AUGUST

Solutions for human and nature

# Wastewater treatment plant technical pass

AT6 - AT20

AT6 - 20K

AT6 - 20GB

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# Introduction

Typical factory-made domestic wastewater treatment plants manufactured by AUGUST IR KO JSC (hereinafter referred to as the Manufacturer) are designed for domestic wastewater treatment of a population equivalent to a number of persons from 4 to 18 in private houses, hotels and boarding houses, restaurants, schools, campers, administrative buildings, etc. (hereinafter referred to as Units or Unit, depending on context). Water treated in the Units can be discharged into open water bodies, infiltrated into the soil or used as technical water. Wastewater is treated in the Units biologically, in a process where microorganisms break down and digest the contaminants in the wastewater, thus purifying the water. In addition to food, vital bacterial activity also requires oxygen; therefore, a blower, comprising an integral part of the Unit, is installed next to the Unit housing. All household chemicals (detergents, cleaning agents, etc.), if used moderately, are allowed and do not cause harmful effects on the Unit.

In order to avoid operational problems, it should be ensured that the following substances, together with wastewater, do not come into contact with the Unit:

- High concentrations of grease and oil products (used oils, lubricants, etc.)
- Toxic or hazardous substances (paints and paint thinners, acids, etc.)
- Biologically non-degradable persistent substances (plastics, rubber, textiles, sanitary napkins, wood, etc.)
- Do not discharge storm water, drainage, pool water or hot water-hotter than 40 °C-wastewater from farms or animal slaughterhouses into the Unit.

## Caring for nature

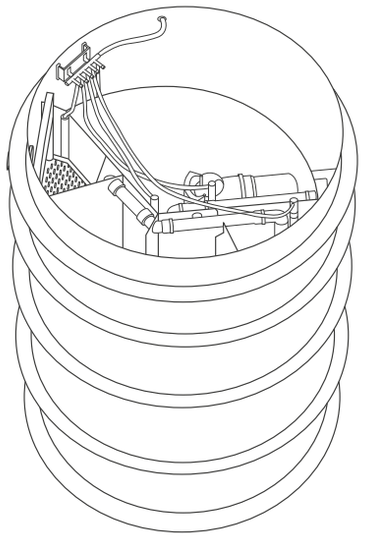
When buying the Unit, you help fight environmental and water pollution. Every installed and functioning Unit contributes to reducing the amount of dirty water released into the environment. The water obtained after the treatment of wastewater in the Unit can be discharged into the ground or water bodies without affecting the ecological system. Therefore, with our built-in wastewater treatment technology, you can rest assured about the ecology and the world will be grateful for your environmentally-friendly Unit.

# AT series devices and modifications

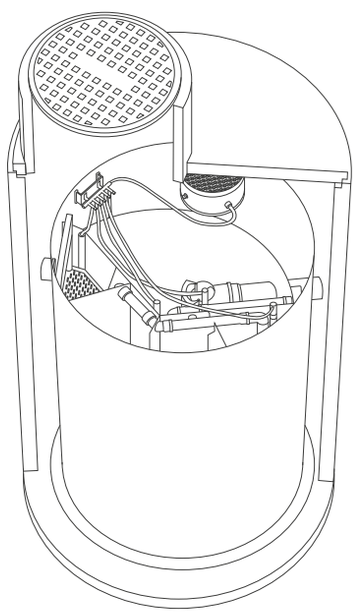
Biological wastewater treatment plants designed for houses and larger facilities. These are reliable, economical and easy-to-maintain wastewater treatment plants that feature an extremely robust construction with reinforcement rings to ensure durability and reliability.

The air blower and controller are installed next to the cleaning unit, making the plant convenient to operate and easy to service. The plant does not use a lot of energy, so its operation is inexpensive.

### AT series



### AT GB modification



These models are designed for installation in reinforced concrete rings under the road surface.

Thanks to integrated brackets, the air blower container and controller are mounted directly on the housing of the plant, keeping the device compact and easy to adapt, and ensuring smooth operation in confined environments.

# AT technical specifications

| TYPE | AT6 | AT8 | AT10 | AT12 | AT15 | AT20 |
|---|---|---|---|---|---|---|
| H (mm) | 1805 | 2205 | 2208 | 2208 | 2208 | 2708 |
| Ø (mm) | 1510 | 1510 | 1760 | 1910 | 2210 | 2210 |
| Inlet H (mm) | 1305 | 1705 | 1708 | 1708 | 1708 | 2208 |
| Outlet H (mm) | 1155 | 1505 | 1508 | 1508 | 1508 | 2008 |
| Average electricity consumption Program: STANDARD (kWh/d) | 0,80 | 0,80 | 1,33 | 1,35 | 1,71 | 2,07 |

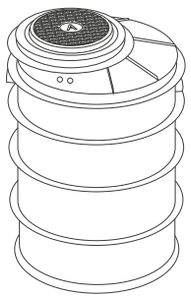
# AT GB technical specifications

| TYPE | AT6 GB | AT8 GB | AT10 GB | AT12 GB | AT15 GB | AT20 GB |
|---|---|---|---|---|---|---|
| H (mm) | 1805 | 2205 | 2208 | 2208 | 2208 | 2708 |
| Ø (mm) | 1410 | 1410 | 1760 | 1810 | 2110 | 2210 |
| Inlet H (mm) | 1305 | 1705 | 1708 | 1708 | 1708 | 2208 |
| Outlet H (mm) | 1150 | 1505 | 1508 | 1508 | 1508 | 2008 |
| Average electricity consumption Program: STANDARD (kWh/d) | 0,80 | 0,80 | 1,33 | 1,35 | 1,71 | 2,07 |

