SQFlex

Renewable-energy based water-supply systems

60 Hz
Product data
- Performance range: 3
- Application: 4
- The SQFlex system: 4
- Type keys: 5
- Pumped liquids: 5
- Curve conditions: 6
- Wiring diagram for pump: 6
- Pump overview: 6
- Dry-running protection: 7
- High efficiency: 7
- Over- and undervoltage protection: 7
- Overload protection: 8
- Overtemperature protection: 8
- Maximum Power Point Tracking (MPPT): 8
- Wide voltage range: 8
- Reliability: 8
- Installation: 8
- Service: 8
- System overview: 9

Application examples
- SQFlex Solar: 10
- SQFlex Wind: 13
- SQFlex Combo: 15
- SQFlex system: 17

System components
- CU 200: 18
- Electrical connections, CU 200: 19
- IO 100: 20
- Wiring diagram, IO 100: 20
- IO 101: 20
- Electrical connections, IO 101: 20
- IO 102: 21
- Electrical connections, IO 102: 21
- Generator: 21

System sizing
- Sizing of SQFlex system: 22
- Example: 22

Performance curves
- Performance range: 24
- Application: 24

Technical data
- Dimensions and weights: 28
- Electrical data: 28
- IO 100 switch box: 29
- IO 101 switch box: 29
- IO 102 breaker box: 29
- CU 200 control unit: 30
- Material specification - helical rotor pump: 31
- Material specification - centrifugal pump: 32
- Material specification - motor: 33

Product numbers
- Complete unit with 6 ft cable: 34
- Submersible drop cables: 34
- IO 100: 35
- IO 101: 35
- CU 200: 35
- IO 102: 35
- Wind turbine H80 Whisper: 35
- Tower kit for H80 Whisper: 36
- Tower installation kit: 36
- Tower pipe selection: 36

Accessories
- Auger / anchor: 37
- Grease: 37

Further product documentation
- Sources of product documentation: 38
- WinCAPS®: 38
- WebCAPS®: 39
Performance range

Note: Do not use the above curves for sizing of the pump.
Application

Designed for continuous as well as intermittent operation, the SQFlex system is especially suitable for water supply applications in remote locations, such as:

- villages, schools, hospitals, single-family houses etc.
- farms
  - watering of cattle
  - irrigation of fields and greenhouses
- game parks and game farms
  - watering applications
- conservation areas
  - surface water pumping
- Floating pump installations for pumping of water from ponds and lakes.

The SQFlex system

The SQFlex system is a reliable water supply system based on renewable energy sources, such as solar and wind energy. The SQFlex system is equipped with the SQF submersible pump.

Very flexible as to its energy supply and performance, the SQFlex system can be combined and adapted to any need according to the conditions on the installation site.

The system components are:

- SQF submersible pump
- CU 200 control unit
- IO 100 and IO 101 switch boxes
- IO 102 breaker box
- energy supply:
  - solar panels
  - wind turbine
  - generator
  - batteries.

Pump

The SQF pump range comprises two pump technologies:

- Helical rotor pump (3") for high heads and moderate flows.
- Centrifugal pump (4") for lower heads and high flows based on the Grundfos SP A pump.

The performance curves below illustrate pump performance for the two pump technologies:

Motor

The SQFlex motor range comprises only one motor size, the MSF 3 with max. power input (P1) of 900 W. MSF 3 is a 3" motor.

The speed range for the motor is 500-3000 rpm depending on the power input and the load.

The motor has been developed especially for the SQFlex system.

The SQFlex motor has three internal limitations,

- max. power consumption (P1) of 900 W
- max. current of 7 A and
- max. speed of 3000 rpm.

The pump delivers its maximum performance when one of the above limitations is reached.

The motor is available in stainless steel EN/DIN 1.4301. The motor is designed according to the permanent-magnet principle with built-in electronic unit.

Voltage supply

The motor can be supplied with either AC or DC voltage.

- 30 - 300 VDC, PE
- 1 x 90 - 240 V -10%/+6%, 50/60 Hz, PE.
**IO 100 switch box**
The IO 100 is an on/off switch box designed as a positive disconnect for the system voltage supply.

**IO 101 switch box**
The IO 101 is an on/off switch box designed as a positive disconnect for the system voltage supply. The IO 101 is used with SQFlex systems supplied by solar panels and with a generator supply backup.

**IO 102 breaker box**
The IO 102 is an on/off switch box designed as a positive disconnect for the system voltage supply. The IO 102 is used with wind-powered SQFlex systems or with SQFlex systems powered by wind and solar energy. IO 102 acts as a brake which makes it possible to slow down or stop the wind turbine.

**CU 200 control unit**
The CU 200 control unit is a combined status and control unit for the SQFlex pump system. Furthermore, the CU 200 enables connection of a level switch placed in a water reservoir or similar tank.

**Solar modules**
Grundfos’ solar modules have been developed especially for the SQFlex system. The solar modules are equipped with plugs and sockets enabling easy and simple installation.

Grundfos offers data sheets for available solar modules. For further information please contact your local Grundfos Company.

**Generator**
If the electricity supply from its primary source of energy is temporarily insufficient, the SQFlex system can be supplied by a generator. The generator can either be diesel or gasoline driven.

