

MAVADRIVE®

Bottom and top entry magnetic agitators



MAVAG AG



MAVADRIVE® magnetic agitators

MAVAG AG is universally recognised for

- Extensive experience in the manufacturing of magnetic agitators
- Customer specific designs for optimal process results
- Extensive know how in sterile applications
- High internal quality standards
- Product development through consistent research and product improvement

Technical advantages of **MAVADRIVE® magnetic agitators**:

- Best CIP-/SIP features through patented design
- Special software for calculation of agitator and shaft
- Large selection of agitator designs
- Minimal wear on bearings through use of high performance ceramics
- Flexible combinations of agitators for different vessel shapes and designs of bottom or top mounting

MAVADRIVE® magnetic agitators are used in the following branches:

- Pharmaceuticals (sterile active ingredients, water based solutions)
- Biotechnology (bioreactors/ fermenters for cell cultures and microbiology)
- Food and beverage industry (milk processing)
- Fine chemicals (API)

Request our reference list!



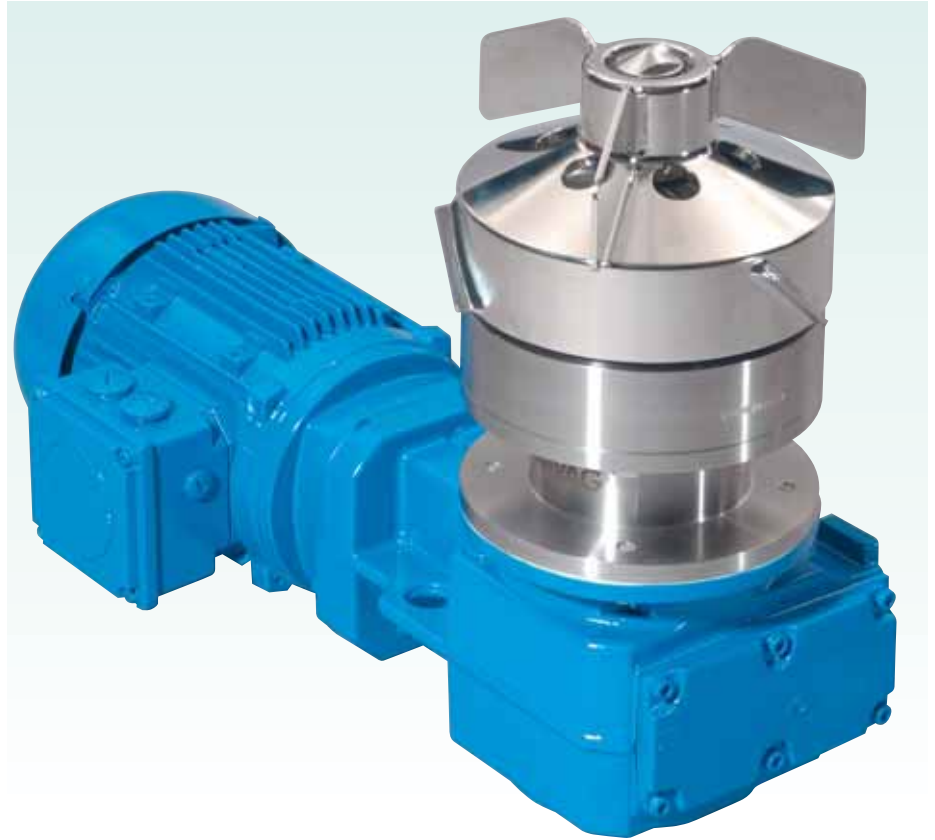
MAVADRIVE® magnetic agitator and MAVAG double impeller and propeller



Technical information MAVADRIVE® magnetic agitators

Hermetically closed containment shell between vessel inside and atmosphere and the use of the magnetic field through high performance samarium-cobalt- magnets provide not only a complete replacement for conventional shaft transmission, but also guarantee the highest integrity and safety standards. With proven validation, the biological, chemical and mechanical safety can be guaranteed and maintenance reduced to a minimum.

MAVAG provides magnetic drives with torque of up to 250 Nm. Higher torque can be specially accommodated.

