



**Schmutzwasser-Tauchmotorpumpen**

**Submersible Waste Water Pump**

**Pompes de relevage submersibles  
pour l'assèchement et l'élévation des eaux chargées**

**Elettropompa sommergibile per acque cariche**



## **Betriebsanleitung**

Diese Betriebsanleitung enthält wichtige Hinweise und Warnvermerke. Bitte vor Einbau, elektrischem Anschluß und Inbetriebnahme unbedingt lesen. Weitere Betriebsanleitungen, die Komponenten dieses Aggregates betreffen, sind zusätzlich zu berücksichtigen. Diese Betriebsanleitung soll in der Nähe des Aggregats aufbewahrt werden.



## **Notice de service**

Cette notice de service comporte des instructions et des avertissements importants. Elle doit être lue impérativement avant l'installation, le branchement électrique et la mise en service. Les notices de service relatives aux composants de ce groupe sont également à respecter. Il est recommandé de conserver cette notice à proximité de la pompe.



## **Operating Instructions**

These operating instructions contain fundamental information and precautionary notes. Please read the manual thoroughly prior to installation of unit, electrical connection and commissioning. It is imperative to comply with all other operating instructions referring to components of individual units.

These operating instructions must be kept close to the location of operation of the pump unit for easy access.



## **Istruzioni per l'esercizio**

Queste istruzioni per l'esercizio racchiudono importanti indicazioni ed avvertimenti. Preghiamo di leggerle prima del montaggio, del collegamento elettrico e della messa in marcia. Si deve inoltre tener conto delle altre istruzioni riguardanti le parti componenti del gruppo.

Questo manuale di istruzioni deve venir custodito in prossimità del gruppo.

**Konformitätserklärung / EC declaration of conformity /****Déclaration CE de conformité / Dichiarazione CE di conformità**

Hiermit erklären wir, daß das Pumpenaggregat  
Herewith we declare that the pump unit  
Par la présente, nous déclarons que le groupe de pompe  
Con la presente si dichiara che l'elettropompa

**Ama-Drainer (B) 80/100**

folgenden einschlägigen Bestimmungen in der jeweils gültigen Fassung entspricht:  
complies with the following relevant provisions as applicable in their current version:  
correspond aux dispositions pertinentes suivantes dans la version respective en vigueur :  
è conforme alle seguenti disposizioni pertinenti nella versione valida al momento:

Im Sinne der EU-Richtlinie 98/37/EG "Maschinen", Anhang II A,  
EU-Richtlinie 89/336/EG "Elektromagnetische Verträglichkeit"  
und der EU-Richtlinie 73/23/EG "Niederspannungsrichtlinie", Anhang III B

EC machinery directive 98/37/EC, Annex II A  
EC electromagnetic compatibility directive 89/336/EEC, Annex I and  
EC directive on low-voltage equipment 73/23/EEC, Annex III B

Directive relative aux machines 98/37/UE, Annexe II A,  
directive relative à la compatibilité électromagnétique 89/336/CEE et  
directive relative à la basse tension 73/23/CEE, Annexe III B

Ai sensi della direttiva CE 98/37/CEE relativa a macchine, Appendice II A,  
direttiva CE 89/336/CEE relativa a compatibilità elettromagnetica e  
direttiva CE 73/23/CEE relativa a bassa tensione, Appendice III B

Angewendete harmonisierte Normen, insbesondere  
Applied harmonised standards, in particular  
Normes harmonisées utilisées, notamment  
Norme armonizzate impiegate, in particolare

**EN 809, EN 292/1, EN 292/2, EN 50 081 - 1, EN 50 082 - 2, EN 61 000 -3 - 2,**

**EN 60 335 - 1, EN 60 335 - 2 - 41**

**Zertifikat nach EN 12 050-2 durch die LGA Würzburg (Kenn-Nr. 1118)**



Jürgen Gröschel, Leiter Produktentwicklung  
Wellendichtungslose Pumpen und Gebäudetechnik-Pumpen 15.1.2005

KSB Aktiengesellschaft, Bahnhofplatz 1, D-91257 Pegnitz

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## 1 General

This KSB pump has been developed in accordance with state-of-the-art standards; it is manufactured with utmost care and subject to continuous quality control.

These operating instructions are intended to facilitate familiarisation with the pump and its designated use.

The manual contains important information for reliable, proper and efficient operation. Compliance with the operating instructions is of vital importance to ensure reliability and a long service life of the pump and to avoid any risks.

These operating instructions do not take into account local regulations; the operator must ensure that such regulations are strictly observed by all, including the personnel called in for installation.

This pump/unit must not be operated beyond the limit values specified in the technical documentation for the medium handled, capacity, speed, density, pressure, temperature and motor rating. Make sure that operation is in accordance with the instructions laid down in this manual or in the contract documentation.

The name plate indicates the type series/size, main operating data and works/serial number; please quote this information in all queries, repeat orders and particularly when ordering spare parts.

If you need any additional information or instructions exceeding the scope of this manual or in case of damage please contact KSB's nearest customer service centre.

## 2 Safety

These operating instructions contain fundamental information which must be complied with during installation, operation and maintenance. Therefore this operating manual must be read and understood both by the installing personnel and the responsible trained personnel/operators prior to installation and commissioning, and it must always be kept at the place of use of the machine for easy access.

Not only must the general safety instructions laid down in this chapter on "Safety" be complied with, but also the safety instructions outlined under specific headings.

### 2.1 Marking of Instructions in the Manual

The safety instructions contained in this manual whose non-observance might cause hazards to persons are specially marked with the general hazard sign, namely



safety sign in accordance with DIN ISO 7000-0434.

The electrical danger warning sign is



safety sign in accordance with ICE 417-536.

The word

#### Caution

is used to introduce safety instructions whose non-observance may lead to damage to the machine and its functions.

Instructions attached directly to the machine, e.g.

- arrow indicating the direction of rotation
- markings for fluid connections

must always be complied with and be kept in perfectly legible condition at all times.

### 2.2 Personnel Qualification and Training

All personnel involved in the operation, maintenance, inspection and installation of the machine must be fully qualified to carry out the work involved. Personnel responsibilities, competence and supervision must be clearly defined by the operator. If the personnel in question is not already in possession of the requisite know-how, appropriate training and instruction must be provided. If required, the operator may commission the manufacturer/supplier to take care of such training. In addition, the operator is responsible for ensuring that the contents of the operating instructions are fully understood by the responsible personnel.

### 2.3 Non-compliance with Safety Instructions

Non-compliance with safety instructions can jeopardise the safety of personnel, the environment and the machine itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claims for damages.




In particular, non-compliance can, for example, result in:

- failure of important machine/unit functions
- failure of prescribed maintenance and servicing practices
- hazard to persons by electrical, mechanical and chemical effects
- hazard to the environment due to leakage of hazardous substances.

### 2.4 Safety Awareness

It is imperative to comply with the safety instructions contained in this manual, the relevant national accident prevention regulations and the operator's own internal work, operation and safety regulations.

### 2.5 Safety Instructions for the Operator/User

- Any hot or cold components that could pose a hazard must be equipped with a guard by the operator. 
- Guards which are fitted to prevent accidental contact with moving parts (for ex. the coupling) must not be removed whilst the machine is operating.
- Leakages (e.g. at the shaft seal) of hazardous media handled (e.g. explosive, toxic, hot) must be carried away so as to avoid any danger to persons and the environment. Pertinent legal provisions must be adhered to. 
- Electrical hazards must be eliminated. (In this respect refer to the relevant safety regulations applicable to different countries and/or the local energy supply companies.) 

### 2.6 Safety Instructions for Maintenance, Inspection and Installation Work

The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.

Work on the machine shall be carried out only during standstill. The shutdown procedure described in the manual for taking the machine out of service must be adhered to without fail.

Pumps or pump units handling media injurious to health must be decontaminated.

Immediately following completion of the work, all safety-relevant and protective devices must be re-installed and/or re-activated.

