

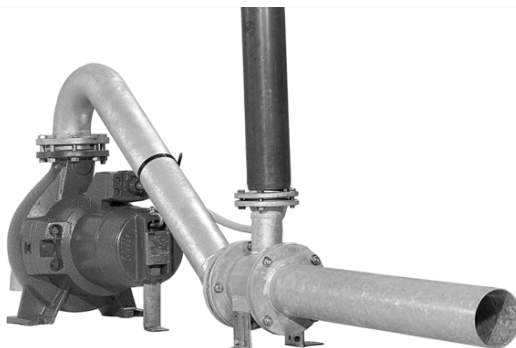


Hoogeindsestraat 5  
NL - 5447 PD Rijkevoort  
Nederland  
T : +31 (0) 485 - 371318  
F : +31 (0) 485 - 371918  
info@pompentechnik.nl  
www.pompentechnik.nl

## Cleaning System

Tank and Retention Chamber \*

**50 Hz**  
**Standard Programme**



\* Sewers with storage capacity and overflow

Non standard designs are  
available upon request

## Areas of Application

The **Amajet System** can, in principle, be used wherever there is a need for economical cleaning of tanks and storage chambers in sewage plant.

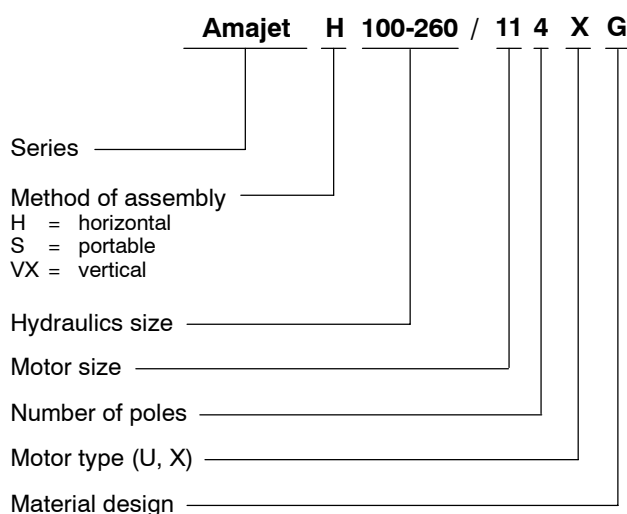
The **Amajet System** is particularly suited for automatic cleaning of tank walls and floors used for storm water retention, overflow and collection reservoirs as well as for the cleaning of storage chambers within sewage treatment systems. In addition, air input necessary for the cleaning process regenerates the sewage water and alleviates any unpleasant odour problems.

## Design

Stationary or portable plant with horizontally or vertically mounted submersible forcing jet motor pump and non-clogging free-flow impeller.

## Denomination

Example



## Operating data

Size: **DN** 100  
Motor rating: **P<sub>2</sub>** 5.5 to 16 kW  
Temperature of pumped medium: **t** to 40 °C  
Higher temperatures upon request.  
Protection type: IP 68 nach EN 60529/IEC 529

## Drive

Three phase asynchronous motor;  
flameproof design is also available in accordance with  
EEx d IIB T3 (T4 upon request); 400 V (*Variants 500 V, 690 V*)

## Materials

Standard design cast iron  
Unit: Material variants in wear resistant chilled cast iron;  
Material variants in corrosion and wear resistant duplex steel  
Material variants in corrosion and wear resistant duplex steel:  
Installations parts: ST TZN or 1.4571

## Shaft Seal

**Always** supplied with 2 mechanical seals independent of direction of rotation with environmentally friendly oil supply.

## Bearing

Lubricated radial ball bearings.

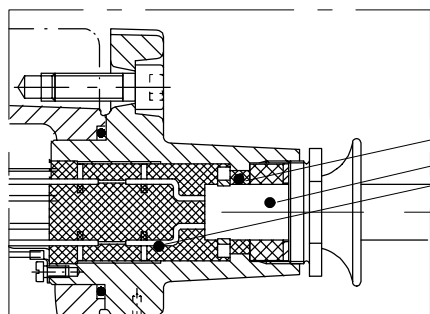
## Design

**Amajet H** (horizontal design) a cleaning system for universal application. **Amajet S** a portable version and **Amajet VX** with guide wire and fixing arrangement.

## Control Equipment

Control units, specifically designed to cope with the various areas of application, form part of the Amajet System. The system can also optionally be equipped with operating data input and data storage facility. For further details and description see the separate type series manual "Electronic control".

## Product advantages - Amajet H 100-260/11 4 X G



Cable entry completely watertight over its entire length.

Safety and reliability guaranteed by:

- 1. Long rubber stuffing box/gland
- 2. Cable sleeve additionally cast in resin
- 3. Individual cores are isolated, galvanised and cast in resin.

**Benefit:**

Guaranteed operating safety and reliability even with damaged cable sleeve or core insulation.

Mechanical seal independent of direction of rotation with silicon carbide rubbing surfaces.

**Benefit:**

A solution guaranteeing a long operating life and permitting brief periods of running in the reverse direction of rotation.

Fitting the cable entry at the top of the unit, provides additional protection

**Benefit:**

Risk of damage during transport and installation is eliminated.

