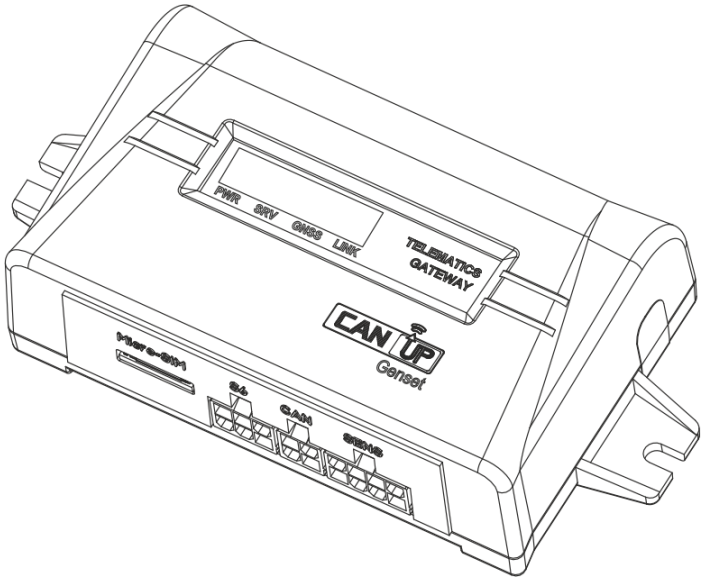
TELEMATICS GATEWAYS



CANUp 27 Standard / Pro / Genset

CATALOGUE OF FUNCTIONAL MODULES

Version 2.1

UNUM IIoT Platform

IoT BURGER

TECHNOTON
ADVANCED MACHINERY TELEMATICS

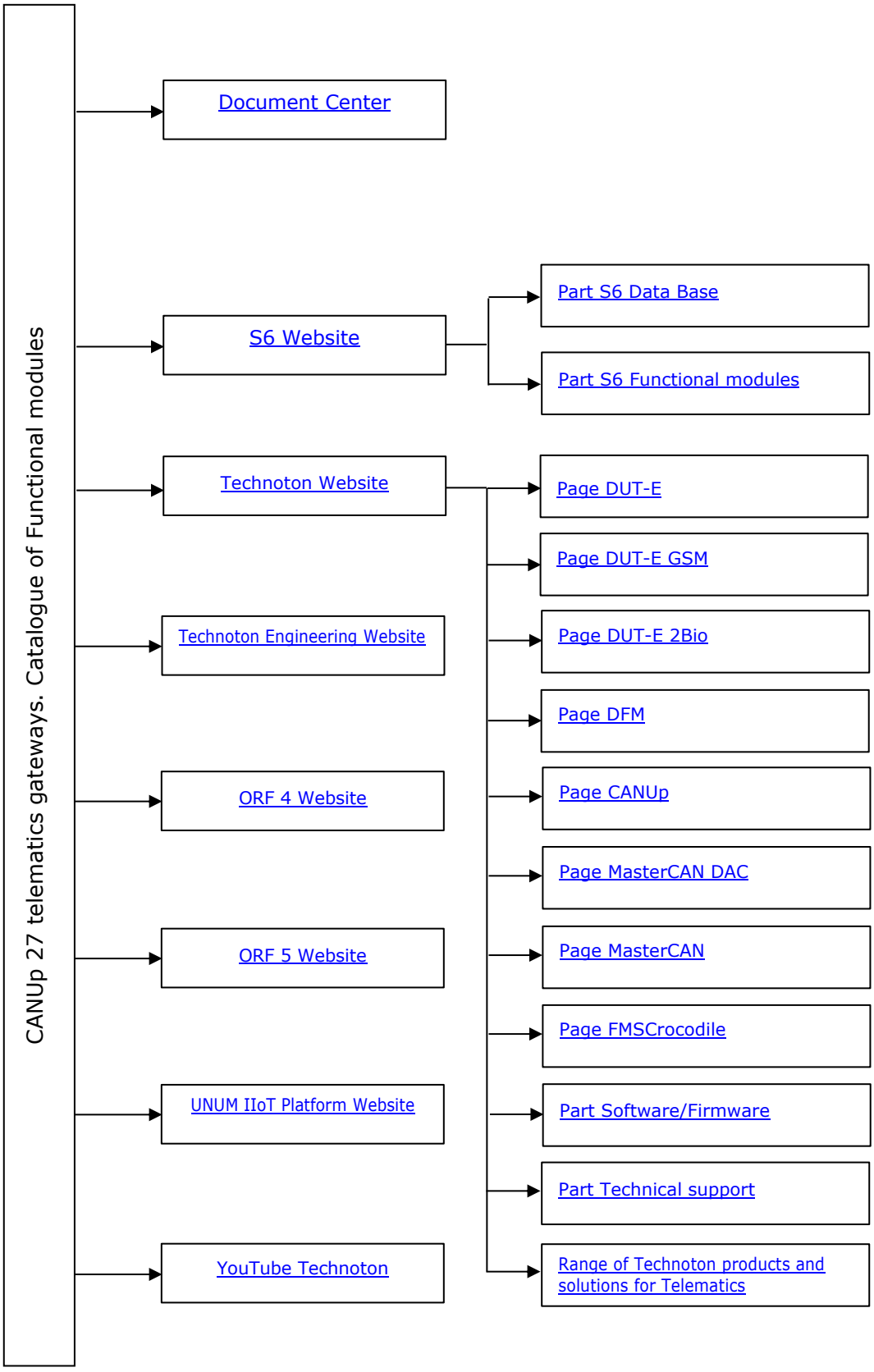
E28 10 R - 05 2701

Contents

Revision history

Version	Date	Editor	Description of changes
1.0	05.2023	OD	Basic version.
2.0	02.2025	OD	• Model codes of the gateways are updated. • List and descriptions of Functional modules are updated. • New Functional modules are added: - Fueling/Fuel Discharge Analyst FM; - Commands FM; - Modbus S6 FM (is introduced instead of deleted Modbus SPN FM). etc.
2.1	03.2026	OD	• A new version of the CANUp 27 Pro S7 LTE G gateway (Model code 30) has been introduced, combining the functionality of CANUp 27 Pro and CANUp 27 Genset sets.

Structure of external links



Terms and Definitions

IoT Burger is the Technology of creating smart sensors and complex telematics IIoT devices operating in real time with built-in analytic features (further on – IoT Burger). The basis of IoT Burger is the software/hardware core, a set of ready-to-use universal Functional Modules, the database of standartized IoT parameters.

Particular features of IoT Burger:

- inbuilt analytic features for maximum treatment of signals within the device itself;
- a possibility to design devices with extremely low power consumption;
- doesn't require programming in the majority of applications, flexible setup;
- using inexpensive industrially manufactured equipment parts;
- measurement and treatment of "quick" processes which is impossible to implement using cloud technologies;
- an option of ready Reports delivery to the user avoiding server platforms;
- the inbuilt system of data authenticity assurance (self-diagnostics, authorization, impact control).

The technology provides for the availability of several measurement channels in any device including pre-set analytical treatment (filtration, linearization, thermal compensation) and the controlled error of measurement.

Devices created using IoT Burger may be united to form a wire-connected or wireless connection network. Data may be transmitted to the telematics server, to popular IoT platforms, by SMS, E-mail, to social networks.

At present, 2G/3G/LTE/NB-IoT/Wi-Fi/BLE data transmission standards are used in devices with IoT Burger. The reports transmitted contain data on instant and average values of Parameters, Counters, Events. The flexible system of Reports setup enables the user to select the optimal ratio of the data completeness and the volume of traffic.

All models of CANUp 27 telematics gateways are designed based on IoT Burger Technology.

S6 is the Technology of combining smart sensors and other IoT devices within one wire network for monitoring of complex stationary and mobile objects: vehicles, locomotives, smart homes, technological equipment etc. The Technology is based and expands SAE j1939 automotive standards.

Information on cabling system, service adapter and S6 software refer to CAN j1939/S6 Operation manual.

All models of CANUp 27 telematics gateways are designed based on S6 Technology.

S7 — Technology designed for wireless collection of data from unattended sensors in systems of industrial and automobile Telematics. S7 Technology is recommended for use in facilities where wiring is impossible or hard to install.

S7 Technology implements Bluetooth 4.X Low Energy (BLE) as a communication channel.

S7 Technology provides ultra-low power consumption and a long period of independent operation for smart sensors and other IoT devices.

On the application level, S7 Technology is fully compatible with S6 Technology which uses cabling.

Advantages of S7 Technology:

- Simple design of data transmission protocol;
- Low power consumption, a potential for fully independent operation of sensors for several years;
- Option of data collection by several data recipients at one time.

For models CANUp 27 Pro of Telematics gateways, we are in the process of preparation for introducing S7 Technology.

CAN (Controller Area Network) — serial digital bus-type communication interface which conforms with ISO 11898-1:2003 International Standard. Various high-level protocols can be used in CAN-bus for data transfer: SAE j1939, CANopen, DeviceNet, CAN Kingdom etc. CAN-bus serves to unite different executive electronic devices and sensors into a single network in the automobile industry or in systems of industrial automation.

ISOBUS – is a communication protocol used in farming machinery which complies with ISO 11783 standard and is based on SAE j1939.

ISOBUS bus contains Parameters of farming machinery operation and besides "classical" Parameters (total fuel consumption, engine rpm, cooling agent temperature), it also includes Parameters of attached equipment (plough, sowing machine, mowing machine, cultivator, winnowing machine, spraying machine etc.). Over 7000 Parameters (SPN) of farming machinery operation complying with ISOBUS protocol are included into S6 Database.

MODBUS RTU – is the industrial communication protocol based on serial data transfer (RS-485/RS-232 interface). It is used for reliable data exchange based on Master/Slave type of relation between electronic devices in automation and monitoring systems.

j1708 — serial digital bus-type communication interface. j1708 bus is used for data transfer and data exchange between the engine controller and other electronic devices in some Vehicles. The level of data presentation meets SAE j1587 Standard.

UNUM IIoT Platform — platform of the industrial Internet of Things which serves for creation and subsequent management of Telematics services of Complicated machines in different industries (power industry, road, water and railway transport, farming, mining industry etc.). It uses special hardware/software set — Database S6 of stanartized Parameters, design and data transfer technologies, IIoT Onboard equipment, cloud software, service hardware/software.

ORF 4 / ORF 5— is the by Technoton telematic services designed for receiving and processing Onboard reports via Internet, displaying Operational Dataoverlapped on area maps, information storage in database and Analytical reports generation upon user's request.

UNUM Genset — specialized Telematics service designed by Technoton which is aimed at real-time monitoring and Post-analysis of Diesel generators performance.

PGN (Parameter Group Number) — is a combined group of S6 parameters, which has common name and number. Functional modules (FM) of the Unit can have input/output PGNs and setup PGNs.

SPN (Suspect Parameter Number) — informational unit of S6. Each SPN has determined name, number, extension, data type and numerical value. The following types of SPN exist: Parameters, Counters, Events. SPN can have a qualifier which allows qualification of parameter's value (e.g. – Onboard power supply limit/Minimum).

Analytical report (Report) is a UNUM IIoT Platform software tool used to analyze the operation of an Object based on Parameters, Counters, Events, and malfunctions over a user-selected time period. Data in Reports can be presented as widgets such as lists, tables, and charts.

Complicated machine — a vehicle or a fixed object that have one or several engines, fuel tanks and a great number of standard and additional sensors. The particularity of complicated machines' Telematics is determined by a broad set of onboard equipment with different interfaces and by the need to integrate standard data buses and analog devices into a single monitoring system.

Counter — cumulative numerical characteristic of Parameter. Counter is displayed by a single number and over time its value is increasing. Examples of counters: fuel consumption, trip, engine hours counter etc.

Dashboards are UNUM IIoT Platform software tools intended for real-time monitoring of an Object's Parameters, Counters, Events, and malfunctions. Data on Dashboards is visualized using various widgets such as gauges, charts, numeric indicators, lists, tables, and maps.

Dashboard template — set of widgets configured for specific SPN / VSPN and linked to a specific task selected for Operational monitoring of the Asset performance.

Diesel generator (DG) — independent power source. It can be fixed or mobile. It consists of one or several internal combustion engines producing mechanical power and one or several generators (alternators) converting mechanical power into electric power.

Edge Computing — is a computing method allowing data procession in the device itsef (data collection location). During Edge Computing access to data is provided via Internet.

Edge Computing ensures maximum data processing rate and communication capacity, no delays and instant response to received data.

Event — relatively rare and sudden change in SPN. For example, applying the magnetic field to the fuel flow meter in order to falsify indications of the hourly fuel consumption is the "Interference" Event. An Event can have one or several characteristics. Thus, the "Interference" Event has the following characteristics: date/time and duration of the interference. When the Event occurs, a terminal unit registers the time of occurrence, which is later mentioned in a report on the event. Thus, the Event is always attached to exact time and place of occurrence.

Function module (FM) unit-embedded component of hardware and software combination, executing a group of special functions. Uses input/output PGNs and settings PGNs.

GNSS (Global Navigation Satellite System) — system for area positioning of an object through satellite signal processing. GNSS is composed of space, ground and user segments. Currently, there are several GNSSs: GPS, GLONASS, Galileo, BeiDou.

Measurement channel — a structurally or functionally separate part of a measurement system that performs all stages of the measurement process, from receiving the measured value to obtaining the final measurement result.

Model code — digits reflecting the product modification. For CANUp 27 telematic gateways, the model code is identified by the 1st and 2nd digits of its serial number placed on the nameplate in the bottom portion of its casing or on its packing label.

Monitored object (Asset, Object) — mobile or fixed Object monitored by means of the Telematics system.

Onboard equipment (OE) efers to UNUM IIoT Platform components installed directly on board the monitored Object.

Onboard reports (the Reports) — information on the Object which a Telematics system user receives in accordance with his specified requirements. The Reports are generated by a terminal unit both periodically (Periodic reports) and on Event occurrence (Event report).

Operational data — information on the monitored Object location and its operation parameters transferred by CANUp 27 to the Telematics server in real time. It includes data on the coordinates, speed and direction of movement, fuel volume in the tank etc. Operational data are updated as new data updates are received.

Online monitoring (Operational monitoring) — remote control of the Object location and its performance parameters in real time, accumulation of data and generation of Analytic reports upon request of a Telematics service user.

Parameter — monitored object characteristic changing with time or space. For example, speed, fuel volume in the tank, hourly fuel consumption, coordinates. Parameter is usually displayed in the form of graph, or averaged data.

Post-analysis — analysis of the monitored Object operation which is conducted based on Analytic reports for the period of time selected by the user. The data received are used in the owner company business activities (accounting, management accounting, maintenance etc.).

Route — data array containing the coordinates, speed and direction of the monitored Object movement. It corresponds to the vehicle route on the terrain. It is displayed by lines on the map. The movement direction is displayed with arrows.

Server (AVL Server) — hardware /software set of the Telematics service aimed at Operational data processing and storage, generating Analytic reports and their transfer via Internet upon users' requests.

Telematics terminal (Tracking device, Telematics unit) — Monitoring system component performing the following functions: reading signals from standard and additional sensors mounted on the monitored Object, determining the location and transfer of data to the Telematics system server.

In case of using CANUp 27 gateway within the Telematics system, the Terminal is not required.

Telematics system — comprehensive solution for tracking monitored Objects in real time and for Post-analysis of their operation. In includes On-board equipment, Communication channels, the Telematics server.
E.g. the main monitored operation specifications for a Vehicle are: Route, fuel consumption, working time, technical integrity, safety.

For Diesel generators the main specifications are: location, frequency, current, voltage, generator power, fuel consumption, working time, technical integrity of units etc.

Vehicle an object controlled within Telematics system. Usually Vehicle means a truck, tractor or bus, sometimes a locomotive or river boat. From Telematics system point of view, stationary objects are also considered to be vehicles: diesel gensets, stationary tanks, boilers/burners.

Unit is an element of vehicle on-board equipment compatible with S6 bus, which uses S6 Technology or S7 Technology.

Introduction

The current catalogue contains the description of **Functional modules** (further on — FM) which are part of **CANUp 27 telematics gateways** (hereinafter CANUp 27), developed and manufactured by Technoton company, Model codes:

- **11** — CANUp 27 Genset 2G;
- **12** — CANUp 27 Standard 2G;
- **14** — CANUp 27 Pro S7 Wi-Fi;
- **15** — CANUp 27 Pro S7 LTE E;
- **16** — CANUp 27 Pro S7 LTE A;
- **17** — CANUp 27 Pro S7 LTE G;
- **18** — CANUp 27 Genset LTE E;
- **19** — CANUp 27 Genset LTE A;
- **20** — CANUp 27 Genset LTE G;
- **30** — CANUp 27 Pro S7 LTE G.

The Model code of CANUp 27 is identified by the first two digits of its factory serial number located below on the label, in the bottom portion of the unit casing or on the label of packing.

Functional modules of CANUp 27 — are internal hardware / software components of the gateway designed to perform certain functions; they have specific input/output data and settings (SPN).

This cataloque contains information on the purpose of Functional modules of CANUp 27 gateways and instructions regarding work with FM, information of SPN displayed and/or edited with the help of Service CANUp service software (also see the document CANUp 27 telematics gateways. Operation manual).

Advantages of Functional modules:

- **Processing speed**. Operation in real time with the period of sending data packets — 0.01…10 s. The modules operate independently from each other; this allows to execute several tasks at once without any delays and congestions, record quick Events and enhance Reports detailzation at the monitoring Server. Minimum Server computing capacity is employed for data processing.
- **Reliability**. Operation asynchrony reduces the risk of conflicts between modules and optimizes the use of computing resources. Stable operation of the internal software. Time-tested electronic components and inbuilt and service software are used.

- **Intellectuality**. IoT Burger Technology and the use of Edge computing method provide data processing and analytics right inside the Unit itself, without use of additional devices. Work with several Measuring channels which have preset signals processing and controlled measurement error.
- **Module-type hardware/software architecture**. The general building architecture and the single data transfer protocol for cable and wireless data transfer (by means of S6 Technology and S7 Technology respectively) provide assured compatibility and reliability of the whole set of connected equipment.
- **Convenience**. Data presentation in the unified format for its further processing by the cloud software and algorythms of machine learning.
- **Cost-effectiveness**. Reliable element base dedicated for special industrial use in severe operating conditions or in conditions of interference. Low power consumption.
- **Flexibility**. Simple service software for configuration of devices.
- **Communicability**. Lower load on communication channels. Stable operation of devices in case of connection failures or temporary disconnection of communication channels.
- **Safety**. The inbuilt system of data reliability assurance (self-diagnostics, authorization, control of unauthorized impact).
- **Many years of successful experience** in practical accomplishment in the field of monitoring fuel and Parameters of mobile, fixed and industrial Assets.
- **Conformity with European and national automotive standards**, high quality technical support and documentation.

S6 SK service adapter (purchased separately) and Service CANUp software are used for work with FM of CANUp 27 gateways. The software current version can be downloaded at https://jv-technoton.com/, Section Software/Firmware.

The procedure for CANUp 27 connection to the PC with the help of S6 SK service adapter and detailed description of Service CANUp service software interface are provided in the document CANUp 27 Telematics gateways. Operation manual.

ATTENTION: During your work with FM of CANUp 27 gateways you are to follow strictly The Manufacturer recommendations provided in this catalogue.
The Manufacturer warrants CANUp 27 gateways compliance with requirements of technical regulations, on condition that operating instructions for work with FM set out in this catalogue are observed.

1 List of CANUp 27 Functional modules

The operation of CANUp 27 models (reception and internal real-time processing of Parameters, maintenance of Counters, recording of Events, configuration and self-diagnostics) are ensured by well-concerted operation of assemblies of appropriate Functional modules (see table 1).

The format of Parameters (SPN) of CANUp 27 FM complies with S6 Database (DB). The detailed description of SPN, composition and content of messages (PGN) of CANUp 27 FM are provided at http://s6.jv-technoton.com/ (you need to get registered to work with DB S6).

Table 1 — List of CANUp 27 Functional modules

#	Functional modules designation	CANUp 27 models				
		Standard (Model code **12**)	**Pro LTE** (Model codes **15**, **16**, **17**)	**Pro Wi-Fi** (Model code **14**)	**Genset** (Model codes **11**, **18**, **19**, **20**)	**Pro S7 LTE G** (Model code **30**)
1	Self-diagnostics FM	+	+	+	+	+
2	Onboard Clock FM	+	+	+	+	+
3	Vehicle Power Supply FM	+	+	+	+	+
4	Battery FM	+	+	+	+	+
5	GNSS FM	+	+	+	+	+
6	GNSS Coordinates Recorder FM	-	+	+	-	-
7	Geofence FM	-	+	+	-	-
8	Reports Generator FM	+	+	+	+	+
9	Simple Reports Registrator FM	+	+	+	+	+
10	Communicator FM	+	+	-	+	+
11	WiFi Communicator FM	-	-	+	-	-
12	Collector 1A1F1D FM	+	+	+	+	+
13	Axle Load Control. Tractor Unit FM	+	+	+	-	-
14	Engine Monitoring FM	-	+	+	+	+
15	Genset FM	-	-	-	+	+
16	Modbus Devices Management FM	-	-	-	+	+
17	Modbus S6 FM*	-	-	-	+	+
18	Additional Equipmer Control FM	-	+	-	+**	+**
19	Statistics FM	-	+	+	-	-

#	Functional modules designation	CANUp 27 models				
		Standard (Model code **12**)	**Pro LTE** (Model codes **15**, **16**, **17**)	**Pro Wi-Fi** (Model code **14**)	**Genset** (Model codes **11**, **18**, **19**, **20**)	**Pro S7 LTE G** (Model code **30**)
20	S6 Bus FM	-	+	+	+	+
21	Parameters Observer FM	-	-	-	+	+
22	Base S7	-	+	+	-	+
23	Accelerometer FM	-	+	+	-	+
24	Events Registrator FM	+	+	+	+	+
25	Alarm Button FM***	+	+	+	+	+
26	Commands FM	-	-	-	+	+
27	Fueling/Fuel Discharge Analyst FM	-	+	-	-	+

* Modbus S6 FM is introduced instead of deleted Modbus SPN FM.
** Additional Equipment Control FM for CANUp 27 Pro S7 LTE G (Model code 30) and CANUp 27 Genset is an internal Functional module and is not displayed in the Service CANUp software. Its settings are combined with the settings of the Modbus Devices Management FM.
*** Alarm Button FM has no settings; therefore, it is not displayed in Service CANUp software.

ATTENTION: The Manufacturer is committed to steady improvement of CANUp 27 gateways and reserves the right to modify technical capabilities of new versions of their Functional modules without deterioration of the product consumer qualities.

2 SPN of CANUp 27 Functional modules

2.1 Self-diagnostics FM

Self-diagnostics FM — is designed for user authorization, identification of CANUp 27 passport data, accounting of the operation period and active malfunctions, as well as for the Unit reset by using software.

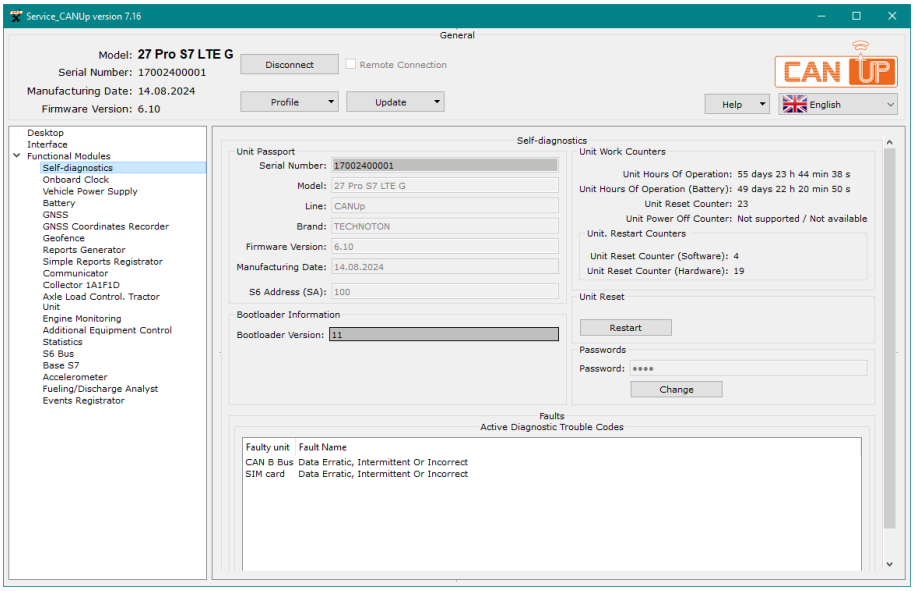


Figure 1 — Example of settings of the Self-diagnostics FM in Service CANUp software

Table 2 — Self-diagnostics FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Unit passport PGN 62995				
521120	Serial number	On the fact	No	Serial number is a set of numbers that is used for identification of specific CANUp 27. Serial number CANUp 27 has the following format: AABBB C DDDDD, where: AA – code of CANUp model; BBB – digits that reflect changes product changes; C – Manufacturer code; DDDDD – sequential number. Setting is not available for editing.
521345	Model	On the fact	No	Model – this is version of the CANUp 27 inside of CANUp product line. Each model has its own functional and constructive features: - CANUp 27 Standard – model with standard functionality; - CANUp 27 Pro LTE / Pro Wi-Fi – models with extended functionality; - CANUp 27 Genset – special model for Diesel generators. Setting is not available for editing.
521123	Line	CANUp	No	Name of the product line. The line represents a group of similar products – online telematics gateways produced under general trademark CANUp. Setting is not available for editing.
521344	Mark	TECHNOTON	No	Name of CANUp 27 Manufacturer. Setting is not available for editing.
521121	Firmware Version	On the fact	No	Version of built in Software CANUp 27. Setting is not available for editing.
521125	Date Of Production	On the fact	No	Date (day, month, year) of CANUp 27 production. Setting is not available for editing.

SPN	Name	Factory value	Unit of measure	Clarification
521188	Address at S6 (SA) Bus	100	No	Network address CANUp 27 which is connected via S6 Technology. Network address value can be 100 only.
Unit Work Counters PGN 62994				
521116	Unit Hours Of Operation	On the fact	s	Counter of summarized working time of CANUp 27 since its production moment*.
521116/16.1	Unit Hours Of Operation/ 16.1 Battery	On the fact	s	Counter of summarized working time of CANUp 27 using the inbuilt accumulator battery (in case there is no power supply from the external source) since its production moment*.
521118	Number Of Unit Restarts	On the fact	pcs.	Counter of sensor's processor restarts at a time when the power is On or there is an impact of conducted interferences of the vehicle's on-board network*. Restarts accounting is carried out since production date of the CANUp 27.
Unit. Restart Counters** PGN 63280				
521118/30.0	Unit Reset Counter/ 30.0 Software	On the fact	pcs.	Counter of the number of CANUp 27 processor restarts, in accordance with preset factory setting; by default – one restart in 24 hours*. The counting of restarts begins from the moment of CANUp 27 delivery from the factory.
521118/30.1	Unit Reset Counter/ 30.1 Hardware	On the fact	pcs.	Counter of the number of CANUp 27 processor restarts in case of power supply failure (onboard circuit outage and complete battery discharge) or in case of the Unit inbuilt software failure*. The counting of restarts is conducted from the moment of CANUp 27 delivery from the factory.
Passwords PGN 63017				
521593/3.3	Password/ 3.3 Installer	1111	No	Password is entered for user authorization while establishing connection session between CANUp 27 and service Software for configuring the Unit. Password is a specific combination of four digits. By default, used: Login – 0, password – 1111. User can change password of the CANUp 27. After entering and confirming the new password is recorded into internal memory of the CANUp 27.
Active diagnostic trouble codes PGN 65226				
521044	Fault identifier (SID+FMI)	On the fact	No	List of current CANUp 27 malfunctions are displayed at the settings field (in case of its presence — up to 10). For each active malfunction is indicated following: - faulty nod; - malfunction name. This setting allows to monitor CANUp 27 working performance. In case of lack of active malfunctions, the following message is displayed "No malfunctions".
Unit Reset PGN 63206				
521272	Reset Enable	No	No	Button for Unit restart (reset) using software, i.e restart without disconnection from external power source.
Bootloader information PGN 63009				
521122	Bootloader Version	On the fact	No	Displays the current version of the loader used for correct starting the inbuilt Unit software (firmware), as well as for the Unit firmware update.
* The User cannot reset this Counter himself. Only the Manufacturer or the Regional Service Center are authorized to do it. ** Only for CANUp 27 Pro / Genset.				

2.2 Onboard clock FM

Onboard clock FM — designed for generation of signals of time and its transmission to other functional modules of CANUp 27, as well as for flexible adjustment of time for transmission of periodic Reports (sending Reports at specified moments of time)*.

* This setting is valid only for CANUp 27 Pro LTE / Pro Wi-Fi / Genset.

