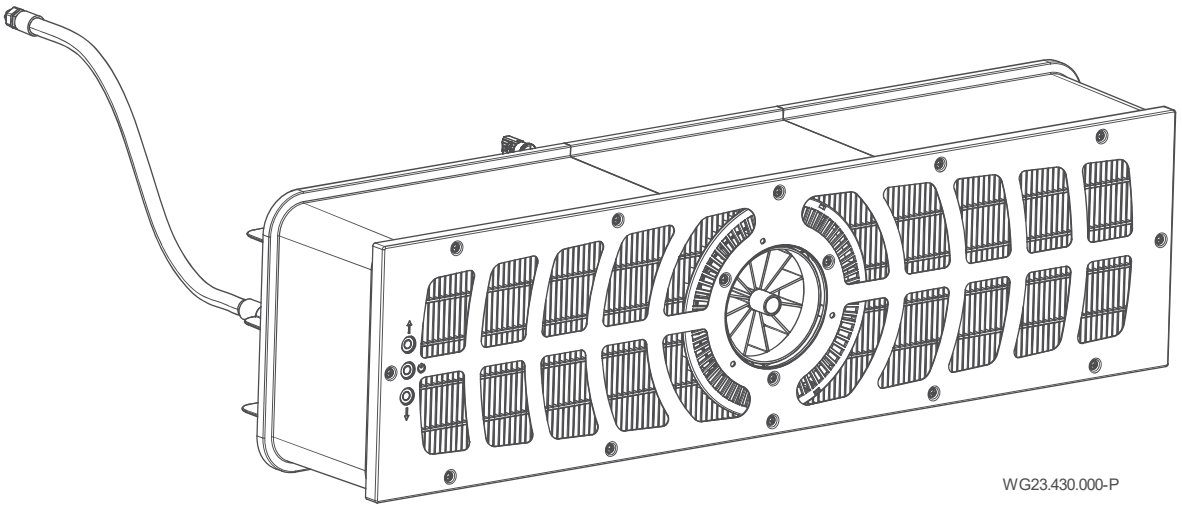
BADU®

EN Translation of original operation manual

# BADU® JET Turbo Pro

## Submerged counter swim unit



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## Table of contents

# 1 About this document

## 1.1 Using this manual

This manual is a component of the pump/unit. The pump/unit was manufactured and tested according to the generally accepted rules of technology. However, if the pump/unit is used incorrectly, not serviced enough or tampered with, danger to life and limb or material damage could result.

➔ Read the manual carefully before use.
➔ Keep the manual during the service life of the product.
➔ Provide access to the manual for operating and service personnel at all times.
➔ Pass the manual on to any future owners or operators of the product.

## 1.2 Target group

This manual is aimed both at qualified specialists and the end customer. Descriptions aimed only at qualified specialists are indicated accordingly (qualified specialist). This indication applies to the whole point. All other points are universally valid.

## 1.3 Other applicable documents

- Packing list
- Technical documents frequency converter

### 1.3.1 Symbols and means of representation

Warnings are used in this manual to warn you of personal injury.

➔ Always read and observe warnings.

**⚠ DANGER**

Danger for people.
Non-observance results in death or serious injury.

**⚠ WARNING**

Danger for people.
Non-observance can result in death or serious injury.

**⚠ CAUTION**

Danger for people.
Non-observance can result in light to moderate injury.

**NOTICE**

Notes to prevent material damage, for better understanding or to optimise the workflow.

Important information and technical notes are specially marked to explain correct operation.

| Symbol | Meaning |
|---|---|
| ➔ | Instructions for a one-step action. |
| 1.<br>2. | Directions for a multi-step action.<br>➔ Observe the order of the steps. |

# 2 Safety

## 2.1 Intended use

For installation in swimming pools as an attraction, for fitness, as a wave pool, for swimming without turning.

Observing the following information is vital for intended use:

- This manual

The pump/unit may only be operated within the application limits, as specified in this manual. Use in water with a salt content exceeding 0.66 g/l must be authorised by the manufacturer/ supplier.

The device can be used commercially.

Any other use or use exceeding this is **not** an intended use and must first be authorised by the manufacturer/supplier.

### 2.1.1 Possible misuse

- Insufficient fastening and sealing of the system.
- Opening and servicing of the pump/unit by unqualified personnel.
- Operation for too long in the upper speed range.

## 2.2 Personnel qualification

This unit can be used by **children** aged 8 and over as well as by persons with limited physical, sensory or mental capacity or by people with a lack of experience or knowledge, provided that they are supervised or have been instructed in the safe use of the unit and understand the resulting dangers. **Children** may not play with the unit. Cleaning and **user maintenance** may not be carried out by **children** without supervision.

➔ Ensure that the following work is only performed by trained professionals with the following qualifications:
  - For mechanical work, for example replacing ball bearings or mechanical seals: qualified mechanics.
  - For work on the electric system: electricians.

➔ Ensure that the following requirements are fulfilled:
  - Personnel who do not yet have the appropriate qualifications must receive the required training before being allowed to work on the system.
  - The personnels' responsibilities, for example working on the product, electric equipment or hydraulic systems, are set based on their qualifications and the job description.
  - The personnel have read this manual and understand the necessary working steps.

### 2.2.1 Cardiac pacemakers

Magnets can interfere with and stop cardiac pacemakers and implanted defibrillators.

- The magnetic field can cause cardiac pacemakers to switch to standard mode and therefore cause cardiovascular problems.
- The defibrillator can potentially stop functioning or cause dangerous electric shocks.

➔ Those affected may not set up, maintain or operate magnetic pumps.

## 2.3 Safety regulations

The operator of the system is responsible for the adherence to all relevant statutory regulations and guidelines.

➔ Observe the following regulations when using the pump/unit:
  - This manual
  - Warning and information signs on the product
  - Other applicable documents
  - The valid national regulations for accident prevention
  - The internal occupational, operational and safety regulations of the operator

## 2.4 Protective equipment

Reaching into moving parts, e.g. coupling and/or impeller fan, can cause serious injury.

➔ Never operate the pump/unit without protective covers.

## 2.5 Structural modifications and spare parts

Alterations or modifications can affect operational safety.

➔ Never modify or alter the pump/unit without the manufacturer's permission.

➔ Only use original spare parts and accessories authorised by the manufacturer.

## 2.6 Signs

➔ Ensure that all the signs on the complete pump/unit remain legible.

## 2.7 Residual risk

### 2.7.1 Falling parts

➔ Only use hoisting and load-bearing equipment which is suitable and technically sound.
➔ Do not stand under suspended loads.

### 2.7.2 Rotating parts

There is a risk of shearing and crushing due to exposed rotating parts.
➔ Only perform servicing when the pump/unit is not in operation.
➔ Prior to servicing, ensure the pump/unit cannot be switched back on.
➔ Immediately after finishing servicing, reattach or reactivate all protective equipment.

### 2.7.3 Electrical energy

There is an increased risk of electric shock when working on the electrical system due to the humid environment.
Electrical protective earth conductors which were not installed correctly can also result in electric shocks, for example due to oxidation or cable breakage.
➔ Observe VDE and utility company regulations.
➔ Build swimming pools and their protection according to DIN VDE 0100-702.
➔ Before working on the electrical system, take the following measures:
  • Disconnect system from the power supply.
  • Attach a warning sign: “Do not switch on! The system is being worked on.”
  • Ensure that the system is free of voltage.
➔ Check the electrical system regularly to ensure it is in proper working condition.

### 2.7.4 Hot surfaces

The electric motor can reach temperatures of up to 80 °C. There is a risk of being burned.
➔ Do not touch the motor during operation.
➔ Allow the pump/unit to cool down before servicing it.

### 2.7.5 Suction danger

The following dangers can lead to drowing:
• Wrong outflow direction/rotation direction. See point 2.9.6 on page 8.
• Sucking towards, sucking in or jamming of the body or body parts, clothing and jewellery
• Knotting of the hair
➔ **Never** operate the system without suction guards.
➔ Do not wear loose swimwear.
➔ Use a bathing cap if you have longer hair.
➔ Check and clean the suction openings regularly.

### 2.7.6 Body traps

If openings between 25 mm and 110 mm are unavoidable for constructional reasons, this is only permissible when the installer warns the customer of the potential risk.
➔ The owner of the system must alert users to the potential risk of body traps.

### 2.7.7 Magnetic forces

Risk of injury from magnetic forces when assembling/dismantling the motor unit and drive unit.
➔ Pay attention to magnetic forces when working on the unit.

### 2.7.8 Magnetic Field

➔ Avoid contact between magnets and all devices and objects which could be damaged or obliterated due to strong magnetic fields.

### 2.7.9 Risk of injury at the inflow nozzle

The inflow nozzle operates with a high volume flow rate. This can cause injuries to the eyes or other sensitive parts of the body.
➔ Avoid direct contact of these parts of the body with the water jet from the inflow nozzle.

### 2.7.10 Danger of drowning

Danger of drowning due to strong current for persons of limited swimming ability and physical strength.
➔ Adapt the system power to the swimmer.
➔ Children and persons with physical and mental disabilities must be supervised.

## 2.8 Faults

➔ In case of a fault, immediately switch the pump off and remove it from operation.
➔ Have all faults repaired immediately.

### 2.8.1 Seized drive unit

Switching on a seized drive unit several times in succession can damage the motor. Observe the following points:

➔ Do not switch the unit on repeatedly.
➔ Turn the propeller by hand.
➔ Clean the drive unit.

## 2.9 Preventing material damage

### 2.9.1 Leakage at the installation housing

Non-observance of the curing time of the ABS bonding can result in leaks and flooding

➔ Observe the curing time of at least 12 hours for the ABS bonding
➔ Provide sufficient ground drainage
➔ Install the unit in a manner which reduces structure-borne and airborne noise transmission. When doing so, observe relevant regulations.
➔ In the event of leakage, the system may not be operated and must be disconnected from the mains.

### 2.9.2 Water splashes over the edge of the pool

Water splashing over the edge of the pool can have the following reasons:

- Wrong dimensioning of the pool.
- Overflow gutters and splash-water tank too small.

### 2.9.3 Dry running

Slide bearings and plastic parts can be destroyed within a few seconds when running dry.

➔ Do not allow the unit to run dry. This also applies to checking the rotation direction.
➔ Only start the system when the water level is 350 mm above the system centre.

### 2.9.4 Overheating

The following factors can lead to overheating of the system:

- Water level too low.
- Ambient temperature which is too high.
- Motor overload switch set incorrectly.
- Blockage of the suction guard by fibres, items of clothing, hairs, leaves, bathing towel etc.

➔ Raise the water level.
➔ Do not exceed the permitted ambient temperature of 40 °C.
➔ Avoid blockages and/or clear existing blockages.

### 2.9.5 Blockage of the drive

Particles of dirt can block the system. This leads to dry running and overheating.

➔ Avoid blockages by fibres, items of clothing, hairs, leaves, bathing towel, etc.

### 2.9.6 Wrong rotation direction of the turbines

Wrong rotation direction due to:

- Wiring not according to the circuit diagram (e.g. wire labelling not observed)
- Water outflow direction at the nozzle not checked.
  ➔ The installer must check the outflow direction with a swimming object.

### 2.9.7 Risk of frost

It is recommended to remove the drive unit during the frost period and store it in a dry room.

➔ Drain the unit and pipes at risk of freezing in plenty of time.

### 2.9.8 Water temperature

The water temperature must not exceed 35 °C.

### 2.9.9 Safe use of the product

Safe use of the product is no longer guaranteed in the following instances:

- When the front panel is blocked.
- When the drive unit is seized.
- When protective devices, e.g. front panel, are damaged or missing.
- When the electrical installation is defective.

### 2.9.10 Contamination of the unit

Pay attention to clean work stations when working on the unit. No magnetisable metallic particles may be kept in the vicinity of the magnetic coupling.

# 3 Description

## 3.1 Components

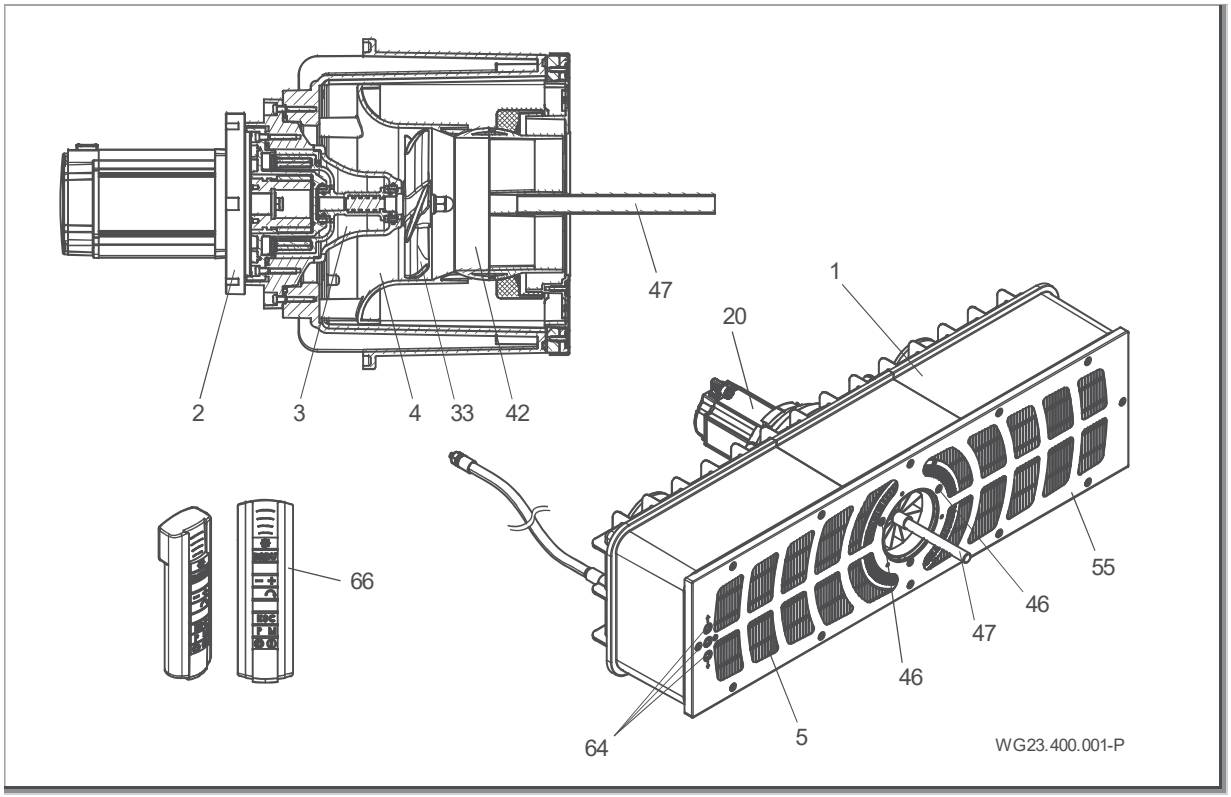



Fig. 1

| | | | |
|---|---|---|---|
| 1 | Installation housing | 2/3 | Drive unit |
| 4 | Suction nozzle unit | 5 | Panel |
| 20 | Motor | 33 | Propeller wheel |
| 42 | Ball nozzle | 46 | Screws |
| 47 | Adjustment aid | 55 | Front panel |
| 64 | Piezo button | 66 | Remote control unit |

## 3.2 Function

The system (1) is designed for installation in a concrete pool and in a sturdy steel or plastic pool with a smooth wall in the assembly area.