Cleaning Aperture DN 100

**Benefit:**

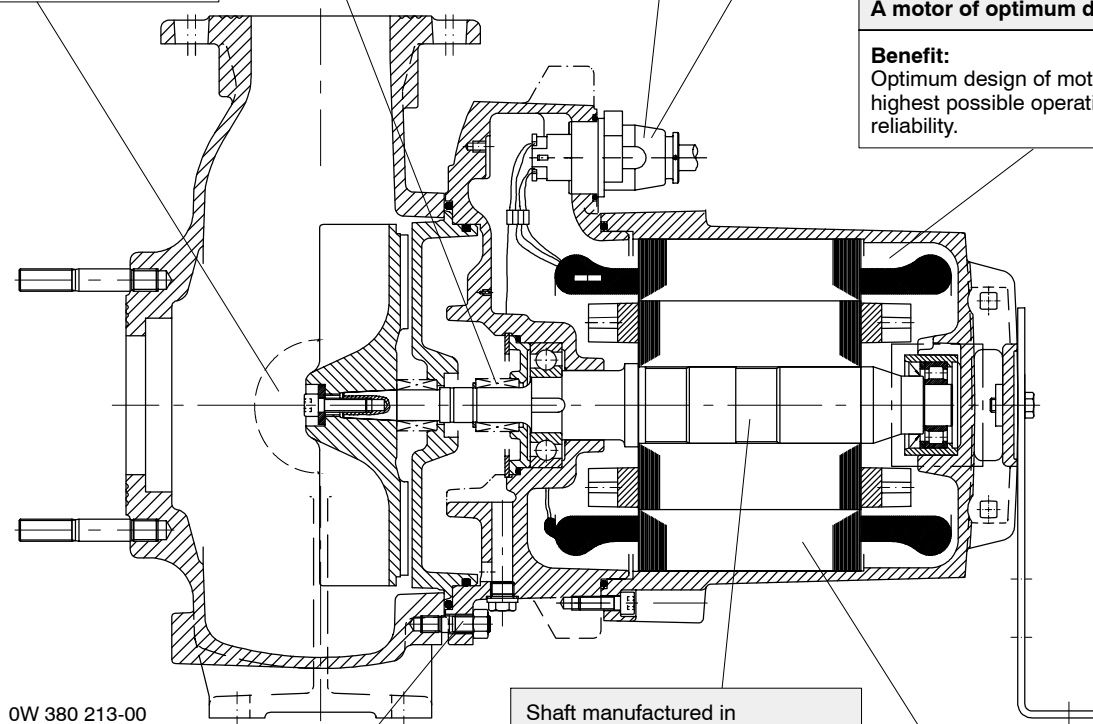
Access to pump casing for cleaning purposes whilst the unit remains installed.

Dry, watertight encapsulated power circuit cut-out motor. Insulation class F; also flameproof design complying with Euro-standard EEx d IIB T3 or T4.

**A motor of optimum design**

**Benefit:**

Optimum design of motor guarantees highest possible operating safety and reliability.



OW 380 213-00

Shaft manufactured in corrosion-resistant stainless steel.

**Benefit:**

No corrosion problems, therefore a long operating life.

Bolts which come in contact with medium are manufactured in stainless steel

**Benefit:**

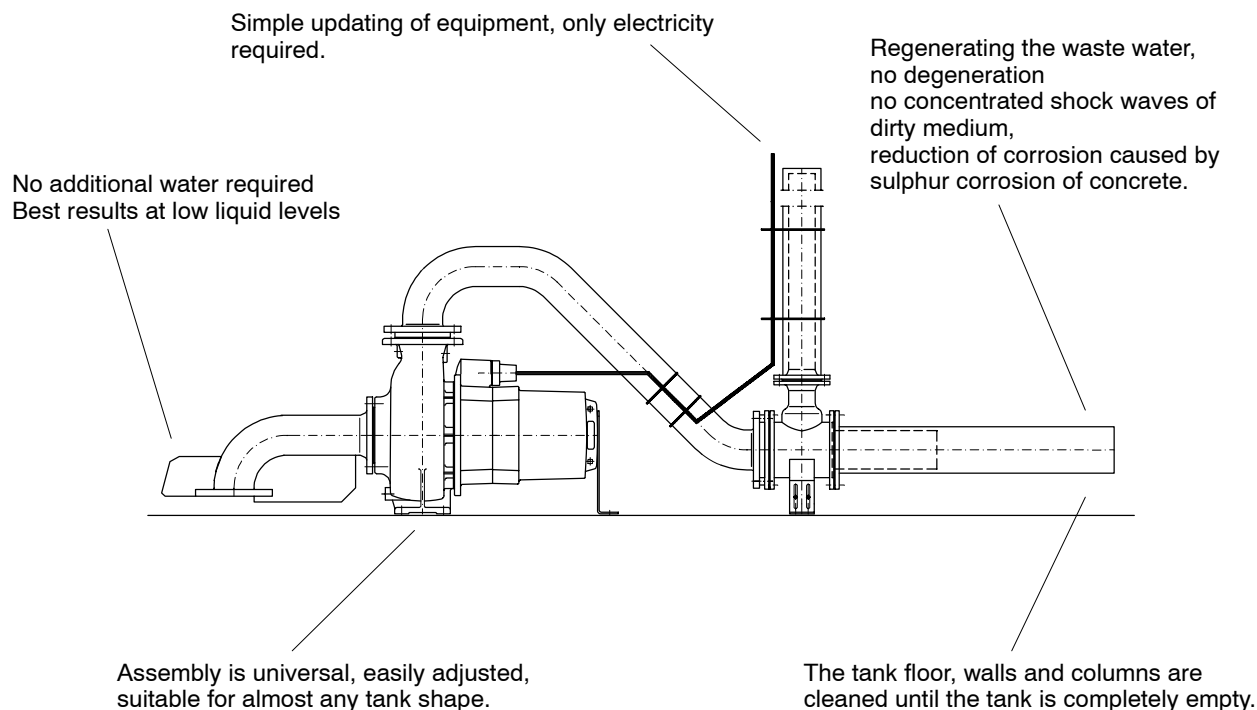
Just a small detail which makes the unit very service-friendly. Dismantling is easy even after years of operation

