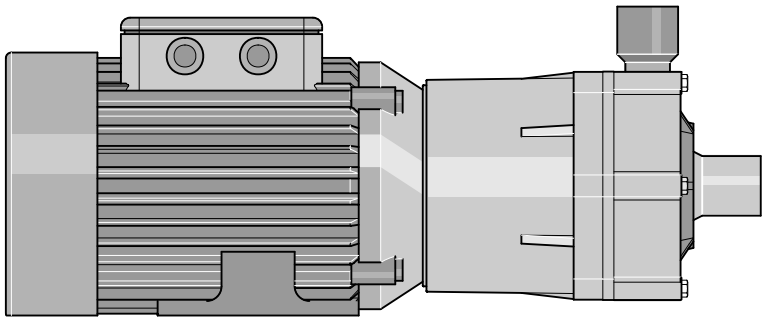
Operating instructions manual

Centrifugal pumps

ProMinent® vonTAINE



Please read through operating instructions manual carefully before use. Do not discard!
The guarantee is void if the equipment is subject to misuse!

Publishing details:
ProMinent® vonTAINE Operating Instructions Manual

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Subject to technical changes.

Table of contents

Type code

vonTAINE

Type	Capacity	Order no.
AM 045 PP	45 W	1010779
AM 300 PP	250 W	1010780
AM 400 PP	370 W	1010781
AM 045 CF	45 W	1010782
AM 300 CF	250 W	1010784
AM 400 CF	370 W	1010785

General instructions for use

Please read through the following instructions for use carefully. They will help you to make the best use of the operating instructions manual.

The following are particularly highlighted in the text:

- numbered points
- ▶ practical instructions

Operating instructions:

IMPORTANT

Notes are intended to make your work easier.

and safety instructions with symbols:

WARNING

Describes a potentially hazardous situation. If not avoided may result in fatal or severe injury.

CAUTION

Describes a potentially hazardous situation. If not avoided, could result in slight or minor injury or damage to property.

NOTICE

Describes a potentially damaging situation. If not avoided may result in damage to property.

Please state the type and capacity, which you will find on the nameplate, with any query or spare parts order (see example above). This will enable clear identification of the pump type and material variants.

1 About this centrifugal pump

The ProMinent® vonTAINE AM pumps are magnetically coupled centrifugal pumps. The magnetic coupling enables the pumps to feed the liquid media from one container to another or from a container into a discharge line without leaks. As the feed rate depends heavily on back pressure it is important to observe the feed curve. When choosing the pump check the material compatibility and take into account the properties of the feed chemical e.g. density, viscosity or temperature.

2 Safety

Correct use of equipment

- The pump may be used to transfer liquids only.
- All other uses or modifications are prohibited.
- The pump may not be used to generate isostatic or back pressures.
- The pump may not be used to mix liquids which would trigger an exothermic reaction.
- Do not operate the pump in an explosive environment.
- You must observe the instructions on mounting, installation and maintenance in this operating instructions manual!
- The pump must be operated by appropriately trained and authorised personnel!

WARNING

- **People with heart pacemakers must stay away from the pump!**
  The pump liquid end contains very strong magnets!
- **The pump cannot be switched off!**
  In the case of an electrical accident disconnect the power cable from the mains or actuate the emergency stop switch mounted on the system!
- **Disconnect the power cable from the mains before working on the pump!**
- **Always depressurise liquid end before working on the pump!**
- **Always empty and rinse the liquid end before working on the pump if used with hazardous or unknown feed chemicals!**
- **Pumps must be accessible at all times for operation and maintenance purposes!**
  Access must never be impeded or blocked!
- **Pumps for radioactive media may not be sent through the post!**
- **Wear appropriate personal safety equipment when working on the liquid end if used with hazardous or unknown liquids!**

CAUTION

- **Mounting and installation of ProMinent® pumps with non-original parts that have not been checked and recommended by ProMinent is not permitted and can result in harm to persons or property!**
- **When metering aggressive media observe the resistances of pump materials! (see " vonTAINE resistance list" at www.prominent.de)!**
- **Note all national directives which apply to the installation!**

Sound pressure level

The sound pressure level is < 70 dB (A)
at maximum speed, maximum back pressure (water) in accordance with:
DIN EN 12639 (measuring fluid pump noise)

3 Storage and transport

WARNING

- **People with heart pacemakers must stay away from the pump. The pump liquid end contains very strong magnets!**

NOTICE

- **Keep hydraulic connections sealed at all times!**
- **Always transport the pump in appropriate packaging!**

Ambient conditions for storage and transport:
Humidity: max. 95% relative humidity, non condensing
Temperature:

Material variants	PP	CF
Temperature range	0 ... 40 °C	-20 ... 40 °C

4 Equipment overview

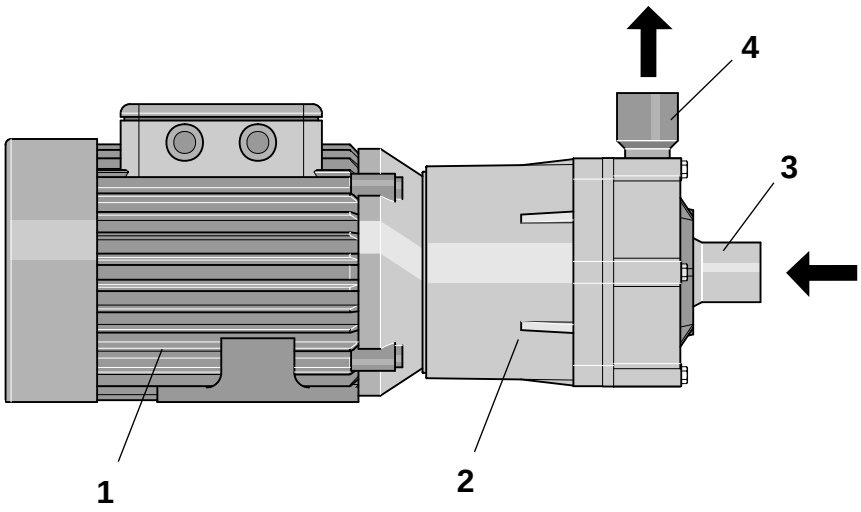


Abb. 1

1 Motor
2 Liquid end
3 Suction connector
4 Discharge connector

5 Function description

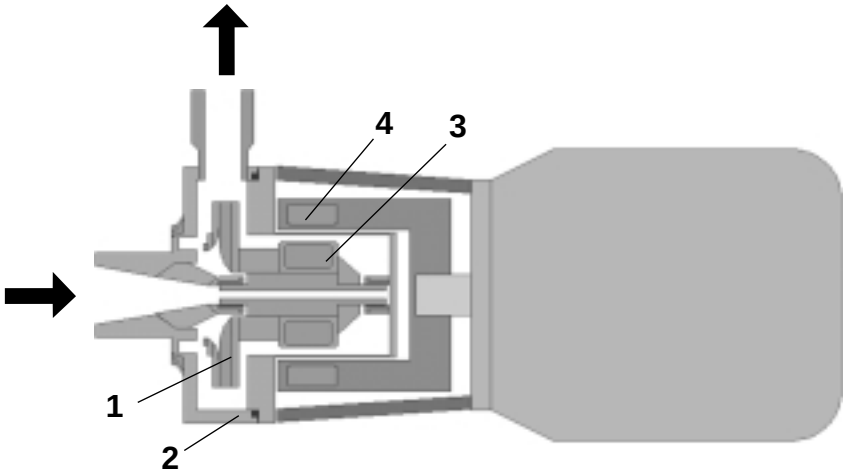


Fig. 2

The hydraulic principle is the same as for all centrifugal pumps. The pump has an impeller (1) which rotates in a stationary casing (2) with tangential output. The impeller thus transfers energy to the feed chemical, forcing it towards the outlet. This therefore generates a vacuum at the centre which in turn draws up more feed chemical.

The mechanical principle of impeller propulsion is different to that underlying conventional centrifugal pumps. The impeller shaft is totally enclosed within the liquid end. It has no physical connection to the rotation action. Its only function is to hold and centre the impeller. The liquid end components are designed so that (on the basis of a simple pressure effect) a spontaneous cooling cycle is created which cools the surfaces which have been heated by friction.

Strong magnets (3) are enclosed within the impeller hub. A powerful magnetic field is generated between this inner magnet and the external magnetic rotor (4). The magnetic field penetrates the plastic parts and the fluids thereby connecting the two magnet assemblies together. The motor turns the external magnetic rotor, thereby causing the internal magnet to rotate the impeller at the same speed.

6 Mounting and installation

NOTICE

- **Flush the equipment and clean thoroughly before connecting the pump!**
- **Foreign bodies must be prevented from entering the pump!**
- **If the crystallisation temperature of the feed chemical is the same or less than the ambient temperature the pump must be thermally insulated!**
- **Ensure that there is sufficient space around the pump for maintenance, repair or dismantling!**
- **Do not mount the pump near heat sources.**
  It is made of thermoplastic material and could distort!

6.1 Mounting

NOTICE

- **The pump must be mounted horizontally!**
- **Types AM 300 and AM 400: the PG threaded connectors of the terminal box must never be facing upwards!**
- **Bolt the pump onto a level, solid base; the base must be at least five times the mass of the pump!**
- **Do not use vibration-absorbing elements to mount the pump!**

Ambient conditions

Humidity: max. 95% relative humidity, non condensing
Temperature:

Material variants	PP	CF
Temperature range	0 ... 40 °C	-20 ... 40 °C

▶ Insert 4 bolts through the 4 bores of the pump pedestal and bolt the pump to the base

▶ Install an equivalent booster pump in parallel.

Bolt sizes

Pump type	Bolt size
AM 045 xx	M 9
AM 300 xx	M 7
AM 400 xx	M 7

6.2 Run-dry protection

NOTICE

- **The primary cause of pump failure is running the pump dry! You must protect your pump accordingly!**
- **Observe national directives for all safety precautions!**

The following measures have been shown to be effective:

a) monitoring the pressure

b) monitoring the flow rate

c) monitoring the level in the suction container

d) monitoring the power consumption of the motor

6.3 Installation, hydraulic

NOTICE

- **Appoint a trained engineer to check that the pump can be used with the intended feed chemical and in the actual physical conditions (NPSH of the system, density, viscosity, temperature...)!**
- **Foreign bodies must be prevented from entering the pump!**
- **Always connect suction and discharge connectors to similar-sized suction and discharge lines!**
- **Ensure that there is sufficient space around the pump for maintenance, repair or dismantling!**

Max. admission pressure (suction side): 1.5 bar

Max. viscosity : 20 mPa s

Max. density : 1.4 kg/dm³

▶ Remove the end caps from the suction and discharge connectors

▶ Fit a check valve on the suction side (as close to the pump as possible)

▶ Connect the lines to the pump

▶ Line connections should be vibration-suppressive

▶ Ensure that the plumbing connections around the pump are free from stress.

Installation example

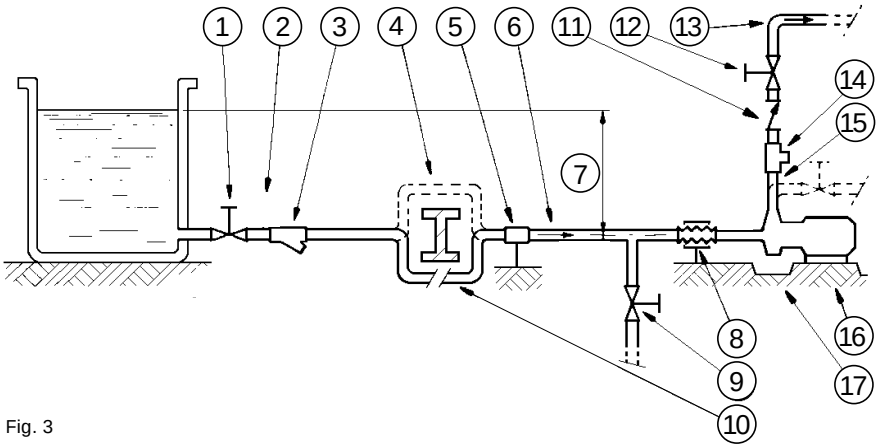


Fig. 3

Suction side

1 Check valve, suction side

2 The suction line should drop down from the pump

3 Filter (straining width 3 - 5 mm)

4 Lines should be kept short and straight; air pockets should be prevented

5 Fix all lines securely in place with appropriate holders

6 Maximum speed of the feed chemical on the suction side: 2.5 m/s

7 Minimum height 0.5 m; Maximum admission pressure 1.5 bar

8 Mount compensator near the pump (absolutely essential in the case of long lines or hot liquids)

9 Line drainage assembly

10 Pass under obstacles rather than over

Discharge side

11 Fit a non-return valve especially with long vertical or horizontal lines (absolutely essential where there are parallel pumps)

