

# Oil Skimmer model 1S

Serial N.

**FRIESS**<sup>GmbH</sup>

Böttgerstraße 2

D-40789 Monheim

## Maintenance Manual

**FRIESS**<sup>GmbH</sup>

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## **Declaration of conformity According to EC-Machinery Directive 2006/42/EG**

FRIESS GmbH declares that the

**Product:** Oil skimmer  
**Type:** 1S  
**Year of manufacturing:**  
**Serial-No:**

complies with the requirements of the European directives.

The manufacturer herewith declares conformity of above mentioned oil skimmer with following standards:

**Machinery Directive:** 2006/42/EG

The oil skimmer is a machine to remove floating oil and fat from water surfaces. The declaration of conformity is only valid if the oil collecting pan is used. If the oil collecting pan is not used, the conformity is unvalid unless an appropriate protection against touching the drive wheel is installed.

This declaration is not valid if the oil skimmer is used for other purposes than designed or if the construction is changed and not confirmed in writing by manufacturer.

Applied harmonized standards:

**EN ISO 12100-1** Safety of machinery  
**EN ISO 12100-2** Safety of machinery  
**EN 60204-1** Safety of machinery

This declaration certifies conformance with the above mentioned directives. Affirmation of attributes in a legal sence is not included. Security declarations given in the product documentation have to be considered.



Oliver Benneck / Executive director

Monheim,

# **FRIESS** GmbH

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## 1. IMPORTANT SAFETY INFORMATION AND SAFETY INSTRUCTIONS

### 1.1 Range of application



Do not use the oil skimmer model 1S for other purpose than designed. The oil skimmer model 1S is designed to pick up floating oil and fat from liquid surface. The oil skimmer is not designed for other applications.

The manufacturer is not responsible for any damage because of using the oil skimmer for other purpose than designed. The manufacturer is not responsible for any damage because of mechanical, electrical or other changes made by others than the manufacturer.



Please follow the start-up, operating and maintenance instruction of this manual. Please pay attention to the local safety regulations and to the general and special safety regulations in your factory.

Please pay attention to the signs mounted at the oil skimmer model 1S.

### 1.2 Safety information and safety instructions

#### 1.2.1 Fundamental safety information



Please pay attention to the local safety precautions and to any other general safety precautions and health regulations. Please pay attention to the safety precautions for electric components. If you do not watch this regulations the manufacturer will not be responsible for any damage. This manual is part of the **FRIESS** oil skimmer model 1S. In case you resell the oil skimmer you have to deliver the oil skimmer with this manual. For safe operation of this oil skimmer the oil skimmer has to be operated and serviced or fixed by trained personal only. Trained personal are persons, which have knowledge about necessary technical standards, technical regulations and safety information's and which are able to handle technical products and recognize possible dangerous situations and are able to avoid these dangerous situations.



The owner of this oil skimmer has to take care, that the persons who are responsible for operating, maintenance and service and repairing of this oil skimmer have read and understood this manual and pay attention to all points of this manual. This is necessary to avoid dangerous situations

- for the user and other persons.



- for safe operation of the oil skimmer model 1S and

- to avoid damage at the environment caused by wrong operation.

Before start working please lay down all competences. Everybody has to follow these competences.

Removal, shut-down or switching-off of covers, protection-switches or other safety equipment may cause severe injuries or death or material damage. For this reason the manufacturer prohibits to remove or shut off safety devices. The manufacturer prohibits to work at the oil skimmer model 1S while the oil skimmer is connected with electric power. After maintenance or other work all safety devices have to be installed correctly.



The manufacturer warrants for the oil skimmer model 1S according to the general sales terms. The manufacturer warrants not for the oil skimmer model 1S in case of damage caused by wrong operation, repairing or maintenance done by not trained personal, using additional equipment or spare parts which are not specified for the oil skimmer model 1S by manufacturer, changes or conversions without confirmation by manufacturer in writing.