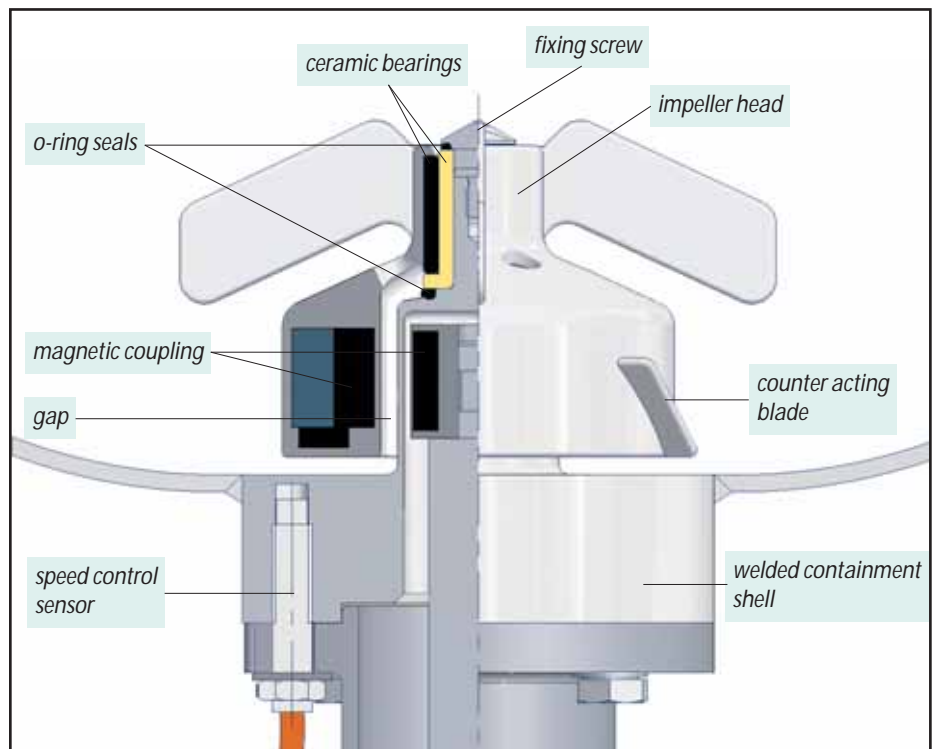


MAVADRIVE® magnetic agitator with MAVAG double impeller

Cleanability

Process wetted components are designed in a way to eliminate deposits during the process phase and that for cleaning cycles besides flooding other CIP concepts can be used:

- Oscillating movement of the agitator head by patented counter acting blades
- Largest gap between containment shell and agitator head for best possible cleanability
- inclined surfaces and accessibility of all wetted areas
- dead zone free construction in combination with slots and holes guarantee the pumping effect of the agitator head.
- adjustment of the operating parameters and of the cleaning cycles during selection of process parameters (Example: speed adjust to avoid dry running)



Principal sketch of MDB with double impeller

technical data MDB

size	torque (Nm)	gap (mm)	welded flange (mm)
MDB 50	0.5	3.0	60
MDB 100	1.0	3.5	95
MDB 300	3.0	3.5	95
MDB 600	6.0	4.5	120
MDB 1200	12.0	6.0	160
MDB 2500	25.0	6.0	160
MDB 5000	50.0	8.0	230
MDB 7500	75.0	8.0	230
MDB 15000	150.0	8.0	260
MDB 25000	250.0	8.0	260



MAVADRIVE® MDB 1200
with double impeller



MAVADRIVE® MDB 7500
with propeller and lowering
device for magnetic rotor

MAVAG-double impeller generate primarily a radial direction of flow causing a limited local recirculation flow. Ideally suited for dispersion of liquids and dissolving of solids and is used in vessels with a H/D-ratio $\leq 1,5$.

MAVAG-propeller installed eccentric generate a axial direction of flow causing a spacious circulation flow and provides for good mixing of the fluid. Due to the axial flow, the design can also be used in tall, slim vessels.

Application recommendation

	MAVADRIVE® propeller	MAVADRIVE® double impeller	MAVADRIVE®-ZKT
direction / type of flow	axial, spacious circulation flow	radial, local limited recirculation flow	axial, spiral circulation flow
installation	eccentric or centric with baffles	eccentric or centric with baffles	centric without baffles
agitator diameter	100 – 500 mm	75 – 400 mm	150 – 1000 mm
recommended d/D	0.1 – 0,3	0.1 – 0.3	0.4 – 0.7
recommended circumference speed	3 – 12 m/s	2 – 8 m/s	0.5 – 2 m/s
Max. vessel volume	40 m ³	3.2 m ³	3.2 m ³
Max. vessel diameter	3000 mm	1600 mm	1400 mm
basic operations	homogenize suspend heat transfer	disperse dissolve heat transfer	low-shear agitation homogenize heat transfer

d/D= agitator diameter/vessel diameter



Magnetic agitators with multiple blade arrangement

Years of know how in the manufacturing of fermenters, from process engineering to design, calculation and fabrication of vessels and agitators up to start up of the equipment provide the foundation for the development of magnetic agitators with multiple blade arrangements on a single shaft. For the very different requirements on fermenter agitation from cell culture up to microbiological applications with high aeration rates, **MAVAG** can offer a wide range of magnetic agitators, bottom and top entry with a variety of bearing arrangements, supplemented on larger sizes with conventional steril agitators with mechanical seals. Up to four blades in a single design or in combination based on the process requirement can be supplied.

