

# SOLAR-POWERED WATER SUPPLY

Unmatched flexibility  
Unparalleled energy savings



# REDUCE ENERGY DEPENDENCY AND SAVE

Grundfos solar water solutions deliver a safe, reliable water supply, reduce energy costs and offer a climate-friendly alternative to power grids. No matter what the application, solar water solutions provide unmatched flexibility for an economically and environmentally sustainable water supply.

## **Economical**

Minimal maintenance and reduced energy expenses mean lower, more predictable operating costs for supplying water to urban communities and rural areas.

An optimised Grundfos solar water solution can be deployed almost anywhere, whether it is in a small waterworks, in farming and irrigation applications or in providing water to remote areas that lack grid-based power and water infrastructure.

### **A STRONG, SOLID RETURN ON INVESTMENT**

The payback time for a solar water system is surprisingly short, even with large systems, because energy costs are reduced or eliminated from the first day of operation.

### **AUTONOMOUS SOURCE-TO-TAP WATER**

From providing remote villages with water to improving the operations of suburban waterworks stations, our complete solar water solutions ensure the long-term viability of water services to communities. Our solar systems help communities, farmers and water service providers become independent of grid power while ensuring a safe, reliable water supply.

### **A PIONEER IN SOLAR**

Grundfos is a global company with decades of experience in solar water systems and a strong local presence in countries worldwide. Our history of pioneering solar water solutions stems back to our first off-grid water supply system in 1980.

Today, our solar water systems are scalable, digitally enhanced for easy setup and monitoring and provide an autonomous and decentralised alternative to traditional grid power and water systems.

#### **Our delivery builds on:**

- An established distribution network and ability to advise partners about their solar investment
- Optimisation of the entire solar water solution cycle, including system monitoring and control
- Our history as a global pioneer in developing sustainable water solutions
- Our expertise, which is part of our offering to our partners and customers

#### **Reliable**

Grundfos solar water systems can integrate with traditional energy sources to provide primary – or secondary – power in areas where grid power is unreliable or too expensive.

#### **Climate Friendly**

Solar is one of the most effective means of reducing the climate impact of energy production and water distribution and treatment.