Any failure has to be reported to the responsible person as soon as possible. In case of malfunction the oil skimmer model 1S has to be marked as *defect*. Before restart all defects have to be fixed otherwise there is no warranty by the manufacturer.

### 1.2.2 General safety instructions



This safety devices may not be complete. Please contact manufacturer in case of questions or problems. The oil skimmer model 1S is manufactured according to the latest technology and is safe in operation. You may use the oil skimmer model 1S only under the conditions and circumstances which are confirmed by manufacturer. Any change or rebuilding of the oil skimmer is not allowed. Please contact manufacturer before changing the design of the oil skimmer.

### 1.2.3 Special safety instructions



The oil skimmer model 1S must not be used without the oil collecting pan. In case you do not want to use the original oil collecting pan you have to install a safety device with the same effect. During operation of the oil skimmer model 1S do not remove the oil collecting pan or other safety devices in order to avoid accidents. During repairing, servicing, maintenance or cleaning you have to switch-off the oil skimmer before working at the oil skimmer. Make sure that it is not possible to switch-on the oil skimmer during working at the oil skimmer. If using the oil skimmer with an additional oil collecting tank you have to install a safety switch at the oil collecting tank in order to avoid environment damage caused by overfilling the tank with oil.



Do not open the oil skimmer model 1S during operation of the oil skimmer.  
Do not touch the oil collector tube during operation of the oil skimmer.



Make sure that it is not possible to touch the oil collector tube during operation. This can be done by additional safety guards or rails.

## 2. GENERAL DESCRIPTION

The Oil Skimmer model 1S is designed to remove floating oil and fat from water, emulsions, washing water or waste water. The floating oil and fat sticks to the outside of the free floating flexible oil collector tube. The oily oil collector tube is drawn into the oil skimmer. Scrapers made of hardened stainless steel remove the oil from the surface of the oil collector tube. The clean oil collector tube returns to the water surface and picks up new oil or fat. The oil, that is removed from the oil collector tube floats into the oil collector pan of the oil skimmer and from there into a collecting tank, which has to be furnished by the customer. The **FRIESS** oil skimmer model 1S is designed for small sized or medium sized basins. The minimum surface should be approx. 400 mm x 500 mm. The maximum lifting height is 10.0m. During skimming process the water level may change up to 1.0m. The oil skimmer model 1S has to be mounted above the maximum liquid level.

## 2.1 Description of parts

The oil skimmer model 1S is made of four structural components:

structural component 1: oil skimmer model 1S with oil collecting pan (100 010 011) or without oil collecting pan (100 010 012)

structural component 2: one gear motor SN5FL  
The gear motor is special designed for each application and may vary from one oil skimmer to the next. Only the data plate on the gear motor shows the correct technical data.

structural component 3: switchboard  
two different switchboard covers are possible

1. standard cover  
motor 400V 3 phase protection class IP54
2. additional switchboard cover with switch, cable and plug and capacitor  
motor 230V single phase protection class IP44

structural component 4: oil collector tube

type U2 (101010001) for bath temperature by 0° C to 60 °C

- lifetime for oil collector tube if temperature is less than	35 °C	approx. 6-24 months
- lifetime for oil collector tube if temperature up to	60 °C	approx. 3-9 months

## 2.2 Description of process

The oil skimmer model 1S has to be mounted above the maximum liquid level. The oil collector tube must not touch walls or other components when running into the oil skimmer. If the oil collector tube touches other parts it will lose oil and the efficiency will be lower.

Depending on the amount of sludge in the oil the oil skimmer has to be cleaned from time to time. Depending on dirt or sludge in the oil and depending on the viscosity of the oil or fat, the drain must be big enough and steep enough to avoid blocking. The drain must have a diameter of at least 20 mm and incline of at least 15°. If the oil contains a lot of sludge or when using the oil skimmer with vegetable oil or fat we suggest to use an open chute which has to be cleaned from time to time.

