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OFF-GRID PRODUCTIVE USE OF ENERGY 2020 CATALOG

Rwanda

ACRONYMS AND ABBREVIATIONS

AC	alternating current	DIN	Deutsches Institut für Normung
Ah	ampere hours	EBZ	Electro Education and Technology Center Dresden (<i>Elektro Bildungs- und Technologiezentrum Dresden</i>)
ALPS	aquaculture, livestock, and poultry solutions	EDA	Energy of Africa (<i>Energie d’Afrique</i>)
AMMA	Modern and Handcrafted Carpentry Workshop (<i>Atelier de Menuiserie Moderne et Artisanal</i>)	EN	European Standard
ASG	African Solar Generation	ESP	Higher Polytechnic School of Dakar (<i>Ecole Supérieur Polytechnique de Dakar</i>)
C	Celsius	F	Fahrenheit
CAC	Crop Aggregation Center	FBO	farmer-based organizations
CDA	controlled droplet application	FES	Free Engineering Services
CDARMA	Center for the Development of Rural Crafts and Agricultural Machinery (<i>Centre de Développement de l’Artisanat Rural et du Machinisme Agricole</i>)	GAM	Group of Metal Artisans (<i>Groupement des Artisans du Métal</i>)
CPF	Mbouo-Bandjoun Polyvalent Training Center (<i>Centre Polyvalent de Formation de Mbouo-Bandjoun</i>)	GIE	Global International Energy
DC	direct current	GIMAFOR	Engineering, Management, Training, and Research Group (<i>Groupe d’Ingénierie, de Management, de Formation et de Recherche</i>)
DENG Ltd.	Danish Engineering Limited		

ACRONYMS AND ABBREVIATIONS

GMACI	Business Marketing and International Brokerage Group (<i>Groupe Marketing des Affaires et Courtage International</i>)	LV	low volume
GSM	global system for mobile communications	m	meter
h	hours	ml	milliliter
HP	horsepower	m²	square meters
IEC	International Electrotechnical Commission	m³	cubic meters
IP	international protection	MFI	microfinance institution
ISO	International Organization for Standardization	min	minute
KCIC	Kenya Climate Innovation Center	mm	millimeter
kg	kilograms	MPPT	maximum power-point tracking
kW	kilowatts	MSBHD	mobile solar biomass hybrid dryer
kWh	kilowatt hours	PAYGO	pay-as-you-go
kWp	kilowatt peak (<i>kilowatt crête</i>)	PV	photovoltaic
L	liters	PUE	productive use of energy
LCB	linear current booster	RESEDA	Network for the Development of Crafts (<i>Réseau pour le Développement de l'Artisanat</i>)
		SACCO	savings and credit cooperative

ACRONYMS AND ABBREVIATIONS

SARL	incorporated business (<i>Société A Responsabilité Limitée</i>)	Wp	watt peak
SAS	Simplified Joint-Stock Company (<i>Société par Actions Simplifiée</i>)	ZECI	Zola EDF Côte d'Ivoire
SATECH	African Society of Technology (<i>Société Africaine de Technologies</i>)		
SEV	Sun Water Life (<i>Soleil Eau Vie</i>)		
SIZE ENR	Ivorian Society of Energy Efficiency and Renewable Energies (<i>Société Ivoirienne d'Efficacité Energétique et des Energies Renouvelables</i>)		
SNV	Netherlands Development Organization		
T / Tel	telephone number		
ULV	ultra-low volume		
V	volts		
V DC	volts direct current		
V AC	volts alternating current		
W	watts		

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BACKGROUND

Power Africa is a U.S. Government-led partnership that brings together the collective resources of over 170 public and private sector partners to double access to electricity in sub-Saharan Africa. Power Africa's goal is to add more than 30,000 megawatts of new electricity generation capacity and connect 60 million new homes and businesses to power by 2030. Read more: www.usaid.gov/powerafrica.

Reliable supply of energy is one of many important requirements for significant growth and increased productivity in African agriculture. For farmers in most African countries, access to fuel or electricity for farm operations, crop processing, and food storage is limited and costly. Rapid growth in agricultural production can stimulate rural and overall economic development.

Power Africa Off-grid Project provides technical assistance to private sector companies, agriculture cooperatives, agribusinesses, and government stakeholders to increase the uptake of off-grid energy solutions, such as solar home systems (SHS), mini-grids, and productive use of energy (PUE) technologies. Under its cross-cutting work stream, the Project plays a vital role in the adoption of PUE technologies by supporting off-grid companies to:

- Expand their product portfolios to include PUE
- Access finance to facilitate company growth, enter new markets, and pilot PUE business models across agricultural value chains
- Leverage innovation as the sector matures

INTRODUCTION

What is Productive Use of Energy (PUE)?

For the purposes of this catalog, PUE refers to any electrical and thermal equipment and technology that serves as a direct input for the production of goods or provision of services for income-generating activities.

Objectives

The main objective of this catalog is to increase awareness and uptake of the off-grid PUE appliances that are available in Rwanda. The catalog provides stakeholders (including manufacturers, suppliers, nongovernment and community organizations, and government policymakers) with insight into PUE products and innovations.

This catalog is part of a collection aiming to:

- Increase the knowledge base of off-grid PUE equipment
- Address the PUE needs of the East and West Africa regions
- Identify sectors for which greater adoption of PUE products can stimulate economic development

Selected Countries

The collection of catalogs covers ten countries:

- **East Africa:** Ethiopia, Kenya, Rwanda, Tanzania, and Uganda
- **West Africa:** Cameroon, Côte d'Ivoire, Ghana, Niger, and Senegal



INTRODUCTION

Contents

The catalog includes technical and financial information for a range of PUE technologies with a focus on the economic activities of agriculture, fishing, livestock, and poultry.

The catalog presents the following information:

- The existing terms of sale for PUE products
- Pay-as-you-go (PAYGO) integration capabilities
- Manufacturer, distributor, and supplier channels

Target Audience

A wide range of participants in the off-grid energy sector can leverage insights from the catalog to inform their decisions, including government policymakers, private-sector practitioners, stakeholders from nongovernment and community organizations, investors, financial institutions, and end users.



CRITERIA FOR SELECTION OF PUE PRODUCTS

The catalog's scope is limited to off-grid PUE products for agriculture, fishing, livestock, and poultry and does not include other uses of energy, such as phone charging. Featured technologies include photovoltaic (PV) solar and those that combine electrical and thermal power, such as food dryers.

Applications and value chains include the following:

Category	Examples
Agriculture production	Water pumping solutions, solar spraying
Agriculture conservation	Fridges and freezers
Agriculture processing	Grain mills, threshing and husking machines, and food dryers
Livestock and poultry	Egg incubators, milk chillers, and fodder preparation (i.e. chaff cutters)
Fishing and aquaculture	Cold storage units (i.e. ice machines), fishing lights

HOW TO READ THE CATALOG

The catalog has two sections:

Section I: Company Information

Provides an overview of local companies supplying PUE products in the targeted countries and outlines general information about the companies, such as contact information and current product offerings.