#### **Powered by AC/DC**

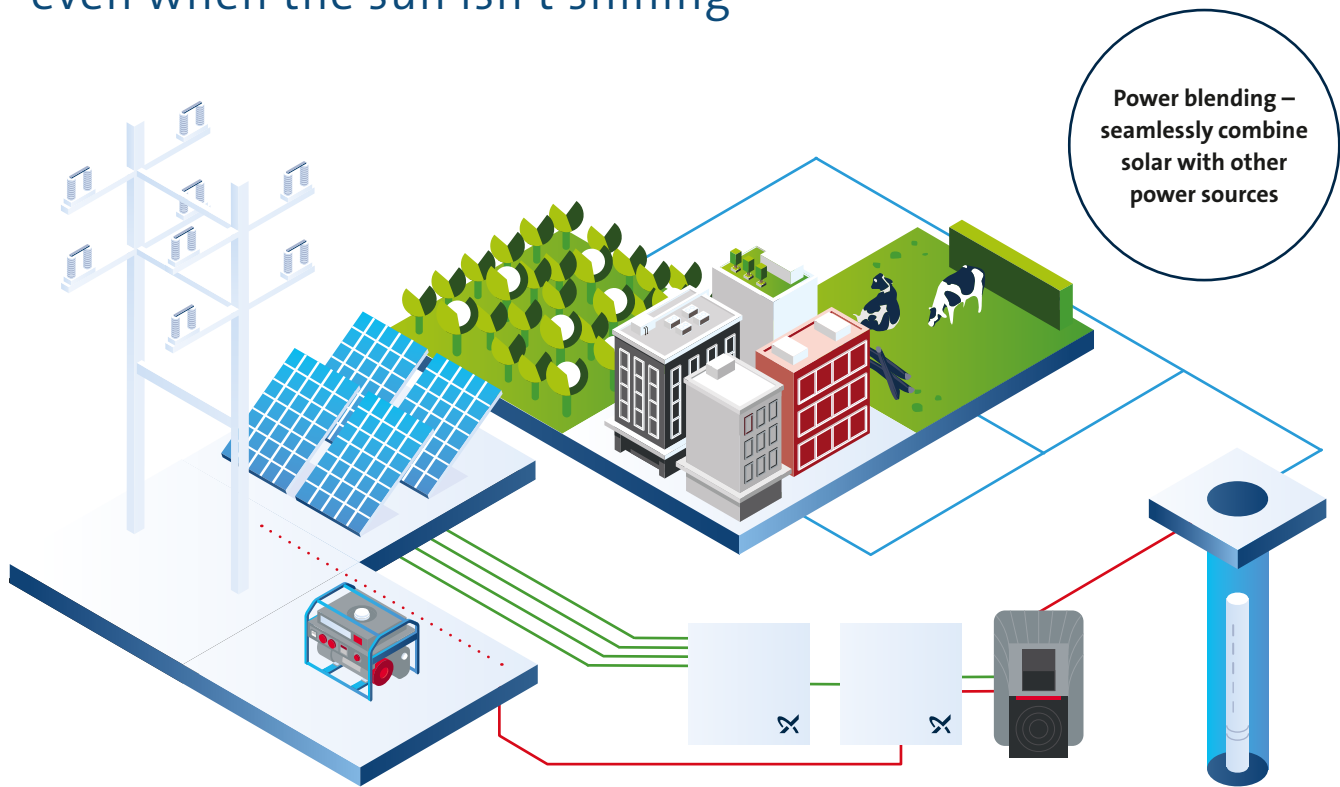
Our unique PowerAdapt system can blend solar (DC) with grid (AC) power to ensure reliable, consistent performance - even when the sun is not shining.

# PROVIDE SAFE, RELIABLE DRINKING WATER 24/7



## IN ANY WATER SUPPLY SITUATION

Grundfos solar water solutions  
- even when the sun isn't shining



For water service providers like local waterworks and utility companies, dependability is of the utmost importance. Grundfos has developed a unique PowerAdapt power blending solution so solar energy savings can be realised without having to compromise on reliable operation.

### Power blending makes it possible

PowerAdapt works by allowing solar (DC) to be used as a primary source of pump energy while topping up any additional power needs with a connected (AC) energy source. Working in conjunction with Grundfos RSI Solar inverters, this solution ensures constant pumping power, 24 hours a day, seven days a week.

Grundfos digital solutions like our solar sizing app, the Grundfos Product Center and Grundfos Remote Management (GRM) can help size, monitor and administer solar pumping operations remotely.

These are just some of the reasons Grundfos solar water solutions make sense for:

- **Subdivisions and local waterworks**  
Solar water supply saves energy and reduces energy costs. Those are savings that shorten return on investment times and can eventually be passed on to utility users.
- **Water utility distribution**  
Grundfos' large renewable solar inverters (RSI) provide up to 250kW (340 hp (460 amp)) of pumping power. This makes solar a feasible energy source for even larger pumps and water utility pumping operations.
- **Off-grid locations**  
For areas without access to grid energy or places where centralised energy is sporadic or overly expensive, Grundfos solar water solutions help water suppliers create grid-independent water supply systems.
- **Remote communities and informal settlements**  
Grundfos delivers total solutions that help small service providers and NGOs effectively utilise ground and surface water in remote communities that lack infrastructure. In areas without running water, Grundfos can even provide manual or automated water kiosks and intelligent water ATMs that are mobile payment enabled.



## SUSTAINABLE WATER FOR ANY ENVIRONMENT

In water supply projects all over the world, solar water solutions are an economically and environmentally sustainable alternative. In remote locations, suburban water utilities and modern cities, Grundfos technology can provide a complete, effective and reliable solar solution for water service providers.