**Batteries**
The SQFlex system can be supplied by batteries with a voltage supply of 30 - 300 VDC, minimum current 7A.

**Type keys**

<table>
<thead>
<tr>
<th>Example</th>
<th>Rated flow at 3000 rpm [US GPM]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Type range</td>
</tr>
<tr>
<td>Example</td>
<td>Number of stages</td>
</tr>
</tbody>
</table>

**Type key for helical rotor pumps**

<table>
<thead>
<tr>
<th>Example</th>
<th>Type key for helical rotor pumps</th>
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</thead>
<tbody>
<tr>
<td>Example</td>
<td>Rated flow at 3000 rpm [US GPM]</td>
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<tr>
<td>Example</td>
<td>Type range</td>
</tr>
<tr>
<td>Example</td>
<td>Number of stages</td>
</tr>
</tbody>
</table>

**Type key for centrifugal pumps**

<table>
<thead>
<tr>
<th>Example</th>
<th>Rated flow at 3000 rpm [US GPM] and pump generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td>Type range</td>
</tr>
<tr>
<td>Example</td>
<td>Number of stages</td>
</tr>
</tbody>
</table>

**Pumped liquids**
The SQF pumps are designed for pumping thin, clean, non-aggressive, non-explosive liquids, not containing solid or long-fibred particles larger than sand grains.

**Sand content:**

- max. 50 ppm.
- A higher sand content will reduce the pump life considerably due to wear.

**pH:**

- 5 - 9

**Liquid temperature:**

- 32°F to +104°F

The pump can run at free convection (~ 0 ft/sec) at max. +104°F.

**Salt content**
The table below shows the resistance of stainless steel to Cl-. The figures in the table are based on a pumped liquid with a pH-value of 4 - 9.

<table>
<thead>
<tr>
<th>Stainless steel</th>
<th>Cl- content [ppm]</th>
<th>Liquid temperature [°F]</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN/DIN 1.4301</td>
<td>0 - 300</td>
<td>&lt; 104</td>
</tr>
<tr>
<td>AISI 304</td>
<td>300 - 500</td>
<td>&lt; 86</td>
</tr>
</tbody>
</table>
Curve conditions

The SQFlex Solar performance range shown on page 3 is based on:

- solar radiation on a tilted surface
- $H_T = 6 \text{ kWh/m}^2 \text{ per day}$
- 20° tilt angle
- ambient temperature: +86°F
- 20° northern latitude
- panel voltage: 120 VDC
- an 11 hour standard solar day.

The SQFlex Wind performance range shown on page 3 is based on:

- average wind speed
- calculations according to Weibull’s factor $k = 2$
- continuous operation over 24 hours.

The performance charts on pages 24 to 27 are based on the following guidelines:

- All curves show mean values.
- The curves must not be used as guarantee curves.
- Typical deviation: +/-15%.
- The measurements were made at a water temperature of +86°F.
- The curves apply to a kinematic viscosity of 1 mm$^2$/s (1 cSt). If the pump is used for liquids with a viscosity higher than that of water, this will reduce the head and increase the power consumption.
- The performance curves are inclusive of inlet and valve losses at the actual speed.
- Supply to pump: 120 VDC.

Wiring diagram for pump

Connection of the MSF motor to the power supply must be done according to the wiring diagram shown below.

As the intelligent motor electronics can handle both connection possibilities, it makes no difference how the wires “+” and “−” or “N” and “L” are connected.

Pump overview

The SQF pump is available as a complete unit.

<table>
<thead>
<tr>
<th>Element</th>
<th>Drawing</th>
<th>Description</th>
</tr>
</thead>
</table>
| SQF pump complete| ![Image](TM0224873901.png) | SQF pump complete with ...  
- motor  
- 6 ft cable with water level electrode, end cover, socket and cable guard. |
Dry-running protection

The SQF pump is protected against dry running in order to prevent damage to the pump. The dry-running protection is activated by a water level electrode placed on the motor cable 12 - 24 inches above the pump depending on the pump type.

The water level electrode measures the contact resistance to the motor sleeve through the water. When the water level falls below the water level electrode the pump will be cut out. The pump will automatically cut in again 5 min. after the water level is above the water level electrode.

High efficiency

The MSF 3 motor is a permanent-magnet motor (PM motor) featuring a higher efficiency within the power range compared to a conventional asynchronous motor.

In addition to this the segmented motor stator contributes considerably to the high efficiency.

The MSF 3 motor is characterized by a high locked-rotor torque even at low power supply.

Over- and undervoltage protection

Overvoltage and undervoltage may occur in the case of unstable voltage supply or a faulty installation.

The pump will be cut out if voltage falls outside the permissible voltage range. The motor is automatically cut in again when the voltage is again within the permissible voltage range. Therefore no extra protection relay is needed.

Note: The MSF 3 motor is protected against transients from the voltage supply according to IEC 60664-1 "overvoltage category III" (4 kV). In areas with high lightning intensity, external lightning protection is recommended.
Overload protection
If the upper load limit is exceeded, the motor will automatically compensate for this by reducing the speed. If the speed falls below 500 rpm, the motor will be cut out automatically.

The motor will remain cut out for 10 sec. after which period the pump will automatically attempt a restart.

The overload protection prevents burnout of the motor. Consequently, no extra motor protection is required.

Overtemperature protection
A permanent-magnet motor gives off very little heat to its surroundings. An efficient internal circulation system leads the heat away from the rotor, stator and bearings ensuring optimum operating conditions for the motor.

As an extra protection, the electronic unit has a built-in temperature sensor. When the temperature rises above +185°F, the motor is automatically cut out; when the temperature has dropped to +167°F, the motor is automatically cut in again.

Maximum Power Point Tracking (MPPT)
The built-in electronic unit gives the SQFlex system a number of advantages compared to conventional products. One of these advantages is the built-in microprocessor with MPPT (MPPT = Maximum Power Point Tracking).

Thanks to the MPPT-function, the pump duty point is continuously optimised according to the input power available. MPPT is only available for pumps connected to DC supply.

Wide voltage range
The wide voltage range enables the motor to operate at any voltage from 30-300 VDC or 90-240 VAC. This makes installation and sizing especially easy.

