

Operating and Maintenance Instructions with Dismounting and Mounting Instructions

Macerators

Series AM, ABM Designs S, I

Operating data of the macerator according to order data sheet

Job No.:

Macerator Ident No.:

Machine No.:

Macerator Type:

- 1. General**
- 2. Safety**
- 3. Transportation and Intermediate Storage**
- 4. Description**
- 5. Installation/Mounting**
- 6. Starting/Stopping**
- 7. Maintenance/Serviceing**

1. General

1.1 Application and range of utilization

Macerators have the task of crushing solids, e.g. wood, textiles, plastics, paper, rubber, bone, fur, glass etc., contained in liquids and of making them suitable for pumping. After treatment, solids have a particle size of approx. 3.5 mm and fibres measure approx. 1.5 cm².

As metal parts and stones would destroy the cutting tools, they should be collected in a collecting tank installed before the macerator.

ATTENTION For the range of utilization, please refer to the order data sheet.

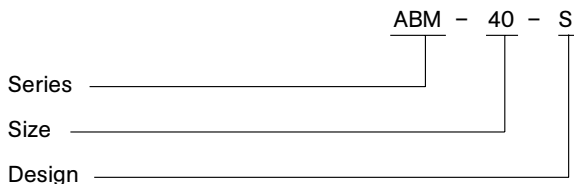
1.2 Performance data

The exact performance data applying to the macerator are to be taken from the order data sheet.

1.3 Abbreviation

The abbreviation of the macerators is set up according to the following scheme.

Example:



This abbreviation is engraved on the type plate.

1.4 Warranty

Our liability for shortcomings in the supply is laid down in our delivery conditions. No liability will be undertaken for any damages caused by non-compliance with the operating instructions and service conditions.

If at any later date the operating conditions happen to change (e.g. different liquid pumped, throughput quantity, viscosity, temperature or delivery conditions), it must be checked by us from case to case and confirmed, if necessary, whether the macerator is suited for these purposes. In case no special agreements were made, macerators supplied by us may, during the warranty period, be opened or varied only by us or our authorized contractual service stations, otherwise, our liability for any defects will cease.

1.5 Testing

Prior to leaving our factory, all macerators are subjected to a leakage and function test. Only properly operating macerators leave the factory achieving the performances warranted by us.

Thus, compliance with the below-listed operating instructions ensures proper operation.

2. Safety

These operating instructions contain basic hints to be observed in case of installation, operation and maintenance. Therefore, prior to mounting and commissioning, these operating instructions must by all means be read by the fitter as well as the pertinent expert personnel/customer and must always be available at the place of installation of the machine/plant.

Not only are the general safety hints listed under this main item Safety to be observed, but also the special safety hints, such as for private use added to the other main items.

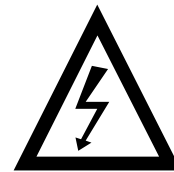
2.1 Marking of hints in the operating instructions

The safety hints contained in these operating instructions which, in case of non-compliance, may cause danger to the personnel, are particularly marked with the general danger symbol



Safety sign according to DIN 4844-W9

in case of warning against electric voltage with



Safety sign according to DIN 4844-W8

For safety hints, non-compliance with which may cause danger to the machine and its operation, the word



is used.

Hints directly attached to the machine such as

- Directional marker
- Sign for fluid connections

must by all means be observed and maintained in completely legible condition.

2.2 Personnel qualification and personnel training

The personnel for operation, maintenance, inspection and mounting must have the corresponding qualification for these operations. Range of liability, competence and the supervision of the personnel must be exactly controlled by the customer. If the personnel do not have the required knowledge, same must be trained and instructed. If required, this may be effected by the manufacturer/supplier on behalf of the machine owner. In addition, it must be ensured by the customer that the contents of the operating instructions are fully understood by the personnel.

2.3 Dangers in case of non-compliance with the safety hints

Non-compliance with the safety hints may result in both, danger to persons as well as environment and machine. Non-compliance with the safety hints may lead to the loss of any claims for damages.

In detail, non-compliance may, **for example**, entail the following dangers:

- Failure of important functions of the machine/plant
- Failure of specified methods for maintenance and servicing
- Danger to persons by electrical, mechanical and chemical influences
- Danger to the environment by leakage of dangerous substances

2.4 Responsible working

The safety hints mentioned in these operating instructions, the current national rules for the prevention of accidents as well as any internal working, operating and safety regulations of the customer must be observed.

2.5 Safety hints for the customer/operator

- If hot or cold machine parts lead to dangers, these parts must be protected against accidental contact at the site.
- Protection against accidental contact for moving parts (e.g. coupling) must not be removed when the machine is in operation.
- Leakages (e.g. of the shaft seal) of dangerous materials to be handled (e.g. explosive, toxic, hot) must be discharged so as not to result in danger to persons and the environment. Legal stipulations are to be observed.
- Dangers by electrical energy are to be excluded (for details with regard hereto, please refer e.g. to the regulations of the VDE and the local energy supply associations).

2.6 Safety hints for maintenance, inspection and mounting operations

The owner shall see to it that all maintenance, inspection and mounting operations are performed by authorized and qualified expert personnel who have sufficiently informed themselves by thoroughly studying the operating instructions.

Basically, operations at the machine must be performed during standstill only. The mode of operation for stopping the machine described in the operating instructions must by all means be observed.

Macerators which crush noxious liquids must be decontaminated.

Prior to restarting, the items listed in Section „Initial Start-Up,“ are to be observed.

2.7 Arbitrary reconstruction and spare parts production

Reconstruction of or changes to the machine are only admissible after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer serve safety purposes. The use of other parts may cancel the liability for the consequences resulting therefrom.