Toledo, Spain:

### SP SUBMERSIBLE PUMP AND RSI SOLAR INVERTER PROVIDE 40,000 M<sup>2</sup> (430,556 FT<sup>2</sup>) OF VINEYARD IRRIGATION

When the Borbotón farm and winery, Santa Cruz del Retamar, Toledo required an estimated 2,000 m<sup>3</sup> (528,344 gallons) of water per hectare for 2,700 of their vines, they turned to Grundfos for a high-capacity solution to utilise the 6,000 W generated by their solar panels. Grundfos delivered an SP7-27 W submersible pump for water extraction from the aquifer at a depth of more than 100

m (328 ft). The Grundfos Solar Inverter (RSI) ensured power supply from the solar panels to the pump.

Antonio Mayoral, owner of the Borbotón farm, says the selected system is the best and most efficient solution for the vineyard, giving him the reliability and the peace-of-mind he needs while his vines mature.



Nyarugusu Refugee Camp, Western Tanzania:

### THE WORLD'S LARGEST SOLAR POWERED WATER SYSTEM

Along Tanzania's western border in the heart of central Africa lies the world's largest solar-powered water system. The system provides safe drinking water daily to 150,000 people living in the Nyarugusu Refugee Camp.

Installation of the Grundfos system began in 2017 in cooperation with the non-profit organization Water Mission to help the camp reduce the massive energy costs of using diesel-powered generators for its water supply. In planning the project, the need for a flexible system that could mix solar (DC) and diesel (AC) generator power became evident.

Grundfos engineers developed the PowerAdapt blending solution to meet that need, and now the camp runs primarily on

solar power and uses diesel generators only in backup situations.

The solar water system, which continues to grow, provides tap water to the 150,000 residents living directly in the camp from a series of boreholes equipped with Grundfos submersible pumps.

*"The system has saved a significant amount of energy costs already and will continue to save more related to operating the camp and it has meant that more people receive more water. Most importantly, the drinking water is safe and that translates directly into improved health and saving lives."*

Will Furlong, Regional Director for Tanzania, Water Mission



Terdjun, Sumatra, Indonesia:

### AN ECONOMICALLY SUSTAINABLE COMMUNITY WATER SUPPLY

Terdjun village is a peri-urban area on the outskirts of Medan, the provincial capital of North Sumatra. Water supply for the 18,000 inhabitants used to be from shallow, unsafe wells, and that has changed with a SQFlex pumping from 40 m (131 ft) underground to an overhead water tank.

With 900 W available from the solar panels, up to 5,000 litres (1,320 gallons), of water is available daily from a water point. The system is community-owned and operated and the water cost ensures the system is economically sustainable for the community.

## PROVEN SOLAR PUMPING TECHNOLOGY

There are huge benefits over time when installing a minimal energy cost, solar-powered water supply system. Renewable energy systems are increasingly common in, for example, irrigation systems in the olive groves and vineyards of southern Europe and for cattle watering in the United States, Australia and elsewhere.



Munarya, Uganda:

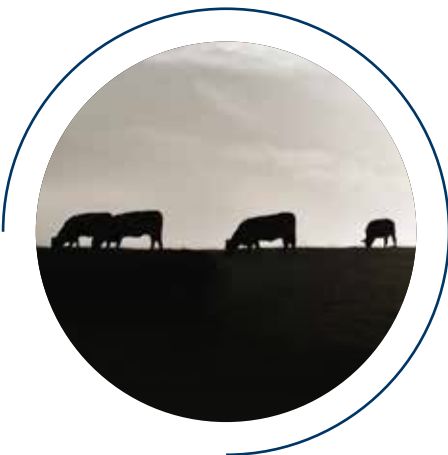
### SQFLEX SUPPORTS SMALLHOLDER COFFEE FARMERS IN UGANDA

Getting safe drinking water to smallholder coffee farmers in Munarya village on Mount Elgon, Uganda, is not without its challenges, not least the 2-3 km (up to 2 mi) walk uphill to a waterfall to fetch water for drinking, washing and fermenting coffee during the harvesting season.

