

COMPONENTS

FOR BIOGASPLANTS

AGITATORS – PUMPS – SEPARATORS



PAULMICHL

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DELIVERY PROGRAM

FERMENTER AGITATORS

- For ceiling and wall installation
- Laterally and height adjustable with additional possibility of connecting
- Power take-off shaft for tractor drive

SUBMERSIBLE CUTTING PUMPS

- With integrated high-performance cutting unit
- As combination unit with attached three-blade agitator blade

SUBMERSIBLE MIXERS

- With gas-tight wall and gas-tight ceiling lead-through

SUBMERSIBLE MOTOR PUMPS

- With lowering and lifting device

SEPARATORS

Screw press separators and screen drum separators

- With extensive accessories and technical equipment
- Pipeline construction up to the ready-to-operate plant

CENTRAL PUMP STATIONS

- Planning, delivery, assembly

PIPELINE CONSTRUCTION FOR BIOGAS PLANTS

- Pump pipes, gas pipes, extraction and filling pipes

BIO HEAT

- Heat exchanger: The solution when heat is needed as external heating

AGITATORS



Fermenter agitator – Wall installation

MAMMUT RF3

Infinitely variable and easy-to-use hydraulic adjustment system.

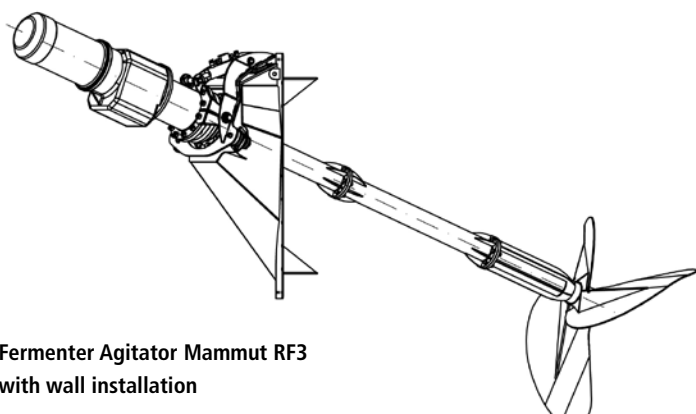
The fermenter agitator type Mammut convinces in practical use, even with high dry substance content, with an unsurpassed agitation performance.

This agitator was specially developed to provide a strong, slow and at the same time gentle mixing action. Due to the layout of the drive unit, there are no electrical components and gear units into the fermenter. The very robust construction of the agitator guarantees reliable operation.

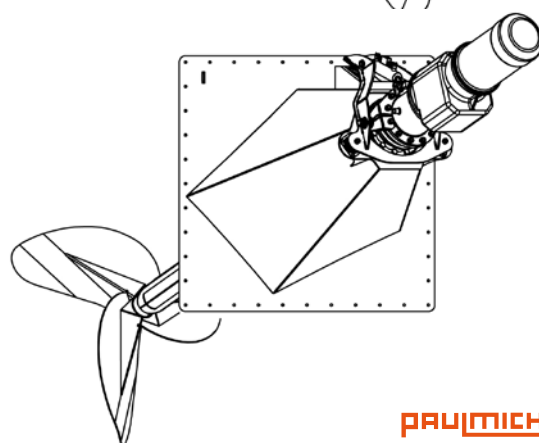
The agitator is mounted on a bearing supported vibration frame, which is equipped with special compensators.

The infinitely variable inclination adjustment of the agitator is carried out by a hydraulic unit, so that an optimal adjustment of the agitator to the fermenter substrate is possible.

The agitator is installed without wear-free bottom or counter bearing in the fermenter.



Fermenter Agitator Mammut RF3
with wall installation



TECHNICAL SPECIFICATIONS

- Diameters agitator blade 1.600 -1.800 mm
- Agitator mounting on vibration bearings mounted on a mounting bracket.
- Robust gear unit with no disturbing running noises
- Multiple bearing drive shaft in oil bath running
- Wall and ceiling installation possible
- Unsurpassed mixing performance

AGITATORS

Fermenter agitator – Ceiling installation

MAMMUT RF3

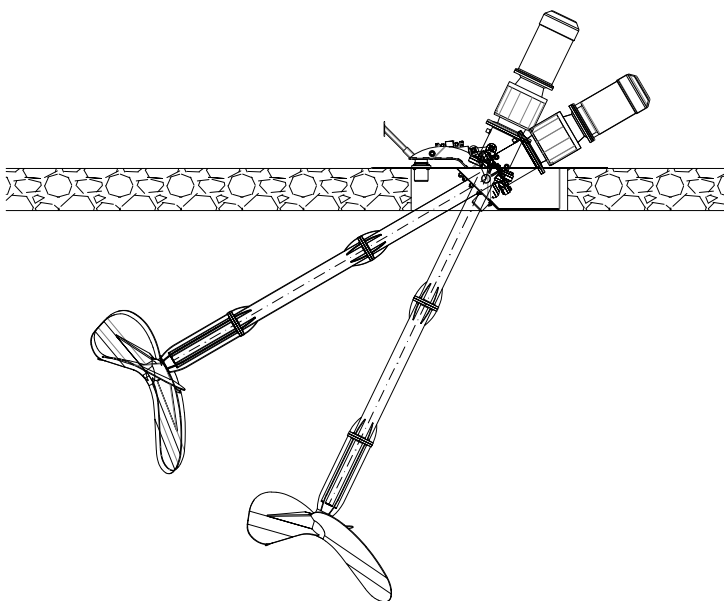
The MAMMUT ceiling mounted fermenter agitator has the same characteristics as the MAMMUT wall-mounted type. Infinitely variable and easy-to-use hydraulic adjustment system.

