GENERAL CATALOGUE

RIELLO ELETTRONICA

riello solar tech


RIELLO ELETTRONICA
riello
solar
tech

Key

Set up for use in Smart Grids

Compatible with lithium batteries

Contents

RIELLO ELETTRONICA

Operating on the market for over 35 years, Riello Elettronica is the holding company of a group of companies operating in Electronics, Energy, Automation and Security. Founded by Cavaliere del Lavoro Pierantonio Riello, it specialises in energy conversion for civil and industrial applications. Under the trademark Riello UPS, it is a leading manufacturer of Uninterruptible Power Supplies, smart electronic installations that act as a power reserve in the event of a grid blackout. Today, the Group employs approximately 1300 people around the world and with sales of over 420 million Euro is an expression of Made in Italy worldwide.

riello ups

Leading manufacturer of a professional range of UPS (Uninterruptible Power Supplies).

riello solar tech

Photovoltaic (PV) and Energy Storage systems for all requirements, from homes to large-scale solar plants.

gamma system

Security solutions for industrial applications.

AVS electronics

Burglar, fire and home automation systems and installations.

cardin
riello elettronica group

Automation and remote control solutions for locks and security systems.

Energy
Automation and safety
Real Estate

420
MILLION € SALES

1300
EMPLOYEES

85
COUNTRIES OF OPERATION

32
COMPANIES

7
PRODUCTION SITES

2011

New brand
AROS Solar Technology.

EVOLUTION

2006

Sirio range by AROS,
the first single-phase inverters
for homes.

2020

New brand Riello Solartech and launch
of new range of **RS single-phase and three-phase** string inverters.

Riello Solartech, always at the heart of photovoltaics. We convert solar energy into electricity with the best technologies. Today, as always, we provide services and support to customers and users. Even when the market became tougher we remained a reliable partner for all operators, leaving no room for dubious manufacturers and undependable distributors. We are Riello Elettronica, the guarantee of an Italian company with a worldwide presence.

Launch of the new range of **RS Hybrid** inverters, hybrid single-phase inverters with **Energy Storage.**

Launch of the updated **RS Hybrid Single-phase** with **Energy Storage** and launch of the new **RS Hybrid Three-phase** with batteries.

2021

2023

2022

Launch of the new range of **Sirio ES** three-phase string inverters.

www.riello-solartech.com

RESEARCH AND THE ENVIRONMENT

RESEARCH AND DEVELOPMENT
Continuous attention to quality

The size of a company and its commitment to growth are measured by the importance of its efforts in research.
The Riello Solartech Research and Development department, which grows each year in terms of investments and personnel, is our beating heart.
It's where custom and specialized components and solutions are designed, making Riello Solartech a byword for innovation.
It's where ambitious and passionate people spend every day solving real user problems, seeking the key to create better-performing inverters.
Using environment simulators, sophisticated analysis tools and CAD systems, the Riello Solartech Research and Development department creates the technologies of the future, designing a new way of living, of relating to the environment, of growing together.

ENERGY BEYOND THE SUN
Natural attention

Our commitment to design, produce and distribute solutions and products with a low environmental impact, and a focus on the natural environment and its preservation, are borne out by achieving certifications such as ISO 14001:2015, which specifies the requirements for an environmental management system, and following European Community guidelines on waste electrical and electronic equipment (WEEE).

Riello Solartech's commitment to the environment is part of its mission: choosing a sector as decisive for everyone's future as renewable energy is the clearest demonstration of Riello Solartech's awareness. This is confirmed by our compliance with the European RoHS Directive, the REACH regulation (on the registration, evaluation and authorisation of chemicals produced, used or put on the market), and by our registration on SCIP (the EU's public database of substances of concern in articles), which aims to enable consumers to make more informed purchasing choices.

SERVICE EXCELLENCE AND CERTIFICATION

SERVICE
The value of being a partner

At Riello Solartech, support for customers and company employees alike forms part of an ongoing quest for quality and excellence, representing the starting point for building a partnership with customers, which is becoming stronger every day.

That's why our Control Centre, the feather in the cap of a system built around the real needs of those who use Riello Solartech products and solutions, is able to read the status of the appliances in real-time across the network, and call on immediate intervention in the event of an emergency. Ongoing training for technical and commercial operators at the main Riello Solartech site or at its customers' sites ensures high problem solving expertise and reduced response times. Riello Solartech's success therefore goes beyond national borders.

CERTIFICATION
The basis of a solid relationship

Obtaining prestigious certifications such as ISO 9001 Quality System certification (issued by DNV) for the design, production, sale and after-sales service of its products, and UNI ISO 45001, which enables it to eliminate or reduce risks to its workers and other interested parties who may be exposed to hazards associated with its activities, is the guarantee of a relationship – with its customers and employees – that is destined to grow day by day. Companies such as Riello Solartech that offer cutting-edge technological solutions must comply with strict, ongoing controls of its business processes in order to continue to believe in quality and strive for excellence.

PRODUCTS

Overview

String inverters

RS SINGLE-PHASE SERIES

RS 1.5

RS 2.0

RS 3.0

RS 4.0

RS 5.0

RS 6.0

RS THREE-PHASE SERIES

RS 6.0 T

RS 10.0 T

RS 15.0 T

RS 20.0 T

RS 25.0 T

RS 30.0 T

String inverters

SIRIO ES THREE-PHASE SERIES

SIRIO ES 50

SIRIO ES 60

SIRIO ES 100

SIRIO ES 110

Overview

Hybrid inverters - Storage

RS HYBRID SINGLE-PHASE SERIES

RS 3.6 HYBRID

RS 6.0 HYBRID

RS BATLIO 5120

RS HYBRID THREE-PHASE SERIES

RS 5.0 T HYBRID

RS 6.0 T HYBRID

RS 8.0 T HYBRID

RS 10.0 T HYBRID

RS BATLIO 5300T + HV-RS BOX

RS 20.0 T HYBRID

RS 30.0 T HYBRID

Central Inverters

SIRIO THREE-PHASE SERIES

SIRIO K64
SIRIO K64 HV

SIRIO K80
SIRIO K80 HV

SIRIO K100
SIRIO K100 HV

SIRIO K200
SIRIO K200 HV

SIRIO K250 HV

MV central inverters

SIRIO THREE-PHASE SERIES

SIRIO K64 HV-MT

SIRIO K80 HV-MT

SIRIO K100 HV-MT

SIRIO K200 HV-MT

SIRIO K250 HV-MT

SIRIO K330 HV-MT
SIRIO K330 HHV-MT

SIRIO K500 HV-MT
SIRIO K500 HHV-MT

SIRIO K800 HHV-MT

Overview

DC/AC Conversion and LV/MV Transformation Substations

SIRIO CENTRAL STATION SERIES

SCS 500

SCS 660

SCS 1000

Energy Storage Systems

HYBRID BATTERY STORAGE SERIES

HBS 10
HBS 15
HBS 20
HBS 30
HBS 40

HBS 60
HBS 80

HBS HE 100
HBS HE 120
HBS HE 160
HBS HE 200
HBS HE 250

HBS HE 300
HBS HE 400

HBS HE 500
HBS HE 600

HBS HE 800

RS SINGLE-PHASE

HIGHLIGHTS

- **Cooling technology with natural ventilation**
- **Maximum efficiency 97.3%**
- **European efficiency 96.3%**
- **String current 15 A**
- **PV configuration 130%**
- **Integrated Bluetooth**
- **Smart self-test and self-learning via the App**
- **Night-time consultation**
- **Remote monitoring**

The second generation RS single-phase inverter range by Riello Solartech offer the best combination of photovoltaic energy conversion, energy efficiency and overall performance with the additional guarantee of considerable savings in terms of installation and running costs.
RS single-phase inverters, like the ones in the previous generation, use innovative technologies and high-quality components sized with a wide margin in relation to normal operating conditions so as to reduce periodic machine maintenance without sacrificing a high degree of operating flexibility.
The digital control of all power stages guarantees low susceptibility to power disruptions, avoiding undesired disconnection due to power variations or micro-interruptions. All models in the RS single-phase range integrate input and output surge protection and have control devices and redundancy protection—especially in the output stage—to guarantee operability and continuous operation.

INNOVATION
Practical, lightweight and compact design.
The aluminium case makes these inverters particularly lightweight and ensures an optimum real IP65 protection level, even for outdoor applications.
The materials chosen are high-quality, to ensure maximum reliability.
Thanks to the wide voltage range, the inverter can be perfectly integrated into the various operating conditions of the electricity grid and is particularly suited for the typical low voltage of rural areas.
- Cooling technology with natural ventilation to ensure a period of reliable use in high temperature situations.
- Smart self-test with self-learning via the app.
- Multiple remote monitoring for operation and maintenance.

EFFICIENCY
- High efficiency and higher efficiency rate.
- Maximum efficiency 97.3%.
- MPPT self-learning technology to optimize the efficiency of each module.
- Wide MPPT range.
- Low threshold voltage for supply to the grid.

MAXIMUM FLEXIBILITY

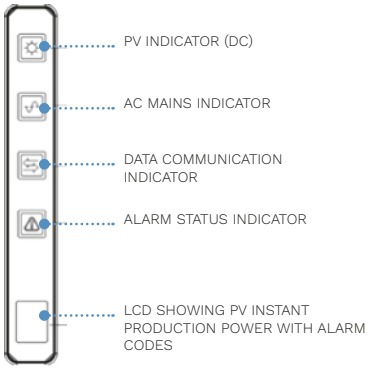
- Simple installation, smart operation and maintenance.
- User-friendly communication interface with integrated Bluetooth and Wi-Fi provided.
- AC/DC connectors that can be plugged in for immediate connection.
- Use of app and supervision web portal for controlling the inverter system and remote firmware updating, maintenance and smart operations.
- Lightweight and extremely compact for easier installation.

Eye-catching design, lightweight, compact, easy to install and set up; this new, second version of RS single-phase inverters has all the standout features of the first generation. Riello Solartech RS single-phase inverters are particularly suitable for residential and small commercial installations. Thanks to the wide range of input current and voltage, they are extremely well-adapted to plants with size limitations.
The digital control of all the power states – which ensures low sensitivity to mains interference, combined with the IP65 protection level – which means the inverter can be positioned outside near the generator, simplify the wiring on the DC side of the inverter, reducing leakage, helping to limit installation costs and greatly improve overall system reliability. The multi-string technology for 4.0-5.0-6.0 kW models also enables strings with different orientations and inclinations to be managed, to work better with any type of photovoltaic module, even if partially in the shade. The integrated DC switch disconnector means the inverter can be rapidly and securely isolated in the event of an emergency or non-routine maintenance.
A series of LED icons on the front of the case immediately identify the operating status of the inverter while an LCD display shows the instantaneous power produced or an alarm code, if any.

The 1.5, 2.0 and 3.0 kW RS single-phase inverters, with single MPPT input, receive signals from a single string of PV panels. The 4.0, 5.0 and 6.0 kW RS single-phase inverters, with dual MPPT input, receive signals from two strings of PV panels. For the latter models, the inputs are grouped into one or two MPPT independent channels in order to track the maximum power point of the PV panels. The MPPT power is converted in the DC bus and the DC voltage is in turn converted to AC voltage via an inverter circuit. Finally, the AC voltage is fed into the power grid to power the loads.
An EMI filter is used on the DC and AC sides to reduce electromagnetic interference; Power surge protection is present on the AC side.

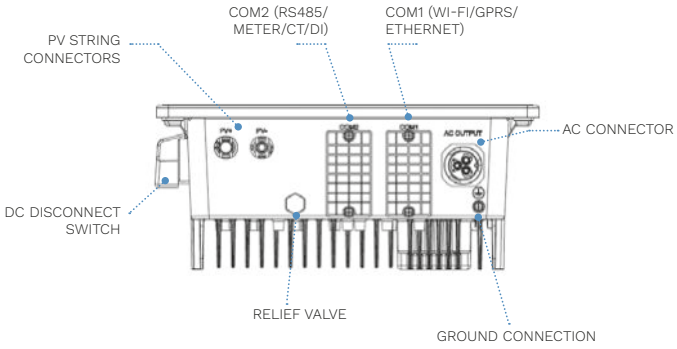
FRONT PANEL

Panel with LED status indicators and LCD display showing instant production power.

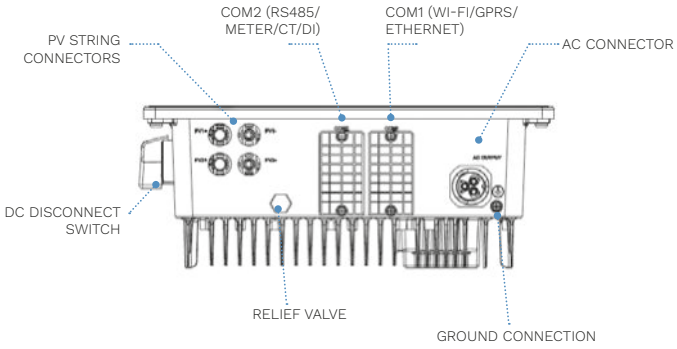


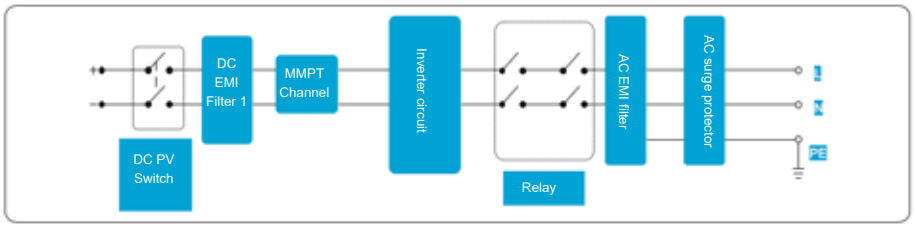
DB9 expansion slot used for optional communication cards, such as Ethernet.

1.5, 2.0 and 3.0 kW RS single-phase inverters (from below)

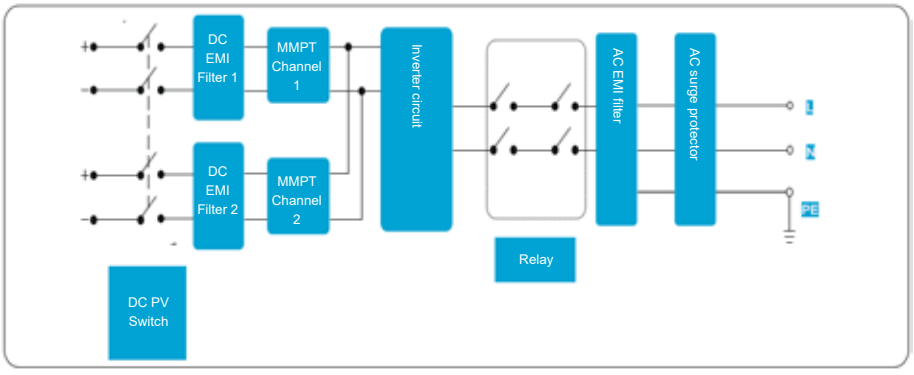


4.0, 5.0 and 6.0 kW RS single-phase inverters (from below)





RS 1.5-2.0-3.0 inverter circuit with single MPPT input.



RS 4.0-5.0-6.0 inverter circuit with dual MPPT input.

OPTIONS

MONITORING
RS Connect/RS Monitoring
SunGuard (optional)

ACCESSORIES
Ethernet card
RS Datalogger
Datalogger Z series

MODEL	RS 1.5	RS 2.0	RS 3.0	RS 4.0	RS 5.0	RS 6.0
EFFICIENCY						
Maximum efficiency [%]		97.3			97.2	
European efficiency [%]	95.6	95.8	96.3	96.0	96.2	96.3
INPUT						
Maximum input voltage [V]		500			550	
Nominal input voltage [V]			360			
PV maximum input power (STC) [%]			130			
Maximum input current [A]		15			30 + (2 x 15)	
Maximum short circuit current [A]		20			40 + (2 x 20)	
Start-up voltage [Vdc]		70			90	
MPPT operating voltage range [V]		50 to 490			70 to 540	
Maximum number of PV strings		1			2 (1/1)	
MPPT number		1			2	
OUTPUT						
AC active power (nominal) [W]	1500	2000	3000	4000	5000	6000
Maximum apparent AC power [VA]	1650	2200	3300	4400	5500	6000
Active power max. AC (PF = 1) [W]	1650	2200	3300	4400	5500	6000
Max current AC output [A]	7.5	10	15	20	25	27.3
Max short circuit current [A]			38			
Nominal voltage AC [V]			220 / 230, L+N+PE			
Nominal mains frequency [Hz]			50 / 60			
Grid frequency range [Hz]			45-55 / 55-65 (configurable)			
Harmonic Distortion (THDi) [%]			<3 (nominal power)			
Direct current injection [%]			<0.5 In			
Power factor			> 0.99 nominal power (selectable 0.8 inductive – 0.8 capacitive)			
PROTECTIONS						
DC disconnect switch			Supported			
Anti-islanding protection			Supported			
AC overcurrent protection			Supported			
Short circuit protection			Supported			
DC pole inversion control			Supported			
Surge arresters (VDR)			DC type II (optional) / AC type III			
Ground fault detection			Supported			
Current leakage protection			Supported			
OVERALL SPECIFICATION						
Type			Transformer-free			
Protection level			IP65			
Night self-consumption [W]			<8			
Cooling			Natural ventilation			
Operating temperature range [°C]			-25 to 60			
Relative humidity range [%]			0 to 100			
Maximum operating altitude [m]			4000			
Noise level [dB]			<30			
Dimensions (WxDxH) [mm]		320x137x344			350x137x347	
Weight [kg]		6.7			8.9	
COMMUNICATIONS						
Display			LCD + APP			
Communications			Bluetooth / Wi-Fi (provided) / RS485 / Ethernet (optional)			
Monitoring			APP, Supervisory Portal			
CERTIFICATION						
Safety			IEC / EN 62109-1, IEC / EN 62109-2			
EMC			EN IEC 61000-6-1, EN IEC 61000-6-2, EN IEC 61000-6-3, EN IEC 61000-6-4, IEC 61000-3-2, IEC 61000-3-12, IEC 61000-3-3, IEC 61000-3-11			
Regulations			CEI 0-21, UNE 217001, UNE 217002, NTS Type A version 2.1, RD 647, RD 244, RD 1699, RD 661, RD 413, UNE 206006, UNE 206007-1			
Warranty			5 years (with possibility of extension)			

RS THREE-PHASE

HIGHLIGHTS

- **Maximum efficiency 98.0%**
- **Dual MPPT**
- **Maximum string current 20 A**
- **PV configuration 130%**
- **Aluminium case and IP66 protection level**
- **LCD and status LEDs**

Riello Solartech's second generation high performance RS three-phase inverters. Extremely compact and lightweight, RS three-phase inverters are available in **6.0, 10.0, 15.0, 20.0, 25.0 and 30.0 kW.** The new inverters benefit from renewed technology, have a made-in-Italy design, and are built with top-quality components - all the work of the company's Research and Development team. These features guarantee maximum product reliability and achieve high efficiency under all operating conditions.

TECHNOLOGY

To guarantee maximum **configuration flexibility, prolonged energy production, efficiency and string optimisation,** the latest generation of RS three-phase inverters are fitted with features such as a DC-side disconnect switch, type II DC and AC surge arresters, and multiple inputs that converge on two independent MPPT trackers characterised by a wide voltage range. RS three-phase inverters have a natural ventilation system - for models up to 15.0 kW - with adequate heat sinks to ensure maximum heat exchange. Whereas 20.0, 25.0 and 30.0 kW models have forced ventilation with controlled speed extraction fans in relation to the operating conditions, to minimize leakage. The **digital control for all power stages** guarantees low susceptibility to power disruptions, avoiding undesired disconnection due to variations or micro-interruptions.

COMPACT AND ROBUST

Riello Solartech RS three-phase inverters have a unique, innovative design. The aluminium case makes them particularly lightweight and ensures a real IP66 protection level, suitable for outdoor applications. They are versatile, easy to handle and their assembly and installation is quick and intuitive.

