



# 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<sub>2</sub> 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.

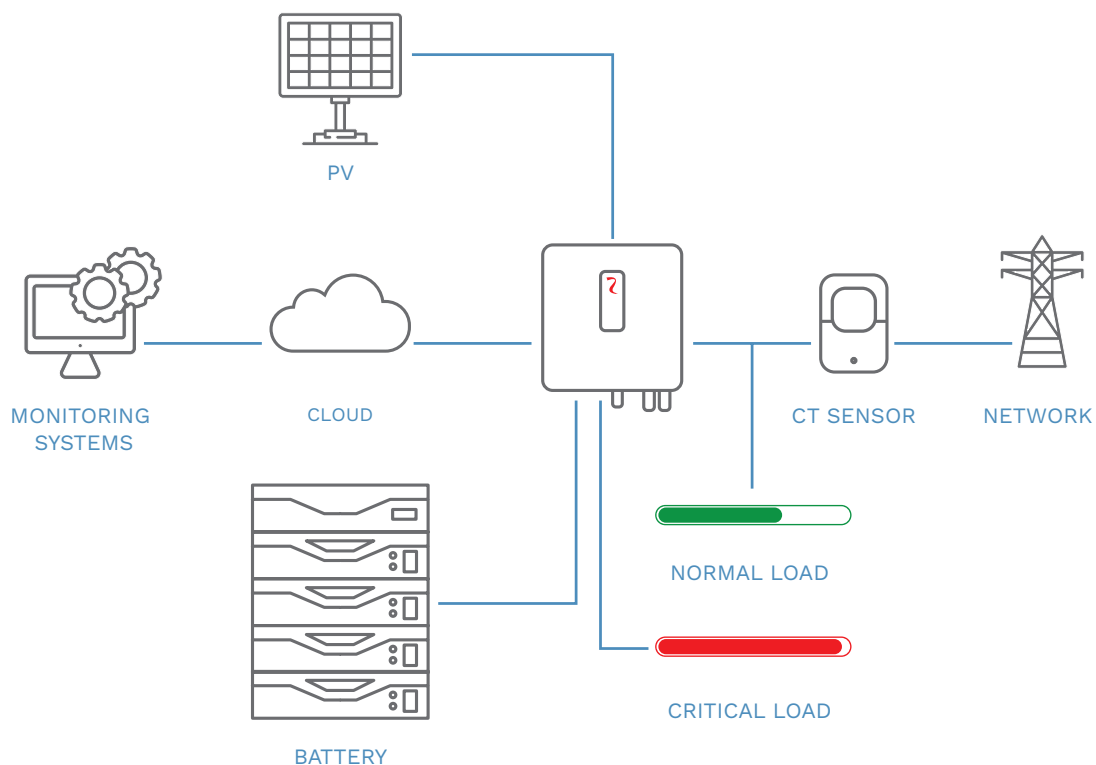
- Easy, immediate activation and set-up with the app;
- Wall/guide mounting for zero surface wastage and for installation in all conditions, even the most unfavourable;
- No special handling equipment is required as it is supplied in small, lightweight boxes that are easy to carry and handle;
- LED indicators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

#### 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.



RS Batlio 5300T battery.

