EN - Instruction Manual Software

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Communications Formats - 411 / FTL / FAS / TDL

EMIS / MultiTask

FMC Technologies

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Further documentation for this product:

Description	Order No.
EMIS2 Instruction Manual	MN F19 010 EN / DOK-447
EMIS4 Instruction Manual	MN F19 009 EN / DOK-540

Documentation on the Internet:

www.fmctechnologies.com/seningttp

History

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Rev. 2.00	Mai 2008	MB / jp	released	- format modifications / new Drawings - editorial changes
Rev. 2.01	December 2012	jp / ef	released	- format modifications (editing system) - cross reference
Rev. 2.02	December 2012	AuTeB	released	- See yellow markings!
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Rev. 3.02	August 2014	HS/TJ/RA/jp	released	- MultiTask Parameter

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Table of Contents (English)

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1 General

1.1 Orientation aids for the manual

We have provided some orientation aids so that you can easily find the necessary information in this manual.

The information in this manual ranges from imperative safety procedures and standardized guidelines through to concrete handling procedures and advice. To differentiate these more easily, the information is marked with corresponding pictograms in front of the relevant text.

These are intended not just to draw particular attention to these passages, but also to make it easier to find the information you want. Therefore the pictograms are symbolic of the underlying textual content.

The following pictograms are used in this manual:

Danger sign
Danger of explosions caused by easily ignited gases and liquids here.

Risk of operating fault
Actions that may damage the equipment.

§ **Legal notice**
Actions that may have legal consequences.

Working step
Concrete action statements, e.g.: *"Press the <Enter> key"*.

► **Input necessary**
e.g. via numeric or function keys.

☺ **Positive response message**
e.g. "The main menu now appears"

☹ **Negative response message**
e.g. "If a fault message appears now..."

Background information
Short-Tip, e.g. "See more detailed information in chapter XX".

Option
Special case.

Function
Functional description.

NOTE:
indicates a special situation.

ATTENTION:
particular attention is to be paid.

2 Introduction

- **Communication** - It is not always possible to adequately maintain the dialogue between the tank truck, which is often on the road for a lengthy period and far away from the base, and the logistics center. For efficient cost calculation and optimum sequences coordination, the control centre constantly needs updated information on transaction data and system events from the tank truck. This is to enable the right tour decisions to be made and for transportation to be carried out at low cost.

- The ***E****uropean* ***M****ultiple* ***I****nterface* ***S****ystem* (**EMIS**) acts as the interface between the components of the Sening vehicle system (**QAS**-node → **NoMix, MultiSeal**; **METER**-node → **MultiFlow** and future **Sening®** components) and any **O**n-**B**oard-**C**omputer (**OBC**).

- Using suitable media, this information, such as transaction data and system events, can be transferred to the control center and edited there. Appropriate evaluation allows a logical shift course to be reconstructed - relating to both complete product information and decisive activities on the vehicle.

- **EMIS2** provides a number of variables in a tree structure permitting data to be exchanged with the connected devices. The **EMIS2**–linked **OBC** has no trouble in accessing this data and comparing it with the use of higher-ranking software modules.

- Communication between **EMIS2** and the **OBC** is done by means of a 3-wire RS232 interface. The protocol used is documented in this interface description (**DOK-411**).

- The **EMIS4 / MultiTask** is a replacement for the communication device for future Gen-X truck developments.

- Storage of internal data on an **FTP** server is possible with the MultiFlow, MultiLevel, NoMix and MultiSeal (MultiLevel) tank truck system together with **EMIS4**. This logging of data records can be done automatically after certain events, or by manually activating the control console of individual devices.

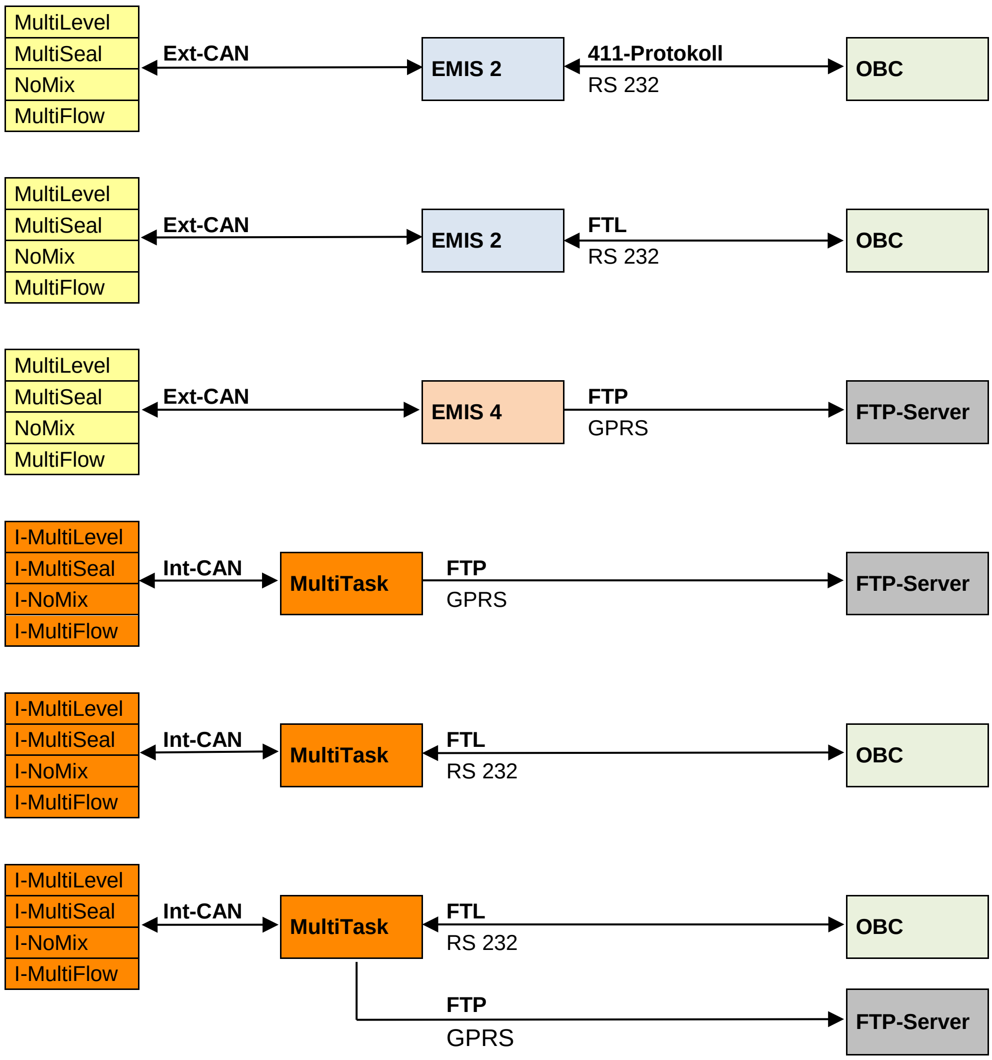
- A tracking system can also be activated in **EMIS4** to store GPS data in a subdirectory of the **FTP** server at certain configurable intervals. This data can be synchronized with other data by timestamp.

- The **MultiTask** platform represents the new platform for tank truck electronics. It combines communication functionalities together with the functionalities of existing MTS systems MultiFlow, MultiLevel, MultiSeal, NoMix, EMIS2; EMIS3.

- **MultiTask**-Hardware is the name of the system components, consisting of the FMC Global HMI 8.4” with display and touch functionality and the

FMC Application Interface which supports various communication interfaces, depending on its stage of expansion. **MultiTask**-Software is the name of the application which includes the complete MTS functionality and is based on **MultiTask**-Hardware and Linux operation system. The **MultiTask**-Hardware shall be the platform for all functionalities which will be developed for future demands. **MultiTask** platform shall be the synonym for the complete system consisting of **MultiTask**-Hardware and **MultiTask**-Software.

2.1 Communication EMIS / MultiTask



2.2 Terms – Definitions - Abbreviations

DOK-411 Each F.A. Sening document has an internal unique number. The document with the number **411** describes the protocol and data format used by F.A. Sening communication devices (e.g. EMIS) for data exchange

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	with an OBC. This document is public and very often used. Therefore DOK-411 has become a synonym for the F.A. Sening communication model.
E7	In March 2005 **7** **E**uropean companies agreed to use the same protocol to handle TDL data for communication. It is not a standard and based on the DOK-411. Because the TDL base data set is not sufficient enough it was enlarged outside the rules of DIN in 2007.
EMIS	is the short form for **E**uropean **M**ultiple **I**nterface **S**ystem and the name of a F.A. Sening communication device. It was built as EMIS, EMIS2 and EMIS4.
Ext.-CAN Bus	The **Ext**ernal **CAN Bus** is the field bus that connects the main truck system devices like NoMix/MultiSeal, MultiFlow, MultiLevel etc. See Int.-CAN Bus which has a different speed and a different protocol.
FAS	is the abbreviation for **F**. **A**. **S**ening.
FTL	**F**uel **T**ruck **L**ink is the name for the European standard DIN EN 15969-x. This standard handles the communication between On Board Computer and Truck Vehicle Equipment. It describes also the Truck - FTP server communication. Part 1 handles logistic data and part 2 commercial data.
HMI	**H**uman **M**achine **I**nterface is the main device of a future FMC device typically with a display and any kind of buttons.
Int.-CAN Bus	The **Int**ernal **CAN Bus** is the field bus that connects the sub devices of NoMix/MultiSeal and MultiLevel with the main device. See Ext.-CAN Bus which has a different speed and a different protocol.
LC	**L**oad **C**ontroller is a metering device installed on the depot e.g. AccuLoad III.
MTS	is an abbreviation in this document for **M**ain **T**ruck **S**ystem and mean NoMix/MultiSeal, MultiFlow, MultiLevel, MultiControl in any combination.
OBC	**O**n **B**oard **C**omputer is a small computer installed at the tank truck.
QAS	**Q**uality **A**ssurance **S**ystem is a company independent marking for a truck system that handle product assurance. **NoMix** and **MultiSeal** is the F.A. Sening - QASystems.
TDL	**T**ruck **D**ata **L**ink is the name for the German standard DIN 26051-x. This standard handles the truck data interface for commercial data (parts 1) and for logistic

data (part 2). It is released in 2000 and a kind of predecessor of FTL.

TMC **T**ruck **M**anagement **C**omputer is an older F.A. Sening truck device. Especially the CAN communication description [6, 7] was made for this device and has these 3 letters in its title. In those documents “TMC” is used very often and can be replaced by EMIS.

2.3 General

The **EMIS4 / MultiTask** is a replacement for the communication device for future Gen-X truck developments.

An intelligent processor system is used with an embedded LINUX operating system. The connection to the existing “Main Truck System” (MTS) NoMix/MultiSeal, MultiFlow, MultiLevel etc. is realized by a CAN bus.

Communication is supported for Bluetooth (BT) (class 1 - for short range), for GSM / GPRS (for long range) and for GPS (satellite navigation).

- 1 serial port is used as a service interface.
- 1 serial port is used for the GPS module connection.
- A USB-connector on the Processor Board is provided for service activities.
- No display and no keys are available (only **EMIS4**).
- The **EMIS4** is not intended to use for approved data handling of e.g. weights and measures data.
- It is used for truck equipment and fulfill the requirements for hazardous zone 1.

2.4 Function

During the working procedure of a tank truck a lot of very different activities happen (normally during loading- and delivery process). The important events or values of these activities are recognized, handled and stored in the MTS devices. EMIS4 / MultiTask is offer these information for public use. Therefore the main function of EMIS4 / MultiTask is the storage of these data onto an FTP server in a qualified format in a very simple way.

▶ GPS data is offered to the MTS and is also be used to generate tracking files onto an FTP server (see GPS Data Support).

▶ Especially for service activities a “Service Interface” is be realized. This interface is not used during the normal application.

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- Fig.64 shows
  the principle arrangement of an EMIS4-MTS based system.
  Fig.66 shows
  a MultiTask based system.
- BlueTooth is used as described in the chapter BlueTooth Support.

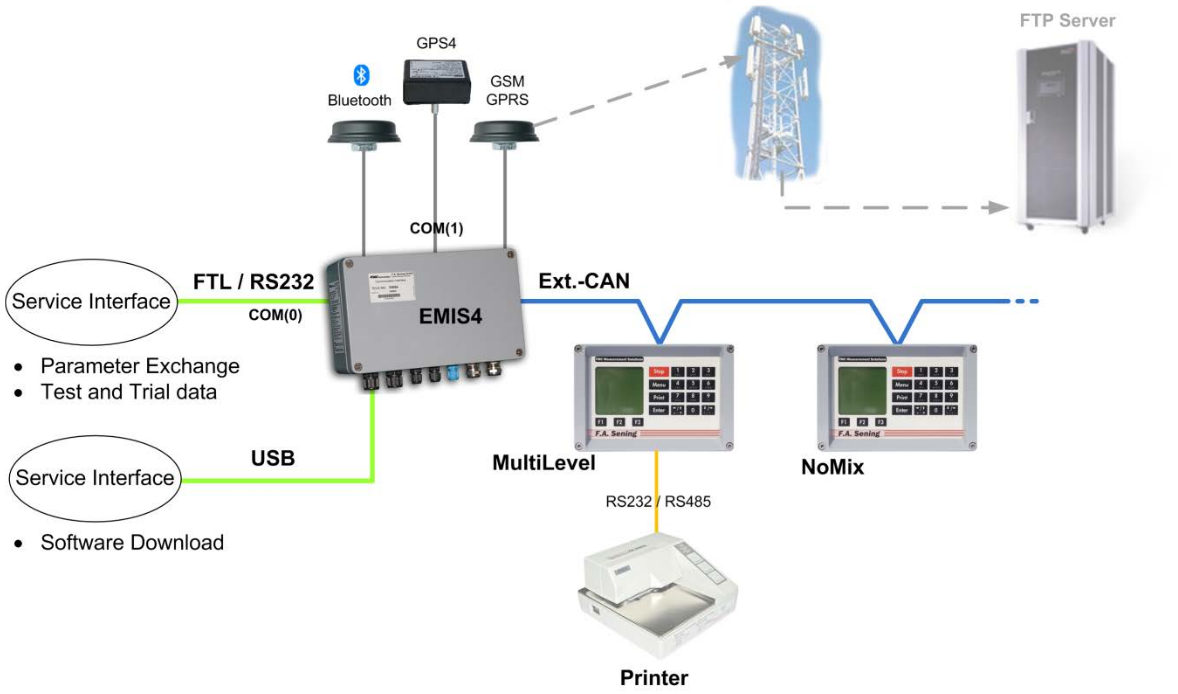

Fig.1: Arrangement with EMIS4

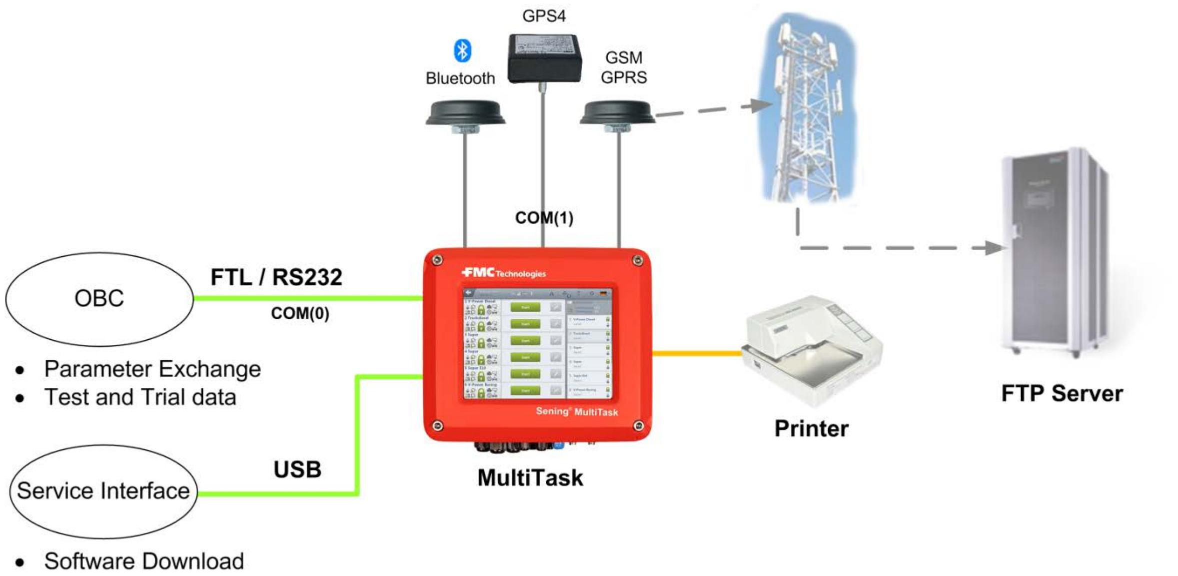

Fig.2: Arrangement with MultiTask

2.4.1 EMIS4 / MultiTask

The basic functionalities have no OBC communication and no printer interface is supported. Only a Service Interface for software download, parameter exchange and for specific values needed for testing is realized instead. Beside software download only the **FTL** protocol is used (**no DOK-411 and no TDL / E7**) for this interface. The only data format for GPS-, event- and delivery data is **FTL**

It can't be specified in detail yet which **FTL** data and structures are needed but a roughly overview is given in the chapter Service Interface. To make it easier understandable the variable names, tree structure and definitions of the **DOK-411** are sometimes used in this document but this is always only be used as a description for the variables which are realized in **FTL**.

Example:

Variable description used in this document concerning **DOK-411**:

ADMIN,DEVICE,CLOCK,Date="24.12.2009"
ADMIN,DEVICE,CLOCK,Time="11:05:59"

Correct variable description concerning **FTL** which is realized in **EMIS4 / MultiTask:**

FTL,SYSTEM,DateTime,20091224110559

A concrete specification for the required **FTL** data structure will follow and is not part of this document.

2.4.2 EMIS4 / MultiTask Data Handling

The data handling inside the EMIS4 is quite different. Needed data can be already available at the EMIS4/MultiTask or have to be requested from the other devices (Fig.3 e.g. MultiFlow). This is done by the CAN bus interface. Because one more CAN bus is currently used by other devices this one is called the *Ext.-CAN Bus*.

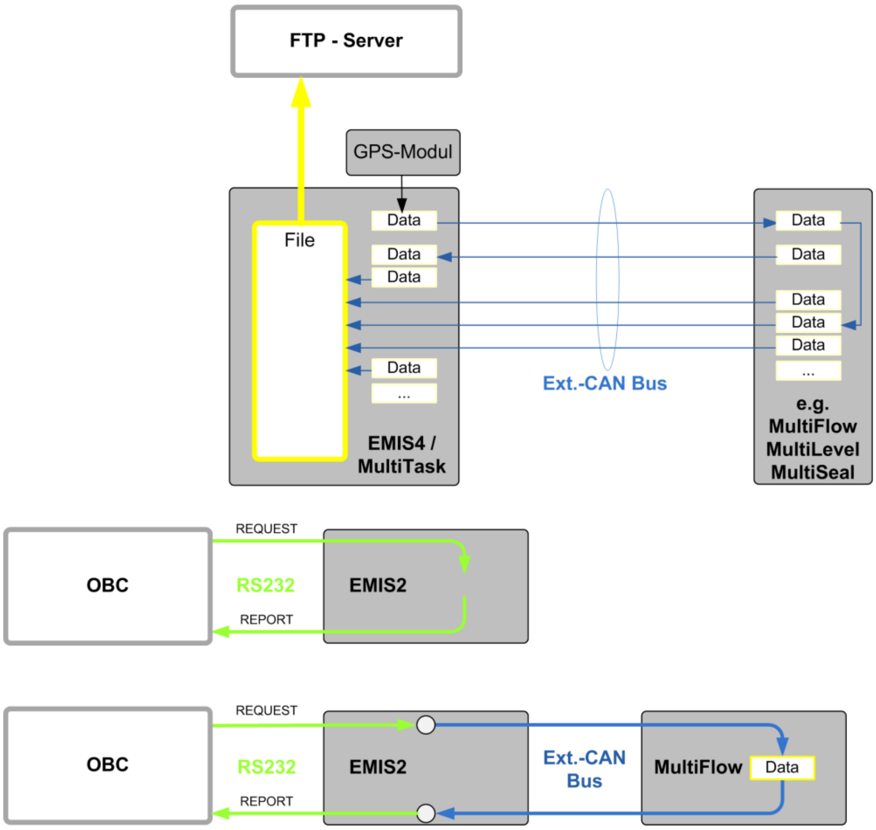

Fig.3: EMIS2 / EMIS4 / MultiTask Data Handling

EMIS4 / MultiTask data handling from different sources:

- The value is fixed by the EMIS4/MultiTask hardware or software.
  - (e. g. EMIS4/MultiTask serial number or CAN address).
- The value is set as a parameter of EMIS4/MultiTask. It is non volatile but can be changed from outside.
  - (e.g. vehicle name of the truck).
- The value is automatic updated inside EMIS4/MultiTask
  - (e.g. Clock variable).
- The value is fixed (however) inside the connected device(s). It is normally sent to EMIS4/MultiTask during every power up sequence and stored temporary.
  - (e.g. serial number of the connected device).
- The value is automatic updated by the connected device and stored temporary.
  - (e.g. latitude information of the GPS module).
- The value is automatic updated by the connected device and stored non volatile.
  - (e.g. delivery information of MultiFlow).
- The value is not available in EMIS4/MultiTask and has to be requested each time from the connected devices.
  - (e.g. Totals of MultiFlow).

- A value has to be sent without any request to different CAN destinations.
- Some activities are initiated with a specific or non specific write to a variable. The written value is not always stored and can be therefore not always read back.
  - (e. g. Reset of EMIS4/MultiTask).
- The EMIS4/MultiTask and the MultiTask functionality is the same. Except that MultiTask no OBC needs, because it is integrated in MultiTask.

2.4.3 CAN Bus Interface

The complete communication between all MTS devices (incl. EMIS4 / MultiTask) is realized by CAN bus with the Ext.-CAN bus protocol. Three layers are specified and is implemented between the EMIS4 / MultiTask Application Software and the API / hardware as shown in Fig. 4. Only the inside EMIS4 needed telegrams are be implemented now but it is considered that other telegrams can be added easily. The CAN interface (API + Layers) is also used later inside the MultiTask software with extensions but with the same basic structure as implemented in the EMIS4.

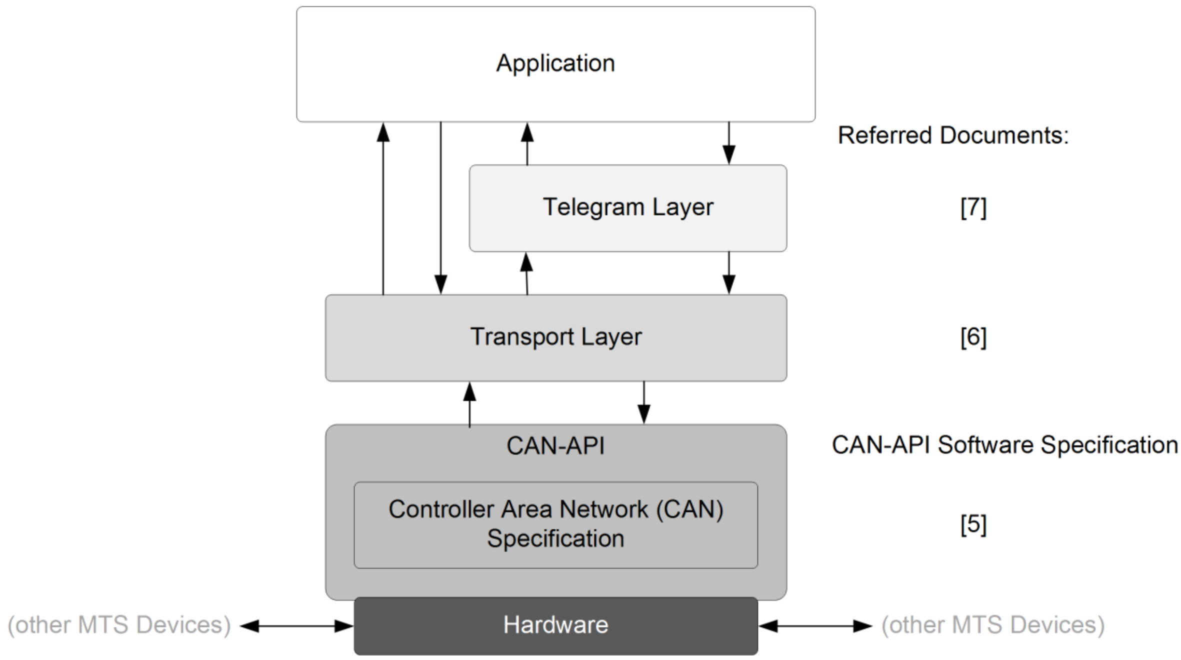

Fig. 4: Communication Layer

The CAN-API handles the data transfer of the basic CAN frames. The Telegram Layer and Transport Layer handles the communication as described in [6] and [7]. An additional document which describes the current context between the accessed variables and the corresponding

CAN telegrams is in progress but not ready. The needed functionality has to be derived from the existing EMIS2 sources.

2.4.4 Service Interface

- The Service Interface is a simple 3 wire RS232 connection COM(0). Beside software download only the FTL protocol with the FTL data structure as described in [11] is used.
- EMIS2 supports approximately 5,800 nodes and variables. This huge number is needed to support the complete OBC interface. The mainly used protocol and data format is DOK-411. For the complete TDL node (with sub nodes and variables) the E7 protocol with the TDL data format is used.
- EMIS4 / MultiTask does not support any kind of customer interface e.g. for an OBC. Therefore no existing protocols or data formats have to be considered. Only the new FTL [11] protocol is used and only those variables are supported which are typically needed for a service interface.
- The FTL standard describes a lot of variables but unfortunately it is not allowed within the roles of this standard to extend the set of variables. If the standard FTL set of nodes is not sufficient enough for theses data an additional node “FAS” is added.
- It can’t be specified in detail yet which data and structures are needed but a roughly overview is given. To make it easier understandable the variable names, tree structure and definitions of the DOK-411 [1] is used here (see EMIS4 / MultiTask).

ADMIN,DEVICE,…
ADIMN,STATUS,…
ADMIN,VEHICLE,…
ADMIN,CLOCK,…
ADMIN,PROTOCOL,Ping
ADMIN,SWUPDATE,…

QAS,DEVICE,…
QAS,STATUS,…
QAS,SETUP,…
QAS,EVENT,…

METER,DEVICE,…
METER,STATUS,…
METER,SETUP,MeterCount
METER,ORDERS,RESULT(m) m = 0 to 9 Batches
without PRICE and ADDITIVE
METER,ORDERS,MANRESULT(m) m = 0 to 9 Batches
without PRICE and ADDITIVE

LEVEL,DEVICE,…
LEVEL,STATUS,…
LEVEL,SETUP,…
LEVEL,EVENTS,…
LEVEL,ORDERS,…
LEVEL,COMP(n),… n = 0 to 23 Compartments

GSM,… complete

GPS,… complete
+ speed converting parameter

COM(0),STATUS,…
COM(0),SETUP,Protocol
COM(1),STATUS,…
COM(1),SETUP,Protocol

FMC,SETUP,Key
FMC,MONITORING,…

These are roughly 1,500 variables but 2 times 30 in an array of 10 (600) and once 22 in an array of 24 (528) this means 500 really different once.

2.4.5 GPS Data Support

Once per second the GPS module sends a set of data which is put into the corresponding EMIS4 / MultiTask variables.

A read only parameter “Name” and “SWVersion” is received from the GPS module once after power ON.

The speed is converted into km/h or mph depending on a parameter.

The GPS status have 3 states:

Ready	valid data from GPS module
Invalid	invalid data from GPS module
Diconnected	no data from GPS module (different to EMIS!)

There are two groups of data sub nodes under GPS

Data (+ SubData)
→ and
LastData (+ LastSubData).

For Data the possible data status (GPS status) is

invalid position (V) - direct after power ON or when no or invalid data are received
→ or
valid position (A) - when continuously valid data are received.

For LastData the possible data status is

invalid position (V)	- direct after power ON till the first valid data received
→ or	
valid position (A)	- when valid data are just received
→ or	
last valid position (L)	- when invalid data or no data are received the existing last valid data is survive with this “L status”

Beside this simple “GPS data monitoring” as described below the EMIS4 / MultiTask also stores tracking data onto an FTP Server. The parameter for this function are available under the GPS,TRACKING (see FTP-Server GPS data Storage).

The TRACING function which is once implemented in EMIS2 but never tested is not be implemented in EMIS4 / MultiTask.

GPS,SETUP,TimeSync	whenever a valid time data is received the internal EMIS4 / MultiTask time is synchronized with the GPS time (+/- UTCOffset)
GPS,SETUP,UTCOffset	offset of the EMIS4 / MultiTask RTC clock to UTC

2.4.6 FTP-Server Connection

The relevant MTS data are stored onto an FTP-Server. The EMIS4 / MultiTask (the FTP client) establishs an internet connection to an FTP-Server using GSM and GPRS technologies. The server has to be prepared and some “EMIS4 / MultiTask requirements” have to be fulfilled.

- Each EMIS4 / MultiTask (each truck) has a separate folder (Home-Folder) on the FTP-Server.
- It is recommended to protect the EMIS4 / MultiTask access to this special folder and subfolder by username and password
- The access should be restricted to “Add + Read” so that the EMIS4 / MultiTask itself can never change or delete the own possibly delicate data
- Each folder has a subfolder with the name “GPS”
- The access to the GPS folder should be restricted to “Change” because the GPS data which are stored onto this folder are appended record by record to the daily new created tracking file

The GSM module together with the possibilities of a telephone provider supports GPRS for data communication. Speech support is not necessary.

The data volume can be roughly calculated with 70 Bytes per GPS record / 500 bytes per MultiFlow delivery and 1000 bytes per QAS loading or delivery. With 8 hours a day /

3 minute GPS interval / 4 loadings a day / 8 deliveries a day, roughly 30 kBytes per day will come up. As worst case 300 kBytes per day is be calculated.

To initiate data storage a trigger is needed which activates the store procedure (details see next chapters).

Different kind of data will be uploaded to the FTP-Server:

Data Type	Source	Destination Folder
Event data	QAS, MultiFlow or MultiLevel	“Home Folder”
Delivery data	MultiFlow or MultiLevel	“Home Folder”
GPS-Tracking data	EMIS4 / MultiTask	“Home Folder\GPS”
Service data	EMIS4 / MultiTask	“Home Folder\LDG”

Details see FTP-Server Event and Delivery Data Storage and FTP-Server GPS Data Storage.

Beside the storage of data a download of new software is also supported. Details see chapters FTP-Server Software Update.

2.4.6.1 FTP-Server Event and Delivery Data Storage

MultiFlow and MultiLevel “produce” event and delivery data, QAS only event data. Depending on the different activities on the tank truck these data can be changed any time. Because GSM / GPRS internet technology is used it is not beneficent to transfer each individual event or value. Therefore trigger events have to be defined which initiates the storage procedure of a list of data. Storage procedure means that the EMIS4 / MultiTask has to pick up the data, convert them, and put them into a file. If needed (depending on a EMIS4 / MultiTask parameter) this file has to be compressed and stored internally. An FTP-Server connection has to be established. The file has to be uploaded to the FTP-Server. The upload procedure has to be checked. In case of success the internal file (not the original source data) can be deleted. Otherwise the upload has to be tried again (until succeeded).

For QAS the trigger for event data are

- “Switch OFF” signal of the main air pressure
- The not regular “Seal Broken” signal
- The signal for a manually requested upload of data (this can be initiated by manual input at the QAS)

For MultiFlow the trigger for event data are

- An automatic trigger is not implemented yet but in a following version of MultiFlow and EMIS4 / MultiTask
- The signal for a manually requested upload of data (this can be initiated by manual input at the MultiFlow).

For MultiFlow the trigger for delivery data is

- “Print Command” at MultiFlow
- The signal for a manually requested upload of data (this can be initiated by manual input at the MultiFlow)
- For MultiLevel the trigger for event data is
- not implemented yet but in a following version
- For MultiLevel the trigger for delivery data is
- “Print Command” at MultiLevel

Delivery data which are triggered by the “Print Command” are already available at the EMIS4 / MultiTask. All other triggers are initiated sending a special CAN telegram to EMIS4 / MultiTask. If no start and stop condition is defined (e.g. in case of events) it starts automatically with the event following the last positive acknowledged event of the last storage. The last event is newest event.

All MTS data are stored onto an FTP-Server in FTL format.

Event and delivery files is use the same name conventions:

Character	Description	Values
SSS	Source	MTR = METER-data QAS = QAS-data LEV = LEVEL-data
n	Device number	1, 2 or 3
t	Type	d = delivery data e = event data m = manual triggered data
YYYY	Year	e.g. 2008
MM	Month	01 - 12
DD	Day	01 - 31
hh	Hour	00 - 23
mm	Minute	00 - 59
ss	Second	00 - 59

Character	Description	Values
.eee	Extension	„ftl“ for FTL format
.gz	Extension for compressed files	„gz“ gz-compression file

Remarks

n: More than 1 device of the same type can be equipped on a tank truck
- -- (e.g. 3 MultiFlows).
  The “device number” follows the value of the CAN addresses
- -- (lowest CAN address >> device number: 1;
  next CAN address >> device number: 2; etc.).

Timestamp: YYYYMMDDhhmmss is the timestamp of the EMIS4 / MultiTask when the file is created.
EMIS4 / MultiTask guarantees unique filenames.
That means that only one type of file is created per second.
This is normally achieved by the normal way of doing.
Two triggers can hardly activated within one second.
But it is checked and in the rarely case a second is added.

eee: extension which describes the format of the file
(ftl >> FTL - format).

gz: additional extension if the file is compressed
(gz - compression format).

Filename examples:

MTR2d20100110120359.ftl.gz MultiFlow 2 delivery data
created at 10. January 2010, 12:03:59
FTL – format compressed

QAS1e20100110120405.ftl QAS 1 event data
created at 10. January 2010, 12:04:05
FTL - format not compressed

File example for MultiFlow delivery file:

- `0,20100730185916,1.00`
- `1,20100730185916,FAS,EMIS4,01.01EMIS4,,04.13EMIS4,,21,18HD0001`
- `1,20100730185916,FAS,MultiFlow,00.00,,3.58 BG,,1,16GM0051`
- `2,20100730185916,0,XYZ_01`
- `6,20100730185916,,0,3,0,0,6,,,0`
- `10,20100730185916,0191720,0,,,16GM0051`
- `8,20100730185815,+23.384863,+42.668000,561,1,8,1.1`
- `11,20100730185815,1324,0,9,0191720,0,10983,10847,+29.5,6,,0,,,,66980 01.00,183921,50000,9,,,9057,0,14,637,,1,,,,,,,,,,16GM0051`

File example for QAS event file:

- `0,20100802104134,300`
- `1,20100802104134,FAS,EMIS4,01.01EMIS4,,04.13EMIS4,,21,18HD0001`
- `1,20100802104134,FAS,MultiSeal,02.00,,01.66,,11,80205`
- `885,20100802104134,21,FAS,Q`
- `882,20100802104134,21,FAS,,,88791`
- `800,20100802104134,11,FAS,0,0,2,06,0,0,1,0,0,0,1,0,0,1,1,0,0,1,1,1,1,0,0,1,0,0`
- `47,20100730192355,,,2`
- `47,20100730192402,,,4`
- `42,20100730194416,1,3,2`
- `42,20100730194422,2,3,2`
- `42,20100730194431,3,3,2`
- `42,20100730194445,5,3,2`
- `42,20100730194454,6,3,2`
- `42,20100730194507,5,3,1`
- `42,20100730194525,1,3,1`
- `20,20100730215038,49`
- ……

¶ is not part of the file. It is inserted into the example to make the line better visible.

The example is a TDL formatted file. The same FTL formatted file looks a little bit different!

2.4.6.2 FTP-Server GPS Data Storage

If a GPS module is equipped GPS data are available on the EMIS4 / MultiTask (see chapter GPS Data Support). These data can be offered to the MTS but they can also be used to build tracking data. The node GPS,TRACKING,… includes the parameter for this functionality. At definite time or distance steps a record of GPS data is built and stored onto the FTP server. The storage procedure is similar to the storage procedure of the delivery or event data. The destination folder is a folder named “GPS” under the “Home Folder”. The first GPS record per day which has to be stored creates a file. The following GPS records are added (FTP - “Append” function) to this file directly after they are built. In case of storage problems the storage is done later as soon as possible. No gaps exist.

The first entry per day is include the FTL IDs 0 and 2. All other are the FTL ID 8 which includes the values of following fieldnames:

timestamp
geo_long
geo_lat
geo_hight
geo_qlty
sat_in_use
hdop
time_diff

speed
drv_dir

Some generals to GPS storage:

Velocity below 5 km/h is interpreted as stoppage. When the truck starts (> 5km/h after stoppage) the next GPS record is built. When the truck stops (< 5 km/h) a GPS record is built. During stoppage no records are built. If no valid position is available (e.g. because of bad satellite connection) one (the last) invalid position is stored and marked with the code 2 (extrapolation) in Index 05. Just the first valid position after an invalid position is then be stored next. At midnight a new file is created even if the truck is continuous driving.

GPS files use the following conventions for the file names:

GPS_YYYMMDD.ftl **YYMMDD** see before

No compression is used because the records which have to be appended are small.

File example:

- `0,20100802063849,1.00`
- `2,20100802063849,0,XYZ_01`
- `8,20100802063849,+22.870100,+40.677931,28,1,10,0.85,10800,5.0,271.5`
- `8,20100802063932,+22.869643,+40.678367,26,1,10,1.04,10800,4.7,28.80`
- `8,20100802064003,+22.869701,+40.678415,27,1,10,1.02,10800,6.3,46.85`
- `8,20100802064158,+22.882044,+40.672452,23,1,09,1.06,10800,4.5,125.3`
- `8,20100802064229,+22.882138,+40.672404,24,1,09,1.34,10800,12.5,123.5`
- `8,20100802064309,+22.882994,+40.672156,22,1,10,0.90,10800,2.9,221.8`
- `8,20100802064325,+22.882941,+40.672138,21,1,10,0.90,10800,5.8,241.8`
- `8,20100802064449,+22.874333,+40.676592,27,1,10,1.02,10800,3.0,32.37`
- `8,20100802064456,+22.874384,+40.676618,28,2,10,0.85,10800,6.2,53.23`
- ….

2.4.7 Provider Support

▶ Common network providers according to the list below should be supported in the EMIS4 / MultiTask GSM/GPRS.

Vodafone	Great Britain
Telefónica / Movistar / O2	Spain
América Móvil	Mexico
Telenor	Norway
Orange	France
T-Mobile	Germany
TellaSonera	Finland / Sweden
MTN Group	South Africa
MTS	Russia

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AT&TMobility	USA
Turkcell	Turkey
Mobiltel EAD (M-Tel)	Bulgaria
Digitel C.A.	Venezuela

▶ It must be part of each customer project to investigate and specify how the system should be setup to work with a specific subscription.
(If necessary someone has to go to the specific country and test).

Vodafone	Great Britain
Telefónica / Movistar / O_2	Spain
América Móvil	Mexico
Telenor	Norway
Orange	France
T-Mobile	Germany
TellaSonera	Finland / Sweden
MTN Group	South Africa
MTS	Russia
AT&T Mobility	USA
Turkcell	Turkey
Mobiltel EAD (M-Tel)	Bulgaria
Digitel C.A.	Venezuela

If more parameters are needed to control different providers these are implemented under the node GSM / GSM,GPRS / GSM,GPRS,FTP.

2.4.8 FTP-Server Monitor Files

With the variables of the node FMC,MONITORING there can be a special kind of monitoring activated. Monitor data are stored in a file in the GPS folder. They are normally not needed but in case that problems are monitored they can be activated.

2.4.9 Software Updates

- It is possible to update the application software using the service interface COM(0) (e.g. with ZModem protocol), FTP, a USB mass storage device or BlueTooth.
- It is possible to upgrade as well as downgrade the application software.
- The upgrade procedure is verify software package integrity before installation.
- The software package contains version information.

- The software may contain executable as well as non-executable files (e.g. configuration files).
- If is possible to extend the update procedure in such a way that a software package can be forwarded to other connected devices on the Ext.-CAN bus.

2.4.10 Service Interface Software Update

Some kind of PC-Hyperterminal has to be connected to the COM(0). When EMIS4 / MultiTask is switched ON a boot loader opens a timeslot with the possibility to use the “standard LINUX” boot. If no input is made during this timeslot LINUX and the EMIS4 / MultiTask application will start. Otherwise U-Boot will start. In U-Boot mode the update file is transferred with ZModem protocol from e.g. PC source to the update folder. ZModem tools on both sides have to be initiated manually.

2.4.11 FTP-Server Software Update

Software update files for the EMIS4 / MultiTask are downloaded from an FTP server and installed at the EMIS4 / MultiTask automatically. A second server destination has to be assigned at the EMIS4 / MultiTask (Node GSM,GPRS,FTP,SERVICE,…) . In general this is the FMC FTP-Server. The EMIS4 / MultiTask will have a look to a special folder on this server and recognize whether a software update is available. If there is one, the specific update file will be downloaded and installed.

Normally this is done every time direct after the EMIS4 / MultiTask is switched ON.

Beside this it is also possible to assign a special date for an update review. The values of the node ADMIN,SWUPDATE,Month,Day,… can be defined and used as a pattern. If this pattern fits to the EMIS4 / MultiTask time an update review is started. If a value is empty it is not part of the comparison. Therefore it is possible to check for software updates e.g. every Monday morning 6:00 o’clock even if the EMIS4 / MultiTask is never switched OFF. The seconds are added as a random value to prevent that a huge number of EMIS4 / MultiTask will start exactly at the same time with a download.

Every EMIS4 / MultiTask belongs to a “customer group” which is defined in ADMIN,SWUPDATE,CustomerID. The software update review only happens for the EMIS4 / MultiTask member of this particular group. Therefore special customer groups can be independently updated. A CustomerID = 0 disables FTP-Server updates.

The procedure is displayed with LEDs (see chapter LED Markings).

2.4.12 USB Stick Software Update

On the processor board there is a USB port for e.g. a memory stick available. If this stick is connected to the EMIS4 / MultiTask it is recognized. A procedure looks e.g. into a special folder of this stick for available software updates and install them (see chapter Software Updates).

The procedure is displayed with LEDs (see chapter LED Markings).

2.4.13 BlueTooth Support

The requirement for the BlueTooth (BT) hardware is at least the "File Transfer Profile" (FTP) and the "Serial Port Profile" (SPP). BT-FTP is used as another alternative for a software update. This function is always enabled with a hardware switch (D6) inside the EMIS4 / MultiTask. After this a BT connection can be established. Then a software update file can be downloaded and installed. The switch is afterwards be changed to the disable position.

The BT-SPP also supports the communication to a Load Controller. The communication follows [13].

The procedure is displayed with LEDs (see LED Markings).

2.4.14 Service Support

A special service mode is activated direct after power ON when the DIP-Switch 8 position ON is detected. In service mode the standard application is not running but a simple connection check as described in [8].

2.4.15 DIP-Switches

(To be done!)

8 DIP-switches are available (**D1**…**D8**). The switches are controlled by software.

D1 to D5	CAN address selection **D1** x 2^0 + **D2** x 2^1 + **D3** x 2^2 + **D4** x 2^3 + **D5** x 2^4 Dn := **0** for **OFF** Dn := **1** for **ON**
D6 = ON	Enables BlueTooth Software Updates
D7 = ON	Clear complete parameter set except factory settings after power **ON** **Factory setting are the values of:** ADMIN,DEVICE,Serial ADMIN,DEVICE,Name

ADMIN,DEVICE,HWVersion
ADMIN,VEHICLLE,Name
ADMIN,CLOCK,AutoDST

GPS,SETUP,Port
GPS,SETUP,TimeSync
GPS,SETUP,UTCOffset

COM(n),SETUP,Protocol
COM(n),SETUP,Mode

D8 = ON Enter service mode

D6, D7, D8 = OFF for normal run

2.4.16 LED Markings

☞ To get a common feeling for the flash sequences a common sequence is used for the LEDs:

LED – OFF: **LED-OFF**
Interface is not activated
(disabled, not existing, needed hardware not available, etc. …)

LED – 2Hz flash: **LED-2Hz**
Interface correct initialized, basic function available

LED – 4Hz flash: **LED-4Hz**
next step after 2Hz – extended function available
or
miscellaneous status

LED – ON: **LED-ON**
connection established, ready for further data transfer

LED – ON with short OFF breaks:
LED-ON-OFF-breaks
correct data (concerning to the required protocol) are transferred. The numbers of breaks is not be identical with the numbers of telegrams etc. It is only be a visualization that valid data transfer happens.

- **LED 1** is controlled by hardware.
- **LED 2** to **LED 16** is controlled by the application software (not by API or driver etc.).
- The APIs has to support the application software with the appropriated information.
- It has to be considered that all **16** LEDs can be **ON**. The hardware has to offer the needed current.

LED	function	controlled by	color	state	meaning
L1	Power	Hardware	**green**	LED-ON	hardware power ON
				LED-OFF	hardware power OFF
L2	application status	Application	**green**	LED-2Hz	normal application running
				LED-OFF	application error
L3	service mode	Application	**red**	LED-ON	Service mode ON
				LED-OFF	Service mode OFF
L4	COM(0) status	Application	**yellow**	LED-ON	COM(0) is active
				LED-ON-OFF-breaks	Indicate the receive of proper FTL-Request-Frame(s)
L5	COM(1) status (GPS)	Application	**yellow**	LED-OFF	GPS: no GPS device connected
				LED-2Hz	GPS: reports no satellites in the GPSD-SKY available
				LED-4Hz	GPS: sufficient for 2D data
				LED-ON	GPS: sufficient for 3D data
L6	receive on CAN	Application	**yellow**	LED-OFF	CAN Socket open failed
				LED-2Hz	The CAN-Process is waiting for an OPEN or ACK_OPEN telegram
				LED-ON	The CAN-Process has received the first valid OPEN or ACK_OPEN telegram
				LED-ON-OFF-breaks	Indicate the receive of proper TMC application telegram(s)
				LED-4Hz	CAN Socket is in any kind of error state (error active, error passive, bus off)
L7	Bluetooth (BT) Status (SPP for Service Interface function or Load Controller Communication or FTP At present it is not known how the BT-FTP can be queried	Application	**red**	LED-OFF	The BT-process is not started
				LED-2Hz	The BT-SPP or BT-FTP is waiting for connection
				LED-4Hz	The BT-SPP or BT-FTP is connected, no data are transferred
				LED-ON	After BT-SPP or BT-FTP is connected and the first valid telegram, frame or data is received
				LED-ON-OFF-breaks	Further valid telegrams, frames or data are received

LED	function	controlled by	color	state	meaning
L8	Bluetooth software update (FTP)	Application	**red**	LED-OFF	Bluetooth software update disabled (D6 = OFF)
				LED-ON	Bluetooth software update enabled (D6 = ON)
				LED-ON-OFF-breaks	Bluetooth FTP Software update is in progress At present it is not known how the BT-FTP can be queried
L9	USB connector accepted	Application	**green**	LED-OFF	No USB device connected
				LED-4Hz	USB device connected
				LED-ON-OFF-breaks	EMIS4 / MultiTask valid USB data found on the memory stick. Memory stick up or download running.
				LED-2Hz	Memory stick up or download ready
L10	GSM network available	Application (At present it is not known how the GSM card can be queried (e. g. AT-command))	**green**	LED-OFF	GSM network not available
				LED-ON	GSM network available.
L11	GPRS attached + connected + FTP data transfer	Application (At present it is not known how the GPRS connection state can be queried (e. g. AT-command)	**yellow**	LED-OFF	GPRS is not attached
				LED-4Hz	GPRS is attached but not connected
				LED-ON	GPRS is connected
				LED-ON-OFF-breaks	FTP file transfer is active
L12	receive on Ethernet	Application	**yellow**	LED-OFF	Reserved for future use
L13		Application	**green**	LED-OFF	Reserved for future application
L14		Application	**green**	LED-OFF	
L15		Application	**yellow**	LED-OFF	
L16		Application	**yellow**	LED-OFF	
L17		Application	**red**	LED-OFF	

2.4.17 Function Scalability

With EMIS2 and EMIS4 as previous devices of EMIS4 / MultiTask the supported functions are clear defined with the available hardware which has nearly no different variants. Future devices like EMIS4 or MultiTask could be equipped with different hardware components or scalable software functionality. The application software is always the same.

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☞ Three kinds of function scalability are implemented:

1. Hardware oriented:

The EMIS4 / MultiTask application software recognize the existing hardware / interfaces. Only available hardware will be supported in the user interface. Access to any items which belong to not equipped hardware is answered with a negative acknowledge.

2. Parameter oriented:

It is possible to disable / enable equipped components by a parameter. No special security function is implemented to handle the access to these parameters.

3. “Key Code” oriented:

A kind of feature control system is implemented. This means that hardware components or software functions which are available at the system are possibly not automatically supported by the application.

Explanation:

It could be that the EMIS4 / MultiTask is always equipped with the complete hardware. In case of maintenance (e.g. damaged device) exactly the current device function is rebuild. In case of a software update only the enabled function is work afterwards. It is not be possible to use software of other EMIS4s. It is not be possible to handle these upgrades or rebuilds with an easy parameter (described under 2.) but with a key system.

Device serial number:

The key system is handled on base of the device serial number, a function code number, the key code and a database system at FMC. Each device has a unique serial number (N1). The different functionalities for a device will have a set of function code numbers (N2a, N2b, ..). N1 and N2x are bind together with a special FMC algorithm (which is made by an internal FMC tool) producing a key code N3. N3 can be set by parameter into the device which know the special algorithm and calculate N2x concerning its own N1. Only if this fits the N2 functionality is enabled.

These requirements need a database system in the sales and manufacturing area where delivered device serial numbers and the currently corresponding functions are handled and is not a part of this document.

For EMIS4 / MultiTask the 3 communication modules GSM/GPRS, GPS and BlueTooth are handled with this system.

3 EMIS2 (411 - Protocol / OBC)

3.1 System Components with EMIS2

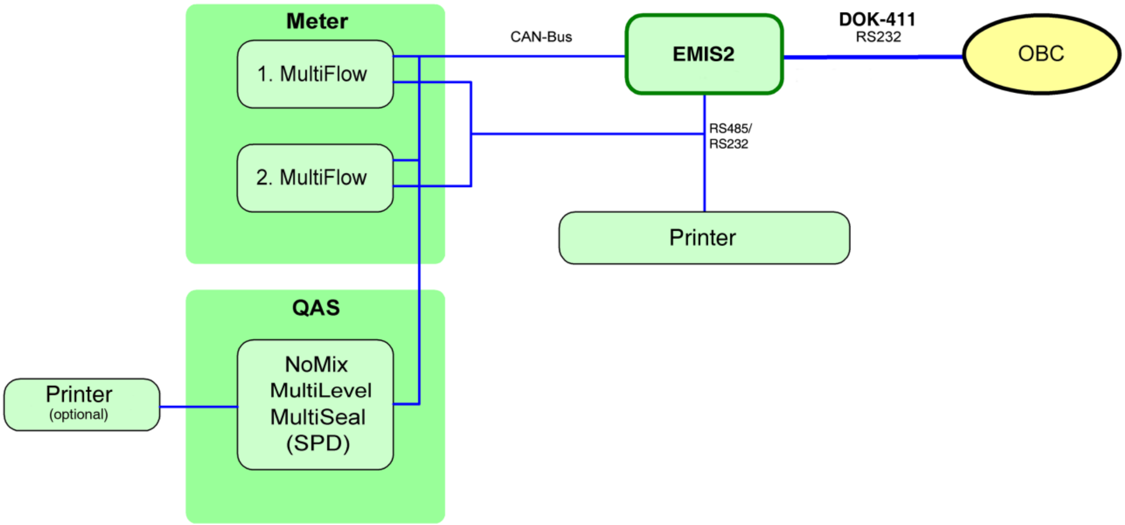

Fig. 5: System Components with EMIS2 and Printer

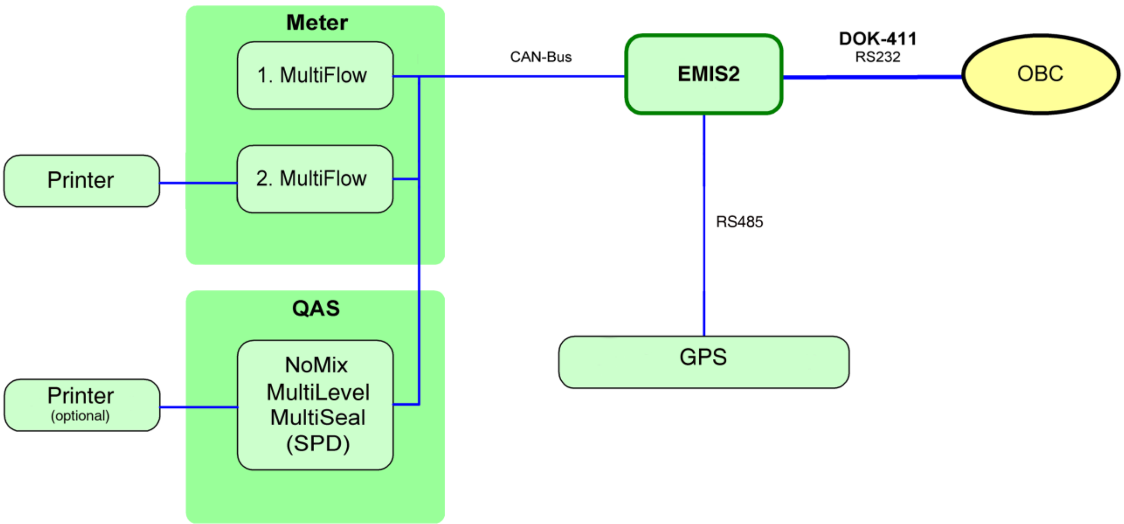

Fig. 6: System Components with EMIS2 and GPS

QAS = **Q**uality **A**ssurance **S**ystem

Communication between EMIS2 and the OBC is based on telegrams exchanges. Each telegram consists of an **OpCode**, a **node** and possibly with one or several **sub-nodes** and from **variables** with the related **variable values**.

- The OBC requests variables through a REQUEST telegram.

- The answer comes from the EMIS as one or several REPORT telegrams.
- The OBC can set variables using a SET telegram.