2.8 Inadmissible modes of operation

The operating safety of the machine supplied is only ensured with due application according to Section 1 of the operating instructions. The limit values given in the data sheet must by no means be exceeded.

3. Transportation and intermediate storage

3.1 Packing

The symbols applied to the packing must be observed. During transportation and storage, supply and discharge side and auxiliary connections of the macerator must be closed with plugs. During installation of the macerator, the plugs must be removed.

3.2 Transportation

Due to their weight, macerators are transported to the place of installation by means of a lifting appliance. When transporting the macerators by means of a crane, the sling ropes must be safely fixed in the lifting eyes of the bearing casing and/or around the motor. The sling ropes must be fixed so that when being lifted, the unit is in exact balance.



Crane installation and the sling ropes must be sufficiently sized. The sling ropes must not be fixed to the suspension eyes of the motor.

3.3 Preservation and storage of macerators

Please refer to our document VM 2103 GB.

4. Description

4.1 Structural design

Wet crusher for crushing, homogenizing and dispersing flowable liquid/solid encrustations. Crushing elements are the rotating impeller and the stationary cutting ring. The drive torque is transmitted onto the impeller via the shaft.

4.1.1 Bearing and lubrication

The bearing of the shaft of series AM is in the bearing casing by grease-lubricated cylindrical roller and grooved ball bearings and for series ABM, in the reinforced bearings of the drive. The bearings are splash-proof.

4.1.2 Shaft seal

By maintenance-free, non-balanced single-acting mechanical seal.

4.1.3 Dimensions/branch position/flanges

The dimensions of the macerator and/or macerator aggregate, the branch position and flange dimensions are to be taken from the tables of dimensions.

4.2 Mode of operation

The solids suspended in the delivery medium are seized by the rotating impeller and flung against the cutting ring. Crushing is effected uniformly between the cutting tips of the impeller and the cutting edges of the cutting ring. Through narrow slots in the impeller and through the gap between the cutting tools, the crushed solids, together with the carrier liquid, enter the retaining chamber of the macerator housing and from here, they are further transported automatically in case of macerators of design S, and by a downstream pump in case of design I.

4.3 Aggregate construction

4.3.1 Drive

By non-explosion-proof or explosion-proof electric motors.

4.3.2 Shaft coupling and protection against accidental contact

Shaft coupling according to DIN 740.

A protection against accidental contact **according to DIN 24 295** is provided as soon as the scope of supply comprises macerators of series AM, shaft coupling and drive.



According to the rules for the prevention of accidents, the macerator may only be operated with a protection against accidental contact according to DIN 24 295.

If a protection against accidental contact is not supplied, same must be attached by the customer.

5. Installation/mounting

5.1 Installation

The macerators may be installed horizontally or vertically with the bearing and/or drive upwards.

5.2 Foundation

The foundation design depends on the size of the macerator and the local installation conditions. For exact data on the macerator dimensions, please refer to our tables of dimensions. The foundation can be designed as a concrete foundation or load-bearing foundation frame, for example, of the steel design. A condition of all foundation designs is: The foundation must be designed so that it can take the weight of the macerator on the entire surface.

5.3 Fastening

The macerator must be fixed to the foundation, stress-free.

5.4 Assembly of macerator and drive

The aggregate being completed at the place of service only, mounting of the coupling must be effected as follows:

1. Cover macerator and drive shaft end with a filmy coat of molybdenum disulfite (e.g. Molykote), and insert keys.
2. By means of a fitting tool, push macerator and motor-side coupling halves on until the shaft end is flush with the coupling hub. If no fitting tool is available, heating of the coupling halves to approx. 100°C (without rubber buffers) facilitates mounting.
3. Axially fix coupling halves with a hexagon socket with cup point according to DIN 916.
4. When assembling macerator and motor, make sure that the coupling halves are exactly aligned. Depending upon the coupling size, the distance between the coupling halves must be between 2 – 8 mm.



5. Mount protection against accidental contact according to DIN 24 295.

5.5 Space required for maintenance and servicing

ATTENTION The macerator must be accessible from all sides allowing necessary visual inspections to be performed.

For maintenance and service operations, sufficient space must be provided, especially for the replacement of the cutting tools. The space required for replacements is given in the macerator table of dimensions. In addition, see to it that all pipelines can be readily mounted and dismantled.

5.6 Laying of pipelines**5.6.1 Nominal diameters**

The nominal diameters of the supply and discharge lines should be designed according to the nominal macerator branch diameters. In case of considerable deviations, kindly contact the factory.

5.6.2 Supports and flange connections

By way of the flange connections, the pipelines must be connected to the macerator, stress-free. They must be supported close to the macerator and should allow of easy screwing to avoid deformations. After the screws have been slackened, the flanges must neither be inclined nor springy nor rest on top of one another under pressure. Any thermal stresses that may occur at the pipelines must be kept away from the macerator by taking appropriate measures, e.g. by the installation of compensators.

5.6.3 Cleaning of pipelines prior to attachment

Prior to mounting the macerator, the supply-side pipelines, slides and valves must by all means be flushed and/or cleaned.

Items left over from assembly operations, e.g. bolts, nuts, large stones, pieces of steel etc. destroy the cutting tools of the macerator.

5.6.4 Protection of the cutting tools

In order to protect the cutting tools against metal particles and stones, a suitable settling tank must be installed in front of the macerator inlet.

We recommend our reliable separating plants for stones and metal particles.

5.7 Laying the auxiliary pipeline for flushing water

The auxiliary pipeline for the supply of the mechanical seal must be connected stress-free and sealing.

5.8 Safety and control mechanisms

Pressure and/or vacuum gauges must be connected.

5.9 Electric connections

Connection of the power supply cables of the drive motor must be effected by an electrical expert according to the switching diagram of the motor manufacturer. For these purposes, the current VDE regulations and the regulations of the local energy and supply association are to be observed. Danger by electrical energy must be excluded.