The fermenter agitator type MAMMUT convinces in practical use with an unsurpassed agitation performance even with high dry substance content. This agitator was specially developed to provide a strong, slow and at the same time gentle agitating action through the ceiling of the fermenter. Due to the layout of the drive unit, there are no electrical components and gear units into the fermenter.

The very robust construction of this agitator ensures reliable operation. The agitator is installed directly on the vessel ceiling or on a raised mounting surface.

The infinitely variable inclination adjustment of the agitator is carried out by a hydraulic unit, so that an optimal adjustment of the agitator to the fermenter substrate is possible.

The agitator is installed without wear-free bottom or counter bearings in the fermenter.



TECHNICAL SPECIFICATIONS

- Diameters agitator blade 1.600 -1.800 mm
- Special mounting plate for existing tank openings
- Robust gear unit with no disturbing running noises
- Recessed installation variant
- Unsurpassed mixing performance
- Individual installation variants
- Agitator blades as pressure and suction blades
- Optionally with removable agitator blades

AGITATORS

Agitator for fermenter, secondary fermentation and final storage tanks

MAMIX

The PAULMICHL agitator type MAMIX can be used in fermenters, secondary fermentation tanks and final storage tanks. The special feature of this agitator is that its design is a combination of our long proven fermenter agitator type MAMMUT and agitator MULTIMIX.

The agitator is constructed from a mounted vibration frame, which is equipped with special compensators.

The multi-reinforced agitator shaft with a standard length of 6.50 m is an integral part. This allows a further range into the tank and enables even stronger substrates to be optimally stirred. Additional lengths of 5 - 7.25 m are optionally available on request.

The infinitely variable inclination adjustment of the agitator is carried out by a hydraulic unit, so that an optimal adjustment of the agitator to the fermenter substrate is possible. The MAMIX is equipped with a 1.200 mm agitator blade as standard.



TECHNICAL SPECIFICATIONS

- Agitator with motor-gear unit ■
- 22,0 kW drive power ■
- Robust gear unit with no disturbing running noises ■
- Drive shaft 5.0 - 7.25 m ■
- Agitator mounting on vibration bearings, mounted on a mounting bracket. ■
- Agitator blade diameter 1.200 mm as suction and pressure blades ■
- Wall and ceiling installation possible

AGITATORS

Agitator for fermenter, secondary fermentation, final storage tanks and mixing pits

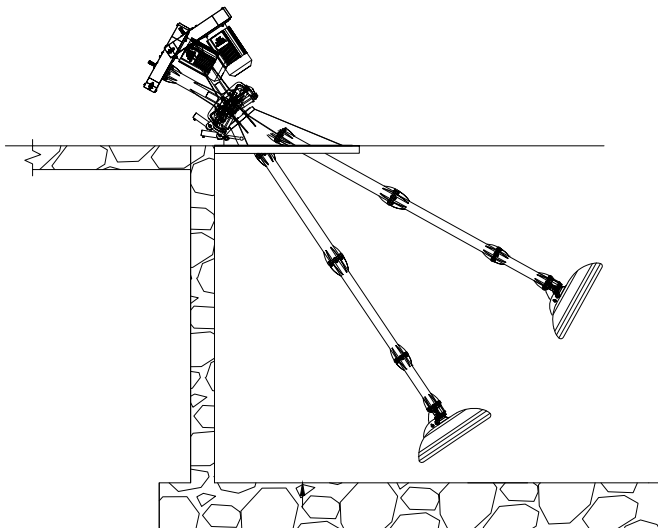
MULTIMIX

The PAULMICHL agitator, Type Multimix, can be used in fermenters, secondary fermentation tanks and final storage tanks. A special feature of the Multimix agitator is the multiple reinforcement of the agitator shaft with a standard installation length of 6.50 m. Other lengths are optionally available on request. The standard horizontal and vertical hydraulic adjustment device is supplied as part of the standard equipment, along with a manual pump and a control unit.

As an option, the PAULMICHL - Multimix agitator can be supplied with a fully automatic filling level adjustment system which is controlled from the central control of the biogas plant. This feature makes it possible for the Multimix to homogenize the complete tank despite changing levels. In spite of an agitator blade diameter of 1200 mm with a capacity of 22.0 kW, the PAULMICHL-Multimix agitator ensures a low-noise but nevertheless powerful transmission by means of the toothed belt (gear wheel) drive.

A further advantage of the agitator is the very stable and robust construction which ensures very reliable use. In addition, due to the layout of the drive unit, the agitator itself contains no electrical components and no gear unit inside the tank. This allows very easy access to the drive elements of the agitator.

Due to the use of a high-quality sealing unit on the mounting plate of the tank, it is possible to operate the Multimix agitator in secondary fermentation tanks at various heights. The SIC/SIC sealing on the agitator is monitored by means of an oil expansion chamber.



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TECHNICAL SPECIFICATIONS

- Powerful but nevertheless low-noise transmission by means of toothed (gear wheel) belt drive.
- 22.0 kW drive power in standard version
optional 15.0 - 18.5 kW
- High-quality sealing unit
- Mechanical seal SIC/SIC
- Agitator blade diameter 1200 mm
- Agitator for fermenter secondary fermentation tank and final storage tank
- Almost the entire contents of the tank can be homogenized despite changing levels
- Solid construction
- Easily accessible drive elements

AGITATORS

Agitator for fermenter and secondary fermentation tanks

BG500

The PAULMICHL agitator BG500 has an infinitely variable and easy-to-use hydraulic adjustment system. Due to this, an optimal positioning of the agitator in relation to the substrate of the tank is possible, even if the level in the secondary fermentation tanks or gas-tight final storage tanks changes. For use in high-pressure tanks in particular, this adjustment device is second to none.