Classifies companies into four categories:

1. **Manufacturer** – a company that builds, design, and packages products for a market
2. **Distributor** – a company that buys products or product lines from a manufacturer and sells them directly to end users or supplies them to other retailing companies
3. **Brand Representative** – an international company's in-country subsidiary or partner company that fulfills sales and other services for end users
4. **Reseller/Retailer** – a company (or entity) that receives products from a distributor and sells them directly to end users

Classifies distribution channels into ten categories:

1. Direct retail
2. Online retail
3. On order
4. Large distributors
5. Retail through farmer cooperatives/producer groups and savings and credit cooperatives (SACCOs)
6. Retail through kiosks and similar outlets
7. Retail through microfinance institutions (MFIs)
8. Retail through outgrower schemes
9. Retail through sales agents
10. Retail through women's groups

Classifies payment models into six categories:

1. PAYGO
2. Flexible installments (hire purchase agreement, leasing, etc.)
3. Cooperation with local banks or MFIs
4. Cash payment or cash and carry
5. Product only sold as part of a package
6. Fee for service



HOW TO READ THE CATALOG

Section 2: Product Information

Provides detailed technical information on PUE products and further categorizes products into six sections by type of solutions:

1. **Agro-Processing** – mills, hullers, threshers, crushers, paste makers, and oil presses
2. **Cooling** – cold rooms, freezers, ice-making machines, milk tanks, and refrigerators
3. **Food Dryers** – thermal and ventilation-based solutions
4. **Aquaculture, Livestock, and Poultry** – fishing lights and egg incubators
5. **Pumping** – surface pumps and submersible pumps
6. **Sprayers** – animal medical treatments, disinfectants, fungicides, herbicides, insecticides, and pesticides



HOW TO READ THE DATASHEETS

The following reference table explains the product information and technical specifications for the product categories of pumps, fridges, mills, dryers, and ALPS (aquaculture, livestock, and poultry solutions) and country-specific data:

Datasheet Heading	Explanation	Unit of Measure	Product Category
Product Information			
Product Name	Product brand name and model	--	All
Manufacturer	The company that manufactures the product	--	All
Picture	Image of the product	--	All
Product Description	Characteristics of the product	--	All
Target Use	How the product is used and its target group	--	All
Technical Specifications			
Models	Specific model type, series, and number if applicable	--	Pumps, Mills
Product Type	Submersible or surface pump	--	All
Load	The power required to operate the solution	W	Pumps
Pump Type	Operational category of the pump, based on its mechanics: centrifugal, helical, and piston	--	Pumps



HOW TO READ THE DATASHEETS

Datasheet Heading	Explanation	Unit of Measure	Product Category
Automation	Process by which an equipment operates an action or a process operated automatically by an electronically controlled system and often without human assistance	--	ALPS
Electrical Output	Electrical energy produced by the product	kW	Dryers
Thermal Output	Thermal energy produced by the product	kW	Dryers
Mechanical Output	Mechanical energy produced by the product	kW	Dryers
AC/DC Coupled	Type of electric current	AC or DC or both	All
Electrical Efficiency	Measurement of the ratio between the energy input and the electrical-energy output	%	Dryers
Thermal Efficiency	Measurement of the ratio between the energy input and the thermal-energy output	%	Dryers
Voltage Range	Operating voltage range of the product	V DC or V AC	Pumps, Fridges, Mills, ALPS
Throughput	Processing-capacity output of the product	kg/h	Mills



HOW TO READ THE DATASHEETS

Datasheet Heading	Explanation	Unit of Measure	Product Category
Egg Capacity	Number of eggs the incubator can hold in one batch	eggs	ALPS
Power Rating	Highest approved power input of the product motor	W	Pumps, Fridges, Mills, ALPS
Required Solar Panel Size	Required PV-panel capacity required to power the product	W or Wp	Pumps
Storage Capacity	Volume of available storage	L	Fridges
Operating Temperature	Operating temperature of the product	°C (°F)	Fridges
Capacity of PV Modules Required	Required PV panel capacity that is required to power the product	Wp or W	Fridges, Mills, ALPS



HOW TO READ THE DATASHEETS

Datasheet Heading	Explanation	Unit of Measure	Product Category
Holdover Time	The time taken by the product to raise the inside cabinet's temperature from its cut-off temperature to the maximum temperature limit of its recommended range. For example, for a fridge with an operating temperature of 4 °C (39.2 °F) and a maximum operating temperature of 8 °C (46.4 °F), the holdover time is the time taken to reach 8 °C (46.4 °F) from 4 °C (39.2 °F) in case of a power loss	h or min	Fridges
Power (Energy Consumption)	Daily energy consumption of the product	W or Wh/day	Fridges
Product Dimensions	External measurements of the product (recorded as length × width × height, unless otherwise noted)	length x width x height	Fridges, ALPS
Total Dynamic Head	Maximum height at which a pump can raise water, inclusive of friction losses	m	Pumps
Max Discharge Rate	Maximum rated volume of water pumped per hour	m ³ /h	Pumps
Controller Requirements	Requirement for an external pump controller	--	Pumps



