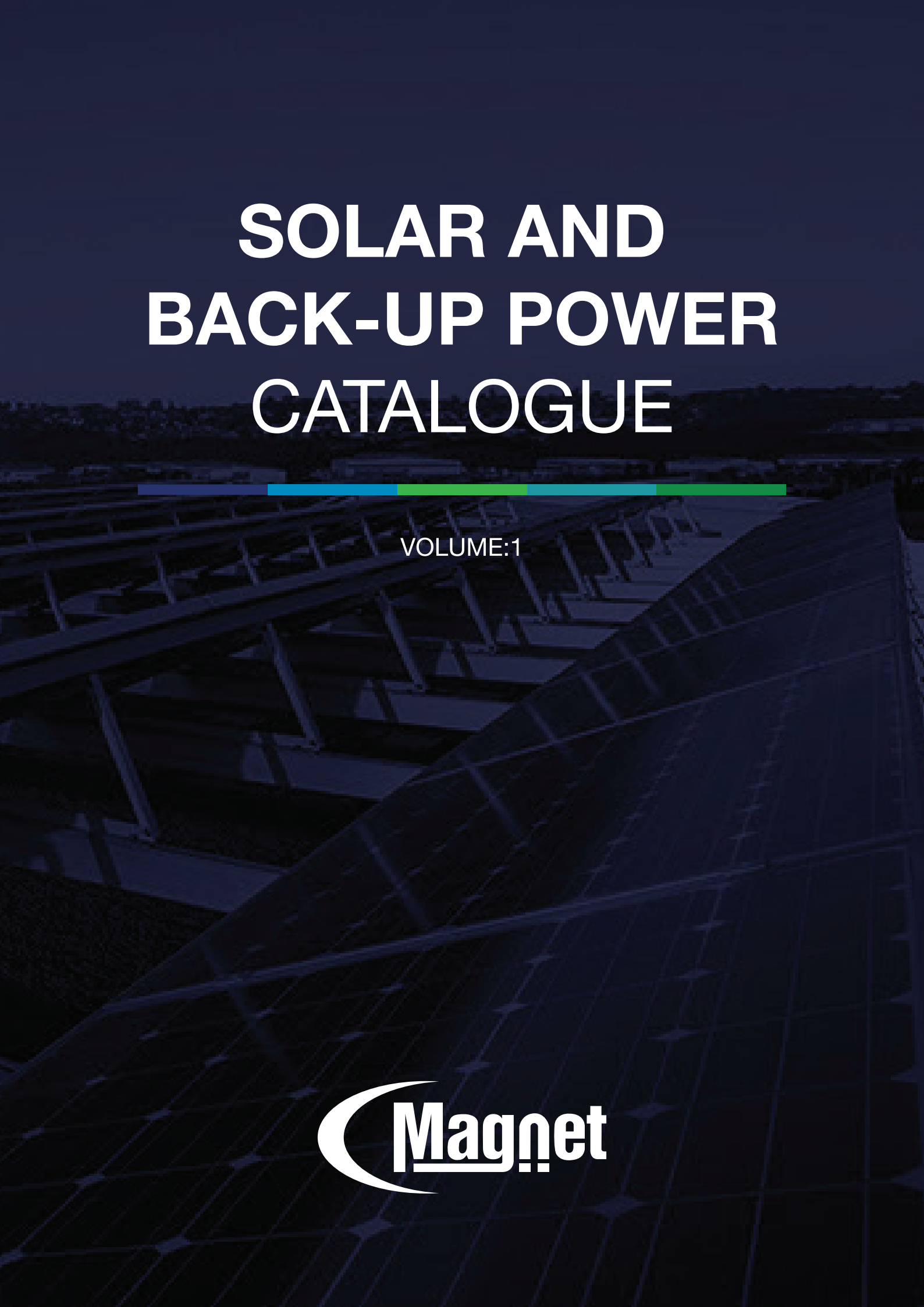
SOLAR AND BACK-UP POWER CATALOGUE

VOLUME:1



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GLOSSARY

Solar

Grid-tied Solar System
A PV system which is interconnected to the local municipality and works in tandem to supplement electrical energy usage. This system is typically made up of panels, inverters and BOS

Hybrid Solar System
This system is also interconnected to local electrical authority, however, it has batteries as a back. Typically, the batteries last for only a few hours, and can be used for applications such as load shedding. These systems usually consist of panels, batteries, inverters and BOS.