It is driven by a motor (20), the power of which can be adjusted in different stages by a frequency converter.

It is switched on and off and controlled by piezo buttons (64) in the front panel (55) and can also be adjusted by a remote control unit (66).

The power is transmitted by a magnet-coupled drive unit (2/3) to the propeller wheel (33).

The water is sucked in at the panel gratings (5) through the suction nozzle unit (4) to the propeller wheel (33) and fed back into the pool with a powerful volume flow.

The flow direction can be set by swivelling a ball nozzle (42) 5° in all directions using the adjustment aid (47). The powerful volume flow thus created gives the swimmer a personally adapted swimming experience.

# 4 Transport and intermediate storage

## 4.1 Transport

➔ Check the delivery conditions:
- Check the packaging for transport damage.
- Determine damages, document them with photographs and contact the distributor.

## 4.2 Packing

Remove the partly pre-assembled system from the packing. Remove the respective pre-assembled parts by undoing the tapping screws and store in a safe place.

## 4.3 Storage

**NOTICE**

Corrosion is possible due to storage in humid conditions with fluctuating temperatures!
Condensation can corrode windings and metal parts.

➔ Store the drive unit in a dry place at constant temperature if possible.

**NOTICE**

Damage or loss of individual parts!

➔ Do not open the original packaging until installation or keep individual parts in the original packaging until installation.

## 4.4 Return

➔ Empty the drive unit completely.
➔ Clean the drive unit.
➔ Pack the drive unit in a cardboard box and send it to the dealer or manufacturer.

# 5 Installation

## 5.1 Installation site (Qualified specialist)

### 5.1.1 Installation point

- The system is normally installed at the narrow side of the pool with a recommended minimum pool size of 3.5 x 6 m.
- It cannot be installed in a round or oval pool.
- The volume flow in the system can lead to circulation in the pool. This can cause an overlap of the volume flow and the return flow which becomes noticeable in the form of an apparent stall in the flow. This happens, above all, when special pool shapes or, for example, steps are installed. Generally, this has only happened very rarely so far and does not constitute a defect. Adjusting the nozzle is usually the simplest remedy here to favourably influence the flow in the pool.

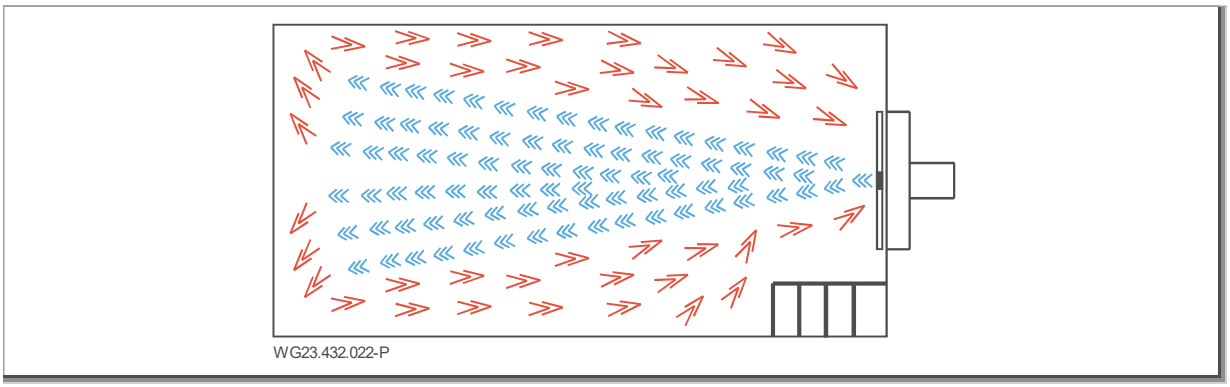



Fig. 2

### 5.1.2 There must be ground drainage

➔ Calculate the size of the ground drain according to the following criteria:
- Size of the swimming pool.
- Circulation flow rate.

### 5.1.3 Ventilation and aeration

➔ Ensure sufficient ventilation and aeration. The ventilation and aeration must ensure the following conditions:
- Prevention of condensation.
- Minimum distance from motor to the wall: min. 300 mm.
- Cooling of the motor and other system components, for example switch cabinets and control units.
- Limitation of the ambient temperature to maximum 40 °C.

### 5.1.4 Structure-borne and airborne noise transmission

➔ Observe the regulations for constructional noise protection, for example DIN 4109.

➔ Install the system so that the structure-borne noise and airborne noise are reduced. Use vibration-absorbing materials such as blanket insulators for example.

- The airborne noise emission is specified according to EN ISO 20361.

### 5.1.5 Space requirements

Leave enough space to be able to remove the motor and drive unit from the rear of the housing.

### 5.1.6 Fastening elements

Fasten the system parts with screws.

### 5.1.7 Swimming pool with overflow gutter

➔ Pay attention to adequate dimensioning of the overflow gutter, piping and splash-water tank when planning the swimming pool.

### 5.1.8 Frequency converter installation instructions

**NOTICE**

The frequency converter should only be installed by a qualified electrician.

- ➔ See the enclosed original operating instructions for full information about the frequency converter.
- ➔ The converter may only be installed vertically.
- ➔ It must be installed on a suitable level and flame-retardant surface.
- ➔ Never store inflammable materials in the vicinity of the converter.
- ➔ The installation site should be vibration-free.
- ➔ Never install the converter in areas with excessive moisture, aggressive chemicals or potentially dangerous dust particles in the air.
- ➔ Do not install the converter in the vicinity of heat sources with high radiation.
- ➔ Protect against direct sunlight. Install sun protection if necessary.
- ➔ The installation site must be free from risk of frost.
- ➔ The air flow through the converter may not be obstructed. The heat from the converter must dissipate naturally.
- ➔ A suitable pressure compensation valve must be installed in the feed-through plate in case of heavy fluctuations in the ambient pressure and temperature.
- ➔ If an EMC filter is to be used in the switch box, the customer must remove the screw from the frequency converter.


**NOTICE**

If the converter has been in storage for longer than 2 years, the intermediate circuit capacitors must be freshly reformed before it is put back into operation. See the manufacturer's documentation for this.