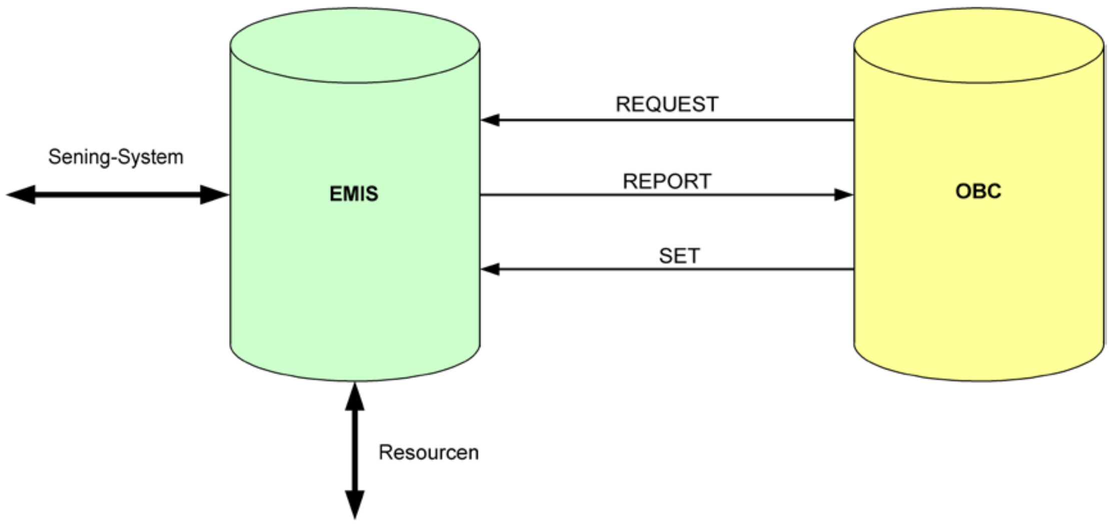

Fig. 7: EMIS2 Data flow only DOK-411

3.1.1 General remarks

Following being switched on, EMIS scans all the CAN addresses to localize connected participants. This takes approx. xx seconds. During this time EMIS in the regular operating mode can still not be "talked to". The OBC should then send a "Ping" (`SET,ADMIN,PROTOCOL`, Ping="e.g. test") as the first telegram to the EMIS to check on communication.

The variables for the EMIS description are organized under the ADMIN node. It is also established here as to which other nodes were implemented (see `ADMIN,PROTOCOL,OPTION`).

3.1.2 Communication layers

The following simplified layer model is used to describe the EMIS interface:

Layer	Description
Data model	Telegram structures: OpCodes, Node[,Sub Node[, ..]], Variables, Variables Values
Flow Control	Data flow control (handshake)
Hardware	Interface concept

The following chapters will describe the important features of the data model used by the EMIS-interface. The following specifications apply to the other layers:

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Hardware:

An RS-232 interface is used. The link is established through three wires (RX, TX, GND). The default parameters are: ***9600 Baud, 8 Bit, No Parity***.

Flow Control:

The above hardware scheme requires a software protocol (XON / XOFF control).

3.1.3 Telegram format

Transmission employs a telegram structure in which each telegram starts with the control character <STX> (start of text, 02_{hex}) and is concluded by the control character <ETX> (end of text, 03_{hex}) and a checksum <BCC> (2 bytes).

All telegrams have the following structure:

- <STX> <OpCode> <Node > <SubNode > <Variable> < Variable Values> <ETX> <BCC>

- **<STX>** (Start of Text, 02_{Hex}) Start character of a telegram
- **OpCode** Telegram type
  (see chapter 3.1.3.1 "OpCode" / page 44)
- **Node** Node selection
  (see chapter 3.1.3.2 "Nodes, sub-nodes and variables" / page 44)
- **Sub node** Sub node selection
  (see chapter 3.1.3.2 "Nodes, sub-nodes and variables" / page 44)
- **Variable** Variable selection
  (see chapter 3.1.3.2 "Nodes, sub-nodes and variables" / page 44)
- **Variable values** Variable values
  (see chapter 3.1.3.3 "Variable values" / page 45)
- **<ETX>** (End of Text, 03_{Hex}) End character of a telegram
- **<BCC>** Checksum as a sequence of ASCII characters
  (see chapter 3.1.3.4 "Checksum BCC" / page 46).

Telegrams are represented in accordance with the following rules:

- All characters are represented by printable ASCII alphanumeric characters, so that numbers, for example, are not transmitted in binary form but rather as a character string. This also applies to the telegram checksums (BCC).
  Example:

The value 1A $_{Hex}$ is represented by the character string "1A" (31 $_{Hex}$ 41 $_{Hex}$).

- The length of the text is limited to **500** characters between <STX> and <ETX>.
- Several REPORT telegrams need to be transmitted when transferring large data quantities
  (see event requests chapter 3.1.6.4 "QAS – Event list query" / page 52).
- Capitalization or lowercase is of no relevance in interpreting OpCode, nodes, sub-nodes and variables.
- However, a distinction is made between capitalization and lowercase for variable values.

3.1.3.1 OpCode

All telegrams begin with a <STX> followed by an operation code (OpCode). This is an identifier as to how the telegram data is to be interpreted.

Following OpCodes are defined:

REQUEST	Recalling one or several variables.
REPORT	Answer from the EMIS to a REQUEST telegram.
SET	Setting a variable.

- ▶ Only REQUEST or SET telegrams may be transmitted from the OBC.
- ▶ The answer to a REQUEST telegram is a REPORT telegram.
- ▶ Apart from a few exceptions, a feedback in the SET telegrams is only done through an ACK answer.
- ▶ The ongoing variable value can then be requested, if needed, with a REQUEST telegram.
- ▶ On setting a number of variables a REPORT telegram will also be transmitted. Its contents can be examined for assessment purposes.
- ▶ Setting a variable can impact on other variables in the EMIS or on the response of the connected devices.

3.1.3.2 Nodes, sub-nodes and variables

All data is organized in a tree structure. Nodes are established with definitions given, if necessary, of sub-nodes and variables for each node. These various nodes could be, for instance:

- ▶ - METER nodes (MultiFlow)
- ▶ - QAS nodes (NoMix, MultiSeal)

- - PRN nodes (printer)
- - ADMIN node (EMIS)

On this also refer to chapter 3.1 "System Components with EMIS2" / page 41.

Nodes, sub-nodes and variables are separated by a comma. A number of variables outputted in a telegram for a node or sub-node are to be separated by a semi-colon. The value of a variable is assigned by an equal character. The distinction made for multiple appearance of node or variable groups is done through a bracketed index. The index count always starts at "0".

Format:

Node[(n)] [,Sub node[(n)] [,...],Variable [= [”]Varvalue[”]][; Variable = [”]Varvalue[”]]]

Example:

METER,DEVICE(1),Serial=”12XY1234”;Name=”MultiFlow”;…

String lengths:

All node, sub-node and variable designations are of a maximum 12-character length.

3.1.3.3 Variable values

Values, which can be accessed in a number of ways, are assigned to the variables (see chapter 3.1.4.2 "Access rights" / page 48).

All variables are converted into character strings before transmission. If character strings contain commas, semicolons or other reserved characters, they must be enclosed within quotation marks. Otherwise the quotation marks are optional. Quotation marks are not permitted at all within values assigned to variables.

Reserved characters:

Character	Use
,	Separates OpCode from variable name and divides hierarchical variable names
;	Separates elements in a list of identifications (only for identifications within a group)
=	Separates variable name from its value
””	Enclose the variable value. Optional, if no reserved characters occur within the character string.
()	Brackets enclose the index in field structures, i.e. if subsidiary groups are present more than once (e.g. COMP(n)). The index counts from 0 upwards.

Variable formats:

- The format of HWVersion and SWVersion is **"xx.xx"** + optionally up to 5 additional characters.
- Dates are always represented in the form **"dd:mm:yyyy"**. Shortening the year number (**yy**) is not permitted (to handle the millennium properly).
- Times are to be displayed in the form "**hh:mm[:ss]**". There is no provision for a resolution finer than seconds. Display of the seconds is optional **(hh:mm)**.
- The variable LastError has the format **"nnnn:Text**", and has a maximum length of 50 characters.
- Special rules are to be observed for the transfer of QAS event lists. (see chapter 3.1.6.4 "QAS – Event list query" / page 52).
- The maximum string lengths of the variable values are determined in the tables under “Length“ in chapter 3.2 "411 - Definition of variables" / page 56.

3.1.3.4 Checksum BCC

The checksum (also known as the binary check code, BCC) is generated by Exclusive-OR operation (XOR) all the bytes contained in the telegram (including STX and ETX). Since this algorithm will yield the same result if the sequence of bytes is altered, the positional index of each byte is added to it ***before*** the Exclusive-OR operation process. This yields a checksum that depends on the position of the bytes.

The function in pseudo-code:

```
Byte:    unsigned character
Word:    unsigned short
Pointer: array of Byte

Byte buildBCC (Pointer DataArray, Word NumberOfByte)
  {
  Word   I   = 0;
  Byte   BCC = 0;
  repeat
    {
    BCC = BCC xor (I + DataArray[I]);
    I   = I + 1;
    }
  until (I equal NumberOfByte);
  return BCC;
  }
```

3.1.4 The communication structure

3.1.4.1 Flow control

The data flow is regulated as follows:

- By using <XOFF> (13_{Hex}) the counterpart is asked not to transmit any more data until the next <XON> (11_{Hex}).
- Following an<XOFF> there is no timeout through which the interface can be reactivated.
- Even an <STX> annuls an <XOFF> previously received.
- Valid telegrams are acknowledged with <ACK> (06_{Hex}).
- Unknown or invalid telegrams are acknowledged with <NAK> (15_{Hex}). The error is described through the ADMIN,STATUS,LastError variable and is only transferred on request.
- Telegrams confirmed with <NAK> are not accompanied by any automatic transmission retransmission. They have to be requested again. The recommendation is firstly to request the ADMIN,STATUS,LastError variable (Exception – see chapter 3.1.6.4 "QAS – Event list query" / page 52).
- A telegram must at least comprise an <STX>, an <ETX> and a 2-byte long valid or invalid check sum for an <ACK> or <NAK> to be transmitted.
  Telegrams not satisfying these minimum requirements will be ignored.
- No further telegram requests will be considered when a telegram is being processed.
- <CAN> (18_{Hex}) can halt the transfer of several telegrams.
- <EOT> (04_{Hex}) signals the end of the transmission of data of several data sets.
- A break for a considerable time in the transmission due to extensive calculations being carried out will result in a < WaitOn > (12_{Hex}) / <

WaitOff > (14_{Hex}) being alternatively transmitted at least every 4 seconds within this break. This is to prevent a timeout being triggered in the receiver and the transmission being stopped.

Composition of the control characters:

Control character			Description	Revision
STX	02_{Hex}		Start character of a telegram	From Version 1.0 onwards
ETX	03_{Hex}		End character of a telegram ahead of BCC	From Version 1.0 onwards
DC1	11_{Hex}	XON	Software handshake	From Version 1.0 onwards
DC3	13_{Hex}	XOFF	Software handshake	From Version 1.0 onwards
ACK	06_{Hex}		Telegram OK	From Version 1.0 onwards
NAK	15_{Hex}		Telegram faulty	From Version 1.0 onwards
CAN	18_{Hex}		Data transmission interrupted	From Version 1.0 onwards
EOT	04_{Hex}		End of data transmission	From Version 1.0 onwards
DC2	12_{Hex}	WaitOn	Data transmission paused	From Version 1.0 onwards
DC4	14_{Hex}	WaitOff	Continuation of data transmission	From Version 1.0 onwards

3.1.4.2 Access rights

For each variable access rights are defined laying down the OBS scope of access:

- R/W Read / Write access is allowed.
  The OBC can read and change variable.
- R Read access is allowed.
  The OBC can read but not change variable.
- W Write access allowed.
  Whilst variable can be set, the value cannot be read.

- The scope for access to several variables can change as a function of the operating mode of the connected devices. There is, for instance, no access to the QAS event variables during discharging.
- The attempt to change a write-protected variable is refused (the SET telegram is answered with NAK). A corresponding error message is placed in ADMIN,STATUS,LASTERROR.
- Setting variables where only a write access is possible triggers sequences for which the variable value is of no significance or for which

later access of the variable serves no purpose. A read access on these variables is answered by a blank expression (““).

- The access rights of the variables are listed in the tables in chapter 3.2 "411 - Definition of variables" / page 56 „Access“.

3.1.5 Operating states

All EMIS components have the variable "STATUS,Mode". This variable can adopt the following states:

State	Node	Meaning
<leer>	All	Undefined / unknown
READY	All	Ready for operation
ALARM	All	A fault that does not prevent operation from continuing has occurred. Alarms are generally caused by devices on the system (CAN) bus.
ERROR	All	Error state; see STATUS,LastError for the error message
BUSY	All	Example: The meter is in the process of performing a function that may not be interrupted (e.g. a discharge). All variables are locked, and may not be altered from outside.
OBC, METER, QAS	PRN	Indicates the allocation status of the printer interface. Possible clients are the devices at the CAN bus: QAS, METER or the OBC. READY means that the printer interface is free and available for a client.
SERVICE	ADMIN	Indicates the EMIS operating mode. <SERVICE> indicates that irrespective of all settings at the COM(0) an OBC interface with 9600 baud is operated (see chapter 1 "General" / page 15 ADMIN description).
INVALID	GPS	The data of this node is invalid due, for instance, to poor reception conditions.

3.1.6 Examples of the procedure

For enhanced readability the OpCodes, nodes and sub-nodes in the following examples are shown in capitals and the names of the variables in capitals and lowercase lettering. Only for reasons of space are the line breaks inserted in the telegrams.

Some telegrams are only reproduced in an abbreviated form.

Control characters are marked with pointed brackets <>; comments with ***//***.

3.1.6.1 REQUEST – Standard queries

All the variables are provided by the EMIS interface, and can be accessed individually or as a structure (group).

Individual query:

Direction	Telegram
EMIS	REQUEST,ADMIN,DEVICE,Name
OBC	<ACK>
OBC	REPORT,ADMIN,DEVICE,NAME=”F.A.Sening EMIS”
EMIS	<ACK>

Structure query:

Direction	Telegram
EMIS	REQUEST,ADMIN,DEVICE
OBC	<ACK>
OBC	REPORT,ADMIN,DEVICE,SERIAL=”191234”; NAME=”F.A.Sening EMIS”; HWVERSION=”02.00EMIS2”; SWVERSION=”03.02EMIS2”
EMIS	<ACK>

3.1.6.2 SET / REQUEST – Variable access

SET with <ACK>:

Direction	Telegram
EMIS	SET,ADMIN,VEHICLE,Name=“HH XX 123“
OBC	<ACK>
…	
EMIS	REQUEST,ADMIN,VEHICLE,Name
OBC	<ACK>
OBC	REPORT,ADMIN,VEHICLE,NAME=“HH XX 123“
EMIS	<ACK>

SET with REPORT-Telegram

Direction	Telegram
EMIS	SET,ADMIN,PROTOCOL,Ping=“Test Ping“
OBC	*<ACK>*
OBC	REPORT,ADMIN,PROTOCOL,PING=“Test Ping“
…	
EMIS	REQUEST,ADMIN,PROTOCOL,Ping
OBC	<ACK>
OBC	REPORT,ADMIN,PROTOCOL,PING=””
EMIS	<ACK>

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3.1.6.3 Control of discharges

MultiFlow Product guidelines - PRESETs:

Direction	Telegram
EMIS	REQUEST,METER,SETUP,MeterCount
OBC	<ACK>
OBC	REPORT,METER,SETUP,METERCOUNT="2" // tank truck with 2 MultiFlows
EMIS	<ACK>
EMIS	REQUEST,METER,STATUS(0) // status request for 1.MutiFlow
OBC	<ACK>
OBC	REPORT,METER,STATUS(0),LASTERROR="0000:No Error";MODE="READY"…
EMIS	<ACK>
EMIS	SET,METER,ORDERS,ReInit ="123" // initiate the discharge sequence
OBC	<ACK>
EMIS	SET,METER, ORDERS,PRESET(0),PCode=1;Volume=1000;PUnit="L"
OBC	<ACK>
EMIS	SET,METER, ORDERS,PRESET(1),PCode=2;Volume=200;PUnit="L"
OBC	<ACK>
EMIS	SET,METERS,ORERS,OrderCount=2 // presets complete
OBC	<ACK>
OBC	REPORT,METERS,ORERS,ORDERCOUNT="2" // presets tranmitted
EMIS	<ACK>

Initiation of the discharge sequence begins when METERS,ORDERS,Count is *successfully* set to the count of the valid orders, if the status of the measuring system(s) is "Ready".

Particular note should be taken of the fact that in the above example no particular measuring system is named when the discharge presets are transferred. The interface is responsible for distributing the data to the available measuring systems.

MultiFlow Measurement - RESULTs:

Direction	Telegram
EMIS	REQUEST,METER,ORDERS,RESULT(0)
OBC	<ACK>
OBC	REPORT,METER,ORDERS,RESULT(0),PCODE="001";VOLUME=" 998"; PUNIT="L";METERID="18DC-80363 "; … CHECK="OK"
EMIS	<ACK>
EMIS	REQUEST,METER,ORDERS,RESULT(1)
OBC	<ACK>
OBC	REPORT,METER,ORDERS,RESULT(1),PCODE="002";VOLUME=" 234"; PUNIT="L";METERID="18DC-80363 "; … CHECK="OK"
EMIS	<ACK>

Check="OK" *indicates a correct and complete "Result Telegram".*

3.1.6.4 QAS – Event list query

The QAS node (**Q**uality **A**ssurance **S**ystem) accesses the NoMix- und MultiSeal data. Events are saved in an internal logbook in both devices (NoMix, MultiSeal). Several thousand saveable events in the QAS device precludes the output being undertaken in a telegram. That is why every event is transmitted in a REPORT telegram. A special structure is defined to represent the events.

Event structure:

QAS			
EVENT	Type		Type of event
	Value1		1. Parameter for this type of event
	Value2		2. Parameter for this type of event
	Date		Date for this event (DD.MM.CCYY)
	Time		Time for this event (hh:mm:ss)

Special features:

- In addition to the usual **<ACK>** and **<NAK>** characters for confirming receipt of correct telegrams or for refusing faulty telegrams respectively, an additional control character, **<CAN>**, is used, with which the transmission of further events can be halted.
- Before a further telegram is outputted, the OBC is to answer every REPORT telegram with an **<ACK>**, **<NAK>** or **<CAN>**.
- Should the OBC answer an “EVENT report line“ with a NAK, then this line is to be repeated for as long as NAKs are transmitted as an answer. It is up to the OBC software to decide whether the report line is to be re-requested or the transmission stopped by a CAN.
- From Log Version 2.0 onwards **<EOT>** signals the end of a data transmission.
- EMIS alternatively sends **<WaitOn>** and **<WaitOff>** when lengthy interruptions (up to 2 minutes) arise. This happens, for instance, when event information is analyzed at the beginning of the query.
- In contrast to all the other variables, the EVENT structure ones cannot be individually inquired into.
- The setup parameters are always transmitted by default at the start of the event query. This can be stopped by setting the variable QAS,SETUP,NoSeP=1. The setup parameters are always outputted on the recalling of the events with date/time.

- The NoSep variable retains its value even after a power-off.
- Setting the QAS,SETUP,ReInit variable with any value establishes the ongoing time as the starting time for the next event query.
- Inquiring into the event without date / time has the effect of stopping SCU events (see chapter 3.2.2.1.3 "Event table" / page 63) being saved in the QAS log book.
- If the OBC does not answer an “EVENT report line“ with an **<ACK>**, then the output is interrupted for as long as it takes for an **<ACK>** to be accepted.

Event query:
Setup parameter

At the start of an event query, the setup parameters of the QAS unit are transmitted. Although not events, they are still depicted in the same structure.

Direction	Telegram
EMIS	REQUEST,QAS,EVENT
OBC	<ACK>
OBC	<WaitOn>
OBC	<WaitOff>
	…
OBC	REPORT,QAS,EVENT,TYPE="SET02";VALUE1="IO";VALUE2="2";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE="SET04";VALUE1="TT";VALUE2="M";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE="SET04";VALUE1="NC";VALUE2="06";DATE=“DD.MM.CCYY" ; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE="SET04";VALUE1="OP";VALUE2="2";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE="SET04";VALUE1="FB";VALUE2="Y";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE="SET04";VALUE1="PS";VALUE2="Y";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
	…
OBC	REPORT,QAS,EVENT,TYPE="SET08";VALUE1="SL";VALUE2="Y";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	// … Fortsetzung mit Ausgabe der Eventdaten

The time (QAS time) of the event query is displayed as the time stamp (Date / Time).

Event query:
extract from a loading procedure

The actual events are transmitted directly following on from the setup parameters.

Direction	Telegram
	…
	// … Setup-Parameter siehe Eventabfrage: Setup–Parameter
OBC	REPORT, QAS,EVENT, TYPE=”PKNG”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	REPORT, QAS,EVENT, TYPE=”VEN”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	REPORT, QAS,EVENT, TYPE=”BST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	REPORT, QAS,EVENT, TYPE=”NSI”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
	…
	…
OBC	REPORT, QAS,EVENT, TYPE=”AST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	<EOT>

Event query :
explicit declaration of start date and time

Direction	Telegram
EMIS	REQUEST,QAS,EVENT,DATE=“12.10.2000“;TIME=“12:00“
OBC	<ACK>
OBC	<WaitOn>
OBC	<WaitOff>
OBC	<WaitOn>
OBC	<WaitOff>
	…
OBC	REPORT,QAS,EVENT,TYPE="SET02";VALUE1="IO";VALUE2="2";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
	…

Direction	Telegram
OBC	REPORT,QAS,EVENT,TYPE="SET08";VALUE1="SL";VALUE2="Y";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE=”PKNG”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
	…
	…
OBC	REPORT,QAS,EVENT,TYPE=”AST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	<EOT>

Event query:
with interruption of the query by the OBC

Direction	Telegram
EMIS	REQUEST,QAS,EVENT
OBC	<ACK>
OBC	<WaitOn>
OBC	<WaitOff>
OBC	<WaitOn>
OBC	<WaitOff>
	…
OBC	REPORT,QAS,EVENT,TYPE="SET02";VALUE1="IO";VALUE2="2";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
	…
OBC	REPORT,QAS,EVENT,TYPE=”PKNG”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
	…
	…
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE=”AST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<CAN>

Event query:
with cancellation of the query by EMIS

Direction	Telegram
EMIS	REQUEST,QAS,EVENT
OBC	<ACK>
OBC	<WaitOn>
OBC	<WaitOff>
OBC	<WaitOn>
OBC	<WaitOff>
OBC	REPORT,QAS,EVENT,TYPE="SET02";VALUE1="IO";VALUE2="2";DATE="DD.MM.CCYY"; TIME="hh:mm:ss"
EMIS	<ACK>
	…
OBC	REPORT,QAS,EVENT,TYPE=”PKNG”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE=”AST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
EMIS	<ACK>
OBC	REPORT,QAS,EVENT,TYPE=”LST”; ... DATE=”DD.MM.CCYY”;TIME=”hh:mm:ss”
OBC	<CAN>

Continuous event query

In the case of an event query without start specification (date / time), the output begins with the last non-positive acknowledged event (with, for instance, **<CAN>** instead of **<ACK>**). After the last query this can be the first of a number of new ones coming in or the final event before a **<CAN>** cancellation. Regular recalling ensures there are no gaps in listing all the events that have arisen without having to explicitly indicate the last query time when recalling.

This approach also enables the event telegrams to be individually recalled. The first telegram must be answered with **<ACK>** and the next with **<CAN>.** Nevertheless, the output of the setup parameters ought to be switched off beforehand (QAS,SETUP,NoSeP=1).

3.2 411 - Definition of variables

3.2.1 ADMIN – (EMIS)

see chapter 3.5.3.1 "ADMIN,DEVICE" / page 96

see chapter 3.3 "411 - Error messages" / page 79

see chapter 3.1.5 "Operating states" / page 49

The use of upper and lower case letters is irrelevant to the interpretation (syntax), and is used simply to clarify the hierarchy.

Quick Reference

(Detailed description see chapter see chapter 3.2.1 "ADMIN – (EMIS)" / page 56)

ADMIN variables				Access	Length
DEVICE	**Serial**		e.g. “18DL0001”	R	10
	Name		e.g. “EMIS2“	R	15
	HWVersion		e.g. “02.00EMIS2“	R	10
	SWVersion		e.g. “03.12EMIS2“	R	10
	Node		CAN-bus node no. of the device, usually “21“	R	2
STATUS	**LastError**		See table in see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode		e.g. „READY“ „SERVICE“ Ready for operation (see see chapter 3.1.5 "Operating states" / page 49)	R	10
	Reset		Setting (SET) this variable releases a software RESET	W	15
VEHICLE	**Name**		e.g. license plate number “HH AB 123“	R/W	15
CLOCK	**Date**		Date, e.g. “01.01.2005“	R/W	10
	Time		Time, e.g. “01:01:10“	R/W	8
	AutoDST		(Daylight Saving Time) “0” no automatic summer winter time daylight saving “1” automatic summer winter time daylight saving on last Sunday in March and on last Sunday in October respectively	R/W	1
	CurrentDST		“0” current time is wintertime “1” current time is summertime	R	1
PROTOCOL	**Version**		“2.10“, corresponds to available specification	R	15
	Ping		Setting (SET) this variable releases an automatic REPORT telegram. It serves the connection for the examination.	W	15
	OPTION	**Meters**	Number of max. supported meters: usually “3“	R	2
		QAS	Number of max. supported QAS: usually “1”	R	2
		OBC	Number of max. supported OBCs: usually “1“	R	2
		PRN	Number of max. supported printers: usually “1”	R	2
		COM	Number of max. supported serial interfaces: usually “2”	R	2
		GPS	Number of max. supported GPS modules: usually “1“	R	2

3.2.1.1 ADMIN structure

The ADMIN structure identifies the EMIS interface in use and the available protocol options (PROTOCOL). It also offers a facility for synchronization of the clock (CLOCK) and identifying the vehicle (VEHICLE).

- From EMIS software version 3.10 onwards, both available serial interfaces can be individually assigned via the ..SETUP,Port Variable of the PRN, OBC or GPS node; e.g. COM(0) to a GPS and COM(1) to a printer. In order to enable continued communication with the EMIS, a SET,PING,PROTOCOL,Ping="..." can be sent during the first few seconds following a reset. EMIS then remains in Service Mode until the next reset, i.e. independent of all settings, EMIS supports the OBC interface (transmission parameter: 9600:8:N:1) on COM(0).
- This mode is displayed with:
  - ▶ ADMIN,STATUS,Mode = "Service"
    All other variables remain unchanged.
  - ▶ A software reset is triggered by SET,ADMIN;STATUS,Reset="...", which has the same effect as a hardware reset.

Direction	Telegram
EMIS	`SET,ADMIN,PROTOCOL,Ping="Service-Mode"     // contents of the Ping variables are arbitrary`
OBC	`<ACK>`

- Also following activation of the Service Mode, a few seconds are required before EMIS is available for communication.
- With the variable CLOCK,AutoDST="1", automatic switching between summer and winter time is activated. This takes place on the last Sunday in March and on the last Sunday in October.

3.2.2 QAS – (NoMix, MultiSeal)

see chapter 3.2.2 "QAS – (NoMix, MultiSeal)" / page 58

see chapter 3.3 "411 - Error messages" / page 79

see chapter 3.1.5 "Operating states" / page 49

see chapter 3.2.2.1 "Events" / page 60

Quick Reference

(Detailed description see chapter see chapter 3.5.4.1 "QAS,DEVICE" / page 101)

QAS variables			Access	Length
DEVICE	**Serial**	Serial-No., e.g. "123456"	R	10
	Name	e.g. "NoMix 2000" or "MuliSeal"	R	15
	HWVersion	e.g. "02.00"	R	10
	SWVersion	e.g. "01.60"	R	10
	Node	CAN-bus node number of the device, usually "11"	R	2
STATUS	**LastError**	See table in see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	e.g. "READY": ready for operation (see see chapter 3.1.5 "Operating states" / page 49)	R	10
SETUP	**Compartments**	Number of compartments, e.g. "5"	R	2

QAS variables				Access	Length
	ReInit		By setting the variable (with any content) all the QAS,COMP( ),LOAD and QAS,COMP( ),DROP will be reset. The memory area for the EVENT list will be cleared.	W	15
	Override		“DISABLE” = Override NOT possible “ENABLE” = Override possible “HOSE” = Override the discharge hose safety system (however NOT the Cross-Over-Prevention) possible “PRODUCT“ = Override the discharge hose safety system AND the Cross-Over-Prevention possible, only if no or unknown code was recognized	R	7
	ManLoadPlan		“DISABLE“ = manual Load plan NOT possible “ENABLE“ = manual Load plan possible	R	7
	PCorrection		“DISABLE“ = Product correction NOT possible “ENABLE“ = Product correction possible	R	7
	OPD		Overfill Prevention Devices	R	2
	NoSeP		No Setup Parameter ”0” = With Setup Parameter output ”1” = NO Setup Parameter output if request WITHOUT Date / Time	R/W	1
AUX	**OutRelease**		Output release “0” = Output NOT activated ”1” = Output activated “2“ = Output unknown	R/W	1
DATA	**TOUR**	TourNo	Tour No.	R	8
		ShiftID	Shift ID	R	8
		DepotID	Depot ID	R	8
		PStationID	Gas station ID	R	8
	CUSTOMER	ShiftStart	DD.MM.CCYY hh:mm:ss	R	19
		ShiftEnd	DD.MM.CCYY hh:mm:ss	R	19
		DriverID	Driver ID	R	8
		CustomerID	Customer ID	R	8
EVENT	**Type**		See see chapter 3.2.2.1 "Events" / page 60	R	10
	Value1			R	16
	Value2			R	16
	Date			R	10
	Time			R	8
COMP(n) **n = 0…23**	**STATUS**	**State**	“EMPTY” = Empty “REST” = Remaining volume “LOADED” = Loaded “SEALED” = Sealed “TLOAD” = Top Loaded “BLOAD” = Bottom Loaded “MSEAxx” = Manual Sealing Number xx (xx = 00-99)	R	6
		Date	DD.MM.CCYY e.g. 01.12.2005	R	10
		Time	hh:mm:ss e.g. 23:59:59	R	8
		LastOp	“LOAD” = Load “DROP” = Discharge “TLOAD” = Top Loaded “BLOAD” = Bottom Loaded	R	6
		ActPCode	Product code for DIN 26051-1 (P53), optional entry in QAS-System, the code can be enhanced or changed	R	3

QAS variables				Access	Length
		PrefCode	see ActPCode	R	3
		Loads	Number of recorded loads	R	2
		Drops	Number of recorded discharges	R	2
	SENSOR	**API**	"LOCKED" = API coupling closed "UNLOCKED" = API coupling open	R	10
		Bottom	"no pressure for bottom valve (bottom valve CLOSED) "HIGH" = bottom valve supplied with pressure (bottom valve OPEN)	R	10
		Dome	"LOCKED" = dome hatch locked "UNLOCKED" = dome hatch unlocked	R	10
		Line	"LOW" = valve CLOSED "HIGH" = valve OPEN	R	10
		WetLeg	"DRY" = Sensor is dry "WET" = Sensor is wet "UNDEFINED" = Status of sensor is undefined	R	10
		Water	"PASSIVE" = passive "ACTIVE" = active (water in the compartment) "DISCONNECT" = disconnected "SHORT" = short-circuited "INVALID" = invalid / unknown	R	10
COMP(n) n = 0…23	**LOAD(m) m = 0…9**	**Mode**	"CODED": = coded "OVERRIDE": = bypass	R	8
		PCode	see ActPCode	R	3
		Date	Date at start time DD.MM.CCYY	R	10
		StartTime	hh:mm:ss	R	8
		StopTime	hh:mm:ss	R	8
		Check	"LAST" = last data record "NEXT" = further data records available "LOST" = records between this and the next stored record are lost	R	4
	DROP(m) m = 0…9	**Mode**	"CODED" = coded "OVERRIDE" = bypass	R	8
		PCode	see ActPCode	R	3
		Date	Date at start time DD.MM.CCYY	R	10
		StartTime	hh:mm:ss	R	8
		StopTime	hh:mm:ss	R	8
		Check	"LAST" = last data record "NEXT" = further data records available "LOST" = records between this and the next stored record are lost	R	4

3.2.2.1 Events

All setup parameters and events are available via QAS,EVENT. Each entry contains a date and time specification, which however are not included in the following. Since EMIS only "hands over" the values from QAS, new values may be added in new QAS software versions which are not included here.

Examples and special items for event queries are given in chapter 3.1.6.4 "QAS – Event list query" / page 52.

3.2.2.1.1 Setup parameters

In order to be able to interpret the correlation of individual events in an event query, it is often necessary to be acquainted with the basic settings of the QAS system.

- For each QAS-EVENT query, the setup parameters are therefore transmitted first by default.
- The time (QAS time) of the event query is output as the time stamp.
- These are then followed by the actual events.
- One setup parameter is transmitted per telegram.
- Each setup parameter is specified in the form <TYPE>=<SETn> <VALUE1>=<Identifier> <VALUE2>=<Value>.
- The "SETn" value is optional and refers to the index number in the NoMix / SPD Setup Index.

SET01	System setup
SET02	Components
SET03	Network
SET04	Tank truck
SET05	Product
SET06	Loading
SET07	Discharge
SET08	Sensors
SET09	Events

- Only the <Identifier> and the corresponding <Value> are necessary for an unambiguous evaluation.
- The setup parameters are output by NoMix from version 1.43 and by MultiSeal from version 1.23.
- The output is supported by EMIS from software revision 2.00.

3.2.2.1.2 Setup table

Setup parameter summary:

Setup description	TYPE	VALUE1	VALUE2	TDL-Identifier 800 Field index
Number of output drivers	SET02	IO	0 to 4	4
Level Gauge	SET03	LG	“N“ = No “Y“ = YES	5
Tank truck type	SET04	TT	“D“ = Direct discharge “M“ = Measuring vehicle “H“ = Hybrid vehicle	6
Number of compartments	SET04	NC	01 to 24	7
Number of overfill prevention devices	SET04	OP	0 to 4	8
Footvalve pressure balanced	SET04	FB	“N“ = No “Y“ = Yes	9
Monitor pipeline fill level	SET04	PS	“N“ = No “Y“ = Yes	10
Double sensors for remaining quantity	SET04	DW	“N“ = No “Y“ = Yes	11
Separate in-line valve controller	SET04	LV	“N“ = No “Y“ = Yes	12
Instrumentation cabinet lock	SET04	UC	“N“ = No “Y“ = Yes	13
Loading mode	SET06	LM	“T“ = Truck “C“ = Compartment	14
Turn on filling release valve	SET06	LE	“L“ = Loading Mode “C“ = Connected	15
Turn off filling release valve	SET06	LD	“C“ = Compartment-Error “L“ = Loading-Error “S“ = System-Error	16
Automatic opening	SET06	AO	“Y“ = Yes “N“ = No “M“ = NOT when manually entering loading plan	17
Close compartments after filling	SET06	CC	“N“ = No “Y“ = Yes	18
Compartment empty test	SET06	CE	“N“ = No “Y“ = Yes, WITHOUT override “O“ = Yes, WITH override	19
Leave compartment open after empty test	SET06	CO	“N“ = No “Y“ = Yes	20
Delivery on filling side	SET07	DL	“N“ = No “Y“ = Yes	21

Setup description	TYPE	VALUE1	VALUE2	TDL-Identifier 800 Field index
First sensor dome cover [1])	SET08	SM	"N" = No "Y" = Yes	22
First sensor API coupling [1])	SET08	SA	"N" = No "Y" = Yes	23
First sensor Footvalve [1])	SET08	SF	"N" = No "Y" = Yes	24
First sensor In-line valve [1])	SET08	SL	"N" = No "Y" = Yes	25
Sensors for overfill prevention	SET08	SO	"N" = No "Y" = Yes	26
Sensors for left cabinet cover	SET08	LC	"N" = No "Y" = Yes	27
Sensors for right cabinet cover	SET08	RC	"N" = No "Y" = Yes	28
Sensor for water detection	SET08	WT	"N" = No "Y" = Yes	29

[1]) The number of the sensor is entered here in the NoMix / Multiseal setup. However, only the information as to whether the sensor type is installed goes to the OBC.

The column "TDL-Identifier 800" is explained in chapter 5 "EMIS2 (TDL - E7 Protocol / OBC)" / page 203.

3.2.2.1.3 Event table

See below for information on the foot notes and abbreviations used in the table.

Event / sensor	TYPE	VALUE1	VALUE2
API coupling (sensor status)	AST	*CoNo*	"L" = locked "U" = unlocked
TDL 42,S,V1,2,(1) (2) >> V2[..]			
ACCU-Load Communication	ALC	Connection to ACCU-Load "0" = interrupted "1" = connected	
TDL 825,S,*NoID*,FAS,V1 [4)]			
Footvalve (sensor status)	BST	*CoNo*	"L" = closed (pressure low) "H" = open (pressure high)
TDL 42,S,V1,1,(1) (2) >> V2[..]			
Footvalve left = standard (solenoid valve)	BVL	*CoNo*	"0" = closed "1" = open
TDL 43,S,V1,1,(1) (2) >> V2[..]			
Footvalve right (solenoid valve)	BVR	*CoNo*	"0" = closed "1" = open
TDL 43,S,V1,1,(1) (2) >> V2[..],2			

Event / sensor	**TYPE**	**VALUE1**	**VALUE2**
Cabinet flap (sensor status)	CAB	Instrumentation cabinet “L“ = left “R“ = right	Action “0“ = closed “1“ = open
TDL	42,S, ,7,(1) (2) >> V2[..],(1) (2) >> V1[..]		
Compartment status	CFS	*CoNo*	“0“ = empty “1“ = not empty “2“ = remaining quantity (not empty) “3“ = unknown “4“ = Full “5“ = Fault
TDL	40,S,V1, ,(0) (1) (1) () (2) ()>> V2[..]		
Overfill prevention (sensor status)	COF	*CoNo.* for which the overfill protection has triggered	
TDL	42,S,V1,17,1		
Seal status	CST	*CoNo*	“E“ = empty (not sealed) “R“ = remaining quantity (not empty) “S“ = sealed “L“ = second sealing when loading “D“ = second sealing when discharging “L(x)” = (x) manual sealing when loading “D(x)” = (x) manual sealing when discharging “?“ = unknown
TDL	40,S,V1, , ,(2) (2) (1) (3) (3) V2 V2 (0) >> V2[..]		
Central unit DIP-switch	DIP	“n“ = switch no’s 1 to 8	“0“ = OFF “1“ = ON
TDL	47,S,2,10,V1,(0) (1) >> V2[..] [3] (10 in [3] designates the central unit DIP-switch		
ANA deadman switch	DMS	“0“ = ANA switched off “1“ = ANA switched on “2“ = ANA Alarm “3 = ANA emergency off	
TDL	824,S,*NoID*,FAS,V1 [4]		
Dome cover (sensor status)	DST	*CoNo*	“L“ = locked ”U” = unlocked
TDL	42,S,V1,3,(1) (2) >> V2[..]		
Quality assurance (error status)	EQS	String “xy[:zz][xy]“ Device-Code (x) “C“ = Compartment “O“ = Overfill prevention “M“ = Measuring system Device-No (y) “n“ = Device No. “zz“ = *PrCo (loaded)*	String “x:zz“ Device-Code (x) “C“ = Magnet product code (hall or limit indicator) “P“ = Product code (TAG) “zz” = *PrCo (connected)*
TDL	823,S,*NoID*,FAS,V1,V2 [4]		
GPO data (NOT up-to-date)	GPO	North–South data 4.4N or 4.4S [1])	East–West data 5.4E or 5.4W [2])
TDL	8,S,DIN-26051-1 O61(V2), DIN-26051-1 O60(V1), , 3		
GPO data (up-to-date)	GPS	North–South data 4.4N or 4.4S [1])	East–West data 5.4E or 5.4W [2])
TDL	8,S,DIN-26051-1 O61(V2), DIN-26051-1 O60(V1), , 6		

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Event / sensor	TYPE	VALUE1	VALUE2
Hose conductance test (gas fluctuation and discharge hose)	GTR	Hose test result “0“ = Fault “1“ = OK	DH (discharge hose) test result String e.g. “1001“ - first figure for DH1 - second figure for DH2 - etc. “0“ = Fault “1“ = OK Example: “0110“
TDL 42,S, ,5,(2) (1) >> V1[..], , ,V2 [3)]			
Magnet code API hall sensor	HMC	*CoNo*	“0“ = NO code or Magnet code (NO PrCo !!)
TDL 45,S, ,V1, , ,1, ,V2			
Interlock release (left & right) (Solenoid valve)	ILP	Interlock release “0“ = NO release “1“ = Release	
TDL 43,S, ,7,(1) (2) >> V1[..]			
In-line valve (Solenoid valve)	LMV	*CoNo*	“0“ = closed “1“ = open
TDL 43,S,V1,11,(1) (2) >> V2[..]			
In-line valve (sensor status)	LST	*CoNo*	“L“ = closed (pressure low) “U“ = open (pressure high)
TDL 42,S,V1,11,(1) (2) >> V2[..]			
Manual entry of loading plan	MLI	*CoNo*	*PrCo*
TDL 41,S,V1,V2, , , ,8			
Sensor for remaining quantity	NSI	Sensor number	“0“ = dry “1“ = wet “2“ = interrupted “3“ = short-circuit
TDL 42,S,V1,13,(2) (1) (6) (5) >> V2[..]			
Magnet code Overfill prevention amplifier (level sensor)	OMC	*Level sensor no.*	“0“ = NO code or *Level sensor magnet code (NO PrCo !!)*
TDL 45,S, ,V1, , ,2, ,V2			
Overfill prevention Level sensor	OPD	*Level sensor no.*	Connection status “0“ = interrupted “1“ = connected “2“ = released “3” = NOT released “4“ = defective
TDL 42,S, ,20,(2) (1) (8) (9) (0) >> V2[..],V1, ,1 [3)] 1 in [7] designates Overfill prevention level sensor			
AS amplifier	OPE	Number of used AS channels “0“ = AS channels deactivated “n“ = no. of channels	
TDL 822,S,*NoID*,FAS,V1 [4)]			
Override (for discharging)	OVR	*CoNo*	“0“ = finish override or *OpNo* or *CoNo* if no AS installed
TDL 41,S,V1, ,0, , ,8 / 41,S,V1, ,0, , ,8,V2 [3)]			
Product code correction for loading	PCC	*CoNo*	“0“ = end of loading or *PrCo* at start of loading

Event / sensor	TYPE	VALUE1	VALUE2
TDL 41,S,V1, ,1, , ,8 / 41,S,V1,V2,1, , ,8			
Loading mode	PKNG	*CoNo*	"0" = end of loading or *PrCo* at start of loading "1" = at start of bottom loading (second event with PrCo follows) "2" = at start of top loading (second event with PrCo follows)
TDL 41,S,V1, ,1 / 41,S,V1,V2,1			
Power ON / OFF	PWR	Device „0" = switched off „1" = switched on	
TDL 20,S,(49) (16) >> V1[..]			
NOMIX operating mode	SCU	"D" = discharge mode "L" = loading mode "M" = menu "R" = Remote Access "S" = Standby "E" = Error	" " = empty „Q" = Default e.g. for magnet codes „N" = NoMix-Tag-Codes (Q and N only for discharge or loading)
TDL 47,S, , ,(0) (1) (2) (3) (4) (5) >> V1[..],() (0) (1) >> V2[..] 3)			
Parking brake (sensor status)	SPB	Parking brake "0" = released "1" = engaged	
TDL 42,S, ,25,(8) (9) >> V1[..]			
Discharge	TKNG	"0" = End of discharge *or* *CoNo.* at start of discharging	OpNo or CoNo if no AS installed
TDL 41,S, , ,0, , , ,V2 / 41,S,V1, ,0, , , ,V2 3)			
Overfill prevention (AS) TAG (sensor status)	TOP	*TAG-No*	Connection status "2" = released "3" = NOT released "4" = defective
TDL 42,S, ,20,(8) (9) (0) >> V2[..],V1, ,2 3) 2 in [7] designates Overfill prevention -TAG			
TAG product code	TPC	*TAG-No*	3 2-figure values (hexadecimal) separated by spaces: "12 34 56" "0" or "00 00 00" = NO code or 1st value TAG type 2nd value TAG group 3rd value TAG quality
TDL 45,S, ,V1, , ,4 / 45,S, ,V1, , ,4, ,V2[4]V2[5], , ,V2[0]V2[1],V2[2]V2[3]			
Uncoded loading	UCL	*CoNo*	"0" = end of loading or *PrCo* at start of loading "1" = at start of bottom loading (second event with PrCo follows) "2" = at start of top loading (second event with PrCo follows)
TDL 41,S,V1, ,1, , , ,1 / 41,S,V1,V2,1, , , ,1 3) 1 in [8] designates Uncoded loading			
Valve driver digital input	VDI	"n" = Input no. "1" = External setup-key switch "2" = External ANA	"0" = passive "1" = active
TDL 820,S,*NoID*,FAS,V1,V2 4)			

Event / sensor	**TYPE**	**VALUE1**	**VALUE2**
Solenoid valve	VEN	Valve number	“0“ = switched off (closed) “1“ = switched on (open)
TDL	43,S,0,19,(1) (2) >> V2[..],V1		
Vapor recovery overpressure sensor	VEP	“0“ = NO overpressure “1“ = overpressure	
TDL	42,S, ,21,(2) (1) >> V1[..]		
Vapor recovery underpressure sensor	VNP	“0“ = NO underpressure “1“ = underpressure	
TDL	42,S, ,22,(2) (1) >> V1[..]		
Vapor recovery hose monitor	VRC	Vapor recovery coupling “1“ = GPS-connection no. 1 “2“ = GPS-connection no. 2 “3“ = GPS-connection no. 3 “4“ = GPS-connection no. 4 “5“ = collective GPS connection	Connection status “0“ = interrupted “1“ = connected
TDL	42,S, ,5,(2) (1) >> V2[..],V1		
Wetleg Digital Input	WDI	“n“ = Input no. “1“ = compressed air sensor “2“ = GPSÜ (vapor recovery hose overpressure	“0“ = pressure low / passive “1“ = pressure high / active
TDL	821,S,*NoID*,FAS,V1,V2 4)		
Water detection (sensor status)	WTR	*CoNo*	“0“ = passive “1“ = active (water in compartment) “2“ = not connected “3“ = short-circuit “4“ = invalid / unknown
TDL	826,S,*NoID*,FAS,V1,V2 4)		

Footnotes:

1) North-South specification according to
NMEA 0183 $GPRMC<3> + GPRMC<4>
Example: 5343.3887N

2) East-West specification according to
NMEA 0183 $GPRMC<5> + GPRMC<6>
Example: 01040.7877E

3) manufacturer-specific data field expansion, which is not specified in this way in DIN 26051

4) new manufacturer-specific data field identifier 91
(see appendix A / chapter 5 "EMIS2 (TDL - E7 Protocol / OBC)" / page 203)

Abbreviations:

CoNo	Compartment number 1 to n, where 1 is the tank compartment following the driver’s cab
AsNo	Overfill prevention device number
PrCo	Product code according to DIN 26051-1 (P53); can be expanded or changed in QAS system
NoID	CAN account number of the QAS unit (typical = 11)
TAG-Nr	TAG No. 1 to 9

Explanation of the implementation of DOK-411 in TDL data sets:

- For "**S**" a time stamp acc. to DIN 26051-1 Table 10 in the CCYYMMDDhhmmss form is to be used.
- The values of **VALUE1** (VALUE2) are to be inserted for V1 (V2).
- For better readability, empty TDL fields have been represented by a comma plus a space.
  Spaces are omitted in the TDL data set.
- Some DOK-411 event data leads to different TDL data sets.
  These are separated by "/" .
- The implementation of some VALUEx in TDL data is effected according to the following scheme:
  - The value of VALUEx e.g. "**S**" is replaced by the value in brackets e.g.(0).
  - The order of the VALUEx values corresponds to the values inside the brackets.

Examples for TDL data records:

Event / sensor	TYPE	VALUE1	VALUE2
Compartment status	CFS	*CoNo*	"0" = empty "1" = not empty "2" = remaining quantity (not empty) "3" = unknown "4" = Full "5" = Fault
TDL 40,S,V1, ,(0) (1) (1) () (2) () >> V2[..]			

CFS,3,4 >> 40,S,3,,2
CFS,4,3 >> 40,S,4

Event / sensor	TYPE	VALUE1	VALUE2
Seal status	CST	*CoNo*	"E" = empty (not sealed) "R" = remaining quantity (not empty) "S" = sealed "L" = second sealing when loading "D" = second sealing when discharging "L(x)" = (x) manual sealing when loading "D(x)" = (x) manual sealing when discharging "?" = unknown
TDL 40,S,V1, , ,(2) (2) (1) (3) (3) V2 V2 (0) >> V2[..]			

CST,5,S >> 40,S,5,,,1
CST,3,? >> 40,S,3,,,0
CST,4,L5 >> 40,S,4,,,L5

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Loading mode	PKNG	*CoNo*	"0" = end of loading or *PrCo* at start of loading "1" = at start of bottom loading (second event with PrCo follows) "2" = at start of top loading (second event with PrCo follows)
TDL	41,S,V1, ,1	/	41,S,V1,V2,1

PKNG,5,0 >> 41,S,5, ,1 End of loading CoNo 5

PKNG,5,3 >> 41,S,5,3,1 Start of loading CoNo 5, PrCo 3

3.2.3 METER – (MultiFlow)

see chapter 3.2.3 "METER – (MultiFlow)" / page 69

see chapter 3.3 "411 - Error messages" / page 79

see chapter 3.1.5 "Operating states" / page 49

Quick Reference

(Detailed description see chapter see chapter 3.5.5.1 "METER,DEVICE(n)" / page 116)

METER variables			**Access**	**Length**
DEVICE (n)	**Serial**	e.g. "12AB1234"	R/W [1])	10
	Name	e.g. "MultiFlow"	R/W [1])	15
	HWVersion	e.g. "01.23"	R/W [1])	10
	SWVersion	e.g. "3.45 DE"	R/W [1])	10
	Node	CAN-bus node number of the device, usually "1"	R/W [1])	2
STATUS (n)	**LastError**	See table in see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	e.g. "READY": Ready for operation (see see chapter 3.1.5 "Operating states" / page 49)	R	10
SETUP	**MeterCount**	Number of measuring units in the network	R/W [1])	1
	AutoScan	"1" EMIS will automatically detect and identify connected meters. "0" Information of the connected meter(s) have to be set once, especially the CAN-bus node number	R/W	1
DATA (n)	**CurVT**	uncompensated volume (in „L")	R	8
	CurVC	compensated volume (in „L")	R	8
	CurMass	weight / mass (in „kg")	R	8
	TotVT	uncompensated volume total (in „L")	R	15
	TotVC	compensated volume total (in „L")	R	15
	TotMass	weight / mass total (in „kg")	R	15
	TotAdditive	volume additive total (in „L")	R	15
ORDERS	**ReInit**	Setting the variable (any content) brings about resetting the presets, customer information and the measuring system(s).	W	15

[1]) Access Read-Only at Meter,Setup,AutoScan = "1"

METER variables					Access	Length
	OrderCount		Number of the transmitted presets. Is automatically answered with the appropriate REPORT when the measuring systems accept the orders. If there is an error, OrderCount=0 is returned..		R/W	2
	Customer		Customer number, match code (numeric)		R/W	8
	PRICE (m)	**PCode**	Product code (PTB)		R/W	3
		PriceFactor			R/W	5
		Vat	Value –added tax 19,12 >> 19,12%		R/W	5
		PRICE-SCALE(o)	From	(Minimum volume for price)	R/W	8
			Price		R/W	10
	PRESET (m)	**PCode**	Product code (PTB)		R/W	3
		Volume	Preset quantity		R/W	8
		PUnit	Dimensional unit of the measuring system e.g. „L“, „kg“		R/W	3
	NewResults		Number of the RESULTS not yet read		R	2
	RESULT (m)	**PCode**	Product code (PTB), for checking (see PRESET)		R	3
		Volume	Measuring system display		R	8
		PUnit	Dimensional unit of the measuring system, e.g. „L“, „kg“		R	3
		MeterID	Measuring point identification		R	15
		ReceiptID	Receipt number, generated by counter		R	10
		ModelD	Discharge type of the measuring system e.g. „VT“, „V15“ (or „MASS“)		R	4
		AvTemp	Average discharge temperature, e.g. „+25,2“		R	10
		TUnit	e.g. „°C“		R	2
		Date	Discharge date in keeping with measuring system e.g. “01.12.2004“		R	8
		StartTime	Discharge start time in keeping with measuring system e.g. “16:17“		R	5
		EndTime	Discharge end time in keeping with measuring systems e.g. “16:32“		R	5
		VT	Uncompensated volume (in „L“)		R	8
		VC	Compensated volume (in „L“)		R	8
		Mass	Weight / mass (in „kg“)		R	8
		Check	“OK“ when RESULT data available ““ when no RESULT data available		R	2
		AvFlowrate	Average flow rate in L/Min		R	5
		HoseSel	Hose selection		R	3
		TransMode	Transfer mode		R	2
		PRICE	PriceFactor	e.g. 100 (PUnit=“L“) then price per 100 liters	R	5
			Price	Price per (PUnit x PriceFactor) max. >> vvvvv,nnn	R	10
			ExVat	0= price incl.Vat / 1= excl.Vat	R	1
			Vat	Value –added tax 19,12 >> 19,12%	R	5
		ADDITIVE	PCode	PTB product code for additive	R	3
			Volume	Additive volume max. >> VVVVV,nn	R	8

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METER variables					**Access**	**Length**
			PUnit	Dimensional unit for the volume e.g. „ml“, „kg“	R	3
			MixRatio	Mixing ratio 1500 >> 1:1500	R	4
			PumpPos	Position of the additive pump	R	1
			RestVolume	Remaining volume max. >> VVVVV,nn in PUnit	R	8
			PriceFactor	e.g. 1000 (PUnit="mL“) then price per 1000 mLiter	R	5
			Price	Price per (PUnit x PriceFactor) max. >> vvvvvv,nnn	R	10
			ExVat	0= price incl.Vat / 1= excl.Vat	R	1
			Vat	Value –added tax 19,12 >> 19,12%	R	5
		Check	„“ no RESULT available		R	2
	MAN-RESULT (m)	**see RESULT (m)**				

(n) denotes the index of the METER (0 to 2)
(m) denotes the index of the PRESETs or RESULT (0 to 9)

Comments:

- **The presets are only to be set**:
  1.) When all the measuring systems (METER,STATUS(n), Mode) are in the "READY" status.
  2.) When a discharge is not over or
  3.) In instances when MultiFlow is in the menu input. A measuring system reporting the "BUSY" status means that specifications have already been transferred. In that case it is not possible to transfer new preset values. The presets in the EMIS and measuring systems can be reset with the aid of SET,METER,ORDERS,ReInit="e.g. 123".
- **Presets** must always be transferred with a rising index (starting with 0). Presets with an incorrect index are ignored, and are answered with NAK.
- **Once the presets are transferred**, the OBC sets METER,ORDERS,OrderCount to the number of the transferred data sets. The interface transfers the specifications to the measuring system(s). The effect of setting METER,ORDERS,OrderCount is to simultaneously delete the entire RESULT memory.
- **The sequence is to be noted:** the specifications are passed on to the MultiFlows when METER,ORDERS,OrderCount is set, i.e. the OBC must have set the presets ***beforehand*** !
- **During processing** of the specifications (discharge up to delivery note printing), the measuring system(s) is in the "BUSY" state. This status can be established at any time by querying the METER,STATUS(n),Mode variable.