### **3. START UP**

#### **3.1 Preparation**

Before commissioning check whether the oil collector tube is floating on the bath surface in a semi circular or oval shape. The length of the oil collector tube floating on the surface should be max. 2 m. If you want to service a bigger surface or a bigger basin please use oil skimmer model W40 or model S 100. Please check after the start of the gear motor the turning sense of the drive. When looking on the drive wheel the oil collector tube has to run clockwise. The gear motor is filled with lubricant. The lubricant has not to be changed.

In case of longer storing of the oil collector tube we suggest to hang the collector tube for at least two days in not twisted form.

#### **3.2 Start up and operating**

After starting the oil skimmer model 1S make sure, that the oil collector tube runs properly without being turned and make sure, that the oil collector tube does not lose oil. Please check the outlet of the oil collector pan in order to avoid blocking by dirt or fat.

### **4. CLEANING AND MAINTENANCE**

For trouble free operation of the oil skimmer following maintenance is necessary:

#### **weekly**

- Please check the operation of the oil collector tube
- Please check the drain

#### **every six months**

- Please open the oil skimmer and clean the oil skimmer and oil collector pan
- Check the scrapers, the oil collector and the ceramic fingers whether they are worn out or cracked.



**ATTENTION: Before servicing the oil skimmer watch the safety instructions in this manual !!!**

#### **Changing the oil collector tube**



**ATTENTION:** Do not cut the oil collector tube !!!  
It is possible to change the oil collector tube as one piece.

Switch off the oil skimmer and protect against restart. To change the collector tube please pull plug and stop the oil skimmer. Loosen the ceramic cylinder screw no. 18. Remove the old oil collector tube and mount the new oil collector tube.

Mount the ceramic cylinder as near as possible near the drive wheel and start the oil skimmer.



### **CAUTION:**

The service life of the oil collector tube depends very strongly on the application. In general the following can be applied: The higher the temperature (more than 40 °C), the higher the load on the oil collector tube and the shorter the service life. For certain applications it should be tested whether the oil collector tube and the medium are compatible. The minimum service life of the oil collector tube is approx. 3 months. For applications involving an oil/water mixture at room temperature, a service life of one or two years can be expected. We recommend unrolling the oil collector tube before commissioning and storing it in the unrolled state, hung up for 2 days.

## **5. MALFUNCTION**

### The oil skimmer removes no oil

- Check whether there is oil on the water surface
  
- Check whether the floating oil sticks to the oil collector tube and whether the tube brings the oil to the oil skimmer
  
- If the oil is not removed from the oil collector tube check and replace the scrapers and the oil collector tube
  
- Check whether the drain is blocked and clean if necessary

### The amount of water in the skimmed oil is too high

- Check whether there is enough oil on the water surface (>0.2 mm). Reduce the operating time of the skimmer by a timer.
  
- Use the **FRIESS** decanter. With the decanter you can eliminate water that is collected by the oil skimmer

### After starting the drive wheel does not turn

- Switch off the oil skimmer and check by turning of the fan at the motor, whether the motor shaft is blocked or not
  
- Start the oil skimmer and check whether the motor shaft turns, if the motor turns and the drive wheel or the pulley wheel not, the gear is damaged and has to be replaced

### Drive wheel turns, but the oil collector tube does not move

- Check whether the motors turn the right way
  
- Check the oil collector tube whether it is worn out
  
- Check the ceramic fingers of the drive wheel, whether they are worn out
  
- Check the correct place of the ceramic cylinder. See attached drawing. The ceramic cylinder (A) has to be mounted as far away as possible from the drive wheel; the ceramic cylinder (B) has to be mounted as near as possible towards the drive wheel.