INTERACTIVITY AND MONITORING

The user interface on the front panel has LEDs for indicating DC and AC side status and communications; in addition, there is an LCD divided into several sections that shows: date, time, alarms (if any), type of connection, operating diagram, MPPT1 and MPPT2 voltage/current, power and all instantaneous network parameters. RS three-phase inverters connect via the app or cloud:

- they connect to the app through Bluetooth integrated in the inverter, enabling the user to set up and self-test from a smartphone;
- via Wi-Fi (provided) or an Ethernet card (optional), the inverters can connect to the Internet for data management on the supervision portal, where it is possible to remotely monitor the strings in detail and view the installation's performance.

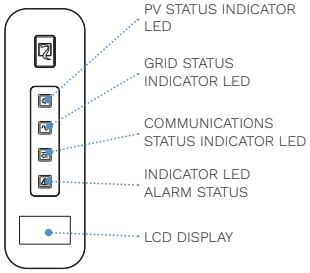
Finally, through the integrated BUS RS485 interface it is possible to connect several inverters to a dedicated Datalogger to manage the connection to the portal of the whole plant via Ethernet, with the option of connecting energy meters and environmental sensors.

OPTIONS

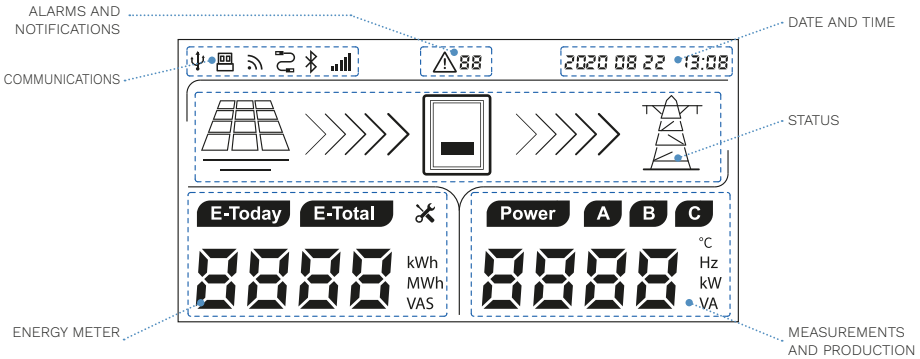
MONITORING
RS Connect/RS Monitoring
SunGuard (optional)

ACCESSORIES
Ethernet card
RS Datalogger
Datalogger Z series

FRONT PANEL



LCD DISPLAY



MODELS	RS T 6.0	RS T 10.0	RS T 15.0	RS T 20.0	RS T 25.0	RS T 30.0
EFFICIENCY						
Maximum efficiency [%]	97.8		98.0			
European efficiency [%]	97.2		97.4	97.5	97.5	
INPUT						
Max input voltage [V]	1100					
Nominal input voltage [V]	620					
PV max input power (STC) [%]	130					150
Max input voltage [A]	2x15		15 + 2x15	2x15 + 2x15		2x20 + 2x15
Max short circuit current [A]	2x20		20 + 2x20	2x20 + 2x20		2x25 + 2x18.7
Start-up voltage [V]	180					
MPPT operating voltage range [V]	160 - 1000					
Max number of PV strings	2 (1/1)		3 (1/2)	4 (2/2)		
MPPT number	2					
OUTPUT						
AC active power (nominal) [W]	6000	10000	15000	20000	25000	30000
Max apparent AC power [VA]	6600	11200	16700	22000	27500	33000
Active power max. AC (PF = 1) [W]	6600	11200	16700	22000	27500	33000
Max current AC output [A]	3x10.1	3x17	3x25.3	3x33.7	3x39.8	3x50.2
Nominal voltage AC [V]	380 / 400 / 415, 3W+N+PE					
Nominal mains frequency [Hz]	50 / 60					
Grid frequency range [Hz]	45-55 / 55-65 (configurable)					
Harmonic Distortion (THDi) [%]	<3 @nominal power					
Direct current injection [%]	<0.5 @rated current					
Power factor	> 0.99 nominal power (selectable 0.8 inductive – 0.8 capacitive)					
PROTECTIONS						
DC disconnect switch	Supported					
Anti-islanding protection	Supported					
AC overcurrent protection	Supported					
Short circuit protection	Supported					
DC pole inversion control	Supported					
Surge arresters (VDR)	AC Type II / DC Type II					
Isolation detection	Supported					
String current detection	Supported					
Current leakage protection	Supported					
OVERALL SPECIFICATION						
Type	Transformer-free					
Protection level	IP66					
Night self-consumption [W]	<8					
Cooling	Natural ventilation			Cooling with fans at controlled speed		
Operating temp. range [°C]	-25 to 60					
Relative humidity range [%]	0 to 100					
Maximum operating altitude [m]	4000					
Noise level [dB]	<30			<45		
Dimensions (WxDxH) [mm]	398x190x460					
Weight [kg]	17.5	17.5	19.5	20.5	21.5	20.3
COMMUNICATIONS						
Display	LED + LCD					
Communications	Bluetooth / Wi-Fi (provided) / RS485 / Ethernet (optional)					
Monitoring	APP, Supervisory Portal					
CERTIFICATION						
Safety	IEC / EN 62109-1, IEC / EN 62109-2					
EMC	EN IEC 61000-6-1, EN IEC 61000-6-2, EN IEC 61000-6-3, EN IEC 61000-6-4					
Regulations	CEI 0-21, CEI 0-16, RD 1699, RD 661, RD 413, UNE 206006 IN, UNE 206007-1 IN, NTS Type A version 2.1, UNE 217002, RD 647, UNE 217001					
Warranty	5 years (with possibility of extension)					

Sirio ES

HIGHLIGHTS

- **Compact**
- **IP65 protection level**
- **Maximum input voltage 1100 VDC**
- **Operating range 200-1000 Vdc**
- **PV-side disconnect switches**
- **Type II DC and AC surge arresters**
- **Controlled forced ventilation**
- **Bluetooth, RS485 standard, Wi-Fi and Ethernet optional**

Range of string three-phase inverters (TL) connected to the grid for industrial or commercial photovoltaic plants.
Riello Solartech's Sirio ES three-phase inverters are usually used in low voltage photovoltaic plants connected to the grid. They benefit from completely new technology and are built with top-quality components, guaranteeing maximum machine reliability and achieving high efficiency under all operating conditions. All models in the Sirio ES range have a unique, innovative design. The aluminium case makes them particularly lightweight for their category and ensures an IP65 protection level, suitable for outdoor applications.

TOP TECHNOLOGY
Sirio ES inverters are sized for a maximum input voltage of 1100 VDC and have innovative digital control of all power stages. They are fitted with PV-side disconnect switches and type II DC and AC surge arresters.
Sirio ES 50 and Sirio ES 60 are fitted with 10 and 12 inputs respectively for maximum optimisation of the strings that converge on the 4 independent MPPT trackers characterised by a wide voltage range 200-960 VDC.
Sirio ES 100 and 110 are fitted with 16 and 18 inputs respectively for strings that converge on 8 and 9 independent MPPT trackers with a voltage range of 200-1000 VDC. This advanced configuration has been designed to ensure maximum flexibility, efficiency optimisation (above 98% under all operating conditions) and prolonged energy production. To minimise leakage, all Sirio ES models have a forced ventilation system with controlled speed extraction fans in relation to operating conditions.
The innovative digital control of all power stages also guarantees low susceptibility to power disruptions, avoiding undesired disconnection due to variations or micro-interruptions on the grid.

COMMUNICATION INTERFACE

The user-friendly interface on the front of the inverters features LEDs signalling the status of the photovoltaic field (PV), grid (AC), communications, data transmission and alarms. The inverters also feature a large LCD* divided into sections, which displays:

- energy flow diagram (PV field/grid);
- network and energy meter parameters;
- communications and data transmission;
- alarm status and reference code;
- date and time.

The new Sirio ES inverters communicate in a whole new way. Parameters can be set and data monitored on a smartphone by connecting to the device through Bluetooth with the dedicated app.

Via Wi-Fi or Ethernet module (optional), the inverters can connect to the Internet for data management remotely and on the supervision portal, where it is possible to monitor the strings in detail and view the installation's performance. Finally, through the integrated RS485 interface it is possible to connect several inverters to a dedicated Datalogger to manage the connection to the portal of the whole plant via Ethernet, with the option of connecting energy meters and environmental sensors.

** Available depending on version.*

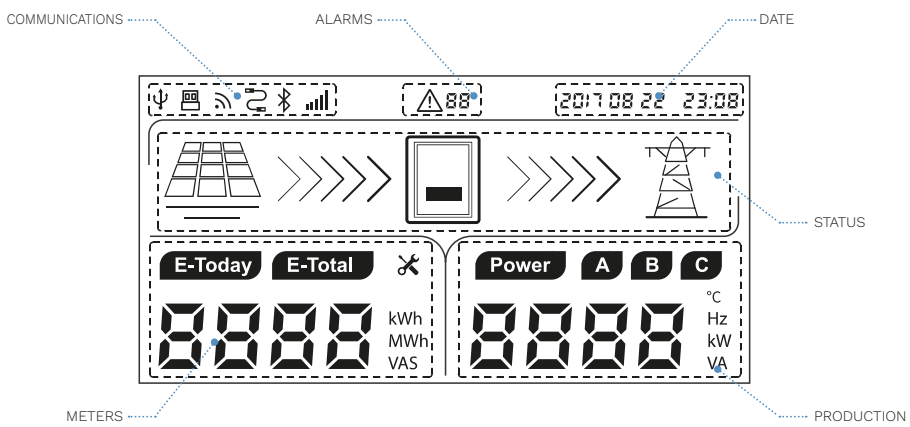
Sirio ES 100 and 110.

OPTIONS

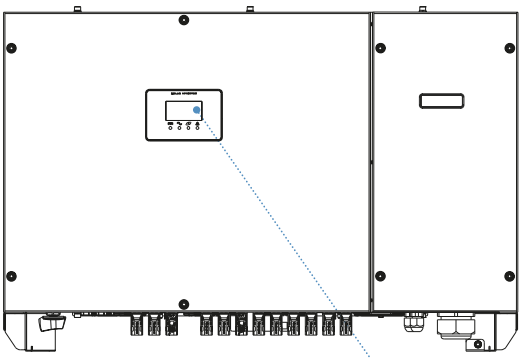
MONITORING
RS Connect/RS Monitoring
SunGuard (optional)

ACCESSORIES
Ethernet card
Wi-Fi card
RS Datalogger
Datalogger Z series

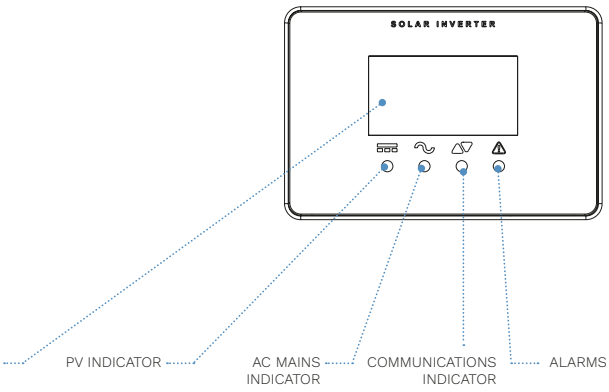
LCD*



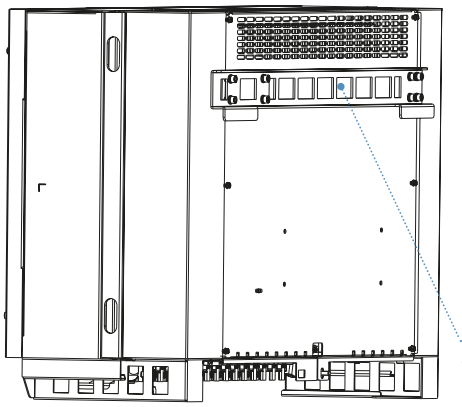
Sirio 50 and 60 kW inverters (front)



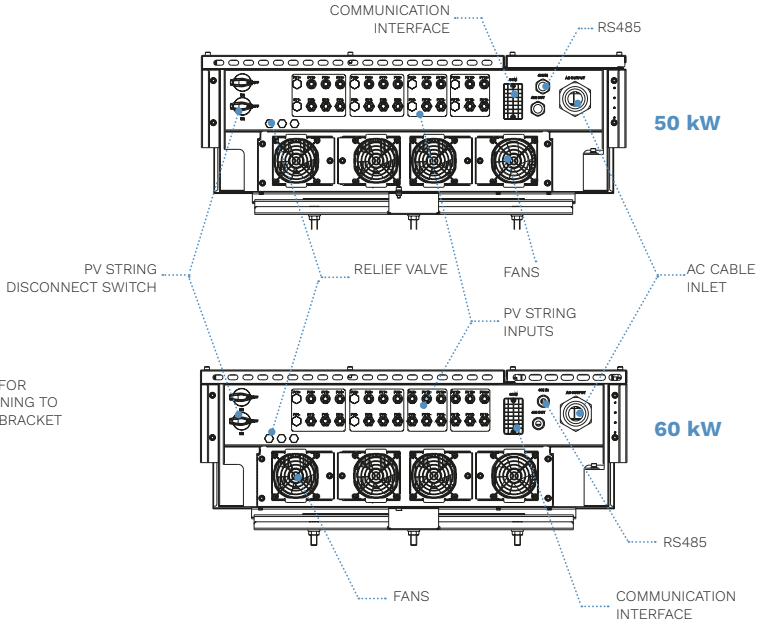
Sirio 50 and 60 kW inverters (display)



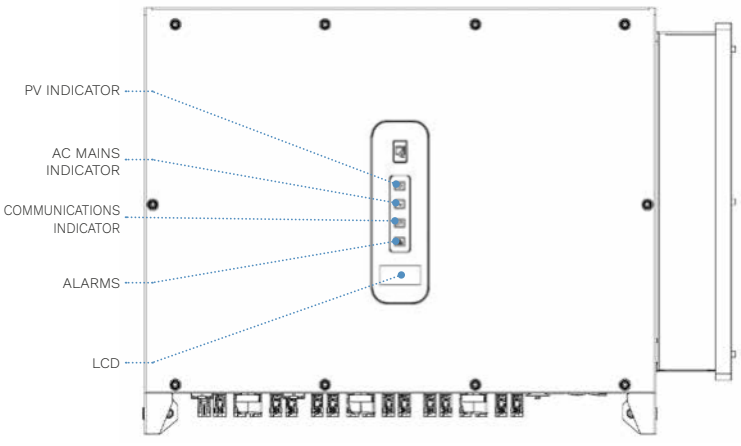
Sirio 50 and 60 kW inverters (back)



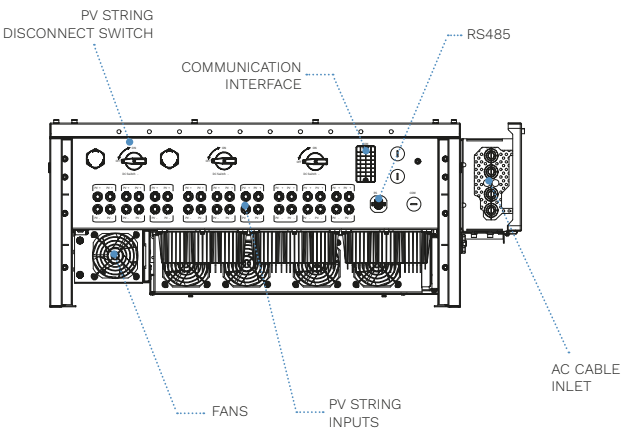
Sirio 50 and 60 kW inverters (from below)



Sirio 100 and 110 kW inverters (front)



Sirio 100 and 110 kW inverters (from below)



Available depending on version.

MODEL	SIRIO ES 50	SIRIO ES 60	SIRIO ES 100	SIRIO ES 110
EFFICIENCY				
Maximum efficiency [%]	98.3		98.4	
European efficiency [%]	98			
INPUT				
Maximum input voltage [V]	1100			
Nominal input voltage [V]	620		600	
Maximum DC power [W]	75000	90000	150000	165000
Maximum input current [A]	2x39 + 2x26	4x39	3x40 + 5x32	3x40 + 6x32
Maximum short circuit current [A]	2x42 + 2x28	4x42	3x50 + 5x45	3x50 + 6x45
Start-up voltage/min op. voltage [V]	250 / 200			
MPPT operating voltage range [V]	200 to 1000			
Op. voltage range (full load) MPPT [V]	200 to 1000		540 to 800	
Maximum number of PV strings	10 (3/3/2/2)	12 (3/3/3/3)	16 (8x2)	18 (9x2)
MPPT number	4		8	9
OUTPUT				
AC active power (nominal) [W]	50000	60000	100000	110000
Maximum apparent AC power [VA]	55000	66000	111000	123000
Active power max. AC (PF = 1) [W]	55000	66000	110000	121000
Max current AC output [A]	3x83	3x92	3x168.8	3x187
Nominal voltage AC [V]	380 / 400, 3W+N+PE		380 / 400 / 415, 3W+N+PE	
AC voltage range [V]	277 - 520 (configurable)			
Nominal mains frequency [Hz]	50 / 60			
Grid frequency range [Hz]	45-55 / 55-65		45-55 / 55-65 (configurable)	
Harmonic Distortion (THDi) [%]	<3 (nominal power)			
Direct current injection [%]	<0.5 In			
Power factor	> 0.99 nominal power (selectable 0.8 inductive – 0.8 capacitive)			
PROTECTIONS				
DC disconnect switch	Supported			
Anti-islanding protection	Supported			
AC overcurrent protection	Supported			
Short circuit protection	Supported			
DC pole inversion control	Supported			
Surge arresters (VDR)	DC type II / AC type II			
Ground fault detection	Supported			
Current leakage protection	Supported			
AFCI	Optional			
PID Recovery	Optional			
Monitoring of photovoltaic strings	Supported			
Nighttime cons. monitoring	Supported			
OVERALL SPECIFICATION				
Type	Transformer-free			
Protection level	IP65		IP66	
Night self-consumption [W]	<1		<10	
Cooling	Cooling with fans at controlled speed			
Operating temperature range [°C]	-25 to 60			
Relative humidity range [%]	0 to 100			
Maximum operating altitude [m]	4000			
Noise level [dB] (@ 1 m)	<62		≤65	
Dimensions (WxDxH) [mm]	855x275x500		936x365x678	
Weight [kg]	73	74	92	
COMMUNICATIONS				
Display	LED / LCD[1]			
Communications	Bluetooth, RS485, Wi-Fi (optional), Ethernet (optional)		Bluetooth, 2xRS485, Wi-Fi (optional), Ethernet (optional)	
Monitoring	APP, Supervisory Portal			
CERTIFICATION				
Safety	IEC62109-I, IEC62109-2			
EMC	EN 61000-6-2/4			
Regulations	CEI 0-21, CEI 0-16, RD 1699, RD 661, UNE 206006 IN, UNE 206007-1 IN, UNE 217001 IN, RD 244		CEI 0-21, CEI 0-16, RD 1699, RD 661, RD 413, UNE 206006 IN, UNE 206007-1 IN, UNE 217002, UNE 217001, RD 244, RD 647	
Warranty	5 years (with possibility of extension)			

[1] *Available depending on version.*

RS Hybrid
SINGLE-PHASE

PHOTOVOLTAIC STORAGE

HIGHLIGHTS

- **Plug & Play installation**
- **Maximum PV power 150% overload**
- **LV lithium iron phosphate batteries**
- **Connect up to 6 battery modules for 30 kWh overall capacity**
- **High discharge rate**
- **Suitable for AC side retrofit**
- **Integrated backup module up to maximum nominal power**
- **IP65**
- **Natural ventilation**
- **Up to 3 units in parallel**

RS Hybrid Single-phase: range of hybrid inverters integrated into an energy storage system for residential applications.
RS Hybrid 3.6 and 6.0 single-phase, teamed with lithium ion battery modules, expand the functionality of an ON-GRID photovoltaic plant whilst at the same time creating a backup with the possibility of dedicating a preferential line to certain loads in the event of a grid failure. With a sleek design and easy Plug & Play installation, the system stores energy in up to 6 5.12 kWh modules installed in parallel, allowing the energy produced by the photovoltaic plant and not self-consumed to be stored for use in the evening hours or during periods of low solar irradiation.
The system is therefore independent of the power supply grid and boosts energy saving.
RS Hybrid single-phase inverters are available in 3.6 and 6.0 kW power and come with DC-side disconnect switches and batteries, category 2 surge arresters for immediate Plug & Play installation (requiring no additional field switchgear), and recharge the batteries themselves.

