BINDER

HydroStar®
Die Turbinenschwimmanlage

Operating Manual

for the models
BGA160, BGA215, BGA275, BGA320, BGA430, BGA550

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Contents

Manufacturer’s address

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1 General information

1.1 Important information

Operation and warranty

Observance of these operating instructions is essential to ensure trouble-free operation and in order for any warranty entitlements to be honored. Therefore, please carefully read through the operating instructions before working with the counter current unit!

Intended use

The counterflow unit is intended for use in privately used swimming pools in accordance with DIN EN 16582. It may only be used in public swimming pools in special solutions.

Note

This operating manual includes instructions on storage, assembly, operation and maintenance of the HydroStar counterflow units BGA 160, BGA 215, BGA 275, BGA 320, BGA 430 and BGA 550.

Start-up, maintenance and installation

The personnel entrusted with the handling, storage, installation, start-up, inspection and maintenance of the system must be qualified for industrial, mechanical and electrical equipment.

Disposal

The current and regional regulations must be observed for disposal. Grease and oil must be disposed of in accordance with applicable environmental protection regulations.

Note

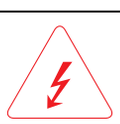
This device is not intended to be used by persons (including children) with limited physical, sensory or mental aptitude or lack of experience and/or knowledge unless they are supervised by a person responsible for their safety or have received instruction from this person as to how the device is used. Children should be supervised to ensure that they do not play with the device.

Warning

If the mains connection cable for this device is damaged, it must be replaced by the manufacturer or its customer service department, or a similarly qualified person to prevent any hazard.

1.2 Hazard information

The following directions are for the safety of the service personnel as well as for the safety of the described products as well as any connected devices.



Warnung! Spinning/rotating components.
Failure to observe this can result in death, serious injury or property damage.

- Please ensure that nobody is near the inlet and outlet area of the counterflow unit before starting it!
- Please ensure that no objects (e.g. toys), body parts or accessories worn on the body get into the openings (suction intake and outflow openings)! Both before starting and during the operation of the counterflow unit!

Warnung! Dangerous electrical voltage
Failure to observe this can result in death, serious injury or property damage.

- Isolate supply voltage before installation or removal work as well as in case of fuse replacement or modifications of the setup.
- Observe the accident prevention and safety regulations that apply to the specific area of use.
- Before putting the machine into operation, check whether the rated voltage coincides with the local mains voltage.
- Emergency stop devices must remain operational in all modes of operation. Disabling the emergency stop devices may not cause an uncontrolled restart.
- Ground wire connections must be checked for fault-free function after installation!
- The conditions described in DIN VDE 0100-702 must be observed.

1.3 Validity

This document applies to the HydroStar counterflow units from the BGA product line.

Safety information
Adherence to this information is the prerequisite for trouble-free operation and the fulfilment of any guarantee claims.

1.4 Intended use

Note: The devices described here are electrical equipment for use in swimming pools and other pools and may only be used under the following conditions.

Exceptions: The manufacturer has designed the product specifically for other applications and conditions.

Intended use

- HydroStar must only be used for the intended purposes and those confirmed in the shipping documents.
- HydroStar must only be operated under the operating conditions stipulated in the operating instructions and within the power limits
- HydroStar is a component for use in privately-used swimming pools with a salt content of $\leq 0{,}4\,\%$ (see note below).
- HydroStar complies with the valid standards and regulations.

Improper use

- Use in potentially explosive areas
- Use in aggressive environments (gases, acids, vapours, dusts, oils, etc.)
- Use in a sewage area
- Use of the turbine above water

Improper surrounding

- Note the surrounding material (filling material) of the installation shaft.
- Depending on the filling material, the installation shaft must be protected
- If filling material with high chloride and sulfate content is used, the stainless steel installation shaft must be protected from these harmful substances with a PE lining (protection film) on the rear side.

Note
The Hydrostar is a component for use in swimming pools with a salt content of $\leq 0{,}4$ %. It is absolutely necessary that the salt is added to the pool dissolved. Do not add salt to the swimming pool within 2 m of the HydroStar.
When used in salty water, the unit must be switched on at least once a day for at least 60 minutes at a low level to avoid stagnant water!
For applications with a salt content of $\geq 0{,}4$ % contact Binder. See also Appendix Water Values!

1.5 Operating conditions

Control cabinet

Ambient temperature: 0 °C to 30 °C

Turbine

Water temperature: 5 °C to 40 °C

Immersion depth: 0,30 m to the lower edge of the turbine, a maximum 0.5 m below the water surface.

The turbine may only be operated in water. The water lubricates the bearings and cools the turbine. If the turbine is operated in air, the manufacturer's warranty is void.

1.6 General safety and application notes

At the time of delivery, the counterflow unit and its components are considered to be state of the art and fundamentally safe to operate.

All transport, storage, installation/assembly, connection, commissioning, maintenance and servicing work may only be performed by qualified personnel.

During such work, qualified personnel must observe:

- the supplementary safety instructions in the individual chapters of this documentation.
- the safety instructions in attached supplementary sheets and further documents from subcontractors.
- this documentation and the circuit diagrams in the control box.

- the warning and safety signs on the devices.
- the machine-specific regulations and requirements.
- the national and regional safety and accident prevention regulations.
- any retrofitting, changes or reconstruction of the drive system is prohibited. The above work may only be performed after consultation with the manufacturer.

The counterflow unit can pose a risk to persons, the machine itself and other property belonging to the operator

- if unqualified personnel work on or with the drive system.
- if the drive system is used improperly.
- if the drive system is installed and operated incorrectly.
- Only operate the counterflow unit if it is in perfect working order.
- During operation and for an extended period afterwards, the components may have live parts, moving parts and hot surfaces.
- Start-up (start of proper operation) may only be carried out once it has been confirmed that the machine complies with EMC Directive 2014/30/EU and that the machine conforms to Machinery Directive 2006/42/EC.
- Observe DIN EN 60204-1.

Should you have any questions or problems, please contact your representative.

1.7 Disposal

Electrical devices must not be disposed of with household waste. If possible, recycle the device. For recycling information, contact your dealer. When disposing of components that are not subject to national regulations, the current regulations and the corresponding environmental protection regulations of the respective country must be observed.

Even during development and construction, we consider a sustainable concept throughout the entire life cycle and pay attention to environmentally friendly design and materials so that our products can be repaired, retrofitted and reused after their life cycle. The use of high-quality materials serves the purpose of further and reuse and thus for renewed use.

2 HydroStar installation in the swimming pool

This section deals with the installation of the HydroStar counter-current unit using the Binder installation shaft.

For this purpose, the Binder installation shaft is integrated into the pool wall. The HydroStar turbines are mounted in the installation shaft.

The installation of the piezo switch is also described.

2.1 The best position for HydroStar

A counter current system creates a current in a pool that enables the swimmer to swim in one place. In addition to the desired flow (starting from about 1,5 to 2 meters away) in front of the counter current system, there is also a backflow in the pool towards the countercurrent system. So that this backflow does not disturb the desired flow too much, the following should be considered when planning the pool:

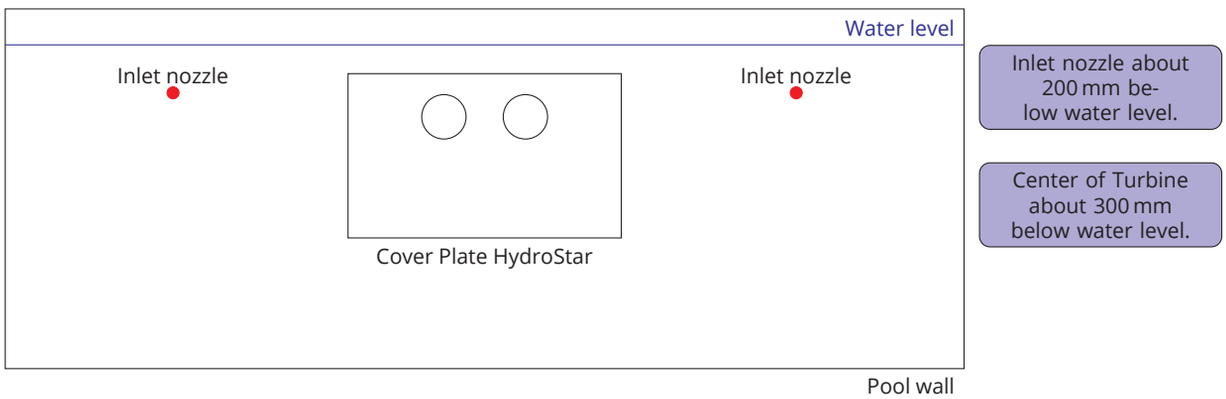


Figure 1: Figure 1 shows the recommended installation situation of the counter current system HydroStar on the (short) pool side. In order to achieve a flow pattern that is as symmetrical as possible, the counterflow system should be mounted in the center of the pool wall. We recommend on this pool wall two adjustable inlet nozzles about 20 centimeters below the water line. Further inlet nozzles are possible. The skimmer should be mounted on the opposite side.

- Install the counter current system as symmetrically as possible in the pool. One-sided stairs are not symmetrical.
- Install adjustable inlet nozzles on the side of the counter current system. You can influence the flow pattern with these nozzles.
- Install the skimmer (for a skimmer pool) on the pool wall opposite the counter current system.

2.2 Delivery

- Wall installation with cover plate.
- Controller in steel cabinet
- Turbine with a 10 m connecting cable.
- Additional accessories as listed in the accompanying papers.