## 5.2 Installation (Qualified specialist)

### 5.2.1 Installation tip concrete pool

**Concrete pool with foil**

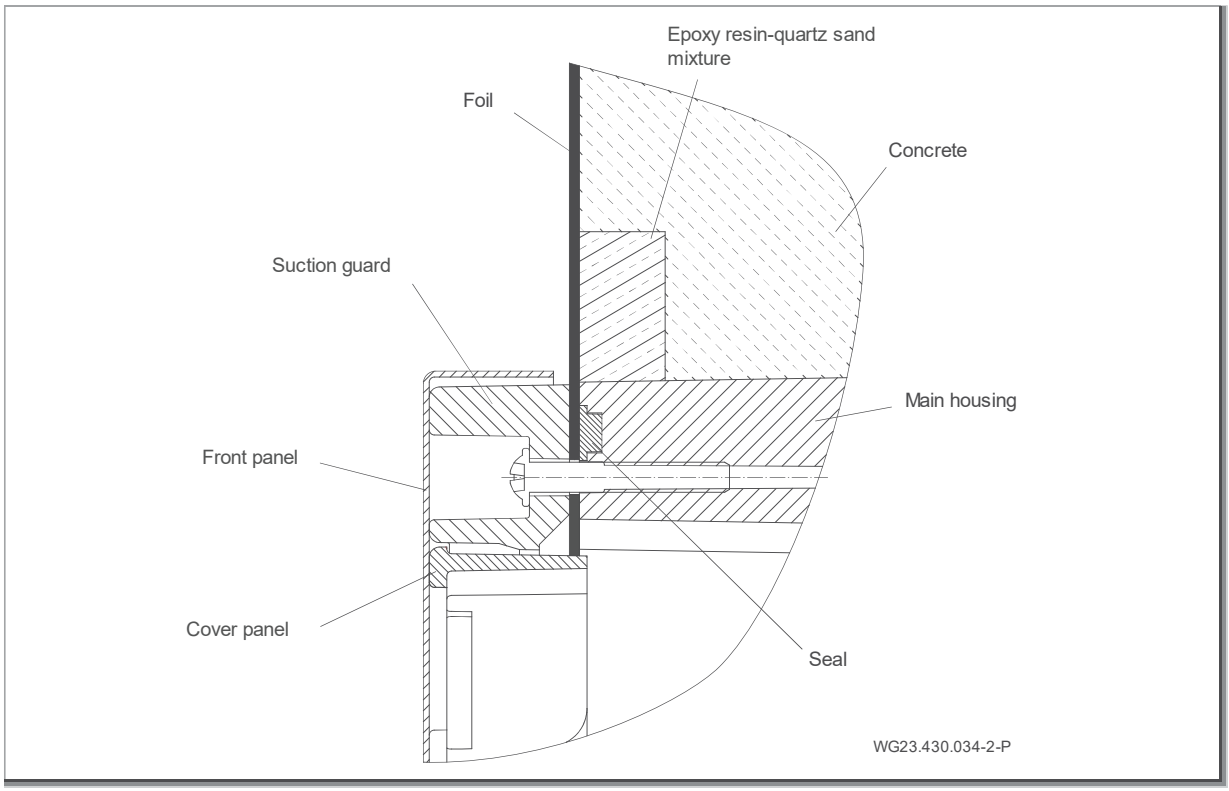



Fig. 3

**Tiled concrete pool**

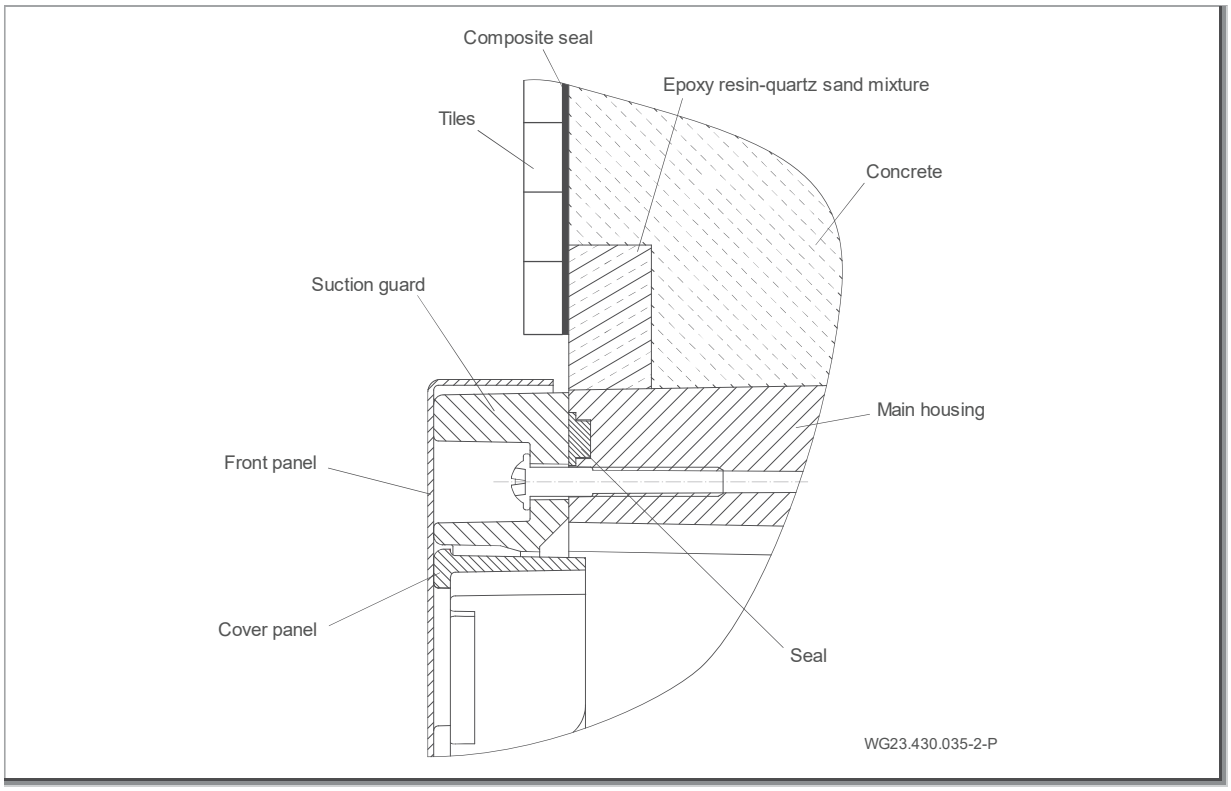



Fig. 4

## Pool cutout for concrete pools/formwork

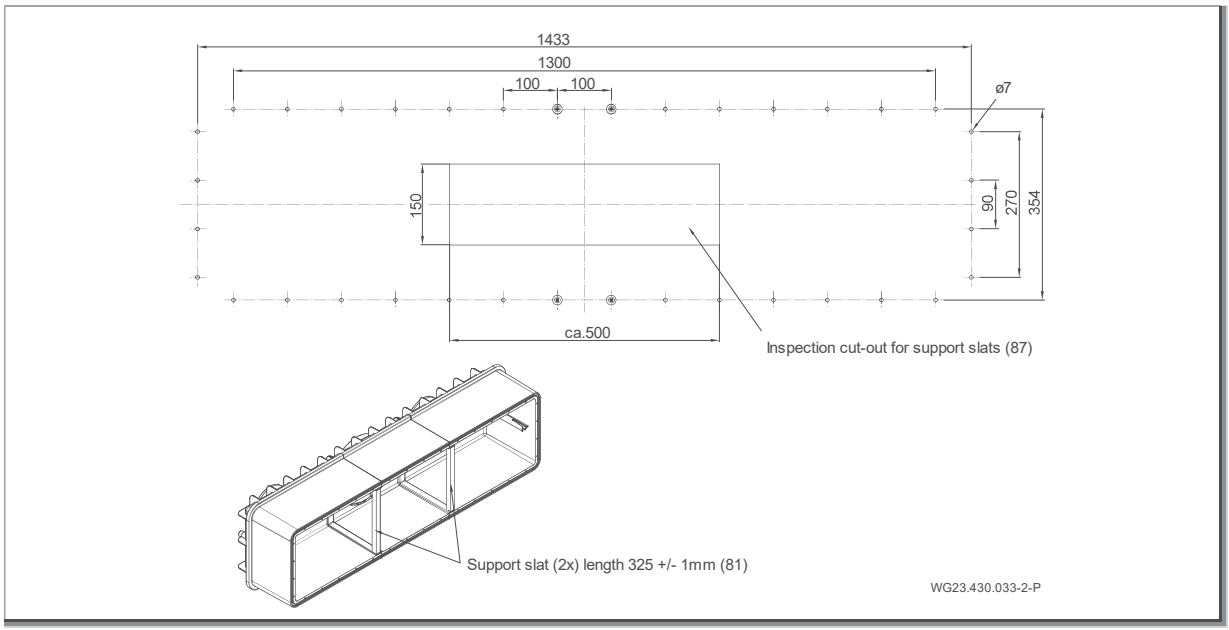



Fig. 5

## Installation of formwork for concrete pools

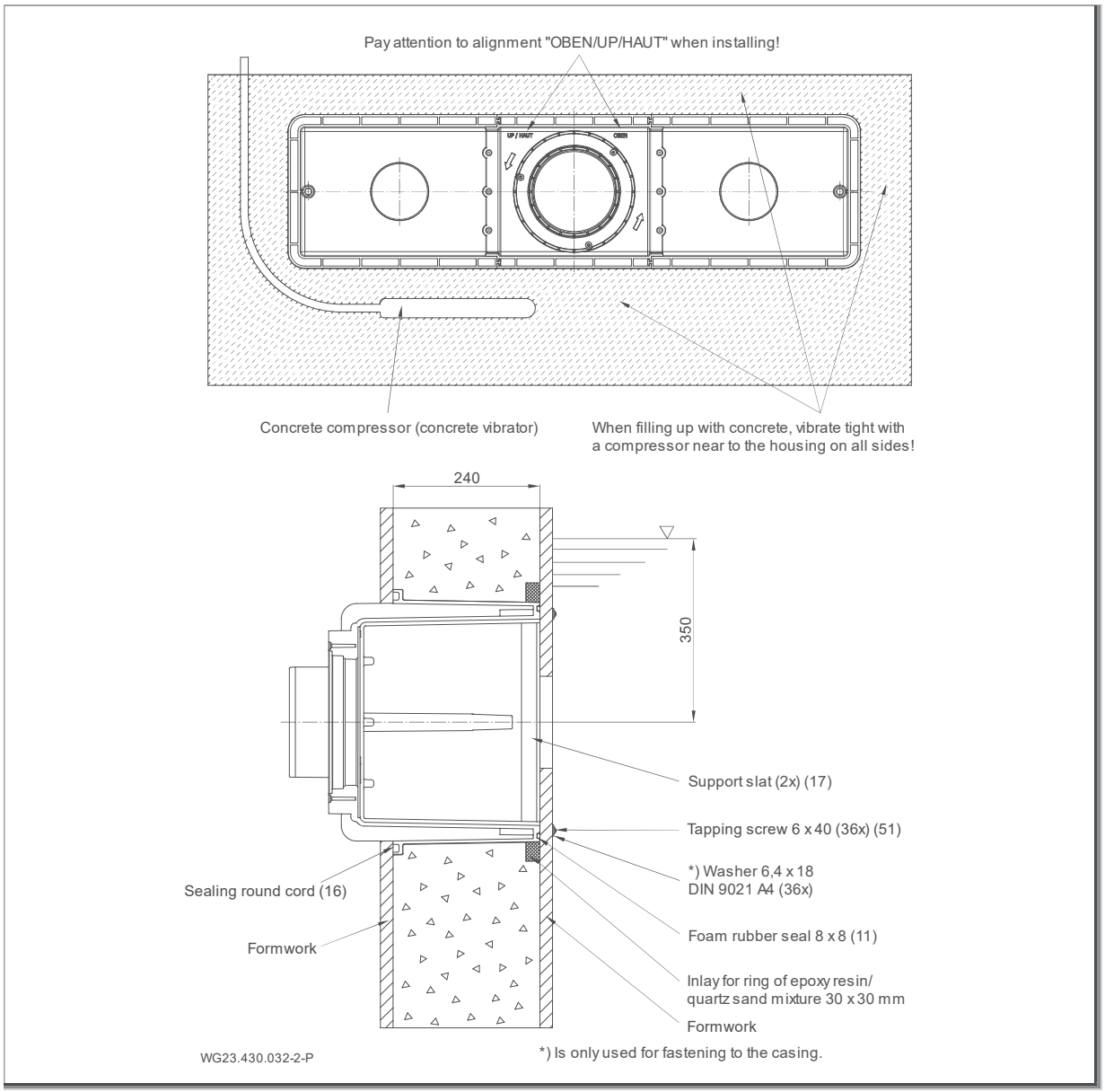



Fig. 6

### Installation of the housing in a concrete and tiled pool

**NOTICE**

It is recommended to lay a surrounding ring of epoxy resin/quartz sand at the pool-side outside wall of the housing (1) as a seal to the concrete wall. Siehe "Fig. 8" auf Seite 17.

➔ Mount a concrete-resistant inlay 30 x 30 mm on the casing on the housing prior to installation.

1. Installation depth: The centre of the installation housing (1) should be mounted 35 cm below the water level.
2. Drill fastening holes into the casing according to the drilling template.
3. Clamp support slats (17) between the two overlaps of the inside of the housing.
4. Press in the foam rubber seal (11) without tension along the groove on the housing (1) by hand. Fix with a drop of instant glue on the floor side.
5. Place the sealing beading (16) in the groove.
6. Align the installation housing (1) according to the label “OBEN/UP/ HAUT” and fix to the casing with the tapping screws (51).

- The rectangular cut-out in the casing is optional. This serves for inspection or correct seating or also later installation of the support slats.

➔ When concreting, make sure that the concrete is filled up from the bottom to the top and is vibrated tight and reinforced several times on all sides.

7. After the concrete has hardened, the inlay must be removed and a seal applied flush with the front side with an epoxy resin/quartz sand mixture.
8. Screw the suction guard to the housing (1) from the inside of the pool with 36 self-tapping screws (51) with a torque of 6 Nm.

**NOTICE**

➔ Observe the hardening time for concrete!

➔ Sealing should be applied as a composite seal in accordance with the swimming pool standard DIN 18535.

**Installation diagram for installation in a concrete pool with foil cladding (a)**

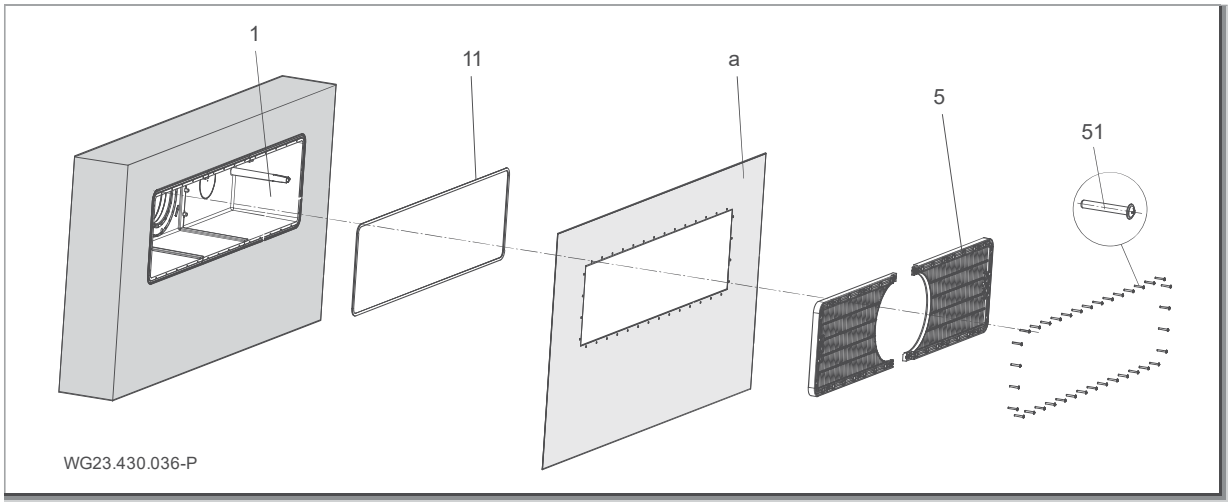



Fig. 7

**NOTICE**

for concrete pool with foil

➔ The foil (a) is pressed against the installation housing (1) with mounted foam rubber seal (11) by the panel (5).

➔ For pools with a foil, it is recommended to reduce the rectangular cut-out all round to increase the distance from the holes.

➔ The overhanging foil can be stuck to the inside of the housing.

**Installation diagram for installation in a tiled concrete pool**

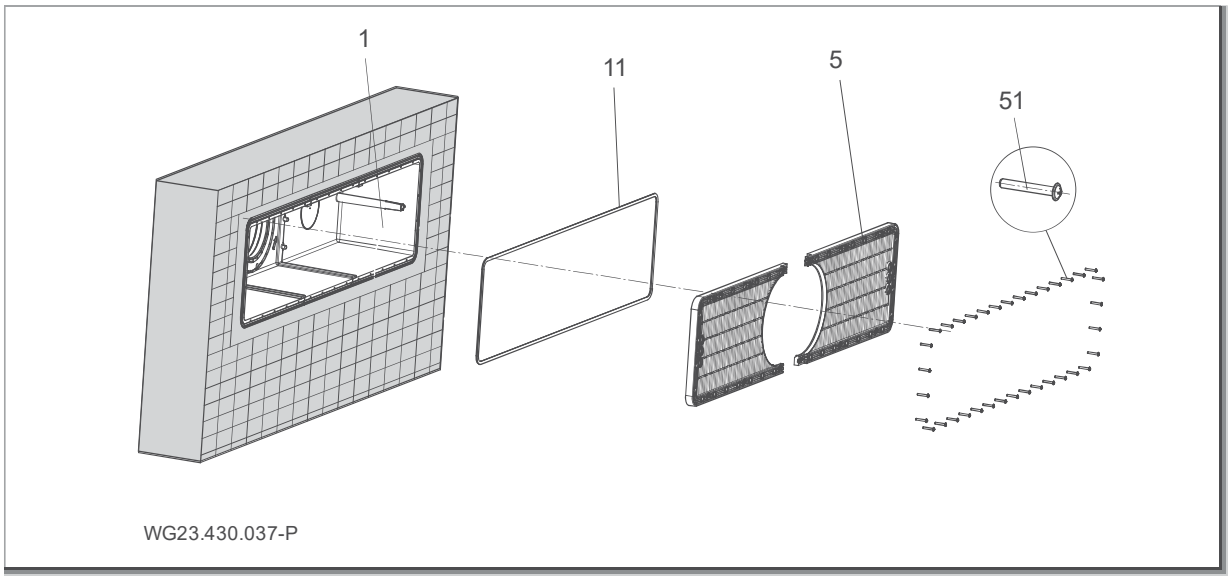



Fig. 8

**NOTICE**

**Note for tiled concrete pool**

➔ After the concrete has hardened, tiles can be mounted around the panel at a distance of approx. 1 cm.

➔ Sealing must be applied as a composite seal in accordance with the swimming pool standard DIN 18535.

