SCALA2

Installation and operating instructions

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http://net.grundfos.com/qr/i/98880508

GRUNDFOS

SCALA2

Original installation and operating instructions

Table of contents

2. 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.

2.1 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.

2.2 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.

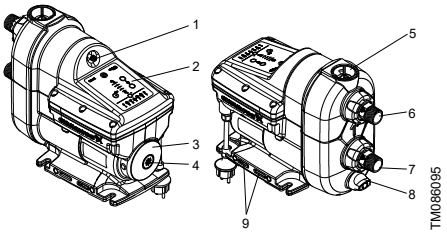
Tips and advice that make the work easier.

2.3 Target group

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

3. Product introduction

3.1 Product description



Grundfos SCALA2 pump

Pos.	Description
1	Air valve for built-in pressure tank
2	Operating panel
3	Nameplate
4	Plug for access to pump shaft
5	Priming plug
6	Outlet opening
7	Inlet opening
8	Drain plug
9	Ventilation holes. They must not be flooded.

The inlet and outlet openings include flexible connections of ± 5°.

Related information

3.4.1 Nameplate

6.3 Connecting the pipe system

8.1 Priming the pump

10.1 Menu overview, SCALA2

13.1 Deblocking the pump

3.2 Intended use

This pump has been evaluated for use with water only.

Only use SCALA2 pumps according to the specifications stated in these installation and operating instructions.

The pump is suitable for pressure boosting of fresh water in domestic water supply systems.

3.3 Pumped liquids

The pump is designed for pumping clean, thin, fresh water with a pH value between 4 and 9, a maximum chloride content of 300 ppm and free chlorine content below 1 ppm, for example:

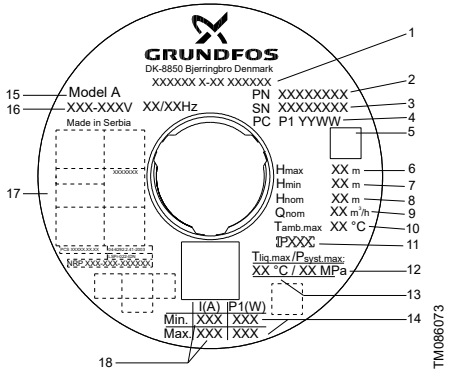
- drinking or tap water
- rainwater
- groundwater
- river and lake water
- softened water.

Sand and other impurities in the water can cause wear to the pump and pump blockage.

Install a filter on the inlet side or apply a floating strainer to protect the pump.

3.4 Identification

3.4.1 Nameplate



Example of nameplate

Pos.	Description
1	Type designation
2	Product number
3	Serial number
4	Production code (year and week)
5	Barcode
6	Max. head
7	Min. head
8	Rated head
9	Rated flow rate
10	Max. ambient temperature
11	Enclosure class
12	Max. operating pressure
13	Max. liquid temperature
14	Min. and max. rated power
15	Model
16	Voltage and frequency
17	Approvals
18	Min. and max. rated current

3.4.2 Type key

Example: SCALA2 3-45 A K C H D E

Code	Explanation	Designation
SCALA 2		Type range
3		Rated flow rate [m^3/h]
45		Max. head [m]
A	Standard	Material code
K	1 × 200-240 V, 50/60 Hz	Supply voltage
M	1 × 208-230 V, 60 Hz	
V	1 × 115 V, 60 Hz	
W	1 × 100-115 V, 50/60 Hz	
C	High-efficiency motor with frequency converter	Motor
A	Cable with plug, IEC type I, AS/NZS3112, 1.5 m	Mains cable and plug
B	Cable with plug, IEC type B, NEMA 5-15P, 6.5 ft	
C	Cable with plug, IEC type E&F, CEE7/7, 1.5 m	
D	Cable without plug, 1.5 m	
G	Cable with plug, IEC type G, BS1363, 1.5 m	
H	Cable with plug, IEC type I, IRAM 2073, 1.5 m	
J	Cable with plug, NEMA 6-15P, 6.5 ft	
K	Cable with plug, IEC type B, JIS C 8302, 1.5 m	
L	Cable with plug, IEC type L, CEI 23-16/VII, 2 m	
O	Cable with plug, IEC type O, TIS 166-2549, 1.5 m	
P	Cable with plug, IEC type D/M, IS 1293, 2 m	
D	Integrated frequency converter	Controller
E	R 1" composite material	Thread
F	NPT 1" composite material	

4. Receiving the product

4.1 Inspecting the product

Check that the product received is in accordance with the order.

Check that the voltage and frequency of the product match the voltage and frequency of the installation site.

Related information

3.4.1 Nameplate

4.2 Scope of delivery

The box contains the following items:

- 1 Grundfos SCALA2 pump
- 1 quick guide
- 1 safety instructions booklet
- 1 quick guide for locking pin (only for versions with locking pin).

5. Installation requirements

5.1 Location

The pump can be installed indoors or outdoors, but it must not be exposed to frost.

We recommend that you install the pump near a drain or in a drip tray connected to a drain in order to lead away possible condensation from cold surfaces.

The product must be installed in a well-ventilated room to avoid condensation.

The installation location must be protected from rain, humidity, condensation, direct sunlight and dust.

The relative air humidity must not exceed 95 %.

Install the pump in such a way that no undesirable collateral damage can arise due to leakage.

If the unlikely event of an internal leakage occurs, the liquid will be drained through the bottom of the pump.

5.1.1 Minimum space

The pump requires a minimum space of 430 × 215 × 325 mm (17 × 8.5 × 12.8 inches).

Even though the pump does not require much space, we recommend that you leave enough space for service and maintenance access.

5.1.2 Installation of the product in a frosty environment

Protect the product from freezing if it is to be installed outdoors where frost may occur.

5.2 System sizing

Make sure that the system in which the pump is incorporated is designed for the maximum pump pressure.

The pump is factory-set to 3 bar (44 psi) outlet pressure which can be adjusted according to the system in which it is incorporated.

The tank precharge pressure is 1.8 bar (26 psi).

In case of suction lift of more than 6 metres (19.7 ft), the pipe resistance on the outlet side must be at least 2 metres water column or 3 psi at any given flow in order to obtain optimum operation.

5.2.1 Maximum system pressure

Make sure that the system in which the pump is installed is designed for the maximum pump pressure.

When using SCALA2 in installations with water heaters, you must use a non-return valve, pressure-relief valve or a thermal expansion tank between SCALA2 and the water heater. This prevents the backflow pressure from exceeding the 10 bar pressure limit the pump is designed for.