- **When all discharges are over** from a measuring system, the appropriate status changes from "BUSY" to "READY". The measuring results can be recalled under METER,ORDERS,RESULT(n) with valid results marked by the Check="OK" variable. For clear-cut assignment purposes, the results are filed in the same order (with the same index) as the presets. All presets and results remain in the EMIS interface to enable later queries to be made.
- **The presets**, customer numbers (customer match code) and the measuring system(s) itself are reset by METER,ORDERS,ReInit.
- **With METER,ORDERS,RESULT(m)**,.. only the results of the discharges initiated by a preset can be read out.
- **A non-planned delivery** - that is the discharge without a preset can be read out using METER, ORDERS,MANRESULT. The data of the last non-planned delivery is always available (one or several MultiFlows).
- **On the use of several measuring systems** the interface distributes the presets to all measuring systems. The measuring systems search for "suitable" presets.
- **For examples** on the programming – see chapter 3.4 "411 - Programming details" / page 81.
- **With the CurVT, CurVC und CurMass variables** (sub-node DATA(n)), volume and/or mass information can be recalled during the discharge. These variables are blank at the start or end of the discharge.
- **Die TotVT, TotVC, TotMass und TotAdditive** (DATA(n) sub-node) variables express the MultiFlow Totalizer values. They represent the total values of all discharges of a MultiFlow.
- **A group interrogation** of the DATA values lasts approx. 1500 m/sec.
- **The tot. values** are updated in the MultiFlow after the discharge, i.e. the values do not change during a discharge.

Example query:

Direction	Telegram
…	
EMIS	REQUEST,METER,DATA(0)// before discharge
OBC	<ACK>
OBC	REPORT,METER,DATA(0),CURVT="";CURVC="";CURMASS=""; TOTVT="11092";TOTVC="10572";TOTMASS="8562";TOTADDITIVE="1"
EMIS	<ACK>
…	
EMIS	REQUEST,METER,DATA(0)// during discharge
OBC	<ACK>
	REPORT,METER,DATA(0),CURVT="00385,75";CURVC="00356,71";CURMASS="00267,18";TOTVT="11092";TOTVC="10572";TOTMASS="8562";TOTADDITIVE="1"

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Direction	Telegram
EMIS	<ACK>
…	
EMIS	REQUEST,METER,DATA(0)// during discharge
OBC	<ACK>
	REPORT,METER,DATA(0),CURVT="00771,75";CURVC="00713,61";CURMASS="00534,49";TOTVT="11092";TOTVC="10572";TOTMASS="8562";TOTADDITIVE="1"
EMIS	<ACK>
…	
EMIS	REQUEST,METER,DATA(0)// during printing
OBC	<ACK>
	REPORT,METER,DATA(0),CURVT="00771,75";CURVC="00713,61";CURMASS="00534,49";TOTVT="11864";TOTVC="11286";TOTMASS="9096";TOTADDITIVE="1"
EMIS	<ACK>
…	
EMIS	REQUEST,METER,DATA(0)// after printing
OBC	<ACK>
	REPORT,METER,DATA(0),CURVT="";CURVC="";CURMASS=""; TOTVT="11864";TOTVC="11286";TOTMASS="9096";TOTADDITIVE="1"
EMIS	<ACK>
…	

„Reinitialisation“ of all relevant preset data is done with SET,METER,ORDER,Retint = „e.g. 103“. This causes all presets in the measuring systems and EMIS to be deleted. The customer numbers (customer match code) and all results and main results are also deleted.

3.2.4 COM Interface

In addition to the CAN interface used exclusively for communication with the Sening® components, EMIS also features two serial interfaces or 'ports.'

As of software version 3.10, as well as the previous fixed assignment of COM(0) to OBC and COM(1) to printer, it is also possible to change the assignment of interfaces (ports) and transfer parameters.

At this time, COM(0) is commonly still being used for linking up the OBC (on-board computer), and always takes the form of an RS232 interface.

COM(1) can be operated as either an RS232 or an RS485 interface. It can be used to connect up a printer/FDW converter or a GPS module.

The data relating to the interfaces are provided via the COM node.

Quick Reference

(Detailed description see chapter see chapter 3.5.8.1 "COM(n),STATUS" / page 146)

COM variables			Access	Length
STATUS	LastError	See table, see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	E.g., "READY" ready for operation (see see chapter 3.1.5 "Operating states" / page 49)	R	10
SETUP	Protocol	E.g., "9600:8:N:1"	R/W	31
	Mode	"OFF" "RS232" / "RS485" only for COM(1)	R/W	15
	Queue	"NONE" "OBC" "GPS" "PRN"	R	15
TEXT		The ASCII string indicated is output directly. Only printable ASCII characters are permitted.	W	220
HEX		The ASCII string indicated is output in HEX format. This is required to output control characters. (Example: ... HEX="0D" >> output 0D $_{Hex}$ carriage return)	W	220

Comments:

- The SETUP,Protocol variables can be used to set different transfer parameters. The available transfer speeds are 2400, 4800, 9600, 19, 200, 38, 400 and 57, 600 baud. The data length can be 7 bit or 8 bit and O (Odd), E (Even), or N (None) can be selected for the parity. The setting 9600:8:N:1 has proven to work well in previous applications. Experience shows that faster transfer speeds are more prone to malfunctions. Baud rates in excess of 9600 should be avoided, particularly on unfavorable transfer routes.
- SETUP,Queue can be used to establish which device is assigned to this interface. This value is changed using variable SETUP,Port on node PRN, GPS, or OBC.
- The assignment of a device with corresponding interface configuration is performed in two steps. The interface must be configured using COM(n). Furthermore, a device must be configured in the node defined for this (PRN, GPS, or OBC) and assigned to an interface. In all cases, a device can only be assigned to an interface if no other device is occupying it.

3.2.5 PRN – (Printer)

Connecting a printer to an EMIS always makes sense when the idea is for one or several MultiFlows and an OBC to collectively access a printer.

Before using this printer, a check should therefore firstly be made from each device to see if the printer is available. This is done through the "PRN,STATUS,Mode" variable which must have the "READY" value.

Setting these variables with "OBC" reserves the printer for the OBC.

The data at the printer interface is actually outputted by setting the "Text" or "Hex" variable. Characters or character sequences written into one of these two variables are directly passed onto the printer interface.

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With the printing over, “PRN,STATUS,Mode“ is to be reset to “READY". The reservation is thus ended. Multiflow reserves the printer, if required, in a similar way.

The CAN bus accesses the “PRN,STATUS,Mode“ variable by means of “METER“.

As some of the MultiFlow data are calibration-relevant, the output is one proceeding directly to the printer. EMIS connects its output driver to the printer for the duration of the meter printer reservation under high ohm conditions.

Quick Reference

(Detailed description see chapter see chapter 3.5.9.1 "PRN,STATUS" / page 147)

PRN variables			Access	Length
STATUS	LastError	See table see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	“READY“, “OBC“, ”METER“ or “ERROR“	R/W	10
SETUP	Port	“NONE“ or “COM(1)“	R/W	15
	ReInit	Setting the variable (any content) outputs the ReInit- string and thus the printer is initialized.	W	15
Text		The indicated ASCII character sequence is directly outputted. Only printable ASCII characters are authorized.	W	220
Hex		The indicated ASCII character sequence is outputted in the HEX format. Is needed for outputting control characters. (Example: ..,Hex=“0D“ >> Output 0DHex Carriage Return)	W	220

Comments:

- Under SETUP,Port, the “printer functionality" must firstly be assigned to a serial interface (usually COM(1)) or it can be deactivated with “NONE“.
- The SET,PRN telegrams (<ACK> from EMIS to the OBC) are only confirmed when all the data has been transferred to the printer.
- The printer can use XON / XOFF to control the data flow. There is no other feedback from the printer.
- When an error occurs during data transfer, EMIS again takes over the printer interface. It needs to be re-requested!
- There is further scope to output control characters from Software version 3.12. In accordance with the char constant Depiction of the C Programming Language, binary data in association with a backslash (\ ) can be outputted directly through the “Text“ variable.
- SET,PRN,Text=“ABC\\\”\n\r\x1B123\0” outputs ABC\“ 0AHex 0D Hex 1BHex 123 00Hex thus 12 characters. The following are supported - \0 \a \b \f \n \r \t \v \“ \’ \\. For instance,\x10 indicates the two characters following \x as being hexa-decimal figures and transformed into a hex value.

- Octal transformation is not supported. Although this makes the Hex variable superfluous, it continues to be supported for compatibility considerations.

Supported backslash characters:

String	HEX format	Description
\0	0x00	Null
\a	0x07	Bell
\b	0x08	Backspace
\f	0x0C	Form Feed
\n	0x0A	Line Feed
\r	0x0D	Carriage Return
\t	0x09	H-Tabulator
\v	0x0B	V-Tabulator
\“	0x22	Double apostrophe
\’	0x27	Simple apostrophe
\\	0x5C	Backslash

Example for outputting a text onto a printer:

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=”OBC”
OBC	<ACK>
EMIS	SET,PRN,Text=”Testausgabe\r\n”
OBC	<WaitOn>
OBC	<WaitOff>
OBC	<ACK>
EMIS	SET,PRN,Text=”2. Zeile\r\n”
OBC	<WaitOn>
OBC	<WaitOff>
OBC	<ACK>
EMIS	SET,PRN,STATUS,MODE=”READY”
OBC	<ACK>

- The variables stored in earlier versions under RESOURCE,PRN,.. are now directly under PRN,... Programs should no longer access data via RESOURCE,PRN. To stay compatible for a transitional period with existing OBC software versions, access via RESOURCE will continue to be supported for the moment. The data is identical in both structures. No further support is being given to the “RESOURCE,Mode“ variable. "ASYNC" is always displayed in the "RESOURCE,Protocol“ variable.

3.2.6 RESOURCE

Access is achieved as described in chapter 3.2.5 "PRN – (Printer)" / page 74, except for the fact that the RESOURCE variable designation must be indicated ahead of PRN.

Example: SET,RESOURCE,PRN,TEXT="123" is identical to SET,PRN,TEXT="123".

This variant is NO LONGER to be used!

3.2.7 OBC – (On-Board-Computer)

OBC variables			Zugriff	Länge
STATUS	LastError	See table in chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	e.g. "READY": ready for operation (see chapter 3.1.5 "Operating states" / page 49)	R	10
SETUP	Port	"NONE" or "COM(0)"	R/W	15

With the OBC node, the OBC function can be switched off if this interface is needed for other devices in future.

3.2.8 GPS – (Global Positioning System)

The GPS data is shown in the NMEA 0183, Version 2.0 format – that is just as it is outputted from the GPS receiver (exception: „Speed" is converted and displayed in km/h).

For the data set groups (GPRMC and GPGGA) a check is made, based on the status in GPRMC<2>, whether the positional data is valid (status = A) or whether the positional data contains inexact data (status = V) e.g. due to poor reception conditions.

If the data is valid, the existing structures "DATA" and "SUBDATA" will be copied to "LASTDATA" and "LASTSUBDATA" before the new data is saved in "DATA" and "SUBDATA".

Invalid data (status = V) is also saved in "DATA" and "SUBDATA". In this case, "LASTDATA" and "LASTSUBDATA" will NOT be overwritten, i.e. the last valid data appears in "LASTDATA" or "LASTSUBDATA" (status = L).

Quick Reference

(Detailed description see chapter see chapter 3.5.10.1 "GPS- Data Support in General" / page 150)

GPS variables		Access	Length

GPS variables			Access	Length
DEVICE	**Name**	Product name >> $PGRMT,<1> to “ VER” e.g. “GPS 17“ [2])	R	15
	SWVersion	Software version >> $PGRMT,<1> from “VER“ e.g. “2.05“ [1])	R	10
STATUS	**LastError**	See table in see chapter 3.3 "411 - Error messages" / page 79	R	50
	Mode	e.g. “READY”: ready for operation (see see chapter 3.1.5 "Operating states" / page 49)	R	10
SETUP	**Port**	“NONE“ “COM(0)“ or “COM(1)“	R/W	15
	TimeSync	“0“ the EMIS time will NOT be synchronized with the GPS time “1“ the EMIS time will be synchronized with the GPS time (+UTCOffset)	R/W	1
	UTCOffset	“-hh:mm“ “+hh:mm“ Offset which will be added to the UTC time for the EMIS time synchronization	R/W	6
DATA	**Status**	>> $GPRMC<2> or „L“ ”A“ = Valid position ”V“ = Invalid position „L“ = Last valid position	R	1
	UTCTime	UTC-time >> $GPRMC<1>	R	6
	UTCDate	UTC-Date >> $GPRMC<9>	R	6
	Lat	Latitude >> $GPRMC<3> (ddnn.nnnn)	R	9
	LatRef	Latitude reference ”N“ = North or ”S“ = South >> $GPRMC<4>	R	1
	Lon	Longitude >> $GPRMC<5> (dddnn.nnnn)	R	10
	LonRef	Longitude reference “E“ = East or “W“ = West >> $GPRMC<6>	R	1
	AltMSL	Height above sea level in m >> $GPGGA<9>	R	6
	AltGeo	Geoid height in m >> $GPGGA<10>	R	6
	NoSats	Number of satellites (0 to 12) >> $GPGGA<7>	R	2
	Speed	Speed >> $GPRMC<7> in km/h	R	10
	Course	Direction of travel (0° to 359.9°) >> $GPRMC<8>	R	5
SUBDATA	**Quali**	Quality indicator >> $GPGGA<6>	R	1
	HDop	Horizontal Dilution of Precision >> $GPGGA<8>	R	4
	AgeDiff	Age of differential GPS >> $GPGGA<11>	R	4
	ID	Differential Reference Station ID >> $GPGAA<12>	R	4
LASTDATA	**...**	Same as DATA		
	...	...		
LASTSUB DATA	**...**	Same as SUBDATA		
	...	...		

[2]) The GPRMT data set is sent only once a minute by the GPS module. The data is therefore not available immediately.

An example for a GPS query:

Direction	Telegram
…	…
EMIS	REQUEST,GPS,DATA
OBC	<ACK>>
OBC	REPORT,GPS,DATA,STATUS="A";UTCTIME="111411";UTCDATE="070508";LAT="5338.5831";LATREF="N";LON="00953.3765";LONREF="E";ALTMSL="15.5";ALTGEO="45.5";NOSATS="03";SPEED="3.9";COURSE="242.7"
EMIS	<ACK>
…	…

3.3 411 - Error messages

All EMIS nodes contain the sub-nodes STATUS with the variables LastError (format: "ErrorCode:ErrorText"). The last occurring error of this device is stored here.

After read-out of these variables, the error is deleted.

After receipt of a <NAK>, a read-out of ADMIN,STATUS,LastError should be performed.

Syntax or format errors occur most often and can be analysed here. In the case of an error code >= 5000 and < 6000 (format 5xnm), this means an error in conjunction with access to an external device. Inference to the relevant device can be drawn from n, inference to the running number from m.

With a second query of LastError of this device, the error can be determined. Error code and error message originate from the relevant device and are not documented here.

3.3.1 ADMIN structure

The following errors are currently defined for the ADMIN structure:

Code	Meaning
0000	No error
1000	Unknown command (OpCode) received
1001	Unknown variable was selected
1002	Telegram transmission failed (NAK received)
1003	Neither ACK nor NAK received for transmitted telegram (acknowledgement absent)
1004	No reply received to REQUEST telegram
1005	Reply to REQUEST telegram faulty or incomplete

Code	Meaning
1006	Index for variable outside permitted limits Example: Meter.Device (99)
1007	No WaitOff received after WaitOn
2000	Assigned value was truncated (character string too long)
2001	Assigned value not possible (telegram format faulty)
2002	Assigned value not possible (above/below permitted range)
2003	Value assignment not possible (specified parameter invalid)
3000	No write access to selected variable
3001	Write access refused. The device is "Busy" (see chapter 0)
4000	Internal error : ROM
4001	Internal error : RAM
4002	Internal error : EEPROM
4003	Internal error : Clock
50nm	Fault at connected device x: 0 = see LastError for the specified device 1 = device not answering no others are defined n: device group (0:measuring system, 1 : QAS) m: sequential number (starting with zero) Example: 5000 = fault at measuring system no. 1
510m	No answer from METER
5110	No answer from QAS
9998	Unknown value for the variable “Mode“
9999	Unknown error

If 2 errors occur one after another, the first will be overwritten. Therefore it is no longer available after read-out.

The error codes cannot be changed, but the texts are optional, and can vary between languages and the implementations of the application.

3.3.2 METER, QAS, etc.

The following errors are currently defined for the device structures (METER, QAS etc.):

Code	Meaning
0xxx	Device ***alarm***, xxx = device specific alarm number Alarms represent faults that do not prevent continued execution of the program
1xxx	Device ***error***, xxx = device specific error number

3.4 411 - Programming details

3.4.1 Original Delivery Note

- The design of the form must satisfy particular requirements for reasons of compatibility with W&M regulations. Since the OBC is not included in the W&M calibration, the measuring system must be capable of autonomously printing a discharge record (the original delivery note), without any reference to the OBC or the EMIS interface.
- This original delivery note is then placed at the beginning of the actual delivery documentation (bill / delivery note). The positions are printed at the same time as the transfer of the measurement results to the OBC.
- The OBC is initially only required to print a header, to position the printing head, and possibly to make desirable adjustments to the attributes (when not controlled by the measuring system).
- When the discharge has been completed and the record of the measurements has been printed, the OBC can add customer information to the original delivery note so that it can easily be assigned at a later stage.
- The purpose of the original delivery note is to obtain a confirmation of delivery (a signature) from the end customer on the "calibrated" delivery note. The driver brings this back to the office for use in accounting and the calculation of government duty. The rest of the form is retained by the customer.

Example of the layout of a delivery form:

Original Delivery Note

Counter No	Del. note	Date	Product	Discharge type	Volume
*FMC-001	004711	09.02.2000	EL heating oil	Compensated for 15°C	2374 L*

Customer address/order (short) | Signature of customer

Supplier address / logo

Customer address | Date
Time
Bill no.

Items supplied

Credit period | Sub-total
Tax
Total

Supplier data, manager, telephone / fax nos., bank details etc.

Payment transfer form | Customer's stub

(and / or)

direct debit authority

(*) – Data generated by calibrated components is bracketed in between two asterisks (*).

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3.4.2 Example of the procedure

An example of the progress of communication in the course of a discharge is illustrated below (variable identifications have in some cases been shortened):

OBC	⇔	EMIS	⇔	MultiFlow (TMU)
①		Initialize Network analysis (opt. incl. STATUS)	⇒ at reset or switching on	All nodes
		QAS,DEVICE	⇐	e.g. SPD / NoMix
		METER,DEVICE(n)	⇐	e.g. TMU (measuring system)
		METER,STATUS(n)	⇒ query ⇐	Status of the TMU
② Initiate discharge	⇒ Query mode	METER,STATUS(n)	⇒	All TMUs: Check Status
	⇐	METER,STATUS(n)	⇐	All TMU report „Ready“ or „Busy“
Product selection and preset quantities	⇒ only metric products	ORDERS,ReInit ORDERS,PRESET(n) ORDERS,Customer ORDERS,OrderCount	⇒ if OrderCount is set	TMU: Initiate discharge
	⇐ Order confirmation	ORDERS,OrderCount	⇐	Confirmation from TMU
	Repeat for each product	RESULT(n) RESULT(n),Check=“OK“	⇐	Perform discharge, transmit event
		PRN,STATUS,Mode	⇐ ⇒	Reserve printer
		PRN,TEXT (only in connection with the EMIS-Multiflow printer)	⇐	Print original delivery note data (usually direct to the port)
		PRN,STATUS,Mode	⇐	Release printer
Management of customer and discharge	⇐ all events at the request of the OBC	ORDERS,RESULT(n)		
③ Reserve printer	⇒ ⇐	PRN,STATUS,Mode		
Print other data, e.g. additional unmeasured products and invoicing	⇒	PRN,TEXT (only in connection with the EMIS-Multiflow printer)		

OBC	⇔	EMIS	⇔	MultiFlow (TMU)
Release printer	⇒ ⇐	PRN,STATUS,Mode		
④		PRN,STATUS,Mode	⇐ ⇒	Reserve printer
		PRN,TEXT (only in connection with the EMIS-Multiflow printer)	⇐	Print trip report (usually direct to the port)
		PRN,STATUS,Mode	⇐	Release printer

Summary:

- ① - The procedure is initiated with the analysis of the CAN Bus system, in which the EMIS interface identifies the devices connected.
- ② - The discharge process itself follows, including printing the original delivery note data.
- ③ - OBC then adds other positions (unit load, freight costs, etc.) and the data of the bill.
- ④ - Finally the measuring system prints a trip report (end of shift).

- For more details, see chapter 3.4.3 "Programming of measuring systems" / page 85

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3.4.3 Programming of measuring systems

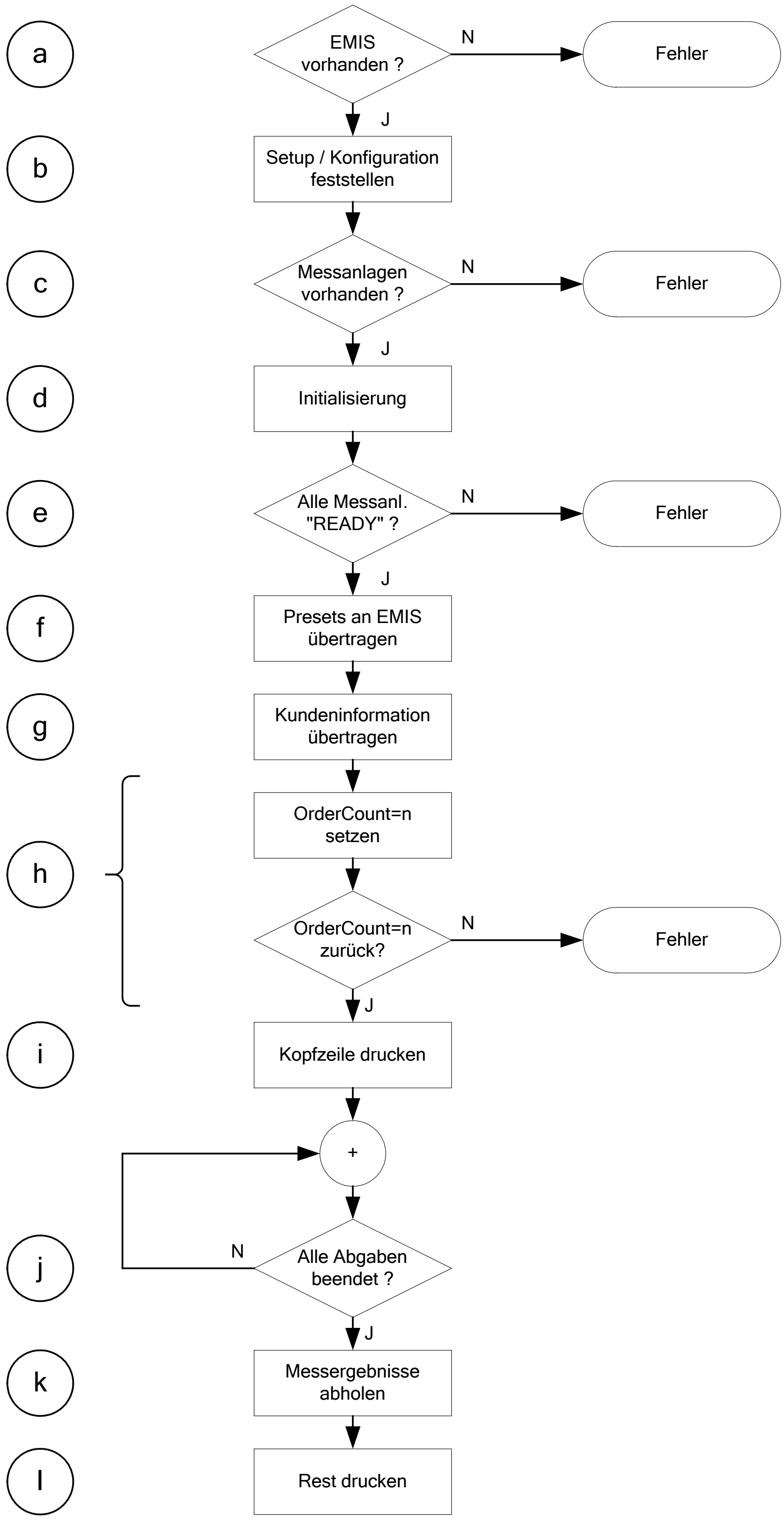

Fig. 8: Flowchart / hints for programming

☞ Deliveries are generally defined for each job / customer, not for a complete shift or day, i.e. the procedure described below has to be performed separately for each customer / delivery!

a - Check if EMIS is present

Direction	Telegram
EMIS	SET,ADMIN,PROTOCOL,Ping=“TEST“
OBC	<ACK>
OBC	REPORT,ADMIN,PROTOCOL,PING=“TEST“
EMIS	<ACK>

EMIS interface present.

⌧ Proceed with the program.

Direction	Telegram
EMIS	SET,ADMIN,PROTOCOL,Ping=“DIESER TEST-STRING IST ZU LANG“
OBC	<NAK>
OBC	REPORT,ADMIN,PROTOCOL,PING=“DIESER TEST-STR“
EMIS	<ACK>

EMIS interface present, text length for ping exceeds the specification.

⌧ Proceed with the program.

Direction	Telegram
EMIS	SET,ADMIN,PROTOCOL,Ping=“TEST“
OBC	... (keine Antwort)

No answer, EMIS interface not present.

⌧ Display an error message, program cannot proceed.

b - Determine setup / Configuration

Direction	Telegram
EMIS	REQUEST,ADMIN,VEHICLE
OBC	<ACK>
OBC	REPORT,ADMIN,VEHICLE,NAME=“4711 – 08/15“
EMIS	<ACK>

The OBC may for example identify the system by evaluation of the received information.

Direction	Telegram
EMIS	REQUEST,METER,SETUP
OBC	<ACK>
OBC	REPORT,METER,SETUP,METERCOUNT=“2“;AUTOSCAN=“1“
EMIS	<ACK>

EMIS is scanning the CAN-bus for measuring systems during start-up (`AUTOSCAN=“1“`) and has found two systems (`METERCOUNT=“2“`).

⌧ Proceed with the program if the result corresponds to the expected amount.

Direction	Telegram
EMIS	REQUEST,METER,SETUP
OBC	<ACK>
OBC	REPORT,METER,SETUP,METERCOUNT=“0“;AUTOSCAN=“1“
EMIS	<ACK>

EMIS is scanning the CAN-bus for measuring systems during start-up (AUTOSCAN=“1“) and did not find any systems (METERCOUNT=“0“). Possible reason: measuring system(s) not switched on.

⌧ must perform error treatment (e.g. display “please check measuring system(s)”).

c - Check if measuring systems are able to communicate

It is assumed that only one measuring system is connected to EMIS to make the further explanations in this chapter easier. If more than one system is connected, all procedures described below have to be repeated for each measuring system.

Direction	Telegram
EMIS	REQUEST,METER,STATUS(0)
OBC	<ACK>
OBC	REPORT,METER,STATUS(0),LASTERROR="000:Ready to receive next order";MODE="READY"
EMIS	<ACK>

The measuring system is connected, in operation and ready to receive the next order (MODE=“READY“).

⌧ Proceed with the program.

Direction	Telegram
EMIS	REQUEST,METER,STATUS(0)
OBC	<ACK>
OBC	REPORT,METER,STATUS(1),LASTERROR="001:Locked with actual operation";MODE="BUSY"
EMIS	<ACK>

The measuring system is connected and in operation, but not able to receive the next order at present (MODE=“BUSY“). This is caused e.g. by manual input at the measuring system (menu-mode) or a delivery in process.

⌧ Proceed with the program for the moment.

Direction	Telegram
EMIS	REQUEST,METER,STATUS(0)
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS

Direction	Telegram
OBC	`<ACK>`
	`REPORT,ADMIN,STATUS,LASTERROR="5100:METER device not present";MODE="READY"`
EMIS	`<ACK>`

The measuring system does not answer the requests by EMIS.

⌧ OBC needs to perform error treatment (e.g. display “please check measuring system(s)“)

d - Initialization / clear all memories and devices

Direction	Telegram
EMIS	`SET,METER,ORDERS,REINIT=“xxx“`
OBC	`<ACK>`

Initialization of measuring system(s) and EMIS memory acknowledged.

⌧ Proceed with the program.

Direction	Telegram
EMIS	`SET,METER,ORDERS,REINIT=“xxx“`
OBC	`<NAK>`
EMIS	`REQUEST,ADMIN,STATUS`
OBC	`<ACK>`
OBC	`REPORT,ADMIN,STATUS,LASTERROR="5100:METER device not present"; MODE="READY"`
EMIS	`<ACK>`

The (or one of the) measuring system(s) does not answer the requests by EMIS. The error code will help to identify the system which caused the error (see chapter 3.2.8 "GPS – (Global Positioning System)" / page 77).

⌧ OBC needs to perform error treatment (e.g. display “please check measuring system(s)“)

e - Verify the success of the initialization

Direction	Telegram
EMIS	`REQUEST,METER,STATUS(0)`
OBC	`<ACK>`
OBC	`REPORT,METER,STATUS(0),LASTERROR="000:Ready to receive next order";MODE="READY"`
EMIS	`<ACK>`

The measuring system is connected, in operation and ready to receive the next order (`MODE=“READY“`), i.e. initialization was successful.

⌧ Proceed with the program.

Direction	Telegram
EMIS	`REQUEST,METER,STATUS(0)`
OBC	`<ACK>`
OBC	`REPORT,METER,STATUS(1),LASTERROR="001:Locked with actual operation";MODE="BUSY"`
EMIS	`<ACK>`

The measuring system is connected and in operation, but not able to receive the next order at present (`MODE="BUSY"`). This is caused e.g. by a delivery in process.

⌦ OBC needs to perform error treatment (e.g. display "please check measuring system(s)")

Direction	Telegram
EMIS	`REQUEST,METER,STATUS(0)`
OBC	`<NAK>`
EMIS	`REQUEST,ADMIN,STATUS`
OBC	`<ACK>`
	`REPORT,ADMIN,STATUS,LASTERROR="5100:METER device not present"; MODE="READY"`
EMIS	`<ACK>`

The measuring systems does not answer the requests by EMIS.

⌦ OBC needs to perform error treatment (e.g. display "please check measuring system(s)")

f - Transmission of presets to EMIS

Direction	Telegram
EMIS	`SET,METER,ORDERS,PRESET(0),PCODE="1";VOLUME="10000";PUNIT="L"`
OBC	`<ACK>`
EMIS	`SET,METER,ORDERS,PRESET(1),PCODE="3"`
OBC	`<ACK>`
EMIS	`SET,METER,ORDERS,PRESET(1),VOLUME="2000"`
OBC	`<ACK>`
EMIS	`SET,METER,ORDERS,PRESET(1),PUNIT="L"`
OBC	`<ACK>`

Up to 10 presets (index 0..9) may be transmitted for the present version of EMIS. Both presets in the example above have been acknowledged by EMIS. The example shows two alternatives: Transmission of all preset-information with one set command (preferred variant) or transmission of the preset data with separate telegrams.

⌦ Proceed with the program.

Direction	Telegram
EMIS	SET,METER,ORDERS,PRESET(0),PCODE=“1“
OBC	<ACK>
EMIS	SET,METER,ORDERS,PRESET(1),PCODE=“3“
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS
OBC	<ACK>
	REPORT,ADMIN,STATUS,LASTERROR="1006:Index out of range"; MODE="READY"
EMIS	<ACK>

Each preset has to be transmitted completely in the correct order. If one preset is not completed, EMIS will reject the transmission of further presets.

g - Transmission of customer information

Customer related information (e.g. customer number) can be transmitted optional. If supported by the measuring system, this data can be printed together with the measuring results on the original receipt.

Direction	Telegram
EMIS	SET,METER,ORDERS,CUSTOMER=“12345678“
OBC	<ACK>

The transmission has been acknowledged by EMIS.

Proceed with the program.

Direction	Telegram
EMIS	SET,METER,ORDERS,CUSTOMER=“123456789“
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS
OBC	<ACK>
	REPORT,ADMIN,STATUS,LASTERROR="2000:string too long"; MODE="READY"
EMIS	<ACK>

The customer number exceeds the specified length (max. 8 chars.). EMIS answers with <NAK> and truncates the number to the max. length (in this example: “12345678“).

Proceed with the program.

h - Transmission of the presets to the measuring system(s)

Direction	Telegram
EMIS	SET,METER,ORDERS,ORDERCOUNT=“2“
OBC	<ACK>
OBC	REPORT,METER,ORDERS,ORDERCOUNT=“2“
EMIS	<ACK>

EMIS was able to transmit the two presets to at least one measuring system.

⌧ Proceed with the program.

Direction	Telegram
EMIS	SET,METER,ORDERS,ORDERCOUNT=“2“
OBC	<ACK>
OBC	REPORT,METER,ORDERS,ORDERCOUNT=“0“
EMIS	<ACK>

EMIS was unable to transmit the presets to the measuring system.

⌧ OBC needs to perform error treatment
(e.g. repeat from step “a”).

Direction	Telegram
EMIS	SET,METER,ORDERS,ORDERCOUNT=“3“
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS
OBC	<ACK>
	REPORT,ADMIN,STATUS,LASTERROR="2002:value out of range"; MODE="READY"
EMIS	<ACK>

The “ORDERCOUNT“ variable is set to a number that doesn’t match the number of presets received by EMIS.

⌧ OBC needs to perform error treatment
(e.g. repeat from step „a“)

i - Print header

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=“OBC“
OBC	<ACK>

The print request was acknowledged by EMIS.

⌧ Proceed with the program.

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=“OBC“
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS
OBC	<ACK>
OBC	REPORT,ADMIN,STATUS,LASTERROR="3000:no write access"; MODE="READY"
EMIS	<ACK>
EMIS	REQUEST,PRN,STATUS,MODE
OBC	<ACK>
OBC	REPORT,PRN,STATUS,MODE=“METER“
EMIS	<ACK>

The printer access was rejected by EMIS since another device (a measuring system in the example above) is occupying the printer.

⌧ OBC needs to perform error treatment
(e.g. repeat requesting printer access)

If printer is assigned to OBC:

Direction	Telegram
EMIS	`SET,PRN,TEXT=“Lieferschein\r\n“`
OBC	`<WaitON>`
OBC	`<WaitOFF>`
OBC	`<ACK>`
...	...
EMIS	`SET,PRN,STATUS,MODE=“READY“`
OBC	`<ACK>`

After discharge the measuring system(s) access the printer for printing the original receipt. The printer access is requested from EMIS. For this reason the OBC must release the printer after printing the header by sending `SET,PRN,STATUS,MODE=“READY“`.

j - Check if all discharges are finished

The measuring results can be found in the `METER,ORDERS,RESULT(n)` area. For a clear assignment the order corresponds to the presets, i.e. `RESULT(0)` contains the measuring results which correspond to `PRESET(0)`, `RESULT(1)` corresponds to `PRESET(1)` etc.

Direction	Telegram
EMIS	`REQUEST,METER,ORDERS,RESULT(0),Check`
OBC	`<ACK>`
OBC	`REPORT,METER,ORDERS,RESULT(0),CHECK=““`
EMIS	`<ACK>`

The result is not yet available. The procedure shown above must be performed for all expected results.

Reasons: The discharge is not finished (in case of MultiFlow measuring systems, the actual mode can be determined by command `REQUEST,METER(n),STATUS,MODE`. If EMIS reports `MODE=“BUSY`“, the discharge is in progress) or the measuring system was not able to discharge the corresponding product (e.g. the system is not configured for this product).

It must be considered that the job distribution cannot be determined if several measuring systems are connected (i.e. it is impossible to determine which measuring systems is connected with which product).

⌧ OBC needs to continue waiting for the result(s), interruption by the operator must be provided (if necessary)

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Direction	Telegram
EMIS	REQUEST,METER,ORDERS,RESULT(0),Check
OBC	<ACK>
OBC	REPORT,METER,ORDERS,RESULT(0),CHECK=“OK“
EMIS	<ACK>

The result is available.
(The procedure shown above must be performed for all expected results).

⌧ Proceed with the program.

k - Collect delivery results

Direction	Telegram
EMIS	REQUEST,METER,ORDERS,RESULT(0)
OBC	<ACK>
OBC	REPORT,METER,ORDERS,RESULT(0),PCODE="001";VOLUME=" 10020"; PUNIT="L";METERID="- ? - ";RECEIPTID="0000000017";MODEID="15"; AVTEMP="+50,4";TUNIT="_C";DATE="28.11.00";STARTTIME="10:02"; ENDTIME="10:14";VT="010330,00";VC="010020,00";MASS="008480,00"; CHECK="OK"
EMIS	<ACK>

The result is available.
(The procedure shown above must be performed for all expected results).

⌧ Proceed with the program.

l - Printing further data by OBC

After transmission of the results the OBC may print further information, e.g. delivery note, invoice, etc. The procedure is equal to the example shown in step 9 (print header).

3.4.4 Printer control

1. Reserving the printer

The EMIS interface is managing the printer, i.e. every device (OBC, measuring system, etc.) must request printer access before printing. The current user of the printer is listed in the variable “RESOURCE,PRN,STATUS,MODE“:

- METER measuring system (e.g. MultiFlow)
- QAS QAS device (e.g. MultiSeal)
- OBC On-Board-Computer
- READY unused / free

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=“OBC“
OBC	<ACK>

The printer is now assigned to the OBC

☒ Proceed with the program.

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=“OBC“
OBC	<NAK>
EMIS	REQUEST,ADMIN,STATUS
OBC	<ACK>
OBC	REPORT,ADMIN,STATUS,LASTERROR="3000:no write access"; MODE="READY"
EMIS	<ACK>
EMIS	REQUEST,PRN,STATUS,MODE
OBC	<ACK>
OBC	REPORT,PRN,STATUS,MODE=“METER“
EMIS	<ACK>

The printer access was rejected by EMIS since another device (a measuring system in the example above) is occupying the printer.

☒ OBC needs to perform error treatment (e.g. repeat requesting printer access)

2. **Sending data to the printer**

   The transmission of data to the printer is done like shown in chapter 3.4 "411 - Programming details" / page 81. During transmission of data the maximum length for the variables TEXT and HEX may not be exceeded.

3. **Releasing the printer**

   The OBC must release the printer after printing so other devices are able to access the printer.

Direction	Telegram
EMIS	SET,PRN,STATUS,MODE=“READY“
OBC	<ACK>

3.5 411 - Record structure

3.5.1 EMIS2

Depending on its configuration, EMIS2 works either in DOK-411 mode or in FTL mode. In DOK-411 mode, it supports a subset of the “old” DOK-411 data structure (“DOK-411 tree”) only; in FTL mode it supports a subset of the “new” FTL data structure (“FTL tree”) plus a selection of the DOK-411 nodes under the “FAS” root node. This is organized as with the EMIS4; only the selection of nodes is different. In the tables that define those subsets (section FAS - Data Tree and Field Description), the corresponding data type in the EMIS2 column is marked with an asterisk (“*”) character.

- In FTL mode, EMIS2 communicates to the OBC over COM(0) and in FTL protocol only. The connection settings in FTL mode are fixed to 9600:8:N:1.

- This applies for software version 3.23 and newer. Further details on requirements can be found in the latest revision of [8] and in the following sections.

- EMIS 2, version 3.23 or newer is parameterized by means of its DIP switches (see table below). The DIP switch setting also determines if EMIS2 starts up in FTL or DOK-411 mode. The initialization sequence for EMIS2 (e. g. after a software update is be described in separate documentation).

- The following table shows the effects of each dip switch setting. For values that are not provided here, parameterization using the EMIS Organizer software has to be used.

DIP	Field	OFF	ON
1	CAN Node	21	22
2	Main Operation Mode	DOK-411	FTL
3	ADMIN,CLOCK,AutoDST	0	1
4	PRN,SETUP,Port	NONE	COM(1)
	GPS,SETUP,Port	COM(1)	NONE
5	COM(1),SETUP,Mode	RS232	RS485
6	PRN,SETUP,Protocol	STD	FDW
	COM(1),SETUP,Protocol	9600:8:E:1	9600:8:N:1
7	-	start	Setup->EEPROM
8	-	nothing	Interface test
-	ADMIN,DEVICE,Serial	0000000000	
-	ADMIN,DEVICE,Name	EMIS2	
-	ADMIN,DEVICE,HWVersion	3.0_432-2	
-	ADMIN,VEHICLE,Name	EMIS_VEH	
-	COM(0),SETUP,Protocol	9600:8:N:1	
-	COM(0),SETUP,Mode	RS232	
-	GPS,SETUP,TimeSync	0	
-	GPS,SETUP,UtcOffset	00:00	
-	FMC,RESOURCE,PRN,Init	1B40	
-	FMC,RESOURCE,PRN,ReInit	1B40	

3.5.2 Data Tree and Field Description

3.5.3 ADMIN

3.5.3.1 ADMIN,DEVICE

Field Description

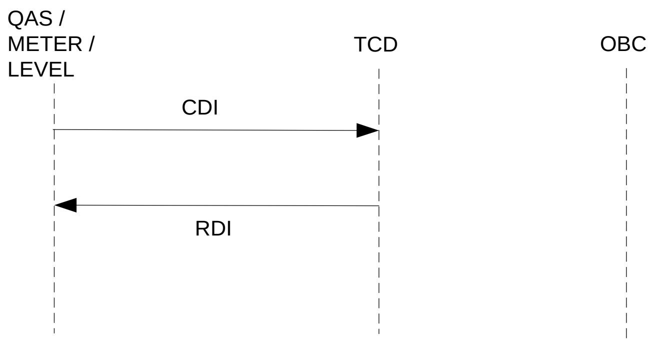
Field Name	Description	Storage	Value eneration	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Serial	Serial number of the TCD; e.g. “18DL0001”	NV	PA	RD, WS	Default depending on TCD type. Otherwise as stored with SET telegram.	C10	C10
Name	Name of the TCD; e.g. “EMIS2“	NV	PA	RD, WS	Default depending on TCD type. Otherwise as stored with SET telegram.	C15*	C15
HWVersion	Hardware version of the TCD; e.g. “EMIS2“	NV	PA	RD, WS	Default depending on TCD type. Otherwise as stored with SET telegram.	C10**	C10
SWVersion	Software version of the TCD; e. g. “3.21”	FI	CI	RD	Coded into software	C10	C10
Node	CAN bus node number.of the TCD	HA	CI	RD	Read from dip switch setting; typically “21“	N2	N2

* *In FTL mode under FAS,ADMIN,DEVICE,Name.*
** *In FTL mode under FAS,ADMIN,DEVICE,Serial.*

Please note that in this document the tables describing “DOK-411” variables are organized slightly different from those in the “FTL” part. Because sometimes the data types do not completely match between the different devices, here the given data type indicates both the data type itself and that the variable is supported by the respective device. If no data type is filled into the cell, the variable in that row is not be available from the device.

Related Communication

An incoming CDI telegram is always answered with an RDI telegram.



RDI Parameter #	Value
P1	ADMIN,DEVICE,SwVer
P2	ADMIN,DEVICE,HwVer
P3	ADMIN,DEVICE,Serial
P4	“” (always empty)
P5	“GW”
P6	ADMIN,DEVICE,Name

3.5.3.2 ADMIN,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
LastError	Last TCD error. Set according to last TCD’s error status; cleared on next REQUEST to this field. See also Table 1 on page 98	VO	CI	RD		C50	C50
Mode	Set according to TCD’s current operation mode. For more detailed information please refer to [1], section “Operating States”.	VO	CI	RD		C10	C10
Reset	Setting (SET) this variable releases a software reset	-	-	WR, TR		C15	C15

Related Communication

An incoming CST telegram is always answered with an RST telegram.

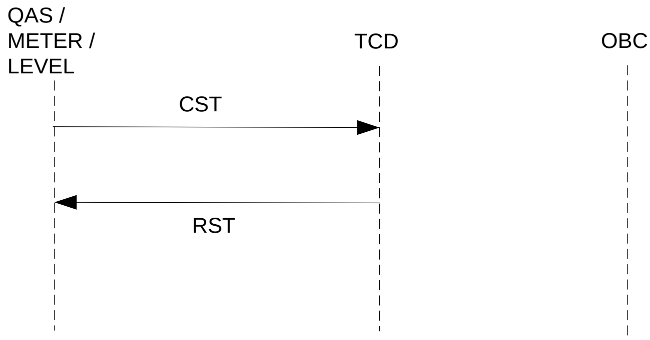


Fig. 9: Exchange of basic device information

RST Parameter #	Value
P1	ADMIN,STATUS,Mode
P2	ADMIN,STATUS,LastError

Code	Meaning
0000	No error
1000	Unknown command (OpCode) received
1001	Unknown variable was selected
1002	Telegram transmission failed (NAK received)
1003	Neither ACK nor NAK received for transmitted telegram (acknowledgement absent)
1004	No reply received to REQUEST telegram
1005	Reply to REQUEST telegram faulty or incomplete
1006	Index for variable outside permitted limits Example: Meter.Device(99)
1007	No WaitOff received after WaitOn
2000	Assigned value was truncated (character string too long)
2001	Assigned value not possible (telegram format faulty)
2002	Assigned value not possible (above/below permitted range)
2003	Value assignment not possible (specified parameter invalid)
3000	No write access to selected variable
3001	Write access refused. The device is "Busy"
4000	Internal error : ROM
4001	Internal error : RAM
4002	Internal error : EEPROM
4003	Internal error : Clock
510m	No answer from METER
5110	No answer from QAS
5200	Master METER device not present
5210	No answer from master METER device
6100	LEVEL device not present
6101	LEVEL preset not completed
7000	METERSI device not present
7010	No answer from METERSI device
9998	Unknown value for the variable “Mode“
9999	Unknown error
10010	Event transmission aborted by MTS device
10020	Event transmission canceled by MTS device
10030	Event transmission rejected by MTS device
10040	Event transmission canceled
10050	No response from MTS device
10060	Operation not permitted for delivery data

Table 1: Error Messages of the TCD

3.5.3.3 ADMIN,VEHICLE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Name	Name of the vehicle; e.g. license plate number “HH AB 123“	NV	PA	RD, WR	Default depending on TCD type. Otherwise as stored with SET telegram.	C15	C15

3.5.3.4 ADMIN,CLOCK

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Date	Date of the TCD's time base	OT	ST, CI GP	RD, WR	REQUEST delivers value from the RTC. Value can be assigned by a SET telegram and will be accepted by the RTC. If a GPS device is connected, the RTC may also be updated once a minute from the Time/Date received from it. See also GPS,SETUP,TimeSync.	D$	D
Time	Time of the TCD's time base	OT	ST, CI GP	RD, WR		T8$	T
AutoDST	Daylight Saving Time) "0" no automatic DST / standard time adjustment "1" automatic DST / standard time adjustment on last Sunday in March and on last Sunday in October respectively	NV	ST	RD, WR, PA	Default: "0"; otherwise as stored with SET telegram	B	B
CurrentDST	"0" current time is standard time "1" current time is DST	OT	CI	RD	Automatically according to built-in rules	B	B

Related Communication

Other MTS devices can request date and time from the TCD's RTC as follows:

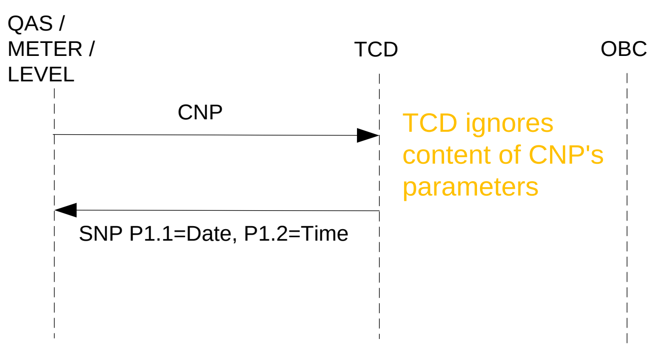


Fig. 10: Date and time synchronization with CNP/SNP

Remark:

The formats of ADMIN,CLOCK,Date and ADMIN,CLOCK,Time are “dd.mm.yyyy and “hh:mm:ss”. They are converted to ‘yymmdd’ and ‘hhmm’ for SNP P1 and P2.

3.5.3.5 ADMIN,AUX

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Out(n)	Output; n = 0 … 3			RD, WR		-	-
In(n)	Input; n = 0 … 3			RD		-	-

3.5.3.6 ADMIN,PROTOCOL

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Version	Corresponds to available specification; e. g. “2.10”	FI	CI	RD	Coded into software	C15	-
Ping	Triggers automatic REPORT telegram on SET; Empty on REQUEST	-	ST	WR, TR	-	C15	C15

3.5.3.7 ADMIN,PROTOCOL,OPTION

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Meters	Number of max. supported meters: typical “3“	FI	CI	RD	Coded into software	-	-
Qas	Number of max. supported QAS: typical “1“	FI	CI	RD	Coded into software	-	-
Obc	Number of max. supported QBCs: typical “1“	FI	CI	RD	Coded into software	-	-
Prn	Number of max. supported Printers: typical “1“	FI	CI	RD	Coded into software	-	-
Com	Number of max. supported serial interfaces: typical "2"	FI	CI	RD	Coded into software	-	-
Gps	Number of max. supported GPS modules: typical “1“	FI	CI	RD	Coded into software	-	-
Gsm	Number of max. supported GSM modules: typical “1“	FI	CI	RD	Coded into software	-	-

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3.5.3.8 ADMIN,SWUPDATE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
CustomerID	Customer Group-ID for software update procedure (0…998) 0: Update disabled	NV	PA	RD, WS	-		N2
Month	1…12	NV	PA	RD, WR	-		N2
Day	1…31	NV	PA	RD, WR	-		N2
Weekday	1…7	NV	PA	RD, WR	-		N2
Hour	0…59	NV	PA	RD, WR	-		N2
Minute	0…59	NV	PA	RD, WR	-		N2

The missing "seconds" are added as a random value.

3.5.4 QAS

3.5.4.1 QAS,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Serial	Serial no of the QAS device; e. g. "102456"	VO	PP	RD	RDI P3	C10	C10
Name	Name of the QAS device; e.g. "NoMix 2000" or "MuliSeal"	VO	PP	RD	RDI P6	C15	C15
HWVersion	Hardware version of the QAS device; e.g. "02.00"	VO	PP	RD	RDI P2	C10	C10
SWVersion	Software version of the QAS device; e.g. "01.60"	VO	PP	RD	RDI P1	C10	C10
Node	CAN bus node number of the QAS device, typically "11"	VO	PP	RD	Generated from RDI telegram	N2	N2

Related Communication

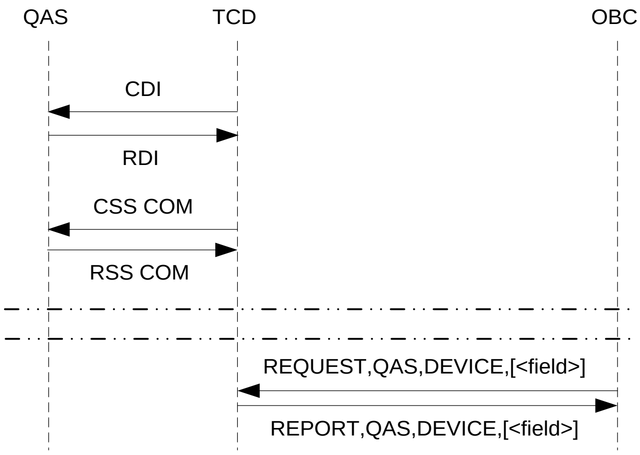

Fig. 11: Generation of QAS,DEVICE,...

If the TCD receives an RDI telegram from the QAS, it responds with a CSS telegram with P1="COM".

3.5.4.2 QAS,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
LastError	Last error detected for the QAS device	VO	OT	RD	Special rules apply, see Related Communication and Table 1 on page 98.	C50	C50
Mode	Operation mode of the QAS device For more detailed information please refer to [1], section "Operating States".	-	OT	RD	Special rules apply, see Related Communication.	C10	C10
LastEvent	No. of last Eventlogentry from device	-	OT	WS	Parameter is needed for first start with OBC	N6	-

Relaed Communication

On SPN telegram from a QAS device:

if P2 = "BSY" oder "TST" oder "TID" oder "CID" oder "CMT":

QAS,STATUS,MODE="BUSY"

else if P2 = "ERR"

QAS,STATUS,MODE = "ERROR"

else

QAS,STATUS,MODE="READY"

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On incoming RST telegram from a QAS device:

Set QAS,STATUS,Mode = P1

and QAS,STATUS,LastError = P2

On incoming PEV telegram from a QAS device:

If P1 = “SCU”

QAS,STATUS,LastError= "0000:No Error"

If P2 = “M”

QAS,STATUS,Mode=”BUSY”

Else

QAS,STATUS,Mode=”READY”

3.5.4.3 QAS,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Compartments	Number of compartments, e. g. “5”	-	OP	RD	CSS “COM” / RSS “COM” P2	N2	N2
ReInit	Triggers resetting of data: QAS,COMP,STATUS,State/Date/Time/LastOp/ActPCode/PRefCode/Loads/Drops.	-	-	TR	SDC “GET” “LEV”; SDS transmits number of latest log event	C15	-
Override	“DISABLE” = Override NOT possible “ENABLE” = Override possible “HOSE” = Override the discharge hose safety system (however NOT the Cross-Over-Prevention) possible “PRODUCT“ = Override the discharge hose safety system AND the Cross-Over-Prevention possible, only if no or unknown code was recognized	-	OP	RD	CSS “OVR” / RSS “OVR” P2	C7	C7
ManLoadPlan	“DISABLE“ = manual Load plan NOT possible “ENABLE“ = manual Load plan possible	-	OP	RD	CSS “MLI” / RSS “MLI” P2	C7	C7
PCorrection	“DISABLE“ = manual Load plan NOT possible “ENABLE“ = manual Load plan possible	-	OP	RD	CSS “PCC” / RSS “PCC” P2	C7	C7
OPD	Number of Overfill Prevention Devices	-	OP	RD	CSS “OPD” / RSS “OPD” P2	N2	N2
NoSeP	No Setup Parameter ”0” = With Setup Parameter output ”1” = NO Setup Parameter output if request WITHOUT Date / Time	NV	ST	RD, WR	Default: 0. Otherwise as stored from SET telegram	B	-

Related Communication

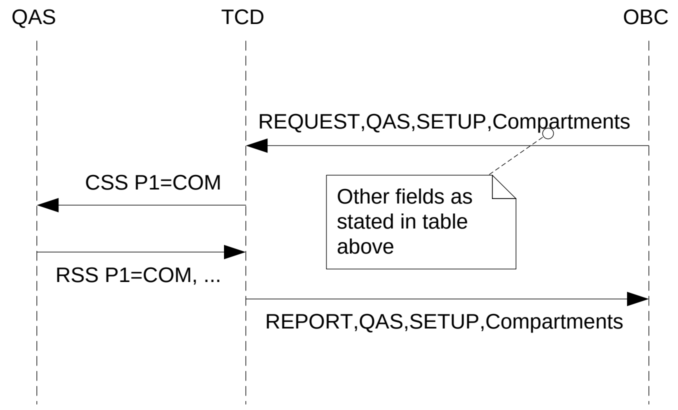

Fig. 12: Generation of QAS,SETUP,...