### 5.2.2 Installation note stainless steel/foil pool

**Foil pool**

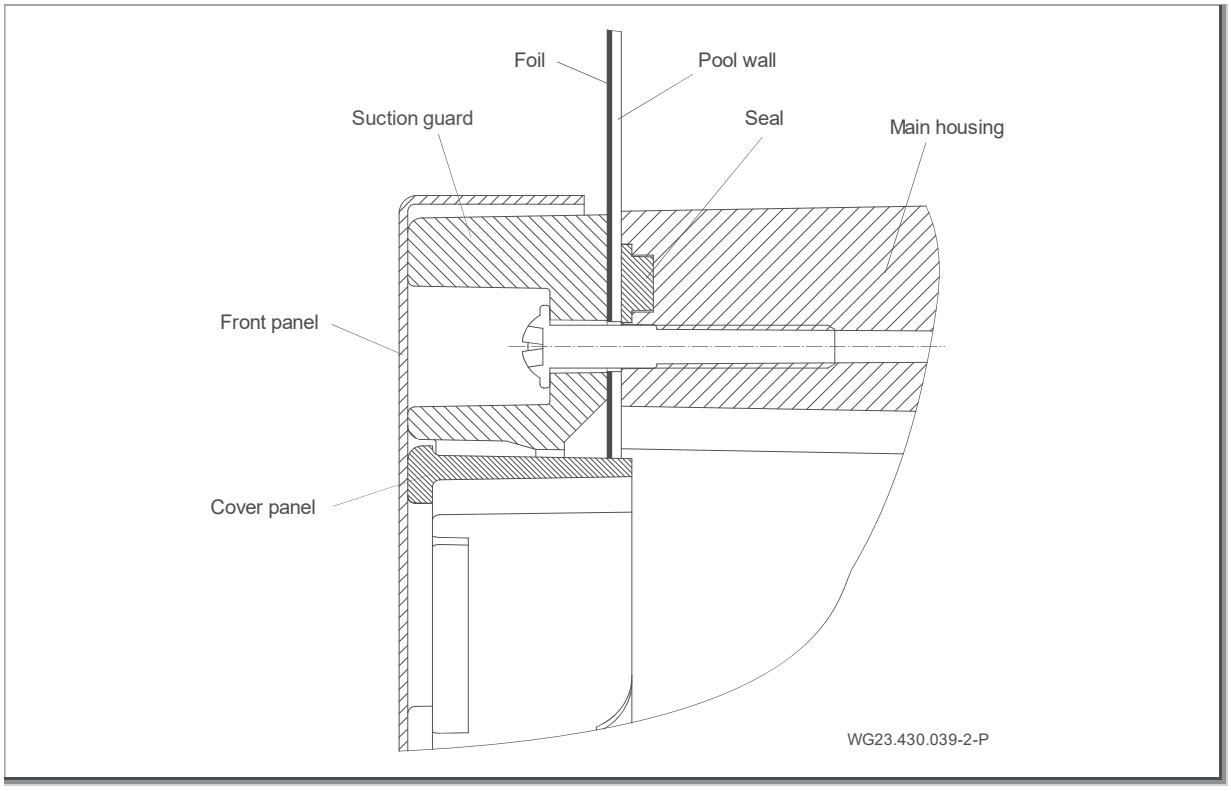



Fig. 9

### Stainless steel/plastic pool

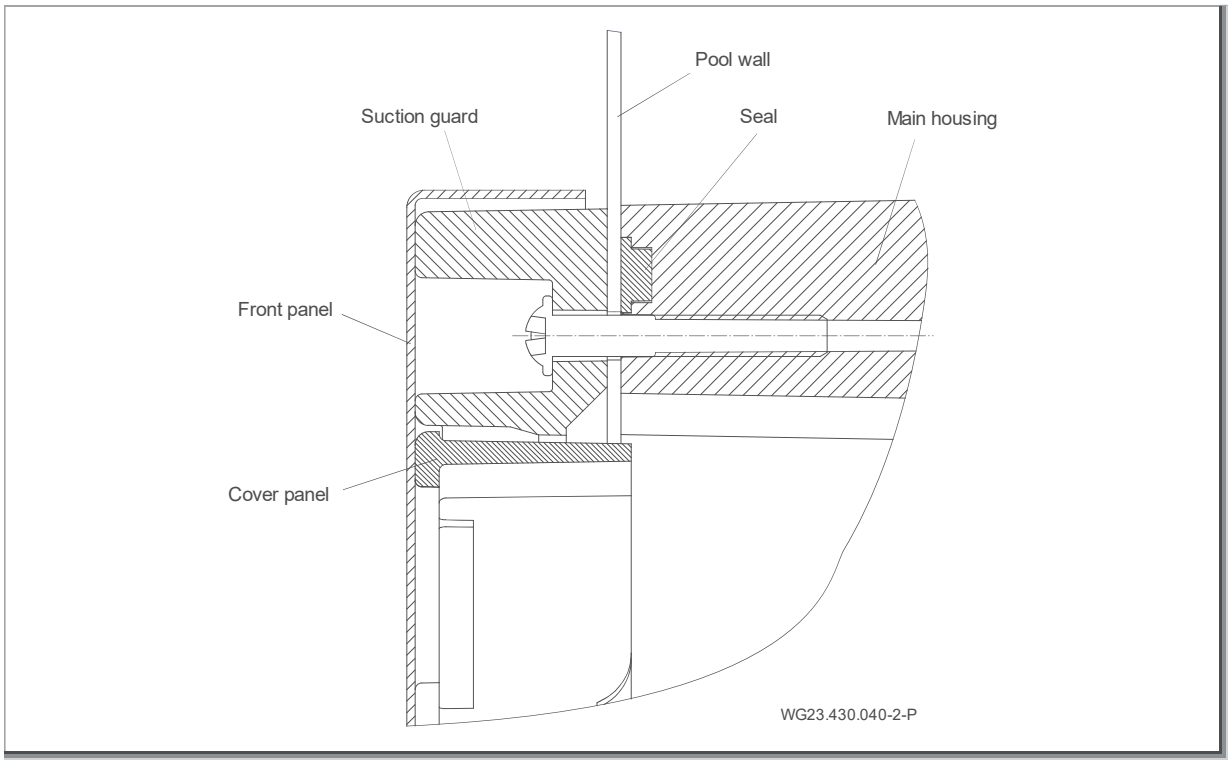



Fig. 10

### Pool cut-out for stainless steel/foil pools

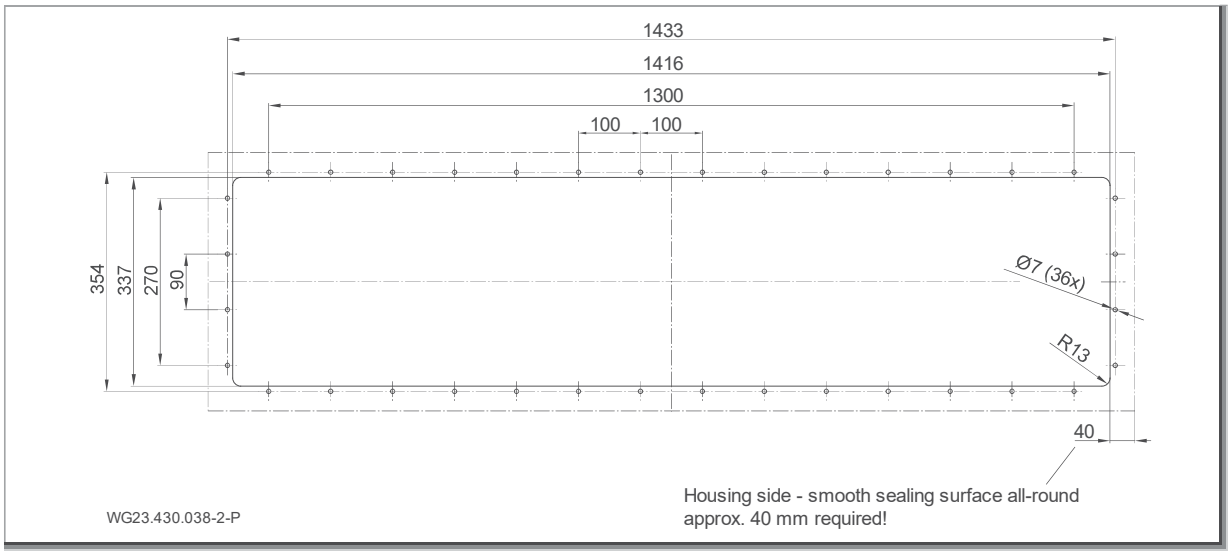



Fig. 11

### Installation of the housing in a stainless steel or plastic pool (b)

1. Installation depth: The centre of the installation housing (1) should be mounted 35 cm below the water level.
2. Drill fastening holes and make cut-out in the pool wall according to the drilling template.

**NOTICE**

For pools with a foil, it is recommended to reduce the rectangular cut-out all round to increase the distance from the holes. The overhanging foil can be stuck to the inside of the housing.

3. Clamp support slats (17) between the two overlaps of the inside of the housing.
4. Press in the foam rubber seal (11) without tension along the groove on the housing (1) by hand. Fix with a drop of instant glue on the floor side.
5. Align the installation housing (1) according to the label “OBEN/UP/ HAUT” to the drilled holes in the outer wall.
6. Screw the suction guard (5) to the housing (1) on the pool wall from the inside of the pool with 36 tapping screws (51) with a torque of 6 Nm.

**Installation diagram for installation in a foil/steel or plastic pool**

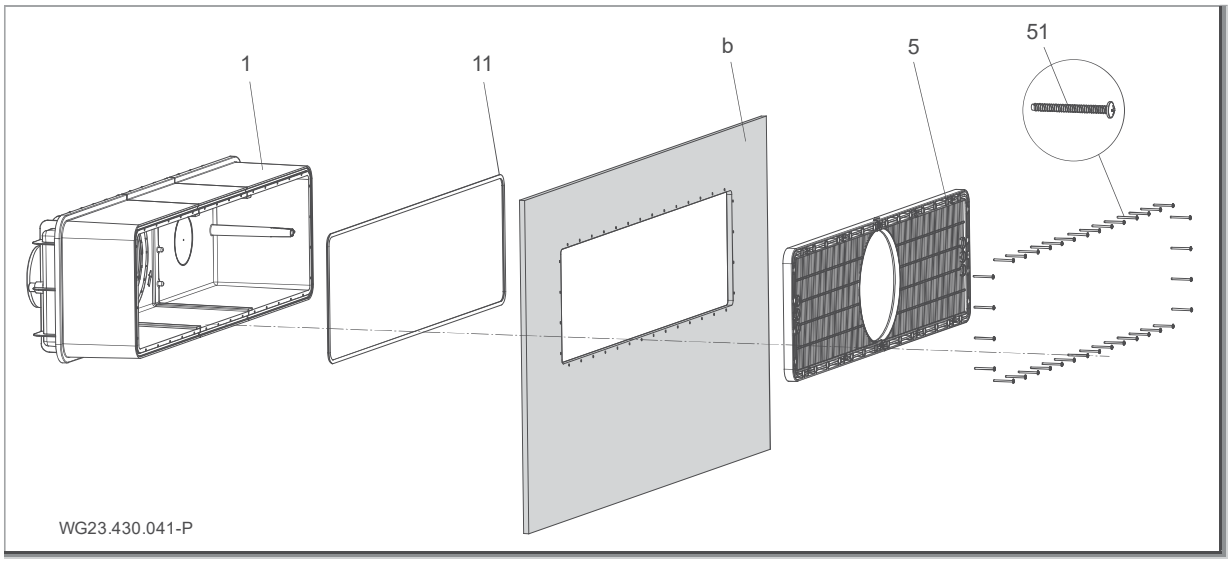



Fig. 12

### 5.2.3 Cable protective tube

1. Remove grease from the connection nozzle (d, see "Fig. 16" on page 21) on the plastic housing (1) and the connection socket of the cable protection tube (12) with PVC-U/ABS cleaner.
2. Coat both sides with PVC-U/ABS adhesive and then plug or stick together.

### 5.2.4 System shaft

The system must be installed in a shaft which borders the edge of the pool. The installation space must have perfect ventilation and sufficient ground drainage. There must be a possibility for fastening the frequency converter and the switch cabinet as well as the cable protection tube (above water level if possible). There must be a potential equalisation connection in the shaft. See "Fig. 17" on page 22.

There must be sufficient room for installation and removal of the motor and drive unit.

### 5.2.5 Electrical control

The terminal box for the countercurrent system must be accommodated in a dry room. The supply cables and system must be connected according to the enclosed circuit diagram. The pertinent regulations (VDE) must be observed. The Fi **must** be type “B”.

Start operation only with the terminal box and frequency converter closed!

Use the cables included. Details of the cables are shown in a separate overview diagram in chapter 5.4.

## 5.3 Final assembly (Qualified specialist)

**⚠ WARNING**

Risk of injury from sucking in/suction effect when the panel parts are not installed!

➔ All panel parts **must** be mounted.

All warranty and damage compensation rights will be voided for damages due to noncompliance or incorrect installation.

### 5.3.1 Installing the piezo buttons

1. Feed the three cables through the cylindrical guide of the suction guard (5) and the installation housing (1).
2. Press in the piezo buttons (64) with two mounted O-rings (65) each up to the stop. Where necessary, lubricate the O-ring to facilitate fitting.
3. Tighten the hexagon nut of the cable gland.

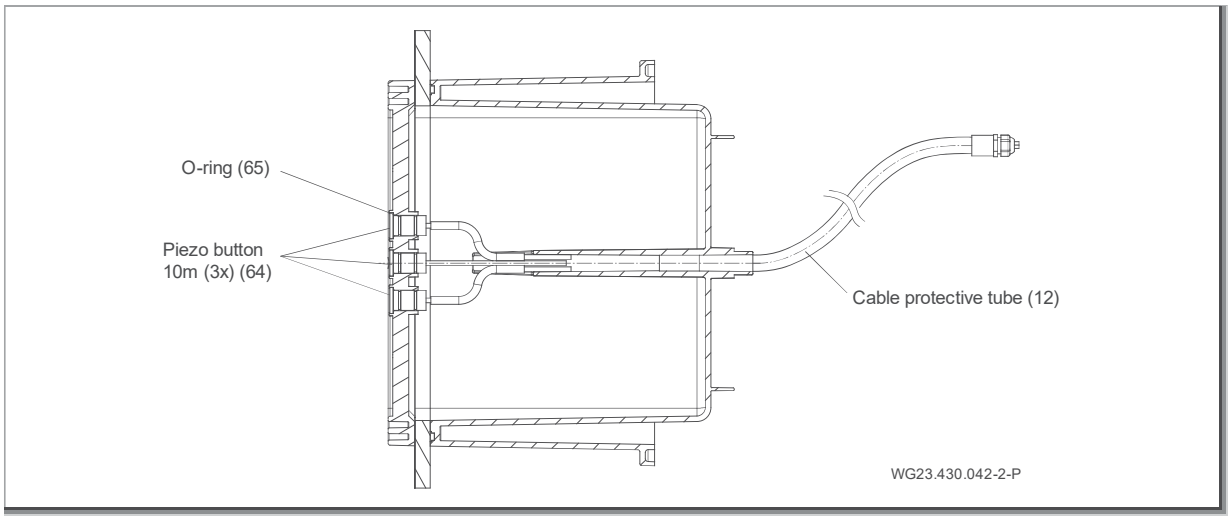



Fig. 13

### 5.3.2 Installing the nozzle unit

1. Insert the nozzle unit (4) with its 3 fastening domes into the cylindrical depression of the housing centring/flange centring.
2. Tighten the three tapping screws (6x40 (46)) with a torque of 6 Nm.

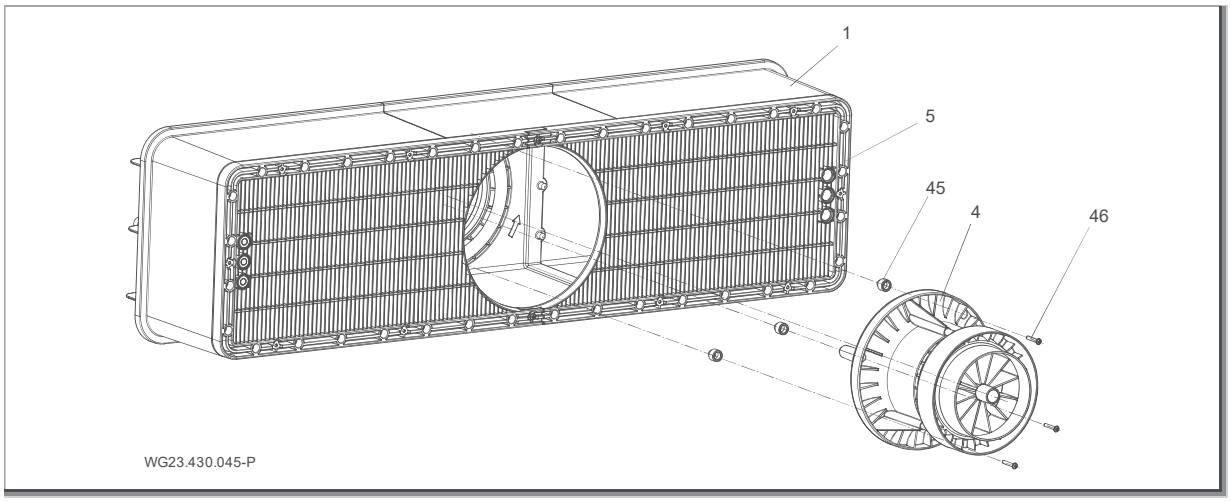



Fig. 14

**NOTICE**

Appropriate adapters (45) must be installed between the housing and the nozzle unit (4) for a pool wall thickness from 3.5 mm up to max. 27 mm.
The adapter height must be chosen so that the round panel (52) has no gap bigger than 8 mm from the maximally swivelled ball nozzle (42) in the installed state.

The following order kits must be used above a wall thickness of 7 mm:

| Wall thickness (mm) | Adapter type | Screw length (mm) | Order kit |
|---|---|---|---|
| 0 to 3.5 | - | 40 | - |
| above 3.5 to 7 | Washer 3.5 | 40 | - |
| above 7 to 11.5 | Washer 7 | 50 | 1 |
| above 11.5 to 14 | C | 50 | 1 |
| above 14 to 17.5 | D | 50 | 1 |
| above 17.5 to 21 | E | 60 | 2 |
| above 21 to 24 | F | 60 | 2 |
| above 24 to 27 | G | 60 | 2 |

### 5.3.3 Fitting the cover panel

1. Clip the cover panel (52) labelled “Top” into the suction guard (5).

### 5.3.4 Installing the stainless steel panel

1. Remove two fastening screws (6 x 22) from the suction guard (5).
2. Align the stainless steel panel (55) on the suction guard (5).
3. Tighten the 12 tapping screws 6 x 22 (56) with a torque of 6 Nm.