With an agitator-blade diameter of 600 – 840 mm, the BG500 provides a powerful but nevertheless low-noise transmission by means of a toothed (gear wheel) belt drive. As an option, the agitator can be supplied with a universal joint shaft drive-through for use with tractor drive.

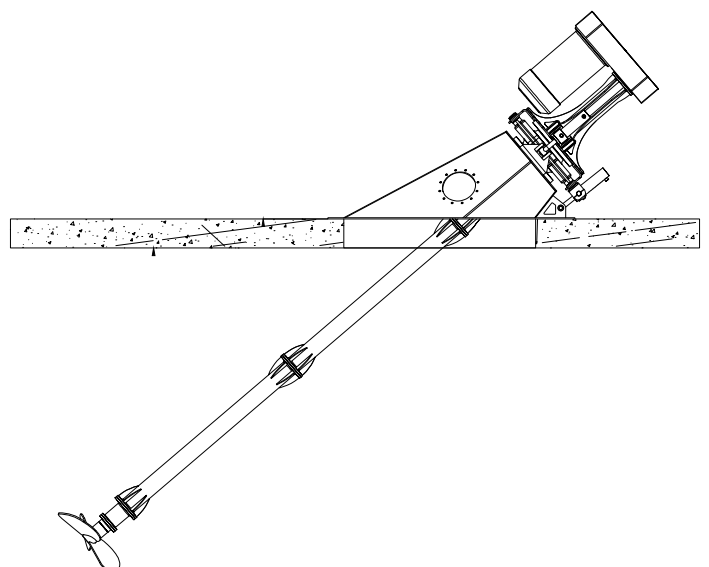
The agitator BG500 is used to mechanically and powerfully support the homogenization process in fermenters, mainly in the solid entry area. Due to the use of a high-quality sealing unit on the mounting plate of the tank, it is possible to operate the agitator in secondary fermentation tanks at various heights. The sealing on the agitator can also be monitored by means of an oil expansion chamber. The high-quality sealing on the agitator's shaft with the SIC/SIC mechanical seal is also a feature of the BG500.

The standard piping for the PAULMICHL agitator BG500 has an overall length of approx. 5.00 m. On request a shorter or longer version can be supplied. In addition, a very robust scraping knife ensures long-term quietness during agitator operation.



TECHNICAL SPECIFICATIONS

- Agitator blade diameter 600 - 840 mm, material thickness 8.00 mm
- Agitator mounting with anti-vibration bearings, fixed to an installation bracket
- Powerful but nevertheless low-noise transmission by means of toothed (geared) belt drive
- Drive shaft with multiple ball bearings running in an oil bath
- High quality agitator shaft seal with SIC/SIC mechanical seal
- Oil expansion chamber for monitoring sealing
- Very robust scraping knife for long-term quietness while the agitator is in use
- Wall and ceiling installation with standard or custom-made mounting plate
- User-friendly hydraulic adjustment system



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AGITATORS

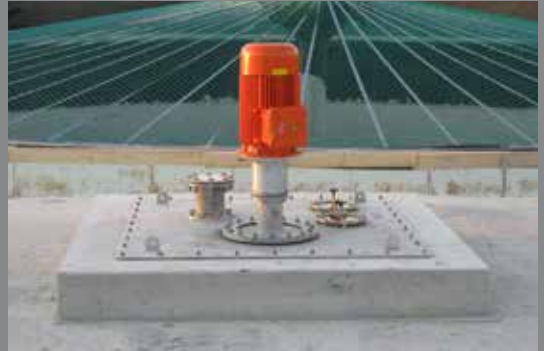
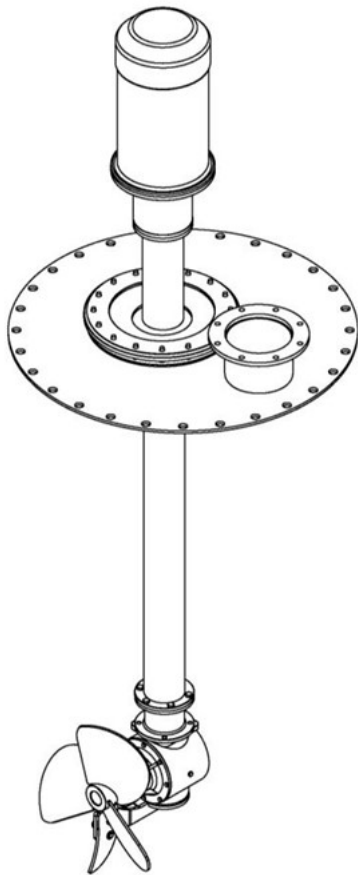
Additional agitator for fermenter

BG500-V

with motor and gear unit combination

The agitator BG 500-V for mechanical and powerful support in fermenters is mainly used as an additional agitator for tanks which are only equipped with one agitator.

The agitator is assembled according to individual need, with either a standard installation plate or a custom-made one for an existing ceiling opening. The agitator can also be supplied with an extensive range of additional equipment such as the motor-gear unit combination and the inspection window and much more. The multiple reinforcement of the gear unit guarantees reliable operation when demands are higher.