After receiving the delivery, check the delivery contents against the accompanying papers to make sure they are complete.

The manufacturer does not offer warranty for claims regarding missing parts submitted at a later date. Any transport damage that is discovered must be reported to the forwarding agent without delay.

2.3 Other items required

- PVC flexible hose as empty conduit for outgoing cables (motor cable, LED, switch and for the flushing connection of the installation shaft.)
- Sleeve with 1 ½" internal thread and the possibility to connect the flexible hose in a watertight manner (e.g. by gluing).
- PVC end caps (1 ½") for unused double nipples on the back of the shaft. End caps for inside the shaft are included.
- PVC adhesive, e.g. Tangit PVC adhesive
- Thread seal (e.g. Tefon tape)

2.4 General installation instructions

Page 10 shows an overview of the installation of the HydroStar counter current unit using the Binder installation shaft. Binder offers various installation shafts for different installation situations. Installation is generally similar for all installation shafts.

The optimum swimming experience is achieved when the installation shaft is mounted so that the centre of the turbine is 300 millimetres below the waterline.

> **Attention**
> Make sure the installation shaft is correctly aligned before installation.

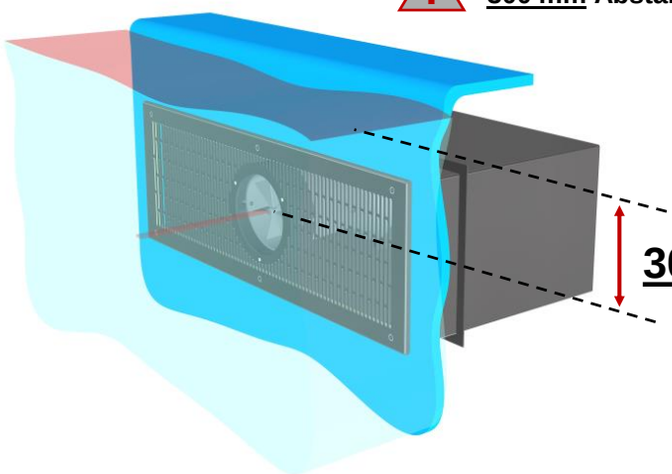
[DE] Einbauhinweise
[EN] General installation instructions
[NL] Algemene aanwijzingen voor de inbouw
[FR] Instructions générales d'installation
[ES] Instrucciones de instalación

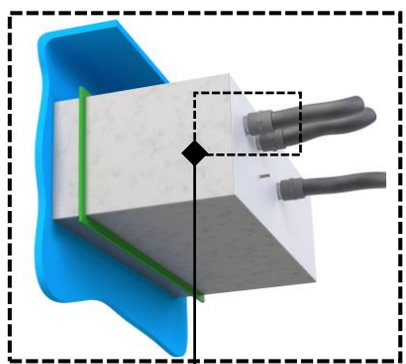
BINDER

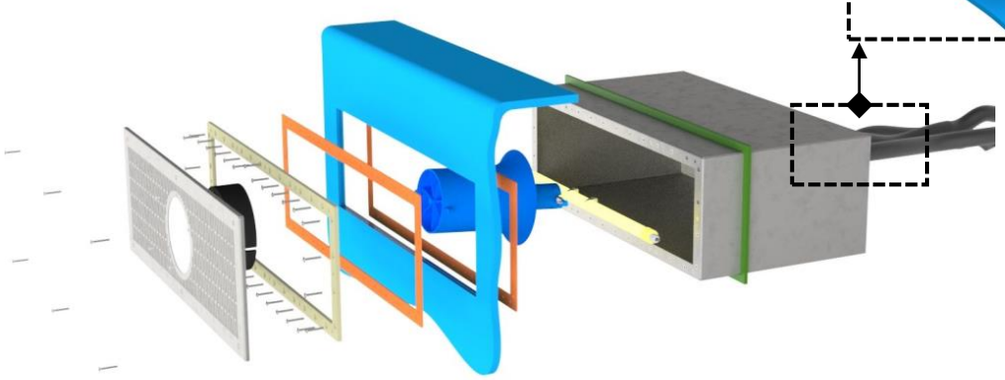
Version 001/2023

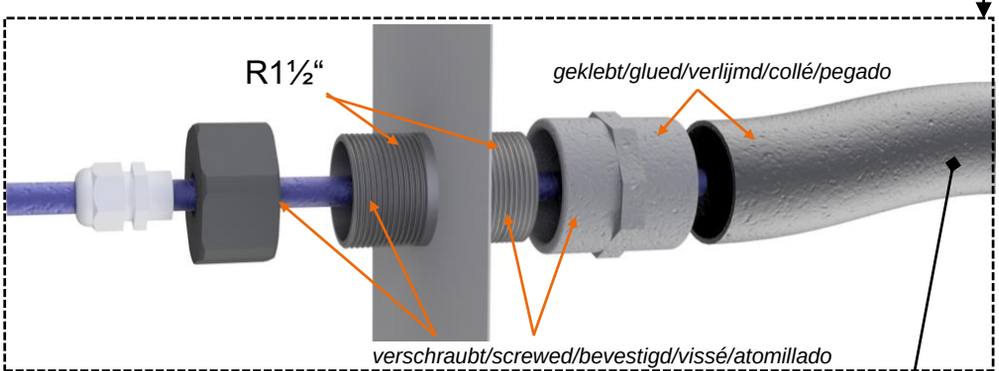
300 mm Abstand/distance/afstand/distance/distancia

[DE] *zwischen Wasseroberfläche und Turbinenmitte*
[EN] *between water surface and turbin center*
[NL] *tussen wateroppervlakte en midden turbine*
[FR] *entre la surface de l'eau et le centre de la turbine*
[ES] *entre la superficie del agua y el centro de la turbina*

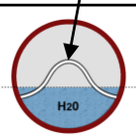








[DE] PVC-Flexschlauch, *über Wasserlevel führen*
[EN] PVC flexible hose, *lead above waterlevel*
[NL] PVC flexibele, *over waterniveau leggen*
[FR] Gaine flexible en PVC, passer a*u-dessus du niveau d'eau*
[ES] Manguera flexible de PVC, *pase sobre el nivel del agua*



2.5 Installing the wall installation shaft in lined pools

Additional information

You can find further information about this chapter such as videos or drawings under the QR code provided.
Also pay attention to the package inserts.
Assembly drawings for alternative installation shafts (e.g. one-piece pools, exposed concrete pools, tiled pools, stainless steel pools) can also be accessed via the QR code.

- Set the installation shaft in concrete in the swimming pool wall.
  - For positioning the installation shaft in the pool, follow the instructions in chapter 2.1.
  - Support the installation shaft so that a firm hold is guaranteed.
  - Before concreting, tape off the flange sealing surface, the screw threads and the threads of the double nipples on the back (inside and outside) so that the concrete does not dirty or damage them.
- Piping of the installation shaft
  - Transition sleeve[1] (not included in delivery) and seal appropriately.
  - Glue PVC flexible pipe (outer diameter 50 mm) into the adhesive sleeve.
  - Close unneeded outputs tightly with a PVC-U end cap (not included in delivery).
- Connect installation shaft tightly with foil
  - Clean the flange sealing surface of the installation shaft from sand and concrete residue.
  - Clean the flange sealing surface of the installation shaft with suitable cleaning agents[2] so that it is free of grease.
  - Insert the seal from the inside to seal it (see assembly drawing on page 12)!
  - Place swimming pool foil over the seal and pierce the holes for the screws.
  - Insert screws with a suitable assembly paste[3].
  - Only use tools for stainless steel.
  - Place the press flange and fasten it with the M6 screws. Screw in screws by hand to avoid thread damage. Screw in the screws crosswise by hand and ensure the correct tightening torque of (2 – 7 Nm)!
  - Make sure that the seal is pressed evenly on all sides. The gasket must protrude approximately 3 mm from the sealing surfaces at the screw positions.
  - After 20 min, the screw connections and the pressed seals must be checked.

[1] such as PVC-U threaded sleeve, adhesive sleeve x internal thread 50 x 1 ½"
[2] Cleaning agent must not be based on hydrochloric acid, see also instructions on stainless steel care
[3] Fully synthetic without metallic additives, e.g. Weicon Anti-Seize High-Tec BINDER Item no. 5301271

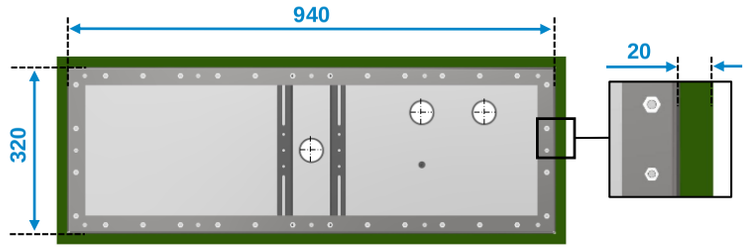
BGA160-215*

[DE] Montagezeichnung (Einbauschacht) | **[EN]** Assembly drawing (Installation shaft) | **[NL]** Montagetekening (Inbouwschacht) | **[FR]** Plan d'assemblage (Caisson d'encastrement) | **[ES]** Dibujo acotado (Nicho empotrable)