Please observe all instructions set out in the chapter on "Commissioning" before returning the machine to service.

## 2.7 Unauthorised Modification and Manufacture of Spare Parts

Modifications or alterations of the machine are only permitted after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.

## 2.8 Unauthorised Modes of Operation

The warranty relating to the operating reliability and safety of the pump/unit supplied is only valid if the machine is used in accordance with its designated use as described in chapter 4. The limits stated in the data sheet must not be exceeded under any circumstances.

## 3 Transport and Interim Storage

### 3.1 Transport

Please use the appropriate handle for transport.

#### Caution

**Never carry the pump by means of the power supply cable or the float switch (for type S only).**

Avoid impacts on the pump during transport and make sure that it cannot drop down.

### 3.2 Interim Storage/Preservation

The pump should be stored in vertical position in a dry, dark, frost-proof room not exposed to sunlight. Under these conditions it does not need additional preservation.

## 4 Description of the Product and Accessories

### 4.1 Technical Specification

KSB submersible motor pumps are floodable, close-coupled units which are not self-priming. The pumps are usually operated completely submerged. They may be operated outside the fluid for short periods of time, until the minimum liquid level has been reached.

#### 4.1.1 Standard Variant

Ama-Drainer are submersible motor pumps for percolating and leakage water.

They are suitable for handling chemically neutral, slightly contaminated waste water containing solids with a grain size of up to 12 mm as well as for washing water.

#### Caution

**The pump cannot cope with the following media:**

- corrosive, combustible or explosive media,
- food,
- sewage.

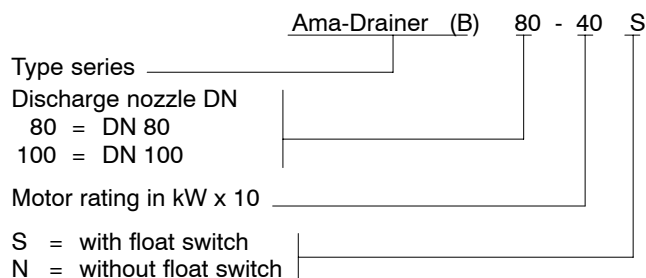
#### 4.1.2 Special Variant B

Variant B is suitable for the media mentioned under 4.1.1 plus:

- abrasive water containing sand.

## 4.2 Designation

The pump name plate states the pump designation. A name plate example is illustrated in section 9.3.



## 4.3 Design Details

### 4.3.1 Drive

KSB submersible motor pump units are supplied with three-phase a.c. motors, complete with power supply cable. The motor winding is in accordance with IEC 38. The electrical data are given on the unit's name plate.

Motor design to EN 60 034 T1/IEC 34-1, insulation class B, type of enclosure IP 68 for the complete unit to EN 60 529, direct starting up to 4 kW, direct or star-delta starting for more than 4 kW.

### 4.3.2 Shaft Seal

The pump end shaft seal and the motor end seal are mechanical seals. A liquid chamber in-between the seal elements ensures cooling and lubrication.

### 4.3.3 Bearings

All pump sizes are equipped with grease-lubricated, maintenance-free rolling element bearings.

### 4.3.4 Installation Options

- Stationary installation
- Portable version

Installation of the pump unit is described in section 5.4.

### 4.3.5 Dimensions and Weights

For dimensions, connection dimensions and weights please refer to **9.2 Dimension Drawings**.

## 4.4 Accessories

For trouble-free functioning of the monitoring equipment appropriate switchgears may be purchased from KSB.

Please contact our relevant sales branch to ask for any accessories you might need.

## 5 Assembly/Installation at Site

### 5.1 Safety Regulations

- **Your electrical installation must be in accordance with VDE 0100/IEC 364 standards; for example, the sockets must have earthing terminals.**
- **The supply mains to which the pump is connected must be equipped with a highly sensitive earth leakage circuit breaker ( $\leq 30$  mA).**
- **Do not operate the pump set in a swimming pool or pond as long as someone is bathing in it. The supply mains to which the pump is connected must be equipped with a highly sensitive earth leakage circuit breaker (max. 30 mA) to avoid any hazard to persons (please consult your electrician).**
- **Caution! Switch off the pump prior to each assembly and disassembly of the pipelines or any other work on the pump.**





- EN 60 335-2-41 (VDE 0700, Part 41) stipulates that submersible motor pumps with a cable length of less than 10 m are only approved for use in buildings, i.e. they must not be operated outdoors!



- If you use an extension cord, please see to it that it is of the same quality (cross-section, cable type) as the pump cable supplied.
- Make sure that all electrical equipment such as socket and alarm unit are installed in a dry, flood-proof location.

## 5.2 Checks to Be Carried out Prior to Installation

All structural work required must have been prepared in accordance with the dimensions stated in the dimension table (9.2). Make sure that all safety regulations are complied with. Check whether the medium to be pumped is covered by the media specified under 4.1.1 or 4.1.2.

## 5.3 Installing the Pump/Unit

Prior to installation, inspect the unit for transport damage to the pump or cable. Carry out the checks described in sections 6.1 and 6.2 before installing the pump.

The pump must be installed on solid, firm ground. For recommended dimensions please refer to section 9.2.

Make sure that the float (for type S only) can move freely.

### Caution



Do not suspend the pump by means of the power supply cable.

### 5.3.1 Verifying the Operating Data

Prior to installation and commissioning/start-up compare the name plate data with the purchase order and site data (for example, operating voltage, frequency etc.).

### 5.3.2 Oil Fill/Oil Quantity

The oil chambers of our submersible motor pumps are filled with ecologically acceptable paraffin oil of medical-use quality 0.8 l for Ama-Drainer (B) 80-40 and 1.0 l for Ama-Drainer (B) 100-75.

### 5.3.3 Direction of Rotation

#### Caution

Ama-Drainer (B) 80 and 100 must be checked for the correct direction of rotation prior to installation (refer to 5.5.3).

## 5.4 Connecting the Piping

(Refer to 9.2 Dimension Drawings/Installation Options.)

Connect the discharge piping to the pump without transmitting any stresses or strains.

### Caution

Never use the pump itself as an anchorage point for the piping.

Thermal expansions of the pipelines must be compensated by appropriate measures so as not to impose any extra loads on the pump exceeding the permissible pipeline forces and moments.

An excessive, impermissible increase in the pipeline forces may cause leaks on the pump where the medium handled can escape into the atmosphere.

**Danger of life when toxic or hot media are handled.**



When the unit is used for draining low-level building areas, fit a swing check valve into the discharge line to avoid backwash from the sewer system.

### Caution

The discharge line should first be laid so that it is situated above the backwash level (street level) before it is led into the sewer.

In addition, a swing check valve should be fitted in long riser pipes, in order to prevent the pump from excessively running in reverse after it is switched off.

When fitting a swing check valve, make sure that the unit can still be properly vented (downstream of the swing check valve).

### Caution

When installing the pumps and pipelines take care not to damage the components by the tools used.

## 5.4.1 Stationary Installation

See sections 9.2.2 and 9.2.3 Installation Options and the respective accessories.

## 5.4.2 Portable Version

A flexible hose can be connected to the pump nozzle using an adapter (i.e. Storz coupling).

## 5.5 Connection to Power Supply

### 5.5.1 General

It is of vital importance to comply with the safety regulations for electrical connection.

Pumps without plug must be connected to the power supply by a trained electrician only. The relevant local regulations must be heeded.

The available mains voltage must correspond to the voltage stated on the name plate.



### 5.5.1.1 Ama-Drainer (B) for Direct Starting

Ama-Drainer pumps for 3~400 V are supplied ready to be plugged in. They are equipped with motor power supply cable and CEE plug, with phase inverter, direction-of-rotation indicator, operation and fault signal lamps, 3-position selector switch manual-0-automatic and protective motor relay.

#### Type N:

Switch position		pump ON
Switch position	0	pump OFF
Switch position		no function for type N!