TECHNICAL SPECIFICATIONS

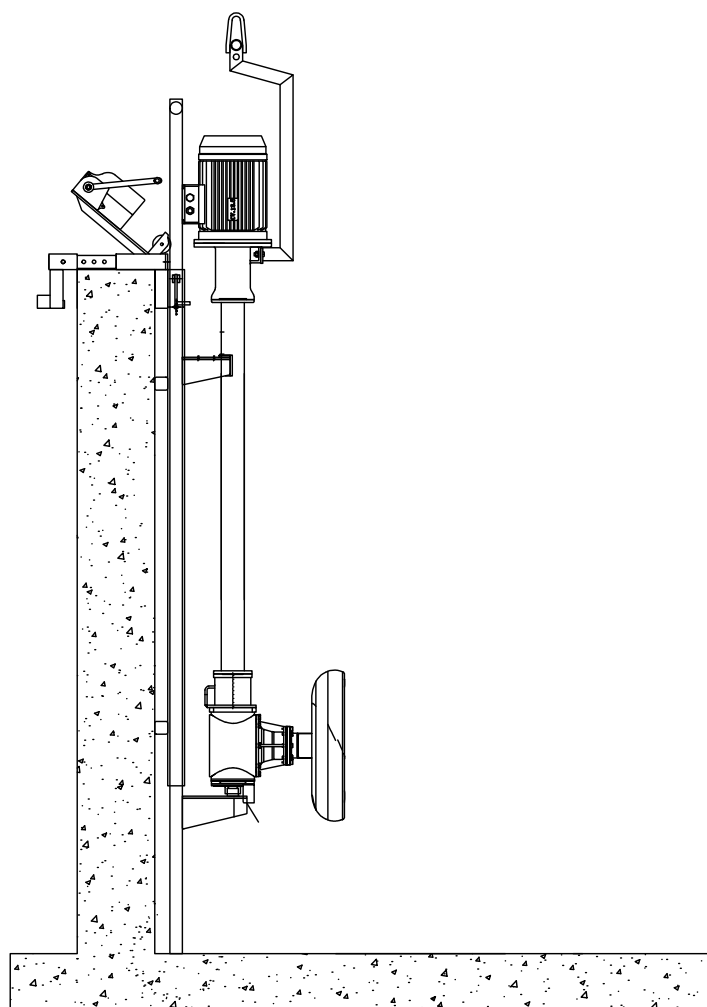
- Motor size from 9.0 - 15.0 kW
- Agitator blade diameter 500 - 840 mm, material thickness 8.00 mm
- Standard version in stainless steel
- Robust angular gear for deflection into a horizontal pushing force
- Optional additional equipment with motor-gear unit
- Special versions for use in different tank systems

AGITATORS

Agitator for storage tanks and mixing pits

VR-AGITATOR

The PAULMICHL VR agitator is used in storage tanks and mixing pits with a high proportion of foreign bodies. The agitator is attached to a stainless steel guide rail, which is dowelled to the tank wall. A special feature of the VR agitator is the infinitely variable height adjustment by means of a rope winch, as well as the lateral adjustment option, thus achieving an efficient agitating performance. The deflection into a horizontal pushing force is done by a robust angular gear.



TECHNICAL SPECIFICATIONS

- Motor size from 9.0 - 15.0 kW
- Standard version in stainless steel
- Robust angular gear for deflection into a horizontal pushing force
- Height adjustable by means of rope winch
- Installation and removal with filled container
- Special versions for use with coated tanks

AGITATORS

Agitators for secondary fermentation
and final storage tanks

SUBMERSIBLE MIXER TYPE TMR

PAULMICHL submersible mixers are preferably used in secondary fermentation tanks and final storage tanks, or for mechanical powerful support. The installation can be done using the standard lowering device for open final storage tanks. For use in closed tanks, the installation is done by means of a gastight wall or ceiling lead-through.

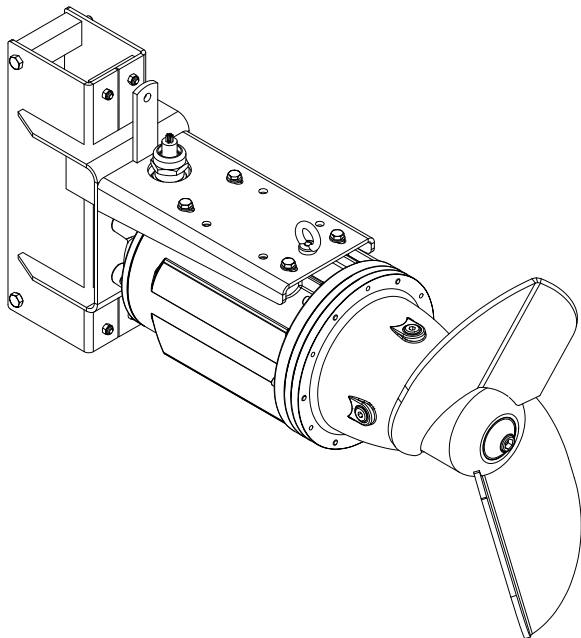
The PAULMICHL agitator design as well as the ATEX-design range from 0.75kW to 18.5 kW.

With an agitator-blade diameter of 181 mm – 780 mm and an increased distance to the wall, a high thrust power is generated

In addition, a reliable use of the PAULMICHL-submersible motor-driven agitator is guaranteed by means of the flow enhancing construction of the motor and the motor support bracket, as well as the high-quality SIC/SIC sealing unit and a drive unit with robust planetary gearing.

Furthermore, thermal monitoring of the agitator is facilitated by an integrated temperature sensor.

The extensive product range of wall and ceiling lead-throughs facilitates use in fermenters and secondary fermentation tanks. The reliable cable routing of the agitator unit guarantees a long service life and reliable use.



