

# SCALA1 System

Installation and operating instructions



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GRUNDFOS



# SCALA1 System

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## **English (GB)**

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# English (GB) Installation and operating instructions

## Original installation and operating instructions

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## 1. General information

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.



Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.



Read this document before you install the product. Installation and operation must comply with local regulations and accepted codes of good practice.

### 1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



**DANGER**  
Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.



**WARNING**  
Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.



**CAUTION**  
Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

The hazard statements are structured in the following way:



#### SIGNAL WORD

#### Description of the hazard

Consequence of ignoring the warning

- Action to avoid the hazard.

### 1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

### 1.3 Target group

These installation and operating instructions are intended for professional as well as non-professional users.

## 2. Product introduction

### 2.1 Product description

The SCALA1 system is used to manage and distribute rain. The system is suitable for irrigation, water flushing of toilets and floor cleaning systems. The system prioritises the use of rainwater over tap water. In case of insufficient rainwater in the tank, the control unit switches to tap water to ensure the necessary water flow at the tapping points. The system automatically switches between the rainwater tank and the tap water tank by means of a three-way valve installed on the pump inlet port. The water supplied by the system is not potable.

### 2.2 Pumped liquids

#### DANGER

#### Explosion risk

Death or serious personal injury



- Do not use the product for flammable liquids such as diesel oil, petrol or similar liquids. The product must only be used for water.

#### WARNING

#### Electric shock

Death or serious personal injury



- Do not use the product for aggressive liquids. The product must only be used for water.

#### WARNING

#### Toxic material

Death or serious personal injury



- Do not use the product for toxic liquids. The product must only be used for water.



If the water contains sand, gravel or other debris, there is a risk of pump blockage and pump damage. Install a filter on the inlet side or apply a floating strainer to protect the pump.

The product is suitable for pumping clean, thin, non-aggressive and non-explosive liquids without solid particles or fibres.

The product is designed for fresh water with a maximum chloride content of 300 ppm and a free chlorine content below 1 ppm.

Examples of liquids:

- drinking water
- rainwater.

### 3. Installation requirements

#### 3.1 Mechanical installation

**WARNING**

**Electric shock**

Death or serious personal injury



- Switch off the power supply before you start any work on the product. Make sure that the power supply cannot be switched on accidentally.

**WARNING**

**Electric shock**

Death or serious personal injury



- Mount the product horizontally to avoid condensation in the electrical insulation inside the control box.

**WARNING**

**Chemical hazard**

Death or serious personal injury



- Before the pump is used for supplying drinking water, flush the pump thoroughly with clean water.

**WARNING**

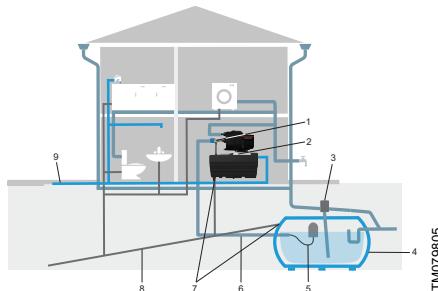
**Biological hazard**

Death or serious personal injury



- Before the pump is used for supplying drinking water, flush the pump thoroughly with clean water.

##### 3.1.1 Wall installation



Pos.	Description
6	Suction pipe
7	Tank overflow
8	Sewer line
9	Mains water supply

Before installing the product, ensure that the sewage system is at least 1 metre below where the SCALA1 system is to be installed. The following requirements must also be met:

- the room must have an outlet pipe that is connected to the sewage system
- the location must be dry and protected from rain
- flat wall, in horizontal position
- minimum distance from the ceiling: 50 cm.

**Pos.**   **Description**

1      Electronic switch

2      SCALA1 System

3      Filter

4      Rainwater tank

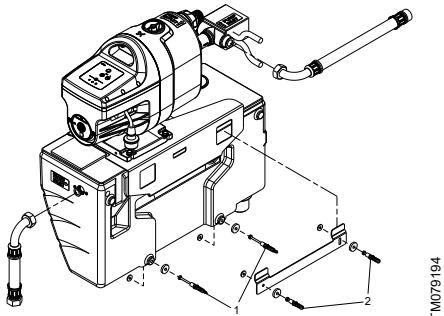
5      Suction filter/float switch

### 3.1.1.1 Mounting the product



The security screws are essential to ensure the stability of the system and the safety of persons.