The maximum inlet pressure must not exceed 6 bar, and the maximum system pressure must not exceed 10 bar.

We recommend installing a pressure-relief valve to protect the pump so that the outlet pressure does not exceed the maximum system pressure.

6. Mechanical installation

DANGER
Electric shock
Death or serious personal injury

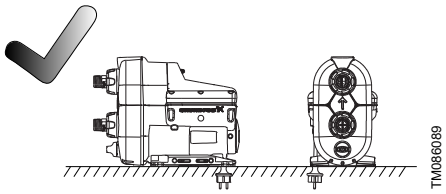
- Switch off the power supply before you start any work on the product. Make sure that the power supply cannot be switched on accidentally.

6.1 Positioning the product

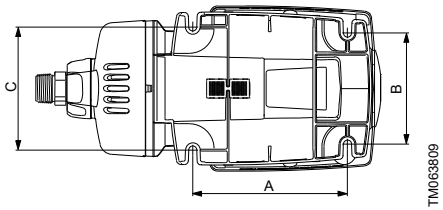
Always mount the pump on the base plate in a horizontal position with a maximum inclination angle of ± 5°.

6.2 Foundation

Fasten the pump to a solid horizontal foundation by means of screws through the holes in the base plate. See the figures below.



Horizontal foundation



Base plate

Pos.	[mm (inch)]
A	181 (7.13)
B	130 (5.12)
C	144 (5.67)

6.3 Connecting the pipe system

Make sure that the pump is not stressed by the pipe system.

Always loosen and tighten the union nuts on the inlet and outlet ports by hand. Damage to the inlet and outlet parts increases the risk of leakage.

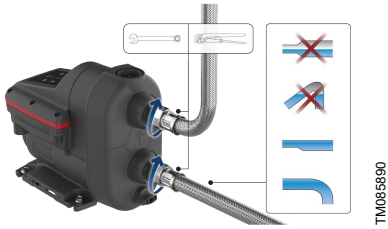
1. Turn the union nuts by hand to loosen the inlet and outlet ports. See the figure below.

2. Seal the pipe fittings with thread sealing tape.

If the pipe is sealed with flat gaskets, do not use sealing tape.

Do not use packing yarn when installing the product.

3. Carefully screw the inlet and outlet connections to the pipe fittings using a pipe wrench or similar tool. Keep the union nut on the pipe fitting if you have removed it from the pump. The pump is equipped with flexible connections, ± 5°, to facilitate the connection of inlet and outlet pipes. See the figure below.



4. Fasten the connections to the inlet and outlet. Hold the connection with one hand and tighten the union nut with the other hand.

6.4 Condensation

When SCALA2 is installed in a warm room and is pumping cold water, there is a risk of condensation forming on the pump and associated components.

We recommend that you place the product on a drip tray and install it in a room with a drain. This precaution is essential to prevent potential damage to the surroundings and to ensure safe and efficient operation of the product.

- **Drip tray:** Placing the product on a drip tray helps contain any minor leakages or spills that may occur during operation. This can prevent water from coming into contact with the floor, which could cause personal injury or damage to the product.
- **Room with a drain:** Installing the product in a room with a drain serves as an additional safety measure. In the event of a significant leakage or malfunction, the drain carries away excess water or liquids, reducing the risk of flooding or water damage.

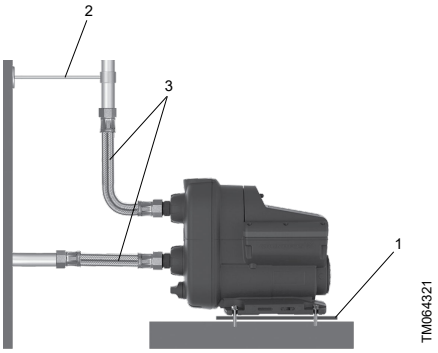
6.5 How to reduce noise in the installation

We recommend using flexible hoses and mounting the pump on a vibration-damping rubber pad.

Vibrations from the pump may be transferred to the surrounding structure and create noise in the 20-1000 Hz spectrum, also called the bass spectrum.

Correct installation using a vibration-damping rubber pad, flexible hoses and correctly placed pipe hangers for rigid pipes can reduce the noise experienced by up to 50 %.

Place pipe hangers for the rigid pipes close to the connection of the flexible hose.



How to reduce noise in the installation

Pos.	Description
1	Rubber pad
2	Pipe hanger for rigid pipe
3	Flexible hose

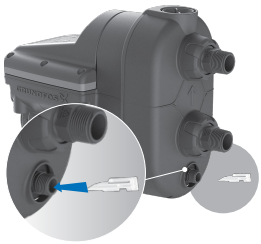
6.6 Locking pin

The pump may produce a clicking noise if there is positive pressure at the inlet of the pump. In this case, you can mount a locking pin to avoid this noise. When a locking pin is mounted, the self-priming function is not applicable.

If the pump has a negative pressure at the inlet, removing the locking pin is necessary to enable the self-priming function.

The pin is also available as an accessory.

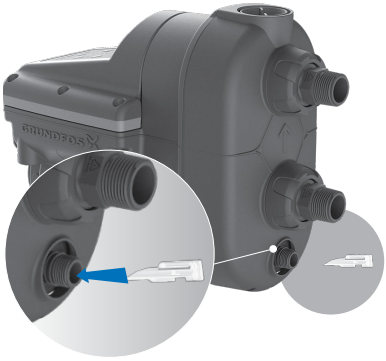
Description	Product number
Locking pin SCALA2 (20 pieces)	99862078



6.6.1 Mounting the locking pin

To mount the locking pin, proceed as follows:

1. Turn off the pump.
2. Close the inlet and outlet valves to the pump to avoid backflow.
3. Loosen and remove the drain plug.
4. Insert the locking pin.



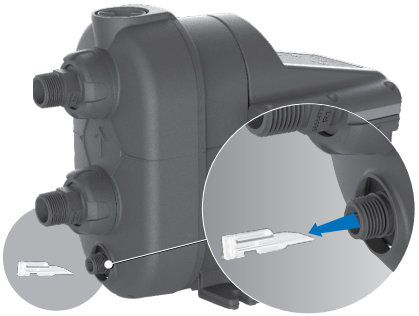
5. Mount and tighten the drain plug.
6. Open the inlet and outlet valves and turn on the pump.