6. Starting/Stopping**6.1 Preparation for starting****6.1.1 Supply of the mechanical seal with flushing water**

For maintaining its function, the mechanical seal requires a flushing liquid which dissipates the frictional heat generated and limits the penetration of the liquid pumped into the sealing chamber.

The required flushing liquid pressure is 0.5 to 2.0 bar over the internal macerator casing pressure. The minimum flushing water quantity is 1.5 l per minute.

The mechanical seal should be loaded with flushing water 30 seconds before the macerator is switched in and 30 seconds after the macerator is disconnected. During operation, the supply of flushing water must by no means be interrupted. For this purpose, we recommend our macerator controller and the sealing water supply unit.

6.1.2 Quality and properties of the sealing liquid

ATTENTION Any liquid may be used as flushing liquid in case of compatibility of all parts contacted and the compatibility with the medium to be sealed. The liquid must be free from solids, must not tend to deposits, should have the highest possible boiling point as well as a good heat conductivity and low viscosity. Pure water of low hardness meets these requirements to a high degree.

6.1.3 Sense of rotation

The sense of rotation of the macerator is counterclockwise or clockwise. Change in the sense of rotation with each motor starting will extend the service life of the cutting tools considerably. For these purposes, we recommend our macerator controller.

6.2 Starting

6.2.1 Start-up

All shut-off mechanisms on the supply and discharge sides must be opened before starting up.

6.2.2 Drive

Switch motor in.
The motor must not be overloaded. The power consumption can be checked by means of an ammeter.

ATTENTION A pump installed upstream or downstream of the macerator may only be started with the macerator switched on.

6.3 Stopping

6.3.1 Shut-down

Switch motor off.

ATTENTION A pump installed upstream or downstream of the macerator may only be started with the macerator switched on.

6.3.2 Measures in case of a longer shut-down period

If a longer shut-down period is projected and there is a danger of frost, the macerator must be drained. Thereafter, the macerator must be preserved (please refer to Section 3.3. above).

7. Maintenance/Serviceing

7.1 Maintenance

For maintenance and service operations, the details listed under Section 2. Safety are to be observed. Regular control and maintenance will extend the service life

7.1.1 General control

1. The drive motor must not be overloaded.
2. Check supply and discharge lines for tightness.
3. The mechanical seal must not have any heavy leakage.
4. Observe pressure and temperature monitoring instruments, and check against the order data sheet and/or acceptance report.
5. Observe additional devices such as sealing water supply unit of the shaft seal, if provided.
6. From time to time, clean the separating plant for stones and metal particles, if provided, according to the local conditions.

7.1.2 Maintenance of components

7.1.2.1 Bearing of the drive shaft and lubrication of the bearing of series AM

The bearing of the drive shaft in the bearing casing is effected by regreasable cylindrical and grooved ball bearings.

Bearing greases

For the lubrication of the anti-friction bearings, we recommend to use the below-listed bearing greases or equivalent. The order of producers is no quality ranking.

Producer	Brand name
ARAL	HL 3
BP	BP ENERGREASE LS 3
CALTEX	CALTEX MULTIFAX 2
ESSO	BEACON 3
GULF	GULFCROWN GREASE No. 2 GULFCROWN GREASE No. 3
MOBIL-OIL	MOBILUX GREASE FETT 3
SHELL	SHELL ALVANIA FETT 3
SKF	ALFALUB LGMT 3
VALVOLINE	VALVOLINE LB 2

If none of the listed bearing greases is available, we recommend in any case a multi-purpose grease on lithium basis.

Grease mixture with grease grades of different basic oils and thickeners leads to a reduction of the lubricating properties and must therefore be avoided.

Grease quantity in grams per bearing

AM 10, AM 20	400 g
AM 40, AM 80	750 g
AM 120, AM 160	1600 g

Relubrication period

Every 3000 operating hours, the bearings must be relubricated.

Relubrication

Relubrication is effected via the grease nipples (119) screwed in the bearing casing (105). Relubrication must be continued for such a period of time until the old grease emerges at the grease quantity control (101) The old grease must be scrapped off.

7.1.2.2 Drive motors

Please refer to the manufacturers' operating and maintenance instructions.

7.2 Servicing (Dismounting and Mounting Instructions)

General

On request, trained service engineers will be at your disposal for mountings and repairs.

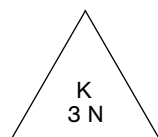


In case of repairs performed by the customer's own personnel or our trained mechanics, it must be ensured that the macerator is completely empty and clean.

This applies in particular to macerators which, in case of repair, are sent to our factory or to one of our contractual repair shops.

In protection of our staff and for reasons of environmental protection, we have to refuse to accept for repair any macerators filled with liquid pumped. Otherwise, we will have to charge the customer/operator with the costs for an ecologically acceptable waste disposal. In case of repair of macerators operated with dangerous materials ① and/or liquids harmful to the environment, the customer/operator must advise hereof his own and/or our local mounting personnel or, in case of return, our factory and/or contractual service shop of his own accord. In such a case, evidence of the liquid handled, e.g. in the form of a DIN safety data sheet will have to be presented to us when requesting a service engineer.

Designation according to
DIN 51 502



① **Dangerous materials are:**

- Toxic substances
- Substances detrimental to health
- Caustic substances
- Irritants
- Explosive materials
- Fire-promoting, highly, easily and normally inflammable materials
- Carcinogenic substances
- Foetopathic substances
- Genes-changing substances
- Substances which are dangerous to human beings in any other way



When working locally, the customer's own and/or our mounting personnel must be referred to dangers which may be caused in connection with repairs. Protective gloves must be worn for all work executed within reach of the cutting tools (403, 409).