To ensure maximum configuration flexibility, efficiency optimisation and prolonged energy production, RS Hybrid single-phase inverters are fitted with 2 PV inputs that converge on 2 MPPT trackers. The MPPT trackers are independent and feature self-learning technology with a wide range and input voltage and a low threshold of output to the grid.

Ventilation is natural with a broad, efficient heat sink to ensure maximum heat exchange and low noise.
Finally, the inverters are fitted with an integrated backup module that, in the event of a mains failure, supports the load from the battery until the mains returns (intervention time below 10 ms).
To optimise the backup, a line supporting the full nominal power of the inverter can be set up.
The inverter is simple and intuitive to manage: 6 LEDs on the front signal the operating status and any alarms. There are various ways of communicating with the inverter: Bluetooth, RS485 (ModBus), Wi-Fi and Ethernet (optional): all methods

interface with the configuration app and cloud-based monitoring software for real-time viewing and control of system status.

IP65

RS Hybrid single-phase inverters have an IP65 protection level, making them suitable for outdoor installation.

LITHIUM IRON PHOSPHATE BATTERIES

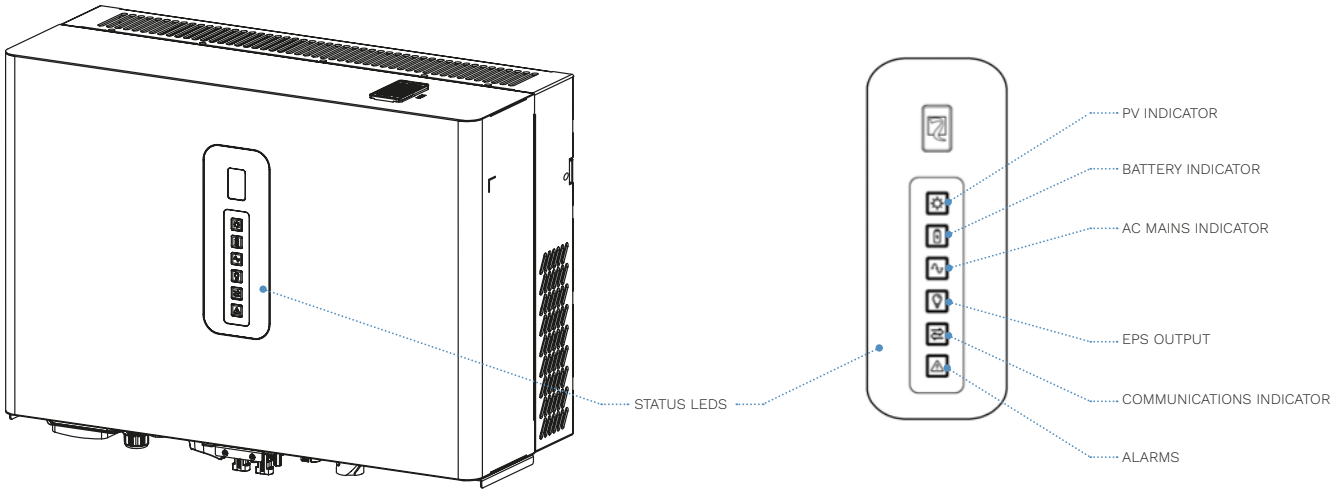
The lithium iron phosphate batteries for the storage system of these inverters are available in low voltage isolated modules (51.2 VDC) for greater safety in residential applications and a capacity of 100 Ah (5120 Wh). The system can manage up to six battery modules connected in parallel and the BMS (Battery Management System) is integrated into each battery module.
This avoids the risk of all storage being out of use in the event of a problem on a single battery module. The BMS also includes overload, overcurrent and over-temperature protection.
The batteries have a high discharge rate and an operating temperature between -20 °C and 55 °C. The entire system is safe and guarantees 100% protection for the end user by detecting possible failures of the cell and/or other components.

OPTIONS

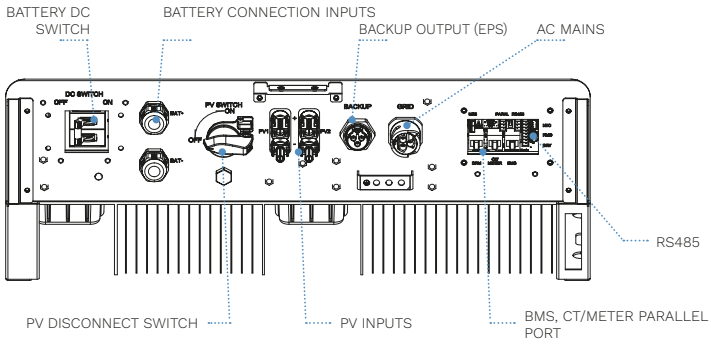
MONITORING
RS Connect/RS Monitoring

ACCESSORIES
Ethernet card
Cables
Shelves

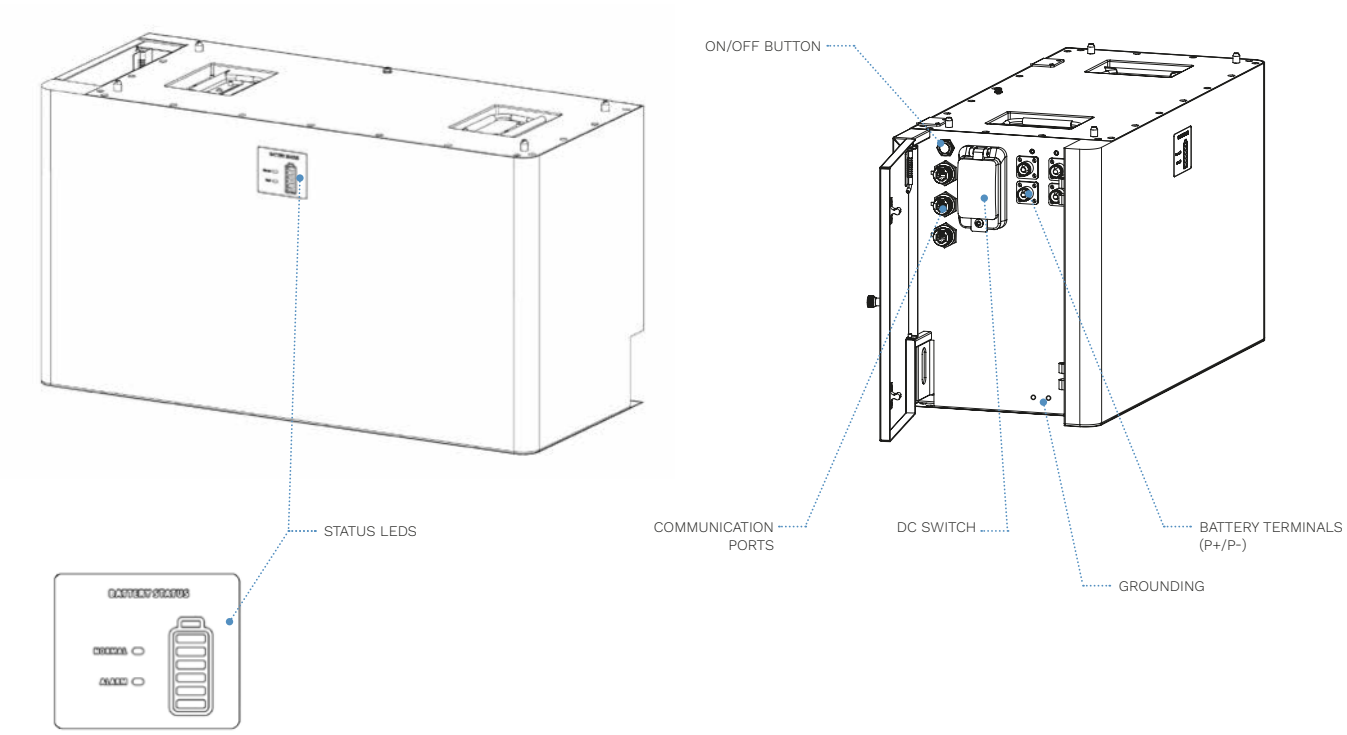
INVERTER MODULE



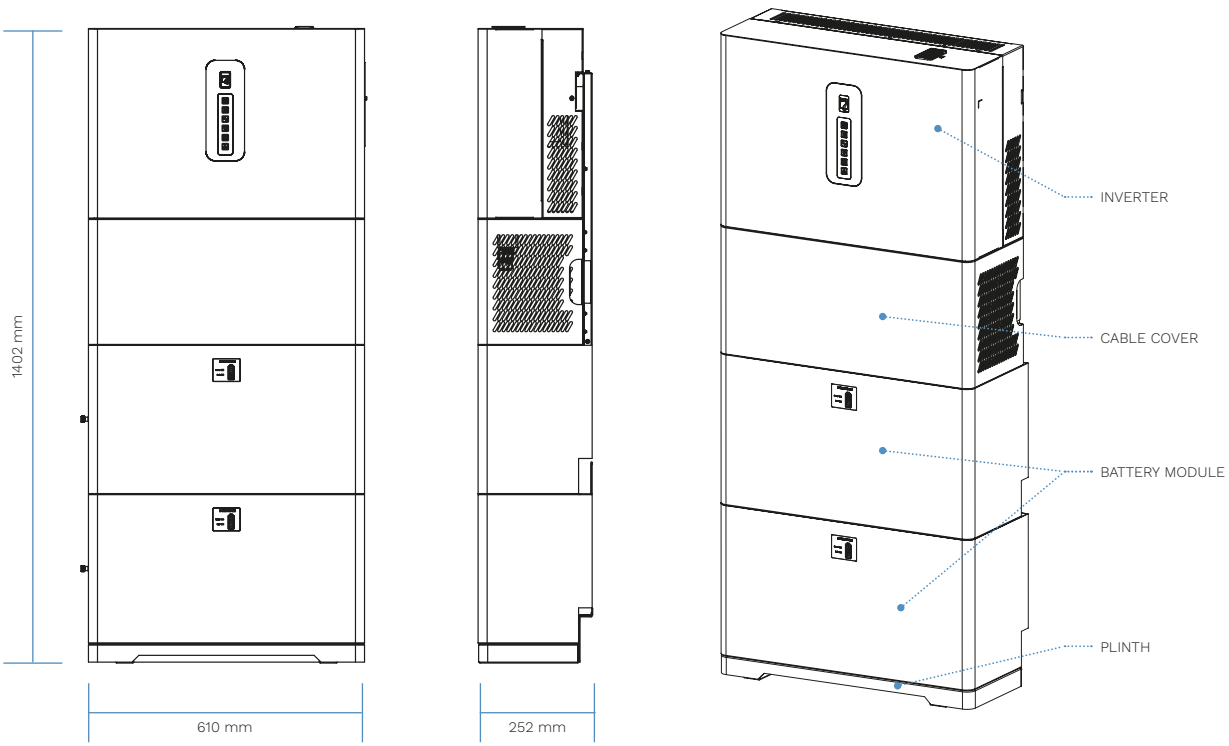
View from below



BATTERY MODULE

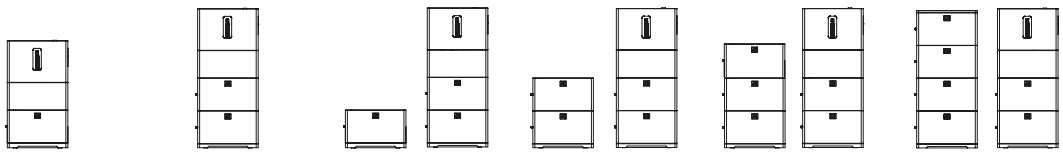


EXAMPLE OF A TYPICAL SYSTEM WITH 2 BATTERIES IN PARALLEL PLUS INVERTER



BATTERY CONFIGURATION

One or more battery modules (RS BATLIO 5120) can be stacked to expand the system's overall capacity. Each battery has its own power supply monitoring module. The system supports up to six battery modules in parallel.



Quantity of batteries [Pcs]	1	2	3	4	5	6

SIDE MOUNTING KIT (optional)

Plinth
Plinth brackets (qty 2)
M6 expansion screws (qty 2)
Feet adjustment tools (spirit level and Allen key)
Communication cable (LINK COM)
Top cover
Alignment pins (qty 4)
Safety screws M4 (qty 6) and M5 (qty 4)
Battery cables (BAT+/BAT-)

WALL MOUNTING KIT (optional)

Wall mounting bracket
Alignment pins (qty 4)
M6 expansion screws (qty 6)

SYSTEM CONFIGURATIONS	1 battery	2 batteries	3 batteries	4 batteries	5 batteries	6 batteries
Inverter type	Hybrid inverter					
Nominal power output [W]	3600 / 6000					
Battery type	LFP (LiFePO4)					
Quantity of batteries [Pcs]	1	2	3	4	5	6
Total battery energy [kWh]	5.12	10.24	15.36	20.48	25.6	30.72
Protection level	IP65					
Weight [kg]	81.2 (3.6) 84.0 (6.0)	131.3 (3.6) 134.1 (6.0)	181.4 (3.6) 184.2 (6.0)	231.5 (3.6) 234.3 (6.0)	281.6 (3.6) 284.4 (6.0)	331.7 (3.6) 334.5 (6.0)
Dimensions (WxDxH) [mm]	610x252x1072	610x252x1402	610x252x1402 610x252x372	610x252x1402 610x252x702	610x252x1402 610x252x1032	610x252x1402 610x252x1362

INVERTER MODULE

MODEL	RS 3.6 HYBRID	RS 6.0 HYBRID
EFFICIENCY		
Maximum efficiency [%] (PV to grid)	95.7	96.6
Max efficiency (AC to BAT) [%]	92.3	92.7
Max efficiency (BAT to AC) [%]	92.6	92.8
Nominal battery voltage [V]	51.2	
Permissible battery voltage range [V]	40 - 60	
Max charge/discharge current [A]	60 / 60	120 / 120
INPUT		
PV maximum input power [W]	9000 (4500 / 4500)	
PV maximum input voltage [V]	550	
PV minimum input voltage [V]	70	
PV nominal input voltage [V]	360	
Maximum input current (input A/input B) [A]	15 / 15	
Maximum short circuit current (input A/input B) [A]	20 / 20	
Initial operating voltage [V]	90	
MPPT operating voltage range [V]	90 to 520	
Number of MPPT trackers	2	
String per MPPT tracker	1	
OUTPUT		
Nominal AC power output [W]	3600	6000
Maximum apparent AC power [VA]	3960	6000
Maximum active AC power (PF=1) [W]	3600	6000
Maximum AC output current [A]	18	27.2
Nominal output voltage [V]	230	
Output voltage range [V]	230 ±5%	
Mains voltage range [V]	176 - 264 (as per local standard)	
Grid nominal frequency [Hz]	50 / 60	
Grid frequency range [Hz]	45-55 / 55-65	
Current harmonic distortion (THDi) [%]	<5 (nominal power)	
Direct current injection [%]	<0.5 In	
Power factor	1 @nominal power (selectable 0.8 inductive – 0.8 capacitive)	
BACK-UP		
Nominal output voltage [V]	230	
Output voltage range [V]	230 ±5%	
Nominal output frequency [Hz]	50 / 60	
Output frequency range [Hz]	50 / 60 (±0.2 %)	
Nominal power output [VA]	3600	6000
Nominal power output [W]	2800 @ 51.2 V battery voltage	5500 @ 51.2 V battery voltage
Nominal output current [A]	15.6	26
DC component output voltage [mV]	≤200	
Output overload capacity [%]	≥105 for 1 s	
Transfer time [ms]	10 (typical), 20 (max)	
THDV	<3% (Rated R Load)	

OVERALL SPECIFICATION		
Type	Transformer-free	
Protection level	IP65	
Overvoltage category battery input	I	
PV input overvoltage category	II	
Overvoltage category AC output	II	
Protection class	I	
Battery overcurrent protection	DC circuit breaker	
Pollution degree	PDIII as per IEC 60664-1 (internal reduced to PDII)	
Cooling	Natural ventilation	
Operating temperature range [°C]	-25 to 60 (up to 40 without derating)	
Storage temperature range [°C]	-30 to 65	
Relative humidity range [%]	0 to 95	
Maximum operating altitude [m]	4000 (up to 2000 without derating)	
Noise level [dB] (@ 1 m)	<30	
Dimensions (WxDxH) [mm]	610x232x458	
Weight [kg]	31.1	33.9
Weight (packed) [kg]	46.5	49.4
Photovoltaic connection	MC4 / H4	
Battery connection	Dedicated DC connector	
AC connection mode (grid and backup)	Dedicated AC connector	
COMMUNICATIONS		
Display	LED	
Communications	Bluetooth / RS485 / Wi-Fi / Ethernet (optional)	
CERTIFICATION		
Regulations	CEI 0-21, UNE 217001, RD 1699, RD 661, RD 413, RD 647, RD 244, UNE 217002, NTS Type A version 2.1	
Safety	IEC / EN 62109-1: 2010; IEC / EN 62109-2: 2011; IEC 62040-1:2017	
EMC	IEC 61000-6-1 / 2 / 4: 2019; IEC 61000-6-3: 2021	

BATTERY MODULE

MODEL	RS BATLIO 5120
Battery type	LFP (LiFePO4)
Nominal battery voltage [V]	51.2
Battery voltage range [V]	44.8 to 58.4
Battery module energy [kWh]	5.12
Max charge/discharge current [A]	100 / 100
Max modules in parallel [Pcs]	6
Operating temperature range for charging [°C]	0 to 45
Operating temperature range for discharging [°C]	-20 to 55
Number of cycles	≥4,000
Dimensions (WxDxH) [mm]	610x252x330
Weight (net) [kg]	50.1
Overcurrent protection	DC circuit breaker
Communication protocol	CAN
Certification	IEC 62619:2017; EN 62619:2017; IEC 61000-6 / 2 / 4:2019; UN 38.3: Rev.7
COMMUNICATIONS	
Display	LED

RS Hybrid
THREE-PHASE

PHOTOVOLTAIC STORAGE

HIGHLIGHTS

- **Plug & Play installation**
- **Self-consumption maximisation**
- **Natural ventilation**
- **Maximum DC power 150% overload**
- **2 MPPT and up to 3 strings**
- **Up to 9 inverters in parallel**
- **Integrated backup module**
- **Remote monitoring via app and WEB PORTAL**
- **Between 3 and 10 batteries can be installed for each inverter, max total capacity 53 kWh**

Riello Solartech's RS Hybrid three-phase storage solution with lithium iron phosphate batteries combines smart management, storage and monitoring of energy produced by photovoltaic plants in a single product.

Every day, **more and more companies are learning that optimising self-consumption is the best energy-saving solution for their business.**
With its RS Hybrid three-phase and LFP batteries (LiFePO4), Riello Solartech offers an ESS (Energy Storage System) designed for the commercial and industrial sector that guarantees a continuous supply of energy.
Storage systems are essential for a photovoltaic plant because they allow energy produced by solar panels to be stored and reused later when it is needed most without taking it from the national grid.
RS Hybrid three-phase inverters cover a power range of 5 kW, 6 kW, 8 kW, 10 kW, 20 kW and 30 kW and are ideal for ESS, but they can also be used on photovoltaic plants without battery storage, which can be installed at a later date. With these inverters, Riello Solartech proposes a design that teams **aesthetics with safety and functionality** of installation and maintenance. These lightweight, compact and versatile inverters can be used to power a three-phase utility from solar panels, batteries, the external grid or a combination of these sources.
These inverters, made using the latest technology, **achieve a European efficiency of 97.4%**.
When used in combination with batteries, they optimise self-consumption by drawing less power from the grid, and at the same time provide economic savings in a short time with an improved degree of autonomy from your grid provider. In terms of **environmental sustainability**, exploiting the system's potential minimises the use of energy from traditional fuels, thereby cutting CO_2 emissions. A practical LED panel combines **multiple and advanced methods of communication**: Integrated Bluetooth, Wi-Fi (integrated), BMS (CAN/RS485), RS485 and Ethernet (optional); CT sensors provided as standard.
The inverter is easy to set up but, at the same time, **advanced management is possible thanks to the Cloud Inverter**

platform. The tools provided by the Riello Solartech cloud platform can effectively reduce costs and simplify maintenance, improving the efficiency of the system as a whole. Up to 9 inverters can be connected in parallel; each inverter can manage up to 10 battery modules with an advanced BMS (Battery Management System).
All configurations are made via an app that can be downloaded free of charge from the Android or Apple stores.