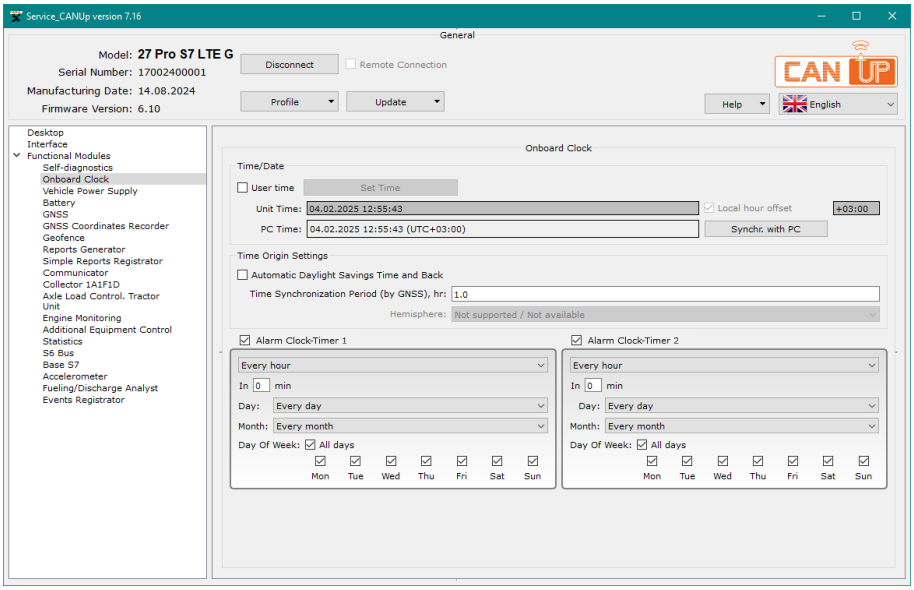


Figure 2 — Example of settings of the Onboard clock FM in Service CANUp software

Table 3 — Onboard clock FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Time/Date PGN 65254					
959	Seconds	On the fact	s	0…62.5	Present time — seconds*.
960	Minutes	On the fact	Min	0…250	Present time — minutes*.
961	Hours	On the fact	h	0…250	Present time — hours*.
963	Month	On the fact	month	0…250	Present date — month*.
962	Day	On the fact	d	0…62.5	Present date — day*.
964	Year	On the fact	year	1985…2235	Present date — year*.
1601	Local minute offset	0	min	0…59	Time displacement (in minutes) in relation to Coordinated Universal Time that matches with local time (Time zone). It is activated and available for editing when configuring present time manually and when synchronizing time with PC.
1602	Local hour offset	+3	h	-24…+24	Time displacement (in hours) in relation to Coordinated Universal Time that matches with local time (Time zone). It is activated and available for editing when configuring present time manually and when synchronizing time with PC.
Time Origin Settings PGN 63011					
521350	Automatic Daylight Savings Time and Back	Off	No	On/Off	Enabling/disabling of automatic present time switching to winter/summer.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521353	Time Synchronization Period (by GNSS)	1.0	h	0…210554000	Time interval value (in hours), after which there is an automatic present time adjustment performed according to GNSS signals. This setting is available for editing by user. Automatic time adjustment with GNSS signals is not carried out when the value is 0 h.
Alarm Clock-Timer 1 PGN 63250** Alarm Clock-Timer 2 PGN 63251**					
521461	Alarm Clock-Timer Enable	On	No	On/Off	Field for switching ON/OFF the "Timer/Alarm" mode. In this field you can adjust transmission of a periodic Report at specific time for CANUp 27 Pro.
959	Seconds	0	s	0…59	Field for entering seconds during setting specific time for the Report transmission with periodicity "Once in 24 hours".
960	Minutes	0	min	0…59	Field for entering minutes during setting specific time for the Report transmission with periodicity "Once in 24 hours"/ "Every hour".
961	Hours	0	h	0…23	Field for entering hours during setting specific time for the Report transmission with periodicity "Once in 24 hours".
962	Day	Every day	d	1…31/ 255 (Every day)	Field for selection a specific day for the periodic Report transmission.
963	Month	Every month	month	1…12/ 255 (Every month)	Current date — month.
521411	Day Of Week	On	No	On/Off	Fields for switching ON/OFF the tansmission of a periodic Report on a specific day of the week. They contain a bit mask with indication of the respective day of the week: 0 - Off. 2^0- Monday. 2^1- Tuesday. 2^2- Wednesday. 2^3- Thursday. 2^4- Friday. 2^5- Saturday. 2^6- Sunday. 127 – all days of the week.

* Used during Events registration. Present time is available for user for editing manually or synchronizing of date/time with computer clock. By default, time is set in UTC format (Coordinated Universal Time standard) and displayed according to local displacement.
**Only for CANUp 27 Pro / Genset.

2.3 Vehicle Power Supply FM

Vehicle Power Supply FM — is designed for monitoring: the onboard circuit ON status and its voltage, the current onboard circuit mode, ignition key position, period of Vehicle operation in different modes of the onboard circuit operation, maximum time of the starter uminterrupted operation, the number of engine starts*.

* In the process of preparation for introduction.

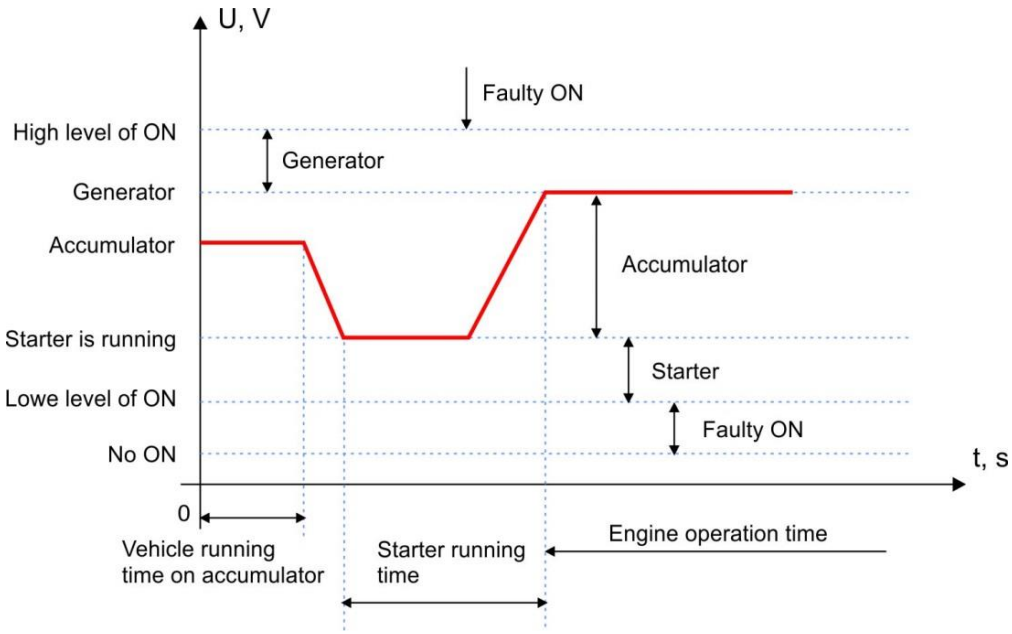


Figure 3 — Operation modes on onboard network (ON) voltage level

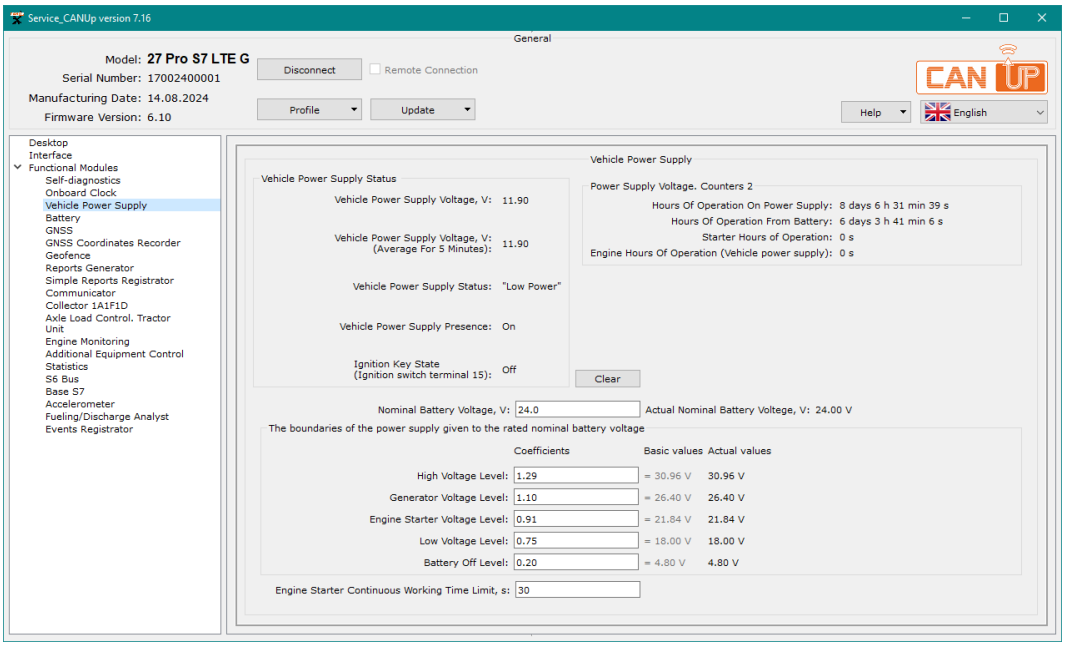


Figure 4 — Example of settings of the Vehicle Power Supply FM in Service CANUp software

Table 4 — Vehicle power supply FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Vehicle Power Supply Status PGN 63089					
521055	Vehicle Power Supply Voltage	On the fact	V	0…3212.75	Shows current value of ON voltage.
521055/2.9	Vehicle Power Supply Voltage/ 2.9 Average For 5 Minutes	On the fact	V	0…3212.75	Shows average value of ON voltage within previous 5 minutes.
521056	Vehicle Power Supply Status	On the fact	No	Off/ Lowe level/ Accumulator/ Starter/ Generator/ High level	Shows current mode of ON in accordance with user-defined borders of ON voltage levels of Vehicle (see figures 3, 4).
521076	Vehicle Power Supply Presence	On the fact	No	On/Off	Displays the current state of the board (On/Off) in accordance with the user-set voltage level of the system trip (see figures 3, 4).
521049/16.2	Ignition Key State/ 16.2 Ignition switch terminal 15	On the fact	No	On/Off	Displays the current position of the Vehicle ignition key (On/Off). The voltage supply to terminal 15 of the Vehicle ignition key indicates that the ignition key is in the ON position.
Power Supply Boundaries PGN 63067					
521075	Nominal Battery Voltage	24	V	0…60	Field for entering a nominal value of accumulator voltage of Vehicle (U_{nom}=12V/24V).
521063	High Voltage Level	1.29	No	0…1.99	Field for entering value of high voltage level of onboard network (1.29•U_{nom}) (see figures 3, 4). Entered value of voltage is used as a threshold for recording "Faulty ON" Event.
521064	Generator Voltage Level	1.10	No	0…1.99	Field for entering value of voltage level of generator, i.e. when engine of Vehicle is running (1.10•U_{nom}) (see figures 3, 4).
521065	Engine Starter Voltage Level	0.91	No	0…1.99	Field for entering value of voltage level starter is running, i.i when Vehicle's engine is starting (0.91•U_{nom}) (see figures 3, 4).
521067	Low Voltage Level	0.75	No	0…1.99	Field for entering value of low voltage level of ON (0.75•U_{nom}). Entered value of voltage is used as a threshold for recording "Faulty ON" Event (see figures 3, 4).
521068	Battery Off Level	0.20	No	0…1.99	Field for entering value of voltage level when ON switches off (0.20•U_{nom}) (see figures 3, 4).
521074**	Engine Starter Continuous Working Time Limit	30	s	5…30	Field to enter the value of allowed time for starter uninterrupted operation (see figures 3, 4). The set time period is used as threshold value during recording of Event "Exceeded allowed time for starter uninterrupted operation".
Power Supply Voltage. Counters 2 PGN 63557					
521173	Hours Of Operation On Power Supply	On the fact	s	0…4211081215	Counter of total operating time of Vehicle from onboard network since CANUp 27 installation to the Vehicle*.
521172	Hours Of Operation From Battery	On the fact	s	0…4211081215	Counter of total operating time of Vehicle from accumulator since CANUp 27 installation to the Vehicle*.
521170	Starter Hours Of Operation	On the fact	s	0…4211081215	Counter of total operating time of starter since CANUp 27 installation to the Vehicle*.
521190/16.0	Engine Hours Of Operation/ 16.0 Vehicle power supply	On the fact	s	0…4211081215	Counter of total operating time of Vehicle's engine since CANUp 27 installation to the Vehicle*.

* If necessary, a user can himself reset the Counter.
**Valid only for models CANUp 27 Pro / Genset.

2.4 Battery FM

Battery FM — designed for power supply status check, built-in battery condition and total CANUp 27 operation time from the battery.

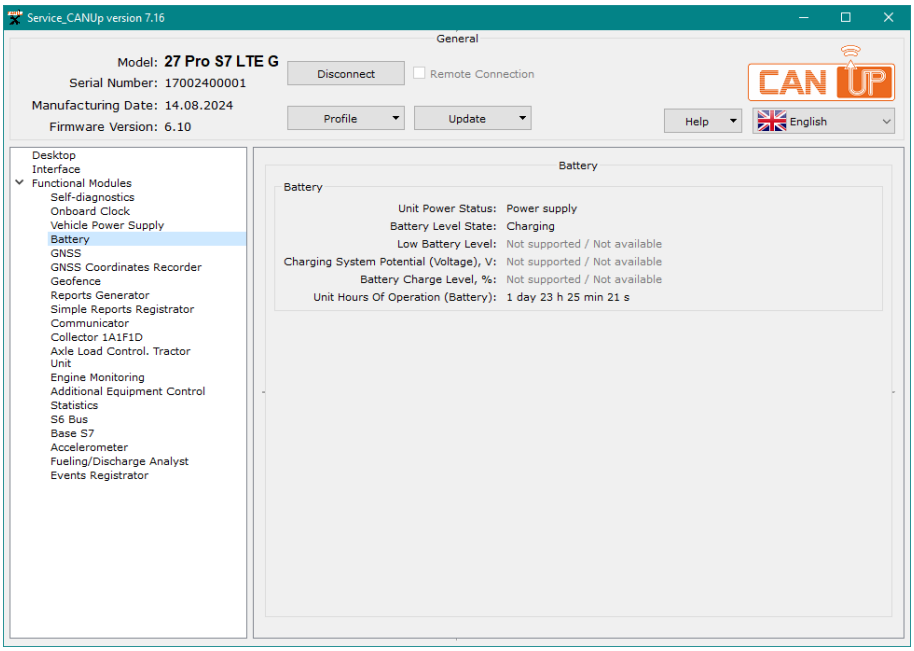


Figure 5 — Example of settings of the Battery FM in Service CANUp software

Table 5 — Battery FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Battery PGN 63086				
521129	Unit Power Status	On the fact	No	Current power-supply status of CANUp 27: - powered from embedded power source; - powered from on-board electrical system; - power is off; - power-supply status is not available/not supported by this device. Since during work with the service software and with cable connection to a Unit data exchange between the PC and CANUp 27 takes place only when power is supplied from the external power source, the power supply status during CANUp 27 configuration is always identified as "Power supply from the onboard circuit".
521050	Battery Level State	On the fact	No	Current charge status of inbuilt battery of CANUp27: - fully charged; - charging; - cannot define battery status; - battery is not available.
167	Charging System Potential (Voltage)	On the fact	V	Current voltage of embedded battery of CANUp 27. This parameter can be measured only in case of CANUp 27 power supply from the inbuilt accumulator. In case the external power supply is used, the status "Not supported/"No access" is always displayed for this setting.
521061	Battery Charge Level	On the fact	%	Current charge of embedded battery of CANUp 27. When working with service software, this setting will always be displayed as "not available/not supported by this device".
521116/16.1	Unit Hours Of Operation/ 16.1 Battery	On the fact	s	Counter of total operation time of CANUp 27 from embedded battery since installation to Vehicle. The Counter cannot be reset by user. Counter can be reset by the Manufacturer or RSC.

2.5 GNSS FM

GNSS FM — receives and process signals from GNSS, calculates parameters received from navigation receiver (coordinates of location, speed and direction of the movement of the Vehicle).

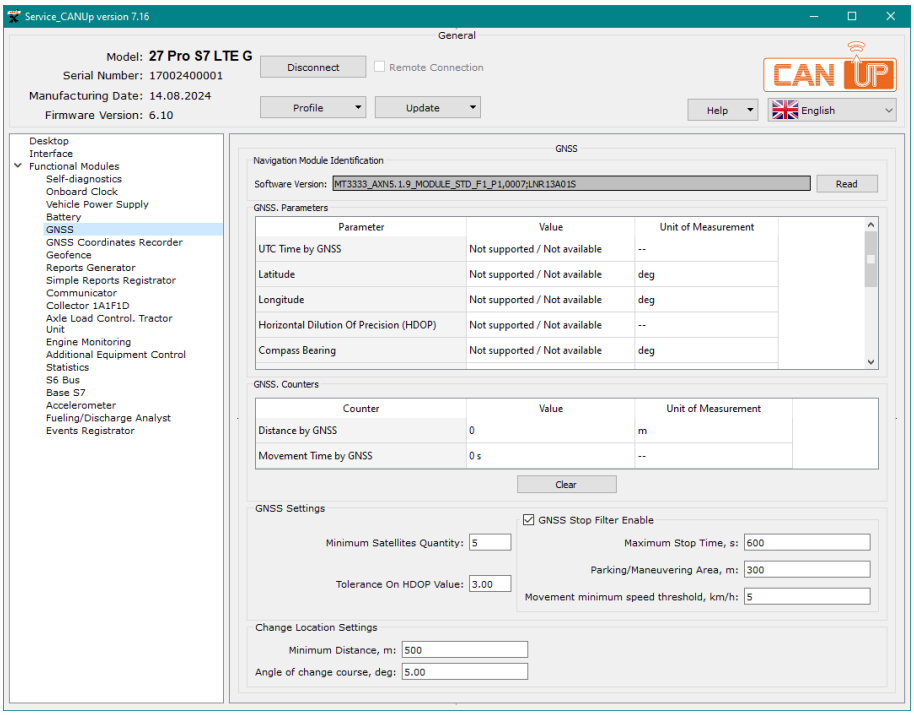


Figure 6 — Example of settings of the GNSS FM in Service CANUp software

Table 6 — GNSS FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Navigation Module Identification PGN 63244					
521282	Software Version	On the fact	No	No	The firmware version of the inbuilt GNSS-module of CANUp 27 is displayed.
GNSS. Parameters PGN 62998					
521155	UTC Time by GNSS	On the fact	s	0… 4211081215*	This setting displays present time in UTC format, defined according to GNSS data.
584	Latitude	On the fact	Degree	-210…211.101*	This setting displays geographical coordinates of latitude of present location of the vehicle, defined according to GNSS data.
585	Longitude	On the fact	Degree	-210…211.101*	This setting displays geographical coordinates of longitude of present location of the vehicle, defined according to GNSS data.
521090	Horizontal Dilution Of Precision (HDOP)	On the fact	No	0…642.55*	This setting displays present value of HDOP – coefficient that characterizes accuracy of the current location defining of the object in the horizontal plane. HDOP value can vary in range from 1 (maximum accuracy) to 50 (minimum accuracy).
165	Compass Bearing	On the fact	Degree	0…501.99*	This setting displays present movement direction of the vehicle, defined according to GNSS data.
580	Altitude	On the fact	m	2500…5531.88*	This setting displays height of present vehicle location above the sea level, defined according to GNSS data.
517	Navigation-Based Vehicle Speed	On the fact	km/h	0…250.996*	This setting displays present vehicle speed, defined according to GNSS data.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521134	GNSS Receiver Status	On the fact	No	On/Error	This setting displays status of serviceability of built-in navigation receiver CANUp 27.
521135	GNSS Antenna Status	On the fact	No	Connected	This setting displays connection** status of built-in navigation antenna CANUp 27.
521128	Satellites Quantity	On the fact	pcs.	0…250*	This setting displays present number of visible navigation satellites.
GNSS. Counters PGN 62996					
521126	Distance By GNSS	On the fact	m	0… 4211081215	Shows value of total travel distance of Vehicle since Unit installation to the Vehicle. This Counter can be reset by the user.
521127	Movement Time By GNSS	On the fact	s	0… 4211081215	Shows value of total travel time of Vehicle since Unit installation to the Vehicle. User cannot reset the value of this Counter.
GNSS Settings PGN 63058					
521098	Minimum Satellites Quantity	5	pcs.	0…255	Field for entering of minimum number of visible navigation satellites, above which coordinates and movement Vehicle's speed are considered to be reliable.
521097	Tolerance On HDOP Value	3.00	No	0…642.55	Field for entering of allowable maximum value of HDOP, bellow which coordinates and movement Vehicle's speed are considered to be reliable.
521101	GNSS Stop Filter Enable	On	No	On/Off	Field to switch ON/OFF the feature of automatic identification of the Vehicle parking mode according to parameters entered.
521102	Maximum Stop Time	600	s	0…64255	Field for entering the threshold time value which, in case it is exceeded, identifies the parking mode, if the Vehicle is immobile and the coordinates of the Vehicle location do not change.
521103	Parking/ Maneuvering Area	300	m	-2500…5531.88	Field for entering the threshold value of the distance which, in case it is exceeded, if the Vehicle is immobile, results in changing the coordinates of the Vehicle location.
521266	Movement Minimum Speed Threshold, km/h	5	km/h	0…63	Field for entering the threshold value of speed below which the Vehicle is considered immobile.
Change Location Settings PGN 63105					
521078	Minimum Distance	500	m	0…4294967295	Field for entering minimum distance between points on the straight section of Vehicle's movement for sending the Report.
521079	Angle Of Change Course	5.00	Degree	0…360	Field for entering Vehicle's course change angle, which if exceeded triggers Report sending.

* When poor quality reception of navigation data or mismatch of GNSS coordinates reliability and vehicle movement speed, the following message displays "Not supported/ not available".
**Status "Connected" is always displayed for GNSS antenna.

2.6 GNSS Coordinates Recorder FM

GNSS Coordinates Recorder FM — is designed to register the coordinates of the moving Vehicle location points, to create a track of the Vehicle movement by the points and send the track in the Reports "Statistics" and "Timer/Alarm" by E-mail in KML-file format.

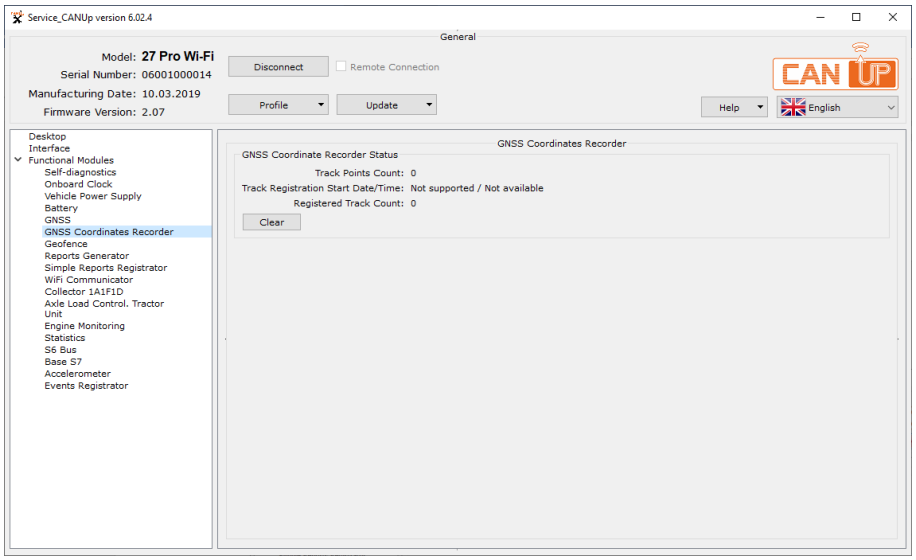


Figure 7 — Example of settings of the GNSS Coordinates Recorder FM in Service CANUp software

Table 7 — GNSS Coordinates Recorder FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
GNSS Coordinate Recorder Status PGN 63078				
521081	Track Points Count	On the fact	pcs.	For an active track, the current Counter indication of points with the latest coordinates of the Vehicle movement which are stored in the Counter memory is displayed. The maximum number of points in one track is 6000. The user may reset this Counter himself.
521082	Track Registration Start Date/Time	On the fact	No	For an active track, date and time of saving the first point with the coordinates of the Vehicle movement in the Unit memory is displayed. The date is stored in the local time format of the Unit.
521083	Registered Track Count	On the fact	pcs.	The current indication by the Counter of the Vehicle movement tracks which are stored in the Unit memory is displayed. When the all memory is filled, a new track overwrites the oldest one. The maximum number of saved tracks 14. The user may reset this Counter himself.

2.7 Geofence FM

Geofence FM — is designed to create and configure Geofences in order to monitor the time of their passing by the Vehicle. Each Geofence is a virtual area on the map of terrain with a boundary to form a circle of a specified radius.

In order to load the local map during the configuration of Geofence FM, you need to ensure steady PC Internet connection!

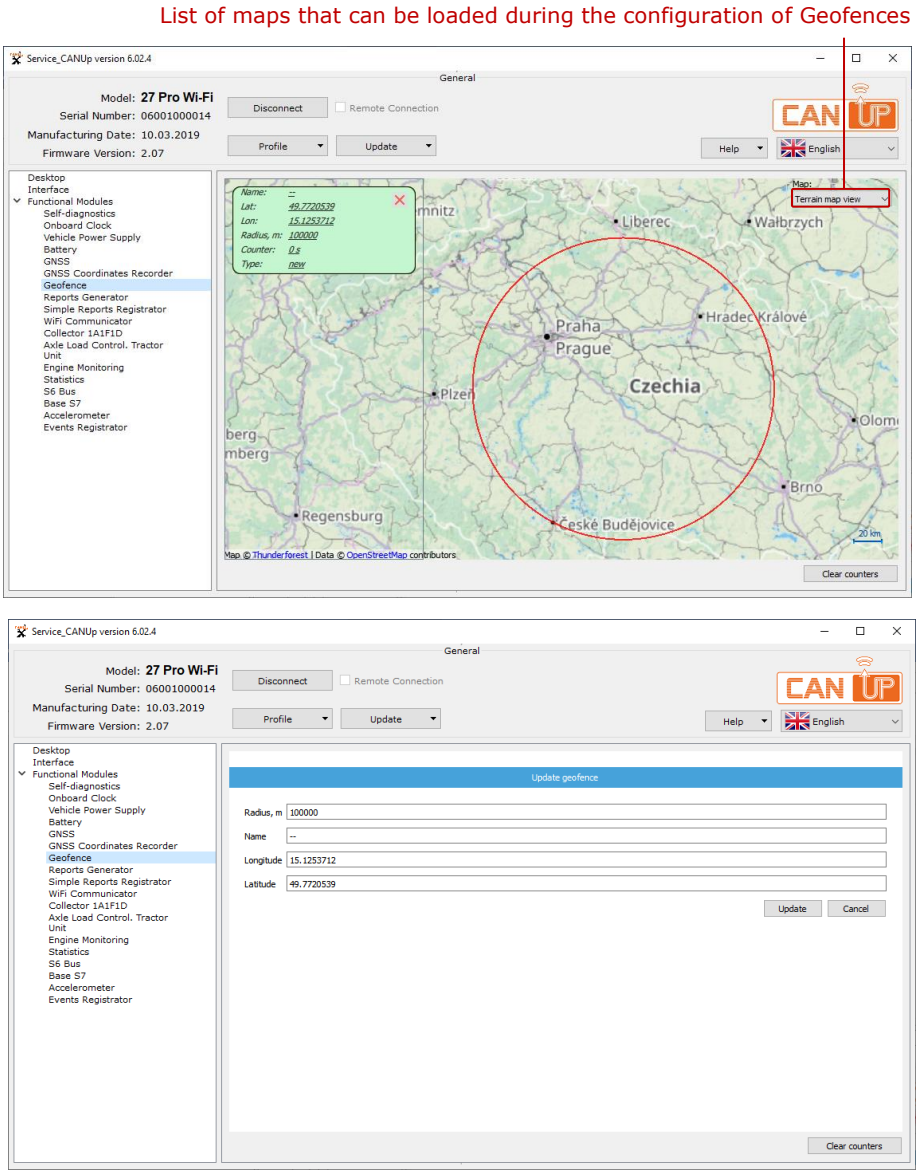


Figure 8 — Example of settings of the Geofence FM in Service CANUp software

Table 8 — Geofence FM.SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Geofence. Settings PGN 63262					
521412	Geofence Quantity	No	pcs.	1…10	The current number of Geofences stored in the Unit memory. In case the user needs, he may delete each of the Geofences individually (in the window of its properties) or all Geofences at once (you need to click the right mouse button on the shortcut menu on the map).
521413/ 29.0…29.9	Geofence Name/ 29.0 Geofence 1… 29.9 Geofence 10	No	No	No	Field to enter the name of the Geofence which is being created or edited 1…10. Only digits, Roman letters and characters "-" , "_" , "." are allowed to enter. 12 characters at a maximum.
584/ 29.0…29.9	Latitude/ 29.0 Geofence 1… 29.9 Geofence 10	No	deg	-210…211.101	Field in which the geographic coordinate of latitude for the center of zone 1…10 is specified. The center of the Geofence 1…10 is selected by clicking the right mouse button on the required point of the map. The value of latitude entered automatically may be edited manually by the user.
585/ 29.0…29.9	Longitude/ 29.0 Geofence 1… 29.9 Geofence 10	No	deg	-210…211.101	Field in which the geographic coordinate of longitude for the center of Geofence 1…10 is specified. The center of Geofence 1…10 is selected by clicking the right mouse button on the required point of the map. The value of latitude entered automatically may be edited manually by the user.
521414/ 29.0…29.9	Radius/ 29.0 Geofence 1… 29.9 Geofence 10	No	m	0…4211081215	Field to enter the value of distance from the center to the boundary of Geofence 1…10 which is being created or edited.
Geofence. Counters PGN 63264					
521416	Location In Geofence Status Mask	No	No	0…65535	Bit mask showing the number of the Geofence in which the Vehicle is located at the moment: 2^0- Geofence 1; 2^1- Geofence 2; 2^2- Geofence 3; 2^3- Geofence 4; 2^4- Geofence 5; 2^5- Geofence 6; 2^6- Geofence 7; 2^7- Geofence 8; 2^8- Geofence 9; 2^9- Geofence 10.
521412	Geofence Quantity	No	pcs.	1…10	The current number of Geofences stored in the Unit memory. In case the user needs, he may delete each of the Geofences individually (in the window of its properties) or all Geofences at once (you need to click the right mouse button on the shortcut menu on the map).
521417 29.0…29.9	Time In Geofence/ 29.0 Geofence 1… 29.9 Geofence 10	No	s	0…4211081215	Indication of the Counter of total time during which the Vehicle was within Geofence 1…10. The Counter is displayed in the Properties window of each Geofence 1…10.

2.8 Reports Generator FM

Reports Generator FM — designed for Onboard Reports formation in accordance with defined configurations and sending through Communicator FM (for CANUp 27 Standard / Pro LTE / Genset) or WiFi Communicator FM (for CANUp 27 Pro Wi-Fi).

The submenu of **FM Reports generator** allows to create and configure **maximally up to 20 pcs.** (for CANUp 27 Standard) and **up to 32 pcs.** (for CANUp 27 Genset / Pro) different Reports. The maximum number of SPN you can add into one Report is **10 pcs**.

To create a new Onboard Report, press button New Report... . In the opening window **Select triggering Event for create Report** you need to choose the specialty of the Report to be created from the dropdown list **Report type**, depending on the type of data contained in it (**Parameters/Navigation/Event/DTC**); from the dropdown list **Event**, you are to select SPN of the Event according to which the Report must be generated (see figure 9)

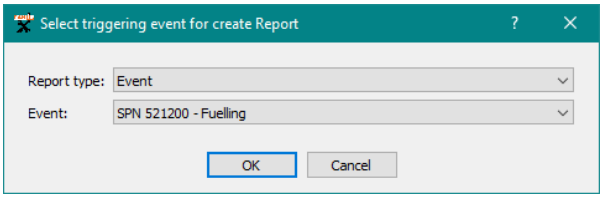


Figure 9 — Selecting Event for Onboard report generation

For quick creation of the Onboard Report based on the earlier created Report, select the necessary Report and press button Copy Report. Enter the new Report name in the field **Report Name**.