### Caution

When the switch is set to (automatic operation), the pump does not operate, neither in manual nor in automatic mode!

#### Type S:

Switch position		manual pump start-up
Switch position	0	pump OFF
Switch position		automatic pump start-up

#### Types N and S:

When the switch is set to (manual operation), the green operation signal lamp is on.

When the switch is set to (automatic operation) the green operation signal lamp is on as long as the float switch is in the upper position.

### Caution

If the CEE plug is removed and the pump is connected to another switchgear, the following points must be observed:

#### Ama-Drainer (B) 80 N

The wires 4 and 5 (temperature switch in the motor winding) must be connected to the switchgear to make sure that the pump is tripped as soon as the maximum winding temperature is reached.

#### Ama-Drainer (B) 80 S

The wires 4, 5 and 6 (temperature switch in the motor winding and float switch) must be connected to the switchgear. Wire 5 is for manual operation and wire 6 for automatic operation. In any case, the wires 4, 5 and 6 must be connected to terminals.

### Caution



Even if the wires 5 or 6 are not required, they may be carrying current (see 9.4.1)!

#### 5.5.1.2 Ama-Drainer (B) 100 for Star-Delta Starting

Ama-Drainer pumps are supplied with a motor power supply cable with 4 and with 7 wires. The cable ends are marked (see 9.4.2). A switchgear with star-delta combination, manual-0-automatic selector switch, motor protection switch and terminals is available as accessory.

### Caution

The protective cap on the cable end of pumps supplied without plug should only be removed immediately before the unit is connected to the power supply.

The individual wires of the cable ends are marked with yellow identification strips with black lettering (e.g. U, V, W, 21, 22 or 10, 11, ...). Should it be necessary to shorten the cable, please take note of the wire codes and/or wire colours. Remove the yellow identification strips and re-attach them correctly after shortening the cable.

For connection of the pump to the power supply mains, please refer to the circuit diagram in 9.4.2.

The connection within the switchgear must be carried out in accordance with the circuit diagram of the respective switchgear set.

#### 5.5.2 Motor Protection

The motor is protected by a temperature switch installed in the motor winding which **switches off the pump if the maximum permissible winding temperature is reached and automatically starts it up again after the pump has cooled down.**

If the temperature switch keeps tripping the pump, contact KSB's inspection service.

### Caution

On variants S and N:

- The external protection equipment should always have three poles and an interlocking device in order to ensure complete separation from the mains; this equipment will also prevent the unit from running on two phases only.
- The motor must be protected against overloading by a thermal time-lag overload protection device in accordance with IEC 947/VDE 0660. The device must be set to the rated motor current. Please refer to the name plate for the correct setting value.

In addition, the pump must never be allowed to run dry. The pump unit must never be operated without appropriate motor and short-circuit protection.

### Caution

#### Ama-Drainer 80

If the thermal motor protection in the motor has tripped the unit, the red fault signal lamp (A) on the CEE plug will remain lit until the motor has cooled down again.

#### The motor starts up automatically.

In addition, the CEE plug is equipped with a protective motor relay, which will protect the motor against over-currents, but **not against short-circuits.**

If the protective motor relay (in the CEE plug) has tripped the unit, the red fault signal lamp (A) will remain lit until you press the reset button (B).

The Reset-Manual-Automatic switch at the protective motor relay (in the CEE plug) must always be set to position 'Manual'; otherwise the reset button will be out of function and the motor will start up automatically after the protective motor relay has tripped the unit.

- When the CEE plug is removed and the unit is connected via another switchgear, the wires must be connected to the switchgear in accordance with its circuit diagram.



#### 5.5.3 Checking the Direction of Rotation

##### Ama-Drainer (B) 80 S and N

The power supply cable (CEE plug) has been connected in the factory so that the pump will have the correct direction of rotation provided that the mains' phase sequence (building supply mains) is correct.

The rotary field is correct when the socket has a clockwise rotary field. This can be verified by means of a phase sequence indicator. If the direction of rotation is not correct, the yellow signal lamp (C) on the CEE plug will light up.

When the pump set has been connected to the electric power supply (5.5.1), observe the following:

### Caution

If running in the wrong direction of rotation, the pump cannot reach its duty point. The pump unit might be damaged.

Before checking the direction of rotation make sure that there is no foreign matter in the pump casing.

**Never put your hands or any other objects into the pump.**

### Caution

The pump should only be started up for a very short period of time (max. 3 minutes) for checking the direction of rotation.

#### Check:

When the pump is started up, there must be an anti-clockwise start reaction. If this is the case, the direction of rotation is correct.

If not, change the direction of rotation as follows: press in the phase inverter in the CEE plug using an appropriate screwdriver and turn it by 180° (see 9.4.3). If the pump unit is connected via a switchgear, interchange two wires. The pump's direction of rotation is thus reversed.

The arrow indicating the direction of rotation is on the cover of the terminal box 81-22.



## 5.6 Level Control Switch

### Ama-Drainer S

For units with automatic pump operation a level control switch is required. Variant S is equipped with a float switch.

The float switch must be set in accordance with the desired switching levels.

This is done by fixing the float switch cable to the rod 574 by means of the holder 99-2 at an appropriate height or by fixing the free float switch cable length to the discharge line, the handle or another appropriate point. The unit is switched on at an upper slant of the float housing of approx. 30° and switched off at a lower slant of the float housing of 30° (clearly audible switching noise in the float housing). When setting the switching levels see to it that the pump switches off before the water level reaches the foot's suction openings. Start-up must be effected before the water level reaches the upper sump edge. The float switch must neither come to rest on the floor nor bump against the sump cover, if installed. Make sure that the float cannot get caught on any projecting parts, juts or similar in the sump. When installing 2 pumps controlled by an Ama-Drainer switchgear for double pumping stations the two float switches must be arranged in a cascade (see chapter 9.2.3 Installation Example).

**This configuration permits 3 switching functions:**

1. alternating start-up of the two pumps at each switching cycle.
2. additional start-up of the stand-by pump at peak load.
3. start-up of the stand-by pump should the duty pump fail.

For twin pumping operation, variant N pumps and 2 float switches with the required cable length must be used, since variant S has a built-on float switch with a cable length of just 0.5 m, which cannot be directly connected to the switchgear.

## 6 Commissioning, Start-up/Shutdown

### Caution

Compliance with the following requirements is of paramount importance. Damage resulting from non-compliance shall not be covered by the scope of warranty.

### Caution

Do not use the pump for media to which its materials are not resistant according to the relevant technical documentation.

Before starting up the pump make sure that:

- the operating data (5.3.1) and direction of rotation (5.5.3) have been checked.
- the pump unit has been properly connected to the electric power supply in accordance with 9.4 Circuit Diagrams.

The temperature switch in the winding will only function properly, if the temperature monitoring circuit has been properly connected.

- Install the pump as described in 5.4.
- Before returning the pump to service after a prolonged shutdown period carry out all checks and maintenance work specified in section 6.4.

## 6.1 Commissioning, Start-up

### 6.1.1 Starting up Type S

The pump's automatic control system will cut in when level **A** is reached and will cut out when level **B** is reached (see 9.2 Dimension Drawings and 5.6 Level Control Switch).

### 6.1.2 Starting up Type N

Make sure that the submerged pump actually delivers water when it is plugged in.

## 6.2 Operating Limits

**The operating data are stated on the name plate (example in 9.3).**

**Ama-Drainer** is suitable for handling chemically neutral waste water not containing coarse dirt particles, sand or faeces (max. grain size 12 mm).

**Ama-Drainer B** is suitable for handling abrasive, sand-containing waste water not containing coarse particles or faeces (max. grain size 12 mm).