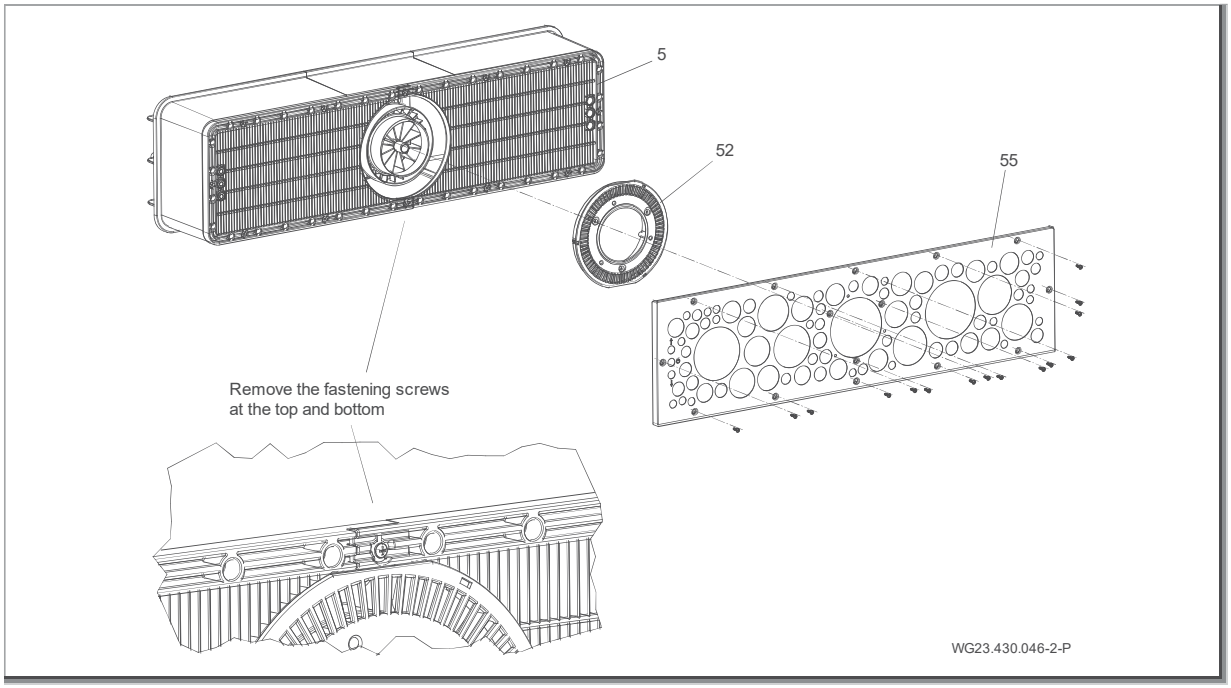



Fig. 15

### 5.3.5 Installing the drive unit

1. Pull the O-ring (36) onto the propeller unit (3).
2. Insert the propeller unit (3) centrally with the orientation pin in 6 o’clock position on the housing centring/flange centring.
3. Tighten 10 hexagon socket head tapping screws (7x48 (37)) with a torque of 8 Nm.

### 5.3.6 Installing the motor unit

1. Place the motor unit cpl. (2) on the centring of the seal housing (31) so that the motor plug is on the top.
2. Fix by tightening the 6 hexagon socket head tapping screws (7 x 48 (29)) with a torque of 9 Nm.

**⚠ CAUTION**

Risk of injury due to magnetic forces.

➔ Pay attention to this when installing/removing the motor unit!

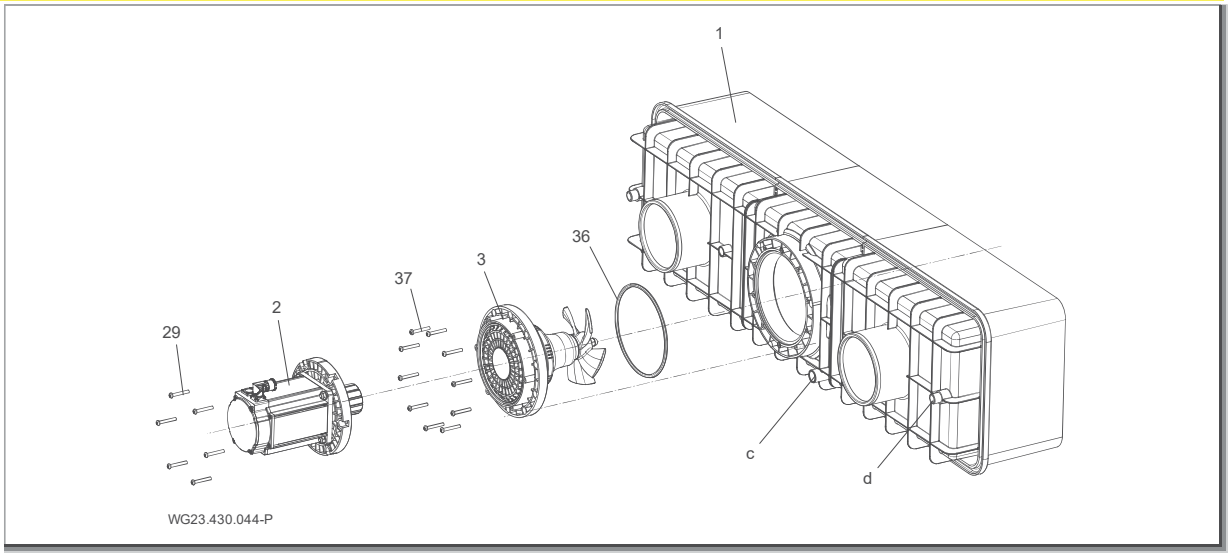



Fig. 16

### 5.3.7 Possibilities for using the connection nozzle (rear wall)

The connection nozzle (c) can be used for:

- active overwintering
- circulation, avoidance of accumulation of water in the installation housing
- emptying

### 5.3.8 Installation example

- Recom. shaft width min. 150 cm.
- Mount switchgear in dry room.
- Lay and fasten cable protective tube above the water level if possible.
- Aeration and ventilation to avoid condensation.

**NOTICE**

➔ Precedence should be given to separate laying of control and power cables (electrical safety and electromagnetic compatibility).

➔ Where cables need to be laid parallel to each other, select as large a spacing as possible **(min. 50 cm)**.

➔ Control cables and piezo button cables should not cross any power cables if possible. Right-angled crossing is recommended where this cannot be avoided.

➔ Control cables/piezo button cables **must** be cut to length and should not be rolled up or remain loosely unrolled.

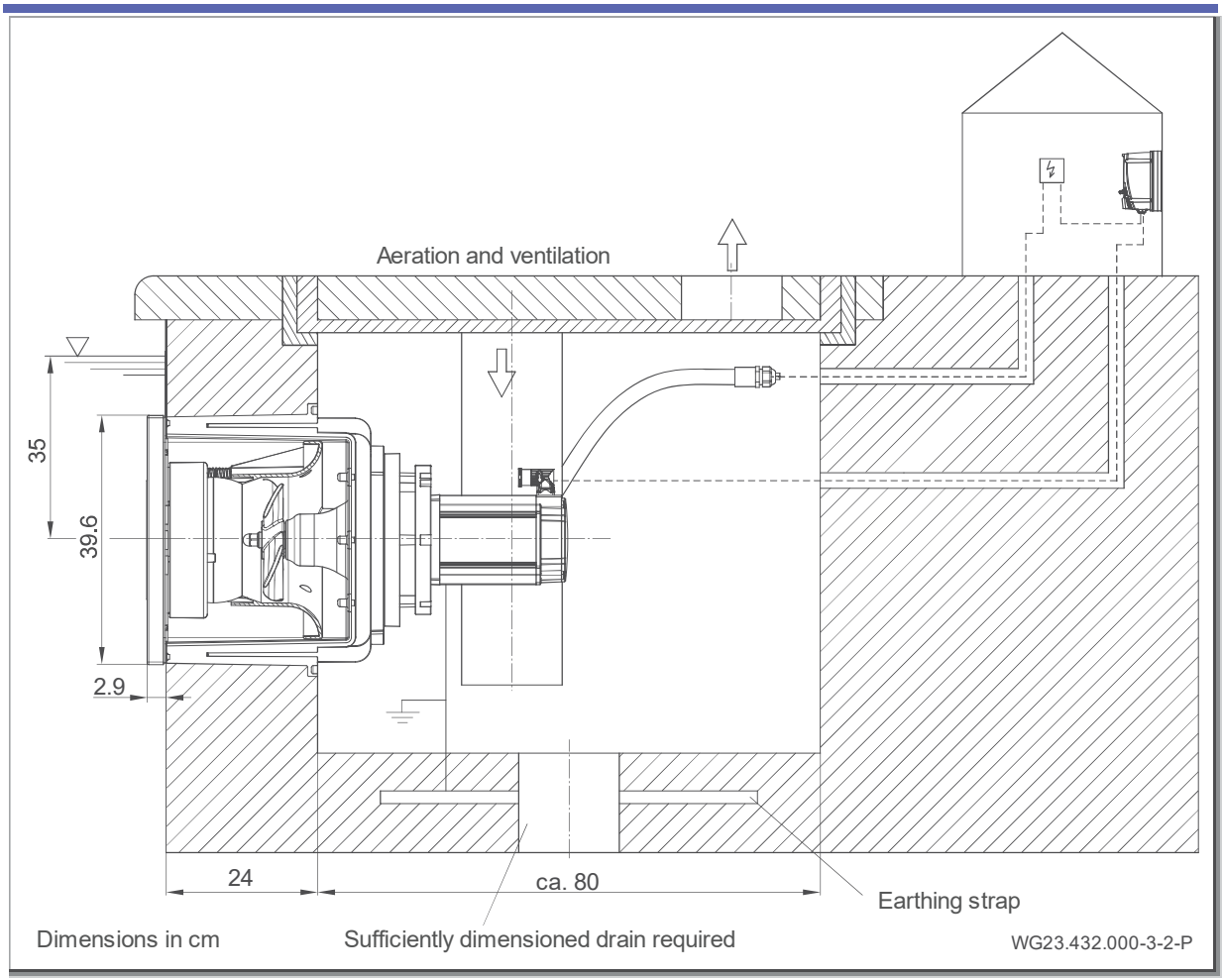



Fig. 17

## 5.4 Electrical connection (Qualified specialist)

**⚠ WARNING**

Mortal danger due to incorrect electrical connection!

➔ The PTC in the motor must be connected to the frequency converter as intended!
➔ It must not be bridged or manipulated in any other way.
➔ This applies equally in commissioning or repair situations.
➔ The manufacturer must be contacted for integration of other safety switches in the stop circuit of the frequency converter (FC-Trip).

**⚠ WARNING**

Risk of electric shock from residual charge of the frequency converter capacitors!

➔ Work may be carried out on the load current circuit after switching off and waiting 10 minutes.

**⚠ WARNING**

Risk of electric shock due to incorrect connections!

➔ Electrical connections must always be carried out by authorised specialists.
➔ Observe VDE and utility company regulations.
➔ Install system for swimming pools and their protection areas in accordance with DIN VDE 0100-702.

**⚠ WARNING**

Risk of electric shock due to voltage on the housing!

➔ An overload switch which is set correctly must be installed for pumps with three-phase motors without motor protection. In doing so, observe the values on the motor name plate.

➔ Install a disconnecting device with at least a 3 mm contact gap per pole to interrupt the power supply.
➔ Protect the circuit with a fault current circuit breaker, all current-sensitive type B, rated error current $I_{FN} \leq 30$ mA.
➔ Only use suitable pipe types according to regional regulations.
➔ Adjust minimum diameter of the electrical pipes to accommodate the motor output and pipe length.
➔ Do not bend or squash the pipes.
➔ If hazardous situations can occur, provide an emergency off switch according to DIN EN 809. The builder/operator must make a decision according to this standard.
➔ The included cables are not approved for laying in the ground. The conduit FFKuS-EM-F 25 or, for easier pull-through possibility, FFKuS-EM-F 32 is recommended. These should also be used for casting in concrete.

### 5.4.1 Electrical connection of the countercurrent system

➔ The circuit is partially wired ready for connection. The connections that are still missing must be made by the customer.
➔ The frequency converter may only be mounted at the available bore holes.

**On-site connection:**

- Fault current circuit breaker $I_{FN} \leq 30$ mA, all current-sensitive type B
- Lines must be protected and laid in accordance with the pertinent standards and local conditions (line length, ambient temperature, type of laying, etc.). These are DIN VDE 0100 Part 400 and DIN VDE 0100 Part 500 i.a. The rated flow of the pump must also be observed.
- We recommend the use of an automatic circuit breaker with a tripping characteristic for higher starting currents (motors, pumps).

**NOTICE**

Cables should be arranged so that electromagnetic interference is minimised and requirements for separation from energised wiring and the control line are observed.

- Shot-circuit switching capability $I_{CW} \leq 6$ kA
- Emergency stop switch, all-pole-switching, with 0 and 1 labelling

- Cable power supply distributor (house connection) to the terminal box: H07RN-F, 5G 2.5 (the cross-section depends on the type of laying)
- Cable terminal box to frequency converter (on/off switch): H07RN-F, 4G 2.5 (the cross-section depends on the type of laying)

➔ An additional protection potential equalisation, connected to the earth strap, must be provided on the motor for potential equalisation.

See the wiring diagrams for additional information. The parts named above are not part of the scope of supply and must be provided by the customer when installing the system.

### 5.4.2 Terminal box wall mounting

The terminal box should only be mounted on the wall using the holes provided for this purpose. Securing by other means is not permitted.

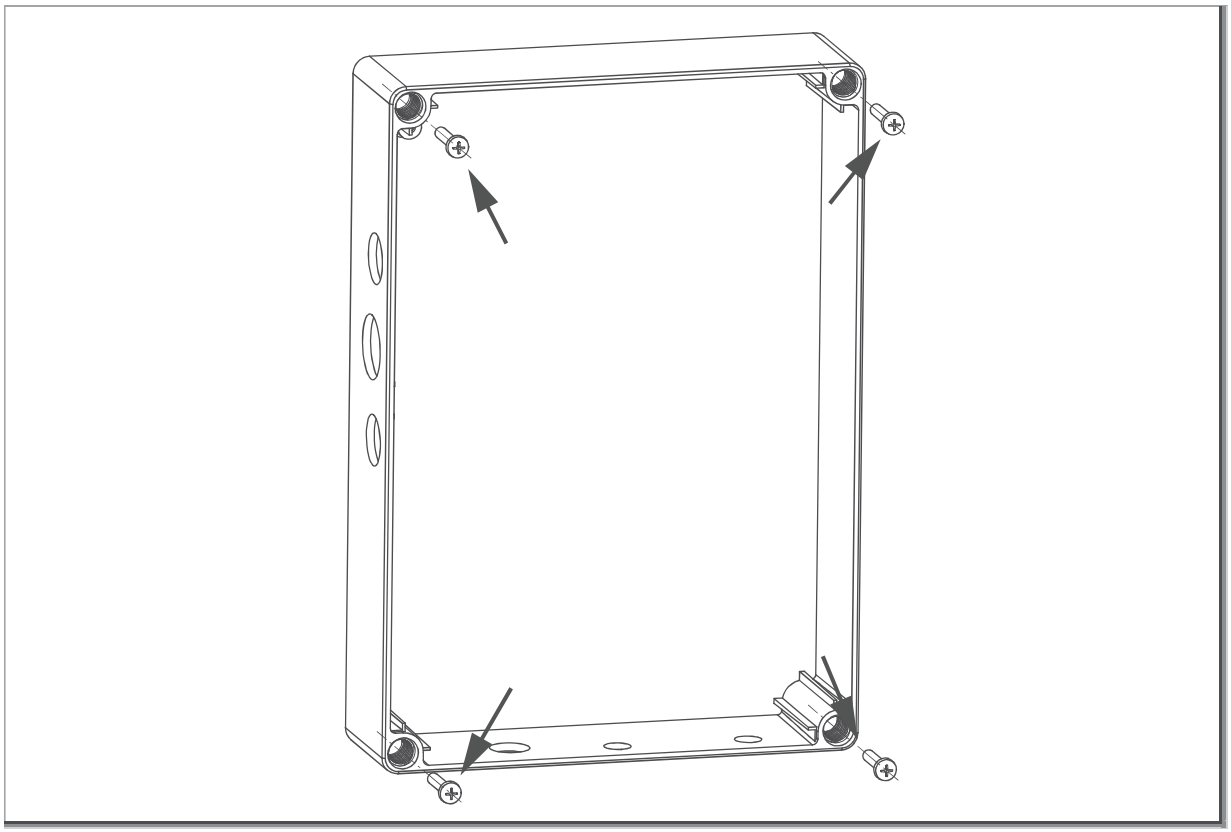


Fig. 18

### 5.4.3 Connection diagram

The diagram below shows an overview of how all the connections are to be wired. The on-site wiring of the motor cable and control cable is explained in separate chapters.