Reliability
The MSF 3 has been developed to provide optimum reliability which is achieved through the following features:
- carbon/ceramic bearings
- excellent starting capabilities
- various protection facilities.

Installation
The following features ensure simple installation of the SQF pump:
- low weight ensuring user-friendly handling
- installation in 3", 4" or larger boreholes
- only an on/off switch is needed, which means that no extra motor starter / starter box is necessary,
- comes with cable and cable cover pre-installed.

Note: Horizontal installation requires the water level electrode to be placed min. 12 to 24 inches above the pump to ensure the dry-running protection.

Service
The modular pump and motor design facilitates installation and service. The cable and the end cover with socket are fitted to the pump with nuts which enable replacement in the field.
## System overview

The SQFlex system can be used in a number of combinations as shown in the table below.

<table>
<thead>
<tr>
<th>System ...</th>
<th>... consists of the following components</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQFlex Solar</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
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<tr>
<td>SQFlex Solar - with CU 200 control unit and level switch</td>
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<td>SQFlex Solar - with generator as power supply back-up</td>
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<td>SQFlex Wind</td>
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<td>SQFlex Wind - with CU 200 control unit and level switch</td>
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<td>SQFlex Combi - combination of solar and wind energy</td>
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<td>SQFlex Combi - with CU 200 and level switch</td>
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<tr>
<td>SQFlex system - with generator as power supply</td>
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</tbody>
</table>

For the number of solar modules required, please consult the sizing tool in WinCAPS.

★★ Can be excluded from the installation.

★★★ May be a component in the system.
SQFlex Solar

The SQFlex Solar system is the simplest of the range of SQFlex systems.

Benefits
- Easy to install
- Maintenance confined to periodic cleaning of the solar panels
- Few and simple components.

The protective circuit incorporated in the motor electronic unit cuts out the pump in case of dry running or similar situations.

By using the IO 100 switch box, the voltage supply to the pump can be closed manually, e.g. when ...
- there is no need for water supply
- the system requires service.

Note: For the number of solar modules required, please consult the Sizing tool.

1  SQF pump
2  Cable
3  Cable clips
4  Straining wire
5  Wire clamp
6  Solar panels
7  Support structure
12 IO 100 switch box
**SQFlex Solar**

- with CU 200 control unit and level switch

The SQFlex Solar system allows energy from the sun to be stored as water in a reservoir.

SQFlex Solar water supply systems with a water reservoir are used where...

- there is a need for night-time water supply
- for short periods, the solar energy is insufficient to run the pump
- there is a need for a back-up water source.

**Benefits**

Combined with the CU 200, the level switch acts as a pump cut-out function when the water reservoir is full.

CU 200 offers indication of...

- full water reservoir (level switch activated)
- pump operation
- input power.

CU 200 indicates operational stoppage in case of...

- dry running
- service (see page 18)
- insufficient energy supply.

In addition, the system features...

- easy installation
- maintenance confined to periodic cleaning of the solar panels.

**Note:** For the number of solar modules required, please consult the Sizing tool.
Application examples

SQFlex Solar
- with generator as power supply back-up

During periods of limited solar energy, the SQFlex Solar water supply system provides a safe supply of water. The system is connected to an external generator as back-up via the IO 101 switch box.

The system enables operation ...

- via generator when ...
  - the energy supply from the solar panels is insufficient
- via solar energy when ...
  - the generator is stopped manually
  - the generator runs out of fuel.

Benefits

- Offers water supply at night or when the solar energy is insufficient
- Easy to install
- Maintenance confined to periodic cleaning of the solar panels
- Few and simple components
- Flexible in terms of energy supply.

1 SQF pump
2 Cable
3 Cable clips
4 Straining wire
5 Wire clamp
6 Solar panels
7 Support structure
10 Generator
13 IO 101 switch box

Note: For the number of solar modules required, please consult the Sizing tool.
SQFlex Wind

The SQFlex Wind system is based on wind energy as the only energy source for pump operation.

The system is suitable for installation in areas where the wind is almost constant seen over a period of time.

As the turbine noise level increases with the wind speed, siting of the wind turbine near a residence is not recommended.

The IO 102 breaker box makes it possible to brake the wind turbine when...

- there is no need for water supply
- the system requires service.

Benefits

- Easy to install
- A minimum of maintenance required
- Few and simple components.
Application examples

SQFlex Wind
- with CU 200 control unit and level switch

The SQFlex Wind system allows energy from the wind to be stored as water in a reservoir. SQFlex Wind water supply systems with a water reservoir are used where...

- for short periods, the wind energy is insufficient to run the pump
- there is a need for a back-up water source.

As the turbine noise level increases with the wind speed, siting of the wind turbine near a residence is not recommended.

Benefits

Combined with the CU 200, the level switch acts as a pump cut out function when the water reservoir is full.

CU 200 offers indication of ...
- full water reservoir (level switch activated)
- pump operation
- input power.

CU 200 indicates operational stoppage in case of ...
- dry running
- service (see page 18)
- insufficient energy supply.

The IO 102 breaker box makes it possible to interrupt the supply voltage in the system and to slow down or stop the wind turbine when ...

- there is no need for water supply
- the system requires service.

In addition, the system features...
- easy installation
- a minimum of maintenance.

1 SQF pump
2 Cable
3 Cable clips
4 Straining wire
5 Wire clamp
8 Wind turbine
9 IO 102 breaker box
11 CU 200 control unit
14 Water reservoir
15 Level switch
**SQFlex Combo**

- combination of solar and wind energy

The SQFlex Combi water supply system is ideal in areas where the solar or wind energy is sufficient to run the pump.