Dual winding temperature control.

**Benefit:**

Automatic operation is possible even in flameproof equipment.

## Product advantages Amajet H



### Example - Operating cost for one cleaning process:

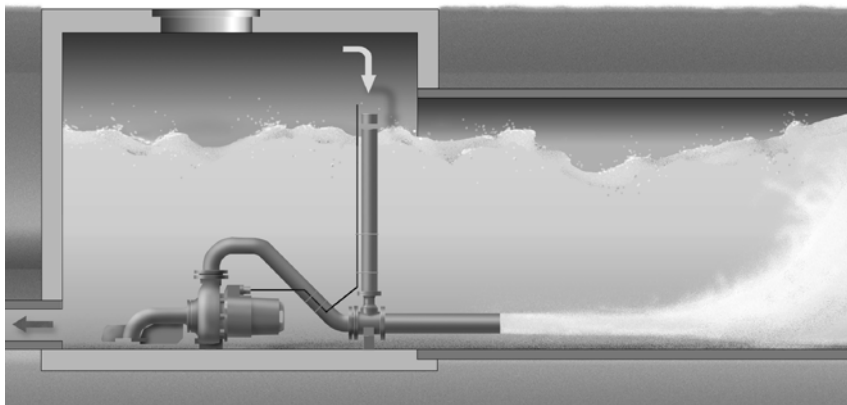
|                                      |                               |
|--------------------------------------|-------------------------------|
| Model:                               | 1 Amajet H 100-249/7 4 X G    |
| Capacity of drainage pump:           | $Q = 72 \text{ m}^3/\text{h}$ |
| Tank size:                           | 20 x 8 m                      |
| Water storage depth:                 | 3.5 m                         |
| Power supply costs (estimated):      | 0.25 €/kWh                    |
| Total tank volume:                   | $V_B = 560 \text{ m}^3$       |
| Water volume - continuous operation: | $V_D = 160 \text{ m}^3$       |
| Water volume - interval operation:   | $V_I = 400 \text{ m}^3$       |

### Drainage time (without inflow):

|                                                        |                                                                                                                       |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1. During continuous operation:                        | $t_D = \frac{160 \text{ m}^3}{72 \text{ m}^3/\text{h}} = 2.2 \text{ h}$                                               |
| 2. During interval operation<br>(at 30 % preset time): | $t_I = \frac{400 \text{ m}^3}{72 \text{ m}^3/\text{h}} \times 0.3 = 1.6 \text{ h}$                                    |
| Duration of operation of Amajet:                       | $t_M = 2.2 \text{ h} + 1.6 \text{ h} = 3.8 \text{ h}$                                                                 |
| Running costs (Power):                                 | $K_{Str.} = 9.8 \text{ kW} \times 3.8 \text{ h} \times 0.25 \text{ €/kWh}$<br>$K_{Str.} = \underline{9.31 \text{ €}}$ |

## The Amajet System for the cleaning of Storm Water Tanks

### Method of Operation



The Amajet circulates the storm water from the bottom of the tank and passes it to an ejector nozzle. The reduced nozzle increases the velocity both before and after the nozzle, producing a negative pressure in the mixing chamber. The negative pressure causes air to be drawn in, which is mixed with the storm water in the mixing chamber. The water-air mixture is ejected at high velocity through the jet pipe parallel to the tank floor.

The combined effect of the water jet and fine air bubbles ejected into the surrounding storm water creates strong horizontal and extensive vertical flows. This causes turbulence within the whole tank whereby sludge particles are always kept in suspension.

During drainage the sludge is carried out of the tank at an even rate and peak demand periods for biological storm water purification are avoided.

For tank water levels exceeding 1 metre the energy saving interval operation will result in energy savings of 10 to 50 % preset time.

This cleaning process is used for the cleaning of tank walls and columns. When the liquid level falls below 1 m the unit runs continuously to clean the tank floor.

### Control

The KSB electronic control unit for the Amajet is designed to guarantee full automatic operation. It can be programmed to handle all plant requirements necessary for automatic operation. Parameters can be set as required to accommodate all levels and hysteresis required for automatic operation.