**When the pump is submerged, the permissible temperature of the medium handled is 50 °C and 90 °C for short periods of time (max. 3 minutes, for example for pumping of washing machine water).**

### Caution

**The manufacturer will not accept liability, if other media than specified are handled.**

**During the drainage of swimming pools it is prohibited - for safety reasons - to use the pool while the pump is operating.**



### Caution

**Dry-running increases wear and should be avoided.**

**Minimum water level 80 mm.**

**For units which are in service very rarely only, we recommend to operate the pump for a short period (approx. 1 minute) every 2 - 3 months.**

**For the max. permissible immersion depth during operation refer to the name plate.**

### Caution

**Do not operate the pump at temperatures exceeding those specified. Damage resulting from disregarding this warning will not be covered by the KSB warranty.**

### 6.2.1 Switching Frequency

To prevent high temperature increases in the motor and excessive loads on the motor, seal elements and bearings the switching frequency should not exceed 20 start-ups per hour.

### 6.2.2 Operating Voltage

The rated operating voltage is indicated on the name plate. The maximum permissible operating voltage deviation is  $\pm 10\%$  of the rated voltage. The maximum permissible voltage difference between the individual phases is 1 %.

### 6.2.3 Density of the Medium Handled

### Caution

The power input of the pump will increase in proportion to the density of the medium handled. To avoid overloading of the motor the density of the medium must comply with the data specified on the purchase order.

### 6.2.4 Sound Pressure Level

Sound pressure level <70 dB(A).

## 6.3 Shutdown/Storage/Preservation

**Work on the unit must only be carried out with the electrical connections disconnected (or with the mains plug unplugged). Make sure that the pump set cannot be switched on accidentally (danger of life!).**

- Unplug the unit.
- Separate the pump and the discharge piping.

**Remove the pump only after it has cooled down sufficiently (min. 10 minutes).**





- Clean the pump under a water jet.
- Position the water jet on the pump's discharge nozzle.
- Leave the pump to dry; store it vertically in a dry, frost-proof, dark room.
- Special preservation measures are not required.

#### 6.4 Returning to Service after Storage

Please refer to section 5 Assembly/Installation at Site.

### 7 Servicing and Maintenance

#### 7.1 General Instructions



**Switch off the pump prior to any servicing/maintenance work.**

**Any extension of the cable or dismantling of the motor component must be carried out by authorised trained personnel only.**

The pump operates practically maintenance-free. Slight wear of the mechanical seal is however unavoidable and will be aggravated by abrasive substances contained in the medium pumped.



**Pumps handling liquids posing health hazards must be decontaminated.**

#### 7.2 Servicing/Inspection

To prevent water from entering the motor and oil from mixing with the medium handled, the oil fill in the supply chamber and the mechanical seal should be checked after 2000 operating hours at the latest.

Operational reliability will be improved by regularly checking the pump's proper functioning.

#### 7.3 Drainage

The pump will be automatically drained when it is taken out of the medium pumped.



#### 7.4 Dismantling

- **Disconnect the unit from the power supply. Unplug the mains plug.**

##### Caution

- **The unit must only be dismantled and reassembled by authorised, trained personnel.**
- **Refer to the exploded view.**

#### 7.4.1 Dismantling the Pump Part

1. Unscrew socket head cap screws 914.21 and remove discs 550.3 and foot.
2. Undo socket head cap screws 914.6 and remove suction cover 162 (for pump type 100: suction cover with inlet ring 131), profile joint 410.2 and bush 540.1.
3. Withdraw plug 916.2 from impeller hub cap 260, unscrew socket head cap screw 914.41, remove impeller hub cap and withdraw impeller 230 (using an appropriate pull-off device if the impeller cannot be removed easily).

#### 7.4.2 Dismantling the Casing Insert 13-6 (only variant B)

1. Unscrew socket head cap screws 914.22 and remove the flanged elbow.
2. Dismantle foot 182, suction cover 162 and impeller 230 as described in section 7.4.1.
3. Withdraw plugs 916.1 (7 pieces), undo countersunk screws 900 and remove retaining ring 506.
4. Lift the projecting seal rim of the casing insert 13-6 off the discharge nozzle and press it into the discharge nozzle. In doing so, remove the casing insert from the volute casing 102.1.

#### 7.4.3 Replacing the Mechanical Seal

1. Remove the two screwed plugs 903.1 and drain the oil chamber.
2. Dismantle the pump part as described in section 7.4.1 or 7.4.2.
3. Remove key 940 and circlip 932.4. Withdraw mechanical seal 433.2.
4. For replacing the motor side mechanical seal 433.1, undo socket head cap screw 914.51 and remove volute casing 102.1.
5. Remove circlip 932.11 and disc 550.2, withdraw mechanical seal 433.1. It is recommended to use a special KSB assembly sleeve to prevent the spring from damaging the shaft surface in the pump side mechanical seal area when withdrawing the mechanical seal 433.1.

#### 7.4.4 Replacing the Radial Ball Bearings

1. Dismantle the pump part and mechanical seal as described in sections 7.4.1 to 7.4.3.
2. Unscrew socket head cap screws 914.23 (3 pieces) and remove bearing cover 360. Withdraw the complete rotating assembly towards the front.
3. Dismantle the pump side radial ball bearing. Remove circlip 932.12, withdraw radial ball bearing 321.1 and shaft sleeve 523. Remove circlip 932.31 or 932.32 and withdraw radial ball bearing 321.2 from the shaft sleeve.
4. Dismantle motor side radial ball bearing 321.1. Withdraw radial ball bearing 321.1 and bearing sleeve 529 from the shaft, remove circlip 932.2 and press the radial ball bearing out of the bearing sleeve.

#### 7.4.5 Motor

If the winding is damaged, it is recommended to replace the complete motor housing with the stator as the stator is shrunk in. Your KSB customer service centre supplies stators with casing as replacement parts.

#### 7.4.6 Oil Check/Change

For checking the oil in the supply chamber, unscrew plug 903.1 and let the oil run into a clean reservoir. (If required, the oil can be filled in again by means of a funnel or similar.) A water/oil emulsion (white colour) is nothing to be worried about, since the mechanical seal always leaks slightly. Rub the emulsion between your fingers, paying particular attention to its oiliness. If the emulsion is not slick or contains abrasive substances, we recommend to consult one of our customer service centres to have the seal elements, oil and worn components replaced. Oil quality and quantity see section 5.3.2 Oil Fill/Oil Quantity.

#### 7.5 Reassembly

##### Caution

Clean all dismantled components and check them for signs of wear. Damaged or worn components are to be replaced by new ones. Make sure that the seal faces are clean and that O-rings and gaskets are properly fitted. It is recommended to use new seal elements whenever the pump is reassembled.

Reassembly is effected in reverse order to dismantling. When reassembling the mechanical seal use a KSB assembly sleeve. When mounting the casing insert 13-6 of Ama-Drainer B take care that the projecting seal rim is properly seated in its recess. Proper functioning of the pump absolutely requires that the bushes 540.1 are fitted. After reassembly fill the supply chamber with oil (see section 5.3.2 Oil Fill/Oil Quantity).

#### 7.6 Spare Parts Stock

Spare parts need not be kept on stock, since as a rule they are readily available. In the case of damage please refer to the service centre directory attached.