Off-grid Solar System
This is a standalone system and is not connected to local power authority. These systems are made up of the same equipment as a hybrid system but have large battery banks. Furthermore, they are typically designed to operate for at least 3 days without any sun light.

Solar Panels
Solar panels comprise numerous solar or photovoltaic (PV) cells. These cells absorb light energy or irradiance from the sun to produce direct current (DC) electricity. Solar panels installed together make up a solar array.

Inverters
The direct current (DC) electricity produced by solar PV panels needs to be transformed into usable alternating current (AC) electricity. A solar inverter does just that, and provides us with AC electricity used to power homes and businesses.

Switchboards
Various appliances in your home or business require AC electricity. A switchboard receives the AC electricity from the inverter, and subsequently directs it to the various appliances and circuits in your house.

Batteries
If there is any unused electricity, it is sent to and stored in a battery bank in off-grid or hybrid systems. If you are using a grid-tied system, excess electricity is sent to the electricity grid. Note that power is wasted when batteries are at capacity and immediate use for power is not found.

Solar battery
If you're choosing an Off-Grid or a Hybrid Solar Power System you will require battery backup. Solar Power batteries work in similar ways to every other battery, the main differences being that they are bigger and they require a controller to protect them from overcharging or over depleting and they are deep-cycle.

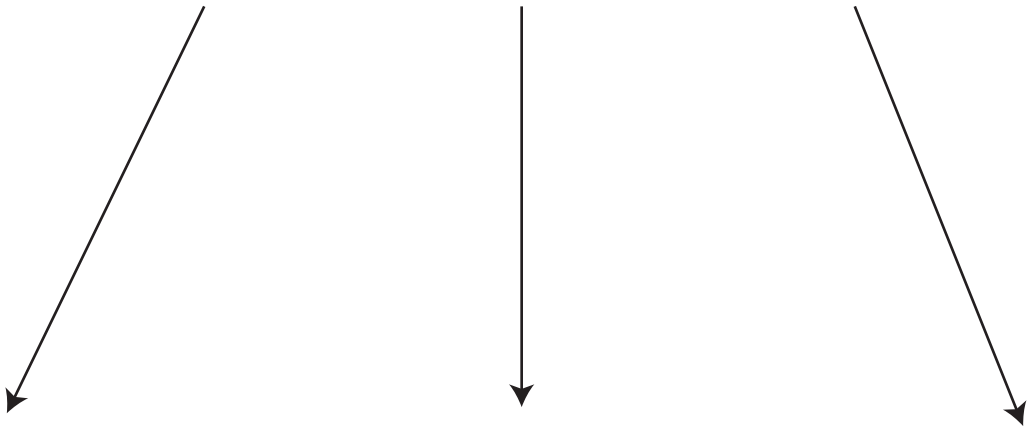
Lead Acid Battery
Contains a mixture with varying concentrations of water and acid. Sulfuric acid has a higher density than water, which causes the acid formed at the plates during charging to flow downward and collect at the bottom of the battery.

Lithium-Ion Battery
Uses an intercalated lithium compound at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect and low self-discharge.

***NB - BOS - Balance of system**

DECISION TREE

Would you like back-up power for load shedding or to reduce your energy cost?



Load shedding
Back-up power kit

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Both
Hybrid Kit

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Reduced energy
Grid-Tied Kit

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CEIL-PLUG & PLAY BACK-UP KITS

[UPS]-SINGLE PHASE PURE SINE WAVE

Single Phase
Pure Sinewave

Apparent Power	Real power (KW)	Battery (AH)	Battery (QTY)	Back-up Autonomy (Hours)
850	0,65	12V/100AH	1	1,3
850	0,65	12V/200AH	1	2,7
1450	1	12V/100AH	2	1,8
1450	1	12V/200AH	2	3,5
2500	2	12V/100AH	4	1,8
2500	2	12V/200AH	4	3,5
5000	4	12V/100AH	4	0,9
5000	4	12V/200AH	4	1,8

- Systems are designed using Lead acid / Lithium ION Batteries and Hybrid inverter/chargers

