

KUSINI

PURPOSE IN EVERY DROP

SITE MAINTENANCE



INSTALLATION & MAINTENANCE OF KUSINI WATER TREATMENT SYSTEMS

Key Components

- Water Source
- Kusini X Pump Solution
- Kusini X Water Treatment System
- Water Tank
- Kusini X Water Dispenser
- Kusini X Remote Management GRM
- Kusini X100 S Solar Panels

Option 1:

3 solar panels are connected in series, 5 sets of 3 solar panels each are connected in parallel.

Option 2:

2 solar panels are connected in series, 7 sets of 2 solar panels each are connected in parallel.

Recommendations for Installation

- Select a configuration that matches the local water quality.
- Select the distribution module to be able to pump the treated water to the elevated water tank.
- Include a level sensing module to make sure, that the Kusini system runs in accordance with the water consumption.

Kusini Water Treatment System

Kusini X should be installed inside a solid building for protection from vandalism and tampering. The building should be accessible only to authorized people.

Water Tank

- The tank must be high enough for gravity feed. It is not possible to feed the dispenser directly from a Kusini system on the same level. The tank outlet should be placed at least 3m above the Kusini dispenser inlet. Kusini X can provide a pump solution.
- The tank should have a lateral water outlet to avoid sediment entering the dispenser. Install the tank in a way that it can be emptied and cleaned.

Water Quality Categorisation

The Kusini system consists of different modules. The quality of the raw water on site determines, which modules are necessary for the water treatment process.

The first step in the selection of the appropriate combination of modules is to determine the water treatment challenge at hand. For this purpose, we developed the Kusini X raw water matrix, which enables you to categorise the raw water into four water types: blue, green, brown and orange. The basis for this categorisation is the content of selected pollutants, referred to as water quality parameters in the table below.

Parameter group	Water quality parameter	Blue water Ground water, rain water or public water	Green water Pond water	Brown water River water in wet Season	Orange water Rivers and lakes in tropical area
		Low fouling	Organic fouling	Inorganic fouling	Organic & Inorganic fouling
Solids	Turbidity [NTU]	<3	3-10	10-100	10-100
	TSS [mg/l]	<5	5-10	>10	5-50
	SD15	<5	5	<5	>5
Dissolved organics	DOC [mg/l]	<5	5-10	<5	10-20
	UV254[1/m]	<0.1	0.1-0.3	<0.5	0.3-0.5
	COD[mg/l]	<15	15-30	<15	30-50
	Oil[mg/l]	<0.1	0.1-0.3	<0.1	0.3-0.5
Dissolved inorganics	Fe/Mn [mg/l]	<0.05	0.05-0.2	>1	>0.5
	Water hardness [mg/l] (CaCO ₃)	<60		>60	
	Conductivity [mg/l]	<500		500-1000	
Water chemistry and temperature	pH	6-9			
	Temperature [°C]	10-35			

Water Quality Limits

UF membranes are very effective barriers for pollutants. Coarse pollutants bigger than 300µm and abrasive particles must be removed from the water entering the system.

The customer is responsible for the relevant pre-treatment of the water. Before entering the UF treatment process, the water quality must comply with the values stated in the table below. Otherwise the warranty is voided.

Parameter group	Water quality parameter	Required feed water quality
Solid	Turbidity [NTU]	<5
	TSS [mg/l]	<5
	SD15	<5
Dissolved organics	DOC [mg/l]	<10
	UV254[1/m]	<0.3
	COD[mg/l]	<20
	Oil[mg/l]	0
Dissolved organics	Fe/Mn [mg/l]	<0.1
	Water hardness [mg/l] (CaCO ₃)	<60
Water chemistry and temperature	Conductivity [mg/l]	<1000
	Cl ₂ [ppm]	Max 0.5 continuously
	pH	6–9
	Temperature [°C]	10–40

Water Samples

Kusini X highly recommends to take representative water samples on a regular basis, to be able to observe the values of the determined water parameters.

It has to be considered to:

- Take several samples from different spots due to changes in the aquatic system
- Ensure that the values account in the middle of the range and not to the critical boundaries
- Consider seasonal changes in the water quality.

Take several samples covering a broad time range and weather conditions.

Service Offerings

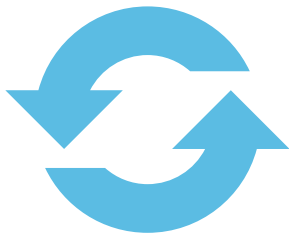
The service offerings described here ensure optimal functioning of the Kusini system with respect to:

- Highly optimised system performance
- Minimal energy consumption
- Reduced operational costs
- Low downtime on site

All service offerings listed below can be purchased individually and locally at Kusini X Service & Solutions. Our Authorised Service Partner network helps us secure a dependable and global availability of service products.

For further information go to: kusiniwater.co.za

Service Stage



Commissioning

- **Check of installation**
During commissioning, all aspects of your Kusini X system are checked, if it is correctly installed and ready for start-up.
- **Commissioning**
Commissioning is crucial to avoid breakdown of the Kusini X system during operation.
- **Train the operator**
Certified service staff trains your operator in the basic maintenance tasks and writes a detailed report including the activities realised, the parameters measured, and gives recommendations.
- **Your operator will be able to keep the system running at optimal conditions.**

Service contracts

- **Professional maintenance and repair service**
With a Kusini service contract, you get dependable and professional service and maintenance, making sure that your installation remains in top condition and runs in an energy efficient manner.
- **Two-level service contract**
To suit your needs, two different levels of service contracts are available: Basic and Advanced.
- **Maximal reliability at low costs**
Regular scheduled service work with replacement of components maximises the reliability of the system and keeps the running costs low

Repair and Maintenance

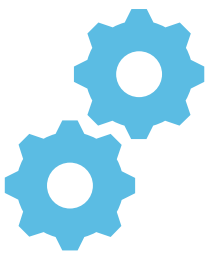


On-site repair

Certified service staff takes care of maintenance and repair tasks. This provides you with the following advantages:

- Minimised downtime and expenditure due to fast and efficient repair work
- Repair work is performed in such a way that the product warranty remains valid
- No need to spend time and resources in dismantling installations, sending components for repairs, and reassembling installations afterwards
- Clear overview of repair costs

Spare Parts and Maintenance Kits



Spare Parts and Maintenance Kits

Each maintenance kit is tailor-made for one specific maintenance operation.