Two SQFlex solar submersible pumps installed in wells by a natural spring have made the long walk unnecessary. Affordable, safe water is pumped to the local community,

and access sustained through a payment scheme for maintenance and operations.

The community owns the installation, which has a locally trained operator and is run by a water commission. Cooperation between a local representative, the humanitarian organisation 'Seniors without Borders' and a Ugandan NGO brought the project to fruition on-time and within the resources allotted.



Hamilton Downs, Australia:

### SQFLEX WATERS SHORTHORN CATTLE IN THE OUTBACK

No commodity is more precious in the vast Australian Outback than water. Hamilton Downs, a 2,000 km<sup>2</sup> (772 mi<sup>2</sup>) cattle property 80 km<sup>2</sup> (49 mi<sup>2</sup>) southwest of Alice Springs averages barely 280 mm of rain a year and relies completely on underground water. Requiring a robust and low-maintenance water supply system, Jamie Evans, the Manager at Hamilton Downs, chose a SQFlex solar submersible pump with a 3" helical rotor. Set in the well at a depth of 64 m (210 ft), the SQFlex is powered from 12 PV solar modules, which produce a maximum of 546 W.

*"When drilling new wells, we would certainly look at installing SQFlex pumps in future... They certainly require less maintenance and are a heck of a lot safer and easier to repair than windmills,"*

Jamie Evans, Manager, Hamilton Downs



Ferreira do Alentejo, Portugal:

### SQFLEX PROVIDES GREENHOUSE IRRIGATION ON THREE HECTARE (SEVEN ACRES) PROPERTY

With 1500 m<sup>2</sup> (16,145 ft<sup>2</sup>) of greenhouses growing cucumbers and melons and 700 fruit trees and an olive grove, Artur Pissarro and Fátima Mourão quickly found out that the SQFlex solar submersible pump was by far the most economical and sustainable solution. Monthly power savings for watering alone are estimated at EUR 90 (\$107 USD).

*"At dawn, the pump is switched on and works until the end of the day. The higher the solar peak, the greater the water pressure... Electricity costs are zero,"*

Artur Pissarro, Owner.

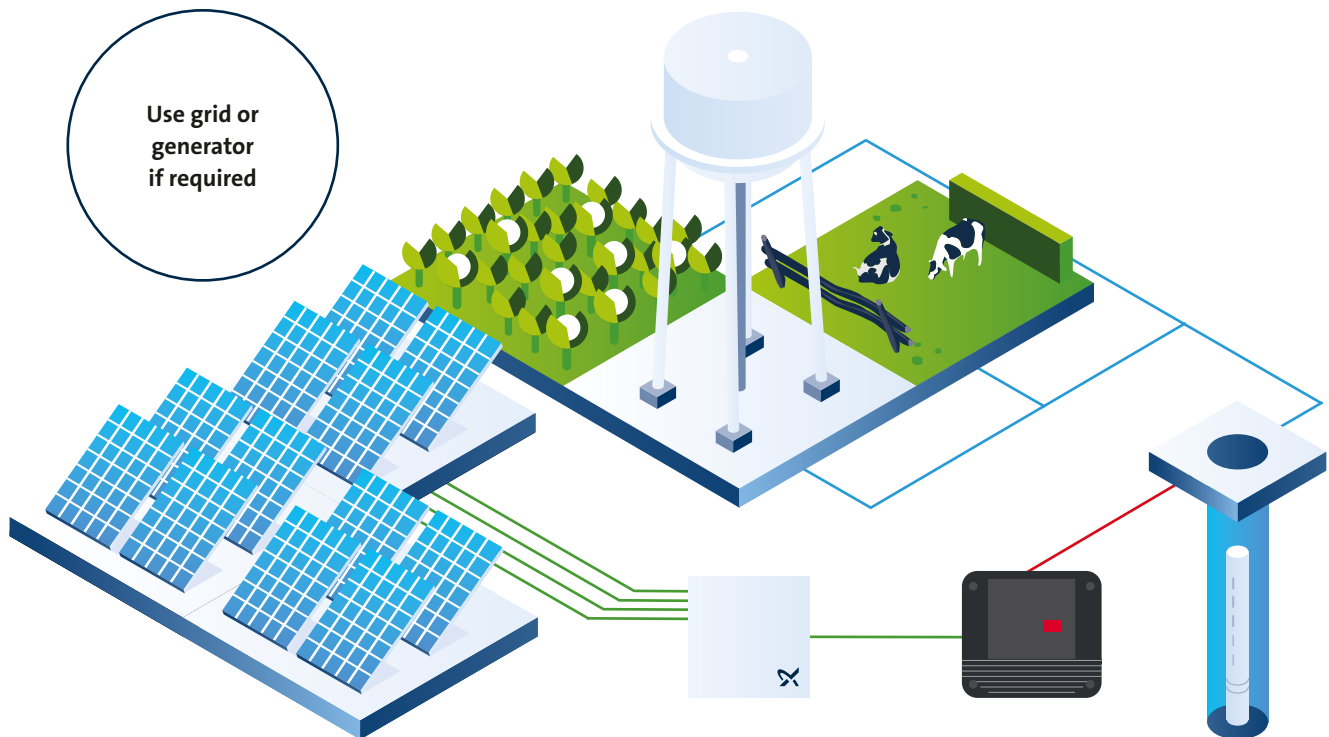
# INCREASE PRODUCTION USING SOLAR ENERGY