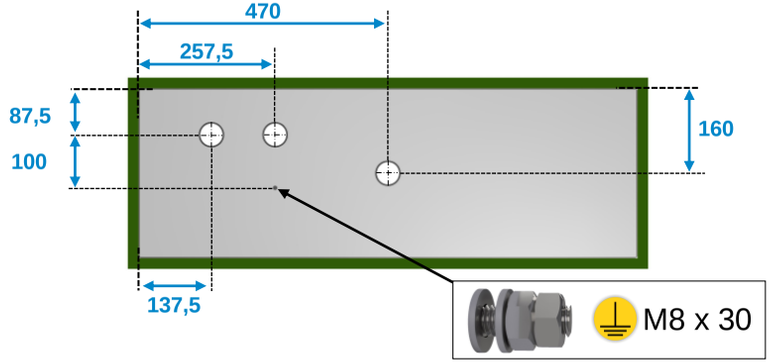
BINDER

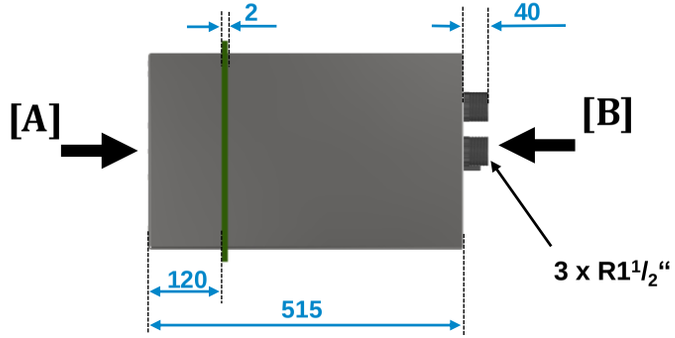
BGA160-215_flat-liner_S_2023-03-09

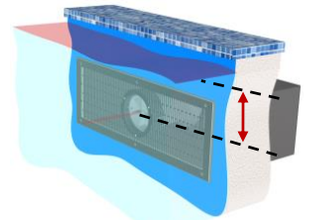
[A]



[B]

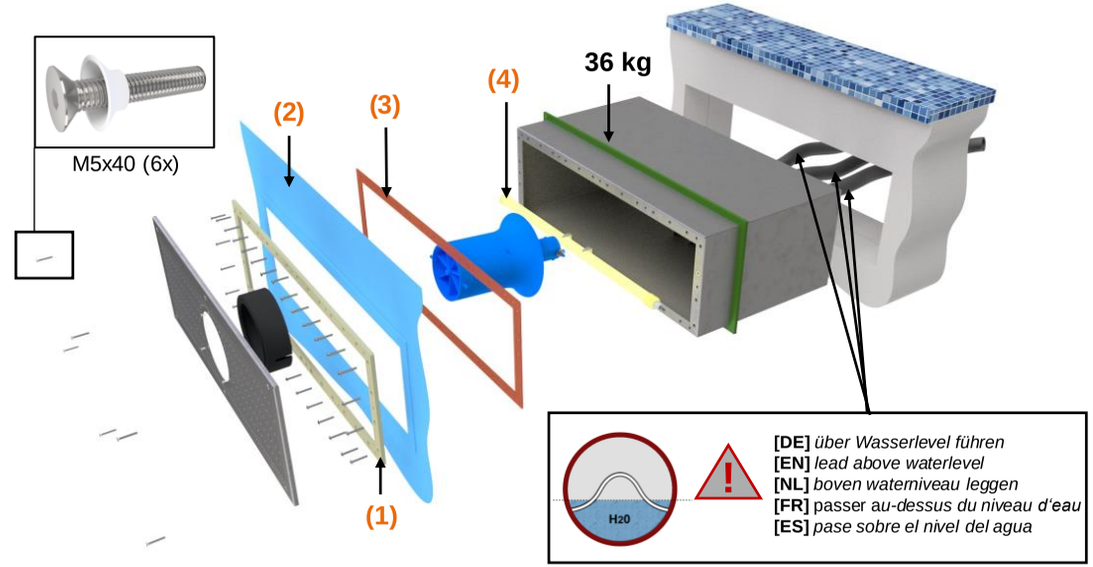


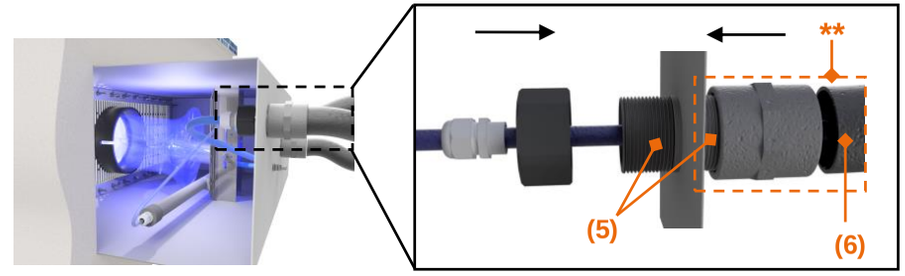




300 mm Abstand/distance/afstand/distance/distancia

[DE] *zwischen Wasseroberfläche und Turbinenmitte*
[EN] *between water surface and turbin center*
[NL] *tussen wateroppervlakte en midden turbine*
[FR] *entre la surface de l'eau et le centre de la turbine*
[ES] *entre la superficie del agua y el centro de la turbina*





	*	**	(1)	(2)	(3)	(4)	(5)	(6) *geklebt/glued/verlijmd/collée/encollada*
DE	flach, Folie	nicht im Lieferumgang	Anpressflansch	Folie	Dichtung	LED optional	verschraubt	PVC-Flexschlauch
EN	flat, liner	not included	Pressure flange	Liner	Seal	LED optional	screwed	Flexible PVC hose
NL	smal, folie	niet inbegrepen	Persflens	Folie	Dichting	LED optioneel	bevestigd	PVC-flexibele buis
FR	allonge, liner	non inclus	Bride de compression	Liner	Joint	LED optionnelle	vissé	Gaine flexible en PVC
ES	plano, lámina armada	no incluido	Brida de presión	Lámina armada	Junta	LED opcional	atornillado	Manguera flexible de PVC

2.6 Installation and alignment of the turbine in the installation shaft

Additional information

You can find further information about this chapter such as videos or drawings under the QR code provided.
Also pay attention to the package inserts.

In order to supply the turbines and the lighting in the wall installation shaft with electrical energy, cables must be led out of the back of the installation shaft. In order not to lose water, there are a few points to keep in mind. This is described in chapter 2.6.1.

For an optimal swimming experience, the turbine must be aligned correctly; this is described in chapter 2.6.2.

2.6.1 Cable installation

The installation shaft has three (the double-turbine system has five) 1 ½" double nipples that lead the cable for the turbine and LED lamp (optional) out of the shaft to the control unit. The middle double nipple is for the connection to a circulation pump (in order to prevent water stagnation in the installation shaft if the HydroStar in not used over a longer period).

Inside the installation shaft:

- If the shaft is not attached to the circulation pump (not recommended), screw the cap appropriately sealed (e.g. with Teflon tape) onto the double nipple in the middle of the shaft. Nothing needs to be done inside the installation shaft if it is to be attached to the circulation pump.
- If no lamp cable is to be led out of the shaft, screw the cap appropriately sealed (e.g. with Teflon tape) onto the outer double nipple of the shaft (double turbine shafts have two outer double nipples).
- If a lamp is installed:
  - Screw the screw cap (M20) appropriately sealed (e.g. with Teflon tape) onto the outer double nipple.
  - Feed the lamp cable through the cable connection (M20).
  - Screw the cable connection into the screw cap.
  - Screw/lock the cable gland tightly.
- In order to lay the motor cable:
  - Waterproof the screw cap (M25), e.g. with Teflon tape, and screw on to the second double nipple from the outside.
  - Feed the motor cable through the cable connection (M25).
  - Screw the cable connection into the screw cap.
  - Screw the cable connection together.

  Screw/lock the cable gland tightly. The cable must no longer be able to be pulled through the cable gland.

In order to be able to place the turbine on the edge of the pool if necessary, leave some cable in the installation shaft. There should not be too much cable (less than 0,5 m per turbine) remaining in the installation shaft. Otherwise the cable could be pulled into the impeller by the current and damaged there. If necessary, secure the cable with cable ties.

Back of the installation shaft:

On the back of the installation shaft, the cables should be fed through a flexible pipe (PVC flex pipe) above the waterline (overflow protection, see chapter 2.5).

We suggest you use a PVC sleeve with 1 ½" internal thread and 50 mm adhesive surface. In addition, you will need a PVC flex pipe (outer diameter 50 mm) and a suitable PVC glue.

We suggest you to use PVC sleeve with 1 ½" internal thread and 50 mm adhesive surface[4] (not included in delivery). You also need a PVC flex pipe (outer diameter 50 mm)[5] and a suitable PVC adhesive.

2.6.2 Adjusting with a guide slot

- Insert the motor into guide slot (see assembly drawing on page 15).The guide slot serves as a guide for the stay bolts at the rear end of the motor.
- Loosely screw the washer and nut onto the stay bolt.
- Start aligning the turbine by tightening the nut accordingly.
- An optimum turbine angle is about 4° to 5° to the water surface. For pools with sloped walls, the slant of the wall must also be taken into account.
- The distance between the outflow opening (turbine) and the top of the installation shaft is approximately 95 mm for the standard installation shaft. This distance must be set correctly, otherwise the cover plate cannot be fitted.
- Guide the turbine cable through the cable connection to the outside (see chapter 2.6.1).
- Pull the turbine cable through the PVC flexible pipe (outer diameter 50 mm) to the control unit.
- Leave the turbine cable in the installation shaft with enough length that the turbine could still be placed on the edge of the pool above the installation shaft (max. 0,5 m).
- Tighten the cable connection[6].
- Mount the cover plate using the screws supplied. Use a copper-free lubricant[7] for the screws!

