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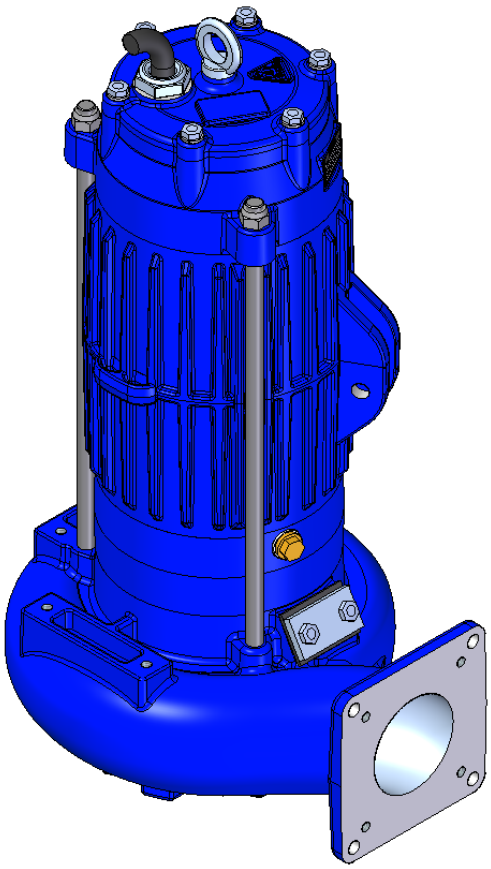
Submersible Motor Pump

AT 44F – 304S



Operation Manual

Technical modifications reserved

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1 Foreword

1.1 Information about the Manual

This manual contains information for the transport, installation, maintenance and removal of the submersible motor pump. The safety instructions are to be observed, in order to ensure safe operation.

We reserve the right to make changes to the illustrations and data specified in this manual, for the purpose of further development.

Abbreviations, units, specialist terms, special designations or terminology common in the branch, that are used in this manual, are explained in more detail in the chapter entitled “Annex”.

This manual is a component part of the scope of supply.

- This manual is not subject to any revision service. The respective latest version can be obtained via specialist shops or directly from the manufacturer.
- It has a modular structure and relates exclusively to the specified product. Further information about the product and the components associated with it can, if necessary, be taken from the relevant documents or instructions. This applies in particular for safety instructions!

1.2 Customer Service

In case of need, please contact the authorised specialist dealer.

An extensive dealer search is available on our homepage in the Internet at the following address:

National:

- https://www.eisele.de/nc/vertriebspartner/national/

International:

- https://www.eisele.de/vertriebspartner/international/

1.3 Safekeeping

Keep the operation manual (including the relevant associated documents) ready at hand close to the submersible motor pump.

1.4 Scope of Supply

The scope of supply is to be checked for completeness and damage with the help of the enclosed packing list. It is possible that the scope of supply deviates from the illustration on the title page. The operation manual is only intended for the respective submersible motor pump. For accessories, a separate operation manual must be requested.

2 Safety

2.1 User's Duty of Care

We point out, that the commissioning is prohibited, until it has been established, that the machine/system in which this product is installed, complies with the provisions of the underlying directives.

The product has been designed and manufactured under consideration of a risk analysis and after careful selection of the harmonised standards to be observed, as well as other technical specifications. Consequently a maximum level of safety is ensured.

This safety can however only be achieved in practical operation, when all measures necessary for this are taken. It falls within the duty of care of the user, to plan these measures and to check their implementation.

The user must ensure that

- All persons who perform work or activities in connection with the product, have carefully read and understood the manual (in particular the safety instructions and warnings).
- The manual is always available in a legible condition and complete at the place where the product is used.
- All persons who perform activities on the product can examine the manual at any time.
- The statutory regulations are observed.
- For the operation, special operating instructions coordinated to the circumstances of his business are prepared, which once again explicitly take into consideration the safety aspects.
- The product is only used as intended.
- The product is only operated in a perfect, functional condition. In particular the safety equipment must be checked regularly for functionality.
- The work to be carried out is only executed or performed by an adequately qualified person!
- Personnel are regularly instructed in all applicable matters of work safety and environmental protection, and know the manual and in particular the safety instructions contained in it.
- Trainee operating personnel work with the product exclusively under the supervision of an experienced person.
- Safety symbols, signs and stickers that are attached to the product are immediately replaced with original ones if they become illegible or are lost!
- In the direct vicinity of the submersible motor pump, if necessary a warning sign is erected with the inscription “Attention! Toxic Fumes!”.
- Rescue routes are marked by signs according to national conventions!
- Necessary personal protective equipment for the operating, maintenance and repair personnel are available and used.
- Unauthorised persons (for example children) do not stand in the danger zone.

2.2 Basic Safety Instructions

Safety instructions serve the avoidance of personal injury and damage to the submersible motor pump as well as the environment. All operators are obligated to read and always observe these safety instructions. It is important, that this instruction is read carefully by the user and the operating personnel.

2.3 Explanation of the Safety Symbols Used

Safety symbols draw attention to the importance of the adjacent texts.

The design of the warning signs is based on DIN ISO 3864.

Notes about Signs and Symbols

Background colour of the field	Contrast colour	Meaning/ Use	Illustration of the field for specification of the level of danger
Red	White	**Danger!** Warns of an imminent danger that leads to death or serious injuries, if not avoided.	
Orange	Black	**Warning!** Warns of a potentially hazardous situation that leads to death or serious injuries, if not avoided.	
Yellow	Black	**Caution!** Warns of a potentially hazardous situation that leads to moderately severe or minor injuries, if not avoided.	
White	Black	**Note!** Warns of a potentially hazardous situation that leads to material or environmental damage, if not avoided.	

2.4 General Safety Regulations:

Overriding Provisions

- Ensure that the operating personnel is at least 18 years old.
- Ensure that the operating personnel and the pump are not in potentially explosive atmospheres.
- Ensure that the operating personnel are regularly instructed in all applicable matters of work safety and environmental protection.
- Make sure that the operating personnel has read and observes the operation manual.
- Make sure that the warning and notice signs are attached and legible.
- Observe all warning and notice signs attached to the submersible motor pump.
- Use personal protective equipment, including safety shoes, fall protection, protective gloves, gas detector, respirator etc.
- Make sure that the submersible motor pump is not put into operation without the safety equipment and guards attached by the manufacturer or installed on site.
- Have defects on the submersible motor pump repaired immediately.

To maintain the Safety and Function,

- Defective components must be replaced exclusively by original replacement parts with identical electrical and mechanical data.
- All safety equipment, fastenings as well as electrical connections and lines must be inspected regularly for perfect condition.
- Defects on the submersible motor pump must be repaired immediately.
- Submersible motor pump and associated peripherals must not be modified or converted, otherwise the operation manual will expire and the declaration of conformity will be invalidated.

Before working on electrical equipment the following points are to be observed:

- Completely disconnect the electric motor and control circuits from all current and voltage.
- Secure electric motor against restarting.
- Verify zero voltage with appropriate measuring device.
- Ground and short circuit the electric motor.
- Cover or cordon off live parts.
- Attach a warning sign.

If the work is not performed by Eisele

- Ensure that all work is performed and accepted exclusively by persons who have been trained, instructed or authorised by Eisele or by specialists.
- Make sure that the trained specialist issues a written confirmation or marks the machine with his test mark.

Danger due to potentially explosive, toxic and combustible atmospheres

It is possible that toxic, combustible and potentially explosive gases escape from the pump medium. The following points are therefore to be observed without fail:

- Make sure that installation and maintenance work is performed exclusively by trained specialists. The Industrial Safety Regulations (BetrSichV) as well as the safety and maintenance instructions in the operation manual are thereby to be strictly observed.
- Make sure that there is no potentially explosive atmosphere present during operation as well as installation and maintenance work on tank openings and couplings.
- Have work that influences the explosion protection performed exclusively by trained specialists.

Increased risk of explosion in biogas tanks

- It is possible, when opening or removing the submersible motor pump, that gases escape, which can form potentially explosive mixtures in combination with air.
- Keep all source of ignition (e.g. naked flame, hot heat sources, mobile phones, tools that are not non-sparking, electrical appliances not protected against explosion) away from the potentially explosive area (Ex-Zone).
- Use exclusively non-sparking tools.
- Make sure that the tool used (e.g. drilling machine, drill, core drill, chisel etc.) is a special non-sparking tool.
- Make sure that welding, flame-cutting and spark generating work is not performed inside an Ex-Zone.
- Ensure that all work, in particular welding, flame-cutting and spark generating work, is carried out outside the potentially explosive area.

Risks of environmental damage

- Make sure that neither gearbox oil nor lubricant flows into the ground, water or sewage system.
- Dispose of lubricant residues, old oil and containers and rags contaminated with it in accordance with regulations.
- After decommissioning, clean and dispose of the submersible motor pump in accordance with national and regional statutory regulations.

2.5 Employee Qualification

Operating Personnel:

The personnel for the installation, commissioning, operation, maintenance, cleaning, repair and inspection of machines must have the necessary qualifications. Personnel under the influence of alcohol, drugs or medicines must not transport, install, start-up, operate or repair the submersible motor pump.