The most important dismantling and mounting operations are described in these instructions. The mounting steps described in the individual sections must be consistently observed.

7.2.1 Dismounting the macerator

Prior to commencing the dismantling, the following operations must be performed:



- Disconnect power supply cable from the motor. Motor must not be capable of being started. This also applies prior to removing the hand hole covers (509) for cleaning purposes.
- All shut-off mechanisms in the supply and discharge lines must be closed.
- Loosen screws between foundation and macerator, and screw out.s

7.2.1.1 Dismounting the impeller, changing the cutting tips

- Remove union (601 ... 604) and (613).
- Lift bearing casing (105) together with coupling casing (305) and motor in case of series M, and/or motor with sealing cover (210) in case of series ABM off the macerator casing (502).
- Bend up the edges of the locking plate (402) and screw off shaft nut (401). For these purposes, block shaft over impeller (403).
- Remove locking plate (402).
- By means of a pull-off device, withdraw impeller (403) from the shaft.
- When they become worn, the four cutting tips soldered in the impeller can be reversed or replaced. For this purpose, the area of the impeller in which the cutting tips are soldered must be heated to approx. 600°C. After removing the cutting tips, the guide grooves must be cleaned (remove solder residues) After doing so, the reversed or new cutting tips can be soldered in again.

Solder: e.g. Castolin 1802.
Flux: e.g. Castolin 1802 F.

After soldering, grind cutting tips to the outside diameter of the impeller.

7.2.1.2 Dismounting the cutting ring

Dismounting the cutting ring is effected after the dismantling of the impeller (403). Please refer to Section 7.2.1.1 above.

- Remove hexagon nut (405) and hexagon screw (404).
- Remove socket-head cap screw (406), spring washer (407) and pressure ring (408).
- Remove upper cutting ring bearing (410), and pull cutting ring (409) out of the macerator casing (502).
- Remove lower cutting ring bearing (410).

7.2.1.3 Dismounting the mechanical seal

Dismounting of the mechanical seal is effected after the dismantling of the impeller (403). Please refer to Section 7.2.1.1 above.

● Series AM

- Remove key (118).
- Withdraw spacer ring (201) from the shaft (113).
- Remove socket-head cap screw (202) and spring washer (203).
- Together with the mechanical seal (208), push mechanical seal casing (204) from the shaft (113). For these purposes, use the two tapped holes in the mechanical seal casing (204) and screws M 8 x 50 for forcing-off. In doing so, do not damage the mechanical seal casing (204).
- Remove socket-head cap screw (205), spring washer (206), mechanical seal casing cover (207) and O-ring (209).
- Remove mechanical seal (208).

● Series ABM

- Remove key (118).
- Remove union (301 ... 303). Withdraw sealing cover (210) with spacer ring (201) and mechanical seal (208) from the shaft butt of the motor. In doing so, do not damage sealing cover (210). Remove spacer ring (201) and mechanical seal (208) from the sealing cover (210).

7.2.1.4 Dismounting the motor with series ABM

Dismounting of the motor is effected after the dismantling of the mechanical seal (208). Please refer to Section 7.2.1.3 above.

- Withdraw flinger ring (106) from the motor shaft.

7.2.1.5 Dismounting the shaft and bearing with series AM

Dismounting of the shaft (113) is effected after the dismantling of the impeller (403) (please refer to Section 7.2.1.1 above) and the mechanical seal (please refer to Section 7.2.1.3 above).

- Remove union (605 ... 607), and lift off coupling casing (305) with motor.
- Withdraw coupling halves (307), and remove key (117).
- Screw out grease quantity control (101).
- Withdraw flinger ring (106).
- Remove hexagon screw (102) and serrated lock washer (103).

- Remove bearing cover (104) together with the lip seal (116).
- Press shaft (113) out of the bearing casing (105).
- Remove grease filling (107) and circlip (108).
- Pull cylindrical roller bearing (111), support disk (109), shims (110) and grooved ball bearing (112) from the shaft (113).
- Remove distance ring (114) from the bearing casing (105).
- By means of a suitable tool (ejector drift), beat outer ring of the cylindrical roller bearing (111) out of the bearing casing (105).
- Remove support disk (115).
- Press lip seal (116) out of the bearing casing (105) and bearing cover (104).
- By means of a suitable pipe length, press shaft (113) over the outer ring of the cylindrical roller bearing (111) into the bearing casing (105). Slightly oil bearing seat previously.
- Mount bearing cover (104), and tighten with serrated lock washer (103) and hexagon screw (102).
- Insert key (117) in the shaft (113), and on the front side, lock by two punch marks.
- By means of a fitting tool, push macerator and motor-side coupling halves on until the shaft end is flush with the coupling hub. If no fitting tool is available, heating of the coupling halves to approx. 100°C (without rubber buffers) facilitates mounting. Axially fix coupling halves with stud (306).
- Attach coupling casing (305) and motor and fix with union (605 ... 607) and (301 ... 303).
- Push flinger ring (106) against the shaft collar.

7.2.2 Assembly of the macerator

General

After careful cleaning, assembly of the individual macerator components is effected analogously in reverse order.

7.2.2.1 Mounting the shaft and bearing for series AM

- Fill the chamber of the lip seal (116) with bearing grease and coat the sealing lips.
- Press lip seal (116) into the cleaned seat of the bearing casing (105) and/or bearing cover (104).

Note: The sealing lip with hose spring of the lip seal must always face the side to be sealed (pointing to the inside).

Pressing-in is effected with a suitable pressing stamp. Absolutely see to it that the pressing force is applied as close as possible to the outside diameter of the lip seal.