## 6. TECHNICAL DOCUMENTATION

### 6.1 Parts list

#### 6.1.1 Wear parts

Pos.	no.		Drawing no.	Item
3	16	Pc	104010001	Ceramic finger 1S
4	3	Pc	105010003	Scraper for oil collector tube
		m	101010001	Oil collector tube type U2

#### 6.1.2 Parts list oil skimmer model 1S

Pos.	Menge	EH	Komponente	Bezeichnung
1	1	pc	102010005	Oil collecting pan 1S plastic
2	1	pc	105010017	Body 1S plastic
3	3	pc	105010018	Scraperholder 1S plastic
4	3	pc	104000007	Ceramic scraper 1S
5	1	pc	105010079	Drive wheel 1S plastic
6	2	pc	105000119	Hex.head bolt DIN 933 M6 x 30 PVDF
7	16	pc	104010001	Ceramic finger 1S
8	2	pc	104000003	Ceramic cylinder
9	16	pc	105000042	nut DIN934 M4 PVDF
10	16	pc	105000044	Hex head bolt DIN 933 M4 x 20 PVDF
11	16	pc	105000109	Washer DIN 125 A 5,3 PVDF
12	2	pc	105000108	Nut DIN 934 M8 PVDF
13	2	pc	105000040	Hex head bolt DIN 933 M8 x 60 PVDF
14	2	pc	105000041	Washer DIN 125 A8,4 PVDF
15	6	pc	105000044	Hex head bolt DIN 933 M4 x 20 PVDF
16	6	pc	105000109	Washer DIN 125 A 5,3 PVDF
17	6	pc	105000119	Hex.head bolt DIN 933 M6 x 30 PVDF
18	6	pc	105000118	Washer DIN125 A 6,4 PVDF
19	4	pc	105000119	Hex.head bolt DIN 933 M6 x 30 PVDF
20	4	pc	105000118	Washer DIN125 A 6,4 PVDF
21	4	pc	105000001	Washer DIN 125 A 8,4 PA
22	4	pc	105000119	Hex.head bolt DIN 933 M6 x 30 PVDF
23	4	pc	105000118	Washer DIN125 A 6,4 PVDF
24	1	pc	109000093	Name plate plastic
25	4	pc	105000044	Hex head bolt DIN 933 M4 x 20 PVDF
26	1	pc	109000040	Cover 22

spare part	art.no.	Foto
oil collector tube type U2	101 010 001	
drive wheel 1S (groß)	105 010 006	
drive wheel 1S (groß) 1.4305	105 010 002	
drive wheel 1S (groß) 1.4571	105 010 009	
ceramic cylinder	104 000 003	
ceramic finger	104 010 001	
ceramic scraper	104 000 007	
scraper holder	105 010 020	