HOW TO READ THE DATASHEETS

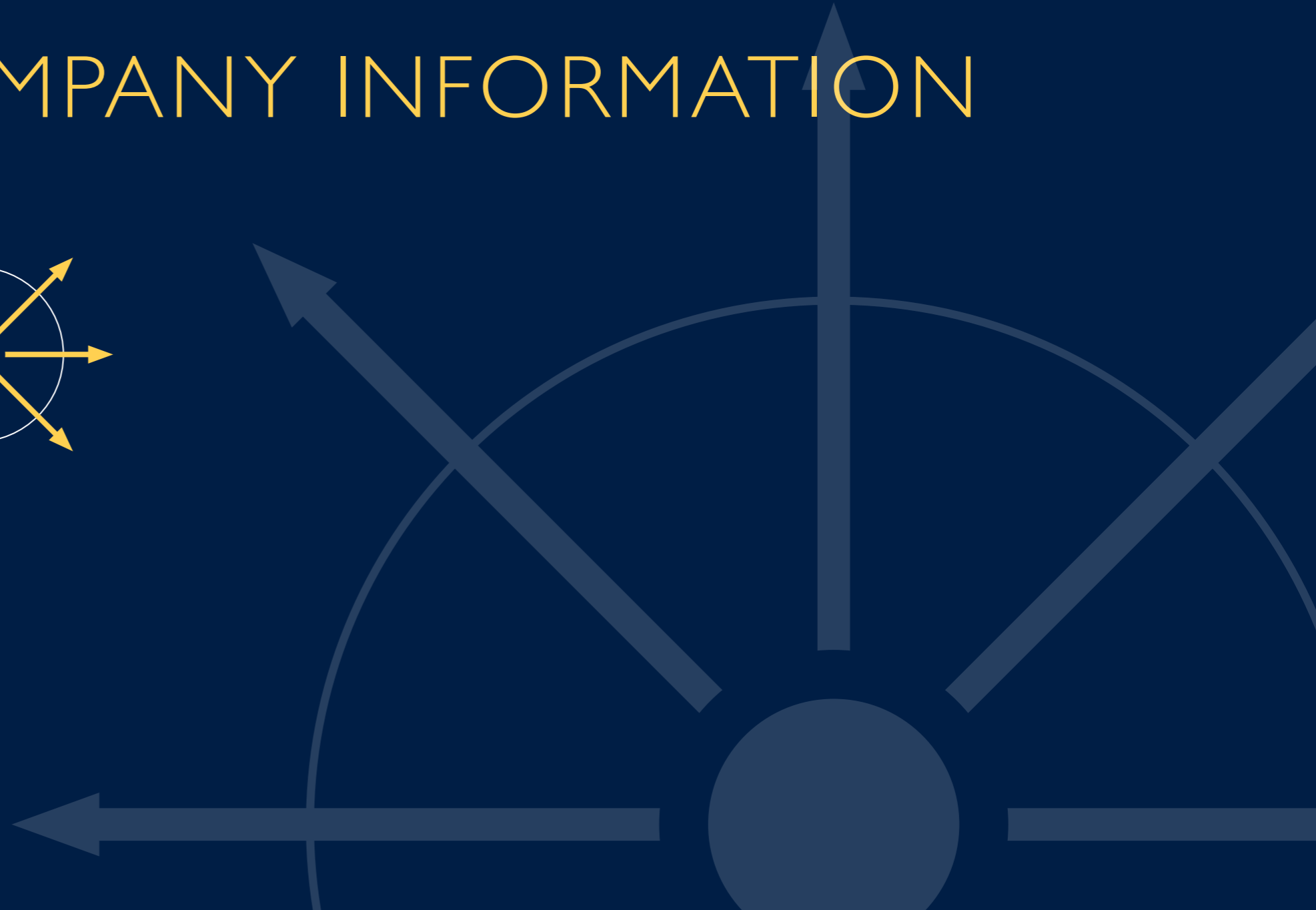
Datasheet Heading	Explanation	Unit of Measure	Product Category
Lamp Display/Output	Amount of light produced	lumens	ALPS
Lighting Duration	Length of time that the product produces light	hours	ALPS
Battery Size	Type, size, and specifications of the battery	Ah	ALPS
PAYGO Integration Capabilities	Compatibility with PAYGO	--	All
Product Link	Product website or datasheet link	--	All
Distribution Channels	Channels listed under the following categories: <ul style="list-style-type: none"> • Direct retail • Online retail • On order • Large distributors • Retail through farmer cooperatives/producer groups and savings and credit cooperatives (SACCOs) • Retail through kiosks and similar outlets • Retail through microfinance institutions (MFIs) • Retail through outgrower schemes • Retail through sales agents • Retail through women's groups 	--	All

HOW TO READ THE DATASHEETS

Datasheet Heading	Explanation	Unit of Measure	Product Category
Payment Models / Terms of Sales	Models and terms listed under the following categories: <ul style="list-style-type: none">• PAYGO• Flexible installments (hire purchase agreement, leasing, etc.)• Cooperation with local banks or MFIs• Cash payment or cash and carry• Product only sold as part of a package• Fee for service	--	All

SECTION I

COMPANY INFORMATION



COMPANY LIST

Companies	Distributed Technologies	Category	Distribution Channels	Payment Models
Agsol info@agsol.com	Mills <ul style="list-style-type: none"> • Agsol Hammer Mill • Agsol Rice/Maize Huller • Agsol Maize Thresher • Agsol Chaff Cutter 	Manufacturer	Large distributors	Cash & carry
Aptech Africa +250 788 653 506 sales@aptechafrika.com aptechafrika.com	Pumps <ul style="list-style-type: none"> • Grundfos • Lorentz 	Distributor	Direct retail	Cash & carry
Davis & Shirliff +250 788 389 755 +250252504039 kigali@dayliff.com www.davisandshirliff.com/rwanda-branches	Pumps <ul style="list-style-type: none"> • Grundfos • Lorentz • Futurepump SF2 • Dayliff Pumps • Shurflo Booster Pumps Fridges <ul style="list-style-type: none"> • Steca 	Brand representative Distributor	Direct retail Large distributors Retail through kiosks/outlets	Cash & carry



COMPANY LIST

Companies	Distributed Technologies	Category	Distribution Channels	Payment Models
ECM Rwanda +250-788-416-746 +250-781-199-330 ecmrda@gmail.com http://ecmrda.com	Pumps <ul style="list-style-type: none"> Lorentz 	Distributor	Direct retail	Cash & carry
InspiraFarms +254 776 951 600 info@inspirafarms.com www.inspirafarms.com	Fridges <ul style="list-style-type: none"> InspiraFarms Modular Pack-Houses & Cold Storage 	Manufacturer	Direct retail	Cash & carry Flexible installments
Ignite Power www.ignite.solar	Pumps <ul style="list-style-type: none"> Ennos Sunlight Pump 	Distributor	Direct retail	Cash & carry



SECTION 2

PRODUCT INFORMATION



QUALITY STANDARDS

Product	Quality Standards	VeraSol-tested / Certified
Pumping Solutions		
Dayliff Sunflo-A Series	--	VeraSol-tested (Dayliff Sunflo-A 270 H270 H)
Futurepump SF2	--	VeraSol-tested
Grundfos CR Flex Series	International Electrotechnical Commission (IEC) and Deutsches Institut für Normung (DIN)	--
Grundfos SQ Flex Series, centrifugal	IEC and DIN, International Organization for Standardization (ISO)	--
Grundfos SQ Flex Series, helical	IEC and DIN, ISO	VeraSol-tested
Lorentz PS2-I00 Series	EC, IEC, EN, ISO	VeraSol-tested (PS2-I00 AHRP-07S-2)
Lorentz PS2-I50 HR-07S	EC, IEC, EN, ISO	--
Lorentz PS2 Series	EC, IEC, EN, ISO	VeraSol-tested (PS2-600 HR-04H, PS2-600 C-SJ8-5)
Lorentz PS-CS-F	EC, IEC, EN, ISO	--
Lorentz PSK2 submersible pumps	EC, IEC, EN, ISO	--



QUALITY STANDARDS

Product	Quality Standards	<u>VeraSol-tested / Certified</u>
Pumping Solutions...		
Lorentz PSK2 surface pumps	EC, IEC, EN, ISO	--
SHURflo DC Booster Pumps	ISO	--
Sunlight Pump	--	VeraSol-tested (JSPBL0.3/HF2.4-5)
Cooling Solutions		
Steca PF 166-H PF 240-H	IEC, ISO	VeraSol-tested (PF166-H)



AGRO-PROCESSING SOLUTIONS

Agro-Processing Solutions – List of Featured Products

1. [Agsol Chaff Cutter](#)
2. [Agsol Hammer Mill](#)
3. [Agsol Maize Thresher](#)
4. [Agsol Rice Mill/Maize Huller](#)

AGRO-PROCESSING SOLUTIONS

Agro-Processing Solutions – Introduction

Solar-powered mills for agro-processing are available in different types, including rice mills, cassava graters, paste makers, crushers, flour mills, and more. This section details appropriate off-grid milling technologies that are financially viable PUE solutions for project developers as well as communities, smallholder farmers, agro-processing enterprises, and other end users. This section also includes technical information to help practitioners operationalize milling technologies and notes the complexities of doing so.