4. If the outlet pipe does not slope sufficiently, install a pump system.



*SCALA1 system*

Pos.	Description
1	Mounting screws for the bracket
2	Security screws

Follow the steps below to mount the SCALA1 system:

1. Install the mounting bracket on the wall.  
Make sure it is horizontal using a spirit level, and mark the positions of the holes.
2. Drill the mounting holes using a D.10 drill bit.
3. Fix the bracket to the wall, making sure that it is level and securely attached to the wall.
4. Install the SCALA1 system as shown above.
5. Mount the security screws.
6. Place two of the supplied vibration dampers between the bracket and the wall, and place the remaining two between the tank and the wall to reduce the transfer of vibrations to the wall.

### 3.1.2 Overflow connection

To install the overflow connection, follow the steps below:

1. Connect the DN50 outlet pipe to the overflow pipe of the system.
2. Make sure that the outlet pipe slopes sufficiently to guarantee correct drainage.
3. Connect the outlet pipe to the sewage system.

### 3.1.3 Connecting the tap water pipe



When tightening the pipe, make sure the tap water hose does not turn.

The float switch that regulates the back-flow of the tap water is designed to operate at a maximum pressure of 4 bar and a flow rate of more than 10 L/min. If the mains water pressure exceeds this value, install a pressure regulator upstream of the float and add a mesh filter to protect the pressure regulator from any debris that could compromise its operation. Excessive pressure in the pipes of the tap water network can lead to a leak or a malfunctioning float switch.

We recommend installing an on/off tap upstream of the float switch to cut off the mains water supply in case of breakage or malfunction so that maintenance can be carried out safely.

1. Connect the tap water pipe to the 3/4 inch drain on the right side of the tank.

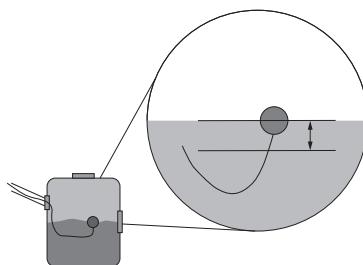
### 3.1.4 Connecting the rainwater inlet pipe

The inlet pipe must have an internal diameter of at least 25 mm, and it must always slope towards the tank.



We recommend installing in the rainwater tank a float switch fitted with a suction strainer and a non-return valve.

1. Install the system as close to the rainwater tank as possible.
  - a. Never exceed a suction height of 6 metres for optimum performance of the pump. The total of the suction distance and the suction loss depends on the length of the inlet pipe.
  - b. The inlet point must always ensure the suction of clean water. Use a suction kit, and install it as shown here.

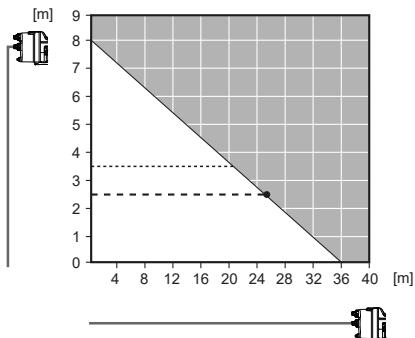


TM079-196

*Installation of the suction kit*

2. Connect the inlet pipe to the connecting piece.

#### Example:



TM079-195

*Maximum inlet pipe length (horizontal axis) according to the suction lift (vertical axis)*

### 3.1.5 Connecting the outlet pipe



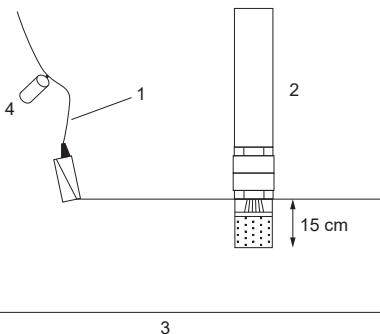
Install an on/off tap upstream of the float switch to cut off the mains water supply in case of breakage or malfunction so that maintenance can be carried out safely.

1. Connect the outlet pipe to the 1-inch connector with the supplied hose as shown below.
2. Fix the pipe to the wall with a suitable bracket.