M5000 BACK UP KIT

SINGLE PHASE PURE SINE WAVE

Single Phase
Pure Sinewave

No. of Batteries (Shunt)	Apparent Power	Battery (AH)	Battery Stand	Fuse	Changeover Switch
1	5kVA Pure Sinewave	48V/200AH	Yes	Yes	Yes
2	5kVA Pure Sinewave	48V/200AH	Yes	Yes	Yes
3	5kVA Pure Sinewave	48V/200AH	Yes	Yes	Yes
4	5kVA Pure Sinewave	48V/200AH	Yes	Yes	Yes

Maximum Load Example

Load (w)	4854	
Battery Type	48V / 200AH	
No. of Battery	Autonomy (Hours)	Minutes
1	1,44	87
2	2,89	173
3	4,57	274
4	6,09	365

NB
- **No. of Batteries determines the Autonomy.**
- **The more batteries, the higher the autonomy (hours/minutes)**

- These systems can be used in conjunction with solar systems to create solar back-up systems
- Battery run time is a guideline only

*** NB - Kit comprises of components described above only**

VICTRON/ NXT BACK-UP KITS

SINGLE PHASE PURE SINE WAVE

Single Phase
Pure Sinewave

Apparent Power	Real power (KW)	Battery (AH)	Battery (QTY)	Battery Stand	Fuse	Changeover Switch	Back-up Autonomy (Hours)
1,2	0,96	12V/100AH	4	YES	YES	YES	3,65
1,2	0,96	12V/200AH	4	YES	YES	YES	7,3
3	2,4	12V/200AH	4	YES	YES	YES	2,92
3	2,4	12V/200AH	8	YES	YES	YES	5,84
5	4	12V/200AH	4	YES	YES	YES	1,752
5	4	12V/200AH	8	YES	YES	YES	3,504
5	4	12V/200AH	12	YES	YES	YES	5,256
5	4	12V/200AH	16	YES	YES	YES	7,008
8	6,4	12V/200AH	8	YES	YES	YES	2,19
8	6,4	12V/200AH	16	YES	YES	YES	4,38
10	8	12V/200AH	8	YES	YES	YES	1,752
10	8	12V/200AH	12	YES	YES	YES	2,628
10	8	12V/200AH	16	YES	YES	YES	3,504
12	9,6	12V/200AH	8	YES	YES	YES	1,46
12	9,6	12V/200AH	12	YES	YES	YES	2,19
12	9,6	12V/200AH	16	YES	YES	YES	2,92

- These systems can be used in conjunction with solar systems to create solar back-up systems
- Battery run time is a guideline only

*** NB - Kit comprises of components described above only**

M5000 SOLAR BACK-UP KITS

Single & Three Phase

Apparent Power	Real power (KW)	Battery (AH)	Solar panels (330W)	Solar Array (kWh)
M5000	4	48V/200AH	6	8,4
M5000	4	48V/200AH	9	12,6
M5000	4	48V/200AH	12	16,8
M5000	4	48V/200AH	14	19,6
M5000	4	48V/400AH	9	12,6
M5000	4	48V/400AH	12	16,8
M5000	4	48V/400AH	14	19,6
M5000	4	48V/600AH	9	12,6
M5000	4	48V/600AH	12	16,8
M5000	4	48V/600AH	14	19,6

BOS in the components consist of all required balance of system equipment:

- Roof mount brackets (Tiled roof)
- Solar Cabling - 100m
- Solar Controllers MPPT
- DC Distribution and protection
- System monitoring

VICTRON ENERGY STORAGE KITS

Single Phase
Pure Sinewave

Apparent Power	Real power (KW)	Battery (AH)	Solar Modules (kW)	Battery Stand	Fuse	Changeover Switch	Back-up Autonomy (Hours)
5	4	48V/200AH	6	YES	YES	YES	1.8
5	4	48V/400AH	5	YES	YES	YES	3.5
5	4	48V/400AH	6,6	YES	YES	YES	3.5
5	4	48V/600AH	8,2	YES	YES	YES	5.3
8	6,4	48V/800AH	8,7	YES	YES	YES	4.4
8	6,4	48V/400AH	10	YES	YES	YES	2.2
8	6,4	48V/800AH	12	YES	YES	YES	4.4