Removable or welded executions can be selected.



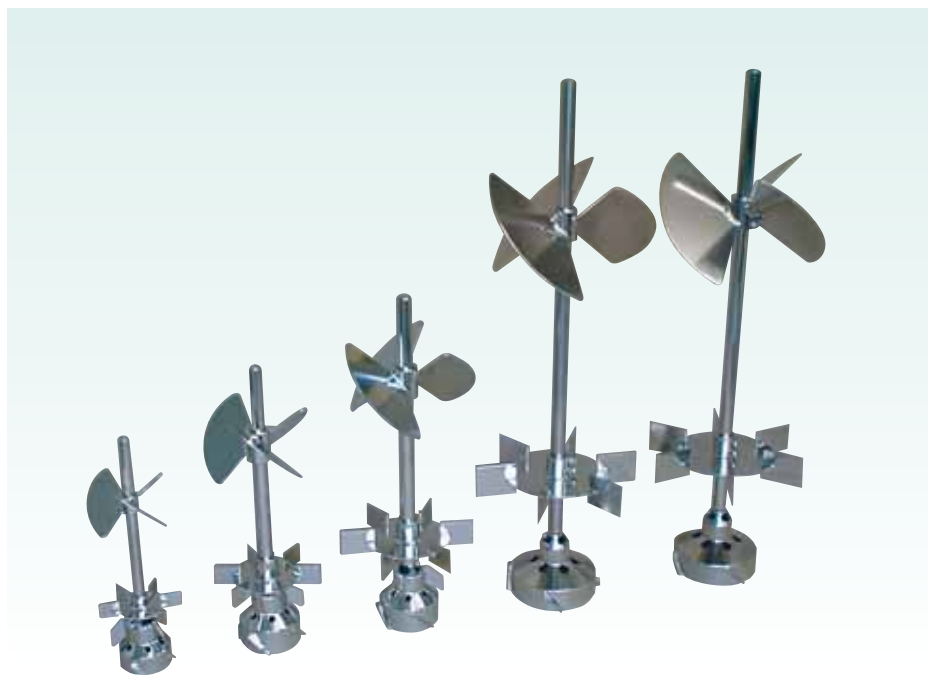
MAVADRIVE® MDB with rushton turbine ana **MAVAG-ZKT** in a bioreactor for cell culture

Examples of blade designs:

- Impeller (Rushton turbine),
- Propeller
- Pitch blade
- **MAVAG-ZKT**-agitator (Paddle)
- Spherical agitator

MDB Bottom entry magnetic agitator with ceramic bearing

The design and the functional components correspond to agitators with a single blade. In connection with the sizing of the shaft, the use of reinforced bushings are possible.



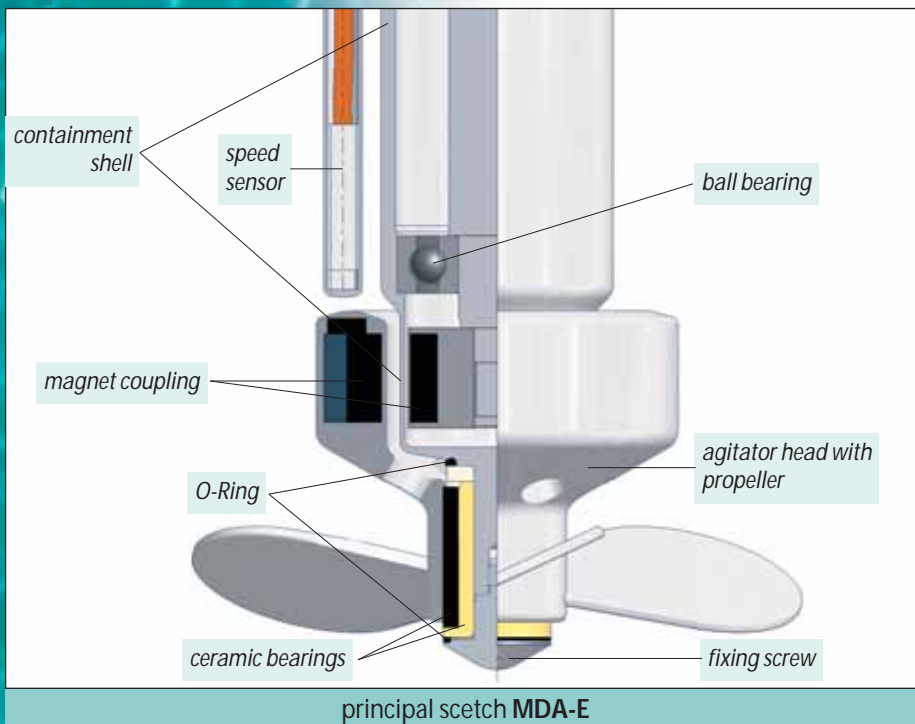
MAVADRIVE® MDB 300 – MDB 1200 for cultivation of animal cells