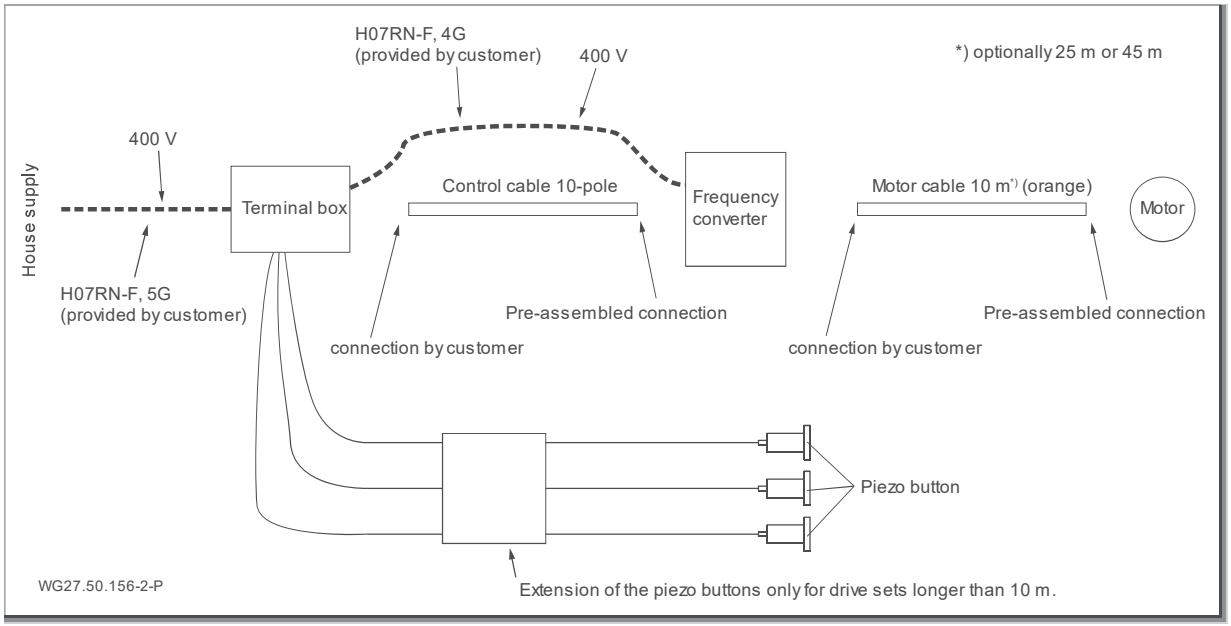



Fig. 19

### 5.4.4 Preparation of the control cable

1. Shorten the control cable to the appropriate length (customer end).
2. Strip the grey control cable approx. 15 cm.
3. Carefully separate the shield.
4. Fit the wire end ferrules to the wires.
5. Wire according to the circuit diagram.

### 5.4.5 Control cable wiring diagram

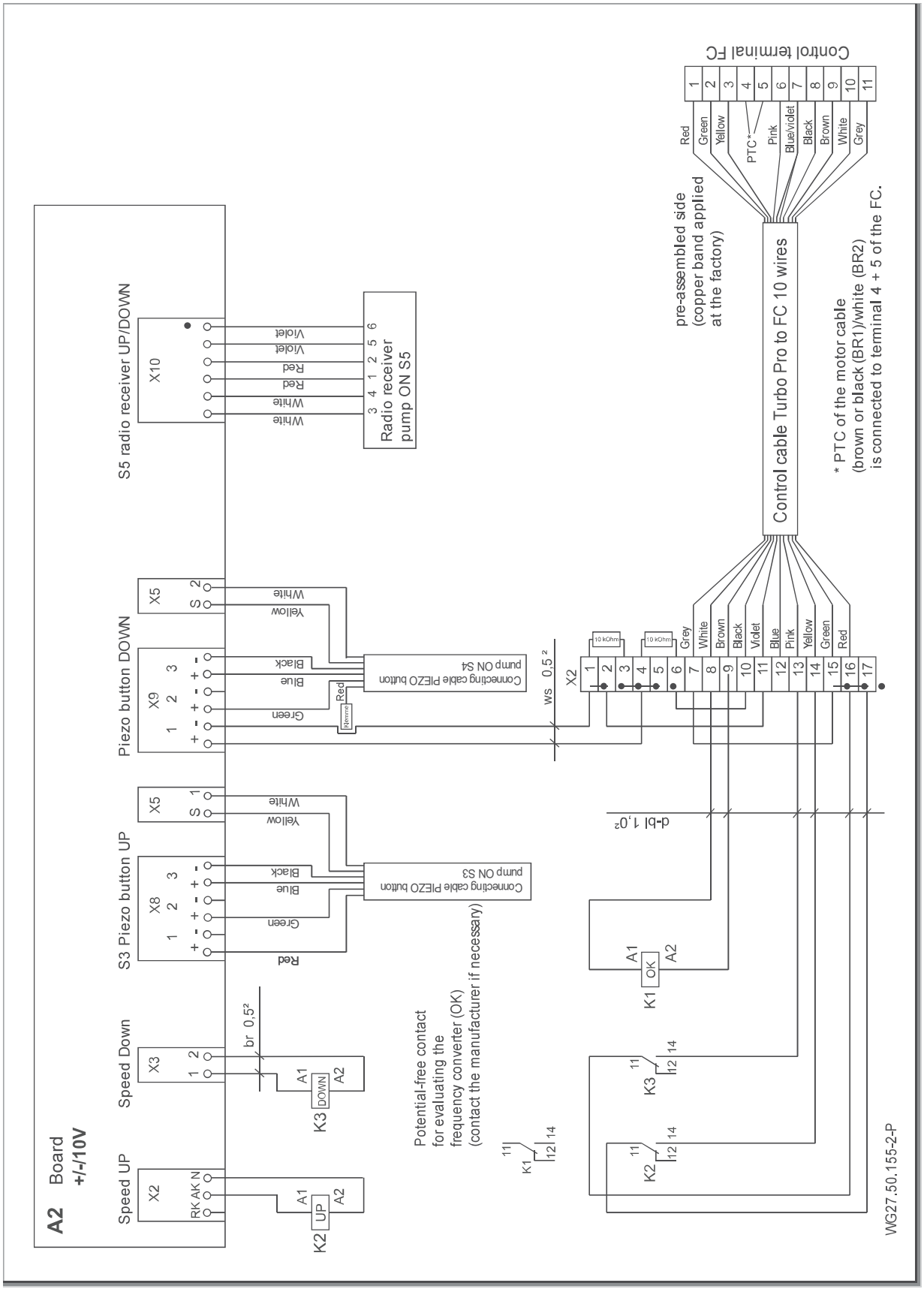



Fig. 20

### 5.4.6 Preparation of the motor cable

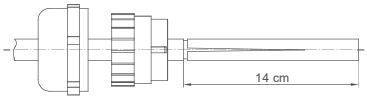
**⚠ WARNING**

Electric shock when working on the motor!

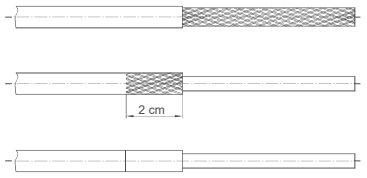
➔ Make sure that the motor is voltage-free and that the cables are disconnected from the power source before beginning installation.

➔ Never connect or disconnect cables as long as the circuit is closed.

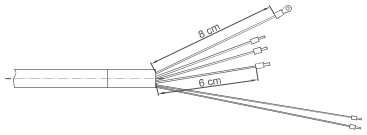
The motor cable must be prepared by the following steps:



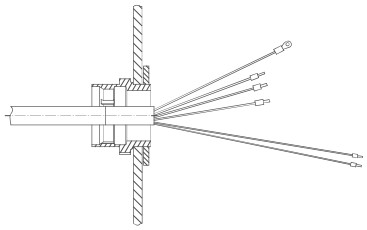

1. Shorten the cable if necessary (customer end).
2. Plug the cap and the plastic inlay of the EMC gland onto the cable. The lugs on the plastic part must face towards the end of the cable.
3. The end of the cable must be stripped over a length of 14 cm. To strip the sheath, it must be slit carefully lengthwise.




4. Open the shield around the wires and fold back. Cut off the shield to a length of 2 cm.
5. Remove the transparent plastic sheath of the wires.
6. The enclosed copper band must be stuck all round the 2 cm shield so that none of the shield is visible any more.

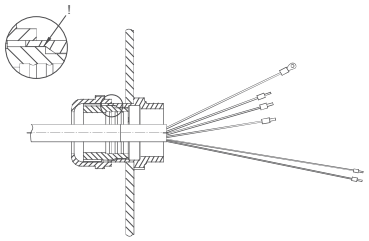



7. Shorten the 3 black wires (U, V, W) to 6 cm. Shorten the earth wire (yellow/green) to 8 cm.
8. Remove film, sheath, aluminium foil and shield from the two thin wires. The length is left at 14 cm.
9. Fit a wire end ferrule (blue) to the end of each wire U, V, W. Fit a ring cable shoe to the earth wire. Fit red wire end ferrules to the thin wires (brown or black (BR1)/white (BR2)). The ring cable shoe is included in the scope of supply.
10. Cut off the cable strain relief.



11. The rest of the EMC gland must be screwed into the feed-through plate on the frequency converter. Align the claws of the enclosed lock nut to the feed-through plate. Do not remove the feed-through plate.
12. The wires U, V, W must be inserted into the plug. Observe the labelling. The plug contacts must be opened first if necessary.
13. Fasten the earthing cable with the ring cable shoe in the FC with a screw. The screw must be loosened first.
14. The wires for the PTC (brown or black (BR1)/white (BR2)) must be connected according to the circuit diagram. See "Fig. 20" on page 25.

**Note:** The earthing cable on the customer side must also have a ring cable shoe.



15. The EMC screw-type gland must be closed and tightened after completing the wiring. Make sure that the lugs on the plastic part grip into the groove. Only then is the position of the plastic part interlocked.

- Remove the transport cap and O-ring from the motor plug.
- The motor plug rotates.
- The cable and motor are connected by a bayonet catch.

Different cable batches can mean that the end of the motor cable has the following label or colour.

| Batch 1 | Batch 2 | Batch 3 |
|---|---|---|
| green/yellow | green/yellow | green/yellow |
| U | L1 | 1 |
| V | L2 | 2 |
| W | L3 | 3 |
| brown | black | black |
| white | white | white |