INVERTER FEATURES AND EQUIPMENT

- IP65 protection level, making them suitable for indoor or outdoor installation;
- With a wide **PV operating voltage range 160-950 Vdc**, the new RS Hybrid Three-phase inverters have **2 trackers (MPPT)**; the **5 and 6 kW models accept 2 strings** while the **8, 10, 20 and 30 kW versions can connect to 3 strings**. The entire range allows a **DC overload (PV side) of 150%** and has a **nominal input current of 15 or 20 A (depending on the model);**
- Inverters ready for Smart Grids;
- Can operate in Zero Injection mode;
- Suitable both for new installations, as they allow the photovoltaic plant, batteries and energy consumption to be managed with a single inverter, and for retrofits on existing systems.

BACKUP MANAGEMENT

The **backup function is built into the inverter**: when the grid is not available, the critical load is supported by the inverter (typical intervention time 10 ms).

EASY TO INSTALL AND USE

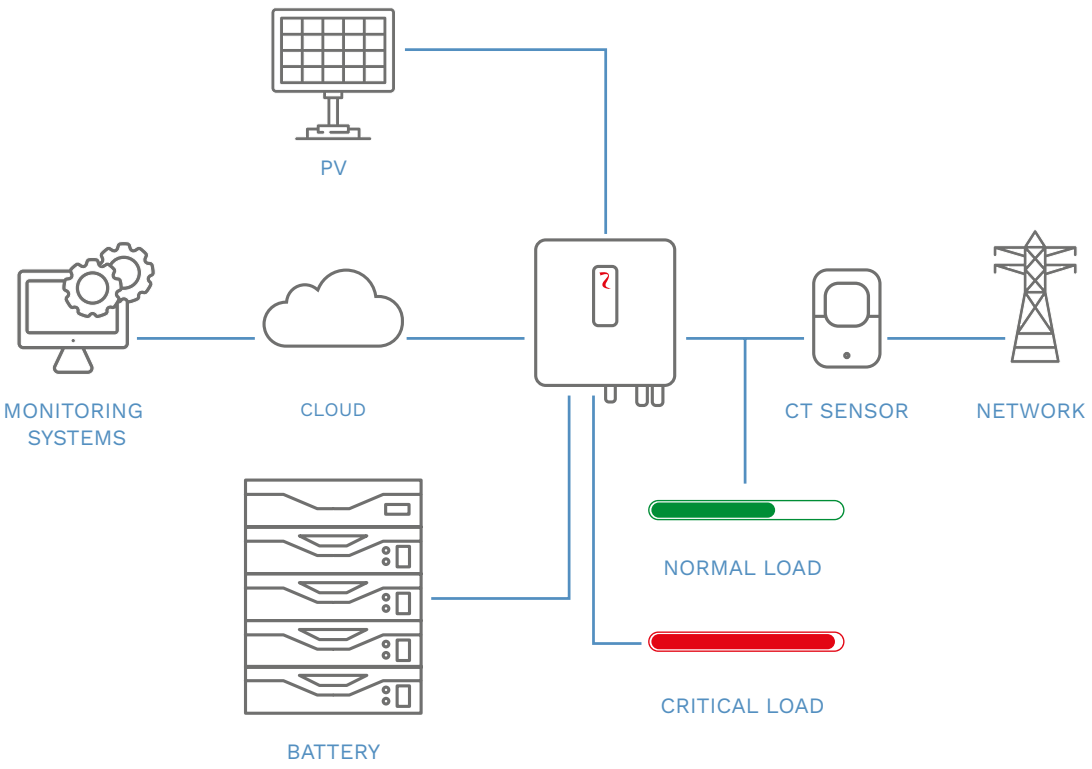
The **inverters in the RS Hybrid three-phase range** combine high power with quick and easy installation.

- Easy, immediate activation and set-up with the app;
- Wall/guide mounting for zero surface wastage and for installation in all conditions, even the most unfavourable;
- No special handling equipment is required as it is supplied in small, lightweight boxes that are easy to carry and handle;
- LED indicators on the front panel instantly display the inverter status.

BATTERIES

With the **RS BATLIO 5300T batteries for RS Hybrid Three-phase inverters**, Riello Solartech offers a comprehensive solution for photovoltaic storage and **optimisation of energy independence.**
Main features:

- 5.3 kWh and 51.2 Vdc batteries;
- User-friendly installation (communications wiring, power connections and battery always included);



Application of Hybrid Inverters.

- Compact dimensions;
- Possibility of ground installation (can be stacked);
- Maximum storage capacity per battery module 5.3 kWh;
- Possibility of increasing storage power by expanding the plant;
- From min 3 to max 10 battery modules can be installed for each inverter, providing an overall capacity of 53 kWh;
- Batteries with LFP technology (Lithium Iron Phosphate);
- Batteries can be monitored via BMS.

Riello Solartech batteries set themselves up automatically, without the need for special and complex manual settings.
LFP technology (Lithium Iron Phosphate) allows optimal use even at high depths of discharge (if and when necessary), enabling optimised energy storage and reuse. Top service life and ease of installation make them advantageous and cost-effective.
Each battery measures 580x474x170 mm (WxDxH) and weighs 51 kg, with nominal power of 5.3 kWh and nominal voltage of 51.2 V. IP20 protection level.
The **batteries require the HV-RS BOX unit** for optimal charging management and coordination of energy to and from the inverter.

RS Batlio 5300T battery.

OPERATING MODES

SELF-CONSUMPTION: in self-consumption mode, the energy produced by the panels is prioritised Load > Battery > Grid; in this case, the energy produced by the photovoltaic prioritises the load, the excess is used to charge the batteries, and finally the remainder is fed into the grid.
GRID INJECTION: in grid injection mode, the energy produced by the panels is prioritised Load > Grid > Battery; in this case, the energy produced in excess of the load request is injected into the grid and the remaining energy is stored in the battery.
TIMED: in this mode, the user can control the charging and discharging of the inverter autonomously.
BACK-UP: in this mode, the energy produced by the panels is prioritised Battery > Load > Grid. The purpose of this mode is to charge the battery quickly, so AC mains charging can also be enabled. In Back-up mode, two types of operation are available: “Charging from grid Prohibited” and “Charging from grid Permitted”.
OFF-GRID: in this mode only critical loads are powered to enable them to keep operating even during a power outage. In Off-Grid mode, the inverter cannot work without the battery.

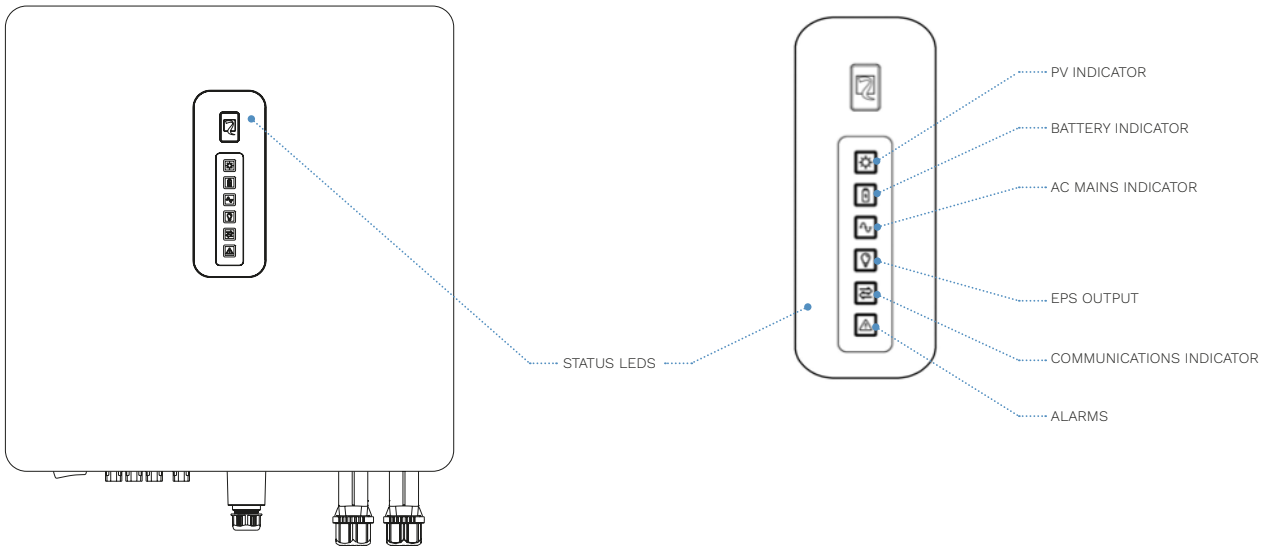
SMART, CONTINUOUS MONITORING

The Cloud Inverter monitoring platform allows users to access their plant’s production data to check it is working correctly and/or to check for alarms or alerts. The user can access from a PC or smartphone using the Riello PV and Cloud Inverter apps, which are free to download from online stores.
Installers can create a single environment for monitoring all installed plants.

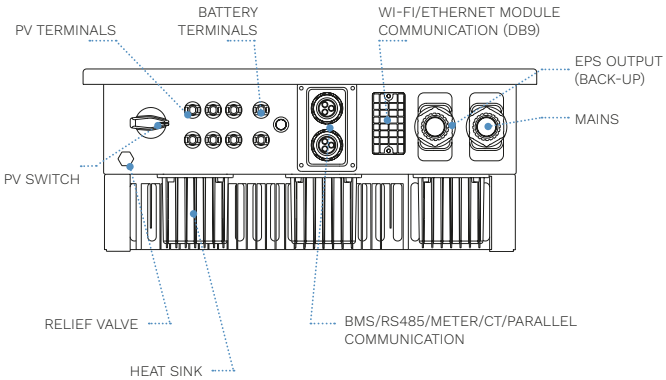
HV-RS BOX

INVERTER DETAILS

Front view

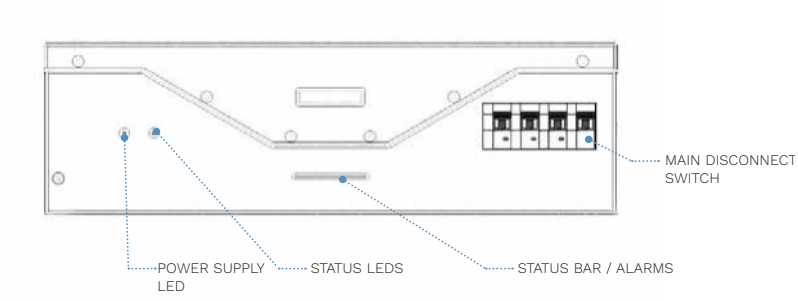


View from below

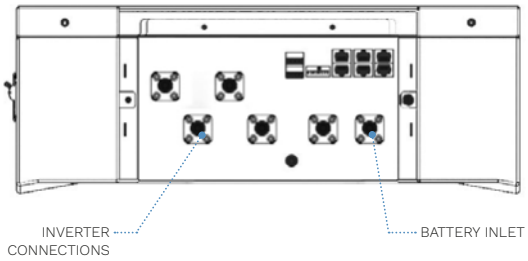


HV-RS BOX DETAILS

Front view

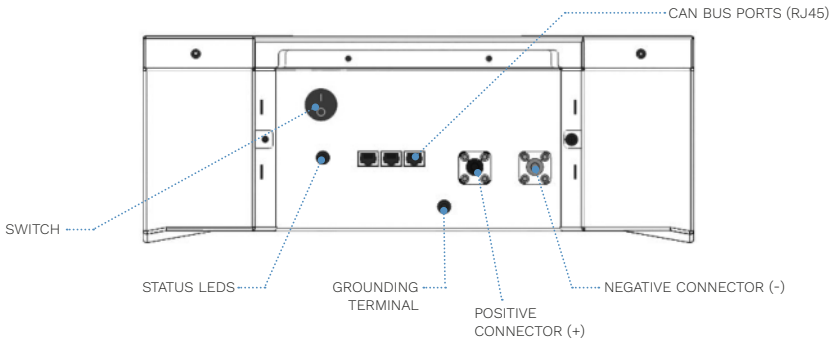


Side view



BATTERY DETAILS

Side view

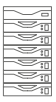
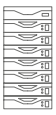
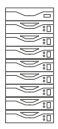
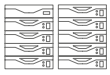
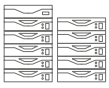


OPTIONS

MONITORING
RS Connect/RS Monitoring

ACCESSORIES
Ethernet card

CONFIGURATIONS

	HV-RS BOX +3 BATTERIES	**HV-RS BOX +4 BATTERIES**	**HV-RS BOX +5 BATTERIES**	**HV-RS BOX +6 BATTERIES**	**HV-RS BOX +7 BATTERIES**	**HV-RS BOX +8 BATTERIES**	**HV-RS BOX +9 BATTERIES**	**HV-RS BOX +10 BATTERIES**
N° battery modules	3	4	5	6	7	8 (max number stackable)	9 (2 towers)	10 (2 towers)
Battery system capacity [kWh]	15.9	21.2	26.5	31.8	37.1	42.4	47.7	53
Recommended voltage [V]	min 136.5 max 175.2	min 182 max 233.6	min 227.5 max 292.4	min 273 max 350.8	min 318.5 max 409.2	min 364 max 467.6	min 409.5 max 526	min 455 max 584.4
Configuration								
Dimensions (WxDxH) [mm]	580x474x730	580x474x900	580x474x1070	580x474x1240	580x474x1410	580x474x1580	580x474x900 + 580x474x900	580x474x900 + 580x474x1070
Weight [kg]	171	222	273	324	375	426	477 (222+255)	528 (273+255)

INVERTER MODEL	5 kW	6 kW	8 kW	10 kW	20 kW	30 kW
EFFICIENCY						
Maximum efficiency [%] (PV to grid)	97.1	97.1	97.4	97.4	97.8	97.8
Maximum charging/discharging efficiency [%]	96.5	96.6	96.8	96.8	98.0 / 97.1	98.5 / 97.4
PV INPUT						
Maximum input voltage [V]	1000					
Maximum DC power [W]	9000		15000		30000	45000
Maximum input current [A]	15 / 15		20 / 30		32 / 32	32 / 32 / 32
Maximum short circuit current [A]	20 / 20		30 / 40		40 / 40	40 / 40 / 40
MPPT operating voltage range [V]	160 to 950					
Maximum number of PV strings	2 (1/1)		3 (1/2)		2 / 2	3 / 3 / 3
MPPT number	2					3
BATTERY INPUT						
Compatible battery type	Lithium ion				Lithium ion / Lead acid	
Nominal battery voltage [V]	250 - 600				512	
Acceptable battery voltage range [V]	130 - 600				120 - 800	
Maximum charge/discharge current [A]	25 / 25		50 / 50		60 / 60	2*75 / 2*75
Maximum charge/discharge power [W]	9000 / 5800	9000 / 7000	15000 / 9300	15000 / 10500	30000 / 24000	45000 / 36000
GRID SIDE OUTPUT (ON-GRID)						
AC active power (nominal) [W]	5000	6000	8000	10000	20000	30000
Maximum apparent AC power [VA]	5500	6600	8800	11000	22000	33000
Active power max. AC (PF = 1) [W]	5500	6600	8800	11000	22000	33000
Max current AC output [A]	3*8.3	3*10	3*13.3	3*16.7	3*33.3	3*50
Nominal voltage AC [V]	380 / 400 / 415V, 3W+N+PE					
Nominal mains frequency [Hz]	50 / 60					
Grid frequency range [Hz]	45-55 / 55-65					
Harmonic Distortion (THDi) [%]	<5 (nominal power)				<3 (nominal power)	
Power factor	> 0.99 nominal power (selectable 0.8 inductive – 0.8 capacitive)					
EPS OUTPUT (Backup)						
AC active power (nominal) [W]	5000	6000	8000	10000	20000	30000
Maximum power [VA]	5500	6600	8800	11000	22000	33000
Maximum power [VA] (10 sec.)	7500	9000	12000	15000	30000	45000
Intervention time [msec.]	10 msec. (typical), 20 msec. (max)					
Nominal voltage AC [V]	380 / 400, 3W+N+PE				380 / 400 / 4/5, 3W+N+PE	
Harmonic Distortion (THDi) [%]	< 3 (R Load), 8 (RCD Load)				< 3 (nominal power)	
PROTECTIONS						
PV disconnect switch	Yes					
Anti-islanding protection	Yes					
AC overcurrent protection	Yes					
AC short circuit protection	Yes					
AC overvoltage protection	Yes					
Surge protection type (SPD)	DC type II / AC type III					
Differential protection (GFCI)	Yes					
Isolation detection (R-ISO)	Yes					
OVERALL SPECIFICATION						
Type	Transformer-free					
Protection level	IP65				IP66	
Cooling	Natural ventilation					Forced with fans
Operating temperature range [°C]	-25 to 60				25 - 60 (> 45 derating)	
Relative humidity range [%]	0 to 100					
Maximum operating altitude [m]	4000 (> 2000 derating)					
Noise level [dB] (@ 1 m)	< 30				≤ 35	≤ 60
Dimensions (WxDxH) [mm]	530x212x550				660x235x596	
Weight [kg]	30		32		45	55
COMMUNICATIONS						
Display	LED					
Communications	Bluetooth / Wi-Fi / BMS (CAN/RS485) / CT Sensors / RS485 / Ethernet (optional) / METER (optional)				CAN/RS485 (for BMS), RS485 (for METER), RS485 (for communication with PC), DRMS, 2*DI (1 for RMO), 3*DO, CT Pack (cable length 10 m) Wi-Fi / Ethernet (optional) / METER (optional)	
Monitoring	APP, Supervisory Portal					

RS BATLIO 5300T BATTERY

ELECTRICAL SPECIFICATIONS	
Battery type	LFP (LiFePO4)
Nominal battery voltage [Vdc]	51.2
Minimum battery voltage [Vdc]	45.5
Maximum battery voltage [Vdc]	58.4
Battery module energy [kWh]	5.3
Battery module capacity [Ah]	105
Usable battery capacity [Ah]	100
Max number batteries in series	10
Maximum charging current [A]	100 (150 for 30 sec.)
Maximum discharging current [A]	100 (150 for 30 sec., 200 for 5 sec.)
SERVICE LIFE CHARACTERISTICS	
Life cycles	>8000 (@ 80% DoD, 25°C)
Depth of discharge (DoD)	Up to 100%
Self-discharge percentage	1% Month (@ STC 25°C) <3% Month (@ STC -10°C/+45°C)
Maximum service life	10 Years (@25°C, regular inspections)
CONNECTION	
HV-RS BOX communication protocol	CAN, RS232 (reserved)
SAFETY	
Functionality	Pre-charge, HV Fuse, Multi firmware management of the BMS, Automatic contactor
CERTIFICATION	
Regulations	EN IEC 61000-6-1:2019, EN IEC 61000-6-2:2019, EN IEC 61000-6-3:2021, EN IEC 61000-6-4:2019 (EMC), IEC 62619 (CB), CE, UN38.3
OVERALL SPECIFICATION	
Weight [kg]	51
Dimensions (WxDxH) [mm]	580x474x170
IP Level	IP20 (indoors only)

HV-RS BOX

MAIN FEATURES	
Operating voltage [Vdc]	80 - 750
Number of inputs	1+1
Maximum input current [A]	100 (50 per duct)
Maximum discharging current [A]	100
Active safety protection [A]	150
Passive safety protection	Fuse 200 A - 750 Vds
Main manual disconnect switch	125 A / 1000 VDC
Temperature range	0 - 45 °C
Storage temperature	-10 °C / +55 °C
Maximum number of batteries	10
Communication protocols	CAN, Wi-Fi, Bluetooth, RS232
Weight [kg]	18
Dimensions (WxDxH) [mm]	580x474x170
IP Level	IP20 (indoors only)
CERTIFICATION	
Regulations	EN IEC 61000-6-1:2019, EN IEC 61000-6-2:2019, EN IEC 61000-6-3:2021, EN IEC 61000-6-4:2019, EN IEC 62368, CE

Sirio Central Inverters

HIGHLIGHTS

- **Low frequency isolation transformer**
- **Full nominal power up to 45°C**
- **Colour LCD touch screen display with datalogger functions**
- **Suitable for operation with modules that require grounding a pole**

Sirio Central three-phase inverters provide a direct connection to the low voltage grid, ensuring their galvanic separation from the direct current plant. The generous dimensions of the transformer and the other components of the inverter provides high conversion efficiency and guarantees one of the highest efficiencies among machines of the same category.