[4] such as: PVC-U threaded sleeve, adhesive sleeve x internal thread 50 x 1 ½"

[5] such as: PVC flex hose 50 mm

[6] Cable connections do not fully prevent water from flowing out. The cable must therefore be laid in a flexible pipe above the waterline.

[7] Fully synthetic without metallic additives, e.g. Weicon Anti-Seize High-Tec BINDER Item no. 5301271

Turbine/Turbina

BGA160/215/320/430

[DE] Montagezeichnung | **[EN]** Assembly drawing | **[NL]** Montagetekening
[FR] Plan d'assemblage | **[ES]** Dibujo acotado

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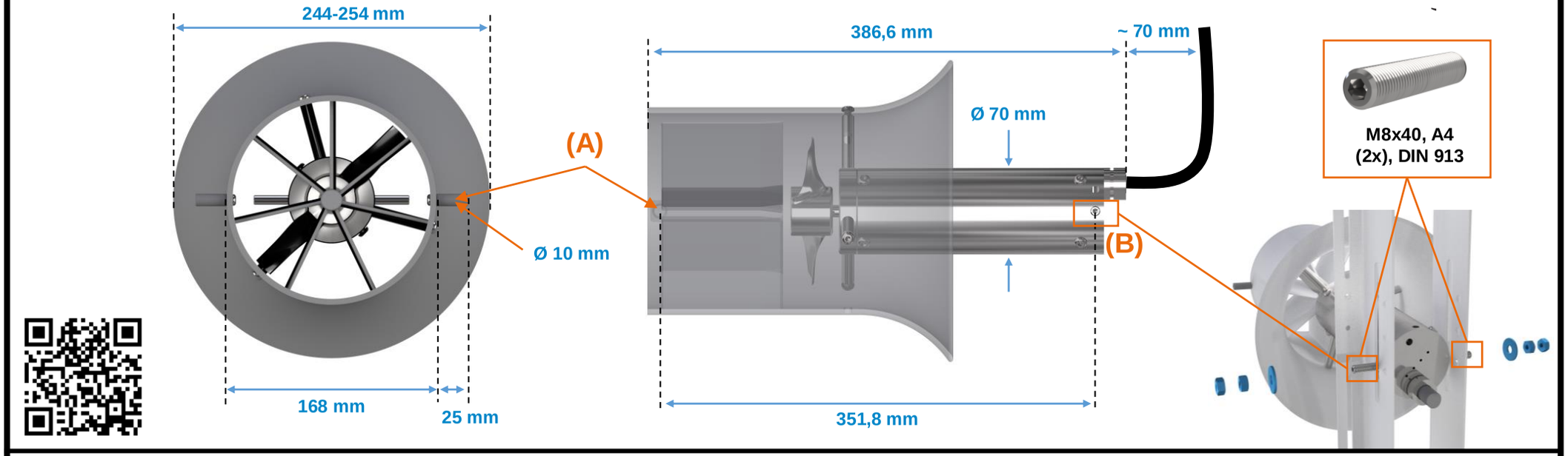
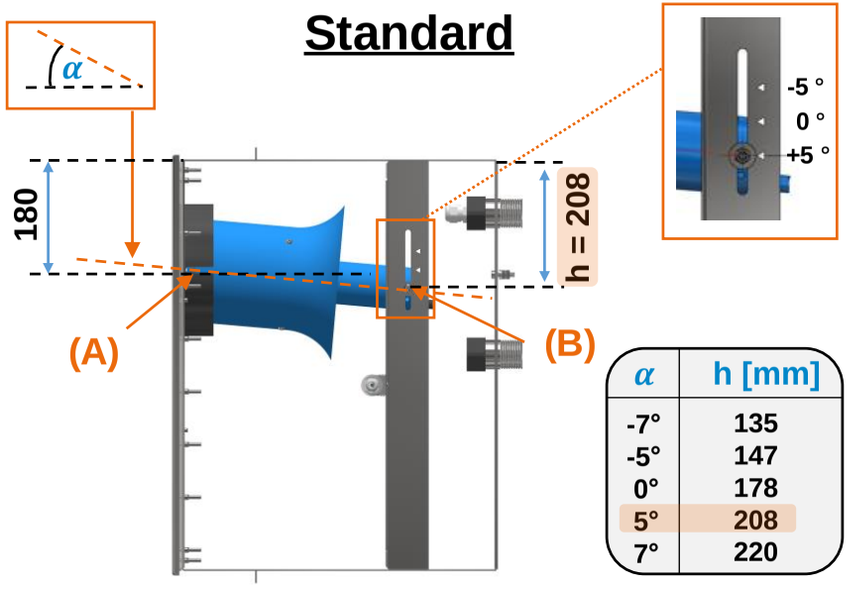
Turbine_160-215-320-430_2023-03-09



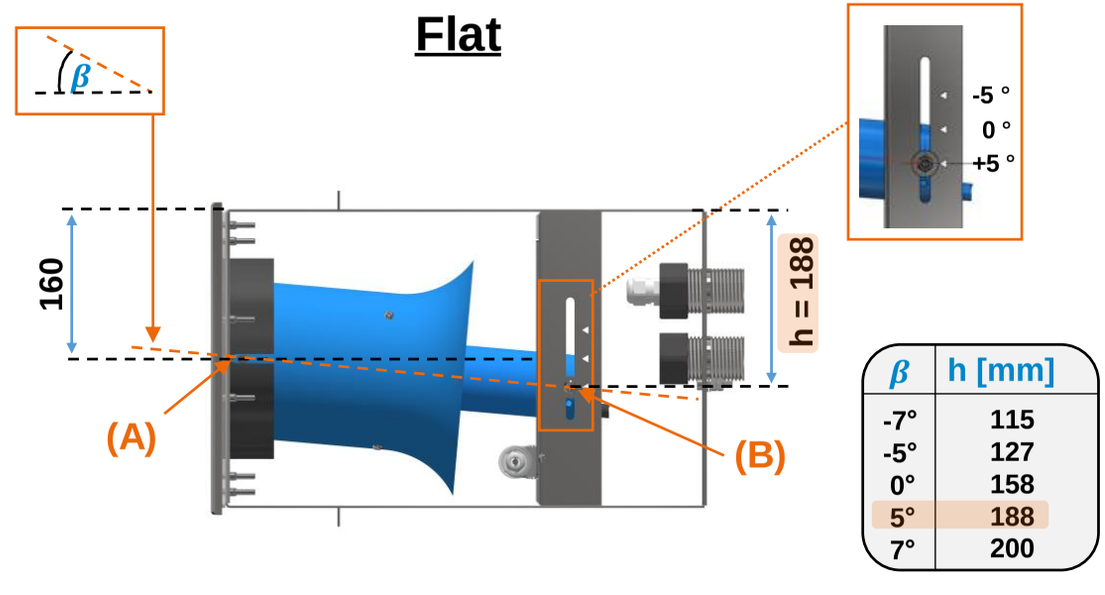
[DE] Einbauhinweise (Winkel) | **[EN]** Installation Instructions (Angle) | **[NL]** Installatie Instructies (Hoek)
[FR] Instructions générales de l'installation (Angle) | **[ES]** Instrucciones generales de instalación (Ángulo)

Standard



α	h [mm]
-7°	135
-5°	147
0°	178
5°	208
7°	220

Flat



β	h [mm]
-7°	115
-5°	127
0°	158
5°	188
7°	200

2.7 LED lighting (optional)

As an option, Binder offers LED lighting for the installation shaft. When installing the LED lighting in the installation shaft, observe the following points:

- Press the LED lighting into the designated holders.
- Feed the cable of the LED lighting through the cable connection to the outside.
- Feed the cable through a PVC flex pipe.
  Like the motor connection cables, the LED lighting cable must be guided to the control cabinet.

2.8 Installing the cover plate

- Align the turbine and do a trial run.
- Do not install the cover plate until the turbine is correctly aligned.
- There is a flow aid attached to the inside of the cover plate.
- The cover plate cannot be installed until the turbine is correctly aligned and protrudes into the flow aid.
- Place the cover plate on the frame of the spring-loaded flange and fix it with the M5 countersunk screws (moisten the screws with a suitable lubricant [8]) ,while supporting the cover plate with one hand or slightly lifting, it to prevent the thread of the countersunk screws from being destroyed.
- Observe the specified tightening torque ($4 - 6$ Nm)!

2.9 Installation of the piezo switch

The assembly drawing on page 18 shows schematically the installation of the piezo switch.

- Concrete the piezo installation housing into the swimming pool wall.
  - Pay attention to the correct position of the installation housing in the pool. For convenient operation, install the installation housing, for example in the stair area. To avoid excessive contamination, install the housing completely below the waterline.
  - Before concreting, tape off the pressing surfaces, the screw threads and the threads for the cable gland as well as the adhesive surfaces on the back so that the concrete does not dirty or damage them.
- Piping of the installation housing
  - Glue PVC flexible pipe (outer diameter 50 mm) into the adhesive sleeve.
- Connect installation housing tightly with foil
  - Clean the flange sealing surface of the installation housing from sand and concrete residue.
  - Clean the flange sealing surface of the installation housing free of grease using suitable cleaning agents.
  - Insert the seal from the inside to seal it (see assembly drawing on page 18)!
  - Place swimming pool foil over the seal and pierce the holes for the screws.
  - Insert screws.
  - Only use tools for stainless steel.