In sub-Saharan Africa, most agriculture-based economies produce grains as their top staple-food crops—especially corn/maize. Current non-solar off-grid milling solutions, such as diesel-powered mills, are not viable in small communities, because they are too large and expensive to run. For this reason, off-grid solar milling solutions have the potential

to increase farming efficiency, increase farmers' revenues, and promote food security. PAYGO models of digital finance use embedded internet-connected hardware to give smallholder farmers and communities the ability to pay with greater ease and flexibility. Solar mills also give farmers the opportunity to generate income immediately after installation, have lower upkeep costs, and provide sound returns on investments.



AGSOL CHAFF CUTTER

Agsol's chaff cutter can process all types of fodder grass, maize stalks, and agricultural straws. It uses rotating blades that cut the chaff against a fixed blade to provide a high cutting rate and low power consumption. It has adjustable gears for lighter or heavier feedstocks. Offered with brushless DC or AC motors.

Target use: Livestock farmers.

Manufacturer:

Agsol

Distributor(s):

Agsol

Distribution channels:

Large distributors

TERMS OF SALE

Cash & carry

SPECS | Agsol Chaff Cutter

Product models	V1.3	V1.8
Product type	Chaff Cutter	Chaff Cutter
AC/DC coupled	AC	AC
Voltage range	230 V	230 V
Throughput	>400 kg/h	>600 kg/h
Power rating	1300 W	1800 W
Capacity of PV modules required	1500 W _p	1500 W _p
PAYGO integration capabilities	No	No



AGSOL HAMMER MILL

This hammer mill is used in agro-processing.

TERMS OF SALE
Cash & carry

Manufacturer:
Agsol

Distributor(s):
Agsol

Distribution channels:
Large distributors

SPECS | Agsol Hammer Mill

Product models	V1.3	V1.8
Product type	Hammer mill	Hammer mill
AC/DC coupled	AC	AC
Voltage range	230 V	230 V
Throughput	60 kg/h	80 kg/h
Power rating	1,300 W	1,800 W
Capacity of PV modules required	1,500 Wp	1,500 Wp
PAYGO integration capabilities	No	No



AGSOL MAIZE THRESHER

Agsol's maize thresher removes maize kernels from dried cobs. It can be adjusted to accommodate larger or smaller cob sizes. It is offered with brushless DC or AC motors.

TERMS OF SALE
Cash & carry

Manufacturer:
Agsol

Distributor(s):
Agsol

Distribution channels:
Large distributors

SPECS | Agsol Maize Thresher

Product models	V0.5	V0.75
Product type	Maize Thresher	Maize Thresher
AC/DC coupled	AC	AC
Voltage range	230 V AC	230 V AC
Throughput	>1,500 kg/h	>1,500 kg/h
Power rating	500 W	500 W
Capacity of PV modules required	1,000 Wp	1,000 Wp
PAYGO integration capabilities	No	No



AGSOL RICE MILL/MAIZE HULLER

Agsol's rice mill/maize huller is capable of producing either brown or white rice as well as taking the hard outer shell off of maize. The machine incorporates an extraction fan to separate the husk and chaff and has an easily adjusted pressure dial to increase or decrease the degree of milling. It is offered with brushless DC or AC motors.

TERMS OF SALE
Cash & carry

Manufacturer:
Agsol

Distributor(s):
Agsol

Distribution channels:
Large distributors

SPECS | Agsol Rice Mill/Maize Huller

Product models	V1.3	V1.8
Product type	Rice Mill/Maize Huller	Rice Mill/Maize Huller
AC/DC coupled	AC/DC	AC/DC
Voltage range	230 V AC	230 V AC
Throughput	Rice: 135 kg/h Maize: 50 kg/h	Rice: 160 kg/h Maize: 70 kg/h
Power rating	1,300 W	1,800 W
Capacity of PV modules required	1,500 Wp	1,500 Wp
PAYGO integration capabilities	No	No

COOLING SOLUTIONS

Cooling Solutions – List of Featured Products

1. [InspiraFarms Modular Pack-Houses & Cold Storage](#)
- ② 2. [Steca PF 166-H | PF 240-H](#)

② = VeraSol-tested/-certified

COOLING SOLUTIONS

Cooling Solutions – Introduction

The cooling solutions vary from solar fridges and freezers to solar cold rooms, solar ice-cube makers, and solar milk tanks.

Solar Fridges and Freezers

Solar fridges and freezers provide various solutions and applications, including the preservation of juices, meat, fish, and milk, as well as cooling and ice production. The medical sector can use them for drug and vaccine storage. In this catalog, all solar fridges and freezers are solar products, powered by solar panels, with a voltage system of 12 and 24V DC. Most solar fridges use batteries to ensure continuous energy service; however, some have very effective insulation capabilities, which allow them to function without battery power. If powered by PV panels, the equipment may not draw enough solar energy to maintain low refrigeration temperatures in severe cloud cover or at night;

therefore, the equipment must preserve low temperatures with high-efficiency insulation, draw reserve power, or couple with another source of power (e.g., a battery).

The capacity of the fridges and freezers is expressed in volume capacity (liters), which manufacturers usually indicate. Freezers operate only at negative temperatures in Celsius (up to $-18\text{ }^{\circ}\text{C}$ [$-0.4\text{ }^{\circ}\text{F}$]), while some fridges or refrigerators can operate dually.

In most cases, solar fridges and freezers are imported from Europe and the United States of America.

Solar Cold Rooms

Solar cold rooms have a variety of applications. Their cooling temperatures can be adjusted and monitored.



COOLING SOLUTIONS

The structure of their cooling chambers enables the preservation of fruits and vegetables (usually at positive temperatures) and the preservation of meat and fish (usually at negative temperatures) over long periods. In general, most cold rooms are large industrial units, but smaller sizes are also manufactured locally. In this catalog, all cold rooms are powered by solar panels with varying voltage systems (AC and DC).

Solar Ice-cube Makers

The solar ice-cube makers are machines that produce ice in large quantities. These machines are useful for people who need ice in large quantities daily, such as fishers or fish sellers who need to preserve and transport fish. Ice-cube makers are

powered by solar panels but run with AC voltage.

Solar Milk Tanks

Solar milk tanks, which are generally in the shape of a tank or a cistern, allow the refrigeration of raw milk from animal milking to slow down the degradation of milk quality. Such tanks usually operate at a positive temperature of approximately 4 °C (39.2 °F). The capacity of these tanks (measured in liters) varies by model.





TERMS OF SALE
Cash & carry
Flexible installments

INSPIRAFARMS MODULAR PACK HOUSES & COLD STORAGE

On-grid/solar/hybrid-powered modular cold storage.

Target use: Farms, agribusinesses, processors, 3rd party logistics/distribution companies, exporters.