12 Fit a control valve on the discharge side

13 Maximum speed of the chemical on the discharge side: 3.5 m/s

14 Connection point for pressure gauge or safety push switch

15 Avoid bends in the lines and fittings near the pump (both suction and discharge sides)

Pump substructure

16 Foundation/base plate

17 Gutter or drip tray

6.4 Installation, electric

WARNING

- **Select PG threaded connectors to fit the intake lines, fit a reducer if necessary!**
- **Seal the cable inlet well!**
  Smear PG-threaded connectors and threaded dummy plugs with sealant, tighten well and then apply sealant again!
- **Clean sealing surfaces of terminal boxes and terminal box covers thoroughly before reassembly. Seals must be glued in on one side! Replace seals and wash ers which have perished after long periods in operation!**

NOTICE

- **Connect electric motor in accordance with national directives! (In the case of three-phase motors the wiring diagram is cast into the cover of the terminal box)**
- **Check that the mains power supply and the mains frequency match the values specified on the motor nameplate!**
- **Fit suitable equipment to protect motor from overload (e.g. motor circuit-breaker with thermal overload cut-out)!**
  Fuses do not protect the motor!
- **The specified motor-wattage rating applies at max. 40 °C ambient temperature and installation heights below 1000 m above sea level. The motor wattage is reduced if these values are exceeded!**
- **Ensure a constant supply of cool air!**

Motors with three-phase power supply (AM 300 / AM 400)

Three-phase cage rotor motor

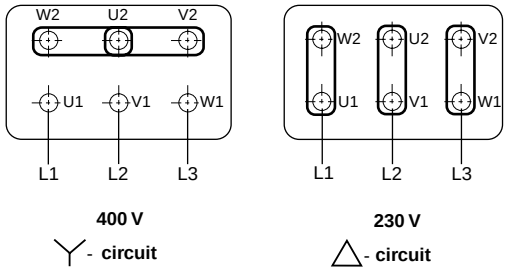


Fig. 4

Example

Requirements:
Nameplate details 230/400 V
Three phase power supply 400 V

Correct motor connection: Y circuit

▶ Run motor for a short period to check the direction of rotation (the fan is travelling clockwise (arrow!).

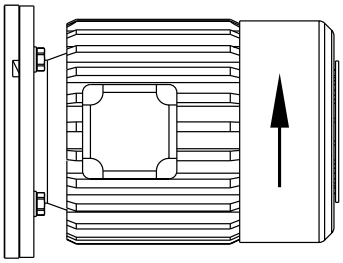


Fig. 5

Reverse direction of rotation:

▶ Swap the 2 power leads

Motors with single phase power supply (AM 045)

Single phase motor

Example

Requirements:
Nameplate details 230 V
Power supply 230 V

Correct motor connection:
Connect pump cable to phase and zero wire.

Reverse direction of rotation:

▶ not possible

7 Commissioning

NOTICE

- **The feed chemical and physical conditions which determined the choice of pump (density, viscosity, temperature, NPSH of the system ...) should not be changed lightly! A trained engineer must check that the pump can be used in the new conditions!**
- **Empty the pump completely, and rinse and wash thoroughly with an appropriate fluid before changing to another chemical!**
- **Ensure that the liquid end materials are resistant to the metering chemical (see "vonTAINE resistance list " at www.prominent.de)!**
- **The feed chemical may not contain solids!**
- **Avoid frequent pump starts and/or very short run times (set up control equipment accordingly)!**
- **Do not operate pump above its performance curve (see appendix)! The motor may otherwise be damaged! Always operate the pump against back pressure!**
- **Never use check valve in the suction line to adjust the flow rate! Use a control valve in the discharge line!**
- **Ensure that the power consumption of the motor under no circumstances exceeds the maximum admissible value stated on the motor nameplate!**
- **If the temperature of the feed chemical rises above the maximum admissible temperature of the pump, switch off the pump immediately and inspect the plastic parts of the liquid end (see "Repair")!**
- **Should the pump develop a leak, switch off the system (pump must stop) and close valves. Remedy the cause of the leaks!**
- **Empty the pump if it is out of operation for a long period, (particularly if the feed chemical crystallises easily). Then flush out with an appropriate fluid!**
- **Always use a suitable fluid which is chemically safe and e.g. cannot trigger hazardous exothermic reactions!**
- **The pump must be thermally insulated if the crystallisation temperature of the feed chemical is the same or less than the ambient temperature!**

Max. admission pressure (suction side): 1,5 bar

Max. viscosity : 20 mPa s

Max. density : 1,4 kg/dm³

Max. feed chemical temperature:

Material version	PP	CF
	80 °C	110 °C

- ▶ Shut off drainage assembly and similar
- ▶ Fill the suction pipe and pump completely (see operating instructions manual for your equipment)
- ▶ Start the pump with the check valve in the suction pipe fully open and the control valve in the discharge line partly closed
- ▶ Control the flow rate by gradually opening and/or closing the control valve in the discharge line (never the valve in the suction line)
- ▶ Check for abnormal vibrations or noises (e.g. due to cavitation, incorrect assembly or foreign bodies) (see "Troubleshooting").

8 Maintenance

NOTICE

The pumps and their peripherals must be serviced by specially trained or authorised personnel!

Every 2 to 6 months

- Inspect the liquid end parts and clean or replace as required (see “Repair”)
- Check whether the pump is leaking (especially at the leakage hole)
- Check whether the pump is vibrating excessively

Every 5 to 8 months

- Check the pump efficiency (see diagram in the appendix)
- Check the power consumption of the motor

9 Repair

WARNING

- **People with heart pacemakers must stay away from the pump!**
  The pump liquid end contains very strong magnets!

NOTICE

- **The pumps and their peripherals must be serviced by specially trained or authorised personnel!**
- **Wear suitable safety equipment if working with hazardous chemicals!**
- **Shut off the motor and prevent it from being switched on again without authorisation prior to carrying out repair work on the pump!**
- **Empty the pump completely, and rinse and wash thoroughly with an appropriate fluid before carrying out repairs!**
- **Always use a suitable fluid which is chemically safe and e.g. cannot trigger hazardous exothermic reactions!**
  Water is usually suitable!
- **Dismantle the pump in a clean dry place!**

IMPORTANT

Keep an o-ring to hand (from the spare part kit).