For loading Onboard Reports from the earlier saved Unit profile, select the necessary file **(*.prf)** from the PC hard disc and press button Load Reports... . In the displayed window **Load Reports** checkmark the necessary Reports names and press Load button. If you highlight any line of any Report, a prompt message with data (SPN) contained in it is displayed. In the upper portion of the window **Load Reports** there is a prompt of how many Reports you may choose to the maximum possible number (see figure 10).

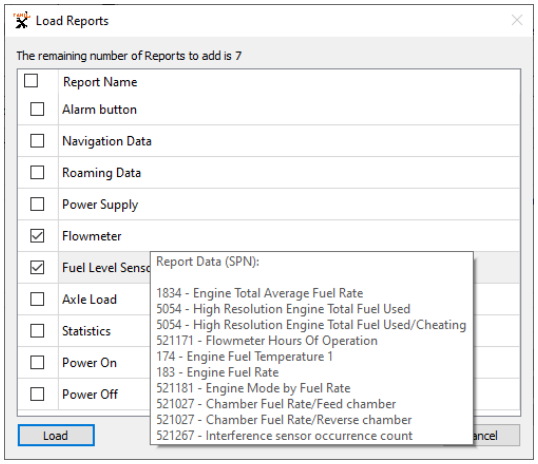


Figure 10 — Downloading Reports from the Unit profile

All created Reports of CANUp 27 are displayed in the form of tabs in the area **Reports Generator**. The number of Reports available and the number of SPN contained in them are indicated in the top right angle of this tab.

All tabs have identical settings for Report generation and its sending to the Server.

If you need to delete a particular Report, press button in the respective tab. If you need to delete all Reports at once from the memory of the connected gateway, use Erase Reports button (see figure 11).

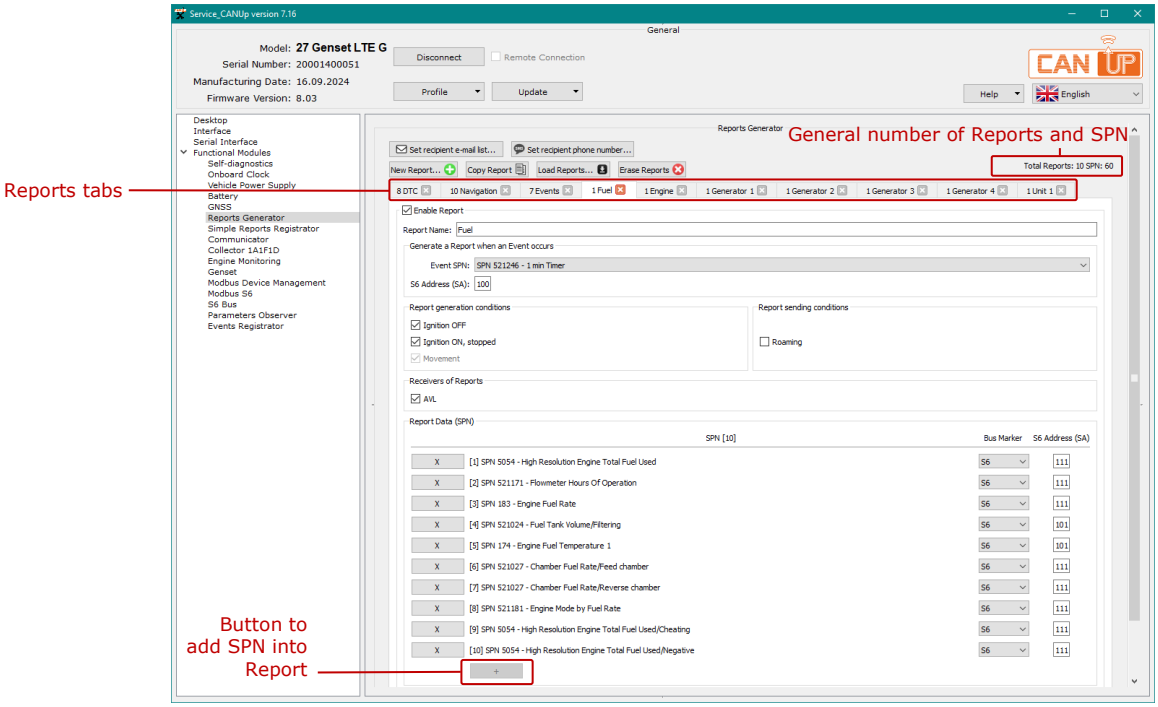
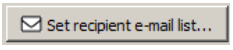


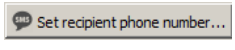
Figure 11 — Example of FM Reports generator window of settings (Navigation Report tab) in Service CANUp software)

For each Report, the following settings are provided:

- **Enable Report** (SPN 521151) field is used to enable or disable generation of selected Report;
- **Report Name** (SPN 521250) field, where you should enter name of the Report to identify it. Use letters of Latin alphabet only (to exclude conversion of encodings during sending Reports by e-mail or via SMS) when entering the name of Report.
- in **Generate a Report when an Event occurs** area, there is:
  - **Event SPN** (SPN 521166) drop-down list corresponding to S6 Database. From this list, you can select the Event, which generates the Report when occurs;
  - field **S6 Address (SA)** to enter the network address of the SPN source Unit in CAN j1939/S6 bus or in a standard CAN-bus.

Note — If the Event is generated not by the gateway but some other Unit whose network address is different from the address entered, warning sign is displayed near the field **S6 Address (SA)**. When the precise network address of the source Unit is unknown, we recommend to use address 255. In this case, any Unit of the network can be the source of the chosen Event.

- In the area **Report generation conditions** you may specify conditions for the Report generation in the appropriate fields, depending on the status of ignition/connecting to Vehicle power supply or on whether the Vehicle is moving or not:
  - ignition is OFF (SPN 521151/12.0) (for CANUp 27 Pro / Genset) or switched OFF from Vehicle power supply (SPN 521151/12.3) (for CANUp 27 Standard);
  - ignition is ON, the Vehicle is not moving (SPN 521151/12.1) (for CANUp 27 Pro / Genset) or Vehicle power supply is ON, stopped (SPN 521151/12.4) (for CANUp 27 Standard);
  - Vehicle is moving (this setting is permanently ON).
- In the area **Report sending conditions** (SPN 521151/11.1), in the field **Roaming** you may enable or disable sending the Report in the Roaming mode;
- in the area **Receivers of Reports** you may specify versions of the Report which is to be sent, in the appropriate fields:
  - in the field **Automatic Vehicle Location** (SPN 521154/25.0) you may enable or disable sending the Report by GPRS;
  - **E-mail** - for sending Report by e-mail to selected addresses from pre-formed list of e-mail addresses of recipients. To create an address list, use 

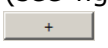
button. A list can contain no more than three e-mail addresses of recipients. Each address must contain no more than 64 characters.
  - **SMS** - for sending Report as an SMS message to mobile phone numbers from the generated list of recipient numbers. To create a list of numbers, use 

button. The list can contain no more than three phone numbers of recipients, recorded in international format (maximum 13 digits).

Notes

1 In case any changes are made in lists of e-mail addresses or telephone numbers of Reports receivers, settings of Reports in which these receivers are specified will change automatically.
2 In order to improve the stability of the gateway operation, there is no feature of sending data by means of SMS messages and to e-mail addresses for SPN Events that are often generated (more often than once in 30 min) in all CANUp 27 models.
3 You may enable the feature of sending SPN in the form of source data (i.e. decimal value which is not converted) in the field **Raw Data** for the Report which is transmitted by means of SMS messages and to E-mail addresses.
4 In model CANUp 27 Pro LTE you may enable the transmission of a KML file for the Reports "Statistics" and "Timer/Alarm", with a track of the Vehicle movement, in the field **Attach Track**.
5 In model CANUp 27 Pro Wi-Fi there is no feature of sending Reports by means of SMS messages and to E-mail addresses.

RECOMMENDATION: do not choose to send by e-mail and/or via SMS the Reports, which are generated more than once per hour.

- In **Report Data (SPN)** area, you can select data from **Select SPN/PGN** (see figure 12 a) window, which will be used for Report generation. To add SPN use 

button, to remove SPN use 

button, placed near the corresponding SPN. You can select up to 10 SPNs for one Report.

Sources for SPN selection:

1) DB S6 — selection of SPN from S6 Database. For this purpose, there is an option of searching SPN by its number or name which is entered into the search bar of **Select SPN/PGN** window. Highlight PGN which contains the needed SPN and confirm your choice by pressing OK button. For SPN with the same numbers within one PGN, whenever you place the cursor on them, the prompt message containing the specificator is displayed (see figure 12 b).

The following data are assigned automatically for the selected SPN: from the dropdown list **Bus Marker** – the message "Not used", while in the field **S6 Address (SA)** – the gateway network address (100).

In case the selected SPN is read from Units connected to CANUp 27 by means of S6 Technology, from a standard CAN bus (or ISOBUS bus) or by means of S7 Technology, you need to select manually the appropriate value (**S6**/**CAN**/**S7**) from **Bus marker** dropdown list.

If the selected SPN is received by means of conversion of data which are read by CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset gateway from an external device connected by means of RS-485 interface (Modbus RTU protocol), select value **RS-485** in **Bus marker** dropdown list.

You are to specify the network address which is source of the selected SPN in **S6 Address (SA) bus** field (SPN 521188).

RECOMMENDATION: When configuring Reports for all SPN received resulting from conversion of data of Modbus RTU registers, we recommend to specify value **134** as source device address.

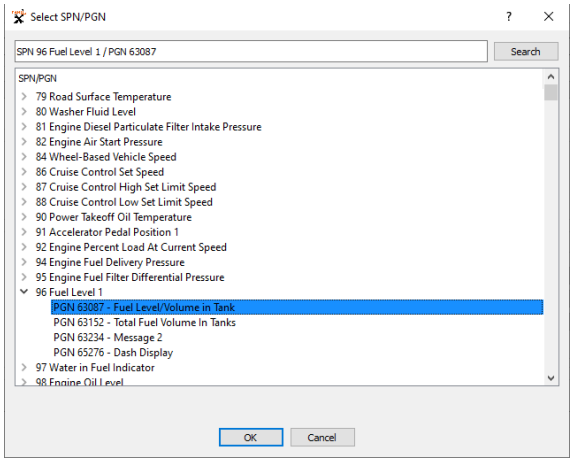
2) S6 bus — selection of SPN from Units connected to CANUp 27 through **S6** connector by means of S6 Technology.
Assigned automatically to the selected SPN: **S6** value from the dropdown list **Bus Marker**, while the network address of SPN source Unit (SPN 521188) — in the field **S6 Address (SA).**

3) CAN bus — selection of SPN from a standard CAN bus (or ISOBUS) connected to the gateway through **CAN** connector.

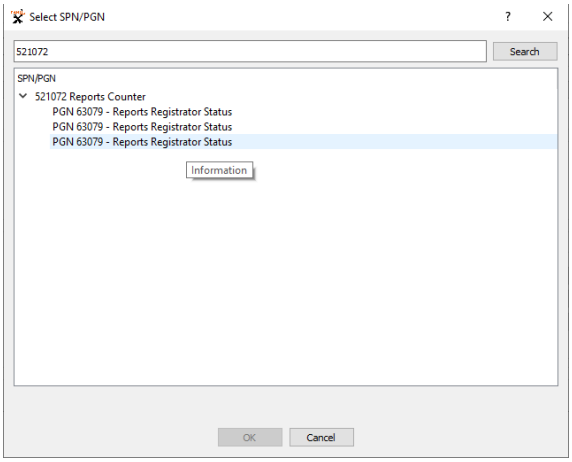
This selection is available only for CANUp 27 Pro / Genset in case of connection to the onboard CAN-bus (or ISOBUS) and in case **input data** for CAN interface **are available**.

For SPN selection, there is an option to filter it from the list of current PGN by SPN number, or by SPN/Specificator name, or by PGN name or by the network address SA of the source Unit (see figure 12 c).

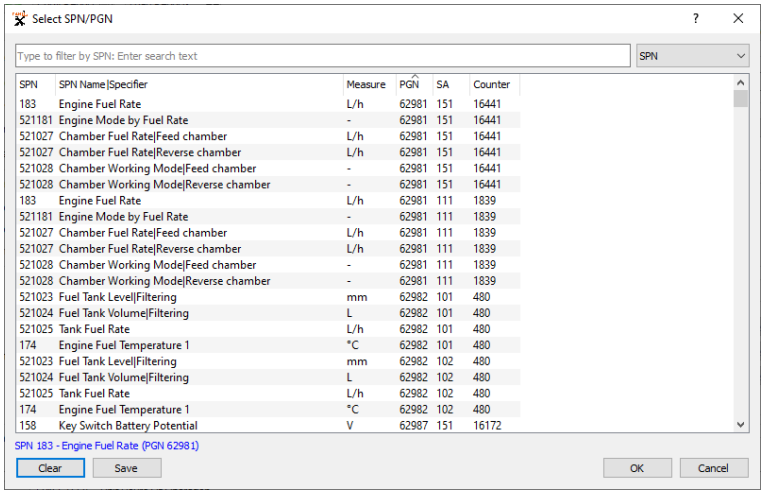
Assigned automatically to the selected SPN: **CAN** value from the dropdown list **Bus Marker**, while the network address of SPN source Unit (SPN 521188) — in the field **S6 Address (SA)**.



a) a list of SPNs in S6 Database



b) an example of displaying qualifier of SPNs with the same names



c) SPN selection from current CAN bus (or ISOBUS) data

Figure 12 — Select SPN/PGN window for adding to Report

WARNING:
1) For CANUp 27 Pro / Genset, the length of a text SPN will be automatically limited to 24 bytes.
2) For CANUp 27 Standard it is allowed to select only SPN with digital value no longer than 4 bytes that may be added to the Report. In case any SPN beyond these limitations is selected, the appropriate warning is displayed (see figure 13).

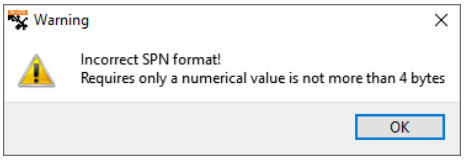


Figure 13 — Warning on choosing SPN of inappropriate format for CANUp 27 Standard

Table 9 — Reports Generator FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
				E-Mail List* PGN 63122	
521355	Array Elements Count	No	pcs.	0…3	Number of e-mail addresses in the list of recipients for sending Report by e-mail.
521242	E-Mail Address	No	No	No	Address of Report recipient. The address should not contain more than 64 characters.
				Phone Numbers List* PGN 63124	
521355	Array Elements Count	No	pcs.	0…3	Number of phone numbers in the list of recipients for sending Report to mobile phone numbers.
521020	Phone Number	No	No	No	Report recipient's phone number. Number should be specified in international format (13 digits maximum).
	Report 1 Generate Attributes PGN 63125 Report 2 Generate Attributes PGN 63126 Report 3 Generate Attributes PGN 63127 Report 4 Generate Attributes PGN 63128 Report 5 Generate Attributes PGN 63129 Report 6 Generate Attributes PGN 63130 Report 7 Generate Attributes PGN 63131 Report 8 Generate Attributes PGN 63132 Report 9 Generate Attributes PGN 63133 Report 10 Generate Attributes PGN 63134				Report 11 Generate Attributes PGN 63135 Report 12 Generate Attributes PGN 63136 Report 13 Generate Attributes PGN 63137 Report 14 Generate Attributes PGN 63138 Report 15 Generate Attributes PGN 63139 Report 16 Generate Attributes PGN 63140 Report 17 Generate Attributes PGN 63141 Report 18 Generate Attributes PGN 63142 Report 19 Generate Attributes PGN 63143 Report 20 Generate Attributes PGN 63144
521250	Report Name	No	No	No	Field for entering Report's name for identifying. To enter the name, use only Latin characters.
521347	SPN Value	No	No	0…4294967295	Dropdown list to select the Event in case of which the Report is to be generated.
521151	Enable Report	On	No	On/Off	Field to enable or disable the Report generation.
521151/12.3	Enable Report/ 12.3 Switched OFF from vehicle power supply	On	No	On/Off	Field to enable or disable the Report generation (on condition the Unit is not connected to the Vehicle onboard circuit (power is supplied from the inbuilt accumulator).
521151/12.4	Enable Report/ 12.4 Vehicle power supply is ON, stopped	On	No	On/Off	Field to enable or disable the Report generation on condition the Unit is connected to the Vehicle onboard circuit but the Vehicle is not moving.
521151/11.1	Enable Report/ 11.1 Roaming	Off	No	On/Off	Field to enable or disable sending the Report in the roaming mode.
521154/25.0	Send Report/ 25.0 AVL	On	No	On/Off	Field to enable or disable sending the Report to the Server.
521154/25.1	Send Report/ 25.1 E-mail	Off	No	On/Off	Field to enable or disable sending the Report by E-mail.
521151/25.2	E-mail Id/ 25.2 E-mail 1	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the first E-mail recipient.
521151/25.3	E-mail Id/ 25.3 E-mail 2	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the second E-mail recipient.
521151/25.4	E-mail Id/ 25.4 E-mail 3	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the third E-mail recipient.
521154/25.5	Send Report/ 25.5 SMS	Off	No	On/Off	Field to enable or disable sending the Report in the form of SMS message.
521252/25.6	SMS Id/ 25.6 SMS 1	Disabled	No	No	Dropdown list to enable or disable the number of the first recipient of the Report in the form of SMS.
521252/25.7	SMS Id/ 25.7 SMS 2	Disabled	No	No	Dropdown list to enable or disable the number of the second recipient of the Report in the form of SMS message.
521252/25.8	SMS Id/ 25.8 SMS 3	Disabled	No	No	Dropdown list to enable or disable the number of the third recipient of the Report in the form of SMS message.
521253	SPN Quantity in Report	No	pcs.	0…10	Number of SPN that can be added during the generation of the Report content.
521347	SPN Value	No	On the fact	0…4294967295	SPN that have digital value and no longer than 4 bytes are allowed to add to the Report.
521367	Specifier. Group	No	On the fact	0…255	Specifying value of SPN which is added to the Report content.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521368	Specifier. Value	No	On the fact	0…255	Additional specifying value of SPN which is added to the Report content.
521150	PGN	No	On the fact	0…65535	PGN which includes SPN which is added to the Report content.
521254	Bus Marker	Not used	No	No	Specification of bus from which the Unit reads SPN which is added to the Report content: - S6 — reading SPN using S6 Technology; - Not used — reading SPN not required.
521188	S6 Address (SA)	100	No	0…255	Network address in CAN-bus of the device which is source of SPN added to the Report content.
Extended Report Generate Attributes PGN 63275					
521151	Enable Report	On	No	On/Off	Field to enable or disable the generation of the selected Report.
521166	Event SPN	No	No	0…4294967295	Dropdown list to select the Event in case of which the Report is to be generated.
521250	Report name	No	No	No	Field to enter the Report name for its identification. We recommend to enter only Roman letters.
521151/12.0	Enable Report/ 12.0 Ignition OFF	On	No	On/Off	Field to enable or disable the generation of the selected Report on condition the Vehicle ignition is OFF.
521151/12.1	Enable Report / 12.1 Ignition ON, stopped	On	No	On/Off	Field to enable or disable the generation of the selected Report on condition the Vehicle ignition is ON, but the Vehicle is not moving.
521151/11.1	Enable Report/ 11.1 Roaming	Off	No	On/Off	Field to enable or disable sending the Report on condition the Vehicle is in the roaming mode.
521154/25.0	Send Report/ 25.0 AVL	On	No	On/Off	Field to enable or disable sending the Report to the Server.
521154/25.1*	Send Report/ 25.1 E-mail	Off	No	On/Off	Field to enable or disable sending the Report by E-mail.
521251*	E-mail ID	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the first Report recipient by E-mail.
521251*	E-mail ID	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the second Report recipient by E-mail.
521251*	E-mail ID	Disabled	No	No	Dropdown list to enable or disable the E-mail address of the third Report recipient by E-mail.
521456*	Attach Track	Disabled	No	No	Enable or disable transmission of a KML-file with a track of the Vehicle movement in Reports “Statistics” and “Timer/Alarm” sent to E-mail addresses.
521154/25.5*	Send Report/ 25.5 SMS	Off	No	On/Off	Field to enable or disable sending the Report in the form of SMS message.
521252*	SMS ID	Disabled	No	No	Dropdown list to enable or disable the number of the first recipient of the Report in the form of SMS.
521252*	SMS ID	Disabled	No	No	Dropdown list to enable or disable the number of the second recipient of the Report in the form of SMS.
521252*	SMS ID	Disabled	No	No	Dropdown list to enable or disable the number of the third recipient of the Report in the form of SMS.
521253	SPN Quantity in Report	No	pcs.	0…10	Number of SPN that can be added during the generation of the Report content.
521347	SPN Value	No	On the fact	0…4294967295	Value of SPN which is added to the Report content.
521367	Specifier. Group	No	On the fact	0…255	Specifying value of SPN which is added to the Report content.
521368	Specifier. Value	No	On the fact	0…255	Additional specifying value of SPN which is added to the Report content.
521150	PGN	No	No	0…65535	PGN which includes SPN which is added to the Report content.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521254	Bus Marker	Not used	No	No	Source from which the CANUp 27 reads SPN of the Event which is added to the Report content: - S6 — source specified by the user when SPN of the Event is read from Units via CAN j1939/S6 interface using S6 Technology; - S7 — source specified by the user when SPN of the Event is read from wireless Units using S7 Technology; - CAN — source assigned automatically, when SPN of the Event is read from a standard Vehicle CAN-bus or ISOBUS using CAN interface; - Not used — source assigned automatically, when SPN of the Event is selected from S6 Database; - RS-485** — source assigned by user, when SPN of the Event results from the conversion of the content of external device registers which is conducted according to Modbus RTU protocol.
521188	S6 Address (SA)	100	No	0…255	Device network address (in the source which is specified in the "Bus marker") which is the source of SPN added to the Report content.
Report Format PGN 63214					
521277	Delivery Method	Disabled	No	No	Enable/Disable transmission of the Report by SMS messages or to E-mail addresses*.
521278	SPN Value View Format	Disabled	No	No	Enable/Disable sending SPN by SMS messages and to E-mail addresses in the form of processed data (converted values taking into account SPN specifications)*.

SPN only for CANUp 27 Standard.

SPN only for CANUp 27 Pro / Genset.

* Except model CANUp 27 Pro Wi-Fi.
** Valid only for CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset.

2.9 Simple Reports Registrator FM

Simple Reports Registrator FM — registers Reports according to sections, corresponding to importance of Reports and the priority of its processing.

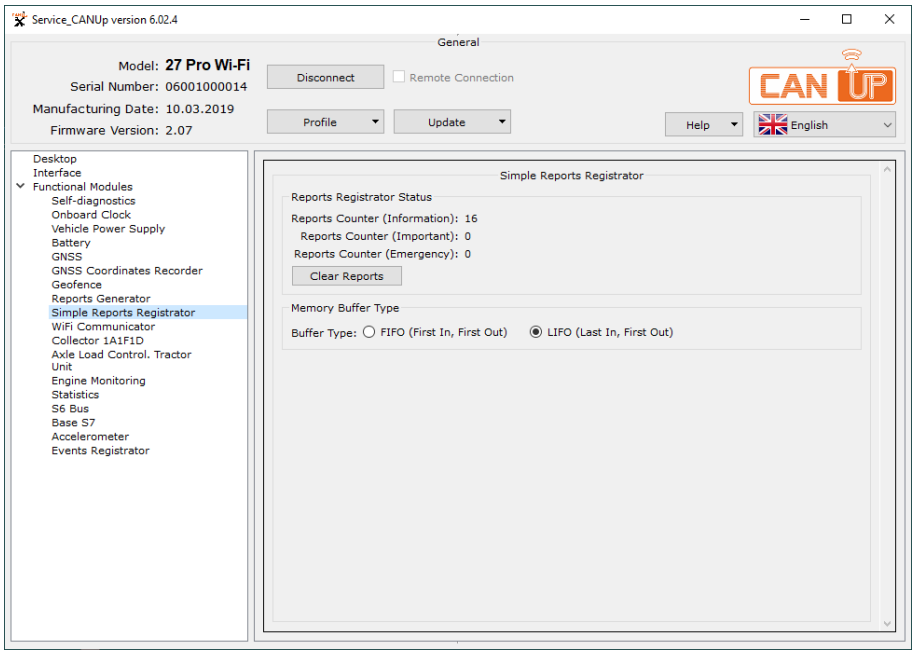


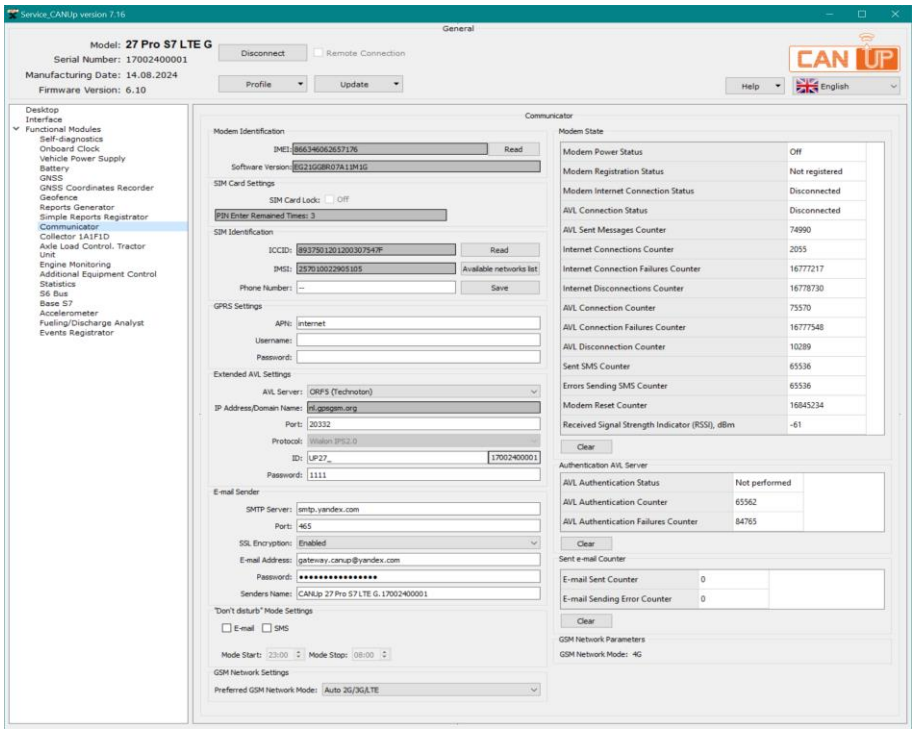
Figure 14 — Example of settings of the Simple Reports Registrator FM in Service CANUp software

Table 10 — Reports Registrator FM. SPNs, displayed and/or editable in Service CANUp software

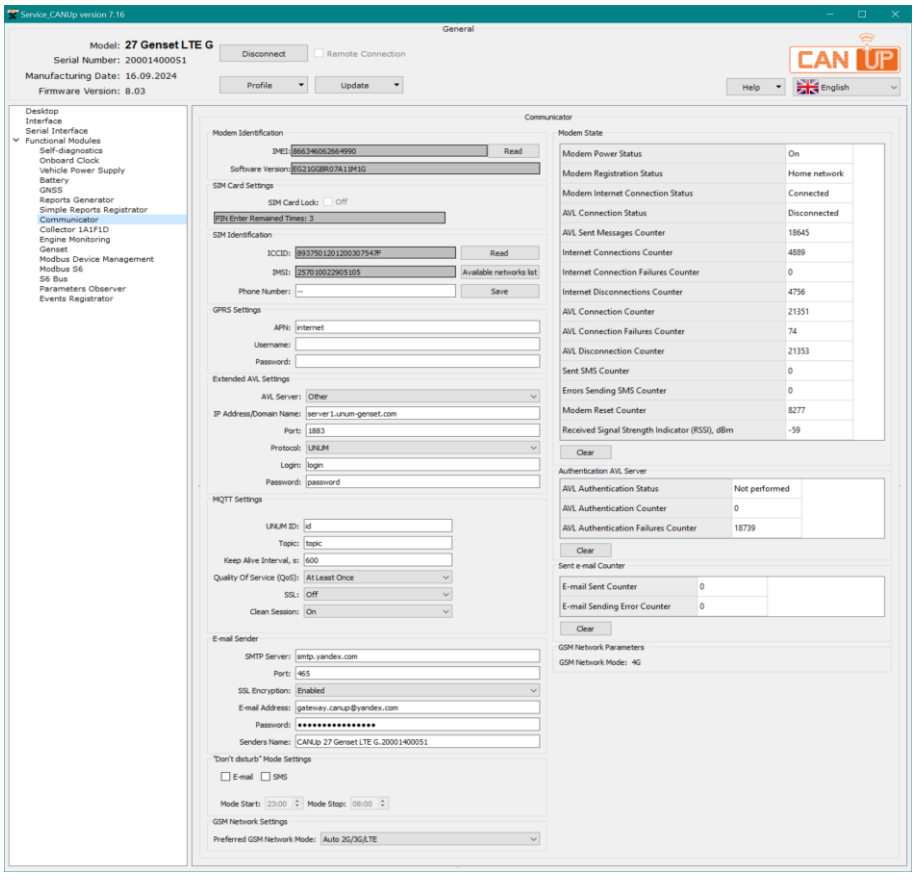
SPN	Name	Factory value	Unit of measure	Clarification
Reports Registrator Status PGN 63079				
521072/21.0	Reports Counter/21.0 Emergency	On the fact	No	Displays current number of registered Reports on emergency Events (for example - "Alarm").
521072/21.1	Reports Counter/21.1 Important	On the fact	No	Displays current number of registered Reports on important Events (for example - "Drain", "Refueling").
521072/21.2	Reports Counter/21.2 Information	On the fact	No	Displays current number of registered Reports on informational Events (for example - "Ignition On/Off", "Satellites detected/lost", "GPRS is available/not available").
Memory Buffer Type PGN 63102				
521489	Buffer Type	LIFO	No	Fields for selecting priority type for sending Reports, accumulated in internal memory while Vehicle was outside of network operator's coverage, to the Server: - FIFO (First In, First Out) – sending accumulated Reports in chronological sequence (i.e. starting from oldest Reports). - LIFO (Last In, First out) – sending accumulated Reports in opposite chronology (i.e. staring from newest Reports).