### 3.1.6 Installing the level sensor

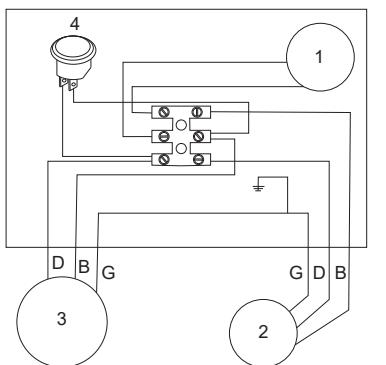
The level sensor must be installed in the rainwater tank. Please proceed as follows:

1. Place the float as shown below.



#### *Installing the float switch*

2. Adjust the counterweight so that it is at least 20 cm above the float.
3. After adjusting the float, make sure that the cable is protected along its entire length:
  - a. Place the cable in a casing tube.
  - b. Reconnect the float cable at the 3-way valve.



4. The float switch must change the contact at least 15 cm before the suction strainer fills with air.

## 4. Starting up the product

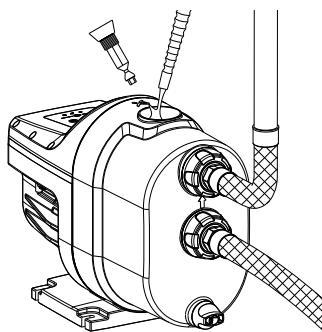


Do not turn on the power supply until the pump has been filled with liquid.

### 4.1 Priming the product

1. Unscrew the priming plug and pour at least 1.7 litres (0.45 gallons) of water into the pump housing.
2. Screw the priming plug on again.

#### **Example:**



#### *Priming the pump*



If the suction depth exceeds 6 m (20 ft), it may be necessary to prime the pump more than once.



Always tighten priming and drain plugs by hand.

### 4.2 Starting up the pump

After installing and priming, follow the following steps to start up the pump.

1. Prime the pump according to the priming instructions.
2. Open all isolating valves.
3. Open the tapping point that is the highest or furthest away from the pump to let out air trapped in the system.
4. Turn on the pump's power supply. All the symbols on the operating panel will light up briefly. The **Stop** icon remains on.

5. Press the **Start/Stop** button to start the pump. If there is a suction lift, it may take up to five minutes before the pump delivers water depending on the length and diameter of the inlet pipe.
6. When the water flows through the tapping point without air, close the tapping point. The pump will stop after approx. 10 seconds.
7. The startup is now completed, and the pump is ready for operation.

## 4.3 Operation

### 4.3.1 Normal operation

When water is consumed in the water supply system, the pump starts if the starting conditions of the pump are fulfilled. This happens, for example, when a tap is opened, making the pressure in the system drop.

The pump stops when the consumption stops, i.e. when the tap is closed.

#### 4.3.1.1 Starting and stopping conditions

##### Starting conditions

The pump starts when at least one of the following conditions is fulfilled:

- The flow is higher than Qmin (1.5 l/min).
- The pressure is lower than pstart.

##### Stopping conditions

The pump stops with a time delay of 10 seconds when both of the following conditions are fulfilled:

- The flow is lower than Qmin (1.5 l/min).
- The pressure is higher than pstart.

The pstart values are shown in Technical data.

## 4.4 Shaft seal run-in

The shaft seal faces are lubricated by the pumped liquid. A slight leakage from the shaft seal of up to 10 ml per day or 8 to 10 drops per hour may occur. Under normal conditions, the leaking liquid will evaporate. As a result, no leakage will be detected.

When the pump is started for the first time, or when the shaft seal has been replaced, a certain run-in period is required before the leakage is reduced to an acceptable level. The time required for this depends on the operating conditions, that is, every time the operating conditions change, a new run-in period will be started.

Leaking liquid will drain through the drain holes in the motor flange.

Install the product in such a way that leakage cannot cause undesirable collateral damage.

## 5. Control functions

## 5.1 Operating panel



TM075407

Symbol	Description
The following alarm lights indicate an issue with installation:	
	Leakage in the system.
	Dry-running or water shortage.
	The maximum runtime has been exceeded.