### 5.4.7 Wiring diagram 3-phase 400 V 50 Hz

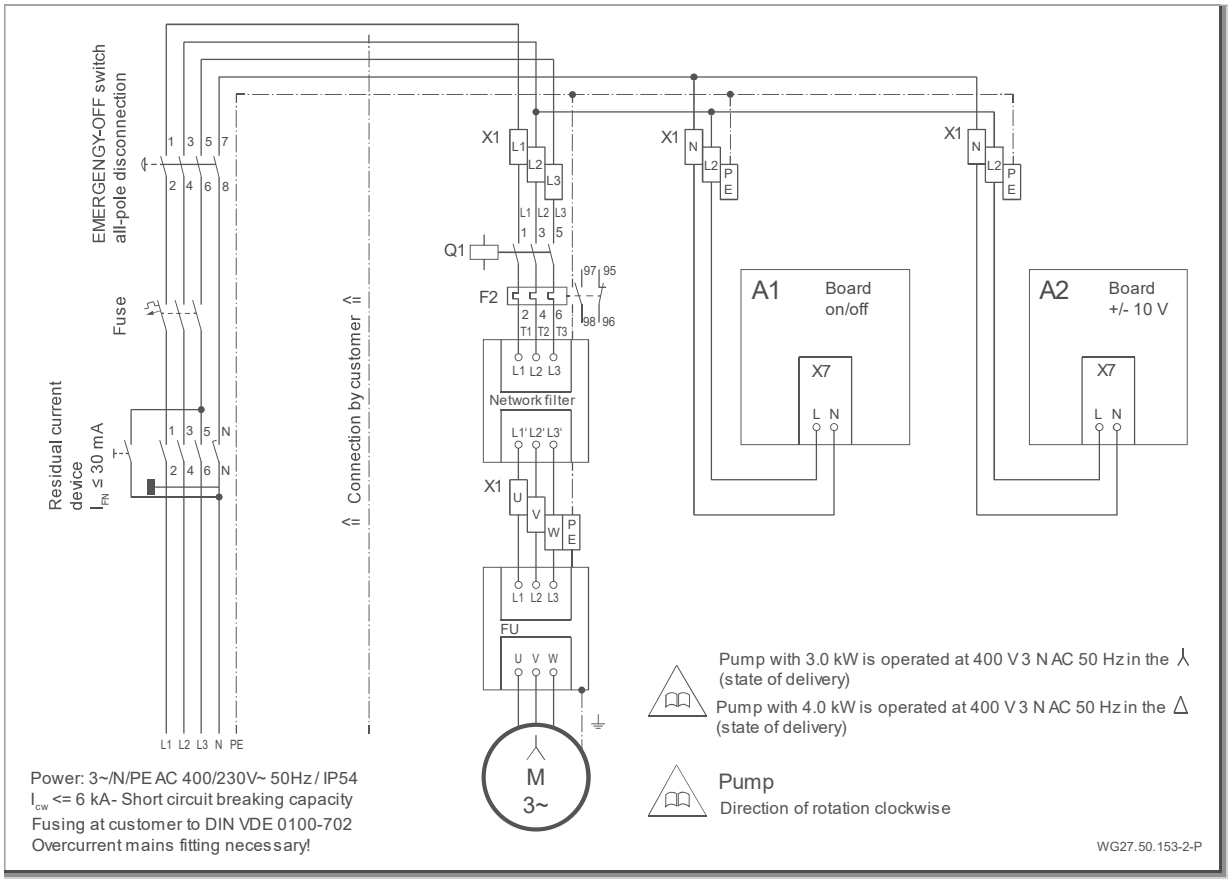



Fig. 21

### 5.4.8 On/off board circuit diagram

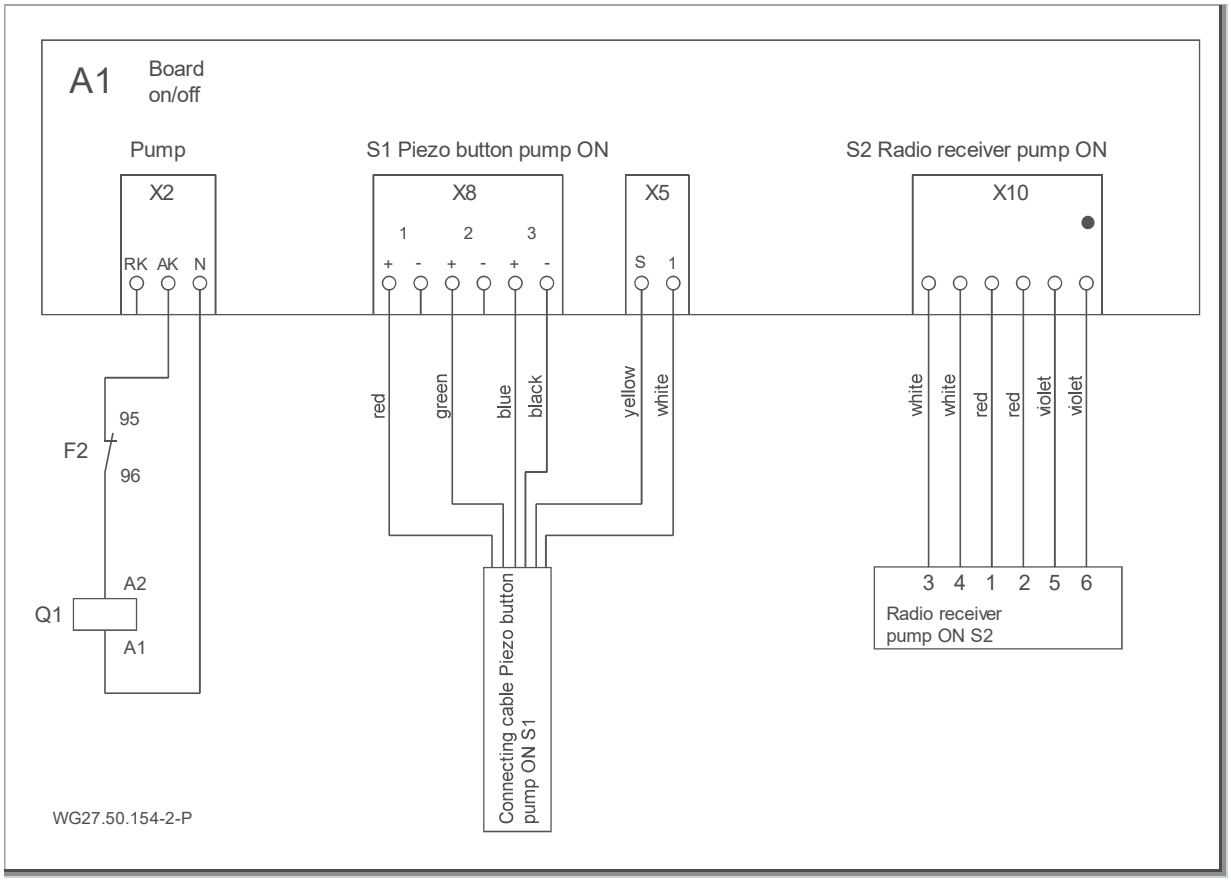



Fig. 22

### 5.4.9 Terminal box connections

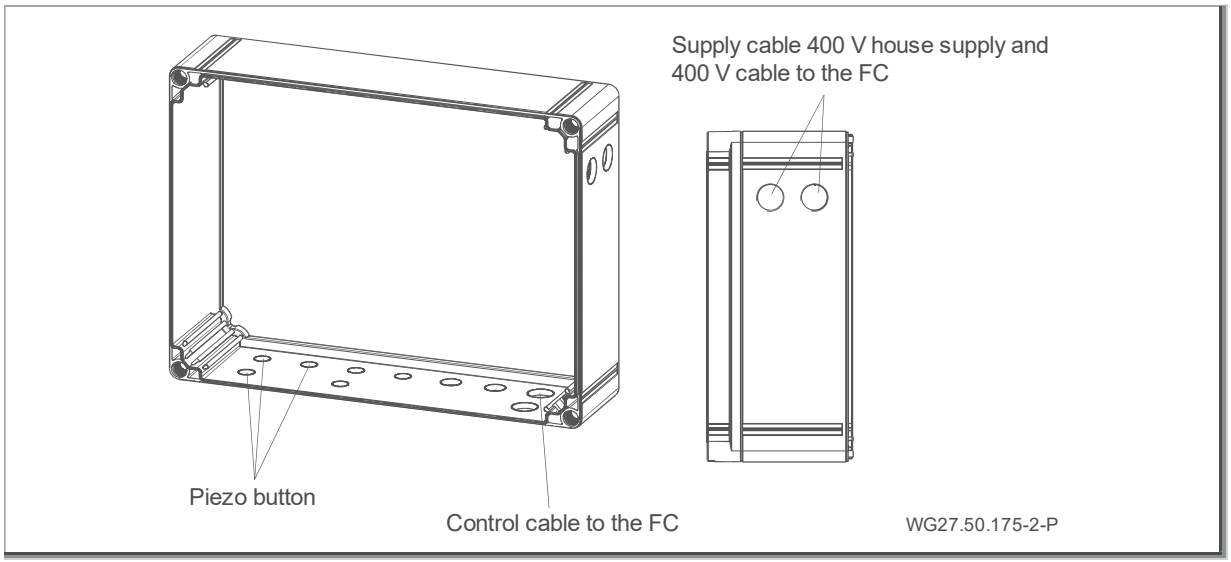
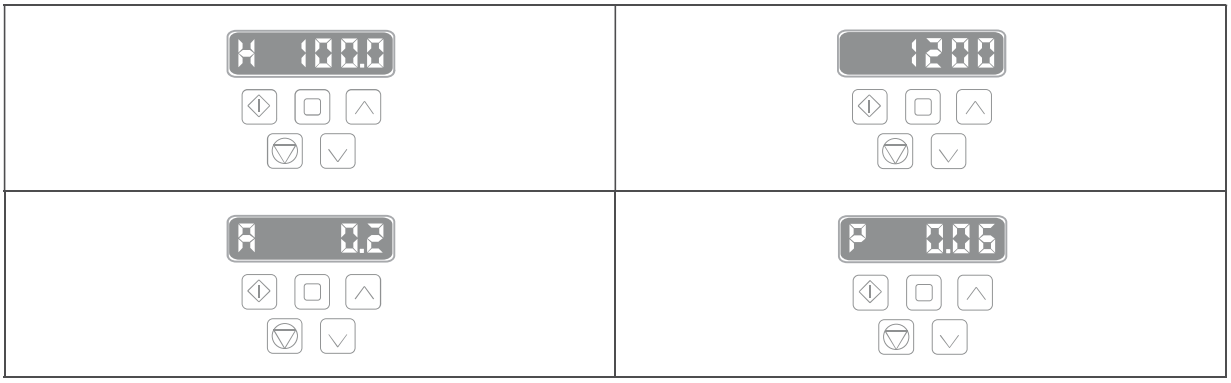



Fig. 23

### 5.4.10 Displays on the frequency converter




The standard setting on the display is the output frequency. By pressing the middle button on the top row, the display can be switched to speed, motor current strength and motor power.
The speed can be set manually with the “up” and “down” arrow keys.
All other keys are locked by a code. The frequency converter is operated either by the piezo buttons on the system or on the remote control unit.

### 5.4.11 Segment display, green and orange LED, fuse

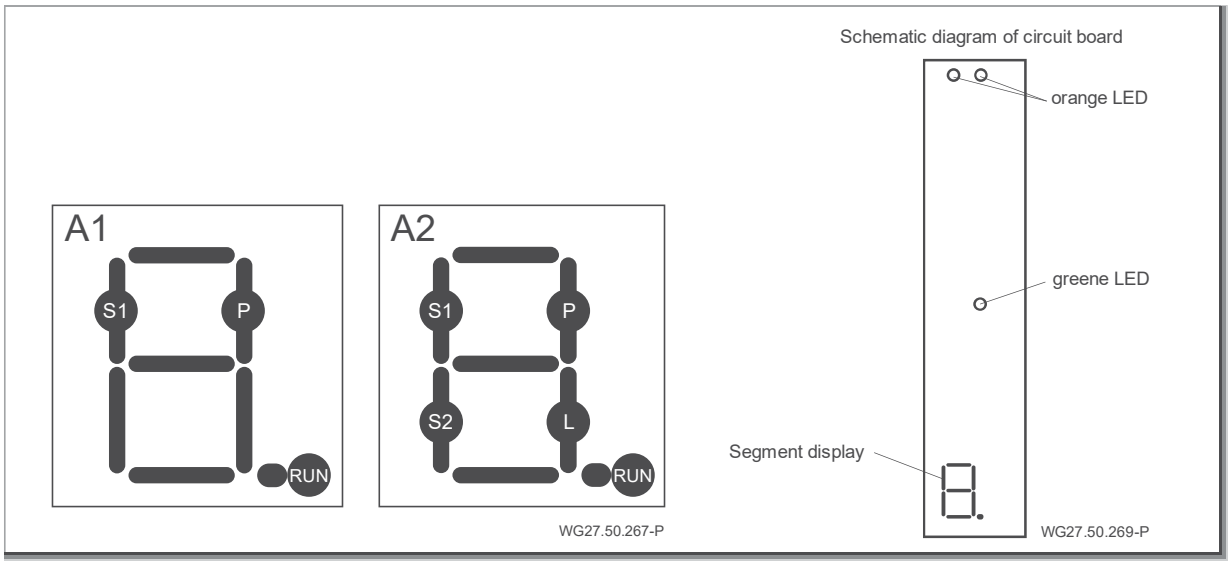



Fig. 24

*__RUN__* flashes when the microprocessor is working.

**Circuit board A1**
*__S1__* lights up when the pump button is pressed (pump on/off).
*__P__* lights up, the pump should now be working and the pump contactor should be energised.

**Circuit board A2**
***S1*** lights up when the piezo button is pressed ‘higher’.
*__S2__* lights up when the piezo button is pressed ‘lower’.
*__P__* flashes briefly, at ‘high’ level.
*__L__* flashes briefly, at ‘low’ level.

**Green and orange LEDs on the circuit board**
***green LED*** lights up: Power supply present in the circuit board [Volt].
***orange LED*** lights up: Motor protection has triggered (over current).
➔ Check the motor protection settings.

**Circuit board fuse**
Replaceable fuse: 3.15 A T
The fuse only needs replacing if the green LED [V] is not lit up.

### 5.4.12 DIP switch settings

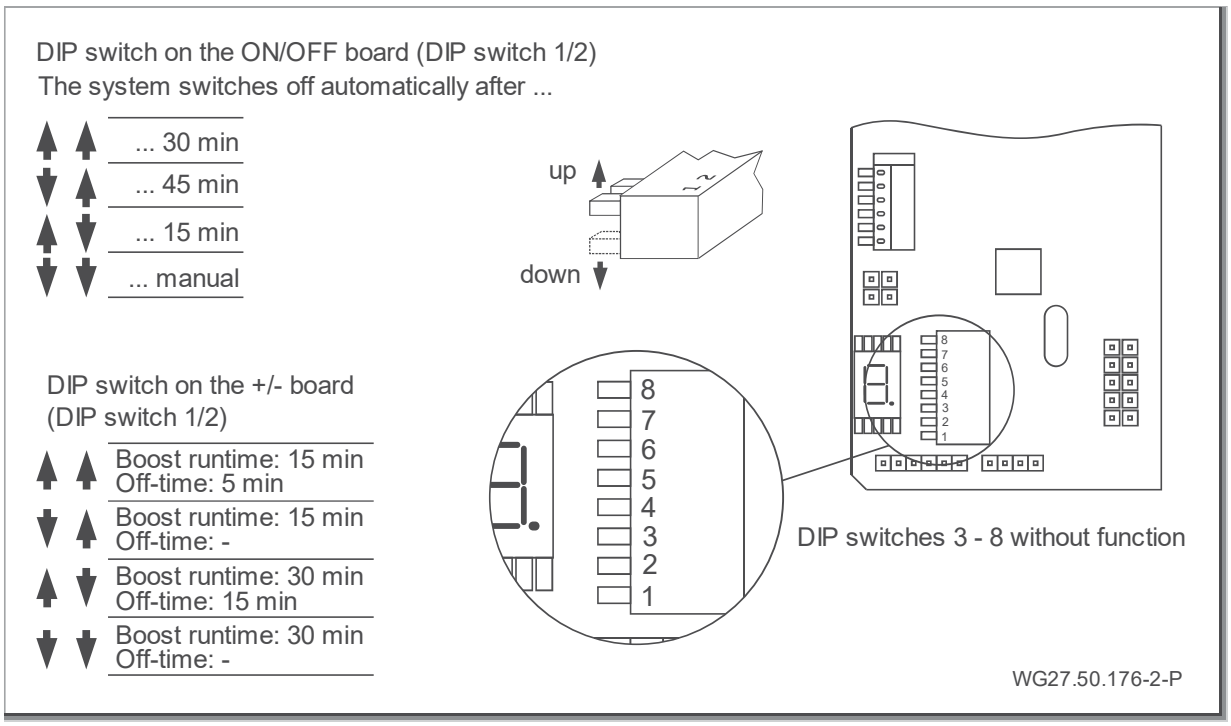



Fig. 25

## 5.5 Dismantling

The system is dismantled in reverse order of the previously described respective units.

# 6 Commissioning/Decommissioning

## 6.1 Commissioning

**NOTICE**

Damage to the drive (sliding bearing) due to dry running and overheating!

➔ Make sure that the system is always operated 350 mm from the system centre under water.

After longer periods at standstill, the drive unit must be checked for smooth action in the off and voltage-free state.

### 6.1.1 Switching on the system

**⚠ WARNING**

Danger of sucking in with wrong rotation direction! The water current must move from the middle outflow nozzle (42) towards the centre of the pool!

➔ No persons may be directly in front of the outflow nozzle!

➔ In case of incorrect rotation direction, switch off the system immediately and check the connections of the motor or the orange cable (check wire labelling) according to the circuit diagram specifications and connect correctly.

The motor can be switched on by the preceding frequency converter (61) directly on the operating panel (55) at the piezo buttons (64) in the pool or with the remote control unit (66).

## 6.2 Operation

### 6.2.1 Switching on/off

The system can be switched on and off with the remote control unit (66) or by pressing the middle piezo button (64) installed in the panel.

The button lights “blue” in the off state and “red” in the on state.

The turbine starts up with a delay of approx. 3 seconds when switching on.

A medium volume flow of 1200 rpm is set here (basic setting).

### 6.2.2 Volume regulation

**⚠ WARNING**

Risk of damage to health!

➔ Keep a safe distance from the current nozzle (ball nozzle (42)).

The volume can be regulated by pressing the upper and lower piezo buttons (64) installed in the panel (55) or by the remote control unit (66).

| **Panel** | |
|---|---|
| Arrow up | Increase volume flow |
| Arrow down | Reduce volume flow |

| **Remote control** | |
|---|---|
| + | Increase volume flow |
| - | Reduce volume flow |

The system can be controlled over a speed range from 750 rpm to 1650 rpm. The individual power stages are additionally indicated visually by changing colours on the buttons.

| | | |
|---|---|---|
|  | yellow flashing<br>yellow<br>violet<br>green | 1650 rpm<br>1500 rpm<br>1350 rpm<br>1200 rpm |
|  | blue<br>red | System off<br>System on |
|  | green<br>turquoise<br>blue<br>blue flashing | 1200 rpm<br>1050 rpm<br>900 rpm<br>750 rpm |

In the boost position (max. volume flow; speed 1650 rpm) the volume regulation automatically switches back one stage after 15 minutes operating time (safety setting, then off-time).