MDA-E

MDA-E

Top mounted magnetic agitator with external bearing and secured agitator head

The patented design **MAVADRIVE® MDA-E** uses a tube as an extended containment shell. The drive shaft is mounted inside the tube with the driving magnetic rotor at its end. The ceramic bearings and agitator head are mounted at the end of the containment shell and a fixing screw is used to secure the assembly.



Innovation

Innovationen

MDB-F

Bottom mounted magnetic agitator with secured agitator head

Key feature of the new range of bottom mounted magnetic agitators with secured agitator head is the locked assembly of the head. The model can be supplied with bolt-on or welded containment shell.

Advantages of this design:

- Extension of process applications
- Irrespective rotational direction
- Simple ceramic bearing installation
- Approved for use in Ex zones up to 0/20 according 94/9/EC (ATEX)
- Use as rotor-stator system

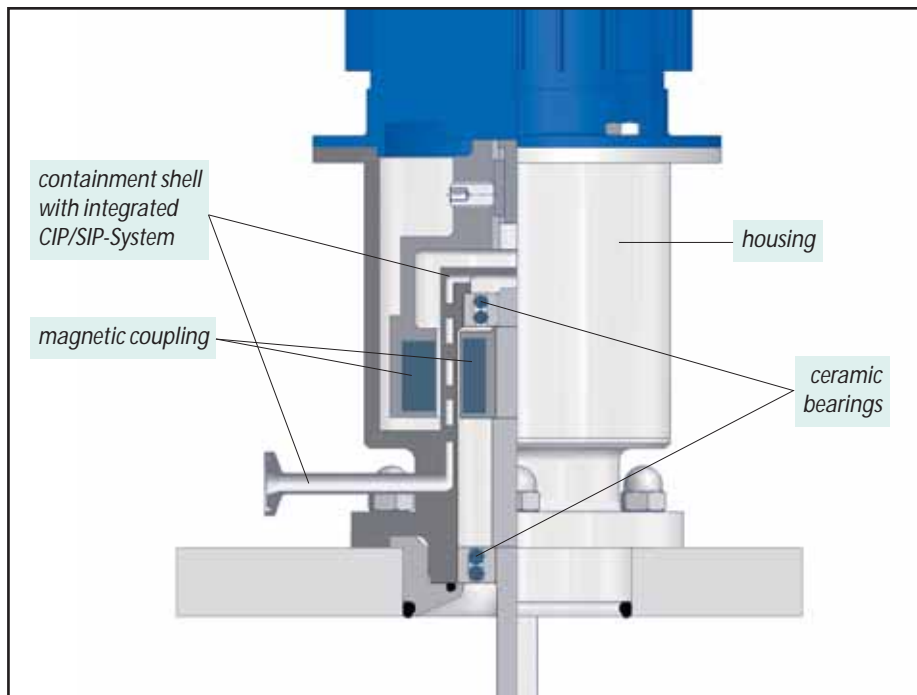


MDA-I

MAVADRIVE® Top mounted magnetic agitator with internal bearings

Designed for shaft with multi stage blades for example in bioreactors or fermenters. The coupling is situated outside the vessel inside a housing.

The ceramic bearings are made of high tech ceramic material and are designed for dry running. The special design of the MDA-I containment shell allows CIP/SIP.



principal scetch MDA-I



MAVADRIVE® Type MDA-I

MAVAG AG – since 1861 Comprehensive quality

We offer a wide range of solutions for the process industry in areas of development, design, manufacturing and installation of sophisticated and high performance equipment, systems and plants.

Our business areas:

- **MAVAG** steril technology
- **MAVAG** bio technology
- **MAVAG** filtration technology
- **MAVAG** mixing technology
- **MAVAG** drying technology



MAVAG AG strength is based on the fact that we carry out turn key projects as well as key components and services. With the help of our know how and the experience of our staff, we can assist you starting with conceptual design all the way to start up. Our engineers look after your needs from the first meeting throughout the project and FAT until hand over.

The advantage for our customers:

Effective project handling and one source supply.



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