Trained / Instructed Personnel:

Persons, who have been instructed and, if necessary, trained in the tasks to which they have been assigned and the possible risks thereby occurring with improper behaviour. They have also been instructed about the necessary protective equipment and protective measures.

- Personnel undergoing training, apprentices and those being instructed or those in general education may only be active under the constant supervision of an experienced person.

Specialist:

Persons who, based on their professional education, knowledge and experience, can assess the work to which they are assigned and recognise possible hazards. Furthermore, they have knowledge of the relevant regulations.

In addition to this, special qualifications are required for the following activities:

- Transport
- Cleaning
- Installation
- Commissioning
- Operation
- Maintenance/ Servicing
- Troubleshooting

- Repairs
- Decommissioning

2.6 Risk of Injury

To avoid injuries:

- Observe the accident prevention regulations of the Industrial Safety Ordinance (BetrSichV).
- Observe the accident prevention regulations for agricultural biogas installations.
- Observe all rules of engineering.
- Observe all safety instructions.
- Provide and observe national and regional regulations for the prevention of accidents, industrial safety.
- Provide and observe national and regional hygiene regulations. Contact with liquid manure, sewage, etc. can trigger serious infections.
- Provide and observe the rules for environmental protection.
- Make sure, that persons under the influence of alcohol, drugs or medicines do not transport, install, start up, operate or repair the submersible motor pump.
- Observe all warning and notice signs attached to the submersible motor pump.

2.7 Product Liability

Modifications to the submersible motor pump and associated peripherals may only be performed following consultation with and written approval of Eisele. Original replacement parts and accessories, approved by Eisele, are a mandatory condition for the warranty. The use of other parts will invalidate the warranty claim.

The company Franz Eisele & Söhne GmbH & Co. KG accepts no liability for personal injury, damage to material or the environment and/or business losses resulting from the fact, that the operation manual has not or not completely been observed. The warranty shall expire in the case of unauthorised interventions. Warranty and liability claims for personal injury, material and environmental damage are excluded, if they can be traced back to one of more of the following causes:

- Non-observance of the instructions in the operation manual concerning installation, removal, commissioning, operation and maintenance.
- Improper use.
- Improper transport, installation, removal, commissioning, operation or repair.
- Unauthorised structural modifications to the submersible motor pump.
- Improperly performed repair.
- The effect of foreign objects that are not suitable for the process.
- Defective monitoring of wearing parts.

For details about the warranty, please refer to our General Delivery Conditions or your contract documentation.

3 Product Description

Risk of death from explosions!

- Operation of the submersible motor pump in an Ex-Zone is not permitted.
- If, due to the installation situation, there is an Ex-Zone above the substrate, it must be ensured by means of suitable safety equipment, that if the submersible mixer pump surfaces it is fully and completely disconnected from voltage and current.

3.1 Proper Intended Use

The submersible motor pump is primarily intended for use in agricultural operations, in biogas installations and in industry and is used in this environment for pumping sewage, sewage sludge and liquid manure with a limited viscosity and with a limited proportion of fibrous material.

The pumping of other media is only possible after consultation with and written authorisation by Eisele. All types of use not listed here are not as intended and are therefore regarded as improper use!

We draw your attention to the fact, that operation of the submersible motor pump outside the described scope of use is forbidden. The manufacturer/supplier is not liable for damage resulting therefrom. The risk is borne solely by the user.

Proper intended use also includes the observance of the operation manual and the inspection and maintenance conditions.

- The manufacturer points out explicitly, that only original parts and accessories are coordinated to the product, tested and approved.
- The installation or use of third-party products can negatively influence the specified characteristics of the original parts and lead to danger for people, the environment and animals.
- Any liability of the manufacturer is excluded for injury/damage to humans, animals, environment, machines and installations, that results from the use of third-party products.
- For reasons of safety, no unauthorised modifications may be undertaken! All planned modifications must be authorised in writing by the manufacturer.
- Ensure, after installation or assembly with other components, that the conformity of the end product is guaranteed in accordance with the applicable directive.
- Sufficiently dimensioned attachment of the submersible motor pump.
- Ensure that the medium is flowable and homogeneous.
- The pumping capacity and limits of use of the pump are dependent on the viscosity. If this data is not available for the pump medium, as a guide value a maximum dry matter content (TS) of 10% can be used for liquid manure.
- Make sure that the pH-value of the medium to be pumped is between 6.5 and 7.8.
- Make sure that all safety and monitoring equipment e.g. pressure-relief valves, pressure transducer and/or thermal sensor of the electric motor, are connected and fully functional.
- Maintain inspection and maintenance intervals.
- Observe operating instructions, safety, rule, prohibitory and warning notices.
- For a change of the installation location or the operating situation of the submersible motor pump, pay attention to possible Ex-Zones.
- All medium conducting components in the piping system must be designed for the maximum pressure of the pump.

3.2 Foreseeable Misuse

Not as intended is the use of the submersible motor pump in an Ex-Zone.

Any use other than that described in chapter 3.1 is not as intended. The user or the operator of the submersible motor pump is responsible for all damage that does not result through proper intended use.

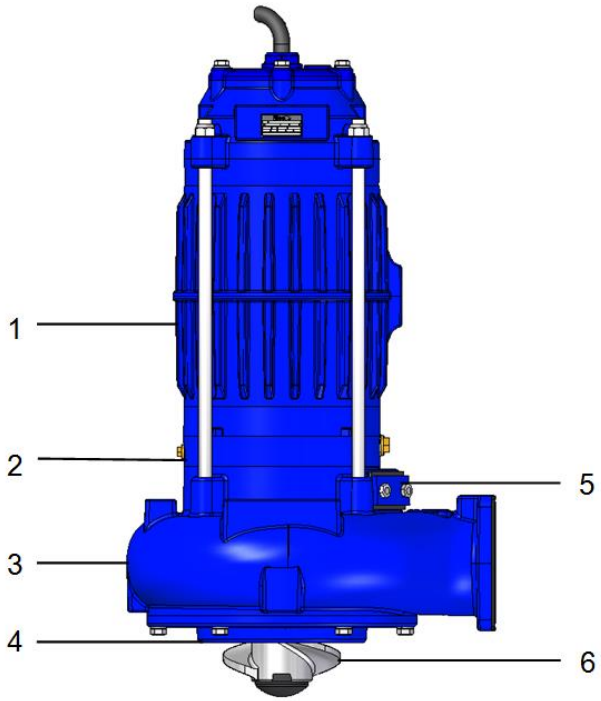
To ensure safe operation and avoid damage to the submersible motor pump it is to be ensured, that the pump medium does not contain the following materials, foreign matter or foreign objects:

- Slaughterhouse waste (bones, etc.)
- Bulky, sharp-edged solids (square timber, boards, tree branches, etc.)
- Metallic and non-metallic parts (such as e.g. screws, iron bars, steel wire, chains, etc.)
- Long-fibred and other products that form a blockage (cords, foils, etc.)

Furthermore it is to be ensured without fail, that the piping system is consistent for the pump medium. Otherwise sudden excessively high pressures and possible damage can occur.

To avoid cavitation and operational disturbances, ensure adequate flowability of the pump medium. The higher the dry-matter content, the greater the wear and the probability of the occurrence of operational disturbances.

3.3 Structure



The illustration does not always correspond with the scope of supply!

1. Submersible motor
2. Oil chamber
3. Pump housing
4. Inlet nozzle
5. Gas escape hole
6. Propeller blade

3.4 Technical Data

DANGER

Airborne acoustical noise
This pump is not assigned to any direct workplace. The sound pressure level of possible adjacent workplaces (LpA) is below 70 dB(A) at full load. Measurement was performed according to EN ISO 3744 (at a distance of 1m from the pump and 1.6m above the ground), the measuring uncertainty is +/- 1.5 dB (Class 2.).

The rotating direction is specified by an arrow on the top cover. Viewed from above, the submersible motor pump rotates counterclockwise.

The performance data are related to water. The pump medium must be chemically neutral and must not exceed a maximum temperature of 65 °C. The admissible immersion depth is 40 m.

Model	AT 44F	AT 54F	AT 64O	AT 84O	AT 74O	AT 104O	AT 74S	AT 104S	AT 154S	AT 204S	AT 254S	AT 304S
Type of installation	wet/ dry	wet	wet/ dry	wet/ dry	wet	wet	wet	wet	wet	wet	wet	wet
Pressure joint DN	75	75	100	100	100	100	100	100	125	125	125	125
Pumping head H_{max} [m]	8	9	10	13	12	17	11	13	18	20	22	25
Flow rate Q_{max} [l/min]	2300	2500	2400	2800	3800	4200	4200	4800	5100	5700	6000	6700
Rated power [kW/HP]	3.0 4.0	4.0 5.5	4.6 6.3	6.0 8.2	5.5 7.5	7.5 10.0	5.5 7.5	7.5 10.00	11.0 15.0	15.0 20.0	18.5 25.0	22.0 30.0
Rated speed [rpm]	1440	1426	1450	1450	1450	1450	1450	1450	1460	1460	1474	1468
Rated current [A] (at 400 V and 50 Hz)	6.3	7.8	9.5	12.5	10.9	15.2	10.9	15.2	21.2	28.9	38.0	43.0
Weight approx. [kg]	76	76	130	130	130	138	133	141	196	210	220	225

Standard versions:

- Stator, insulation class F (155°C) or H (180°C)*, class of protection: IP68
- Operating voltage 400 Volt, 50 Hz, 3-phase
- Switch with phase inverter or automatic control system *
- Thermal winding protection with built-in thermal contacts
- Thermal control system in the switch equipment
- Mechanical seal motor and medium-side
- Sealing sensor in oil chamber
- Electronic leakage control in the switch *
- Housing parts made from cast iron CI
- Tearing device* on the inlet nozzle made from fine tungsten carbides (>1900 HV) in a NiCr-Matrix (60-65 HRC)

Impeller*:

- Non-clogging vortex impeller
- Open impeller (not for medium with clogging contents)
- Impeller/propeller blade made from cast iron CI
- Tearing device on propeller blade made from coarse-grained tungsten carbides (>2300 HV) in steel matrix

(* according to model and version)

3.5 Modification to the Product

Unauthorised modifications to the product may negatively affect the safety, service life or function of the product. All changes that are not described in the product documentation are not permitted.