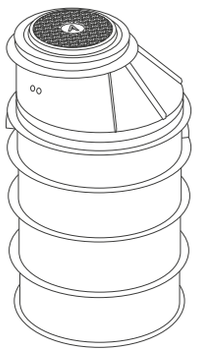
H (mm) – total height of the device
Ø (mm) – transportation diameter of the device
H inlet (mm) – height of the inlet pipe from the bottom
H outlet (mm) – height of the outlet pipe from the bottom

## ATK modification

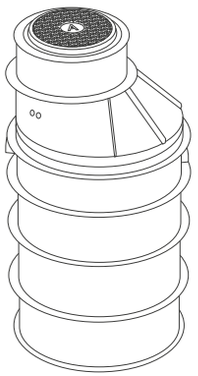
With this modification, the cover of the plant is installed at ground level, so it does not interfere with landscaping at all. This means that you can easily mow the lawn with either a traditional or robotic lawn mower. This is a wastewater treatment solution that does not spoil the aesthetics of the plot.
The specially designed, robust construction with reinforcement rings ensures durability and reliability.



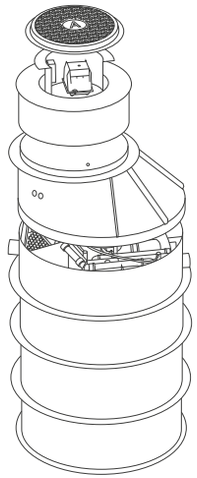
**ATK S modification -**
- modification with a low-profile lid reduction.



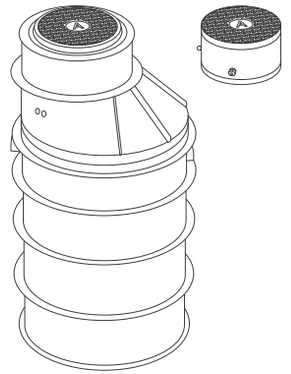
**ATK M modification -**
- modification with a standard lid reduction.



**ATK L modification -**
- modification with a standard lid reduction and extension.



**IN modification -**
- the air blower and smart controller are installed inside the wastewater treatment plant.



**OUT modification -**
- the air blower and smart controller are installed next to the treatment plant, in the air blower container.

**IMPORTANT:** For ATK S modification, extension rings are not used.

# ATK technical specifications

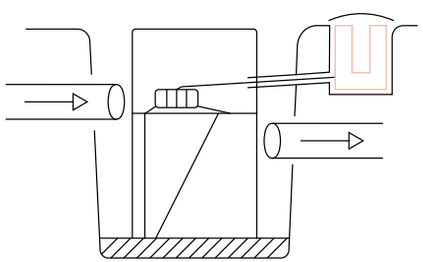
| TYPE | AT6K S | AT6K M | AT6K L | AT8K S | AT8K M | AT8K L | AT10K S | AT10K M | AT10K L | AT12K M | AT12K M | AT15K M | AT15K L | AT20K M | AT20K L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H (mm) | 1820 | 2120 | 2350 | 2220 | 2520 | 2520 | 2380 | 2740 | 2970 | 2740 | 2970 | 2830 | 3060 | 3330 | 3560 |
| Ø (mm) | 1510 | 1510 | 1510 | 1510 | 1510 | 1510 | 1760 | 1760 | 1760 | 1910 | 1910 | 2110 | 2110 | 2110 | 2110 |
| Inlet H (mm) | 1305 | 1305 | 1305 | 1705 | 1705 | 1705 | 1708 | 1708 | 1708 | 1708 | 1708 | 1708 | 1708 | 2208 | 2208 |
| Outlet H (mm) | 1155 | 1155 | 1155 | 1505 | 1505 | 1505 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 1508 | 200 | 200 |
| Average electricity consumption Program STANDART (kWh/d) | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 0,80 | 1,33 | 1,33 | 1,33 | 1,35 | 1,35 | 1,71 | 1,71 | 2,07 | 2,07 |

H (mm) – total height of the device
Ø (mm) – transportation diameter of the device
H inlet (mm) – height of the inlet pipe from the bottom
H outlet (mm) – height of the outlet pipe from the bottom

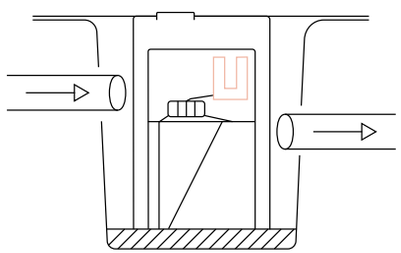
# Rules for the installation of the Unit

**DOWNLOAD INSTALLATION DIAGRAMS**

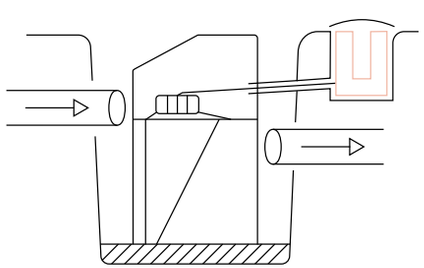
## AT



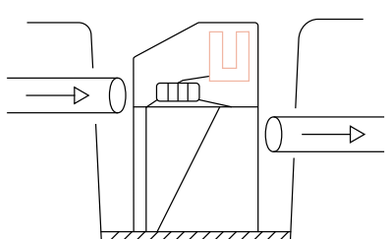
## AT GB



## ATK OUT



## ATK IN



## 1. Selection of installation location:

1.1 Location for installation of the Unit must be selected so that the treated water can flow automatically (see Principal diagram 1).