SOLAR GRID -TIED KIT

SINGLE AND THREE PHASE

Solar Power (kW)	Apparent Power	Grid Inverter kW	Phase	Bracket	Dc Cabling	Roof Mount Sysytem will produce (+/-)	Hours
1,6	3kW (1-ø)	3	1	Roof mount bracket	Cabling	7 kWh	5,5
3,3	3kW (1-ø)	3	1	Roof mount bracket	Cabling	14 kWh	5,5
4,8	5kW (1-ø)	5	1	Roof mount bracket	Cabling	21 kWh	5,5
6,6	2 x 3kW (1-ø)	6	1	Roof mount bracket	Cabling	23.8 KWh	5,5
8	8kW (1-ø)	8	1	Roof mount bracket	Cabling	29 kWh	5,5
9,9	2 x 4,6kW (1-ø)	9,2	1	Roof mount bracket	Cabling	36 kWh	5,5
10	2 x 5kW (1-ø)	10	1	Roof mount bracket	Cabling	47.6 kWh	5,5
16	2 x 8kW (1-ø)	16	1	Roof mount bracket	Cabling	72 kWh	5,5
6	6kW (3-ø)	6	3	Roof mount bracket	Cabling	26 kWh	5,5
12	12kW (3-ø)	12	3	Roof mount bracket	Cabling	55 kWh	5,5
21	20kW (3-ø)	20	3	Roof mount bracket	Cabling	95 kWh	5,5
52	2x 27kW (3-ø)	52	3	Roof mount bracket	Cabling	229 kWh	5,5

VICTRON POWER STATION OFF -GRID KIT

SINGLE PHASE -PURE SINEWAVE

Type	Autonomy
Solar power with Battery Back-up	2 day

Solar Back-up Kits	Solar Panels	Apparent Power	Battery (AH)	MPPT Regulator	Bracket	Dc Cabling	Dc Cabling	Bracket
PWRS1kW	330w	1 kW	24V/100AH	15 A	Battery Rack	2 Day Autonomy	Cabling	Roof mount bracket
PWRS2kW	660w	1 kW	24V/200AH	30 A	Battery Rack	2 Day Autonomy	Cabling	Roof mount bracket
PWRS4kW	990w	1 kW	48V/200AH	35 A	Battery Rack	2 Day Autonomy	Cabling	Roof mount bracket
PWRS6kW	1320w	2.4 kW	48V/400AH	35 A	Battery Rack	2 Day Autonomy	Cabling	Roof mount bracket
PWRS8kW	1980w	2.4 kW	48V/400AH	70 A	Battery Rack	2 Day Autonomy	Cabling	Roof mount bracket
PWRS10kW	2640w	4.6 kW	48V/600AH	70 A	Battery Stand	2 Day Autonomy	Cabling	Roof mount bracket
PWRS15kW	3960w	4.6 Kw	48V/800AH	70 A	Battery Stand	2 Day Autonomy	Cabling	Roof mount bracket

SOLAR

Specialised Solar Solutions

We guarantee system performance by designing specialised, bespoke solar solutions. Our projects are designed to enable system online monitoring; therefore we can guarantee results and measure performance. Rely on our renewable energy solutions to reduce your cost of energy and fix your electrical cost at today's rate, for the next 20 years.

Our Solar offer includes:

> Grid Tied Solar
> Hybrid Solar
> Off Grid Solar Systems

GUARANTEED ENERGY SAVING CALCULATIONS

GUARANTEED LIFE EXPECTANCY

SERVICE LEVEL AGREEMENT

CASE STUDY

Grid Tied Solar System

Grid Group

SCOPE

- To meter and size a grid tied solar system to subsidise the grid's electricity usage, ensuring optimised production (i.e.: not oversized)
- Design a system that would not impact the aesthetics of the existing building
- Deliver power according to the guaranteed solar system production
- Deliver a 4 year or less payback through electricity savings (on an over 20 - 25 year asset)
- Mitigate financial risk

SUCCESS

- Magnet installed a 260kWp grid tied system that will reduce the sites' utility consumption by up to 35%
- Due to exceeding power production and high increases in electricity costs, the actual payback was estimated to be shorter than originally anticipated
- The system is seamless and the tenants do not notice any change between solar and utility supplied power
- The inverter app/website allows for live system and per-panel performance monitoring
- Monthly reporting with quarterly site inspections and panel cleaning allow the owner to rest assured his investment is bringing in the financial returns as promised
- The solar panels have a linear output warranty for 25 years, and the inverters come with a 20 year warranty

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