For reasons of safety, no unauthorised modifications may be undertaken! All planned modifications must be authorised in writing by the manufacturer.

Arbitrary, unauthorised modifications to the product lead to the loss of warranty claims, invalidate the enclosed manufacturer or installation declarations and increase the risk of damage.

3.6 Electrical Protection and Monitoring Equipment

Fault Current Switch (RCD):

A fault current switch (RCD) with a rated leakage current of maximum **30 mA** is to be installed by the user for every individual submersible motor pump, in addition to the prescribed fuse protection. In the case of a fault, this RCD should activate all power circuits, incl. leakage control and thermal sensor.

Motor Protection:

When using motor protection switches with only bimetal trips, no reliable shutdown is guaranteed for overheating, i.e. the thermal contacts integrated in the submersible motor are definitely to be looped into the control circuit via an ATEX approved tripping unit.

Thermal Monitoring:

Thermal contacts are installed in the submersible motor for monitoring the temperature. That ensures, that with defective motor cooling a reliable shutdown takes place. If no switch/ no control system of Eisele is in use, in addition a motor protection switch/motor protection relay must be used. The motor protection switch/ motor protection relay must be temperature-compensated and phase-failure sensitive. The motor can only be switched on again after it has cooled down and the cause of the fault has been eliminated.

Leakage Control:

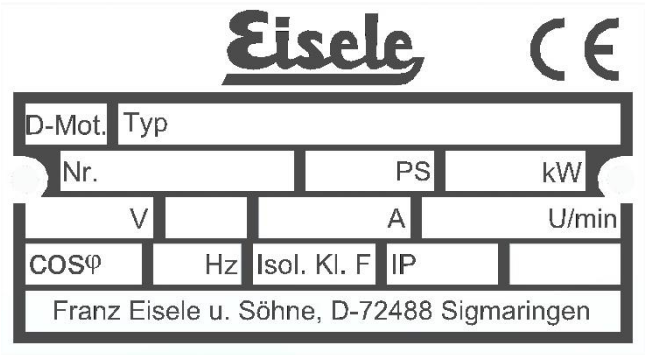
A sensor is mounted in the oil chamber, which signals the ingress of fluid by means of a signal lamp of the evaluation electronics (on the switch or in the control system).

If signalled: Carry out an oil change and check the motor compartment. If the signal lamp lights up again, the mechanical seal must be replaced.

Attention: This leakage control is a very important component, in order to ensure the function of the submersible motor pump. At the same time it is an item of operating equipment that helps to ensure the observance of the protection objective. It is not permitted to put the device into operation without leakage control. Its function is to be checked and assured during commissioning, as well as monitored at regular short intervals. The evaluation electronics necessary for this is available as an accessory.

3.7 Rating Plate

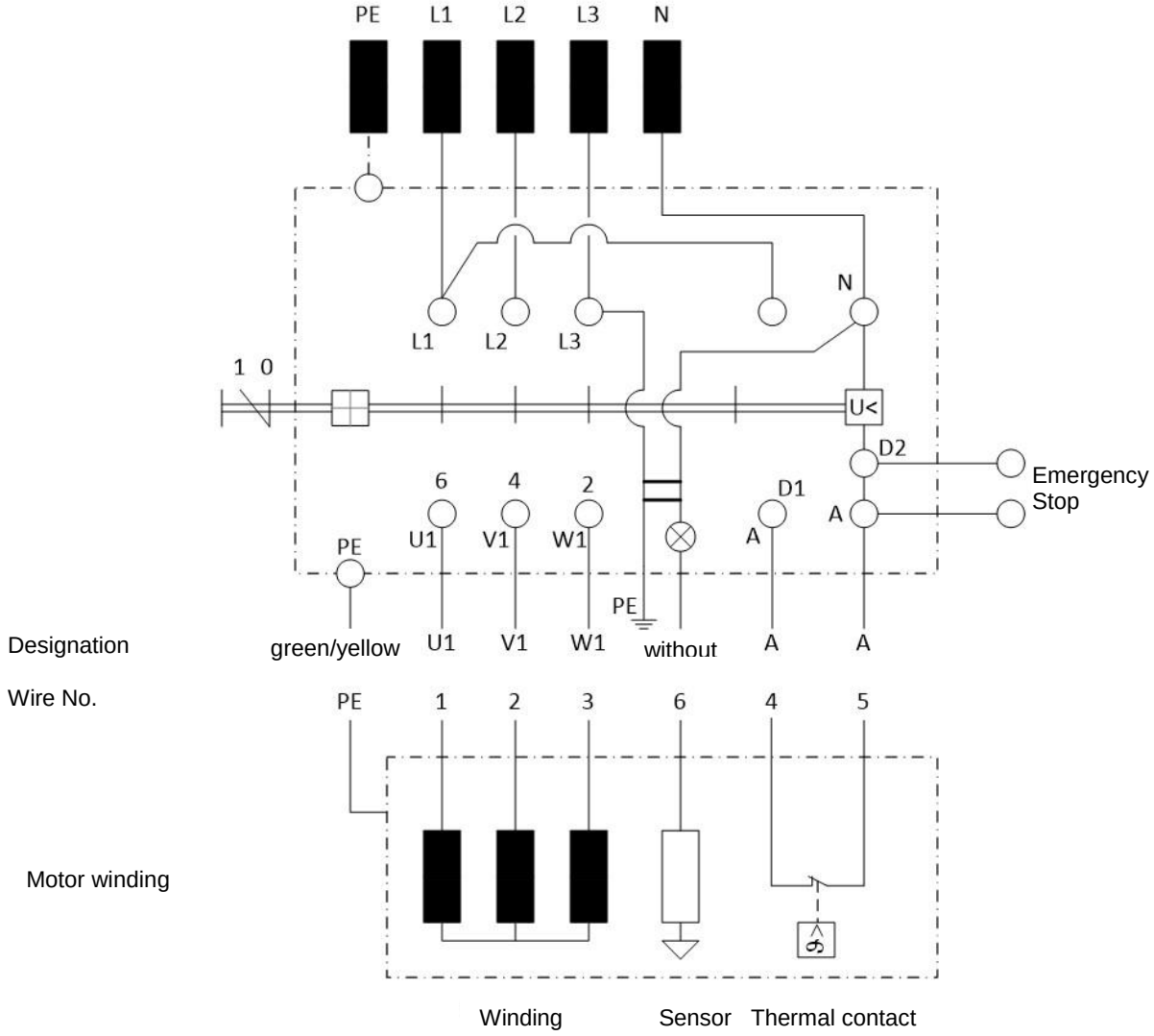
It is to be checked before connection, whether the details on the rating plate correspond with the mains voltage and frequency available.



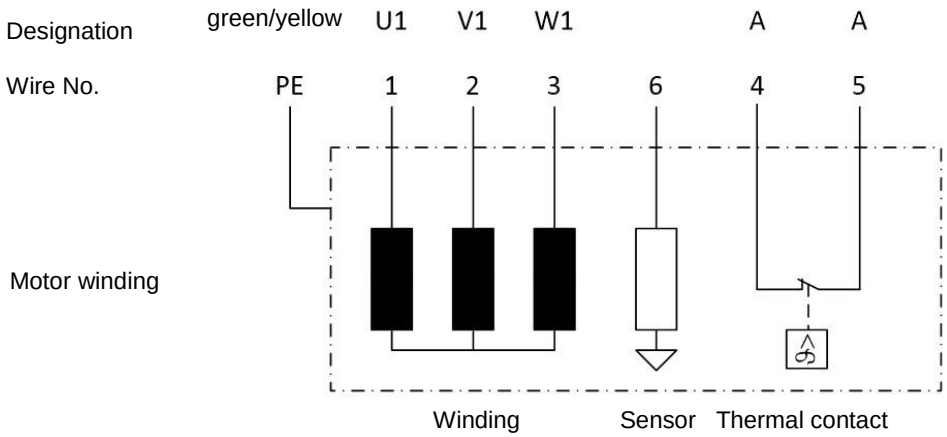
Meaning	**Unit**
“Three-phase motor” for three-phase alternating voltage	D-Mot
Device number	NR
Rated power	kW
Frequency	Hz
Rated voltage	V
Switching type for the specified rated voltage	Empty field (in most cases Δ)
Insulation class	Iso.Kl.F
Class of protection	IP
Power factor	cos-φ
Rated current	A
Rated power	HP