[8] fully synthetic without metallic additives

- Place the press flange and fasten it with the M6 screws. Screw in screws by hand to avoid thread damage. Screw in the screws crosswise by hand and ensure the correct tightening torque of (2 – 7 Nm)!
- Make sure that the seal is pressed evenly on all sides. The gasket must protrude approximately 3 mm from the sealing surfaces at the screw positions.
- After 20 min, the screw connections and the pressed seals must be checked.

• Insert piezo switch and lay cable

- Screw the cable gland into the piezo installation housing to seal it (see page 18).
- Lead the cable through the PVC flexible pipe to the control unit.

Note
Installation of the piezo switch either completely above or completely below the waterline!

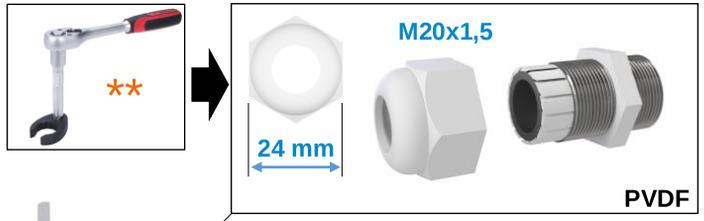
Note
Installation housing also available for tiled pools, natural stone pools or stainless steel pools.

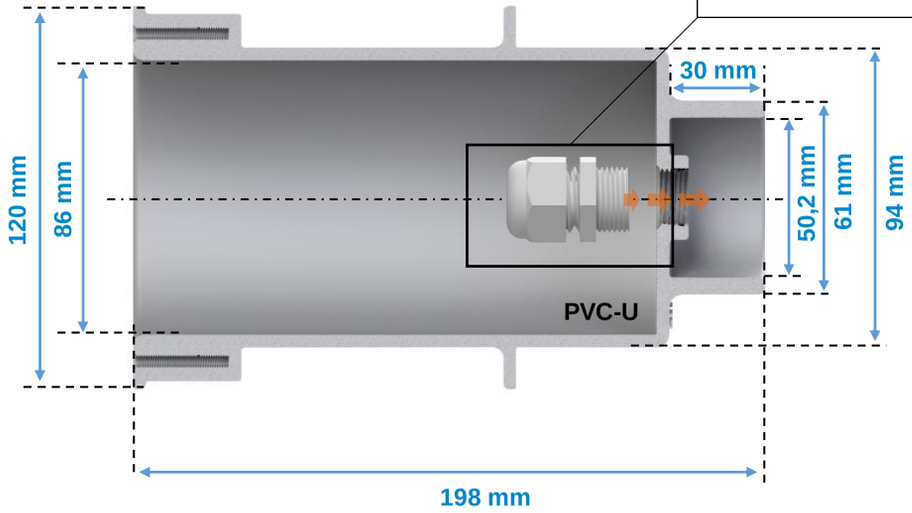
Piezo*

[DE] Montagezeichnung | **[EN]** Assembly drawing | **[NL]** Montagetekening
[FR] Plan d'assemblage | **[ES]** Dibujo acotado

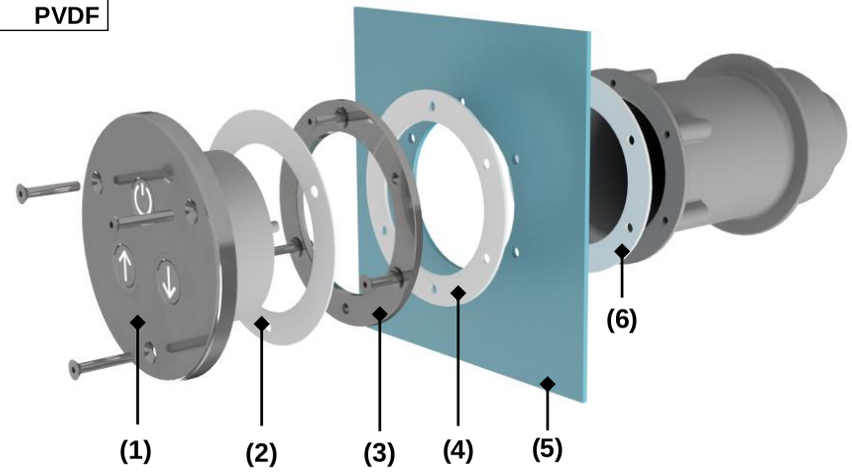
BINDER

Piezo-circular-liner-GFK_2023-03-10

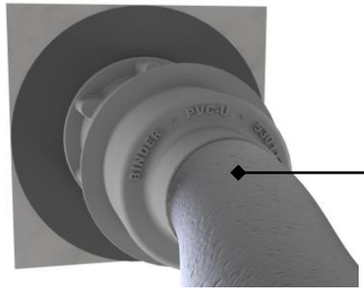


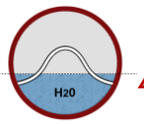


[A]

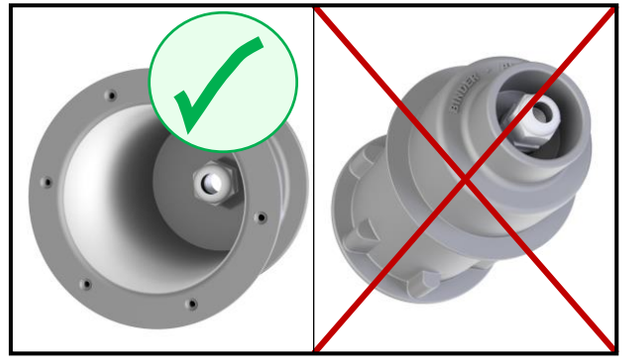


[A]





[DE] PVC-Schlauch *über Wasserlevel führen*
[EN] PVC hose *lead above water evel*
[NL] PVC-slang *over waterniveau leggen*
[FR] tuyau flexible passer a*u-dessus du niveau d'eau*
[ES] Manguera flexible de PVC *pase sobre el nivel del agua*



	*		**	(1)	(2) Ø6 (3x)	(3)	(4) Ø6 (3x)	(5)	(6) Ø6 (6x)
DE	rund	Folienbecken/GFK	nicht im Lieferumgang	Bedienfeld	Dichtung	Pressflansch	Dichtung, optional	Folie/GFK	Dichtung
EN	circular	Lined Pool/GFK	not included	Control panel	Seal	Pressure flange	Seal, optional	Liner/GFK	Seal
NL	rond	Folie zwembad/GFK	niet inbegrepen	Controlepaneel	Dichting	Persflens	Dichting, optioneel	Folie/GFK	Dichting
FR	allonge	Bassins à liner/GFK	non inclus	Panneau de commande	Joint	Bride de compression	Joint, optionnel	Liner/GFK	Joint
ES	rond	Revestimiento de lámina/GFK	no incluido	Panel de control	Junta	Brida de presión	Junta, opcional	Lámina armada/GFK	Junta

3 Control unit (Control cabinet)

Additional information

You can find further information about this chapter such as videos or drawings under the QR code provided.
Also pay attention to the package inserts.

- DIN VDE 0100-702 (Installation of low voltage equipment, section 702: Swimming pools and other basins) must be observed.
- The control unit must be installed in area 2 as per DIN VDE 0100-702. The power lead-in must be equipped with residual current protection (RCD) with a rated residual operating current of ≤ 30 mA.
- The system must have a 16 A inert fuse installed.
- Installation in a dry room in which other technical equipment for operating the swimming pool is installed. The room should be a maximum of 10m from the pool.
- Ensure sufficient ventilation and free space around the control cabinet.
- The control unit is designed for wall mounting. It is mounted with 4 screws $\varnothing 8$ mm (not included in delivery).
- Cable entries are on the bottom.