Symbol	Description
	<b>Grundfos Eye:</b> The indicator light shows the operating status of the product.
	<b>Start/Stop:</b> Press the button to make the product ready for operation or to start and stop the product. <b>Start:</b> If you press the button when the product is stopped, the product starts if no other functions with higher priority have been enabled. <b>Stop:</b> If you press the button when the product is running, the product always stops.
	Pump is stopped. The stop icon will light up on the display.
	Bluetooth connect button enables communication with Grundfos GO Remote. Connection indicator light. It will light up when the connection to Grundfos GO Remote is established.
	Reset the alarms.

## 5.2 Auto reset

This function allows the pump to automatically check if the operating conditions are back to normal. If the operating conditions are back to normal, the alarm indication will be reset automatically.

The factory setting is: **ON**

The auto reset function works as follows:

Alarm	Auto reset action	Configurable	Default
Dry run	<p>The pump will attempt eight restarts at five-minute intervals. If not successful, this cycle will be repeated after 24 hours.</p> <p>In twin configuration Duty/Assist, there is no reset if only one pump is in dry run alarm. If both pumps are in dry run, the reset will be staggered.</p> <p>In twin configuration Duty/Standby, the pump will attempt to restart immediately independent of the second pump.</p>	YES	ON
Anti-cycling	This function will attempt to reset after 12 hours, and the pump will return to normal operation.	YES	ON
Max. runtime	None	Fixed disabled	
Missed twin pump	Auto reset is performed by the system when communication is reestablished.	Fixed enabled	

## 5.3 Dry-running protection



If a dry-running alarm has been activated, the cause should be identified before the pump is restarted to prevent damage to the pump.

The unit incorporates dry-running protection that automatically stops the pump in case of dry-running. The dry-running protection functions differently during priming and operation.

### 5.3.1 Dry-running during priming

If the unit does not detect pressure and flow within 5 minutes after it has been connected to a power supply, and the pump has started, the dry-running alarm is activated.

### 5.3.2 Dry-running during operation

If the unit does not detect pressure and flow within 40 seconds during normal operation, the dry-running alarm is activated.

### 5.3.3 Resetting of dry-running alarm

If the dry-running alarm has been activated, the pump can be restarted manually by pressing [Reset]. If the unit does not detect pressure and flow within 40 seconds after restarting, the dry-running alarm is reactivated.

This protection is always **ON**.



Dry-running or water shortage.

## 5.4 Anti-cycling

If there is a minor leakage in the system, or a tap has not been closed entirely, the unit will start and stop the pump periodically. To avoid cycling, the anti-cycling function of the unit will stop the pump and indicate an alarm. The anti-cycling function can be configured in Grundfos GO Remote.

### Off

If the pump starts 40 times in a fixed pattern, a LED icon will signalize cycling. The pump will remain in normal operation.

### On

If the pump starts and stops in a fixed pattern, there is a leakage in the system, and the pump will stop and show red Grundfos Eye and LED icon indication.

The factory setting for this function is **OFF**.



Leakage in the system.

## 5.5 Maximum runtime

This function is a timer that can turn off the pump if it runs continuously for a certain amount of time. This time period can be adjusted via Grundfos GO Remote.

### Off

The pump will run depending on the operating conditions disregarding the continuous operation.

### On

The pump will stop after the specified period of continuous operation, and it will show the alarm **Maximum runtime exceeded**. This alarm will always need to be reset manually.

The factory setting for this function is **OFF**.



Maximum runtime exceeded.

## 6. Fault finding

### CAUTION

#### Hot surface

Minor or moderate personal injury

- Do not run the pump continuously with a closed inlet or outlet valve.

### CAUTION

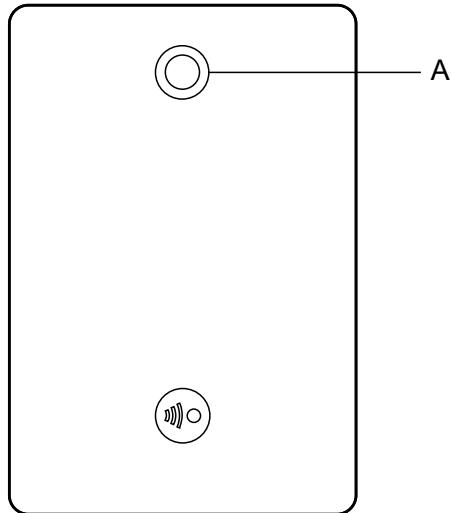
#### Hot or cold liquid

Minor or moderate personal injury

- Make sure that escaping hot or cold liquid does not cause injury to persons or damage to the equipment.