3.8 Wiring Diagram

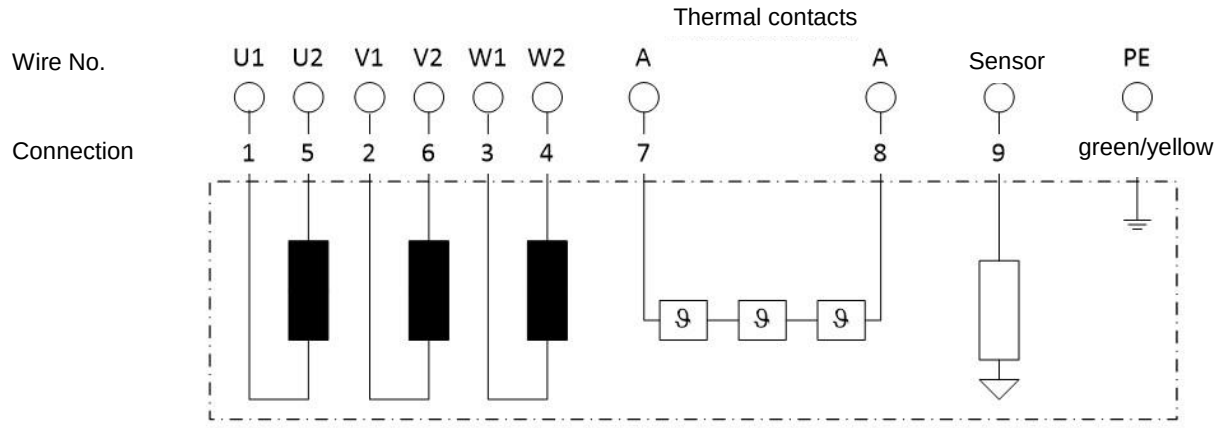
Wiring diagram for the submersible motor pump models AT 44 and AT 54:



Wiring diagram for the submersible motor pump models AT 44 and AT 54 of the "i" series:



Wiring diagram for the submersible motor pumps of the model series AT 64 O to AT 304 S:



4 Transport and bearing

Danger to life and risk of injury through improper transport!

- Use suitable lifting equipment (e.g. forklift, crane, frontloader, etc.).
- It is to be ensured, that no persons are standing in the danger zone when lifting, transporting and lowering the submersible motor pump.
- Wear and use suitable work protection clothing/ equipment.
- Always supervise the load in the raised state.
- Do not reach under the submersible motor pump while lifting and lowering.
- Suspended loads can fall down, consequently there is a danger to life. Do not stand under suspended loads!
- Parts stacked too high can collapse.
- Never reach into moving parts.
- Protruding sharp edges can cause cut injuries.
- If load-bearing equipment other than those specified here are used, serious material damage and/or life-threatening injuries to persons can occur as a result.
- Due to the easily combustible packaging material there is a risk of fire. Do not use any naked flame and do not smoke.

Read chapter 2 (Safety) carefully without fail!

4.1 Special Personnel Qualification for the Transport

The transport may only be performed by suitably qualified personnel, under observance of the safety instructions.

- A national driving license for self-driving work machines, forklifts and other industrial trucks must exist.

4.2 Admissible Devices and Auxiliary Equipment for the Transport

Provide a suitable tool for lifting and carrying work, for example a forklift, crane or frontloader.

4.3 Transport

- Transport the submersible motor pump fastened securely in the horizontal position.
- Use suitable lifting gear.
- Make sure that lifting gear and lifting equipment are suitable for the weight specified in the operation manual.
- The submersible motor pump must only be lifted at the mountings provided for this purpose.
- It is to be observed, that no lateral/one-sided forces act on the pump shaft.
- The submersible motor pump must not be lifted by the cable under any circumstances.

4.4 Storage Conditions

- Store the submersible motor pump fastened securely in the horizontal position.
- To prevent the mechanical seal surfaces from sticking together, rotate the propeller blade every 2 months.
- Store the submersible motor pump at a temperature between 0° C to +40° C.
- For prolonged intermediate storage, remove the shrink wrap, adhesive tape and plastic bags from the product.
- Protect the submersible motor pump from frost and external moisture (concerns above all the control box and electric motor).
- Avoid direct exposure to heat (sun, heater).

5 Installation

DANGER

Risk of death from explosions!

- It must be ensured that during the entire installation there is no explosive mixture of gas and air present.
- The submersible motor pump is not approved for use in Ex-Zones!

Before working in potentially explosive areas:

- Fill out a permit for working in a potentially explosive area and have it signed by the person in charge.

Risk of death or injury due to faulty and improper installation!

- It is to be ensured, that the tank is empty or the substrate has been lowered sufficiently. Adequate aeration in the tank must also be ensured. Always carry a gas detector with you.
- The installation is only to be performed when no voltage is present. The main switch is to be secured against being unintentionally switched on.
- It is to be ensured, that installation work is only performed by trained/instructed personnel and that any electrical installation work is only carried out by a qualified electrician.

WARNING

- It is to be ensured that the submersible motor pump is not switched on until it has been properly and completely installed or if there are people in the danger zone.
- It is to be ensured during installation, removal and repair work, that there are no people (especially children) or animals in the operating area of the submersible motor pump.
- It is to be ensured that the submersible motor pump is not left unattended during installation, removal and maintenance work.
- Installation work should always be carried out by 2 people.
- Use personal protective equipment, including gas detector, fall protection, respirator, safety shoes, safety helmet, protective gloves, etc.
- The warning signs for transport and bearing are also to be observed during installation.
- It is to be ensured that the connection cable is not damaged.
- Contact with substrates can lead to skin irritations, infections or similar problems.
- The installation location is to be selected, so that it is not possible to reach into the intake area of the pump during operation.

NOTE

See also section 2.3 (Employee Qualification)

5.1 Special Personnel Qualification for the Installation

- The installation may only be carried out by suitably qualified personnel, taking into consideration the safety instructions.
- The electrical connection may only be performed by a qualified electrician.

5.2 Customer-side Prerequisites for the Installation

- The static and dynamic layout of the tank is suitable for use with the submersible motor pump.
- The sliding mast with adjusting equipment is suitable for use with the submersible motor pump, according to manufacturer specifications.
- In case of need, please contact the authorised specialist dealer.

5.3 Safety Instructions for the Installation

Substrates emit toxic substances!
Inhalation of substrate fumes can lead to serious health issues with possible fatal consequences. It is essential to ensure that there is sufficient ventilation and/or extraction of fumes! Carry a gas detector with you.

Risk of falling into open cavities!
A fall can lead to serious injuries with possible fatal consequences. The shaft opening is to be covered or surrounded by a fence.

To prevent life-threatening injuries to persons and/or material damage, the following points are to be observed without fail:

- National standards and regulations are to be observed during the installation!
- Before installation, inspect the submersible motor pump for transport damage.
- Do not use any damaged components!
- All electrically conductive components, with which a person or animal can come into contact, must be connected together and with the protective conductor of the system by means of an additional equipotential bonding.
- The submersible motor pump may only be installed, aligned and fastened with suitable accessories at the proper intended place of installation.
- During the installation of the submersible motor pump it is essential to ensure that there is sufficient ventilation and/or extraction of fumes!
- Secure the submersible motor pump shaft with a cover or surrounding fence, which complies with the local safety regulations.
- Ensure for sufficient lighting (at least 200 Lux), to guarantee a good view of the work to be carried out.
- Live cable ends and components can lead to injuries from electrical current (electric shock!).
- Before beginning work on the electrical installation the supply voltage must first be switched off without fail! Secure main or emergency stop switches with a lock against restarting and erect warning signs.
- Route the neutral conductor through to the switch or the automatic switching mechanism.
- For protection against fault currents in addition to the electrical protective equipment usually prescribed, install a 4-pin fault-current circuit breaker (30 mA). Extension cables must always be designed 5-wire.
- A response of the temperature sensor must lead to a permanent shutdown of the main and auxiliary circuit. A restart lock must be provided without fail.

5.4 Special Hazards during Installation

Please observe all the relevant regulations and safety instructions. Even the slightest carelessness can cause devastating material damage and personal injury!

Toxic fumes! Risk of explosion! Risk of excess pressure!
Many of the liquids are fermenting biomasses (e.g. liquid manure, sludge) which can form toxic and explosive gas mixtures. These gases are released, especially during pumping. Smoking, fire, sparks and the use of a mobile phone are prohibited. Ensure that there is sufficient aeration. With insufficient aeration, personal protective equipment must be worn. The regulations specified by professional trade associations must be adhered to.
Fermenting biomasses can generate an enormous gas pressure in closed pipelines or tank systems. Pressure compensation must be possible.

The applicable regulations with regard to
- Work safety
- Plant configuration

e.g. of the professional trade associations are to be strictly observed.