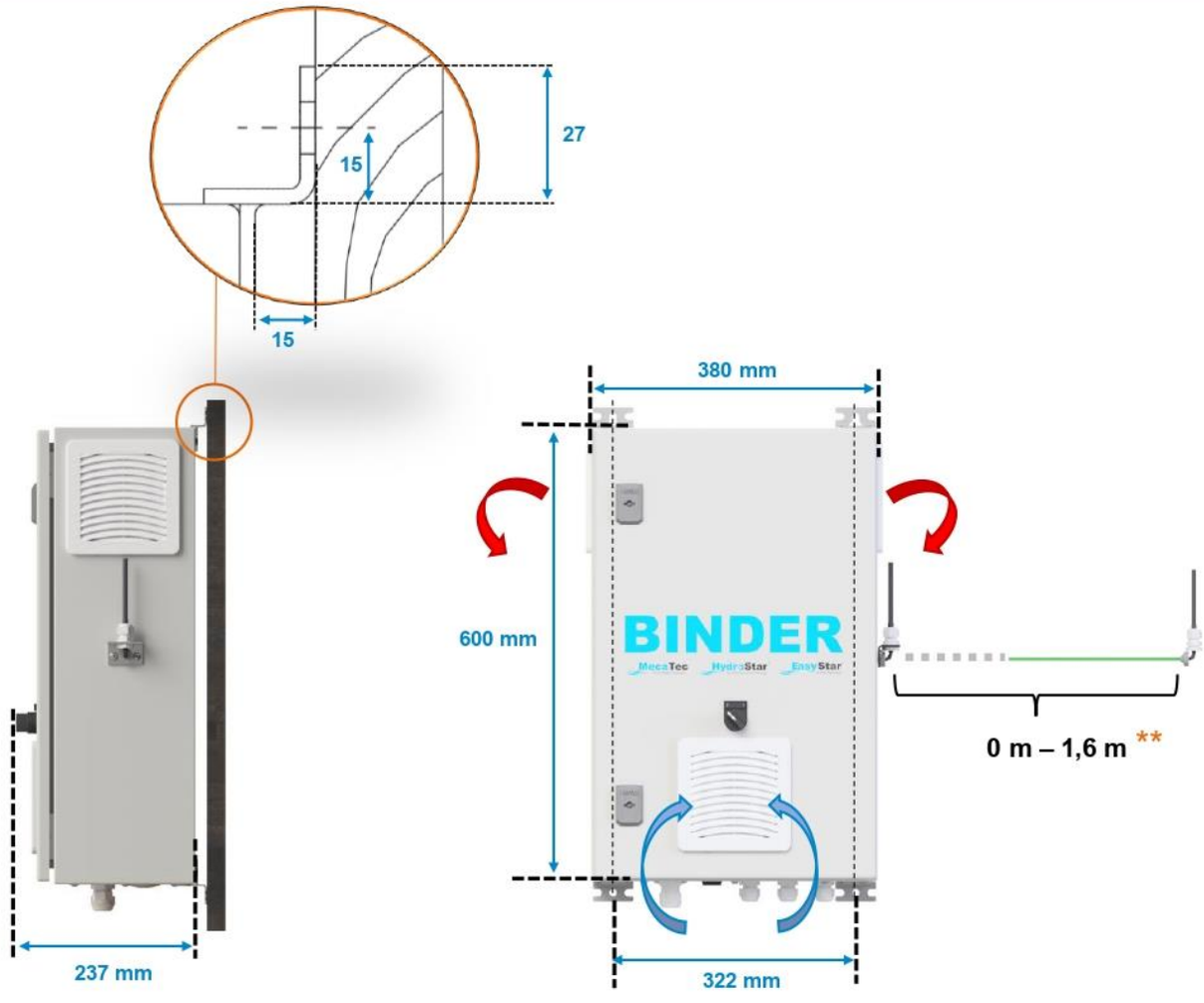
Note!
Please also observe the circuit diagrams included in delivery!

Schaltschrank-*Single**

[DE] Montagezeichnung | **[EN]** Assembly drawing | **[NL]** Montagetekening
[FR] Plan d'assemblage | **[ES]** Dibujo acotado

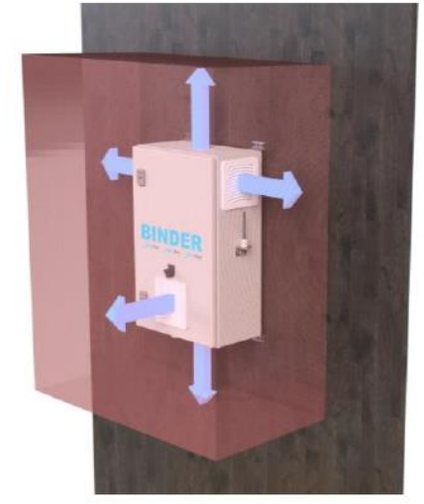
BINDER

control_cabinet-single_2023-01-25



250 mm

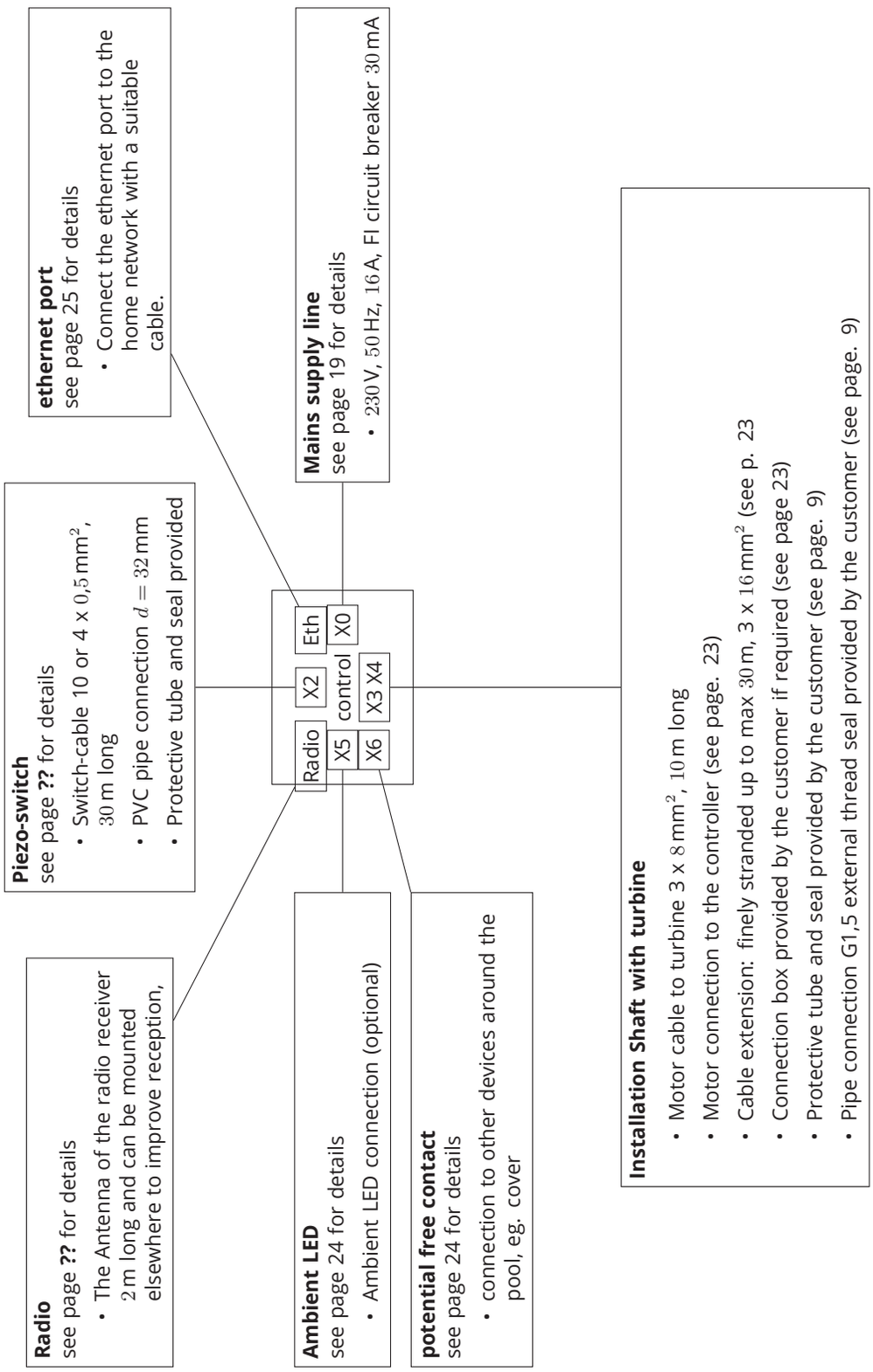
Freiraum zum Schaltschrank für Belüftung
Free space vor ventilation from the control cabinet
Vrije ruimte voor ventilatie vanuit de schakelkast
Espace libre pour la ventilation de l'armoire de commande
Espacio libre para ventilación desde el armario de control



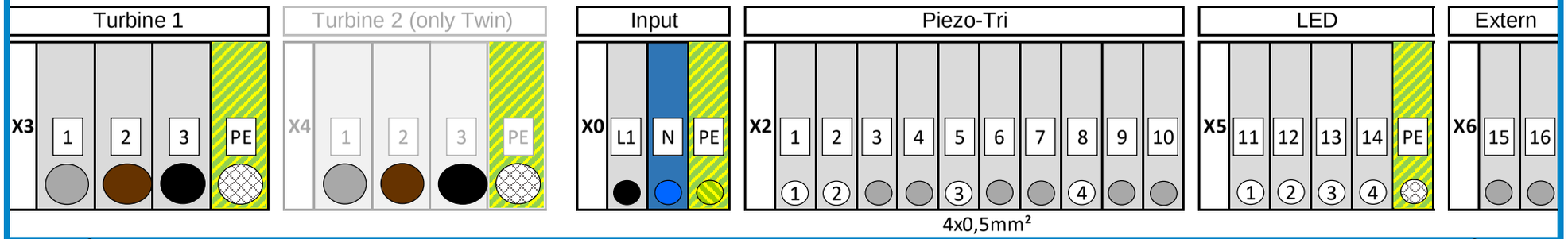
	*	**
DE	Schaltschrank	Optional länger
EN	Control cabinet	Optional expandable
NL	Besturingskast	Verlenging mogelijk
FR	Armoire de commande	Prolongement en option
ES	Cuadro eléctrico	Opcionalmente más largo

Lufteingang	Air inlet	Luchtinlaat	Prise d'air	Entrada del aire
Luftausgang	Air outlet	Luchtuitlaat	Sortie d'air	Salida del aire

3.1 Connection block diagram



Anschlussschema *(Connection diagram, Diagramme de connexion, Verbindingsdiagram)*



Änderung der Motorzuleitung *(Change of the motor lead, Changement du câble moteur, Verandering van de motorkabel)*

Änderung der Kabellängen, Querschnitten sowie deren Verbindungsstellen können bei unsachgemäßer Ausführung zu Störungen oder Leistungsverlust der Anlage führen!