7. If necessary, prime the pump.

6.6.2 Removing the locking pin

To remove the locking pin, proceed as follows:

1. Turn off the pump.
2. Close the inlet and outlet valves to the pump to avoid backflow.
3. Loosen and remove the drain plug.
4. Remove the locking pin with a small plier.



TM1040381

5. Mount and tighten the drain plug.
6. Open the inlet and outlet valves and turn on the pump.

6.7 Installation examples

Fittings, hoses and valves are not supplied with the pump.

We recommend to follow the installation examples in sections Mains water pressure boosting to Suction from freshwater tank.

All installations must be carried out in accordance with local regulations.

Related information

6.7.1 Mains water pressure boosting Mains water pressure boosting, SCALA2

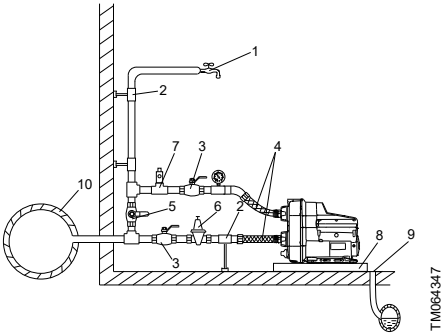
6.7.3 Suction from a well

6.7.4 Suction from freshwater tank

6.7.5 Inlet pipe length

6.7.1 Mains water pressure boosting Mains water pressure boosting, SCALA2

In some countries, boosting from the city water mains is prohibited. Please follow local regulations regarding this application.



Mains water pressure boosting, SCALA2

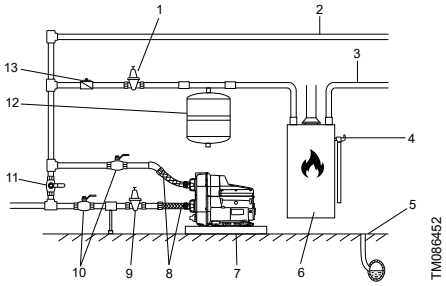
Pos.	Description
1	Highest tapping point
2	Pipe hangers and supports
3	Isolating valves
4	Flexible hoses
5	Bypass valve
6	Optional pressure-reducing valve on the inlet side if the pressure can exceed 10 bar (145 psi).
7	Optional pressure-relief valve on the outlet side if the pressure can exceed 10 bar (145 psi).
8	Drip tray. Install the pump on a small stand to prevent the ventilation holes from being flooded.
9	Drain to sewer
10	Mains water pipe

6.7.2 Thermal expansion

When using SCALA2 in installations with water heaters, you must use a non-return valve, pressure-relief valve or a thermal expansion tank between SCALA2 and the water heater. This prevents the backflow pressure from exceeding the 10 bar pressure limit the pump is designed for.

When water is heated in a closed-loop system, its volume increases. A thermal expansion tank is most often used to absorb the additional volume created by this process. The small reservoir inside SCALA2 is built to prevent cycling and cannot compensate for thermal expansion.

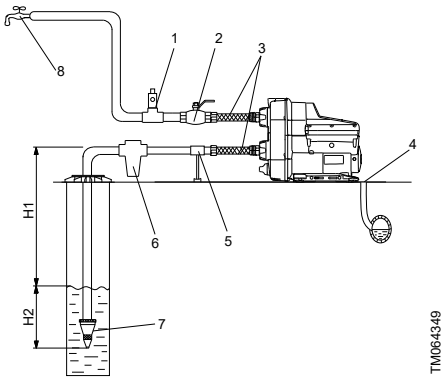
Always consult the applicable water heater manufacturer specifications as installations may vary.



Installation example

Pos.	Description
1	Pressure-relief valve (optional)
2	Cold water
3	Hot water
4	Temperature and pressure valve
5	Drain to sewer
6	Water heater
7	Drip tray. Install the pump on a small stand to prevent the ventilation holes from being flooded.
8	Flexible hoses
9	Optional pressure-reducing valve on the inlet side if the pressure can exceed 10 bar (145 psi).
10	Isolating valves
11	Bypass valve
12	Expansion tank
13	Non-return valve

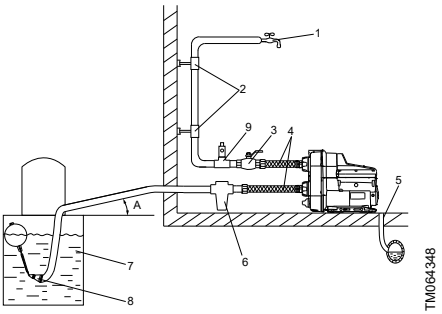
6.7.3 Suction from a well



Suction from a well

Pos.	Description
1	Optional pressure-relief valve on the outlet side if the pressure can exceed 10 bar (145 psi).
2	Isolating valve
3	Flexible hoses
4	Drain to sewer
5	Pipe support
6	Inlet filter If the water may contain sand, gravel or other debris, install a filter on the inlet side to protect the pump and installation.
7	Foot valve with strainer (recommended)
8	Highest tapping point
H1	Maximum suction lift is 8 m (26 ft).
H2	Inlet pipe must be submersed at least 0.5 m (1.64 ft).

6.7.4 Suction from freshwater tank



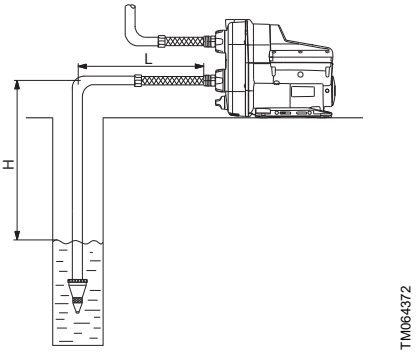
Suction from freshwater tank

Pos.	Description
1	Highest tapping point
2	Pipe hangers
3	Isolating valve
4	Flexible hoses
5	Drain to sewer
6	Inlet filter. If the water may contain sand, gravel or other debris, please install a filter on the inlet side to protect the pump and installation.
7	Freshwater tank
8	Foot valve with strainer (recommended)
9	Optional pressure-relief valve on the outlet side if the pressure can exceed 10 bar (145 psi).
A	Minimum 1° inclination

6.7.5 Inlet pipe length

The overview below shows the different possible inlet pipe lengths, depending on the vertical pipe length.

The overview is only intended as a guide.