- Insert support disk (115) in the bearing casing (105).
- If required, carefully clean anti-friction bearings with Diesel fuel. The contact surfaces being bright and undamaged, the anti-friction bearings (111) and (112) may be re-used. If this is not the case, the anti-friction bearings must be replaced.
- Fill anti-friction bearings (111) and (112) with bearing grease. The grease filling is applied as described below.
 1. Fill hollow spaces between the rolling bodies up to approx. 30 to 50% with grease.
 2. Scrape off excessive grease (most suitably with the fingers, do not use any metallic object). For bearing greases recommended by us, please refer to Section 7.1.2.1 above.
- By means of a suitable pipe length, press outer ring of the cylindrical roller bearing (111) into the bearing casing (105). Slightly oil bearing seat previously.
- Coat the inner surface of the distance ring (114) with a bearing grease layer of approx. 20 mm and mount in the bearing casing (105).

ATTENTION Place distance ring (114) so that the grease quantity control (101) engages the bore hole of the distance ring (114). Screw grease quantity control (101) in.
- By means of a suitable pipe length, push inner ring of the drive-side cylindrical roller bearing (111) as well as the greased grooved ball bearing (112) onto the shaft (113). Slightly oil shaft previously. Mount the guard disk of the grooved ball bearing (112), pointing to the impeller. Mount shim (110), support disk (109) and circlip (108).

7.2.2.2 Mounting the mechanical seal

● Mounting the mechanical seal, general

Mechanical seals are high-quality precision parts. The mounting instructions of the mechanical seal manufacturers are to be observed. During mounting, careful handling and extreme cleanliness are a condition of proper functioning. To facilitate mounting, surfaces on which O-rings are sliding may be coated with lubricants such as silicon oil, polydiol or soft soap.

ATTENTION Do not use standard oil.

Mechanical seals with elastomer bellows are mounted on the shaft with normal or low-surface-tension water (with cleansing agent addition). Wet sealing seat and shaft well.

ATTENTION Do not use oil or grease. The static sealing element (bearing ring) must exclusively be used with water or alcohol.

Note: See to it that the parts sliding on each other are replaced in pairs only. Never provide sliding surfaces with lubricant, but mount completely dry, dust-free and clean.

● Series ABM

- Concentrically press stationary seal ring of the mechanical seal (208) with O-ring in the cleaned sealing cover (210).

Note: See to uniform pressure distribution.
- Push flinger ring (106) on the motor shaft.
- Push sealing cover (210) over the motor shaft. In doing so, do not damage sealing cover.
- Fix sealing cover (210) with union (301 ... 303) to the motor.
- By means of the distance ring (201), press rotating part of the mechanical seal (208) onto the motor shaft.

● Series AM

- Insert stationary seal ring of the mechanical seal (208) with O-ring in the cleaned mechanical seal casing (204).
- Screw mechanical seal casing cover (207) with spring washer (206) and socket-head cap screw (205) to the mechanical seal casing (204).
- Mount O-ring (209).
- Press mechanical seal casing (204) into the bearing casing (105).

Note: When mounting the mechanical seal casing onto the shaft see to it that the mechanical seal casing is not canted to avoid damages to the stationary seal ring of the mechanical seal.

- By means of the socket-head cap screw (202) and spring washer (203), fix mechanical seal casing to the bearing casing (105).
- By means of the distance ring (201), press rotating part of the mechanical seal (208) into the mechanical seal casing.

7.2.2.3 Mounting the cutting ring

- Mount cutting ring bearing (410) on the cutting ring (409), and press assembly into the cleaned seat of the macerator casing (502).
To facilitate mounting, the macerator casing seat may be coated with lubricants such as silicon oil, polydiol or soft soap.
ATTENTION Do not use standard oil.
- Tighten pressure ring (408) with spring washer (407) and socket-head cap screw (406) at the macerator casing (502).
- Uniformly tighten hexagon screws (404) attending to the centric position of the cutting ring, and lock with a hexagon nut (405).

7.2.2.4 Mounting the impeller

- Insert key (118).
- Press impeller on the shaft. Slightly oil shaft previously.
ATTENTION Turn distance ring (201) so that the pins project into the bore holes of the impeller.
- Put locking plate (402) on, and tighten impeller with shaft nut (401).
ATTENTION Secure shaft nut (401) by bending up the edges of the locking plate (402) against loosening.
- Mount O-ring (501).
- Mount bearing casing (501) and/or sealing cover (210) with all mounted parts on the macerator casing (502).
Note: During mounting, see to it that the impeller (403) is directed concentrically into the cutting ring (409).
- Fix bearing casing (105) and/or sealing cover (210) with union (601 ... 604) to the macerator casing (502).

7.2.2.5 Control of the gap between impeller and cutting ring

ATTENTION Following assembly and prior to putting the macerator into operation check whether impeller (403) does not touch the cutting ring (409). This is done by manually turning the impeller through 360° over the breaking-off ring on the coupling half (307) or, in case of series ABM, over the motor fan. For these purposes, remove motor fan cowl. If required, the gap between the impeller and cutting ring must be adjusted by means of the hexagon screws (404).

7.3 Spare parts/replacement parts

In the following sectional drawings with parts list, all macerators mentioned are represented. The parts marked in the parts list can be provided as spare parts-replacement parts.

Recommended spare parts/replacement parts:
R = large repair kit
r = small repair kit



For reasons of operating safety, only **original spare parts** supplied by us may be kept on stock and installed. In this connection, we refer to the statements made under Section 2.7 above.