- Original Motorzuleitung nicht kleiner 2m kürzen
- Bei einer Verlängerung der Motorzuleitung >10m muss erst das vorhandene Kabel auf 2 bis 5m gekürzt werden und nur mit 16mm² Kabel (feindrähtig) verlängert werden
- Verlängerung bis max.30m Gesamtlänge (16mm² feindrähtig)
- Zur Verlängerung wird ausdrücklich das Original Binder Kabel empfohlen
- Anschlussdose muss wasserdicht vergossen werden
- Anschlussdose muss frei zugänglich bleiben

Ensure minimum cross-section of 16mm² finely stranded! If a cable extension is required, the correct connection between the two cables must be ensured. Both cables must be extended colour to colour to avoid mixing up the individual wires. The junctions must offer the best possible conductivity A higher resistance in the line reduces the performance of the turbine!

- Shorten the original motor supply line to≤5m (minimum 2m)
- Extension up to total length of 30m with cable cross-section 16mm² finely stranded
- The original Binder 3x16mm² cable is expressly recommended for extending the turbine cable
- The junction box must remain freely accessible
- The junction box must be sealed watertigh

Respectez une section minimale de 16mm² de câbles multibrins fins! Si une extension de la ligne est nécessaire, assurez-vous que le raccordement est correct. La couleur peut être rallongée pour éviter d'interchanger les fils individuels. Les joints doivent offrir la meilleure conductivité possible. Une résistance plus élevée dans la ligne réduit la puissance de la turbine!

- Raccourcissez le câble d'alimentation du moteur original à ≤5m (minimum 2m)
- En cas de l'extension du câble d'alimentation , le câble existant doit d'abord être raccourci de 2 à 5mètre
- Extension jusqu'à une longueur totale de 30m avec une section de câble de 16mm² câbles multibrins fins
- Le câble original Binder est expressément recommandé pour l'extension du câble de la turbine
- La boîte de jonction doit rester librement accessible
- La boîte de jonction doit être scellée de façon étanche

Minimale doorsnede van 16mm² fijndradig in acht nemen! Is een verlenging van de kabel nodig, dan moet altijd op de correcte verbinding tussen beide kabels worden gelet. Kabels moeten op kleur worden verlengd, om verwisseling van de afzonderlijke aders tevoorkomen. De verbindingsplaatsen moeten een zo goed mogelijk geleidend vermogen bieden.
Een hogere weerstand in de leiding reduceert het vermogen van de turbine!

- Originele motorvoedingskabel inkorten tot≤5m(minimum 2m)
- Verlenging tot een totale lengte van 30m met een kabeldwarsdoorsnede van 16mm² fijndradig
- Om de kabel uitbreiden, wordt uitdrukkelijk de originele Binderkabel van 3x16mm² aanbevolen
- Aansluitdoos moet vrij toegankelijk blijven
- Aansluitdoos moet waterdicht gegoten worden

Betriebsanleitung (Operation instructions, Mode d´emploi, Bedieningshandleiding)

3.2 Connecting the cables

All connection cables of the HydroStar counter-current unit are distributed from the control cabinet. The following sections describe the connection to the control cabinet. The block diagram on page 21 provides a good overview.

3.2.1 Motor connection

- Insert the motor cables into the M25 cable connection in the control cabinet so that the sheathing is pushed through approx. 50 mm.
- Securely tighten the cable connection.
- Connect the motor supply line to the X3 terminal blocks according to the color coding, in the case of a double system, connect the second turbine to the X4 terminal blocks (see connection diagram page 22).
- Do not use wire end sleeves.
- Stripping length must be **18 to 20 mm**.
- The cores of the turbine cable must not be twisted and should be inserted into the terminals as flatly as possible (so that there is as large a contact area as possible).
- Wires must be firmly seated in the terminals in order to achieve the lowest possible contact resistance.

3.2.2 Lengthening the motor supply line

> **Note: Ensure minimum cross-section of 16 mm² finely stranded!**
> If a cable extension is required, the correct connection between the two cables must be ensured. Both cables must be extended color to color, to avoid mixing up the individual wires. The junctions must offer the best possible conductivity. A higher resistance in the line reduces the performance of the turbine!

- If the motor cable is extended, the existing cable must first be shortened to 2 to 5 meters.
- Extension up to total length of 30 m with cable cross-section 16 mm² finely stranded!
- The original Binder 3x16 mm² cable is expressly recommended for extending the turbine cable! (BINDER Item no. 5300115)
- The junction box must remain freely accessible.
- The junction box must be sealed watertight.
- Matching junction box (gel sleeve set with wire end sleeves)[9] should be ordered at the same time.

3.2.3 Connecting the HydroStar PIEZO Tri

- The connecting cable is a finely stranded 4-core cable with a cross-section of 0,5 mm².
- In order to make the correct connection, the wire number must be the same as the terminal number (see also page 22)
- The connection is made to terminal strip X2 (see connection diagram on page 22).

[9] BINDER Item no. 4872877

3.3 Connecting the radio

The radio is installed at the factory. If the control with the radio remote control at the swimming pool does not work well, it is possible to mount the antenna (mounted on the left side of the control box) in a more convenient place. To do this, unscrew the antenna from the control box and remove the antenna cable from the cable duct. The antenna cable is at least 2 m long. If the antenna cable is not long enough, you can order a longer cable from us (BINDER Item no. 5000624).

3.4 Connecting an external operating device

The following functions can be operated via electronic push-buttons additionally connected to terminal strip X2 (pulse duration less than 500 ms):

- Turn system on/off by closing terminals 1-2
- Speed up turbine by closing terminals 1-8
- Slow down turbine by closing terminals 1-5
- Switching capacity: 24 VDC/20 mA, maximum cable length 30 m

3.4.1 Connecting a higher-level control unit

The X2 terminal strip can be used as an interface to a higher-level control unit (e.g., Loxone). See also page 22.

3.4.2 Connecting external enabling

The counter-current unit can be enabled and disabled by an external device via terminal strip X6. Terminals 15 and 16 are bridged with a comb bridge ex works and the system is ready for operation. As soon as the connection between 15 and 16 is disconnected, the turbine stops and can no longer be switched on. Once the connection is established again, it can be switched on again. If a device or switch for external enabling is connected to terminals 15 and 16, the comb bridge must be removed by pulling it out (e.g. with a pair of needle- nose pliers).

3.5 LED lighting

Installation shaft	Performance	Luminous flux
BGA Single Standard	22 W	850 lm
BGA Single Flat	43 W	1700 lm
BGA Double Standard	43 W	1700 lm
BGA Double Flat	86 W	3400 lm

Table 1: Output and luminous flux of the various LED lighting variants.

The optionally available LED light is permanently waterproof and cannot be opened. The built-in illuminants are high-power RGB LEDs. Depending on the installation shaft, several lighting variants with different outputs are available (see Table 1).

The lighting can be operated via the supplied radio remote control or optionally and more conveniently via the BINDER24 APP.

3.6 Connecting to a home network (optional)

Additional information

You can find further information about this chapter such as videos or drawings under the QR code provided.
Also pay attention to the package inserts.

If HydroStar is to be controllable with the BINDER24 APP, optionally an expansion module[10] is attached to the control board. To use the functions, please connect the control cabinet with a network cable to the home network[11].

3.6.1 Retrofitting HydroStar for operation with the app

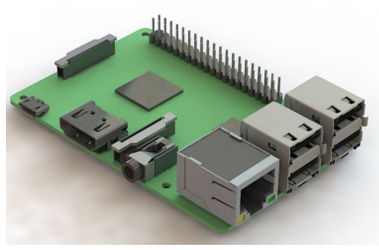


Figure 2: The figure depicts the mini computer Raspberry Pi.

Check which control card is installed in the control cabinet. In order to upgrade HydroStar to app control, it is necessary that an up-to-date control card has been installed (since 01/2020). Even after the upgrade, the previous control options will be retained.

To upgrade, proceed as follows:

- The upgrade kit includes a mini computer (see Fig. 2) with SD card, RPI connector and patch cable.
- First disconnect the system from the power supply via the main switch.
- Plug the RPI connector into the GPIO connector (40-pin male connector) on the mini computer, then plug the mini computer into the 40 pin female connector on the control card.
- Remove the filler plug from the control cabinet and insert the RJ45 panel jack.
- Connect the mini computer and the panel jack with the patch cable.
- Integrate the controller into the house network via the panel jack on the outside using a patch cable (not included).

The mini computer starts up automatically when the system is put into operation or switched on. If the end device (tablet or smartphone) and the installed BINDER24 app are on the same network, the devices automatically connect to each other and the system can be operated via the app.

4 Start-up

Turn the unit on using the rotary switch on the front side of the control unit!

[10] BINDER Item no. 4873010
[11] control card and mobile device must be in the same network

Warnung! Danger due to electrical current
Before starting the machine up, check the operation of the residual current device (RCD) on the machine side! Check all lines for damage and make sure the electrical connections are secure !

Note
Do not perform any trial runs unless the turbine is completely under water! Operating it above water or only partly in water will cause the drive motor to fail!

Note
Before using it for the first time, make sure that all parts of the system have been firmly assembled and cleaned and that there are no dirt, material residues or foreign parts in the system.

4.1 Radio remote control operation

Warnung! Danger
The radio transmitter and receiver are pre-set to match at the factory and programmed for the operation of the HydroStar counterflow unit. Any reprogramming or using a second or third-party radio transmitter may damage the machine or harm people!
Before starting the turbine, make sure that no one is in the outflow area of the turbine. The sudden flow of water may lead to unpredictable reactions.