9.1 Dismantling pump

NOTICE

- **Always protect bearing parts in the liquid end from impact (graphite and Al_2O_3)! They are highly sensitive to shock!**
- **You must follow the exact sequence when dismantling and assembling the pump! The bearing parts may otherwise be irreparably damaged!**

Tools required

- Socket wrench, SW 8

for AM 300, AM 400:

- Crosstip screwdriver, antimagnetic
- Drift punch D < 4 mm
- 2 tallow drop screws M5 X 50, antimagnetic (threaded along the whole length)

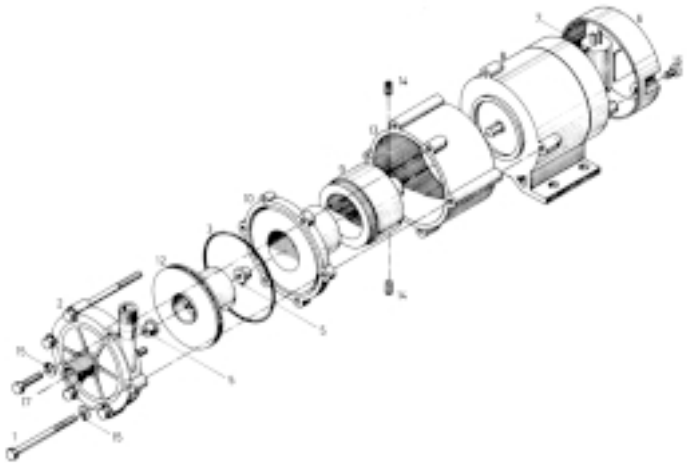


Fig. 6: Exploded drawing vonTAINE AM 045

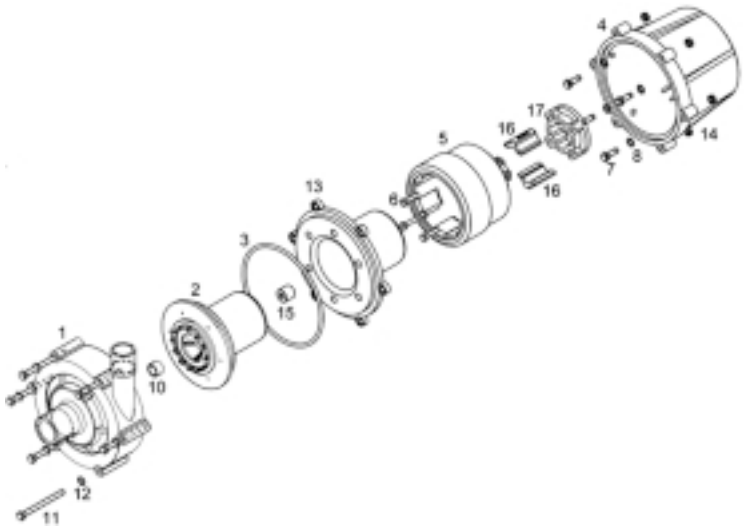


Fig. 7: Exploded drawing vonTAINE AM 300 / AM 400

- ▶ Disconnect the motor from the mains power supply and prevent from being switched on again
- ▶ Close the suction valve and the pressure valve and open the outlet valve
- ▶ Detach the lines from the pump and empty the pump
- ▶ Clean the pump thoroughly with a suitable fluid
- ▶ Stand the pump upright (suction connector pointing upwards)
- ▶ Remove the 6 screws from the liquid end
- ▶ First remove the front section of the liquid end
- ▶ Turn the lugs on the rear section of the liquid end so that they are easy to grip
- ▶ Grasp the liquid end rear section firmly by the lugs and lift carefully together with the impeller out of the lantern and the external magnetic rotor
- ▶ Carefully remove the impeller from the rear section of the liquid end.

AM 045

- Remove the lantern
- Unscrew the 2 grub screws from the motor shaft
- Remove the external magnetic rotor.

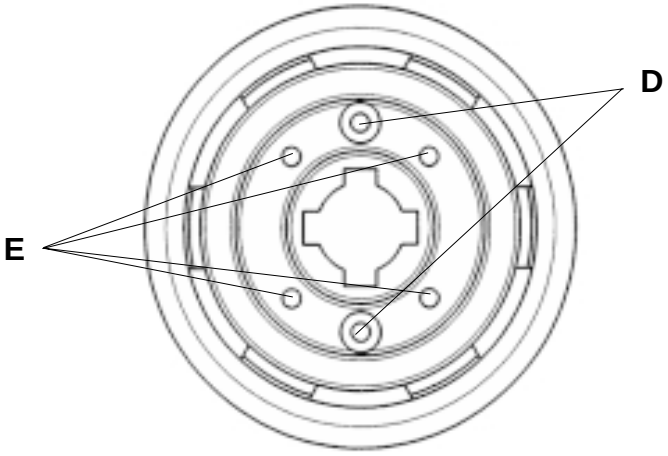


Fig. 8

AM 300, AM 400

- Unscrew the 4 recessed head screws (E) from the external magnetic rotor
- Insert the drift punch into the bores (D) and work the clamping piece (C) off the shaft of the external magnetic rotor
- Place the 2 tallow drop screws into two facing threads of the crosshead screws (E) of the external magnetic rotor (A)
- Screw both tallow drop screws together into the thread screw until the external magnetic rotor (A) has been lifted almost 10 mm from the motor shaft
- Remove the tallow drop screws
- Insert the drift punch into the bores (D) and work the clamping piece (C) off the shaft of the external magnetic rotor again
- Remove the external magnetic rotor (A) from the motor shaft
- Remove the clamping piece (C) from the motor shaft
- Remove the 4 screws from the lantern
- Remove the lantern.

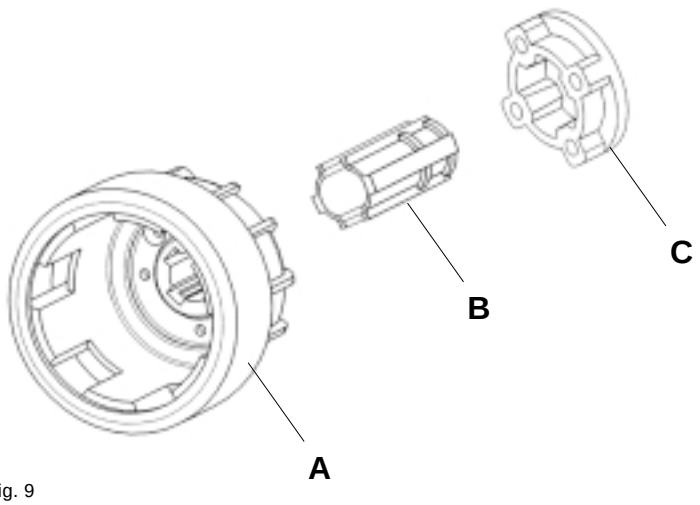


Fig. 9

9.2 Inspection

- Replace all damaged parts
- Remove all blockages and deposits
- Clean all surfaces thoroughly, in particular the seating surfaces of the o-rings.
- Check:
  - Impeller shaft for cracks and excessive wear.
  - Running bushes for excessive wear.
  - Impeller shaft cooling bore for blockages.
  - Impeller, the insides of the front and rear sections of the liquid end for wear, ageing chemical corrosion and dirt.
  - Enclosed interior of the impeller for leaks (the internal magnets must not get wet!).
  - Outside of the rear section of the liquid end for abrasion from the magnets of the external magnetic rotor.