PAULMICHL



TECHNICAL SPECIFICATIONS

- Motor size from 0,75 kW – 18,5 kW ■
- Agitator blade diameter 181 – 780 mm ■
- Agitator blade design with self-cleaning profiling ■
- Drive unit with robust planetary gearing ■
- High-quality sealing unit with SIC/SIC mechanical seal ■
- IP68 protection class ■
- Thermal monitoring of the agitator facilitated by an integrated temperature sensor ■
- Special motor cabling with a reinforced cable insulation for double protection against damage ■
- Reliable cable routing through cable conduits ■
- Robust plastic cable brackets

AGITATORS

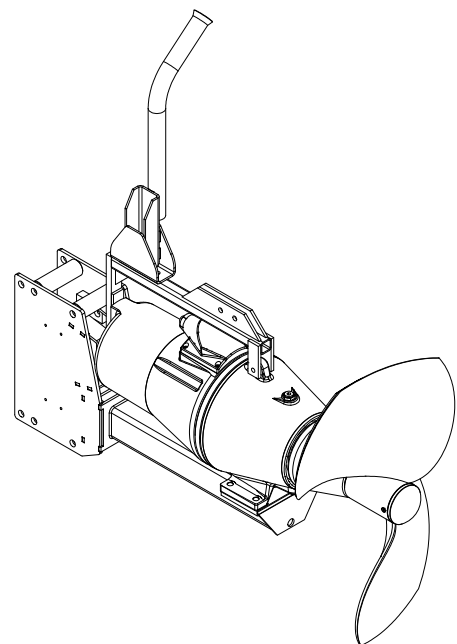
Agitators for secondary fermentation tanks and final storage tanks

SUBMERSIBLE MIXER TYPE OMPG

The submersible mixers of the OMPG series are powerful mixers for increased requirements such as tanks with a large volume and media with difficult substrates. They can be used flexibly in liquid manure technology and biogas plants and are particularly suitable for the homogenization of liquid manure and biogas substrate.

Due to the large dimensioned two-blade agitator blades with a diameter of 800 mm to 850 mm, as well as the horizontal and vertical adjustability, the agitator achieves an extremely high agitating performance and an efficient mixing effect. The submersible mixer is therefore mainly used in secondary fermentation tanks and final storage. In closed tanks, they are installed with a gas-tight wall or ceiling lead-through. Our delivery programme includes the power ratings from 11.0 to 18.5 kW, as well as the optional ATEX version.

The agitator is equipped with a 12 m motor cable, a high-quality SIC/SIC mechanical seal and a robust planetary gear, which guarantees a long service life of the agitator. The agitator is controlled by a leakage sensor.



TECHNICAL SPECIFICATIONS

- Motor size from 11,0 kW – 18,5 kW
- Agitator blade diameter 800 mm – 850 mm
- Agitator blade design with self-cleaning profiling
- Drive unit with robust planetary gearing
- High-quality sealing unit with SIC/SIC mechanical seal
- IP68 protection class
- Thermal monitoring of the agitator facilitated by an integrated temperature sensor
- Special motor cable with reinforced cable sheath
- Reliable cable routing through cable conduits
- Cast motor housing with 2K epoxy coating

PUMPS

Submersible motor pump

SUBMERSIBLE MOTOR PUMP PTS

The submersible motor-driven pumps in the PTS product line are used to pump liquid manure, biogas slurry, sewage sludge, waste water, and similar substances, which partly contain solids. The pumps are equipped with a high-quality cutting device on the impeller, to ensure reliable and trouble-free running. Main areas of use are pre-pits and final storage tanks which are only partially accessible or difficult to enter. The connection to the pump line can be made using flexible pipes or with an underground coupling system in connection with a stationary lowering device.

This pump stands out due to its large flow rate and reliability when filling liquid manure and tank vehicles. The submersible motor pump from 0.75 to 1.1 kW capacity is often used in condensate pits, pump shafts and drainage shaft. This pump stands out due to its compact construction and stainless steel motor housing as well as the stable centrifugal chamber. This reliable pump is also ideally suited for use in situations where the distance to the relevant storage tanks is greater.



TECHNICAL SPECIFICATIONS

- 0.75 – 18.5 kW capacity
- Cutting device
- Sealing unit SIC/SIC
- Double suction cutting device
- Versatile use, agriculture, sewage treatment plants and industry
- Stationary and mobile versions

PUMPS

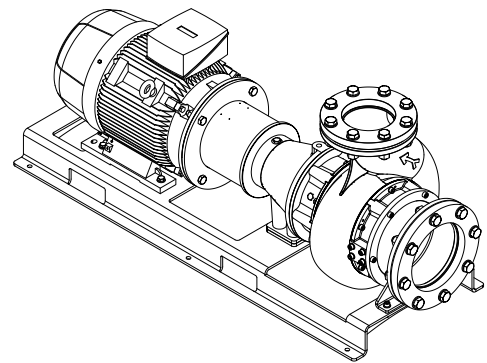


Centrifugal pump

CENTRIFUGAL PUMP ETO

The centrifugal pump type ETO is built onto a stable base frame. The connection to the drive motor is effected by a flexible coupler. Characteristic of this robust pump is the double suction cutting device which ensures a reliable running of the pump. The pumps are equipped with a high-quality cutting device on the impeller, in order to guarantee reliable and trouble-free running.

Biogas slurry, sewage sludge, waste water and industrial waste are the main areas in which this pump is used. This pump stands out due to its large flow rate and reliability when filling liquid manure vehicles and tank lorries.