**IMPORTANT!** If the Unit is not mounted on reinforced concrete rings, it may not be installed on the part of the plot of land intended for transport traffic and/or parking, as well as on the part of the land where storm water or high groundwater accumulates.

1.2 The Unit must be easily accessible for frequent inspections.

1.3 It is necessary to maintain the distance from adjacent objects established by the applicable legal regulations.
The Unit and the systems ensuring its functionality must be installed in accordance with the requirements of the effective legal regulations, the technical or work project of the building, instructions for installation work and these recommendations.

## 2. Preparation for construction:

2.1 The wastewater pipe from the source to the Unit must be laid with a slope suitable for gravity flow of wastewater.

2.2 **IMPORTANT!** Burying the pipe for the discharge of wastewater to the Unit may not exceed 1 m from the ground surface, which must be taken into account in advance in the formation of the terrain. For pipes buried 1 m and more, the sewage lifting pump station must be installed upstream of the Unit.

2.3 The diameters of the wastewater effluent and treated water pipes **MUST** correspond to the diameter of the built-in couplings in the Unit.
The depth of the wastewater pipe must match the depth of the Unit coupling.

2.4 The pit for the convenient installation of the Unit must be at least 150 cm wider than the diameter of the Unit. The installation site should be cleaned of debris and be free of vegetation (trees), the roots of which may interfere with the installation and subsequent operation of the Unit.

## 3. Construction:

3.1 Earthwork must be carried out strictly in accordance with the normative acts in force and the technical or work project of the building.

3.2 Pits for the Units are excavated in two steps:

3.2.1 In the first stage, the pit is excavated by an excavator, leaving about a 20-30 cm thick layer to the design altitude.

3.2.2 At the second stage, the layer of 20-30 cm is dug manually. This method of earthwork will ensure the installation of the Unit on undisturbed soil.

3.3 **IMPORTANT!** Pit depth depends on the depth of the wastewater pipe at the installation location. The pit must have a funnel shape: the diameter of the pit must be at least 150 cm wider than the diameter of the device at the top and 50 cm wider than the diameter of the device at the bottom.

3.4 **IMPORTANT!** Installations must be mounted on a reinforced concrete base in order to ensure horizontal and vertical levelling of the Units. A concrete base (about 15-20 cm thick, with reinforcement mesh) is concreted on the compacted soil, or prefabricated reinforced concrete soles can be used.

3.5 Units can be fully or partially buried (depending on the groundwater level). **IMPORTANT!** Units are mounted above groundwater level (see Principal diagram 2).

3.6 **IMPORTANT!** If there is high groundwater on the construction site, the Units are partially buried, i.e. to a certain depth, and the remaining part is covered with a gravel-sand mixture (0.4 mm fraction) by forming a dyke. In this case, the pumping stations for sewage lifting should be installed upstream of the Units. It is necessary to raise about 30 cm of undisturbed soil to the groundwater level.

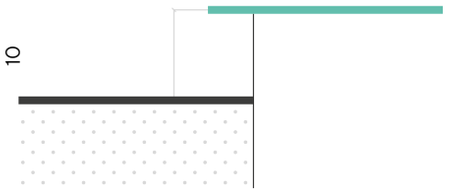
3.7 The Unit is lowered into the pit using typical lifting mechanisms.

3.8 After lowering the Unit into the pit and checking the design position (depth, horizontal/vertical alignment), the inlet and outlet pipelines are connected (the pipes must be rigidly fixed and resting on a solid foundation).

3.9 Built into the design position, the Unit is gradually filled with water, and the space between the pit and the Unit is filled with sand layers (20-30 cm thick). Sand layers are carefully compacted (by human body weight). Water is poured into the Unit to the level of the outlet pipe.

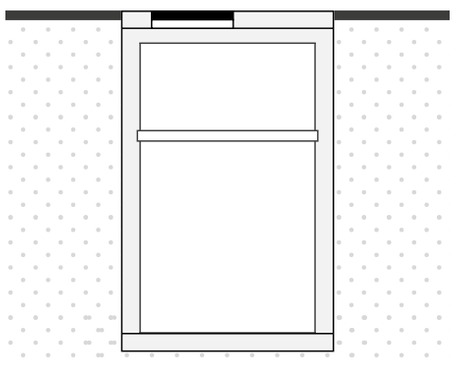
3.1.0 The soil surface around the Unit is formed with a slight slope away from the Unit, to prevent the accumulation of storm water around the Unit, allowing its free flow (see Detail A).

3.1.1 **Installation of AT** - leave about 10 cm from the top of the wastewater treatment unit unfilled with soil. The ground surface around the installed unit should be shaped with a slight slope away from the unit, so that rainwater does not accumulate around it but can freely drain away (see Detail A).