Inlet pipe length

DN 32		DN 40	
H [m (ft)]	**L [m (ft)]**	**H [m (ft)]**	**L [m (ft)]**
0 (0)	68 (223)	0 (0)	207 (679)
3 (10)	43 (141)	3 (10)	129 (423)
6 (20)	17 (56)	6 (20)	52 (171)
7 (23)	9 (30)	7 (23)	26 (85)
8 (26)	0 (0)	8 (26)	0 (0)

Preconditions:

Maximum flow velocity	1 l/s (16 gpm)
Inside roughness of pipes	0.01 mm (0.0004 inch)

Size	Inside pipe diameter [mm (inch)]	Pressure loss [mm (psi/ft)]
DN 32	28 (1.1)	0.117 (5/100)
DN 40	35.2 (1.4)	0.0387 (1.6/100)

7. Electrical connection

Carry out the electrical connection according to local regulations.

Check that the supply voltage and frequency correspond to the values stated on the nameplate.

DANGER
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.

DANGER
Electric shock
Death or serious personal injury

- The pump must be earthed.
- The pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce the risk of electric shock, be certain that the pump is connected only to a properly grounded, grounding type receptacle (protective earthing).
- If national legislation requires a Residual Current Device (RCD), a Ground Fault Circuit Interrupter (GFCI), or equivalent in the electrical installation, this must be type B (according to UL/IEC 61800-5-1) or better, due to the nature of the constant DC leakage current.

If the power supply cable is damaged, it must be replaced by the manufacturer, his service agent or similarly qualified persons in order to avoid hazard.

We recommend that you fit the permanent installation with a residual-current circuit breaker (RCCB) with a tripping current less than 30 mA.

7.1 Motor protection

The pump incorporates current and temperature dependent motor protection.

7.2 Plug connection

DANGER
Electric shock
Death or serious personal injury

- Check that the power plug delivered with the product is in compliance with local regulations.
- Make sure that the pump is connected only to a properly grounded, grounding-type receptacle (protective earthing).
- The protective earth of the power outlet must be connected to the protective earth of the pump. The plug must therefore have the same PE connection system as the power outlet. If not, use a suitable adapter.

7.3 Connection without plug

The electrical connection must be carried out by an authorised electrician in accordance with local regulations.

DANGER
Electric shock
Death or serious personal injury

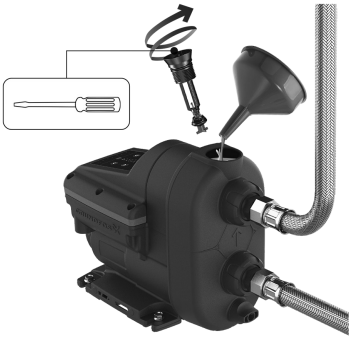
- The pump must be connected to an external main switch with a minimum contact gap of 3 mm (0.12 inch) in all poles.

8. Starting up the product

Do not start the pump until it has been filled with liquid.

8.1 Priming the pump

1. Unscrew the priming plug and pour minimum 1.7 litres (0.45 gallons) of water into the pump housing.



2. Screw the priming plug on again.

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

Always tighten priming and drain plugs by hand.

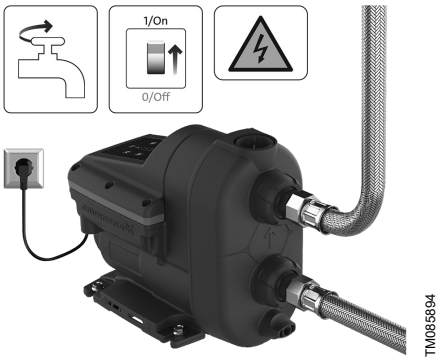
Related information

8.2 Starting the pump

8.2 Starting the pump

1. Open a tap to prepare the pump for venting.
2. Insert the power plug into the socket or turn on the power supply and the pump will start.
3. When water flows without air, close the tap.
4. Open the highest tapping point in the installation, preferably a shower.
5. Adjust the pressure setpoint to the required pressure by means of the **Up** and **Down** buttons.
6. Close the tapping point.

Startup has been completed.



Related information

8.3 Pressure setting

8.3 Pressure setting

The pump can be set to provide a water pressure between 1.5 to 5.5 bar (22 to 80 psi) at intervals of 0.5 bar (7 psi).

The factory setting is 3 bar (44 psi).

We recommend you to use the default pressure of 3.0 bar (44 psi) which will suit most applications.

The difference between the positive inlet pressure and outlet pressure must not exceed 3.5 bar (51 psi).

Example: If the inlet pressure is 0.5 bar (7 psi), the maximum outlet pressure is 4 bar (58 psi).

If you set the pressure too high, this might cause the pump to operate for up to three minutes after the tap is turned off. The maximum setpoint is 4 bar (58 psi).

You can achieve more energy efficient operation and prolong the life of the pump by making sure that the tank precharge pressure is optimised to 70 % of the setpoint of the pump. See the table below for recommended optimal tank precharge pressure.

Optimal tank precharge pressure

Setpoint [bar (psi)]	Optimal tank precharge pressure setting [bar (psi)]
5.5 (80)	3.9 (57) [1)]
5 (73)	3.5 (51) [1)]
4.5 (65)	3.2 (46) [1)]
4 (58)	2.8 (4.1) [1)]
3.5 (51)	2.5 (36)
3 (44)	2.1 (30)
2.5 (36)	1.8 (26)
2 (29)	1.4 (20)
1.5 (22)	1.1 (16)

1) Only with positive inlet pressure. The factory precharge pressure is 1.8 bar.

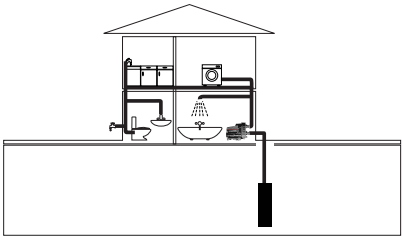
Related information

5.2 System sizing

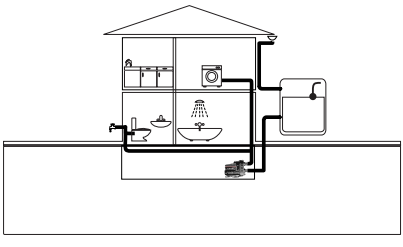
8.3.1 Boosting from a well or a tank

If you are boosting from a well or a tank, make sure not to set the pressure setpoint too high. The difference between the inlet pressure and outlet pressure must not exceed 3.5 bar (51 psi).