CENTRIFUGAL PUMP AFI

The centrifugal pump type AFI sets new standards in meeting the requirements of large flow rates. The pump is built on a stable, galvanised base frame. The connection to the drive motor is made with a flexible motor coupling. This robust pump is characterised by its large-volume suction area which is equipped with a cutting device on the impeller. As an option, the pump can be supplied with a double or fourfold suction and cutting device.

The standard version of the pump impeller is supplied in resistant special steel. All components are available optionally in stainless steel. The high-quality sealing of the centrifugal chamber is achieved by a SIC/SIC mechanical seal which is equipped with a durable oil supply. The power transmission is effected by means of a robust bearing housing and multi-bearing drive shaft.

TECHNICAL SPECIFICATIONS

- 2.2 kW – 55.0 kW capacity
- Robust base frame
- Flexible motor coupler
- Double suction cutting device on the ETO pump
- Optional double or fourfold cutting device on the AFI pump
- Sealing unit SIC/SIC

PUMPS

Submersible cutting pump, mixing pump

SUBMERSIBLE CUTTING PUMP

The counter-rotating PAULMICHL high performance cutter, made of resistant WIDIA special steel, is built into a large suction and pump housing, which prevents constipation of the pump in the suction area. The cutting unit of this high performance, liquid manure, thick matter pump reliably shreds long-fiber materials from floating layer and therefore has no problems with media from biogas plants. In addition, the PAULMICHL submersible cutting pump has a drive unit made of high-strength machine tube, a drive shaft made of stainless steel with multiple robust shaft bearings and high-quality industrial ball bearings which is running in an oil bath. It is mounted with a hot-dip galvanized wall rail for hanging / dowelling.

Individual special solutions and the combination unit pump agitator set new standards in the field of pump technology. This combination system is characterized by its unique homogenization capability, by simultaneous stirring and pumping of extreme liquid manure. Separate, lateral swiveling of the agitator nozzle and agitator blade during operation ensures an optimum homogenization process.

(ORIGINAL-BEHAM)

MIXING PUMP PGD

The PGD is a mixing pump for particularly high demands. Due to the specially developed impeller with high intake screw and long tearing edges made of WIDIA steel, this pump is particularly suitable for media with a high dry substance content. The top-suction mixer pump PGD develops a pressure of approx. 4 bar and is therefore suitable for overcoming large delivery heights and long conveying distances. The mixing pumps are delivered in lengths from 1.40 to 4.90 m and in power sizes from 7.5 to 22.0 kW. PAULMICHL pumps are designed for extreme loads, even in continuous operation, and a long service life.



TECHNICAL SPECIFICATIONS

- 2.2 – 55.0 kW (submersible cutting pump)
- 7.5 – 22.0 kW (mixing pump PGD)
- Stirring nozzle horizontal and vertical adjustable
- Electric and tractor version (also in combination)
- Combination unit pumping and stirring

PUMPS



Progressive cavity pump

SUCTION PUMP

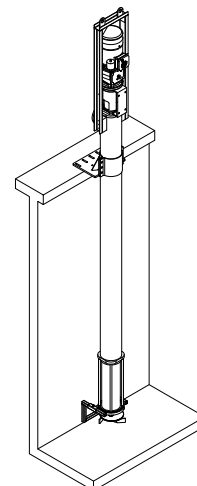
Progressive cavity pumps are self-priming positive displacement pumps. The basic principle is based on a rotor rotating in a fixed stator. Due to the geometry and the eccentric rotation of the rotor, cavities are formed in which the medium is transported. The pressure is created inside the pump. Because of their good suction power, the progressive cavity pumps have proven their worth as central pumping stations in biogas plants. It is also suitable for feeding separators. Progressive cavity pumps are used in particular when slurry/biogas substrate with high viscosity must be pumped, high pressure is required or long lines are installed. To monitor the pump, over pressure/under pressure fuses and a dry-running sensor are installed.

SUBMERSIBLE PROGRESSIVE CAVITY PUMP

The progressive cavity pump is suitable for emptying open and closed containers. The length of the suction tube is adjusted to the customer's specific requirements. The pump is equipped with a suspension bracket for quick installation and removal during service work. The submersible pump is fixed with a clamp, which allows the pressure connection of the pump to be flexibly adjusted. A fugator is mounted on the suction side, which additionally supports the suction process of the pump.

TECHNICAL SPECIFICATIONS

- Capacity from 10 - 100 cbm
- About speed adjustable flow rate
- Reversal of suction and delivery side
- Installation in any position



PUMP STATIONS

CENTRAL PUMP STATION

The central pump stations are equipped with manual or fully automatic shut-off and gate valve technology. Individual special solutions with integrated barrel filling pumps, extraction pipes/stations are custom-made. The gravity overflow pipes are made of stainless steel.

- Individual special solutions, custom-made
- Complete pump plant for separators
- Gravity overflow pipes made of stainless steel
- Shut-off and gate and valve technology
- Barrel-filling and extraction stations
- Technical equipment of intake and preliminary pits - planning, delivery

PIPE/GAS PIPELINE CONSTRUCTION

PAULMICHL piping construction, a TÜV (German Technical Inspection Agency) certified, specialized company in accordance with § 62 (1) WHG (Water Resources Act) stands out due to its dependable and professional on-site installation, carried out by our highly qualified specialists. Installation is very cost-effective and is carried out under specialist supervision. We offer a range of products from filling and extraction pipes to flushing and pump pipes. In addition, necessary and individual, custom-made designs are no problem.

A further advantage of PAULMICHL pipeline construction is that planning, delivery and installation come from a single source.