### 6.2.3 Ball nozzle

The nozzle (42) alignment can be set using the pipe Ø25 included in the scope of supply. The direction of the ball nozzle is individually adjustable. The nozzle (42) must usually be set horizontally.

If it is stiff, the nozzle (42) can be loosened and adjusted by undoing the three Phillips tapping screws (46) with a suitable screwdriver. Insert the Phillips screwdriver through the respective guide hole on the stainless steel panel (3x) and push through to the screw.

## 6.3 Shutting down

1. Switch off the system and disconnect from the mains.
2. Lower the water level in the swimming pool to the lower edge of the panel.

### 6.3.1 Wintering over

For outdoor countercurrent systems which could be endangered by frost during the winter.

**Active overwintering:**

Formation of ice can be prevented by circulating the water by connecting a filter pump to the nozzle (c).

**Passive overwintering:**

1. Lower the water level at least to the lower edge of the panel.
2. Pull out the complete drive unit (including the motor) after loosening the 10 tapping screws (37) and store in a dry room.
3. It is also recommended to remove the stainless steel panel (55) to protect it from getting dirty during the winter months.

# 7 Faults

**NOTICE**

The magnet-coupled drive unit is mounted on slide bearings. When the plain bearing is run dry it creates warmth and both the plain bearing and pump parts are damaged.

➔ Ensure that the pump/unit is always filled with the pump media. This also applies to checking the rotation direction.

## 7.1 Overview

**Problem:** Motor does not start

| Possible cause | Solution |
|---|---|
| Error protection device has tripped. | ➔ Switch the circuit breaker back on.<br>➔ Have it checked by an electrician. |
| Frequency converter not connected correctly. | ➔ Plug the connection correctly (bayonet catch). |

**Problem:** Piezo button does not light

| Possible cause | Solution |
|---|---|
| Cable wired incorrectly. | ➔ Check and set correctly. |
| Sensor defective. | ➔ Check and replace if necessary. |

**Problem:** Radio transmitter does not work

| Possible cause | Solution |
|---|---|
| Battery inserted incorrectly or dead. | ➔ Insert battery the right way round.<br>➔ Replace battery. |
| Transmitter immersed in water for too long. | ➔ Remove batteries and dry the transmitter at max. 40 °C.<br>➔ Replace batteries if necessary. |

**Problem:** Fuse in the house distributor trips

| Possible cause | Solution |
|---|---|
| Wrong or fast fuse installed. | ➔ Check connections.<br>➔ Use 16 A slow-blow fuse. |

**Problem:** Motor deactivated by winding protective contact

| Possible cause | Solution |
|---|---|
| No or poor venting in the installation shaft. | ➔ Let the motor cool down for about 30 minutes. |
| Too high ambient temperature | ➔ Improve ventilation with supply and exhaust air (chimney effect). |
| Too long in operation at max. speed. | ➔ Adapt operating time. |

**Problem:** Wrong rotation direction of the turbine

| Possible cause | Solution |
|---|---|
| Wiring not according to circuit diagram. | ➔ Have it checked by an electrician. |

**Problem:** Magnetic coupling is disengaged

| Possible cause | Solution |
|---|---|
| Damage to the magnet unit or plain bearing. | ➔ Contact customer services. |
| Impeller is blocked. | ➔ Clean interior parts. |

**Problem:** Error in the frequency converter

| Possible cause | Solution |
|---|---|
| ➔ Observe the manufacturer’s operating instructions. | |

# 8 Maintenance

**NOTICE**

Disconnect the system from the mains before carrying out maintenance work.

| When? | What? |
|---|---|
| Regularly | ➔ Clear foreign bodies from suction openings and propeller.<br>➔ Turn the propeller wheel (after longer standstill)<br>➔ Re-tighten screw connections. |

➔ After completing all maintenance work, perform all necessary measures for start-up. See point 6.1 on page 31.

Due to the various water components the parts made of stainless steel have to be cleaned periodically to avoid possible corrosive damage.

## 8.1 Warranty

The warranty includes the devices delivered and all components. However natural wear and tear (DIN 3151/DIN-EN 13306) on all turning and dynamically loaded components, including electronic components under tension, is not covered under the warranty.

Failure to comply with the safety instructions may void the warranty.

### 8.1.1 Safety-relevant spare parts

- Suction guards
- Nozzle housing

## 8.2 Service addresses

Service addresses can be found on our website www.speck-pumps.com.

# 9 Disposal

➔ At the end of its service life, the pump/unit or individual components must be disposed of correctly. Disposal in the household waste is not permitted!

➔ Dispose of the packaging materials in the household waste in accordance with the local regulations.

# 10 Technical Data

| | |
|---|---|
| Volume flow rate [m³/h] | 150-350 |
| Power consumption $P_1$ [kW] 3~ | 3.60 |
| Power output $P_2$ [kW] 3~ | 3.00 |
| Number of nozzles Ø 172 mm | 1 |
| Outflow speed [m/s] | 1.80-4.10 |
| Nozzle swivellable to all sides [degrees] | ± 5 |
| Net weight [kg] | 51.50 |

## 10.1 Dimensional drawing

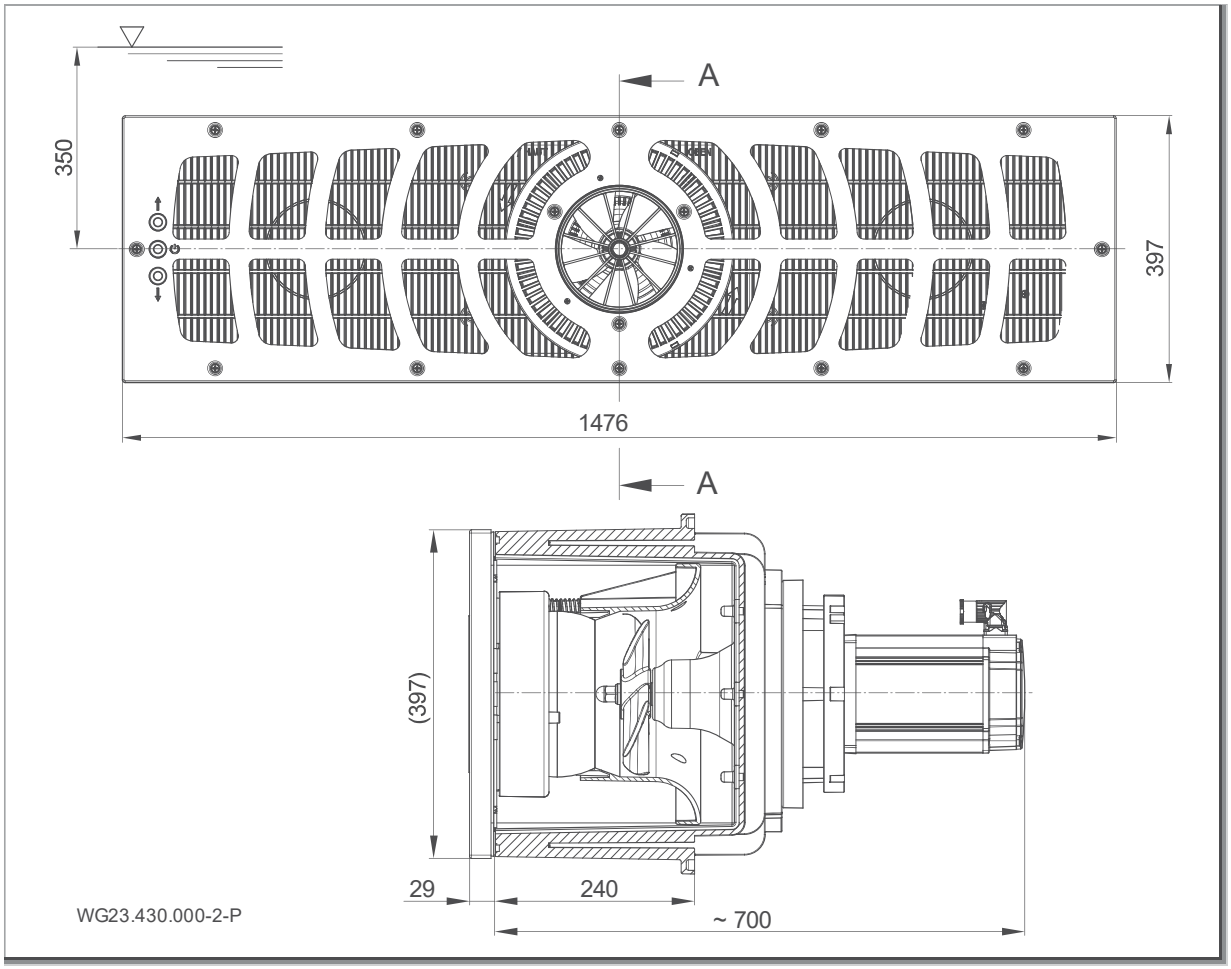



Fig. 26

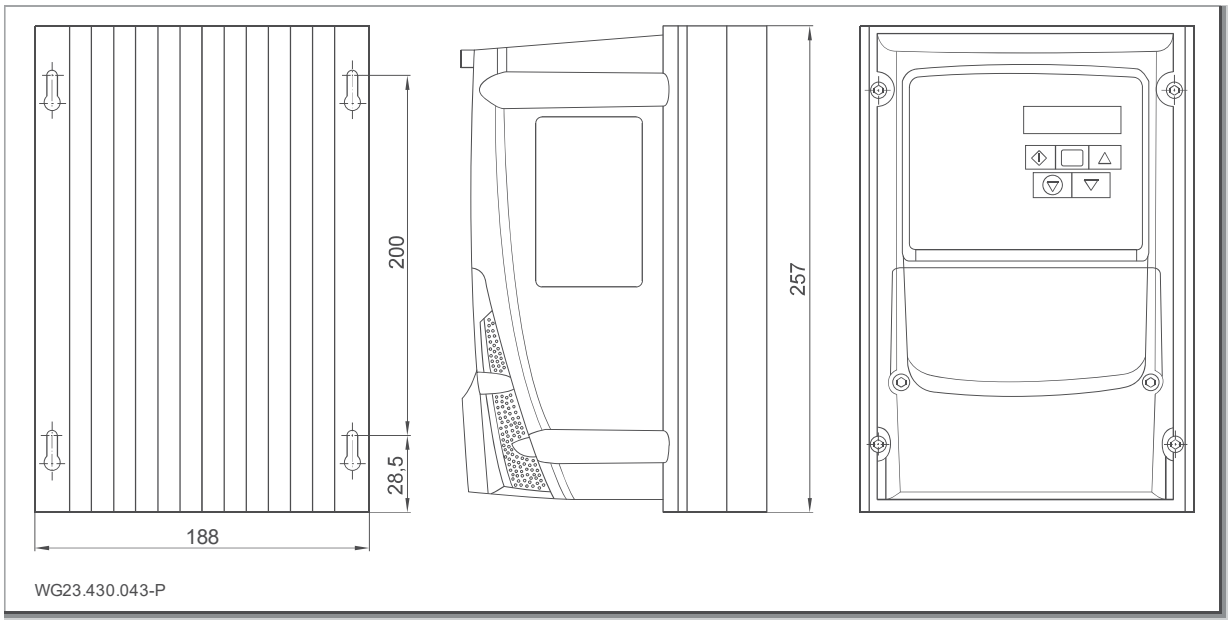



Fig. 27

## 10.2 Exploded drawing

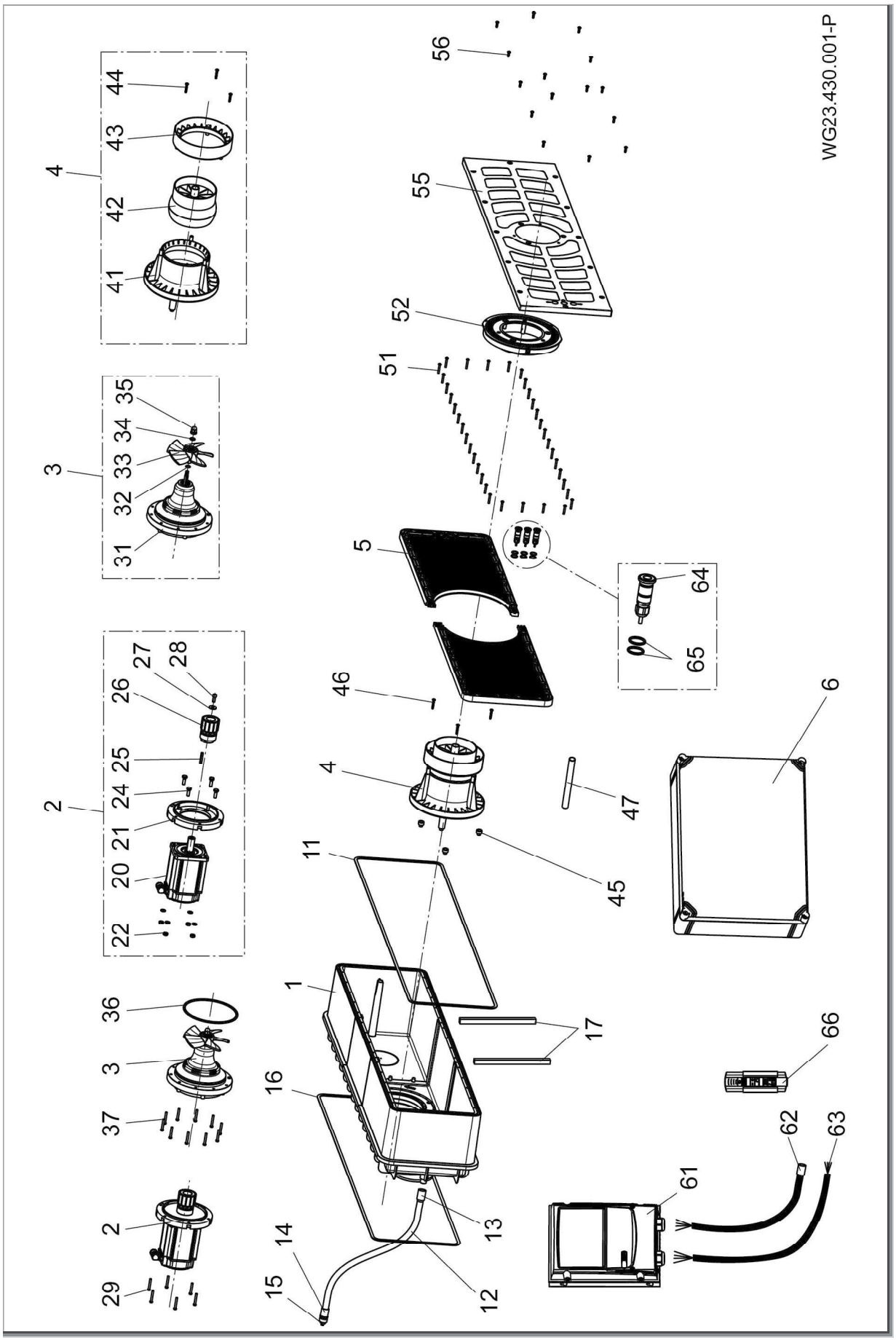



Fig. 28

# 11 Index