9.3 Assembling pump

AM 045

- Place the external magnetic rotor onto the motor shaft.
- Screw the 2 grub screws into the motor shaft.
- Draw the lantern over the external magnetic rotor (the side with the 6 lugs away from motor!).

AM 300, AM 400

- Place the lantern onto the motor (the leakage bore must face downwards when the pump is subsequently installed!).
- Attach the lantern to the motor with 4 screws (use washers!).
- Insert the adapters (B) into the external magnetic rotor (A) to depth “a” (see Fig. 10).
- Place the clamping piece (C) over the external magnetic rotor and the adapters (the clamping piece must be positioned with the brass inserts facing the external magnetic rotor while at the same time being as far from it as possible).
- Turn the 4 recessed head screws until they are only loosely attached by their threads.
- Place this assembly onto the motor shaft.
- Tighten the 4 recessed head screws through several turns (tightening torque = 6 Nm).

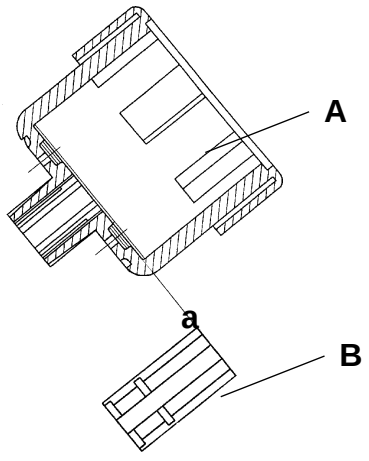


Fig. 10

- Carefully place the impeller into the rear section of the liquid end.
- Grasp the rear section of the liquid end firmly by the lugs and lower it carefully, together with the impeller into the lantern.
- Place the new o-ring onto the rear section of the liquid end.

AM 045 only

- Locate the leakage bore so that it faces downwards when the pump is subsequently installed.
- Fit the front end of the liquid end.
- Insert the 6 screws with washers into the liquid end and screw in.

10 Troubleshooting

NOTICE

- **The pumps and their peripherals must be serviced by specially trained or authorised personnel!**
- **Wear suitable safety equipment if working with hazardous chemicals!**
- **Prior to carrying out repair work on the pump disable the motor and prevent it from being switched on again without authorisation!**
- **Empty the pump completely and rinse and wash thoroughly with an appropriate fluid before carrying out repairs!**

Pump does not feed

Cause Pump rotating in the wrong direction (arrow)

Remedy ▶ Swap over the two cables on the motor terminals (see “Installation, electrical”)

Cause The required feed rate is greater than the maximum feed rate of the pump

Remedy ▶ Modify system, install higher capacity pump

No feed chemical in the suction pipe or the pump

Remedy ▶ Top up the suction pipe and pump

Cause Admission pressure too low

Remedy ▶ Remove cause, modify system

Cause The slots in the impeller are clogged

Remedy ▶ Dismantle liquid end and clean slots (see “Repair”);
In the case of crystallisation: Try to prevent crystallising (thermal insulation of pump, flush pump when idle ...)

Pump operating at reduced feed rate

See “Pump does not feed”. Additionally:

Cause Back pressure in the system higher than expected

Remedy ▶ Remove cause, modify equipment, install higher capacity pump

Cause Nominal diameters of suction line, check valve or other hydraulic elements too small

Remedy ▶ Modify system

Cause Pump suction lift too low

Remedy ▶ Increase geometrical suction lift

Cause The viscosity or the specific weight of the feed chemical is high

Remedy ▶ Modify system, install higher capacity pump

Pump using too much current

Cause The viscosity or the specific weight of the feed chemical is high

Remedy ▶ Modify system, install higher capacity pump

Cause Pump operates at a higher feed rate than expected

Remedy ▶ Close the control valve on the discharge side slightly more

Cause The supply voltage of the motor does not comply with the voltage ratin

Remedy ▶ Install motor correctly (see “Installation, electrical”)

Pump vibrates and is loud

Cause Cavitation

Remedy ▶ Close the control valve on the discharge side slightly more.

Cause Imbalance of the impeller due to worn running bushes

Remedy ▶ Replace running bushes

Cause The pump feed rate is excessive (no back pressure)

Remedy ▶ Close the control valve on the discharge side slightly more.

Internal liquid end components are wearing out too quickly:

Cause Contaminants in the pump lead to increased wear

Remedy
- ▶ Dismantle pump and clean (see “Repair”), analyse properties of the feed chemical (suspended solids, crystallisation temperature, ...), but do not insert a fine filter in the suction line!

Cause Cavitation

Remedy
- ▶ Close the control valve on the discharge side slightly more.
- ▶ Increase nominal diameters of suction line, check valve and other hydraulic elements.
- ▶ Shorten suction line or remove bends.

Cause The feed chemical polymerises or crystallises when the pump is idle

Remedy
- ▶ Flush the pump when idle

Cause The feed chemical attacks the materials of the liquid end

Remedy
- ▶ Use liquid end made of appropriate materials.

11 Decommissioning and disposal

Decommissioning Safety regulations see “Troubleshooting”!

Ongoing decommissioning
- ▶ Empty the pump completely, and rinse and wash (particularly if the feed chemical crystallises easily)
- ▶ Attach end caps to the suction and discharge connectors
- ▶ Cover the pump with a tarpaulin (provide ventilation from the back!).

Store the pump in a dry closed warehouse at:

Humidity: max. 95% relative humidity, non condensing

Temperature:

Material variants	PP	CF
Temperature range	0 ... 40 °C	-20 ... 40 °C

Disposal

NOTICE

Observe relevant local directives!

12 Technical data

Pump type Order number	**AM 045 PP** 1010779	**AM 045 CF** 1010782	**AM 300 PP** 1010780	**AM 300 CF** 1010784	**AM 400 PP** 1010781	**AM 400 CF** 1010785
Hydraulic data						
Max. feed rate*	848 l/h	848 l/h	5500 l/h	5500 l/h	8687 l/h	8687 l/h
Max. feed rate *	7.1 m	7.1 m	9.3 m	9.3 m	10.7 m	10.7 m
Suction connector	1/2", ext.	1/2", ext.	3/4", int.	3/4", int.	1/", ext.	1", ext.
Discharge connector	3/8", ext.	3/8", ext.	3/4", ext.	3/4", ext.	1/", ext.	1", ext.
* for water at 20 °C						
Electrical data						
Motor wattage	0.045 kW	0.045 kW	0.25 kW	0.25 kW	0.37 kW	0.37 kW
$Voltage_{50\ Hz}$	1~, 230 V	1~, 230 V	230/400 V	230/400 V	230/400 V	230/400 V
$Current_{50\ Hz}$	0.5 A	0.5 A	1.30/0.75 A	1.30/0.75 A	1.56/0.90 A	1.56/0.90 A
$Speed_{50\ Hz}$	2800 rpm	2800 rpm	2635 rpm	2635 rpm	2730 rpm	2730 rpm
cos φ	-	-	0.8	0.8	0.85	0.85
Enclosure rating:	IP 21	IP 21	IP 55	IP 55	IP 55	IP 55
Insulation class	E	E	F	F	F	F
Other data						
Ambient-temperature	0...+40 °C	-20...+40 °C	0...+40 °C	-20...+40 °C	0...+40 °C	-20...+40 °C
Dimensions LxTxH	259x120x135	259x120x135	365x142x163	365x142x163	392x143x183	392x143x183
Weight	4.5 kg	4.5 kg	5.8 kg	5.8 kg	8 kg	8 kg