Maximum setpoint	[bar (psi)]
Well application	3.0 (44)
Tank below ground level	3.5 (51)
Tank above ground level	4.0 (58)



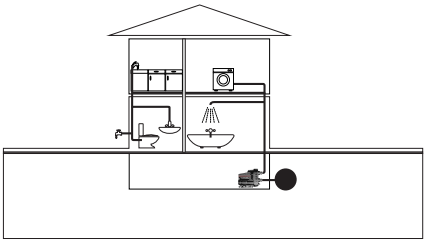
Boosting from a well



Boosting from a tank

8.3.2 Boosting from the mains

The pressure settings 4, 4.5, 5.0 and 5.5 bar (58, 65, 73 and 80 psi) require a positive inlet pressure, and these settings must only be used when boosting from the water mains.



Boosting from the mains

8.3.3 Self-learning setpoint

If the pump cannot reach the user-defined pressure setpoint, the self-learning function will automatically lower the setpoint.

Related information

11.3.2 Self-learning function

8.4 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.

When the pump is started up 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.

Under normal conditions, the leaking liquid will evaporate. As a result, no leakage will be detected.

If the unlikely event of an internal leakage occurs, the liquid will be drained through the bottom of the pump. Install the pump in such a way that no undesirable collateral damage can arise.

9. Handling and storing the product

9.1 Handling the product

Take care not to drop the pump as it may break.

9.2 Storing the product

If the pump is to be stored for a period of time, for example during the winter, drain it and store it indoors in a dry location.

Temperature range during storing must be -40 to +70 °C (-40 to +158 °F).

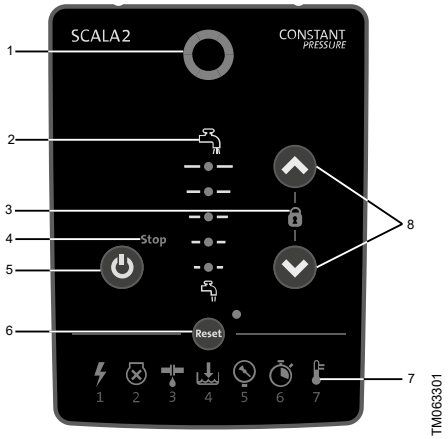
Maximum relative humidity during storing	95 % RH

Related information

13. Starting up the product after standstill

10. Control functions

10.1 Menu overview, SCALA2



SCALA2 operating panel

Pos.	Description
1	**Grundfos Eye**
2	**Pressure indicator**: This indicator light shows the required outlet pressure.
3	**Lock**: When this symbol is lit, it indicates that the operating panel is locked.
4	**Stop**: When this symbol is lit, it indicates that the pump has been stopped manually.
5	**On/off**: This button turns the pump on and off.
6	**Reset**: This button resets alarms.
7	**Fault indicator lights**: An indicator light will be lit to indicate a fault.
8	**Up**: This button increases the outlet pressure. **Down**: This button decreases the outlet pressure.

Related information

10.1.2 Indicator lights for SCALA2

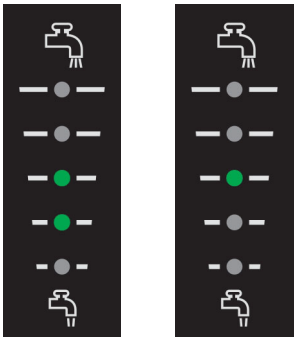
10.1.1 Pressure indicator, SCALA2

10.1.1 Pressure indicator, SCALA2

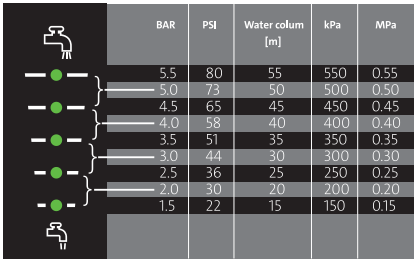
The pressure indicator shows the required outlet pressure from 1.5 to 5.5 bars (22 to 80 psi) in 0.5 bar (7.5 psi) intervals.

The illustration below shows a pump set to 3 bar (44 psi) indicated by two green lights, and a pump set to 3.5 bar (51 psi) indicated by one green light.

Flashing green lights indicate that the pump has automatically lowered the pressure.



SCALA2 outlet pressure indication



Pressure indication table

Related information

8.3.3 Self-learning setpoint

10.1.2 Indicator lights for SCALA2

Indications	Description
	Operating indications
	The operating panel is locked.
	Power supply failure
	The pump is blocked, for instance the shaft seal has seized up.
	Leakage in the installation after the pump
	Dry running or water shortage [2]
	The maximum pressure has been exceeded or the setpoint cannot be reached.
	The maximum runtime has been exceeded.
	The temperature is outside the range.

2) For fault number 4, dry running, the pump must be reset manually.

For fault number 1, 2, 3, 5, 6 and 7, the pump resets whenever the cause has disappeared or been remedied. You can always reset the pump manually.

Related information

11.3.3 Auto reset

11. Setting the product

The pump will remember the controller settings even if it is turned off.

11.1 Setting the outlet pressure

Adjust the outlet pressure by pressing the **Up** and **Down** buttons.

11.2 Locking and unlocking the operating panel

The operating panel can be locked, which means that the buttons do not function and no settings can be changed accidentally.

How to lock the operating panel

1. Hold down the **Up** and **Down** buttons simultaneously for 3 seconds.
2. The operating panel is locked when the **Lock** symbol lights up.

How to unlock the operating panel

1. Hold down the **Up** and **Down** buttons simultaneously for 3 seconds.
2. The operating panel is unlocked when the **Lock** symbol turns off.

11.3 Expert settings, SCALA2

Expert settings are for installers only.

The expert settings allow the installer to toggle between the following functions:

- self-learning
- auto reset
- micro-leakage detection
- maximum continuous operating time.

11.3.1 Accessing the expert settings

Proceed as follows:

1. Hold down the **Reset** button for 5 seconds.
2. The fault indicator light 1 will start flashing to indicate that the expert settings are active.

The pressure indicator now acts as menu for the expert settings. A flashing green diode is the cursor. Move the cursor using the **Up** and **Down** buttons, and toggle the setting on or off using the **Reset** button. The LED for each setting lights up when the setting is active.

	Move cursor up.
	Move cursor down.
Reset	Toggle settings.

Overview of menu for expert settings

Pos.	Description
1	Auto reset
2	Micro-leakage detection
3	Maximum continuous operating time
4	Exit expert settings
5	Self-learning

11.3.2 Self-learning function

The factory setting for this function is on.

On

If the pump cannot reach the user-defined pressure setpoint, the self-learning function automatically adjusts the setpoint. This process may take up to 5 minutes.

