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SenNet
Monitoring Solutions

Dataloggers series

DL150

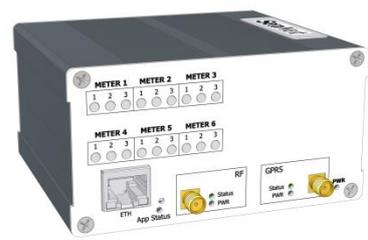**DL151**

DL170

DL171

DL172

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Introduction

The Dataloggers are data concentrators designed to capture information from various devices, such as meters (electric, water, gas, thermal, etc.) or environmental sensors (temperature, humidity, air quality...). The dataloggers can internally store the information captured and/or send it to an external server.

SenNet dataloggers are designed to offer the maximum performance in the market. Their main features are:

- **Universality:**
  - o Downstream: the datalogger can connect to a great variety of devices from different manufacturers, thanks to the large numbers of protocols implemented.
  - o Upstream: able to send the data to different platforms. The datalogger can be also connected to a SCADA or BMS.
  - o Standard architecture: Linux-based, which means greater stability and standardization.
- **Scalability**. Each datalogger can communicate with up to 100 metering devices, this means, that the dataloggers can be used for projects of different sizes; from small buildings to big ones. SenNet dataloggers are suitable for very different sectors, from industries to tertiary sector (shopping centres, hospitals, schools...).
- **Internal electricity meters** (models DL151, DL171 and DL172) with a wide metering range (5A - 5000A). Up to 6 three-phase meters or up to 18 single-phase meters.
- **Radio frequency integrated.** With a comprehensive submetering network of different devices. License free in Europe (available also with license free frequencies for USA and Asia). RF provides a wireless solution where it is too costly to lay cable. Our radio network has a mesh topology, which means, it is self-organized and more reliable.
- **Diversity of connections.** Apart from the radio frequency, the datalogger can read the data from different devices using GPRS/3G, GSM, Z-Wave, Ethernet, USB-WiFi, serial ports (RS232, RS485).

Which devices can be connected?

SenNet dataloggers are designed to be open and compatible with as much devices as possible. We have already developed the connectivity with more than 150 devices from different manufacturers.

The list of compatible devices from third-parties includes: Schneider, Carlo Gavazzi, Siemens, Ista, Relay, Diehl, Satec Global, Electrex, LEM, Circutor, Entes, Open Domo, Eldu, Flexim, Sauter, Seneca, Kontrel, Legrand, Hager, ABB, Eastron, Pilot Technology, EBC, Fuji Electronics, Power Sensors, Endress Hauser, Seinon, Advantech, Moxa, Novus, Itron, Niessen, etc.

SenNet dataloggers can capture the data from the different devices using a wide diversity of protocols. The dataloggers can capture data from external devices that have compatible interface. This can be done either via standard protocols, or via proprietary protocols implemented in the device. The main ones are listed below.

- **Modbus RTU and TCP** for communication with electric meters, temperature sensors, weather stations, photovoltaic inverters, gateways to third-party radio networks, etc.
- **MBUS** for communication with electricity and thermal meters...
- **IEC870-5-102** for utility meters
- **DLMS/COSEM** for utility meters.
- **IEC 62056-21 / IEC 61017** for utility meters
- **KNX** for communication with home-automation equipment
- **Z-Wave** for radio communication at smart homes
- **Proprietary protocols**: Apart from the standard protocols, the dataloggers support specific proprietary protocols developed by other manufacturers.

Please, contact Satel Spain or your SenNet distributor for further information concerning compatibility and protocols supported.

Depending on the model, SenNet dataloggers can have the following ports: RS485, RS232, Ethernet, GPRS/3G, USB and radio frequency. The models DL170, DL171 and DL172 include also digital inputs (8..30 Vdc) and outputs (8-30 Vdc).

How can be sent the captured data?

The mechanisms offered by the datalogger to access the data captured are:

- **Request mechanisms** (where the datalogger works as a server or pull)
  - Webserver to see the latest data received and download files in CSV format
  - Modbus TCP for access from SCADA or BMS systems
  - Web service to download the data in XML format
  - SNMP

- **Automatic delivery mechanisms**: (where the datalogger works as a client or push)
  - Sending CSV files with the data captured to an FTP server or to two different FTP servers
  - Via API REST, using different json formats: our own format (API SenNet) or third-party formats, such as DexCell, BlauLabs, Carriots...
  - MQTT to Sofia 2, for example

The mechanisms listed above may be concurrent, so that the same datalogger can be configured to automatically send data via TCP-IP and via FTP, and simultaneously being asked via Modbus TCP.

