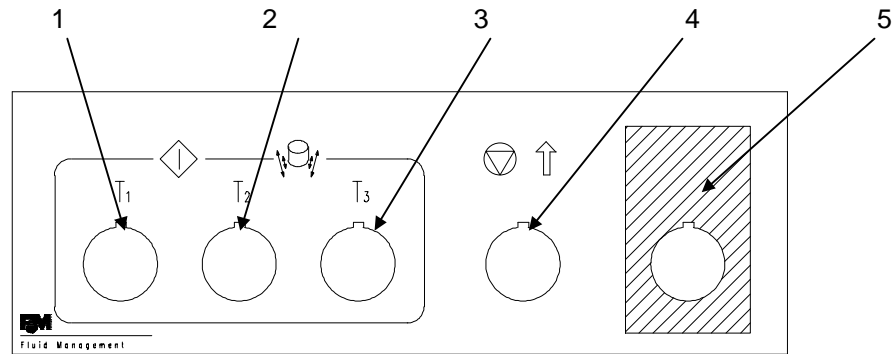


figure 10

1 = Start**2 = Start****3 = Start****4 = Stop/Up****5 = Emergency stop**

6.1 Maintenance instructions

Before carrying out any maintenance, make sure that the machine has been disconnected from the mains power supply. With the SO-30ex, the shut-off valve must first be turned transversely to the direction of flow.

- 1) Maintenance and any repairs should only be carried out by qualified personnel.
- 2) Use only reliable and properly fitting tools.
- 3) Use only original Fluid Management parts.
- 4) Before the equipment is released for use following servicing, checks must be carried out to ensure that all the settings are correct and the control and safety systems are working properly.

6.2 Maintenance to be carried out by the user

The maintenance consists mainly of lubricating the machine. It is advisable to lubricate all parts with grease containing lithium.

Every 3 months :

All types

Lubricate the shock absorber shafts (4x) (see: 6.3.1, figure 11).

SO-30m and SO-30ex: use grease containing lithium.

SO-40a: use Teflon spray.

Type SO-40a

Lubricate the leadscrews (2x) over the entire length (see: 6.3.3, figure 13).

Every 6 months:

All types

Lubricate the flange bearings (2x) (see: 6.3.3, figure 14).

Lubricate the main shaft bearings (2x) (see: 6.3.2, figure 12).

Lubricate the pivot bearings (2x) (see 6.3.3, figure 13).

Type SO-30ex

Top up oil and drain off water.