The pump lowers the setpoint to either 4.5, 3.5 or 2.5 bar (65, 51 or 36 psi).

The self-learned setpoint is indicated on the operating panel by one flashing green light.

After every 24 hours, the pump automatically attempts to revert to the original user-defined setpoint. If this is not possible, the pump again returns to the self-learned setpoint. The pump continues to operate with the self-learning setpoint until the user-defined setpoint can be reached.

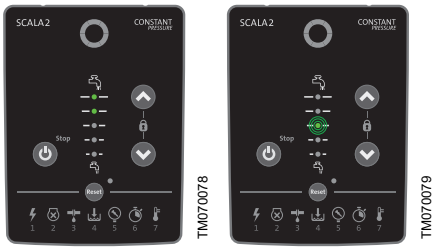
Example:

The user-defined pressure is set to 5 bar (72 psi), indicated by constant green lights on the pressure indicator panel.

The pump is unable to reach this pressure due to negative pressure on the inlet side.

The self-learning function automatically adjusts the setpoint to 3.5 bar (51 psi), indicated by one flashing green light on the pressure indicator panel.

After 24 hours, the pump automatically tries to adjust the setpoint back to 5 bar (72 psi).



User-defined setpoint (left) and self-learned setpoint (right)

How to reset the self-learned setpoint

1. You can manually reset the settings by pressing any button on the operating panel. The pump immediately tries to reach the original setpoint.
2. If the pump keeps reducing the setpoint due to self-learning, we recommend to reduce the setpoint manually on the operating panel.

Off

If you set the self-learning function to off and the pump is unable to reach the desired setpoint, the pump shows alarm 5.

11.3.3 Auto reset

The factory setting for this function is on.

On

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 auto reset function works in the following way:

Indication	Action
Water shortage	The pump will attempt eight restarts at five-minute intervals. If not successful, this cycle will be repeated after 24 hours.
Dry running (pump not primed)	Prime the pump and reset it manually.
All other indications	The pump will attempt three restarts within the first 60 seconds, then eight restart attempts at five-minute intervals. If not successful, this cycle will be repeated after 24 hours.

Off

All alarms must be reset manually by means of the **Reset** button.

Related information

10.1.2 Indicator lights for SCALA2

11.3.4 Micro-leakage detection

The factory setting for this function is off.

This function monitors the starts and stops of the pump.

Off

If the pump starts 40 times in a fixed pattern, there will be an alarm. The pump remains in operation as normal.

On

If the pump starts and stops in a fixed pattern, there is a leakage in the installation after the pump, and the pump stops and shows alarm 3.

Leakage in the installation after the pump

11.3.5 Maximum continuous operating time

The factory setting for this function is off.

This function is a timer that can turn off the pump if it runs continuously for 30 minutes.

Off

If the pump exceeds the running time of 30 minutes, the pump will run depending on the flow.

On

If the pump exceeds the running time of 30 minutes, the pump will stop after 30 minutes of continuous operation, and it will show alarm 6. This alarm will always need to be reset manually.

Maximum runtime exceeded

11.4 Resetting to factory settings

The pump can be reset to factory setting by pressing the **Down** and **Reset** buttons simultaneously for 5 seconds.

12. Servicing the product

DANGER
Electric shock
Death or serious personal injury

- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

12.1 Maintaining the product

12.1.1 Pressure tank

To ensure optimal performance and long pump life, check the precharge pressure in the built-in pressure tank once a year and adjust to correct value, if required. To adjust the precharge pressure, do the following:

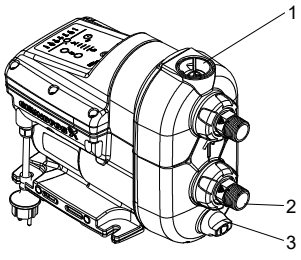
1. Stop the pump by pressing the **Stop** button. Observe that the LED turns yellow.
2. Open a tap to allow the water to run out in order to release all pressure from the system.
   The tap must remain open until the tank precharge pressure has been adjusted.
3. Without using tools, remove the cap from the pressure tank valve.
4. Adjust the precharge pressure in the tank to 70 % of the setpoint value.
5. Return the cap to the pressure tank valve. Make sure the cap is fully tight.
6. Start the pump again.
7. Close the tap.
   Scan the QR code below for more information on precharging the pressure tank.

QR92887983

http://net.grundfos.com/qr/i/92887983

12.1.2 Cleaning the inlet and outlet valves

Check and clean the inlet and outlet valves once a year or as needed.



TM086111

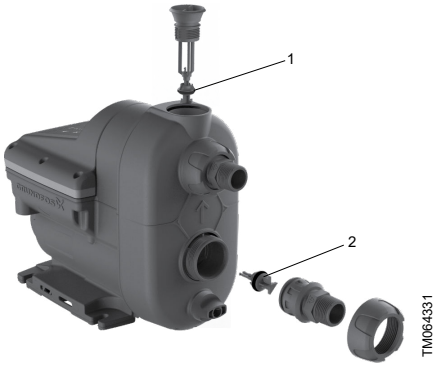
SCALA2 pump

To remove the inlet valve, follow the steps below:

1. Turn off the power supply and disconnect the power plug.
2. Shut off the water source.
3. Open a tap to release the pressure in the pipe system.
4. Close the isolating valves and/or drain the pipes.
5. Gradually open and remove the priming plug. See the figure above (1).
6. Remove the drain plug and drain the pump. See the figure above (3).
7. Unscrew the union nut holding the inlet connection. See the figure above (2). Depending on the installation type, it may be necessary to remove the pipes from both the inlet and outlet connections.
8. Pull out the inlet connection.
9. Pull out the inlet valve.
10. Clean the inlet valve with warm water and a soft brush.
11. Assemble the components in reverse order.

To remove the outlet valve, follow the steps below:

1. Turn off the power supply and disconnect the power plug.
2. Shut off the water source.
3. Open a tap to release the pressure in the pipe system.
4. Close the isolating valves and/or drain the pipes.
5. Gradually open and remove the priming plug. See the figure above (1). The plug and valve are one unit.
6. Clean the valve with warm water and a soft brush.
7. Assemble the components in reverse order.



TM064331

Outlet and inlet valves

Pos.	Description
1	Outlet valve
2	Inlet valve

12.2 Customer service information

For further information on service parts, see Grundfos Product Center on *www.product-selection.grundfos.com*.

12.3 Service kits

For further information on service kits, see Grundfos Product Center at *www.product-selection.grundfos.com*.