2.10 Communicator FM

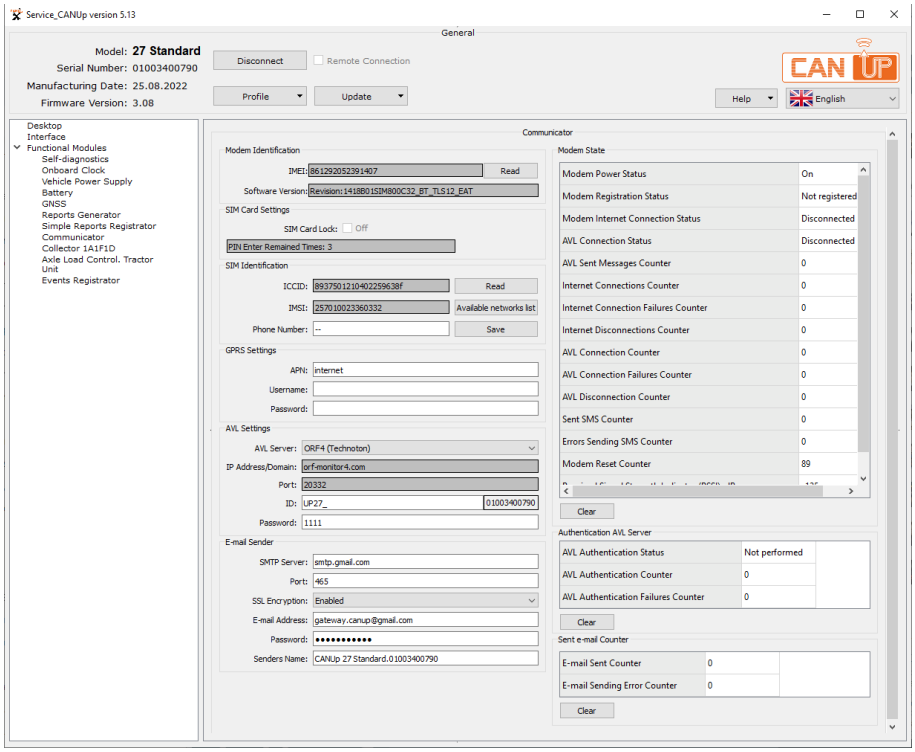
Communicator FM — designed for transmitting of generated Onboard reports CANUp 27 Standard / Pro LTE / Genset to the Server/e-mail/SMS, configuration settings of parameters responsible for connection to Internet, AVL Server, FTP Server.



a) for CANUp 27 Pro LTE / Genset (Wialon IPS 2.0 protocol)



b) for CANUp 27 Pro LTE / Genset (UNUM protocol)



c) for CANUp 27 Standard

Figure 15 — Example of settings of the Communicator FM in Service CANUp software

Table 11 — Communicator FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Modem Identification PGN 63237				
521281	IMEI	On the fact	No	The International Mobile Equipment Identity is displayed in the cellular communication operator network for the Unit inbuilt modem. The International Mobile Equipment Identity is a unique number consisting of 15 digits in the decimal form in which the last digit is a check-sum digit according to Luhn algorithm, in accordance with ISO/IEC 7812. The data are not available for editing.
521282	Software Version	On the fact	No	The firmware version for the inbuilt GSM modem is displayed. The data are not available for editing.
SIM Card Settings PGN 63059				
521625	PIN	On the fact	No	PIN-code is a specific sequence of four digits for each SIM-card. Field for entering of PIN-code is displayed while using SIM-card that is password protected.
521628	PIN Enter Remained Times	3	No	Counter of remaining number of attempts for PIN-code entering of protected SIM-card while not correct PIN-code is entered. The user cannot reset this Counter.
521627	SIM Card Lock	Off	No	SIM-card is locked automatically while PIN-code is entered incorrectly. To unlock the SIM-card enter its present correct PIN-code and turn locking off.

SPN	Name	Factory value	Unit of measure	Clarification
SIM Identification PGN 63238				
521283	ICCID	On the fact	No	The unique serial number of SIM Card (Integrated Circuit Card Identifier) is displayed. The serial number is printed on the SIM card and contains 19 digits; their values are specified, in accordance with ITU-T E.118 Standard. The data are not available for editing.
521284	IMSI	On the fact	No	The International Mobile Subscriber Identity associated with an individual user of GSM mobile communication. The data are not available for editing.
521020	Phone Number	No	No	Field to enter the telephone number corresponding to the SIM card which is used. The number is entered in the international format. This setting is optional.
GPRS Settings PGN 63020				
521619	APN	internet	No	It is necessary to enter access point address of GSM provider (APN) for connecting Unit to the Internet. Access point address can be obtained from GSM service provider which SIM-card is installed into the Unit.
521620/13.0	Username/ 13.0 GPRS	No	No	It is necessary to enter access point user name for Unit authorization while connecting to the Internet. User name can be obtained from GSM service provider which SIM-card is installed into the Unit.
521621/13.0	Password/ 13.0 GPRS	No	No	It is necessary to enter access point user password for Unit authorization while connecting to the Internet. User password can be obtained from GSM service provider which SIM-card is installed into the Unit.
AVL Settings PGN 63068				
521622/13.2	IP Address/ Domain/ 13.2 Automatic Vehicle Location	nl.gpsgsm.org	No	It is necessary to enter IP- or URL- address of AVL Server that CANUp 27 Standard is establishing connection with for transmitting Onboard reports.
521623/13.2	Port/13.2 Automatic Vehicle Location	20332	No	It is necessary to enter opened port number of AVL Server that will be used for communicating with CANUp 27 Standard.
521080/13.2	ID/13.2 Automatic Vehicle Location	UP27_XXXXXXXXXX (XXXXXXXXX – CANUp 27 Standard serial number, automatically generated)	No	It is necessary to enter prefix for CANUp 27 Standard identification at AVL Server. Fields of entered prefix have to match with the settings of "Unique ID" field while registering vehicle at ORF4 Telematics Server (see User manual).
521621/13.2	Password/13.2 Automatic Vehicle Location	1111	No	It is necessary to enter password for CANUp 27 Standard authentication at the AVL server.
Extended AVL Settings PGN 63232				
521595/13.2	IP Address/ Domain/ 13.2 Automatic Vehicle Location	nl.gpsgsm.org	No	You need to enter IP- or URL-address of AVL Server with which CANUp 27 Pro LTE / Genset is establishing communication to transmit Onboard reports.
521623/13.2	Port/13.2 Automatic Vehicle Location	20332	No	You need to enter the number of the open port of AVL Server which will be used for communication with CANUp 27 Pro LTE / Genset.

SPN	Name	Factory value	Unit of measure	Clarification
521080/13.2	ID/13.2 Automatic Vehicle Location	UP27_XXXXXXXXXX (XXXXXXXXXX — CANUp 27 Pro LTE / Genset serial number, automatically generated)	No	You need to enter a prefix CANUp 27 Pro LTE / Genset identification at AVL Server. The fields of the prefix entered must match the fields of ID setting during the Vehicle registration at ORF 4 / ORF 5 Telematics Service or at the Server of UNUM IIOT Platform: - UP27_ XXXXXXXXXX (for protocol Wialon IPS2.0); - the value (Login) is taken from ID data of Unit profile those data are generated at the Server (for UNUM protocol).
521594/13.2	Password/13.2 Automatic Vehicle Location	1111	No	You need to enter for CANUp 27 Pro LTE / Genset authentication at AVL Server. For UNUM protocol, the value (Password) is taken from ID data of the Unit profile that are generated at the Server.
521399/13.2	Protocol/13.2 Automatic Vehicle Location	Wialon IPS2.0	No	From the dropdown list you need to select the required communication protocol for transmission of Onboard reports by CANUp 27 Pro LTE / Genset to AVL Server: - Wialon IPS2.0; - UNUM (see Onboard reports format in CANUp 27 Telematics gateways operation manual).
MQTT Settings*** PGN 63258				
521039	Client Id	id	No	Field to enter Client ID used in Connect Message to establish connection between CANUp 27 Pro LTE / Genset and the Server of UNUM IIOT Platform. Value entered must be identical to unique device identifier (UNUM ID) from the Identification data generated at the Server during Unit registration.
521040	Topic	topic	No	Field to enter variable name of Publish Message used for transmission of Onboard Reports by CANUp 27 Pro LTE / Genset to the Server of UNUM IIOT Platform. The value entered must be identical to the Topic from the Identification data generated at the Server during the Unit registration.
521041	Keep Alive Interval	600	s	Field to enter the maximum interval of time in seconds during which the connection between CANUp 27 Pro LTE / Genset and the Server of UNUM IIOT Platform will be active without any traffic.
521042	Quality Of Service (QoS)	At Least Once	No	From the dropdown list select one of quality levels of Onboard reports: - No more than once — on this level, CANUp 27 Pro LTE / Genset sends a Report to the Server only once, not expecting the delivery confirmation; - At least, once — this level ensures that the Report from CANUp 27 Pro LTE / Genset will be delivered to the Server of UNUM IIOT Platform; however, there is a possibility of sending Reports duplicates.
521043	SSL	Off	No	One of the options of Reports transfer to UNUM IIOT Platform Server is to be selected from the dropdown list: - ON — (Reports are transferred according to the cryptographic protocol of secure sockets (connection endpoints)— Secure Sockets Layer (SSL) which is responsible for secure data transfer on the level of a communication session. - OFF — (Reports are transferred without using the cryptographic protocol of secure sockets which does not guarantee secure data transfer on the level of a communication session.

SPN	Name	Factory value	Unit of measure	Clarification
521087	Clean Session	On	No	From the dropdown list select one version of completing the session during the user disconnection from the Server of UNUM IIOT Platform: - OFF — The Server saves the session and all user settings. All Reports of CANUp 27 Pro LTE / Genset accumulated during the OFF period will be automatically transmitted to the user during his next connection; - ON — During the next connection the user he will have to conduct another configuration in order to receive CANUp 27 Pro LTE / Genset Reports from the Server.
E-Mail Sender PGN 63145				
521618	SMTP Server	smtp.yandex.com	No	Field to enter the address of SMTP Server. It is allowed to use no more than 32 characters (Roman letters, dots). SMTP Server is the network protocol of e-mail transmission (Simple Mail Transfer Protocol) in TCP/IP networks. The main functions of SMTP Server: - checkup of correctness of settings and authorization for Unit to send a Report; - sending a Report to the specified address by the Unit. If the delivery is impossible, the Server transmits to the sender a sending error message.
521623/13.3	Port/ 13.3 SMTP Server	465	No	Field to enter SMTP-port number to retransmit Reports from the Unit. It is allowed to use no more than 5 digits. Port 465 is used to send letters encoded in accordance with SSL protocol. This connection is better protected than the usual TCP/IP.
521617/13.3	SSL Encryption/ 13.3 SMTP Server	Enabled	No	From the dropdown list you may enable or disable encoding Reports according to the level of SSL (Secure Sockets Layer). SSL encoding is the cryptographic protocol used for enhanced security data transmission by E-mail.
521242	E-mail Address	gateway.canup@yandex.com	No	Field to enter the address of mailbox from which the Unit will send Reports to E-mail addresses of users. It is allowed to use no more than 64 characters (Roman letters, digits, dots).
521621	Password	On the fact	No	Field to enter password to the Unit E-mail mailbox. It is allowed to use no more than 16 characters (only Roman letters, digits and special characters).
521616	Senders Name	On the fact	No	Field to enter the name of the Unit from which Reports are to be sent by E-mail. The maximum length of address – 48 characters. It is allowed to use only Roman letters, digits, dots, as well as the following characters: dash, dot, underlining and space. By default: CANUp 27 Pro LTE.XXXXXXXXXX / CANUp 27 Standard.XXXXXXXXXX, Where XXXXXXXXXX — serial Unit number. The data are entered automatically, but accessible for editing.
"Don't disturb" Mode Settings** PGN 63267				
521420/25.1	Don't Disturb Mode Active/25.1 E-mail	Off	No	Field to enable or disable sending Reports by E-mail by the Unit during the specified time interval.
521420/25.5	Don't Disturb Mode Active/25.5 SMS	Off	No	Field to enable or disable sending Reports as SMS messages by the Unit during the specified time interval.
960/24.2	Minutes/ 24.2 Mode Start	00	min	Field to enter minutes for the start of the time interval during which sending Reports by E-mail and/or as SMS messages by the Unit is disabled. The field is accessible for editing only if sending Reports by E-mail and/or as SMS messages is enabled.

SPN	Name	Factory value	Unit of measure	Clarification
961/24.2	Hours/ 24.2 Mode Start	23	h	Field to enter hours for the start of the time interval during which sending Reports by E-mail and/or as SMS messages is disabled. The field is accessible for editing only if sending Reports by E-mail and/or as SMS messages is enabled.
960/24.3	Minutes/ 24.3 Mode Stop	00	min	Field to enter minutes for the end of the time interval during which sending Reports by E-mail and/or as SMS messages by the Unit is disabled. The field is accessible for editing only if sending Reports by E-mail and/or as SMS messages is enabled.
961/24.3	Hours/ 24.3 Mode Stop	7	h	Field to enter hours for the end of the time interval during which sending Reports by E-mail and/or as SMS messages by the Unit is disabled. The field is accessible for editing only if sending Reports by E-mail and/or as SMS messages is enabled.
GSM Network Settings** PGN 63179				
521335	Preferred GSM Network Mode	Auto 2G/3G/LTE	No	From the dropdown list you may select the cellular communication standard for the Unit inbult GSM modem: - Auto 2G/3G/LTE — automatic switching between GSM 2G / GSM 3G / GSM 4G networks; - Only 2G — operation only in GSM 2G networks; - Only 3G — operation only in GSM 3G networks; - Only LTE (NB-IoT) — operation only in GSM 4G networks. In the majority of cases, we recommend to use "Auto 2G/3G/LTE" during the Unit operation in home network. However, in some cases enabling "Only 2G" or "Only 3G" modes may improve the operation of the Unit inbuilt modem. E.g. if the Vehicle is outside the 3G network signal coverage area, enabling "Only 2G" mode will save the battery charge in case of using the inbuilt accumulator. Besides, enabling "Only 3G" mode, when the signal is feeble, will provide more stable and higher speed Internet connection of modem.
GSM Network Parameters** PGN 63178				
521334	GSM Network Mode	On the fact	No	The setting displays the cellular communication standard which is currently used by the Unit inbult GSM modem: 2G / 3G / 4G.
Modem Status PGN 63007				
521130	Modem Power Status	On the fact	No	This setting displays present GPRS modem power status (On/Off).
521131	Modem Registration Status	On the fact	No	This setting displays present GPRS modem registration status in GSM network (No network/Home network/Roaming).
521132	Modem Internet Connection Status	On the fact	No	This setting displays present GPRS modem connection status to the Internet (Connected/Disabled).
521133	AVL Connection Status	On the fact	No	This setting displays present status of GPRS modem connection to AVL server (Connected/Disabled).
521140	AVL Sent Messages Counter	On the fact	pcs.	Counter of Onboard Reports transmitted by modem to AVL server address via GPRS channel*.
521141	Internet Connections Counter	On the fact	pcs.	Counter of successful GPRS modem connections to the Internet*.
521142	Internet Connection Failures Counter	On the fact	pcs.	Counter of GPRS modem connection errors to the Internet*.
521143	Internet Disconnections Counter	On the fact	pcs.	Counter of GPRS modem disconnections from the Internet*.
521144	AVL Connection Counter	On the fact	pcs.	Counter of GPRS modem connections to AVL Server*.
521145	AVL Connection Failures Counter	On the fact	pcs.	Counter of GPRS modem connection errors to AVL Server*.
521146	AVL Disconnection Counter	On the fact	pcs.	Counter of GPRS modem disconnections from AVL Server*.

SPN	Name	Factory value	Unit of measure	Clarification
521147	Sent SMS Counter	On the fact	pcs.	Counter of sent SMS commands for remote configuration of CANUp 27*.
521148	Errors Sending SMS Counter	On the fact	pcs.	Counter of sent SMS command errors for remote configuration of CANUp 27*.
521149	Modem Reset Counter	On the fact	pcs.	Counter of automatic GPRS modem resets while GPRS modem has operation errors*.
521178	Received Signal Strength Indication (RSSI)	On the fact	dBm	This setting displays present level of signal strength (on a logarithmic scale) received by GPRS modem receiver. Produced range: from -52 to -115 dBm.
Authentication AVL Server PGN 63099				
521175	AVL Authentication Status	On the fact	No	This setting displays present authentication status (originality check) of CANUp 27 at AVL Server (Completed/Not completed).
521176	AVL Authentication Counter	On the fact	pcs.	Counter of successful authentications of CANUp 27 at AVL Server*.
521177	AVL Authentication Failures Counter	On the fact	pcs.	Counter of authentication errors of CANUp 27 at AVL Server*.
Sent E-Mail Counter PGN 63147				
521240	E-Mail Sent Counter	On the fact	pcs.	Counter of number of Reports sent by e-mail*.
521241	E-Mail Sending Error Counter	On the fact	pcs.	Counter of number of failed Report by e-mail sending attempts*.

* User can reset values of all Counters PGN 63007, PGN 63099 and (or) PGN 63147 if it is necessary.
** Settings are relevant only for CANUp 27 Pro LTE / Genset.
***Settings are accessible only after selection of UNUM protocol in AVL Server settings (see Onboard reports format in CANUp 27 Telematics gateways operation manual).

Obligatory settings for CANUp 27 Standard / CANUp 27 Pro LTE / Genset, required for connecting to Internet and sending Reports to Server.

Obligatory settings only for CANUp 27 Standard.

Obligatory settings only for CANUp 27 Pro LTE / Genset.

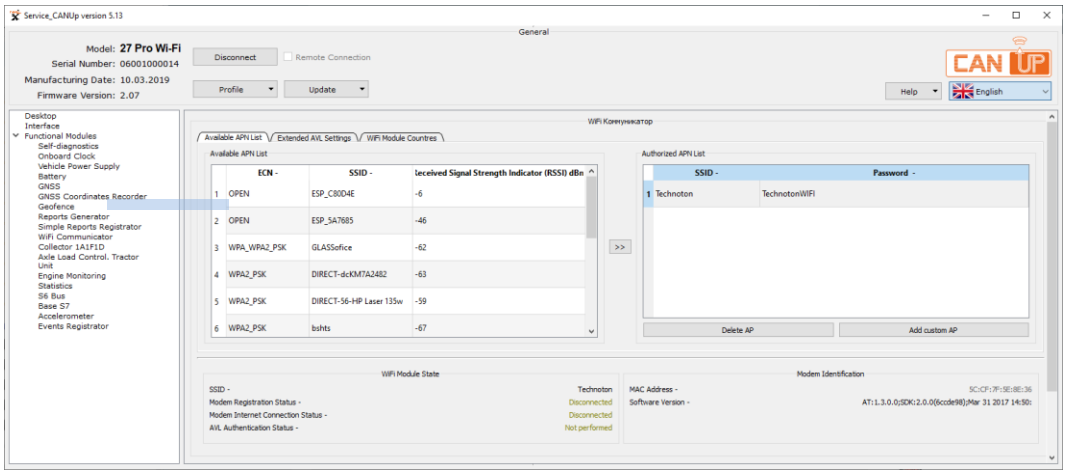
RECOMMENDATIONS:

Detailed information on the gateways connection can be found in the following guides available for downloading in the Technoton document center:

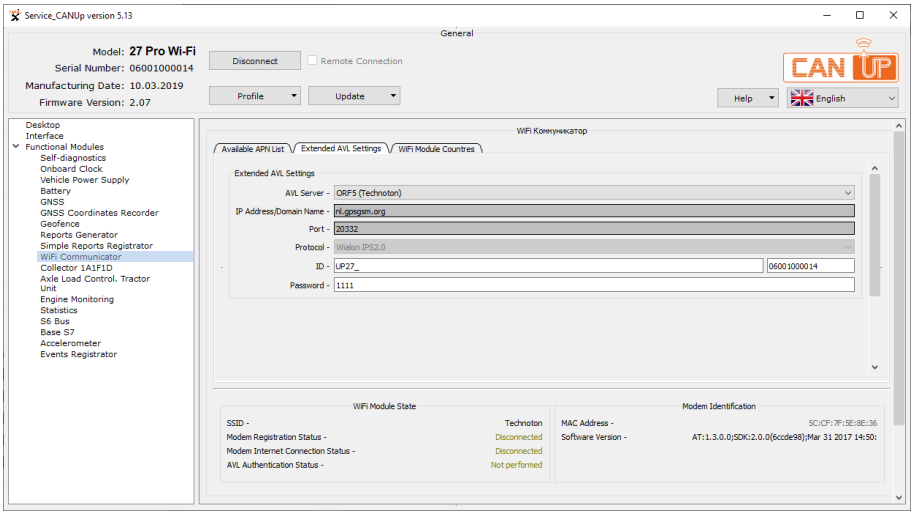
- CANUp 27 Pro LTE /Genset to UNUM IIOT Platform server — in CANUp 27 and UNUM. Quick Start Guide.
- CANUp 27 Standard/Pro LTE /Genset to ORF 4/ORF 5 Telematics server — in CANUp 27 and ORF. Quick Start Guide.

2.11 WiFi Communicator FM

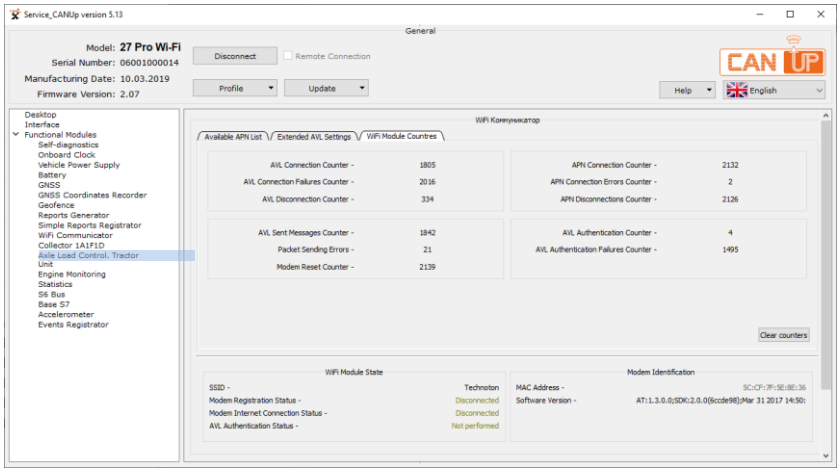
WiFi Communicator FM — is designed for transmission of generated Onboard reports of CANUp 27 Pro Wi-Fi via Internet using the Wi-Fi access point to the Server, for configuration of parameters of connection to AVL Server, for diagnostics of the inbuilt Wi-Fi module.



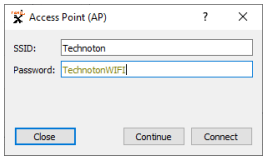
a) list of available access points



b) extended AVL Server settings



c) Counters of Wi-Fi module



d) connection of Wi-Fi access point

Figure 16 — Example of settings of the WiFi Communicator FM in Service CANUp software

Table 12 — WiFi Communicator FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Authentication AVL Server PGN 63099				
521175	AVL Authentication Status	On the fact	No	This setting displays the current status of authentication (authenticity check) of CANUp 27 Pro Wi-Fi at AVL Server (Completed/Not completed).
521176	AVL Authentication Counter	On the fact	pcs.	Counter of number of successful CANUp 27 Pro Wi-Fi authentications at AVL Server*.
521177	AVL Authentication Failures Counter	On the fact	pcs.	Counter of authentication errors of CANUp 27 Pro Wi-Fi at AVL Server*.
WiFi Module State PGN 63281				
521106	SSID	On the fact	No	Field to enter the ID of access point (SSID) used for wireless connection of CANUp 27 Pro Wi-Fi to Internet. Maximum length: 32 characters. It is allowed to use only Roman letters, digits as well as characters: dash, dot, underlining and space.
521131	Modem Registration Status	On the fact	No	This setting displays the current status of registration of the inbuilt Wi-Fi modem of CANUp 27 Pro Wi-Fi at the authorized access point (Enabled/Disabled).
521132	Modem Internet Connection Status	On the fact	No	This setting displays the current status of the Internet connection of CANUp 27 Pro Wi-Fi modem (Enabled/Disabled).
521105	ECN	On the fact	No	This setting displays the type of confidential information protection (WEP/WPA/WPA2/PSK) which is used in the authorized access point.
521178	Received signal strength indication (RSSI)	On the fact	dBm	This setting displays the current level of signal power (in the logarithmic scale) received by CANUp 27 Pro Wi-Fi modem from the Wi-Fi access point. The range displayed: from -52 to -115 dBm.
WiFi Module Counters* PGN 63282				
521107	APN Connection Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt modem connections to the authorized access point.
521108	APN Connection Errors Counter	On the fact	pcs.	Counter of errors of CANUp 27 Pro Wi-Fi inbuilt modem connections to the authorized access point.
521109	APN Disconnections Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt modem disconnections from the authorized access point.
521144	AVL Connection Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt modem connections to AVL Server.
521145	AVL Connection Failures Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt modem connection errors while connecting to AVL Server.
521146	AVL Disconnection Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt modem disconnections from AVL Server.
521140	AVL Sent Messages Counter	On the fact	pcs.	Counter of Onboard reports transmitted by CANUp 27 Pro Wi-Fi via Internet AVL Server.
521110	Packet Sending Errors	On the fact	pcs.	Counter of Onboard reports transmission errors by CANUp 27 Pro Wi-Fi at AVL Server.
521149	Modem Reset Counter	On the fact	pcs.	Counter of CANUp 27 Pro Wi-Fi inbuilt Wi-Fi modem restarts in cases of its operation failures.

SPN	Name	Factory value	Unit of measure	Clarification
Available APN List PGN 63283				
521355	Array Elements Count	On the fact	pcs.	List of available access points (routers) for Internet connection identified by the inbuilt Wi-Fi modem of CANUp 27 Pro Wi-Fi he area. This list may contain any number of routers in the coverage area of the inbuilt Wi-Fi modem of CANUp 27 Pro Wi-Fi.
521105	ECN	On the fact	No	This setting displays the type of data confidentiality protection (WEP/WPA/WPA2/PSK) used in a specific access point.
521106	SSID	On the fact	No	Identifiers (SSID) of access points (routers) that can be identified in the local area by the inbuilt Wi-Fi modem of CANUp 27 Pro Wi-Fi.
521178	Received Signal Strength Indicator (RSSI)	On the fact	dBm	This setting displays the current level of signal power (in the logarithmic scale) received by CANUp 27 Pro Wi-Fi modem from the access point. The range displayed: from -52 to -115 dBm.
Extended AVL Settings PGN 63232				
521595/13.2	IP Address/ Domain/ 13.2 Automatic Vehicle Location	On the fact	No	You need to enter IP- or URL-address of AVL Server with which CANUp 27 Pro Wi-Fi is establishing communication to transmit Onboard reports.
521623/13.2	Port/13.2 Automatic Vehicle Location	On the fact	No	You need to enter the number of the open port of AVL Server which will be used for communication with CANUp 27 Pro Wi-Fi.
521080/13.2	ID/13.2 Automatic Vehicle Location	UP27_ XXXXXXXXXX (XXXXXXXXXX – CANUp 27 Pro Wi-Fi, serial number, automatically generated)	No	You need to enter a prefix CANUp 27 Pro Wi-Fi identification at AVL Server. The fields of the prefix entered must match the fields of ID setting during the Vehicle registration at ORF 4 Telematics Service or at the Server of UNUM IIOT Platform: - UP27_XXXXXXXXXX (for protocol Wialon IPS2.0); - the value (Login) is taken from ID data of the Unit profile that are generated at the Server (for UNUM protocol).
521594/13.2	Password/13.2 Automatic Vehicle Location	1111	No	You need to enter password for CANUp 27 Pro Wi-Fi authentication at AVL Server. For UNUM protocol, the value (Password) is taken from ID data of the Unit profile that are generated at the Server.
521399/13.2	Protocol/13.2 Automatic Vehicle Location	Wialon IPS2.0	No	From the dropdown list you need to select the required communication protocol for transmission of Onboard reports by CANUp 27 Pro Wi-Fi to AVL Server: - Wialon IPS2.0; - UNUM (see Onboard reports format in CANUp 27 Telematics gateways operation manual).
MQTT settings** PGN 63258				
521039	Client Id	id	No	Field to enter Client ID used in Connect Message to establish connection between CANUp 27 Pro Wi-Fi and the Server of UNUM IIOT Platform. The value entered must be identical to the unique device identifier (UNUM ID) from the Identification data generated at the Server during the Unit registration.
521040	Topic	topic	No	Field to enter variable name of Publish Message used for transmission of Onboard reports by CANUp 27 Pro Wi-Fi to the Server of UNUM IIOT Platform. The value entered must be identical to the Topic from the Identification data generated at the Server during the Unit registration.
521041	Keep Alive Interval	600	s	Field to enter the maximum interval of time in seconds during which the connection between CANUp 27 Pro Wi-Fi and the Server of UNUM IIOT Platform will be active without any traffic.

SPN	Name	Factory value	Unit of measure	Clarification
521042	Quality Of Service (QoS)	At Least Once	No	From the dropdown list select one of quality levels of Onboard reports: - No more than once — on this level, CANUp 27 Pro Wi-Fi sends a Report to the Server only once, not expecting the delivery confirmation; - At least once — this level ensures that the Report from CANUp 27 Pro Wi-Fi will be delivered to the Server of UNUM IIOT Platform; however, there is a possibility of sending Reports duplicates.
521043	SSL	Off	No	One of the options of Reports transfer to UNUM IIOT Platform Server is to be selected from the dropdown list: - ON — (Reports are transferred according to the cryptographic protocol of secure sockets (connection endpoints)— Secure Sockets Layer (SSL) which is responsible for secure data transfer on the level of a communication session. - OFF — (Reports are transferred without using the cryptographic protocol of secure sockets which does not guarantee secure data transfer on the level of a communication session.
521087	Clean Session	On	No	From the dropdown list select one version of completing the session during the user disconnection from the Server of UNUM IIOT Platform: - OFF — the Server saves the session and all user settings. All Reports of CANUp 27 Pro Wi-Fi accumulated during the OFF period will be automatically transmitted to the user during his next connection; - ON — during the next connection the user he will have to conduct another configuration in order to receive CANUp 27 Pro Wi-Fi Reports from the Server.
Authorized APN List PGN 63284				
521355	Array Elements Count	On the fact	pcs.	List of Authorized Access Points (routers) for Internet connection of CANUp 27 Pro Wi-Fi. To create this list, the user may select a router from the List of Available Access Points or add a user access point (see figure 16 d). To connect CANUp 27 Pro Wi-Fi to the access point, the user must enter its password in the respective field. In case he needs, the user may delete any router from the List of Authorized Access Points. The maximum number of routers in the List of Authorized Access Points is 10. CANUp 27 Pro Wi-Fi may be connected to only one authorized access point.
521106	SSID	On the fact	No	Identifiers (SSID) of routers in the List of Authorized Access Points.