### 6.1 Grundfos Eye SCALA1

Grundfos Eye indicates the operating conditions of the motor on the motor operating panel.



TMO54846

**Grundfos Eye indicator light**

<b>Grundfos Eye</b>	<b>Cause</b>	<b>Remedy</b>
	No lights are on.	The power is off. The motor is not running.
	Two opposite green lights are permanently on.	The power is on. The motor is not running.
	Two opposite green lights are rotating.	The power is on. The motor is running. The indicator lights are rotating in the direction of rotation of the motor when seen from the non-drive end.
	Two opposite red indicator lights are flashing simultaneously.	Alarm. The motor has stopped.
	Two opposite yellow lights are permanently on.	The pump was stopped by external input, calendar function or twin communication failure.
	Two yellow and four green lights are permanently on.	The pump is performing a self-test.

## 6.2 The pump does not start

Grundfos Eye	Indicator light	Auto-matic re-set	Cause	Remedy
	-	-	The fuses in the electrical installation have blown.	Replace the fuses. If the new fuses blow as well, check the electrical installation.
	-	-	The earth leakage circuit breaker or the voltage-operated circuit breaker has been tripped.	Cut in the circuit breaker.
	-	-	No power supply.	Contact the power supply authorities.
	-	-	The difference between SCALA1 unit and the tapping point is too large.	Adjust the installation or select a SCALA1 unit with a higher head.

Cause	Remedy
-------	--------

## 6.3 The pump is not running

Grundfos Eye	Indicator light	Auto-matic reset	Cause	Remedy
	-	-	Power supply failure.	Switch on the power supply. Check the cables and cable connections for defects and loose connections. Check for blown fuses in the electrical installation.
		Yes	Dry-running or water shortage.	Check the water source, and prime the pump.
		Yes	Impurities are blocking the inlet pipe.	Clean the inlet pipe.
		Yes	The foot or non-return valve is blocked in a closed position.	Clean, repair or replace the foot or non-return valve.
		Yes	Leakage in the inlet pipe.	Repair the inlet pipe.
		Yes	Air in the inlet pipe or the pump.	Prime the inlet pipe and the pump. Check the inlet conditions of the pump.

Grundfos Eye	Indicator light	Auto- matic reset	Cause	Remedy
		No	Maximum runtime has been exceeded.	Check the installation for leakage and reset the alarm.
		Yes	<p>The internal non-return valve is defective or blocked in completely or partially open position.</p> <p>Small leakage is detected by the anti-cycling function. Alarm is on.</p>	<p>Clean, repair or replace the non-return valve.</p> <p>Check the taps and reconsider the usage pattern, e.g. ice machines, water evaporators for air-conditioning, etc.</p>
	-	No	The shaft seal is seized up.	
	No	No	The pump is blocked by impurities.	See section 10. Starting up the product after the standstill.
	No	No	Overheating due to seized-up or choked-up pump.	Contact your pump supplier.
	No	No	Too low or too high supply voltage.	Check the supply voltage and correct the fault, if possible.
	No	-	The pump has been stopped by external input or calendar function.	

**Cause****Remedy**

## 6.4 The pump is running

Grundfos Eye	Indicator light	Auto-matic reset	Cause	Remedy
		No	The non-return valve is not properly closed, or the pipe system is leaking. This happens when cycling alarm and/or leakage alarm are disabled.	Check and repair the pipe system, or clean, repair or replace the non-return valve.
		No	Small continuous consumption.	Check the taps and reconsider the usage pattern (ice machines, water evaporators for air-conditioning, etc.).