**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.

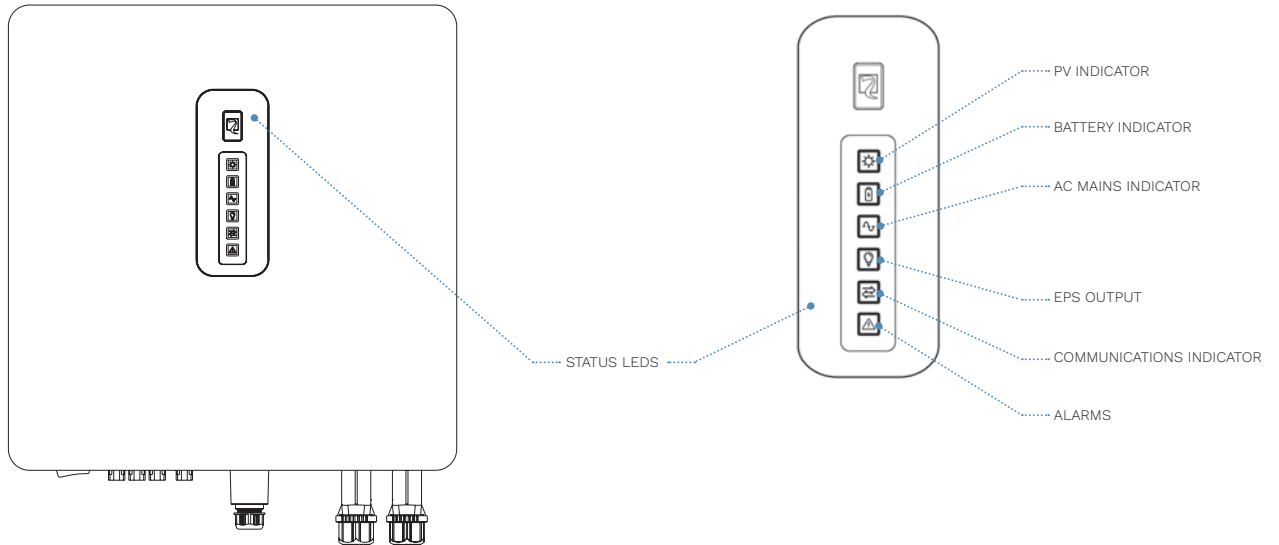
Installers can create a single environment for monitoring all installed plants.