The Amajet only operates when the water level within the tank is falling, i.e. during the draining process.

The operating times for the individual Amajets are calculated separately to take into account the changing water levels.

The KSB Amajet consists of:

- A robust submersible **forcing jet pump** with non-clogging free-flow impeller
- An **Amajet ejector set designed** for high capacity
- A control unit with an option for data collection and data storage
- Level registration
- Motor control centre

For further details and description see the separate type series manual "Electronic control".

## Pre-selection of Amajet units

### Tank shapes and approximate parameters for the cleaning efficiency of a unit

For the preselection of the Amajet-aggregates and the selection for ideal tank shapes please contact KSB.

Because the parameters can only be calculated based on optimum marginal conditions and the fact that aspects which are specific to a project, such the constituents of the storm water, installation, surfaces, drainage etc. can affect these parameters considerably. We suggest that these factors are taken into account during the early planning stage.

## The Amajet system for the cleaning of Retention Chambers\*

### Method of Operation

The Amajet is installed on the floor of the reservoir within the retention chamber. By means of a suction pipe and ejector nozzle the Amajet mixes waste water with air and the mixture is blasted lengthwise along the bottom of the retention chamber, thus enriching the water with oxygen and avoiding degradation.

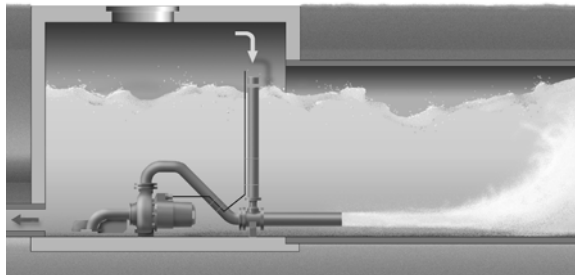
This high grade cleaning effect is achieved by a throttle valve, combined with a jet nozzle.

The opening and closing of the valve is controlled by impulses sent by the control unit.

When the valve is partly closed during continuous operation of the plant, the pressure increases 1.5 times. When the valve opens, this energy is suddenly released and produces shock waves, which spread over the entire length of the retention chamber.

In most situations the Amajet can be successfully fitted to existing retention chambers. The basic requirement, however, would be a chamber adequate to accommodate the installation of the Amajet.

The Amajet System is also suitable for the cleaning of retention chambers running parallel to one another with a single pump, providing certain requirements are fulfilled.



### Control Units for Retention Chambers\*

Fully automatic operation is guaranteed by the control unit which has been programmed to cope with the prevailing conditions within the retention chamber. To maintain a clean retention chamber the control unit can be adjusted to comply with the different operating conditions with regard to the dimensions of the retention chamber, water intake, emptying facilities and the level of contamination/dirt content of the waste water.

The KSB system consists of:

- A robust submersible forcing jet pump with non-clogging free-flow impeller
- An Amajet ejector set with valve
- Control unit with operating data connection and data storage facilities

For further details and description see the separate type series manual "Electronic control".

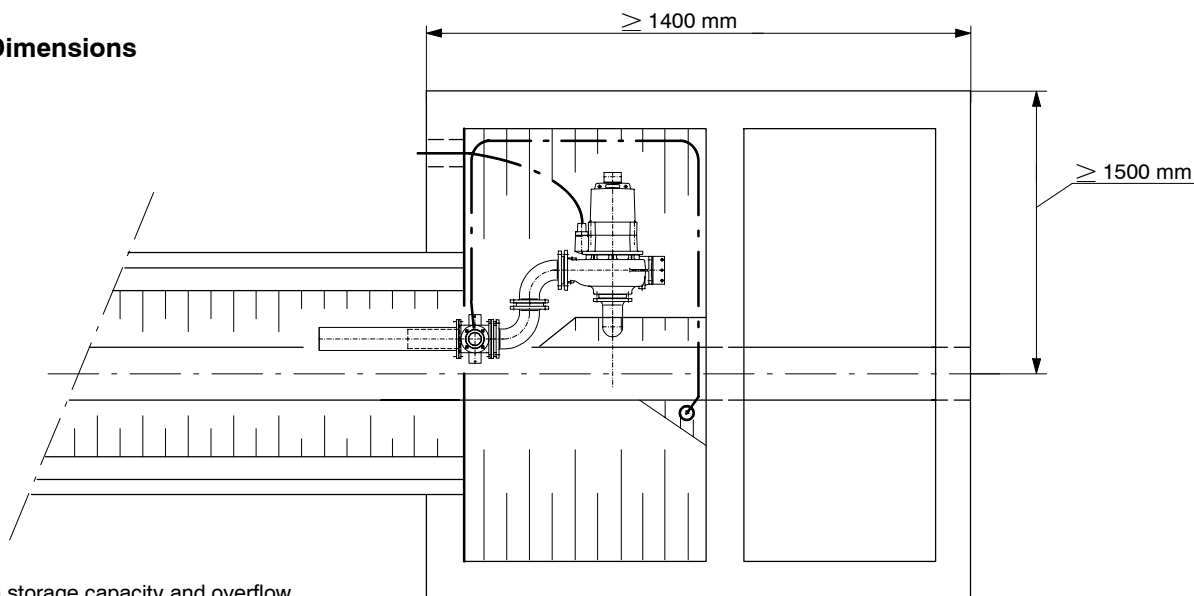
### Pre-selection of the Amajet Units

#### Approximate values for the cleaning capacity of the Unit:

| Bottom Gradient<br>[‰] | Maximum<br>cleaning length<br>per unit **)<br>[m] |
|------------------------|---------------------------------------------------|
| 2-3                    | 80                                                |

\*\* ) These values are only achieved under ideal conditions, because tank floors, rough surfaces and unfavourable channel geometry have a negative effect on the level of cleaning achieved.