For use in agriculture:
Binding twines or similar materials in the substrate lead to faults on the submersible motor pump. The twines do not decay. Shredding with the pump shredding unit (Type S) is not possible. The long-fibred twines wind around the blades und frequently lead to considerable reductions in performance and extreme vibrations. These twines can also coil up between blade and pump housing and cause the destruction of the mechanical seal.
In your own interest, please be aware of the possible disadvantages that could occur if you feed these twines into the substrate circuit!

The points listed below are definitely to be taken note of and observed:

- There is a risk of fire and explosion during welding work!
- Incorrectly placed or improperly attached components can fall down or fall over.
- Loose parts lying on top of each other can slip and fall down.
- There is a risk of injury on sharp-edged components that are still open and accessible.
- Before working on hydraulic components, first relieve the hydraulic pressure!
- Serious personal injury and material damage can occur due to incorrect screw tightening torques.

5.5 Electrical Connections

Risk of death from electric voltage!

- Submersible motor pumps are only to be connected by a qualified electrician.
- It is to be ensured, that the supply cable is laid safely, so as not to present a tripping or stumbling hazard, become damaged, pinched, come loose, fall down etc. (e.g. underground, at an adequate height on buildings or masts).
- Make sure that the line has been laid protected from UV radiation, microbes and rodents.
- It is to be ensured that the supply pipe is adequately dimensioned.

Risk of explosions and risk of death due to overheating!

- It is to be ensured, that the thermistors are evaluated on site without fail.

All installation work may only be carried out by a qualified electrician, taking into consideration the relevant regulations. Electrical installation on site must be carried out so that protection is ensured against overloading or shorting of all cables and operating equipment. Preference is given to using 3-pin circuit breakers of type **K**.

The entire electrical installation must comply with VDE regulations. A main equipotential bonding as well as an additional local equipotential bonding between all conductive parts and the protective conductor of the operating equipment are to be provided on site. The effectiveness must be recorded and monitored on a regular basis.

When using external controllers/switches, the following points must also be considered. Control systems/switches must be weather-proofed in the operating and visible area of the submersible motor pump. If this is not the case, an EMERGENCY OFF switch is to be provided by the customer in this area without fail.

The specifications of EN 60204 (VDE 0113) must be observed.

Material damage due to incorrect tripping devices!
The submersible motor is provided with thermal sensors for additional motor protection (Thermal Machine Protection, TMS).

- To protect the motor from overheating it is to be ensured, that a thermistor evaluation with restart lock is installed on site.

In addition the chapter entitled 3.6 (Electrical Protection and Monitoring Equipment) is to be read carefully and observed!

For a proper connection observe the following:

- The neutral conductor must be routed to the switch or to the control system. Extension lines are to be designed 5-wire.
- Make sure, that the electrical connection is carried out by a specialist in accordance with the valid regulations for safety and accident prevention.
- During the installation use appropriate screw connections, matching the connection cables used.

For safe Pump Operation:

- Protect the motor from overloading and impermissible heating.
- Ensure that if the motor is tripped, it is switched completely de-energised.

Suitable combination:

- Motor protection switch with phase failure protection
- Temperature monitoring by means of the thermal sensors integrated in the motor

5.6 Installation Notes

- When using a base frame, this must be installed firmly and without bracing on a flat surface.
- The foundation for mounting the submersible motor pump must be designed adequately dimensioned and free of vibration.
- To reduce transmission of the vibrations to the piping system, solid pipe connections directly on the pump are to be avoided.
- All components of the pressure line system must be designed at least for the pump operating pressure.
- All components of the piping system are to be inspected for tightness.
- It is to be ensured, that the gas hole on the pump housing is consistent and free of contamination.

5.7 Installation Instructions

In case of need, please contact the authorised specialist dealer.

5.8 Design

The submersible motor pump satisfies class of protection IP68 and is intended for submerged operation to a depth of 40 m.

5.9 Disposal of Installation Material

Handle installation material no longer required appropriately and dispose of it properly in compliance with the valid local regulations for waste disposal or recycling.

5.10 After Installation is Completed

- Re-tighten all screws and nuts on the device with a torque wrench.
- Observe standardised torques for each connection element.
- Check the function of the motor protection and thermal protection.
- If applicable, check the proper integration in the on-site lightning protection system.
- Check proper installation of equipotential bonding between tank, submersible motor pump and distribution.

6 Commissioning

Special dangers during initial commissioning:

- Serious personal injuries and material damage can occur through incorrect behaviour during incidents. Therefore familiarise yourself with the rules for incidents.
- Serious material damage and/or life-threatening injuries to people can occur through improper types of use.
- The maximum possible discharge pressure of the pump must not exceed the maximum permitted value of all subsequent system components.
- Before all work on electrically driven systems, always switch the main switch off and secure it against restarting.
- Incorrectly wired connections can destroy the electrical/ electronic components.
- Faulty connections can cause an unexpected start-up of the product or uncontrolled movements.
- Transposed connections cause the motor to run in the wrong direction, through which serious material damage and/or life-threatening injuries to people can occur.
- The electrical connection cable must be routed, so that contact with the impeller is excluded.
- It is to be ensured, that strain relief of the electrical connection cables is established on site at all stressed points.
- The wire cable or the chain must always be tensioned.
- Always reckon with the possibility, that when pumping or mixing substrates, gases with suffocating or explosive effect can be released. It is therefore essential to ensure that there is sufficient ventilation and/or extraction of fumes!
- Because of a possible build-up of pressure due to the formation of gas, the feed and discharge pipes must not be permanently shut off before and after the pumping operation.
- The installation location is to be selected, so that it is not possible to reach into the intake area of the pump during operation.

Any floating layers are to be broken up with the help of an agitator before the operation of the pump. Dry, entwined or clumped material can lead to damage and the failure of the pump.

The initial commissioning must only be performed by suitably qualified personnel, taking into consideration the safety instructions.

6.1 Safety Instructions

Read chapter 2 (Safety) carefully without fail!

To prevent material damage and/or life-threatening injuries to people, the points listed below are to be observed without fail:

- Activate all safety equipment and Emergency Stop circuits before commissioning.
- Check the system for completeness.
- Check all operating equipment for suitability as well as correct installation.
- Before commissioning the submersible motor pump, all tools and other objects are to be removed from the danger zone.
- The compatibility of the submersible motor pump with the electrical specifications of the system is to be checked by a qualified electrician.
- With an electrically driven system, one must always reckon with an automatic system start!
- Only use and adjust the product properly as intended.
- Serious personal injuries and material damage can occur through incorrect behaviour during incidents. One must therefore familiarise oneself with the rules for incidents.
- Before all work on electrically driven systems, always switch the main switch off and secure it against being switched on again unintentionally.

6.2 Preconditions

Preconditions for trouble-free pumping:

- Make sure that the submersible motor pump is undamaged.
- Make sure, that the blade is not blocked by settled solid matter.
- Listen for unusual noises and vibrations during operation. (e.g. due to lack of lubrication, wrong rotating direction, loose parts, motor, transmission, bearing, or shaft damage, etc.).
- Make sure that the fastening parts are undamaged.
- Make sure, that the electrical cable lines are undamaged and cannot become tangled in the blade.
- Make sure that no maintenance and servicing work is performed during operation.
- To avoid damage to the submersible motor pump, the rotating direction must not be changed during operation.

6.3 Procedure

When adjusting the submersible motor pump, attention is to be given to the connection cable without fail! This must be attached to the wire cable in such a way, that contact with the impeller is excluded.

If oscillations and vibrations beyond the normal level develop during operation, the device is to be shutdown immediately and inspected. This also applies for all fastenings, connections and cable clamps.

The following points are to be checked during commissioning:

- The prescribed oil level is to be checked (oil filling screw marked red).
- The ease of movement is to be checked by moving the impeller to and from (de-energise system beforehand). Slight grazing of the intake auger (Type S) on the inlet nozzle is however not detrimental for the operation of the pump.
- All screws and connections are to be checked for tight seating. These checks are to be repeated at regular intervals.
- The smooth guidance of the wire cable/ plastic rope is to be checked.
- Make sure that the piping system is consistent for the pump medium and the valves are opened accordingly.

7 Operation

Special dangers during pump operation:

- The maximum possible discharge pressure of the pump must not exceed the maximum permitted value of all subsequent system components.
- Always reckon with the possibility, that when mixing or pumping substrates, gases with suffocating or explosive effect can be released. It is therefore essential to ensure that there is sufficient ventilation and/or extraction of fumes!
- The installation location is to be selected, so that it is not possible to reach into the intake area of the pump during operation.
- With gas escape hole open, liquid can spray out through it during operation.

Material damage to the submersible motor pump and system!
The wire cable and the electrical connection line must always be tensioned. If the wire cable or the line is loose, these could become tangled in the submersible motor pump and damage it as well as the complete system.

7.1 Personnel Qualification

The operation may only be performed by suitably qualified personnel, taking into consideration the safety instructions.

The operator may only execute or perform work on the machine, for which he has been trained, instructed and authorised by the user.