ENERGY AND SAFETY AT THE HIGHEST LEVEL

The Maximum Power Point Tracking (MPPT) algorithm implemented in the control system of Sirio Central inverters enables full use of the photovoltaic generator in any radiation and temperature conditions, making the plant work constantly at maximum efficiency. In the absence of solar radiation, the converter goes on standby and resumes normal operation when there is radiation again. This feature reduces self-consumption to a minimum and maximises energy efficiency. The use of speed-controlled fans helps to optimise the overall efficiency of the inverter. Temperature-linked fan operation also increases the expected lifespan and reduces costs incurred for non-routine maintenance. All these design features, the careful choice of components and guaranteed quality of production according to ISO9001 standards make the Sirio Central three-phase inverters extremely efficient and reliable and guarantees maximum energy production.

THERMAL DERATING

Derating depending on temperature is aimed at safeguarding against overheating inverter semiconductors in environments where the temperature exceeds installation specifications or for forced ventilation faults, without causing a complete shutdown of the inverter itself. Sirio Central models ensure a nominal power output at up to 45°C ambient. If this threshold is exceeded, the inverter gradually decreases the power fed into the network, so as to maintain heat sink temperature within the maximum limit. Once back in the thermal range of normal operation, the inverter restores the optimal working point, again ensuring maximum power transfer.

EASY INSTALLATION AND MAINTENANCE
The overall dimensions are greatly reduced; indeed, it is not necessary to provide for any space at the sides of the equipment for maintenance, since the electronics and the power components have complete front access. Fully automatic operation ensures ease of use and facilitates installation, reducing the likelihood of configuration errors, which could lead to failures or reduced plant productivity.

CUSTOMISED SOLUTIONS
On request, Riello Solartech can supply Sirio Central inverters configured according to the customer's needs.
Available options include the pole/ground connection kit (positive or negative) required for some kinds of photovoltaic modules.

USER INTERFACE
Sirio Central inverters are fitted as standard with a new user interface consisting of a colour LCD touchscreen in a convenient 7" format. The millions of colours and quantity of features greatly enrich the user's experience of interaction with the solar inverter.
Intuitive icons and brief messages in the set language guide users through the simple menu structure, providing them with access to all reference, configuration and inverter control features. In particular, it is possible to view a daily energy production graph and the instantaneous value of power produced, verify module temperatures and the measurements of any installed analogue sensors.
The archive section provides a view and analysis of historical data, cross-checking measurements as desired (no longer two variables at a time). By scrolling a finger along the screen, users can query values recorded on previous days, including in monthly or annual intervals, and the graphs displayed can be sent via e-mail. Internal storage enables the archiving of about 5 years of data (however, if necessary, it is possible to delete previous years by means of a special function). Historical data produced by the inverter and the system card can be saved on a USB flash drive.
The device also enables users to change the €/kWh ratio, adjust display brightness, change the system date and time, assign an identification and label to the plant it belongs to, configure and customise up to 4 external analogue sensors. It also enables the sending of e-mails (the frequency of which can be set) with production data and graphs and, in the case of abnormalities, any malfunction or ignition failure alarms.
Finally, via special counters in the Info section, users can consult data on total produced energy, overall hours of operation, economic return of the plant and other technical parameters, including the amount of memory used for historical data. The graphic interface is available in Italian, English, French, Spanish and German.

NETWORK ACCESS
The touchscreen device offers many communication possibilities when connected to a local network. The inverter is compatible both with the PVSER proprietary protocol on the network and with ModBUS/TCP, thus offering easy addition to any management BMS or data analysis via an Ethernet network.
Moreover, with a freeware program (VNC), users can remotely view the inverter screen or interact with it from their computer or mobile device.

COMMUNICATIONS

DISPLAY
Colour LCD touchscreen
COMMUNICATION INTERFACE
Ethernet, USB, 2xRS232, 2 inputs for remote controls (inverter trip and EPO) and 3 operating status signal relays. Optional RS485 and ModBUS RTU (slot version)
PROTOCOL
ModBUS / TCP

OPTIONS

MONITORING
Sirio Data Control
SunGuard (optional)

ACCESSORIES
RS485
Datalogger Z series
ModCOM PV
Power Reducer Kit

MODEL	SIRIO K64	SIRIO K80	SIRIO K100	SIRIO K200
INPUT				
PV max power (Pmax) [kWp]	80	100	125	250
Recommended PV min power (Pmin) [kWp]	55	70	50	170
Voltage @recommended STC (Vo) [V]	540 - 640			
DC voltage range, MPPT (Vdc) [V]	330 - 700			
Max DC voltage (Vdc, max) [V]	800			
Start-up voltage (Vstart-up) [V]	390			
Max short circuit current (Icc, max) [A]	205	260	320	650
Ripple voltage on modules [%]	<1			
Short circuit inputs (in parallel)	1			
OUTPUT				
Nominal AC power (p.f. =1) (Pca) [kW]	64	80	100	200
Max AC power (Pca 1h) [kW]	71	88	110	220
Nominal voltage (Vac) [V]	400 three-phase (+ / -15%)			
Rated current (Ica) [Aca]	92	115	145	289
Maximum current (Ica) [Aca]	117	146	182	364
Nominal frequency (Fca) [Hz]	50 (+2 / -3)			
Distribution system	TT, TN-S, TN-C			
Mains current harmonic distortion (THDi) [%]	<3 with nominal power			
Power factor (cosϕ) [%]	>0.99 (adjustable ± 0.9)			
Short circuit current contribution (Icc) [A]	175	219	274	434
STANDARDS				
Electromagnetic compatibility	Yes			
EC Conformity	Yes			
ENVIRONMENTAL PROTECTIONS AND CONDITIONS				
Protection level EN60529	IP20			
Environmental category	Indoors, not air conditioned			
Overvoltage category (EN62109)	II (DC) - III (AC)			
Pollution degree	3			
Permissible temp. range (T) [°C]	-10 to 50			
Non-condensing relative humidity range [%]	5 to 95			
Maximum operating altitude [m]	1000			
Air change (with deltaT=5 °C) [m^3/h]	1760	2400	3300	6450
Air flow direction	Suction through base and front. Expulsion from roof			
Maximum dissipated power (P loss) [W - KCal/h]	2866 - 2450	3821 - 3266	5231 - 4471	10598
MECHANICAL				
Weight [kg]	600	650	720	1580
Dimensions (WxDxH) [mm]	800x800x1900			1600x1000x1900

MODEL	SIRIO K64 HV	SIRIO K80 HV	SIRIO K100 HV	SIRIO K200 HV	SIRIO K250 HV
INPUT					
PV max power (Pmax) [kWp]	80	100	125	250	320
Recommended PV min power (Pmin) [kWp]	55	70	80	170	220
Voltage @recommended STC (Vo) [V]	710 - 760				
DC voltage range, MPPT (Vdc) [V]	450 - 760				
Max DC voltage (Vdc, max) [V]	880				
Start-up voltage (Vstart-up) [V]	540				
Max short circuit current (Icc, max) [A]	157	196	245	500	620
Ripple voltage on modules [%]	<1				
Short circuit inputs (in parallel)	1				
OUTPUT					
Nominal AC power (p.f. =1) (Pca) [kW]	64	80	100	200	250
Max AC power (Pca 1h) [kW]	71	88	110	220	250
Nominal voltage (Vac) [V]	400 three-phase (+ / -15%)				
Rated current (Ica) [Aca]	92	115	145	289	361
Maximum current (Ica) [Aca]	117	146	182	364	420
Nominal frequency (Fca) [Hz]	50 (+2 / -3)				
Distribution system	TT, TN-S, TN-C				
Mains current harmonic distortion (THDi) [%]	<3 with nominal power				
Power factor (cosϕ) [%]	>0.99 (adjustable ± 0.9)				
Short circuit current contribution (Icc) [A]	175	219	274	434	542
STANDARDS					
Electromagnetic compatibility	Yes				
EC Conformity	Yes				
ENVIRONMENTAL PROTECTIONS AND CONDITIONS					
Protection level EN60529	IP20				
Environmental category	Indoors, not air conditioned				
Overvoltage category (EN62109)	II (DC) - III (AC)				
Pollution degree	3				
Permissible temp. range (T) [°C]	-10 to 50				
Non-condensing relative humidity range [%]	5 to 95				
Maximum operating altitude [m]	1000				
Air change (with deltaT=5 °C) [m^3/h]	1760	2400	3300	6450	7650
Air flow direction	Suction through base and front. Expulsion from roof				
Maximum dissipated power (P loss) [W - KCal/h]	2866 - 2450	3821 - 3266	5231 - 4471	10598	12359
MECHANICAL					
Weight [kg]	600	650	720	1580	1750
Dimensions (WxDxH) [mm]	800x800x1900			1600x1000x1900	

Sirio Central Inverters
MV

HIGHLIGHTS

- **No isolation transformer**
- **Made for direct connection to LV/MV transformers**
- **High conversion efficiency**
- **Full nominal power up to 45°C**
- **Colour LCD touch screen display with datalogger functions**

To increase overall plant efficiency, Sirio MV three-phase Central Inverters do not include a built-in transformer. This feature and the meticulous design make them ideal for use in medium-high power plants connected to a medium voltage grid.

ENERGY AND SAFETY AT THE HIGHEST LEVEL

The Maximum Power Point Tracking (MPPT) algorithm implemented in the control system of Sirio Central inverters enables full use of the photovoltaic generator in any radiation and temperature conditions, making the plant work constantly at maximum efficiency. In the absence of solar radiation, the converter goes on standby and resumes normal operation when there is radiation again. This feature reduces self-consumption to a minimum and maximises energy efficiency. The use of speed-controlled fans helps to optimise the overall efficiency of the inverter.
To ensure higher standards of safety and fire prevention in case of a internal fault in the converter, the Sirio K330, K500 and K800 units are fitted as standard with a motorised cut-off switch on the DC side with undervoltage protection. Moreover, the presence of 6, 8 and 16 inputs respectively, protected by fuses placed on both poles, ensures the protection of the lines coming from field switchboards; this arrangement allows avoiding secondary level switchboards (DC-Boxes) during the design phase, with consequent cost savings. Temperature-linked fan operation also increases the expected lifespan and reduces costs incurred for non-routine maintenance.
All these design features, the careful choice of components and guaranteed quality of production according to ISO9001 standards make the Sirio Central three-phase inverters extremely efficient and reliable and guarantees maximum energy production.

THERMAL DERATING

Derating depending on temperature is aimed at safeguarding against overheating inverter semiconductors in environments where the temperature exceeds installation specifications or for forced ventilation faults, without causing a complete shutdown of the inverter itself.

Sirio Central models ensure a nominal power output at up to 45°C ambient. If this threshold is exceeded, the inverter gradually decreases the power fed into the network, so as to maintain heat sink temperature within the maximum limit.
Once back in the thermal range of normal operation, the inverter restores the optimal working point, again ensuring maximum power transfer.

USER INTERFACE
Sirio Central inverters are fitted as standard with a new user interface consisting of a colour LCD touchscreen in a convenient 7" format. The millions of colours and quantity of features greatly enrich the user's experience of interaction with the solar inverter.

EASY INSTALLATION AND MAINTENANCE
The greatly reduced overall dimensions for this power class mean it is not necessary to provide for any space at the side or back of the equipment for maintenance, since the electronics and the power components have complete front access.
Fully automatic operation ensures ease of use and facilitates installation, thus avoiding installation and configuration errors, which could lead to failures or reduced productivity of the plant.

CUSTOMISED SOLUTIONS
On request, Riello Solartech can supply Sirio Central inverters configured according to the customer's needs. Available options include the pole/ground connection kit (positive or negative) required for some kinds of photovoltaic modules.

COMMUNICATIONS

DISPLAY
Colour LCD touchscreen
COMMUNICATION INTERFACE
Ethernet, USB, 2xRS232, 2 inputs for remote controls (inverter trip and EPO) and 3 operating status signal relays. Optional RS485 and ModBUS RTU (slot version)
PROTOCOL
ModBUS / TCP

OPTIONS

MONITORING
Sirio Data Control
SunGuard (optional)

ACCESSORIES
RS485
Datalogger Z series
ModCOM PV
Power Reducer Kit

MODEL	SIRIO K64 HV-MT	SIRIO K80 HV-MT	SIRIO K100 HV-MT	SIRIO K200 HV-MT	SIRIO K250 HV-MT
Nominal power [kW]	64	80	100	200	250
INPUT					
PV max power (Pmax) [kWp]	80	100	125	230	290
Recommended PV minimum power (Pmin) [kWp]	50	64	80	160	200
Voltage @recommended STC (Vo) [V]	710 - 760				
DC voltage range, MPPT (Vdc) [V]	450 - 760				
Max DC voltage (Vdc, max) [V]	880				
Start-up voltage (Vstart-up) [V]	540				
Max short circuit current (Icc, max) [A]	157	196	245	471	590
Ripple voltage on modules [%]	<1				
Short circuit inputs	1				
OUTPUT					
Nominal AC power (p.f. =1) (Pca) [kW]	64	80	100	200	250
Nominal voltage (Vac) [V]	270 three-phase (+/- 15%)				
Rated current (Ica) [Aca]	137	171	214	428	535
Maximum current (Ica) [Aca]	178	221	277	475	630
Nominal frequency (Fca) [Hz]	50 (+2 / -3)				
Distribution system	IT				
Mains current harmonic distortion (THDi) [%]	<3 with nominal power				
Power factor (cosϕ) [%]	>0.99 (adjustable ± 0.9)				
Short circuit current contribution (Icc) [A]	267	331	415	813	945
STANDARDS					
Electromagnetic compatibility	Yes				
EC Conformity	Yes				
ENVIRONMENTAL PROTECTIONS AND CONDITIONS					
Protection level EN60529	IP20				
Environmental category	Indoors, not air conditioned				
Overvoltage category (EN62109)	III (DC) - III (AC)				
Pollution degree	3				
Permissible temperature range (T) [°C]	-20 to 50				
Maximum operating altitude [m]	1000				
Air change (with deltaT=5 °C) [m^3/h]	1020	1271	1600	3180	4750
Air flow direction	Suction through base and front. Expulsion from roof				
Maximum dissipated power (overload) (P loss) [W - KCal/h]	1641 - 1402	2051 - 1752	2564 - 2190	5128 - 4381	6410 - 5477
MECHANICAL					
Weight [kg]	380	400	420	1000	1050
Dimensions (WxDxH) [mm]	800x800x1900			1600x1000x1900	

MODEL	SIRIO K330 HV-MT	SIRIO K500 HV-MT	SIRIO K330 HHV-MT	SIRIO K500 HHV-MT	SIRIO K800 HHV-MT
Nominal power [kW]	330	500	330	500	800
INPUT					
PV max power (Pmax) [kWp]	380	570	380	570	880
Recommended PV minimum power (Pmin) [kWp]	260	400	260	400	500
Voltage @recommended STC (Vo) [V]	710 - 760		780 - 880		
DC voltage range, MPPT (Vdc) [V]	450 - 760		530 - 820		
Max DC voltage (Vdc, max) [V]	1000				
Start-up voltage (Vstart-up) [V]	540		600		
Max short circuit current (Icc, max) [A]	780	1180	660	1000	1600
Ripple voltage on modules [%]	<1				
Short circuit inputs	6 x 140 A (OPT)	8 x 140 A (OPT)	6 x 140 A (OPT)	8 x 140 A (OPT)	1 (optional up to 20 x 160 A with fuses)
OUTPUT					
Nominal AC power (p.f. =1) (Pca) [kW]	330	500	330	500	800
Nominal voltage (Vac) [V]	270 three-phase (+/- 15%)		320 three-phase (+/- 15%)		
Rated current (Ica) [Aca]	706	1070	600	905	1450
Maximum current (Ica) [Aca]	830	1260	706	1065	1600
Nominal frequency (Fca) [Hz]	50 (+2 / -3)				
Distribution system	IT				
Mains current harmonic distortion (THDi) [%]	<3 with nominal power				
Power factor (cosϕ) [%]	>0.99 (adjustable ± 0.9)				
Short circuit current contribution (Icc) [A]	1250	1890	900	1600	2175
STANDARDS					
Electromagnetic compatibility	Yes				
EC Conformity	Yes				
ENVIRONMENTAL PROTECTIONS AND CONDITIONS					
Protection level EN60529	IP20				
Environmental category	Indoors, not air conditioned				
Overvoltage category (EN62109)	III (DC) - III (AC)				
Pollution degree	3				
Permissible temperature range (T) [°C]	-20 to 50				
Maximum operating altitude [m]	1000				
Air change (with deltaT=5 °C) [m^3/h]	6200	9500	5240	7940	12700
Air flow direction	Suction through base and front. Expulsion from roof				
Maximum dissipated power (overload) (P loss) [W - KCal/h]	8460 - 7230	12820 - 10954	6600 - 7725	10000 - 11700	16000 - 18725
MECHANICAL					
Weight [kg]	1250	1320	1000	1400	1380 + 200 (DC BOX)
Dimensions (WxDxH) [mm]	1500x1000x1900				1500x1000x1900 + 600x1000x1900 DC BOX

SCS

HIGHLIGHTS

- **Complete, safe and high-performance Plug & Play solution**
- **No air conditioning system required**
- **AC transformer station with measurement**
- **Possibility of masonry or shelter construction**

Increase the overall efficiency of the conversion system and cut installation costs. This objective can be achieved by using a Sirio Central Station (SCS) system with Sirio Central MV inverters connected to a high-efficiency medium-voltage transformer and installed in concrete stations to prolong their useful life, improve thermal insulation and to provide resistance to atmospheric agents and the most unfavourable environmental conditions.

THE COMPLETE SYSTEM FOR LARGE PLANTS

Sirio Central Station solutions are available in versions ranging from 200 kW to 1 MW, offering a complete, safe and high-performance Plug & Play solution. The modular system, which uses inverters housed in separate stations, each with its own MV/LV transformer, provides the inverters with a barycentric position within the photovoltaic field, to optimise installation.

The logic of having separate stations cuts production losses caused by failures and during routine and non-routine maintenance operations. The stations are made of vibrated reinforced concrete, in accordance with current CEI 0-16 standards. The structures are particularly resistant to atmospheric agents since they are treated with special plastic and waterproofing coatings, which protect against the formation of cracks and seepages.

The external walls are coated with a quartz/rubber paint with a textured finish, to provide optimal resistance to atmospheric agents, even in marine, mountain, industrial or highly polluted environments.

The normal operating conditions of the installed equipment are guaranteed by a natural ventilation system using air vents, thus avoiding recourse to air conditioning systems.
The whole structure is assembled entirely using electromechanical equipment in the factory in accordance with the IEC EN 62271-202 standard, and electrical equipment where applicable, ready to be placed on site for subsequent start-up.

OPTIONAL SOLUTIONS

Riello Solartech can also offer pre-assembled solutions for:

- user stations with interface and general device protection in compliance with CEI 0-16 requirements;
- public utility cabins implemented in compliance with ENEL unification standards DG 2092 Rev.2 with the measurement unit where the electricity distribution utility takes its readings;
- intermediate configurations from 200 kW are available in addition to the versions present in the catalogue;
- shelter constructions.