Manufacturer:

InspiraFarms
Kenya

Distributor(s):

InspiraFarms

Distribution channels:

Direct retail

SPECS | Inspirafarms Modular Pack Houses & Cold Storage

Product information	
Product type	Pack houses
AC/DC coupled	AC
Voltage range	3 phase
Storage capacity	75,000 L
Operating temperature	4 °C to 10 °C (39.2 °F to 50 °F)
Power (energy consumption)	--
Capacity of PV modules required	9,300 W
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

STECA PF 166-H | PF 240-H

Steca PF Solar Refrigerators are highly efficient DC energy-saving refrigerators specially designed for off-grid solar-powered applications, including medical clinics, camps, and residential homes. They can be used either as refrigerators or freezers with their fully programmable temperature controls.

Target use: Preservation of juices, meat, fish, and milk. Production of ice. Cooling and storage of drugs and vaccines.

Manufacturer:

Steca
Katek Memmingen Gmbh
Mammostraße 1
87700 Memmingen
Germany

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Steca PF 166-H | PF 240-H

Product models	PF 166-H	PF240-H
Product type	Refrigerator/freezer	Refrigerator/freezer
AC/DC coupled	DC	DC
Voltage range	12/24V DC automatic battery voltage detection	12/24V DC automatic battery voltage detection
Storage capacity	166 L	240 L
Operating temperature	+2 °C to +12 °C (35.6 °F to 53.6 °F)	+2 °C to +12 °C (35.6 °F to 53.6 °F)
Power (energy consumption)	70 W	100 W
Capacity of PV modules required	80 W	120 W
PAYGO integration capabilities	No	No

FOOD DRYERS

Food Dryers – List of Featured Products

Currently no listings for Rwanda

FOOD DRYERS

Food Dryers – Introduction

Off-grid food dryers are generally used for the preservation and transformation of food (e.g., fruits and vegetables, meat, fish, and medicinal herbs) and can be operated on site immediately after a harvest. For the majority of the ten targeted countries in this catalog, off-grid communities face a particular challenge: Large quantities of agricultural products can spoil due to inadequate infrastructure and insufficient processing capacities, even during the traditional process of open-air drying. For such communities, solar food dryers have the potential to prevent food losses, generate income, and promote food security.

Food dryers are mostly produced locally and come in different sizes and shapes, often tailored to customer needs. Some are solely thermal, while others have ventilation systems powered by small PV panels.

In this catalog, solar food dryers fall into several categories:

Category	Examples
Direct drying	Solar box dryers
Indirect drying	Solar cabinet dryers
Mixed-mode drying	Solar tunnel dryers
Hybrid drying	Hybrid solar/biomass cabinet dryers
Natural air convection	Small-scale solar box dryers
Forced convection (<i>with air circulation fans</i>)	Solar tunnel dryers

Special Considerations

Some models are simple and inexpensive. More sophisticated types have temperature and humidity monitoring. For protection and hygiene, air filters and insect screens are useful. Manufacturers usually specify product-drying times in days or hours, which vary from food to food.

AQUACULTURE, LIVESTOCK, AND POULTRY SOLUTIONS

Aquaculture, Livestock, and Poultry Solutions – List of Featured Products

Currently no listings for Rwanda

AQUACULTURE, LIVESTOCK, AND POULTRY SOLUTIONS

This section consists of solar products for fishing lights, livestock, and poultry. Solar-powered egg incubators vary by size and capacity, depending on the needs of smallholder farmers to provide chick-hatching solutions to farmers, especially in rural areas without electricity. Incubators ensure that eggs hatch in bulk, which is an efficiency that many farmers prefer to the natural hatching process. Because incubators boost poultry production, they often result in greater income generation for communities and empower women and youth in rural communities. For example, through new poultry-raising opportunities facilitated by the NGO Tanager in Burkina Faso, local women improved their decision-making skills, gained market inclusion, and increased their societal status (Agrilinks 2019).

Special Considerations

In selecting an incubator, it is useful to consider a product's automation capabilities. For example, many incubators automate egg turning, temperature and humidity controls, and more.

PUMPING SOLUTIONS

Pumping Solutions – List of Featured Products

- ① 1. [Dayliff SUNFLO-A Series](#)
2. [Dayliff SUNFLO-X Series](#)
3. [Dayliff SUNFLO-B Series](#)
4. [Dayliff SUNFLO-S Series](#)
- ② 5. [Futurepump SF2](#)
6. [Grundfos CR Flex Series](#)
7. [Grundfos SQ Flex Series, centrifugal](#)
- ③ 8. [Grundfos SQ Flex Series, helical](#)
- ④ 9. [Lorentz PS2-100 Series](#)
10. [Lorentz PS2-150 HR-07S](#)
- ⑤ 11. [Lorentz PS2 Series](#)
12. [Lorentz PS-CS-F](#)
13. [Lorentz PSK2 Submersible Pumps](#)
14. [Lorentz PSK2 Surface Pumps](#)
15. [SHURflo DC Booster Pumps](#)
- ⑥ 16. [Sunlight Pump JSPBL0.3/HF2.4-5](#)

① = VeraSol-tested/-certified

PUMPING SOLUTIONS

While solar water pumps vary in size, this catalog focuses on solar pumps with a power rating between 150 watts (W) to 10 kilowatts (kW) (13 horsepower [HP]). Solar pumps are one part of the pumping system that involves three key components: the pumping mechanism itself, the pump controller, and the solar energy-generating technology (i.e., solar panels and inverters, when needed).

Pumps are classified either as surface pumps or submersible pumps depending on the depth of their submersion in a water source. **Surface pumps** are designed to pump water from surface sources, such as rivers, ponds, and shallow wells. They are placed above the surface of the water and should not be submerged. They are designed to draw water to a maximum depth of eight meters, beyond which submersible pumps are used. **Submersible pumps** are fully submerged in water and include a hermetically sealed motor which is close-coupled to

the body of the pump.

Direct current (DC) pumps draw power directly from solar panels without inverting.

Alternating current (AC) pumps require an inverter to transform the DC power from the panels into AC power. Both types of solar pumps require an electronic-pump controller. One of the key features of the controller, the Linear Current Booster (LCB), boosts the current from the solar array by lowering the voltage, which translates the current and voltage available from the PV panels into a combination that better serves the pump's power requirements. The LCB enables pumping to operate even in the low-light conditions of early mornings, late evenings, and cloudy days. A pump's control box also protects it from current and voltage spikes and enables its sensors, such as the float switch, to activate and deactivate the pump. Some controllers also have remote monitoring capabilities.



PUMPING SOLUTIONS

DC pumps can operate without a controller while connected to a battery system. External power-storage systems, such as batteries, allow pumping to occur at night and in low-light conditions. Such storage systems allow pressure boosting to provide a continuous water supply at any time for optimal output. Most solar water-pumping systems, however, do not have energy storage and, therefore, can only operate within daylight hours.

Pump Sizing

The process of selecting the best pump system for a specific purpose involves several steps, the first of which is sizing. During the sizing process, a user must evaluate several parameters, such as flow rate and total dynamic head. Sizing is a technical process that requires the analysis of qualified personnel and

technicians to get an accurate fit.