7.2 Normal Operation

- The product must only be started from the specified workplace.
- During operation the operating personnel must only stand at the specified workplaces.
- During operation no protective devices may be removed or put out of service.
- Standing in the danger zone during operation is strictly forbidden!
- The operating personnel must ensure that no unauthorised persons stand in the operating area.
- After shutdown the operating personnel must wait until all moving parts have come to a standstill!
- The following control activities are to be performed at least once a day:
    - Visual inspection for obvious external damage
    - Check all lines for leaks
    - Check the function of all protective devices
- With a change compared with normal operation (e.g. increased temperature, loud noises, vibrations), the submersible motor pump is to be shut down and checked for damage. Foreign objects in the pump medium (e.g. cords, ropes, plastic tapes) cause, for example, an imbalance on the blade, which can lead to a higher bearing load, faster material fatigue and therefore ultimately to a premature failure of the mechanical seal and bearing.
- After prolonged stationary periods the ease of movement is to be checked by moving the pump blade back and forth (pull out electrical plug beforehand). Slight grazing of the intake auger (Type S) on the inlet nozzle is however not detrimental for the operation of the pump.

7.3 Perform the following inspections before each start:

- Check and ensure that all operating equipment is suitable, connected and present.
- Check and ensure that all protective devices (cover and barriers) are attached and fully functional.
- Inspect the product for visible damage. Repair determined defects immediately (observe necessary personnel qualification) or contact the specialist dealer. The product may only be operated in perfect condition.
- Check and ensure that only authorised persons stand in the working area and that no other persons will be endangered by the start of the operation.
- Check and ensure that there are no objects and materials in the working area that are not required for the operation.
- Make sure, that the piping system is consistent for the pump medium and the valves are opened accordingly.
- In the event of frost, check that there is no frozen liquid manure in the pump or the system. Never start a frozen pump.

7.4 Optimal Pumping

The substrate to be pumped differs in composition. For this reason, no generally applicable statement can be made about the optimal pumping operation.

A homogeneous pump medium is essential in order to ensure pulsations, shock waves and a constant operation. The medium should therefore be well mixed before pumping.

The delivery volume flow of the submersible motor pump depends on the consistency and viscosity of the fermenting substrate. After switching on, the feed and discharge pipes are to be checked.

In case of need, please contact the works directly or an authorised specialist dealer.

If the pumping capacity drops due to heavily gas-laden liquid, then it can be raised again by opening the gas escape hole. In the event of blockages, the gas escape hole can be cleaned when the pump is in the de-energised state (electrical plug pulled out).

8 Fault

NOTE

Corrosion due to electrochemical reactions (e.g. different grounding potentials, pH-value of the substrate, high concentration of hydrogen sulphide) or due to microbial influences (e.g. bacteria, algae, fungi) do not represent any defect (reason for complaint).

With every fault, immediately shutdown the submersible motor pump as well as upstream and downstream system components, until the cause has been rectified. Otherwise permanent damage to the components cannot be excluded.

8.1 Fault Causes

For detailed troubleshooting the manufacturer or an authorised specialist dealer is to be contacted.

Fault	Possible Cause
Pumping capacity too weak	• Propeller blade is worn • Dry-matter content too high • Device running in surfaced state • Pump is not correctly vented (air bubble in the housing)
No pump output	• Device does not get up to speed • Incorrect rotating direction • Propeller blade has fallen off/worn out • Device running in surfaced state • Pump is not correctly vented (air bubble in the housing)
Knocking noises on the impeller	• Bearing defective • Propeller blade is loose • Uneven running of the propeller blade
Leakage control responds	• Defect on the outer mechanical seal • Water ingress in the motor compartment • Cable damage • Induction voltages • Heat influence on the electronics
Fault-current circuit breaker (FI) trips	• Winding damage • Cable damage • Water ingress in the motor compartment
Delivery volume too low	• Pressure line dimensioned too small • Impeller worn • Pressure line blocked / hose buckled • Device running in surfaced state • Pump is not correctly vented (air bubble in the housing)
Motor protection trips	• Device is overloaded • Cooling is defective • Device blocked • Device running in surfaced state • Error in supply network • Motor protection incorrectly set • Cable damage • Winding damage

Fault	Possible Cause
Motor rotates, but no delivery	• Pressure line blocked / hose buckled • Pump is not correctly vented (air bubble in the housing)
Motor does not rotate	• Mains voltage missing • Faulty connection • Defective power cable • Motor defective • Impeller clogged / hose buckled • Float stuck (optional component)
Fuses trip when switching over from star to delta	• Device does not get up to speed • Device blocked • Fuses incorrectly dimensioned

8.2 Personnel Qualification

The rectification of faults may only be performed by suitably qualified personnel, taking into consideration the safety instructions.

8.3 Safety Instructions for the Rectification of Faults

To avoid damage and/or life-threatening personal injuries, the following points are to be observed without fail:

- During repair work the product must be secured against unintentional restarting.
- Ensure the safety shutdown by a second person every time.
- Secure the range of action of the movable components and restrict it to the necessary minimum.
- With the risk of frost, make sure that the pipes cannot freeze.

9 Inspection and Maintenance

Risk of death from explosions!

- It is to be ensured during the complete inspection and maintenance, that there is no explosive mixture of gas and air present.

Substrate fumes emit toxic substances!

- Inhalation of substrate fumes can lead to serious health issues with possible fatal consequences. It is essential to ensure that there is sufficient ventilation and/or extraction of fumes! Carry a gas detector with you.

Risk of death and injuries through improper behaviour.

- It is to be ensured, that repair work is performed exclusively by trained/ instructed personnel.
- It is to be ensured, that the submersible motor pump is not switched on when there are people in the danger zone or if it has not been properly and completely installed.
- It is to be ensured during maintenance and repair work, that there are no people (especially children) or animals in the operating area of the submersible motor pump.
- It is to be ensured, that the submersible motor pump is not left unattended during maintenance and servicing work.
- It is to be ensured, that the submersible motor pump is fully disconnected from current and voltage at all poles, and is secured against restarting.
- Use personal protective equipment, such as for example gas detector, safety shoes, protective gloves as well as, if necessary, fall protection, respirator, etc.
- You can come into contact with the pump medium during inspection/maintenance work. If necessary, flush the pump and connected pipelines before opening the feed and discharge pipes.
- The pump housing could be hot and must not be touched during operation. If necessary, allow the system to cool down.
- With gas escape hole open, liquid can spray out through it during operation.

Material damage to the submersible motor pump due to poor maintenance!

- It is to be ensured, that the correct quantity of oil is present in the transmission.
- Do not clean the mechanical seal with a high-pressure water jet.

Maintenance and servicing work may only be performed by qualified specialist personnel.
Maintenance going beyond the points listed may only be performed in the Eisele works or in an authorised specialist workshop.

9.1 Maintenance Work

- If the removal of the submersible motor pump is necessary for the maintenance work, lower the filling level in the tank sufficiently.
- Ensure, if possible, that the tank is aerated. If aeration is not possible, appropriate protective equipment is absolutely necessary.

9.2 Wear

The wear is dependent on:

- Running time
- Level of stress
- Operating conditions

All moving parts wear!

In rare cases it is possible that an increased removal of material or local corrosion occurs on permanently installed devices. Possible causes are:

- Earth currents (potential drift/ faulty earthing)
- Electrochemical reactions e.g. higher acidification with co-fermentation of organic waste
- Cavitation

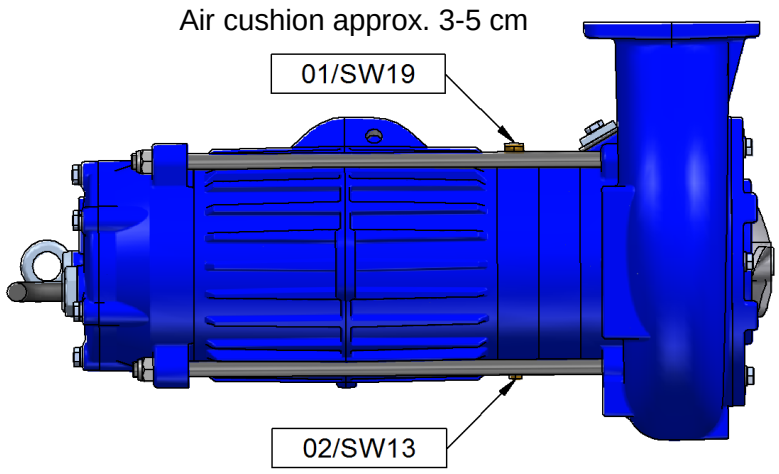
9.3 Cleaning

The submersible mixer is to be cleaned regularly of external incrustations or blockages. If corrosion or cavitation damage is noticeable, it must be stopped through suitable means. In case of need, please contact the authorised specialist dealer or the works.

9.4 Oil Inspection and Check Oil Level

The oil level must be up to the prescribed height (3-5 cm below the opening). If necessary motor oil SAE 30 is to be refilled. Do not overfill, an air cushion is necessary for the thermal expansion of the oil.

Every 6 months, however at the latest after 500 hours of operation, the oil must be checked as follows: Unscrew the locking screw (01/SW19) and insert a thin object, e.g. a hose diagonally downwards, with which a little oil can be sampled from the lower area. The motor compartment (02/SW13) is also to be inspected at the same time as the oil control.



The illustration does not always correspond with the scope of supply!