* User can reset values of all Counters PGN 63282 if it is necessary.
** Settings are accessible only after selection of UNUM protocol in AVL Server settings.
— Obligatory settings for CANUp 27 Pro Wi-Fi, required for connecting to Internet and sending Reports to Server.

RECOMMENDATIONS:
Detailed information on the gateways connection can be found in the following guides available for downloading in the Technoton document center:
- CANUp 27 Pro Wi-Fi to UNUM IIOT Platform server — in CANUp 27 and UNUM. Quick Start Guide.
- CANUp 27 Pro Wi-Fi to ORF 4/ORF 5 Telematics server — in CANUp 27 and ORF. Quick Start Guide.

2.12 Collector 1A1F1D FM

Collector 1A1F1D FM — used for receiving and transformation of analog/frequency/pulse/ discrete signal to digital values of SPN parameters.

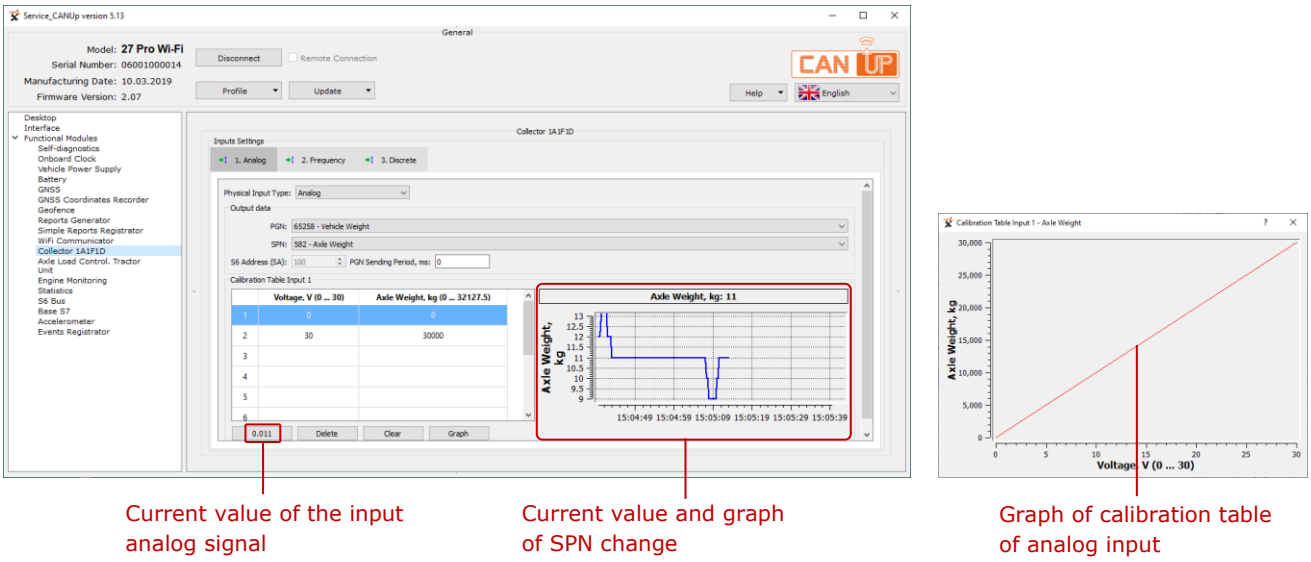


Figure 17 — Example of settings of the Collector 1A1F1D FM in Service CANUp software

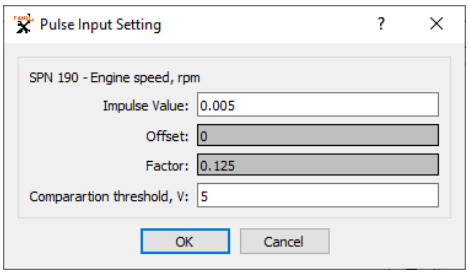


Figure 18 — Example of window of configuration of pulse input

Table 13 — Collector 1A1F1D FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
			Inputs Settings (PGN 63100)		
521363	Inputs Quantity	3	No	No	Number of physical inputs of CANUp 27.
521364	Input Number	0	No	No	Select I1 group of contacts of analog physical input of CANUp27.
521150	PGN	PGN 65258 Vehicle weight	No	0…65535	Enter output PGN, which will contain SPN parameter converted from analog signal. PGN can be selected through Service software from the list, containing most important Vehicle parameters, or from the extended DB S6 list.
1214	SPN	SPN 582 Axle weight	No	0…524287	Select SPN, which should be resulted from converting analog signal.
521188	S6 Address (SA)	100	No	0…255	Enter unique network address (SA) of CANUp 27 connected via S6 Technology. SA cannot be edited if PGN is sent “on request”.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521362	PGN Sending Period	0	ms	0…4294967295	Enter time interval (in ms) of sending generated PGN via S6 Technology. For "on request" sending, enter 0 ms.
521364	Input Number	1	No	No	Contact group I2 of frequency/counting physical input of CANUp 27 is selected.
521150	PGN	PGN 61444 Electronic Engine Controller 1	No	0…65535	Output PGN containing SPN parameter converted from frequency or pulse signal is specified. PGN can be selected through Service software from the list, containing most important Vehicle parameters, or from the extended DB S6 list.
1214	SPN	SPN 190 Engine speed	No	0…524287	SPN which is to be received as a result of frequency/pulse signal conversion is selected.
521188	S6 Address (SA)	100	No	0…255	Enter unique network address (SA) of CANUp 27 connected via S6 Technology. SA cannot be edited if PGN is sent "on request".
521362	PGN Sending Period	50	ms	0…4294967295	Enter time interval (in ms) of sending generated PGN via S6 Technology. For "on request" sending, enter 0 ms.
521364	Input Number	2	No	No	Contact group I3 of discrete physical input of CANUp 27 is selected.
521150	PGN	PGN 64960 Passenger Counter	No	0…65535	Output PGN containing SPN parameter converted from discrete signal is specified. PGN can be selected through Service software from the list, containing most important Vehicle parameters, or from the extended DB S6 list.
1214	SPN	SPN 3044 Silent Alarm Status	No	0…524287	SPN which is to be received as a result of discrete signal conversion is selected.
521188	S6 Address (SA)	100	No	0…255	Enter unique network address (SA) of CANUp 27 connected via S6 Technology. SA cannot be edited if PGN is sent "on request".
521362	PGN Sending Period	0	ms	0…4294967295	Enter time interval (in ms) of sending generated PGN via S6 Technology. For "on request" sending, enter 0 ms.
Calibration Table Input 1 (PGN 63101)					
521431	Physical Input/Output Type Mask	4	No	0…255	Bit mask containing a description of possible functions of input 1: 0 – Not supported; 4 – Analog (by default).
521365	Physical input type	4-Analog	V	0…30	Analog type of the signal physical input (value of the bit mask – 4) is selected from the dropdown list. The user can also deactivate the analog input support. In such a case, all settings of the input will become inaccessible for editing.
521355	Array Elements Count	2	pcs.	1…10	Number of points of the calibration table which is created during the configuration of the input. The maximum number of calibration points – 10.
521366	Signal input value	0; 30	V	0…4294967295	For points of the calibration table of input 1 values of analog input signal are specified*.
521347/33.1	SPN value/ 33.1 Input 1	0; 30000	kg	0…4294967295	For points of the calibration table of input 1 values of converted SPN parameter are specified*.
Calibration Table Input 2 (PGN 63153)					
521431	Physical Input/Output Type Mask	48	No	0…255	Bit mask containing a description of possible functions of input 2: 0 – Not supported; 16 – Frequency (by default); 32 – Counting.
521365	Physical input type	16- Frequency	kHz (for frequency input) No (for counting input)	0.001…10 (for frequency input) No (for counting input)	Selected from the dropdown list: Frequency (bit mask value 16) or Counting (bit mask value 32) type of the signal physical type. The user can also deactivate the input supprt. In such a case, all input settings will become inaccessible for editing.
521355	Array Elements Count	2	pcs.	1…10	Number of points of the calibration table created during the frequency input configuration. The maximum number of calibration points – 10.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521366	Signal input value	On the fact	On the fact	0…4294967295	In case of selecting the counting physical type, the calibration table is inactive. For points of the calibration table of input 2, only values of frequency input signal are specified*.
521347/33.2	SPN value/ 33.2 Input 2	On the fact	On the fact	0…4294967295	For points of the calibration table of input 2 values of converted SPN parameter are specified*.
Pulse Input Setting (PGN 63509)					
521274	Impulse Value	On the fact	On the fact	0…4294967295	Coefficient which defines the amount of physical value corresponding to one input pulse is specified. (see figure 18). E.g. one pulse of DFM fuel flow meter corresponds to the volume of fuel which has passed through its measuring chamber. The flow meter pulse value is specified in its operation documentation.
521295	Offset	0	On the fact	0…4294967295	Offset attribute is introduced; it is necessary for automatic calculation of value of SPN received as a result of the pulse signal conversion.
521296	Factor	1	On the fact	0…4294967295	Factor attribute is introduced; it is necessary for automatic calculation of value of SPN received as a result of the pulse signal conversion.
521678	Comparartion threshold	On the fact	On the fact	0…3212.75	The minimum value of input signal amplitude is specified which, in case it is surpassed, is counted as a pulse.
Calibration Table Input 3 (PGN 63154)					
521431	Physical Input/Output Type Mask	8	No	0…255	Bit mask containing a description of possible functions of input 3: 0 – Not supported; 8 – Discrete.
521365	Physical input type	8-Discrete	No	U_{PS}…3 (“0”) 3…0 (“1”) (U_{PS} — voltage of power supply source)	Discrete type of the signal physical input (value of the bit mask – 8) is selected from the dropdown list. The user can also deactivate the discrete input support. In such a case, all settings of the input will become inaccessible for editing.
521355	Array Elements Count	2	pcs.	1…10	Number of points of the calibration table created during the discrete input configuration. The maximum number of calibration points – 2.
521366	Signal input value	0; 3	V	0…4294967295	For points of the calibration table of input 3 values of the discrete input signal corresponding to two states of pressing the emergency button are specified*.
521347/33.3	SPN value/ 33.3 Input 3	“1”; “0”	On the fact	0…4294967295	For points of the calibration table of input 3 two states of pressing the emergency button are specified which correspond to “0” and “1” values of the discrete input signal*.
Physical Inputs Signal Level (PGN 63298)					
521366	Signal Input Value	0	V Hz	0…4294967295	The current value of the input signal (analog/frequency/discrete) displayed on the button below the calibration table in the process of calibration of the respective physical input.

Settings of analog physical input.

Settings of frequency/counting physical input.

Settings of discrete physical input.

* By default, the table contains two points corresponding to the extreme values of the input signal range of fluctuations. You can specify the maximum of 10 calibration points (for discrete input – 2 points). After pressing “Graph” button, the graph of dependence of values of the converted parameter of SPN on input signal values is displayed, in accordance with the calibration table (see example in figure 17).

2.13 Axle Load Control. Tractor Unit FM

Axle Load Control. Tractor Unit FM — designed for obtaining real-time data on current Vehicle load per axle, total trip and operation time in different modes of axle load, Events of loading/unloading/overloading Vehicle, as well as the trailer coupling/uncoupling.

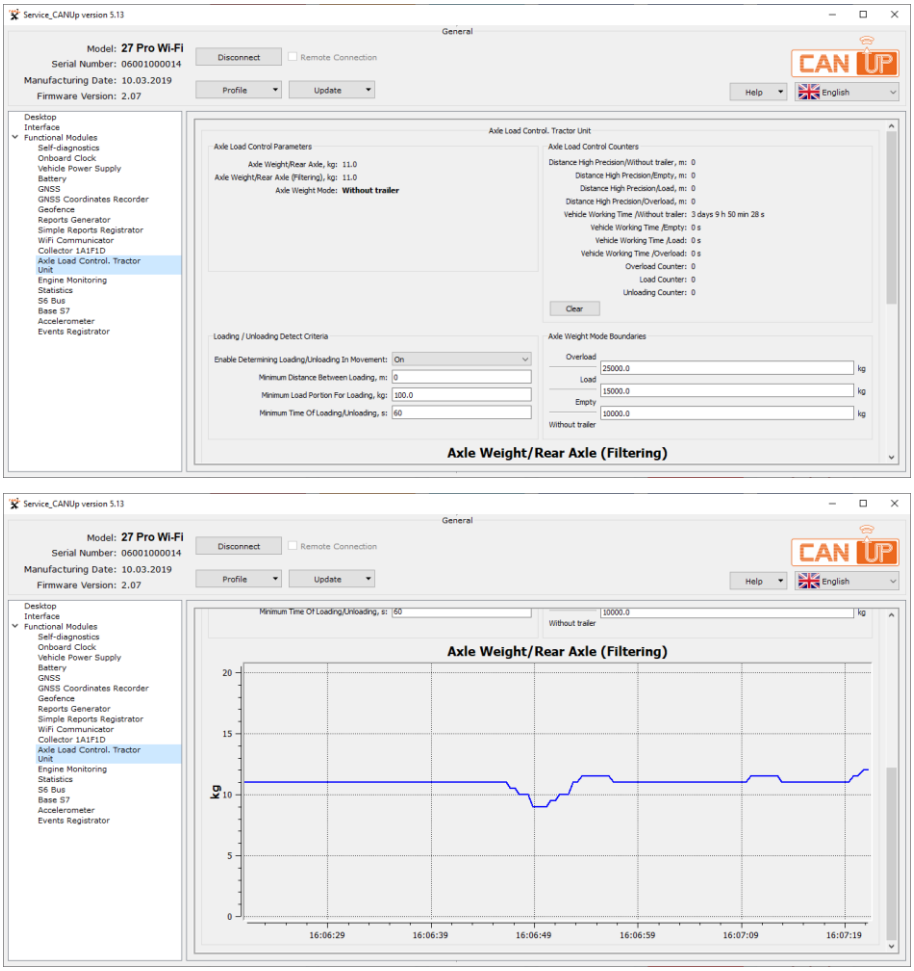


Figure 19 — Example of settings of the Axle Load Control. Tractor Unit FM in Service CANUp software

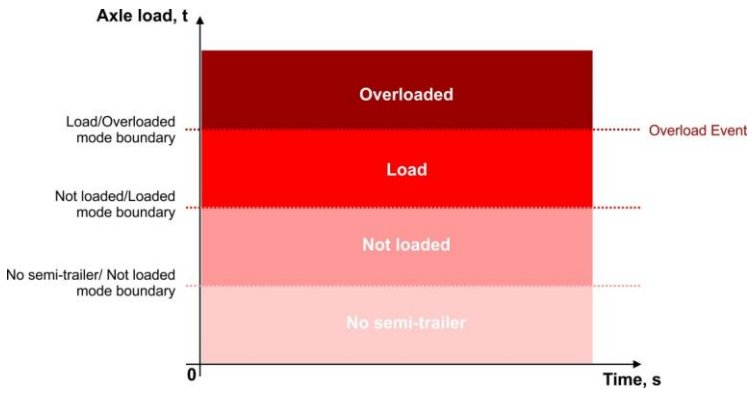


Figure 20 — Axle load mode boundaries

Table 14 — Axles Load Monitoring FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Axle Load Control Parameters PGN 62985					
582/19.2	Axle weight/ 19.2 Rear axle	On the fact	kg	0…32127.5	Displays current value of load on rear axle of Vehicle.
582/19.2/2.10	Axle weight/ 19.2 Rear axle / 2.10 Filtering	On the fact	kg	0…32127.5	Displays filtrated current value of load on rear axle of Vehicle, i.e. values filtrated during pre-set time interval.
521182	Axle weight Mode	On the fact	No	No	Vehicle operation mode according to current value of axle load (see figure 20).
Axle Load Control Counters PGN 62986					
521004/10.0	Distance high precision/ 10.0 Without trailer	On the fact	m	0…4211081215	Displays total distance, covered by Vehicle in operation mode corresponding to axle load without a semi-trailer. The counter can be reset by user.
521004/10.1	Distance high precision/ 10.1 Empty	On the fact	m	0…4211081215	Displays total distance, covered by Vehicle in operation mode corresponding to axle load with unloaded semi-trailer. The counter can be reset by user.
521004/10.2	Distance high precision / 10.2 Load	On the fact	m	0…4211081215	Displays total distance, covered by Vehicle in operation mode corresponding to axle load with loaded semi-trailer. The counter can be reset by user.
521004/10.3	Distance high precision/ 10.3 Overload	On the fact	m	0…4211081215	Displays total distance, covered by Vehicle in operation mode when maximum allowed load per axle was exceeded. The counter can be reset by user.
521057/10.0	Vehicle working time/ 10.0 Without trailer	On the fact	s	0…4211081215	Displays total time of Vehicle in operation mode corresponding to axle load without a semi-trailer. The counter can be reset by user.
521057/10.1	Vehicle working time/ 10.1 Empty	On the fact	s	0…4211081215	Displays total time of Vehicle in operation mode corresponding to axle load with unloaded semi-trailer. The counter can be reset by user.
521057/10.2	Vehicle working time/ 10.2 Load	On the fact	s	0…4211081215	Displays total time of Vehicle in operation mode corresponding to axle load with loaded semi-trailer. The counter can be reset by user.
521057/10.3	Vehicle working time/ 10.3 Overload	On the fact	s	0…4211081215	Displays total time of Vehicle in operation mode when maximum allowed load per axle was exceeded. The counter can be reset by user.
521036	Overload Counter	On the fact	pcs.	0…4211081215	Displays number of recorded facts of exceeding maximum allowed load per axle of Vehicle. The counter can be reset by user.
521037	Load Counter	On the fact	pcs.	0…4211081215	Displays number of recorded facts of loading cargo to semi-trailer. The counter can be reset by user.
521038	Unloading Counter	On the fact	pcs.	0…4211081215	Displays number of recorded facts of unloading cargo from semi-trailer. The counter can be reset by user.
Loading/Unloading Detect Criteria PGN 63151					
521258	Enable determining Loading/Unloading in movement	On	No	On/Off	Enabling or disabling to recognize Event of Loading/Unloading while Vehicle is moving.
521255	Minimum distance between loading	0	m	0…4211081215	Enter minimum trip distance (in meters) between Vehicle loadings. This option can be useful for logistics operations monitoring within smaller areas.
521256	Minimum load portion for loading	100	kg	0…32127.5	Enter minimum cargo weight, which is recognized by Telematics system as Vehicle Loading Event.
521257	Minimum time of Loading/Unloading	60	s	0…64255	Enter minimum time interval between Loading/Unloading (in seconds) Vehicle. This option can be useful for logistics operations optimization.

SPN	Name	Factory value	Unit of measure	Range	Clarification
Axle weight Mode Borders PGN 63066					
521393/10.1	Axle weight Mode border / 10.1 Empty	10000	kg	0…32127.5	Enter axle load value, which will be a boundary between "No semi-trailer" and "not loaded" operation modes (see figure 20).
521393/10.2	Axle weight Mode border / 10.2 Load	15000	kg	0…32127.5	Enter axle load value, which will be a boundary between "not loaded" and "loaded" operation modes (see figure 20).
521393/10.3	Axle weight Mode border / 10.3 Overload	25000	kg	0…32127.5	Enter axle load value, which will be a boundary between "loaded" and "overloaded" operation modes. If boundary is exceeded, Telematics system will recognize "Overload" Event (see figure 20).

2.14 Engine Monitoring FM

Engine Monitoring FM — is designed for real-time monitoring of current values of main Parameters and Counters of the Vehicle engine operation based on data received from the onboard CAN-bus, as well as for identification of Events according to preset limit values of Parameters.

For correct operation of FM Engine Monitoring, you need to connect the Unit to the Vehicle CAN-bus.

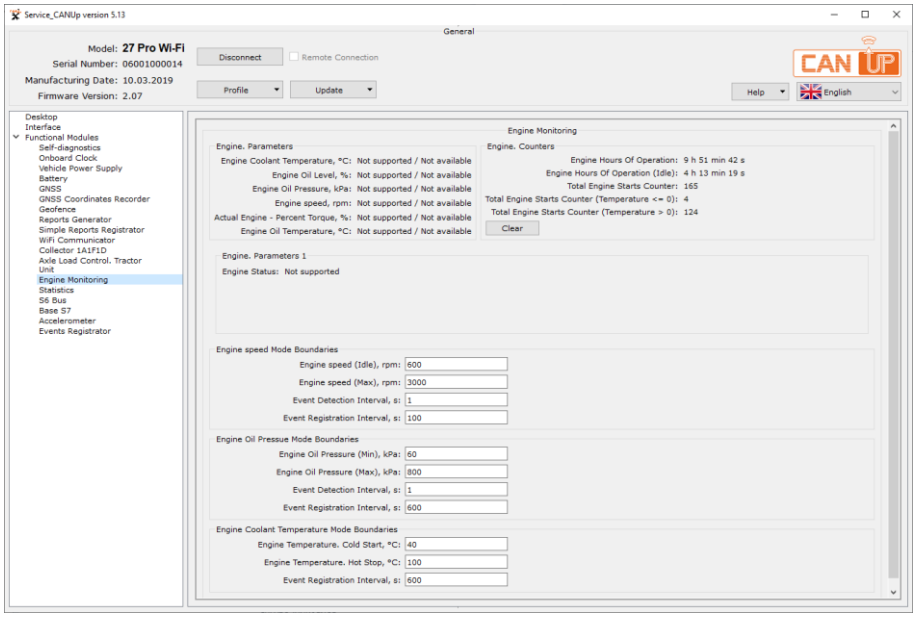
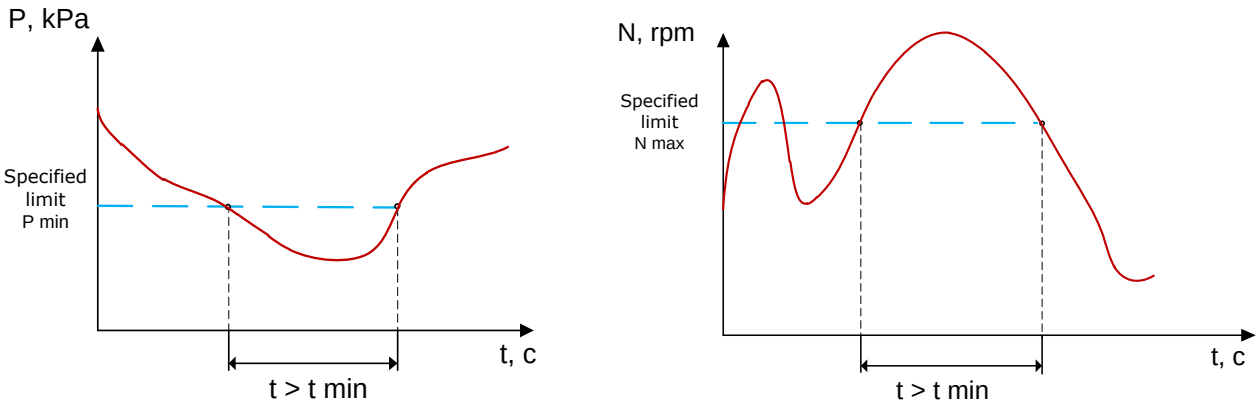


Figure 21 — Example of settings of the Engine Monitoring FM in Service CANUp software



a) of low oil pressure in the engine *b) of exceeding engine rpm limit*

Figure 22 — Examples of preset limits of Parameters to identify Events in FM Engine Monitoring

Table 15 — Engine Monitoring FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Engine. Parameters PGN 62978					
110	Engine Coolant Temperature	No	°C	-40…210	Current value of the Vehicle engine cooling agent temperature is displayed. The cooling agent temperature is, in fact, the temperature of the engine itself. The diesel engine optimal range of working temperature is 70…90 °C. The engine temperature at maximum load should not exceed 97 °C. The process of formation of fuel/air mix and the quality of its combustion, i.e. correct engine running depend on the cooling agent temperature.
98	Engine Oil Level	No	%	0…100	Current value of oil level in the Vehicle engine is displayed. For correct engine operation the oil level must not change throughout the whole period "from replacement to replacement". The causes of oil level lowering are: malfunction of the oil pump, the wear of cylinders, overheating of piston rings, oil filter or oil retainers leakage etc. The causes of oil level raising are: cooling agent penetration into oil because of leakage in the cylinder assembly or because of fuel penetration into oil due to the wear of pistons, oil retainers, faulty injectors etc.
100	Engine Oil Pressure	No	kPa	0…1000	Current value of oil pressure in the Vehicle engine is displayed. Oil pressure must be permanent in the running engine. The causes of low oil pressure are: lowering of oil level in the engine, strong resistance of the oil filter, the oil pump malfunction etc. The causes of high oil pressure are: using oil of inappropriate viscosity, malfunctions of the retaining valve, pressure relief valve or discharge valve, malfunctions of the lubrication system components etc.
190	Engine Speed	No	Rpm	0…8031.88	Current value of the Vehicle engine crankshaft rpm is displayed. Monitoring the crankshaft rpm enables the driver to adjust the driving mode, to provide the optimal load for the engine; it reduces the risk of the engine overheating and increased wear of the engine parts. In the optimal mode, diesel engine rpm must be within 1800…2800 rpm range.
513	Actual Engine - Percent Torque	No	%	-125…125	Per cent of maximum Vehicle engine torque is displayed (instant value). This is a quality indicator characterizing the crankshaft rotative force, depending on the pressing force of the accelerator pedal and the current mode of the engine load. The best engine acceleration dynamics and the optimal engine thrust performance are reached at rpm, when the actual torque is maximal. The reduction of the actual torque indication may be a sign of the engine wear-out.
175	Engine Oil Temperature	No	°C	-273…1734.97	Current value of oil temperature in the Vehicle engine is displayed. The optimal oil temperature at which the wear of engine parts is minimal: 90…105 °C, i.e. 10…15 °C higher than the cooling agent temperature. If the oil temperature is below 90°C, the efficiency of the engine operation is lower and the engine service life is less. Clearance spaces between the piston and the cylinder are bigger, compression is lower. Lubricant is mixed with fuel and that results in the appearing of soot and growing of fuel consumption. The metal of the cylinders is corroded by acids that appear; this results in the increased wear of the cylinders. If the oil is heated over 105 °C, its viscosity becomes less, it gets more fluid which leads to the engine parts friction. If the oil temperature is over 125 °C, it penetrates into work space of the cylinders and burns there. All this results in the increased engine wearing.

SPN	Name	Factory value	Unit of measure	Range	Clarification
Engine. Parameters 1 PGN 63546					
521749	Engine Status	On the fact	No	0 - Stop 1 - Start 2 - Runnning	Current Vehicle engine status is displayed; it is automatically defined, depending on current Parameters received in the priority descending order from the following sources: 1) Engine rpm from onboard CAN-bus; 2) Input signal from frequency input of Collector 1A1F1D FM; 3) Onboard circuit status.
Engine Start Counters PGN 63556					
521002	Normal Engine Starts Counter	No	pcs.	0…4211081215	Counter of total number of correct engine starts (i.e. except all "cold" starts and starts with exceeding the maximum time of the starter uninterrupted operation). Counter increment starts from the moment Unit is manufactured and cannot be reset by user.
521003	Cold Engine Starts Counter	No	pcs.	0…4211081215	Counter of total number of "cold" engine starts (i.e. only all engine starts at the engine temperature not higher than 0 °C). Counter increment starts from the moment the Unit is manufactured and cannot be reset by user.
521239	Incorrect Engine Start Counter	No	pcs.	0…4211081215	Counter of total number of incorrect Vehicle engine starts (i.e. all "cold" starts and/or starts with exceeding the maximum time of the starter uninterrupted operation). Counter increment starts from the moment the Unit is manufactured and cannot be reset by user.
521007	Engine Start Failures Counter	No	pcs.	0…4211081215	Counter of total number of unsuccessful Vehicle engine starts (i.e. when an attempt of engine start is recorded, but engine is not started). Counter increment starts from the moment the Unit is manufactured and cannot be reset by user.
521006	Exceeding Starter Continuous Working Time Counter	No	pcs.	0…4211081215	Counter of total number of all Vehicle engine starts performed with exceeding the maximum time of starter uninterrupted operation. Counter increment starts from the moment the Unit is manufactured and cannot be reset by user.
Engine. Counters PGN 62977					
521190	Engine Hours Of Operation	0 h 0 min 0 s	s	0…4211081215	Counter of total time of the Vehicle engine operation within the whole range of load, including the "Idling" mode of engine operation. Counter can be reset by user.
521190/9.0	Engine Hours Of Operatio/ 9.0 Idle	0 h 0 min 0 s	s	0…4211081215	Counter of total time of the Vehicle engine operation in the "Idling" mode of engine operation. Counter can be reset by user.
521001	Total Engine Starts Counter	No	pcs.	0…4211081215	Counter of total number of the Vehicle engine starts which increments in case of any rpm. Counter can be reset by user.
521001/14.1	Total Engine Starts Counter/ 14.1 Temperature <= 0	No	pcs.	0…4211081215	Counter of total number of the Vehicle engine "cold" starts (when the engine temperature is no higher than 0 °C) which result in its increased wear. Counter can be reset by user.
521001/14.0	Total Engine Starts Counter / 14.0 Temperature > 0	No	pcs.	0…4211081215	Counter of total number of the Vehicle engine "hot" starts (when the engine temperature is higher than 0 °C). You can evaluate the correctness of the engine service by indications of this Counter. Counter can be reset by user.