#### Chamber Dimensions



\* Sewers with storage capacity and overflow

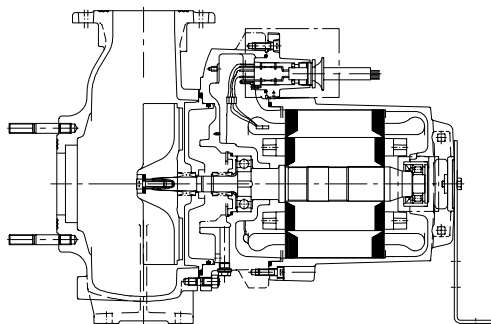


## Material Design

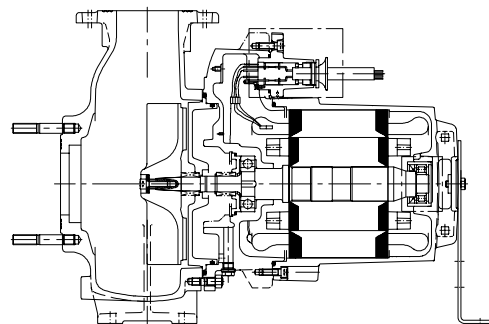
The main parts of the KSB Amajet system are manufactured in:

- **Cast Iron (GG-25),**
- **Chilled cast iron (0.9635),**
- **Duplex steel (1.4517) or or equivalent materials**

### Cast Iron



OW 380 213-00



**G** = **Standard design**  
Main parts in cast Iron  
**G1** = G,  
Impeller in duplex steel  
**G2** = G,  
Impeller in chilled cast iron

**GH** = like G,  
Impeller and intermediate casing  
in chilled cast iron

| Part                                | Material design       |        |        |        |
|-------------------------------------|-----------------------|--------|--------|--------|
|                                     | G                     | G1     | G2     | GH     |
| Pump Unit                           |                       |        |        |        |
| Pump casing                         | GG-25                 |        |        |        |
| Impeller                            | GG-25                 | 1.4517 | 0.9635 |        |
| Intermediate casing/Discharge cover | GG-25                 |        |        | 0.9635 |
| Mechanical seal (pump side)         | SiC / SiC             |        |        |        |
| Mechanical seal (motor side)        | Carbon / SiC          |        |        |        |
| Shaft                               | 1.4021                |        |        |        |
| Bearing bracket                     | GG-25                 |        |        |        |
| Motor casing                        | GG-25                 |        |        |        |
| O-rings                             | Nitrile rubber        |        |        |        |
| Bolts                               | A4 (as 1.4571)        |        |        |        |
| Installation parts                  |                       |        |        |        |
| Clamp (Assembly VX)                 | GG-25                 |        |        |        |
| Bracket (Assembly VX)               | 1.4571                |        |        |        |
| Clamp (Assembly VX)                 | 1.4571                |        |        |        |
| Guide rope (Assembly VX)            | 1.4401                |        |        |        |
| Support foot (Assembly VX)          | ST TZN (Var.: 1.4571) |        |        |        |
| Inlet and outlet bend               | ST TZN (Var.: 1.4571) |        |        |        |
| Ejector set                         | ST TZN (Var.: 1.4571) |        |        |        |
| – Mixing Chamber                    | GG-25                 |        |        |        |
| Ventilation pipe                    | ST TZN (Var.: 1.4571) |        |        |        |
| Connection pipe (Assembly H)        | ST TZN (Var.: 1.4571) |        |        |        |
| Other connection pipes              | ST TZN (Var.: 1.4571) |        |        |        |