13 CLIMATE  
ACTION



## IN AGRICULTURE AND FARMING

A Grundfos SQFlex solar water solution can increase crop yields and ensure effective watering for livestock and game

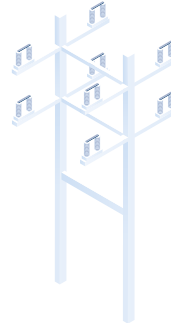


Grundfos solar water solutions offer a smarter and more viable means of delivering reliable water for all your water needs. In addition to reducing energy costs, system operating costs are also extremely low. This, ultimately, ensures a solid return on investment and makes the solar water solution economically sustainable in the long-term.

- **Drip and sprinkler irrigation**  
Perfect when using smaller pumps with an integrated solar inverter, as the drippers or emitters are most water efficient and work with pressurised and gravity systems
- **Flood and pivot irrigation**  
These applications generally require a larger pump with an external solar inverter. Pivots are most effective in pressurised systems, whilst flood irrigation works well with pressurised or gravity feed
- **Livestock watering**  
Pump water directly to the watering station or to a tank, flowing to the watering station
- **Wildlife and game farms**  
Provides watering for wildlife and game within the confines of the reserve; the water supply can be managed for livestock
- **Pumping to tank**  
Offers the advantage of solar water pumping to a holding tank while the sun is shining, from where water is released either pressurised or by gravity feed
- **Domestic water supply**  
Meets domestic needs on the farm, ranch or any remote location, including supplying potable water for homes

# MAXIMISED FLEXIBILITY

## ENERGY SOURCE



## PRODUCT



SQFlex submersible pump

MGFlex motor

RSI solar inverter

POWERADAPT

Combine with

Combine with

Combine with

Combine with

High efficiency SQFlex solar submersible pumps are ideal for plug and pump, flexible, low flow water supply.

The MGFlex motor can pair with nearly all Grundfos pumps, depending on your requirements. Versatile application possibilities.

The Grundfos Solar Inverter (RSI) works with almost any Grundfos pump for large-scale water supply. The RSI comes in 2 different enclosure classes from up to 37kW with IP66 and from 45 to 250kW (60 to 340 hp) it is in IP54.

PowerAdapt is a system companion to RSI and is used to blend the AC and DC power.





## Product range



### SOLAR WATER SUPPLY PUMPS

## SQFlex solar submersible pump

Get even greater coverage for your solar-powered water pumping needs with our extended range of Grundfos SQFlex submersible pumps. Now available in 5 helical rotor models (3" diameter) and 11 centrifugal models (3" and 4" diameter), the SQFlex is built with proven technology based on 40 years of solar pumping experience.