SPN	Name	Factory value	Unit of measure	Range	Clarification
Engine speed Mode Boundaries PGN 63060					
190/9.0	Engine speed/ 9.0 Idle	600	Rpm	0…8031.88	Setting the lower limit of the Vehicle engine rpm variations range (“Idling” mode of engine operation). This setting is designed to identify the Event “Exceeding Engine rpm”) which is identified in case of exceeding the specified upper limit of engine rpm within specified time (see figure 22 b). This setting is accessible for editing by the user.
190/2.7	Engine speed/ 2.7 Max	3000	Rpm	0…8031.88	Setting the upper limit of the Vehicle engine rpm variations range. This setting is designed to identify the Event “Exceeding Engine rpm”) which is identified in case of exceeding the specified upper limit of engine rpm within specified time (see figure 22 b). This setting is accessible for editing by the user.
521389	Event Detection Interval	1	s	0…64255	In this field, the time interval during which the Vehicle engine rpm exceed the specified upper limit of the rpm variations range is specified and a decision is taken to register the Event “Exceeding Engine rpm” (see figure 22 b).
521390	Event Registration Timeout	100	s	0…64255	In this field, the time interval during which only one Event «Exceeding Engine rpm” is registered (see figure 22 b).
Engine Oil Pressure Mode Borders PGN 63062					
190/9.0	Engine Oil Pressure/ 2.8 Min	60	kPa	0…8031.88	Setting the lower limit of the Vehicle engine oil pressure variations range (“Minimum” oil pressure). This setting is used to identify the Event “Low Oil Pressure” which is identified by the oil pressure falling below the specified minimal value (lower limit) of the range within specified time period (see figure 22 a). This setting is accessible for editing by the user.
190/2.7	Engine Oil Pressure/ 2.7 Max	800	kPa	0…8031.88	Setting the upper limit of the Vehicle engine oil pressure variations range (“Maximum” oil pressure). This setting is used to identify the Event “High Oil Pressure” which is identified by the oil pressure exceeding the specified maximum value (upper limit) of the range within specified time period (see figure 22 a). This setting is accessible for editing by the user.
521389	Event Detection Interval	1	s	0…64255	In this field, the time interval during which the Vehicle engine oil pressure is below the specified lower limit/above the specified upper limit of oil pressure variations range and a decision is taken to register the Event “Low Oil Pressure/High Oil Pressure” (see figure 22 a).
521390	Event Registration Timeout	600	s	0…64255	In this field, the time interval during which only one Event ”Low Oil Pressure/High Oil Pressure” is registered (see figure 22 a).

2.15 Additional Equipment Control FM

Additional Equipment Control FM — is designed for remote control of additional equipment connected to CANUp 27 Pro LTE.

Remote control of additional equipment is employed in the Vehicle engine immobilization system (see the document Subtask "Engine immobilization system". Configuration and connection instructions"). For this purpose, an electromagnetic relay with normally closed contacts is mounted into the break in the electric circuits controlling the engine start or the fuel system. The relay contacts are opened by an output dicrete signal from MasterCAN DAC 15 digital to analog converter; the signal is generated upon receiving a controlling CAN message from CANUp27 Pro LTE Telematics gateway connected to the converter via CAN j1939/S6 interface. The gateway generates a controlling message after receiving the respective GPRS command from ORF 4 / ORF 5 Telematics service or after receiving a special SMS message from up to 3 authorized telephone numbers (see figure 23).

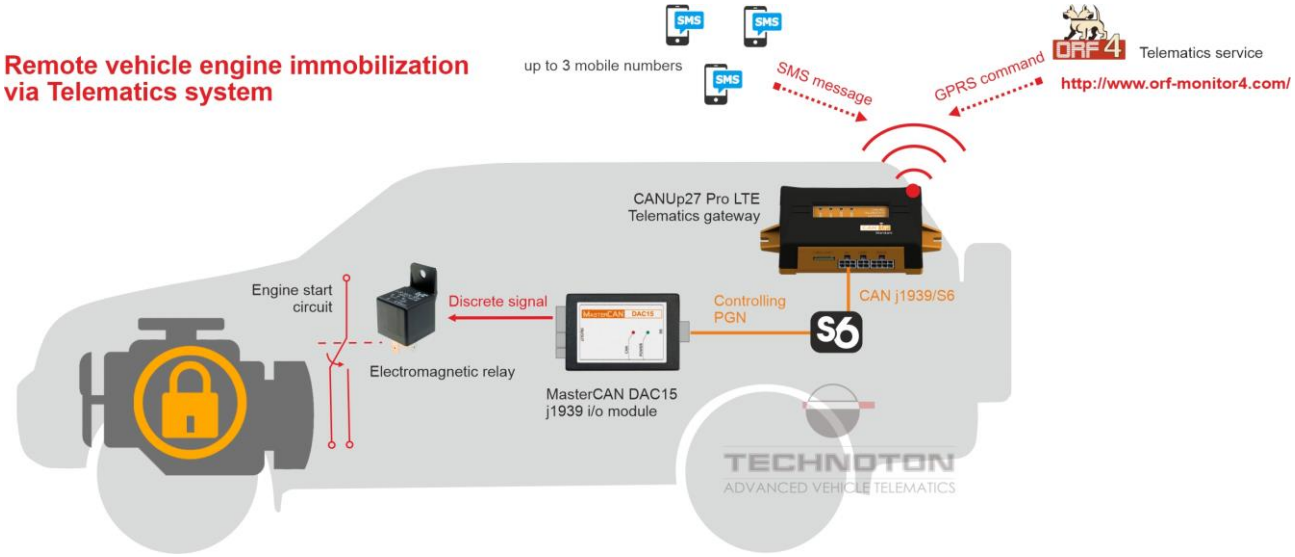


Figure 23 — Principle of operation of engine remote immobilization system

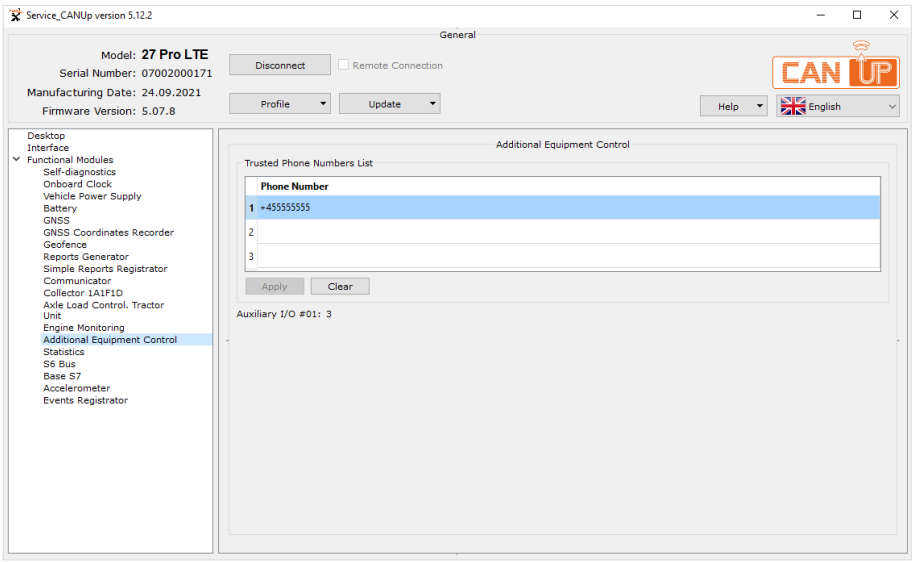


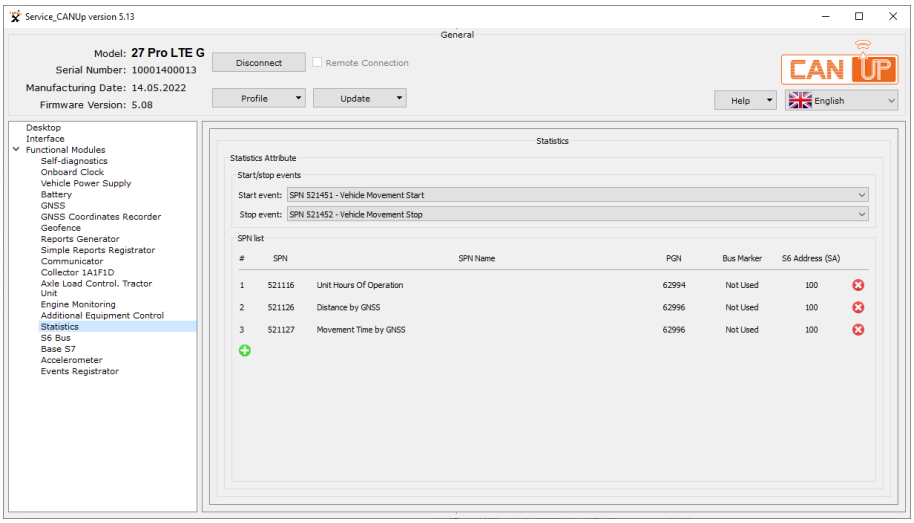
Figure 24 — Example of settings of the Additional Equipment Control FM in Service CANUp software

Table 16 — Additional Equipment Control FM.
SPNs, displayed and/or editable in Service CANUp software

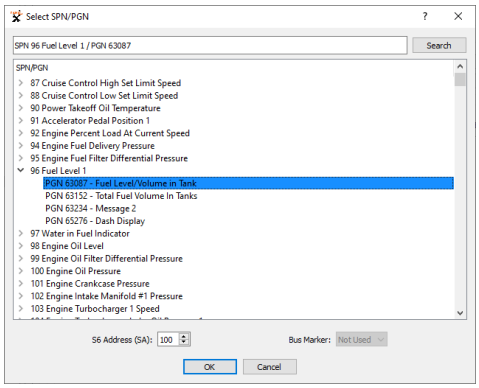
SPN	Name	Factory value	Unit of measure	Range	Clarification
Auxiliary Input/Output Status 1 PGN 65241					
701	Auxiliary I/O #01	No	No	0…3	Parameter of CANUp 27 Pro LTE output message that serves for control of additional equipment connected to the gateway by means of S6 Technology. It may have values — "0", "1", "2", "3". For instance, during the Telematics gateway operation in Vehicle engine immobilization system the control signal emitted by MasterCAN DAC 15 converter to the relay in order to block fuel supply, corresponds to "0" value. Control signal emitted by MasterCAN DAC 15 converter to the relay in order to switch on fuel supply corresponds to values "1", "2" and "3". Converter input data for discrete physical output must be configured in advance only for SPN 701.
Trusted Phone Numbers List PGN 63551					
521355	Array Elements Count	No	pcs.	0…3	List of telephone numbers (maximally 3 pcs.) which could be used for additional equipment remote control by means of SMS messages.
521020	Phone Number	No	No	No	Authorized telephone number which can be used to send SMS messages for remote control of additional equipment. The number must be specified in the international format (maximally 13 digits).

2.16 Statistics FM

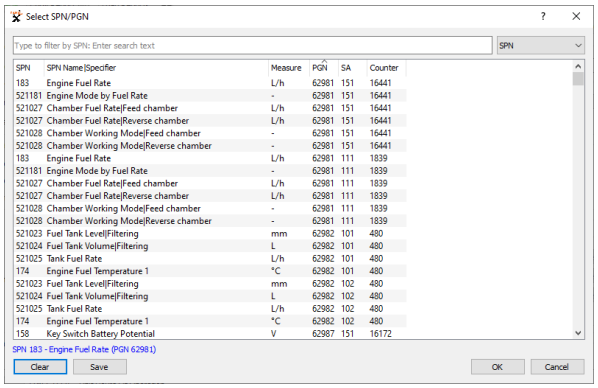
Statistics FM — is designed to generate base data of "Statistics" Report from the period of the selected initial Event to the final Event based on which increments of specified Counters are calculated.



a) window Statistics FM



b) a list of SPNs in S6 Database



c) SPN selection from current CAN bus data

Figure 25 — Example of settings of the Statistics FM in Service CANUp software

Table 17 — Statistics FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Statistics Attribute PGN 63252					
521347	SPN Value	No	On the fact	0…4294967295	Value of parameter (SPN) which is added to the content of the statistics Report as the initial event of "Event". It is allowed to add to the Report SPN that have digital value and no longer than 4 bytes.
521347	SPN Value	No	On the fact	0…4294967295	Value of parameter (SPN) which is added to the content of the statistics Report as the final event of "Event". It is allowed to add to the Report SPN that have digital value and no longer than 4 bytes.
521183	SPN Quantity	No	pcs.	0…10	Number of parameters (SPN) that can be added during the generation of content of a statistics Report.

SPN	Name	Factory value	Unit of measure	Range	Clarification
521368	Specifier. Value	No	On the fact	0…255	Specifying value of parameter (SPN) which is added to the content of the statistics Report.
521150	PGN	No	On the fact	0…65535	Group of parameters (PGN) that includes SPN which is added to the Report content.
521188	S6 Address (SA)	100	No	0…255	Network address in CAN-bus of the device which is source of SPN added to the content of the statistics Report.
521254	Bus Marker	Not used	No	No	Source from which the CANUp 27 reads SPN of the Event which is added to the Report content: - S6 — source specified by the user when SPN of the Event is read from Units via CAN j1939/S6 interface using S6 Technology; - S7 — source designated by the user, when Events SPN is read from wireless Units by means of S7 Technology; - CAN — source assigned automatically, when SPN of the Event is read from a standard Vehicle bus using CAN interface; - Not used — source assigned automatically, when SPN of the Event is selected from S6 Database.

2.17 S6 Bus FM

S6 Bus FM — is designed for analysis and diagnostics of operation (monitoring of active and saved malfunctions, emergency, important and information Events) of Units connected to form a network using S6 Technology.

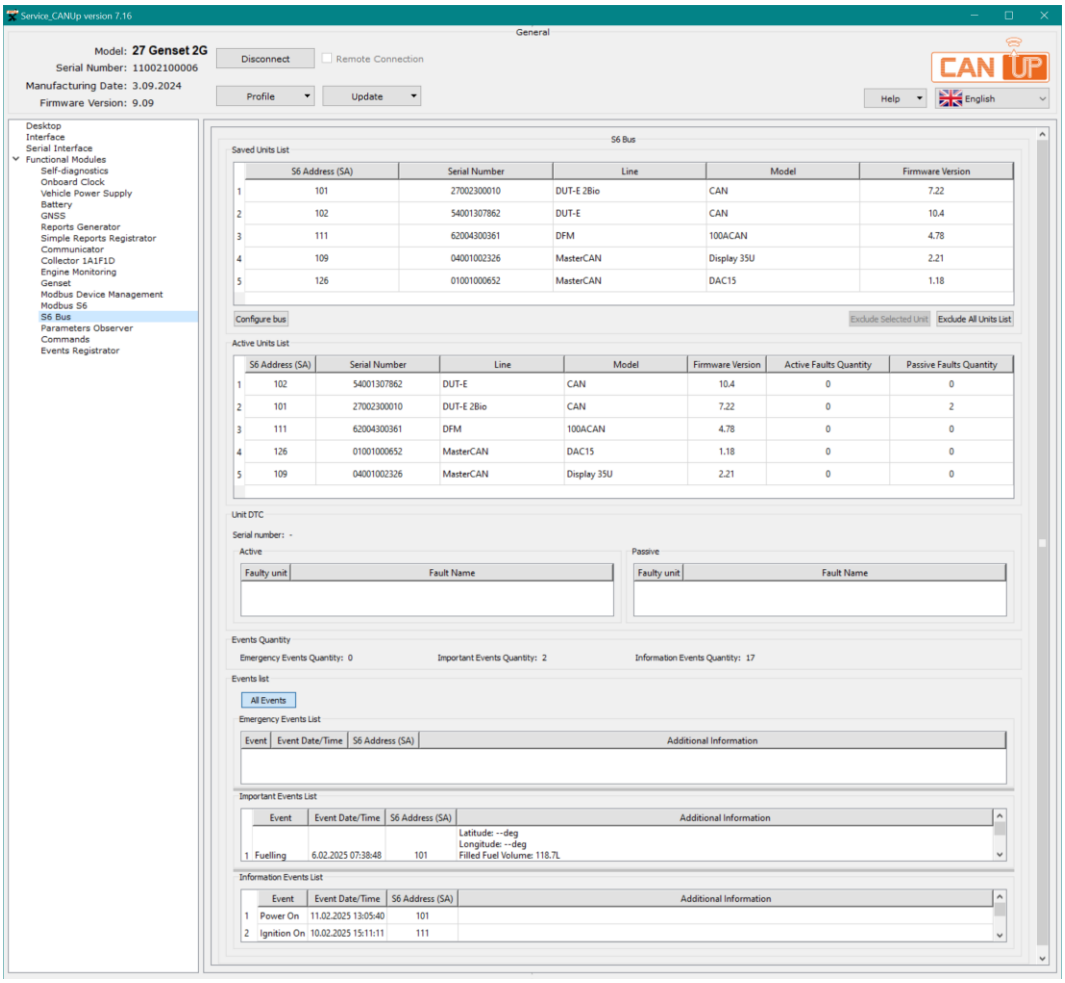


Figure 26 — Example of settings of the S6 Bus FM in Service CANUp software

Table 18 — S6 Bus FM. SPNs, displayed and/or editable in Service CANUp software

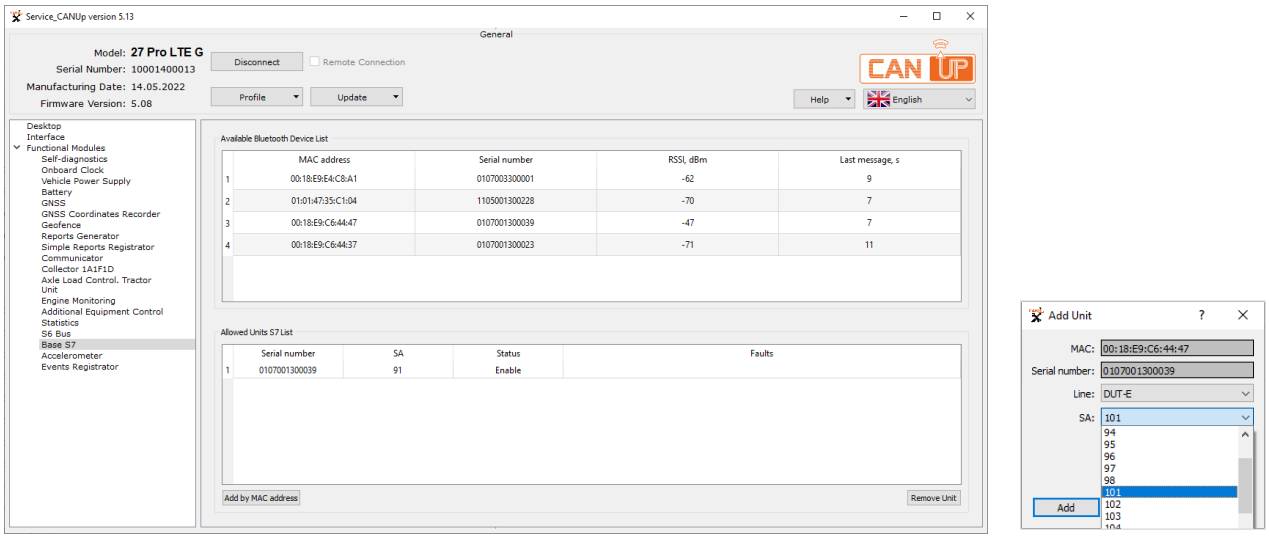
SPN	Name	Factory value	Unit of measure	Clarification
Saved Units List PGN 63257				
521355	Array Elements Count	No	pcs.	Number of Units contained in the List of Saved Units (max. 15). The List of Saved Units is created based on List of Active Units by pressing the button “Configure Bus”. For Units of this list, CANUp 27 Pro LTE / Pro Wi-Fi / Genset generates Events “Unit Connections to S6 Bus ”/ “Unit Disconnections from S6 Bus”. Data are not available for editing.
521188	S6 Address (SA)	No	No	Network address of the Unit contained in the List of Saved Units. The network address serves to identify Units during their operation using S6 Technology. Data are not available for editing.

SPN	Name	Factory value	Unit of measure	Clarification
521120	Serial Number	No	No	The Unit serial number is a set of digits designed for clear identification of a specific Unit. A serial number of Unit has the format: AABBB C DDDDD, in which: AA – code of model in the line of products; BBB – digits reflecting changes in the product; C – Manufacturer code; DDDDD – sequence number. Data are not available for editing.
521123	Line	No	No	Designation of the line of products to which the Unit from the List of Saved Units belongs. The line of products is a group of products of the same kind – online Telematics gateways manufactured with the common trademark (e.g. DUT-E, DFM, DFM Marine etc.). Data are not available for editing.
521345	Model	No	No	Model is the Unit design within its line of products. Each of the Units models has its functional and/or design particularities. Data are not available for editing.
521121	Firmware Version	No	No	Version of the Unit inbuilt software contained in the List of Saved Units. Data are not available for editing.
Active Units List PGN 63254				
521355	Array Elements Count	No	pcs.	Number of Units contained in the List of Active Units (max. 15). This list contains all Units which together with CANUp 27 Pro LTE / Pro Wi-Fi / Genset are connected to form a network based on S6 Technology. For each Unit from the List of Active Units you may receive information on Active and Saved Malfunctions. The registered Events are also displayed for the selected Unit according to their types in the respective tables (“List of Emergency Events”, “List of Important Events” and “List of Information Events”). The total number of Events for all active Units is displayed in the “Number of Events” group of data for each Event type. Data are not available for editing.
521188	S6 Address (SA)	No	No	Network address of the Unit contained in the List of Active Units. The network address serves to identify Units during their operation using S6 Technology. Data are not available for editing.
521120	Serial Number	No	No	The Unit serial number is a set of digits designed for clear identification of a specific Unit. A serial number of Unit has the format: AABBB C DDDDD, in which: AA – code of model in the line of products; BBB – digits reflecting changes in the product; C – Manufacturer code; DDDDD – sequence number. Data are not available for editing.
521123	Line	No	No	Designation of the line of products to which the Unit from the List of Active Units belongs. The line of products is a group of products of the same kind – online Telematics gateways manufactured with the common trademark (e.g. DUT-E, DFM, DFM Marine etc.). Data are not available for editing.
521345	Model	No	No	Model is the Unit design within its line of products. Each of the Units models has its functional and/or design particularities. Data are not available for editing.
521121	Firmware version	No	No	Version of the Unit inbuilt software contained in the List of Active Units. Data are not available for editing.
521045	Active Faults Quantity	No	No	Displays the number of active malfunctions of the Unit (if any, up to 15) contained in the List of Active Units. Data are not available for editing.
521046	Passive Faults Quantity	No	No	Displays the number of saved malfunctions of the Unit (if any, up to 15) contained in the List of Active Units. Data are not available for editing.

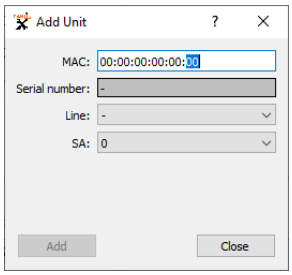
SPN	Name	Factory value	Unit of measure	Clarification
Unit S6 Active DTC List PGN 63255				
521355	Array Elements Count	No	pcs.	Number of current malfunctions of active Units (up to 15). Data are not available for editing.
521188	S6 Address (SA)	No	No	Network address of active Unit which is the source of the currently displayed malfunction. Data are not available for editing.
521104	Fault Code. SID	No	No	Displays the defective unit (e.g. "Fuel Level Sensor") for each current malfunction.
521048	FMI	No	No	Displays malfunction designation (e.g. "Calibration Error") for each current malfunction.
Unit S6 Saved DTC List PGN 63256				
521355	Array Elements Count	No	pcs.	Number of saved malfunctions of active Units (up to 15). Data are not available for editing.
521188	S6 Address (SA)	No	No	Network address of active Unit which is the source of the currently displayed malfunction. Data are not available for editing.
521104	Fault Code. SID	No	No	Displays the defective unit (e.g. "Fuel Level Sensor") for each saved malfunction.
521048	FMI	No	No	Displays malfunction designation (e.g. "Calibration Error") for each saved malfunction.
Units S6 Emergency Events List PGN 63273				
521355	Array Elements Count	No	pcs.	Displays the current number (up to 20) of emergency Events from active Units. Data are not available for editing.
521166	Event SPN	No	No	Displays the current number (up to 20) of emergency Events from active Units. Emergency Events are such as, for instance, "Activation of Emergency Button"*.
Units S6 Important Events List PGN 63272				
521355	Array Elements Count	No	pcs.	Displays the current number (up to 20) of important Events from active Units. Data are not available for editing.
521166	Event SPN	No	No	Displays the list (up to 20) of important Events from active Units. Events such as, for instance, Events: "Onboard Circuit Failure", "Fuel Drain from the Tank", "Fuelling Tank" "Interference into Flow Meter Operation" are considered to be important Events*.
Units S6 Information Events List PGN 63274				
521355	Array Elements Count	No	pcs.	Displays the current number (up to 20) of information Events from active Units. Data are not available for editing.
521166	Event SPN	No	No	Displays the list (up to 20) of information Events from active Units. Events, such as, for instance: "Power Supply ON/OFF, "GNSS Signal Loss/Restore" are considered to be information Events*.
* For each Event the following data are specified: designation, date/time of occurrence, as well as additional information (if any). Events are displayed in chronological sequence, starting from the most recent. As soon as the maximum number of Events displayed is reached, new Events overwrite the earliest Events.				

2.18 Base S7 FM

Base S7 FM — is designed for reception of messages (PGN) from wireless Units by means of S7 Technology.



a) adding a wireless Unit from the list of accessible devices



b) adding a wireless Unit by the specified MAC-address

Figure 27 — Example of settings of the S7 Base FM in Service CANUp software

Table 19 — Base S7 FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Available Bluetooth Device List PGN 63279				
521355	Array Elements Count	On the fact	pcs.	Number of MAC-addresses of wireless Units (DUT-E S7 / DUT-E 2Bio S7 fuel level sensors, DFM S7 / DFM Marine S7 fuel flow meters, GNOM DDE S7 pressure sensors GNOM DP S7 position sensors, ADM31 temperature and humidity sensors) which are accessible at a given moment for the BLE-module of CANUp 27 Pro. The maximum number of elements in the list — 15. The list is not accessible for editing.
521490	MAC Address	On the fact	No	The setting displays the unique identifier (MAC address) of BLE-module of the wireless Unit. Using MAC address, the software generates a serial number of a specific Unit and also identifies its accessibility status for operation based on S7 Technology. The data are not accessible for editing.

SPN	Name	Factory value	Unit of measure	Clarification
521178	Received Signal Strength Indicator (RSSI)	On the fact	dBm	The setting displays the current level of the signal power (by the logarithmic scale) received from the wireless Unit. The displayed range: from -125…0 dBm. The data are not accessible for editing.
521084	Timeout	On the fact	s	The setting displays the length of the time interval after reception of the latest message from the wireless Unit. The data are not accessible for editing.
Allowed Units S7 List PGN 63270				
521355	Array Elements Count	On the fact	pcs.	The number of MAC addresses of wireless Units (DUT-E S7 / DUT-E 2Bio S7 fuel level sensors, DFM S7 / DFM Marine S7 fuel flow meters, GNOM DDE S7 pressure sensors GNOM DP S7 position sensors, ADM31 temperature and humidity sensors) selected by the user for connection to CANUp 27 Pro using S7 Technology. The maximum number of elements in the list — 10. The user has access to editing the list — adding/deleting Units.
521188	S6 Address (SA)	No	No	The network address of the wireless Unit selected by the user for connection to CANUp 27 Pro using S7 Technology. The network address is used for identiofication of Units during work using S7 Technology. The designation of the network address is automatically assigned to the Unit from the number of vacant addresses within the following ranges: Value of network address is automatically assigned to a Unit from the number of vacant addresses within the following ranges: - for DUT-E S7/DUT-E 2Bio S7 fuel level sensors: 91…98, 101…108; - for DFM S7/DFM Marine S7 fuel flow meters: 111…118, 151…158; - for GNOM DDE S7 pressure sensors and GNOM DP S7 position sensors: 82…85; - for ADM31 temperature and humidity sensors: 136…139. The network addresses may be changed by the user. A network address for each Unit must be unique! The use of coinciding network addresses for cable-connected and wireless Units of the same type is not allowed!
521490	MAC Address	On the fact	No	The MAC address of the wireless Unit selected by the user for connection using S7 Technology by itself is not displayed in the list of authorized Units. However, the software generates the serial number for a specific Unit using its MAC address and also by its MAC address it identifies its accessibility status for work using S7 Technology. The data are not accessible for editing.

2.19 Accelerometer FM

Accelerometer FM — is designed to identify current values of the Vehicle linear accelerations in three rectangular axes of Cartesian coordinate system and to calculate root-meansquare values of these accelerations, to identify the Vehicle movement and its banking angles.

After CANUp 27 Pro LTE / Pro Wi-Fi mounting on the Vehicle you need to calibrate the inbuilt accelerometer, i.e. to specify zero values of pitch angle and banking angle by pressing Set <0> **button!**

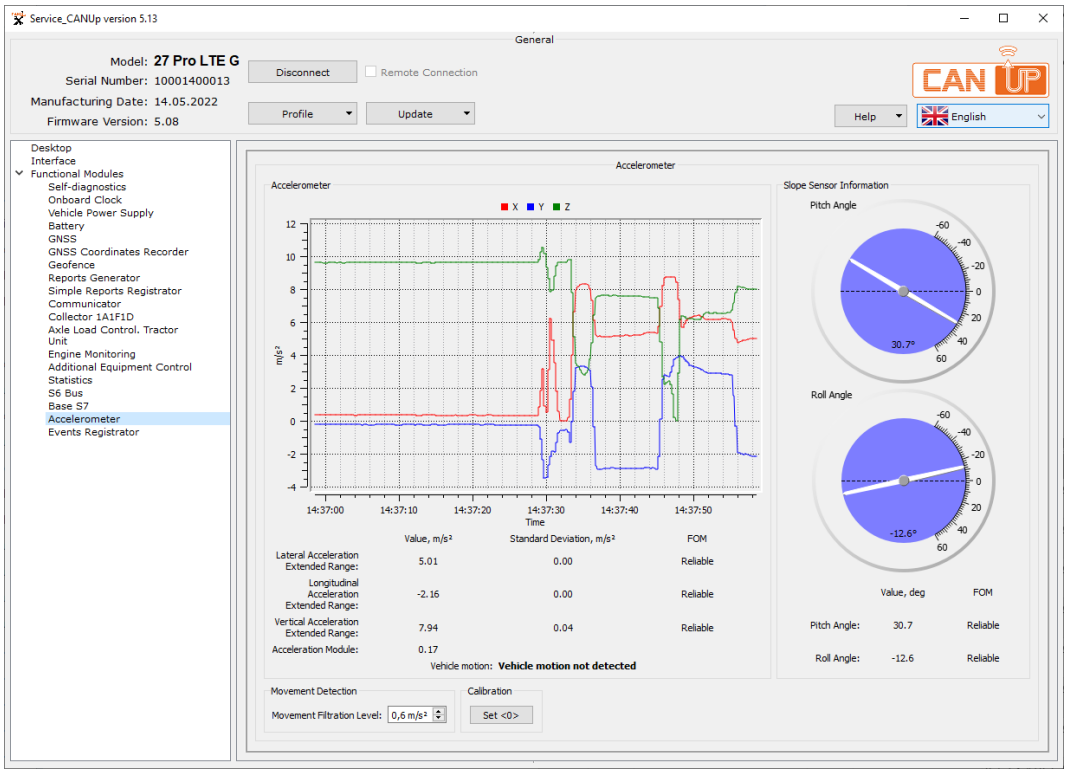


Figure 28 — Example of settings of the Accelerometer FM in Service CANUp software

Table 20 — Accelerometer FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Accelerometer PGN 63155					
5347	Lateral Acceleration Extended Range	On the fact	m/s^2	-320…322.55	Current value of the Vehicle transverse linear acceleration is displayed (along Y axis of the Cartesian coordinate system) and the diagram of its changing with time.
5347/2.3	Lateral Acceleration Extended Range / 2.3 Standard Deviation	On the fact	m/s^2	-320…322.55	Value of the Vehicle mean-square deviation calculated based on the current data of the Vehicle transverse linear acceleration is displayed. You can estimate the reliability of the measured values of the Vehicle transverse linear acceleration by the value of mean-square deviation.
5350	Lateral Acceleration Extended Range Figure of Merit	On the fact	No	Reliable/ Unreliable	Estimate of reliability of the measured values of the Vehicle transverse linear acceleration is displayed. If the transverse linear acceleration is less than 5 m/s^2, the acceleration data are reliable, while in case the transverse linear acceleration is more than 5 m/s^2, the data are unreliable.