- One-stop shop solution: You'll get all the suitable original spare parts and maintenance kits at one place.
- Spare parts can be ordered at the local Kusini sales company or the Service and Sales Partner.
- Kusini Distribution Service offers 24/7 global delivery options

Surveillance and Mobility



Kusini Remote Management

Expert service engineers perform remote monitoring of the key parameters of your Kusini X system.

- When a critical event occurs, you are informed immediately by a warning or alarm, which avoids a breakdown of your system.
- Your operator receives assistance and recommendations
- Site visits for troubleshooting are coordinated
- A detailed report that highlights potential problems, gives recommendations and analyses data is sent periodically.

Basic Maintenance Schedule

The basic preventative maintenance activities expected to be carried out by the user described in the following table, in order to keep the system free from troubles and to avoid unexpected breakdowns

Interval	Module	Task	See section
Weekly	Whole Kusini X system	Perform a visual inspection. Check the presence of warnings or alarms, water, leaks, abnormal noise or vibrations.	
		Visually inspect strainers () and (). Clean, if necessary.	Strainers
	Whole Kusini X system	Clean the strainers () and ().	Strainers
	Air Sourcing	Check that there is no water in the transparent hose.	
	Solar package	Clean the solar panel in order to obtain the maximum efficiency.	
Monthly	Whole Kusini X system	If necessary, clean all system surfaces with a dry and clean cloth.	Cleaning the system
		Check the feed water supply.	Checking the feed water supply.
	UV disinfection	<p>Heck the UV intensity value displayed at the UV controller. The UV controller can be found at the lower back side of the Kusini X control cabinet. Actions should be taken according to the displayed value:</p> <ul style="list-style-type: none"> • >65%: No action required. • 65–50%: Clean the quartz sleeve and the sensor of the UV system () soon. • <50%: An alarm is displayed and the system is stopped. Clean the quartz sleeve and the sensor of the UV system (). 	UV disinfection module

The position reference in the table refer to the PID.



Warning

Danger of personal injury or damage to the equipment!
The following tasks must be performed by certified service staff. The staff must have received proper training from Kusini before any work on the system

Interval	Component	Task	See section
Every 6 months	Whole Kusini system	Inspection of general installation conditions. Log statistics, alarm history, check system for functionality, leaks, abnormal conditions.	
	Feed pump ()/Backwash pump ()	Inspect shaft seal, tighten up connections, tighten electrical connections on terminal box.	
	Pressure relief valve ()	Check that no leak is present.	
	Motor valves ()	Check functionality of valves.	
	Filters (),()	Replace filter screens.	Strainers
	UF membrane ()	Perform integrity test.	Performing integrity test (without air scouring module)
	Control cabinet	Retighten electrical connections. Clean mat of cooling filter.	
	Internal CIP	General check of circulation pump (). Retighten mechanical and electrical connections.	
	Air sourcing	General check of air compressor (). Retighten mechanical and electrical connections	
	GAC filter ()	Replace activated carbon () in filter vessel () and check the filter cartridge in cartridge filter (). Inspect strainers and riser pipe for damages or clogging. Test functionality of multiport valve ().	Activated carbon filter
UV disinfection	Clean UV sleeve and sensor of UV system (). Check intensity value. Check functionality of solenoid valve ().	UV disinfection module	
Chlorination	Check level sensor () and suction line. Check that no sediments are in chemical tank (). Check that the sodium hypochlorite solution meets the specifications. Calibrate dosing pump () and retighten dosing head screws.		

Every 12 months	Prefilter	Replace filter screen	Self-cleaning prefilter
	Air sourcing	Replace intake filter of compressor ()	
	GAC filter	Replace filter cartridge in cartridge filter.	Cartridge filter
	UV disinfection	Replace UV lamp of UV system (). Perform sensor cleaning. Reset intensity value to 100%.	UV disinfection module
	Solar packages	Tighten electrical connections, measure voltage of batteries.	
Whole Kusini system	Perform external CIP to remove sediments and other particles.	Performing external CIP	
Every 24 months	Feed pump (/Backwash pump ())	Replace shaft seal, wear kit, gaskets and motor bearings	
	Prefilter	Replace non-return valve. Replace cylinder () and elbow fitting.	Self-cleaning prefilter
	Internal CIP	Replace non-return valves.	
	Air sourcing	Replace non-return valves.	
	Chlorination	Replace diaphragm and valves of dosing pump ().	
	External CIP unit	Replace non-return valves.	
Every 60 months	UF membrane element	Replace membrane	
	Internal CIP	Replace pump head of circulation pump ().	
	Air sourcing	Replace intake vanes of compressor.	
	Solar power	Replace batteries	

Note

After maintenance, the certified service staff is responsible for setting the new scheduled maintenance date in the service menu at the HMI. Details can be found in the separate HMI manual, which is supplied to certified service staff only.