## TECHNICAL DETAILS - STANDARD PROGRAMME / (Standard Variants)

**Material Design:** G, G1, G2, GH

**Motor Size:** 4-pole, 5 4 ... 16 4

|                                            |                                                                                                     |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Bearing assembly</b>                    | Radial ball bearings – sealed for life                                                              |
| <b>Motor</b>                               |                                                                                                     |
| Version <b>U</b>                           | Non-flameproof                                                                                      |
| Version <b>X</b>                           | Flameproof to EEx d IIB T3                                                                          |
| Switching Method                           | Direct (Star delta possible for 400 V)                                                              |
| Voltage                                    | 400 V (Var.: 500 V, 690 V)                                                                          |
| Cooling                                    | By ambient medium                                                                                   |
| <b>Cable</b>                               |                                                                                                     |
| Length                                     | 15 m (Var.: up to 50 m)                                                                             |
| Entry                                      | cast in resin, completely watertight over its entire length                                         |
| Type                                       | Rubber hose cable (see Motor data)                                                                  |
| Special cable                              | (Var.: Tefzel = Modified fluorine-polymer EFTE)                                                     |
| <b>Seals</b>                               |                                                                                                     |
| O-rings                                    | Nitrile-rubber NR, (Var.: Viton – fluorite-rubber)                                                  |
| Shaft Seal                                 | Bellows mechanical seal<br>(Var.: Mechanical seal with covered spring)                              |
| <b>Control/Monitoring</b>                  |                                                                                                     |
| Winding temperature                        | Cold conductor (PTC) and bimetal switch                                                             |
| Moisture                                   | (Var.: moisture protection electrode within the motor chamber)                                      |
| <b>Paint</b>                               | Environmentally friendly KSB 2-pack standard paint, Colour RAL 5002<br>(Var.: 2-pack Epoxy coating) |
| <b>Max. ambient Temperature</b>            | 40 °C                                                                                               |
| <b>Max. storm water/medium temperature</b> | 40 °C                                                                                               |
| <b>Acceptance</b>                          |                                                                                                     |
| Hydraulics                                 | Only upon request                                                                                   |
| General                                    | to ISO 9001 (Var.: with Works Certificate EN 10204 – 2.2)                                           |

## Technical Data - Amajet-System

### Standard Operation

| Amajet        | Ejector set                     |                                      | Nominal Power Rating<br>$P_2$ | Hydraulic Power Rating<br>$P_{Hydr.}$ | Capacity<br>Q | Output<br>H |
|---------------|---------------------------------|--------------------------------------|-------------------------------|---------------------------------------|---------------|-------------|
|               | Jet<br>(inner diameter)<br>[mm] | Diffuser<br>(inner diameter)<br>[mm] |                               |                                       |               |             |
| 100-200/ 5 4  | 60                              | 104                                  | 5,5                           | 4,0                                   | 23            | 5,5         |
| 100-237/ 5 4  | 60                              | 104                                  | 5,5                           | 5,5                                   | 32            | 7,0         |
| 100-249/ 7 4  | 60                              | 104                                  | 7,5                           | 7,5                                   | 40            | 7,5         |
| 100-260/ 11 4 | 65                              | 104                                  | 11,8                          | 11,3                                  | 48            | 10,0        |
| 100-262/ 16 4 | 65                              | 104                                  | 16,0                          | 13,0                                  | 52            | 11,5        |
| 100-265/ 16 4 | 65                              | 104                                  | 16,0                          | 14,0                                  | 54            | 13,0        |

### Shock-wave Operation

| Amajet        | Ejector set                     |                                      | Nominal Power Rating<br>$P_2$ | Hydraulic Power Rating<br>$P_{Hydr.}$ | Capacity<br>Q | Output<br>H |
|---------------|---------------------------------|--------------------------------------|-------------------------------|---------------------------------------|---------------|-------------|
|               | Jet<br>(inner diameter)<br>[mm] | Diffuser<br>(inner diameter)<br>[mm] |                               |                                       |               |             |
| 100-249/ 11 4 | 60                              | 104                                  | 11,8                          | 7,5                                   | 40            | 7,5         |
| 100-260/ 16 4 | 65                              | 104                                  | 16,0                          | 11,3                                  | 48            | 10,5        |
| 100-262/ 16 4 | 65                              | 104                                  | 16,0                          | 13,0                                  | 52            | 11,5        |

## Motor Data

### Flameproof design EEx d IIB T3

| Motor data<br>für 400 V, 50 Hz, 3~            |      | Motor Type | 5 4 XG            | 7 4 XG            | 11 4 XG           | 16 4 XG                        |
|-----------------------------------------------|------|------------|-------------------|-------------------|-------------------|--------------------------------|
| Power rating $P_2$                            | [kW] |            | 5.5               | 7.5               | 11.8              | 16.0                           |
| Absorbed power $P_1$                          | [kW] |            | 6.7               | 8.86              | 13.4              | 17.9                           |
| Nominal current $I_N$                         | [A]  |            | 12.1              | 15.8              | 23.5              | 33.0                           |
| Efficiency factor $\cos \varphi$              |      |            | 0.8               | 0.81              | 0.82              | 0.79                           |
| Starting method                               |      |            | direct/star delta | direct/star delta | direct/star delta | direct/star delta              |
| Starting current $I_A$ (direct) <sup>1)</sup> | [A]  |            | 56                | 80                | 132               | 200                            |
| Protection to DIN 40 050                      |      |            | IP 68             | IP 68             | IP 68             | IP 68                          |
| Electric connection cable                     |      |            | H07RN-F12G1.5     | H07RN-F12G1.5     | H07RN-F12G1.5     | NSS H0u-J<br>(7 x 4 + 5 x 1.5) |
| Outer cable diameter                          | [mm] |            | 17.0 to 19.0      | 17.0 to 19.0      | 17.0 to 19.0      | 26.9 to 28.8                   |