General hydraulic data

Max. admission pressure (suction side): 1.5 bar

Max. viscosity : 20 mPa s

Max. density : 1.4 kg/dm³

Max. feed chemical temperature :

Material version	PP	CF
	80 °C	110 °C

Materials

Impeller, liquid end, lantern:

Material version	Materials
PP	PP with fibreglass,
CF	E-CTFE (ethylene-chlorine trifluoroethylene) with carbon fibre

O-ring: FKM

Bearing bushes: graphite

Impeller shaft: Al_2O_3

13 Spare parts

The vonTAINE AM spare part kit contains:

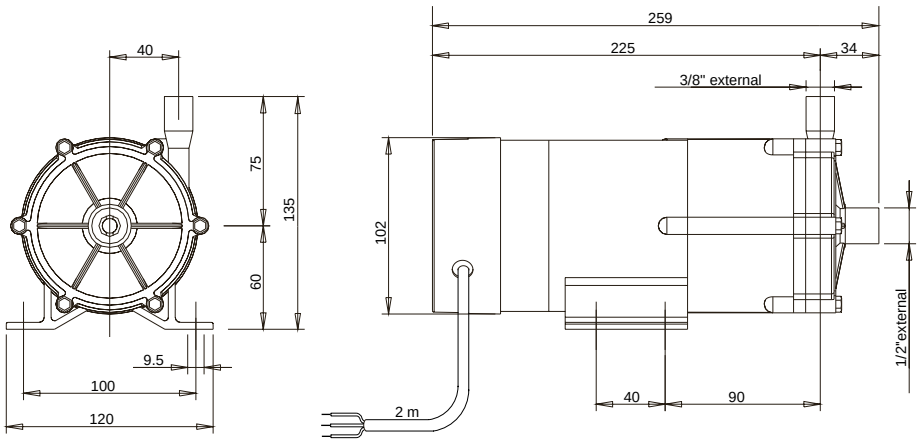
1 impeller
1 O-ring (FKM)
2 bearings
1 housing

Order no.

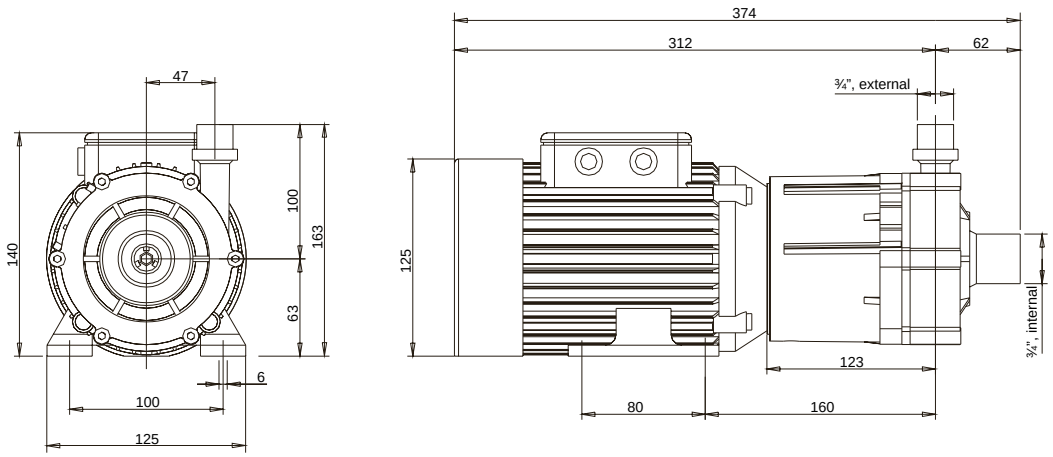
AM 045 PP	1010786
AM 300 PP	1010787
AM 400 PP	1010788
AM 045 CF	1010789
AM 300 CF	1010791
AM 400 CF	1010792

Appendix

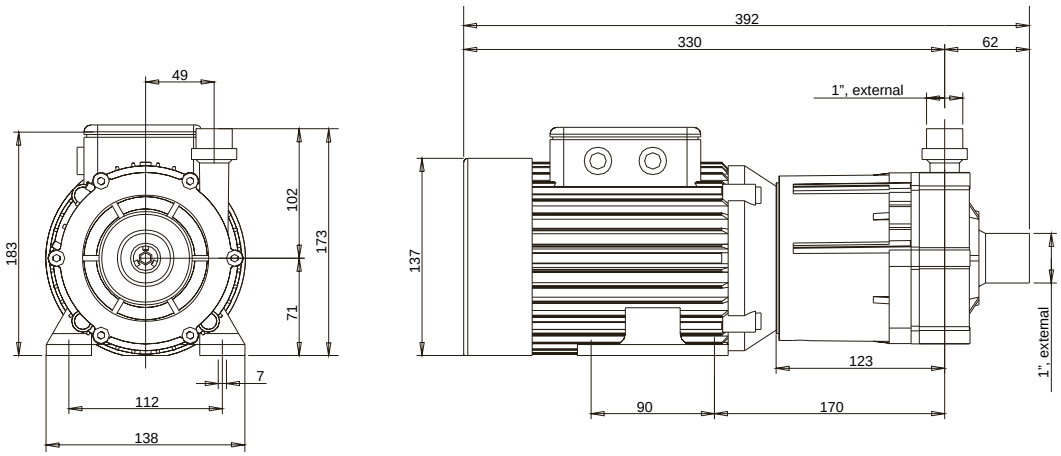
Dimension sheet vonTAINE AM 045
(Dimensions in mm)



Dimension sheet vonTAINE AM 300
(Dimensions in mm)