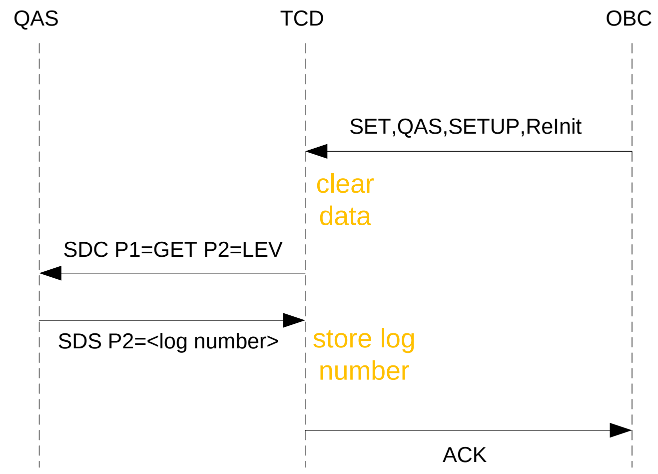

Fig. 13: QAS,SETUP,ReInit

Remark:

- If P2 does not contain a number, the SDS telegram is ignored.

3.5.4.4 QAS,CLOCK

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Date	Date of the QAS device	-	OP	RD	SNP P1	D$	D
Time	Time of the QAS device	-	OP	RD	SNP P2	T8$	T

Related Communication

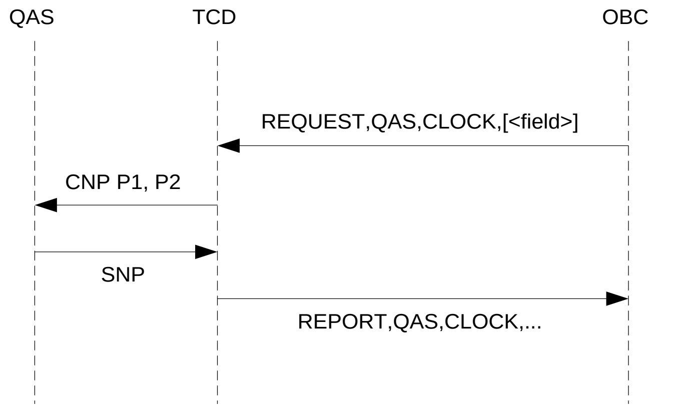

Fig. 14: Generation of QAS,CLOCK,...

Remarks:

- The CNP / SNP sequence is sent only once, even if sub-node CLOCK is requested as a whole.
- The TCD sends CNP with P1 and P2 being ADMIN,CLOCK,Date and ADMIN,CLOCK,Time.

3.5.4.5 QAS,AUX

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
OutRelease	Output release “0” = Output NOT activated ”1” = Output activated “2“ = Output unknown	VO	ST	RD, WR	Equals 2 at power-up. Possible values: 0, 1, 2. OBC can only set values 0 or 1. SET with 2 or greater is answered with NAK.	N1	-

Related Communication

Request by QAS:

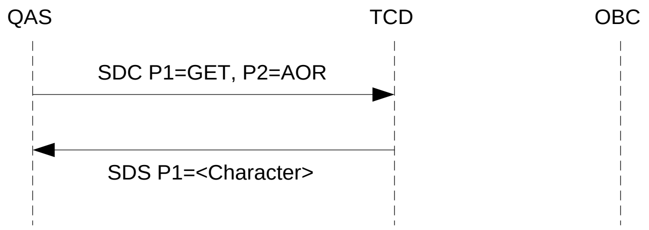

Fig. 15: Request of QAS,AUX,AuxRelease

Set by OBC:

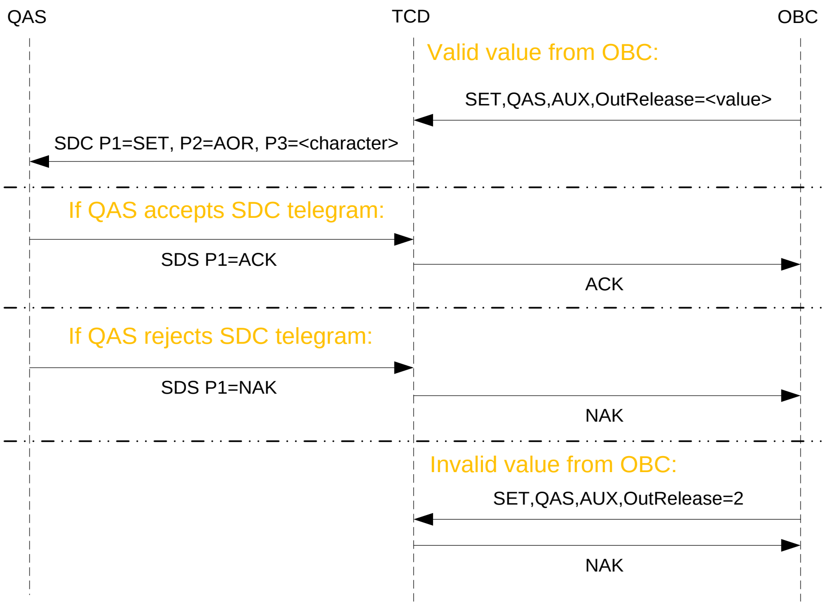

Fig. 16: Setting of QAS,AuxRelease

For both variants, the following applies:

OutRelease	Character
0	'N' ("no permission")
1	'P' ("permission granted")
2	'U' ("unknown")

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3.5.4.6 QAS,DATA

3.5.4.6.1 QAS,DATA,TOUR

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information		Data Type	
							EMIS2	EMIS4
TourNo	Tour Number	-	OP	RD	if SAD P1=TID; else no changes	if SAD P2=L OR D SAD P5 else "" (empty)	N4	-
ShiftID	Shift ID	-	OP	RD		if SAD P2=L OR D SAD P4 else "" (empty)	N4	-
DepotID	Depot ID	-	OP	RD		if SAD P2=L SAD P3 else "" (empty)	N8	-
PStationID	Petrol Station ID	-	OP	RD		if SAD P2=D SAD P3 else "" (empty)	N8	-

Related Communication

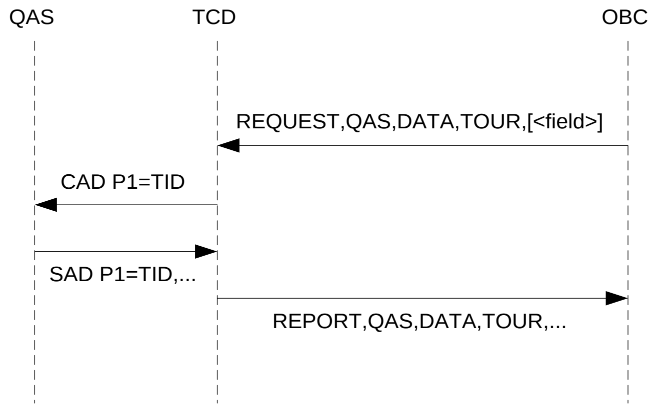


Fig. 17: Generation of QAS,DATA,TOUR,...

3.5.4.6.2 QAS,DATA,CUSTOMER

Field Description

<table>
<tr><th rowspan="2">Field Name</th><th rowspan="2">Description</th><th rowspan="2">Storage</th><th rowspan="2">Value Generation</th><th rowspan="2">Access Mode</th><th rowspan="2" colspan="2">Additional Information</th><th colspan="2">Data Type</th></tr>
<tr><th>EMIS2</th><th>EMIS4</th></tr>
<tr><td>ShiftStart</td><td>Start of shift</td><td>-</td><td>OP</td><td>RD</td><td rowspan="4">if (SAD P1=CID AND SAD P2 <> X);
else no changes</td><td>if P4 valid
DateTime composed from SAD P4
else
“” (empty)</td><td>D$+
T8$</td><td>-</td></tr>
<tr><td>ShiftEnd</td><td>End of shift</td><td>-</td><td>OP</td><td>RD</td><td>if P5 valid
DateTime composed from SAD P5
else
“” (empty)</td><td>D$+
T8$</td><td>-</td></tr>
<tr><td>DriverID</td><td>Driver ID</td><td>-</td><td>OP</td><td>RD</td><td>SAD P3</td><td>N8</td><td>-</td></tr>
<tr><td>CustomerID</td><td>Customer ID</td><td>-</td><td>OP</td><td>RD</td><td>SAD P2</td><td>N8</td><td>-</td></tr>
</table>

Related Communication

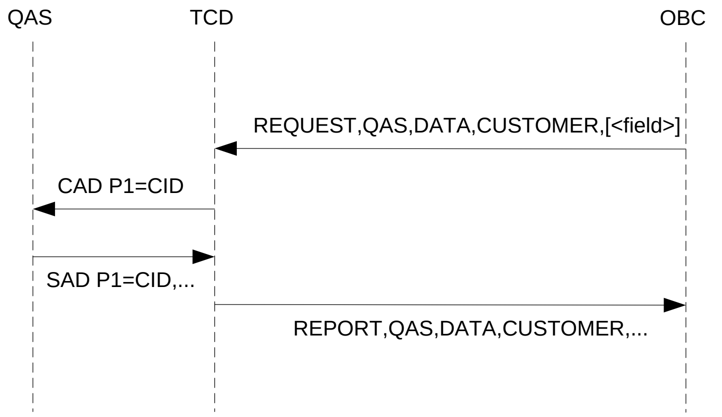


Fig. 18: Generation of QAS,DATA,CUSTOMER,...

3.5.4.7 QAS,EVENT[,Date=DD.MM.YYYY[;Time=hh:mm:ss]]*

Field Description

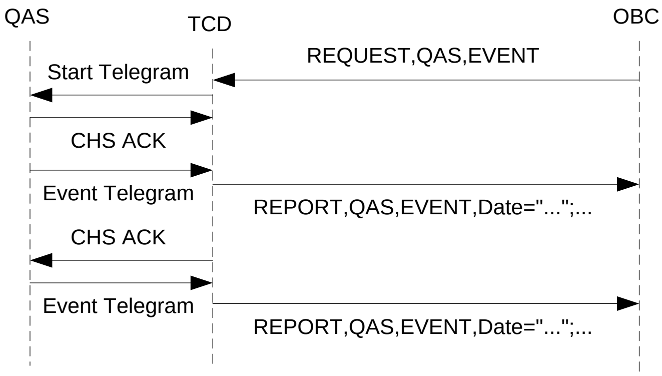
<table>
<tr><th rowspan="2">Field Name</th><th rowspan="2">Description</th><th rowspan="2">Storage</th><th rowspan="2">Value Generation</th><th rowspan="2">Access Mode</th><th rowspan="2">Additional Information</th><th colspan="2">Data Type</th></tr>
<tr><th>EMIS2</th><th>EMIS4</th></tr>
<tr><td>Type</td><td rowspan="4">Please refer to [1], QAS,EVENT</td><td>-</td><td>OT</td><td>OT</td><td>ILE P5</td><td>C3</td><td>C3</td></tr>
<tr><td>Value1</td><td>-</td><td>OT</td><td>OT</td><td>ILE P6</td><td>C10</td><td>C10</td></tr>
<tr><td>Value2</td><td>-</td><td>OT</td><td>OT</td><td>ILE P7</td><td>C10</td><td>C10</td></tr>
<tr><td>Date</td><td>-</td><td>OT</td><td>OT</td><td>Generated from ILE P3</td><td>D$</td><td>D</td></tr>
</table>

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Time		-	OT	OT	Generated from ILE P4 ERF: Seconds set to zero	T8$	T

*** Remark:**

- The FTL protocol does not allow setting two values at once, therefore this ENQ would not work. For determining the start time of the event transmission, the variable FTL,LOG,TimeStamp is be used when communicating over FTL protocol.

Related Communication



Continue until all events are transmitted

Fig. 19: Simple QAS Event Transmission Example

For details see also algorithm in appendix A. DDE/CLE P1 is always “EVE” (designator).

3.5.4.7.1 Setup Parameters

In order to be able to interpret the correlation of individual events in an event query, it is often necessary to be acquainted with the basic settings of the QAS system.

- For each QAS-EVENT query, the setup parameters are therefore transmitted first by default.
- The time (QAS time) of the event query is output as the time stamp.
- These are then followed by the actual events.
- One setup parameter is transmitted per telegram.
- Each setup parameter is specified in the form <TYPE>=<SETn>

<VALUE1>=<Identifier>
<VALUE2>=<Value>.

- The “SETn” value is optional and refers to the index number in NoMix / SPD Setup Index.

SET01	System setup
SET02	Components
SET03	Network
SET04	Tank truck
SET05	Product
SET06	Loading
SET07	Discharge
SET08	Sensors
SET09	Events

- Only the <Identifier> and the corresponding <Value> are necessary for an unambiguous evaluation.
- The setup parameters are output by NoMix from version 1.43 and by MultiSeal from version 1.23.
- The output is supported by EMIS from software revision 2.00.

3.5.4.7.2 Setup Table

Setup parameter summary:

Setup Description	TYPE	VALUE1	VALUE2
Number of output drivers	SET02	IO	0 to 4
Level Gauge	SET03	LG	“N“ = No “Y“ = YES
Tank truck type	SET04	TT	“D“ = Direct discharge “M“ = Measuring vehicle “H“ = Hybrid vehicle
Number of compartments	SET04	NC	01 to 24
Number of overfill prevention devices	SET04	OP	0 to 4
Footvalve pressure balanced	SET04	FB	“N“ = No “Y“ = YES
Monitor pipeline fill level	SET04	PS	“N“ = No “Y“ = YES “B” = With Bottom valve delay
Double sensors for remaining quantity	SET04	DW	“N“ = No “Y“ = YES “B” = With Bottom valve delay (NoMix 1.88 or newer / MultiSeal 1.68 or newer)
Separate in-line valve controller	SET04	LV	“N“ = No “Y“ = YES

Setup Description	TYPE	VALUE1	VALUE2
Instrumentation cabinet lock	SET04	UC	“N“ = No “Y“ = Yes
Loading mode	SET06	LM	“T“ = Truck “C“ = Compartment
Turn on filling release valve	SET06	LE	“L“ = Loading Mode “C“ = Connected
Turn off filling release valve	SET06	LD	“C“ = Compartment-Error “L“ = Loading-Error “S“ = System-Error
Automatic opening:	SET06	AO	“Y“ = Yes “N“ = No “M“ = NOT when manually entering loading plan
Close compartments after filling:	SET06	CC	“N“ = No “Y“ = YES
Compartment empty test	SET06	CE	“N“ = No “Y“ = Yes, WITHOUT override “O“ = Yes, WITH override (Override)
Leave compartment open after empty test	SET06	CO	“N“ = No “Y“ = YES
Delivery on filling side:	SET07	DL	“N“ = No “Y“ = Yes
First sensor dome cover 1)	SET08	SM	“N“ = No “Y“ = Yes
First sensor API coupling 1)	SET08	SA	“N“ = No “Y“ = Yes
First sensor Footvalve 1)	SET08	SF	“N“ = No “Y“ = Yes
First sensor In-line valve 1)	SET08	SL	“N“ = No “Y“ = Yes
Sensors for overfill prevention	SET08	SO	“N“ = No “Y“ = Yes
Sensors for left cabinet cover	SET08	LC	“N“ = No “Y“ = Yes
Sensors for right cabinet cover	SET08	RC	“N“ = No “Y“ = Yes
Sensor for water detection	SET08	SW	“N“ = No “Y“ = Yes

3.5.4.8 QAS,COMP(n)

3.5.4.8.1 QAS,COMP(n),STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
State	"EMPTY" = Empty "LOADED" = Loaded "SEALED" = Sealed		OP	RD	RLD P6	C6	-
Date	Date and time of LastOp (see below)		OP	RD	composed from RLD P7	D$	-
Time			OP	RD	composed from RLD P8	T8$	-
LastOp	"LOAD" = Loaded "DROP" = Discharged "SEALED" = Seal set "UNSEALED" = Seal broken		OP	RD	If RLD P1 = 'S' If RLD P6 = "SEALED" "SEALED" else "UNSEALED" else if RLD P1 = 'L' "LOAD" else "DROP"	C6	-
ActPCode	Product code DIN 26051-1 (P53), optional entry in QAS-System the code can be enhanced respectively changed	-	OP	RD	RLD P3	C3	-
PrefCode	see ActPCode	-	OP	RD	RLD P3	C3	-
Loads	Number of recorded loadings	NV	OT	RD	Default: 0; Incremented on reception of "new" RLD telegrams with P1 = 'L'	N2	-
Drops	Number of recorded discharges	NV	OT	RD	Default: 0; Incremented on reception of "new" RLD telegrams with P1 = 'D'	N2	-

An RLD telegram is considered "new" if its telegram counter (P4) is not equal to the telegram counter of the last received RLD telegram. All values in this table are cleared on SET,QAS,SETUP,ReInit.

☞ See also QAS,COMP(n),LOAD(m) resp. QAS,COMP(n),DROP(m).

Related Communication

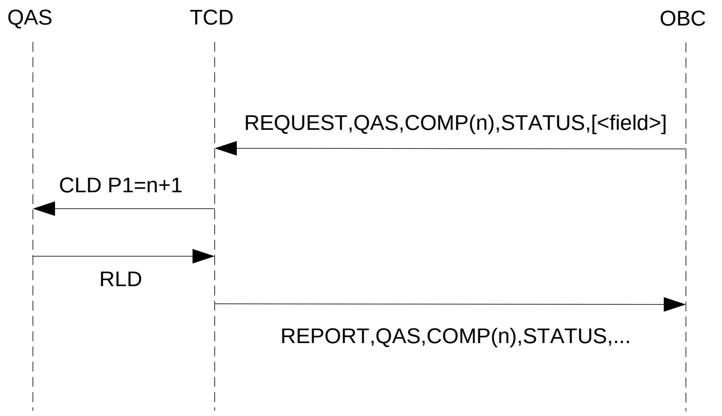


Fig. 20: Generation of QAS,COMP(n),STATUS,...

Remarks:

☞ See also section chapter 3.5.4.8.3 "QAS,COMP(n),LOAD(m)" / page 115.

If the TCD sends a CLD telegram with an invalid compartment number (e. .g “6”, but there are only 5 compartments configured), the QAS does not send an answer.

3.5.4.8.2 QAS,COMP(n),SENSOR

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
API	‘L’: “LOCKED” ‘U’: “UNLOCKED” ‘?’: “UNDEFINED” ‘X’: “NOSUPPORT” “LOCKED“= API coupling closed “UNLOCKED“= API coupling open	-	OP	RD	SDC GET AST / from SDS P2	C10	-
Bottom	‘L’: ‘LOW’ ‘H’: ‘HIGH’ ‘?’: “UNDEFINED” ‘X’: “NOSUPPORT” “LOW“= no pressure for bottom valve (bottom valve CLOSED) “HIGH“ = bottom valve supplied with pressure (bottom valve OPEN)	-	OP	RD	SDC GET BST / from SDS P2	C10	-
Dome	‘L’: “LOCKED” ‘U’: “UNLOCKED” ‘?’: “UNDEFINED” ‘X’: “NOSUPPORT” “LOCKED“= dome hatch locked “UNLOCKED“= dome hatch unlocked	-	OP	RD	SDC GET DST / from SDS P2	C10	-

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Line	‘L’: ‘LOW’ ‘H’: ‘HIGH’ ‘?’: “UNDEFINED” ‘X’: “NOSUPPORT” “LOW“= no pressure for line valve (valve CLOSED) “HIGH“ = line valve supplied with pressure (valve OPEN)	-	OP	RD	SDC GET LST / from SDS P2	C10	-
WetLeg	‘E’: “DRY” ‘L’: “WET” ‘R’: “REST” ‘?’: “UNDEFINED” ‘X’: “NOSUPPORT” “DRY“= Sensor is dry “WET“= Sensor is wet “UNDEFINED“= Status of sensor is undefined	-	OP	RD	SDC GET WST / from SDS P2	C10	-
Water	0: “PASSIVE” 1: “ACITVE” 2: “DISCONNECT” 3: “SHORTEN” 4: “INVALID” else: “” (empty) “PASSIVE“= passiv “ACTIVE“= aktiv (Wasser in Kammer) “DISCONNECT“ = disconnect “SHORT“= short-circuit “INVALID“= invalid / unknown	-	OP	RD	SDC GET WTR / from SDS P2	C10	-

Related Communication

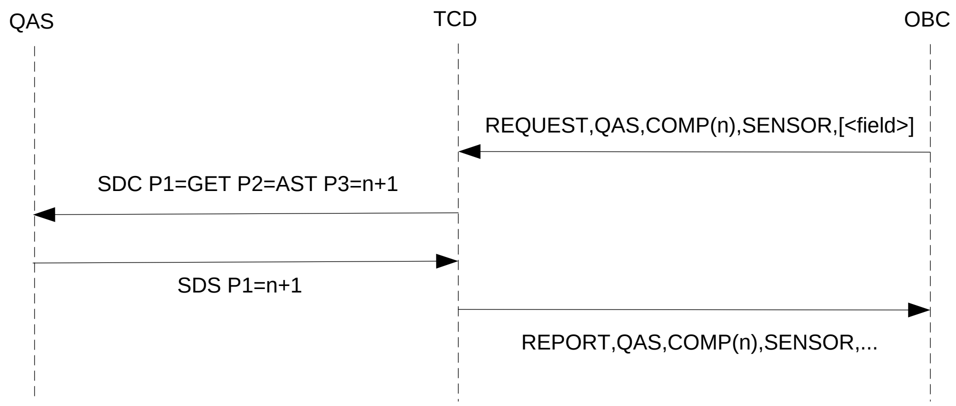


Fig. 21: Generation of QAS,COMP(n),SENSOR,...

Remark: If the TCD sends an SDC telegram with an invalid compartment number (e. .g “6”, but there are only 5 compartments configured), the QAS sends an SDS with P1 = “0” and P2 = “X”.

3.5.4.8.3 QAS,COMP(n),LOAD(m)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Mode	“CODED”: = coded “OVERRIDE”: = bypass	NV	MP	RD	RLD P5	C8	-
PCode	see ActPCode	NV	MP	RD	RLD P3	C3	-
Date	Date at start time	NV	MP	RD	RLD P7 (converted)	D$	-
StartTime	Start time of loading	NV	MP	RD	RLD P8 (converted)	T8$	-
StopTime	End time of loading	NV	MP	RD	RLD P9 (converted)	T8$	-
Check	Indicates contiguity and completeness of stored data; for details see flowchart below “LAST“ = last data record “NEXT“ = further data records available “LOST“ = records between this and the next stored record are lost	NV	OT	RD	Generated according to built-in rules	C4	-

Related Communication and Data Storage (RLD Telegram Processing)

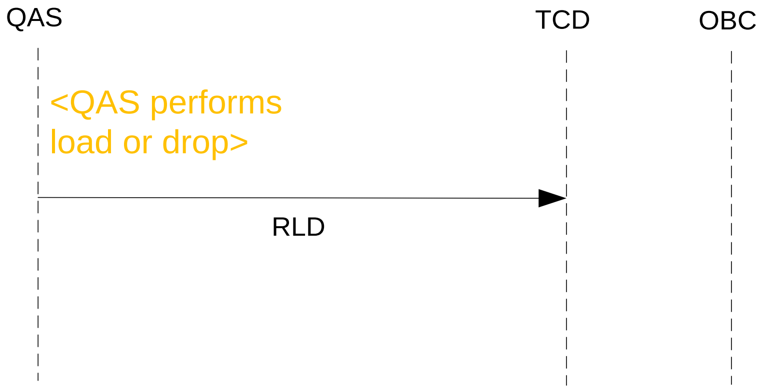


Fig. 22: Load or Drop on QAS

See also section chapter 3.5.4.8.1 "QAS,COMP(n),STATUS" / page 112.

A proposal how to process incoming RLD telegrams can be found in Appendix C.

- The purpose of the QAS,COMP(n),LOAD/DROP functionality is to keep record of loadings and discharges that are signaled by the QAS. The data sets of those events are stored into some kind of FIFO buffer with 10 places each for loads and drops. If all places are occupied, the oldest entry in the list is deleted on the next incoming data set (“new” RLD telegram).
- By means of the “Telegram Counter”, the TCD is able to detect if data are missing, i. e. the TCD has for some reason not received the data of some load or drop. In this case, the field “Check” is set to “LOST” to indicate this incident. Please note that “Check” of the last received data is alwas set to “LAST”; indication of “LOST” or “NEXT” happens in the “Check” field of the second to oldest entry.
- The diagram above represents a source code analysis taken from EMIS2’s RLD_Scan() procedure.

3.5.4.8.4 QAS,COMP(n),DROP(m)

☞ See previous section; works analogously to .

3.5.5 METER

3.5.5.1 METER,DEVICE(n)

- Variable generation works as with QAS,DEVICE by CDI/RDI exchange. The TCD can handle up to three different METER devices which are distinguished by an index value n in order of their CAN logon. The first recognized METER device is DEVICE(0), the second is DEVICE(1) and the third is DEVICE(2).

<u>Variable definitions and data types also work as in QAS,DEVICE.</u>

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Serial	See QAS,DEVICE					C10	C10
Name						C15	C15
HWVersion						C10	C10
SWVersion						C10	C10
Node						N2	N2

3.5.5.2 METER,STATUS(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
LastError	Special rules apply, see Related Communication and Table 1 on page 98.	VO	OP	RD	RST P2	C50	C50
Mode	Operation mode of the METER device. For more detailed information please refer to [1], section “Operating States”.	VO	OP	RD	RST P1	C10	C10
DeliveryStatus	Not available to OBC; see also section METER,ORDERS,[MAN]RESULT(m), page 124.	NV	OT	-	This variable is used only internally, but it affects the behavior of METER,ORDERS,[MAN]RESULT(m). Therefore it is listed here although it is not part of the TCD’s interface.	-	-

Related Communication

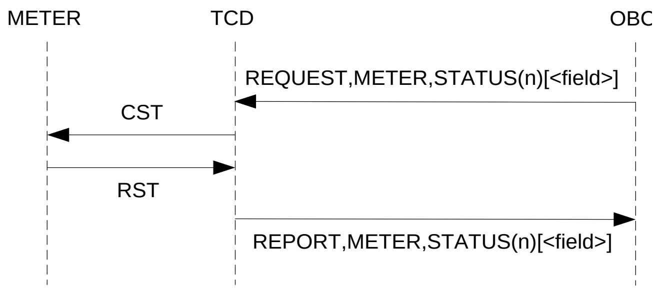


Fig. 23: Generation of METER,STATUS(n),...

Furthermore:

On an incoming SCU telegram from a METER device, check SCU P1

If ‘1’

METER,STATUS(n),Mode= “BUSY”

Else

METER,STATUS(n),Mode= “READY”

On incoming RST telegram from a METER device,

Set METER,STATUS(n),Mode = P1

and METER,STATUS(n),LastError = P2

3.5.5.3 METER,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
MeterCount	Number of METER devices on the MTS (“0”…”3”)	VO	PP	RD	This value is incremented on the first (and only on the first) incoming RDI telegram from any METER device (see also section METER,DEVICE(n)).	N1	N1
AutoScan	Deprecated	FI / NV	ST	RD, WR	Deprecated. FI and RD for EMIS2, 3.21 or newer NV , WR and RD therefore only for EMIS3. In EMIS2 Software version 3.21 or newer, this value is always “1”. Field has no function any more then.	B	-
EventStyle	Valid values: “All”, “Delivery”, “IO”, “SI” “All”: transfer all events “Delivery”: only delivery data plus GPS positions “IO”: Only events from the IO interface plus GPS positions “SI”: Only events from the sensor interface plus GPS positions	NV	ST	RD, WR	Used for CDE or CLE telegram composition on REQUEST,METER, EVENT(n),…	C10	C10

3.5.5.4 METER,SISETUP

The MTS supports up to 1 sensor interface that is managed by the “master” MultiFlow. The “master” MultiFlow is always configured as being CAN node 1.

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Compartments	Number of compartments configured for the METERSI device	-	OP	RD	CSC / RSC P3	N2	N2
DST1	Index m of the dome hatch of the first compartment	-	OP	RD	CSC / RSC P8	N2	N2
AST1	Index m of the API coupling of the first compartment	-	OP	RD	CSC / RSC P11	N2	N2
BVL1	Index m of the bottom valve of the first compartment	-	OP	RD	CSC / RSC P14	N2	N2
LST1	Index m of the line valve of the first compartment	-	OP	RD	CSC / RSC P17	N2	N2

Field Name	**Description**	**Storage**	**Value Generation**	**Access Mode**	**Additional Information**	**Data Type**	
						EMIS2	**EMIS4**
CABL	Index m of the left-hand cabinet door	-	OP	RD	CSC / RSC P20	N2	N2
CABR	Index m of the right-hand cabinet door	-	OP	RD	CSC / RSC P23	N2	N2
SPB	Idex m of the parking brake	-	OP	RD	CSC / RSC P26	N2	N2

Related Communication

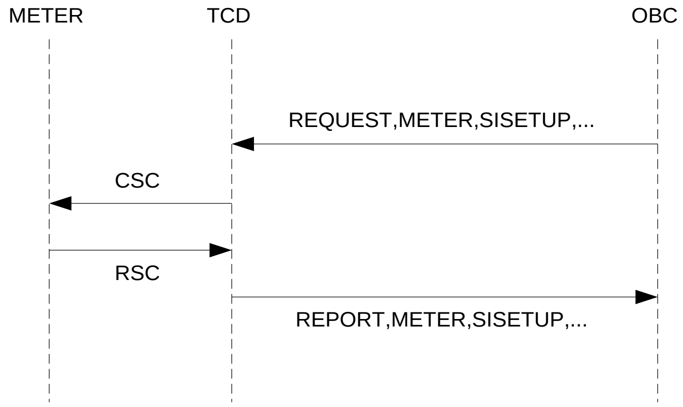


Fig. 24: Generation of METER,SISETUP Variables

Remark:

If the OBC requests more than one variable of the METER,SISETUP node, only one CSC telegram will be generated.

3.5.5.5 METER,EVENT(n) [,Date=DD.MM.YYYY;Time=hh:mm:ss [;EndDate=DD.MM.YYYY;EndTime=hh:mm:ss]]*

Field Description

Field Name	**Description**	**Storage**	**Value Generation**	**Access Mode**	**Additional Information**	**Data Type**	
						EMIS2	**EMIS4**
FTLRecord	Event data in FTL format, according to #LH_File and L_File records defined in [6] and **7.6.12 FTL,LOG**.	-	OT	OT	LEF P2	C350	C350

*** Remark:**

The FTL protocol does not allow setting two values at once, therefore this ENQ would not work. For determining the start time of the event transmission, the variable FTL,LOG,TimeStamp is used when communicating over FTL protocol. Giving an end time will not be supported then.

Related Communication

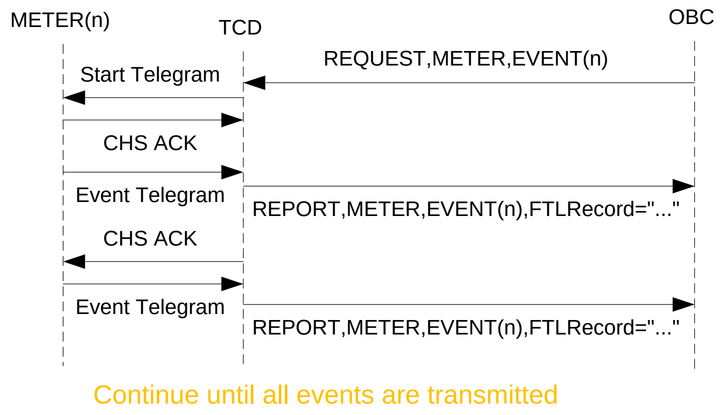


Fig. 25: Simple METER,EVENT Transmission Example

The “master” METER is always the METER device that is configured as CAN node 1. For event transmission details see also algorithm in appendix A. For CDE/CLE P1 (designator) see table below:

Selecting Event Data Subset to Transmit

METER,SETUP,EventStyle	CDE/CLE Designator P1	StartDate optional	EndDate optional
All	“LOG”	Yes	Yes
Delivery	“PRC”	No	Yes
IO	“EIO”	Yes	Yes
SI	“EVE”	Yes	Yes

Remarks:

- The transmission of Delivery data is handled differently from other event data, i. e. consecutive event transmission is not available. This means that if METER,SETUP,EventStyle=”Delivery”, REQUEST,METER,EVENT(n) will be answered with a <NAK>.
- The algorithm for event transmission is implemented in accordance with “TCD Functional Description”, Appendix A.
- Please note that “snapshot” event data are considered a single event by MultiFlow but will be distributed over several LEF telegrams during transmission. As these LEF telegrams all contain the same event number, the mechanism for consecutive event data transfer (REQUEST,METER,EVENT(n) without providing a start date and time) may not work properly with snapshot data.

3.5.5.6 METER,DATA(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
CurVT	uncompensated volume of delivery in progress (unit: liters)	-	OP	RD	CMV “12” / RMV “12”, P2	F$8	-
CurVC	compensated volume of delivery in progress (unit: liters)	-	OP	RD	CMV “11” / RMV “11”, P2	F$8	-
CurMass	mass of delivery in progress (unit: kg)	-	OP	RD	CMV “13” / RMV “13”, P2	F$8	-
TotVT	total uncompensated volume delivered (unit: liters)	-	OP	RD	CMV “41” / RMV “41”, P2	F$15	-
TotVC	total compensated volume delivered so far(unit: liters)	-	OP	RD	CMV “40” / RMV “40”, P2	F$15	-
TotMass	total mass delivered so far (unit: kg)	-	OP	RD	CMV “42” / RMV “42”, P2	F$15	-
TotAdditive	total additive volume delivered so far (unit: liters)	-	OP	RD	CMV “43” / RMV “43”, P2	F$15	-

Related Communication

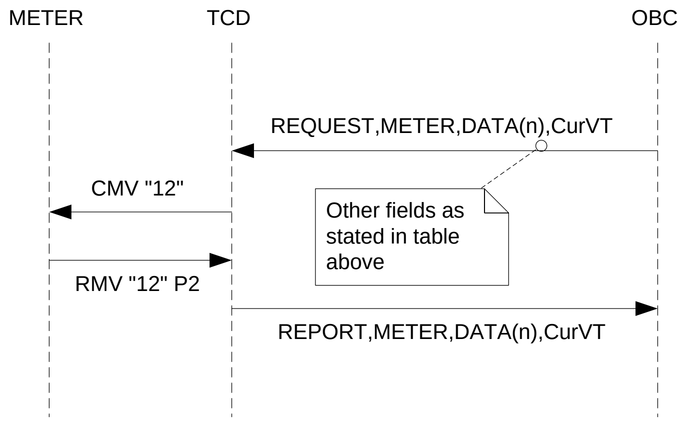


Fig. 26: Generation of METER,DATA(n),CurVT

3.5.5.7 METER,ORDERS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
ReInit	SET: Triggers resetting of METER,ORDERS,OrderCount METER,ORDERS,Customer, METER,ORDERS,NewResults, METER,ORDERS,RESULT(m),… METER,ORDERS,MANRESULT(m), … METER,ORDERS,PRESET(m),… METER,ORDERS,PRICE(m),…	-	-	TR	Triggers also sending a CER telegram to all connected METER devices. The EMIS4 does not send a CER telegram to the METER device.	C15	-
OrderCount	Number of the transmitted presets. SET: Triggers transmission of order presets to the METER devices and a REPORT telegram; see DOK-411. REQUEST: indicates correct transmission of order presets (see DOK-411 as well as section 3.5.5.7.3, page 124 and following in this document for details).	VO	OT	RD, TR		N2	-
Customer	Customer number / Matchcode	VO	OT	RD, WR	Will be transmitted in CPI P2 to the METER devices (See section 3.5.5.7.3, page 124 and following).	N8	-
NewResults	Number of the RESULTS not yet read.	VO	OT	RD	Calculated from incoming result telegrams (CEF/CRF; See section 3.5.5.7.3, page 124 and following).	N2	N2

Related Communication

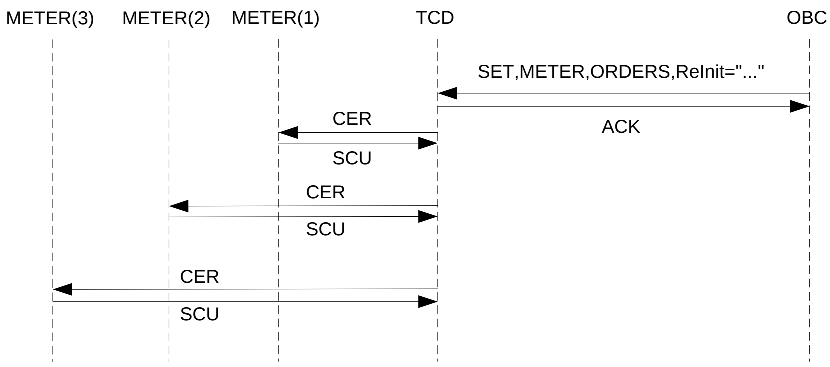


Fig. 27: METER,ORDERS,ReInit

For handling of incoming SCU, please have a look at note in section .

3.5.5.7.1 METER,ORDERS,PRICE(p)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
PCode	Product code (PTB) for checking	VO	ST	RD, WR	RPF P1	N3	-
PriceFactor	Pricefactor for PRICESCALE(o),Price (details see there)	VO	ST	RD, WR	RPF P2	N5	-
Vat	Value –added tax 19.12 → 19.12%	VO	ST	RD, WR	RPF P3	N2.2	-
Cur	Currency of the price	VO	ST	RD, WR	RPF P14	-	-

Related Communication

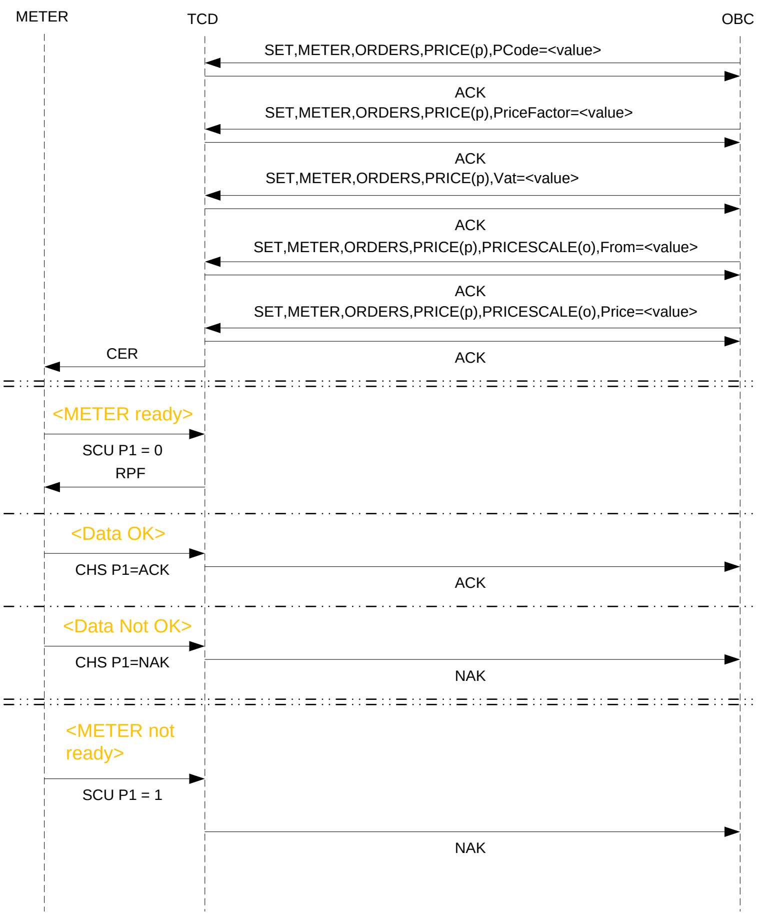


Fig. 28: Transmission of Price Scale Information

3.5.5.7.1.1 METER,ORDERS,PRICE(p),PRICESCALE(o)

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
From	Minimum volume for price	VO	ST	RD, WR	RPF P(4+2p) → 4, 6, 8, 10, 12	N8	-
Price	Price per (PriceFactor * PUnit)	VO	ST	RD, WR	RPF P(4+2p+1) → 5, 7, 9, 11, 13	F$10	-

Field Description

Related Communication

☞ See section chapter 3.5.5.7.1 "METER,ORDERS,PRICE(p)" / page 123.

3.5.5.7.2 METER,ORDERS,PRESET(m)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
PCode	Product code DIN 26051-1	VO	ST	RD, WR	CPI P(m+1).4	N3	-
Volume	Preset quantity	VO	ST	RD, WR	CPI P(m+1).2	N8	-
PUnit	Dimensional unit of the measuring system. Informational (Field content has no effect)	VO	ST	RD, WR	-	C3	-

Related Communication

☞ See section 3.5.5.7.3, page 124 and following.

3.5.5.7.3 METER,ORDERS,[MAN]RESULT(m)

General

There are two different ways how results can be generated:

- The OBC feeds the TCD with desired delivery data and triggers their transmission to the METER devices.
- The operator manually performs a delivery on the METER device.
- In both cases the results are transmitted from the METER device to the TCD within a CRF / CEF telegram pair. On each incoming CRF telegram, the TCD checks if the value of P11 equals 9999. If this condition yields

TRUE, the data are stored into the MANRESULT node's fields. Else they are stored into the RESULT node's fields.

- Incoming CEF telegrams are handled analogously, but here the TCD checks for P1 = 9999
- If CRF resp. CEF telegram is identified as a RESULT(m) (and not a MANRESULT(m)) telegram, index m is set equal to CRF P11 resp. CEF P1. E. g. if CRF P11 = 5 the data are stored into RESULT(5). MANRESULTs are stored with index m=0, 1,…,9 in order of their reception.
- In all other respects the nodes METER,ORDERS,RESULT and METER,ORDERS,MANRESULT are treated identically.

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
MeterIndex	Index n of the meter the delivery was processed on.	NV	OT	RD	Value generated from source of CRF telegram	N2	N2
CompNo	Delivery compartment (1 to 24	NV	MP	RD	CRF P22	-	N2
PCode	Product code (PTB), for checking (see PRESET)	NV	MP	RD	CRF P1	N3	N3
Volume	Measuring system display	NV	MP	RD	CRF P2	N8	N8
PUnit	Dimensional unit of the measuring system, e.g. „L“, „kg“	NV	MP	RD	CRF P16	C3	C3
ModeID	Discharge type of the measring system e.g. „VT“, „V15“ (or „MASS“)	NV	MP	RD	CRF P3	C4	C4
VT	Uncompensated volume(in „L“)	NV	MP	RD	CRF P5	F$8	N5.3
VC	Compensated volume (in „L“)	NV	MP	RD	CRF P7	F$8	N5.3
Mass	Weight / mass (in „kg“)	NV	MP	RD	CRF P8	F$8	N5.3
AvTemp	Mean discharge temperature e.g. „+25,2“	NV	MP	RD	CRF P4	F$10	N3.3
TUnit	Discharge date in keeping with measuring system e.g. “01.12.2004“	FI	CI	RD	always “C”	C2	C2
AvFlowRate	Mean flow rate in L/Min	NV	MP	RD	CEF P7	N5	N5
HoseSel	Hose selection	NV	MP	RD	CEF P6	N3	N3
TransMode	Transfer mode	NV	MP	RD	CEF P8	N2	N2
PresetVolume	Changed preset volume for delivery if applicable	NV	PM	RD	CRF P21	-	N8
Approved	0: non-approved delivery 1: approved delivery	NV	PM	RD	CRF P17	-	B
Date	Discharge date in keeping with measuring system e.g. “01.12.2004“	NV	MP	RD	CRF P13	D$	D
StartTime	Discharge start time in keeping with measuring system e.g. “16:17“	NV	MP	RD	CRF P15	T5$	T
EndTime	Discharge end time in keeping with measuring systems e.g. “16:32“	NV	MP	RD	CRF P14	T5$	T
MeterID	Measuring point identification	NV	MP	RD	CRF P12	C15	C15

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
ReceiptType	“L”: delivery note “R”: receipt “”: no separation of delivery note and receipt	NV	MP	RD	derived from CRF P10	-	C1
ReceiptID	Receipt number, generated by counter	NV	MP	RD	CRF P10	N10	N10
Customer	Customer number / matchcode	NV	MP	RD	CEF P18	N8	N8
OrderInfo	Additional order information if applicable	NV	MP	RD	CEF P23	-	C9
Check	„“: No RESULT available “OK” Result stored properly “RD” Result has been reported to the OBC	NV	CI	RD	Value generated as stated in DOK-411	C9	C9

Related Communication

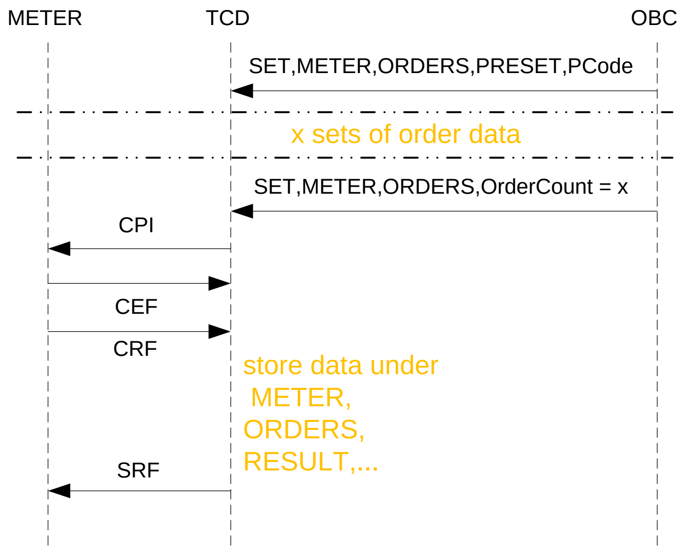


Fig. 29: Transmission of Delivery Results (Planned)

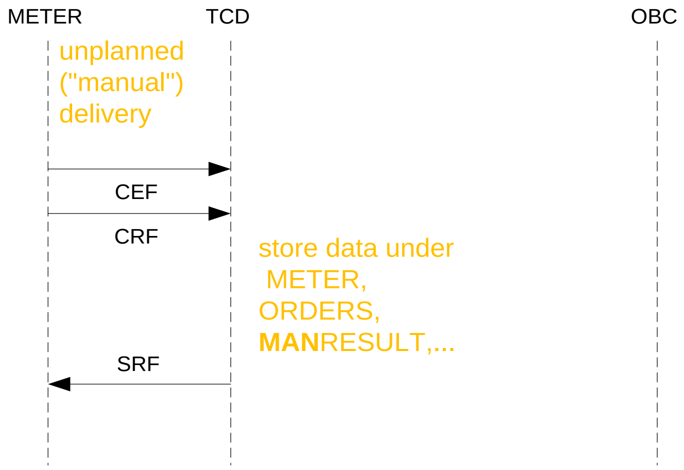


Fig. 30: Transmission of Delivery Results (Unplanned)

Furthermore:

On an incoming SPN telegram from a METER device, check for METER,STATUS(n),DeliveryStatus.

if not equal P1:

set METER,STATUS(n),DeliveryStatus = P1

if P1 = 'D'

clear METER,ORDERS,MANRESULT(m)

3.5.5.7.3.1 METER,ORDERS,[MAN]RESULT(m),PRICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
PriceFactor	e.g. 100 (PUnit=“L“) then price per 100 litres	NV	MP	RD	CEF P4	N5	-
Price	Price per (PUnit x PriceFactor) max. >> vvvvvv,nnn	NV	MP	RD	CEF P3	F$10	-
ExVat	0= Preis incl. Vat / 1= excl.Vat	NV	MP	RD	CEF P2	B	-
Vat	Value –added tax 19.12 >> 19.2%	NV	MP	RD	CEF P5	F$5	-
Cur	Currency according to ISO 4217 e. g. “EUR”, “DKK”	NV	MP	RD	CRF P24	C3	-

Related Communication

☞ See section chapter 3.5.5.7.3 "METER,ORDERS,[MAN]RESULT(m)" / page 124.

3.5.5.7.3.2 METER,ORDERS, [MAN]RESULT(m),ADDITIVE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
PCode	PTB product code for additive	NV	MP	RD	CEF P9	N3	-
Volume	Additive volume max. >> VVVVV,nn	NV	MP	RD	CEF P15	F$8	-
PUnit	Dimensional unit for the volume e.g. „ml", „kg"	NV	MP	RD	CEF P17	C3	-
MixRatio	Mixing ratio 1500 >> 1:1500	NV	MP	RD	CEF P10	N4	-
PumpPos	Position of the additive pump	NV	MP	RD	CEF P11	N1	-
RestVolume	Remaining volume max. >> VVVVV,nn in PUnit	NV	MP	RD	CEF P16	F$8	-
PriceFactor	e.g. 1000 (PUnit="mL") then price per 1000 mLitre	NV	MP	RD	CEF P13	N5	-
Price	Price per (PUnit x PriceFactor) max. >> vvvvvv,nnn	NV	MP	RD	CEF P12	F$1 0	-
ExVat	0= Preis incl. Vat / 1= excl.Vat	NV	MP	RD	CEF P2	B	-
Vat	Value –added tax 19.12 >> 19.2%	NV	MP	RD	CEF P14	N2.2	-

Related Communication

☞ See section chapter 3.5.5.7.3.1 "METER,ORDERS,[MAN]RESULT(m),PRICE" / page 127.

3.5.5.7.3.3 METER,ORDERS, [MAN]RESULT(m),GPS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Status	"A" valid, "V" invalid, "L" last valid	NV	MP	RD	CEF P19	-	C1
Lat	Latitude $GPRMC<3>	NV	MP	RD	CEF P20	-	N4.4
Lon	Longitude $GPRMC<5>	NV	MP	RD	CEF P21	-	N5.4

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3.5.6 METERSI

3.5.6.1 METERSI,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Serial	Serial number of the METERSI device	VO	PP	RD	RDI P3	C10	C10
Name	Name of the METERSI device	VO	PP	RD	RDI P6	C15	C15
HWVersion	Hardware version of the METERSI device	VO	PP	RD	RDI P2	C10	C10
SWVersion	Software version of the METERSI device	VO	PP	RD	RDI P1	C10	C10
Node	CAN bus node number of the METERSI device	VO	PP	RD, WR	Source node of RDI telegram is stored here	N2	N2

Related Communication

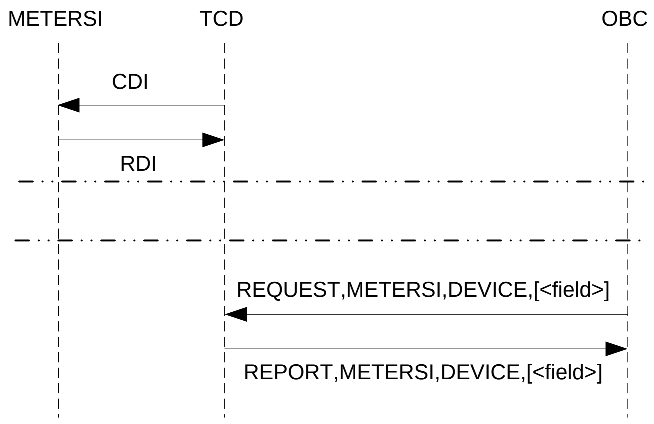

Fig. 31: Generation of METERSI,DEVICE,...

3.5.6.2 METERSI,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
StandAlone	The SI-Device is supported direct from EMIS	NV	PA	RD, WR	“0”: OFF “1”: ON, default “0”	-	B
SwWatchdog	Time, after that the SensorInterface falls in Offline-Mode	NV	PA	RD, WR	‘0’ OFF, 1 to 65535 * 10 msec. e.g.CSN`06`21`SWD`500`, default “500”	-	N5
TrInterval	TriggerInterval to keep the SensorInterface in OnlineMode	NV	PA	RD, WR	1 to 60 sec., default “4” e.g.Send every 4 sec. : CSN`06`21`TRI`	-	N2
ScInterval	Base Interval between scanning sensors	NV	PA	RD, WR	1 to 65535 sec., default “10” e.g. SDC`06`21`SET`SCA`10`	-	N5
FrameDelay	Delay until sending events	NV	PA	RD, WR	1 to 255 msec., default “50” e.g. CSN`06`21`FRA`50`	-	N3
AutoTrans	If ‘ON’ the SensorInterface sends changes of the inputs to EMIS	NV	PA	RD, WR	“0”: OFF, “1”: ON, default “1” e.g. CSN`06`21`MOD`1`	-	B
FtlMode	Mode of generating a FTL-File	NV	PA	RD, WR	‘Interval’ or ‘Counter’, default “Interval”	-	C8
UploadInt	Time, how often a FTL-File should be generated and uploaded	NV	PA	RD, WR	1 to 86400 sec., default “600”	-	N5
EventLimit	Max. Events, until a FTL-File should be generated and uploaded.	NV	PA	RD, WR	1 to 9999, default “20”	-	N4
Compartm	Number of compartments	NV	PA	RD, WR	1 to 24, default “4”	-	N2
DSType	Type of connected sensor	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
DSIndex1	Index m of the dome hatch of the first compartment	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``m111111111111000000`, default “1”	-	N2
APISType	Type of connected sensor	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
APISIndex1	Index m of the API coupling of the first compartment	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``1111m111111110000000`, default “5”	-	N2
APIDelay	Delay time	NV	PA	RD, WR	0 to 60, default “1”	-	N2
BVSType	Type of connected sensor	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1

Field Name	**Description**	**Storage**	**Value Generation**	**Access Mode**	**Additional Information**	**Data Type**	
						EMIS2	**EMIS4**
BVSIndex1	Index m of the bottom valve of the first compartment	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``11111111m1 110000000`, default "9"	-	N2
LVSType	Type of connected sensor	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
LVSIndex1	Index m of the line valve of the first compartment	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``1111111111 11m0000000`, default "13"	-	N2
CabLSType	Sensortype at left cabinet door	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
CabLSIndex	Index m of the left-hand cabinet door sensor	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``1111111111 110000m000`, default "17"	-	N2
CabRSType	Sensortype at right cabinet door	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
CabRSIndex	Index m of the right-hand cabinet door sensor	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``1111111111 110000m00`, default "18"	-	N2
PBSType	Sensortype at Parking Brake	NV	PA	RD, WR	1 : Digital open, 2: Digital close 3: NAMUR open, 4: NAMUR close	-	N1
PBSIndex	Index m of the Parking Brake Sensor	NV	PA	RD, WR	e.g. SDC`06`21`SET`TYP``1111111111 11000000m0`, default "19"	-	N2

3.5.6.3 METERSI,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
ResetState	Reset State of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P1	B	B
RomError	ROM error of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P2	B	B
RamError	RAM error of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P3	B	B
HwWatchdog	HW watchdog of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P4	B	B
SwWatchdog	SW watchdog of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P5	B	B
CanError	CAN error of sensor interface "0": OFF "1": ON	-	OP	RD	NDS P6	B	B

Related Communication

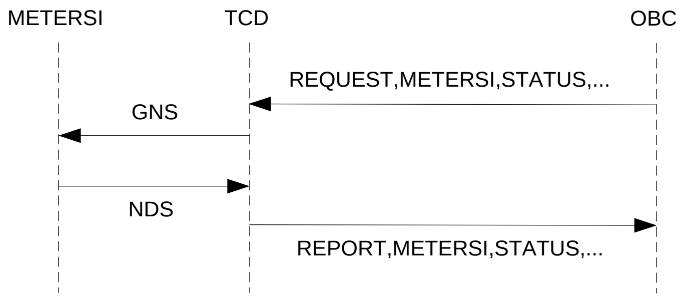

Fig. 32: Generation of METERSI,STATUS

If the OBC requests more than one variable of the METERSI node, only one GNS telegram will be generated.