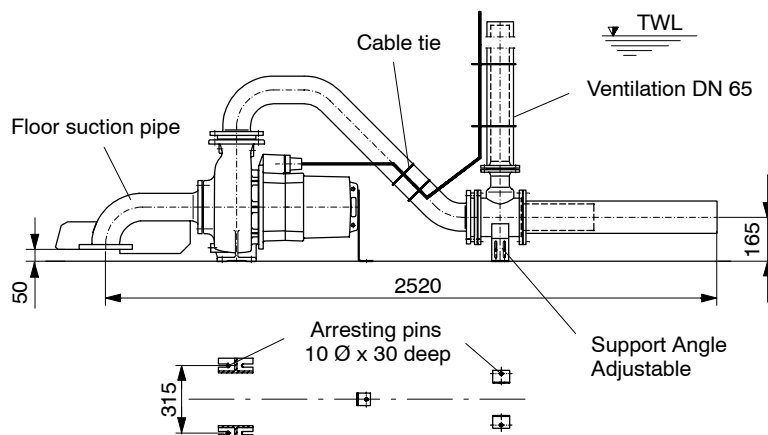
### Non-Flameproof design

| Motor data<br>für 400 V, 50 Hz, 3~            |      | Motor Type | 5 4 UG            | 7 4 UG            | 11 4 UG           | 16 4 UG                        |
|-----------------------------------------------|------|------------|-------------------|-------------------|-------------------|--------------------------------|
| Power rating $P_2$                            | [kW] |            | 5.5               | 7.5               | 11.8              | 16.0                           |
| Absorbed power $P_1$                          | [kW] |            | 6.7               | 8.86              | 13.4              | 17.9                           |
| Nominal current $I_N$                         | [A]  |            | 12.1              | 15.8              | 23.5              | 33.0                           |
| Efficiency factor $\cos \varphi$              |      |            | 0.8               | 0.81              | 0.82              | 0.79                           |
| Starting method                               |      |            | direct/star delta | direct/star delta | direct/star delta | direct/star delta              |
| Starting current $I_A$ (direct) <sup>1)</sup> | [A]  |            | 56                | 80                | 132               | 200                            |
| Protection to DIN 40 050                      |      |            | IP 68             | IP 68             | IP 68             | IP 68                          |
| Electric connection cable                     |      |            | H07RN-F12G1.5     | H07RN-F12G1.5     | H07RN-F12G1.5     | NSS H0u-J<br>(7 x 4 + 5 x 1.5) |
| Outer cable diameter                          | [mm] |            | 17.0 to 19.0      | 17.0 to 19.0      | 17.0 to 19.0      | 26.9 to 28.8                   |

<sup>1)</sup> Data taken from Motor catalogue 2553.53/5-90

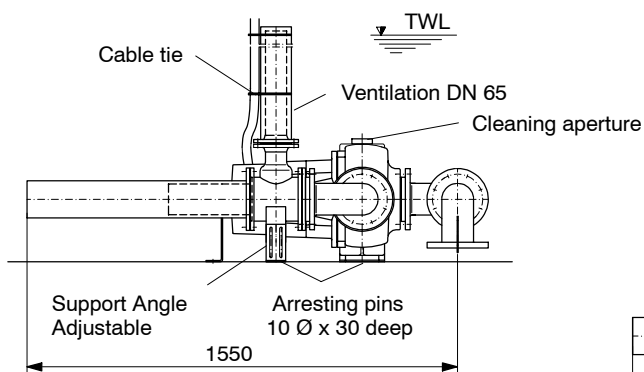
## Main Dimensions

### Amajet H - Horizontal design



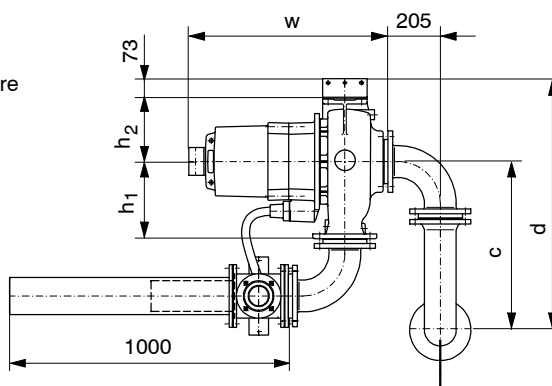
| Amajet           | Weight [kg] |
|------------------|-------------|
| H 100- ... / 5 4 | 140         |
| H 100- ... / 7 4 | 150         |
| H 100- ... /11 4 | 165         |
| H 100- ... /16 4 | 180         |