6.3 General drawings

6.3.1 Lubrication points on shock absorbers

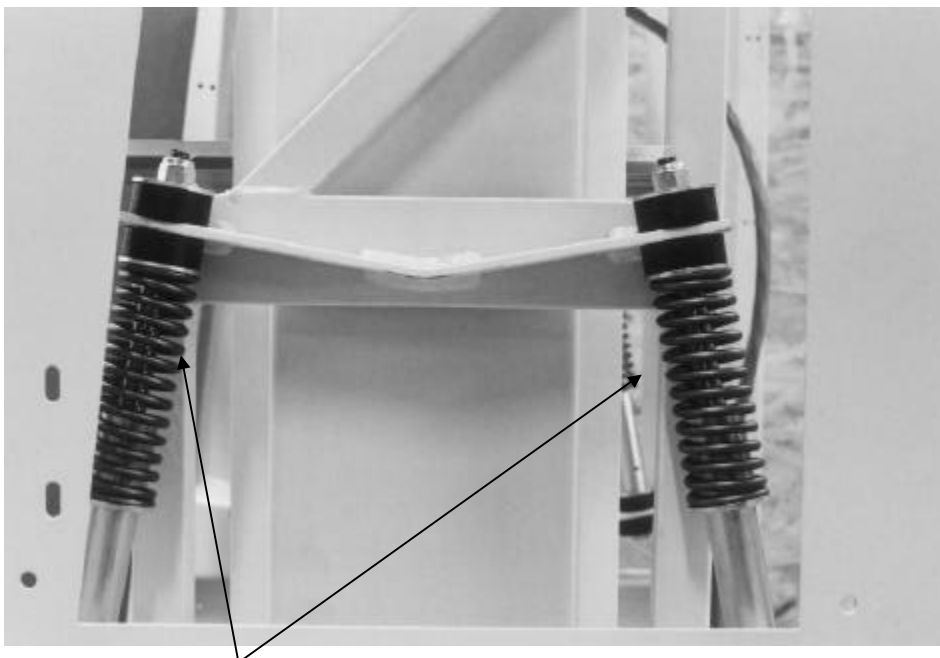


figure 11
Lubrication points
shock absorbers

6.3.2 Lubrication points on main shaft bearings

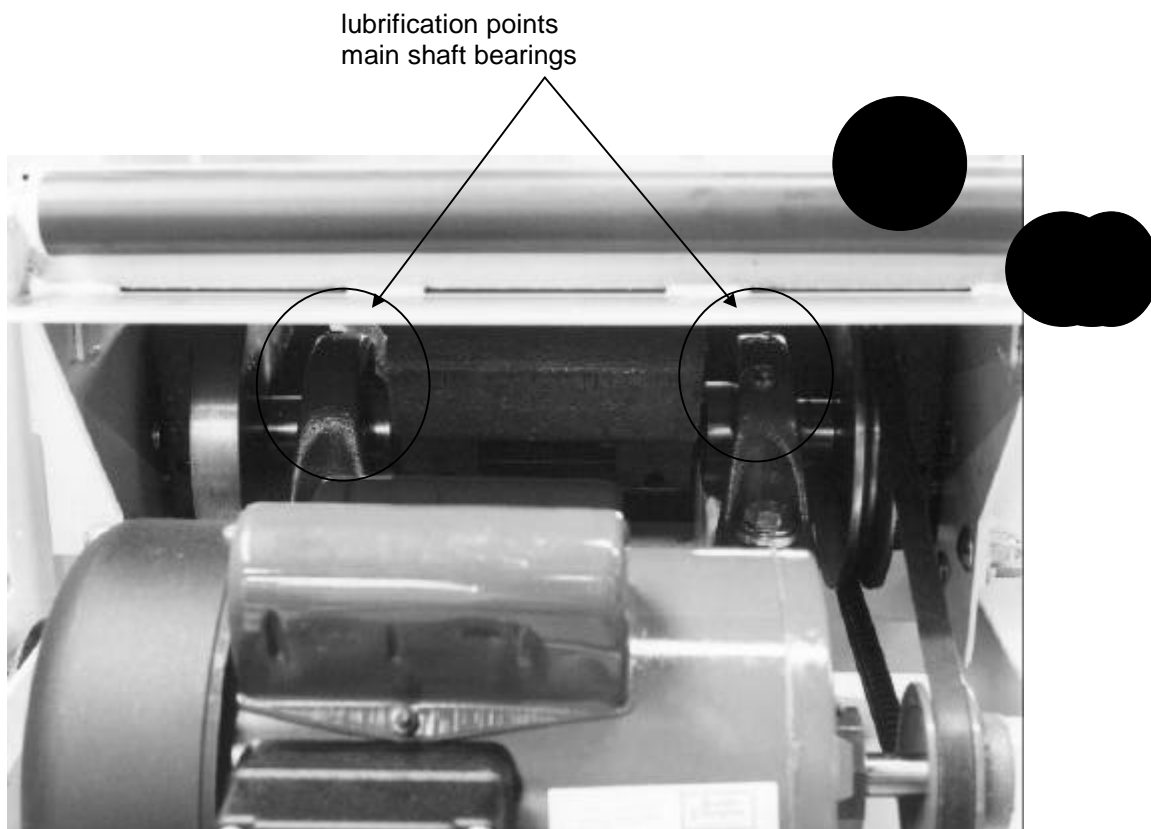


figure 12

6.3.3 Lubrication points on lead screws, pivot bearings and flange bearings

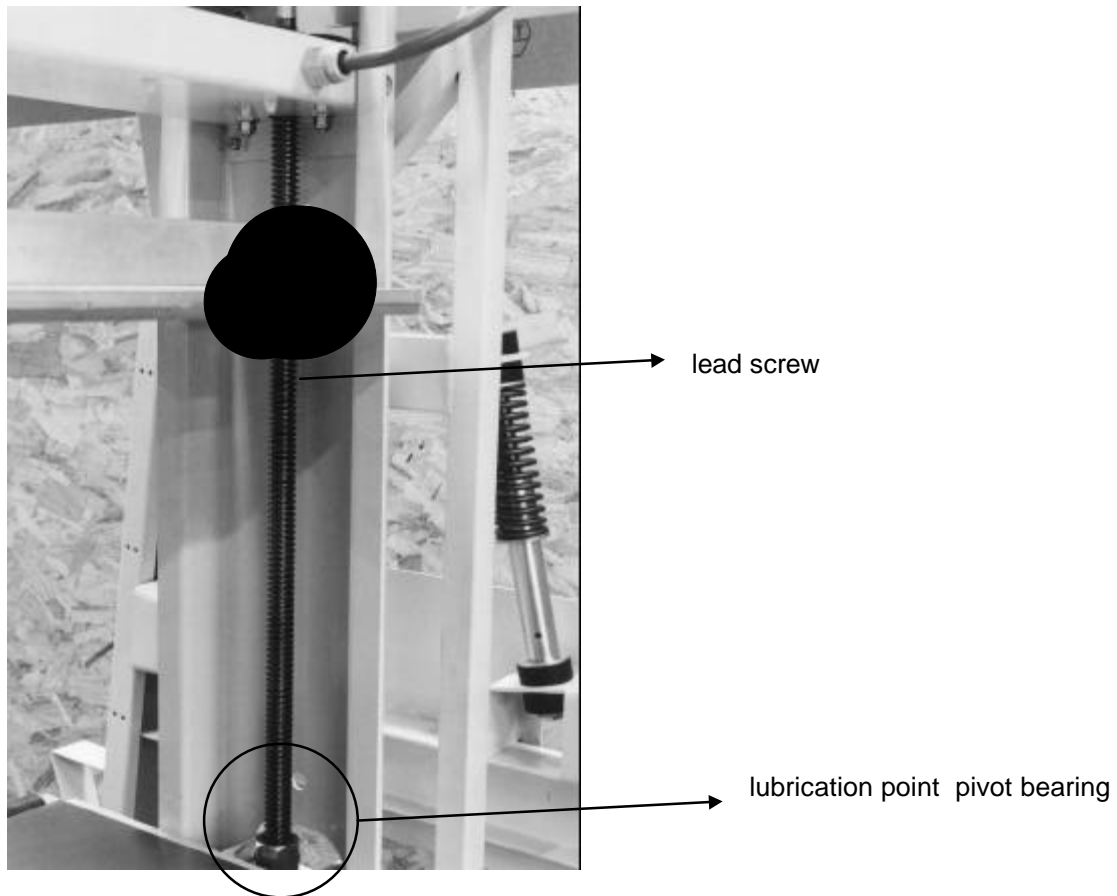


figure 13

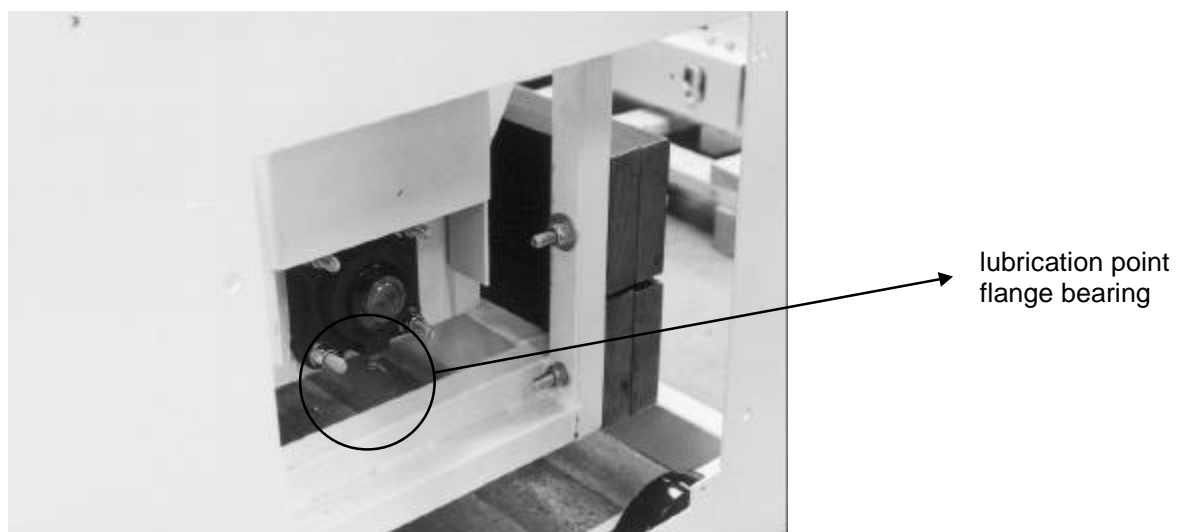



figure 14










6.4 Troubleshooting guide

Before calling in the Service Department, please check whether you can solve the problem yourself. If you don't succeed, call the Service Department for advice (see 6.5), making sure you have the model number and serial number to hand. They can be found on the name plate on the machine (see 7.1).

Use the chart of Problem, Cause and Action below to judge whether you can solve a problem yourself or whether you will need to call in the Service Department. The  symbol means that the Service Department must be called.

In this chart are not included the problems that you are informed of by the software. These messages and possible solutions are shown on the monitor.