Detail A

Detail B



Detail C

3.1.2 **Installation of ATK IN and OUT** - the wastewater treatment unit is installed at ground level (see Detail B).

3.1.3 **Installation of AT GB** - the wastewater treatment unit is installed into reinforced concrete rings beneath the road surface (see Detail C).

## 4. Installation of the blower and the air supply pipe:

4.1 The location for the blower is selected in accordance with the technical requirements. The blower can be installed in a ventilated room (garage, storage, etc.) and outdoors (in the blower container). The indoor-mounted blower must not come into contact with the wall or any other building structure. If the blower is installed outdoors, it must be protected against moisture, rain and dust. A blower container should not be installed in a place where water can run on it and accumulate. High quality gaskets **MUST** be used in openings.

4.2 220V-3X1.5 $mm^2$ electric cable is connected to the Unit.

4.3 The distance from the blower to the Unit must not exceed 5 m. In order to minimise pressure losses, the turning points in the air supply line should be reduced to the minimum.

4.4 The air supply tube must be mounted in the protective shell and placed on a stable base, for example, on undisturbed immobile soil.

## 5. Installation and connection of AUGUST BASIC:

5.1 The Unit controller can be installed indoors (in a garage, warehouse, etc.) or in the blower container.

5.2 Good air circulation should be ensured so that the maximum permitted temperature of the Unit is not exceeded even during continuous operation at high ambient temperatures (max. 40 °C).

5.3 For indoor installation of the AUGUST BASIC Unit, two single-phase cables 3x1.5 mm **MUST** be laid to the Unit.

**DOWNLOAD INSTALLATION DIAGRAMS**

# Warranty terms

**IMPORTANT!** If the Buyer performs the installation of the Unit at their own cost and initiative, they undertake to perform the work in accordance with the installation rules of the Unit.

In all cases, only the manufacturer or its authorised persons are entitled to perform installation and adjustment work on the Unit.

1. Warranty provided by the Manufacturer: for the underground part of the Unit housing is 10 years from the date of the sale or transfer of the Unit (whichever occurs earlier) to the Buyer. Mechanical and electrical devices for legal entities are covered with 12 months' warranty, for natural persons - 24 months' warranty

2. During the warranty period, the Manufacturer undertakes an obligation to eliminate any quality defects in the bodywork of the Equipment free of charge within a reasonable and technically feasible period, which were caused by the reasons directly within the Manufacturer's control, and to carry out Equipment launch-adjustment works, if needed.

3. The warranty covers defects in the underground bodywork part of the Equipment discovered during the Warranty period, which were caused by low-quality materials used by the Manufacturer and/or defects of Equipment manufacture and/or of Equipment construction, about which the Manufacturer was informed in writing within the Warranty period.

4. The Warranty applies and is valid only if:

4.1. From the moment of sale until mounting day, the Equipment was warehoused (stored) indoors, at the average ambient temperature of from -25°C to 30°C, and protected from climate impact and,

4.2. Equipment mounting works were carried out following the Manufacturer's instructions; and,

4.3. Equipment repairs, if any, were carried out by the Manufacturer or his authorised person.

5. The warranty does not cover:

5.1. If the Equipment was transported disregarding the manufacturer's requirements; and,

5.2. If the fault was caused by Force Majeure circumstances (thunder, fire, etc.); and,

5.3. If the requirements for safe and proper equipment mounting, operation and maintenance were disregarded, the Buyer uses the Commodities not to their usual purpose; and,

5.4. If the equipment was damaged by factors beyond the manufacturer's control; and,

5.5. If the Buyer continues using the Commodities after discovering their defects; and

5.6. If the Buyer made additions, modifications or other changes to the factory construction of the equipment at his own discretion; and,

5.7. If safety label stickers of the Commodity or parts of the Commodity are damaged, modified, or removed; and,

5.8. If fluctuations in power supply voltage occurred (undervoltage or overvoltage); and,

5.9. If the equipment was damaged mechanically, and because of its use in aggressive environment.

6. To exercise the right to Warranty, the Equipment operating person must:

6.1. Give a written notice to the Equipment seller about the defect detected within 10 working days from the moment a defect of the underground part of the Equipment bodywork was discovered; and,

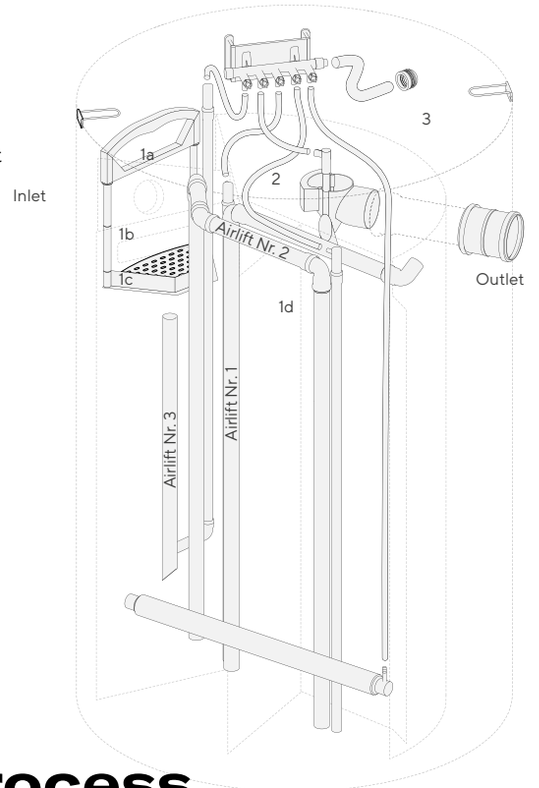
6.2. present the following to the Equipment seller:

6.2.1. Documents proving Equipment acquisition.



# Unit Diagram

The body of the wastewater treatment plant is made of plastic (polypropylene) and is supplied with a cover.




