smartBridges SOLAR·POWER

SOLAR POWER ENERGY SOURCE

for a wireless ethernet link located at remote places

OFT – 456/04

ENGLISH VERSION

TARGET

This document describes the technical feasibility of using a photovoltaic system for supplying energy to any smartBridge model installed at remote locations.

The system is composed of photovoltaic panels and batteries that can be configured in different ways in order to work correctly in any location around the world.

It is a robust, reliable and, above all, modular system that can be arranged in a wide range of configurations. With only a few different parts it is possible to satisfy all customer requests.

The wide experience in similar projects around the world support the photovoltaic systems as proved solutions for supplying energy at remote locations with minimum technical risk.

MAIN ADVANTAGES

- Power supply to any SMART·BRIDGE module in a remote location
- Easy to configure for any location in the world
- Modular system that can offer a wide range of solutions with few different standard parts.
- Long working life: more than 20 years
- Easy to install: PLUG & PLAY connections
- Minimum maintenance: 1 inspection per year

SMARTBRIDGES MODELS TO FEED WITH THE SOLAR MODULE

MODEL	VOLTAGE	CURRENT	POWER	CLASSIFICATIÓN SOLAR · POWER
AIRPOINT XO	48 V	300 mA	14.4 W	L
AIRPOINT XO2	48 V	400 mA	19.2 W	L
AIRPOINT PRO OUTDOOR	12 V	350 mA	4.2 W	S
AIRPOINT PRO TOTAL	12 V	500 mA	6.0 W	S
AIRBRIDGE OUTDOOR	12 V	350 mA	4.2 W	S
AIRBRIDGE TOTAL	12 V	350 mA	4.2 W	S

In order to reduce the number of different solutions we have grouped de SMARTBRIDGES models in two categories according to the working voltage and power range.

- SOLAR · POWER " S " (SMALL)

  Voltage: 12 V
  Power: 6.0 W

- SOLAR · POWER " L " (LARGE)

  Voltage: 48 V
  Power: 19.2 W

BASIC SPECIFICATIONS

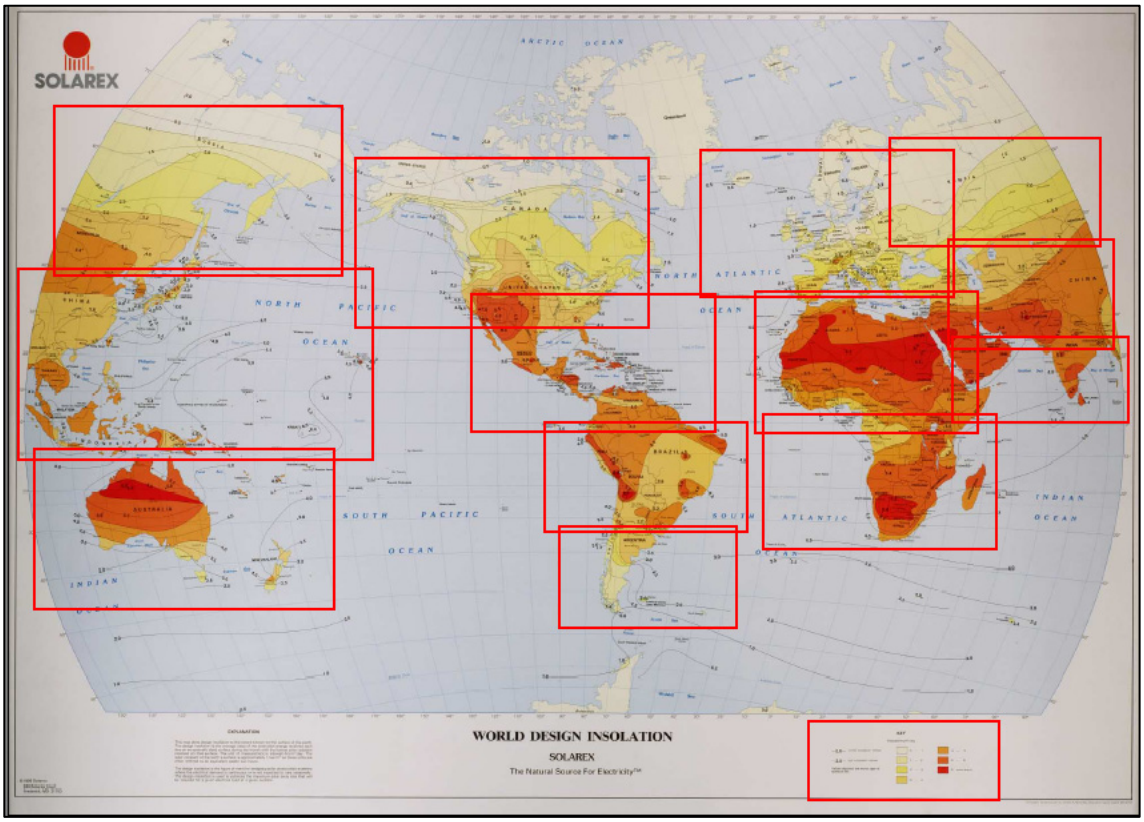
- WORKING PERIOD: 24 hours per day, 365 days per year
- FAILURE RISK: Minimum
- LATITUTE RANGE: 60º N – 60º S
- MAINTENANCE: 1 revision per year
- CONSECUTIVE CLOUDY DAYS: Between 19 and 26
- CLOUDY DAYS MEAN RADIATION: Between 50 and 150 W/m2
- SUNNY DAYS FOR RECHARGING: 5
- TEMPERATURES RANGE: - 20º C - + 60º C
- MEAN RADIATION SUNNY DAYS: 1.000 W/m2
- PANNEL PITCH: PITCH = Latitude (+/- 15º)
- PANNEL ORIENTATION: S / N (subject to world location)
- BATTERIES DISCHARGE RATIO: 50%