3.5.6.4 METERSI,AUX

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
InAll	20-digit number representing the states of each individual input of the sensor interface; e. g. “10101011320001110100” “0”: open circuit “1”: closed circuit “2”: broken circuit “3”: short circuit “4”: unknown	-	OP	RD	SDS P3	N20	N20
In(m)	see example below	-	OP	RD	Generated from SDS P3	N1	N1

Index m = 0 to 19. SDS P3 is a string consisting of 20 digits, each being a number from 0 to 4. In(m) represents the digit at position m of InAll.

Example:

InAll = “40000030000020000001” ➔
In(0) = 4, In(1) = 0, In(6) = 3, In(12) = 2 and In(19) = 1.

Related Communication

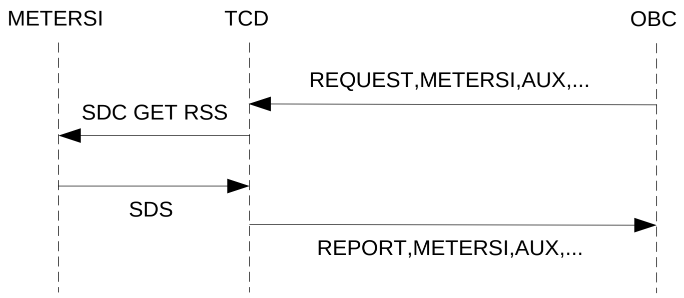

Fig. 33: Generation of METERSI,AUX

If the OBC requests more than one variable of the METERSI node, only one SDC telegram will be generated.

3.5.7 LEVEL

3.5.7.1 LEVEL,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Serial	Serial number of the LEVEL device	VO	PP	RD	RDI P 3	C10	C10
Name	Name of the LEVEL device	VO	PP	RD	RDI P 6	C15	C15
HWVersion	Hardware version of the LEVEL device	VO	PP	RD	RDI P 2	C10	C10
SWVersion	Software version of the LEVEL device	VO	PP	RD	RDI P 1	C10	C10
Node	CAN bus node number of the LEVEL device	VO	PP	RD	Source node of RDI telegram stored here	N2	N2

Related Communication:

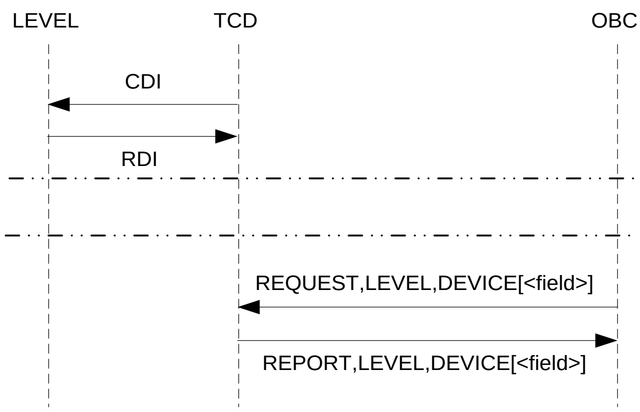

Fig. 34: Generation of LEVEL,DEVICE,...

If the TCD receives an RDI telegram from the LEVEL device and LEVEL,SETUP,Compartments = 0, it responds with a CRC telegram to the LEVEL device.

3.5.7.2 LEVEL,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Lasterror	Last error of the LEVEL device. See also Table 1 on page 98	VO	OP	RD	RST P2	C70	C70
Mode	READY": LEVEL device is in idle mode "BUSY": LEVEL device is in menu mode (loading, discharge) "ERROR": LEVEL device shows an error message on its display	VO	OP	RD	RST P1	C10	C10
LastEvent	No. of last Eventlogentry from device	-	OT	WS	Parameter is needed for first start with OBC	N6	-

Related Communication

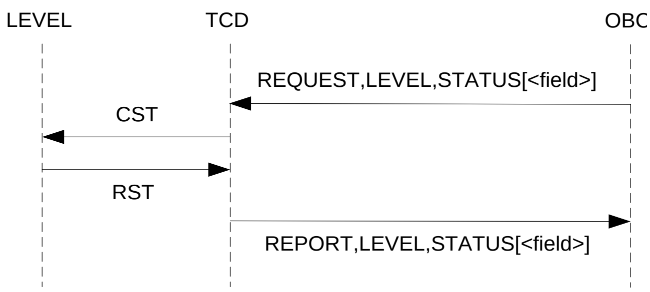

Fig. 35: Generation of LEVEL,STATUS

Furthermore:

On an incoming SCU telegram from a LEVEL device, check P1

If '1'

LEVEL,STATUS,Mode="BUSY"

Else

LEVEL,STATUS,Mode="READY"

On an incoming RST telegram from a LEVEL device,

Set LEVEL,STATUS,Mode = P1

and LEVEL,STATUS,Lasterror = P2

3.5.7.3 LEVEL,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Compartments	Number of compartments	-	OP	RD	Number of parameter groups $G_1,\ldots,G_n$ (n = 1 … 24) in CCC telegram	N2	N2

Related Communication

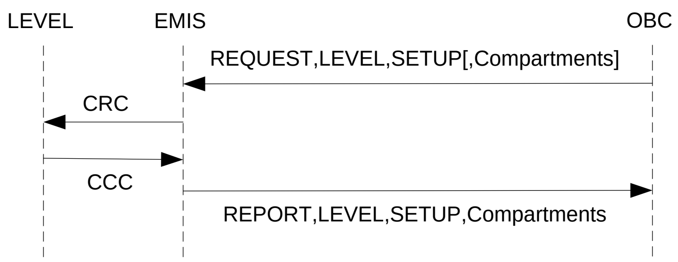

Fig. 36: Generation of LEVEL,SETUP,...

☞ See also section chapter 3.5.7.6.1 "LEVEL,COMP(m),STATUS" / page 141.

3.5.7.4 LEVEL,EVENT[,Date=DD.MM.YYYY[;Time=hh:mm:ss]]*

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
FTLRecord	Event data in FTL format (see FTL standard CEN/TC 296/WG 8 N 505 and MultiLevel specification for further information)	-	OT	OT	LEF P2	C350	C350 **

*** Remark:**

The FTL protocol does not allow setting two values at once, therefore this ENQ would not work. For determining the start time of the event transmission, the variable FTL,LOG,TimeStamp is used when communicating over FTL protocol.

****Remark:**

This limitation originates from its definition in [2]. In principle, there is no maximum length defined for FTL datagrams.

Related Communication

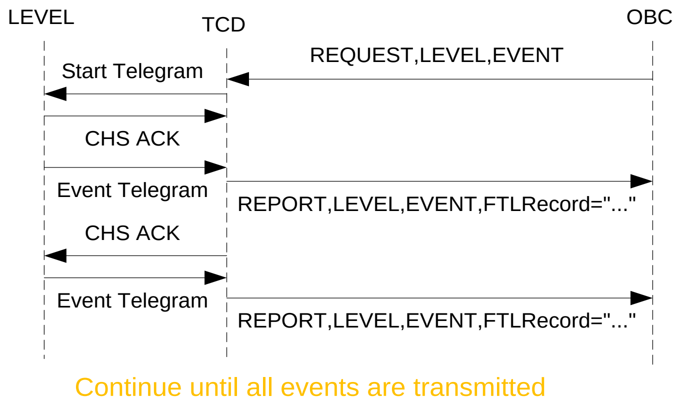

Fig. 37: Simple LEVEL Event Transmission Example

☞ For details see also algorithm in appendix A. CDE/CLE P1 is always "EVE" (designator).

3.5.7.5 LEVEL,ORDERS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
ReInit	Clear trigger for node LEVEL,ORDERS and its subnodes	-	-	TR	Analogous to METER,ORDERS	C15	-
OrderCount	Number of presets to transmit. Acts as a trigger to transmit stored presets when set to a nonzero value. Automatically answered with the appropriate REPORT if the LEVEL device accepts the orders. Else OrderCount=0 is returned.	VO	OT	RD, TR		N2	-
Customer	Customer number / Matchcode	VO	OT	RD, WR		N8	-
NewResults	Number of the RESULTS received from LEVEL device but not yet read by the OBC. This includes node RESULT(m) as well as MANRESULT(m).	VO	OT	RD		N2	N2
MainMode	-	NV	OT	-	Not available to OBC; see also section 3.5.7.5.2 LEVEL,ORDERS,[MAN]RESULT(m), page 139	-	-

Related Communication

☞ Analogous to chapter 3.5.5.7 "METER,ORDERS" / page 122.

3.5.7.5.1 LEVEL,ORDERS,PRESET(I)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
PCode	Product code (PTB)	VO	ST	RD, WR	CPI P(I+1).4	N3	-
Volume	Preset quantity in liters	VO	ST	RD, WR	CPI P(I+1).2	F$8	-
PUnit	Dimensional unit of the measuring system e.g. „L“, „kg“ (informational; this setting has no effect on the LEVEL device)	VO	ST	RD, WR	None (Field content has no effect)	C3	-
CompNo	Compartment number for the delivery (0…23)	VO	ST	RD, WR	CPI P(I+1).6	N2	-

Related Communication

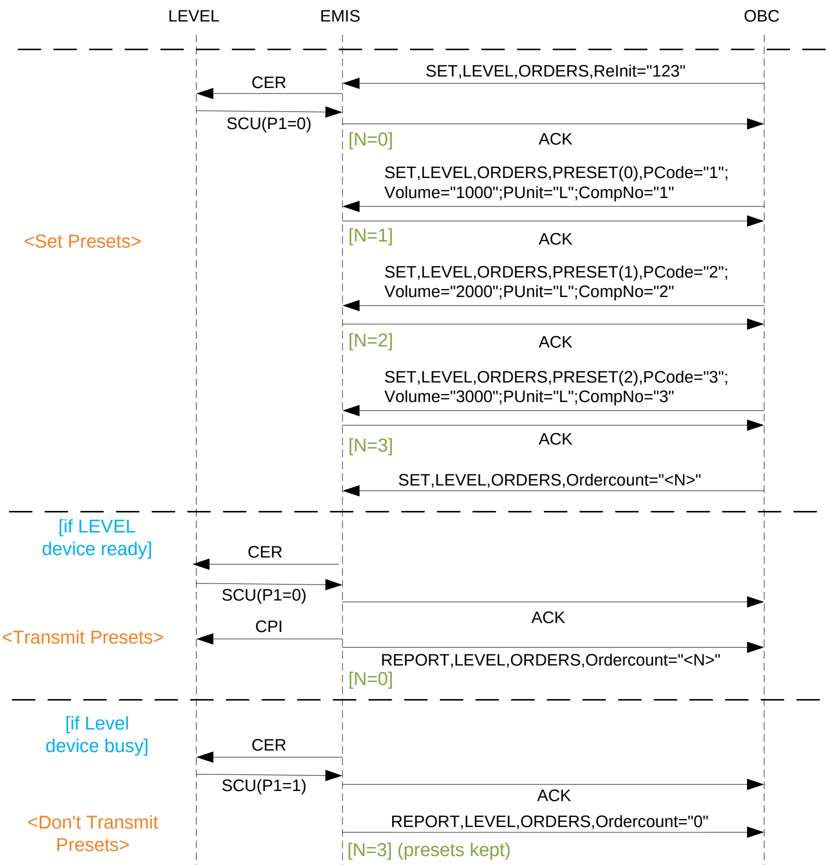

Fig. 38: Transmission of Delivery Presets

Remarks:

- After CPI, N is set to 0.
- OC > N:
  NAK→OBC; ignore

- OC < N:
  Presets (0 … OC-1) are transmitted in CPI parameters;
  N = 0 (presets with index >= OC are discarded.)
- N < 0: undefined
- Preset “skipped” when setting them
  (e. g. PRESET(0), then PRESET(2):
  NAK→OBC; ignore content
- Preset changed that already has been set:
  Values are changed.
- Preset not completely set and next one started:
  NAK→OBC; ignore content

3.5.7.5.2 LEVEL,ORDERS,[MAN]RESULT(m)

General

There are two different ways how results can be generated:

- The OBC feeds the TCD with desired delivery data and triggers their transmission to the LEVEL devices.
- The operator manually performs a delivery on the LEVEL device.
- In both cases the results are transmitted from the LEVEL device to the TCD within a CRF telegram. If GPS information is available, the LEVEL device additionally sends a CEF telegram to the TCD. On each incoming CRF telegram, the TCD checks if the value of P11 is equal to 9999. If this condition yields TRUE, the data are stored into the MANRESULT node’s fields. Else they are stored into the RESULT node’s fields.
- Incoming CEF telegrams are handled analogously, but here the TCD checks for P1 = 9999.
- In all other respects the nodes LEVEL,ORDERS,RESULT(m) and LEVEL,ORDERS,MANRESULT(m) are treated identically. In all cases, results and manresults are stored in the subnodes with the corresponding compartment index m.

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
CompNo	Compartment number the product was delivered from	NV	MP	RD	CRF P22 (1 = first comp.)	N2	N2
PCode	Product code (PTB)	NV	MP	RD	CRF P1	N3	N3
Volume	As displayed on the LEVEL device's control panel	NV	MP	RD	CRF P2	N8	N8
PUnit	Dimensional unit of the measuring system when delivering the product. Always „L" for "liters".	NV	MP	RD	CRF P16	C3	C3
ModeID	Delivery mode, e. G. "VT", "12", "15"	NV	MP	RD	CRF P3	C4	C4
VT	Uncompensated volume in liters	NV	MP	RD	CRF P5	F$8	N5.3
VC	Compensated volume in liters	NV	MP	RD	CRF P7	F$8	N5.3
Mass	Mass in kg	NV	MP	RD	CRF P8	F$8	N5.3
Density	Density in kg/m³	NV	MP	RD	CRF P9	F$8	N5.3
AvTemp	Mean discharge temperature e.g. „+25,2". Unit is always °C	NV	MP	RD	CRF P4	F$10	N5.3
TUnit	Temperature unit, always „°C"	FI	CI	RD	always "C"	C2	C2
Approved	0: not approved, 1: approved	NV	MP	RD	CRF P17	B	B
Date	Discharge date in keeping with LEVEL device (dd.mm.yy e.g. "01.12.10")	NV	MP	RD	CRF P13	D$	D
StartTime	Discharge start time in keeping with LEVEL device (hh:mm e.g. "16:17")	NV	MP	RD	CRF P15	T$5	T
EndTime	Discharge end time in keeping with measuring systems (hh:mm e.g. "16:32")	NV	MP	RD	CRF P14	T$5	T
MeterID	Identification of the LEVEL device	NV	MP	RD	CRF P12	C15	C15
ReceiptType	This field is always empty and without function.	NV	MP	RD	always ""	C1	C1
ReceiptID	Identification number of the receipt for this delivery (e. g. "1234")	NV	MP	RD	CRF P10	N10	N10
TotVT	Total uncompensated volume delivered by the LEVEL device including this delivery. Max. 4.000.000.000 liters.	NV	MP	RD	CRF P18	N10	N10
Customer	Customer number / Matchcode For RESULT(m): Contains the value of LEVEL,ORDERS,Customer when transmitting presets is initiated. For MANRESULT(m): Contains the customer number if provided by the LEVEL device.	NV	MP	RD	CEF P18	N8	N8
Check	""(empty): no RESULT(m) available, "OK": RESULT(m) contains valid and complete information "RD": RESULT(m) has been read by the OBC already	NV	MP	RD	Value generated as stated in DOK-411	C2	C2

Related Communication

Analogous to chapter 3.5.5.7.3 "METER,ORDERS,[MAN]RESULT(m)" / page 124.

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<u>On an incoming SPN telegram from a LEVEL device, the following applies:</u>

If P1 = D:

check for LEVEL,ORDERS,MainMode

NOT D:

clear LEVEL,ORDERS,MANRESULT(m) where m=0...23

if P1 = L:

check for LEVEL,ORDERS,MainMode

NOT L:

clear LEVEL,ORDERS,MANRESULT(m) where m=0...23

always set LEVEL,ORDERS,MainMode = P1

3.5.7.5.2.1 LEVEL,ORDERS, [MAN]RESULT(m),GPS

☞ Analogous to METER,ORDERS,[MAN]RESULT,GPS

3.5.7.6 LEVEL,COMP(m)

3.5.7.6.1 LEVEL,COMP(m),STATUS

<u>Field Description</u>

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
State	State of the compartment; either “EMPTY” or “LOADED”	VO	OP MP	RD	CCC Pn.2 (n = 1 to 24) 0: “EMPTY” 1: “LOADED”	C10	C10
ActPCode	Product code (PTB) according to DIN 26051-1 (P53)	VO	OP MP	RD	CCC Pn.1 (n = 1 to 24)	N3	N3

On each incoming CCC telegram from a LEVEL device, the number of parameter groups is counted and stored to LEVEL,SETUP,Compartments. n = 1… number of parameter group;

☞ see also section chapter 3.5.7.3 "LEVEL,SETUP" / page 136.

3.5.7.6.2 LEVEL,COMP(m),SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
MaxHigh	Length in mm of the dip rod in compartment m. Four fractional digits.	VO	OP	RD	CSS “MXH” / RSS “MXH” P3 Value *1/1000 (P3 comes in 10^{-6} m)	F$10	-
Volume	Volume of compartment m in liters	VO	OP	RD	CSS “CVL” / RSS “CVL” P3	N5	-

Related Communication

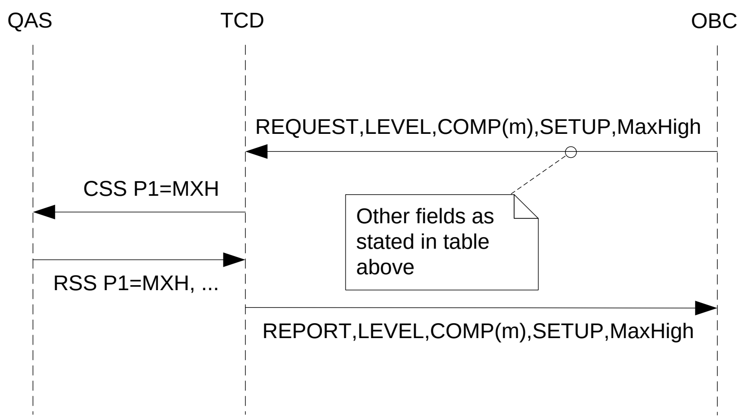

Fig. 39: Generation of LEVEL,COMP(m),SETUP,...

3.5.7.6.3 LEVEL,COMP(m),TOTAL

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
TotVT	Total uncompensated volume delivered by the LEVEL device. Max. 4.000.000.000 liters.	-	OP	RD	CMV “41” / RMV “41”, P(m+2)	N10	-
TotVC	Total compensated volume delivered by the LEVEL device. Max. 4.000.000.000 liters.	-	OP	RD	CMV “40” / RMV “40”, P(m+2)	N10	-
TotMass	Total mass delivered by the LEVEL device. Max. 4.000.000.000 Kg (overflow to zero).	-	OP	RD	CMV “42” / RMV “42”, P(m+2)	N10	-

Related Communication

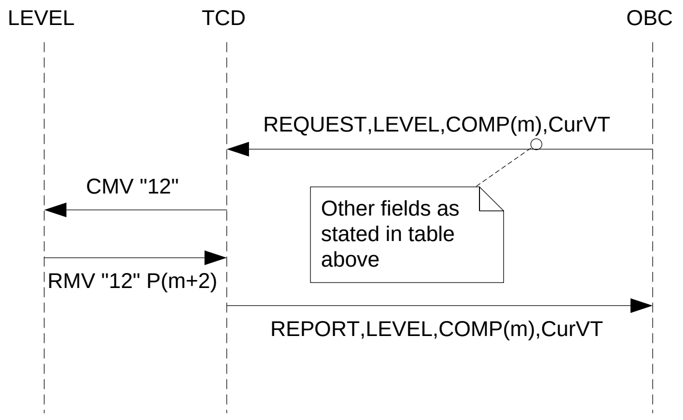

Fig. 40: Generation of LEVEL,COMP(m),...

LEVEL,COMP(m),LOAD

Related Communication

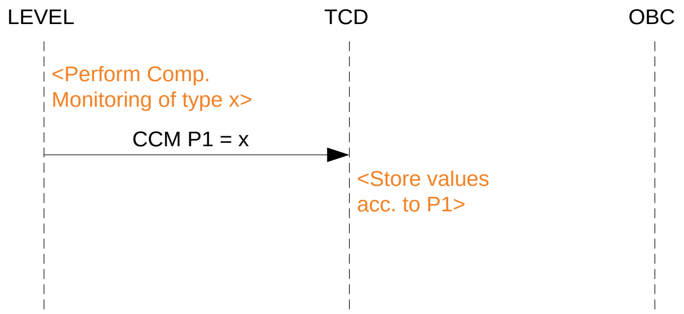

Fig. 41: Value Generation for Compartment Monitoring

For all fields in this sub-node, the following numbering convention applies:

- n: CCM group number (G1…Gn) n max. 24; n = m + 1
- m: Compartment index; m = 0…23; m = n – 1
- All fields are empty by default (after first power-up).

3.5.7.6.3.1 LEVEL,COMP(m),LOAD,BEFORE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
VtBvClose	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 1: Pn.1 else no change	C9*	C9
TsBvClose	Timestamp	-	MP	RD	If CCM P1 = 1: P2 else no change	S*	S
WlBvClose	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 1: Pn.2 else no change	C1*	C1
VtBvOpen	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 2: Pn.1 else no change	C9*	C9
TsBvOpen	Timestamp	-	MP	RD	If CCM P1 = 2: P2 else no change	S*	S
WlBvOpen	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 2: Pn.2 else no change	C1*	C1

** In DOK-411 and FTL-Mode*

3.5.7.6.3.2 LEVEL,COMP(m),LOAD,AFTER

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
VtBvClose	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 3: Pn.1 else no change	C9*	C9
TsBvClose	Timestamp	-	MP	RD	If CCM P1 = 3: P2 else no change	S*	S
WlBvClose	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 3: Pn.2 else no change	C1*	C1
VtBvOpen	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 4: Pn.1 else no change	C9*	C9
TsBvOpen	Timestamp	-	MP	RD	If CCM P1 = 4: P2 else no change	S*	S
WlBvOpen	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 4: Pn.2 else no change	C1*	C1

** In DOK-411 and FTL-Mode*

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3.5.7.6.4 LEVEL,COMP(m),DROP

3.5.7.6.4.1 LEVEL,COMP(m),DROP,BEFORE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
VtBvClose	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 5: Pn.1 else no change	C9*	C9
TsBvClose	Timestamp	-	MP	RD	If CCM P1 = 5: P2 else no change	S*	S
WlBvClose	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 5: Pn.2 else no change	C1*	C1
VtBvOpen	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 6: Pn.1 else no change	C9*	C9
TsBvOpen	Timestamp	-	MP	RD	If CCM P1 = 6: P2 else no change	S*	S
WlBvOpen	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 6: Pn.2 else no change	C1*	C1

** In DOK-411 and FTL-Mode*

3.5.7.6.4.2 LEVEL,COMP(m),DROP,AFTER

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
VtBvClose	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 7: Pn.1 else no change	C9*	C9
TsBvClose	Timestamp	-	MP	RD	If CCM P1 = 7: P2 else no change	S*	S
WlBvClose	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 7: Pn.2 else no change	C1*	C1
VtBvOpen	Valid Compartment filling volume at product temperature in Liter.	-	MP	RD	If CCM P1 = 8: Pn.1 else no change	C9*	C9
TsBvOpen	Timestamp	-	MP	RD	If CCM P1 = 8: P2 else no change	S*	S
WlBvOpen	Wetleg Sensor Status 0: dry, 1: wet, E: Error	-	MP	RD	If CCM P1 = 8: Pn.2 else no change	C1*	C1

** In DOK-411 and FTL-Mode*

3.5.8 COM(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Text	Writes value of “Text” directly to COM(n).	-	ST	WR		C22 0	-
Hex	Writes value of “Hex” directly to COM(n).	-	ST	WR		C22 0	-

3.5.8.1 COM(n),STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
LastError	Last COM port error error status; cleared on next REQUEST to this field. See also Table 1 on page 98	FI	CI	RD	Coded into software	C50	C50
Mode	e. g. “READY”, “SERVICE”	FI	CI	RD		C10	C10

3.5.8.2 COM(n),SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Protocol	e.g. “9600:8:N:1“	NV	PA	RD, WR	Default depending on TCD type. Otherwise as stored with SET telegram.	C31	C31
Mode	“OFF“ “RS232“ / “RS485“ only COM(1)	FI	CI	RD		C15	-
Queue	“NONE“ “OBC“ “GPS“ “PRN“	NV	PA	RD, WR		C15	-

3.5.9 PRN

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Text	The indicated ASCII character sequence is directly outputted. Only printable ASCII characters are authorized.	-	ST	WR		C22 0	-
Hex	The indicated ASCII character sequence is outputted in the HEX format. Is needed for outputting control characters. (Example: ..,Hex=“0D“ >> Output 0DHex Carriage Return)	-	ST	WR		C22 0	-

3.5.9.1 PRN,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
LastError	Set according to last error status of the PRN device; cleared on next REQUEST to this field. See also Table 1 on page 98	FI	CI	RD	Coded into software	C50	-
Mode	"READY", "OBC", "METER", "LEVEL" or "ERROR"	FI	CI	RD		C10	-

3.5.9.2 PRN,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Port	Default depending on TCD type. Otherwise as stored with SET telegram.	NV	PA	RD, WR		C15	-
ReInit	Writes value of FMC,RESOURCE,PRN,ReInit directly to PRN.	-	ST	WR		C15	-
Protocol	Default depending on TCD type. Otherwise as stored with SET telegram.	NV	PA	RD, WR		C15	-

3.5.9.3 Shared Printer Access

3.5.9.3.1 General

Every time a CAN node wishes to use a shared resource it sends a CGR telegram to the master node which for this consideration will be the TCD. The master checks the status of the resource (free or allocated) and performs one of two actions:

1. If the resource has been allocated to another node, the master will send a CRS telegram to this node to check if the resource is now free. The node must then reply with an SRS telegram.
   If the node fails to reply, then the master will assume that the node has crashed and will automatically free the resource. Else the TCD will forward the received status information to the requesting node using an SGR telegram.
2. If the resource has not been allocated, then the master node will reply immediately with an SGR telegram to indicate that the resource in question is now free. The resource will then be marked as allocated by the master.

A requesting node that receives an SGR telegram indicating that the resource is busy may retry with another CGR telegram after a set time.

To prevent a deadlock situation between two nodes the following rules must be implemented:

1. On initialization the master will mark all resources as free.
2. Every slave node must reply to a master CRS telegram within a timeout of 3 seconds. If this timeout elapses, the master assumes that the node is now inactivated and will free the resource.
3. The master must reply to a CGR telegram within 6 seconds. If it fails to do so, the master is considered inactive and the slave node will assume that the resource is free.

Remark:

The EMIS4 does not support shared printer access.

3.5.9.3.2 Switching RS232 / Printer interfaces to active/passive

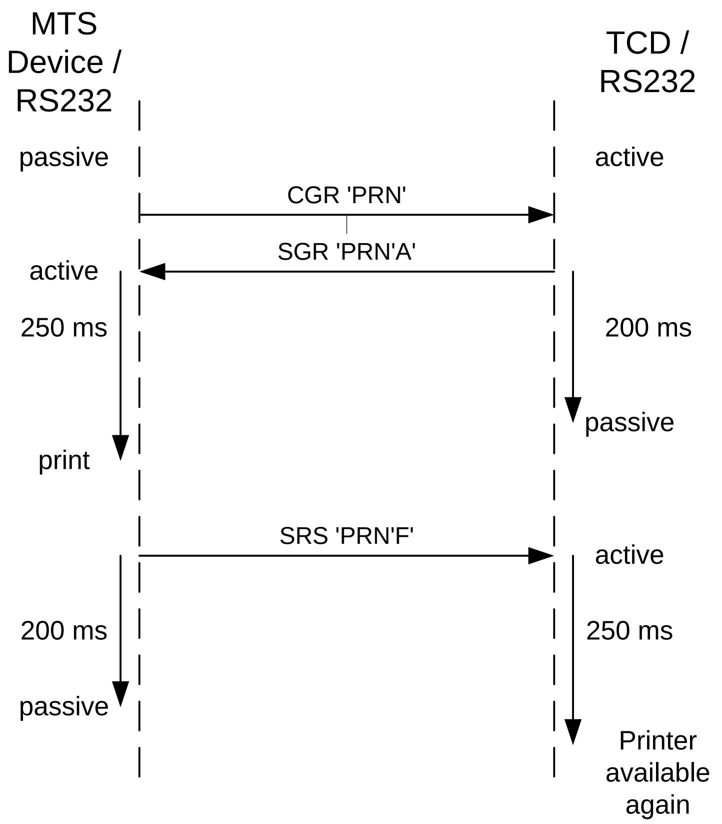

Fig. 42: Switching of the RS232 to "active" or "passive" with Delay

The above shown timing shall make sure that the printer's interface always lies on a well-defined electic potential. Otherwise it would be possible that the printer received erroneous signals that might lead to printing random characters or other types of malfunction.

3.5.9.3.3 Examples

<u>Example 1:</u>

A METER device prints:

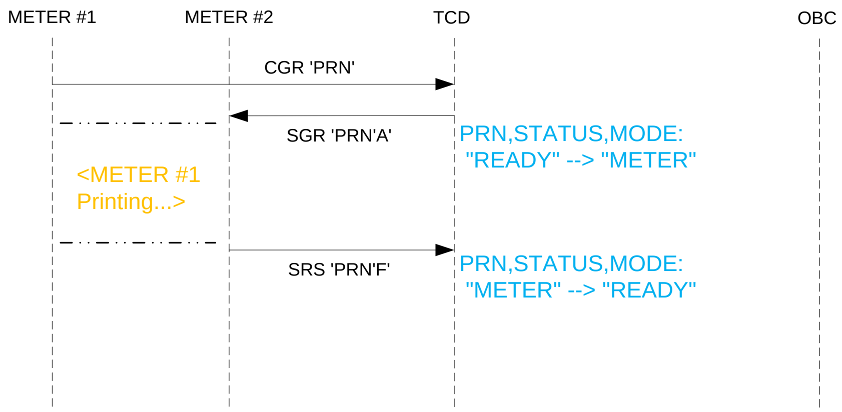

Fig. 43: Printing Example 1: METER

<u>Example 2:</u>

The OBC prints and a LEVEL device waits for the printer:

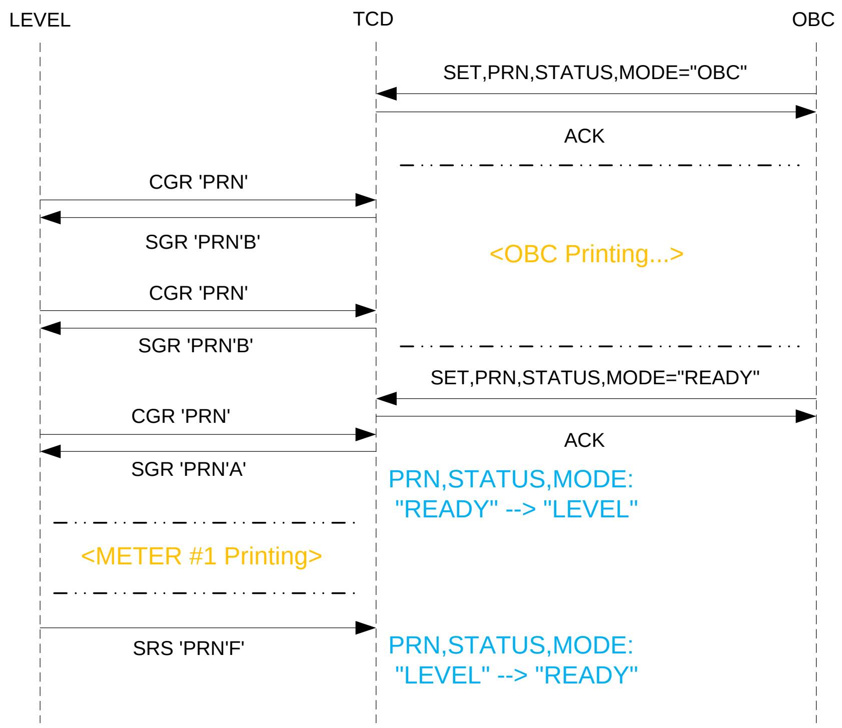

Fig. 44: Printing Example 2: OBC / LEVEL

Example 3:

A METER device prints and another one tries to allocate the printer:

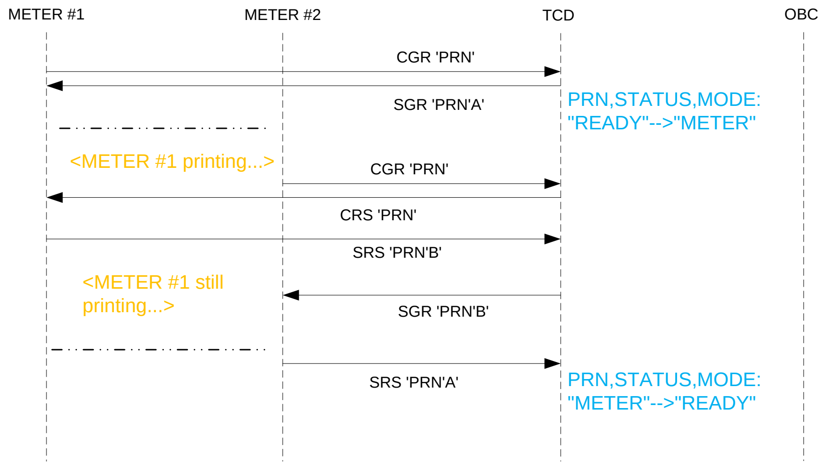

Fig. 45: Printing Example 3: 2 METERs

3.5.10 GPS

3.5.10.1 GPS- Data Support in General

If the TCD is equipped with a GPS Module (GPS is optional for EMIS2), the GPS data are provided in two subnodes (GPS,DATA and GPS,LASTDATA). Generally, GPS data are received cyclically (e.g. once per second) and can be marked as ‘valid’ (if satellite reception is good) or as ‘invalid’ (e.g. if not enough satellites are available or if the system is just being powered up). No data reception is also possible in case of invalid data. Directly after power up, data in both sub-nodes are marked as invalid.

Valid GPS data are stored in both, the GPS,DATA (GPS,DATA,Status=“A”) and GPS,LASTDATA (GPS,LASTDATA,Status=“L”) subnode. Invalid GPS data are only stored within the GPS,DATA subnode; (GPS,DATA,Status=“V”) and GPS,LASTDATA remain unchanged.

In case that data are required by an MTS device, GPS,DATA are transferred if valid data are currently available (signed “valid”) or GPS,LASTDATA are transferred if data are currently invalid (signed “invalid”). GPS data can be used in different ways. OBC can read them, MTS devices can request them. For EMIS4 / MultiTask they can be stored as tracking files on an FTP server.

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3.5.10.2 GPS,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Name	Product name >> $PGRMT,<1> to " VER" e.g. "GPS 17" [1])	FI	CI	RD	Coded into software	C15	C15
SWVersion	Software version >> $PGRMT,<1> from "VER" e.g. "2.05" [1])	FI	CI	RD	Coded into software	C10	C10

3.5.10.3 GPS,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
LastError	Last Error of the GPS Device. See also Table 1 on page 98	VO	CI	RD	Set according to last TCD's error status; cleared on next REQUEST to this field	C50	C50
Mode	e.g. "READY": ready for operation. For further details please refer to [1].	VO	CI	RD	Set according to GPS's current mode	C10	C10

3.5.10.4 GPS,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Port	"NONE" "COM(0)" or "COM(1)"	NV	PA	RD, WR	TCD Parameter	C15	-
AutoReport	Deprecated	-	-	-	-	-	-
TimeSync	"0" the EMIS time will NOT be synchronised with the GPS time "1" the EMIS time will be synchronised with the GPS time (+UTCOffset)	NV	PA	RD, WR	TCD Parameter	N1	N1
UTCOffset	"-hh:mm" "+hh:mm" Offset which will be added to the UTC time for the EMIS time synchronisation	NV	PA	RD, WR	TCD Parameter	C6	C7 [1)]

[1)] Format for EMIS4 is "-hhmm00" respective "+hhmm00"

3.5.10.5 GPS,DATA

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Status	>> $GPRMC<2> or „L“ ”A“ = Valid position ”V“ = Invalid position „L“ = Last valid position	VO	CI	RD		C1	C1
UTCTime	UTC-time >> $GPRMC<1>	VO	CI	RD		N6	T
UTCDate	UTC-Date >> $GPRMC<9>	VO	CI	RD		N6	D
Lat	Latitude >> $GPRMC<3>	VO	CI	RD		F$9	N4.4
LatRef	Latitude reference ”N“ = North or ”S“ = South >> $GPRMC<4>	VO	CI	RD		C1	C1
Lon	Longitude >> $GPRMC<5>	VO	CI	RD	Automatically according to built-in rules	F$10	N5.4
LonRef	Longitude reference “E“ = East or “W“ = West >> $GPRMC<6>	VO	CI	RD		C1	C1
AltMSL	Height above sea level in m >> $GPGGA<9>	VO	CI	RD		F$7	N6.1
AltGeo	Geoid height in m >> $GPGGA<10>	VO	CI	RD		F$6	N5.1
NoSats	Number of satellites (0 to 12) >> $GPGGA<7>	VO	CI	RD		N2	N2
Speed	Speed >> $GPRMC<7> in km/h	VO	CI	RD		F$10	N6.3
Course	Direction of travel (0° to 359,9°) >> $GPRMC<8>	VO	CI	RD		F$5	N3.1

3.5.10.6 GPS,SUBDATA

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Quali	Quality indicator >> $GPGGA<6>	VO	CI	RD		N1	N1
HDop	Horizontal Dilution of Precision >> $GPGGA<8>	VO	CI	RD	Automatically according to built-in rules	F$4	N2.1
AgeDiff	Age of differential GPS >> $GPGGA<11>	VO	CI	RD		N4	N4
ID	Differential Reference Station ID >> $GPGAA<12>	VO	CI	RD		N4	N4

3.5.10.7 GPS,LASTDATA

Field Description

see chapter 3.5.10.5 "GPS,DATA" / page 152.

3.5.10.8 GPS,LASTSUBDATA

Field Description

☞ see GPS,LASTDATA

3.5.10.9 GPS,TRACKING

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Status	OFF, INTERVAL, DISTANCE, STOP	NV	PA	RD, WR	TCD Parameter	-	C10
Format	Data format (FTL,GPX,…)	NV	PA	RD, WR		-	C3
Interval	0, 10 to 3600 sec. 0: no interval measurement	NV	PA	RD, WR		-	N4
Distance	0, 100, 100.000 m 0: no distance measurement	NV	PA	RD, WR		-	N6
SpeedLevel	5 to 120 km/h below SpeedLevel measurement is switched to interval measurement	NV	PA	RD, WR		-	N3

3.5.10.10 GPS Data for MTS

If GPS data are needed by an MTS device, two different procedures are possible. The data can be polled one record at a time or an MTS device can subscribe to a cyclic update.

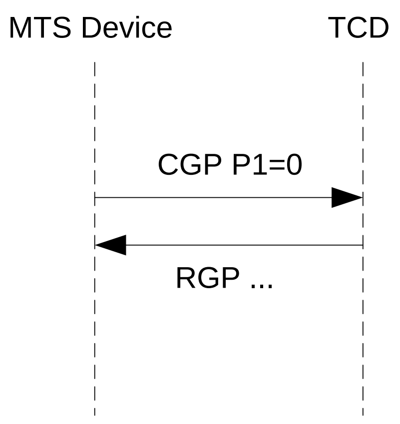

Fig. 46: GPS Data Polling

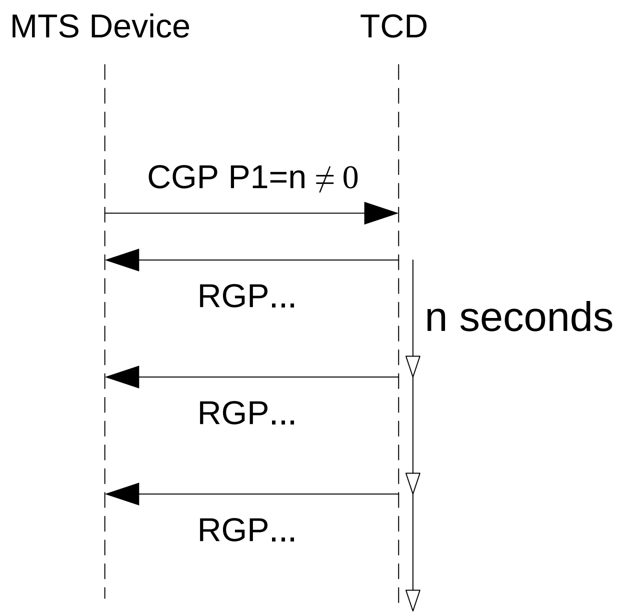

Fig. 47: Cyclic GPS Data Update

3.5.11 GSM

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
ATCommand	SET: Writes AT-Command to GSM-Module Triggers REPORT with GSM echo	VO	ST	RD, WR	Example: SET,GSM,ATCommand="AT+CSQ" REPORT,GSM,ATCommand="+CSQ:27,99<CR><LF>OK" Control sequences will be sent in brackets e.g. <CR><LF>.	-	C248

3.5.11.1 GSM,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
Serial	Serial number of the GSM module (IMEI)	FI	CI	RD	Coded into software	-	C20
Name	Type of the GSM module	FI	CI	RD		-	C15
SWVersion	Software version	FI	CI	RD		-	C40
PhoneNo	Phone number of the GSM module	NV	PA	RD, WR	TCD Parameter	-	N16
PIN	Personal Identification number	NV	PA	RD, WR		-	N8
IMSI	International Mobile Subscriber Identity	FI	CI	RD	Coded into software	-	C15
TimeOut	-	NV	PA	RD, WR	TCD Parameter	-	N3

3.5.11.2 GSM,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
LastError	Last occurred error of the GSM device	FI	CI	RD	Coded into software	-	C50
Mode	„NO_NETWORK“ „REGISTERED“ „ROAMING“ „FAILED“	FI	CI	RD		-	C10
RSSI	Signal quality	FI	CI	RD		-	N2
BER	Bit error rate	NV	PA	RD		-	N1

3.5.11.3 GSM,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type EMIS2	Data Type EMIS4
LockedRadius	0, 100 bis 9999 radius in m (1 to 99 : NAK) in which GSM is switched off 1 : always ON. OFF position from list of known loads	NV	PA	RD, WR	TCD Parameter	-	N4

3.5.11.4 GSM,GPRS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
UserName	Username / provider	NV	PA	RD, WR	TCD Parameter	-	C20
Password	Password / provider	NV	PA	RD, WR		-	C20
APN	Acces point name / provider	NV	PA	RD, WR		-	C50
DNS1	IPv4 address of the domain name server #1	NV	PA	RD, WR		-	C15
DNS2	IPv4 address of the domain name server #2	NV	PA	RD, WR		-	C15
TimeOut	3 to 60 seconds; default=60	NV	PA	RD, WR		-	N3

3.5.11.5 GSM,GPRS,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Mode	„INIT“ „OFFLINE" „ONLINE" “ERROR“	VO	CI	RD	Coded into software	-	C10

3.5.11.6 GSM,GPRS,FTP

3.5.11.7 GSM,GPRS,FTP,DATA

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Domain	Domain name of FTP server	NV	PA	RD, WR	TCD Parameter	-	C10 0
UserName	User name on FTP server	NV	PA	RD, WR		-	C20
Password	Password for user on FTP server	NV	PA	RD, WR		-	C20
Path	Working directory after connection established	NV	PA	RD, WR		-	C20 0
ZIP	Data compression (“0”: no compression, “1” apply compression)	NV	PA	RD, WR		-	B
TimeOut	3 to 60 seconds; default = 60	NV	PA	RD, WR		-	N3

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Test	SET: Triggers file storage onto FTP-Server	-	-	WR		-	C10

3.5.11.8 GSM,GPRS,FTP,SERVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Domain	Domain name of FTP server	NV	PA	RD, WR	TCD Parameter	-	C100
UserName	User name on FTP server	NV	PA	RD, WR		-	C20
Password	Password for user on FTP server	NV	PA	RD, WR		-	C20
Path	Working directory after connection established	NV	PA	RD, WR		-	C200
ZIP	Data compression ("0": no compression, "1" apply compression)	NV	PA	RD, WR		-	B
TimeOut	30 to 999 seconds / default = 60	NV	PA	RD, WR		-	N3
Test	Name of the test file (+ extension ".tst")	-	-	WR	SET: Triggers file storage onto FTP-Server	-	C10

3.5.11.9 GSM – GPRS – FTP Data Upload

3.5.11.9.1 General

The most important function of EMIS4/MultiTask is the storage of MTS and TCD data onto an FTP-Server. These data can be event data, delivery data or GPS data. Because some effort is needed to establish an FTP client - server connection, not each individual data is sent separately but sets of data are bound together into a file. Therefore specific CAN telegrams act as a trigger to initiate CAN telegram and FTP data transfer. The last CEF/CRF pair's chaining character is 'L'. With the manual transmission and distribution of logbook data from MultiSeal and MultiFlow, the transfer will be "denied", if at the beginning of the transmission there is no GPRS connection available. The initiating CSE will be answered by a CHS NAK in this case.

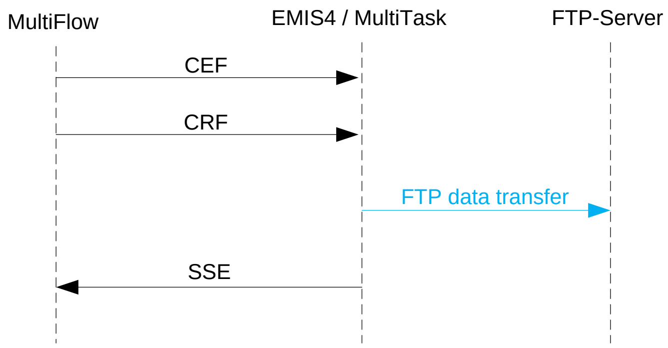

Fig. 48: MultiFlow - EMIS4/MultiTask delivery data transfer after "Delivery >> Printing"

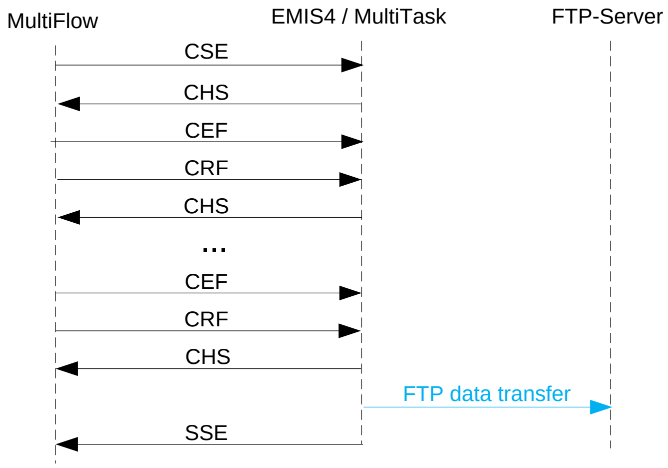

Fig. 49: MultiFlow - EMIS4/MultiTask delivery logbook data transfer after manual input with CEF / CRF

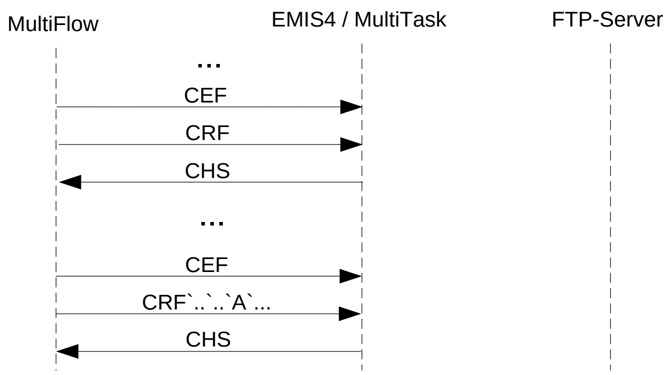

Fig. 50: MultiFlow - EMIS4/MultiTask CEF / CRF delivery logbook data transfer with MultiFlow-CANCEL

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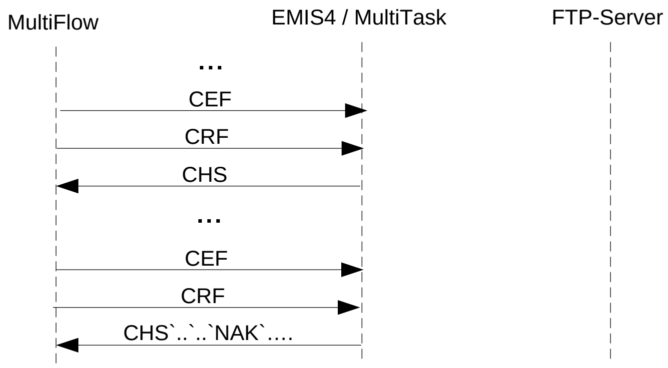

Fig. 51: MultiFlow - EMIS4/MultiTask CEF / CRF delivery logbook data transfer with EMIS4/MultiTask-CANCEL

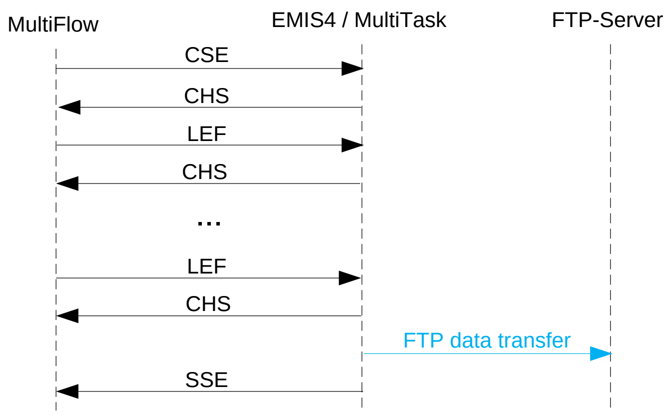

Fig. 52: MultiFlow - EMIS4/MultiTask event logbook data transfer after manual input with LEF

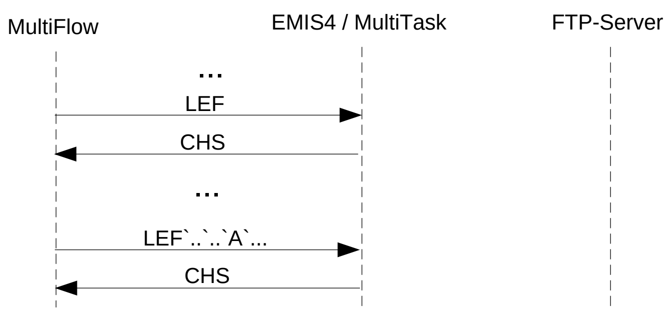

Fig. 53: MultiFlow - EMIS4/MultiTask LEF event logbook data transfer with MultiFlow-CANCEL

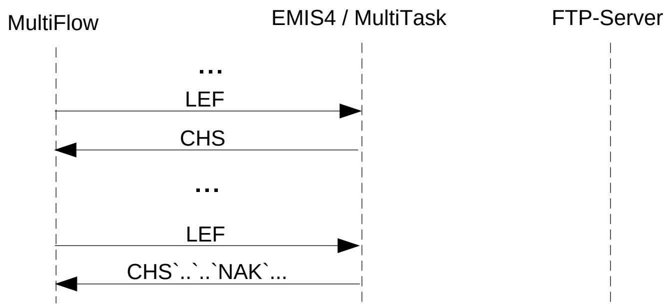

Fig. 54: MultiFlow - EMIS4/MultiTask LEF event logbook data transfer with EMIS4/MultiTask-CANCEL

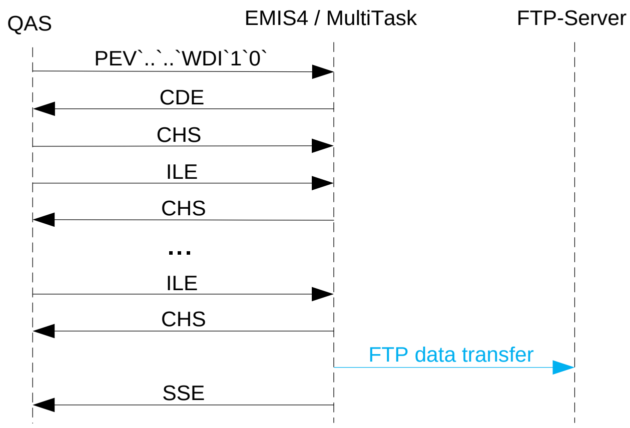

Fig. 55: QAS - EMIS4/MultiTask event data transfer after the event "Main Pressure Passive"

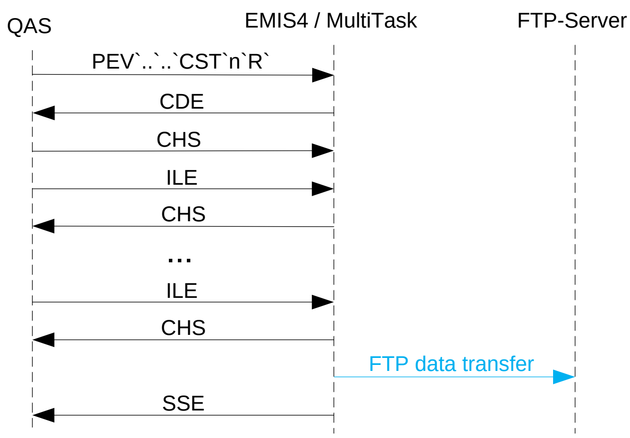

Fig. 56: QAS - EMIS4/MultiTask event data transfer after the event "Unsealed"

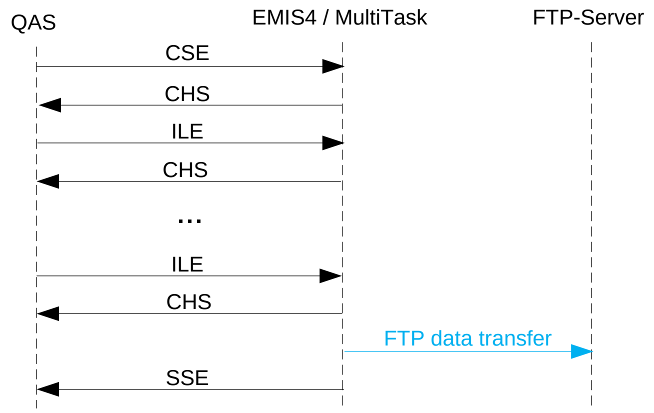

Fig. 57: QAS - EMIS4/MultiTask event data transfer after manual input

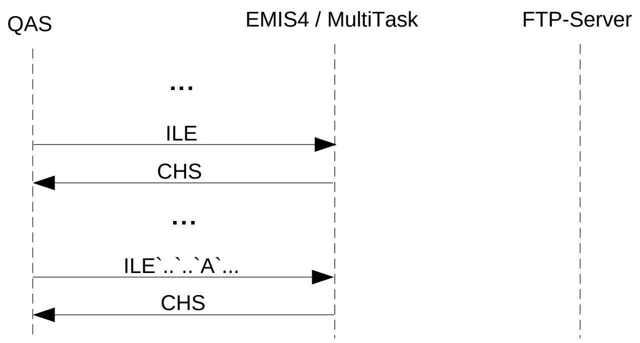

Fig. 58: QAS - EMIS4/MultiTask event data transfer with QAS-CANCEL

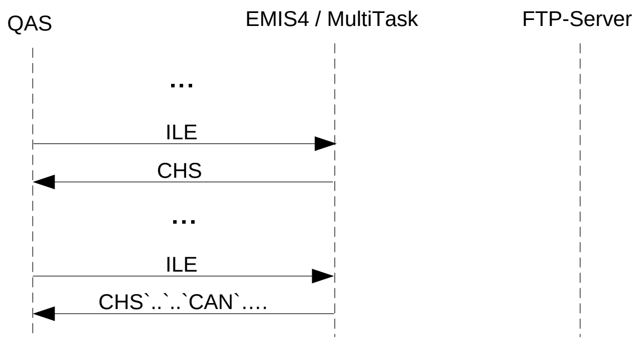

Fig. 59: QAS - EMIS4/MultiTask event data transfer with EMIS4/MultiTask-CANCEL

☞ See [2] for detailed flow control information (CRF..[P19], LEF..[P1], ILE..[P1] etc.)