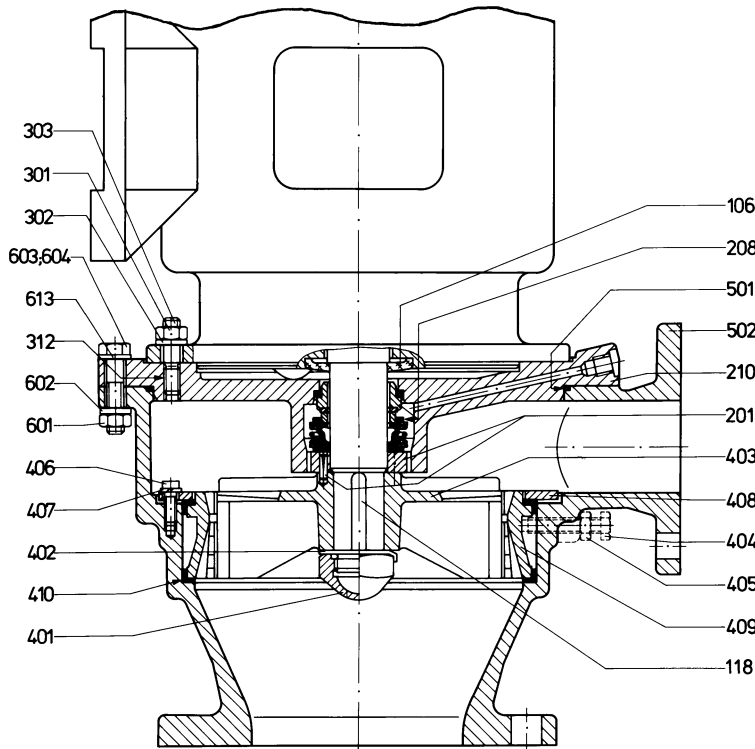
For spare parts/replacement parts orders, the following must be quoted:

Machine number
Abbreviation of macerator
Part number
Denomination and part quantity
or Ident No. and quantity

Note: The machine number and the abbreviation of the macerator are engraved on the type plate. The Ident No. and quantity can also be seen from the attached separate spare parts list.

7.4 Sectional drawing with list of components and recommended spare parts/replacement parts

7.4.1 Series ABM

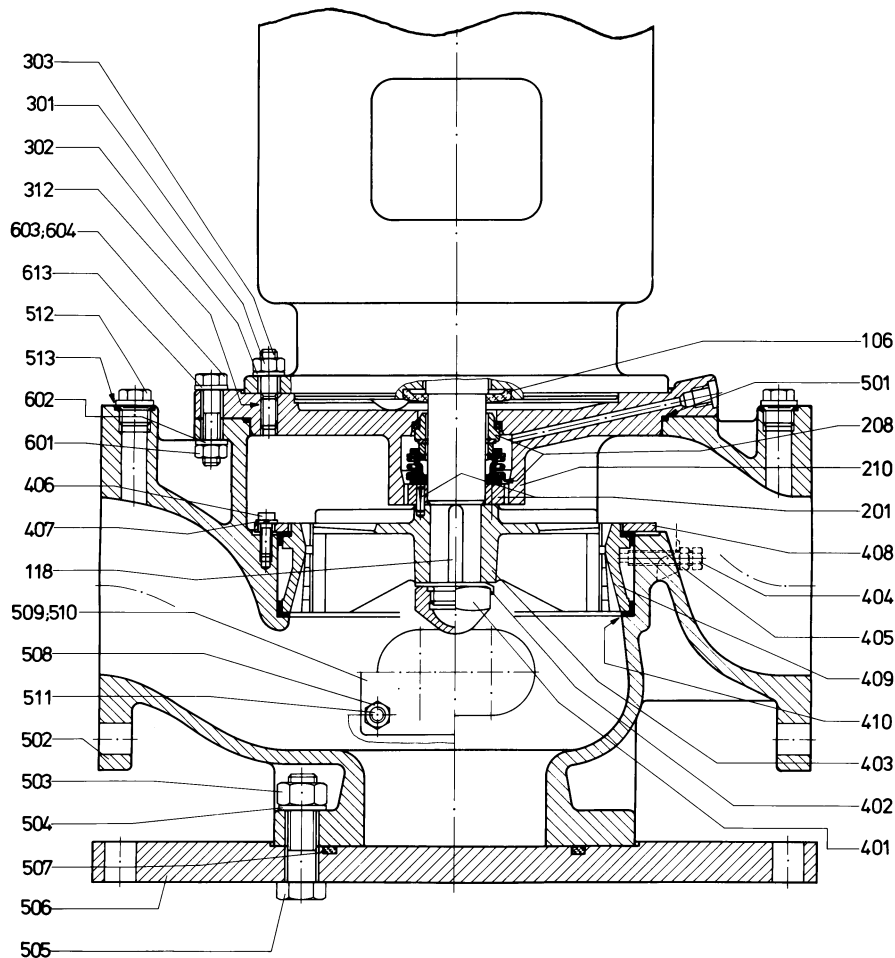


Part No.	Denomination	Quantity	
		Design S	Design I
106	Flinger ring	1	1
118	Key	1	1
201	Distance ring with grooved pin	1	1
208	Mechanical seal	1	1
210	Sealing cover	1	1
301	Hexagon nut	4	4
302	Serrated lock washer	4	4
303	Stud	4	4
312	Loctite		
401	Shaft nut	1	1
402	Locking plate	1	1
403 ①	Impeller, complete	1	1
404	Hexagon screw	3	4
405	Hexagon nut	3	4
406	Socket-head cap screw	8 ②	8 ②
407	Spring washer	8 ②	8 ②
408	Pressure ring	1	1
409	Cutting ring	1	1
410	Cutting ring bearing	2	2
501	O-ring	1	1
502	Macerator casing	1	1
503	Hexagon nut	-	8
504	Serrated lock washer	-	8
505	Hexagon screw	-	8
506	Foundation plate	-	1
507	O-ring	-	1
508	Hexagon nut	-	8
509	Hand hole cover	-	2
510	Hand hole gasket	-	2
511	Stud	-	8
512	Threaded plug	-	2
513	Joint washer	-	2
601	Hexagon nut	8	8
602	Serrated lock water	8	8
603	Hexagon screw	6	6
604	Stud	2	2
613	Washer	8	8