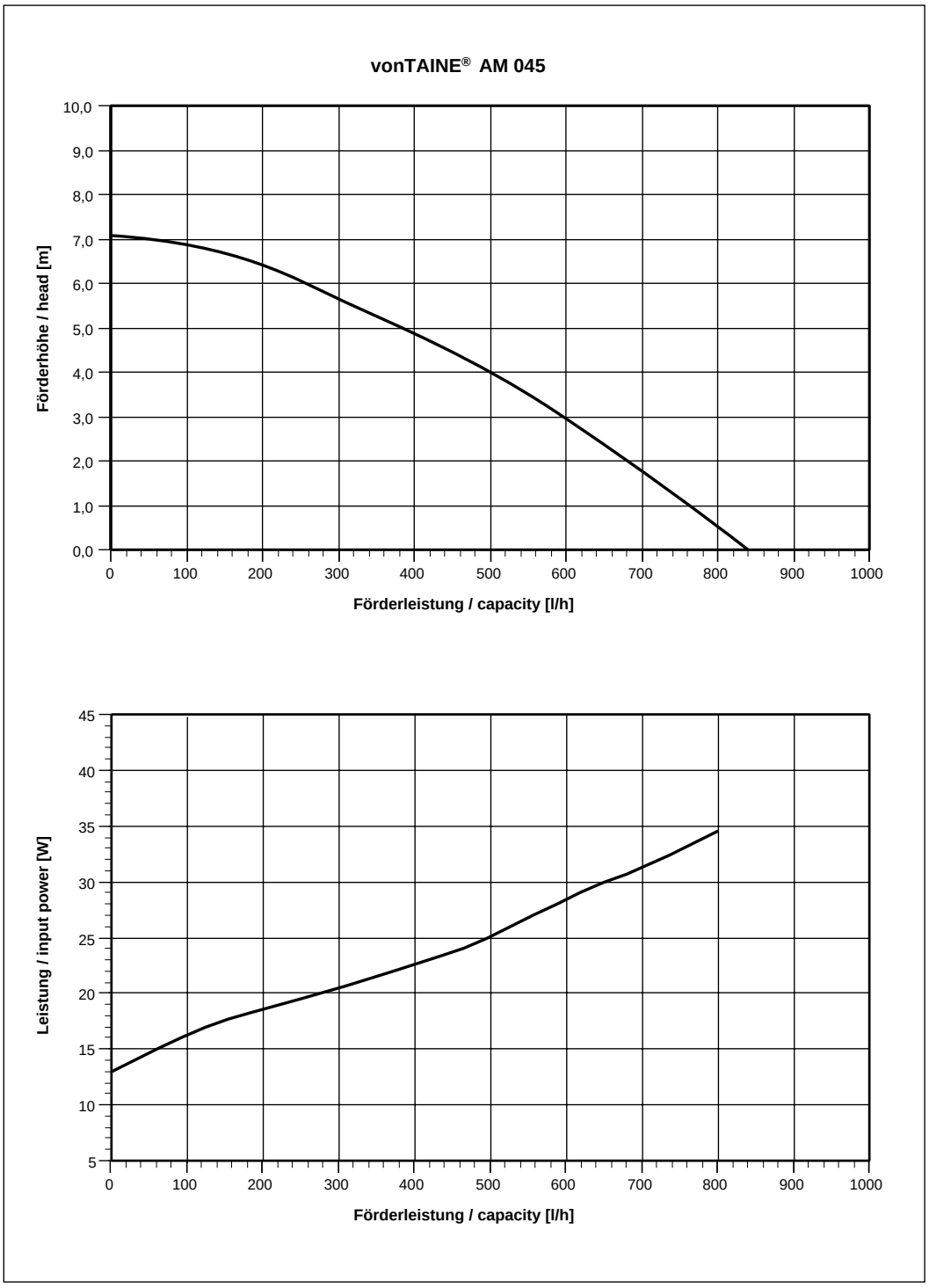


Dimension sheet vonTAINE AM 400
(Dimensions in mm)