3.5.12 BLUETOOTH

TBD

Will be defined during development.

3.5.13 FMC

3.5.13.1 FMC,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Key	Provides "service password" functionality. Correct setting of this value enables "Write Service", i. e. fields with Access Mode "WS" may be written to.	-	ST	WR		C15	C15
FTL_L0202	veh_type according to [6], Tab. 13	NV, PA	ST	WR, RD	Field marked as required by [6].	N1* (FTL mode only)	-

In FTL mode under FAS,FMC,SETUP.

3.5.13.2 FMC,RESOURCE

3.5.13.2.1 FMC,RESOURCE,PRN

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Init	This string represents a Hex-coded command sequence sent to the printer on its first initialization.	NV			TCD Parameter, default: "1B40"	C63	-
ReInit	This string represents a Hex-coded command sequence sent to the printer on each reinitialization.	NV				C63	-

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3.5.13.3 FMC,MONITORING

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Emis		NV	PA	RD, WR	TCD Parameter	-	TBD
Main		NV	PA	RD, WR		-	
Owa		NV	PA	RD, WR		-	
Can	value range for all: 0, 1, 2, 3	NV	PA	RD, WR		-	
Sio		NV	PA	RD, WR		-	
Frt	0: lowest monitoring depth	NV	PA	RD, WR		-	
Dio		NV	PA	RD, WR		-	
Gps		NV	PA	RD, WR		-	
Gsm	3 highest monitoring depth	NV	PA	RD, WR		-	
Bth		NV	PA	RD, WR		-	

3.5.13.3.1 FMC,MONITORING,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Mode	0 = OFF 1 = ON	NV	PA	RD, WR	TCD Parameter	-	TBD
Test	Name of the test file (+ extension ".tst")	-	ST	WR	SET: Triggers log file storage onto FTP-Server	-	

3.5.13.3.2 FMC,MONITORING,VAR

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Admin		NV	PA	RD, WR	TCD Parameter	-	B
Qas		NV	PA	RD, WR		-	C10
Meter		NV	PA	RD, WR		-	N1

Field Name	Description	Storage	Value Generation	Access Mode	Additional Information	Data Type	
						EMIS2	EMIS4
Com		NV	PA	RD, WR		-	N1
Prn		NV	PA	RD, WR		-	N1
Obc		NV	PA	RD, WR		-	N1
Gps		NV	PA	RD, WR		-	N1
Gsm		NV	PA	RD, WR		-	N1
Bth		NV	PA	RD, WR		-	N1
Fmc		NV	PA	RD, WR		-	N1

3.5.14 Other CAN Communication

3.5.14.1 Incoming CSE

An incoming CSE telegram is always answered by a CHS NAK telegram. (This applies at least for EMIS2).

3.5.14.2 Incoming ECU

An incoming ECU telegram is always answered by a CST telegram (This applies at least for EMIS2).

3.5.14.3 Incoming Telegrams from Unknown Devices

If the TCD receives a telegram from a device that was not previously identified by means of a CDI/RDI sequence, the TCD always sends a CDI telegram to that device.

3.5.15 CAN Start up Procedure

3.5.15.1 General

After a TCD or an MTS device is started up or performs a restart (power on, watchdog, DOK-411 reset), a special sequence of CAN frames or telegrams is initiated before the normal operating mode of the starting device is activated.

Depending on the connected device types, different sequences are possible. In general the devices should detect each other and get needed basic information.

Because no broadcast message is specified that reaches all nodes at once, a common procedure starts with the exchange of "OPEN" frames on the transport layer which will be answered with an “ACK on OPEN” frame (see [3]).

- After that, the nodes may start exchanging TMC Application Telegrams as defined in [2]. The exact procedure how each individual device manages its CAN logon sequence is up to the device’s specification. As the start-up time of the different devices may vary, different strategies may be applied to ensure proper and timely CAN startup – i. e. repetition of the “OPEN” frames using different patterns.

- After the successful exchange of the “OPEN” / “ACK on OPEN” frames on transport layer, devices may typically request general identification data by means of CDI / RDI telegrams and may synchronize their internal clocks with CNP / SNP telegrams.

3.5.15.2 EMIS2 in 411 Mode

- During its CAN start-up sequence, EMIS2 sends a transport layer “OPEN” frame to each node in sets of eight frames (three times 0 to 7, 8 to 15, 16 to 23, 24 to 31). It does not send the “OPEN” to itself. Each of those sets is repeated three times before moving on to the next so that in the end each of the 31 other nodes will have been queried up to 3 times.

- After receiving a transport layer “ACK on OPEN” frame, EMIS2 sends a CDI telegram to the node of the “ACK on OPEN”’s source immediately. From EMIS2’s viewpoint, the logon phase to that specific devicve is complete after the exchange of CDI/RDI.

3.5.15.3 EMIS2 in FTL Mode

- Additional to the CAN start-up sequence in 411 mode, EMIS2 now also sends a CNP telegram with its current RTC value (date and time) to all nodes EMIS2 has received an RDI telegram. This may be used by the other nodes for time synchronization purposes.

<u>First Power-Up</u>
(after the initial workshop setup or after a software update)

1. Check the SNP answers for matching values.
2. If the values both match EMIS2’s RTC value:
   - this value is written to FTL,LOG,TimeStamp.
   - EMIS2 continues with normal operation
3. Else
   - FTL,LOG,L_File is disabled,
   - ENQ,FTL,LOG,L_File yields NAK-ID 20410 and
   - any incoming CEF/CRF telegram pair is ignored;

- no Event data are collected.

4. All other functionality stays normal

Regular Power-Up or Reset

1. Check if collecting events is disabled If so:
   - Check the SNP answers for matching values.
   - If the values both match EMIS2's RTC value:
     - this value is written to FTL,LOG,TimeStamp.
     - EMIS2 continues with normal operation.
   - Else
     - FTL,LOG,L_File is disabled,
     - ENQ,FTL,LOG,L_File yields NAK-ID 20410 and
     - any incoming CEF/CRF telegram pair is ignored;
     - no Event data are collected.
     - All other functionality stays normal
2. Else:
   - Check the SNP answers for matching values.
   - If they don't match, generate an #L09 record (NAK-ID 20410).
   - EMIS2 continues with normal operation.

The above procedures shall ensure that time synchronization between the event generating devices has been established at least once during operation and that errors with regard to time synchronization can be detected. See also section xxx.

3.5.15.4 QAS

After start up QAS sends "OPEN" frames to the own CAN address (typ. 11). If any other CAN node accepts this telegram on lower CAN level, QAS continues sending telegrams to the CAN address which is set as the TCD target address (QAS parameter - typ. 21). If an "ACK on OPEN" frame is received it stops sending "OPEN" frames. The "ACK on OPEN" frame sending TCD will then be checked.
The number of "OPEN" frames telegrams is only limited by the error function of the lower CAN layer.

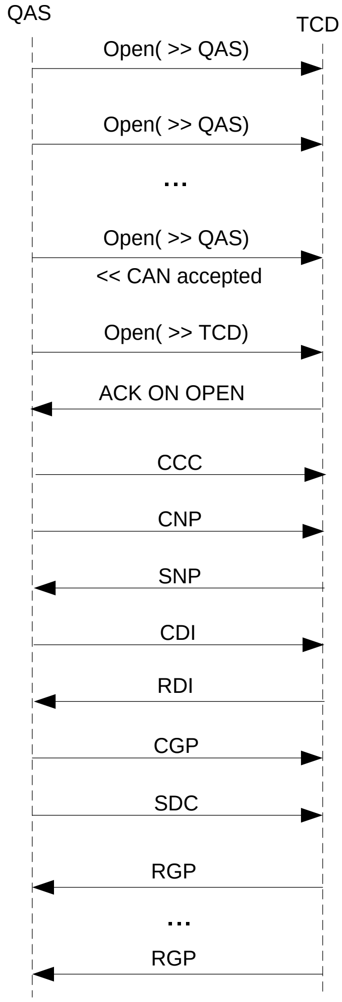

Fig. 60: Shows QAS transactions connected with a TCD

3.5.15.5 MultiLevel

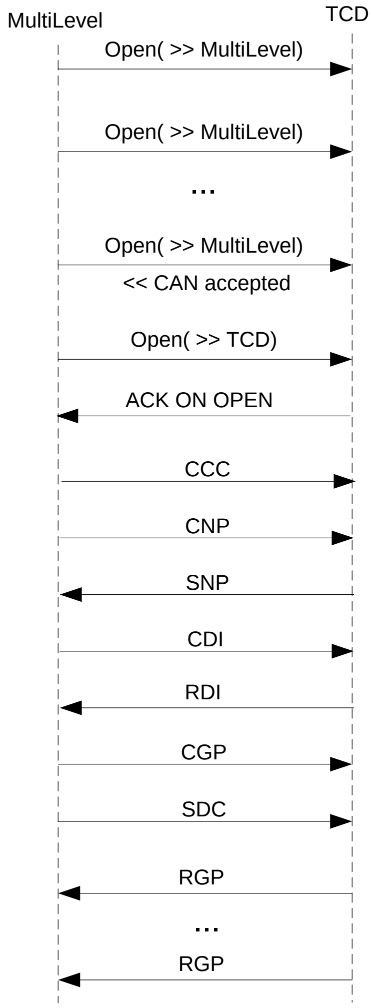

Fig. 61: Shows MultiLevel transactions connected with a TCD

4 EMIS2 (FTL - Protocol / OBC)

4.1 Communication and file format on the FTP server with EMIS

Storage of internal data on an FTP server is possible with the MultiFlow, MultiLevel, NoMix and MultiSeal (MultiLevel) tank truck system together with EMIS4. This logging of data records can be done automatically after certain events, or by manually activating the control console of individual devices.

A tracking system can also be activated in EMIS4 to store GPS data in a subdirectory of the FTP server at certain configurable intervals. This data can be synchronized with other data by timestamp.

The MultiFlow and all data records are stored in FTL format. To reduce data volumes, parameters can be set to allow this data to be transferred in compressed format (but not GPS data).

Each tank truck must have its own directory (home directory) set up on the server. A subdirectory named "GPS" must be created under the home directory. Each tank truck should have access only to these two directories (protected by name and password). Access rights in the home directory should be restricted to add and read only. This makes it impossible for EMIS4 to change or delete its own data or to write data to the directories of other tank trucks. In the GPS directory, access must be changed to modify since the GPS data records will be appended to an existing file.

In addition, an administrator should be set up on the office side to archive data and, if necessary, delete it.

MultiFlow, MultiLevel, NoMix and MultiSeal files are named according to the following pattern:

- **SSS t YYYYMMDD hhmmss.ftl**
  for uncompressed files

or

- **SSS t YYYYMMDD hhmmss.ftl.gz**
  for compressed files.

A different pattern applies to GPS files, because only one GPS file is created per day and tank truck. The individual GPS data records are appended at intervals.

- **GPS_YYYYMMDD.ftl**

Explanation of format:

SSS	=	data source
n	=	device number
t	=	data source number
YYYY	=	year
MM	=	month
DD	=	day
hh	=	hour
mm	=	minute
ss	=	second
ftl	=	filename extension
gz	=	filename extension for compressed file

4.1.1 File structure

The log file consists of a series of log records.

A log record consists of an arbitrary number of fields separated by commas [,] which may also be empty.

>> A data record is delimited with CR.
>> LF may follow optionally.
There is no explicit limit on data record size.

4.2 FTL - Data record structure

4.2.1 Fields

- The first field (field index 0)
  in a data record is numerical (an integer), and contains the identifier for the type of data record.
- The second field (field index 1)
  in every data record is a timestamp (S). The timestamp is valid until it is updated with a new one.
- All subsequent fields (field index 2 through n)
  are specified in Chapter x "xxx" / page xx. These tables contain a list of field types in the "Field name" and "Data type" columns in accordance with DIN 26051-1.
- The data record may contain more (custom) fields than described in the standard.

4.2.2 Field name

Each field name of a data record begins with the letter "L", and also receives a numerical code calculated by the formula

- (data record identifier) x (100) + (field index)

4.2.3 FTL Protocol

FTL is an acronym for **F**uel **T**ruck **L**ink, the interface between electronic system(s) on board of a tank vehicle (tank-vehicle-equipment) *(TVE* and any external computer, e.g. an on-board-computer installed in the driver's cabin, for illustration see the figure below.

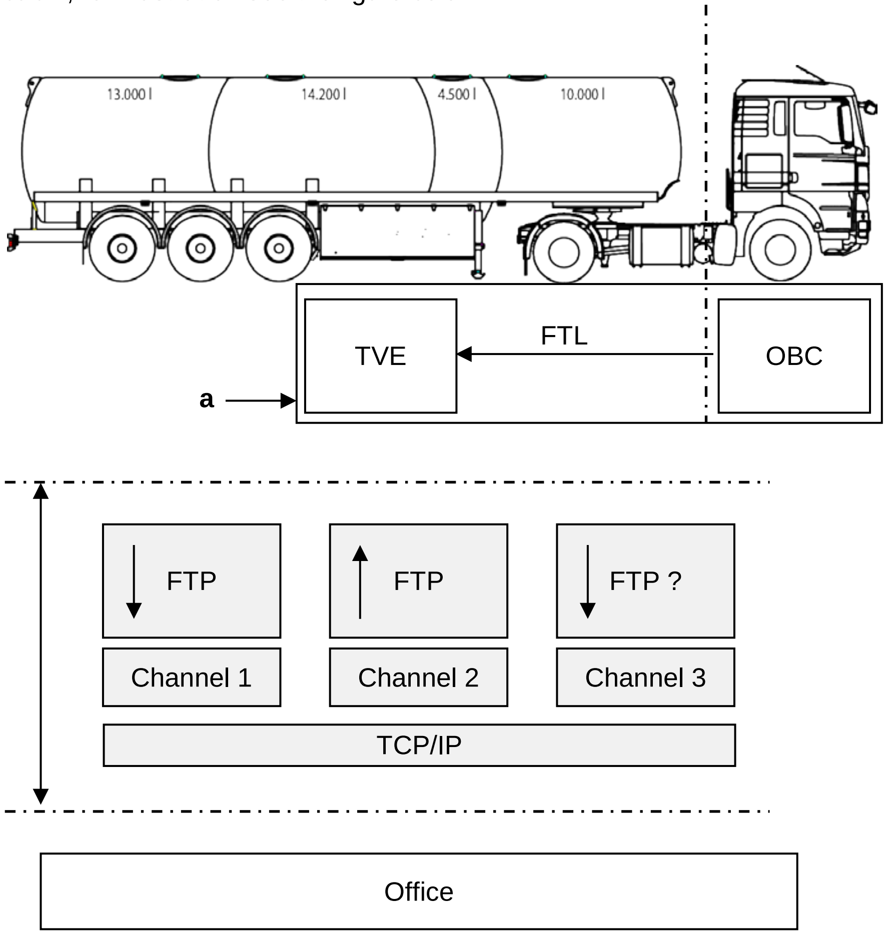

Fig. 62: FTL Protocol

- → direction of communication (client → server)
- **a** may be either two independent units or one single unit which incorporates both functions OBC and TVE.

4.2.4 Structure of the File Server

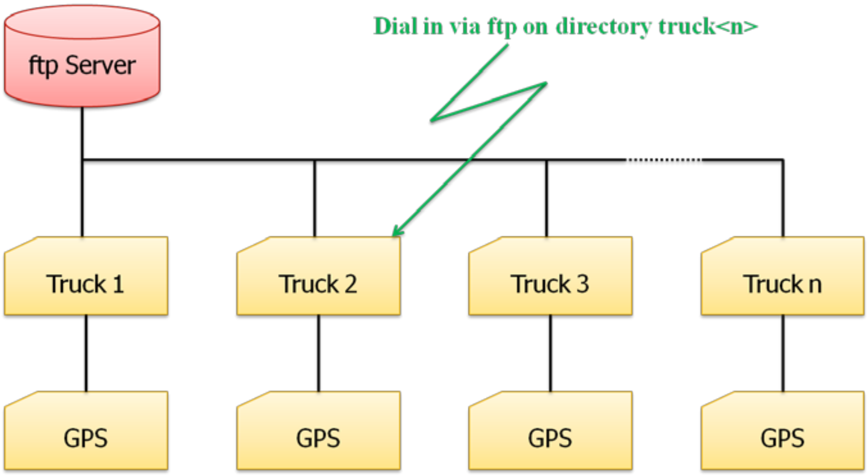

Fig. 1: Structure of the File Server

4.2.5 Structure of the data directory

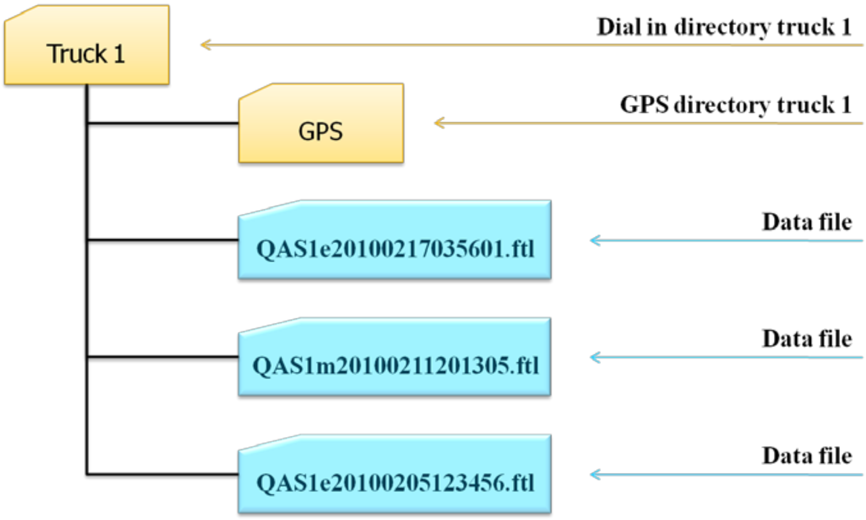

Abb. 2: Structure of the data directory

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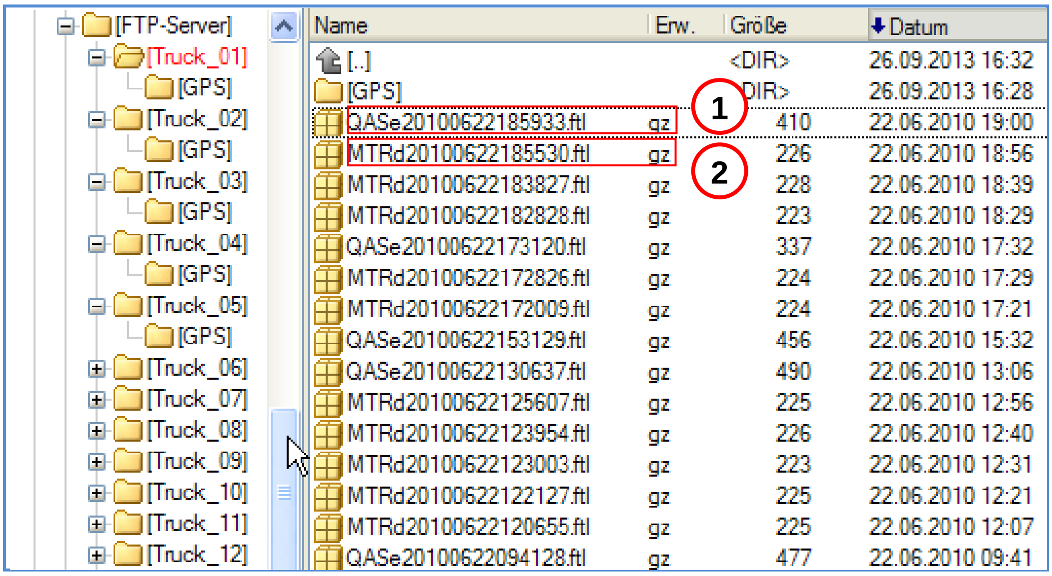
4.2.6 Data structure for dial directory Truck 1

This could, for example, a content look on the FTP server for Truck 1.

Truck 1



4.2.7 Example of a QAS file (NoMix or MultiSeal).

1 →

Contents of the file - **QAS1e20140113082155.ftl**
Accurate explanation of the structure of the event file
.

QAS1e20140113082155.ftl

```
0,20140113082155,1.00
1,20140113082155,FAS,RMTT,00.00,,04.10,,21,
1,20140113082155,FAS,MultiSeal,02.00,,01.70,,11,1002
2,20140113082155,0,RMTT_VEH
6,20140113082155,,,,,,4,,,,,,,,,,,,,,
10,20140113082155,,0,,,1002
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
42,20140113082100,,307,12,1
42,20140113082100,1,2,2
42,20140113082100,2,2,2
42,20140113082100,3,2,2
42,20140113082100,4,2,2
08,20140113082100,9.889163,53.642962,0,10,,0
42,20140113082100,1,1,2
```

```
42,20140113082100,2,1,2
42,20140113082100,3,1,2
42,20140113082100,4,1,2
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
42,20140113082100,1,13,2
42,20140113082100,2,13,2
42,20140113082100,3,13,2
42,20140113082100,4,13,2
40,20140113082100,1,,0
40,20140113082100,2,,0
40,20140113082100,3,,0
40,20140113082100,4,,0
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
42,20140113082100,1,2,1
42,20140113082100,2,2,1
42,20140113082100,3,2,1
42,20140113082100,4,2,1
42,20140113082100,,307,11,1
...
...
```

4.2.7.1 Darstellung der QAS-Datei mit dem Event Monitor

1 → Contents of the file - **QAS1e20140113082155.ftl**
View with the Event Monitor in plain text.

Explanation of the symbols and the Event Monitor
see chapter 8 "Event Monitor" / page 333.

QAS1e20140113082155.ftl

	Datum	Zeit	Ka...	Text
	13.01.2014	08:21:55		FTL-Version: 1.00
	13.01.2014	08:21:55		Gerät: RMTT Hardware: 00.00 Software: 04.10 CAN-ID: 21
	13.01.2014	08:21:55		Gerät: MultiSeal Hardware: 02.00 Software: 01.70 CAN-ID: 11 Serien Nr: 1002
				Fahrzeug: RMTT_VEH (Tankwagen)
				Anzahl der Kammern: 4
				Meter Standort: Tankwagen
	13.01.2014	08:21:00	1	Bodenventil - geschlossen
	13.01.2014	08:21:00	2	Bodenventil - geschlossen
	13.01.2014	08:21:00	3	Bodenventil - geschlossen
	13.01.2014	08:21:00	4	Bodenventil - geschlossen
	13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - eingescl
	13.01.2014	08:21:00	1	API-Kupplung - offen
	13.01.2014	08:21:00	2	API-Kupplung - offen
	13.01.2014	08:21:00	3	API-Kupplung - offen
	13.01.2014	08:21:00	4	API-Kupplung - offen
	13.01.2014	08:21:00		GPS-Position: 9.889163 (O) 53.642962 (N)
	13.01.2014	08:21:00	1	Bodenventil - offen
	13.01.2014	08:21:00	2	Bodenventil - offen
	13.01.2014	08:21:00	3	Bodenventil - offen
	13.01.2014	08:21:00	4	Bodenventil - offen
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Restmengensensor Nr. 1 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 2 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 3 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 4 - trocken
	13.01.2014	08:21:00	1	Kammer Status - leer
	13.01.2014	08:21:00	2	Kammer Status - leer
	13.01.2014	08:21:00	3	Kammer Status - leer
	13.01.2014	08:21:00	4	Kammer Status - leer
	13.01.2014	08:21:00	1	Bodenventil - geschlossen

1 → Inhalt der Datei – **QAS1e20140113082155.ftl**
Ansicht mit dem Event Monitor
(Fortsetzung)

?				ERROR: 3 Sensor Events in < 2 Min. (Comp=1 Sensor=1)
	13.01.2014	08:21:00	2	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=2 Sensor=1)
	13.01.2014	08:21:00	3	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=3 Sensor=1)
	13.01.2014	08:21:00	4	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=4 Sensor=1)
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00	1	API-Kupplung - geschlossen
	13.01.2014	08:21:00	2	API-Kupplung - geschlossen
	13.01.2014	08:21:00	3	API-Kupplung - geschlossen
	13.01.2014	08:21:00	4	API-Kupplung - geschlossen
	13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - ausgesc

4.2.7.2 Example of a meter file (Multiflow).

2 → Contents of the file - **MTR1d20140113085047.ftl**

MTR1d20140113085047.ftl

```
0,20140113085047,1.00
1,20140113085047,FAS,RMTT,00.00,,04.10,,21,
1,20140113085047,FAS,MultiFlow,00.00,,3.61 DE,,1,16DF0032
2,20140113085047,0,RMTT_VEH
6,20140113085047,,,,,,0,,,,,,,,,,,,,,
10,20140113085047,- ? -,0,,,16DF0032
8,20140113084800,+9.889163,+53.642962,40,,7,1
11,20140113084800,119,0,3,16DF0032,0,241,245,-
0.3,,,,,,,,,,,,,,,,,,0...
...
...
```

4.2.7.3 Representation of the meter file with the Event Monitor.

2 →

Contents of the file - **MTR1d20140113085047.ftl**
View with the Event Monitor.

MTR1d20140113085047.ftl

	Datum	Zeit	Ka...	Text
	13.01.2014	08:50:47		FTL-Version: 1.00
	13.01.2014	08:50:47		Gerät: RMTT
				Hardware: 00.00
				Software: 04.10
				CAN-ID: 21
	13.01.2014	08:50:47		Gerät: MultiFlow
				Hardware: 00.00
				Software: 3.61 DE
				CAN-ID: 1
				Serien Nr: 16DF0032
				Fahrzeug: RMTT_VEH (Tankwagen)
				Meter Standort: Tankwagen
	13.01.2014	08:48:00		GPS-Position: +9.889163 (O) +53.642962 (N)
	13.01.2014	08:48:00		Abgabe
				Beleg Nr.: 119
				Abgabe vom Fahrzeug / Gemessen vom Fahrzeug
				Produktcode: 3 (Normal-Bleifrei)
				Messanlagen Nr.: 16DF0032
				Umkompensiertes Volumen: 241,0 Liter
				Kompensiertes Volumen: 245,0 Liter
				Mittlere Temperatur: -0,3 °C
				Messtechnisch NICHT geeicht

4.2.7.4 Structure and format of the event file.

The format of the files is:

- Name of the data source,
- Number of the data source,
- data type,
- Timestamp of creation,
- Extension of the file name.

Example:

QAS1e20140113082155.ftl

```
|   ||    |       |      |
|   ||    |       |      +-- File name extension:
|   ||    |       |            .ftl
|   ||    |       |            .gz = gepackte
|   ||    |       |                 (.ftl) Datei
|   ||    |       |
|   ||    |       +---------- Time stamp:
|   ||    |                    Time = hhmmss
|   ||    |                    Time = 08:21:55
|   ||    |
|   ||    +----------------- Time stamp:
|   ||                         Date = YYYYMMDD
|   ||                         Date = 13.01.2014
|   ||
|   |+---------------------- Type:
|   |                          m = manually;
|   |                          e = event (automatic)
|   |                          d = delivery data
|   |
|   +----------------------- Data source number:
|                              1 = Single QAS System
|                              2 =
|
+--------------------------- Data source :
                               QAS = NoMix / MultiSeal
                               MTR = MultiFlow
                               LEV = MultiLevel
```

4.2.7.5 Example of the contents of an event file.

4.2.7.5.1 Identifier “0”

The format of the contents of the file is:

- Identifier, time stamp, and one or more events.

A very frequently used identifier is:

„0“ Version request

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
0,20091215091041,1.00
|      |       |     |
|      |       |     +--- * 1.00  = FTL output code.
|      |       |
|      |       +--------- Time stamp:
|      |                    Time  = hhmmss
|      |                    Time  = 09:10:41
|      |
|      +----------------- Time stamp:
|                           Date = YYYYMMDD
|                           Date = 15.12.2009
|
+------------------------ Time stamp:
(Listing of all identifiers
<dg_ref_source_inline>)
```

4.2.7.5.1.1 Identifier “1”

A very frequently used identifier is:

„1“ Device ID query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
1,20091215091041,FAS,EMIS4,01.01,,04.10EMIS4,,21,JL448
|    |      |      |    |     |  |     |      | |   |
|    |      |      |    |     |  |     |      | |   +-- serial no.
|    |      |      |    |     |  |     |      | |
|    |      |      |    |     |  |     |      | +--- CAN bus node no.
|    |      |      |    |     |  |     |      |
|    |      |      |    |     |  |     |      +----- not used
|    |      |      |    |     |  |     |
|    |      |      |    |     |  |     +------------- software version
|    |      |      |    |     |  |
|    |      |      |    |     |  +------------------- not used
|    |      |      |    |     |
|    |      |      |    |     +---------------------- hardware version
|    |      |      |    |
|    |      |      |    +---------------------------- device type
|    |      |      |
|    |      |      +---------- Manufacturers short code – 3 character
|    |      |
|    |      +------------------ Time stamp:
|    |                            Time  = hhmmss
|    |                            Time  = 09:10:41
|    |
|    +------------------------- Time stamp:
|                                 Date = YYYYMMDD
|                                 Date = 15.12.2009
|
+------------------------------ Identifier:
                (Listing of all identifiers
                see chapter 4.2 "FTL - Data record structure" / page 170)
```

4.2.7.5.1.2 Identifier “8”

A very frequently used identifier is:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43
|   |    |    |   | | | | |  | |
|   |    |    |   | | | | |  | |
|   |    |    |   | | | | |  | +- Driving direction
|   |    |    |   | | | | |  |      (in degrees)
|   |    |    |   | | | | |  |
|   |    |    |   | | | | |  +---- Speed
|   |    |    |   | | | | |
|   |    |    |   | | | | +-- Time lag
|   |    |    |   | | | |        (in seconds)
|   |    |    |   | | | |
|   |    |    |   | | | +----- horizontal
|   |    |    |   | | |        positioning error
|   |    |    |   | | |
|   |    |    |   | | +-------- Number of used
|   |    |    |   | |           satellites
|   |    |    |   | |
|   |    |    |   | +----------- Quality of GEO Info
|   |    |    |   |
|   |    |    |   +--- altitude
|   |    |    |
|   |    |    +------------- latitude
|   |    |
|   |    +----------------------- longitude
|   |
|   +-------------------------------------- Time stamp:
|                                             Date = YYYYMMDDhhmmss
|                                             Date = 12.04.2013 / 08:49:53
|
+------------------------------------------------- Identifier:
                  (Listing of all identifiers
                  see chapter 6.3 "FTL - Data record structure" / page 221)
```

4.2.7.5.1.3 Identifier “42”

A very frequently used identifier is:

„42“ Access status

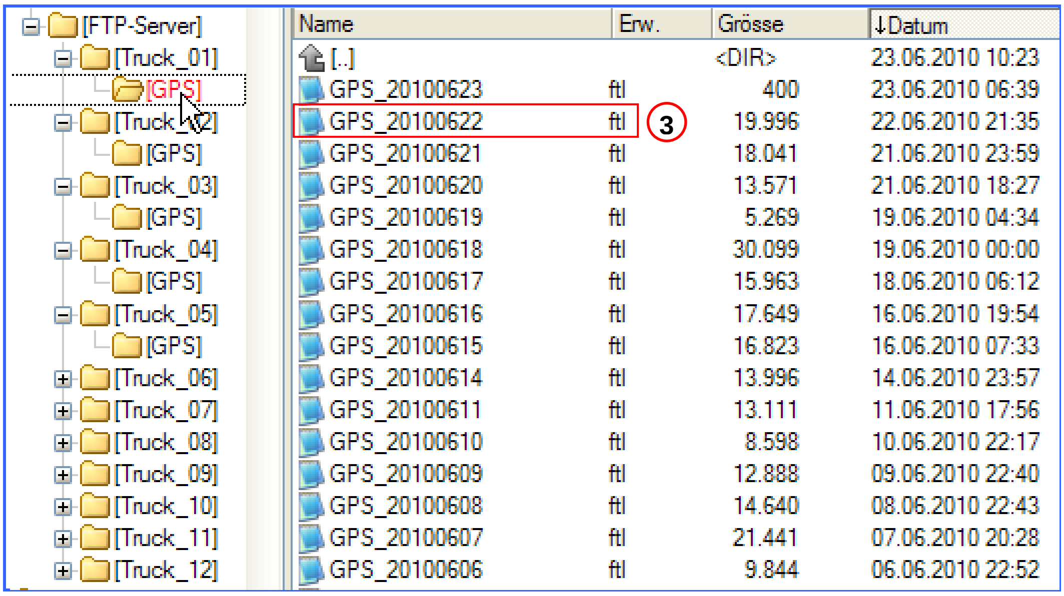
see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
42,20091215091041,2,2,2
 |      |       |     | | |
 |      |       |     | | +--- Status = open
 |      |       |     | |
 |      |       |     | +----- API coupling
 |      |       |     |
 |      |       |     +------- Compartment no.= 2
 |      |       |
 |      |       +------------- Time stamp:
 |      |                        Time  = hhmmss
 |      |                        Time  = 09:10:41
 |      |
 |      +--------------------- Time stamp:
 |                               Date = YYYYMMDD
 |                               Date = 15.12.2009
 |
 +--------------------------- Identifier:
(Listing of all identifiers
see chapter 4.2 "FTL - Data record structure" / page 170)
```

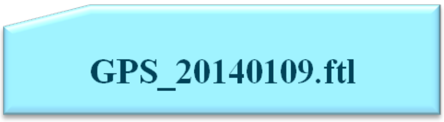
4.2.8 File structure for GPS directory Truck 1

And so could, for example, a table of contents on the FTP server, look for Truck 1 in the GPS directory.



4.2.8.1 Structure and format of the GPS file.

3 → Contents of the file - **GPS_20140109.ftl**




```
00,_20140100000000,1.00
02,_20140100000000,0,RMTT_VEH
08,20140109074732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109074932,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075131,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075331,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075531,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075933,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080133,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080333,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080534,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080742,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080942,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081142,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081206,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081314,9.889163,53.642962,40,2,3,1,3600,0,84
```

```
08,20140109081514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109084114,9.889163,53.642962,40,2,3,1,3600,0,84
...
...
```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4.2.8.2 Representation of the GPS file with the Event Monitor.

3 → Contents of the file - **GPS_20140109.ftl**
View with the Event Monitor.

GPS_20140109.ftl

Datum	Zeit	Ka...	Text
			FTL-Version: 1.00
			Fahrzeug: RMTT_VEH (Tankwagen)
09.01.2014	07:47:32		GPS-Position: (extrapoliert) 9.889163 (O) 53.642962 (N)
09.01.2014	07:49:32		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	07:51:31		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
09.01.2014	07:53:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	07:55:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	07:57:32		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
09.01.2014	07:59:33		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:01:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:03:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:05:34		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:07:42		Time: 00:02:08 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:09:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:11:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:12:06		Time: 00:00:24 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:13:14		Time: 00:01:08 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:15:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:17:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:19:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:21:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:23:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:25:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:27:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:29:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:31:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:33:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:35:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:37:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:39:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:41:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:43:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:45:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:47:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:49:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:51:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:53:10		Time: 00:01:56 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:55:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:57:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	08:59:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:01:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:03:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:05:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:07:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:09:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:11:09		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:13:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
09.01.2014	09:15:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h

. . .

. . .

4.2.8.3 Structure and format of the GPS file

The format of the files is:

- Identifier of the GPS file,
- Timestamp of creation,
- Extension of the file name.

Example:

GPS_20140109.ftl

```
|       |       |
|       |       |
|       |       +---------   File extension:
|       |                    .ftl
|       |
|       +---------------- Time stamp:
|                            Date = YYYYMMDD
|                            Date = 09.01.2014
|
+----------------------- Type:
                             GPS = GPS file
```


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4.2.8.3.1 Example of the contents of a GPS file