#### Benefits

- High efficiency permanent magnet motor with built-in MPPT software and motor protection
- Flexibility to various power sources from AC or DC
- Tank filling system by connecting to CU200 and remote monitoring through GSM by connecting to CIU Flex

#### Technical data

- Motor size: 2.5 kW(P1)
- Flow rate (Q): 18 m<sup>3</sup>/h (79 gpm)
- Head (H): 250 m (820 ft)

## CRFlex solar surface pump

High efficiency and reliability from multistage CR pump hydraulics and with the MGFlex motor designed specifically for solar applications. Built-in frequency converter with MPPT software and motor protection.



#### Benefits

- Built-in frequency converter with MPPT software and motor protection
- Compatible to both AC and DC, with 3 x analog input and 2 x digital input
- Uniquely designed cartridge shaft seal offers excellent reliability

#### Technical data

- Motor size: 0.88 kW or 1.73 kW (P1)

### SOLAR INVERTER

## Renewable Solar Inverter (RSI)

Designed to power any 3-phase pump, the intelligent off-grid Renewable Solar Inverter (RSI) greatly expands possibilities for solar energy water supply systems with substantially reduced lifecycle costs.



#### Benefits

- IP66 enclosure class means the RSI is weather-proof and allows outdoor installation
- Advanced MPPT software which continuously optimises the system with respect to temperature as well as the solar panel conditions
- Quick setup Wizard with pre-defined parameters suits the Grundfos submersible MS motor

#### Technical data

- Power size: Up to 250kW (340 hp (460 amp))
- Voltage supply: DC or 3-phase AC
- Enclosure class: IP54 and IP66
- Analog and digital input

### SOLAR INVERTER CABINET

## PowerAdapt

Used in conjunction with a RSI unit, this enables a Grundfos pump to safely mix solar (DC) power with a secondary (AC) source like the grid or a generator.



#### Benefits

- Allows for a partial solar system when there is not enough space or budget for a full panel installation
- Provides a seamless, 24/7 system with constant power
- Enables solar to be used as a backup in areas with poor grid stability
- Maximises water pumping time for low-yield boreholes

#### Technical data

- Voltage 3 X 380 - 415 V
- Enclosure class: IP54

## Product range



### WATER SUPPLY PUMPS

## SP Submersible Pumps

Complete range of submersible pumps for groundwater applications built to deliver optimum efficiency during periods of high demand, with long product life and easy maintenance.

#### Benefits

- State-of-the-art hydraulics provide high efficiency and low operating costs
- Made entirely of stainless steel to ensure high reliability and long lifetime, even in corrosive environments
- One supplier of the pump, motor and controls for an optimal pumping system

#### Technical Data:

- Motor size: 190 kW (250 hp)
- Flow rate (Q): 474 m<sup>3</sup>/h (1,500 gpm)
- Head (H): 676 m (2,173 ft)



## CR Multi- stage centrifugal pumps

Modularity for a complete range of pump solutions; from four material variants, thirteen flow sizes (up to almost 50 bar of pressure (580 psi)), a variety of shaft seals, rubber materials, and supply voltages. Pump parts can be optimised and designed for specific requirements.

#### Benefits

- Available with Grundfos Blueflux IE3 motor efficiency, reducing energy costs
- Multi-flange fits a variety of standard connections for a more flexible solution
- Uniquely designed cartridge shaft seal increases reliability, reducing downtime

#### Technical Data:

- Motor size: 200 kW (268 hp)
- Flow rate (Q): 244 m<sup>3</sup>/h (1,280 gpm)
- Head (H): 487 m (1,597 ft)



## NB/NBG/NK/NKG Single-stage end-suction standard pumps

Multi-purpose end-suction pumps for reliable and cost-efficient applications such as water supply. Non-self-priming, single-stage, centrifugal volute pumps with axial suction port, radial discharge port and horizontal shaft comply fully with either EN733 or ISO2858.