Various online resources are available to assist in determining the correct pump for a particular application, including pump-sizing resources on the websites of many manufacturers. Some manufacturers also sell complete plug-and-play solar systems, as featured in this catalog, which come equipped with solar panels, pump controllers, and solar pumps. In most cases, because companies sell pumps as singular units, users must complete the process of sizing.

Special Considerations

Because it is essential to seek the advice of qualified technical experts to achieve correct sizing, this catalog does not delve into the technical details of pump sizing.



PUMPING SOLUTIONS

However, in general, the sizing process involves the following steps:

	Objective	Considerations
Step 1	Determine if a surface or submersible pump is suitable for a particular application	What is the source of water, river, water pan, shallow well, borehole.
Step 2	Determine the daily water requirement	How many liters is the pump required to move during the day within prime daylight hours?
Step 3	Determine if the water source can produce enough water to supply the pump system	For example, the required water amount may be 100 liters per hour (L/h); however, the water source may only supply 50 liters per hour. For boreholes, wells, or streams, if flowrates are unknown, end users can conduct test-pumping
Step 4	Determine the total dynamic head	How high does the pump need to move the water? Measurements must account for the margin of friction loss
Step 5	Determine the correct pump make and model by referencing the pump flow chart, as provided by the manufacturer	--
Step 6	Estimate the balance of the system	This includes the wiring, piping, and necessary fittings



PUMPING SOLUTIONS

Pump Controllers

The primary function of the controller is to boost the current of solar modules in low-light conditions while holding the voltage of the solar modules at the maximum power point (i.e., the point of highest power output). This allows a pump to start earlier in the morning and stay running late into the evening.

A variety of controllers meet the specific needs of individual pumps, allowing them to maximize their output. DC pump controllers, also known as converters, maximize both the DC current and voltage. AC pump controllers invert the DC current to AC for use by the AC motors. It is also possible to use a solar-pump inverter to convert a grid-powered AC pump to use solar panels without changing the AC pump.

Related Resources

For calculation sheets, checklists and guidelines, see the [Toolbox on Solar Powered Irrigation Systems](#) by the Water and Energy for Food ([VVE4F](#)) program.





DAYLIFF SUNFLO-A SERIES

Dayliff SUNFLO-A pumps are specifically designed for PV solar-powered water supply from wells and boreholes. The pumps include a rotary-screw design, and the construction material for the rotary screw is stainless steel with a rubber stator. Pumps have a simple structure and feature an inbuilt controller.

Target use: Medium head low flow applications.

TERMS OF SALE
Cash & carry

Manufacturer:

Davis & Shirtliff Head Office
Dundori Road, Industrial Area
Nairobi, Kenya

headoffice@dayliff.com

+254 206 968 000

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail

Large distributors

Retail through kiosks/outlets

SPECS | Dayliff SUNFLO-A Series

Product models	SUNFLO-A 150H	SUNFLO-A 270H	SUNFLO-A 600H
Product type	Submersible pump		
Pump type	Centrifugal	Centrifugal	Centrifugal
Power rating	150 W	270 W	600 W
Required solar panel size	200 W	400 W	800 W
AC/DC coupled	DC	DC	DC
Voltage range	24V DC	36V DC	48V DC
Total dynamic head	40 m	70 m	90 m
Max discharge rate	0.6 m ³ /h	0.9 m ³ /h	1.3 m ³ /h
PAYGO integration capabilities	No		



TERMS OF SALE
Cash & carry

DAYLIFF SUNFLO-X SERIES

The Dayliff SUNFLO-X range of pumps include high-specification solar-powered centrifugal and helical rotor DC pumps, specifically designed for borehole applications. They feature a remote surface-mounted controller.

Target use: Medium to high head, medium-flow application.

Manufacturer:

Davis & Shirtliff Head Office
Dundori Road, Industrial Area
Nairobi, Kenya
headoffice@dayliff.com
+254 206 968 000

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Dayliff SUNFLO-X Series

Product models	SUNFLO-X 600 H	SUNFLO-X 1200 H	SUNFLO-X 1800 C
Product type	Submersible pump		
Pump type	Helical		
Power rating	600 W	1,200 W	1,800 W
Required solar panel size	780 W	1,560 W	2,340 W
AC/DC coupled	DC	DC	DC
Voltage range	60–120V DC	120–160V DC	120–160V DC
Total dynamic head	80 m	180 m	87 m
Max discharge rate	3 m ³ /h	1.8 m ³ /h	3 m ³ /h
Controller requirements	Yes	Yes	Yes
PAYGO integration capabilities	No		



TERMS OF SALE
Cash & carry

DAYLIFF SUNFLO-B SERIES

Dayliff SUNFLO-B pumps are specifically designed for PV solar-powered water supply from wells and boreholes. They have a centrifugal and rotary screw design, and the construction material for the rotary screw design is principally stainless steel with a rubber stator. The centrifugal design features Noryl impellers and stainless-steel chambers. Pumps are supplied complete with a controller, cable connectors, a water-level sensor, solar PV connecting cables, and spare rotor for the helical type.

Manufacturer:

Davis & Shirtliff Head Office
Dundori Road, Industrial Area
Nairobi, Kenya
headoffice@dayliff.com
+254 206 968 000

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Dayliff SUNFLO-B Series

Product models	SUNFLO-B 120 H	SUNFLO-B 500 C	SUNFLO-B 1000 C
Product type	Submersible pump		
Pump type	Helical	Centrifugal	Centrifugal
Power rating	120 W	500 W	1,000 W
Required solar panel size	200 W	800 W	1,600 W
AC/DC coupled	DC	DC	DC
Voltage range	24V DC	48V DC	100V DC
Total dynamic head	58 m	80 m	96 m
Max discharge rate	0.8 m ³ /h	1.7 m ³ /h	4.0 m ³ /h
Controller requirements	External controller	External controller	External controller
PAYGO integration capabilities	No		



TERMS OF SALE
Cash & carry

DAYLIFF SUNFLO-S SERIES

The Dayliff SUNFLO-S series of submersible pumps is designed for reliable small-scale water supply from boreholes and wells. They are suited for the remote pumping requirements of livestock watering, irrigation, and other general water supply applications. They include a positive displacement three-chamber diaphragm design and can run dry without damage. An internal bypass is also incorporated to prevent pump damage in the event of delivery cut-off.

Target use: Small-scale water supply from boreholes and wells

Manufacturer:

Davis & Shirliff Head Office
Dundori Road, Industrial Area
Nairobi, Kenya
headoffice@dayliff.com
+254 206 968 000

Distributor(s):

Davis & Shirliff

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Dayliff SUNFLO-S Series

Product models	SUNFLO-S 150	SUNFLO-S 300
Product type	Submersible pump	Submersible pump
Pump type	Helical	Centrifugal
Power rating	120 W	300 W
Required solar panel size	200 W	400 W
AC/DC coupled	DC	DC
Voltage range	24V DC	24V DC
Total dynamic head	60 m	90 m
Max discharge rate	0.32 m ³ /h	0.7 m ³ /h
Controller requirements	External controller	External controller
PAYGO integration capabilities	No	No



FUTUREPUMP SF2

A portable reciprocating piston water pump suitable for smallholder irrigation farming.