## 8 Troubleshooting

	A	B	C	D	E	Schlüssel	
Schlüssel	Pump does not deliver	Pump delivers insufficient flow rate	Excessive current/power input	Insufficient discharge head	Vibrations and noise during pump operation	Causes	Remedy  The pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure. Disconnect the pump from the power supply and let it cool down before starting work on it.
1	•					Pump delivers against an excessively high discharge pressure.	Open the shut-off valve to re-adjust duty point.
2	•					Gate valve in the discharge line is not fully open.	Fully open the gate valve.
3		•		•		Pump is running in the off-design operating range (low flow/overload).	Check the pump's operating data.
4	•					Pump or piping are not completely vented.	Clean out vent hole E in the flanged elbow.
5	•					Pump intake clogged by deposits.	Clean the intake, pump components and swing check or non-return valve.
6	•	•		•	•	Inlet line or impeller clogged.	Remove deposits in the pump and/or piping.
7		•		•		Dirt/fibres in the clearance between the casing wall and impeller of a sluggish rotor.	Check whether the impeller can be easily rotated; clean the hydraulic system, if required.
8		•	•	•	•	Wear of internal pump parts.	Replace worn components by new ones.
9	•	•		•		Defective riser pipe (pipe and seal elements).	Fit new riser pipes. Fit new seal elements.
10	•		•	•	•	Impermissible air or gas content in the fluid pumped.	Consult KSB.
11		•	•	•	•	Reverse rotation.	Interchange two of the phases of the power supply cable.
12			•			Operating voltage is too low.	Check the mains voltage. Check the electric cable connections.
13	•					Motor is not running because of lack of voltage.	Check the electric equipment. Notify the energy supply company.
14	•	•		•		Motor is running on two phases only.	Replace the defective fuse. Check the electric cable connections.
15	•					Motor winding or electric cable are defective.	Contact KSB's pump service.
16			•	•		Defective radial bearing in the motor.	Consult KSB.
17		•	•			Pump clogged by sand, dirt in the pump sump, insufficient inflow.	Clean the intake, sand trap, pump components and swing check valve; drain and clean the pump sump.
18	•					The temperature switch monitoring the winding has tripped the pump because of excessive temperature rise in the winding.	The motor will restart automatically once the unit has cooled down.

**Caution:** Before opening the pump unit within the warranty period please always consult the manufacturer. Disregard of this warning will lead to forfeiture of any and all rights to claims for damages.





**9 Relevant Documentation see page 36**

**9.1 Exploded View see page 36**

**9.2 Dimension Drawings see page 38**

**9.3 Name Plate**

Example of name plate, here for Ama-Drainer 80-40 N

<b>KSB</b> Aktiengesellschaft	
<b>AMA-</b>	B 80 - 40 N S -
<b>DRAINER</b>	380 - 415 V Y 3 ~
	8,5 A
	50 Hz P <sub>I</sub> 5,1 kW
	2800 1/min P <sub>2</sub> 4,0 kW
	2 - 100 m <sup>3</sup> /h IP 68
	22,8 - 2,7 m PA-I 1858
	
	Anlaufdruck entgegengesetzt Starting jerk opposite direction Couple résistant Rincule-nel senso opposto della rotatione Aanloopruk tegenovergesteld
W 331 317-01	
Made in Germany	

**9.4 Electric Circuit Diagrams see page 41**

**9.5 Recycling**

Ama-Drainer pump units consist of materials that can be separately recycled.

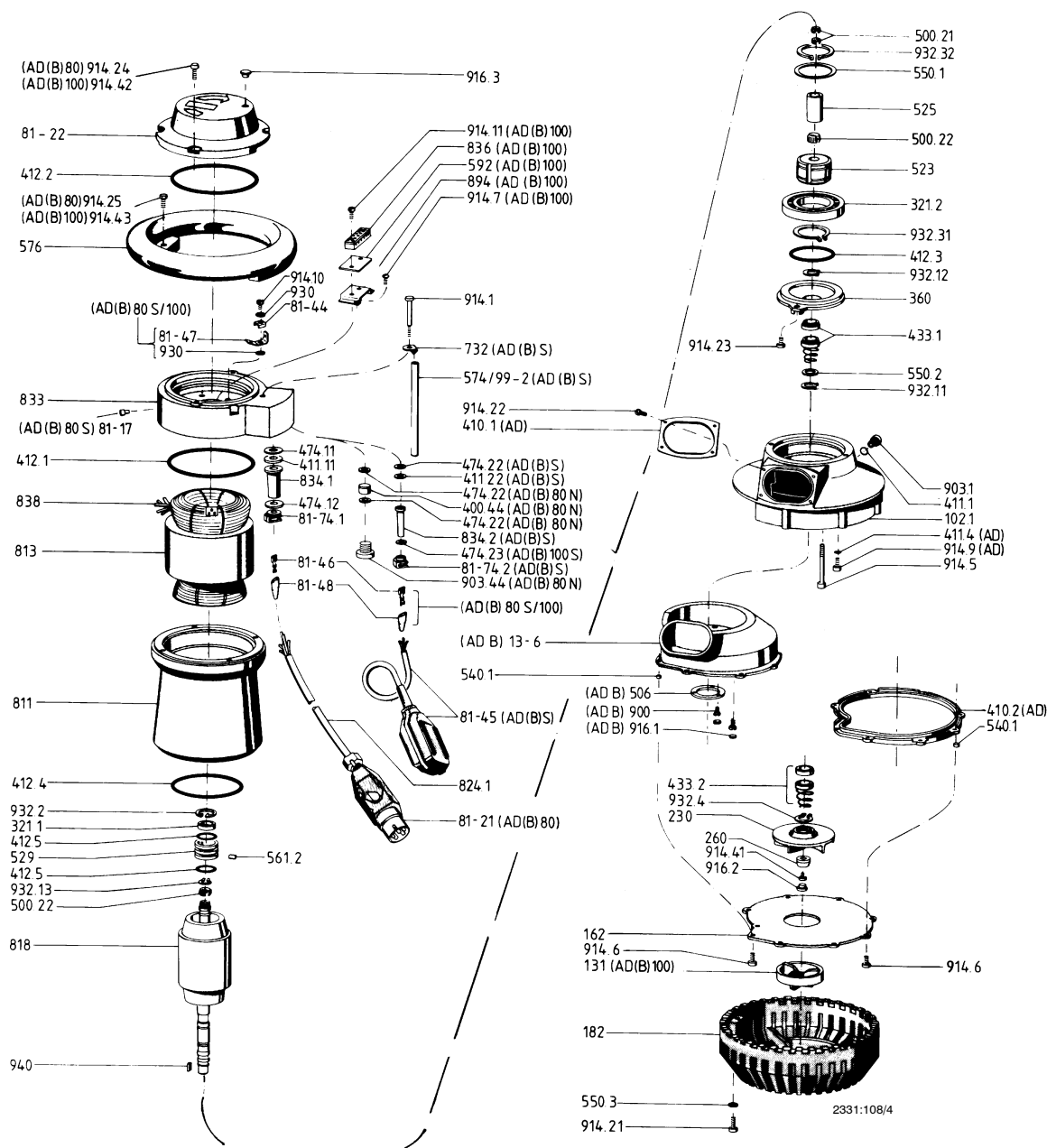
Plastic components are marked in accordance with ISO 11 469.

**9.6 Safety Standards**

The pumps are in accordance with the following European standards:

 - EN 12 050-2

**9 Zugehörige Unterlagen/Relevant Documentation/Documents annexes/Documentazioni**  
**9.1 Explosionsdarstellung/Exploded View/Vue éclatée/Disegno a vista esplosa**



Teile Nr.	Teile-Benennung	Teile Nr.	Teile-Benennung	Teile Nr.	Teile-Benennung
102.1	Spiralgehäuse	529	Lagerhülse	818	Rotor
13-6	Gehäuseeinsatz	540.1	Buchse	824.1	Kabel
131	Einlauftring	550.1	Stützscheibe	833	Klemmenkasten
162	Saugdeckel	550.2	Paßscheibe	834.1/.2	Leitungsdurchführung
182	Fuß	550.3	Scheibe	836	Klemmleiste
230	Laufgrad	561.2	Paßkerbstift	838	Temperaturschalter
260	Laufgradkappe	574	Stange	894	Konsole
321.1/.2	Rillenkugellager	576	Griff	900	Senkschraube
360	Lagerdeckel	592	Unterlage	903.1/.44	Verschlußschraube
400.44	Flachdichtung	732	Halterung	914.1/.5/.6/.7	Innensechskantschraube
410.1/.2 *)	Profildichtung	81-17	Endverbinder	914.9*)/.10/.11	Innensechskantschraube
411.1/.4*)	Dichtring	81-21	CEE-Motorschutzstecker	914.21-.25	Innensechskantschraube
411.11/.22	Dichtring	81-22	Klemmenkastendeckel	914.41/.42	Innensechskantschraube
412.1-.5	O-Ring	81-44	Klemmbügel	914.43/.51	Innensechskantschraube
433.1/.2	Gleitringdichtung	81-45	Schwimmerschalter	916.1/.2/.3	Stopfen
474.11/.12	Druckring	81-46	Steckhülse	930	Sicherungsscheibe
474.22/.23	Druckring	81-47	Flachstecker	932.11-.13/.2	Sicherungsring
500.21/.22	Scheibe	81-48	Steckkupplung	932.31/.32/.4	Sicherungsring
506	Haltering	81-74.1/.2	Druckschraube	940	Paßfeder
523	Wellenhülse	811	Motorgehäuse	99-2	Halter
525	Abstandshülse	813	Statorpaket		