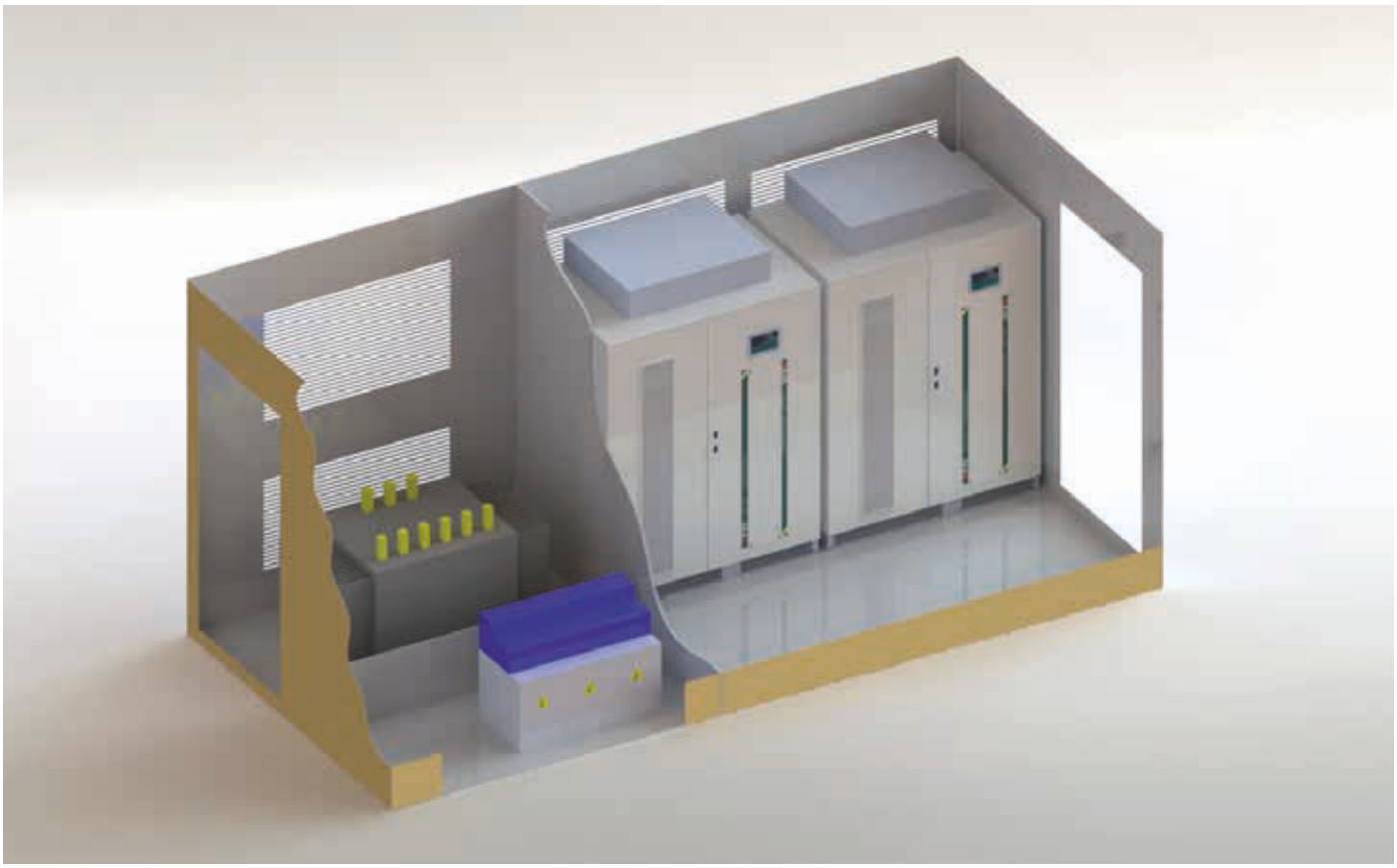
PRACTICAL AND COMPLETE

The SCS solutions can be defined as "All-in-One", as they tend to reduce the normal design phases, cut transport and installation times and come already equipped with everything needed for system start-up.
The significantly lower costs, the excellent efficiency of the whole system (due to the inverters and transformers used) and the time saving in the start-up phase make the Sirio Central Station an attractive choice to optimise return on investment.

OPTIONS

MONITORING
Sirio Data Control
SunGuard (optional)

ACCESSORIES
RS485
Datalogger Z series
ModCOM PV
Power Reducer Kit



MODEL	SCS 500	SCS 660	SCS 1000
Alternating current nominal power [kVA]	500	660	1000
Alternating current maximum power [kW]	500 (cosφ=1)	660 (cosϕ=1)	1000 (cosϕ=1)
INPUT			
Max. DC voltage in an open circuit [V DC]		1000	
MPPT at full rating range [V DC]		530 to 820	
Maximum input current [A DC]	2x590	2x780	2x1180
Number of inputs	2	16	16
MPPT number	2	2	2
DC connectors		Bar	
OUTPUT			
Operating voltage [kV]		20 [1]	
Frequency range [Hz]		47.5 to 51.5 [(2)]	
Settable frequency range [Hz]		47 to 53	
Nominal current (at 20 kV) [A AC]	14.45	19	28.90
Harmonic Distortion (THDi) [%]		<3	
Power factor		from 0.9 inductive to 0.9 capacitive [(2)]	
SYSTEM			
Maximum efficiency [%]		97.3 (including inverter auxiliaries and LV/MV transformer)	
European efficiency [%]		96.7 (including inverter auxiliaries and LV/MV transformer)	
Operating temperature [°C]		-20 to 45 (without derating)	
Humidity [%]		0 to 95 non-condensing	
CABIN FEATURES			
Materials		Mono-block structure with reinforced concrete, class Rck-250 kg/cm$_2$, with added superfluidifying and waterproofing agents	
Structure		Comprising electric welded mesh and iron rod reinforcement, with improved adherence, both in Feb44k	
Walls		Water-resistant plastic plasters painted with quartz/ rubber paint with a textured finish	
Cooling		Natural ventilation through metal ducting	
Dimensions (WxDxH) [mm]		5440x2500x2550	
Weight [kg]		22000	
Lighting		Fluorescent lamps 2x18 W of which 1x18 W in an emergency for each prefabricated structure	
Standard equipment		2 ENEL-approved meters, GSM remote reading system, fire extinguisher	
Regulations		CEI 0-16	
TRANSFORMER FEATURES			
Construction		Resin or oil bath seal	
Primary nominal power	500 kVA	1 MVA	1 MVA
Secondary nominal power [kVA]	2x250	2x500	2x500
IN/OUT voltage [V]		2x (270) / 20000[1]	

[1] The MV level can vary depending on Utility Administrator requirements.
[2] These values may vary according to the regulations of the country of installation.

Hybrid Battery Storage

Lithium compatible

SmartGrid ready

HIGHLIGHTS

- **Compatible with ON-GRID and OFF-GRID solutions**
- **Hybrid energy storage system: grid + renewable**
- **Quality power with integrated renewable sources**
- **Peak shaving and load management**
- **Grid services**
- **UPS Protection**
- **Eco-sustainable**

Global energy needs, consumption and prices are on the rise and we can no longer take for granted that a continuous supply of electricity will be guaranteed to meet all these needs. After years of research and decades of experience in power quality and battery solutions, **the Riello Solartech Hybrid Battery Storage (HBS) range for hybrid storage solutions is finally available. HBS is a "Made in Italy" multifunctional and highly flexible energy storage system (ESS) + UPS.**
In combination with the use of renewable energy (e.g. PV inverters), every kWh produced by these sources will be fully used (100%) to power the connected load, the batteries or to provide services to the grid (if necessary, the green energy produced may not be fed back into the local grid). With this range of solutions, Riello Solartech helps reduce energy production from fossil fuel or nuclear power plants and, consequently, CO_2 emissions. HBS can be used for decentralised grid applications. HBS can store any type of excess green energy for use when energy is underproduced. There is no need to add extra electrical lines because HBS uses existing infrastructure, thus avoiding further capital expenditure. Self-generating energy protects the user from fluctuating electricity costs: this smart solution works with different energy prices per kW and also allows the user to analyse prices and choose the cheapest tariff for the times when electricity needs to be purchased.
The UPS technology built into the HBS offers maximum protection against power outages: if a failure occurs, the batteries guarantee a backup period ranging from many minutes to several hours.
The rising number of electric vehicles in circulation also increases the demand for energy. The current electrical grid is not entirely suitable for meeting this requirement: HBS offers the unique advantage of being able to meet the enormous demand for energy by drawing on renewable sources (PV, wind) alongside the batteries and the grid. Everything is easy to manage with HBS's open-source controller through a simple internet connection. The return on investment guaranteed by HBS varies between 2 and 10 years, depending on parameters (PV installation, type of batteries, price per kWh,

UPS power, country of installation, energy profile). The examples set out here are just some of the many solutions the HBS series can offer.

HYBRID STORAGE OPERATING PRINCIPLE

Hybrid storage optimises the concept of energy management: it can receive energy from several sources and transfer or return it to the target application, including grid services. Riello Solartech's hybrid storage is the first to support Smart Grids.

HYBRID STORAGE APPLICATIONS

HBS devices can be installed both in places connected to the grid and in geographically remote, rural and isolated areas with a high energy demand but unreliable grid power or power supplied via generator sets. They are therefore ideal in cases where energy needs to be stored, preferably from renewable sources such as the sun. Let's look at a few examples in detail:

Areas connected to the grid and capable of feeding into the grid (ON-GRID)

The system uses its batteries to optimise the self-consumption of photovoltaic energy and only supplies the grid power that is not used to power the load or charge the battery.

ADVANTAGES:

- meets peak current requirements by using energy from the battery and not from the grid;
- uses the energy produced when the distribution grid tariffs are more expensive;
- feeds energy into the grid when tariffs are more convenient;
- optimises periods of self-consumption, thus reducing the plant's total cost of ownership (TCO).

Areas connected to the grid but not capable of feeding into the grid (ON-GRID)

In areas where energy cannot be fed into the grid, it is possible to use all the photovoltaic energy produced to power the load and charge the battery. This system uses its batteries to optimise the self-consumption of photovoltaic energy.

ADVANTAGES:

- meets peak current requirements by using energy from the battery and not from the grid;
- increases the amount of renewable energy self-consumption;
- reduces the plant's TCO.

Areas not connected to the grid (OFF-GRID)

Using photovoltaic energy, this system supplies electrical current to places where it is normally produced by generators.

ADVANTAGES:

- meets peak current requirements by using energy from the battery and not from generators;
- minimises the use of generators;
- reduces fuel consumption and, therefore, running costs;
- reduces the expense and inconvenience of transporting fuel to remote areas.

OPTIONS

MONITORING
Sirio Data Control

ACCESSORIES
NETMAN 208
MULTICOM 302
Relay card
ENERGYMANAGER

PRODUCT ACCESSORIES
DC filter
MBB 125 A
MBB 400 A
MULTIPANEL
Cold Start (HBS HE only)

MODELS	HBS 10	HBS 15	HBS 20	HBS 30	HBS 40	HBS 60	HBS 80
INPUT							
Nominal voltage [V]	400 three-phase						
Voltage tolerance [V]	+20% -25% at full load[1]						
Frequency [Hz]	45 - 65						
Soft start	0 - 100% in 120 sec (selectable)						
Permissible frequency tolerance [%]	±2 (selectable from ±1 to ±5 from front panel)						
Standard equipment	Back-feed protection; removable bypass line						
OUTPUT							
Nominal power [kVA]	10	15	20	30	40	60	80
Active power [kW]	9	13.5	18	27	36	54	72
Number of phases	3 + N						
Nominal voltage [V]	400 three-phase + N						
Static stability [%]	±1						
Dynamic stability [%]	±5 in 10 msec.						
Voltage distortion [%]	<1 with linear load / <3 with non-linear load						
Crest factor [lpeak/lrms]	3:1						
Battery frequency stability [%]	0.05						
Frequency [Hz]	50 or 60 (selectable)						
Overload [%]	110 for 60 min.; 125 for 10 min.; 150 for 1 min.						
BATTERIES							
Type	VRLA AGM / GEL; NiCd; Supercap; lithium ion						
Residual ripple voltage [%]	<1						
Maximum charging current from AC input without output load [A]	24	36	48	72	96	144	192
Maximum charging current from HBS output (photovoltaic inverter) [A]	24	36	48	72	96	144	192
OVERALL SPECIFICATIONS							
Weight [kg]	228	241	256	315	335	460	520
Dimensions (WxDxH) [mm]	555x740x1400					800x740x1400	
Remote signals	Volt-free contacts						
Remote commands	ESD and bypass						
Communications	Dual RS232 + volt-free contacts + 2 slots for communication interface						
Ambient temperature [°C]	0 to +40						
Relative humidity range [%]	From 5 to 95 non-condensing						
Colour	RAL 7016						
Noise level at 1 m (ECO mode) [dBA]	62						
IP class	IP20 (other available on request)						
Regulations	European Directives: L V 2014/35/EU Low Voltage Directive EMC 2014/30/EU Electromagnetic Compatibility Directive Standard: Safety IEC EN 62040-1; EMC IEC EN 62040-2; compliance with RoHS directive Classification according to IEC 62040-3 (Voltage Frequency Independent) VFI - SS - 111						
Classification according to EN 62040-3	(Voltage Frequency Independent) VFI - SS - 111						
HBS Management	Forklift						

[1] *Additional conditions apply to larger tolerances.*

MODELS	HBS HE 100	HBS HE 120	HBS HE 160	HBS HE 200	HBS HE 250	HBS HE 300	HBS HE 400	HBS HE 500	HBS HE 600	HBS HE 800
INPUT										
Nominal voltage [V]	400 three-phase									
Voltage tolerance [V]	+20% -25% at full load[1]									
Frequency [Hz]	45 - 65									
Power factor	>0.99									
Current harmonic distortion (THDi)	<3%									
Soft start	0 - 100% in 120 sec (selectable)									
Frequency tolerance [%]	±2 (selectable from ±1 to ±5 from front panel)									
Standard equipment	Back-feed protection; removable bypass line									
OUTPUT										
Nominal power [kVA]	100	120	160	200	250	300	400	500	600	800
Active power [kW]	100	120	160	200	250	300	400	500	600	800
Number of phases	3 + N									
Nominal voltage [V]	380 / 400 / 415 three-phase + N (selectable)									
Static stability [%]	±1									
Dynamic stability [%]	±5 in 10 msec.									
Voltage distortion [%]	<1 with linear load / <3 with non-linear load									
Crest factor [lpeak/lrms]	3:1									
Battery frequency stability [%]	0.05									
Frequency [Hz]	50 or 60 (selectable)									
Overload [%]	110 for 60 min.; 125 for 10 min.; 150 for 1 min.									
BATTERIES										
Type	VRLA AGM / GEL; NiCd; Supercap; lithium ion									
Ripple current	Zero									
Maximum charging current from AC input without output load [A]	175	210	280	350	435	525	700	875	1050	1400
Maximum charging current from HBS output (photovoltaic inverter) [A]	175	210	280	350	435	525	700	875	1050	1400
OVERALL SPECIFICATIONS										
Weight [kg]	850	850	1015	1070	1300	1680	2050	3026	3080	4004
Dimensions (WxDxH) [mm]	800x850x1900		1000x850x1900			1500x1000x1900		2100x1000x1900		3200x 1000x 1900
Remote signals	Volt-free contacts (configurable)									
Remote commands	ESD and bypass (configurable)									
Communications	Dual RS232 + remote contacts + 2 slots for communication interface									
Ambient temperature [°C]	0 to +40									
Relative humidity range [%]	From 5 to 95 non-condensing									
Colour	RAL 7035									
Noise level (at 1 m) [dBA]	65		68			72				
Protection level	IP20 (others available on request)									
Input/Output										
Regulations	Safety: EN 62040-1 (Directive 2006/95/EC); EMC: EN 62040-2 (Directive 2004/108/EC)									
Classification according to IEC 62040-3	(Voltage Frequency Independent) VFI - SS - 111									

[1] *Additional conditions apply to larger tolerances.*

MONITORING AND CONFIGURATION SOLUTIONS

CONTROL YOUR PLANT ANY TIME, WHEREVER YOU ARE

With its **RS, Sirio ES and RS Hybrid range** of inverters, Riello Solartech guarantees flexible, comprehensive solutions, offering its customers timely monitoring of production and PV performance and inverter status. Whether via cloud and app, from a PC, smartphone or tablet (Android/iOS operation systems), with the **RS Monitoring supervision WEB portal** or the **RS Connect and RS Monitoring apps**, you will have access to smart inverter and PV plant management, with the possibility of monitoring and configuring everything locally and/or remotely.
Riello Solartech string and hybrid inverters offer different communication options for connection to monitoring platforms:

Model	Mode of connection to WEB portal	Remote Monitoring		Local Configuration	Communications
		WEB portal	APP	APP	
		RS Monitoring	RS Monitoring 2.0	RS Connect	
RS single-phase	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 (for RS Datalogger) SLOT expansion (DB9) Wi-Fi (occupies the SLOT) Ethernet optional and alternative to Wi-Fi
	With RS Datalogger				
RS three-phase	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 (for RS Datalogger) SLOT expansion (DB9) Wi-Fi (occupies the SLOT) Ethernet optional and alternative to Wi-Fi
	With RS Datalogger				
Sirio ES 50-60 kW	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 (for RS Datalogger) SLOT expansion (DB9)
	With RS Datalogger	√	√		
Sirio ES 100-110 kW	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 (for RS Datalogger) SLOT expansion (DB9) Wi-Fi and Ethernet optional
	With RS Datalogger				
RS HYBRID Single-phase	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 / SLOT expansion (DB9) Wi-Fi (occupies the SLOT) Ethernet optional and alternative to Wi-Fi
	With RS Datalogger	No	No		
RS HYBRID Three-phase	Direct*	√	√	√	Bluetooth (for local inverter configuration) RS485 / SLOT expansion (DB9) Wi-Fi (occupies the SLOT) Ethernet optional and alternative to Wi-Fi
	With RS Datalogger	No	No		

** With Wi-Fi module or Ethernet module.*

ETHERNET COMMUNICATION CARD

Simple Plug & Play installation for quick, convenient configuration.

WI-FI COMMUNICATION CARD

Simple Plug & Play installation for quick, convenient configuration. Internet monitoring with phone or tablet.

RS Datalogger

ACCESSORY

Riello Solartech's **string inverters can be monitored via an RS Datalogger** connected to a Wi-Fi network on site or through Ethernet cable to a modem.

- **Simple Plug & Play installation;**
- **Easy access and flexible configuration.**

RS Datalogger provides a simple and cost-effective solution to achieve the following objectives:

- full monitoring of all parameters of the inverters in a plant.
- monitoring the inverters of a plant with the function of a power limiter (a digital multimeter is required for the power limiter application).

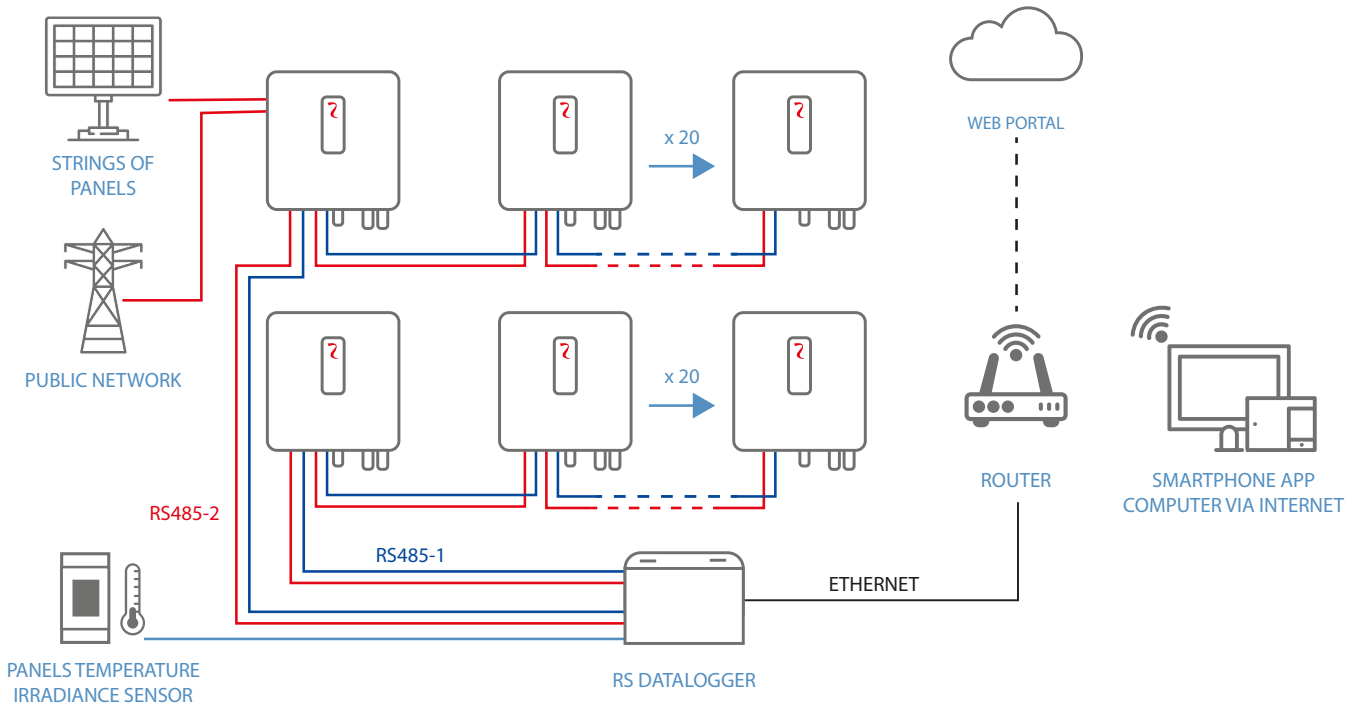
RS Datalogger is equipped with **two RS485-1 and RS485-2 communication ports** and up to 20 inverters can be connected to **each port**. An external sensor can also be connected to the system to measure the radiation and external temperature of the panels.
The RS485-2 port must generally be configured in "Inverter" mode.