# Treatment process

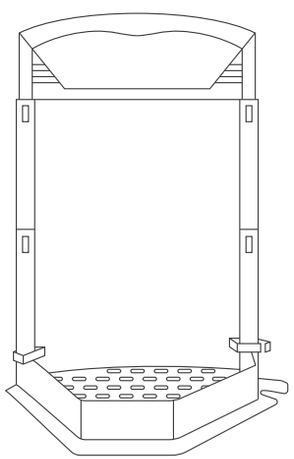
Typical AT series wastewater treatment units of AUGUST IR KO JSC are supplied in a single container, comprising: anaerobic-anoxic zones (1a-d), aeration zone (2) and secondary settler (3). The anaerobic-anoxic zone is divided by partitions into the descending and ascending flow sections (1a, 1b, 1c and 1d), creating the so-called "vertical flow labyrinth". The secondary settler (3) is equipped with a flow regulator protecting the Unit against the negative effects of peak flows.

# Mechanical and electrical devices

Mechanical equipment consists of the solids bag (integrated in a domestic sewage treatment plant), a blower, an air distribution manifold with valves, airlifts 1, 2, 3 and aeration elements.

## Solids bag

The solids bag is used for separation of gross solids from wastewater (biodegradable, soluble solids (paper, kitchen waste, etc.). Only non-degradable materials (textiles, wood, bone, etc.) remain in the solids bag, and must be removed later. The solids bag is lifted by pulling the handle, and cleaned.



## Air distribution panel and adjustment valves

Air supply to airlifts 1, 2 and 3 and to the current regulator and aeration elements is adjustable by means of valves B, C, D, E and F located on the air distribution manifold.

### Air supply A

Air supply from the blower.

### B-valve

Controls the amount of air into the diffuser (aeration) in the aerated part of the biological reactor. Valve fully open (approx. 2.5 turns) – fine bubbling should appear on the surface of the aeration chamber of the aerated activated sludge. Adjustment – **maximally open all the time.**

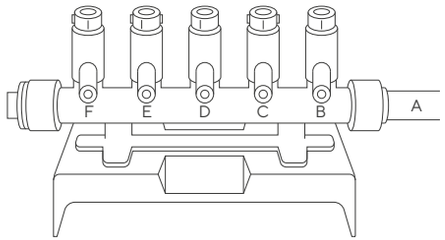
### C-valve

Controls air volume to airlift 3. Flow from the non-aerated part of the reactor, chamber 1d to chamber 1a, must be visible. **The valve is partially opened.** Activated sludge must flow continuously, the flow should not be too weak or too strong.

### D-valve

Controls the air volume to airlift 2 – the return of recirculating sludge from the secondary settler partially into the third compartment of the non-aerated chamber and partially into the aeration chamber (oxygen), with the ratio changed from 4:1 to 1:1. This can be done by turning the elbow toa horizontal position.

The air distribution manifold has been factory-set during internal production control. If necessary, you can set new settings, but first you have to close all the valves and then follow the instructions above.




When turned down, the recirculating sludge will be pumped into the aeration chamber, and when turned upwards, to the non- aerated chamber. **Valve partially open** – activated sludge must flow continuously; the flow should not be too weak or too strong.

### E-valve

Controls air flow to the current regulator (3). Normally, it is set to release one bubble for control of the automatic flow controller approximately once in 1-2 seconds. **The valve is minimally opened (approx. 2.5 turns).**

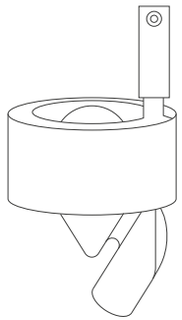
### F-valve

Controls air volume to airlift 1 (internal recirculation). Large bubbles mix the contents of section 1a; whirling should be visible on the water surface. **The valve is partially opened.**

**VIDEO GUIDE: SETTING AIR DISTRI-BUTION VALVES**

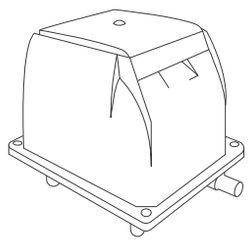
## Flow controller

The flow controller ensures flow balancing under high instantaneous loads (bath, wash basin, etc.). The discharge of water from the biological wastewater treatment plant through the calibrated hole in the flow regulator is 3 l/min (180 l/h).



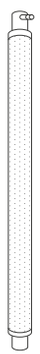
## Blower

The blower is an electromagnetic diaphragm compressor, which is characterised by longevity, low maintenance timing and low maintenance costs. The performance and power of the blower vary depend- ing on the model of the cleaning unit.