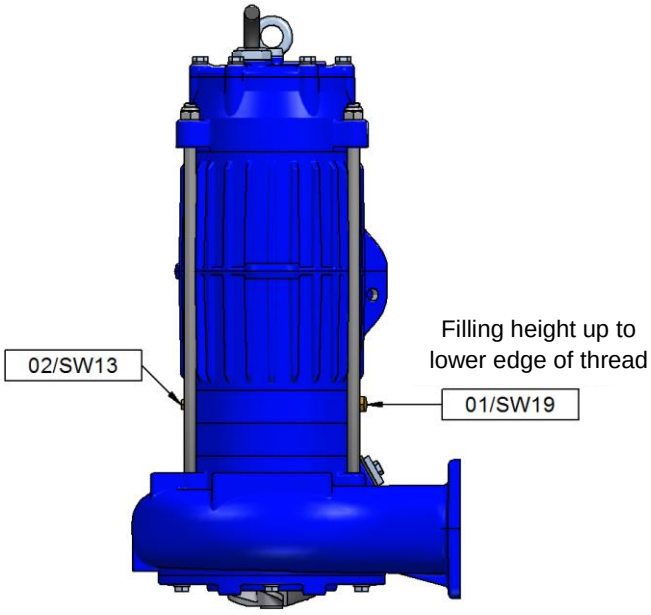
If the oil contains too much foreign fluid, it is greatly emulsified (creamy) and an oil change is necessary. This control is to be repeated 14 days after an oil change. If too much foreign fluid is again determined in the oil, then the external mechanical seal is probably defective. The repair may only be performed in a specialist workshop.

9.5 Oil Change

An oil change is required at least every year, or with longer daily service after 1000 hours of operation. Make sure the oil is completely drained (locking screw 01/SW19) before refilling with fresh oil. The oil chamber must not be filled completely! The air space above the oil is absolutely necessary and enables the thermal expansion of the oil.

Oil grade: Motor oil SAE 30

Oil quantity: AT44/54F approx. 1.0 Litre,
AT74/104O/S approx. 2.3 Litres,
AT154-304S approx. 2.5 Litres



The illustration does not always correspond with the scope of supply!

9.6 Mechanical Seals

Risk of death or injury due to improper repair!

- Have mechanical seal replaced exclusively by trained/ instructed personnel.

Mechanical seals must be replaced at the latest after 3000 hours of operation or maximum 2 years. Mechanical seals must only be replaced completely. Once removed, mechanical seals must not be installed again.

9.7 Electrical component

Risk of death from electric voltage!

- E-motors are to be maintained and connected exclusively by a qualified electrician.

The specifications of EN 60204 (VDE 0113) must be observed.

Carefully read chapter **Fehler! Verweisquelle konnte nicht gefunden w erden.** (Electrical Protection and Monitoring Equipment) as well as chapter 5.5 (Electrical Connections) and observe without fail!

Connection cable and its fastenings:

The connection cable is to be checked regularly for buckling and pinching, sheathing damage as well as other damage.
The connection cable, cable protection conduit and cable clamps must be completely replaced after 2 years at the latest. Damaged cables must not be reused under any circumstances.

Motor Inspection:

The motor compartment is to be inspected at the same time as the oil control. The locking screw of the control opening (02/SW13) is to be removed. If fluid escapes, the submersible motor pump must no longer be put into service; small quantities of leakage oil from the mechanical seal may be present. Have the submersible motor pump inspected by a specialist company. The ease of movement of the submersible motor pump, its transmission and the entire bearing is to be checked by turning.

Insulation measurement:

Every 6 months, however at the latest after 500 hours of operation, an insulation measurement of the connection cable must be carried out. Thereby the sensor wire must be disconnected and the thermal contacts short circuited, so as not to endanger sensitive electronic components. The test voltage must be selected, so that the insulations are not destroyed. It must be ensured, that no hazardous situation can develop through an insulation fault on the device or on the cable. Ideally, devices and cable are covered by liquid during the measurement.

9.8 Cable Winch and Fastening Cable

When using EISELE lifting gear, the cable winch and the wire cable are to be inspected according to the operating conditions, however at least once a year. The bearing bushes of the drive shaft and the drum hub are to be oiled regularly, the sprocket is to be greased.

The brake mechanism itself must not be lubricated. The hand crank must be able to turn freely to the left on the shaft in the unloaded state.

The wire cable (or plastic rope) is to be checked for fibre breakage, pinching and rubbing marks as well as other damage over the entire length.

9.9 Replacing the Propeller Blade (Type S) / Impeller

Before removal, release any existing overpressure in the oil chamber by opening the locking screw (01/SW19) and then re-sealing it.

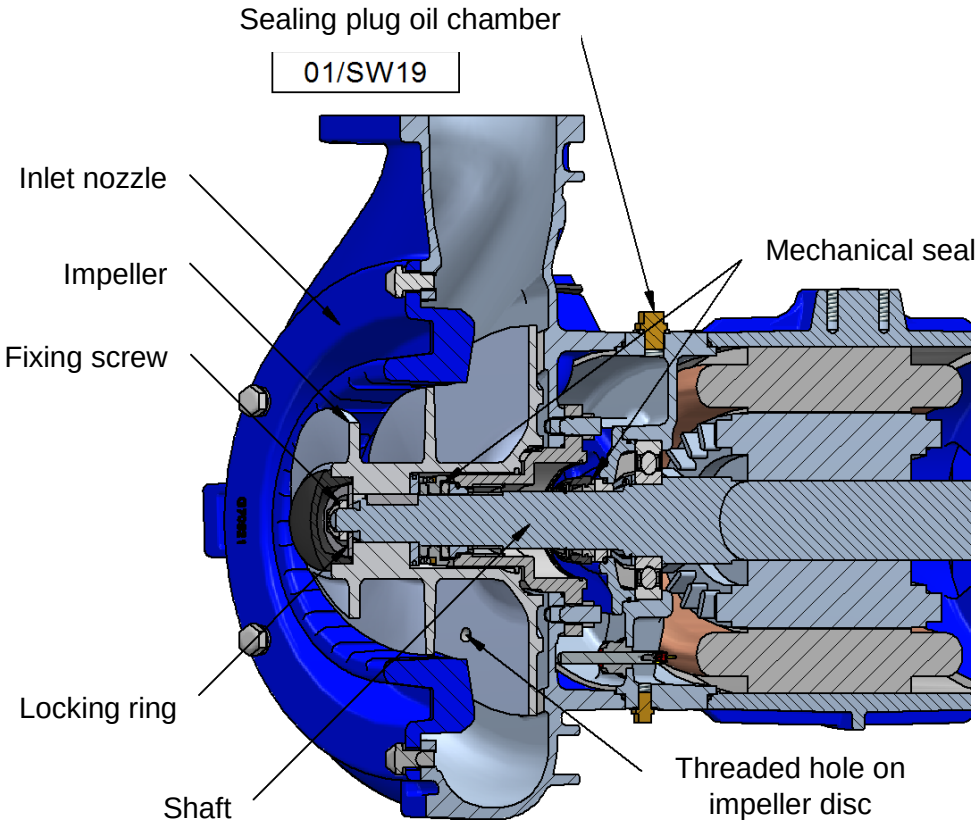
Removal:

Remove inlet nozzle by unscrewing the screws. Then unscrew the fixing screws and locking washers of the impeller and then pull this down away from the shaft. On the types AT44/54/154-304 there are additional threaded holes (M12) on the impeller disc. By screwing in a screw, the impeller is pressed off the shaft. The mechanical seal remains on the shaft.

Installation:

Before the installation of the new impeller, the end of the shaft and the key are to be cleaned, deburred and treated with fretting corrosion inhibitor (anti-seize, if necessary grease/oil). Then push the new impeller onto the cleaned shaft and fix it to this with the locking washer and fixing screw. The locking parts are always to be renewed.

In case of need, contact the authorised specialist dealer or the works.



9.10 Maintenance Plan

Components	Check / Activity	Daily	Monthly	Yearly	Operating equipment/ comment
External screw connections	Tighten all screws and nuts.		×		Tighten visible Screw connections (observe tightening torque).
		3 hours after initial commissioning, then monthly visual inspection			
Transmission	Oil change			×	Change oil
		After 1,000 hours of operation			
	Bearing change				Replace bearing
		After 11,000 hours of operation			
Mechanical seal	Wear			×	(Have) defective parts replaced.
		After 3,000 hours of operation or maximum 2 years.			
Insulation measurement	Connection cable		×		(Have) defective parts replaced.
		After 500 hours of operation			
Cable protection system	Connection cable, cable protection conduit, cable clamps			×	(Have) defective parts replaced.
		After 2 years at the latest			
Motor	Motor inspection		×		Change components as necessary.
		Every 6 months, after 500 hours of operation at the latest			
Control system, connections, and cable	E-Check		×		Test acc. DIN VDE 0702. Clean, also clean inside if necessary. (have) defects repaired
		Acc. BetrSichV every 6 months			
Submersible motor	Replace bearing				(Have) repaired as necessary. (Have) defective parts replaced.
		After 11,000 hours of operation			
Oil check	Check oil level		×		Change oil as required
		Every 6 months, after 500 hours of operation at the latest			

9.11 Inspection

Components	Check for	Daily	Monthly	Yearly	Operating equipment/ comment
Connection cable and cable routing	Damage, unacceptable buckling, clamping distance	After 2,000 hours of operation or at least once a year		x	(Have) defective parts replaced as necessary
Sliding mast with mounting	Function	With every actuation			Swivel submersible motor pump as required.
	Damage and corrosion	After 2,000 hours of operation or at least once a year		x	(Have) repaired as necessary. (Have) defective parts replaced.
Impeller	Damage	as well as with each actuation	×		(Have) impeller replaced as necessary.
	Wear	Current consumption (pump capacity)	×		(Have) impeller replaced as necessary.
Cable pull and cable guidance	Damage	With each actuation or at least once a year		x	Raise and lower submersible motor pump as required
Submersible motor pump	Damage	With every actuation			(Have) repaired as necessary. (Have) defective parts replaced.
	Contamination	With every actuation			Suck up or brush away dirt.
	Damage and corrosion	After 2,000 hours of operation or at least once a year		×	(Have) repaired as necessary. (Have) defective parts replaced.
	Noticeable noises, vibrations and changes	With every actuation			(Have) repaired as necessary. (Have) defective parts replaced.