Target use: Smallholder farmers.

TERMS OF SALE
Cash & carry

Manufacturer:

Futurepump Limited

support@futurepump.com

www.futurepump.com

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail

Large distributors

Retail through kiosks/outlets

SPECS | Futurepump SF2

Product information	
Product type	Surface mounted
Pump type	Piston
Power rating	80–120 W
Required solar panel size	120 W
AC/DC coupled	DC
Voltage range	60V DC
Total dynamic head	15 m
Max discharge rate	3.6 m ³ /h
PAYGO integration capabilities	No



GRUNDFOS CR FLEX SERIES

Grundfos CR Flex is a high-technology multi-stage centrifugal in-line non-self-priming surface pump, specifically designed for water transfer, irrigation, and pressure boosting in solar-powered applications. It is fitted with the advanced MG Flex permanent magnet variable frequency-driven motor.

Target use: Small-scale irrigation, livestock, fish farming, and water supply.

TERMS OF SALE
Cash & carry

Manufacturer:

Grundfos
Poul Due Jensens Vej 7
Dk-8850 Bjerringbro,
Denmark

Distributor(s):

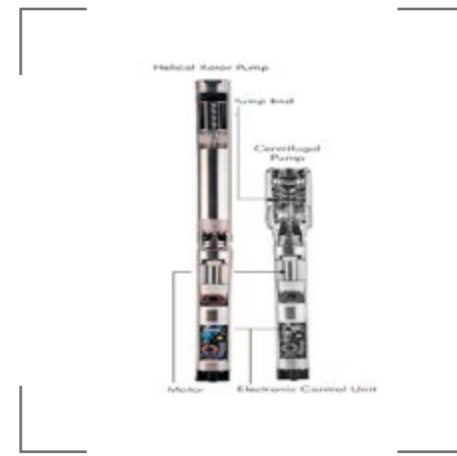
Davis & Shirtliff
Aptech Africa

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Grundfos CR Flex Series

Product information	
Product type	Surface pump
Pump type	Centrifugal
Load	1,730 W
AC/DC coupled	DC
Voltage range	30–300 V DC, 90 - 240V AC 50/60Hz
Total dynamic head	150 m
Max discharge rate	13 m ³ /h
Controller requirements	Required
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

GRUNDFOS SQ FLEX SERIES CENTRIFUGAL

The SQFlex system is a reliable water-supply system, based on renewable energy sources, such as solar and wind energy. Thanks to its flexible energy supply and performance, the SQFlex system can be combined and adapted to meet any need at an installation site. The SQFlex system has a wide voltage range, built-in maximum power-point tracking, as well as dry-running, voltage, and overload protection. The complete SQFlex pump range consists of 11 different pump sizes: five helical rotor pumps for medium to high heads and low to medium flows, and six centrifugal pumps for shallow heads and high flows.

Target use: Medium to high heads and low to medium flows, and 6 centrifugal pumps for shallow heads and high flows.

Manufacturer:

Grundfos
Poul Due Jensens Vej 7
Dk-8850 Bjerringbro,
Denmark

Distributor(s):

Davis & Shirtliff
Aptech Africa

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Grundfos SQ Flex Series Centrifugal

Product information	
Product type	Submersible pump
Pump type	Centrifugal
Power rating	1,400 W
AC/DC coupled	AC and DC
Voltage range	30–300 V DC and 90–240 V AC
Total dynamic head	70 m
Max discharge rate	20 m ³ /h
Controller requirements	External controller
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

GRUNDFOS SQ FLEX SERIES HELICAL

The SQFlex system is a reliable water supply system based on renewable energy sources, such as solar and wind energy. Thanks to its flexible energy supply and performance, the SQFlex system can be combined and adapted to meet any need on the installation site. The SQFlex system has a wide voltage range, built-in maximum power-point tracking, as well as dry-running, voltage, and overload protection. The complete SQFlex pump range consists of 11 different pump sizes: five helical rotor pumps for medium to high heads and low to medium flows, and six centrifugal pumps for shallow heads and high flows.

Target use: High head, low to medium-flow applications.

Manufacturer:

Grundfos
Poul Due Jensens Vej 7
Dk-8850 Bjerringbro,
Denmark

Distributor(s):

Davis & Shirtliff
Aptech Africa

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Grundfos SQ Flex Series Helical

Product information	
Product type	Submersible
Pump type	Helical
Power rating	1,400 W
Required solar panel size	1,000–4,000 W
AC/DC coupled	AC and DC coupled
Voltage range	30–300 V DC and 90–240 V AC
Total dynamic head	250 m
Max discharge rate	2.8 m ³ /h
Controller requirements	External controller
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

LORENTZ PS2-100 SERIES

Self-installed high-efficiency solar pump system. This system can be powered by a single 60- or 72-cell module in the power range of 180 Wp to 260 Wp. It is also PAYGO-enabled.

Target use: Medium head low flow applications.

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 4193 8806 700

Distributor(s):

Aptech Africa
Davis & Shirtliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PS2-100 Series

Product models	PS2-100 AHRP-14S	PS2-100 AHRP-23S
Product type	Submersible pump	Submersible pump
Pump type	Helical	Centrifugal
Power rating	150 W	150 W
AC/DC coupled	DC	DC
Voltage range	34-50V DC	34-50V DC
Total dynamic head	27 m	18 m
Max discharge rate	1.9 m ³ /h	2.8 m ³ /h
PAYGO integration capabilities	Yes	Yes



TERMS OF SALE
Cash & carry

LORENTZ PS2-150 HR-07S

Lorentz PS 150 HR-07S Solar Submersible Pump is a high-specification solar-powered helical DC pump, specifically designed for reliable small-scale water supply from boreholes and wells and is the ideal solution for remote pumping requirements in livestock watering, irrigation and general water-supply applications. Pumps feature a remote surface-mounted controller.

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 (0)4193 8806-700

Distributor(s):

Aptech Africa
Davis & Shirtliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PS2-150 HR-07S

Product information	
Product type	Submersible pump
Pump type	Helical
Power rating	300 W
AC/DC coupled	DC
Voltage range	50V DC
Total dynamic head	60 m
Discharge volume	Max 1.4 m ³ /h
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

LORENTZ PS2 SERIES

Solar submersible pump system for 4-inch wells.

Target use: Farmers, water utility companies, manufacturing companies, NGOs, international organizations.

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 (0)4193 8806-700

Distributor(s):

Aptech Africa
Davis & Shirliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PS2 Series

Product models	PS2-600 C-SJ8-5	PS2-150 C-SJ5-8	PS2-200 HR -07	PS2-4000 C-SJ8-15	PS2-1800 C-SJ8-15
Product type	Submersible pump				
Pump type	Helical	Helical	Helical	Helical	Helical
Load	700 W	300 W	300 W	4,000 W	1,800 W
AC/DC coupled	DC	DC/AC	DC	DC	DC
Voltage range	150 V DC	17–50 V DC and 220–240 V AC	34–100 V DC	238–375 V DC	102–200 V DC
Total dynamic head	15 m	20 m	40 m	80 m	70 m
Discharge volume	12 m ³ /h	4.6 m ³ /h	1.3 m ³ /h	13 m ³ /h	7.6 m ³ /h
Controller requirements	External controller required				
PAYGO integration capabilities	No				



TERMS OF SALE
Cash & carry

LORENTZ PS-CS-F

The Lorentz PS CS-F DC Surface Solar Pumps are high-specification solar-powered in-line centrifugal DC pumps, specifically designed for high-flow booster applications, including irrigation, water boosting, and industrial processes. They are also ideal diesel pump replacements.