### 6.1.3 Parts list structural components

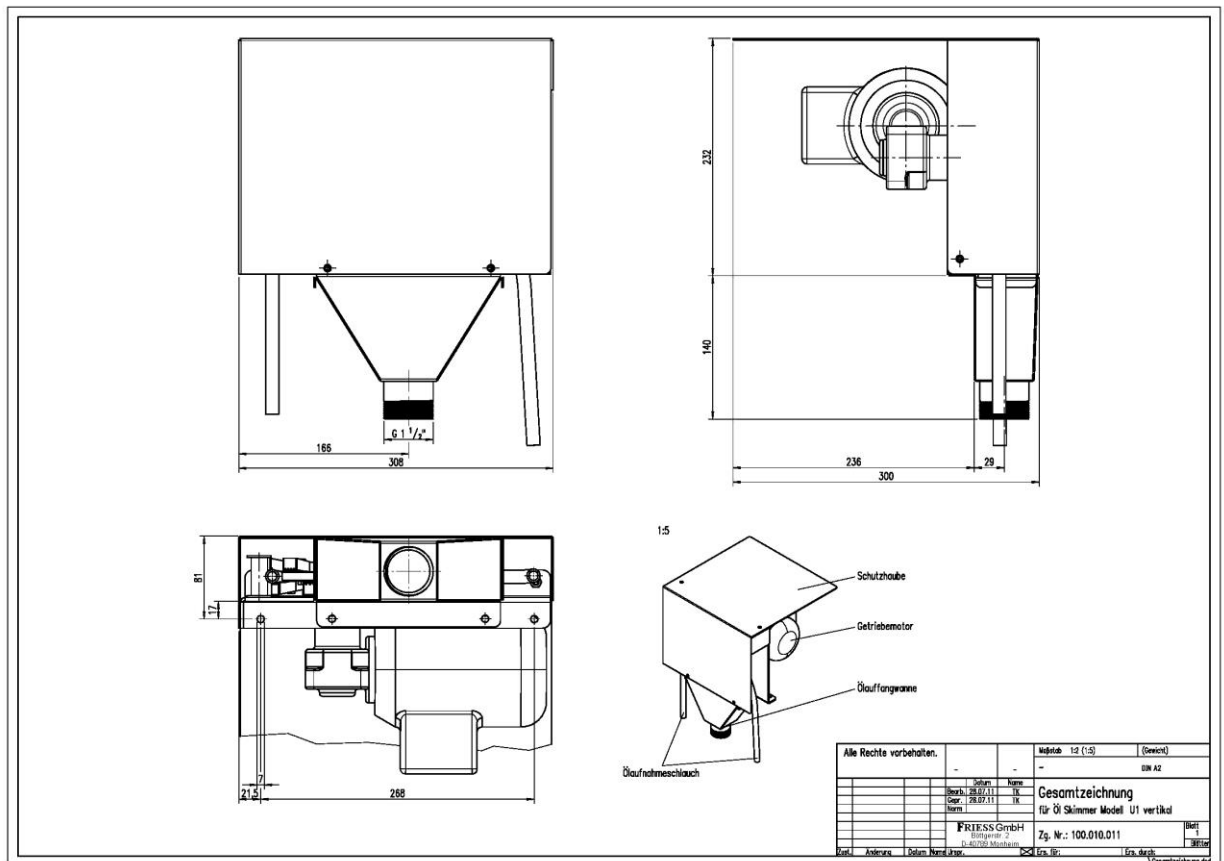
#### 6.1.3.1 Protection class IP 54 (108 010 005)

1	1	pc	108 010 005	switchboard standard
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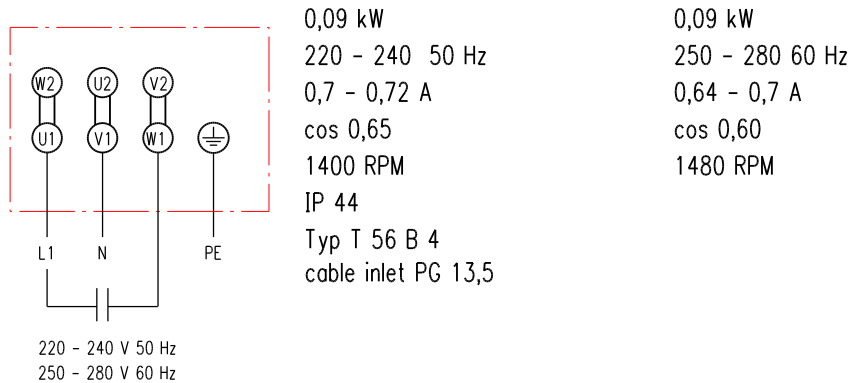
#### 6.1.3.2 Protection class IP 44 (108 010 001)

1-5	1	pc	108 010 004	switchboard with switch,
	1	pc	108 010 003	Cable with plug,
	1	pc	108 010 002	Capacitor
	1	pc	105 000 051	Bolt DIN 912 M4 x 25 VA
	3	pc	105 000 052	Screw DIN 7982 4,8 x 16 St Zn