9.12 Miscellaneous

All screw connections are to be checked regularly for tight seating. It is the responsibility of the user to ensure that all protective and monitoring equipment is connected and functional. This state is to be permanently ensured through suitable measures.

10 Removal

Risk of death from explosions!

- It must be ensured, that during the entire removal, there is no explosive mixture of gas and air present.

Substrate fumes emit toxic substances!

- Inhalation of substrate fumes can lead to serious health issues with possible fatal consequences. It is essential to ensure that there is sufficient aeration and/or extraction of fumes! Carry a gas detector with you.

Risk of death or injury due to improper behaviour!

- It is to be ensured, that removal work is performed exclusively by trained/ instructed personnel.
- It is to be ensured, that the submersible motor pump is fully disconnected from current and voltage at all poles, and is secured against restarting.
- It is to be ensured during installation, removal and repair work, that there are no people (especially children) or animals in the operating area of the submersible motor pump.
- Make sure that the submersible motor pump is not left unattended during installation, removal and repair work.
- Use personal protective equipment, such as e.g. protective gloves, safety glasses, safety shoes as well as, if necessary, gas detector, fall protection, respirator, etc.

10.1 Before Removal

Observe the following before removal of the submersible motor pump:

- Ensure, if possible, that the tank is aerated. If aeration is not possible, appropriate protective equipment is absolutely necessary.
- Lower the filling level sufficiently in the tank before removal.
- Completely disconnect the pump from all current and voltage. The main switch is to be secured against being unintentionally switched on.

10.2 Dangers during the Removal

- Lubricant leaks can lead to environmental damage.
- Escaping gases and fumes can lead to suffocation and conceal a risk of fire or explosion!
- Components not removed professionally can fall down or fall over.
- Unsecured lifting equipment can cause injuries and material damage!
- Suspended loads can fall, consequently there is a danger to life. Do not stand under suspended loads.
- There is a risk of injury on open, sharp-edged components, tools, etc.

10.3 Removal of the submersible motor pump

Remove the submersible motor pump as follows:

- Shut down submersible motor pump.
- Disconnect the submersible motor pump from the power network. Disconnect electrical connections and unhook the connection cable.
- Ensure that the connection cable is fully disconnected from all current and voltage at all poles.
- Securely suspend the submersible motor pump with lifting gear at the suspension points.
- Lift the submersible motor pump away from the sliding mast with suitable lifting equipment.
- Cover the shaft opening after removing the submersible motor pump.

10.4 Disposal

After decommissioning, all components are to be handled properly and disposed of properly in accordance with the applicable local regulations for waste disposal or recycling.

The user is responsible for the disposal.

11 Annex

11.1 Abbreviations

Symbols	Explanation
Ø	Diameter specification

Units	
°	Degrees (angular specification)
°C	Degrees Celsius
s	Seconds
min	Minutes
(in)	Zoll/ INCH (= 25.4 mm)
mm	Millimetres
cm	Centimetres
m	Metres
mm^2	Square millimetres
mm^3	Cubic millimetres
g	Grams
kg	Kilograms
kPa	Kilopascal
kW	Kilowatt
A	Ampere (current strength)
V	Volt (voltage)
Ω	Ohms (resistance)

11.2 Replacement Parts List

In case of need, please contact the authorised specialist dealer.

Quality wins through - since 1887

EC DECLARATION OF CONFORMITY

Franz Eisele u. Söhne GmbH & Co. KG
Pumpen und Maschinenfabrik
Hauptstraße 2-4
D-72488 Sigmaringen

in the sense of the
Machinery Directive 2006/42/EC
Low Voltage Directive 2014/35/EU
Pressure Equipment Directive 2014/68/EU

We herewith declare, that the following products:

Product designation:
Submersible motor pump

Type designation:
AT 44F – 304S

from year of manufacture 1992 and device number 920001,
conform in the version supplied with the following relevant
provisions: Machinery Directive 2006/42/EC
in the valid edition, as well as the requirements of the other EC Directives.

The following harmonised standards have been applied:
DIN EN ISO 12100 -1
DIN EN ISO 12100 -2
EN 60204 – 1

The Engineering Office is authorised
to compile the technical documentation.

Sigmaringen, dated 08.03.2018

CEO

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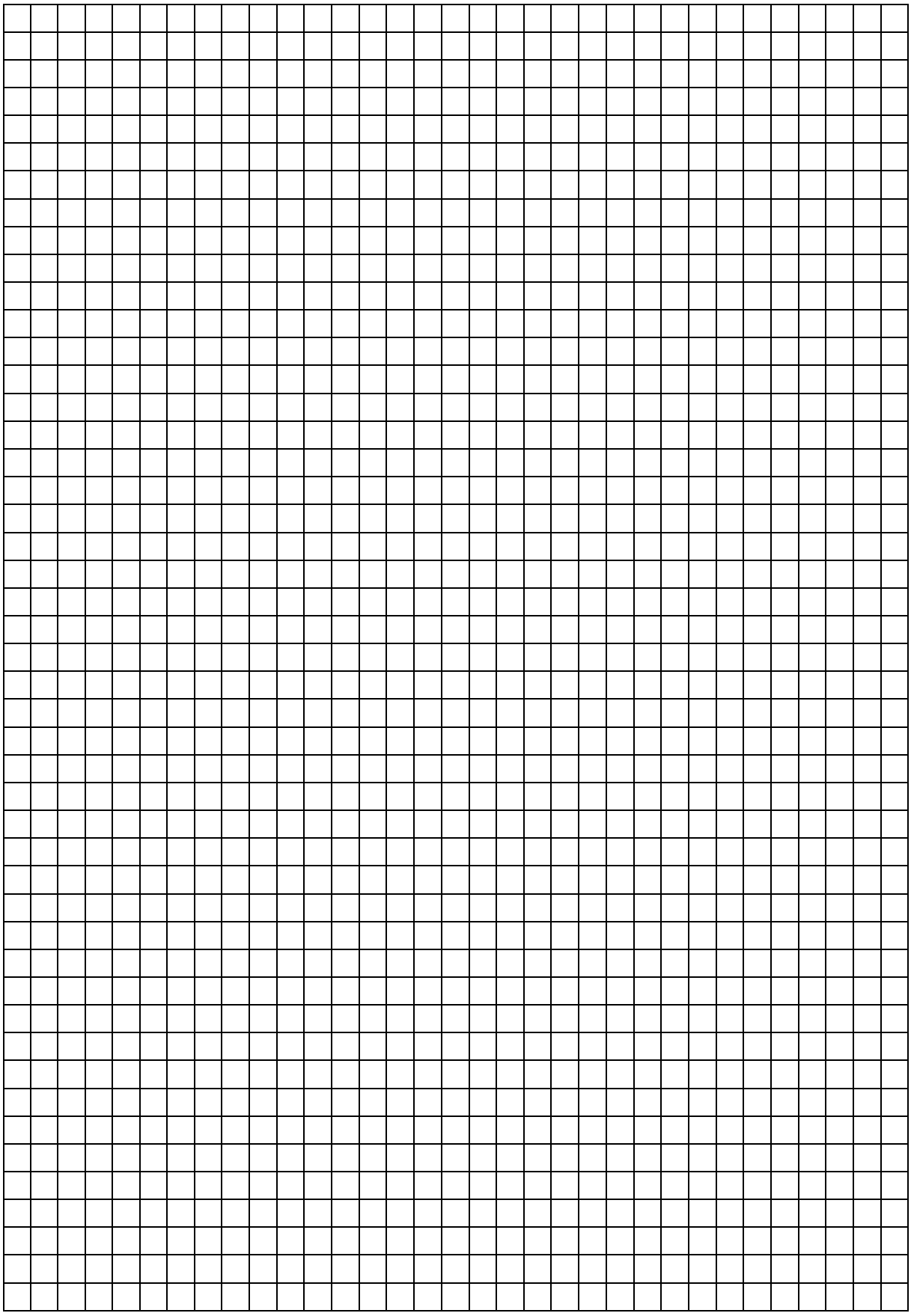

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