13. Starting up the product after standstill

1. Check that the pump is not blocked.
2. If the pump has been drained, it must be filled with liquid before startup.
3. Start up the pump.
4. The pump will remember the controller settings even if it is turned off.

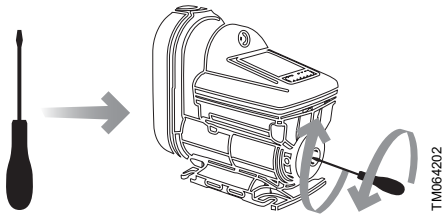
Related information

8. Starting up the product
8.1 Priming the pump
13.1 Deblocking the pump

13.1 Deblocking the pump

DANGER
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.

The end cover incorporates a plug which can be removed by means of a suitable tool. This makes it possible to deblock the pump shaft if it has seized up as a result of inactivity.



Deblocking the pump

14. Taking the product out of operation

If the pump is taken out of operation for a period of time, for example during the winter, it must be disconnected from the power supply and placed in a dry location.

Proceed as follows:

1. Stop the pump by means of the **On/off** button.
2. Disconnect the power supply.
3. Open a tap to release the pressure in the pipe system.
4. Close the isolating valves and/or drain the pipes.
5. Gradually loosen the priming plug to release the pressure in the pump.
6. Remove the drain plug to drain the pump. See the figure below.
7. We recommend storing the pump indoors in a dry location. Due to humidity, the disconnected pump must not be left outside for a longer period of time.

Draining the pump

15. Fault finding

DANGER
Electric shock
Death or serious personal injury

- Before starting any work on the product, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

15.1 Grundfos Eye operating indications

Grundfos Eye		Indication	Description
	TM053827	No lights are on.	**Power off** The pump is not running.
	TM053829	Two opposite green indicator lights running in the direction of rotation of the pump.	**Power on** The pump is running.
	TM063806	Two opposite green indicator lights are permanently on.	**Power on** The pump is not running.
	TM053839	Two opposite red indicator lights are flashing simultaneously.	**Alarm** The pump has stopped.
	TM1040615	Two opposite red indicator lights are flashing three to five times and in between two opposite green indicator lights are flashing one time.	**Alarm** The pump has stopped. Contact Grundfos.

15.2 Fault resetting

You can reset a fault indication in one of the following ways:

- When you have eliminated the fault cause, reset the pump manually by pressing the **Reset** button. The pump will then revert to normal duty.
- If the fault disappears by itself, the pump will attempt to reset automatically and the fault indication will disappear if automatic reset is successful and provided that you have enabled the auto reset function in the service menu.

15.3 The pump is not running

Grundfos Eye:
No lights are on.

Cause	Remedy
Power supply failure.	1. Switch on the power supply. 2. Check the cables and cable connections for defects and loose connections. 3. Check for blown fuses in the electrical installation.

15.4 The pump is not running, and indicator light 1 is on

Grundfos Eye:
Two opposite green indicator lights are permanently on.

Indicator light 1 is on, indicating power supply failure.

Cause	Remedy
The power supply is out of prescribed voltage range.	1. Check the power supply and the pump nameplate. 2. Reestablish the power supply within the prescribed voltage range.

15.5 The pump is not running, and indicator light 2 is on

Grundfos Eye:
Two opposite red indicator lights are flashing simultaneously.

Indicator light 2 is on, indicating that the pump is blocked, for instance the shaft seal has seized up.

Cause	Remedy
The pump is blocked by impurities.	1. Check that the pump is not blocked. 2. If the pump has been drained, it must be filled with liquid before startup. 3. Start up the pump. 4. The pump will remember the controller settings even if it is turned off. Contact Grundfos Service if the problem persists.
The shaft seal has seized up.	1. Check that the pump is not blocked. 2. If the pump has been drained, it must be filled with liquid before startup. 3. Start up the pump. 4. The pump will remember the controller settings even if it is turned off. Contact Grundfos Service if the problem persists.

15.6 The pump is not running, and indicator light 4 is on

Grundfos Eye: Two opposite green indicator lights are permanently on.	
Indicator light 4 is on, indicating dry running or water shortage.	

Cause	Remedy
Dry running.	• Check the water source, and prime the pump.

15.7 The pump is not running, and indicator light 3 is on

Grundfos Eye: Two opposite red indicator lights are flashing simultaneously.	
Indicator light 3 is on, indicating leakage in the installation after the pump.	

Cause	Remedy
The internal valve is defective or blocked in completely or partly open position.	• Clean, repair or replace the internal valve.

15.8 The pump is not running, and indicator light 6 is on

Grundfos Eye: Two opposite green indicator lights are permanently on.	
Indicator light 6 is on, indicating that the maximum runtime has been exceeded.	

Cause	Remedy
The maximum runtime has been exceeded.	• Check the installation for leakage and reset the alarm.

15.9 The pump is running, and indicator light 3 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 3 is on, indicating leakage in the installation after the pump	

Cause	Remedy
Leakage from the pipe system, or the external non-return valve is not properly closed due to impurities.	• Check and repair the pipe system, or clean, repair or replace the external non-return valve.
Small continuous consumption.	• Check the taps and reconsider the usage pattern (for example, ice machines and water evaporators for air-conditioning).

15.10 The pump is running, and indicator light 7 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 7 is on, indicating that the temperature is outside the range.	

Cause	Remedy
The temperature of the pump and water is below 3 °C.	• Consider protecting the pump and the installation against frost.

15.11 Insufficient pump performance

Grundfos Eye: Two opposite green indicator lights are rotating.	

Cause	Remedy
The pump inlet pressure is too low.	• Check the inlet conditions of the pump.
The pump is undersized.	• Replace the pump with a bigger pump.
The inlet pipe, the inlet strainer or the pump is partly blocked by impurities.	• Clean the inlet pipe or the pump.
There is a leakage in the inlet pipe.	• Repair the inlet pipe.
There is air in the inlet pipe or the pump.	• Prime the inlet pipe and the pump. • Check the inlet conditions of the pump.
The required outlet pressure is too low for the installation.	• Increase the pressure setting (arrow up).

15.12 Insufficient pump performance, and indicator light 7 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 7 is on, indicating that the temperature is outside the range.	

Cause	Remedy
The maximum temperature has been exceeded, and the pump is running at reduced performance.	• Check the cooling conditions. Protect the pump against direct sunlight or any nearby heat sources.