The data captured by the datalogger can be remotely obtained via:
  — Integrated GPRS module or 3G (only in models DL170, DL171 and DL172)
  — External router, connected to the Ethernet port.
  — WiFi (models DL150, DL1512) connected to the USB port

Internal electric meters

The dataloggers SenNet DL151, DL171 include three internal three-phase electricity meters that can be configured also as 9 single-phase (monophase) or as a combination of single and three-phase. The model DL172 includes 6 three-phase electricity meters (or 18 single-phase) with the same characteristics.

The internal electricity meters can be connected either to CTs or to Rogowski coils. CTs are recommended for currents up to 800 A. Rogowski coils are recommended for currents between 100 A and 5000 A.

The internal electricity meters work with standard current transformers type 0.33 V. The standard models supplied by SenNet are intended for the following rated currents: 5 A, 50 A, 100 A, 150 A, 400 A, 800 A. Other current transformers can be provided upon request.

The parameters read by the internal meters are: energy (active, reactive and apparent), power (active, reactive and apparent), power factor, current, voltage, frequency. The device can also detect cuts or voltage drops. It can also detect voltage sags.

The electricity meters can do summations, this means, that when two current transformers are embraced to two different circuits but the cables are joint to the same current-reference terminal, the current read is the summation of the two currents (the voltage reference must be also connected two both circuits and the phase of both circuits must be the same).

Compliance with standards

SenNet dataloggers comply with the following standards

- ETSI EN 300 220-1

Electromagnetic compatibility:

- Directive 2004/108/EC and
- Directive 1999/5/EC (R&TTE Directive)

Electrical safety:

- Directives 2006/95/EC and 2001/95EC

Moreover, the internal electricity meters (DL151, DL171 and DL172 models), comply with the following standards:

- EN 50470-1
- EN 50470-3
- IEC 62053-21
- IEC 62053-23

All internal electricity meters are Class 1 (kWh).

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TECHNICAL CHARACTERISTICS SENNET SERIES DATALOGGERS

Depending on the model, SenNet dataloggers have the following characteristics

Characteristics	DL150	DL151	DL170	DL171	DL172
Power supply	5Vdc	5Vdc	8..30Vdc	8..30Vdc	8..30Vdc
Conectivity					
Ethernet	✔	✔	✔	✔	✔
GPRS	-	-	✔	✔	✔
Wi-Fi (USB port)*	✔	✔	✔	✔	-
HDMI	optional	optional	-	-	-
Communications					
RS485	✔	✔	✔	✔	✔
RS232	-	-	✔	✔	✔
Accesories RF					
SenNet RF 868MHz	optional	optional	✔	✔	✔
Z-Wave®	optional	optional	optional	optional	-
Processor	ARM® Cortex ® -A8-based core (300MHz-1GHz)				
RAM memory	512 MB				
eMMC (SO) memory	2 GB / 4 GB				
Card slot (micro-SD) form memory expansion	✔	✔	✔	✔	✔
Internal battery (up to 45 min)	✔	✔	✔	✔	✔
RTC (real time clock)	✔	✔	✔	✔	✔
Internal energy meters Active and reactive energy, power, power factor, current, voltage, surges, power cuts	-	3 three-phase or 9 single phase **	-	3 three-phase or 9 single phase **	6 three-phase or 9 single phase ***
CT or Rogowsky	-	✔	-	✔	✔
Inputs and outputs					
Current output (5V@300mA)	-	-	✔	✔	✔
Standard output (VinpUT@100mA)	-	-	4	4	4
Standard input	-	-	3	3	3
Software All-in-one	optional	optional	optional	optional	optional
Operating system	Linux 3.8.13				
Mounting	DIN rail				

*   USB port for connexion
**   It is also possible to use it in the following combinations: 1 three-phase meter + 6 single-phase or 2 three-phase + 3 single- phase
***   It is possible to configure other combinations of single-phase and three-phase meters. For instance: 4 three-phase meters 6 single-phase meters.