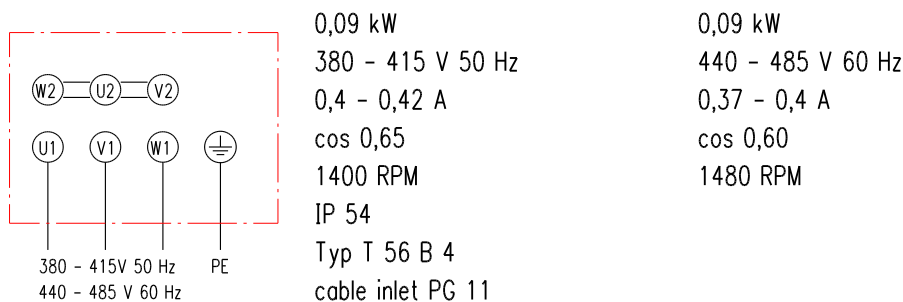
## 6.2 Drawings



### 6.3 Wiring diagram



Attention! Pay attention to the data plate, special configurations are possible



Attention! Pay attention to the data plate, special configurations are possible

### 6.4 Manual and safety instructions of gear motor

#### Operating and safety instructions Worm gear motors

##### 0. Foreword

A geared motor proper is not subject to the Machinery Directive. Through appropriate installation and/or assembly in an overall system it becomes a component of the machine or plant under construction, which must comply with the relevant standards and directives. The manufacturer of the machine bears the sole responsibility for compliance with these standards.

##### 1. Safety Instructions

The commissioning of a machine is forbidden until it has been established that the protection and safety provisions of Machinery Directive 2006/42/EC have been complied with. A precondition for the proper installation and connection is the recognition and observance of the operating and safety instructions as well as workplace safety and accident prevention regulations. Work on the gear motors may be entrusted only to qualified staff. Malfunctions that affect safety must be immediately rectified by the aforementioned staff.



*Geared motors are devices for use in industrial machinery and plant. In operation, these devices can have dangerous live, non-insulated parts, or perhaps moving or rotating parts. Hence, for example, unauthorised removal of the required casing, or improper use, incorrect operation or poor maintenance, could lead to severe bodily harm or damage to machinery.*

*Persons responsible for the safety of the machine or plant must therefore ensure that*

- only qualified persons are charged with working on the machines or plant.
- such persons always have access to the current operating instructions and other product documentation applicable to the work in hand, and that they are charges with consistent compliance with these documents
- unqualified persons are prohibited from working on or near the machines or equipment.

**Qualified Personnel** are persons who by reason of their training, experience, instruction and their knowledge of the relevant standards, regulations, accident prevention rules and working conditions have been authorized by the person responsible for the safety of the machine or plant to perform the appropriate activities required, and thereby are able to recognise and prevent potentially dangerous situations (For the definition of skilled workers see VDE 0105 or IEC 364, which also regulate the prohibition of the employment of unqualified persons). A knowledge of first aid and the local rescue organisation must also be included.

It is assumed that the basic planning of the machine or plant and all operations relating to its transportation, assembly, installation, commissioning, maintenance and repair will be performed by qualified personnel or controlled by responsible skilled hands. In this respect, special attention should be paid to:

- technical data, and information on permissible use which are included in the catalogue, the documents relating to the order and on the data plate,
- the general regulations applicable to erection and safety,
- the local regulations and requirements specific to the machine or plant
- the proper employment of tools, lifting transport devices,
- the use of personal protective equipment,
- assembly conditions, to ensure the necessary protection for operators during use, and to prevent personnel from approaching too closely for safety.

The present documentation would become too unwieldy if it contained all the detailed information relative to possible construction variants, and it cannot take into account every conceivable case involving erection, operation or maintenance. Consequently, it only contains the essential instructions necessary for qualified personnel operating geared motors in industrial areas of application. Should, in a special case where it is intended to use the machine or plant in non-industrial areas of application, more stringent requirements have to be met (e.g. to prevent children's fingers from touching the machine), these conditions must be assured during assembly by introducing additional safety measures for the machine or plant.