SPN	Name	Factory value	Unit of measure	Range	Clarification
5348	Longitudinal Acceleration Extended Range	On the fact	m/s²	-320…322.55	Current value of the Vehicle longitudinal axis linear acceleration is displayed (along X axis of the Cartesian coordinate system) and the diagram of its changing with time.
5348/2.3	Longitudinal Acceleration Extended Range / 2.3 Standard Deviation	On the fact	m/s²	-320…322.55	Value of the Vehicle mean-square deviation calculated based on the current data of the Vehicle longitudinal linear acceleration is displayed. You can estimate the reliability of the measured values the Vehicle longitudinal linear acceleration by the value of mean-square deviation.
5351	Longitudinal Acceleration Extended Range Figure of Merit	On the fact	No	Reliable/ Unreliable	Estimate of reliability of measured values of the Vehicle longitudinal linear acceleration is displayed. If the longitudinal linear acceleration is less than 5 m/s², the acceleration data are reliable, while in case of longitudinal linear acceleration more than 5 m/s², the acceleration data are unreliable.
5349	Vertical Acceleration Extended Range	On the fact	m/s²	-320…322.55	Current mean value of the Vehicle vertical linear acceleration is displayed (along Z axis of the Cartesian coordinate system) and the diagram of its changing with time.
5349/2.3	Vertical Acceleration Extended Range / 2.3 Standard Deviation	On the fact	m/s²	-320…322.55	Value of the Vehicle mean-square deviation calculated based on the current data of the Vehicle vertical linear acceleration is displayed. You can estimate the reliability of the measured values the Vehicle vertical linear acceleration by the value of mean-square deviation.
5352	Vertical Acceleration Extended Range Figure of Merit	On the fact	No	Reliable/ Unreliable	Estimate of reliability of measured values of the Vehicle vertical linear acceleration is displayed. If the vertical linear acceleration is less than 5 m/s², the acceleration data are reliable, while in case of vertical linear acceleration more than 5 m/s², the acceleration data are unreliable.
521384	Acceleration Module	On the fact	m/s²	-320…322.55	Automatically calculated total value of the Vehicle linear acceleration in three axes of coordinates (X, Y, Z) is displayed; this value is equal to square root of the sum of squares of the Vehicle linear accelerations in each axis. If this value exceeds the specified level of the Movement Filtering (SPN 521341), the Unit automatically identifies the Vehicle current status in relation to the Vehicle movement.
1611	Vehicle motion	On the fact	No	Vehicle motion not detected/ Vehicle motion detected	Vehicle current status in relation to the Vehicle movement is displayed (the Vehicle is moving/not moving).
Movement Detection PGN 63247					
521341	Movement Filtration Level	0.3	m/s²	-12.5…12.5	Field in which the user may specify threshold value of acceleration with which the value of the sum of the Vehicle linear accelerations in the three coordinates axes (X, Y, Z) must be compared. According to the results of the comparison, the Unit automatically identifies the Vehicle current status in relation to movement.
Slope Sensor Information PGN 61459					
3318	Pitch Angle	On the fact	deg	-64…64.51	Displays the current value of the grade angle in relation to the transverse axis of coordinates (Y axis).
3319	Roll Angle	On the fact	deg	-64…64.51	Displays the current value of the grade angle in relation to the longitudinal axis of coordinates (X axis).
3323	Pitch Angle Figure Of Merit	On the fact	No	Reliable/ Unreliable	Estimate of reliability of measurement of the Vehicle banking angle. If the value of the pitch angle is less than 60°, its value is considered reliable.
3324	Roll Angle Figure Of Merit	On the fact	No	Reliable/ Unreliable	Estimate of reliability of measurement of the Vehicle banking angle. If the value of the banking angle is less than 60°, its value is considered reliable.

2.20 Genset FM

Genset FM — is designed for automatic generation of Events, in case values of basic Diesel generator Parameters go beyond specified limits.

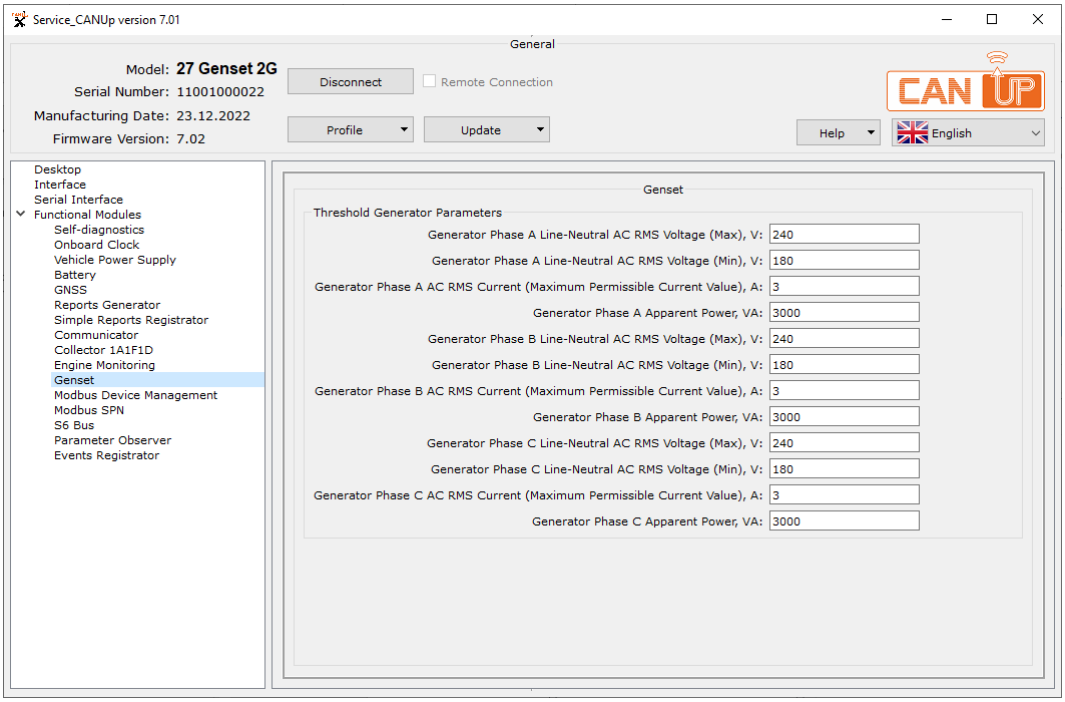


Figure 29 — Example of settings of the Genset FM in Service CANUp software

Table 21 — Genset FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Threshold Generator Parameters PGN 63520					
2445/2.7	Generator Phase A Line-Neutral AC RMS Voltage/ 2.7 Max	240	V	0…64255	Field to enter maximum allowed value L1(A) of generator voltage - N(Neutral), above which the Event "Exceeding generator voltage, phase A" (SPN 521691) will be recorded.
2445/2.7	Generator Phase A Line-Neutral AC RMS Voltage/ 2.8 Min	180	V	0…64255	Field to enter minimum allowed value L1(A) of generator voltage - N(Neutral) below which the Event "Lowered generator voltage, phase A" (SPN 521692) will be recorded.
2449/35.0	Generator Phase A AC RMS Current/ 35.0 Maximum Permissible Current Value	3	A	0…64255	Field to enter maximum allowed value L1(A) of generator current - N(Neutral), above which the Event "Exceeding generator current, phase A" (SPN 521695) will be recorded.
2461	Generator Phase A Apparent Power	3000	VA	-2000000000…2211081215	Field to enter maximum allowed value L1(A) of generator full power above which the Event "Exceeding generator power, phase A" (SPN 521696) will be recorded.
2446/2.7	Generator Phase B Line-Neutral AC RMS Voltage/ 2.7 Max	240	V	0…64255	Field to enter maximum allowed value L2(B) of generator voltage - N(Neutral), above which the Event "Exceeding generator voltage, phase B" (SPN 521709) will be recorded.

SPN	Name	Factory value	Unit of measure	Range	Clarification
2446/2.7	Generator Phase B Line-Neutral AC RMS Voltage/ 2.8 Min	180	V	0…64255	Field to enter minimum allowed value L2(B) of generator voltage - N(Neutral), above which the Event "Exceeding generator voltage, phase B" (SPN 521710) will be recorded.
2450/35.0	Generator Phase B AC RMS Current/ 35.0 Maximum Permissible Current Value	3	A	0…64255	Field to enter maximum allowed value L2(B) of generator current - N(Neutral), above which the Event "Exceeding generator current, phase B" (SPN 521705) will be recorded.
2462	Generator Phase B Apparent Power	3000	VA	-2000000000…2211081215	Field to enter maximum allowed value L2(B) of generator full power above which the Event "Exceeding generator power, phase B" (SPN 521706) will be recorded.
2447/2.7	Generator Phase C Line-Neutral AC RMS Voltage/ 2.7 Max	240	V	0…64255	Field to enter maximum allowed value L3(C) of generator voltage - N(Neutral), above which the Event "Exceeding generator voltage, phase C" (SPN 521707) will be recorded.
2447/2.7	Generator Phase C Line-Neutral AC RMS Voltage/ 2.8 Min	180	V	0…64255	Field to enter minimum allowed value L3(C) of generator voltage - N(Neutral), above which the Event "Exceeding generator voltage, phase C" (SPN 521708) will be recorded.
2451/35.0	Generator Phase C AC RMS Current/ 35.0 Maximum Permissible Current Value	3	A	0…64255	Field to enter maximum allowed value L3(C) of generator current - N(Neutral), above which the Event "Exceeding generator current, phase C" (SPN 521711) will be recorded.
2463	Generator Phase C Apparent Power	3000	VA	-2000000000…2211081215	Field to enter maximum allowed value L3(C) of generator full power above which the Event "Exceeding generator power, phase C" (SPN 521712) will be recorded.

2.21 Modbus S6 FM

Modbus S6 FM is designed for reading out data from selected Modbus RTU registers of external devices via RS-485 interface, their conversion into SPN according to settings (CAN j1939/S6 protocol). Converted data are transferred into CAN j1939/S6 Telematics interface and can be included into Onboard reports. MODBUS → S6 automatic scanner is supported; it displays input data (Modbus RTU registers) and output SPN values in the "RAW" and converted form.

For convertion of the content of Modbus RTU registers into SPN, (e. g. of a Diesel generator controller), CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset gateway is configured with the help of **Modbus S6 FM** submenu in which up to **50 pcs.** of slots for conversion of data from registers are available. Each slot is a number of settings for reading one or two specified Modbus RTU registers (see figure 30).

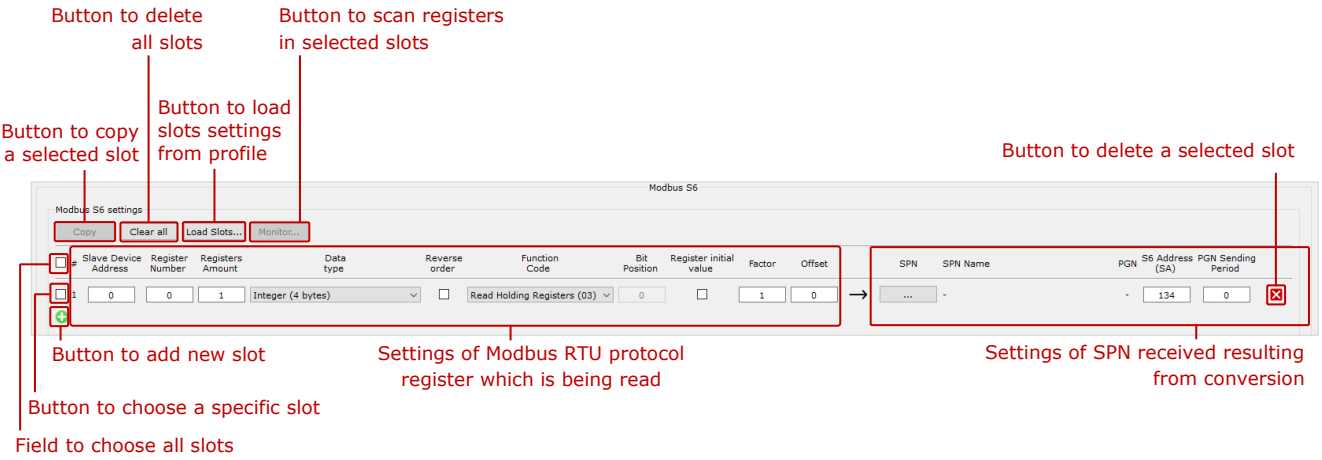


Figure 30 — Example of a slot for converting data from Modbus RTU registers into SPN of Modbus S6 FM submenu in Service CANUp software

To add a slot template for data conversion, press button.

1) In the left portion of the slot template (till → character), settings of Modbus RTU protocol registers which are read by gateway are located:

- Field **Slave Device Address** (SPN 521269) is designed to specify the unique network address of data source device (Slave) which is connected to the gateway (always Master) via RS-485 interface. The network address of the Slave device may be specified from the range **0…255** (by default — **0**).

IMPORTANT: During the configuration of registers make use of the information on the data transfer protocol via RS-485 interface (table of Modbus RTU registers) provided in the operation documentation of the respective Slave devices.

- The field **Register Number** (SPN 521683) serves to specify the address of the requested register which may be specified from the range **0…65535** (by default — **0**).
- The field **Register Amount** (SPN 521684) serves to specify the total number of several registers read in succession in which the data to be selected for conversion are contained (by default — **1**).

Notes
1 The value of the number of registers for the data "whole number" or the "floating point number" are specified from **1…2** range.
2 The number of registers for digital values 8 bytes long — **4**.
3 For the function codes (SPN 521682) "Reading coil registers (01)" or "Read discrete inputs (02), the maximum number of registers — **1**.

4 Value of the number of registers for string data is selected from **1…125** range.

- The dropdown list **Data type** (SPN 521462) serves to specify data presentation in read out registers. Data type may be selected from the following fixed values (by default – **Integer**):

  - ASCII, Text (fixed length);
  - ASCII, Text (variable length);
  - Integer (4 bytes) — Whole number;
  - Float — Fractional number;
  - Unsigned Integer (4 bytes) — Unsigned whole number;
  - Short Integer (2 bytes) — Short whole number;
  - Unsigned Short Integer (2 bytes) — Unsigned short whole number;
  - 64-bit Integer (8 bytes) — Whole long;
  - 64-bit Unsigned Integer (8 bytes) — Unsigned long whole;
  - Double — Fractional, double.

- If needed, you can change the standard (direct) order of reading the serial registers content of 4 bytes size by ticking the **Reverse Order** (SPN 521701) field. By default, it is not ticked; that is, the direct order of reading the serial registers is used.
  Note — You need to switch the reverse order, for example, when working with DUT-E 2Bio 485 fuel level sensors.

- The dropdown list **Function Code** (SPN 521682) serves to select the required function of reading Modbus RTU registers. When the slot template for data conversion is added, the function code **"Read Holding Registers (03)"** is specified by default. Possible values of the function code are provided in table 22.

Table 22 — Feature codes of reading Modbus RTU registers

Feature code	Command name	Type of value	Access type
"Reading coil registers (01)" (0x01)	Read Coil Status	Discrete	Reading
"Reading discrete inputs (02)" (0x02)	Read Input Status	Discrete	Resding
"Reading storage registers (03)" (0x03)	Read Holding Registers	16 bit	Resding
"Reading input registers (04)" (0x04)	Read Input Registers	16 bit	Resding

- The field **Bit Position** (SPN 521685) serves to specify the specific bit position number in the register of 1 byte size for codes of the function "Reading coil registers (01)" or "Reading discrete inputs (02)". This field is inaccessible for other function codes. The bit position may be specified from 0…7 range (by default — **0**).

- If needed, you can save the data read from the register without any conversion in the output SPN (for example, when reading registers from DUT-E 2Bio 485 fuel level sensors) by ticking the **Register Initial Value** (SPN 521278) field.
  By default, it is not ticked; so the data read from the register are converted, in accordance with the specified values of attributes of factor and offset for the respective Modbus RTU register and are transferred into the output CAN interface in SAE j1939 format.

- The fields **Factor** (SPN 521296) and **Offset** (SPN 521295) are designed to enter attributes that are necessary for calculation of values of the register read by the gateway.
  Below there is the formula (1) to recalculate the read out values of Modbus RTU register into SPN, with respect to attributes of the registers conversion and to the SPN format, in accordance with SAE j1939 standard.

  $$SPN=REG\_VALUE * (factor_{rg} / factor_{SPN}) - ((offset_{SPN} – offset_{rg}) / factor_{SPN}) \quad (1)$$

  where

  REG_VALUE - the Modbus RTU register value read by the gateway;

  $factor_{rg}$ and $offset_{rg}$ - values of attributes specified by the user in the fields **Factor** and **Offset** respectively (see the operation documentation (list of Modbus RTU registers) of the corresponding data source device). In case the parameter is not converted during saving in the register, the attributes by default will assume the following values: $factor_{rg}$ = 1 and $offset_{rg}$ = 0;

  $factor_{SPN}$ and $offset_{SPN}$ - values of SPN attributes automatically selected by the gateway from S6 Database (BD S6).

Note — You should take note that given different physical values, the additional conversion for the attributes $factor_{rg}$ and $offset_{rg}$ should be performed in Modbus RTU register and in the selected output SPN.

Examples:
a) In case the value of the Parameter from the register is read in bars and the output SPN is specified in kPa, then, taking into account the correlation 1 bar=100 kPa, the $factor_{rg}$ base value should be multiplied by 100.
b) To recalculate the temperature Parameter from K into °C, you need to deduct 272.15 from $offset_{rg}$.

2) In the right portion of each slot (after → character) there are settings of SPN in which the converted data will be transferred (see figure 30):

- By pressing ... button, select the required SPN from S6 Database into which the data conversion from Modbus RTU register is to be performed.

  For your convenience, search the SPN by the SPN number or name entered into the search bar of **Select SPN/PGN** window. Highlight the PGN in which the required SPN will be transmitted and confirm its selection by pressing OK button.

  After that, both the number, and the name of the selected SPN, as well as the PGN number (SPN 521150) will be displayed in the slot.

WARNINGS:
1) In case the data type of the selected SPN does not match the code of "Reading coil registers (01)" function or "Reading discrete inputs (02)" function, we recommend to select SPN only with whole numbers values (factor coefficient — 1).
2) When the selected SPN is changed, the number of registers is automatically reset to 1 and the correction of the value in **Register Number** (SPN 521684) field may be needed by replacing it with the source device value, according to Modbus RTU list of registers.
3) For values of SPN that are less than 8 bits long, we recommend to specify the function code "Reading coil registers (01)" or "Read discrete inputs (02)". In this case, when the function codes 0x01 and 0x02 cannot be replaced by others, the notification of incompatibility will appear.
4) The value of **Offset** setting for Modbus RTU registers must be within the admissible SPN change range. Then, during the conversion of the register value into the output SPN there will be no overfill and no incorrect SPN value will be received.

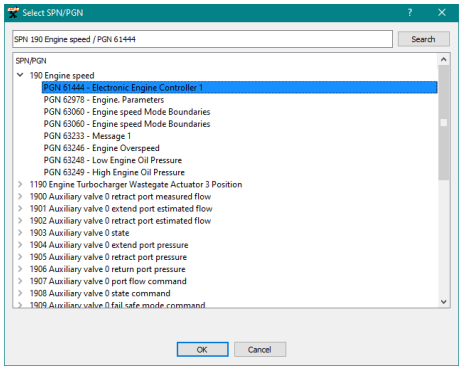
- The field **S6 Address (SA)** (SPN 521188) serves for entering the Unit network address for linking to SPN and specifying during configuration of Parameters in Reports which are transferred to the Server. The network address can be specified from **0...250** range (by default — **134**).

To start the scanner for conversion of Modbus RTU registers in order to monitor the content of registers and values of output SPN, you need to tick required slots and press Monitor... button. In the opening **Monitor MODBUS -> S6** window converted data of selected registers will be displayed in real time, with respect to specified settings (see figure 31).

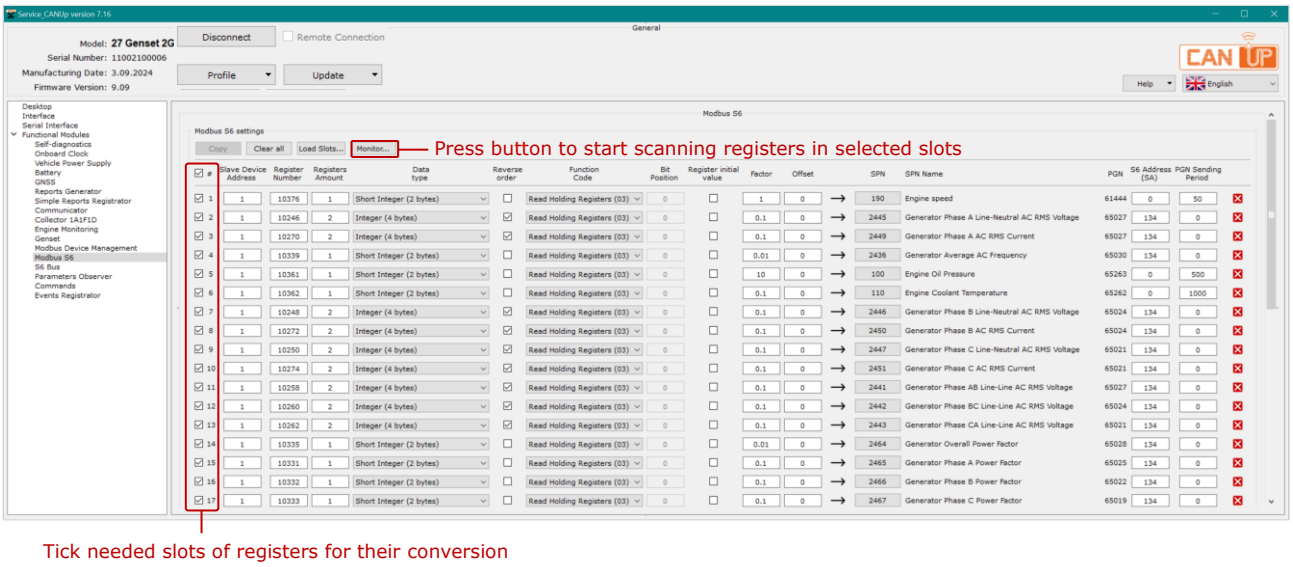
In case you need to load an earlier saved file of CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset profile from the PC disc, press Load Slots... button. In the window for loading, find on the disc and choose the needed file (***.prf**).

In order to copy the settings of the slot created earlier into the new slot, tick the field to the left from the number of the slot which is to be copied and press Copy button. For this operation, you may highlight only one slot for copying.

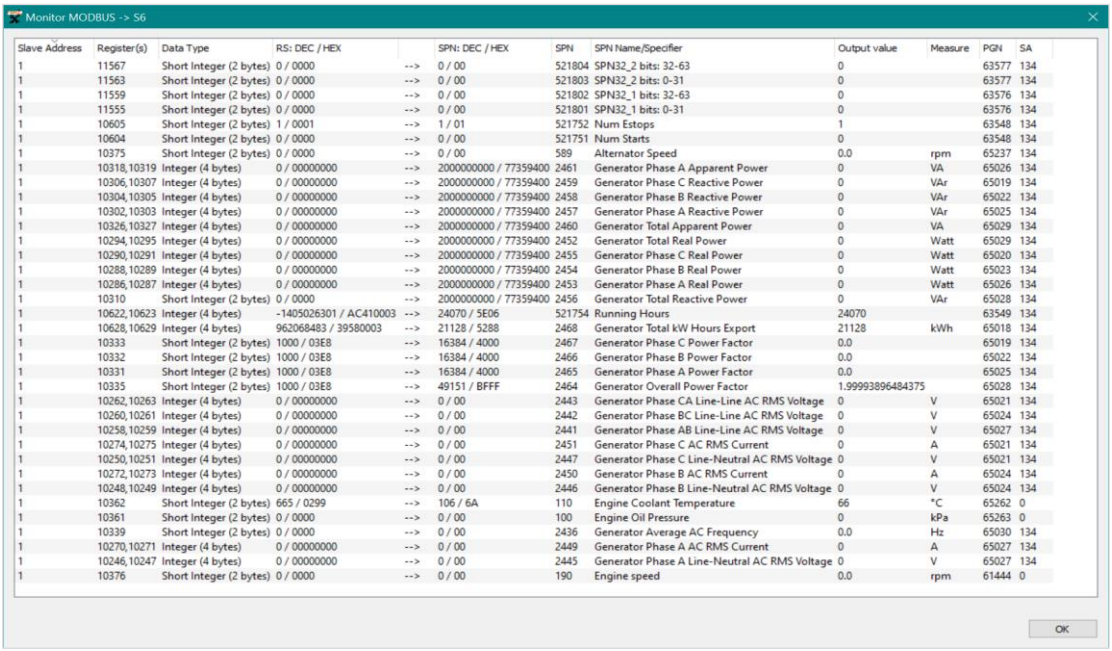
To delete one specific slot, use button, to the right of its settings. To delete all created slots, press Clear all button.



a) selection of SPN from BD S6 list



b) configured slots of Modbus RTU registers for conversion of data into SPN



c) scanning data in the process of conversion of selected Modbus RTU registers

Figure 31 — Example of a window of settings of Modbus S6 FM in Service CANUp software

Table 23 — Modbus S6 FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
FM Gate MODBUS-CAN Settings PGN 63514					
521269	Slave Device Address	0	No	0…255	Field to specify the unique network address of the data source device (Slave) connected to the CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset (Master) by means of RS-485 interface.
521683	Register Number	0	No	0…65535	Field to specify the address of the requested Modbus RTU register.
521684	Registers Amount	1	pcs.	0…255	Field to specify the total number of several Modbus RTU serial registers in which data to be selected for conversion are recorded. The value of the number of registers for the data "whole number" or the "floating point number" are specified from 1…2 range. The number of registers for digital values 8 bytes long — 4. For the function codes "Reading coil registers (01)" or "Read discrete inputs (02), the maximum number of registers — 1. Value of the number of registers for string data is selected from 1…125 range.
521462	Data type	Integer	No	0…6	Dropdown list from which you are to select data presentation in registers that are read out for conversion from the following fixed values: - ASCII, Text (fixed length); - ASCII, Text (variable length); - Integer (4 bytes) — Whole number; - Float — Fractional number; - Unsigned Integer (4 bytes) — Unsigned whole number; - Short Integer (2 bytes) — Short whole number; - Unsigned Short Integer (2 bytes) — Unsigned short whole number; - 64-bit Integer (8 bytes) — Whole long; - 64-bit Unsigned Integer (8 bytes) — Unsigned long whole; - Double — Fractional, double.
521701	Reverse Order	Off	No	On/Off	If needed, you can change the standard (direct) order of reading the serial registers content of 4 bytes size by ticking this field. By default, it is not ticked; so the direct order of reading the serial registers is used. You need to switch the reverse order, for example, when working with DUT-E 2Bio 485 fuel level sensors.
521682	Function Code	No	No	0…4	Dropdown list for selecting the required function of reading Modbus RTU registers (in case the value is not specified, the "Error" is displayed) (see the admissible values of the function code in table 22).
521685	Bit Position	0	No	0…7	Field to specify the position number of the specific bit in the register of 1 byte size for feature codes (01) or (02). For other function codes this field is inaccessible.
521278	SPN Value View Format (Register Initial Value)	Off	No	On/Off	By ticking this field, you can, if necessary, save the data read from the register in the output SPN without any conversion (for example, during reading of registers from DUT-E 2Bio 485 fuel level sensors).
521296	Factor	1	On the fact	0…4294967295	Field to enter the factor attribute for calculation of values of the register which is being read by the gateway (see formula 1).
521295	Offset	0	On the fact	0…4294967295	Field to enter the offset attribute for calculation of values of the register which is being read by the gateway (see formula 1).
521150	PGN	0	On the fact	0…65535	Display of the message (SAE j1939) selected from S6 Database, which contains the selected SPN.
521188	S6 Address (SA)	134	No	0…250	The field for entering the Unit network address for linking to SPN and specifying during configuration of Parameters in Reports which are transferred to the Server.

2.22 Modbus Devices Management FM

Modbus Devices Management FM — is designed for remote management by means of an external device via RS-485 interface (Modbus RTU protocol) using GPRS or SMS command "Write Modbus register".

Using **Modbus Devices Management FM** submenu you can configure CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset specifically for remote management of an external Modbus device (e.g. Diesel generator controller) connected to gateway via RS-485 interface.