The energy supply to the pump is a combination of solar and wind energy.

As the turbine noise level increases with the wind speed, siting of the wind turbine near a residence is not recommended.

**Benefits**

- Offers water supply at night or when the solar energy is insufficient
- Easy to install
- Maintenance confined to periodic cleaning of the solar panels
- Few and simple components.

The IO 102 breaker box makes it possible to interrupt the supply voltage in the system and to slow down or stop the wind turbine when ...

- there is no need for water supply
- the system requires service.

In addition, the system features ...

- easy installation
- a minimum of maintenance.

Note: For the number of solar modules required, please consult the Sizing tool.
Application examples

SQFlex Combo
- with CU 200 and level switch
The SQFlex Combi system allows solar and wind energy to be stored as water in a reservoir.

SQFlex Combi water supply systems with a water reservoir are used where ...
• for short periods, the solar or wind energy is insufficient to run the pump
• there is a need for a back-up water source.

As the turbine noise level increases with the wind speed, siting of the wind turbine near a residence is not recommended.

Benefits
Combined with the CU 200, the level switch acts as a pump cut-out function when the water reservoir is full.

CU 200 offers indication of ...
• full water reservoir (level switch activated)
• pump operation
• input power.

CU 200 indicates operational stoppage in case of ...
• dry running
• service (see page 18)
• insufficient energy supply.

The IO 102 breaker box makes it possible to interrupt the supply voltage in the system and to slow down or stop the wind turbine when ...
• there is no need for water supply
• the system requires service.

In addition, the system features ...
• easy installation
• a minimum of maintenance.

Note: For the number of solar modules required, please consult the Sizing tool in WinCAPS.
SQFlex system

- with generator as power supply

The SQFlex water supply system is connected to a generator, which can be diesel or gasoline driven.

Benefits

• Offers water supply 24 hours a day independent of the weather.
• Easy installation.
• Few and simple components.

1 SQF pump
2 Cable
3 Cable clips
4 Straining wire
5 Wire clamp
10 Generator
CU 200

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

The CU 200 incorporates cable entries for ...
- power supply connection (pos. 6),
- pump connection (pos. 7),
- earth connection (pos. 8),
- level switch connection (pos. 9).
(The position numbers shown in brackets refer to the drawing to the right).

Communication between the CU 200 and the pump takes place via the pump power supply cable. This is called mains borne signalling (or Power Line Communication), and this principle means that no extra cables between the CU 200 and the pump are required.

It is possible to start, stop and reset the pump by means of the on/off button (pos. 1).

The CU 200 control unit offers:
- System monitoring
- Alarm indication.

The following indications allow the operation of the pump to be monitored:
- Water reservoir is full (level switch) (pos. 2)
- Pump is running (pos. 3)
- Input power (pos. 11).

The CU 200 offers the following alarm indications:
- Dry running (pos. 10)
- Service needed (pos. 5) in case of:
  - No contact to pump
  - Overvoltage
  - Overtemperature
  - Overload.

In addition, the CU 200 shows the symbols of the energy supply options (pos. 4).
System components

Electrical connections, CU 200

**Level switch input:**
- High water level: Contact is closed
- Low water level: Contact is open
System components

IO 100
The IO 100 switch box is designed specifically for solar powered SQFlex systems.
The IO 100 enables manual starting and stopping of the pump in an SQFlex Solar system and functions as a connection box joining all necessary cables.
The dimensions and wiring diagram of IO 100 are shown below.

Dimensions, IO 100

![Dimensions diagram]

Dimensions stated in inches.

Wiring diagram, IO 100

![Wiring diagram]

IO 101
The IO 101 switch box is designed specifically for solar powered SQFlex systems.
The IO 101 enables the connection of a generator supply back-up in case of insufficient solar radiation. The switching between solar power and generator must be made manually.
When the generator is stopped manually or runs out of fuel, the IO 101 will automatically switch to the solar energy supply.
The IO 101 functions as a connection box joining all necessary cables.
The dimensions and electrical connections of IO 101 are shown below.

Dimensions, IO 101

![Dimensions diagram]

Dimensions stated in inches.

Electrical connections, IO 101

![Electrical connections diagram]
**System components**

**IO 102**

The IO 102 breaker box is designed specifically for wind powered SQFlex systems.

The IO 102 enables manual starting and stopping of the pump in an SQFlex Wind system and an SQFlex Combo system.

The on/off switch has a built-in electrical brake for the turbine. When the switch is in the "off" position, the turbine stops or slows down.

The IO 102 rectifies the three-phase AC voltage from the wind turbine into DC voltage. Furthermore, the IO 102 enables the combination of wind energy from the wind turbine and solar energy from the solar panel.

At the same time, the IO 102 also functions as a connection box joining all necessary cables.

Dimensions and wiring diagram of the IO 102 are shown below.

**Dimensions, IO 102**

![Dimensions diagram](image)

Dimensions stated in inches.

**Electrical connections, IO 102**

![Electrical connections diagram](image)

**Generator**

The generator can be either diesel or gasoline driven. The generator must be running steadily before the pump is cut in.
Sizing of SQFlex system

Grundfos has developed a PC-based sizing tool enabling the sizing of SQFlex systems.

The sizing tool is also available in a paper version. The PC-based sizing tool is integrated in WinCAPS and covers both solar and wind powered systems. The paper version covers both solar powered and wind powered systems.

The following three parameters must be known for the sizing of the optimum SQFlex system:
- installation location
- max. head required and
- quantity of water required.

With a view to the sizing of a correct solar powered SQFlex system the world has been divided into six regions:
- North America
- South America
- Australia/New Zealand
- Asia/Pacific
- Southern Africa
- Europe/Middle East/Northern Africa.