\*) Entfällt bei Ama-Drainer B

Part No.	Part designation	Part No.	Part designation	Part No.	Part designation
102.1	Volute casing	529	Bearing sleeve	818	Rotor
13-6	Casing insert	540.1	Bush	824.1	Cable
131	Inlet ring	550.1	Disc	833	Terminal box
162	Suction cover	550.2	Disc	834.1/.2	Cable duct
182	Foot	550.3	Disc	836	Terminal strip
230	Impeller	561.2	Grooved pin	838	Temperature switch
260	Impeller hub cap	574	Rod	894	Bracket
321.1/.2	Radial ball bearing	576	Handle	900	Screw
360	Bearing cover	592	Base	903.1/.44	Screwed plug
400.44	Gasket	732	Holder	914.1/.5/.6/.7	Socket head cap screw
410.1/.2 <sup>*)</sup>	Profile joint	81-17	Butt joint	914.9 <sup>*)</sup> /.10/.11	Socket head cap screw
411.1/.4 <sup>*)</sup>	Joint ring	81-21	CEE plug	914.21-.25	Socket head cap screw
411.11/.22	Joint ring	81-22	Junction box cover	914.41/.42	Socket head cap screw
412.1-.5	O-ring	81-44	Clamp strap	914.43/.51	Socket head cap screw
433.1/.2	Mechanical seal	81-45	Float switch	916.1/.2/.3	Plug
474.11/.12	Thrust ring	81-46	Receptacle for tab	930	Safety device
474.22/.23	Thrust ring	81-47	Plug	932.11-.13/.2	Circlip
500.21/.22	Disc	81-48	Insulating funnel	932.31/.32/.4	Circlip
506	Retaining ring	81-74.1/.2	Pressure screw	940	Key
523	Shaft sleeve	811	Motor housing	99-2	Lable Holder
525	Spacer sleeve	813	Stator laminations		

1) not fitted on Ama-Drainer B

Repère	Désignation	Repère	Désignation	Repère	Désignation
102.1	Volute	529	Chemise d'arbre sous coussinet	818	Rotor
13-6	Chemise de corps	540.1	Douille	824.1	Câble
131	Bague d'entrée	550.1	Disque	833	Boîte à bornes
162	Fond d'aspiration	550.2	Disque	834.1/.2	Passage de câble
182	Pied	550.3	Disque	836	Réglette à bornes
230	Roue	561.2	Goupille cannelée	838	Thermostat
260	Ogive de roue	574	Tige	894	Console
321.1/.2	Roulement à billes	576	Poignée	900	Vis
360	Couvercle de palier	592	Cale	903.1/.44	Bouchon fileté
400.44	Joint plat	732	Fixation	914.1/.5/.6/.7	Vis à tête cylindrique
410.1/.2 <sup>*)</sup>	Joint profilé	81-17	Raccord d'extrémité	914.9 <sup>*)</sup> /.10/.11	Vis à tête cylindrique
411.1/.4 <sup>*)</sup>	Joint circulaire	81-21	Prise CEE	914.21-.25	Vis à tête cylindrique
411.11/.22	Joint circulaire	81-22	Couvercle de boîte à bornes	914.41/.42	Vis à tête cylindrique
412.1-.5	Joint torique	81-44	Etrier de serrage	914.43/.51	Vis à tête cylindrique
433.1/.2	Garniture mécanique	81-45	Contacteur à flotteur	916.1/.2/.3	Bouchon
474.11/.12	Bague de serrage	81-46	Cosse de câble	930	Frein
474.22/.23	Bague de serrage	81-47	Fiche plate	932.11-.13/.2	Segment d'arrêt
500.21/.22	Bague	81-48	Douille d'isolation	932.31/.32/.4	Segment d'arrêt
506	Bague d'arrêt	81-74.1/.2	Vis de serrage	940	Clavette
523	Chemise d'arbre	811	Carcasse de moteur	99-2	Fixation
525	Entretoise	813	Paquet de tôle statorique		

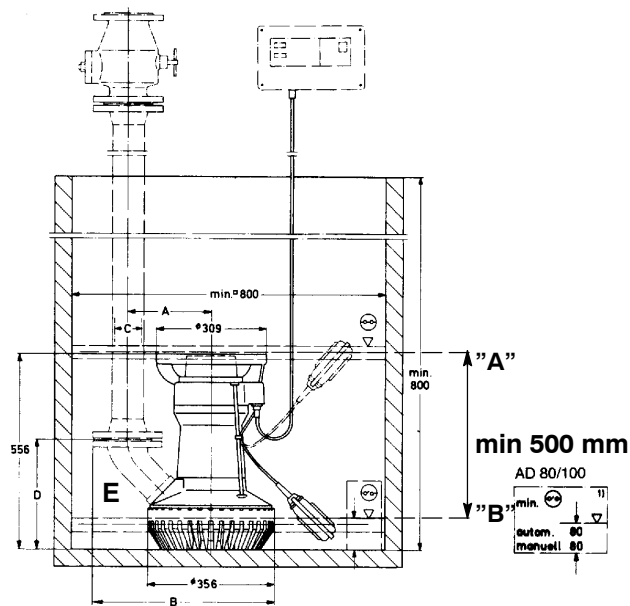
\*) n'existe pas sur Ama-Drainer B

Pezzo Nr.	Denominazione	Pezzo Nr.	Denominazione	Pezzo Nr.	Denominazione
102.1	Corpo di pompa	529	Bussola del cuscinetto	818	Rotore
13-6	Inserto del corpo	540.1	Boccola	824.1	Cavo
131	Anello di ingresso	550.1	Disco di sostegno	833	Scatola della morsettiere
162	Coperchio aspirante	550.2	Disco d'aggiustaggio	834.1/.2	Passacavo
182	Piede	550.3	Rondella	836	Morsettiere
230	Girante	561.2	Spina	838	Termostato
260	Calotta della girante	574	Asta	894	Mensola
321.1/.2	Cuscinetto rigido a sfere	576	Impugnatura	900	Vite a testa svasata
360	Coperchietto	592	Spessore	903.1/.44	Tappo a vite
400.44	Guarnizione piatta	732	Sostegno	914.1/.5/.6/.7	Vite ad esagono incassato
410.1/.2 <sup>*)</sup>	Guarnizione profilata	81-17	Terminale	914.9 <sup>*)</sup> /.10/.11	Vite ad esagono incassato
411.1/.4 <sup>*)</sup>	Anello di guarnizione	81-21	Spina CEE di protezione del motore	914.21-.25	Vite ad esagono incassato
411.11/.22	Anello di guarnizione	81-22	Coperchio della morsettiere	914.41/.42	Vite ad esagono incassato
412.1-.5	O-Ring	81-44	Staffa di fermo	914.43/.51	Vite ad esagono incassato
433.1/.2	Tenuta meccanica	81-45	Interruttore a galleggiante	916.1/.2/.3	Tappo
474.11/.12	Anello di pressione	81-46	Bussola di contatto	930	Rondella di sicurezza
474.22/.23	Anello di pressione	81-47	Spina piatta	932.11-.13/.2	Anello di sicurezza
500.21/.22	Rondella	81-48	Giunto ad innesto	932.31/.32/.4	Anello di sicurezza
506	Anello di fermo	81-74.1/.2	Vite di pressione	940	Linguetta
523	Bussola dell'albero	811	Corpo del motore	99-2	Sostegno
525	Bussola distanziatrice	813	Pacco dello statore		