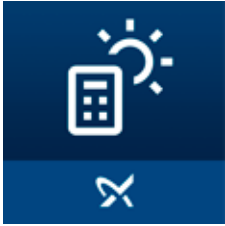
#### Benefits

- Optimised hydraulics in housing and impeller for unimpeded liquid flow
- O-ring seal between pump housing and cover means no risk of leakage
- Housing, impeller and wear ring in different materials for improved corrosion resistance, no sticking elements

#### Technical Data:

- Flow rate (Q): 3,087 m<sup>3</sup>/h (13,591 gpm)
- Head (H): 343 m (1,125 ft)

## Product range



### MONITORING AND CONTROLS

## Grundfos GO Solar app

The Grundfos GO Solar app provides three ways to size. Once you've downloaded the app, you can size offline and sync with Grundfos Product Center at a later time. You also get a built-in water calculator based on geolocation, which determines the water needed for homes, crops, livestock water and humanitarian projects.

#### Benefits

- Three solar system sizing options
- Size in remote locations offline and sync with GPC later on
- Optimal stock utilisation for Distributors

#### Sizing

- Size by application
- Size by pump
- Size by number of solar panels
- Built-in water calculator



## Grundfos Remote Management (GRM)

A cost-effective and straightforward way to monitor and manage pump installations, GRM reduces the need for onsite inspections and in the event of an alarm or warning, the relevant people are notified directly.

#### Benefits

- Get the full overview of the operation, performance and trends and see the status of your entire system on your own map or image
- Live monitoring, analysis and adjustments, monitoring of energy consumption, and optimisation of system performance
- Manage service & maintenance; plan service work on the basis of actual operating data and get notification when service is due

#### Communication

- CIM/CIU communication interfaces enable data transmission via GPRS, SMS and Internet from Grundfos pumps and controllers
- Built-in multi-purpose I/O board allows the connection of sensors and switches
- A fixed low fee covers data traffic, hosting costs and system support, including back-up of all data



## CIU 903 SQFlex control

The CIU 903 is a combined status, control and communication unit especially developed for the SQFlex system. Combined with the GRM modem CIM 280, it enables monitoring over the GSM network with GRM. The CIU 903 also enables connection of a level switch. CIU 903 is the control unit to be used with SQFlex pumps also for the range above 1.4kW

#### Benefits

- Communication between the CIU 903 and the pump
- System monitoring and alarm indication
- Start, stop by external contacts.
- Works with Grundfos GO for remote control  
Option for GRM with CIM 280 module

#### Technical data

- Voltage: 30-300 VDC, 8.4 A, 90-240 VAC, 12 A
- Power consumption: maximum 11 W
- Max. communication length 300m between CIU 903 and SQFlex
- Enclosure class: IP55



## CU 200 SQFlex control

The CU 200 is a combined status, control and communication unit especially developed for the SQFlex system. The CU 200 also enables connection of a level switch.

#### Benefits

- Communication between the CU 200 and the pump
- System monitoring and alarm indication
- Start, stop and reset the pump with the on/off button

#### Technical data

- Voltage: 30-300 VDC, 8.4 A, 90-240 VAC, 8.4 A
- Power consumption: 5 W
- Max. communication length 300m between CU 200 and SQFlex
- Enclosure class: IP55



Grundfos is a global leader in advanced pump solutions and a trendsetter in water technology. We contribute to global sustainability by pioneering technologies that improve quality of life for people and care for the planet. With an annual production of more than 16 million pump units and more than 80 companies in 55 countries, we offer a full range of modular, energy-efficient and intelligent products and services for applications within buildings, industries and water.

Grundfos Solar Water Solutions consist of a broad range of proven products that build robust and reliable solar water supply systems with long product life, low maintenance and manageable service requirements. A highly optimised Grundfos solar water solution offers low risk for your investment with low operating costs and no energy costs.

*For more information, please visit [grundfos.com](http://grundfos.com)*