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 (0)4193 8806-700

Distributor(s):

Aptech Africa
Davis & Shirliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PS-CS-F

Product information	
Product type	Surface mounted pump
Pump type	Centrifugal
Load	700 / 1,700 / 4,000 W
AC/DC coupled	DC
Voltage range	150 / 200 / 375 V DC
Total dynamic head	Max 70 m
Discharge volume	12 m ³ /h
PAYGO integration capabilities	No



TERMS OF SALE
Cash & carry

LORENTZ PSK2 SUBMERSIBLE SERIES

Solar submersible pump system for 6-inch wells.

Target use: Farmers, water utility companies, manufacturing companies, NGOs, international organizations.

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 (0)4193 8806-700

Distributor(s):

Aptech Africa
Davis & Shirliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PSK2 Submersible Series

Product models	PSK2-7 C-SJ42-3	PSK2-9-C-SJ8-44	PSK2-9-C-SJ17-11
Product type	Submersible pump		
Pump type	Centrifugal	Centrifugal	Centrifugal
Load	8,000 W	10,000 W	10,000 W
AC/DC coupled	DC	DC	DC
Voltage range	575–850 V DC	575–850 V DC	575–850 V DC
Total dynamic head	30 m	180 m	90 m
Discharge volume	76 m ³ /h	12 m ³ /h	25 m ³ /h
Controller requirements	Controller required		
PAYGO integration capabilities	No		



LORENTZ PSK2-SURFACE SERIES

A solar surface pump system.

Target use: Farmers, water utility companies, manufacturing companies, NGOs, international organizations.

TERMS OF SALE
Cash & carry

Manufacturer:

Lorentz
Bernt Lorentz GmbH & Co. KG
Siebenstuecken 24
24558 Henstedt-Ulzburg, Germany

+49 (0)4193 8806-700

Distributor(s):

Aptech Africa
Davis & Shirliff
ECM Rwanda

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | Lorentz PSK2-Surface Series

Product models	PSK2-9 CS-F20-7	PSK2-9 CS-G100-22/2	PSK2-15-CS F32-60-2	PSK2-15-CS-G150-12.54
Product type	Surface mounted pump			
Pump type	Centrifugal	Centrifugal	Centrifugal	Centrifugal
Load	10,000 W	10,000 W	15,000 W	15,000 W
AC/DC coupled	DC coupled	DC coupled	DC coupled	DC coupled
Voltage range	575 V DC–850 V DC	575 V DC–850 V DC	575 V DC–850 V DC	575 V DC–850 V DC
Total dynamic head	80 m	120 m	80 m	135 m
Discharge volume	22 m ³ /h	20 m ³ /h	41 m ³ /h	25 m ³ /h
Controller requirements	Controller required			
PAYGO integration capabilities	No			



TERMS OF SALE
Cash & carry

SHURFLO DC BOOSTER PUMPS

SHURflo DC Booster pumps are designed for reliable general-duty water-transfer applications, their unique design providing easy maintenance and high efficiencies. They have a positive-displacement three-chamber diaphragm design with a built-in check valve, allowing for self-priming operations and the ability to run dry without damage. All pumps also incorporate a pressure switch, providing the facility for automatic on-demand installations. Also, for added reliability, other available features include a twist-on line-strainer and a heat sink recommended for continuous operation in hot conditions. The pumps are battery-compatible.

Target use: General-duty water-transfer applications

Manufacturer:

Pentair Inc
3545 Harbor Gateway South
Suite 103 Costa Mesa, Ca 92626
United States

Distributor(s):

Davis & Shirtliff

Distribution channels:

Direct retail
Large distributors
Retail through kiosks/outlets

SPECS | SHURflo DC Booster Pumps

Product models	2088	8000	8030
Product type	Surface mounted pump		
Pump type	Centrifugal	Centrifugal	Centrifugal
Power rating	100–120 W	60–90 W	75–140 W
AC/DC coupled	DC	DC	DC
Voltage range	12V DC	12V DC	12V DC
Total dynamic head	20–35 m	20–45 m	20–100 m
Max discharge rate	0.8 m ³ /h	0.35 m ³ /h	0.4 m ³ /h
PAYGO integration capabilities	No		



TERMS OF SALE
Cash & carry

SUNLIGHT PUMP JSPBL0.3/HF2.4-5

The pump is connected directly to the solar photovoltaic field via a controller. The flow varies depending on the speed of rotation and sunshine.

Target use: Small and medium-scale farmers; community-development farmers.

Manufacturer:

ENNOSAG
Aarbergstrasse 5
CH-2560 Nidau
Switzerland

Distributor(s):

Ignite Power

Distribution channels:

Direct retail

SPECS | Sunlight pump JSPBL0.3/HF2.4-5

Product information	
Product type	Surface mounted pump
Pump type	Centrifugal
Power rating	375 W
Required solar panel size	100–500 WP
AC/DC coupled	DC coupled
Voltage range	17–65 V DC
Total dynamic head	40 m
Maximum discharge rate	2.7 m ³ /h
PAYGO integration capabilities	Yes

SOLAR SPRAYERS

Solar Sprayers – List of Featured Products

Currently no listings for Rwanda

SOLAR SPRAYERS

Solar Sprayers – Introduction

Sprayers diffuse liquid chemicals into mists through a process known as atomizing. Farmers and other users operate these products to spray a variety of chemicals, such as disinfectants, fungicides, herbicides, insecticides, and pesticides. Farmers often apply them to row crops (e.g., cotton, cowpeas, groundnuts, tobacco, vegetables, sugarcane, sisal, and maize) and for the control of migrant pests (e.g., locusts, grasshoppers, and armyworms). In some cases, farmers use sprayers as medical solutions to strengthen the immune systems of poultry and the treat mange in pigs and other animals.

Many varieties of sprayers are available in sub-Saharan Africa. This catalog presents solar-powered, handheld models of the spinning-disc type, which are designed for smallholder farmers and low volumes of liquid. Some sprayers come equipped with integrated light-emitting diode (LED) lights to allow spraying at night. Solar sprayers can replace other varieties of sprayers that use disposable batteries,

thus reducing long-term environmental impacts and costs.

Special Considerations

In selecting the most appropriate sprayer for an activity, it is useful to compare data on run times and charging times as well as battery lifespans. Users may also consider the types of liquids (e.g., water-based products or CDA formulations) that the sprayer is designed to dispense. Other points of reference for decision-making include the volume capacity, flow rate range (measured in ml/min), and time needed to treat one hectare of land. It is essential to observe the precautions indicated by the manufacturer to minimize risks and promote the safety of operators.