TECHNICAL SPECIFICATIONS

- Dependable and professional on-site installation by highly qualified specialists.
- Cost-effective installation by means of the lead fitter principle and on site provision of assistants.
- Individual custom-made designs
- Filling and extraction pipes
- Flushing and pump pipes
- Planning, delivery and installation from a single source
- Specialized company in accordance with WHG

HEATING SYSTEM

The efficient, outdoor heating system for biogas plants

BIOHEAT

The BioHeat heat exchangers are designed in such a way that they can be easily installed on any biogas plant. They are used for fermenter heating and hygienization

Functionality of the heat exchangers:

BioHeat is operated in series in a countercurrent process. There is no accumulation of water in the upper pipe due to the higher flow velocity. The substrate can already be fed in at a temperature of 70°C, which eliminates the need for time-consuming heating.

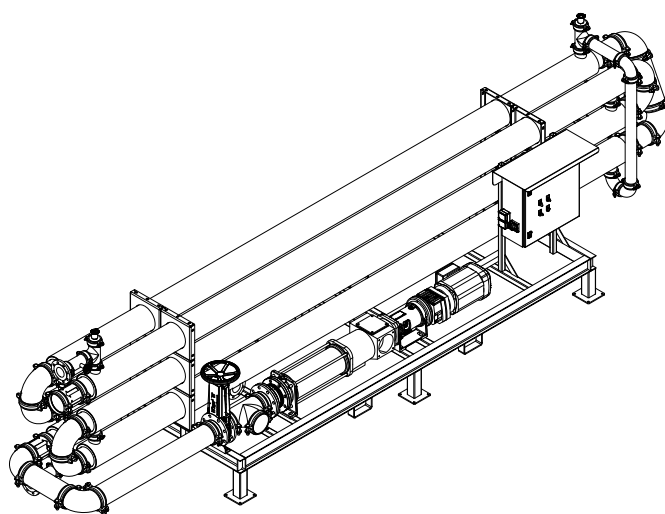
The pipe sizes DN100, DN150 and DN200 allow for a need-based design. The high-quality insulation made of Firocover ensures reliable outdoor use, as the plastic mats do not absorb water.

The heat exchanger ensures constant and reliable temperatures at all operating times. The device is TÜV-certified (German Technical Inspection Agency). It can also be completely disassembled and is therefore very flexible.



TECHNICAL SPECIFICATIONS

- Variable in width and height
- Consistent, reliable and safe operation at all times temperatures
- Heat transfer surface available as required
- Maintenance-free operation
- First-class price-performance ratio
- Connections substrate: DN150
- Heating water connections: DN80
- Mobile version possible
- All substrate pipes are made of stainless steel



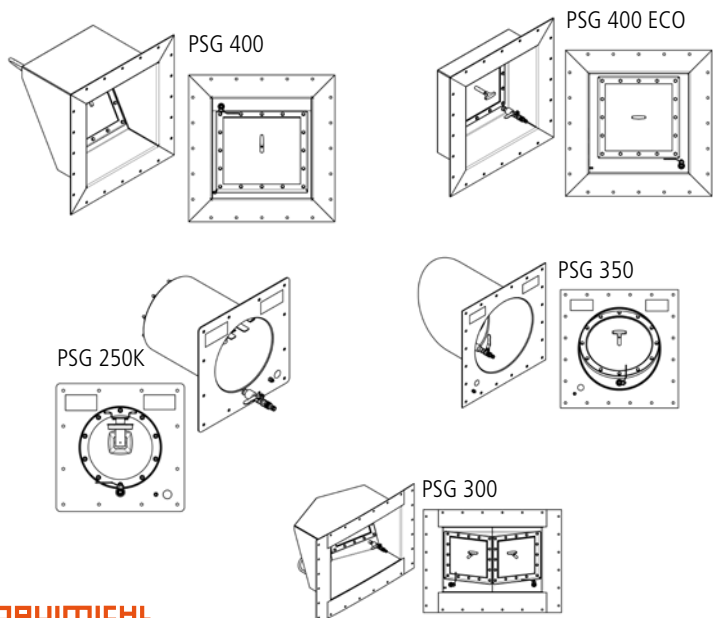
INSPECTION WINDOWS

PANORAMA INSPECTION WINDOW PSG

Panorama inspection windows for fermenters, secondary fermentation and final storage tanks allow for a significantly better optical control of the fermentation and homogenization process in closed tanks. The enlarged field of vision facilitates an optimal spatial assessment of the conditions within the tank. PAULMICHL inspection windows set new standards in monitoring and above all in optimizing the efficiency of agitators through adjustment measures under perfect optical control.

The use of high-quality materials which are resistant to chemical attack makes the individual components highly durable. By means of the easily accessible sealing unit from the PAULMICHL inspection window PSG 250K – 400, a simple control of leak tightness is possible at all times from outside the tank.

The glass pane is made of soda-lime glass in accordance with DIN 8902, with wipers. The factory installation of a washing nozzle made of V4A piping with gas non-return valves and a DVGW approved ball valve facilitate easy cleaning of components inside the tank. In order to achieve a high degree of serviceability the Paulmichl Inspection Windows feature a separate internal fixing system for the glass elements in the mounting frame. The special glass as well as the V4A stainless steel frame has a compressive strength of up to 1 bar.



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TECHNICAL SPECIFICATIONS

- Modular design
- High-quality design in VA
- Special safety glass
- Washing nozzle
- Safety tested

SEPARATORS

STATIONARY SEPARATION UNIT

The stationary separation units are planned and constructed individually according to the local conditions and requirements.