Turbine On / Off
↑ Turbine faster
↓ Turbine slower
Keyboard illumination (10 s)
P1 On/Off LED (optional)
P2 Colour change LED (optional)
P3 LED darker (optional)
P4 LED brighter (optional)

Note
When the turbine is switched on, it always runs at the lowest speed!

Note
All buttons on the remote control have a right and a left side (not just the P1, P2, P3 and P4 buttons). For the remote to trigger properly, press each button on the right or left side (not in the middle).

4.1.1 Switching the turbine on and off

- Switch it on by briefly pressing the button ⏻. After a delay of up to 10 seconds, the turbine starts running at the minimum motor speed.
- Switch it off by briefly pressing the button ⏻. The speed of the turbines is reduced and after max. 10 seconds, the unit is switched off.

The operation of a switch on the radio remote control is indicated by a green/red LED above button P1/P2!

Note
After pressing the buttons on the hand-held transmitter, it takes about 2 seconds for the signal to reach the radio receiver. If you press several keys one after the other hectically or repeatedly, malfunctions may occur.

Note
The range of the radio transmitter under ideal conditions is 50 m. The range may be severely limited because of local conditions. If the range is insufficient, an external antenna with an antenna cable of up to 16 m can be connected and installed in a more favorable position in the building.

Note
The radio transmitter complies with protection class IP64. Permanent immersion of the remote control under water is therefore not possible.

Note
The system switches off automatically after 180 minutes, but can be switched on again immediately.

4.1.2 Water jet control

By pressing the buttons ↑ or ↓, the flow rate can be changed between the minimum and maximum speed.

4.2 Optional operation by PIEZO Tri

If the HydroStar conterflow unit has a PIEZO Tri switch, the HydroStar counterflow unit can be operated by radio remote control and via the PIEZO Tri switch.

The system is switched on by pressing the On/Off button ⏻. The water quantity can be adjusted by pressing the ↑ or ↓ button.

Pressing the ⏻ button again switches the unit off.

Note
The unit can be switched on with the radioremote control, and switched back off by using the PIEZO Tri switch. Activation of the radio remote control is also indicated on the PIEZO Tri. Both operating modes work in parallel.

4.3 Operator feedback

Action	State	Feedback
via Radio or Piezo	Lighting Off	red LED
via Radio or Piezo	Lighting On	white LED
via Radio P3 (darker)	Lighting On	no Feedback
via Radio P4 (brighter)	Lighting On	no Feedback

Table 2: Operator feedback.

If the LED light is installed, optical feedback is given via the light as soon as the HydroStar receives a signal via the radio remote control, the piezo push-button or an externally connected control unit. When a signal is received, the lighting briefly flashes once (see Table 2). There is only feedback if an action can be executed by pressing a key. If the brightness is changed via the radio remote control, no feedback is given.

4.4 Operation via app

HydroStar can optionally be ordered from the factory with an app control system. The system can then be operated via a mobile device (mobile phone or tablet). The prerequisite for this is a network connection in the vicinity of the counter-current unit control cabinet. Directly connecting HydroStar to the WLAN is not possible.

The app extends the scope of operation and the ease of use of the counter-current unit. The app (BINDER24 APP) is available free of charge in the Apple App Store and Google Play for Android devices and is constantly being developed. Please inform yourself about the current status of development via the specified app stores.

4.5 End of operation

At the end of operation and overnight, the machine should be switched off using the power switch on the control unit.

5 Maintenance and repair

All work on the HydroStar counterflow unit must be carried out by trained personnel. Before working on the control unit, disconnect it from the mains and secure it against being accidently switched back on.

5.1 Maintenance

- The turbine of the HydroStar counterflow unit is maintenance-free.
- The underwater motor has no seals that have to be maintained or replaced
- Make sure that no objects of pieces or clothing are caught on any protective equipment in the intake area. Remove those items when the turbine is switched off.
- The installation shaft and the cover plate are made of high-quality stainless steel. Clean the installation shaft and cover plate with a suitable cleaning agent.
- Remove dirt, deposits and patina on the stainless steel parts with a suitable cleaning agent[12].
- The control unit can be cleaned with a damp cloth. Do not spray it.

[12] z.B. 1 kg Pelox mit Schwamm und Polierpad BINDER Item no. 5301134

5.2 Repair

- Repairs are only to be performed by suitably trained specialists or in the manufacturer's factory.
- Only use original BINDER spare parts for repairs.

6 Troubleshooting

Warnung! Danger
In accordance with the Accident Prevention Regulations (Unfallverhütungsvorschriften, UVV), interventions or repairs to the device may only be carried out by qualified technicians. Otherwise there is danger to people and equipment!

6.1 Turbine does not start

6.1.1 Maintenance

- Does the battery in the remote control still have a charge?
  - Press one of the assigned buttons on the remote control. Two LEDs light up in the upper section. Another test: Now press the lowest button of the remote control printed with a lamp symbol. The background lighting of the remote control is switched on for a few seconds. If nothing lights up, the battery of your remote control is probably flat. Replace it. The remote control requires a CR123A battery.
- Does the radio signal reach the radio receiver?
  - Observe the LEDs on the radio receiver (to be found on control card in the switch cabinet). If several LEDs switch on in the remote control, a signal is received. If no LED switches on, the battery in the remote control may be too weak after all. Is the antenna properly connected? Has the radio remote control been programmed?
- Is the turbine free? Or is something perhaps blocking it? To check switch installation off!

6.1.2 Connection leads

Is the switch cabinet connected to the mains (230 V)? Does any LED in the switch cabinet light up?

6.2 Turbine does not always start reliably

The motor control device supplies the motor of the turbine with fluctuating direct current. In addition, the motor control device is also responsible for starting. The resistance of the motor connecting lead plays an especially decisive role in the starting phase.

6.2.1 Check the cable and connection points

Actuating the motor during starting depends on the resistance of the cable and terminals. Consequently, you should check these first.

- Remove the motor cable from the X3, X4 terminals.
- The cable should be stripped 18 – 20 mm.
- No wire end sleeves may be used.

- The cable may not be too strongly twisted and should be inserted as flat as possible (to ensure the biggest contact surface possible exists) into the terminals.
- Wires must be firmly seated in the terminals in order to achieve the lowest possible contact resistance.
- Has the motor cable been extended? Was fine-wired cable[13] with the correct cross-section used for this (see 3.2.2)? Fine-wired cable has a better connection in the terminal. How good is the connection of the two cables in the conduit box[14]?

6.3 The performance of the turbine is unsatisfactory

Is the turbine properly aligned? The alignment of the turbine should ensure the following:

- The outlet opening may not be covered by the cover plate.
- The turbine jet breaks the water surface about 1,5 to 2 m from the outlet opening. If you do not see any breaking of the water surface, the turbine setting is not set steep enough. If the water surface is too disturbed, you could set the turbine to be flatter.
- At high outside temperatures (higher than 30 °C), the switch cabinet adjusts the performance downwards. If the problems occur at high temperatures, this might be the reason.

6.4 Turbine switches off

The installation switches off for safety reasons after 180 minutes. The installation can be switched on again immediately.

This value can be changed (optionally) with the BINDER24 APP.

[13] BINDER Item no. 5300115
[14] BINDER Item no. 4872877

Appendix

A Water values

- pH value: 7,0 – 7,2
- bound chlorine: $\leq$ 0,5 mg/l (preferably close 0,0 mg/l)
- free chlorine: 0,3 mg/l bis 2,0 mg/l (3000 ppm bis 20 000 ppm)
- cyanuric acid: $\leq$ 100 mg/l
- salt concentration: $\leq$ 0,4 % (4000 ppm) (4 g/l)
- metals: $\approx$ 0 mg/l
- carbonate hardness: $\geq$ 2 °dH
- ozon: 0 mg/l
- $\sum$ chlorite + chlorate: $\leq$ 30 mg/l
- Redox – potential: $\geq$ 700 mV
- Water temperatures above 30 °C should be avoided.
- Ideally, the pool water should be treated according to DIN (19643 - 1) or the recommendations of the Federal Environment Agency. See also: Hygiene requirements for pools and their monitoring.
- A regular check of the hygiene parameters is necessary. This applies in particular to the pH value and the salt concentration.
- When refilling with salt, it is essential to ensure that the salt concentration does not exceed 0,4 %.
- Please note that a sufficient quantity of fresh water must be fed into the pool in order to prevent excessive salinity. This is best achieved by sufficient filter backwashing at regular intervals.
- The installation shaft must be connected to the circulation pump of the pool system via the flushing connection/inlet nozzle.
- The installation shaft must be connected to the existing ground (potential equalization).
- Your swimming pool dealer will be glad to assist you with questions regarding water treatment and care.
- We use only premium quality materials that are optimally suited for use in swimming pools under the aforementioned conditions. However, in the event that one or more of the aforementioned parameters are not adhered to over an extended time period, or insufficient quantities of fresh water/no fresh water are/is fed into the pool, we will not accept liability for any damage incurred!

B Care instructions for stainless steel

The installation shaft, motor and cover plate of the Binder counter-current unit are made of stainless steel alloys commonly used in swimming pools.

Cleaning agents must be selected according to the intended use and taking into account the materials, surfaces or equipment.

The limit values described in Appendix A must also always be observed when adding substances into the pool water in order to avoid damage and corrosion. In particular, solid substances must be dissolved before adding.

Under no circumstances may cleaners containing hydrochloric acid be used on stainless steel!

BINDER

HydroStar®

Die Turbinenschwimmanlage

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Letzte Änderung: Monday 8th April, 2024