



RS Datalogger User manual

Purpose

This document introduces the RS Datalogger in terms of installation, electrical connections, operation, maintenance, and troubleshooting.

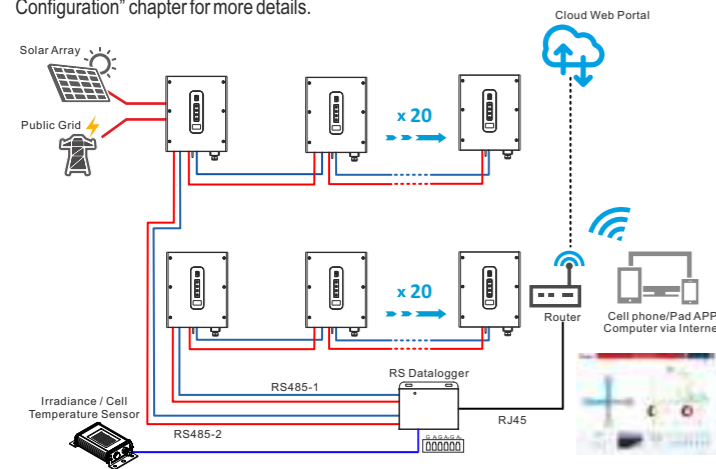
General description

The RS Datalogger provides a simple and cost-effective solution to allow the monitoring of the two following plant types:

Type 1

Monitoring of a plant (production and diagnostic) with several inverters.

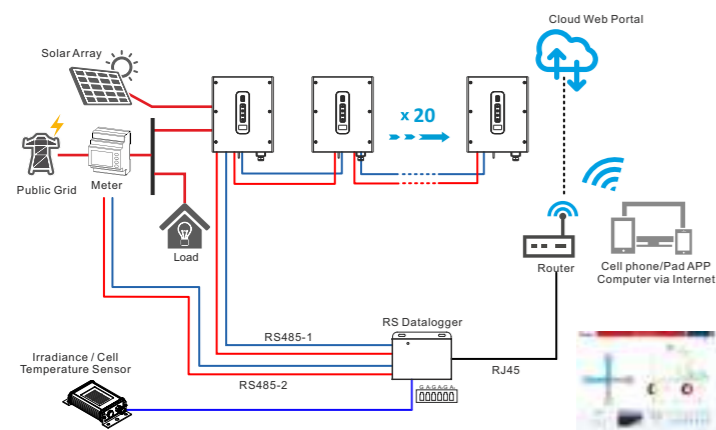
The following drawing shows an example of the system for monitoring the inverters via both RS485-1 and RS485-2 ports on the RS Datalogger, for each port supporting a maximum 20 inverters. An external sensor can be installed to the system for measuring irradiance and cell temperature. The RS485-2 port should be configured to "Inverter" mode. Refer to "RS485-2 Configuration" chapter for more details.



Type 2

Complete monitoring of a plant (energy produced, consumed, sold and diagnostic) with several inverters, eventually with power limiter function. For this application, an energy meter (not included in the package) is needed.

The following drawing shows an example of the system for power limiter, which monitoring and controlling the inverters via RS485-1 port and monitoring the energy meter via RS485-2 port. Also the external sensor can be installed to the system. The energy meter is installed on the grid side, as the RS Datalogger default setting is "Meter on grid". The RS485-2 port should be configured to "Meter" mode. Refer to the "RS485-2 Configuration" chapter for more details.

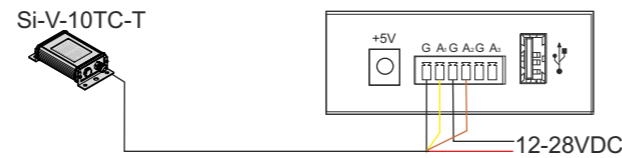


If needed, the energy meter can be installed on the load side, as an alternative to the grid side. In this case, the RS Datalogger must be configured as "Meter on load".

The RS Datalogger supports the following meters:

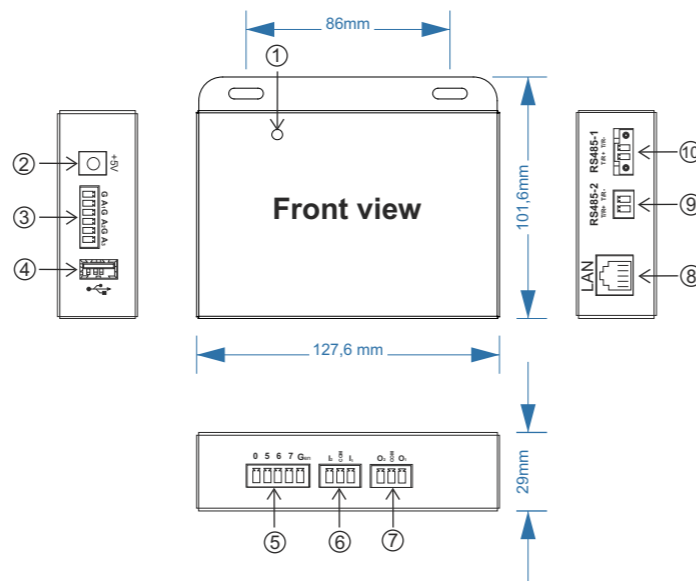
N.	Vendor	Meter type	Protocol	Connection
1	Lovato	DMG210, three phase meter	MODBUS-RTU	RS485
2	Gavazzi	Et340, three phase meter		
3	Gavazzi	Et112, single phase meter		
4	CHINT	DTSU666, three phase meter		

The RS Datalogger supports a Si-V-10TC-T external sensor for measuring irradiance and cell temperature. The following drawing shows the connection of the external sensor:



Device characteristics

Appearance



- Status indicator LED
- +5V adapter connector
- External sensor signal connector
- USB connector
- Remote control signal connector
- Input signal connector
- Output signal connector
- RJ45 connector
- RS485-2 connector
- RS485-1 connector

Port description

Connector	Port	Description
EXTERNAL SENSOR SIGNAL	G	GND
	A1	Irradiance sensor input (range 0-10V)
G A1 G A2 G A3	G	GND
	A2	Solar panel temperature sensor input (range 0-10V)
	G	GND
	A3	Temperature sensor input (range 0-10V)

	USB	Use for FW upgrade or data export.
REMOTE CONTROL SIGNAL* 0 5 6 7 Gen 	0	When this pin is connected to Gen, the inverter will be shutdown
	5	When this pin is connected to the Gen, the output power of inverter will be limited to 0%
	6	When this pin is connected to the Gen, the output power of inverter will be limited to 50%
	7	When this pin is connected to the Gen, the output power of inverter will be limited to 75%
	Gen	GND
*To be used exclusively if allowed by the local regulation.		
INPUT SIGNAL 	Input signal	Reserved
OUTPUT SIGNAL 	Output signal	Reserved
LAN 	LAN	Use for router connection
	Green indicator	If the indicator is steady green, the line is normal.
	Yellow indicator	If the indicator blinks, data communication is normal.
RS485-2 T/R+ T/R- 	T/R+	RS485-2 port signal+
	T/R-	RS485-2 port signal-
RS485-1 T/R+ T/R- 	T/R+	RS485-1 port signal+
	T/R-	RS485-1 port signal-

Both ports RS485-1 and RS485-2 are using Modbus-RTU protocol, with 8 data bit, 1 stop bit, no parity and 9600 baud rate. Please make sure that the devices connected to the RS Datalogger have the same configuration.

The RS Datalogger is powered by an external power supply 5V 1A. Please, use only the AC adapter included in the package.



Installation

Package contents

- RS Datalogger unit
- Accessories bag (screws and terminals)
- External power supply 5V, 1A
- Manuals

Connections

For monitoring a system with Type 1 configuration (refer to the General description chapter) please, follow the instructions below:

1. Connect the RS Datalogger to the inverter using the port RS485-1 (connect maximum 20 inverters to the port).
2. Connect the RS Datalogger to the inverter using the port RS485-2 if needed (connect maximum 20 inverters to the port). RS485-2 has to be configured to "Inverter" mode.
3. Configure the communication address for each inverter by using the *RS Connect* APP. Default address for port RS485-1 is 1 to 20, and default address for port RS485-2 is 21 to 40.
4. Connect the datalogger to the local network via LAN cable.
5. Power on the RS Datalogger.

For monitoring a system with Type 2 configuration (refer to the General description chapter) please, follow the instructions below:

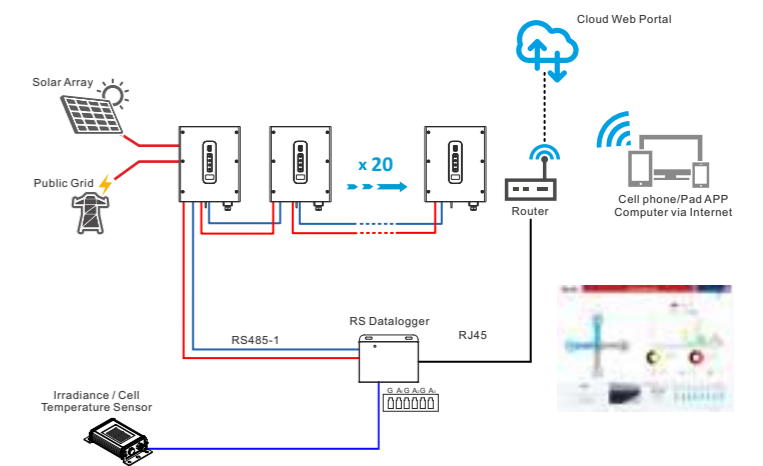
1. Install the Energy Meter. Refer to the Energy Meter manual for additional information regarding its connections. Make sure that the protocol for the meter is set to Modbus-RTU, and the data format is: 8 data bit, 1 stop bit, no parity bit, baud rate is 9600bps.
2. Connect the RS Datalogger to the energy meter using the port RS485-2. Refer to the Energy Meter manual for additional information regarding its RS485 connections.
3. Connect the RS Datalogger to the inverter using the port RS485-1.
4. Configure the communication address for each inverter by using *RS Connect* APP, default address for port RS485-1 is 1 to 20.
5. Connect the datalogger to the local network via LAN cable.
6. Power on the RS Datalogger.

Default configuration

No change to the settings are needed if:

- The system is only for monitoring a maximum 20 inverters, in Type 1 configuration.
- The system is also monitoring irradiance and cell temperature.
- The default Modbus parameters settings of the RS Datalogger are used for the communication to the inverters via RS485-1:
- ◆ Address: 1-20.
- ◆ Baudrate: 9600bps.
- The datalogger is connected to a LAN supporting DHCP protocol for automatic IP address assignment.

The following figure shows the connections for the default configuration of RS Datalogger, the address for the inverters should be configured to 1-20:



Changing default settings of RS Datalogger

In case of any other configuration different from the one described in the previous chapter, the RS Datalogger must be configured with special settings. In order to change the settings of RS Datalogger, it's required to connect the RS Datalogger to a local area network and to connect a computer to the same LAN.

Connecting to the RS Datalogger using web browser

The first step is to connect to the RS Datalogger via the LAN, by opening a browser page and typing the IP address of the RS Datalogger. To know the IP address assigned to the RS Datalogger, please check the device list of the router.

The following picture shows the setting page of RS Datalogger:

RS Datalogger		Settings	Logs	List	Main
Now Today Total kwh/kwp	13.36 kW 0 kWh 5877 kWh 0	Logger Info.	RS Datalogger	Date & Time	2020-7-27 17:22:14
SENSORS		IP Address	192.168.1.187	Language	English
Irradiance Thermometer	29w/m ² 27.3°C	Server Address	54.38.38.66	Administration	admin
		Irradiance	29w/m ²	RS485-1 Search Starting Address	1
		Solar cell Temperature	27.3°C	RS485-2 Search Starting Address	21
		Irradiance Meter Address	31	Temperature Meter Address	32
		RS485-2 Configuration	Device	Power Limit	Disable
		Grid Configuration	Edit	Standard Code	IT (CEI 0-21 INTERNAL SPI)
		Active Power Control	Edit	Reactive Power control	Edit
		Digital Meter	Measurement Value		

The name and password necessary to access any setting page are both "admin":

Name :
 Password :

Logger info

The "logger info" page shows the basic info for the logger, including model name, S/N, FW version, database version. It is also possible to change the name for the logger, which will be visible on the web portal.

MODEL : RS Datalogger
 S/N : AL23SDLS0000001
 Version : 010608
 DB Version : 23107-03 / DBEX02
 Name :
 KWP :

Date & Time

In the "Date & Time" page, it is possible to set the time zone, to enable/disable NTP (Network Time Protocol) function, and change the NTP server:

On Off
 Europe/Rome
 pool.ntp.org

IP Address

In the "IP Address" page it is possible to change the IP mode to DHCP mode or fixed IP mode. When setting to fixed IP mode, ensure that the IP address is set according to the local router settings.

IP Mode:
 IP Address :
 IP Mask :
 Gateway :

Language

In the "Language" page it is possible to change the system language.

Language :

Server Address

The IP address of the Cloud Server is displayed in the "Server Address" field. This setting is not changeable.

Administration

In the "Administration" page it is possible to change the name and password necessary to modify settings.

Name :
 Password :
 Re-enter Password :

Irradiance

In the "Irradiance" page is shown the irradiance measure by the external sensor (if it is installed) and inside this page, a calibration value can be written to calibrate the irradiance, in W/m² unit.

Irradiance Calibration
 Value :

Solar Cell Temperature

In the "Solar Cell Temperature" page is shown the cell temperature measure by the external sensor (if it is installed) and inside this page, a calibration value can be written to calibrate the cell temperature, in °C unit.