\*) non previsto nella Ama-Drainer B

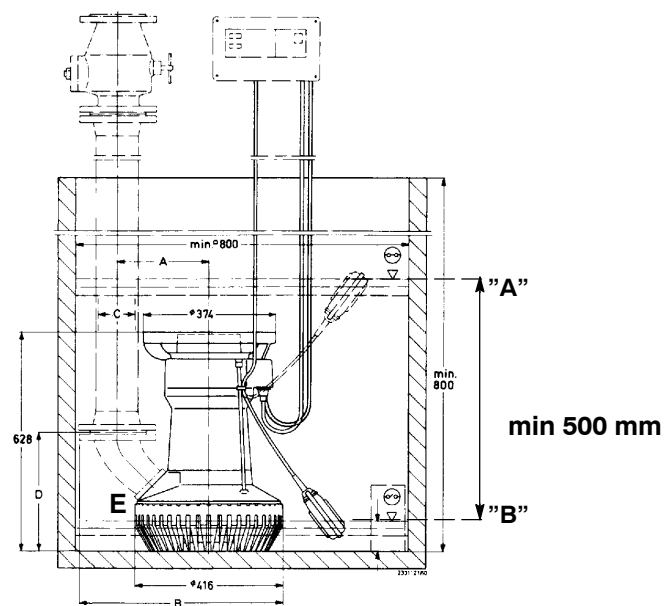
9.2 Maßbilder/Dimension Drawings/Plans d'encombrement/Disegni di ingombro  
9.2.1 Einzelpumpen/Single Pumps/Pompes individuelles/Pompe singole

Ama-Drainer 80



1) Restwasserstand / Residual water level /  
Niveau d'eau résiduelle / livello residuo dell'acqua

Ama-Drainer 100

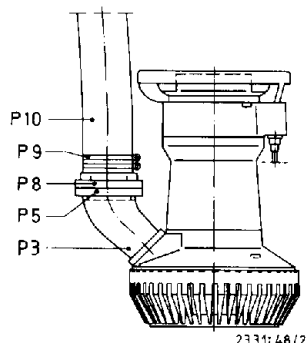


E = Entlüftungsbohrung  
E = Vent hole  
E = Orifice de purge d'air  
E = Foro di sfiato

Maße Gewichte / Dimensions and Weights / Poids et dimensions / Dimensioni e pesi

		A		B		C		D		kg	
Ama-Drainer		80	100	80	100	80	100	80	100	80	100
Anschlußkrümmer mit Innengewinde Connection elbow with internal thread Coude de raccordement taraudé Gomito di attacco con filettatura interna	Rp 2 1/2	223		445		Rp 2 1/2		314		68	-
	Rp 4		275		546		Rp 4		383	-	110
Anschlußkrümmer mit Flansch Connection elbow with flange Coude de raccordement bridé Gomito di attacco con flange	DN 80, PN 16	233		511		80		312		70	-
	DN 100, PN 16		260		578		100		340	-	119

## 9.2.2 Einbauvorschläge Einzelpumpe Installation Options, Single Pumps Modes d'installation pompe individuelle Proposte di installazione di pompe singole

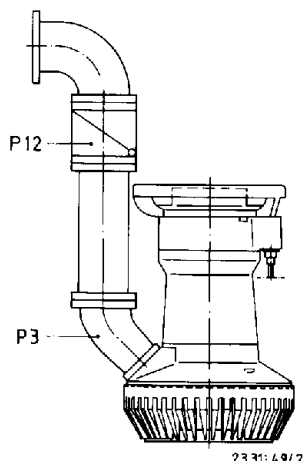


**Einbauvorschlag 1**  
Schlauchanschluß für  
transportable Verwendung  
(Schnellverbindung mit Storz-Kupplung)

**Installation option 1**  
Flexible hose connection for portable  
version (quick-release Storz coupling)

**Mode d'installation 1**  
Raccord de tuyau flexible pour installation  
mobile (raccord express avec accouple-  
ment Storz)

**Proposta 1**  
Attacco a tubo flessibile  
per impiego trasportabile  
(Attacco rapido con giunto Storz)

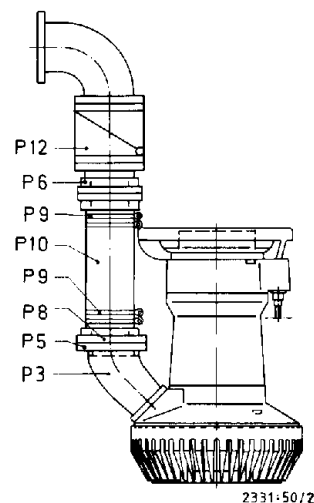


**Einbauvorschlag 2**  
Anschluß über Flanschrohre für  
stationäre Verwendung

**Installation option 2**  
Connection by flanged pipes for stationary  
installation

**Mode d'installation 2**  
Raccord par l'intermédiaire de conduites  
bridées pour installation fixe

**Proposta 2**  
Attacco a tubi flangiati  
per impiego fisso



**Einbauvorschlag 3**  
Schlauchanschluß für  
stationäre Verwendung  
(Schnellverbindung mit Storz-Kupplung)

**Installation option 3**  
Flexible hose connection for stationary  
installation (quick-release Storz coupling)

**Mode d'installation 3**  
Raccord de tuyau flexible pour installation  
fixe (raccord express avec accouplement  
Storz)

**Proposta 3**  
Attacco a tubo flessibile  
per impiego fisso  
(Attacco rapido con giunto Storz)

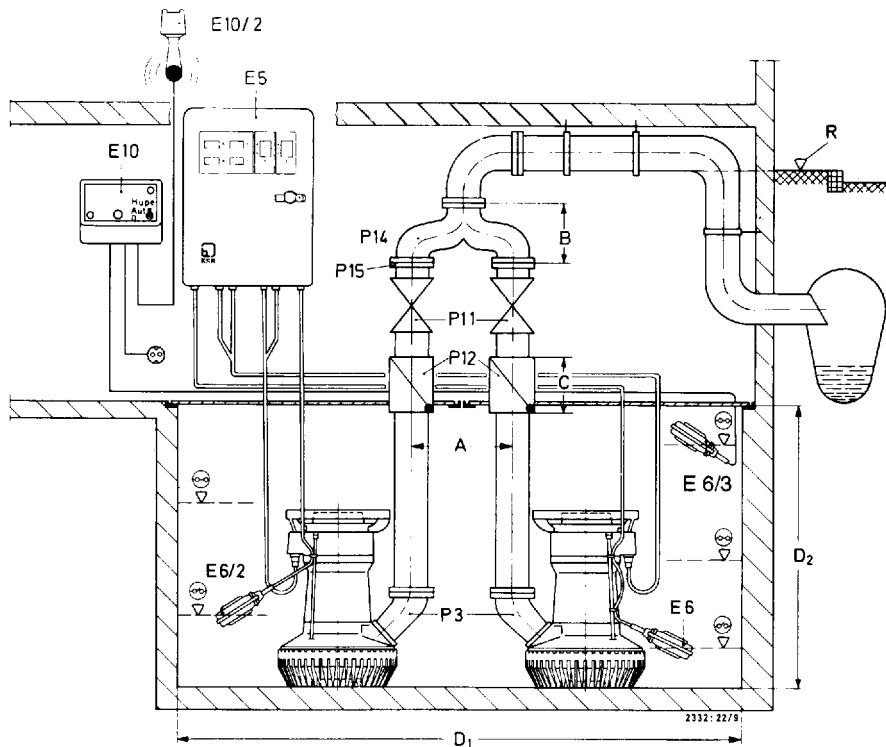
P 3	Anschlußkrümmer
P 5	Storz-Festkupplung mit Außengewinde
P 6	Storz-Festkupplung mit Flansch
P 8	Storz-Schlauchkupplung
P 9	Schlauchselle
P 10	Synthetischschlauch
P 12	Rückflußsperre