Cause Remedy

---

## 6.5 The pump cuts out during operation

### Condition

Grundfos Eye	Indicator light	Automat-ic reset	Cause	Remedy
	-	-	Overheating due to excessive liquid temperature above 45 °C.	Supply cold liquid to the pump.
	-	-	Overheating caused by – high ambient temperature 55 °C – overloaded motor – seized-up motor or pump.	Contact your pump supplier.
	-	-	Supply voltage too low.	Check the supply voltage and correct the fault, if possible.

Cause Remedy

---

## 6.6 The pump performance is insufficient

Grundfos Eye	Indicator light	Automatic reset	Cause	Remedy
	-	-	Pump inlet pressure is too low.	Check pump inlet conditions.
	-	-	Pump is undersized.	Replace the pump with a larger pump.
	-	-	Inlet pipe, inlet strainer or pump are partially blocked by impurities.	Clean the inlet pipe or the pump.
	-	-	Leakage in the inlet pipe.	Repair the inlet pipe.
	-	-	Air in the inlet pipe or the pump.	Prime the inlet pipe and the pump. Check pump inlet conditions.

Cause	Remedy

## 6.7 The pump starts and stops too frequently

Grundfos Eye	Indicator light	Automatic reset	Cause	Remedy
	-	-	Leakage in suction pipe or air in the water.	Restore the water supply or repair suction pipe.
	-	-	A tap has not been closed entirely after use.	Check that all taps have been closed. See section Anti-cycling.
	-	-	Minor leakage in the system.	Check the system for leakages. See section Anti-cycling.

Cause	Remedy

## 6.8 The pump does not stop

Grundfos Eye	Indicator light	Automatic reset	Cause	Remedy
	-	-	The pump cannot deliver the necessary discharge pressure.	Replace the pump.
	-	-	The existing pipes are leaking or defective.	Repair the pipes.
	-	-	The non-return valve is blocked or missing.	Clean the valve or fit a non-return valve.

Cause	Remedy
-------	--------

## 6.9 The pump gives electric shocks

Grundfos Eye	Indicator light	Automatic re-set	Cause	Remedy
-	-	-	Defective earth connection.	Connect the earth connection to the pump according to local regulations.

Cause	Remedy
-------	--------

## 6.10 Fault resetting

A fault indication can be reset in one of the 2 following ways:

1. Eliminate the fault cause and reset the pump manually by pressing the [Reset] button.
2. Enable the **Auto reset** function.

### Example:



If the fault disappears by itself, the pump will attempt to reset automatically, and the fault indication will disappear. The fault indication will still be visible in the Grundfos GO Remote alarm log.

## 7. Maintenance

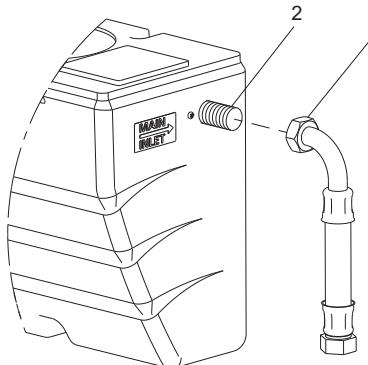
The system does not require regular maintenance.

The following maintenance activities can be performed preventatively every 6-12 months:

- Make sure that the valve closes hermetically and that the float switch can move freely.
- Make sure that the pump is delivering the correct pressure and that it is not making any mechanical noise or whistling.
- Make sure that there are no leaks in the connections.
- Confirm that the level sensor functions correctly when cleaning the rainwater tank.

### 7.1 Cleaning the filter

To clean the filter on the SCALA1 system, follow the steps below.



TM079192

Pos.	Description
1	Tuboflex tap water inlet
2	Pressure relief valve

1. Loosen and remove the ring nut of the Tuboflex.
2. Remove any dirt from the filter with a pressure washer.
3. Insert the filter back into the pressure relief valve.
4. Place the gasket on the ring nut of the Tuboflex.
5. Tighten the ring nut onto the screw thread of the regulator.

Make sure the screw thread of the ring nut is correctly positioned on the screw thread of the pressure relief valve.