4.2.8.3.1.1 Identifier “8”

Da in einer GPS-Datei ausschließlich GPS Positionen protokolliert werden ist dies auch die einzige, bis auf „**0**“ und „**2**“ die zur Eröffnung gehören, gebrauchte Kennung:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43
|  |              |         |          |  | | | |    | |
|  |              |         |          |  | | | |    | |
|  |              |         |          |  | | | |    | +- Driving direction
|  |              |         |          |  | | | |    |      (in degrees)
|  |              |         |          |  | | | |    |
|  |              |         |          |  | | | |    +---- Speed
|  |              |         |          |  | | | |
|  |              |         |          |  | | | +-- Time lag
|  |              |         |          |  | | |         (in seconds)
|  |              |         |          |  | | |
|  |              |         |          |  | | +----- horizontal
|  |              |         |          |  | |         positioning error
|  |              |         |          |  | |
|  |              |         |          |  | +-------- Number of used
|  |              |         |          |  |           satellites
|  |              |         |          |  |
|  |              |         |          |  +----------- Quality of GEO Info
|  |              |         |          |
|  |              |         |          +--- altitude
|  |              |         |
|  |              |         +------------- latitude
|  |              |
|  |              +------------------------ longitude
|  |
|  +------------------------------------ Time stamp:
|                                          Date = YYYYMMDDhhmmss
|                                          Date = 12.04.2013 / 08:49:53
|
+-------------------------------------------------- Identifier:
            (Listing of all identifiers
            see chapter 4.2 "FTL - Data record structure" / page 170)
```

4.3 FTL - Record structure

4.3.1 Scope

☞ This document outlines the communication between an OBC and the a MultitTask device via FTL protocol.

4.3.2 Record type groups

Record types are grouped in order to facilitate decoding and improve readability of the protocol file.

Record type	Description
0 to 9	System data
10 to 19	Measuring results
20 to 29	Operating data, e.g. working times
30 to 39	Reserved
40 to 49	Quality, safety and sealing data (e.g. crossover prevention, overfill prevention)
50 to 59	GSM data
60 to 69	Reserved
70 to 79	Reserved
80 to 89	Reserved
90 to 99	Maintenance data
100 and above	Reserved

4.3.3 Storage Classes

Class	Short	Description
Fixed	FI	Value is built-in into software and can only be changed by a software update
Hardware-Adjusted	HA	Value is determined by a hardware setting (e. g. DIP switch or jumper)
Non-Volatile	NV	Value will remain the same after power-up or restart
Volatile	VO	Value will be set to default on every power-up or restart
Other	OT	None of the above

4.3.4 Value Generation Types

Type	Short	Description
Set Telegram	ST	Value is set by the OBC by means of a SET telegram
Parameter	PA	Value is considered part of the TCD's parameterization
Computed Internally	CI	MultiTask software computes value from internal state
MTS Pushed	MP	Value is sent to the TCD by another MTS device spontaneously, i. e. without being queried by the TCD.
OBC Polled	OP	Value is queried from another MTS device each time the OBC requests it

Polled at Power-up	PP	Field is received from another MTS device only during power-up sequence
GPS	GP	Value is received from a GPS device that is connected to a COM port.
Other	OT	None of the above

4.3.5 Access Modes

Mode	Short	Description
Read	RD	Field can be read
Write	WR	Field can be written to
Clear	CL	Field can be cleared
Write Service	WS	Field can be written to if service password is set
Trigger	TR	Write operation to field triggers an action
Other	OT	None of the above

4.3.6 Data Format Types

Data types in this documents are categorized according to [4], Table 3 – "Format identifiers". The following table shows a summary of those. "(…)" indicates that the original description provides more information. For further details and examples please refer to [4], Table 3.

Format Identifier	Description
B	Boolean; only the values "0" and "1" are valid
F$x	Floating point value; total max. x characters before and after decimal point, including sign if applicable
FC$	GPS position value (latitude, longitude, corresponds to DOK-411's FloatC)
Nx	Integer decimal value with max x characters (including sign character)
Nx.y	Floating point value; max x digits in front of the point; including sign character; max y digits behind the point. (…)
Cx	Text with a maximum number of x characters (…)
S	Time stamp; CCYYMMDDhhmmss (…)
D	Date (CCYYMMDD)
D$	Date (DD.MM.CCYY)
IP$	IPv4-Adresse xxx.xxx.xxx.xxx
T	Time (hhmmss)
T5$	Time (hh:mm)
T8$	Time (hh:mm:ss)
Hx	Unsigned hexadecimal value with max x characters. (…)

Note: Fx, FC, D$, T5$ and T8$ are not conform to the FTL standard.

4.3.7 FTL Variable Kinds

Kind Identifier	Description
SV	Single-value
LV	List of values, individual values do not possess a specific order.
AV	Array of values; individual values are indexed with a number in brackets. Counting starts at "(1)".

4.3.8 FTL Value Types

Kind Identifier	Description
SF	Single-field; one data entry per value
MF	Multiple-field, string of comma-separated data entries. Also referred to as “record”

4.3.9 Data Structure Support and Parameterization

- The MultiTask OBC Interface supports two root nodes, “FAS” and “FTL”. The “FTL” root node is defined in [2]. The “FAS” node is used for the parameterization of MultiTask and also shall be used to provide additional data, which is supported by the MultiTask system but not considered by FTL.

- The handling of data which is available in the FAS sub-nodes shall be identical to the data which is available in the FTL sub-node. For example, selection of predefined parameter values is typically done numerically (e.g. 7.5.2 FTL,PRN,TYPE).

- The mentioned parameters listed in this document are based on the current state of implementation and on the “EPR270 - Software Specification - NextGeneration Tank Truck Electronics - MultiTask - V1.00”. Due to the ongoing implementation of different modules of the MultiTask project, parameters mentioned in this document may differ from the final implementation. The format may change, parameters will disappear and additional parameters will be added.

- Nodes wich includes only parameters witch access mode RD can be combined in one record FTL-Style.

4.4 FTL - Data Tree and Field Description

4.4.1 FTL

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Vehicle_ID	NV	PA	RD	SV	MF	#L02; see 7.6.12.1 Definitions for LH_File Records	x

4.4.2 FTL,SYSTEM

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
FTL_Vers	FI	CI	RD	SV	MF	#L00; "1.00"; see	x
FTL_Format	FI	CI	RD	SV	SF / C3	"CSV"	-
DateTime	OT	CI	RD, WR, TR	SV	SF / S	<RTC value> If this value is written to, the realtime clock of MultTask is set to the "DateTime".	x
Baud	NV	ST	RD, WR	SV	SF / N6	Default: "9600"	-
SYS_Err	NV	CI	RD	SV	MF	#L09; This field is cleared when the OBC performs a read access on it.	-
NodeList	FI	CI	RD	LV	SF	List of all supported nodes	x

4.4.3 FTL,PRN

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Port	NV	ST	RD, WR	SV	SF / N1	Class/variable: CRunPrn.iPort Printer port to access Describing the printer port to use. V = 0 means default printer port. Returns currently selected port used for printing. Value range from 0 to 9	-
Type	OT	CI	RD	SV	SF / N2	Class/variable: CRunPrn.iType Type of printer Numeric value, one of 0: no printer at this port 1: printer installed but generally not available for OBC 2: generalized FTL-printer (UTF-8 shall be used) 3: printing to file 4: unknown printer Printers from STAR (10 to 19): 10: STAR SP298 11: STAR DP8340 Printers from EPSON (20 to 29): 20: EPSON TM290 21: EPSON TM295 22: EPSON LQ570 Other printers (90 to 99) manufacturer specific	x
Status	OT	CI	RD	SV	N1	Class/variable: CRunPrn.iStatus	-

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
						Status of selected printer Set to 1 tries to reserve printer for usage by OBC. Set to 0 frees the printer Numeric value, one of 0: ready 1: no paper on top (upper sensor) 2: no paper on bottom (lower sensor) 3: no paper (both sensors) 4: printer offline	
Reserved	VO	OT	RD, WR	SV	N1	Class/variable: CRunPrn.iReserved Reserving the printer required if FTL,PRN,Type is greater than 0 Numeric value, one of 0: idle, free for usage 1: currently reserved for OBC > 1: reserved by MultiTask	-
Tx_Text	VO	ST	WR	SV	C120	Class/variable: CRunPrn.sTxText Text to print A SET prints the text and returns an ACK-frame after the text was successfully printed, NAK-ID frame otherwise	-

- The printer could be in use by TVE or another client. In this case, the TVE reserves the printer itself.
- If the OBC tries to reserve the printer by writing V=1, while the printer is already reserved by TVE or another client, the TVE shall answer with a NAK-ID frame.
- When the printer was reserved by the OBC and a further request by the OBC for reservation is done, the TVE shall answer with an ACK and shall leave the value at V=1.

4.4.4 FTL,LOG

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
LH_File	NV	CI, OP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
L_File	NV	CI, OP, MP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
TimeStamp	NV	ST, CI	RD, WR	SV	SF	Timestamp of last transmitted L_File record and start time for next L_File enquiry.	-
SnapShot	-	ST	WR	SV	SF	Triggers the generation of a “snapshot” set of L_File records.	-

** MultiTask provides only the mandatory L_File and LH_File records.*

4.4.4.1 Definitions for LH_File Records

00 FTL_VERS (required)			**Req.**	**Source / Data Generation**
L0000	dataset_id	N2	x	„0“
L0001	timestamp	S	x	current time stamp read from MultiTask OS
L0002	ftl_vers	N2.2	x	„1.00“

Number of data sets: 1

01 DEVICE_ID (required)			**Req.**	**Source / Data Generation**	**Description**
L0100	dataset_id	N2	x	„1“	
L0101	timestamp	S	x	current time stamp read from MultiTask OS	
L0102	man_name	C32	x	e. g. „F. A. Sening“	Manufacturer name
L0103	dev_code	C16	x	CSetGeneralWM.sDeviceID	Manufacturer specific device code
L0104	hard_vers	C8		CSetGeneralWM.sHmiHwVers	Hardware version
L0105	hard_conf	C64		“” (empty)	Hardware configuration
L0106	soft_vers	C8		CSetGeneralWM.sAppOsVers	Software version
L0107	soft_vers	C64		CSetGeneralWM.sAppOsVers	Software configuration
L0108	dev_id	N3	x	CSetGeneralWM.sDevID	Unique code number for the device within the system (e.g. bus address). This number is used to identify the data source, also in case of several devices of the same type.
L0109	dev_serial	C20			Serial number of the device which shall be unique for each manufacturer.
L0110	App_name	C20		“” (empty)	Name of application
L0109	Seal_cnt	N8		“” (empty)	Seal counter if present

Number of data sets: one for MultiTask

02 VEHICLE_ID (required)			**Req.**	**Source / Data Generation**	**Description**
L0200	dataset_ID	N2	x	„2“	
L0201	timestamp	S	x	current time stamp read from MultiTask OS	
L0202	veh_type	N1	x	CSetGeneralNonWM.iTruckType	Vehicle type: 0 tank truck (rigid) 1 tractor 2 semitrailer 3 trailer 4 hydrant vehicle 5 IBC 6 other
L0203	veh_no	C16	x	CSetGeneralWM. sTruckID	Vehicle identifier (e.g. number plate)

Number of data sets of this type: 1

03 DRIVER_ID (optional)	**Not supported**

Number of data sets: 0

04 TOUR_ID (optional)	**Not supported**

Number of data sets: 0

05 COMP_ID (optional)	**Not supported**

Number of data sets: 0

06 TRUCK_SETUP (required)			Req.	Source / Data Generation	Description
L0600	dataset_id	N2	x	„6“	
L0601	timestamp	S	x	current time stamp read from MultiTask OS	
L0602	outp_drv	N2	-	empty	
L0603	dip_stick	N1	X	CSetGeneralNonWM. iDipStick	Electronic dipstick system 0 no dipstick system 1 dipstick not metrologically approved 2 dipstick metrologically approved
L0604	delv_type	N1	X	CSetGeneralNonWM.iTruckType	Tank truck type 0 undefined 1 direct outlet 2 flow metering system(s) (with collector(s)) 3 Hybrid system (1 and 2)
L0605	delv_side	N1	X	CSetGeneralNonWM. iDeliverySide	Delivery side(s) 0 undefined 1 left 2 right 3 left and right 4 rear 5 left and rear 6 right and rear 7 left and right and rear
L0606	load_side	N1	x	CSetGeneralNonWM. iLoadingSide	Loading side(s) See L0604
L0607	no_cpts	N2	x	CSetGeneralWM .iNrOfComp	Number of compartments
L0608	no_ops	N1	-	“” (empty)	
L0609	bv_presbal	B	-	“” (empty)	
L0610	wleg_conf	N1	x	CSetGeneralNonWM.iWetlegConfiguration	Wetleg configuration 0 none 1 one sensor low in each pipe 2 one sensor left, one right, both in low position 3 one sensor low, one sensor high in each 4 one sensor in each compartment 5 combination of 4 + 1 6 combination of 4 + 2 7 combination of 4 + 3 8 other configuration with four or more sensors
L0611	sep_cvctrl	B	-		
L0612	cab_lock	N1	-		
L0613	load_mode	N1	-		
L0614	load_start	N1	-		
L0615	load_stop	N1	-		
L0616	ld_auto_op	N1	-		
L0617	ld_auto_cl	B	-		
L0618	rpmon	N1	-		
L0619	**rpm_remop**	**B**	**-**		
L0620	delv_lside	N1	-		
L0621	mhole_mon	N1	x	CSetGeneralNonWM.iMonManlid	Dome cover monitoring 0 none, free access 1 none, covers mechanically sealed 2 per compartment 3 common for all compartments
L0622	api_mon	B	x	CSetGeneralNonWM.bMonApi	API monitoring (of closed state)

06 TRUCK_SETUP (required)			Req.	Source / Data Generation	Description
L0623	bv_mon	N1	x	CSetGeneralNonWM.iMonButtomValve	Foot valve monitoring 0 none 1 pneumatic monitoring of "closed state" 2 pneumatic monitoring of "fully opened state" 3 combination of 1 and 2 4 electromechanical monitoring of "closed state" 5 electromechanical monitoring of "fully opened state" 6 combination of 4 and 5
L0624	cv_mon	N1	x	CSetGeneralNonWM.iMonCV	In line valve monitoring as L0623
L0624 to L0630 not supported					

Remarks:
Number of datasets: 1.

07 COMP_PROP (optional)	Not supported

Number of data sets: 0

10 METER_ID (required)			Req.	Source / Data Generation	Description
L1000	dataset_ID	N2	x	„10“	
L1001	timestamp	S	x	current time stamp read from MultiTask OS	
L1002	cntr_no	N8		CSetGeneralWM. sDeviceID	Metrological meter number
L1006	met_no	C16	x		Measuring point number

Number of data sets: 1

90 CALIBR (required)			Req.	Source / Data Generation	Description
L9000	dataset_ID	N2	x	„90“	
L9001	timestamp	S	x	current time stamp read from MultiTask OS	
L9002	cntr_no	N8	x	CSetGeneralWM. sDeviceID	Metrological meter number
L9003	met_no	C16	x		Measuring point number
L9004	met_prod	N3	x		Metrological product code according to EN 14116 Message #2
L9005	base_temp	N3.1	x		Base temperature for this product (if temperature compensation is enabled)
L9006	density_t0	N4.1	M		Density in kg m-³ at base temperature
L9007	comp_coeff	N1.4			Thermal coefficient of expansion for this product in %/°C
L9008	tvc_type	N1	x		Temperature compensation method for this product 0 no temperature compensation 1 Method B according to DIN 51757 3 Method D according to DIN 51757 4 Method X according to DIN 51757 5 linear (using L9007)
L9009	cal	N2.4	x		Main meter factor (determined during official preverification

Number of data sets: as provided by the individual data sources.

91 NODE_CONF (required)			**Source / Data Generation**
L9100	dataset_ID	N2	„91“
L9101	timestamp	S	current time stamp read from MultiTask OS
L9102	dev_id	N3	See L0108; device id of the MultiTask
L9103	*node_0_id*	C20	Identifier of top-level node, e. g. “ADMIN”
L9104	*node_1_id*	C20	Identifier of node level 1 e. g. “CLOCK”; empty if not applicable
L9105	*node_2_id*	C20	Identifier of node level 2; empty if not applicable
L9106	*node_3_id*	C20	Identifier of node level 4; empty if not applicable
L9107	*var_id*	C20	Identifier of variable
L9108	*var_type*	C3	One of {“B”, “Nx”, “Nxy”, ”Cx”, “S”, “D”, “T”, “Hx”}
L9109	*format_x*	N2	Specifier “x” for “Nx”, “Nxy”, ”Cx”, “Hx” if applicable
L9110	*format_y*	N2	Specifier “y” for “Nxy” if applicable
L9111	*val_B*	B	Value if var_type = “B”
L9112	*val_Nx*	N99	Value if var_type = “Nx”
L9113	*val_Nxy*	N99.99	Value if var_type = “Nxy”
L9114	*val_Cx*	C99	Value if var_type = “Cx”
L9115	*val_S*	S	Value if var_type = “S”
L9116	*val_D*	D	Value if var_type = “D”
L9117	*val_T*	T	Value if var_type = “T”
L9118	*val_Hx*	H99	Value if var_type = “Hx”

Number of data sets: 1 per config variable as listed below.

92 NODE_STAT (required)			**Source / Data Generation**
L9200	dataset_ID	N2	„92“
L9201	timestamp	S	current time stamp read from MultiTask OS
L9202	dev_id	N3	See L0108; device id of the MultiTask
L9203			See #L91
…			

Number of data sets: 1 per config variable as listed below.

4.4.4.2 Definitions for L_File Records

08 GPS_INFO			**Source / Data Generation**	**Description**
L0800	dataset_id	N2	“8”	
L0801	timestamp	S	CGps. oDateTime	
L0802	geo_long	N4.6	CGps. dLatitude	Longitude in degrees (positive values for east, negative values for west)
L0803	geo_lat	N3.6	CGps. dLongitude	Latitude in degrees (positive values for north, negative values for south)
L0804	geo_hght	N4	CGps.dAltitude	Altitude above sea level in metres

08 GPS_INFO			**Source / Data Generation**	**Description**
L0805	geo_qlty	N2	CGps.iValidity	Quality of position data 0 no position data or unknown quality 1 Matching Postcode only 2 Matching Town only 3 Matching Postcode and Town (uncertain) 4 Matching Postcode and Town (exact match) 5 Matching up to Town district (uncertain) 6 Matching up to Street (uncertain) 7 Matching up to Street No. (uncertain) 8 Matching up to Town District (exact match) 9 Matching up to Street (exact match) 10 Matching up to Street No. (exact match) 11 GPS positioning (unknown quality) 12 Manually assigned in digital map 13 GPS positioning (dead reckoning) 14 GPS positioning (single measurement) 15 GPS positioning (differential) 16 GPS positioning (averaged) If no GPS data available: 0, else 14
L0806	sat_in_use	N2	CGps.iSatellites	Number of satellites used
L0807	hdop	N4	CGps.dHorPosError	horizontal positioning error in metres (estimated from HDOP)
L0808	time_diff	N3	CGps.iTimeOffset	Time difference in seconds (local, GPS synchronized time — system time) If no GPS data avaliable: 0, else GPS time minus RTC value.
L0809	speed	N3	CGps.dSpeed	speed in km/h
L0810	drv_dir	N3	CGps.dCourse	Driving direction, in degrees (0 to 359) (at rest, keep last direction before stop)

09 SYS_ERR			**Source / Data Generation**
L0900	dataset_id	N2	"9"
L0901	timestamp	S	time of registration of the error condition
L0902	dev_id	N3	See Table 4: NAK-IDs and Error Codes
L0903	error_code	N5	
L0907	err_add	N2	See Table 4: NAK-IDs and Error Codes
L0908	err_info*0*	C20	
…	…		
L090*n*	err_info*n*		

☞ This field will be filled with an appropriate error code record directly when a NAK-ID frame was sent to the OBC or at the moment an error occurs. The relationship between NAK-IDs and error codes (is shown in Table 4: NAK-IDs *and Error Codes*" / p. 328)

NAK-ID	**Description**	**dev_id**	**error_code L0903**	**err_add**	**err_info*0*…err_info*n***

<table>
<tr><th></th><th></th><th></th><th>Group</th><th>Source</th><th>Type</th><th></th><th></th></tr>
<tr><td>10100</td><td>Unknown opcode received</td><td rowspan="31">node(TCD) see #L0108</td><td rowspan="31">0</td><td rowspan="14">01</td><td rowspan="14">02</td><td rowspan="31">as needed for description (20 char each)</td><td rowspan="31"><NAK-ID> + “:” + description</td></tr>
<tr><td>10101</td><td>Unknown subnode or variable accessed</td></tr>
<tr><td>10102</td><td>Transmission of frame failed</td></tr>
<tr><td>10103</td><td>Type identifier not correct</td></tr>
<tr><td>10106</td><td>Array index out of boundaries</td></tr>
<tr><td>10107</td><td>Frame exceeded internal buffer size</td></tr>
<tr><td>10200</td><td>Assigned value was trimmed to fit buffer</td></tr>
<tr><td>10201</td><td>Assignment denied, incorrect frame</td></tr>
<tr><td>10202</td><td>Assignment denied, value out of boundaries</td></tr>
<tr><td>10203</td><td>Assignment denied, invalid value type</td></tr>
<tr><td>10300</td><td>Write access denied, variable read-only</td></tr>
<tr><td>10301</td><td>Write access denied, because subnode/variable in use</td></tr>
<tr><td>10302</td><td>Write access denied, list capacity exceed</td></tr>
<tr><td>10400</td><td>Time/date change not permitted out of bounds</td></tr>
<tr><td>10500</td><td>Printer occupied</td><td rowspan="5">02</td><td>00</td></tr>
<tr><td>10501</td><td>No paper in printer</td><td>02</td></tr>
<tr><td>10502</td><td>Printer offline</td><td>01</td></tr>
<tr><td>10503</td><td>Printer not reserved for OBC</td><td rowspan="2">00</td></tr>
<tr><td>10504</td><td>No answer from printer</td></tr>
<tr><td>10600</td><td>Subnode/variable not capable of notification</td><td rowspan="12">01</td><td rowspan="12">02</td></tr>
<tr><td>10700</td><td>Not enough disk space</td></tr>
<tr><td>10701</td><td>Invalid filename</td></tr>
<tr><td>10702</td><td>Invalid file access mode</td></tr>
<tr><td>10703</td><td>File doesn’t exist</td></tr>
<tr><td>10704</td><td>File is read only</td></tr>
<tr><td>10705</td><td>No wildcards allowed</td></tr>
<tr><td>10706</td><td>Directory doesn’t exist</td></tr>
<tr><td>10707</td><td>Can’t create directory</td></tr>
<tr><td>10708</td><td>No file or directory given</td></tr>
<tr><td>10709</td><td>File/Directory not opened</td></tr>
<tr><td>10710</td><td>Relative path not permitted</td></tr>
</table>

Table 2: NAK-IDs and Error Codes

11 TRANSFER			**Source / Data Generation**	**Description**
L1100	dataset_ID	N2	“11”	
L1101	end_time	S		
L1102	rcpt_no	N6		
L1103	dl_type	N1		
L1104	met_prod	N3		
L1105	cntr_no	N8		
L1106	unit_msr	N1		
L1107	vol_grs	N8.2		
L1108	vol_t0	N8.2		
L1109	avg_temp	N4.1		
L1110	cpt_no	N2		
L1111	del_path	N2		
L1112	add_no	N3		
L1115	add_vol	N4.3		
L1116	vol_sum	N10.2		
L1117	start_time	T		
L1118	ord_amnt	N6.2		

11 TRANSFER			**Source / Data Generation**	**Description**
L1122	vol_weight	N6.2		
L1124	ord_no	C8		
L1125	pmp_rate	N4		
L1126	del_stat	N1		
L1127	approved	B		
L1140	metp_no	C16		

TBD

Collected data from deliveries. Number of records of this type equals number of deliveries.

12 DELV_MODE		

13 COMP_CONT			**Source / Data Generation**	**Description**
L1300	dataset_id	N2	"13"	
L1301	timestamp	S	time of registration of the error condition	
L1302	cpt_no	N3	Number of the compartment	
L1304	met_prod	N3		
L1305	unit_msr	N1	"0"	
L1306	vol_grs	N6.2		

TBD

14 DENSITY	**No record generated.**	

15 INCLINOM0	**No record generated.**	

16 BATTVOLT	**No record generated.**	

17 PRESSURE	**No record generated.**	

20 EVENT	**TBD**	

22 SHIFT	**No record generated**	

23 ODOMETER	**No record generated.**	

24 DISTANCE	**No record generated.**	

25 AUTEHTLV	**No record generated.**	

26 DATETIME	**No record generated.**	

40 COMP_STAT			**Source / Data Generation**	**Description**
L4000	dataset_id	N2	"40"	
L4001	timestamp	S	from current RTC value	

40 COMP_STAT			Source / Data Generation	Description
L4002	cpt_no	N2	Number of the compartment	
L4003	met_prod	N3	TBD siehe Comp_setup	
L4004	cpt_state	N1		
L4005	seal_state	N1		

41 PROD_INFO		

42 ACC_STAT	Manufacturer specific extensions for L4203:

Number	Source Device	Description
101	LGM	State of DIP switch has changed
102		State of wetleg sensor digital input has changed
103		State of temperature sensor has changed
104		State of inclination sensor has changed
105		State of level sensor has changed
106		State of level sensor has changed
107		State of level interface digital input has changed
108		State of valve interface digital input has changed
109		Read / Write parameter chipcard (L4204=0: Read, L4204=1: Write)
110		Read /Write gauging table chipcard (L4204=0: Read, L4204=1: Write)
111		Read / Write slope table chipcard (L4204=0: Read, L4204=1: Write)
112		Read /Write layout chipcard (L4204=0: Read, L4204=1: Write)
108…199		Reserved for LEVEL extensions
301	COP	AccuLoad connection status
302		State of DIP-switch has changed
303		Hall sensor magnet code
305		Number of overfill preventions in use
306		State of valve interface digital input has changed
307		State of wetleg sensor digital input has changed
301…300	COP	Reserved for COP extensions

Manufacturer specific extensions for L4204:

Number	Source Device	Description
51	LGM	No error
52		Timeout
53		Transmission checksum error
54		General failure
55		RAM error
56		Parameter checksum error
57		Float gauge position
58		Reference position
59		Float gauge installation
60		Reference installation
61		Overflow

TBD

45 PID_INFO	**Not supported.**	

46 BYPASS	**TBD**	

47 ABORT	**TBD**	

51 GSM_STATUS	**Not supported.**	

52 GSM_CALL	**Not supported.**	

53 SMS_CALL	**Not supported.**	

93 DR_ACT	**TBD**	

5 EMIS2 (TDL - E7 Protocol / OBC)

5.1 E7 Protocol – TDL formatted data

As an alternative to the “DOK-411 Communication“, there is the additional possibility since the emergence of the EMIS software version 3.12 to recall some information in the TDL format (see DIN 26051 1 and DIN 26051 2). The protocol used here varies slightly from the one described above. Communication is done in keeping with the E7 specification. This involves a protocol oriented to the DOK-411 format which 7 leading European manufacturers commercially involved with communication on the tank truck have agreed to. The E7 specification is available as a separate document.

Definitions are provided for several sub-nodes in a further "TDL" designated node. The EMIS currently supports the L_FILE, SYSTEM, GPS, PRN and AUX sub-nodes.

5.1.1 TDL,L_FILE

In a similar manner to QAS,EVENT, the TDL,L_FILE node can recall setup and event information.

Given that basically no other data is available, the TDL formatted output solely represents data conversion from the setup or event table (see chapter 3.2.2.1.2 "Setup table" / page 62and chapter 3.2.2.1.3 "Event table" / page 63).

The entry in the setup table (TDL Identifier 800 Field index) specifies the index of the individual setup information in the TDL string (see Setup information TDL Identifier 800).

Example from the setup table:

Setup description	TYPE	VALUE1	VALUE2		TDL Identifier 800 field index
Number of output drivers	SET02	IO	0 to 4	e.g. 2	4

REPORT,TDL,L_FILE=800,20060106143800,11,FAS,**2**,0,0, …..

In the event table (chapter 3.2.2.1.3 "Event table" / page 63) conversion into the TDL format is listed in the line below.

Example from event table:

Ereignis / Sensor	TYPE	VALUE1		VALUE2	
API coupling (Sensor status)	AST	*CoNo*	e.g. 3	"L" "U"	= locked = unlocked
TDL 42,S,V1,2,(1) (2) >> V2[..]					

The API coupling for Compartment 3 was closed at 17:40 on 11/10/2005

- Event report line from REQUEST,QAS,EVENT query:

  REPORT,QAS,EVENT,TYPE="AST";VALUE1="**3**";VALUE2="**L**";
  DATE="11.10.2005";TIME="17:40"

- Event report line from REQUEST,TDL,L_FILE query:

  REPORT,TDL,L_FILE=42,20051011174000,**3**,2,**1**

A description of how the individual event table information is converted is given in chapter 3.2.2.1 "Events" / page 60 (Information on converting DOK-411 in TDL data sets).

Not all setup information or events occurring in the system are defined in DIN 26501. For those missing use is made of the 8xx Sening® identifier to establish specific telegrams.

5.1.1.1 TDL,L_FILE - Identifier 8xx

Thanks to DIN 26051-2 (TDL-2non-used identifiers and/or manufacturer-specific data sets can be used. To allow this identifier to distinguish between differing data set types, the following holds good for Sening®:

- Field index 0 Identifier 8xx (DIN 26051-2)
- Field index 1 Time stamp (DIN 26051-1)
- Field index 2 CAN node ID of the QAS (DIN 26051-2)
- Field index 3: Manufacturer abbreviated identifier „FAS“
- Field index 4 .. n: data

Depending on type, the data (Field index 4 to Field index n) can be differentiated into content, number and format.

5.1.1.2 Sening® TDL Identifier 8xx in general

Identifier	Identifier name	Record configuration	Field index	Description
8xx	NODE_CONF	8xx,S,N,C,N,..	0	Identifier 8xx
			1	DIN 26051-1 time stamp
			2	Manufacturer-specific device configuration Code number as per DIN26051-2 #L108 (CAN-Node-ID)
			3	Manufacturer abbreviated code DIN26051 #L102 “FAS“
			4 .. n	Data

TDL Identifier 800 – Setup information

Identifier	Identifier name	Record configuration	Field index	Description
800	NODE_CONF	800,S,N,N,N,N,N, N,N,N,N,N, N,N,N,N,N, N,N,N,N,N, N,N,N,N,N, N,N	2	Manufacturer-specific device configuration Code number as per DIN26051-2 #L108 (QAS CAN-Node-ID)
			3	Manufacturer code DIN26051 #L102 “FAS“
			4	Number of output drivers 0 to 4
			5	Dipstick 0 = No 1 = Yes
			6	Tank truck type 0 = Direct delivery 1 = Truck with metering packages 2 = Hybrid vehicle
			7	Number of compartments 01 to 24
			8	Number of overfill prevention devices 0 to 4
			9	Footvalve pressure balanced 0 = No 1 = Yes
			10	Monitor pipeline fill level 0 = No 1 = Yes
			11	Double sensors for remaining quantity 0 = No 1 = Yes
			12	Separate in-line valve controller 0 = No 1 = Yes
			13	Armature cabinet locking device 0 = No 1 = Yes
			14	Loading mode 0 = Truck 1 = Compartment
			15	Switch on filling release valve when… 0 = Loading mode 1 = Connected

Identifier	Identifier name	Record configuration	Field index	Description
			16	Switch off filling release valve given… 0 = Compartment fault 1 = Loading fault 2 = System fault
			17	Automatic opening 0 = No 1 = Yes 2 = Not with manual entry of loading plan
			18	Close compartment after loading 0 = No 1 = Yes
			19	Compartment empty test 0 = No 1 = Yes without override 2 = Yes with override
			20	Leave compartment open after empty test 0 = No 1 = Yes
			21	Delivery on filling side 0 = No 1 = Yes
			22	Dome cover sensors present 0 = No 1 = Yes
			23	API coupling sensors present 0 = No 1 = Yes
			24	Foot valve sensors present 0 = No 1 = Yes
			25	In-line valve sensors present 0 = No 1 = Yes
			26	Overfill protector sensors present 0 = No 1 = Yes
			27	Sensor for left armature compartment flap present 0 = No 1 = Yes
			28	Sensor for right armature compartment flap present 0 = No 1 = Yes
			29	Sensor for water detector present 0 = No 1 = Yes

5.1.2 TDL Identifier 800 – Event information

Valve Driver Digital Input - VDI

Identifier	Identifier name	Record configuration	Field index	Description
820	NODE_CONF	820,S,N,C,N,N	4	Valve driver incoming number
			5	Action

Wetleg Digital Input - WDI

Identifier	Identifier name	Record configuration	Field index	Description
821	NODE_CONF	821,S,N,C,N,N	4	Wetleg interface incoming number
			5	Action

AS Amplifier OPE

Identifier	Identifier name	Record configuration	Field index	Description
822	NODE_CONF	822,S,N,C,N	4	Number of the AS amplifiers used

Error Staus Quality Assurance - EQS

Identifier	Identifier name	Record configuration	Field index	Description
823	NODE_CONF	823,S,N,C,C,C	4	Error string 1
			5	Error string 2

ANA dead man's switch - DMS

Identifier	Identifier name	Record configuration	Field index	Description
824	NODE_CONF	824,S,N,C,N	4	ANA status

ACCU-Load Communication - ALC

Identifier	Identifier name	Record configuration	Field index	Description
825	NODE_CONF	825,S,N,C,N,N	4	Connection status

Water sensor - WTR

Identifier	Identifier name	Record configuration	Field index	Description
826	NODE_CONF	826,S,N,C,N,N	4	Compartment no.
			5	Sensor status

5.1.3 TDL Identifier 850 - new event information

EMIS "passes on" the data received from the QAS given a QAS,EVENT request to the OBC, i.e. no analysis or formatting takes place. This means that unknown events from revised QAS versions can be easily handed on to the OBC. In contrast for the TDL output, the QAS data is changed into a new format in the EMIS – something which of course is only possible with known data. To output new and thus unknown data in the TDL format, the identifier is outputted with the possible 3 parameters in 3 strings.

Identifier	Identifier name	Record configuration	Field index	Description
850	NODE_CONF	850,S,N,C, C,C,C	4	TYP (see chapter 3.2.2.1 "Events" / page 60)
			5	VALUE1 (see chapter 3.2.2.1 "Events" / page 60)
			6	VALUE2 (see chapter 3.2.2.1 "Events" / page 60)

Example:

Event / Sensor	TYPE	VALUE1	VALUE2
XXX-example	XXX	*CoNo* e.g. 3	“AB“ = passive “CD“ = active “EF“ = not connected “GH“ = short-circuited “IJ“ = invalid / unknown
TDL unknown			

- Event report line from query REQUEST,QAS,EVENT:

  REPORT,QAS,EVENT,TYPE=“**XXX**“;VALUE1=“**3**“;VALUE2=“**GH**“;
  DATE=“11.10.2005“;TIME=“17:40“

- Event report line from query REQUEST,TDL,L_FILE:

  REPORT,TDL,L_FILE=850,20051011174000,11,FAS,**XXX**,**3**,**GH**

Event table arranged by TDL identifiers

	TYPE	V1	V2
GPO data (NOT up to date)			
8,S,+23.33016,+42.712133,,3			
	GPO	North–South data	East–West data
GPS data (up to date)			
8,S,+23.33016,+42.712133,,6			
	GPS	North–South data	East–West data
Power ON / OFF			
20,S,49			
	PWR	„0“ = switched off	
20,S,16			
	PWR	„1“ = switched on	

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	TYPE	V1	V2
COMPARTMENT STATUS			
40,S,V1, ,0			
	CFS	*CoNo*	“0“ = empty
40,S,V1, ,1			
	CFS	*CoNo*	“1“ = not empty
40,S,V1, ,1			
	CFS	*CoNo*	“2“ = remaining quantity (not empty)
40,S,V1			
	CFS	*CoNo*	“3“ = unknown
40,S,V1, ,2			
	CFS	*CoNo*	“4“ = full
40,S,V1			
	CFS	*CoNo*	“5“ = fault
SEAL STATUS			
40,S,V1, , ,2			
	CST	*CoNo*	“E“ = empty (not sealed)
40,S,V1, , ,2			
	CST	*CoNo*	“R“ = remaining quantity (not sealed)
40,S,V1, , ,1			
	CST	*CoNo*	“S“ = sealed
40,S,V1, , ,3			
	CST	*CoNo*	“L“ = second sealing when loading
40,S,V1, , ,3			
	CST	*CoNo*	“D“ = second sealing when discharging
40,S,V1, , ,0			
	CST	*CoNo*	„?“ = unknown
MANUAL ENTRY OF LOADING PLAN			
41,S,V1,V2, , , ,8			
	MLI	*CoNo*	*PrCo*
DISCHARGE			
41,S, , ,0, , , ,V2 [3)]			
	TKNG	“0“ = End of discharge	AsNo or CoNo if no AS installed
41,S,V1, ,0, , , ,V2 [3)]			
	TKNG	CoNo *at start of discharging*	AsNo or CoNo if no AS installed
OVERRIDE (AT DISCHARGE)			
41,S,V1, ,0, , ,8			
	OVR	*CoNo*	“0“ = end of override
41,S,V1, ,0, , ,8,V2 [3)]			
	OVR	*CoNo*	*AsNo* or CoNo if no AS installed
LOADING MODE			
41,S,V1, ,1			
	PKNG	*CoNo*	“0“ = end of loading
41,S,V1,V2,1			

	TYPE	V1		V2	
	PKNG	*CoNo*		*PrCo*	at start of loading
UNCODED LOADING					
41,S,V1, ,1, , , ,1 [3)]					
	UCL	*CoNo*		“0“	= end of loading
41,S,V1,V2,1, , , ,1 [3)]					
	UCL	*CoNo*		PrCo	at start of loading
1 in [8] denotes uncoded loading					
PRODUCT CODE CORRECTION (WHILE LOADING)					
41,S,V1, ,1, , ,8					
	PCC	*CoNo*		“0“	= end of loading
41,S,V1,V2,1, , ,8					
	PCC	*CoNo*		PrCo	at start of loading
FOOTVALVE (SENSOR STATUS)					
42,S,V1,1,1					
	BST	*CoNo*		“L“	= closed (pressure low)
42,S,V1,1,2					
	BST	*CoNo*		“H“	= open (pressure high)
API COUPLING (SENSOR STATUS)					
42,S,V1,2,1					
	AST	*CoNo*		“L“	= locked
42,S,V1,2,2					
	AST	*CoNo*		“U“	= unlocked
DOME COVER (SENSOR STATUS))					
42,S,V1,3,1					
	DST	*CoNo*		“L“	= locked
42,S,V1,3,2					
	DST	*CoNo*		“U“	= unlocked
VAPOR RECOVERY HOSE MONITORING					
42,S, ,5,2,V1					
	VRC	“1-4“	GPS connection No. 1-4	“0“	= interrupted
42,S, ,5,1,V1					
	VRC	“1-4“	GPS connection No. 1-4	“1“	= connected
42,S, ,5,2,5					
	VRC	Collective GPS connection		“0“	= interrupted
42,S, ,5,1,5					
	VRC	Collective GPS connection		“1“	= connected
HOSE CONDUCTIVGITY TEST (VAPOUR RECOVERY AND DISCHARGE HOSE)					
42,S, ,5,2, , ,0110 [3)]					
	GTR	“0“	= Fault	Example: 0110	
42,S, ,5,1, , ,1001 [3)]					
	GTR	“1“	= OK	Example: 1001	
ARMATURE CABINET FLAP (SENSOR STATUS)					
42,S, ,7,1,1					
	CAB	“L“	= left	“0“	= closed
42,S, ,7,1,2					
	CAB	“R“= right		“0“	= closed
42,S, ,7,2,1					

	TYPE	V1	V2
	CAB	"L" = left	"1" = open
42,S, ,7,2,2			
	CAB	"R"= right	"1" = open
IN-LINE VALVE (SENSOR STATUS)			
42,S,V1,11,1			
	LST	*CoNo*	"L" = closed (pressure low)
42,S,V1,11,2			
	LST	*CoNo*	"U" = open (pressure high)
RESTMENGENSENSOR			
42,S,V1,13,2			
	NSI	Sensor number	"0" = dry
42,S,V1,13,1			
	NSI	Sensor number	"1" = wet
42,S,V1,13,6			
	NSI	Sensor number	"2" = interrupted
42,S,V1,13,5			
	NSI	Sensor number	"3" = short-circuit
OVERFILL PROTECTION DEVICE (SENSOR STATUS)			
42,S,V1,17,1			
	COF	*CoNo. for which the overfill protection was triggered*	
OVERFILL PREVENTION LEVEL SENSOR			
42,S, ,20,2,1, 1 [3)]			
	OPD	Level sensor no.	"0" = interrupted
42,S, ,20,1,2, 1 [3)]			
	OPD	Level sensor no.	"1" = connected
42,S, ,20,8,1, 1 [3)]			
	OPD	Level sensor no.	"2" = released
42,S, ,20,9,2, 1 [3)]			
	OPD	Level sensor no.	"3" = NOT released
42,S, ,20,0,1, 1 [3)]			
	OPD	Level sensor no.	"4" = defective
1 in [7] denotes overfill prevention level sensor			
OVERFILL PREVENTION DEVICE TAG (SENSOR STATUS)			
42,S, ,20,8,1, 2 [3)]			
	TOP	*TAG No*	"2" = released
42,S, ,20,9,2, 2 [3)]			
	TOP	*TAG No*	"3" = NOT released
42,S, ,20,0,3, 2 [3)]			
	TOP	*TAG No*	"4" = defective
2 in [7] denotes overfill prevention TAG			
VAPOR RECOVERY OVERPRESSURE (SENSOR)			
42,S, ,21,2			
	VEP	"0" = NO overpressure	
42,S, ,21,1			
	VEP	"1" = overpressure	
VAPOR RECOVERY UNDERPRESSURE (SENSOR)			
42,S, ,22,2			

	TYPE	V1	V2
	VNP	"0" = NO overpressure	
42,S, ,22,1			
	VNP	"1" = overpressure	
LOCKING BRAKE (SENSOR STATUS)			
42,S, ,25,8			
	SPB	"0" = released	
42,S, ,25,9			
	SPB	"1" = engaged	
FOOTVALVE LEFT = STANDARD (SOLENOID VALVE)			
43,S,V1,1,1			
	BVL	*CoNo*	"0" = closed
43,S,V1,1,2			
	BVL	*CoNo*	"1" = open
FOOTVALVE RIGHT (SOLENOID VALVE)			
43,S,V1,1,1,2			
	BVR	*CoNo*	"0" = closed
43,S,V1,1,2,2			
	BVR	*CoNo*	"1" = open
INTERLOCK RELEASE (LEFT + RIGHT) (SOLENOID VALVE)			
43,S, ,7,1			
	ILP	"0" = KEINE Freigabe	
43,S, ,7,2			
	ILP	"1" = Freigabe	
IN-LINE VALVE (SOLENOID VALVE)			
43,S,V1,11,1			
	LMV	*CoNo*	"0" = closed
43,S,V1,11,2			
	LMV	*CoNo*	"1" = open
SOLENOID VALVE			
43,S,0,19,1,V1			
	VEN	Valve number	"0" = switched off (closed)
43,S,0,19,2,V1			
	VEN	Valve number	"1" = switched on (open)
MAGNET CODE API HALL SENSOR			
45,S, ,V1, , ,1, ,0			
	HMC	*CoNo*	"0" = NO code
45,S, ,V1, , ,1, ,V2			
	HMC	*CoNo*	Magnet-Code (KEIN PrCo !!)
MAGNET CODE AS AMPLIFIER (LEVEL SENSOR)			
45,S, ,V1, , ,2, ,0			
	OMC	Level sensor no.	"0" = KEIN Code
45,S, ,V1, , ,2, ,V2			
	OMC	Level sensor no.	*Magnet code (NO PrCo !!)*
TAG PRODUCT CODE			
45,S, ,V1, , ,4			
	TPC	*TAG-No*	"00 00 00" = NO code
45,S, ,V1, , ,4, ,56, , ,12,34			

	TYPE	V1		V2	
	TPC	*TAG-No*		Example: “12 34 56“	
NOMIX OPERATING MODE					
47,S, , ,0,0 3)					
	SCU	“D“	= discharge mode	“Q“	= default e.g. for magnet codes
47,S, , ,0,1 3)					
	SCU	“D“	= discharge mode	“N“	= NoMix TAG codes
47,S, , ,1,0 3)					
	SCU	“L“	= loading mode	“Q“	= default e.g. for magnet codes
47,S, , ,1,1 3)					
	SCU	“L“	= loading mode	“N“	= NoMix TAG codes
47,S, , ,2 3)					
	SCU	“M“	= Menu		
47,S, , ,3 3)					
	SCU	“R“	= Remote Access		
47,S, , ,4 3)					
	SCU	“S“	= Standby		
47,S, , ,5 3)					
	SCU	“E”	= Error		
CENTRAL UNIT DIP-SWITCH					
47,S,2,10,V1,0 3)					
	DIP	*“n“*	*= switch no’s 1 to 8*	„0“	= OFF
47,S,2,10,V1,1 3)					
	DIP	*“n“*	*= switch no’s 1 to 8*	„1“	= ON
VALVE DRIVER DIGITAL INPUT					
820,S,*NoID*,FAS,1,0 4)					
	VDI	“1“	= external setup key switch	“0“	= passive
820,S,*NoID*,FAS,1,1 4)					
	VDI	“1“	= external setup key switch	“1“	= active
820,S,*NoID*,FAS,2,0 4)					
	VDI	“2“	= external ANA	“0“	= passive
820,S,*NoID*,FAS,2,1 4)					
	VDI	“2“	= external ANA	“1“	= active
WETLEG DIGITAL INPUT					
821,S,*NoID*,FAS,1,0 4)					
	WDI	“1“	= compressed air sensor	“0“	= Pressure Low / passive
821,S,*NoID*,FAS,1,1 4)					
	WDI	“1“	= compressed air sensor	“1“	= Pressure High / active
821,S,*NoID*,FAS,2,0 4)					
	WDI	“2“	= GPSÜ	“0“	= Pressure Low / passiv
821,S,*NoID*,FAS,2,1 4)					
	WDI	“2“	= GPSÜ	“1“	= Pressure High / aktiv
AS AMPLIFIER					
822,S,*NoID*,FAS,0 4)					
	OPE	“0“	= AS channels deactivated		
822,S,*NoID*,FAS,V1 4)					

	TYPE	V1	V2
	OPE	"n" = AS channels deactivated	
QUALITY ASSURANCE (ERROR STATUS)			
823,S,*NoID*,FAS, xy[:zz][xy], x:zz [4)]			
	EQS	String "xy[:zz][xy]"	String "x:zz"
DMS DEAD MAN'S SWITCH			
824,S,*NoID*,FAS,0 [4)]			
	DMS	"0" = ANA switched off	
824,S,*NoID*,FAS,1 [4)]			
	DMS	"1" = ANA switched on	
824,S,*NoID*,FAS,2 [4)]			
	DMS	"2" = ANA Alarm	
824,S,*NoID*,FAS,3 [4)]			
	DMS	"3 = ANA emergency off	
ACCU LOAD COMMUNICATION (CONNECTION TO THE ACCU LOAD)			
825,S,*NoID*,FAS,V1 [4)]			
	ALC	"0" = interrupted	
825,S,*NoID*,FAS,V1 [4)]			
	ALC	"1" = connected	
WATER DETECTION (SENSOR STATUS)			
826,S,*NoID*,FAS,V1,0 [4)]			
	WTR	*CoNo*	"0" = passive
826,S,*NoID*,FAS,V1,1 [4)]			
	WTR	*CoNo*	"1" = active (water in compartment)
826,S,*NoID*,FAS,V1,2 [4)]			
	WTR	*CoNo*	"2" = not connected
826,S,*NoID*,FAS,V1,3 [4)]			
	WTR	*CoNo*	"3" = short-circuit
826,S,*NoID*,FAS,V1,4 [4)]			
	WTR	*CoNo*	"4" = invalid / unknown

[3]) *manufacturer-specific data field expansion, which is not specified in this way in DIN 26051*

[4]) *new manufacturer-specific data field identifier 8xx (see appendix A …)*

CoNo Compartment number 1 to n, where 1 is the tank compartment following the driver's cab

AsNo Overfill prevention device number

PrCo Product code as per DIN 26051-1 (P53) can be extended or changed in the QAS sysstem

NoID CAN account number of the QAS unit (typical = 11)

Example for a TDL,L_FILE request

Direction	Telegram
EMIS	REQUEST,TDL,L_File
OBC	<ACK>
OBC	REPORT,TDL,L_FILE=0,20060106143641,300 // TDL-Version

Direction	Telegram
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=1,20060106143641,FAS,EMIS2,02.00EMIS2,,03.12EMIS2,,21,18DM0019
EMIS	<ACK>
OBC	<Syn>>
OBC	<Syn>>
OBC	REPORT,TDL,L_FILE=800,20060106143800,11,FAS,2,0,0,05,3,1,0,0,0,0,0,0,0,0,2,1,2,0,1,0,0,0,0,0,1,0 // Setup-Informationen
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=47,20060105161800,,,0,0 // 1. Event
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=43,20060105161800,0,19,2,8
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=43,20060105161900,0,19,1,8
EMIS	<ACK>
…	
OBC	REPORT,TDL,L_FILE=47,20060106143800,,,4
EMIS	<ACK>
OBC	<EOT>

Example for a TDL,L_FILE request with CAN cancellation by the OBC

Direction	Telegram
EMIS	REQUEST,TDL,L_File
OBC	<ACK>
OBC	REPORT,TDL,L_FILE=0,20060106143641,300 // TDL-Version
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=1,20060106143641,FAS,EMIS2,02.00EMIS2,,03.12EMIS2,,21,18DM0019
EMIS	<ACK>
OBC	<Syn>
OBC	<Syn>
OBC	REPORT,TDL,L_FILE=800,20060106143800,11,FAS,2,0,0,05,3,1,0,0,0,0,0,0,0,0,2,1,2,0,1,0,0,0,0,0,1,0
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=47,20060105161800,,,0,0 // 1. Event
EMIS	<ACK>
…	
OBC	REPORT,TDL,L_FILE=47,20060105161900,,,3 // letztes ACK-quittiertes EVENT
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=47,20060106143800,,,4 // NICHT-ACK-quittiertes EVENT
EMIS	<CAN> // Abbruch durch den OBC

Example for a TDL,L_FILE request with specification of start date and time

Direction	Telegram
EMIS	REQUEST,TDL,L_FILE,Date=20060101123000 // Start: 1.1.2006 12:30:00
OBC	<ACK>
OBC	REPORT,TDL,L_FILE=0,20060106143641,300 // TDL-Version
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=1,20060106143641,FAS,EMIS2,02.00EMIS2,,03.12EMIS2,,21,18DM0019
EMIS	<ACK>
OBC	<Syn>>
OBC	<Syn>>
OBC	REPORT,TDL,L_FILE=800,20060106143800,11,FAS,2,0,0,05,3,1,0,0,0,0,0,0,0,2,1,2,0,1,0,0,0,0,0,1,0 // Setup-Informationen
EMIS	<ACK>
OBC	REPORT,TDL,L_FILE=47,20060101161800,,,0,0 // 1. Event
EMIS	<ACK>
…	
OBC	REPORT,TDL,L_FILE=47,20060106143800,,,4
EMIS	<ACK>
OBC	<EOT>

Comments:

- EMIS can even transmit a <CAN> within a REPORT telegram (e.g. when after an XOFF the OBC does not transmit any XON for 5 sec. or when the menu is activated at the QAS. The transfer of ETX and BCC is then dropped.
- Following an XOFF from the OBC, EMIS does not transmit any <SYN>.
- A REPORT telegram from the OBC acknowledged with a <NAK> is repeated by the EMIS until it is acknowledged with an <ACK> or the transfer is ended with a <CAN>.
- Given that the OBC does not transmit any acknowledgement for a report telegram (e.g. no ACK), then <SYN> is transmitted every second until a <CAN> from the EMIS stops the transfer after 5 seconds.

5.1.4 TDL,SYSTEM

Requests on system information or information on faults having arisen can be made through the SYSTEM sub-node. As no separating character for various variables is envisaged in the E7 specification, there are no group requests. The SYSTEM sub-node variables must be requested one by one.

Example:

Direction	Telegram
EMIS	REQUEST,TDL,SYSTEM,TDL_Vers
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,TDL_VERS=0,20060104145323,300
EMIS	<ACK>
	…
EMIS	REQUEST,TDL,SYSTEM,TDL_Format
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,TDL_FORMAT=SDC
EMIS	<ACK>
	…
EMIS	REQUEST,TDL,SYSTEM,LastError
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,LASTERROR=00000:No Error
EMIS	<ACK>
	…
EMIS	REQUEST,TDL,SYSTEM,DateTime
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,DATETIME=20060104145401
EMIS	<ACK>
	…
EMIS	REQUEST,TDL,SYSTEM,Devices
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,DEVICES=1,20060104145420,FAS,EMIS2,02.00EMIS2,,03.12EMIS2,,21,18DL0001
EMIS	<ACK>
	…
EMIS	REQUEST,TDL,SYSTEM, Sys_Err
OBC	<ACK>
OBC	REPORT,TDL,SYSTEM,SYS_ERR=9,20060104145435
EMIS	<ACK>
	…

5.1.5 TDL,GPS

The two PDA and Trailer variables are available for the GPS information. In the trailer variable the EMIS can provide GPS information which it has received form an EMIS-connected GPS module.

Example:

Direction	Telegram
EMIS	REQUEST,TDL,GPS,Trailer
OBC	<ACK>
OBC	REPORT,TDL,GPS,TRAILER=8,20040901100139,-010.519043,+53.532944,0000,06,1.10,,4.4,201.0
EMIS	<ACK>

In the PDA variable, the OBC can provide the EMIS with GPS information given that the GPS module is installed at the OBC. Whilst EMIS saves this information, it does not use it for internal purposes.

Example:

Direction	Telegram
EMIS	SET,TDL,GPS,PDA=8,20050901160547,+010.999999,-53.000000,0000,06,1.10,,60.4,221.8
OBC	<ACK>
	…
EMIS	REQUEST,TDL,GPS,PDA
OBC	<ACK>
OBC	REPORT,TDL,GPS,TRAILER=8,20050901160547,+010.999999,-53.000000,0000,06,1.10,,60.4,221.8
EMIS	<ACK>

5.1.6 TDL,PRN,Port

- 1 to 10 values can be saved in the Port variable. However, the printer installed at the EMIS is always used irrespective of the value.
- EMIS does not support any sensoring on paper recognition at the printer. That is why the Status=0 (printer ready) is always returned even when no printer has been parameterized at the EMIS. The CMD variable is not supported i.e. whilst values can be written into the variable, they produce no effects.
- Apart from these limitations, the printer is controlled as described in the E7 specification.

5.1.7 TDL,AUX

- An output is supported by the QAS system (see QAS,AUX,OutRelease). This output can also be accessed with TDL,AUX,OUT(1). The output is passive at 0 and active at 1. TDL,AUX,OUT(10) is a special feature. The effect of this variable being set to 0 is for the event request to be transmitted with setup information. No setup information is transmitted should the variable have the 1 value (seeQAS,SETUP,NoSeP).

6 EMIS4 (FTL - Protocol / FTP-Server)

6.1 System Components with EMIS4

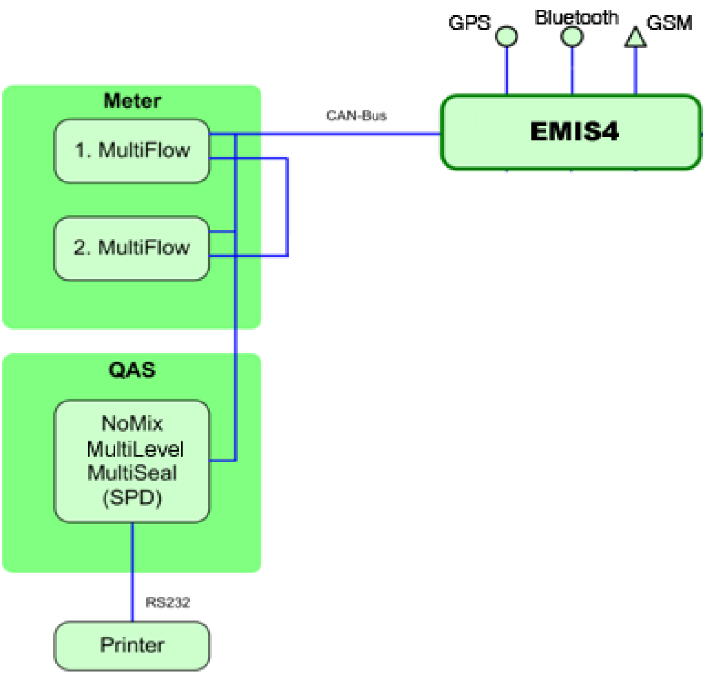


Fig. 63: System Components with EMIS4 and GPS

QAS = **Q**uality **A**ssurance **S**ystem

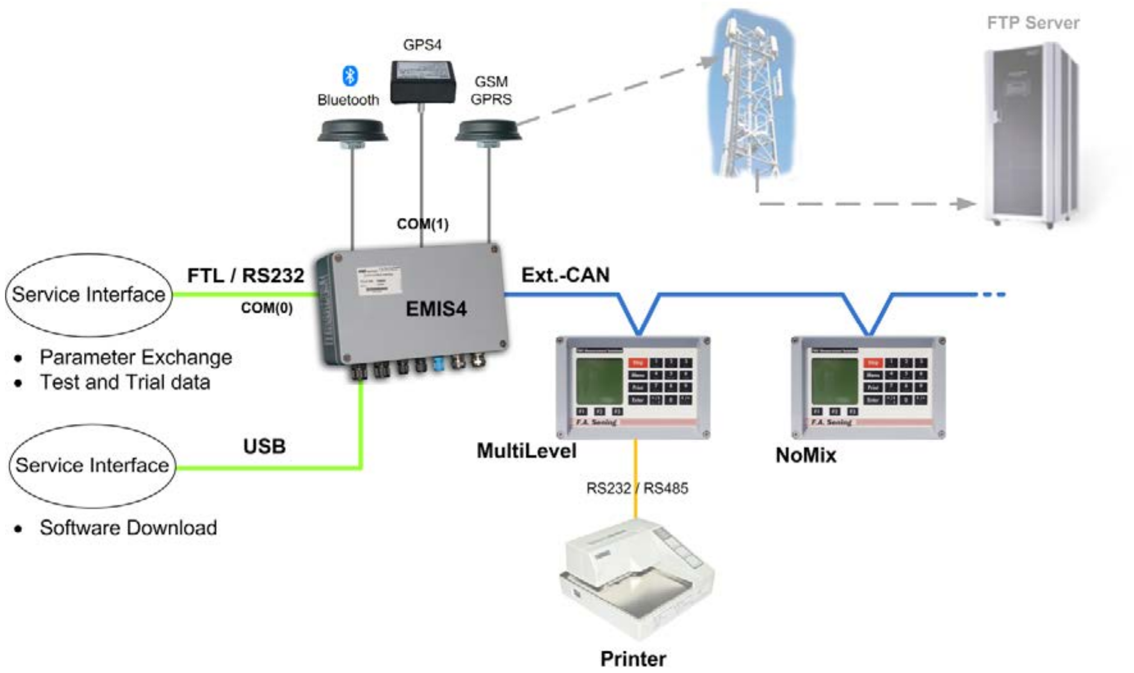


Fig.64: Arrangement with EMIS4

6.2 Communication and file format on the FTP server with EMIS

Storage of internal data on an FTP server is possible with the MultiFlow, MultiLevel, NoMix and MultiSeal (MultiLevel) tank truck system together with EMIS4. This logging of data records can be done automatically after certain events, or by manually activating the control console of individual devices.

A tracking system can also be activated in EMIS4 to store GPS data in a subdirectory of the FTP server at certain configurable intervals. This data can be synchronized with other data by timestamp.

The MultiFlow and all data records are stored in FTL format. To reduce data volumes, parameters can be set to allow this data to be transferred in compressed format (but not GPS data).

Each tank truck must have its own directory (home directory) set up on the server. A subdirectory named "GPS" must be created under the home directory. Each tank truck should have access only to these two directories (protected by name and password). Access rights in the home directory should be restricted to add and read only. This makes it impossible for EMIS4 to change or delete its own data or to write data to the directories of other tank trucks. In the GPS directory, access must be changed to modify since the GPS data records will be appended to an existing file.

In addition, an administrator should be set up on the office side to archive data and, if necessary, delete it.

MultiFlow, MultiLevel, NoMix and MultiSeal files are named according to the following pattern:

- **SSS t YYYYMMDD hhmmss.ftl**
  for uncompressed files

or

- **SSS t YYYYMMDD hhmmss.ftl.gz**
  for compressed files.

A different pattern applies to GPS files, because only one GPS file is created per day and tank truck. The individual GPS data records are appended at intervals.

- **GPS_YYYYMMDD.ftl**

Explanation of format:

SSS	=	data source
n	=	device number

t	=	data source number
YYYY	=	year
MM	=	month
DD	=	day
hh	=	hour
mm	=	minute
ss	=	second
ftl	=	filename extension
gz	=	filename extension for compressed file

6.2.1 File structure

The log file consists of a series of log records.

A log record consists of an arbitrary number of fields separated by commas [,] which may also be empty.

>> A data record is delimited with CR.
>> LF may follow optionally.
There is no explicit limit on data record size.

6.3 FTL - Data record structure

6.3.1 Fields

- The first field (field index 0)
  in a data record is numerical (an integer), and contains the identifier for the type of data record.
- The second field (field index 1)
  in every data record is a timestamp (S). The timestamp is valid until it is updated with a new one.
- All subsequent fields (field index 2 through n)
  are specified in Chapter x "xxx" / page xx. These tables contain a list of field types in the "Field name" and "Data type" columns in accordance with DIN 26051-1.
- The data record may contain more (custom) fields than described in the standard.

6.3.2 Field name

Each field name of a data record begins with the letter "L", and also receives a numerical code calculated by the formula

- (data record identifier) x (100) + (field index)

6.3.3 FTL Protocol

FTL is an acronym for **F**uel **T**ruck **L**ink, the interface between electronic system(s) on board of a tank vehicle (tank-vehicle-equipment) *(TVE* and any external computer, e.g. an on-board-computer installed in the driver's cabin, for illustration see the figure below.

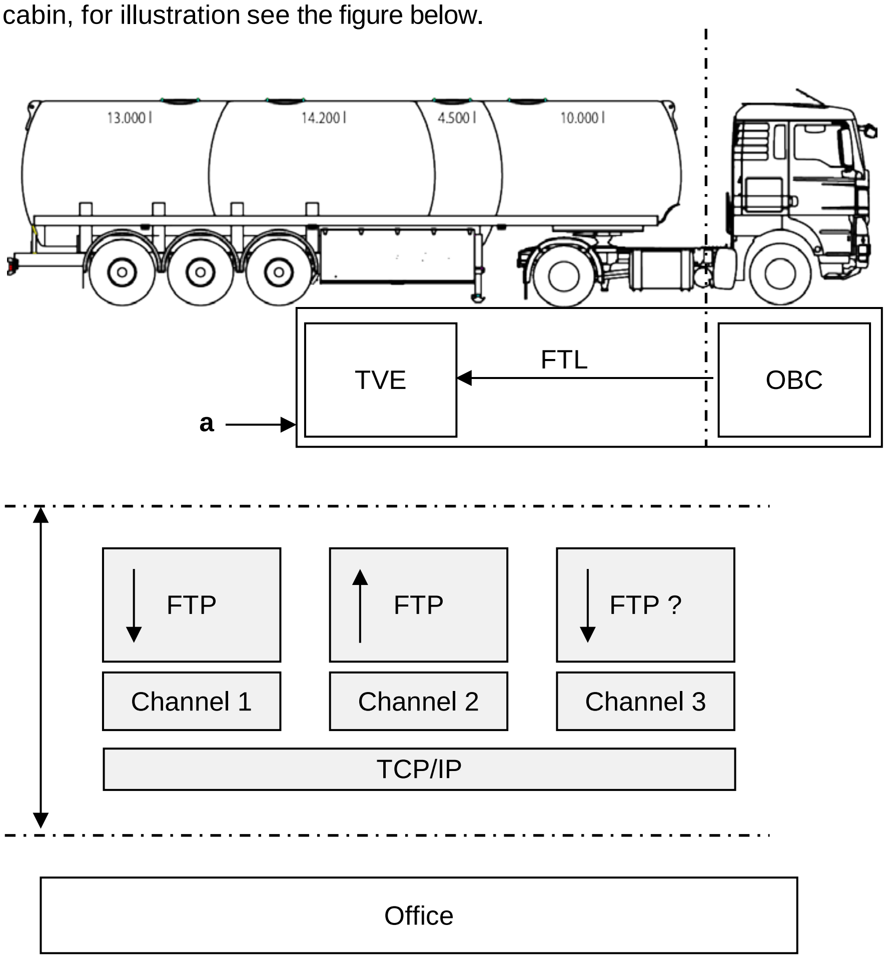


Fig. 65: FTL Protocol

- → direction of communication (client → server)
- **a** may be either two independent units or one single unit which incorporates both functions OBC and TVE.

6.3.4 Structure of the File Server

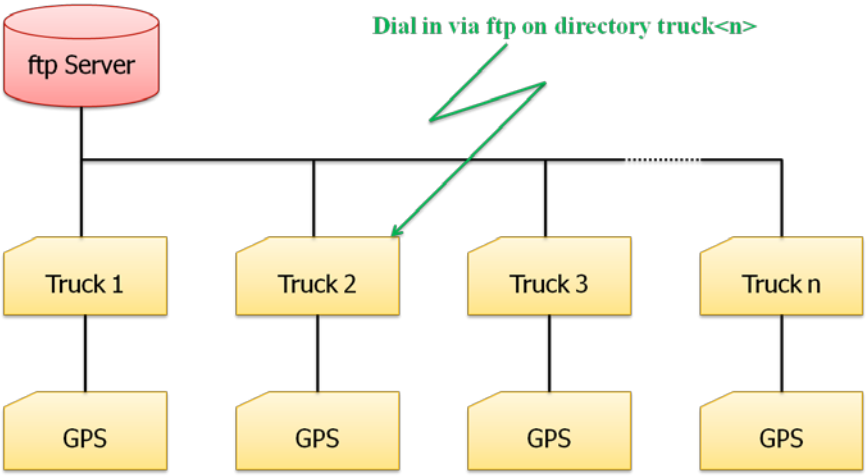


Fig. 3: Structure of the File Server

6.3.5 Structure of the data directory

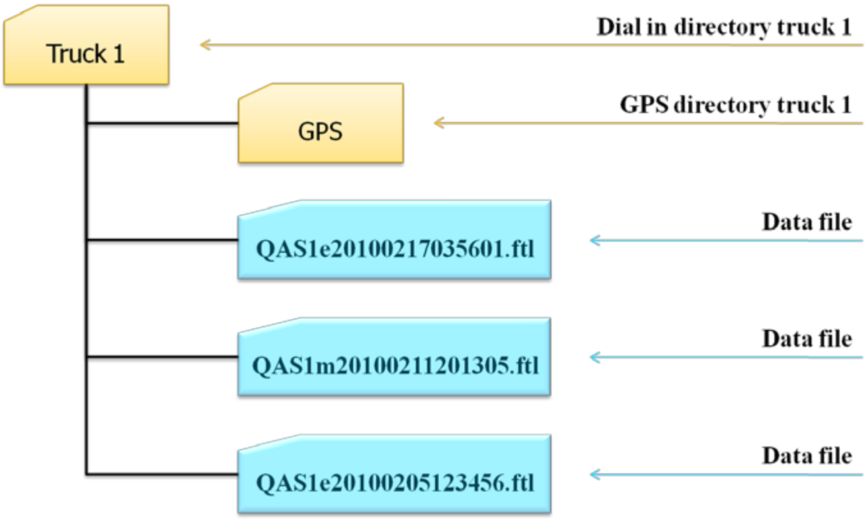
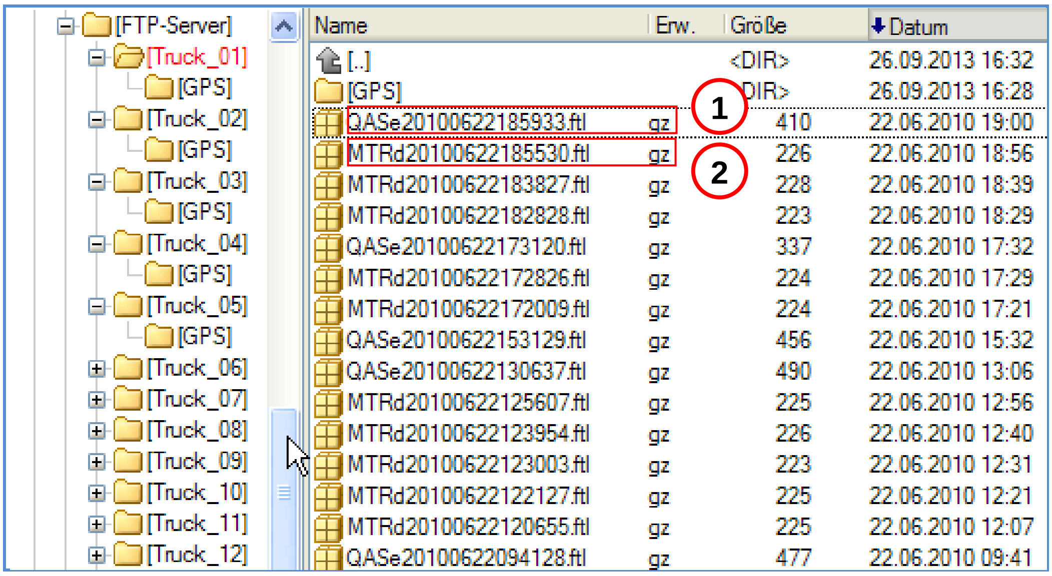


Abb. 4: Structure of the data directory

6.3.6 Data structure for dial directory Truck 1

This could, for example, a content look on the FTP server for Truck 1.

Truck 1



6.3.7 Example of a QAS file (NoMix or MultiSeal).

1 → Contents of the file - **QAS1e20140113082155.ftl**
Accurate explanation of the structure of the event file
.

QAS1e20140113082155.ftl