## Diffuser

The number and length of aeration elements vary in wastewater treatment plants depending on the amount of oxygen needed to dissolve. High quality aeration elements are made with a non-clogging membrane, polypropylene and stainless steel parts.



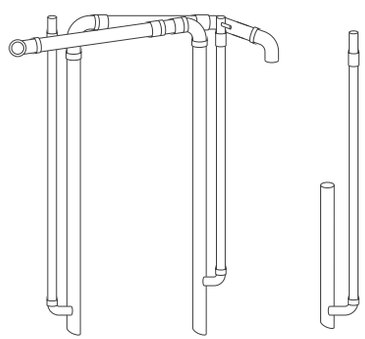
## Airlifts

Mixing, circulation and activated sludge and wastewater recirculation in the system are ensured by airlifts 1, 2 and 3.

Airlift 1 – mixing in the solids bag

Airlift 2 – sludge return from secondary settler

Airlift 3 – internal recirculation





# AUGUST AT controller

AUGUST AT controller (hereinafter the control- ler) is designed to control the aeration and circulation processes in the Units. The screen of the controller indicates the actual date, time and selected mode. The control unit of the controller reads (locks) the connection of the blower as well as the additional device (PZ).

## First run

At the first run of the unit, the display offers choice of language. Set the language by t:,, and confirm the selection with **SET**.

Then a requirement to set the current date appears. Set the value of the flashing digit using t:, (the date is in format dd-mm-yy, e.g. April 19, 2017 is 19.04.17), confirm the selection with **SET**, after pressing **SET** the cursor moves automatically to the next digit.

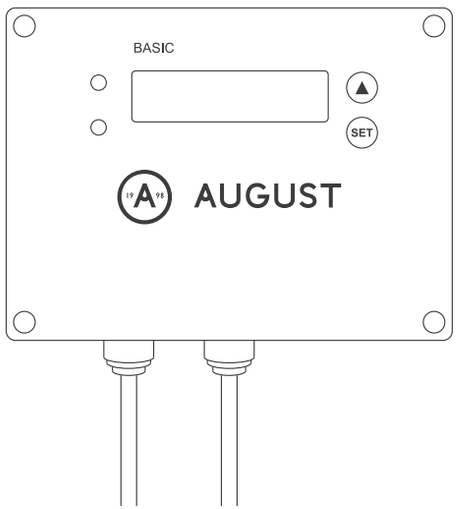
And finally, the system will ask for setting the current time. Set the value of the flashing digit using t:, (the time is in format hh-mm-ss, e.g. 18.45 is 18.45.00), confirm the selection with SET, after pressing **SET**, the cursor moves automatically to the next digit.

After the language, date and time and eventually the day of week are fixed the display shows AUGUST, and the unit switches automatically into the pre-set standard mode.

The control unit must be connect- ed into the el. network of the object through an individual circuit breaker with AC 230V 50Hz.

▲ This button serves for moving in the menu, dismiss the acoustic signalization and setting the current date and time, eventually the day of the week.

SET Button **SET** serves for selection of items in the menu and confirmation of the values.




## Change of mode/program

The microprocessor control unit AUGUST has the pre-set standard mode, in which it is ready to control the operation of the plant without other settings. The display shows date and time and program STANDARD.

The user- owner of the plant can change the program, particularly in these cases:

according to instructions of an authorized serviceman or a representative of the manufacturer (e.g. after start-up of the plant, in case of necessary “remote” service interventions and the like) when using programs HOLIDAY and WEEKEND HOUSE

## Change of mode/program

- By pressing **SET** we enter into the menu of the control unit. The first item in the menu is OPERATING MODE SELECT.
- By a next pressing **SET** we enter into the selection of programs, there we can move with ▲. If we want to select a program, select by ▲ and then confirm it with **SET**.

## Description of programs:

- program STANDARD – pre-set program with average air pump run for 18 hours daily. Suitable in most cases.
- program STANDARD-3 – minimum program with minimum air pump run for some 10 hours daily. It suits when the device is loaded very little.
- program STANDARD-2 – minimum program with minimum air pump run for some 12 hours daily. It suits when the device is loaded little.
- program STANDARD-1 – program with air pump run for some 15 hours daily. It suits when the device is loaded less than standard.
- program STANDARD+1 – program with air pump run for some 20 hours daily. It suits when the device is loaded more than standard.
- program STANDARD+2 – program with air pump run for some 22 hours daily. It suits when the device is loaded heavily.
- program STANDARD+3 – maximum program with air pump run for some 23 hours daily. It suits when the device is loaded very heavily.

## The unit has 7 standard programs:

STANDARD, STANDARD-3, STANDARD-2, STANDARD-1, STANDARD+1, STANDARD+2, STAND- ARD+3.

These programs differs particularly in duration of air pump run. Sections with interrupted run (the air pump is ON for several minutes and then OFF for several minutes) and sections with uninterrupted run (the air pump is ON) occur during each standard program.

## Non-standard programs:

- program HOLIDAY - it is advisable to set just before leaving for holiday. The device will work during absence of the inhabitants in the saving mode, i.e. with interrupted run. This will save not only the power, but the device will adjust even to lacking waste water which is the source of nutrients for friendly microorganisms in the equipment. After returning from the holiday, it is enough to click ▲ and the microprocessor switches automatically to the pre-set standard program.
- program WEEKEND HOUSE - this was designed for treatment of waste water from weekend houses with occupation on weekends or once in a month. Before leaving such an object, program WEEKEND HOUSE is set. After returning, it is enough to click ▲ and the microprocessor returns automatically to the pre-set standard program.