The SO-40a machine also has an ERROR display (see 6.5)

Problem	Cause	Action
The machine is not receiving any power (230V) (SO-30m / SO-40a)	1. No supply voltage present 2. On/Off button is in <0> position	1. Check main power supply 2. Put On/Off-button in <I> position
The machine is not receiving any compressed air (SO-30ex)	1. No compressed air present 2. Shut-off valve is closed 3. Valves are defective	1. Check air supply 2. Open shut-off valve 3. Replace valves 
Main power supply is present but the machine doesn't work SO-30m, SO-40a Compressed air is present but machine does not work (SO-30ex)	1. Door of the machine is open 2. Emergency stop has been pressed (SO-40a) 3. Machine is overloaded 4. Door switch is defective or a wire has broken 5. Start button defective 6. Printed-circuit board is defective (SO-40a) 7. Compressed-air pressure is too low (SO-30ex)	1. Close the door 2. Release the emergency stop 3. Check frame and press 10A-fuse button above front door at the inside (zie figure 15) 4.  5.  6.  7. Using the pressure reducing valve, set air pressure to 6.2 bar
Extreme vibrations during shaking (all types)	1. Machine is not leveled 2. Adjustable feet have been set incorrectly 3. Shock absorbers are defective 4. Machine has been loaded incorrectly	1. Level the machine 2. Adjust all feet so they support the machine properly and lock them into position 3.  4. Centre the load
Run lamp is on but the machine is not doing anything (SO-40a)	1. Clamping motor defective or a wire is broken 2. Coupling between clamping motor and threaded spindles is defective	1.  2. 
Run lamp is on, top plate goes down, but machine does not shake (SO-40a)	1. Shaking motor is defective or a wire is broken 2. Shaking motor is switched off	1.  2. Switch on the shaking motor (see fig.16)
Clamping plate will not go down (SO-40a)	1. Fuse is defective	1. Shut power off and replace the 6,3 A fuse (See figure 16)
Machine starts shaking before the container has been clamped (SO-40a)	1. Too much mechanical resistance 2. Clamping pressure incorrectly set	1. Clean the lead screws and lubricate 2. 
Clamping plate goes down and back up again without shaking (SO-40a)	1. Container is too low 2. Too much mechanical resistance	1. Place other container 2. Clean the lead screws and lubricate