## 8. Technical data

### 8.1 Operating conditions

SCALA1 System		
	3-35	3-45
Pump water temperature [°C]	5 - 35	5 - 35
Max. ambient temperature [°C]	55	55
Max. liquid temperature [°C]	45	45
Max. system pressure [bar]	8	8
Max. inlet pressure [bar]	4	3
Max. head [m]	36	45
Nominal head [m]	20	25
Nominal flow [m³/h]	3.72	3.59
IP Rating System	IP 20	IP 20
Pumped liquid	Rainwater	Rainwater
Noise level [db(A)]*	< 55	< 55
Frequency of starts and stops	25 per hour	25 per hour
Start pressure (pstart) [bar]	1.5	2.2
Inlet and outlet connections	1"	1"
Diameter of tap water pip	3/4"	3/4"
Diameter of overflow	PP DN 50 M	PP DN 50 M
Tank capacity [L]	15 **	15
Material of tank	HDPE (high-density polyethylene)	
Float switch level of tank	Start/Stop float switch with 20 m cable	
Media type	Non-aggressive and non-explosive liquids without solid particles or fibres or abrasive water.	

\* Noise level of SCALA1 pump

\*\* Useful volume is 12 L

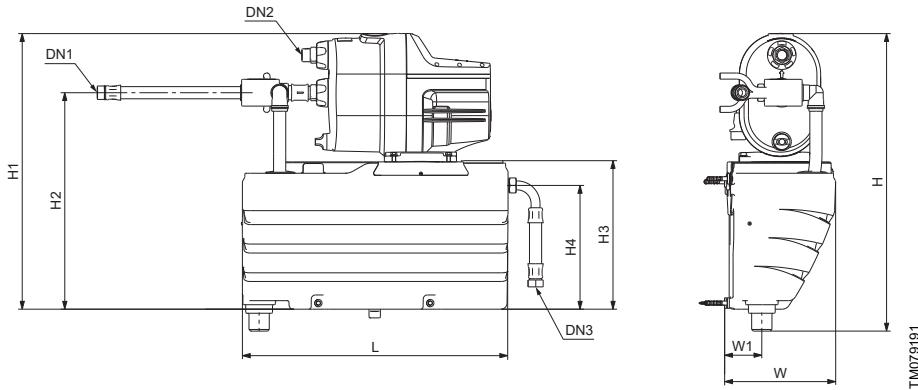
## 8.2 Mechanical data

Pipe connections are R1" or NPT1".

## 8.3 Electrical data

Pump type	Volt-age[V] 1	P1 [W]	P2 [W]	n [rpm]	I <sub>n</sub> [A]	I <sub>start</sub> [A]	Stand by power [W]
SCA-LA1 3-35	1 x 230	720	450	2800	3.27	13.0	1.5
SCA-LA1 3-45	1 x 230	910	580	2800	4.10	17.0	1.5

## 8.4 Dimensions and weights



Pump	H [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	L [mm]	W [mm]	W1 [mm]	DN1	DN2	DN3	Weight [kg]
SCALA1 System 3-35	733	679	533.5	366	305	650	259.3	77	1"	1"	3/4"	26
SCALA1 System 3-45	733	679	533.5	366	305	650	259.3	77	1"	1"	3/4"	27

## 9. Disposing of the product

This product or parts of it must be disposed of in an environmentally sound way.

1. Use the public or private waste collection service.
2. If this is not possible, contact the nearest Grundfos company or service workshop.

3. Dispose of the waste battery through the national collective schemes. If in doubt, contact your local Grundfos company.



The crossed-out wheelie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local waste disposal authorities.

The separate collection and recycling of such products will help protect the environment and human health.

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See also end-of-life information at  
[www.grundfos.com/product-recycling](http://www.grundfos.com/product-recycling).

## 9.1 Disposing of hazardous or toxic materials

### **WARNING**

#### **Chemical hazard**

Death or serious personal injury

- Observe the material safety data sheet of the dosing medium.
- Wear protective clothing when working on the dosing head, connections or lines.
- Rinse the parts that have been in contact with the dosing medium.
- Collect and dispose of all chemicals in a way that is not harmful to persons or the environment.

The materials used in DMX pumps do not pose any health risk to the person handling them. To identify the specific materials, check the type key on the product nameplate and read the explanation in the section Type key.

Observe also the product recycling page on <http://www.grundfos.com/products/product-sustainability/dmx.html>

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