Each region is divided into a number of zones according to the solar radiation in kWh/m² per day.

The following example shows the sizing of a solar powered SQFlex system using the paper version of the sizing tool.

For the sizing of a wind powered SQFlex system, please refer to the WinCAPS version.

Example

Conditions:
- installation location: Austin, Texas
- required head: 220 ft
- quantity of water required: 1500 gal/day

Proceed as follows:

1. Find Austin, TX on the map.
   The map shows that Austin is located in solar radiation zone K, and the recommended tilt angle of the solar panel is 30°.
2. Go to the sizing table and find zone K and tilt angle 30°.
3. Find the required head (A) and the required flow (B) and read the recommended SQF pump type (C), number of solar modules (D) and the output power of the solar modules (E).

SQFlex system configuration:
- Pump: 6 SQF-2
- Number of solar modules: 8
- Power: 50 Wp x 8 = 400 Wp.
## System sizing

### North-America (July)

![Map of North America with shading indicating solar radiation zones and tilt angles.]

### Sizing table

<table>
<thead>
<tr>
<th>Zone</th>
<th>Solar radiation (kWh/m² per day)</th>
<th>Required head [ft]</th>
<th>No. of 50 Wp modules</th>
<th>Required flow [gal/day]</th>
<th>Power [Wp]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone K - tilt angle 30°</td>
<td>7.3</td>
<td>25 SQF-3</td>
<td>5810</td>
<td>3380</td>
<td>2770</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 SQF-2</td>
<td>6 SQF-2</td>
<td>3 SQF-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13600</td>
<td>6340</td>
<td>5150</td>
<td>4020</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 SQF-3</td>
<td>25 SQF-6</td>
<td>11 SQF-2</td>
<td>6 SQF-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20400</td>
<td>9670</td>
<td>6970</td>
<td>5230</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 SQF-3</td>
<td>25 SQF-6</td>
<td>11 SQF-2</td>
<td>6 SQF-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25900</td>
<td>14100</td>
<td>9700</td>
<td>5890</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 SQF-3</td>
<td>25 SQF-6</td>
<td>3 SQF-2</td>
<td>6 SQF-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30400</td>
<td>18400</td>
<td>12100</td>
<td>7980</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75 SQF-3</td>
<td>25 SQF-6</td>
<td>11 SQF-2</td>
<td>6 SQF-2</td>
</tr>
</tbody>
</table>
Performance curves SQFlex

2 SQF-2

3 SQF-2

4 SQF-2

5 SQF-2

6 SQF-2

[Diagram showing performance curves for different SQF-2 models with legend for pressure and flow rates]
Performance curves

11 SQF-2

Q [US GPM]

P1 [W]

25 SQF-3

Q [US GPM]

P1 [W]
Performance curves
### Technical data

#### Dimensions and weights

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>B</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>3 SQF-2</td>
<td>47</td>
<td>2.9</td>
<td>1&quot; NPT</td>
<td>17</td>
</tr>
<tr>
<td>6 SQF-2</td>
<td>48</td>
<td>2.9</td>
<td>1&quot; NPT</td>
<td>17.5</td>
</tr>
<tr>
<td>11 SQF-2</td>
<td>49</td>
<td>2.9</td>
<td>1 1/4&quot; NPT</td>
<td>18</td>
</tr>
<tr>
<td>25 SQF-3</td>
<td>32</td>
<td>3.9</td>
<td>1 1/4&quot; NPT</td>
<td>18</td>
</tr>
<tr>
<td>25 SQF-6</td>
<td>35</td>
<td>3.9</td>
<td>1 1/4&quot; NPT</td>
<td>19.5</td>
</tr>
<tr>
<td>40 SQF-3</td>
<td>36</td>
<td>3.9</td>
<td>2&quot; NPT</td>
<td>21</td>
</tr>
<tr>
<td>75 SQF-3</td>
<td>39</td>
<td>3.9</td>
<td>2&quot; NPT</td>
<td>24</td>
</tr>
</tbody>
</table>

* Pump complete

#### Electrical data

**30 - 300 VDC or 1 x 90 - 240 VAC, 50/60 Hz**

<table>
<thead>
<tr>
<th>Pump type</th>
<th>Motor type</th>
<th>Max. power input ( P_1 ) [W]</th>
<th>Max. current [A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 SQF-2</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>6 SQF-2</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>11 SQF-2</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>25 SQF-3</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>25 SQF-6</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>40 SQF-3</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
<tr>
<td>75 SQF-3</td>
<td>MSF 3</td>
<td>900</td>
<td>7</td>
</tr>
</tbody>
</table>
## Technical data