15.13 System overpressure, and indicator light 5 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 5 is on, indicating that the maximum pressure has been exceeded or the setpoint cannot be reached.	

Cause	Remedy
The setpoint is set too high. The difference between the outlet pressure and the inlet pressure must not exceed 3.5 bar, 0.35 MPa (51 psi).	• Reduce the pressure to a new setpoint (maximum 3.5 bar, 0.35 MPa (51 psi) + positive inlet pressure). Example: If the inlet pressure is 0.5 bar, 0.05 MPa (7 psi), the maximum outlet pressure is 4 bar, 0.4 MPa (58 psi).
The maximum pressure has been exceeded, the inlet pressure is higher than 6 bar, 0.6 MPa (87 psi).	• Check the inlet conditions.
The maximum pressure has been exceeded. Equipment elsewhere in the system causes a high pressure at the pump, for example water heater or defective safety equipment.	• Check the installation.

15.14 After a reset, the pump runs briefly, and indicator light 4 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 4 is on, indicating dry running or water shortage.	

Cause	Remedy
Dry running or water shortage.	• Check the water source, and prime the pump.
The inlet pipe is blocked by impurities.	• Clean the inlet pipe.
The foot or internal valve is blocked in closed position.	• Clean, repair or replace the foot or internal valve.
There is a 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 the inlet conditions of the pump.

15.15 After resetting, the pump immediately restarts, and indicator light 3 is on

Grundfos Eye: Two opposite green indicator lights are rotating.	
Indicator light 3 is on, indicating leakage in the installation after the pump.	

Cause	Remedy
The internal valve is defective or blocked in completely or partly open position.	• Clean, repair or replace the internal valve.
The tank precharge pressure is not correct.	• Adjust the tank precharge pressure to 70 % of the required outlet pressure.

16. Technical data

16.2 Operating conditions

Temperature	[°C (°F)]
Max. ambient temperature	
1 × 208-230 V, 60 Hz:	45 (113)
1 × 115 V, 60 Hz:	45 (113)
1 × 200-240 V, 50/60 Hz:	55 (131)
Max. liquid temperature	45 (113)

Pressure	[bar (psi)]	[MPa]
Max. system pressure	10 (145)	1
Max. inlet pressure	6 (87)	0.6

Other operating data	
Max. head	45 m (147 ft)
IP rating	X4D (outdoor installation)
Pumped liquid	Clean water
Noise level	< 44 dB(A) [3]

[3] 44 dB(A) is measured in a typical application at duty point Q = 1 m^3/h and H = 19 m in accordance with ISO 3745.

16.3 Mechanical data

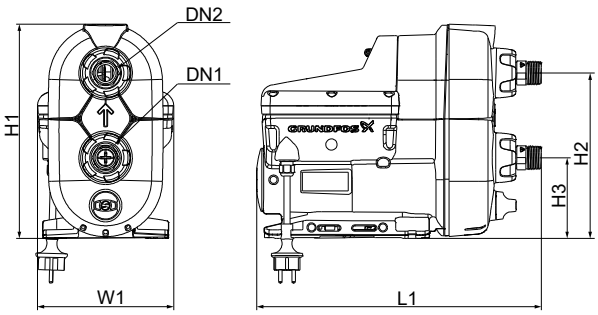
Pipe connections are R 1" or NPT 1".

16.4 Electrical data

Supply voltage [V]	Frequency [Hz]	$I_{max.}$ [A]	P1 [W]	Stand-by power [W]
1 × 200-240	50/60	2.8	550	2
				2
				2
				2
1 × 208-230	60	2.8	550	2
1 × 115	60	4.9	550	2

Supply voltage [V]	Frequency [Hz]	Plug
1 × 200-240	50/60	Schuko
		Schuko EAC
		Schuko SNI
		AUS
		UK
		ARG
		Chile
		Thailand
		India
		None
		No plug CN
		No plug AR1
		No plug AR2
1 × 208-230	60	NEMA 6-15P
1 × 115	60	IEC, type B, NEMA 5-15P
		Japan
		None

16.5 Dimensions and weights



TM086088

Dimensions of SCALA2

	H1 [mm] [inch]	H2 [mm] [inch]	H3 [mm] [inch]	L1 [mm] [inch]	W1 [mm] [inch]	DN1	DN2	Weight [kg] [lb]
SCALA2	302	234	114	403	193	R 1	R 1	10
	11.9	9.2	4.5	15.9	7.6	NPT 1"	NPT 1"	22

17. Disposing of the product

This product has been designed with focus on the disposal and recycling of materials. The following disposal values apply to all variants of Grundfos SCALA2 pumps:

- minimum 85 % for recycling
- maximum 10 % for incineration
- maximum 5 % for depositing.

Values are percent of total weight.

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.

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.

See also end-of-life information at *www.grundfos.com/product-recycling*.

18. Document quality feedback

To provide feedback about this document, scan the QR code using your phone's camera or a QR code app.

FEEDBACK_93058725

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Click here to submit your feedback

FEEDBACK_93058724

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Declaration of conformity

GB: EU declaration of conformity

We, Grundfos, declare under our sole responsibility that the product SCALA2, to which the declaration below relates, is in conformity with the Council Directives listed below on the approximation of the laws of the EU member states.

AR: إقرار مطابقة الاتحاد الأوروبي (EU)

نقر نحن، جروندفوس، بمقتضى مسؤوليتنا الفردية بأن المنتج SCALA2، الذي يختص به الإقرار أدناه، يكون مطابقا لتوجيهات المجلس المذكورة أدناه بشأن التقريب بين قوانين الدول أعضاء الاتحاد الأوروبي (EU).

- Machinery Directive (2006/42/EC).
- Low Voltage Directive (2014/35/EU).

  Standards used:

  EN 60335-1:2012 + AC + A11 + A13 + A1 + A2 + A14:2019.

  EN 60335-1:2012/A15:2021.

  EN 60335-2-41:2021.

  EN 60335-2-41:2021/A11:2021
- EMC Directive (2014/30/EU).

  Standards used:

  EN 55014-1:2006 + A1:2009 + A2:2011

  EN 55014-2:1997 + A1:2001 + A2:2008

  EN 61000-3-2:2014

  EN 61000-3-3:2013.
- RoHS Directives (2011/65/EU and 2015/863/EU)

  Standard used:

  EN IEC 63000:2018.

This EU declaration of conformity is only valid when accompanying Grundfos instructions.

Bjerringbro, 6 November 2023

Steen Tøffner-Clausen
Head of PD DBS
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