### Amajet S - Compact/portable design



#### Attention!

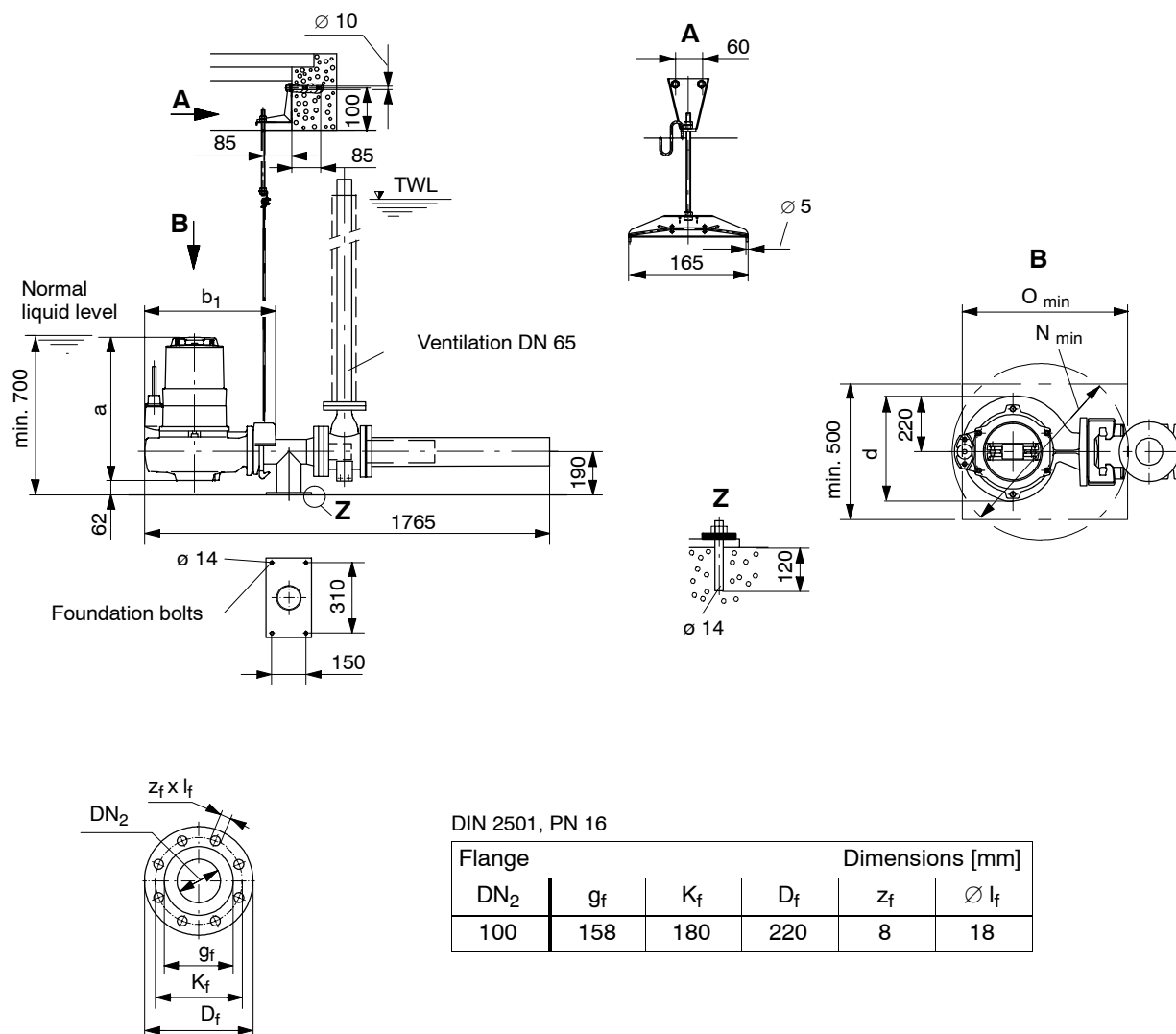
Installation must guarantee that the cleaning aperture is situated on top.



| Amajet           | Dimensions [mm] |     |                |                |     | Weight [kg] |
|------------------|-----------------|-----|----------------|----------------|-----|-------------|
|                  | c               | d   | h <sub>1</sub> | h <sub>2</sub> | w   |             |
| S 100- ... / 5 4 | 485             | 903 | 225            | 280            | 610 | 140         |
| S 100- ... / 7 4 | 485             | 903 | 225            | 280            | 610 | 150         |
| S 100- ... /11 4 | 485             | 903 | 225            | 280            | 640 | 165         |
| S 100- ... /16 4 | 485             | 903 | 225            | 280            | 640 | 180         |

## Main dimensions

### Amajet VX - Vertical Design



| Amajet             | Dimensions [mm] |                |     |                                     | Weight [kg] |
|--------------------|-----------------|----------------|-----|-------------------------------------|-------------|
|                    | a               | b <sub>1</sub> | d   | N <sub>min</sub> / O <sub>min</sub> |             |
| VX 100- ... / 5 4  | 600             | 580            | 388 | 610                                 | 130         |
| VX 100- ... / 7 4  | 600             | 580            | 388 | 610                                 | 140         |
| VX 100- ... / 11 4 | 630             | 580            | 388 | 610                                 | 155         |
| VX 100- ... / 16 4 | 630             | 580            | 388 | 610                                 | 170         |



**KSB Aktiengesellschaft**

P.O. Box 200743 • 06008 Halle (Saale) • Turmstraße 92 • 06110 Halle (Germany)  
Tel. +49 (345) 48 26 0 • Fax +49 (345) 48 26 46 99 • [www.ksb.com](http://www.ksb.com)

Jansen Pompentechniek T: +31(0)485-371318 E: [info@pompentechniek.nl](mailto:info@pompentechniek.nl)