### SQF pump

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply to pump</td>
<td>1 x 90 - 240 V –10%/+6%, 50/60 Hz. 30 - 300 VDC.</td>
</tr>
<tr>
<td>Run-up time</td>
<td>Depending on power source.</td>
</tr>
<tr>
<td>Start/stop</td>
<td>No limitation to the number of starts/stops per hour.</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>IP 68.</td>
</tr>
<tr>
<td>Motor protection</td>
<td>Built into the pump. Protection against:</td>
</tr>
<tr>
<td></td>
<td>- Dry running by means of a water level electrode.</td>
</tr>
<tr>
<td></td>
<td>- Overvoltage and undervoltage.</td>
</tr>
<tr>
<td></td>
<td>- Overload.</td>
</tr>
<tr>
<td></td>
<td>- Overtemperature.</td>
</tr>
<tr>
<td>Conductivity</td>
<td>≥ 70 μs/cm (micro siemens).</td>
</tr>
<tr>
<td>Sound pressure level</td>
<td>The sound pressure level is lower than the limiting values stated in the EEC Machinery Directive.</td>
</tr>
<tr>
<td>Radio noise</td>
<td>SQF comply with EMC Directive 89/336/EEC. Approved according to EN 50081-1 and 50082-2.</td>
</tr>
<tr>
<td>Reset function</td>
<td>SQF can be reset via CU 200 or by disconnecting the power from the power supply in 1 minute.</td>
</tr>
<tr>
<td>Power factor</td>
<td>PF = 1.</td>
</tr>
<tr>
<td>Operation via generator</td>
<td>Voltage: 115 VAC, –10%/+6%. The generator output must be a minimum of 1000 Watts.</td>
</tr>
<tr>
<td>Earth leakage circuit breaker</td>
<td>If the pump is connected to an electrical installation where an earth-leakage circuit breaker (ELCB) is used as an additional protection, this circuit breaker must trip out when earth fault currents with DC content (pulsating DC) occur.</td>
</tr>
<tr>
<td>Borehole diameter</td>
<td>3 SQF-2, 6 SQF-2, 11 SQF-2: Minimum: 3 inch.</td>
</tr>
<tr>
<td></td>
<td>25 SQF-3, 25 SQF-6, 40 SQF-3, 75 SQF-3: Minimum: 4 inch.</td>
</tr>
<tr>
<td>Installation depth</td>
<td>Min.: The pump must be totally submerged in the pumped liquid. Max.: 500 ft below the static water table (220 psi).</td>
</tr>
<tr>
<td>Suction strainer</td>
<td>3 SQF-2, 6 SQF-2, 11 SQF-2: 0.090 inch.</td>
</tr>
<tr>
<td></td>
<td>25 SQF-3, 25 SQF-6: 0.10 inch.</td>
</tr>
<tr>
<td></td>
<td>40 SQF-3, 75 SQF-3: 0.16 inch x 0.79 inch.</td>
</tr>
<tr>
<td>Pumped liquids</td>
<td>pH 5 to 9. Sand content up to 50 ppm.</td>
</tr>
<tr>
<td>Marking</td>
<td>CE</td>
</tr>
</tbody>
</table>

### IO 100 switch box

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Max. 225 VDC, 7 A.</td>
</tr>
<tr>
<td></td>
<td>Max. 265 VAC, 7 A.</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>IP 55 / NEMA 3R.</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>In operation: –22°F to +122°F; during storage: –22°F to +140°F.</td>
</tr>
<tr>
<td>Marking</td>
<td>CE</td>
</tr>
</tbody>
</table>

### IO 101 switch box

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>115 VAC –15%/+10%, 50/60 Hz (internal relay).</td>
</tr>
<tr>
<td></td>
<td>Max. 225 VDC, 7 A.</td>
</tr>
<tr>
<td></td>
<td>Max. 265 VAC, 7 A.</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>IP 55 / NEMA 3R.</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>In operation: –22°F to +122°F; during storage: –22°F to +140°F.</td>
</tr>
<tr>
<td>Marking</td>
<td>CE</td>
</tr>
</tbody>
</table>

### IO 102 breaker box

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>Max. 225 VDC, 7 A.</td>
</tr>
<tr>
<td></td>
<td>Max. 265 VAC, 7 A.</td>
</tr>
<tr>
<td>Enclosure class</td>
<td>IP 55 / NEMA 3R.</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>In operation: –22°C to +122°F; during storage: –22°C to +140°F.</td>
</tr>
<tr>
<td>Marking</td>
<td>CE</td>
</tr>
</tbody>
</table>
## CU 200 control unit

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage</strong></td>
<td>30 - 300 VDC</td>
</tr>
<tr>
<td></td>
<td>90 - 240 VAC –10%/+6%, 50/60, PE.</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>5 W.</td>
</tr>
<tr>
<td><strong>Current consumption</strong></td>
<td>Max. 130 mA.</td>
</tr>
<tr>
<td><strong>Enclosure class</strong></td>
<td>IP 55 / NEMA 3R.</td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>In operation: –22°C to +140°F; during storage: –22°C to +140°F.</td>
</tr>
<tr>
<td><strong>Relative air humidity</strong></td>
<td>95%</td>
</tr>
<tr>
<td><strong>Pump cable</strong></td>
<td>Max. length between CU 200 and pump: 660 feet.</td>
</tr>
<tr>
<td></td>
<td>Max. length between CU 200 and level switch: 1640 feet.</td>
</tr>
<tr>
<td><strong>Back-up fuse</strong></td>
<td>Max.: 10 A.</td>
</tr>
<tr>
<td><strong>Radio noise</strong></td>
<td>The CU 200 complies with EMC Directive 89/336/EEC.</td>
</tr>
<tr>
<td></td>
<td>Approved according to standards EN 55 014 and 55 014-2.</td>
</tr>
<tr>
<td><strong>Marking</strong></td>
<td>CE.</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>4.5 lb</td>
</tr>
</tbody>
</table>
# Technical data