It is not necessary neither advisable to change the set program frequently, it can be necessary just in the case when some fault has appeared – unusual smell or visually sensed worse quality of treated water, excessive foam and the like.

## Other settings, information

Beside selection of programs, other items appear in the menu:

- DATE AND TIME SETUP – by selecting of this item the set date and time with a flashing digit is displayed. By multiple pushing **SET** is possible to jump from digit to digit or by ▲ to set the required digit.
- OPERATING HOURS – can be deleted only by a serviceman. It serves for checking during the service work.
- READ LOG – the shut-down and failure events are logged here, available only for checking during the service work.
- SERVICE MENU – available only after entering a password, reserved for service
- LANGUAGE SELECT - by entering into this item is possible by pushing ▲ and confirming by **SET** to select languages.
- ADDITIONAL DEVICE STATUS (A.D. STATUS) – the user can by ▲ activate or deactivate the additional device. Pushing **SET** the selection is confirmed.
- LEAVE MENU - pushing **SET** we leave the menu and coming back to the displaying of actual date, time and mode.

# Operation and maintenance instructions

## Unit shutdown:

The Unit is turned off upon disconnecting the controller. Make sure to pump out the contents of the Unit, wash and fill it up with clean water.

## The list of necessary maintenance tasks:

The Unit operates automatically and requires no continuous maintenance, but the owner should periodically perform the inspection and maintenance.

## Launching the Unit:

- Setting the AUGUST AT controller
- Connecting the blower
- Adjusting the air distribution manifold valves
- Filling activated sludge (0.25 $m^3$-4 $m^3$, depending on sewage treatment plant model and sludge concentration)

**START-UP GUIDE VIDEO**

## During the inspection, the owner should:

| METHOD OF CONTROL MAINTENANCE | FREQUENCY OF CONTROL MAINTENANCE |
|---|---|
| Check the Unit for foul odour | periodically |
| Check the operation of the blower | periodically |
| Check for foam and carried sludge on the water surface | 1 x month |
| Check the airlift operation, aeration, current regulator | 1 x month |
| Check the solids bag | 1 x month |

## Important points of control:

**Solids bag** - cannot be clogged.
Remove non-degradable materials.

**Operation of airlift 1** - mixing in the solids bag. The flow should not be too strong or too weak. The flow generated by airlift must be sufficient for efficient agitation.

**Aeration work** - air bubbles appearing on the surface of the aeration chamber during blower operation must be fine.

**Operation of airlift 2** - this airlift pumps the settled sludge from the secondary settler into the non-aerated and aeration chamber. Pumping of the sludge mixture must always take place during the operation of the blower.

**Operation of airlift 3** - internal recirculation in the non-aerated (anaerobic) chamber. Pumping of the sludge mixture must always take place during the operation of the blower.

**Foam in the non-aerated chamber** – can be formed from household chemicals; foam can dissipate automatically within a few hours. This is a possible phenomenon during the start-up/ tuning operations or after excessive reduction of sludge concentration.

## Controller's error messages

**There are two types of alarm in the controller** – acoustic and optical. The optical alarm system operates continuously. The audible alarm will be triggered if the blower or controller is malfunctioning or in case of power failure. The audible alarm can be interrupted by pressing ▲.

**Brown foam** – may be caused by several reasons, please contact the Manufacturer or its authorised representative immediately for maintenance of the Unit.

**Floating sludge in the secondary settler** – if the sludge occupies more than half of the surface area of the secondary settler, contact the responsible service representative.

**Foul odour** – strong unpleasant odour is not normal. Contact the Manufacturer or its authorised representative who is authorised to operate the Unit.

**Blower control** – the blower must always be connected to the power source. The blower runs periodically, using the BASIC controller; the maximum resting time is several minutes. If the blower is not working, please contact the Manufacturer or its authorised representative urgently to perform the Unit maintenance.

## Optical alarm

**Constant green** - blower operation is temporarily paused (this is not a malfunction).

**Flashing green** - blower operating.

**Constant red** - blower disconnected – meaning the disconnection or failure of the blower or auxiliary device (non-standard). In the event of failure of the blower or auxiliary device, contact the Manufacturer or its authorised representative who is authorised to operate the Unit.

**Flashing red** - power failure – the controller signals this fault by sound and image. This alarm may last for several hours (depending on the battery charge level). When the batteries run out, the controller will switch to standby mode. When the power supply is restored, the controller will turn on after 2 minutes, with the last selected mode recorded in the memory. If the battery is excessively depleted, the displayed time may not match actual time. In such case, set the actual time.

## Controller notifications of maintenance

**REPLACE FILTER warning** – warns the user to clean or replace filter after half a year of blower operation. Cleaning or replacement of the filter must be confirmed on screen: press the ▲ button and ▲ again to change the message NO to YES, and confirm with **SET**.

**CHANGE MEMBRANE warning** – warns the user for the replacement of the membrane after 1 year of operation of the blower. Replacement of the membrane must be confirmed on screen: press the ▲ button and ▲ again to change the message NO to YES, and confirm with **SET**.