Sectional drawing ABM... S

① Consisting of:
Impeller with four soldered-in cutting tips, which, after being worn, can be reversed (please also refer to Item 7.2.1.1 above)

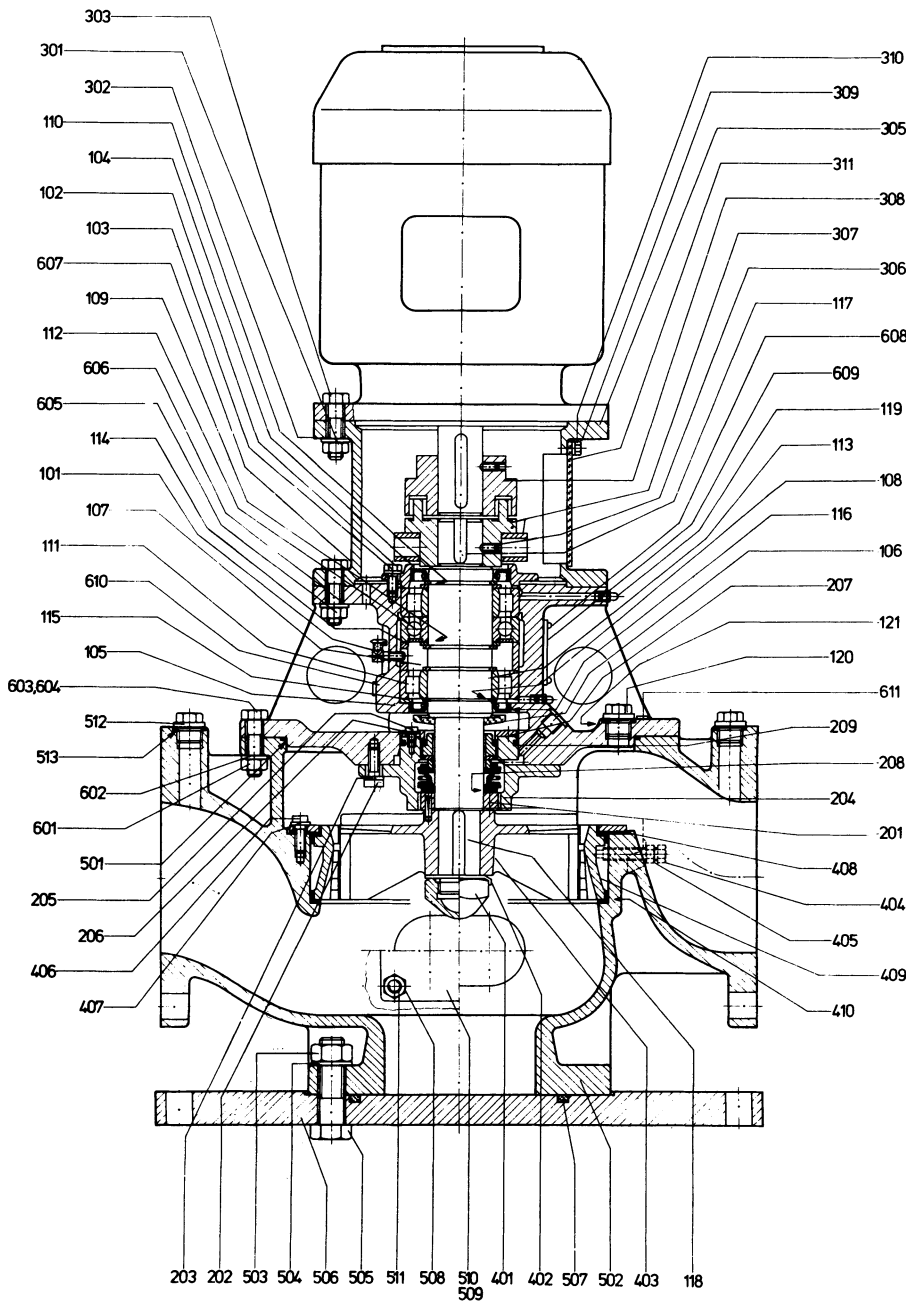
② 12 pieces for sizes 40 and 80.



Sectional drawing ABM... I

7.4.2 Series AM

AM...I (list of components for designs S and I)



Part No.	Denomination	Quantity
101	Grease quantity control	1
102 ⑥	Hexagon screw	4
103 ⑥	Serrated lock washer	4
104	Bearing cover	1
105	Bearing casing	1
106	Flinger ring	1
107	Grease filling	R
108	Circlip	4
109	Support disk	2
110 ⑦	Shim	6
111	Cylindrical roller bearing	2
112	Grooved ball bearing	1
113	Shaft	1
114	Distance ring	1
115	Support disk	1
116	Lip seal	2
117	Key	1
118	Key	1
119	Grease nipple	2
120	Threaded plug	1
121	Joint washer	1
201	Distance ring with grooved pin	1
202	Socket-head cap screw	4
203	Spring washer	4
204	Mechanical seal casing	1
205	Socket-head cap screw	4
206	Spring washer	4
207	Mechanical seal casing cover	1
208	Mechanical seal	1
209	O-ring	1
301 ①	Hexagon nut	4
302 ①	Serrated lock washer	4
303 ①	Hexagon screw	4
305	Coupling casing	1
306	Stud	2
307***	Coupling half, complete	1
308	Coupling half	1
309	Hexagon screw	4
310	Clamp	2
311	Sealing plate	2
401	Shaft nut	1
402	Locking plate	1
403**	Impeller, complete	1
404 ⑥	Hexagon screw	4
405 ⑥	Hexagon nut	4
406 ②	Socket-head cap screw	8
407 ②	Spring washer	8
408	Pressure ring	1
409	Cutting ring	1
410	Cutting ring bearing	2
501	O-ring	1
502	Macerator casing	1
503*	Hexagon nut	8
504*	Serrated lock washer	8
505*	Hexagon screw	8
506*	Foundation plate	1
507*	O-ring	1
508*	Hexagon nut	8
509*	Hand hole cover	2
510*	Hand hole gasket	2
511*	Stud	8
512*	Threaded plug	2
513*	Joint washer	2
601 ③	Hexagon nut	8
602 ③	Serrated lock water	8
603 ④	Hexagon screw	6
604 ⑥	Stud	2
605	Hexagon nut	4
606	Serrated lock washer	4
607	Hexagon screw	4
608	Grooved stud	1
609	Rating plate	1
610	Information plate	1
611	Information plate	1