## SQFlex

### Material specification - helical rotor pump

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
<th>Material</th>
<th>SQF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>EN/DIN</td>
</tr>
<tr>
<td>1</td>
<td>Valve casing</td>
<td>Polyamide</td>
<td></td>
</tr>
<tr>
<td>1a</td>
<td>Discharge chamber</td>
<td>Stainless steel</td>
<td>1.4301</td>
</tr>
<tr>
<td>1d</td>
<td>O-ring</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Valve cup</td>
<td>Polyamide</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Valve seat</td>
<td>NBR</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Flange, upper</td>
<td>Stainless steel</td>
<td>1.4301</td>
</tr>
<tr>
<td>7a</td>
<td>Circlip</td>
<td>Stainless spring steel</td>
<td>1.4310</td>
</tr>
<tr>
<td>9</td>
<td>Pump stator</td>
<td>Stainless steel/EPDM</td>
<td>1.4301</td>
</tr>
<tr>
<td>13</td>
<td>Pump rotor</td>
<td>Hard-chromed stainless</td>
<td>1.4301</td>
</tr>
<tr>
<td></td>
<td></td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Torsion shaft</td>
<td>Stainless steel</td>
<td>1.4401</td>
</tr>
<tr>
<td>39</td>
<td>Valve spring</td>
<td>Stainless spring steel</td>
<td>1.4406</td>
</tr>
<tr>
<td>55</td>
<td>Outer sleeve</td>
<td>Stainless steel</td>
<td>1.4301</td>
</tr>
<tr>
<td>70</td>
<td>Valve guide</td>
<td>Polyamide</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Screws for cable</td>
<td>Stainless steel</td>
<td>1.4301</td>
</tr>
<tr>
<td></td>
<td>guard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example: 6 SQF - 2**
### Material specification - centrifugal pump

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
<th>Material</th>
<th>SQF</th>
<th>EN/DIN</th>
<th>AISI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valve casing</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Chamber, upper</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Top bearing</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Neck ring</td>
<td>NBR/PPS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bearing</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Chamber, complete</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nut for split cone</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Split cone</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Impeller</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Inlet part</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>14a</td>
<td>Connecting piece, complete (MSF 3 adapter)</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Strainer</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Shaft, cylindrical</td>
<td>Stainless steel</td>
<td>1.4057</td>
<td>431</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Strap</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Cable guard, pump</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>18c</td>
<td>Cable guard, motor</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Nut for strap</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>19a</td>
<td>Nut</td>
<td>Stainless steel</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Coupling with nut</td>
<td>Stainless steel</td>
<td>1.4462</td>
<td>329</td>
<td></td>
</tr>
<tr>
<td>24a</td>
<td>Supporting ring</td>
<td>Stainless steel</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>24b</td>
<td>Spline protector</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Retainer for neck ring, complete</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>Stop ring Only 25 SQF and 75 SQF</td>
<td>Carbon/graphite PTFE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Screws for cable guard</td>
<td>Stainless steel</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
</tbody>
</table>

**Example: 25 SQF - 6**

[Diagram of centrifugal pump]
## Material specification - motor

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
<th>Material</th>
<th>MFS 3</th>
<th>EN/DIN</th>
<th>AISI</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
<td>Stator with sleeve, complete</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Rotor</td>
<td>Stainless steel</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>202a</td>
<td>Stop ring</td>
<td>PP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>202c</td>
<td>Shaft end</td>
<td>Stainless steel</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Thrust bearing, stationary</td>
<td>Stainless steel/carbon</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>Bearing plate with radial bearing</td>
<td>Silicon carbide</td>
<td>1.4301</td>
<td>304</td>
<td></td>
</tr>
<tr>
<td>206</td>
<td>Thrust bearing, rotating</td>
<td>Stainless steel/ aluminium oxide $\text{Al}_2\text{O}_3$</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>220</td>
<td>Motor cable with plug</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>222a</td>
<td>Filling plug</td>
<td>NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>223</td>
<td>Electronic unit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>224</td>
<td>O-ring</td>
<td>Standard version: NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td>Top cover</td>
<td>PPS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>232</td>
<td>Shaft seal</td>
<td>MFS 3: NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>243</td>
<td>Thrust-bearing housing</td>
<td>Stainless steel</td>
<td>1.4408</td>
<td>316</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>Nut (M4)</td>
<td>Stainless steel</td>
<td>1.4401</td>
<td>316</td>
<td></td>
</tr>
</tbody>
</table>
Complete unit with 6 ft cable

Submersible drop cables

The submersible drop cables for SQF pumps are approved for use in drinking water (KTW approved). The material of the submersible drop cable is EPR.

The table below shows the maximum length of the submersible drop cable for the different sizes of cable, allowing for a 2% power loss.

<table>
<thead>
<tr>
<th>No. of 50 Wp solar modules</th>
<th>Power [Wp]</th>
<th>Max. cable length [ft]</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 AWG</td>
<td>12 AWG</td>
<td>10 AWG</td>
</tr>
<tr>
<td>3</td>
<td>150</td>
<td>515</td>
</tr>
<tr>
<td>4</td>
<td>200</td>
<td>385</td>
</tr>
<tr>
<td>6</td>
<td>300</td>
<td>255</td>
</tr>
<tr>
<td>8</td>
<td>400</td>
<td>190</td>
</tr>
<tr>
<td>10</td>
<td>500</td>
<td>155</td>
</tr>
<tr>
<td>12</td>
<td>600</td>
<td>125</td>
</tr>
<tr>
<td>14</td>
<td>700</td>
<td>110</td>
</tr>
<tr>
<td>16</td>
<td>800</td>
<td>95</td>
</tr>
<tr>
<td>18</td>
<td>900</td>
<td>85</td>
</tr>
<tr>
<td>20</td>
<td>1000</td>
<td>75</td>
</tr>
</tbody>
</table>

The values in the table are based on Grundfos 50 W solar modules (140 VDC output).