SOLAR RADIATION WORLD REGIONS

In order to dimension the SOLAR POWER modules according to different world locations, we have divided the world in five solar regions. Each region is determined by its DAYLY PEAK SOLAR HOURS factor, which indicates the solar radiation available in the worst month. The larger the factor, the bigger the amount of energy available.

SOLAR REGIÓN	DAYLY PEAK SOLAR HOURS (worst month)	MEAN DIFFUSE RADIATION LEVEL	DIFFUSE RADIATION HOURS PER DAY	MAXIMUM SUN HOURS PER DAY	MAXIMUM NUMBER OF CONTINUOUS DAYS
I *	< 0.5	Not considered	Not considered	Not considered	Not considered
II	0.5 – 1.0	50 W / m2	4	2	26
III	1.0 – 2.0	75 W / m2	6	4	26
IV	2.0 – 4.0	100 W / m2	8	6	24
V	> 4.0	150 W / m2	10	8	19

* SOLAR REGION I has not been considered in this calculations as solar radiation and temperatures are extremely low. For installations in these regions a specific project and calculation is recommended.



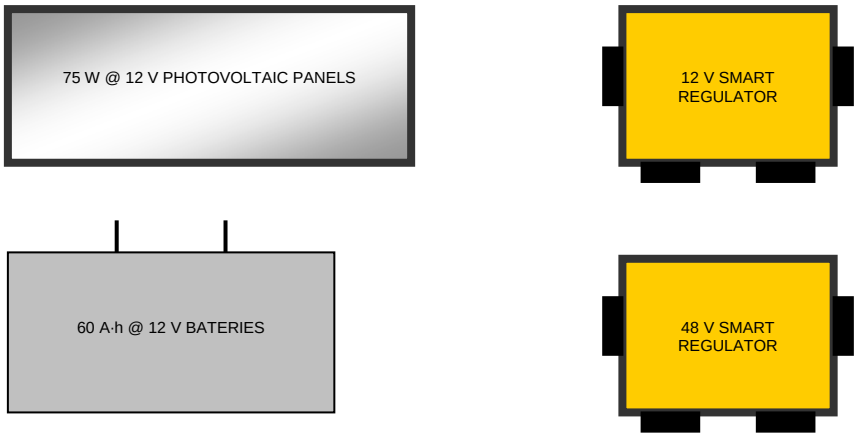
BASIC SPECIFICATIONS

PHOTOVOLTAIC PANEL	Photovoltaic panels transform solar radiation into electric energy. This energy is then stored in the batteries and supplied to the SMARTBRIDGES module.	
	SPECIFICATION	**COMMENTS**
NATURE	MONOCRISTALINE	Maximum performance and durability.
WORKING VOLTAGE	12 V	This voltage allows using the same panel for both, LARGE and SMALL modules. 48 V will be achieved by a series connection of 4 panels.
PEAK OUTPUT (Wp)	75 Wp	This power allows a modular concept of the whole system. Additional power can be achieved step by step with an easy to transport standard module.
DIMMENSIONS	1224 x 545 x 39,5 mm	Can be easily manipulated by one person. Can be mounted in a mast with one central bracket.
WEIGHT	9 Kg	Can be easily manipulated by one person.
MAINTEINANCE	1 Inspection / year	Inspection to check brackets, bolts, connections, excessive dust, ...
WORKING LIFE	More than 20 years	