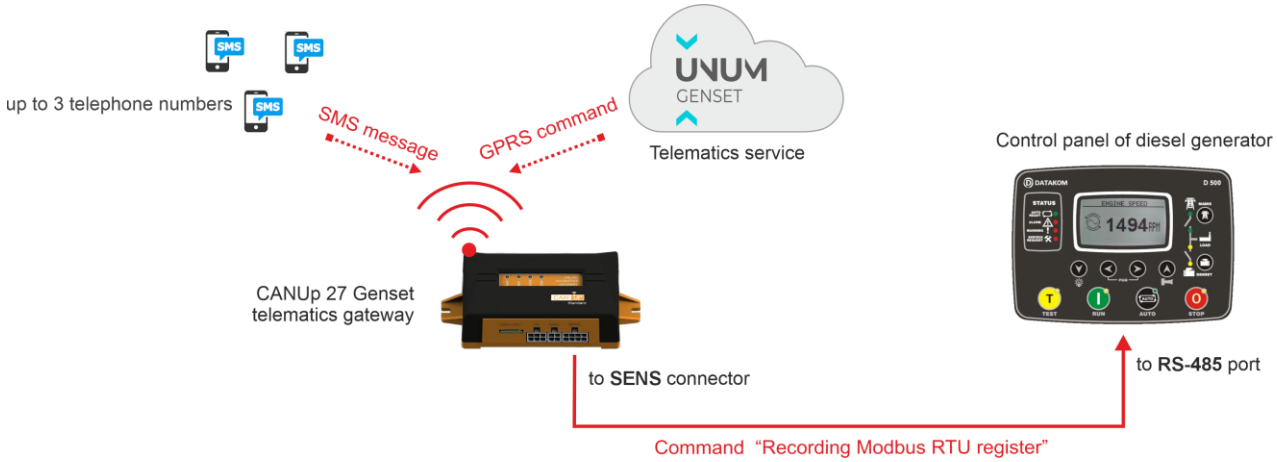


Figure 32 — Example of remote control of a Diesel generator controller

RECOMMENDATION: See detailed information on procedures for remote control over Diesel generators controllers in CANUp and DATACOM/COMAP configuration instructions available for downloading in the Technoton document center.

Using "Write Modbus register" command you can conduct remote controller configuration, its switching on/off, reset errors etc.

IMPORTANT: Before you record registers, study information on the data transfer protocol of RS-485 interface (map of Modbus RTU registers) provided in the operation documentation for a specific controller.

"Write Modbus register" command can be sent to gateway by means of GPRS message sent from AVL Server via TCP/IP channel or by means of SMS message. For both cases, the command format is identical (see table 24).

Gateway can receive SMS command messages only from entrusted telephone numbers (PGN 63551) (up to 3 pcs.) entered in the international format (13 digits maximum).

To add each new entered number into the list, press Apply button; to delete all numbers of the list, press Clear button (see figure 33).

Table 24 – Designation of fields of the command "Write Modbus register"

Command field	Designation	Comment
Command format: **++PVX;Y;Z;V;DDD…DDDD/++**		
++	Command start	—
PV	Version of SMS commands format	One "V" character.
X	Gateway service password	Digits, no more than 4 By default — 1111.
Y	Network address S6 (SA) for gateway	100
Z	Command version (see table 25)	Characters (0,1,2…Z), no more than 4 characters.
V	Time of command execution	Specified in minutes, no more than 4 characters. Range: 1…9999. Time for command execution. In case the time specified is over and the command cannot be executed, the command is ignored.
DDD…DDD	Command field	Text containing specification of command parameters, up to 50 characters (see example in table 25).
/++	Command end	—

Two versions of "Write Modbus register" command are available (see table 25):

- **W6** – record one register;
- **W16**- record two registers.

Table 25 – Examples of "Write Modbus register"

Commands versions	Commands examples	Commands versions
W6	Recording into one register of Modbus device (function code — 6) of the value (decimal number system), with address specified. Example: ++B1111;100;W6;5;**3-3051,1,4**/++	Recording into Modbus device with address 3 into register 3051, number of recorded registers — 1, value 4.
W16	Recording in succession into several registers (maximally two registers) of Modbus device (function code — 16) of the value (decimal number system), with address specified. Example: ++B1111;100;W16;5;**3-3051,2,0,5555**/++	Recording several registers into Modbus device with address 3, starting from number 3051, number of recorded registers — 2, values 0 and 555.

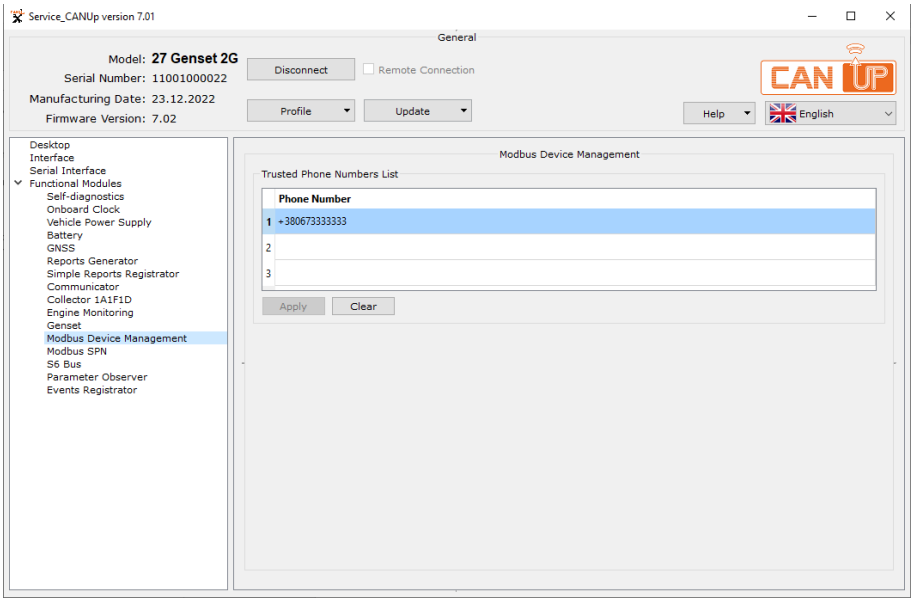


Figure 33 — Example of the window of settings of Modbus Devices Management FM, with specified telephone number for sending a command SMS message in Service CANUp software

After receiving "Write Modbus register" command, CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset automatically generates the Event "Write Register Modbus Command Received" (SPN 521778). In accordance with it, it sends the Event-based Report to the AVL Server, specifying the register which is recorded into the controller, as well as its value. In case the command is sent by means of SMS message, this Report also contains the sender telephone number.

In case of using GPRS command, the confirmation of its execution is not sent. When using SMS message, the sender is to receive the response message of the command execution. In the first case, the result of the command execution can be evaluated by the data at AVL Server that were received from gateway (see table 26). After the command reception and processing, gateway records the specified register into the Diesel generator controller, according to Modbus RTU protocol. After that, gateway automatically generates the Event "Modbus Register Write Result" (SPN 521779).

Table 26 — Possible SMS responses from CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset to the result of "Write Modbus register" command execution

#	Text	Condition
1	Command error (W6, W16)	Incorrect command format
2	Command error (W6, W16): incorrect password	Authentification error
3	Command execution (W6, W16) in progress	In case SMS is sent another time or in case of sending a command whose function is already being executed
4	Command (W6, W16) executed successfully	Command executed successfully
5	No response to command (W6, W16)	Time for command execution is over due to RS-485 error

Table 27 — Modbus Devices Management FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Trusted Phone Numbers List PGN 63551					
521355	Array Elements Count	No	pcs.	0…3	Number of telephone numbers (maximally 3 pcs.) from which remote control over the connected Modbus device will be exercised by means of SMS messages.
521020	Phone Number	No	No	No	Field to enter the authorized telephone number from which SMS messages could be sent, in order to exercise remote control over the connected Modbus device. The telephone number must be presented in the international format (13 digits maximum).

2.23 Parameters Observer FM

Parameters Observer FM — is designed for automatic generation of Events in case the selected SPN change, in accordance with specified conditions.

With the help of **Parameters Observer FM** submenu, you can configure CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset gateway specifically for automatic generation of Events, in case the selected SPN change (**up to 30 pcs.**) (**Attributes of Events generation** area) (see figure 34).

The Event SPN 521780 — **Parameter Changes** (**Event SPN** field) is generated immediately after conditions specified in the setting of conditions for the respective Parameter (SPN) are met.

Registration of one Event for each selected Parameter is performed within the time interval specified in the field **Event Registration Timeout** (SPN 521390) (by default — **300 s**).

1) To add SPN with conditions for generating an Event for it, press  button in the area **Event Registration Conditions**.

Each SPN can be selected from the following sources:

- **DB S6**— any SPN from S6 Database are selected. For this purpose, there is an option for their search according to their numbers or names entered into the search line of the window **Select SPN/PGN**. Highlight PGN including SPN you need and confirm your choice by pressing  button. For SPN with the same numbers within one PGN, the specificator is displayed in the prompt message, when the cursor is placed on it.

WARNING: It should be noted that
1) The size of the selected SPN (Parameter / Counter) must not exceed 4 bytes.
2) SPN in the text format are not supported.

By default, for a selected SPN are automatically assigned: from the dropdown list **Bus Marker** — "Not Used" value, while in **S6 Address (SA)** field — the gateway network address (100).

If the selected SPN is read from Units connected to gateway by means of S6 Technology or from a standard CAN bus, you should select the appropriate value (**S6**/**CAN**) manually, from the dropdown list **Bus Marker**.

If the selected SPN is received by conversion of data that are read by gateway from an external device connected by means of RS-485 interface (Modbus RTU protocol), select **RS-485** value in the dropdown list **Bus Marker**.

In the field **S6 Address (SA)** you are to specify the network address of the device which is source of the selected SPN (SPN 521188).

RECOMMENDATION: For all SPN that are received resulting from conversion of data contained in Modbus RTU registers, we recommend to enter **134** as value of the source device network address.

- **S6 bus** — must be selected SPN which are read from Units connected to gateway through **S6** connector by means of S6 Technology.

For a selected SPN, are automatically assigned: value **S6** from the dropdown list **Bus Marker**; whereas in the field **S6 Address (SA)** — the network address of the SPN source Unit (SPN 521188) is assigned.

- **CAN bus** — you are to choose SPN from the standard CAN bus connected to gateway through **CAN** connector. You can choose SPN only **in case there are input data** received via CAN interface.

  For choosing SPN, there is an option to filter it from the list of current PGN by SPN number, or by SPN name/Specificator, or by PGN number, or by the network address SA of the source Unit.

  For the selected SPN are automatically assigned: from the dropdown list **Bus Marker** — **CAN** value; in the field **S6 Address (SA)** — network address of the SPN source device (SPN 521188).

2) For each added SPN, select priority from **Priority** dropdown list (SPN 521071) corresponding to the level of Parameter priority (**Emergency/ Important/ Information**).

3) For each SPN, enter its threshold value in the field **SPN Value** (SPN 521347). After that, from the dropdown list **Comparision Condition** (SPN 521767) select the condition in accordance with which Event must be generated in case of SPN change, compared to the threshold value specified.

Depending on SPN type, you may specify the following comparison conditions:
- for Parameters — comparison with the set limit (**More / Less / Equals / Not equal** / **Greater than or equal** / **Less than or equal**);
- for Counters — change of specified value (**Increment** / **Decrement**).

Consistency check of SPN values against conditions specified is conducted automatically, once a second.

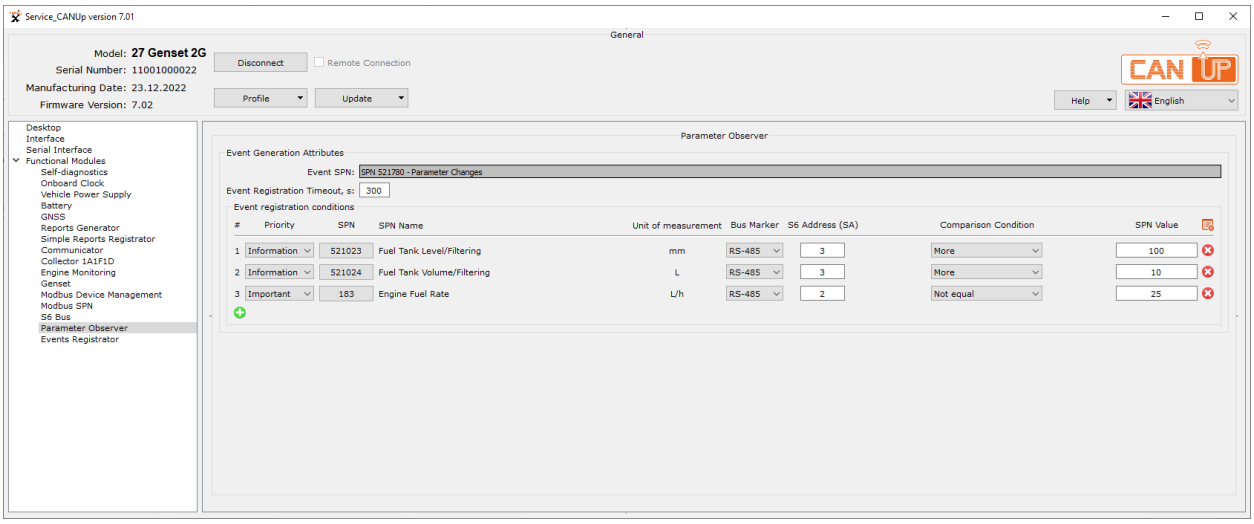


Figure 34 — Example of the window of settings of Parameters Observer FM in Service CANUp software displaying the list of SPN with specified conditions of Events generation

To delete one particular Parameter, use button to the right of its settings.

In order to clear the whole created list of Parameters, press button.

Table 28 — Parameters Observer FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Event Generation Attributes PGN 63563					
521166	Event SPN	521780 Parameter Changes	No	0…4294967295	Event generated after the conditions set for the appropriate SPN are met is specified. Data are not accessible for editing.
521390	Event Registration Timeout	300	s	0…64255	Field to enter time interval during which one Event will be registered according to a selected Parameter.
521183	SPN Quantity	No	pcs.	0…30	Number of SPN that can be added into the list of Parameters (up to 30 pcs.).
521150	PGN	No	No	0…65535	PGN including SPN which is added into the list of Parameters.
1214	SPN	No	No	0…524287	SPN added into the list of Parameters. SPN can be selected from the following sources: - DB S6 — selection of any SPN from S6 Database; - S6 bus — selection of SPN that are read from Units connected to gateway through S6 connector by means of S6 Technology; - CAN bus — selection of SPN from a standard CAN bus connected to gateway via "CAN" connector.
521071	Priority	On the fact	No	0…3	Selection of the level of priority corresponding to the added Parameter (Urgent/Important/Information).
521254	Bus Marker	Not used	No	No	Source from which gateway reads SPN which is added to the list of Parameters: - S6 — source assigned by user, when the Event SPN is read from Units via CAN j1939/S6 interface by means of S6 Technology; - CAN — source assigned by user, when the Event SPN is read via CAN interface from a standard CAN bus; - Not used — source assigned by user, when the Event SPN is selected from DB S6; - RS-485 — source assigned by user, when the Event SPN results from reading from external device registers, according to Modbus RTU protocol.
521188	S6 Address (SA)	100	No	0…255	Device network address (in source specified in "Bus marker") which is source of SPN added to the list of Parameters.
521767	Comparison Condition	On the fact	No	0…255	From the dropdown list select comparison condition, in accordance with which Event must be generated, depending on the specified threshold value, when SPN changes. Depending on SPN type, you can specify the following comparison conditions: - for Parameters — comparison with the set limit (More / Less / Equals / Not equal / Greater than or equal / Less than or equal); - for Counters — change of specified value (Increment / Decrement).
521347	SPN Value	On the fact	On the fact	0…4294967295	Field to enter SPN of threshold value of the respective Parameter. When SPN changes compared to this value, in accordance with the selected comparison condition, Event will be generated.

2.24 Events Registrator FM

Events Registrator FM — designed for registration of 15 emergency, 15 important and 15 informative latest Events.

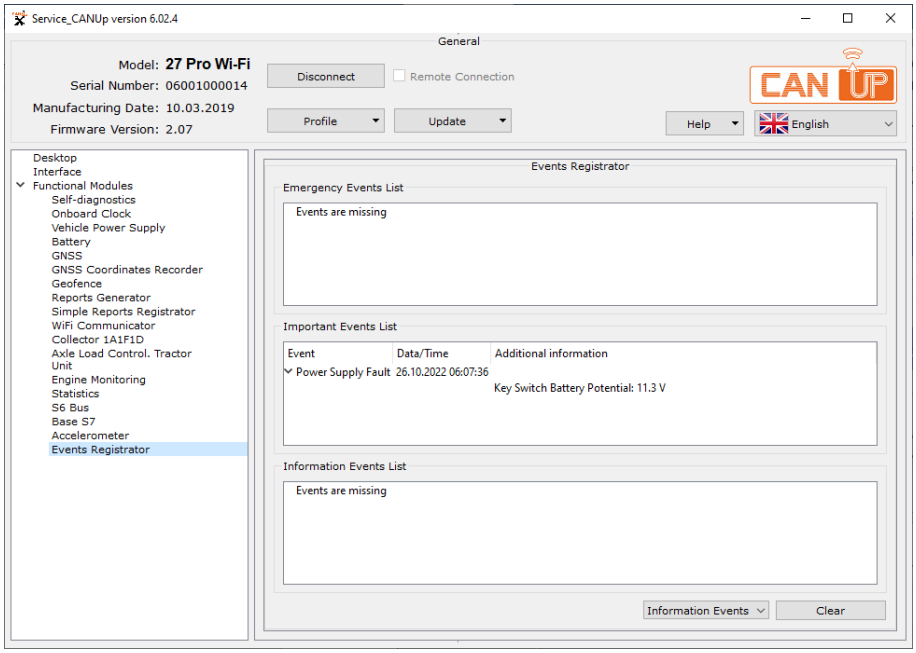


Figure 35 — Example of settings of the Events Registrator FM in Service CANUp software

Table 29 — Events Registrator FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Emergency Events List PGN 63051				
521166	Event SPN	No	No	List of emergency Events is displayed (up to 15)*. Activation of Emergency Button belongs to emergency Events.
Important Events List PGN 63055				
521166	Event SPN	No	No	List of important Events is displayed (up to 15)*. The following Events are considered to be important: - Onboard circuit failure (with voltage value displayed); - Overload; - Hot stop/Cold start; - Exceeding engine rpm; - High/low oil pressure in the engine; - Too high onboard circuit voltage.
Information Events List PGN 63056				
521166	Event SPN	No	No	List of information Events is displayed (up to 15)*. The following Events are considered to be information Events: - Power supply ON/OFF; - Ignition ON/OFF; - GNSS signals Loss/Restore; - Load/Unload; - Trailer coupled/trailer uncoupled; - Geofence Entry; - Geofence Exit; - Unit Loss/Restore in S6-bus.
* For each Event the following data are specified: designation, date/time of occurrence, as well as additional information (if any). Events are displayed in chronological sequence, starting from the most recent. As soon as the maximum number of Events displayed is reached, new Events overwrite the earliest Events. The user cannot clear the list of important Events.				

2.25 Commands FM

Commands FM — is designed for automatic processing and registration of remote control commands sent from UNUM IIoT Platform Server. Registered commands are displayed in the respective list of the service software and saved in the non-volatile memory of CANUp 27 Pro S7 LTE G (Model code 30) / CANUp 27 Genset.

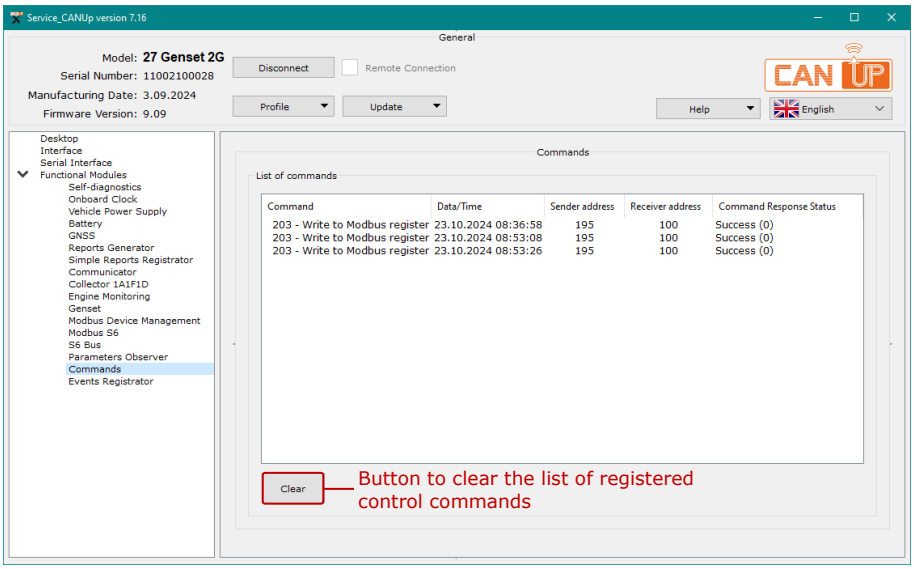


Figure 36 — Example of a window of settings of Commands FM in Service CANUp software

Table 30 — Commands FM. SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Clarification
Processed Commands List PGN 63082				
521085	Command Counts In List	No	No	Total number of control commands displayed in the list of service software registered from the latest moment the list was cleared.
521167	Command Code	No	No	Identification number (ID) of a respective control command from UNUM IIoT Platform Server is displayed: - 200 — corresponds to "Firmware update" command which serves to start the procedure of firmware update from FTP server for gateway or other Units supporting firmware update which are connected to the gateway via CAN j1939/S6 interface. - 201 — corresponds to command "Write PGN" which serves to record PGN settings into the gateway. - 202 — corresponds to command "Read PGN" which serves to read the needed PGN from gateway or from a selected Unit connected to the gateway by means of S6 Technology. - 203 — corresponds to command "Write to Modbus Register" which serves to record Modbus RTU registers (up to two registers) into any device connected to the gateway through RS-485 bus. - 204 — corresponds to command "Read from Modbus register*" which serves to read Modbus RTU registers from any device connected to the gateway through RS-485 bus. - 205 — corresponds to command "Restart device" which serves for the gateway power supply restart (reset) by means of software, without its disconnection from the external power source. - 206 — corresponds to command "Remote connection" which serves for remote connection with the gateway and for other Units connected by means of S6 Technology (DUT-E CAN / DUT-E 2 Bio CAN, fuel level sensors, DFM CAN / DFM Marine CAN / DFM Industrial CAN) flow meters for data exchange/configuration using the respective service software. - 207 — corresponds to command "Engine shutdown" which serves for engine shutdown after the mobile Asset is parked and stays immobile longer than 5 min., with no speed and change of coordinates. - 208 — corresponds to the command "Forced engine shutdown" which serves for the Asset engine forced shutdown. - 209 — corresponds to the command "Cancelling forced engine shutdown" which serves for cancelling the Asset engine forced shutdown.

SPN	Name	Factory value	Unit of measure	Clarification
521300	Event Date/Time	No	No	Date (day, month, year) and time (hours, minutes, seconds) of a respective control command registration are displayed.
521188	S6 Address (SA)	No	No	Network address (SA) of the respective control command of a source unit is displayed. For UNUM IIoT Platform Server, SA is always =195.
521900	S6 Address (DA)	No	No	Network address (DA) in CAN j1939/S6 interface for a destination Unit of the respective control command. For gateway, DA is always =100.
521798	Command Response Status	No	No	Status of a destination Unit response to a respective control command is displayed: - 0 – successful; - 1 – execution error; - 2 – engaged line; - 3 – not ready for execution.
* In preparation for introduction.				

2.26 Fueling/Fuel Discharge Analyst FM

Fueling/Fuel Discharge Analyst FM is designed for configuration and automatic identification of "Fueling"/"Fuel discharge" and "Change of fuel dielectric permittivity"* Events by readings of up to 8 pcs. of DUT-E CAN / DUT-E S7 / DUT-E 2 Bio CAN / DUT-E 2Bio S7 fuel level sensors connected at one time to CANUp 27 Pro LTE gateway.

IMPORTANT:
For correct operation of Fueling/Fuel discharge Analyst FM, **it is necessary to**:
1) Conduct calibration of sensors according to "Empty"/"Full" levels for the type of fuel used in the respective tank.
2) In case you use DUT-E 2 Bio CAN / DUT-E 2Bio S7, conduct calibration of their additional electrodes for correct operation of the automatic fuel type correction feature in corresponding tanks.
3) Record calibration tables of all monitored tanks into the internal memory of respective tanks.
Note — See the sequence of the above-listed operations described in operation manuals for the respective fuel level sensors.
4) Create a Report (see 2.8, Reports Generator FM, Type of Report — Event) for notifications of the Events:
- SPN 521200 — "Fueling";
- SPN 521201 — "Fuel discharge";
- SPN 521826 — "Change of dielectric permittivity".

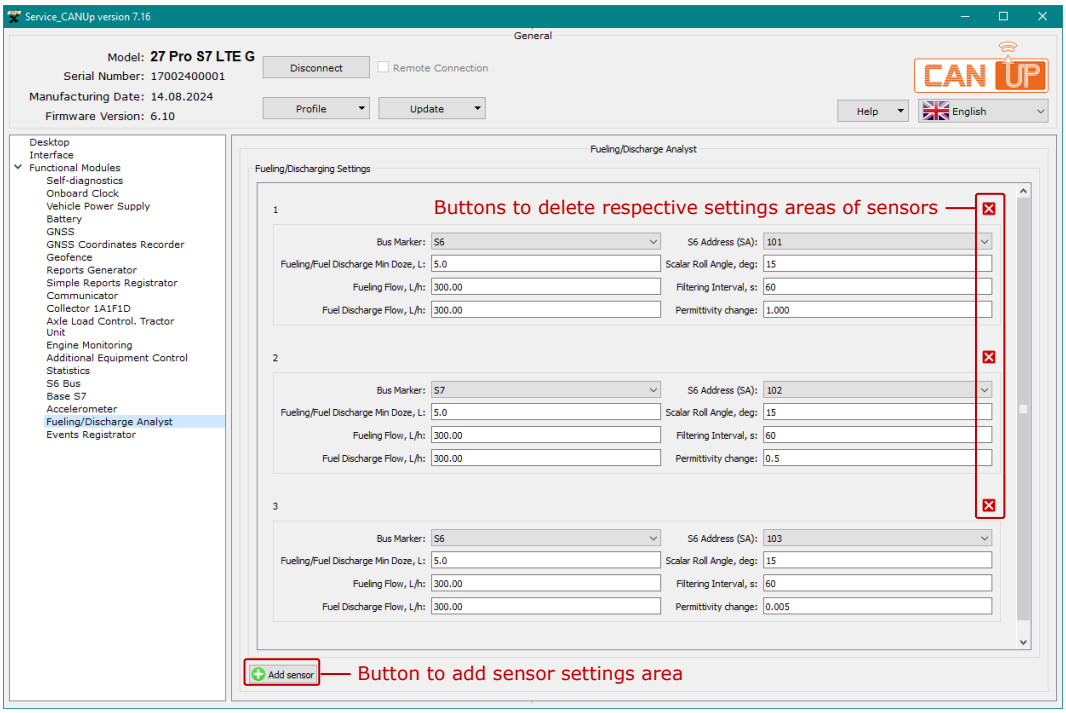


Figure 37 — Example of a window of settings of Fueling/Fuel discharge Analytist FM in Service CANUp software

* Detection of changes in the dielectric permittivity of fuel by the sensor is accessible only in case of operation together with differential fuel level sensors (models DUT-E 2 Bio CAN / DUT-E 2Bio S7).

Table 31 — Fueling/Fuel discharge Analytist FM.
SPNs, displayed and/or editable in Service CANUp software

SPN	Name	Factory value	Unit of measure	Range	Clarification
Fueling/Fuel Discharge 2 Settings PGN 63584					
521827	Number Of Monitored Sensors	No	pcs.	1…8	Number of fuel level sensors (up to 8 pcs.) connected to CANUp 27 Pro LTE by means of S6 Technology and/or S7 Technology for which settings of Events identification are specified. Based on specified settings and data (SPN), received from respective sensors, the gateway automatically records "Fueling/Fuel discharge"/"Change of fuel dielectric permittivity" Events.
521254	Bus Marker	S6	No	S6 or S7	Dropdown list to choose an identifier of a data source from which the gateway must read out SPN for automatic identification of Events according to specified settings: - S6 — SPN are read out using the cable S6 Technology from DUT-E CAN or DUT-E 2 Bio CAN sensors; - S7 — SPN are read out by means of the wireless S7 Technology from DUT-E S7 or DUT-E 2Bio S7 sensors.
521188	S6 Address (SA)	101	No	101…108, 91…98	Dropdown list to choose the unique network address of a respective fuel level sensor.
521423	Fueling/Fuel Discharge Min Doze *	5.0	l	0…6425.5	Field to enter the minimum fuel volume value selected depending on the fuel tank capacity (e.g. for tanks of smaller capacity, smaller volume value is specified). Exceeding this value will be a criterion to identify fueling/fuel discharge. It should be noted that in case too low value of minimum fuel amount is selected, the fuel stirring in the tank of a mobile Asset can be identified as false fueling/fuel discharge. The selection of a too high value of the minimum fuel amount may result in the Events data loss.
521426	Scalar Roll Angle*	15	grad	0…360	Field to enter the value of the Asset (Vehicle) maximum possible roll angle in specific conditions of operation. Fuelings/fuel discharges will be identified only when roll angles will be below the specified value. For roll angles above the specified value, identifying fuelings/fuel discharges will be ignored. Not exceeding the specified value will be a criterion for identifying a fueling/fuel discharge.
521444	Filtering Interval	60	s	0…64255	Field to enter the value of a time interval during which the gateway will calculate the smoothed value of fuel volume in the tank, before it transfers data for Report generation.
521421	Fuel Discharge Flow*	300.00	l/h	0…3212.75	Field to enter the value of maximum fuel volume decrease in the tank for a certain period of time. Exceeding the specified value will be a criterion for identifying a "Fuel discharge" Event.
521422	Fueling Flow*	300.00	l/h	0…3212.75	Field to enter the value of maximum fuel volume increase in the tank for a certain period of time. Exceeding the specified value will be a criterion for identifying a "Fueling" Event.
521828	Permittivity Change	0.005	No	0…64.255	Field to enter a conventional coefficient used by the gateway to calculate the deviation in conductivity of fuel in the tank from its threshold value. The deviation is the criterion to record the Event "Change of fuel dielectric permittivity". It allows to monitor the fuel quality and reveal facts of: - mixing different types of fuel. - presence of impurities and extraneous liquids (water). - fuel non-compliance with declared physical and chemical characteristics.
* The gateway automatically records "Fueling"/"Fuel discharge" Events only in case all the specified criteria are met. Values of entered parameters are defined experimentally in the process of the Asset operation.					

Contacts

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