## Inspection and service are carried out only by AUGUST specialists orauthorised representatives:

| MAINTENANCE MODE | MAINTENANCE INTERVALS |
|---|---|
| Check sludge concentration | 1 x 6 months |
| Sludge removal | 1 - 2 x years |
| Replacement of membrane in the blower | 1 x year |
| Check the airlift operation, aeration, flow regulator | 1 x 6 months |
| Check the solids bag | 1 x 6 months |
| Clean the air filter in the blower | 1 x 6 months |

All tasks performed must be recorded in the Unit maintenance documents.

In the event of the malfunction of the controller, disconnect the blower from the controller and connect directly to the mains.

# Removal of excess sludge

## Measurement of settled sludge content

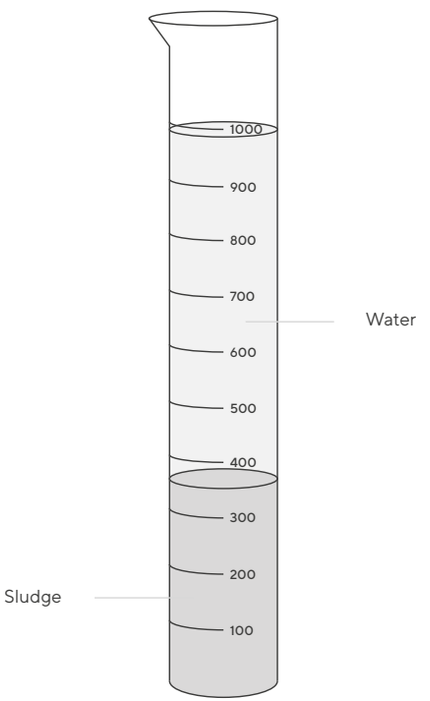
The amount of settled sludge or the settling of the mixture is determined by a sedimentation test flask (1000 ml) or a transparent vessel allowing the sludge to settle for 30 minutes. If the sludge does not settle in the sedimentation test flask, contact the Manufacturer or its representative who is authorised to perform the maintenance of the Unit. Take 1 litre of the activated sludge mixture from the aerated chamber and transfer to the sedimentation test flask. The sample is collected with the blower operating. Allow the mixture to settle for 30 minutes. After this period, check the amount of settled sludge (a clear difference between water and sludge should be visible). This should be 300-600 ml of sludge/1 l of water (most optimal: 400-500 ml of sludge/1 l of water). In such a ratio, the Unit achieves the highest treatment efficiency. The amount of settled sludge should be measured every six months, and the results should be recorded in the Unit maintenance register.

## Removal of excess sludge

If the amount of sludge in the biological reactor of the Unit exceeds 600 ml of sludge/1 l of water, the excess sludge must be removed from the Unit. The intervals and amount of removal depend on the load on the Unit. As the age of the sludge in the Unit is at least 30 days, it means that the sludge is aerobically stabilised and harmless.

**IMPORTANT:** For high groundwater level, the Unit tank may not be completely emptied, as the Unit may be raised or the tank walls may be deformed (crushed).

# Process of excess sludge removal from the Unit




- Blower is off. Aeration and agitation in the biological reactor is stopped. Also, the operation of airlifts 1, 2 and 3 is stopped.
- The contents of the biological reactor must be settled for 30 minutes. The settled sludge must then be pumped out of the bottom of the biological reactor chambers.
- Make sure that the water level between the biological reactor chambers during the removal does not exceed 15 cm, otherwise it may result in damage to the internal partitions of the Unit.
- After removal, the biological reactor chambers must be filled with water to the previous level. When filling with water, all chambers must be filled evenly, maintaining the water level difference between the chambers up to 15 cm.
- The sludge concentration in the biological reactor of the Unit after removal must not be less than 300 ml/l.
- The pump pipe for pumping excess sludge must be placed carefully into the biological reactor of the Unit without damaging the aeration elements or other internal equipment.

# Security

## Household wastewater may contain organisms that are pathogenic to humans, and therefore, when working with the Unit, make sure to protect yourself:

- Wear clothing with long sleeves and long trousers to avoid skin contact with the household wastewater system.
- Use rubber gloves.
- It is forbidden to keep food or drinks near the sewage samples (never store food and sewage samples in the same refrigerator).
- Remove splashed or wet clothes as soon as possible and put on clean garments, wash with disinfectant soap.
- Be sure to treat body cuts or scratches with antiseptics and protect them properly.

## Personal and protective equipment

- Personal and protective equipment must be used:
- Work clothes, shoes.
- Protective rubber gloves.

## Recommended tools for the Unit maintenance:

- Sedimentation test flask – 1000 ml (plastic or glass) for settled sludge measurement.
- Rubber gloves.
- Brush with a long handle.
- The Unit may be serviced by a person aged 18 or over who is objectively able to perform this job. Such a person must be familiar with the operating procedures.
- Any work on the electrical part of the Unit must be carried out by a qualified electrician in accordance with legal regulations and standards in force.
- Use recommended tools and means when working on the Unit.
- Wash and disinfect hands after work on the Unit.
- Access to the Unit may not be covered with ice or snow.
- It is forbidden to walk on the Unit cover. The maximum cover load is 50 kg.





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