BATTERIES	Batteries store the energy produced by the photovoltaic modules and work as an energy buffer. Photovoltaic batteries are designed to support a lot more discharge cycles than conventional ones.	
	SPECIFICATION	**COMMENTS**
NATURE	GEL MONOBLOCK	Maximum working life, minimum maintenance
NOMINAL VOLTAGE	12 V	This voltage allows using the same battery for both, LARGE and SMALL modules. 48 V will be achieved by a series connection of 4 batteries.
CAPACITY	60 A·h @ 12 V	This capacity allows a modular concept of the whole system. Additional capacity can be achieved step by step with an easy to transport standard module.
DIMENSIONS	175 x 278 x 190 mm	
WEIGHT	20 Kg	Can be easily manipulated by one person.
MAINTENANCE	1 Inspection / year	Inspection to check brackets, bolts, connections, excessive dust, ...
WORKING LIFE	12 - 15 years	If correctly installed and used

REGULATOR	Regulators are electronic equipment that control the charging process between photovoltaic panels and batteries. A good regulator protects batteries and increases its working life by setting limits to the discharging and charging process.	
	SPECIFICATION	**COMMENTS**
SMART REGULATOR 12 V	12 V / 50 A	Regulator for any of the SMALL modules. Weatherproof sealed box for exterior use. RJ45 connectors for plug and play installation with the SMARTBRIDGE modules.
SMART REGULATOR 48 V	48 V / 30 A	Regulator for any of the LARGE modules. Weatherproof sealed box for exterior use. RJ45 connectors for plug and play installation with the SMARTBRIDGE modules.

ONLY 4 DIFFERENT PARTS FOR ANY *SOLAR POWER* CONFIGURATION



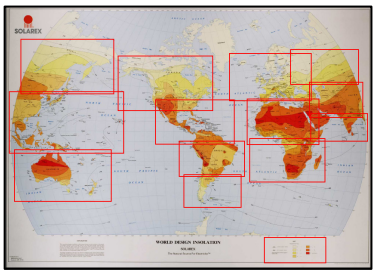
OTHER ACCESSORIES

- Support brackets, bolts and nuts, small bracketry, ...
- Cables, connectors, ...

DIMENSSIONS AND ORDERS MANAGEMENT

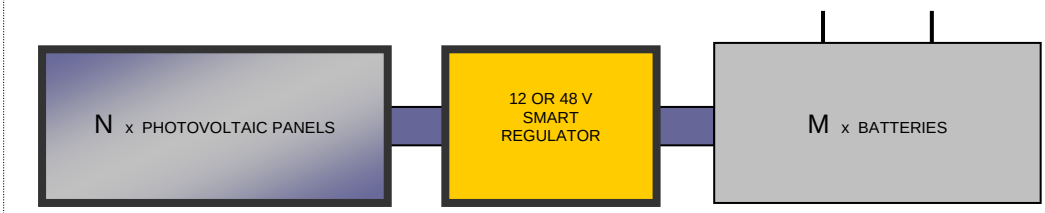
The modular kit required for each *SOLARPOWER* equipment can be easily selected by determining the SMARTBRIDGES unit and the solar region where to be installed. The kit will be formed by a regulator, "N" photovoltaic panels and "M" batteries.