DEFAULT CONFIGURATION
Once the RS Datalogger is installed for monitoring or power limiting, with no further changes to its default settings, it can be used to:

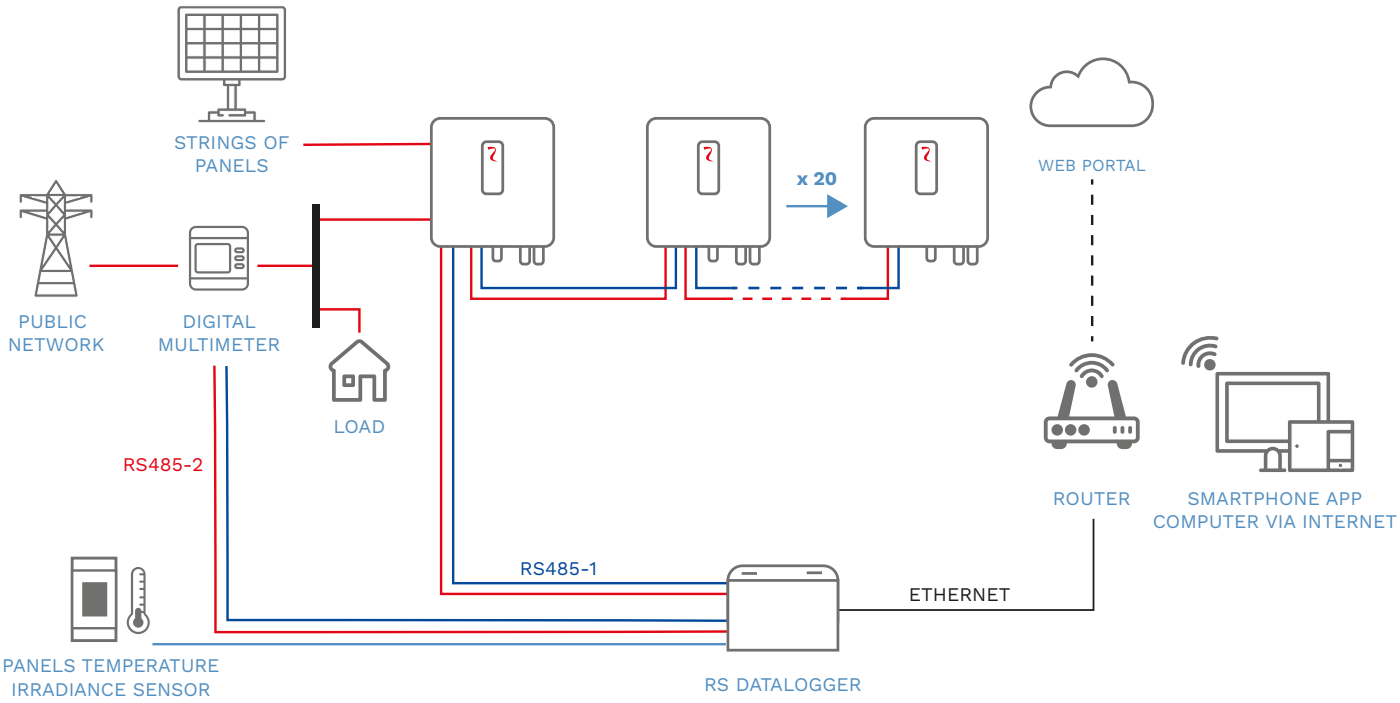
- monitor up to 20 inverters;
- and/or monitor the radiation and temperature of the panels;
- connect the inverters via the RS485-1 port using its default Modbus parameters:
  - Address: 1-20
  - Baudrate: 9600 bps
- connect to an Ethernet that supports DHCP for automatic IP address assignment.

The first diagram on the next page shows an example of a complete inverter monitoring system that uses both of the RS Datalogger's communication ports RS485-1 and RS485-2.

RS DATALOGGER CONNECTION DIAGRAMS



RS DATALOGGER CONNECTION DIAGRAMS WITH ZERO INJECTION



RS Connect

APP

The RS Connect app is available for Riello Solartech's string and hybrid inverters.
This app enables Riello Solartech users to **set and monitor the production of their solar power plant** via smartphone and tablet, locally or remotely.
With a **simple, user-friendly graphic interface**, the app makes it possible to configure the system, manage the self-test and analyse the plant's operating conditions.
RS Connect becomes essential for automatically running the **self-test**, issuing a report, and for configuring the IP address needed for the Wi-Fi connection with your router. In addition, **all the inverter's DC parameters** (input voltage and current) and inverter output **AC parameters** (voltage and current, power factor, frequency, active power and reactive power) can be displayed, both instantaneously and for specific historical reference periods.
The following menus can be accessed from the Start mode:

- **HISTORY**: energy production and graphs day/month/year and configurable time periods.
- **PRODUCTION**: instantaneous electrical operating parameters of each inverter; efficiency at a given time; daily, monthly and annual aggregate production.
- **MAINTENANCE**: menu dedicated to technical support. To access this menu, you need to change user (via the setup menu) and log in with an administrator password.
- **SETTINGS**
  Basic settings: date and time, IP address, Wi-Fi settings, RS485 parameters;
  User settings: change user - change password and/or login as administrator (solely for Riello Solartech technical support);
  Performance parameters: isolation detection, current
  leakage detection, RS485 termination resistance, local control, self-test reset, network connection standard, reactive power, power derating, power factor, all level 1, level 2 frequency and voltage protection parameters, power limiter (optional).
- **SELF-TEST**: starts the self-test process at the end of which you can download the results. A file called Autotest (date time).csv [Self-test(date time).csv] will be saved directly to the mobile device's main memory for email forwarding.

The RS Connect app is free to download from Google Play and App Store.

RS Monitoring

WEB PORTAL AND APP

RS Monitoring is the supervision portal for Riello Solartech string and hybrid inverters and is also available as an app that is free to download from Google Play and App Store.
It is a **professional monitoring system that closely monitors every type of photovoltaic plant and the environment where it is located, using local weather reports.**
Useful for small plants, but absolutely necessary for medium and large plants, RS Monitoring communicates data and information in real time both to the operators who carry out monitoring and to the specialised technicians in charge, thus making it possible to carry out targeted, timely and preventive maintenance work.

By registering on the WEB portal, RS Monitoring (accessible from the website) allows you to **monitor** the production and consumption trends of one or more photovoltaic plants from a single account. It can also **display alarm messages** for faults and signals relating to PV energy production.
The type of message received is an email alert and the user can change the email addresses to which messages and other alarms are sent, as well as choose the priority level. The system enables **real-time monitoring** of plant performance and, via Wi-Fi connection to the inverter (built in for some Riello Solartech inverters, optional for others), sends the data to the central calculation unit (Cloud) over an SNMP Protocol.
The processing of the data received, in addition to those sent by weather stations, allows us to keep the plants monitored, to **guarantee the highest performance ratio** and ensure a service even more oriented towards maximum customer satisfaction.
The platform provides an ordered, summary **dashboard** of all the monitored photovoltaic fields for each customer with related indications on the operating status (alarm signalling and error list) and on the production of the plant. A **second level accesses the detailed information of the selected plant**.
Meters always provide the values of energy produced and the economic income generated. The quantity in CO_2 emissions saved and the equivalent in trees planted is also calculated in real time, without neglecting the energy values of daily, weekly, monthly, annual and total production, with the aid of appropriate graphical reports.

Routine **exporting in text format** enables the data to be used in various software applications for subsequent statistical analysis. A report page allows **event logs to be uploaded/downloaded**, including within a selected time period. Finally, if the plant has SMARTSTRING, it will be possible to receive detailed information on the performance of the plant on the DC side, with a comparison between the producible power of a string and the actual power.

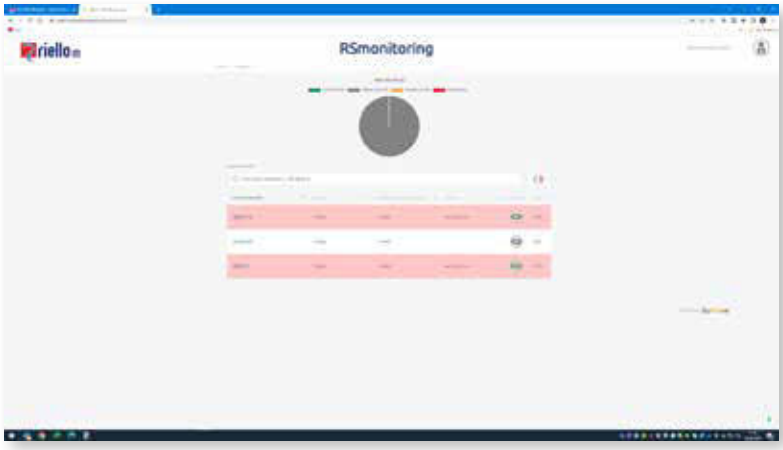
ALERT SERVICE AND ALARM MANAGEMENT

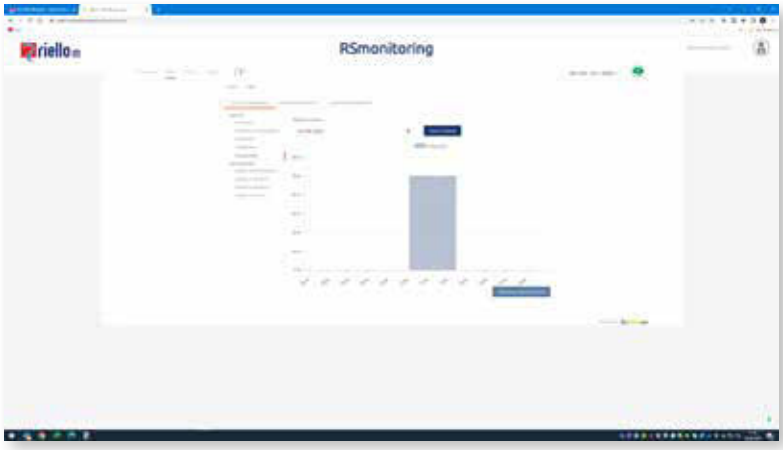
Thanks to the **smart dashboard**, customers and maintenance engineers of a photovoltaic field **always have real-time access to all information** related to the DC and AC side power values, daily, weekly, monthly, annual, and total energy produced, and the status of the devices (there may be a notification next to the alarms icon). From the dashboard, we can obtain information on the user and PV field, with the date of installation, the size of the field location, the current time inherent to the place where the plant is located, logo and image (default or entered by the user during the configuration phase) and legal information related to earnings (calculated on the basis of the user-defined incentive rate for their own system), trees planted and CO_2 savings. In addition, information is provided on the energy produced by the entire plant and a button can be used to select the graph to be displayed in the third box (field level or single inverter). This graph shows the instantaneous DC and AC power values both at the inverter level (for each individual inverter) and at the field level (intended as the sum of all the inverters that are part of the field).

The RS Monitoring system is equipped with an **ALERT Service**, to always stay up to date on any anomalies and malfunctions of the plant, for a detailed service you can configure by sending an email.

Alarm management is divided into the following groups:

- GROUP 1 – **No communication**: this error is generated when no packets are sent by an inverter for more than 8 hours, after which an alarm email is sent to the customer and the error is reported on the portal. This check is carried out 24 hours a day.
- GROUP 2 – **Zero power generation**: this error is generated when for 8 consecutive hours the packages of the inverter in question have a zero power parameter, after which an alarm email is sent to the customer and the error is reported on the portal. This check is only performed during daylight hours (sunrise-sunset)
- GROUP 3 – **Alarms generated by inverters**: these errors, sent by the inverters, are handled according to defined specifications.





Sirio Data Control

MONITORING SOFTWARE

Sirio Data Control was developed with the aim of **simplifying the configuration of controlled inverters** as much as possible, without compromising the main functions of the **supervision** program, and to **monitor their status** through an Ethernet or Internet connection, with **up to 300 inverters.**

The Sirio Data Control graphical user interface has been designed to be as **simple and intuitive** as possible, showing all the available measurements and all the historical data of each inverter at the same time. Sirio Data Control recovers any missing historical data from the devices connected to it without the limitation of having the software always running on a dedicated PC. Sirio Data Control also enables the user to remotely send control commands (like switching on/off, management of the active and reactive power, soft starts) to the inverter in the field.

Compatibility is guaranteed with central inverters running firmware version 1.2.5 or later and with HBS systems equipped with a NetMan 208 network card.

MAIN FEATURES

- Monitoring of Riello Solartech inverters via LAN or internet;
- Sending control commands to a single inverter or to the entire plant;
- Simple and self-explanatory push-buttons;
- Scanning the LAN and automatically adding inverters without user intervention;
- Assigning the addresses without using the DHCP server;
- Real-time measurement of each inverter;
- Synchronising the inverter's date/time with the PC;
- Optional: display the plant's production data in full screen mode (for example for large monitors in large-scale installations or public administrations).

SUPPORTED OPERATING SYSTEMS

- Microsoft Windows
- Linux
- Mac OS X

STRING BOX

A field switchboard able to monitor the string currents and promptly diagnose any faults.
It has a general 250 A 1000 Vdc circuit breaker, specific to photovoltaic applications, and also allows for the addition of a release coil to disconnect the photovoltaic field from the inverter. The casing is made of UV-resistant polyester resin with an IP65 protection level and enables the connection of up to 16 strings (with a maximum input current per string of 12 A) or 8 strings with maximum current per string of 20 A.
As it is compatible with the Sirio Data Control monitoring software, it can display currents and send signals and alarms in the event of current faults according to the thresholds set at configuration.
Communication solutions include an RS485 and an RS232 port (supplied as standard), a slot for an optional NetMan Plus PV Ethernet card, digital and analogue inputs for the connection of environmental sensors (temperature, radiation and wind).

MAIN FEATURES

- Parallel connection of up to 16 strings of 12 A each (8 measurement channels) or 8 strings of 20 A each;
- local and remote indication of status and alarm conditions;
- RS232 and RS485 connections as standard
- one slot connection for expanding communication (e.g. with Ethernet board);
- proprietary communication protocol and MODBUS RTU, both available on all the communication ports;
- wide configurability of the monitoring parameters using the available software;
- local history log of alarms;
- protection fuses for each input with 1000 V DC fuses on the positive and negative pole;
- for each input it is possible to connect wires up to 16mm^2;
- output disconnect switch, with optional release coil, used for disconnecting the inverter;
- monitored discharger, used against overvoltage situations, protected against over-currents and easy to restore thanks to removable cartridges;
- direct power supply from the photovoltaic field or from auxiliary voltage;
- insulated digital inputs for local monitoring;
- insulated analogue inputs for environmental sensors (2xPT100, 0-10 V, 4-20 mA);
- configurable digital outputs with voltage-free contacts;
- polyester box for outdoor use with IP65 protection level.

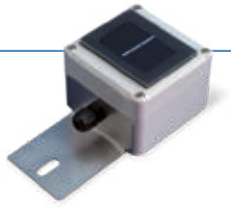
STRING BOX SETUP

The String Box Setup application is used to set up the String Box according to the features of the plant and the user's requirements. The items that can be set are the analogue inputs, digital inputs and outputs, read channels and alarm thresholds.

MAIN FEATURES

- Via the Time Windows function, time windows can be set for each of the 8 inputs necessary to avoid false alarms (e.g. in case of systematic shading in certain periods and at certain times of the year);
- configuration of the relays present on the device depending on the status of the alarms;
- configuration of the two inputs 4/20 mA and 0/10 V;
- full management of the minimum alarm threshold parameters;
- management and download of the events log.

RADIATION SENSOR
ENVIRONMENTAL SENSOR



Compatible with String Box too.

MAIN FEATURES

- Measuring range: 0 to 1500 W/m^2;
- Sensor type: monocrystalline cell (33mm / 50mm);
- Sensor accuracy: ± 5% yearly average;
- Electrical output: 4–20 mA or 0–10 V or 0–3.125 V or 0–150 mV;
- Consumption: C. 30 mW;
- Connection type: connection terminals, 1.5 mm^2;
- Dimensions: 150x80x60 mm (WxDxH);
- Weight: 700 g.

PV MODULE TEMPERATURE SENSOR
ENVIRONMENTAL SENSOR

Compatible with String Box too.

MAIN FEATURES

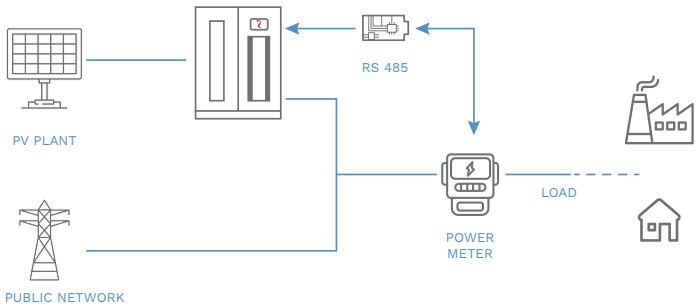
- Measuring range: -20 to 150 °C;
- Sensor type: platinum resistance wire;
- Electrical output: PT100;
- Cable: 3 m, connection with 3 conductors;
- Mounting: adhesive tape (included);
- Dimensions: 50x50x1 mm (WxDxH).

POWER REDUCER KIT
SELF-CONSUMPTION SOLUTION

In some cases, the mains supply cannot accept the power generated by the photovoltaic stations, but the user wishes to reduce his energy costs by installing a PV field with the intention of using all the energy produced.
To adhere to contractual limitations and not supply energy to the grid, Riello Solartech recommends adding the “Power Reducer” Kit which forces the inverter to produce only the power required to supply the connected loads.

MAIN FEATURES

- Compatible with RS and Sirio Central inverters
- Kit consisting of:
  - RS485 card (only for Sirio Central inverters)
  - Power meter (modular digital multimeter with multilingual graphic LCD and RS485 output port)
  - Current transformer rated based on the load.



RS485
COMMUNICATION ADAPTER

The RS485 card enables the creation of a BUS to connect multiple inverters, displaying all the parameters via connection to a Datalogger.

MAIN FEATURES

- Plug & Play installation;
- Data transfer up to 9.6 KBaund.

Note: accessory compatible with Sirio Central inverters.

ENERGYMANAGER
COMMUNICATION ADAPTER

In HBS storage systems, the EnergyManager card enables managing static and dynamic Peak Shaving and communication with lithium batteries via BMS.

MAIN FEATURES

- Compatible with 10/100 Mbps Ethernet interface;
- RS485 port;
- ModBus/TCP;
- IP address (DHCP) with dynamic or manual assignment;
- Operating system: MAC OS, Windows.

Note: accessory compatible with Hybrid Battery Storage (HBS).

MODCOM PV
MODBUS PROTOCOL CONVERTER

MODBUS is an open-source and royalty-free serial communication protocol, which has become an industry standard in recent years thanks to its ease of use and implementation. The ModCOM PV device makes it possible to monitor Riello Solartech photovoltaic inverters via the MODBUS RTU protocol over half-duplex RS-485 serial cable.

MAIN FEATURES

- MODBUS/JBUS port can be configured as RS232 or RS485;
- RJ-45 connector for connecting to the MODBUS network;
- can be integrated with the main BMS management programs;
- LED signals for communication activity;
- firmware upgradeable through serial port.

Note: For Central series, needed for ModBUS/RTU (standard for ModBUS/TCP).

MONITORING SOLUTIONS

FOR STRING OR CENTRAL INVERTERS AND HBS STORAGE SYSTEMS

SunGuard

WEB PORTAL

Every day, more and more photovoltaic systems, both civil and industrial, are installed without providing for adequate maintenance.
When undergoing significant development, technological systems require routine and non-routine maintenance operations to be carried out by specialised technicians. However, this does not guarantee the complete and constant efficiency of the photovoltaic system and, even less, preventive interventions in the case of imminent energy loss or malfunction due to exogenous and/or endogenous causes. That's why SunGuard has been developed.