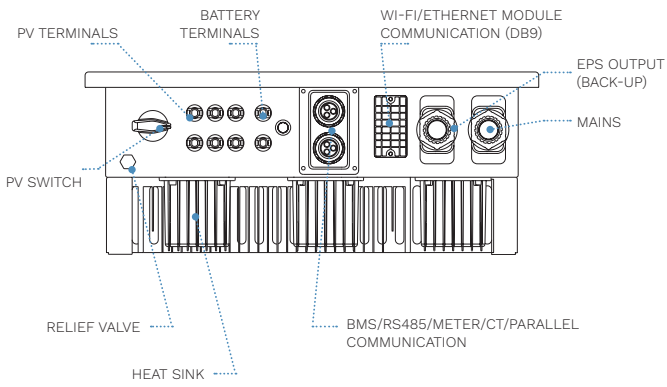
HV-RS BOX

## INVERTER DETAILS

Front view

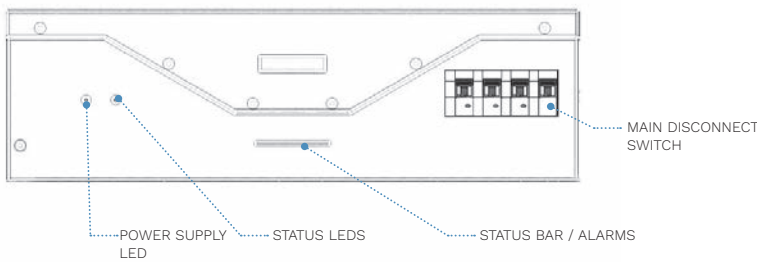


View from below

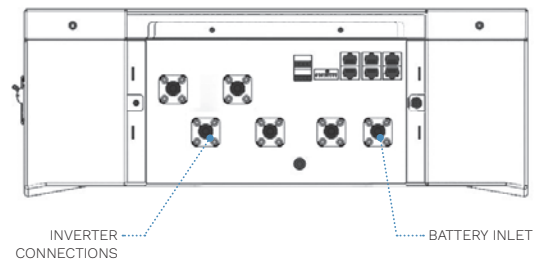


## HV-RS BOX DETAILS

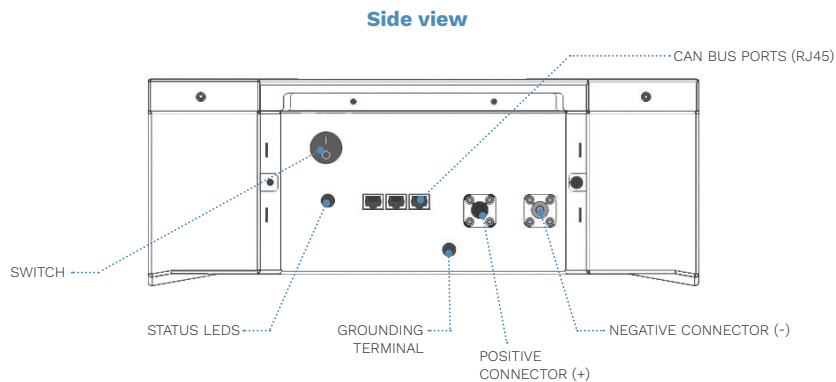
Front view



Side view



## BATTERY DETAILS



## OPTIONS

### MONITORING

RS Connect/RS Monitoring

### ACCESSORIES

Ethernet card



## CONFIGURATIONS

|                               | HV-RS BOX<br>+3 BATTERIES | HV-RS BOX<br>+4 BATTERIES | HV-RS BOX<br>+5 BATTERIES | HV-RS BOX<br>+6 BATTERIES | HV-RS BOX<br>+7 BATTERIES | HV-RS BOX<br>+8 BATTERIES   | HV-RS BOX<br>+9 BATTERIES       | HV-RS BOX<br>+10 BATTERIES       |
|-------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------------|---------------------------------|----------------------------------|
| N° battery modules            | 3                         | 4                         | 5                         | 6                         | 7                         | 8<br>(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<br>max 175.2    | min 182<br>max 233.6      | min 227.5<br>max 292.4    | min 273<br>max 350.8      | min 318.5<br>max 409.2    | min 364<br>max 467.6        | min 409.5<br>max 526            | min 455<br>max 584.4             |
| Configuration                 |                           |                           |                           |                           |                           |                             |                                 |                                  |
| Dimensions (WxDxH) [mm]       | 580x474x730               | 580x474x900               | 580x474x1070              | 580x474x1240              | 580x474x1410              | 580x474x1580                | 580x474x900<br>+<br>580x474x900 | 580x474x900<br>+<br>580x474x1070 |
| Weight [kg]                   | 171                       | 222                       | 273                       | 324                       | 375                       | 426                         | 477 (222+255)                   | 528 (273+255)                    |

| <b>INVERTER MODEL</b>                       | <b>5 kW</b>                                                                                       | <b>6 kW</b> | <b>8 kW</b>  | <b>10 kW</b>  | <b>20 kW</b>                                                                                                                                                                        | <b>30 kW</b>  |
|---------------------------------------------|---------------------------------------------------------------------------------------------------|-------------|--------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| <b>EFFICIENCY</b>                           |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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   |
| <b>PV INPUT</b>                             |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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             |
| <b>BATTERY INPUT</b>                        |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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 |
| <b>GRID SIDE OUTPUT (ON-GRID)</b>           |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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)                                  |             |              |               |                                                                                                                                                                                     |               |
| <b>EPS OUTPUT (Backup)</b>                  |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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)                                                                                                                                                                 |               |
| <b>PROTECTIONS</b>                          |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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                                                                                               |             |              |               |                                                                                                                                                                                     |               |
| <b>OVERALL SPECIFICATION</b>                |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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                                                                                                                                                                                  |               |
| <b>COMMUNICATIONS</b>                       |                                                                                                   |             |              |               |                                                                                                                                                                                     |               |
| 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 |
|-------------|--------------------------------------------------------------------------------------------------------------|