SMARTBRIDGES MODULE TO FEED



SOLAR REGION TO BE INSTALLED

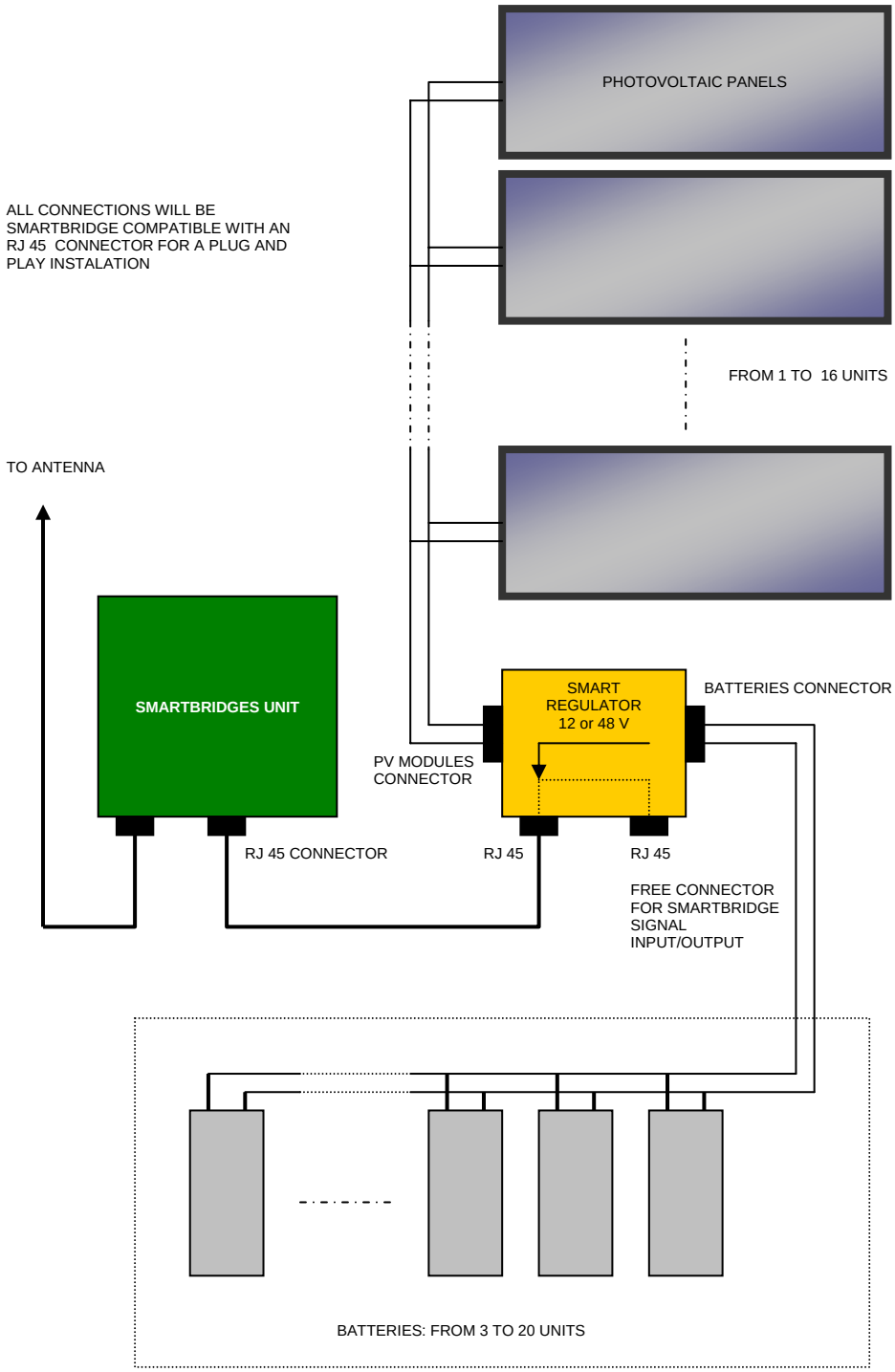
SOLARPOWER KIT



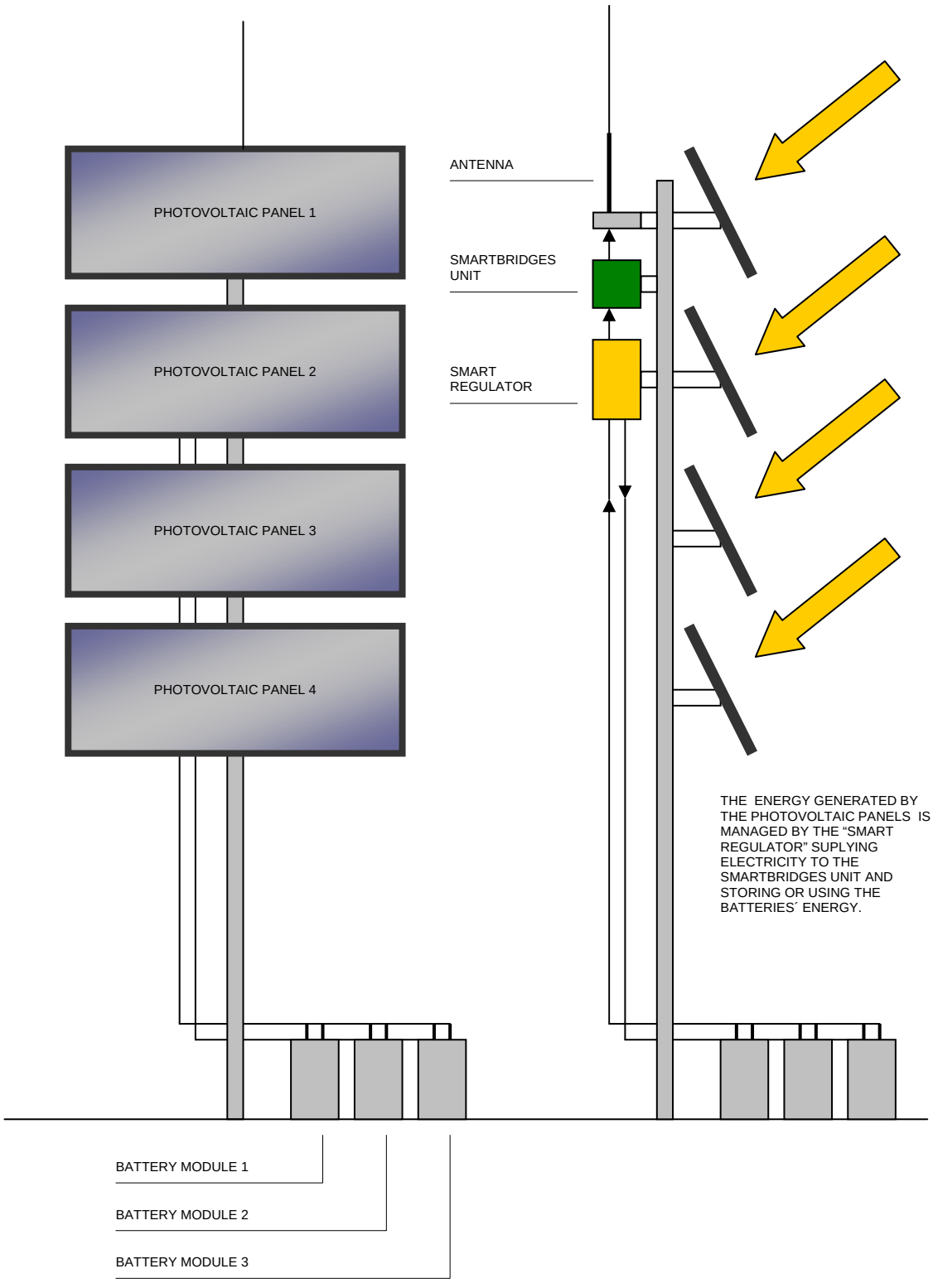
Each SOLARPOWER KIT will be supplied with a complete instructions booklet that will show easily how to assemble, connect and maintain the equipment.

SOLAR POWER is supplied in 8 different standard configurations, but the system is conceived as to be easily adapted to different configurations in order to meet with new requirements.

SOLAR REGION	SMALL			LARGE		
	"N" PHOTOVOLTAIC PANELS	"M" BATTERIES	REGULATOR	"N" PHOTOVOLTAIC PANELS	"M" BATTERIES	REGULATOR
I	REQUIRES SPECIAL STUDY			REQUIRES SPECIAL STUDY		
II	7 units	4 units	1 unit 12V	16 units	20 units	1 unit 48 V
III	4 units	3 units	1 unit 12V	12 units	16 units	1 unit 48 V
IV	2 units	3 units	1 unit 12V	8 units	12 units	1 unit 48 V
V	1 units	3 units	1 unit 12V	4 units	12 units	1 unit 48 V



"PLUG AND PLAY" MODULAR SYSTEM



EXAMPLE: TYPICAL ASSEMBLY FOR A "SMALL" UNIT AT REGION III


solarpower
smartBridges