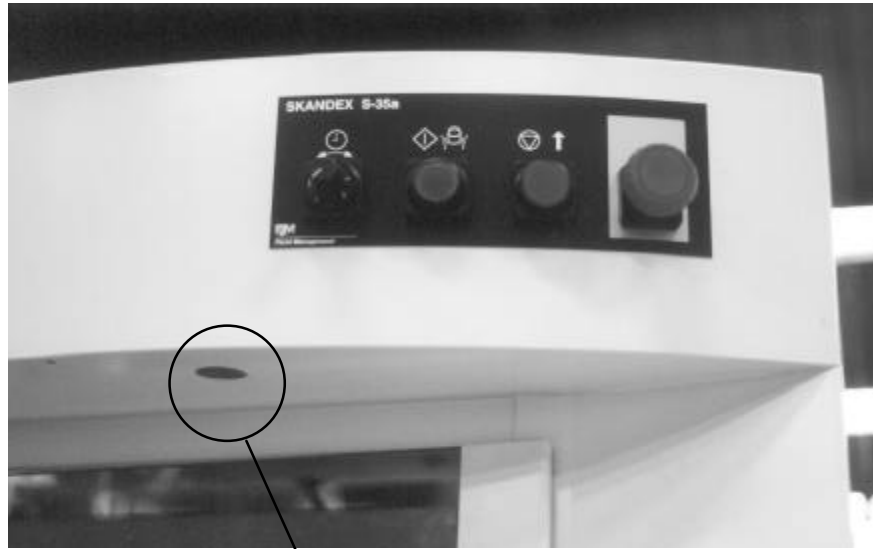


figure 15

10 A.-fuse

6,3 A.-fuse

On/Off shaking motor

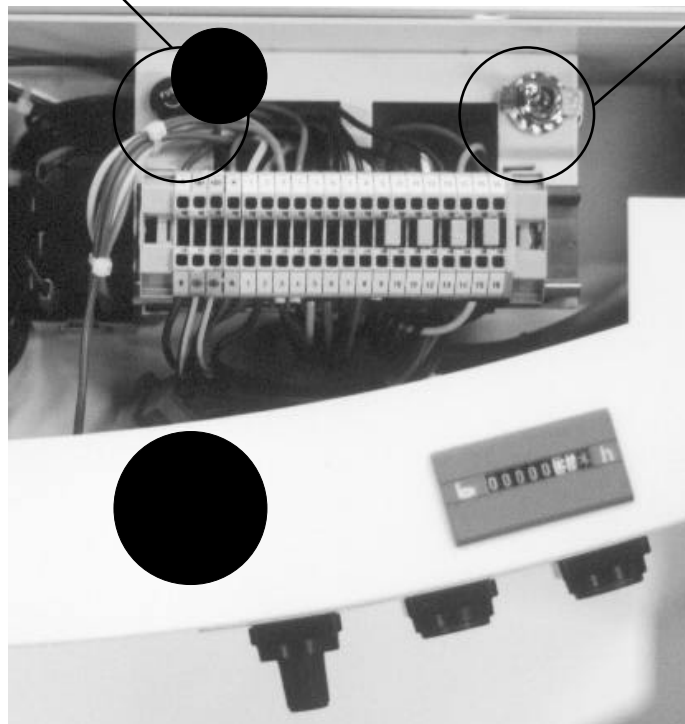


figure 16

6.5 Summary of display messages

(ONLY TYPE: **SO-40a**)


The SO-40a is equipped with an ERROR display on the Printed Circuit Board (PCB).


N.B.: *The display only shows when the machine is connected to mains power supply!*

The display is located behind the control panel. To see the display, it is necessary to remove the top plate. The top plate can be removed by unscrewing the two screws at the back of the top plate. Now you can push the top plate to the back and you can lift it. The display is located in the middle at the front. It displays the machine's status. The following messages may appear:


Board 1610020:


E 00: Normal operation


E 01: Chopping current is too low. 
Clamping motor not detected.


E 02: The maximum pressure current has been exceeded. 

E 03: Door has been opened during shaking operation.


E 04: The mains power supply voltage is too low, which means that the 5V feed power supply voltage is also too low. 


E 05: The mains power supply voltage is too high, which means that the 5V feed power supply voltage is also too high. 

E 06: The mains power supply voltage is too low, which means that the 50V feed power supply voltage is also too low. 

E 10: The Opto-coupler is defective. 


E 12: The PCB (printed-circuit board) is defective. 

E 47: The PCB (printed-circuit board) is defective. 


E 58: The PCB (printed-circuit board) is defective. 

Board 1610028:

E 00: Normal operation


E 01: Chopping current is too low. 
Clamping motor not detected.


E 03: Door has been opened during shaking operation.


E 10: The Opto-coupler is defective. 

E 20: No container detected.

E21: The supply voltage is too high.

E 80: The PCB (printed-circuit board) is defective. 

E 81: The PCB (printed-circuit board) is defective. 

E 82: The PCB (printed-circuit board) is defective. 

6.6 Service / Service Department

If necessary, you can contact your supplier, local service department or you can contact the manufacturer directly:

Fluid Management Europe B.V.

A Unit of IDEX Corporation

Postbus 220

2170 AE Sassenheim, Nederland

Hub van Doorneweg 31



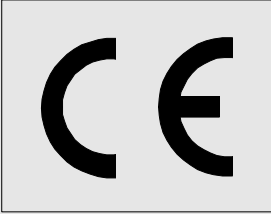
2171 KZ Sassenheim, Nederland

Tel : + 31 (0)252 - 240800

Fax : + 31 (0)252 - 240880

7.1 Data machine disc SO-30m, SO-30ex, SO-40a

The machine plate is situated at the rear side of the machine (on the exterior), in the upper right corner.

			
Fluid Management			
P.o.Box 220 2170 AE Sassenheim, Holland			
	V~	Hz	W
Weight	kg		A
Model nr.:			
Serial nr.:			
			

7.2 Technical data

Type: SO-30m

Machine dimensions (HxBxD in mm)	1200x740x710
Empty weight (kg)	170
Maximum size of product (HxBxD in mm)	390x350x330
Minimum height of product (mm)	60
Maximum weight of product (kg)	30
Maximum clamping force (N)	2500
Supply	220/240 Volt ~ 50 Hertz, 4 A
Motor output (Watt)	370
Motor speed (rpm)	1425
Shaking frequency (rpm)	619

Type: SO-30ex

Identical to the S 30 type except:

- Air-powered motor and pneumatic control
- No timer

Type: SO-40a

Machine dimensions (HxBxD in mm)	1200x740x710
Empty weight (kg)	195
Maximum size of product (HxBxD in mm)	450x370x320
Minimum height of product (mm)	50
Maximum weight of product (kg)	40
Maximum clamping force (N)	3500
Supply	220/240 Volt ~ 50 Hertz, 5,4 Ampère
Motor output (Watt)	750
Motor speed (rpm)	1425
Shaking frequency (rpm)	685