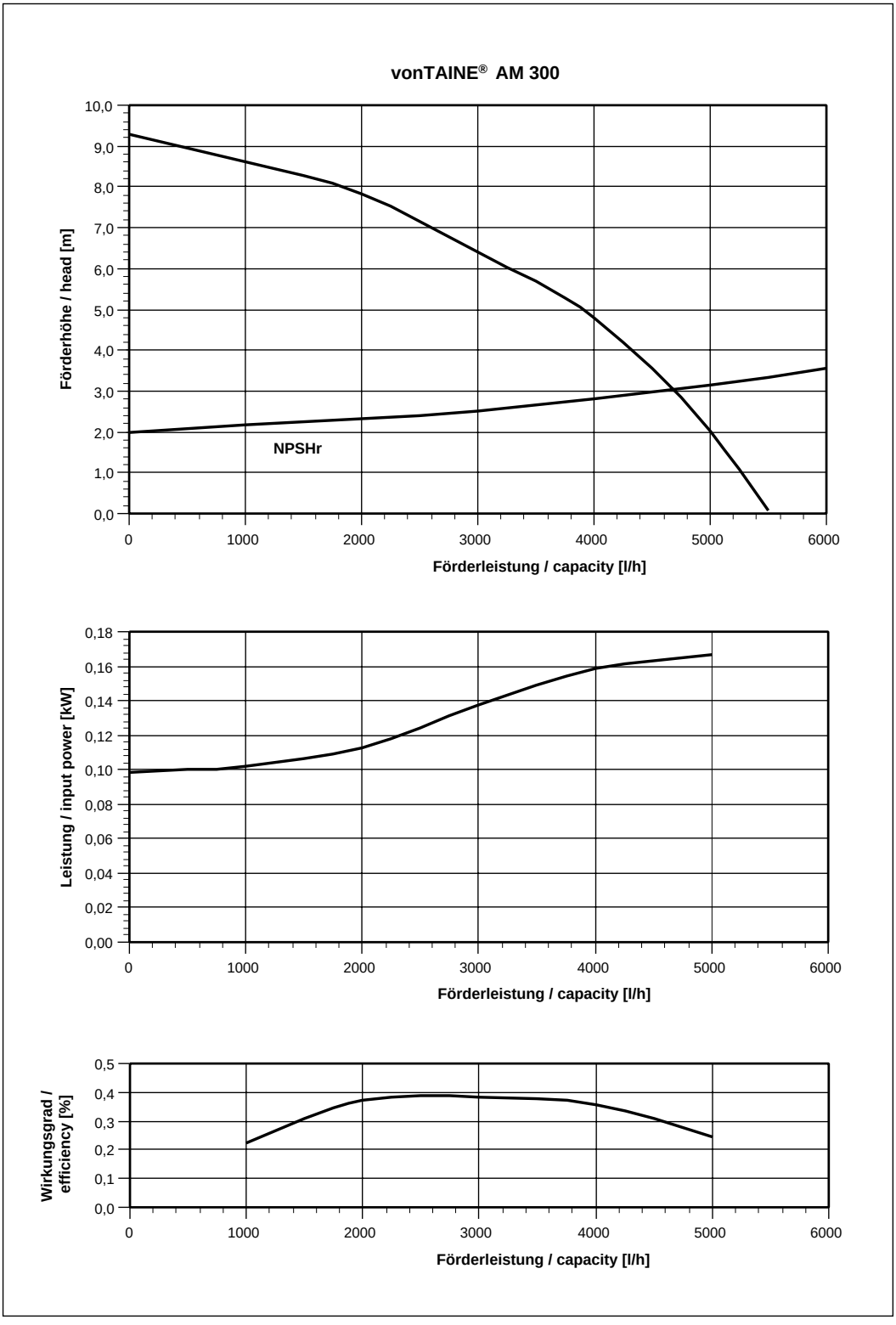


Feed curves, power consumption, efficiency

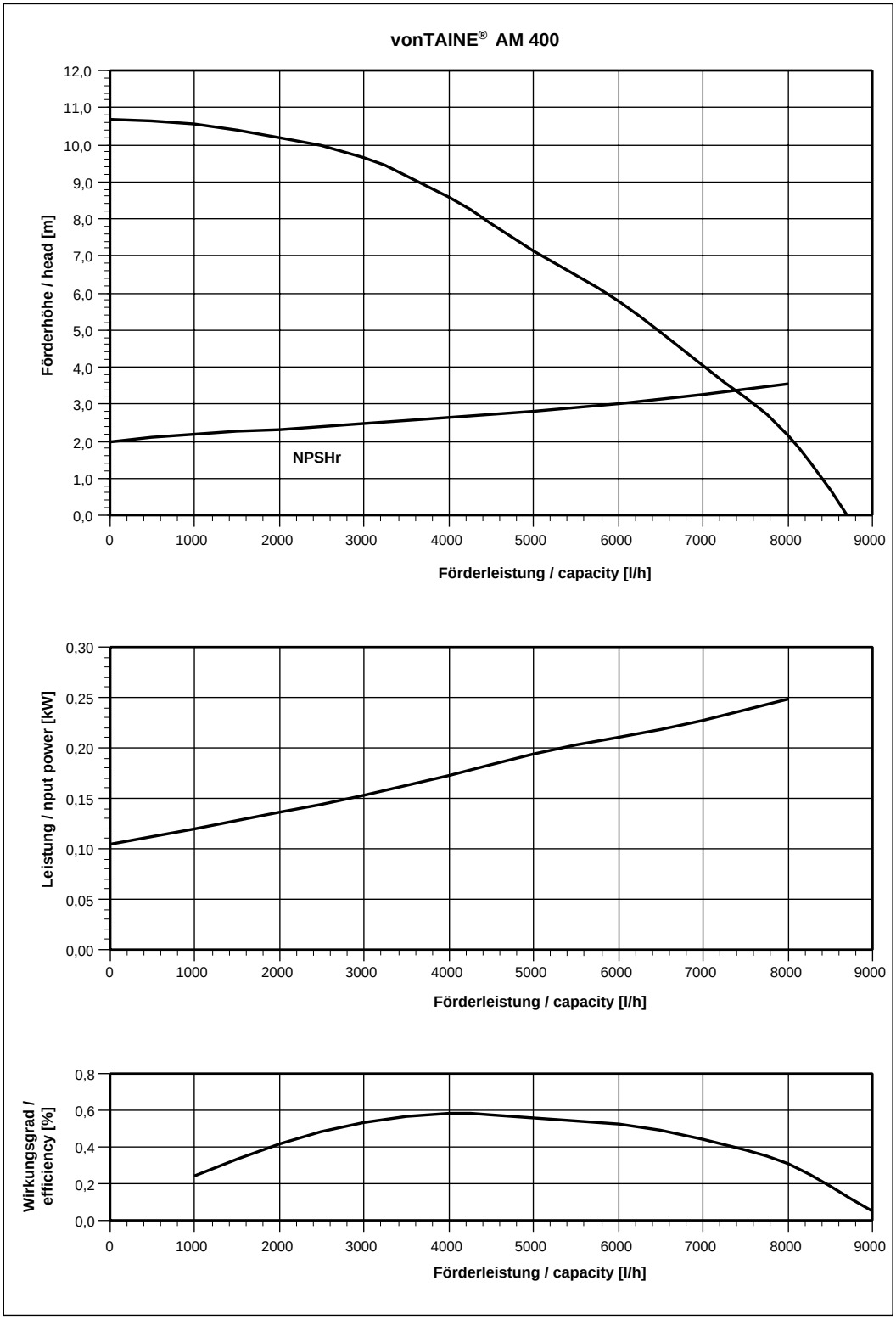
AM 045



AM 300


vonTAINE® AM 300
Förderhöhe / head [m]
10,0
9,0
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
NPSHr
0
1000
2000
3000
4000
5000
6000
Förderleistung / capacity [l/h]
Leistung / input power [kW]
0,18
0,16
0,14
0,12
0,10
0,08
0,06
0,04
0,02
0,00
Förderleistung / capacity [l/h]
Wirkungsgrad / efficiency [%]
0,5
0,4
0,3
0,2
0,1
0,0
Förderleistung / capacity [l/h]

AM 400


vonTAINE® AM 400
Förderhöhe / head [m]
12,0
11,0
10,0
9,0
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
NPSHr
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Förderleistung / capacity [l/h]
Leistung / nput power [kW]
0,30
0,25
0,20
0,15
0,10
0,05
0,00
Förderleistung / capacity [l/h]
Wirkungsgrad / efficiency [%]
0,8
0,6
0,4
0,2
0,0
Förderleistung / capacity [l/h]

Conformity declaration

EC Declaration of Conformity

We,

ProMinent Dosiertechnik GmbH
Im Schuhmachergewann 5 - 11
D - 69123 Heidelberg

hereby declare that, on the basis of its functional concept and design and in the version brought into circulation by us, the product specified in the following complies with the relevant, fundamental safety and health stipulations laid down by EC regulations.
Any modification to the product not approved by us will invalidate this declaration.

Product description :	***Circulation pump***
Product type :	***vonTAINE***
Serial number :	***see type identification plate on device***
Observed relevant EC regulations :	***EC - machine regulation (89/392/EEC)*** ***EC - low voltage regulation (73/23/EEC)*** ***EC - EMC - regulation (89/336/EEC)***
Date/manufacturer´s signature :	***April 17, 2002***
The undersigned :	*Mr. Manfred Hüholt, Factory Manager*