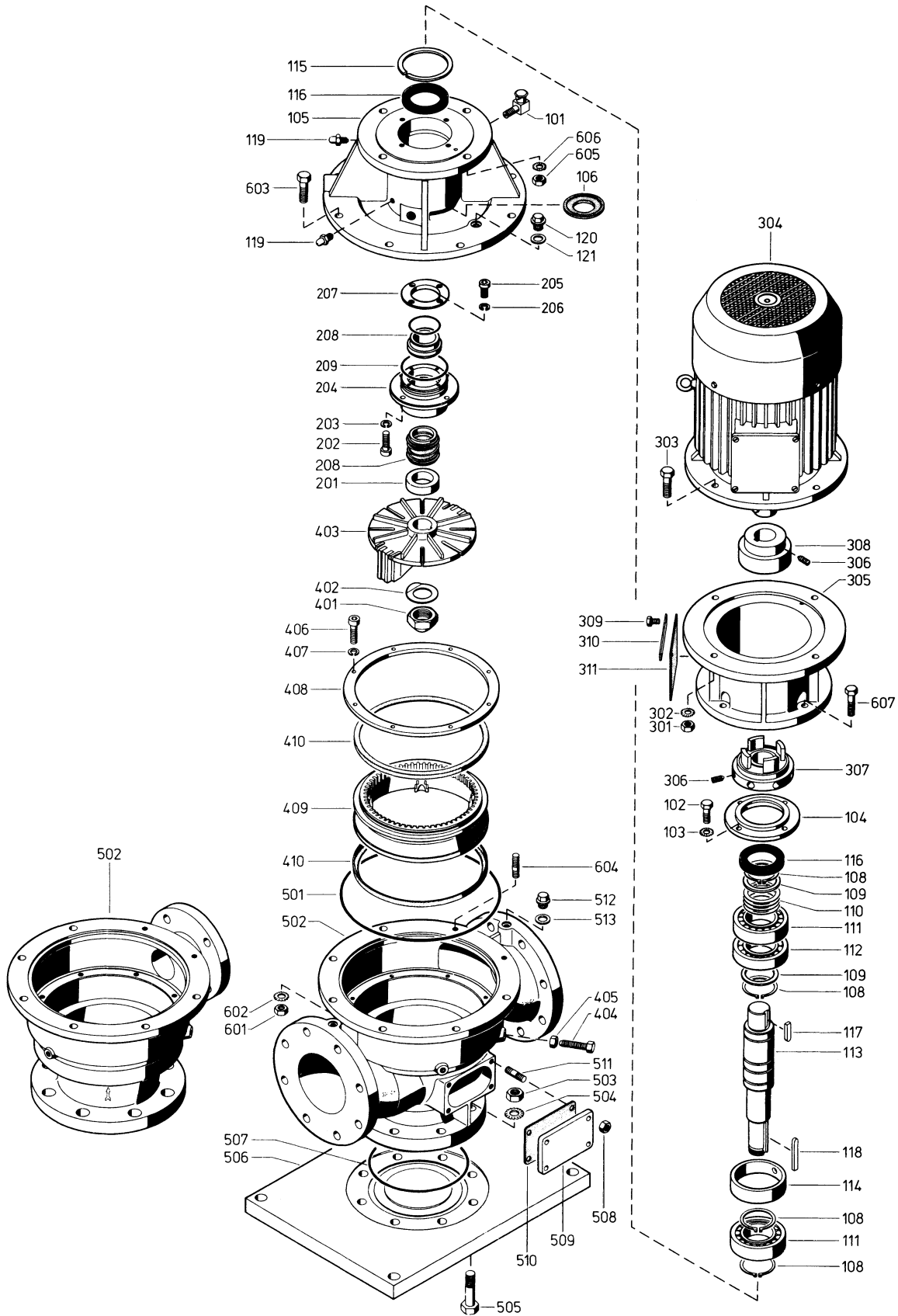
* Parts not required for Design S

** Consisting of:
Impeller with four soldered-in cutting tips, which, after being worn, can be reversed (please also refer to Item 7.2.1.1 above)

*** Consisting of:
Coupling half and breaking-off ring

- ① 8 pieces for size AM 160
- ② 12 pieces for sizes AM 40, AM 80, AM 120, AM 160
- ③ 12 pieces for sizes AM 120, AM 160
- ④ 8 pieces for sizes AM 120, AM 160
- ⑤ 3 pieces for design S
- ⑥ 4 pieces for sizes AM 120, AM 160
- ⑦ 3 pieces for sizes AM 40, AM 80
- ⑧ 8 pieces for sizes AM 40, AM 80, AM 120, AM 160

Explosion drawing AM...S, AM...I



Design S

Design I

Subject to technical alterations.

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VM 770.0001 GB/05.00 – Ident-No. 151000