Temperature
 Calibration Value :

RS485-1 Search Starting Address

To the RS485-1 port, can be connected maximum 20 inverters, which default addresses are from 1 to 20. The search starting address can be set to 1-216.

RS485-1 Search
 Starting Address :

RS485-2 Search Starting Address

To the RS485-2 port, can be connected maximum 20 inverters, which default addresses are from 21 to 40. The search starting address can be set to 1-228.

RS485-2 Search
 Starting Address :

RS485-2 Configuration

The RS485-2 port is a multi-function port, which can be configured as:

- Device
- Inverter
- Digital Meter

RS485-2 Configuration :

In "Device" mode, the RS Datalogger works as a device, so a host connected to the RS485-2 port, can get the information from RS Datalogger. This is used by Service operations only.

In "Inverter" mode, the RS Datalogger works as a host, so it communicates with the inverter(s) connected to the RS485 ports.

In "Digital Meter" mode, the RS Datalogger works as a host, so it communicates with the digital meter connected to the RS485-2 port (see the next chapter for the digital meter configuration).

Power limit

To enable the power limitation, the datalogger should be configured with the following settings:

- Enable the power limit function.
- Set the digital meter address according to the meter address settings (refer to the meter's user manual for more informations).
- Set the type of the digital meter used.
- Set the direction of the current sensor connected to the meter: the power from grid to load is considered as positive.
- Set the meter position according to the meter installation on load side, or on grid side.
- Set maximum feed-in grid power if needed.

The following picture shows the RS Datalogger default settings.

Function	Parameter
Power limit function	<input type="text" value="Disable"/>
Digital meter modbus address	<input type="text" value="1"/>
Digital meter type	<input type="text" value="Unknown"/>
Digital meter power direction	<input type="text" value="Positive"/>
Digital meter position	<input type="text" value="Meter on Grid"/>
Maximum feed-in grid power(w)	<input type="text" value="0"/>

Grid Configuration

The "Grid configuration" page is protected by Service password and it is reserved exclusively for Service use.

Standard Code

The "Standard Code" page allows to select the regulation related to the local standard for the grid connection.

Reactive Power Control

The "Reactive Power Control" page is protected by Service password and it is reserved exclusively for Service use.

Active Power Control

Active power control supports the over frequency derating. By setting the "Frequency Derating Function" to 1, this function is enabled and the active power control will be based on the start frequency with 100% of the output power and on the end frequency with 0% of the output power linearly.

1-AL23SPS1000000

Function	Parameter	Function	Parameter
Frequency Derating Function	<input type="text" value="0"/>	Over frequency derating start(0.01Hz)	<input type="text" value="5020"/>
Over frequency derating end(0.01Hz)	<input type="text" value="5270"/>		

Digital Meter

The "Digital Meter" page shows the values measured by the digital meter. When the system is configured to support the digital meter, it is possible to check the values in this page in order to confirm if the meter works properly.

Function	Value	Function	Value
L1 phase voltage(V)	0.0	L1-L2 phase voltage(V)	0.0
L2 phase voltage(V)	0.0	L2-L3 phase voltage(V)	0.0
L3 phase voltage(V)	0.0	L3-L1 phase voltage(V)	0.0
L1 phase current(A)	0.00	L1 phase watt(W)	0
L2 phase current(A)	0.00	L2 phase watt(W)	0
L3 phase current(A)	0.00	L3 phase watt(W)	0
L1 phase watt(VA)	0	L1 phase watt(VAR)	0
L2 phase watt(VA)	0	L2 phase watt(VAR)	0
L3 phase watt(VA)	0	L3 phase watt(VAR)	0
System watt(w)	0	System VA(VA)	0
System VAR(VAR)	0	L1 phase power factor	0.000
L2 phase power factor	0.000	L3 phase power factor	0.000
System power factor	0.000		

Registering the system on the portal

Register the system on the *Rsmonitoring* web portal, which can be found at:

<https://riello-rsmonitoring.com>

For more informations please, refer to the following website: <https://riello-solartech.it>

Troubleshooting

The indicators used to report any installation problems are the following:

- The LED on the RS Datalogger unit.
- The web interface of the RS Datalogger.
- The alarms logged on the App.
- The alarm LED on the inverter.

The following table summarizes the status of these indicators depending on the condition of the system.

Description	LED on RS Datalogger	Web interface on RS Datalogger
Inverter fault	Red led on	Specific fault message
Lost communication with meter	Yellow led on	Energy Meter lost
Lost communication with server	Yellow led blinking	LAN Unavailable
Lost communication with inverter	Green led blinking	Inverter Offline
Communication with inverter well	Green led on	N/A