Changes from normal operation (increased power consumption, raised temperatures, vibrations, noises, etc. or indications from monitoring facilities) lead to the assumption that the machine is not functioning correctly. To prevent faults which, in their turn, might cause serious indirect or direct damage to persons or machinery, the responsible maintenance staff must be informed immediately.

## **IN CASE OF DOUBT; SWITCH OFF THE MACHINE INVOLVED AT ONCE!!!**

### **2. Regulation Use**

The geared motors are designed exclusively for installation in or for mating with a machine or plant in industrial use. Use for any other or extended purpose is non-regulation. The supplier will not be liable for any damage arising from this improper use.

### **3. Erection**

The beds on which the gears and geared motors are to be erected must be adequately dimensioned and free from vibration. When mounting the geared motors care must be taken to ensure that these are immovably mounted, free from distortion, and on a level surface. Adequate ventilation for the motors must be assured. Should coupling elements be fitted onto the drive- or output-shaft blows to the shafts must be avoided since they could cause leakage or damage to the bearings. Prior to fitting, the shaft-end should be lightly greased to facilitate mounting. We recommend that a flexible coupling be employed in order to reduce shock on the gears or geared motor from the machine being driven.

### **4. Electrical Connection**

The electrical connection of the motor may only be performed by personnel with the appropriate qualification and in compliance with the prescribed safety precautions and the local regulations governing electrical connections (see para.1 Safety Instructions). The motor must be connected in accordance with the circuit diagram in the terminal box. Care must be taken to ensure that the voltage of the power supply corresponds to that on the performance plate of the motor. Any additional devices installed, such as brakes, revolution counter generators, and secondary fans, must comply with the appropriate standards. The direction of rotation can be changed in three-phase motors by changing two phases, in alternating-current (a.c.) motors by re-clamping the bridges on the terminal boards, and in direct-current (d.c.) motors by changing the polarity of the armature voltage – all this may only be performed when the motor is at standstill!

### **5. Safety Precautions**

The earth lead must without fail be connected to the marked earthing screw! To protect it against overloading every motor should be fitted with a trip switch. Heat-sensitive safety devices react to effective values, and the manufacturer will design them accordingly when ordered. Where a transformer is used, the voltage must be restricted to the level of the effective nominal voltage.

### **6. Maintenance**

**ATTENTION!** Before starting any maintenance operations the geared motor must be permanently disconnected from the mains.

#### a) Motor:

It is recommended that, depending on the ambient dust arising, the dirt accumulation on the fan cowling of the motor and the motor and gears themselves should be cleaned off from time to time (heating). In the case of motors with carbon brushes, these should be checked at regular intervals. The life of the brushes depends on the mode and conditions of operation. The brushes must be renewed as and when this becomes necessary. Once the fan cowling, the holding band or the screw-caps have been removed the brushes are in most cases easily accessible.

#### b) Gears:

On delivery, the geared motors are ready for use and filled with gear grease or oil. This ensures long-term lubrication for all drive parts and bearings. No complicated stripping, cleaning or grease change are required. Should, however, any additional greasing become necessary then synthetic and mineral lubricants must not be mixed.

### **7. Closing Remarks**

Your attention is drawn to the fact that the contents of the operating and safety instructions and of the product documentation do not form part of any previous or existing agreement, undertaking or legal relationship, nor are they designed to alter such. All the obligations incumbent upon the supplier are based on the contract of sale in each case, which also contains the complete and solely applicable regulations relating to the guarantee. The contractual provisions of the guarantee are neither extended nor restricted by the statements contained in these operating and safety instructions.

## 7. Appendage

### 7.1 Lubrication information

The gear motors are filled with lubrication. During the life time of the gear motors it is not necessary to change the lubrication.