Many years of experience allows individual special and system solutions for a simple and cost-effective realization of the separation unit. The pipelines are designed according to the installation situation and integrated into the existing pump system of the biogas plant.

Our many years of experience in the field of separation and plant technology guarantee a reliable design and operation of the plant.

SEPARATOR MOBILE

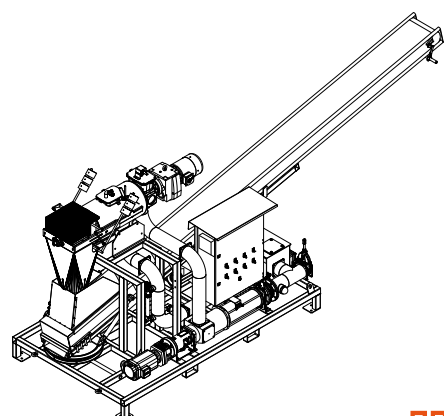
The mobile separator is mounted on a base frame as standard. This allows the complete unit to be positioned accordingly with a lifting vehicle. The separator is fed via a self-priming progressive cavity pump. The press water is returned over a free outlet. Optional equipment with an additional press water pump is possible.

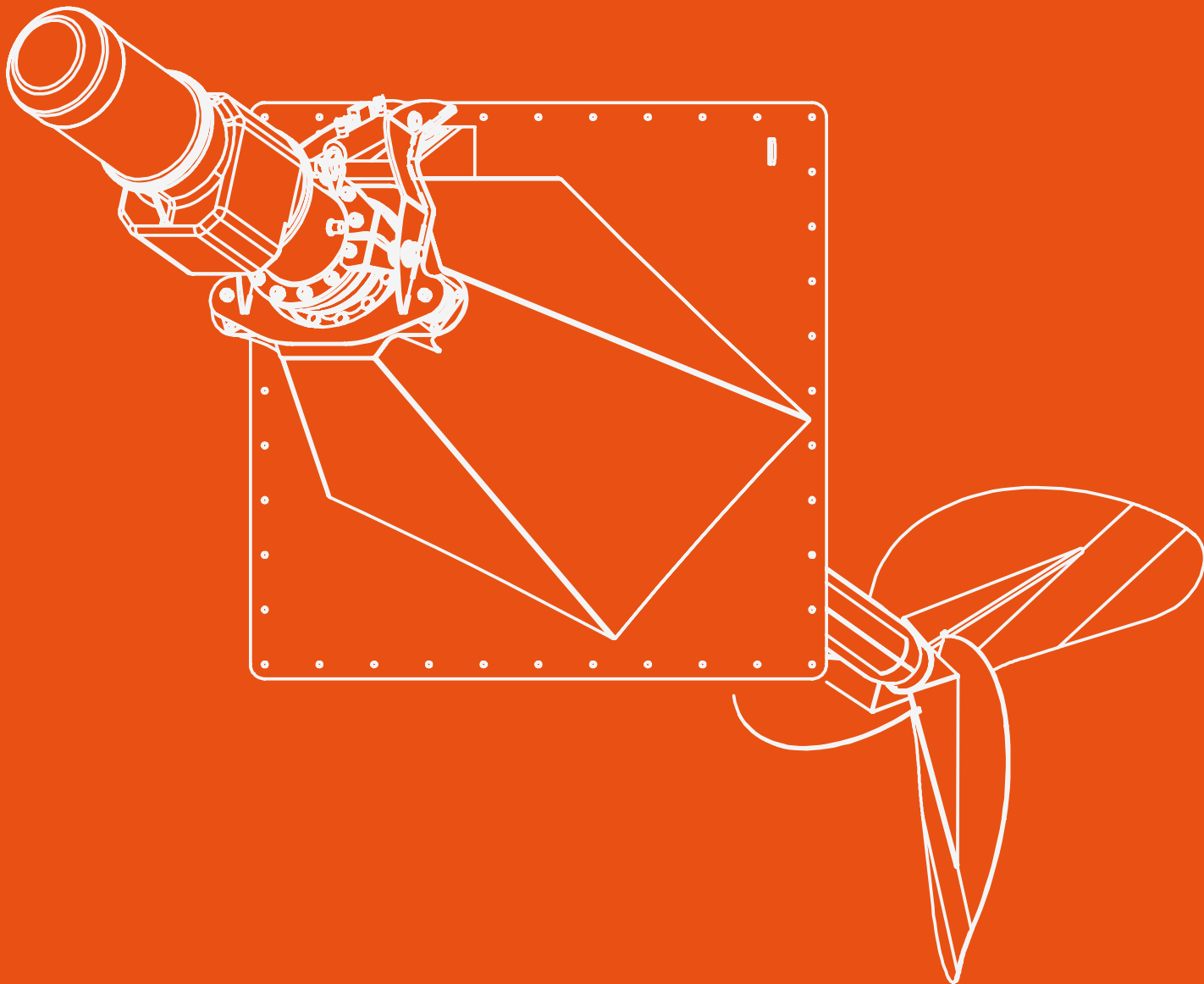
The reliable separation operation of the plant is made possible by the fully automatic control and regulation unit, which is equipped as standard with a frequency converter for operation by means of pressure control technology of the separator, as well as manual individual speed control of the feed pump. The separator can therefore be operated without overflow pipes or complex and failure-prone expansion tanks. As a safety device, the pump is equipped with a negative pressure switch and a leakage monitor.



TECHNICAL SPECIFICATIONS

- Individual special solutions made to measure
- Complete pumping systems for separators
- Platform and work platforms
- Shut-off and slide valve technology
- Delivery optional incl. electrical control and on-site commissioning
- Reliable on-site service by specially trained staff





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