P 3	Connection elbow
P 5	Storz coupling with external thread
P 6	Storz coupling with flange
P 8	Storz flexible hose coupling
P 9	Hose clamp
P 10	Synthetic hose
P 12	Check valve

P 3	Coude de raccordement
P 5	Accouplement Storz fileté
P 6	Accouplement Storz bridé
P 8	Accouplement Storz pour tuyau flexible
P 9	Collier de serrage
P 10	Tuyau flexible synthétique
P 12	Clapet de non-retour

P 3	Gomito di attacco
P 5	Giunto rigido Storz con filettatura esterna
P 6	Giunto rigido Storz con flangia
P 8	Giunto Storz per tubo flessibile
P 9	Fascetta per tubo flessibile
P 10	Tubo flessibile in materiale sintetico
P 12	Valvola di ritegno

**9.2.3 Einbaubeispiel Doppelpumpwerk**  
**Installation Example, Double Pumping Station**  
**Mode d'installation station de pompage double**  
**Esempi di installazione di due pompe**  
**Ama-Drainer 80 / 100**



P 3 Anschlußkrümmer  
P 11 Absperrschieber  
P 12 Rückschlagklappe  
P 14 Hosenrohr  
P 15 Gewindeflansch  
E 5 Schaltgerät  
E 6 Schwimmschalter Normalwasser  
E 6/2 Schwimmschalter Normalwasser  
E 6/3 Alarmkontaktgeber Euro-2000 E  
E 10 Alarmschaltgerät AS 5  
E 10/2 Hupe  
R Rückstauenebene

P 3 Connection elbow  
P 11 Gate valve  
P 12 Swing check valve  
P 14 Y-pipe  
P 15 Threaded flange  
E 5 Switchgear  
E 6 Float switch normal water level  
E 6/2 Float switch normal water level  
E 6/3 Alarm contactor Euro-2000 E  
E 10 Alarm switchgear AS 5  
E 10/2 Horn  
R Backwash level

P 3 Coude de raccordement  
P 11 Vanne d'arrêt  
P 12 Clapet de non-retour  
P 14 Tuyau-culotte  
P 15 Bride filetée  
E 5 Boîte de commande  
E 6 Contacteur à flotteur eaux normales  
E 6/2 Contacteur à flotteur eaux normales  
E 6/3 Contacteur d'alarme Euro-2000 E  
E 10 Dispositif d'alarme AS 5  
E 10/2 Avertisseur sonore  
R Niveau de reflux

P 3 Gomito di attacco  
P 11 Saracinesca di intercettazione  
P 12 Valvola di ritegno  
P 14 Tubo ad U  
P 15 Flangia filettata  
E 5 Quadro di comando  
E 6 Interruttore a galleggiante per acqua normale  
E 6/2 Interruttore a galleggiante per acqua normale  
E 6/3 Contattore di allarme Euro-2000 E  
E 10 Interruttore di allarme AS 5  
E 10/2 Avvisatore acustico  
R Piano di ristagno

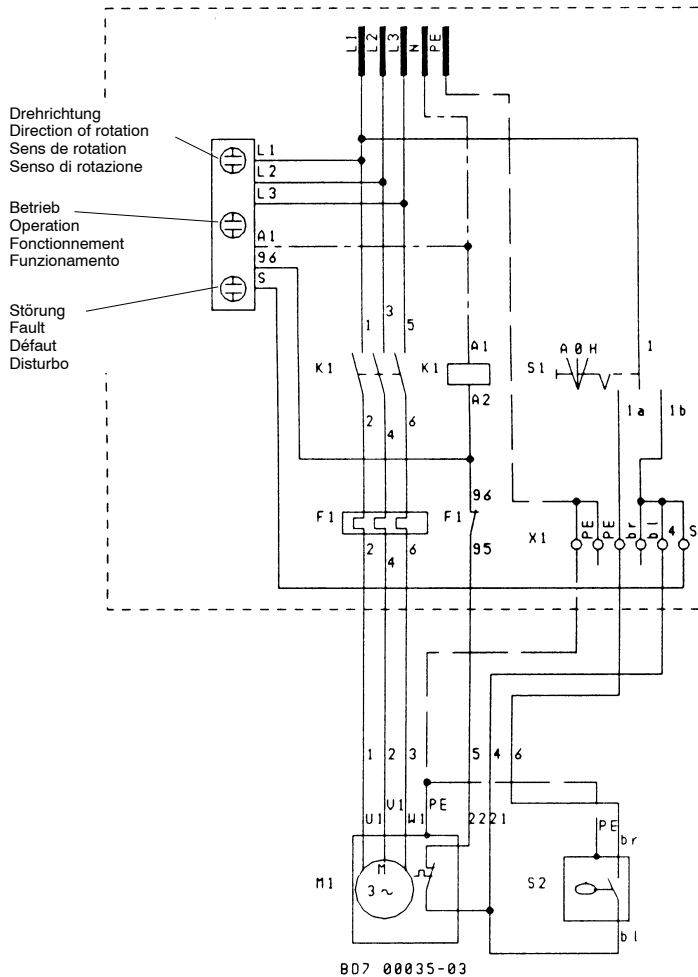
**Maße in mm / Dimensions in mm / Cotes en mm / Misure in mm**

Ama-Drainer	A	B	C	D <sub>1</sub>	D <sub>2</sub>
80	350	260	260	1690 (x800)	1000
100	325	295	300	1690 (x800)	1000

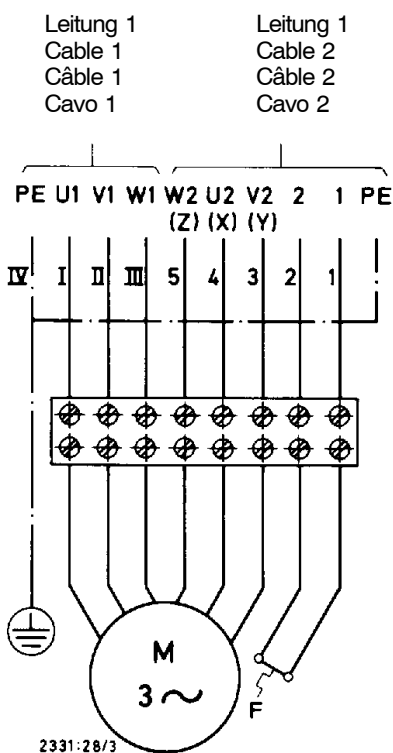


## 9.4 Elektrische Anschlußpläne / Electric Circuit Diagrams / Schémas de connexions électriques / Schemi elettrici di collegamento

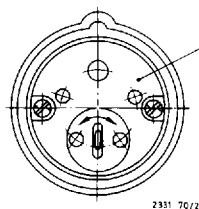
### 9.4.1 Ama-Drainer (B) 80-40



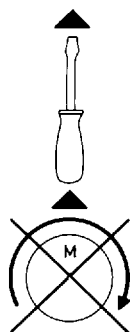
### 9.4.2 Ama-Drainer (B) 100-75 N, S



### 9.4.3 Drehrichtungskontrolle/Phasenwender Checking the Direction of Rotation/Phase Inverter Contrôle du sens de rotation / Inverseur de phases Controllo del senso di rotazione/Invertitore di fase



DIN 49 462  
16 A, 400 V 3~, 50/60 Hz, 6 h  
3L + PE + N



CEE-Stecker Ansicht auf die Steckerstifte mit Phasenwender  
CEE plug, view of the plug pins with phase inverter  
Prise CEE : vue sur les broches avec inverseur de phases  
Vista sugli spinotti della spina CEE con l'invertitore di fase





**KSB Aktiengesellschaft**

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