The table values are calculated on the basis of the formula:

\[ L = \frac{\Delta P \times q \times V_{mp}^2}{Wp \times 100 \times 2 \times \rho} [ft] \]

where

- \( L \) = Length of cable [ft]
- \( \Delta P \) = Power loss [%]
- \( V_{mp} \) = Maximum power voltage [V]
- \( Wp \) = Watt peak [Wp]
- \( \rho \) = Specific resistance: \( 8.175 \times 10^{-6} \Omega \text{in}^2/\text{ft} \)
- \( q \) = Cross-section of submersible drop cable [in²]

The sizing tool in WinCAPS makes it possible to calculate the exact losses.
Product numbers

<table>
<thead>
<tr>
<th>Product</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 100</td>
<td>96475073</td>
</tr>
<tr>
<td>IO 101</td>
<td>96481502</td>
</tr>
</tbody>
</table>

IO 100

Product numbers

<table>
<thead>
<tr>
<th>Product</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CU 200</td>
<td>96467801</td>
</tr>
</tbody>
</table>

CU 200

Description Product no.

<table>
<thead>
<tr>
<th>Description</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO 102 breaker box for wind turbine.</td>
<td>96475065</td>
</tr>
</tbody>
</table>

IO 102

Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind turbine H80 Whisper.</td>
<td>96472120</td>
</tr>
</tbody>
</table>

Instructions are included.

Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor diameter:</td>
<td>10 ft</td>
</tr>
<tr>
<td>Weight:</td>
<td>65 lb</td>
</tr>
<tr>
<td>Mount:</td>
<td>pipe</td>
</tr>
<tr>
<td>Start-up wind speed:</td>
<td>7 mph</td>
</tr>
</tbody>
</table>

Wind turbine H80 Whisper
**Tower kit for H80 Whisper**

<table>
<thead>
<tr>
<th>Description</th>
<th>Height</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower kit for H80 Whisper</td>
<td>30 ft</td>
<td>96475066</td>
</tr>
<tr>
<td></td>
<td>50 ft</td>
<td>96475067</td>
</tr>
</tbody>
</table>

Instructions are included.

**Note:** The pipes are not included

For tower pipe selection see below.

---

**Tower installation kit**

<table>
<thead>
<tr>
<th>Description</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower installation kit</td>
<td>96475069</td>
</tr>
</tbody>
</table>

**Note:** The gin pole is not included

For tower pipe selection see below.

---

**Tower pipe selection**

The tower kit is designed to use 2 ½” pipes.

The following table shows the required thickness of the pipe(s) depending on the maximum wind speed:

<table>
<thead>
<tr>
<th>Max. wind speed [mph]</th>
<th>Recommended wall thickness [in]</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>0.090</td>
</tr>
<tr>
<td>90</td>
<td>0.120</td>
</tr>
<tr>
<td>110</td>
<td>0.140</td>
</tr>
</tbody>
</table>

The wall thickness of the gin pole must be 0.060 in or greater.

Pieces of pipe needed:

**Tower kit, 30 ft**
- 1 pipe of 13 ft for tower
- 1 pipe of 17 ft for tower
- 1 pipe of 15 ft for gin pole.

**Tower kit, 50 ft**
- 2 pipes of 15 ft for tower
- 1 pipe of 20 ft for tower
- 1 pipe of 19 ft for gin pole.
## Accessories

**Auger / anchor**

<table>
<thead>
<tr>
<th>Description</th>
<th>Length [in]</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auger /anchor (4 pcs.)</td>
<td>48</td>
<td>96475068</td>
</tr>
</tbody>
</table>

**Grease**

<table>
<thead>
<tr>
<th>Description</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease for lubrication of motor shaft.</td>
<td>96037562</td>
</tr>
</tbody>
</table>

**Level switch**

<table>
<thead>
<tr>
<th>Description</th>
<th>Product no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level switch.</td>
<td>00010748</td>
</tr>
</tbody>
</table>

High water level: Contact is closed.
Low water level: Contact is open.
Further product documentation

Sources of product documentation

In addition to the printed data booklet, Grundfos offers the following sources of product documentation.

- WinCAPS
- WebCAPS.

WinCAPS®

WinCAPS is a Windows-based Computer-Aided Product Selection program containing information on more than 90,000 Grundfos products.

Available on CD-ROM in more than 15 languages, WinCAPS offers

- detailed technical information
- selection of the optimum pump solution
- dimensional drawings of each pump
- detailed service documentation
- installation and operating instructions
- wiring diagrams of each pump.

Click on Catalog and select a product from the extensive product catalog.

Click on Sizing and select the most suitable pump for your application.
**Further product documentation**

**WebCAPS®**

WebCAPS is a Web-based Computer Aided-Product Selection program and a web-version of WinCAPS.

Available on Grundfos' homepage, [www.grundfos.com](http://www.grundfos.com), WebCAPS offers:

- detailed technical information
- dimensional drawings of each pump
- wiring diagrams of each pump.

![WebCAPS](image)

**Fig. 3  WebCAPS**

Click **Replacement** and select the right replacement pump based on the current installation.

Click **Catalog** and select a product from the extensive product catalog.

Click **Literature** to select and download Grundfos documentation by browsing the product ranges or performing a specific search. The literature includes:
- Data booklets
- Installation and operating manuals
- Service etc.

Click **Product** search and select a product from the extensive product catalog.

Click **Service** to find information on service kits and spare parts.

Click **Units** and select your preferred units of measurement:
- Default units
- SI units
- US units.

Click **Language** and select your preferred language.

Click the dropdown list to select the frequency.

Click **CAD drawings** to select and download CAD drawings in:
- .stp
- .dxf
- .dwg

Click **Literature** to select and download Grundfos documentation by browsing the product ranges or performing a specific search. The literature includes:
- Data booklets
- Installation and operating manuals
- Service etc.

Being a registered user click **Log in to**:
- save your settings
- define and save your own units
- save personalized information.

Click **Units** and select your preferred units of measurement:
- Default units
- SI units
- US units.

Click **Language** and select your preferred language.

Click **CAD drawings** to select and download CAD drawings in:
- .stp
- .dxf
- .dwg