It's a professional system that closely monitors every type of photovoltaic plant, as well as the environment where it is installed. Useful for smaller installations, necessary for medium to large plants. SunGuard communicates data and information in real time both to the operators who perform the monitoring and to the specialised technicians, thereby allowing for targeted, timely and preventive interventions. SunGuard provides for the real-time monitoring of the system's performance and, via the SunGuard Box interface, sends the data to the central calculation unit over an SNMP Protocol. The elaboration of this data, in addition to those received from weather stations, pyranometers, toroids and video cameras positioned on the plant, provides for the constant supervision of our systems and enables us to offer a service even more oriented towards maximum customer satisfaction.

TECHNICAL SPECIFICATIONS

- Can also be used for Riello Solartech inverters in the RS and Sirio ES range;
- Remote web-based management through UMTS, GPRS, Ethernet and Wi-Fi connectivity;
- Monitoring of each single inverter;
- Connection to every type of environmental sensor;
- Numerical and graphical display of the periodic data and reports regarding the plant's production;
- Notifications sent by email and SMS;
- Pro-active management of maintenance interventions;
- Web-based plant management for the installers, maintenance personnel, technical assistance, help desk and end customer, through dedicated administration panels.

MAIN FUNCTIONS

- Centralised multi-system management;
- Multi-user functionality with various access levels;
- Data storage in SQL databases;
- Advanced formula editor;
- Events and actions management;
- Reporting system;
- Performance analysis;
- Graphics management;
- Integrated video camera management;
- SNMP standard for extended monitoring;
- Access to collected data.

DATALOGGER Z SERIES
FOR PHOTOVOLTAIC PLANTS

The SunGuard Z series Datalogger uses an Ethernet port or Wi-Fi connected to an ADSL router/modem to send data to the SunGuard web server, which generates automatic messages on faults or malfunctions. Via any web browser and with an internet connection, you can access your own private interface and monitor and analyse all the photovoltaic plants equipped with a SunGuard datalogger.

PLANT COMPATIBILITY:
- XSOL082A SGB-DATALOGGER Z1 0-20 kW 1 x RS485 (COM2);
- XSOL083A SGB-DATALOGGER Z2 20-50 kW 1 x RS485 (COM2);
- XSOL084A SGB-DATALOGGER Z3 50-200 kW 2 x RS485 (COM2-COM3);
- XSOL085A SGB-DATALOGGER Z4 200-500 kW 3 x RS485 (COM2-COM3-COM4);
- XSOL086A SGB-DATALOGGER Z5 500-1000 kW 4 x RS485 (COM2-COM3-COM4-COM5).

MAIN FEATURES
- Mounting: on DIN rail for both Datalogger (4 modules) and power supply unit (4 modules);
- Power supply unit: 24VDC included;
- Converter: Isolated USB/485 included (in the RS485 COM N° indicated in plant compatibility);
- Consumption: max 20 W;
- Operating range: 0 to 50 °C;
- LAN: 10/100 Mbps Ethernet controller, Wi-Fi;
- COM1 communication interfaces: N°1 RS232/RS485 (on board Datalogger).

MODULE IRRADIANCE AND TEMPERATURE SENSOR
ENVIRONMENTAL SENSORS

The SunGuard Sensor Irradiation Light 485 is a digital photovoltaic irradiance sensor equipped with a monocrystalline silicon cell laminated in high-performance glass. Output: digital irradiance and temperature value (bus RS485). Code XSOL090A.

MAIN FEATURES
- Power supply: 12-30 VDC
- Measuring range: 0 - 1600 W/m2
- Output: RS485
- Resolution: 1 W/m2
- Irradiation precision: +- 5% (2.5% @S.T.C. (25 °C))
- Temperature precision: +- 1°C
- Operating temperature: -30 +85 °C
- Consumption: 85 mW
- Cable length: 60cm
- Dimensions: 98x55x25 mm

LED DISPLAY
OUTDOOR

AVAILABLE VERSIONS
- LED display;
- LED display with network analyser.

MAIN FEATURES
- Display: 2 lines of 16 alphanumeric characters;
- Type: page or scrolling (max 512 scrolling characters);
- Management: via RS485 to the network analyser or Ethernet;
- Power supply: 220 V / 50 Hz;
- Dimensions: 1500x75x700 mm (WxDxH);
- Weight: 15 kg.

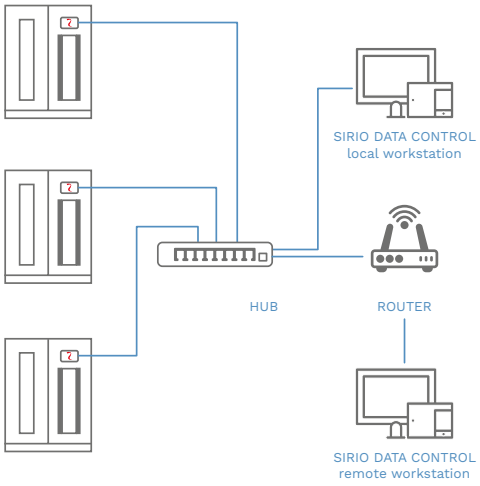
SUNGUARD VIDEO DISPLAY
SIGNAL SPLITTER FOR VIDEO SYSTEMS

AVAILABLE VERSIONS
- SunGuard Video Display;
- SunGuard Video Display Wi-Fi.

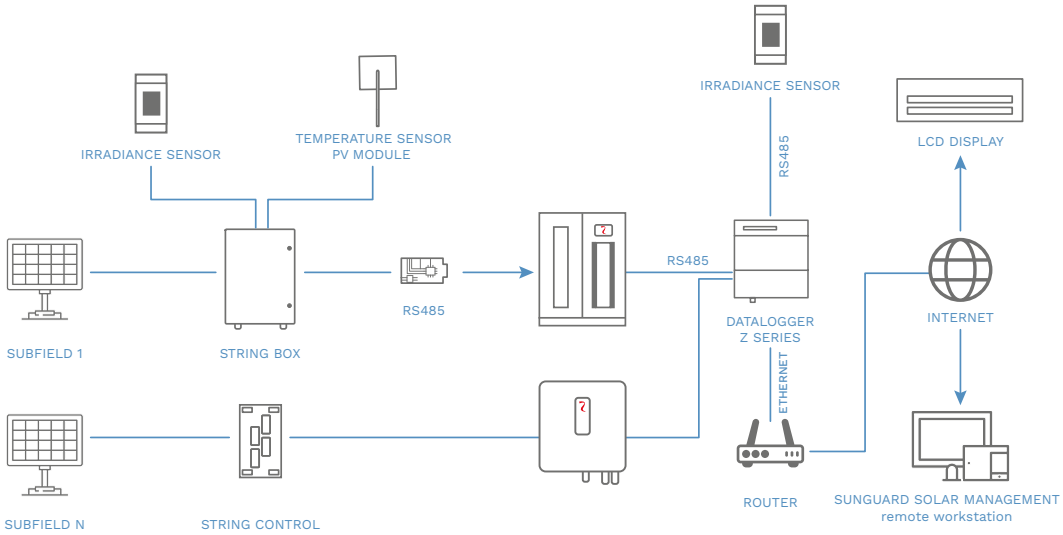
The SG-VIDEO-DISPLAY is connected to a monitor with a HDMI port and to the internet. In cycles of about 5 seconds, it displays the various slides related to the performance of one or more photovoltaic plants monitored with the SunGuard monitoring system. It displays the following data: daily production, total production, saved trees, equivalent barrels of petroleum, weekly production, monthly production, avoided CO_2 emissions, instantaneous power.

MAIN FEATURES
- Power supply unit: 5 Vdc/10 W including wall mount;
- Operating range: 5°C to 50 °C;
- Communication interfaces: 1 RJ45 Ethernet, HDMI, Wi-Fi.

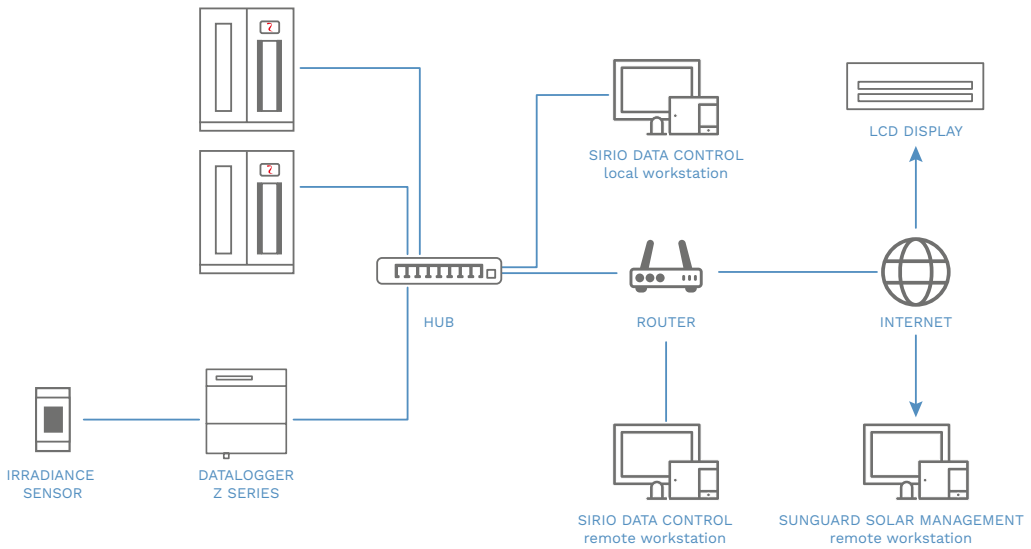
MONITORING WITH SIRIO DATA CONTROL VIA LAN

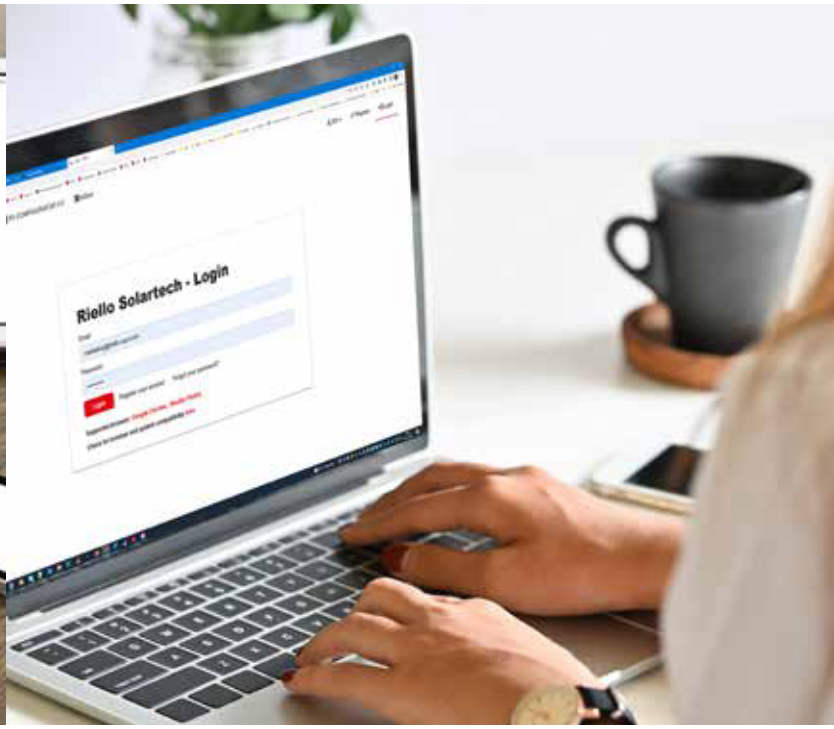


MONITORING WITH SUNGUARD SOLAR MANAGEMENT VIA RS485 BUS



MONITORING ON LAN WITH SIRIO DATA CONTROL AND/OR SUNGUARD SOLAR MANAGEMENT





PV CONFIGURATOR 4.0

Free web configurator for designers, distributors and installers for finding the photovoltaic inverter solution to best suit their customer's requirements.

A completely revamped version of its predecessor, it offers solar professionals a comprehensive tool that adds new options and functions.

The PV plant can be sized and configured by selecting from the entire Riello Solartech product range for all types of plant, whether residential, commercial or industrial.
It is possible to opt for either a traditional photovoltaic system, which generates electricity by converting the sunlight captured by photovoltaic panels and making it available to the building's electrical system; or a photovoltaic system with storage, i.e., a hybrid photovoltaic system that incorporates all the advantages of photovoltaics combined with the use of a battery system.
User-friendly yet at the same time precise and extremely useful, it helps the user select the most suitable product. Enter parameters such as the geographical area (of the PV plant), the Riello Solartech inverter model to be sized and the photovoltaic module to be used: a dedicated algorithm will suggest the best available solutions.
Find the solution that best meets your customer's requirements from Riello Solartech's extensive range in just a few clicks.
Once you have selected the product, contact the company for more technical and commercial information.

PV Configurator 4.0 is a user-friendly web application.
It does not require any special apps to be installed on your PC or smartphone/tablet.

Scan the QR CODE to access the configurator.

SUPPORT

The reliability of the components that make up a photovoltaic plant plays a major role in the return on investment.
An inverter failure would cause damaging downtime, while even unoptimized operations can lead to economic losses, significant ones for large plants.

An optimal support service is therefore a key factor when choosing a product on today's market. This service is the best insurance on your investment because it is provided by those who designed and built your machine, providing you with valuable advice to manage your plant, including during extensions and refurbishment.
Here are 10 simple reasons for relying on Technical Support Services for your equipment's maintenance:

1. EXPERIENCE
To ensure the fullest effectiveness of the service, Riello Solartech provides the synergy of its competence in design, construction and maintenance.

2. AVAILABILITY
Riello Solartech is able to ensure the prompt availability and perfect compatibility of new spare parts and guarantees that all the replaced parts comply with the specifications.

3. COMPETENCE
The work is carried out by technicians trained in the range of products they work on. Their technical know-how is kept constantly up to date with training courses.

4. PERFORMANCE
Riello Solartech designs and implements integrated solutions geared to improving the performance of your installations.

5. WARRANTY
Riello Solartech provides all the guarantees you have the right to expect (hardware and/or software updates, genuine spare parts, technical support, etc.).

6. CONTROL
We are a comprehensive organization that provides an integral, proactive and preventive service to avoid any risk of disruption.

7. SUPERVISION
The solutions provided ensure remote supervision, preventing and anticipating potential risks and ensuring prompt intervention.

8. WIDESPREAD SERVICE
Riello Solartech benefits from skilled human resources and an excellent mastery of logistics to ensure, throughout the country, a rapid and effective return to operation through a service in line with your needs.

9. ENVIRONMENTAL PROTECTION
Waste treatment in accordance with the regulations and through accredited operators.

10. BENEFITS

The maintenance carried out by Riello Solartech enables the overall cost to be optimised, through:

- **Limiting technical interventions;**
- **Short repair times;**
- **Maintaining system performance;**
- **Plant reliability over time;**
- **Analysis and consulting.**

A direct line to our call centre provides you with expert personnel at your disposal for every need, able to assist you with:

- **operational analysis and troubleshooting;**
- **replacement service;**
- **configuration and use of monitoring and communication devices;**
- **commissioning.**

Riello Solartech can provide on-site technical support thanks to an extensive national network of technicians who can provide an extremely rapid response to your issue.
Sign up to our “Warranty Extension” service at the time of purchase or within the basic warranty period to protect your plant for up to 10 years, ensuring free repairs or replacement products.

Technical support is available Monday to Friday from 8:30 am to 5:30 pm, or via email at:
service@riello-solartech.com

WARRANTY

TERMS OF WARRANTY

Riello Solartech guarantees the good quality and construction of its products and undertakes, during the warranty period, to repair or replace any parts that prove to be defective free of charge. All warranty shall cease if the malfunctions are caused by the customer's incompetence or negligence, by act of God or force majeure or if the materials are installed in conditions other than those set out in writing. After the warranty period, the support service will only be carried out after acceptance of the work and repair cost estimate.

The standard warranty for the RS and RS T inverter range and RS HYBRID versions with batteries (BATLIO) is 5 years and covers the repair or complete replacement of the equipment in the event of a fault or malfunction; please note that the replacement work is to be done by the customer. The Sirio Central and Hybrid Battery Storage (HBS) ranges have a standard warranty of 2 years. In the event of a fault or malfunction, they will provide for the on-site intervention of expert technical personnel. If the equipment is replaced during the warranty period, the remaining duration will be transferred.

LIMITATION OF LIABILITY

Any entitlement to compensation for damages is waived except where the claim is determined by malicious conduct or gross negligence on the part of Riello Solartech or its staff. The liability provided for under the manufacturer's liability act is excepted.

There shall be no liability for:

- claims made by third parties against the customer for loss or damage;
- loss or damage to customer drawings or data or costs incurred in reacquiring such data;
- consequential economic damage (including loss of earnings or savings) or ancillary damage, even if we were advised of this possibility.

Riello Solartech shall also not be held liable for any incidental, indirect, special, consequential or other damage of any kind (including, without limitation, damage related to loss of profit, interruption of business, loss of commercial information or any other loss) due to the use of the equipment or in any way in relation to it, claimed by contract, compensation for damages, negligence, objective or other liability, even if Riello Solartech has been advised in advance of such a possibility. This exclusion also concerns civil liability arising from claims made by third parties against the first purchaser.

EXTENSIONS OF WARRANTY

- RS, RS T and RS HYBRID

By subscribing, within the first 12 months of purchase, to the warranty extension of +5, +10 or +15 years, warranty can be extended to from 5 to 20 years.

- Sirio Central

By subscribing to the purchase of the standard 5-year warranty extension with the BASIC formula for 5 (+ 3) years, you are also entitled to the commissioning of the equipment or, as an alternative, at any time you can enter into an annual maintenance and warranty contract with the SILVER or GOLD formulas.

The SILVER warranty extension and maintenance includes:

- No. 1 annual maintenance visit
- Labour and travel costs included
- Spare parts with a dedicated price list
- Unlimited number of interventions

The GOLD warranty extension and maintenance includes:

- No. 1 annual maintenance visit
- Labour and travel costs included
- Spare parts included
- Unlimited number of interventions
- Remote support (only if our monitoring systems are installed)

Spare parts and all travel expenses are included in the contract. Nothing else shall be acknowledged by Riello Solartech, except for malfunctions due to external causes, negligence or incompetence and as listed in the "Exclusions" section of the contract.

THE ANNUAL MAINTENANCE VISIT INCLUDES:

GENERAL TASKS

- Cleaning equipment
- Cleaning control logic boards
- Checking mechanical fasteners and electrical connections
- Checking operation of signals and alarms
- Checking the suitability of the rooms (cleaning, ambient temperature, water infiltration, etc.)

FUNCTIONAL TASKS

- Calibrating voltmeters with sample instrumentation
- Checking the power supply voltage parameters
- Checking the reference of the voltage and current reactions on the inverter logic board
- Checking the inverter output waveform
- Checking output voltage
- Checking output frequency
- Checking fan operation
- Checking and if necessary replacing fans

CHECKS AND ADJUSTMENTS

- Inverter in/out parameter check
- Final operational tests - Inverter on

HOW TO SUBSCRIBE TO EXTENDED WARRANTY CONTRACTS:

To extend your warranty, simply email service@riello-solartech.com including the following information:

1. Inverter model (code and description);
2. Date of purchase (certified by a copy of the purchase document);
3. Serial number (shown on the equipment nameplate);
4. Location of the plant (full address);
5. Telephone numbers of the plant manager;
6. Billing Information (VAT No. or Tax Code, Business Name, address, etc.).

Riello Solartech will send the customer the "warranty extension" contract form to be returned signed. It will then issue an invoice.

On the website www.riello-solartech.it, the customer can activate the purchased warranty extension and receive the corresponding certificate via e-mail.

SUPPORT SERVICE

Riello Solartech has over 20 support centres all over Italy, where more than 60 expert technicians work to provide the finest technical support at any time and location. This service is indispensable to guarantee Riello Solartech customers the certainty of their plant's remuneration.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tech

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RIELLO SOLARTECH

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