```
0,20140113082155,1.00
1,20140113082155,FAS,RMTT,00.00,,04.10,,21,
1,20140113082155,FAS,MultiSeal,02.00,,01.70,,11,1002
2,20140113082155,0,RMTT_VEH
6,20140113082155,,,,,,4,,,,,,,,,,,,,,
10,20140113082155,,0,,,1002
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
42,20140113082100,,307,12,1
42,20140113082100,1,2,2
42,20140113082100,2,2,2
42,20140113082100,3,2,2
42,20140113082100,4,2,2
08,20140113082100,9.889163,53.642962,0,10,,0
42,20140113082100,1,1,2
```

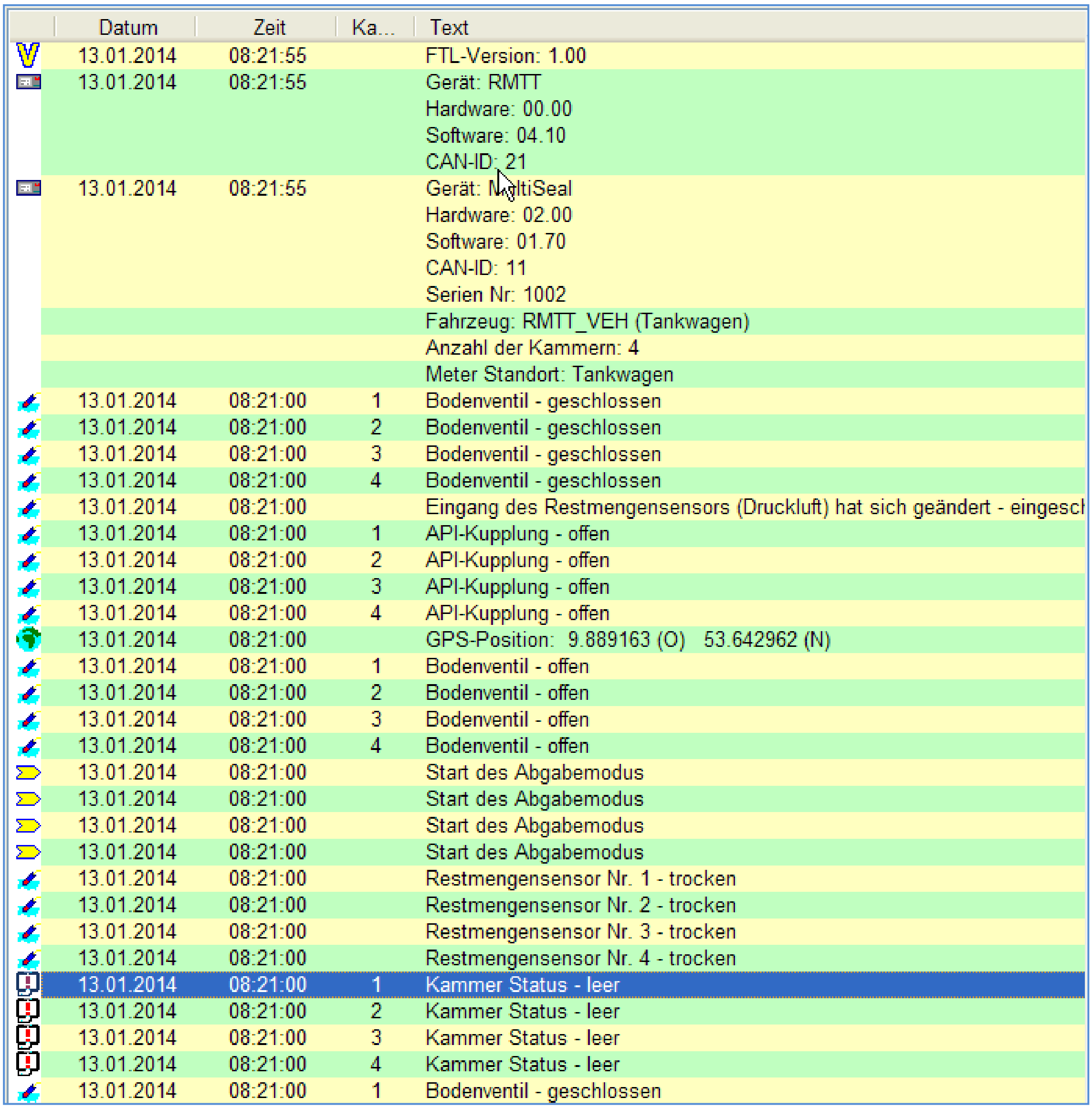
```
42,20140113082100,2,1,2
42,20140113082100,3,1,2
42,20140113082100,4,1,2
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
42,20140113082100,1,13,2
42,20140113082100,2,13,2
42,20140113082100,3,13,2
42,20140113082100,4,13,2
40,20140113082100,1,,0
40,20140113082100,2,,0
40,20140113082100,3,,0
40,20140113082100,4,,0
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
42,20140113082100,1,2,1
42,20140113082100,2,2,1
42,20140113082100,3,2,1
42,20140113082100,4,2,1
42,20140113082100,,307,11,1
...
...
```

6.3.7.1 Darstellung der QAS-Datei mit dem Event Monitor

1 → Contents of the file - **QAS1e20140113082155.ftl**
View with the Event Monitor in plain text.

Explanation of the symbols and the Event Monitor
see chapter 8 "Event Monitor" / page 333.

QAS1e20140113082155.ftl



	Datum	Zeit	Ka...	Text
	13.01.2014	08:21:55		FTL-Version: 1.00
	13.01.2014	08:21:55		Gerät: RMTT
				Hardware: 00.00
				Software: 04.10
				CAN-ID: 21
	13.01.2014	08:21:55		Gerät: MultiSeal
				Hardware: 02.00
				Software: 01.70
				CAN-ID: 11
				Serien Nr: 1002
				Fahrzeug: RMTT_VEH (Tankwagen)
				Anzahl der Kammern: 4
				Meter Standort: Tankwagen
	13.01.2014	08:21:00	1	Bodenventil - geschlossen
	13.01.2014	08:21:00	2	Bodenventil - geschlossen
	13.01.2014	08:21:00	3	Bodenventil - geschlossen
	13.01.2014	08:21:00	4	Bodenventil - geschlossen
	13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - eingescl
	13.01.2014	08:21:00	1	API-Kupplung - offen
	13.01.2014	08:21:00	2	API-Kupplung - offen
	13.01.2014	08:21:00	3	API-Kupplung - offen
	13.01.2014	08:21:00	4	API-Kupplung - offen
	13.01.2014	08:21:00		GPS-Position: 9.889163 (O) 53.642962 (N)
	13.01.2014	08:21:00	1	Bodenventil - offen
	13.01.2014	08:21:00	2	Bodenventil - offen
	13.01.2014	08:21:00	3	Bodenventil - offen
	13.01.2014	08:21:00	4	Bodenventil - offen
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Start des Abgabemodus
	13.01.2014	08:21:00		Restmengensensor Nr. 1 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 2 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 3 - trocken
	13.01.2014	08:21:00		Restmengensensor Nr. 4 - trocken
	13.01.2014	08:21:00	1	Kammer Status - leer
	13.01.2014	08:21:00	2	Kammer Status - leer
	13.01.2014	08:21:00	3	Kammer Status - leer
	13.01.2014	08:21:00	4	Kammer Status - leer
	13.01.2014	08:21:00	1	Bodenventil - geschlossen

1 → Inhalt der Datei – **QAS1e20140113082155.ftl**
Ansicht mit dem Event Monitor
(Fortsetzung)

?				ERROR: 3 Sensor Events in < 2 Min. (Comp=1 Sensor=1)
	13.01.2014	08:21:00	2	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=2 Sensor=1)
	13.01.2014	08:21:00	3	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=3 Sensor=1)
	13.01.2014	08:21:00	4	Bodenventil - geschlossen
?				ERROR: 3 Sensor Events in < 2 Min. (Comp=4 Sensor=1)
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00		Ende des Abgabemodus
	13.01.2014	08:21:00	1	API-Kupplung - geschlossen
	13.01.2014	08:21:00	2	API-Kupplung - geschlossen
	13.01.2014	08:21:00	3	API-Kupplung - geschlossen
	13.01.2014	08:21:00	4	API-Kupplung - geschlossen
	13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - ausgesc

6.3.7.2 Example of a meter file (Multiflow).

2 → Contents of the file - **MTR1d20140113085047.ftl**

MTR1d20140113085047.ftl

```
0,20140113085047,1.00
1,20140113085047,FAS,RMTT,00.00,,04.10,,21,
1,20140113085047,FAS,MultiFlow,00.00,,3.61 DE,,1,16DF0032
2,20140113085047,0,RMTT_VEH
6,20140113085047,,,,,,0,,,,,,,,,,,,,,
10,20140113085047,- ? -,0,,,16DF0032
8,20140113084800,+9.889163,+53.642962,40,,7,1
11,20140113084800,119,0,3,16DF0032,0,241,245,-
0.3,,,,,,,,,,,,,,,,,,0...
...
...
```

6.3.7.3 Representation of the meter file with the Event Monitor.

2 → Contents of the file - **MTR1d20140113085047.ftl**
View with the Event Monitor.

MTR1d20140113085047.ftl

	Datum	Zeit	Ka...	Text
	13.01.2014	08:50:47		FTL-Version: 1.00
	13.01.2014	08:50:47		Gerät: RMTT
				Hardware: 00.00
				Software: 04.10
				CAN-ID: 21
	13.01.2014	08:50:47		Gerät: MultiFlow
				Hardware: 00.00
				Software: 3.61 DE
				CAN-ID: 1
				Serien Nr: 16DF0032
				Fahrzeug: RMTT_VEH (Tankwagen)
				Meter Standort: Tankwagen
	13.01.2014	08:48:00		GPS-Position: +9.889163 (O) +53.642962 (N)
	13.01.2014	08:48:00		Abgabe
				Beleg Nr.: 119
				Abgabe vom Fahrzeug / Gemessen vom Fahrzeug
				Produktcode: 3 (Normal-Bleifrei)
				Messanlagen Nr.: 16DF0032
				Umkompensiertes Volumen: 241,0 Liter
				Kompensiertes Volumen: 245,0 Liter
				Mittlere Temperatur: -0,3 °C
				Messtechnisch NICHT geeicht

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6.3.7.4 Structure and format of the event file.

The format of the files is:

- Name of the data source,
- Number of the data source,
- data type,
- Timestamp of creation,
- Extension of the file name.

Example:

QAS1e20140113082155.ftl

```
|   ||    |       |      |
|   ||    |       |      +-- File name extension:
|   ||    |       |            .ftl
|   ||    |       |            .gz = gepackte
|   ||    |       |                 (.ftl) Datei
|   ||    |       |
|   ||    |       +--------- Time stamp:
|   ||    |                    Time = hhmmss
|   ||    |                    Time = 08:21:55
|   ||    |
|   ||    +----------------- Time stamp:
|   ||                         Date = YYYYMMDD
|   ||                         Date = 13.01.2014
|   ||
|   |+---------------------- Type:
|   |                          m = manually;
|   |                          e = event (automatic)
|   |                          d = delivery data
|   |
|   +----------------------- Data source number:
|                              1 = Single QAS System
|                              2 =
|
+--------------------------- Data source :
                               QAS = NoMix / MultiSeal
                               MTR = MultiFlow
                               LEV = MultiLevel
```

6.3.7.5 Example of the contents of an event file.

6.3.7.5.1 Identifier “0”

The format of the contents of the file is:

- Identifier, time stamp, and one or more events.

A very frequently used identifier is:

„0“ Version request

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
0,20091215091041,1.00
|      |       |     |
|      |       |     +--- * 1.00  = FTL output code.
|      |       |
|      |       +--------- Time stamp:
|      |                    Time  = hhmmss
|      |                    Time  = 09:10:41
|      |
|      +----------------- Time stamp:
|                           Date = YYYYMMDD
|                           Date = 15.12.2009
|
+------------------------ Time stamp:
(Listing of all identifiers
<dg_ref_source_inline>)
```

6.3.7.5.1.1 Identifier “1”

A very frequently used identifier is:

„1“ Device ID query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
1,20091215091041,FAS,EMIS4,01.01,,04.10EMIS4,,21,JL448
|     |       |       |     |      |   |      |       | |    |
|     |       |       |     |      |   |      |       | |    +-- serial no.
|     |       |       |     |      |   |      |       | |
|     |       |       |     |      |   |      |       | +--- CAN bus node no.
|     |       |       |     |      |   |      |       |
|     |       |       |     |      |   |      |       +----- not used
|     |       |       |     |      |   |      |
|     |       |       |     |      |   |      +------------- software version
|     |       |       |     |      |   |
|     |       |       |     |      |   +-------------------- not used
|     |       |       |     |      |
|     |       |       |     |      +------------------------ hardware version
|     |       |       |     |
|     |       |       |     +------------------------------- device type
|     |       |       |
|     |       |       +---------- Manufacturers short code – 3 character
|     |       |
|     |       +------------------ Time stamp:
|     |                             Time  = hhmmss
|     |                             Time  = 09:10:41
|     |
|     +-------------------------- Time stamp:
|                                   Date = YYYYMMDD
|                                   Date = 15.12.2009
|
+-------------------------------- Identifier:
                (Listing of all identifiers
                see chapter 6.3 "FTL - Data record structure" / page 221)
```

6.3.7.5.1.2 Identifier “8”

A very frequently used identifier is:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43

```
|         |              |          |         |  |  |  |  |    |  |
|         |              |          |         |  |  |  |  |    |  |
|         |              |          |         |  |  |  |  |    |  +- Driving direction
|         |              |          |         |  |  |  |  |    |     (in degrees)
|         |              |          |         |  |  |  |  |    |
|         |              |          |         |  |  |  |  |    +---- Speed
|         |              |          |         |  |  |  |  |
|         |              |          |         |  |  |  |  +-- Time lag
|         |              |          |         |  |  |  |      (in seconds)
|         |              |          |         |  |  |  |
|         |              |          |         |  |  |  +----- horizontal
|         |              |          |         |  |  |         positioning error
|         |              |          |         |  |  |
|         |              |          |         |  |  +-------- Number of used
|         |              |          |         |  |            satellites
|         |              |          |         |  |
|         |              |          |         |  +----------- Quality of GEO Info
|         |              |          |         |
|         |              |          |         +--- altitude
|         |              |          |
|         |              |          +------------- latitude
|         |              |
|         |              +------------------------ longitude
|         |
|         +--------------------------------------- Time stamp:
|                                                    Date = YYYYMMDDhhmmss
|                                                    Date = 12.04.2013 / 08:49:53
|
+------------------------------------------------- Identifier:
                  (Listing of all identifiers
                  see chapter 6.3 "FTL - Data record structure" / page 221)
```

6.3.7.5.1.3 Identifier “42”

A very frequently used identifier is:

„42“ Access status

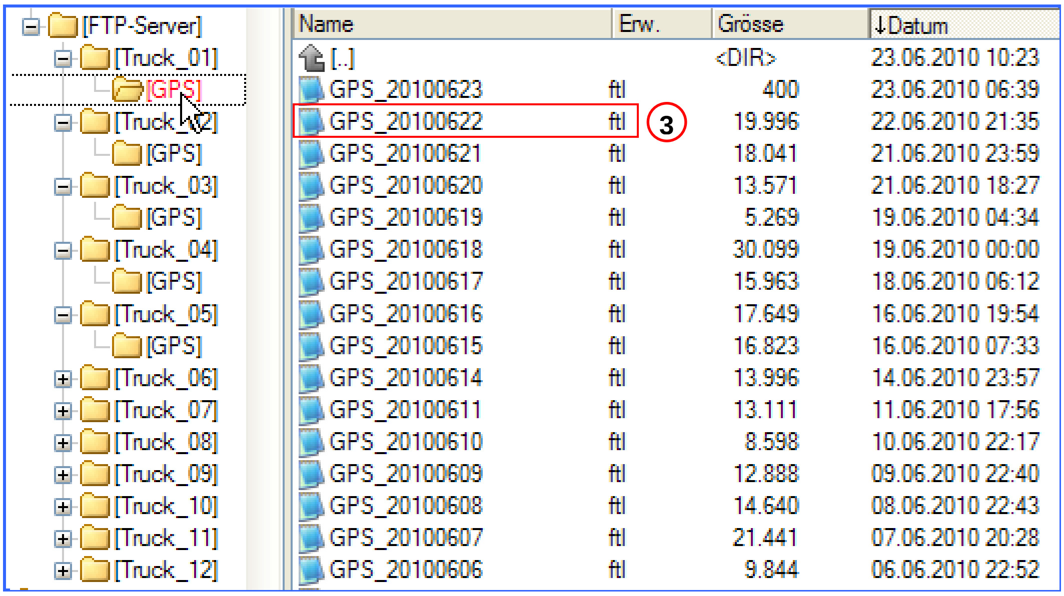
see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
42,20091215091041,2,2,2
 |       |        |      | | |
 |       |        |      | | +--- Status = open
 |       |        |      | |
 |       |        |      | +----- API coupling
 |       |        |      |
 |       |        |      +------- Compartment no.= 2
 |       |        |
 |       |        +------------- Time stamp:
 |       |                         Time  = hhmmss
 |       |                         Time  = 09:10:41
 |       |
 |       +-------------------- Time stamp:
 |                                Date = YYYYMMDD
 |                                Date = 15.12.2009
 |
 +---------------------------- Identifier:
(Listing of all identifiers
see chapter 6.3 "FTL - Data record structure" / page 221)
```

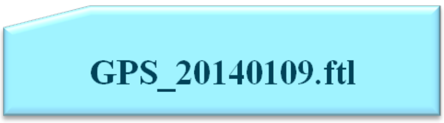
6.3.8 File structure for GPS directory Truck 1

And so could, for example, a table of contents on the FTP server, look for Truck 1 in the GPS directory.



6.3.8.1 Structure and format of the GPS file.

3 → Contents of the file - **GPS_20140109.ftl**




```
00,_2014010000000,1.00
02,_2014010000000,0,RMTT_VEH
08,20140109074732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109074932,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075131,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075331,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075531,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075933,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080133,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080333,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080534,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080742,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080942,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081142,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081206,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081314,9.889163,53.642962,40,2,3,1,3600,0,84
```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```
08,20140109081514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109084114,9.889163,53.642962,40,2,3,1,3600,0,84
...
...
```

6.3.8.2 Representation of the GPS file with the Event Monitor.

3 → Contents of the file - **GPS_20140109.ftl**
View with the Event Monitor.

GPS_20140109.ftl

	Datum	Zeit	Ka...	Text
V				FTL-Version: 1.00
				Fahrzeug: RMTT_VEH (Tankwagen)
	09.01.2014	07:47:32		GPS-Position: (extrapoliert) 9.889163 (O) 53.642962 (N)
	09.01.2014	07:49:32		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:51:31		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:53:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:55:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:57:32		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:59:33		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:01:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:03:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:05:34		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:07:42		Time: 00:02:08 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:09:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:11:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:12:06		Time: 00:00:24 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:13:14		Time: 00:01:08 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:15:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:17:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:19:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:21:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:23:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:25:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:27:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:29:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:31:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:33:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:35:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:37:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:39:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:41:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:43:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:45:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:47:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:49:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:51:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:53:10		Time: 00:01:56 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:55:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:57:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:59:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:01:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:03:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:05:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:07:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:09:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:11:09		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:13:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:15:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h

. . .
. . .

6.3.8.3 Structure and format of the GPS file

The format of the files is:

- Identifier of the GPS file,
- Timestamp of creation,
- Extension of the file name.

Example:

GPS_20140109.ftl

```
|      |       |
|      |       |
|      |       +---------   File extension:
|      |                     .ftl
|      |
|      +---------------- Time stamp:
|                          Date = YYYYMMDD
|                          Date = 09.01.2014
|
+---------------------- Type:
                           GPS = GPS file
```

6.3.8.3.1 Example of the contents of a GPS file

6.3.8.3.1.1 Identifier “8”

Da in einer GPS-Datei ausschließlich GPS Positionen protokolliert werden ist dies auch die einzige, bis auf „**0**“ und „**2**“ die zur Eröffnung gehören, gebrauchte Kennung:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43
|  |              |         |          |  | | | |    | |
|  |              |         |          |  | | | |    | |
|  |              |         |          |  | | | |    | +- Driving direction
|  |              |         |          |  | | | |    |      (in degrees)
|  |              |         |          |  | | | |    |
|  |              |         |          |  | | | |    +---- Speed
|  |              |         |          |  | | | |
|  |              |         |          |  | | | +-- Time lag
|  |              |         |          |  | | |       (in seconds)
|  |              |         |          |  | | |
|  |              |         |          |  | | +----- horizontal
|  |              |         |          |  | |         positioning error
|  |              |         |          |  | |
|  |              |         |          |  | +-------- Number of used
|  |              |         |          |  |           satellites
|  |              |         |          |  |
|  |              |         |          |  +---------- Quality of GEO Info
|  |              |         |          |
|  |              |         |          +--- altitude
|  |              |         |
|  |              |         +------------- latitude
|  |              |
|  |              +----------------------- longitude
|  |
|  +------------------------------------- Time stamp:
|                                           Date = YYYYMMDDhhmmss
|                                           Date = 12.04.2013 / 08:49:53
|
+----------------------------------------- Identifier:
             (Listing of all identifiers
             see chapter 6.3 "FTL - Data record structure" / page 221)
```

6.4 FTL - Record structure

6.4.1 Scope

☞ This document outlines the communication between an OBC and the a MultitTask device via FTL protocol.

6.4.2 Record type groups

Record types are grouped in order to facilitate decoding and improve readability of the protocol file.

Record type	Description
0 to 9	System data
10 to 19	Measuring results
20 to 29	Operating data, e.g. working times
30 to 39	Reserved
40 to 49	Quality, safety and sealing data (e.g. crossover prevention, overfill prevention)
50 to 59	GSM data
60 to 69	Reserved
70 to 79	Reserved
80 to 89	Reserved
90 to 99	Maintenance data
100 and above	Reserved

6.4.3 Storage Classes

Class	Short	Description
Fixed	FI	Value is built-in into software and can only be changed by a software update
Hardware-Adjusted	HA	Value is determined by a hardware setting (e. g. DIP switch or jumper)
Non-Volatile	NV	Value will remain the same after power-up or restart
Volatile	VO	Value will be set to default on every power-up or restart
Other	OT	None of the above

6.4.4 Value Generation Types

Type	Short	Description
Set Telegram	ST	Value is set by the OBC by means of a SET telegram
Parameter	PA	Value is considered part of the TCD’s parameterization
Computed Internally	CI	MultiTask software computes value from internal state
MTS Pushed	MP	Value is sent to the TCD by another MTS device spontaneously, i. e. without being queried by the TCD.
OBC Polled	OP	Value is queried from another MTS device each time the OBC requests it

Polled at Power-up	PP	Field is received from another MTS device only during power-up sequence
GPS	GP	Value is received from a GPS device that is connected to a COM port.
Other	OT	None of the above

6.4.5 Access Modes

Mode	Short	Description
Read	RD	Field can be read
Write	WR	Field can be written to
Clear	CL	Field can be cleared
Write Service	WS	Field can be written to if service password is set
Trigger	TR	Write operation to field triggers an action
Other	OT	None of the above

6.4.6 Data Format Types

Data types in this documents are categorized according to [4], Table 3 – “Format identifiers”. The following table shows a summary of those. “(…)” indicates that the original description provides more information. For further details and examples please refer to [4], Table 3.

Format Identifier	Description
B	Boolean; only the values “0” and “1” are valid
F$x	Floating point value; total max. x characters before and after decimal point, including sign if applicable
FC$	GPS position value (latitude, longitude, corresponds to DOK-411’s FloatC)
Nx	Integer decimal value with max x characters (including sign character)
Nx.y	Floating point value; max x digits in front of the point; including sign character; max y digits behind the point. (…)
Cx	Text with a maximum number of x characters (…)
S	Time stamp; CCYYMMDDhhmmss (…)
D	Date (CCYYMMDD)
D$	Date (DD.MM.CCYY)
IP$	IPv4-Adresse xxx.xxx.xxx.xxx
T	Time (hhmmss)
T5$	Time (hh:mm)
T8$	Time (hh:mm:ss)
Hx	Unsigned hexadecimal value with max x characters. (…)

Note: Fx, FC, D$, T5$ and T8$ are not conform to the FTL standard.

6.4.7 FTL Variable Kinds

Kind Identifier	Description
SV	Single-value
LV	List of values, individual values do not possess a specific order.
AV	Array of values; individual values are indexed with a number in brackets. Counting starts at “(1)”.

6.4.8 FTL Value Types

Kind Identifier	Description
SF	Single-field; one data entry per value
MF	Multiple-field, string of comma-separated data entries. Also referred to as “record”

6.4.9 Data Structure Support and Parameterization

The MultiTask OBC Interface supports two root nodes, “FAS” and “FTL”. The “FTL” root node is defined in [2]. The “FAS” node is used for the parameterization of MultiTask and also shall be used to provide additional data, which is supported by the MultiTask system but not considered by FTL.

The handling of data which is available in the FAS sub-nodes shall be identical to the data which is available in the FTL sub-node. For example, selection of predefined parameter values is typically done numerically (e.g. 7.5.2 FTL,PRN,TYPE).

The mentioned parameters listed in this document are based on the current state of implementation and on the “EPR270 - Software Specification - NextGeneration Tank Truck Electronics - MultiTask - V1.00”. Due to the ongoing implementation of different modules of the MultiTask project, parameters mentioned in this document may differ from the final implementation. The format may change, parameters will disappear and additional parameters will be added.

Nodes wich includes only parameters witch access mode RD can be combined in one record FTL-Style.

6.5 FTL - Data Tree and Field Description

6.5.1 FTL

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Vehicle_ID	NV	PA	RD	SV	MF	#L02; see 7.6.12.1 Definitions for LH_File Records	x

6.5.2 FTL,SYSTEM

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
FTL_Vers	FI	CI	RD	SV	MF	#L00; "1.00"; see	x
FTL_Format	FI	CI	RD	SV	SF / C3	"CSV"	-
DateTime	OT	CI	RD, WR, TR	SV	SF / S	<RTC value> If this value is written to, the realtime clock of MultTask is set to the "DateTime".	x
Baud	NV	ST	RD, WR	SV	SF / N6	Default: "9600"	-
SYS_Err	NV	CI	RD	SV	MF	#L09; This field is cleared when the OBC performs a read access on it.	-
NodeList	FI	CI	RD	LV	SF	List of all supported nodes	x

6.5.3 FTL,GPS

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
TVE	VO	CI	RD	SV	MF	#L08; see 7.6.12.2 Definitions for L_File Records	-

6.5.4 FTL,PRN

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Port	NV	ST	RD, WR	SV	SF / N1	Class/variable: CRunPrn.iPort Printer port to access Describing the printer port to use. V = 0 means default printer port. Returns currently selected port used for printing. Value range from 0 to 9	-
Type	OT	CI	RD	SV	SF /	Class/variable: CRunPrn.iType	x

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
					N2	Type of printer Numeric value, one of 0: no printer at this port 1: printer installed but generally not available for OBC 2: generalized FTL-printer (UTF-8 shall be used) 3: printing to file 4: unknown printer Printers from STAR (10 to 19): 10: STAR SP298 11: STAR DP8340 Printers from EPSON (20 to 29): 20: EPSON TM290 21: EPSON TM295 22: EPSON LQ570 Other printers (90 to 99) manufacturer specific	
Status	OT	CI	RD	SV	N1	Class/variable: CRunPrn.iStatus Status of selected printer Set to 1 tries to reserve printer for usage by OBC. Set to 0 frees the printer Numeric value, one of 0: ready 1: no paper on top (upper sensor) 2: no paper on bottom (lower sensor) 3: no paper (both sensors) 4: printer offline	-
Reserved	VO	OT	RD, WR	SV	N1	Class/variable: CRunPrn.iReserved Reserving the printer required if FTL,PRN,Type is greater than 0 Numeric value, one of 0: idle, free for usage 1: currently reserved for OBC > 1: reserved by MultiTask	-
Tx_Text	VO	ST	WR	SV	C120	Class/variable: CRunPrn.sTxText Text to print A SET prints the text and returns an ACK-frame after the text was successfully printed, NAK-ID frame otherwise	-

- The printer could be in use by TVE or another client. In this case, the TVE reserves the printer itself.
- If the OBC tries to reserve the printer by writing V=1, while the printer is already reserved by TVE or another client, the TVE shall answer with a NAK-ID frame.
- When the printer was reserved by the OBC and a further request by the OBC for reservation is done, the TVE shall answer with an ACK and shall leave the value at V=1.

6.5.5 FTL,COMP

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Count	VO	OP	RD	SV	N2	Value from *CSetGeneralWM.sDeviceID*	-
Status	VO	OP	RD	AV	MF	Returns array with status of all compartments or the status of compartment n. #L40; see 7.6.12.2 Definitions for L_File Records Generate one record for each compartment	-
Content	VO	OP	RD	AV	MF	Returns array with the current load of all compartments or the current load of compartment n #L13; see 7.6.12.2 Definitions for L_File Records Generate one record for each compartment	-
PID_Info	VO	OP	RD	AV	MF	Returns a list of CSV records with all detected PIDs for all compartments. #L45; see 7.6.12.2 Definitions for L_File Records	-
Loading	VO	OP	RD, CL	AV	MF	Returns array with loading information for each compartment stored by loading gantry (OBC). A CLR erases all previous loading information for all compartments. An access with index n returns a CSV record with loading information for compartment n stored from loading gantry (OBC). #L11; see 7.6.12.2 Definitions for L_File Records	-

6.5.6 FTL,NOTIFY

⌧ Not supported

6.5.7 FTL,DRIVER

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Drivers	NV	ST	RD, WR, CL	LV	MF	List of drivers Returns the list of all drivers according to the record structure described below. A SET adds a new driver to the list. (Only if access-level >= Master) A CLR removes all drivers from the database on the TVE. (Only if access-level >= Master) Tab.7 / p.34: DRV_PIN only available if access-level >= Master	-
Current	NV	ST	RD, WR	SV	MF	This variable affects both directions. When a driver logs into MultiTask, the MultiTask shall update this node. Alternatively, when the driver logs into OBC, the OBC shall set this node. When the driver logs out, this shall be indicated by value 0 in field DRV_ID.	-

Record structure:

DRV_ID (N6) Identification number of driver #L0302
DRV_NAME (C30) Name of driver in recommended format <name> <surname>.
LNG_ID (C2) ID of language according to ISO 639-1 shall be used for this driver.
DRV_PIN (N6) PIN code of driver.
PIN_TIME (S) Timestamp of last login.

6.5.8 FTL,FS

Not supported

6.5.9 FTL,AUX

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Out	NV	ST	RD, WR	AV	B	TBD	-
In	NV	undef.	RD	AV	B	TBD	-

6.5.10 FTL,ORDER

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Order	NV	ST	RD, WR, CL	LV	MF	It shall contain general header data which are valid for all positions, namely address information. Data may be used by TVE when printing tickets, or when asking the driver for confirmation of order processing. FTL,ORDER is a list limited to one element. A CLR clears ORDER.Order, ORDER.Plan, ORDER.Delivery and set ORDER.State to zero. See [2] Tab. 9 below	-
Plan	NV	ST	RD, WR	LV	MF	The TVE shall be configurable not to allow any delivery unless a data set is set in the node "ORDER.ORDER" with an order number greater than 0. See [2] Tab. 10 below.	-
State	VO	CI	RD	SV	SF	Numerical code according to the following list: 0 undefined, no order present 2 order data received, at least one order plan item present, TVE ready for processing 3 planned order is being processed 4 unplanned order in process (manual start on TVE, if enabled) 9 order processing finished, but with error 10 order processing finished without error	-
Delivery	NV	MP	RD	LV	MF	#L11; see 7.6.12.2 Definitions for L_File Records	-

Index	Field Name	Value Generation	Data Format	Value Generation
0	plan_id	COrderPlan.iPlanId	N2	Unique index number of this position (will be used by MultiTask when returning order results)
1	art_no	-	-	-
2	art_id	-	-	-
3	art_txt	-	-	-
4	unit_msr	0	N1	Unit of measure (0 = litres)
5	ord_amnt	COrderPlan.iOrderAmnt	N8.2	Quantity ordered (positive number in case of delivery, negative number for loadings)
6	base_tmp	-	-	-
7	dens_t0	-	-	-
8	cpt_no	COrderPlan.iCptNo	N2	compartment number referred, or 0 if free choice by driver
9	tnk_loc	-	-	-
10	met_prd	COrderPlan.iMetPrd	N2	metrological product code according to EN 14116 message #2
11	pmp_rate	-	-	-
12	ord_no	COrderPlan.sOrderNr	C15	host order number for this position
13	del_path	-	-	-
14	down_grade	-	-	-
15	PID_grade	-	-	-

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6.5.11 FTL,PRODUCT

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Deta Format	Description	required
Article			RD	LV	MF	[2] Tab. 5 / p. 16	-

6.5.12 FTL,LOG

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Deta Format	Description	required
LH_File	NV	CI, OP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
L_File	NV	CI, OP, MP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
TimeStamp	NV	ST, CI	RD, WR	SV	SF	Timestamp of last transmitted L_File record and start time for next L_File enquiry.	-
SnapShot	-	ST	WR	SV	SF	Triggers the generation of a “snapshot” set of L_File records.	-

** MultiTask provides only the mandatory L_File and LH_File records.*

6.5.12.1 Definitions for LH_File Records

00 FTL_VERS (required)			Req.	Source / Data Generation
L0000	dataset_id	N2	x	„0“
L0001	timestamp	S	x	current time stamp read from MultiTask OS
L0002	ftl_vers	N2.2	x	„1.00“

Number of data sets: 1

01 DEVICE_ID (required)			Req.	Source / Data Generation	Description
L0100	dataset_id	N2	x	„1“	
L0101	timestamp	S	x	current time stamp read from MultiTask OS	
L0102	man_name	C32	x	e. g. „F. A. Sening“	Manufacturer name
L0103	dev_code	C16	x	CSetGeneralWM.sDeviceID	Manufacturer specific device code
L0104	hard_vers	C8		CSetGeneralWM.sHmiHwVers	Hardware version
L0105	hard_conf	C64		“” (empty)	Hardware configuration
L0106	soft_vers	C8		CSetGeneralWM.sAppOsVers	Software version
L0107	soft_vers	C64		CSetGeneralWM.sAppOsVers	Software configuration
L0108	dev_id	N3	x	CSetGeneralWM.sDevID	Unique code number for the device within the system (e.g. bus address). This number is used to identify the data source, also in case of several devices of the same type.

01 DEVICE_ID (required)			Req.	Source / Data Generation	Description
L0109	dev_serial	C20			Serial number of the device which shall be unique for each manufacturer.
L0110	App_name	C20		“” (empty)	Name of application
L0109	Seal_cnt	N8		“” (empty)	Seal counter if present

Number of data sets: one for MultiTask

02 VEHICLE_ID (required)			Req.	Source / Data Generation	Description
L0200	dataset_ID	N2	x	„2“	
L0201	timestamp	S	x	current time stamp read from MultiTask OS	
L0202	veh_type	N1	x	CSetGeneralNonWM.iTruckType	Vehicle type: 0 tank truck (rigid) 1 tractor 2 semitrailer 3 trailer 4 hydrant vehicle 5 IBC 6 other
L0203	veh_no	C16	x	CSetGeneralWM. sTruckID	Vehicle identifier (e.g. number plate)

Number of data sets of this type: 1

03 DRIVER_ID (optional)	Not supported

Number of data sets: 0

04 TOUR_ID (optional)	Not supported

Number of data sets: 0

05 COMP_ID (optional)	Not supported

Number of data sets: 0

06 TRUCK_SETUP (required)			Req.	Source / Data Generation	Description
L0600	dataset_id	N2	x	„6“	
L0601	timestamp	S	x	current time stamp read from MultiTask OS	
L0602	outp_drv	N2	-	empty	
L0603	dip_stick	N1	X	CSetGeneralNonWM. iDipStick	Electronic dipstick system 0 no dipstick system 1 dipstick not metrologically approved 2 dipstick metrologically approved
L0604	delv_type	N1	X	CSetGeneralNonWM.iTruckType	Tank truck type 0 undefined 1 direct outlet 2 flow metering system(s) (with collector(s)) 3 Hybrid system (1 and 2)
L0605	delv_side	N1	X	CSetGeneralNonWM. iDeliverySide	Delivery side(s) 0 undefined 1 left 2 right 3 left and right 4 rear 5 left and rear 6 right and rear 7 left and right and rear

06 TRUCK_SETUP (required)			**Req.**	**Source / Data Generation**	**Description**
L0606	load_side	N1	x	CSetGeneralNonWM. iLoadingSide	Loading side(s) See L0604
L0607	no_cpts	N2	x	CSetGeneralWM .iNrOfComp	Number of compartments
L0608	no_ops	N1	-	“” (empty)	
L0609	bv_presbal	B	-	“” (empty)	
L0610	wleg_conf	N1	x	CSetGeneralNonWM.iWetlegConfiguration	Wetleg configuration 0 none 1 one sensor low in each pipe 2 one sensor left, one right, both in low position 3 one sensor low, one sensor high in each 4 one sensor in each compartment 5 combination of 4 + 1 6 combination of 4 + 2 7 combination of 4 + 3 8 other configuration with four or more sensors
L0611	sep_cvctrl	B	-		
L0612	cab_lock	N1	-		
L0613	load_mode	N1	-		
L0614	load_start	N1	-		
L0615	load_stop	N1	-		
L0616	ld_auto_op	N1	-		
L0617	ld_auto_cl	B	-		
L0618	rpmon	N1	-		
L0619	**rpm_remop**	**B**	**-**		
L0620	delv_lside	N1	-		
L0621	mhole_mon	N1	x	CSetGeneralNonWM.iMonManlid	Dome cover monitoring 0 none, free access 1 none, covers mechanically sealed 2 per compartment 3 common for all compartments
L0622	api_mon	B	x	CSetGeneralNonWM.bMonApi	API monitoring (of closed state)
L0623	bv_mon	N1	x	CSetGeneralNonWM.iMonButtomValve	Foot valve monitoring 0 none 1 pneumatic monitoring of "closed state" 2 pneumatic monitoring of "fully opened state" 3 combination of 1 and 2 4 electromechanical monitoring of "closed state" 5 electromechanical monitoring of "fully opened state" 6 combination of 4 and 5
L0624	cv_mon	N1	x	CSetGeneralNonWM.iMonCV	In line valve monitoring as L0623
L0624 to L0630 not supported					

Remarks:
Number of datasets: 1.

07 COMP_PROP (optional)	**Not supported**

Number of data sets: 0

10 METER_ID (required)			**Req.**	**Source / Data Generation**	**Description**
L1000	dataset_ID	N2	x	„10“	
L1001	timestamp	S	x	current time stamp read from MultiTask OS	
L1002	cntr_no	N8		CSetGeneralWM. sDeviceID	Metrological meter number
L1006	met_no	C16	x		Measuring point number

Number of data sets: 1

90 CALIBR (required)			**Req.**	**Source / Data Generation**	**Description**
L9000	dataset_ID	N2	x	„90“	
L9001	timestamp	S	x	current time stamp read from MultiTask OS	
L9002	cntr_no	N8	x	CSetGeneralWM. sDeviceID	Metrological meter number
L9003	met_no	C16	x		Measuring point number
L9004	met_prod	N3	x		Metrological product code according to EN 14116 Message #2
L9005	base_temp	N3.1	x		Base temperature for this product (if temperature compensation is enabled)
L9006	density_t0	N4.1	M		Density in kg m-³ at base temperature
L9007	comp_coeff	N1.4			Thermal coefficient of expansion for this product in %/°C
L9008	tvc_type	N1	x		Temperature compensation method for this product 0 no temperature compensation 1 Method B according to DIN 51757 3 Method D according to DIN 51757 4 Method X according to DIN 51757 5 linear (using L9007)
L9009	cal	N2.4	x		Main meter factor (determined during official preverification

Number of data sets: as provided by the individual data sources.

91 NODE_CONF (required)			**Source / Data Generation**
L9100	dataset_ID	N2	„91“
L9101	timestamp	S	current time stamp read from MultiTask OS
L9102	dev_id	N3	See L0108; device id of the MultiTask
L9103	*node_0_id*	C20	Identifier of top-level node, e. g. “ADMIN”
L9104	*node_1_id*	C20	Identifier of node level 1 e. g. “CLOCK”; empty if not applicable
L9105	*node_2_id*	C20	Identifier of node level 2; empty if not applicable
L9106	*node_3_id*	C20	Identifier of node level 4; empty if not applicable
L9107	*var_id*	C20	Identifier of variable
L9108	*var_type*	C3	One of {“B”, “Nx”, “Nxy”, ”Cx”, “S”, “D”, “T”, “Hx”}
L9109	*format_x*	N2	Specifier “x” for “Nx”, “Nxy”, ”Cx”, “Hx” if applicable
L9110	*format_y*	N2	Specifier “y” for “Nxy” if applicable
L9111	*val_B*	B	Value if var_type = “B”
L9112	*val_Nx*	N99	Value if var_type = “Nx”
L9113	*val_Nxy*	N99.99	Value if var_type = “Nxy”
L9114	*val_Cx*	C99	Value if var_type = “Cx”
L9115	*val_S*	S	Value if var_type = “S”
L9116	*val_D*	D	Value if var_type = “D”
L9117	*val_T*	T	Value if var_type = “T”
L9118	*val_Hx*	H99	Value if var_type = “Hx”

Number of data sets: 1 per config variable as listed below.

92 NODE_STAT (required)			Source / Data Generation
L9200	dataset_ID	N2	„92“
L9201	timestamp	S	current time stamp read from MultiTask OS
L9202	dev_id	N3	See L0108; device id of the MultiTask
L9203			See #L91
…			

Number of data sets: 1 per config variable as listed below.

6.5.12.2 Definitions for L_File Records

08 GPS_INFO			Source / Data Generation	Description
L0800	dataset_id	N2	"8"	
L0801	timestamp	S	CGps. oDateTime	
L0802	geo_long	N4.6	CGps. dLatitude	Longitude in degrees (positive values for east, negative values for west)
L0803	geo_lat	N3.6	CGps. dLongitude	Latitude in degrees (positive values for north, negative values for south)
L0804	geo_hght	N4	CGps.dAltitude	Altitude above sea level in metres
L0805	geo_qlty	N2	CGps.iValidity	Quality of position data 0 no position data or unknown quality 1 Matching Postcode only 2 Matching Town only 3 Matching Postcode and Town (uncertain) 4 Matching Postcode and Town (exact match) 5 Matching up to Town district (uncertain) 6 Matching up to Street (uncertain) 7 Matching up to Street No. (uncertain) 8 Matching up to Town District (exact match) 9 Matching up to Street (exact match) 10 Matching up to Street No. (exact match) 11 GPS positioning (unknown quality) 12 Manually assigned in digital map 13 GPS positioning (dead reckoning) 14 GPS positioning (single measurement) 15 GPS positioning (differential) 16 GPS positioning (averaged) If no GPS data available: 0, else 14
L0806	sat_in_use	N2	CGps.iSatellites	Number of satellites used
L0807	hdop	N4	CGps.dHorPosError	horizontal positioning error in metres (estimated from HDOP)
L0808	time_diff	N3	CGps.iTimeOffset	Time difference in seconds (local, GPS synchronized time — system time) If no GPS data avaliable: 0, else GPS time minus RTC value.
L0809	speed	N3	CGps.dSpeed	speed in km/h
L0810	drv_dir	N3	CGps.dCourse	Driving direction, in degrees (0 to 359) (at rest, keep last direction before stop)

09 SYS_ERR			**Source / Data Generation**
L0900	dataset_id	N2	"9"
L0901	timestamp	S	time of registration of the error condition
L0902	dev_id	N3	See Table 4: NAK-IDs and Error Codes
L0903	error_code	N5	
L0907	err_add	N2	See Table 4: NAK-IDs and Error Codes
L0908	err_info*0*	C20	
…	…		
L090*n*	err_info*n*		

☞ This field will be filled with an appropriate error code record directly when a NAK-ID frame was sent to the OBC or at the moment an error occurs. The relationship between NAK-IDs and error codes (is shown in Table 4: NAK-IDs *and Error Codes*" / p. 328)

NAK-ID	**Description**	**dev_id**	**error_code L0903**			**err_add**	**err_info*0*…err_info*n***
			Group	**Source**	**Type**		
10100	Unknown opcode received	node(TCD) see #L0108	0	01	02	as needed for description (20 char each)	<NAK-ID> + ":" + description
10101	Unknown subnode or variable accessed						
10102	Transmission of frame failed						
10103	Type identifier not correct						
10106	Array index out of boundaries						
10107	Frame exceeded internal buffer size						
10200	Assigned value was trimmed to fit buffer						
10201	Assignment denied, incorrect frame						
10202	Assignment denied, value out of boundaries						
10203	Assignment denied, invalid value type						
10300	Write access denied, variable read-only						
10301	Write access denied, because subnode/variable in use						
10302	Write access denied, list capacity exceed						
10400	Time/date change not permitted out of bounds						
10500	Printer occupied			02	00		
10501	No paper in printer				02		
10502	Printer offline				01		
10503	Printer not reserved for OBC				00		
10504	No answer from printer						
10600	Subnode/variable not capable of notification			01	02		
10700	Not enough disk space						
10701	Invalid filename						
10702	Invalid file access mode						
10703	File doesn't exist						
10704	File is read only						
10705	No wildcards allowed						
10706	Directory doesn't exist						
10707	Can't create directory						
10708	No file or directory given						
10709	File/Directory not opened						
10710	Relative path not permitted						

Table 3: NAK-IDs and Error Codes

11 TRANSFER			**Source / Data Generation**	**Description**
L1100	dataset_ID	N2	“11”	
L1101	end_time	S		
L1102	rcpt_no	N6		
L1103	dl_type	N1		
L1104	met_prod	N3		
L1105	cntr_no	N8		
L1106	unit_msr	N1		
L1107	vol_grs	N8.2		
L1108	vol_t0	N8.2		
L1109	avg_temp	N4.1		
L1110	cpt_no	N2		
L1111	del_path	N2		
L1112	add_no	N3		
L1115	add_vol	N4.3		
L1116	vol_sum	N10.2		
L1117	start_time	T		
L1118	ord_amnt	N6.2		
L1122	vol_weight	N6.2		
L1124	ord_no	C8		
L1125	pmp_rate	N4		
L1126	del_stat	N1		
L1127	approved	B		
L1140	metp_no	C16		

TBD

Collected data from deliveries. Number of records of this type equals number of deliveries.

12 DELV_MODE		

13 COMP_CONT			**Source / Data Generation**	**Description**
L1300	dataset_id	N2	“13”	
L1301	timestamp	S	time of registration of the error condition	
L1302	cpt_no	N3	Number of the compartment	
L1304	met_prod	N3		
L1305	unit_msr	N1	“0”	
L1306	vol_grs	N6.2		

TBD

14 DENSITY	**No record generated.**	

15 INCLINOM0	**No record generated.**	

16 BATTVOLT	**No record generated.**	

17 PRESSURE	**No record generated.**	

20 EVENT	**TBD**	

22 SHIFT	**No record generated**	

23 ODOMETER	**No record generated.**	

24 DISTANCE	**No record generated.**	

25 AUTEHTLV	**No record generated.**	

26 DATETIME	**No record generated.**	

40 COMP_STAT			**Source / Data Generation**	**Description**
L4000	dataset_id	N2	“40”	
L4001	timestamp	S	from current RTC value	
L4002	cpt_no	N2	Number of the compartment	
L4003	met_prod	N3	TBD siehe Comp_setup	
L4004	cpt_state	N1		
L4005	seal_state	N1		

41 PROD_INFO		

42 ACC_STAT	**Manufacturer specific extensions for L4203:**

Number	**Source Device**	**Description**
101	LGM	State of DIP switch has changed
102		State of wetleg sensor digital input has changed
103		State of temperature sensor has changed
104		State of inclination sensor has changed
105		State of level sensor has changed
106		State of level sensor has changed
107		State of level interface digital input has changed
108		State of valve interface digital input has changed
109		Read / Write parameter chipcard (L4204=0: Read, L4204=1: Write)
110		Read /Write gauging table chipcard (L4204=0: Read, L4204=1: Write)
111		Read / Write slope table chipcard (L4204=0: Read, L4204=1: Write)
112		Read /Write layout chipcard (L4204=0: Read, L4204=1: Write)
108…199		Reserved for LEVEL extensions
301	COP	AccuLoad connection status
302		State of DIP-switch has changed
303		Hall sensor magnet code
305		Number of overfill preventions in use
306		State of valve interface digital input has changed
307		State of wetleg sensor digital input has changed
301…300	COP	Reserved for COP extensions

Manufacturer specific extensions for L4204:

Number	**Source Device**	**Description**
51	LGM	No error
52		Timeout
53		Transmission checksum error
54		General failure
55		RAM error
56		Parameter checksum error
57		Float gauge position
58		Reference position
59		Float gauge installation
60		Reference installation
61		Overflow

<u>TBD</u>

45 PID_INFO	**Not supported.**	

46 BYPASS	**TBD**	

47 ABORT	**TBD**	

51 GSM_STATUS	**Not supported.**	

52 GSM_CALL	**Not supported.**	

53 SMS_CALL	**Not supported.**	

93 DR_ACT	**TBD**	

7 MultiTask (FTL - Protocol / FTP-Server)

7.1 System Components with MultiTask

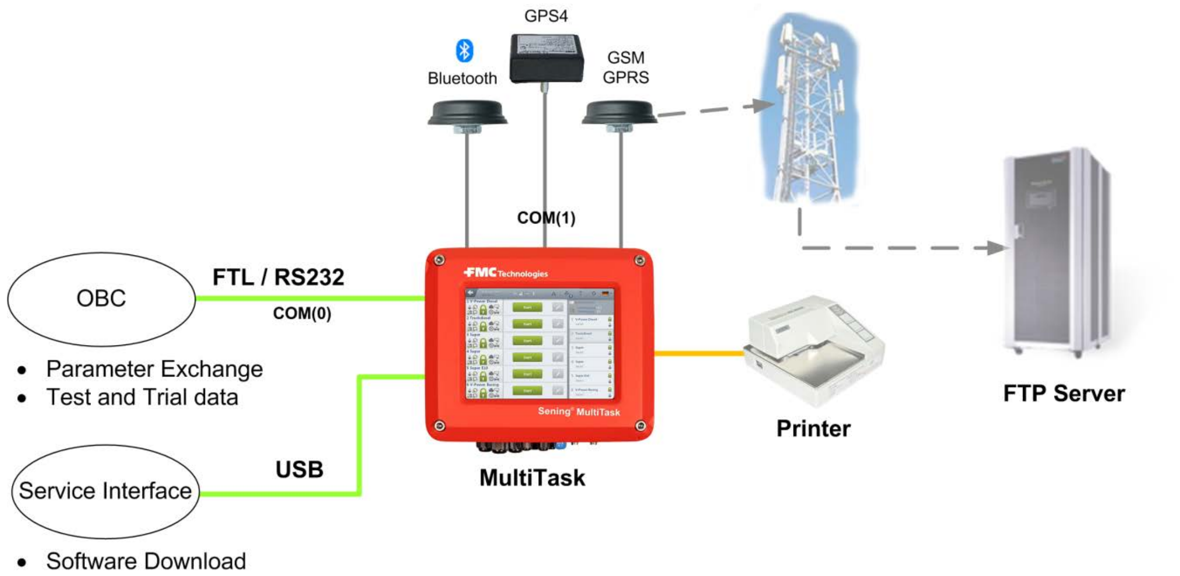

Fig.66: Arrangement with MultiTask

7.2 Communication and file format on the FTP server with MultiTask

- Storage of internal data on an FTP server is possible with the MultiFlow, MultiLevel, NoMix and MultiSeal (MultiLevel) tank truck system together with MultiTask. This logging of data records can be done automatically after certain events, or by manually activating the control console of individual devices.

- A tracking system can also be activated in MultiTask to store GPS data in a subdirectory of the FTP server at certain configurable intervals. This data can be synchronized with other data by timestamp.

- The MultiFlow and all data records are stored in FTL format. To reduce data volumes, parameters can be set to allow this data to be transferred in compressed format (but not GPS data).

- Each tank truck must have its own directory (home directory) set up on the server. A subdirectory named "GPS" must be created under the home directory. Each tank truck should have access only to these two directories (protected by name and password). Access rights in the home directory should be restricted to add and read only. This makes it impossible for MultiTask to change or delete its own data or to write data to the directories of other tank trucks. In the GPS directory, access must be changed to modify since the GPS data records will be appended to an existing file.

In addition, an administrator should be set up on the office side to archive data and, if necessary, delete it.

MultiFlow, MultiLevel, NoMix and MultiSeal files are named according to the following pattern:

- **SSS t YYYYMMDD hhmmss.ftl**
  for uncompressed files

or

- **SSS t YYYYMMDD hhmmss.ftl.gz**
  for compressed files.

A different pattern applies to GPS files, because only one GPS file is created per day and tank truck. The individual GPS data records are appended at intervals.

- **GPS_YYYYMMDD.ftl**

Explanation of format:

SSS	=	data source
n	=	device number
t	=	data source number
YYYY	=	year
MM	=	month
DD	=	day
hh	=	hour
mm	=	minute
ss	=	second
ftl	=	filename extension
gz	=	filename extension for compressed file

7.2.1 File structure

The log file consists of a series of log records.

A log record consists of an arbitrary number of fields separated by commas [,] which may also be empty.

>> A data record is delimited with CR.
>> LF may follow optionally.
There is no explicit limit on data record size.

7.3 FTL - Data record structure

7.3.1 Fields

- The first field (field index 0)
  in a data record is numerical (an integer), and contains the identifier for the type of data record.
- The second field (field index 1)
  in every data record is a timestamp (S). The timestamp is valid until it is updated with a new one.
- All subsequent fields (field index 2 through n)
  are specified in Chapter x "xxx" / page xx. These tables contain a list of field types in the "Field name" and "Data type" columns in accordance with DIN 26051-1.
- The data record may contain more (custom) fields than described in the standard.

7.3.2 Field name

Each field name of a data record begins with the letter "L", and also receives a numerical code calculated by the formula

- (data record identifier) x (100) + (field index)

7.3.3 FTL Protocol

FTL is an acronym for **F**uel **T**ruck **L**ink, the interface between electronic system(s) on board of a tank vehicle (tank-vehicle-equipment) *(TVE* and any external computer, e.g. an on-board-computer installed in the driver's cabin, for illustration see the figure below.

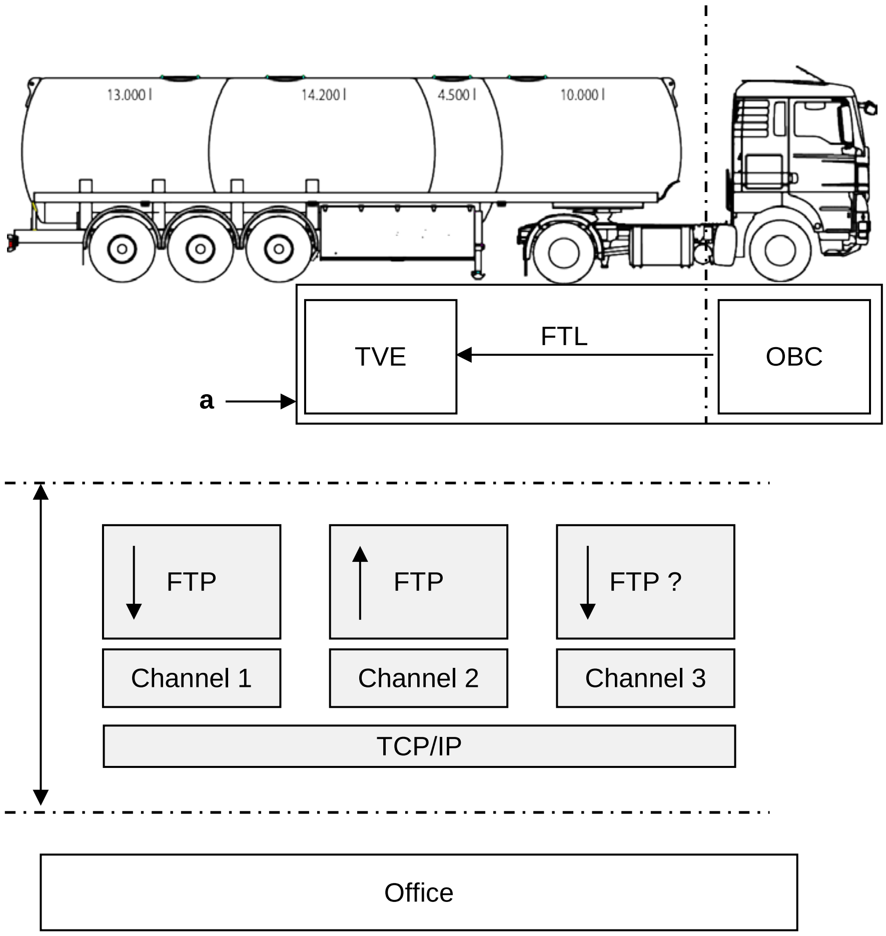

Fig. 67: FTL Protocol

- → direction of communication (client → server)
- **a** may be either two independent units or one single unit which incorporates both functions OBC and TVE.

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7.3.4 Structure of the File Server

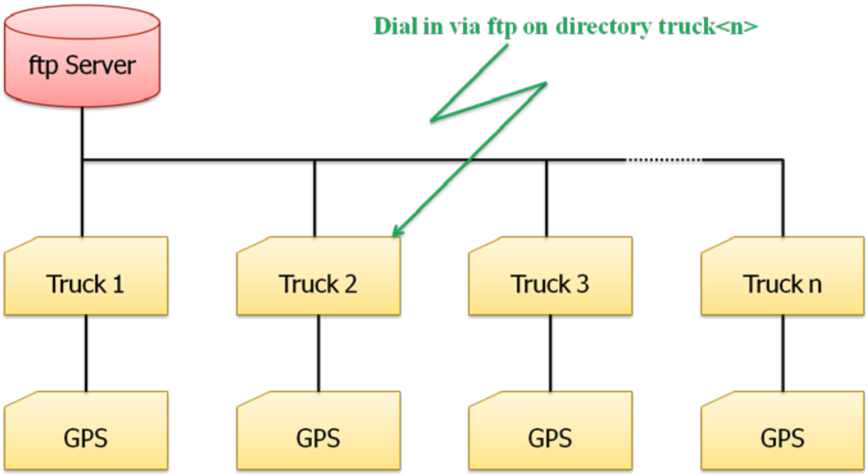


Fig. 5: Structure of the File Server

7.3.5 Structure of the data directory

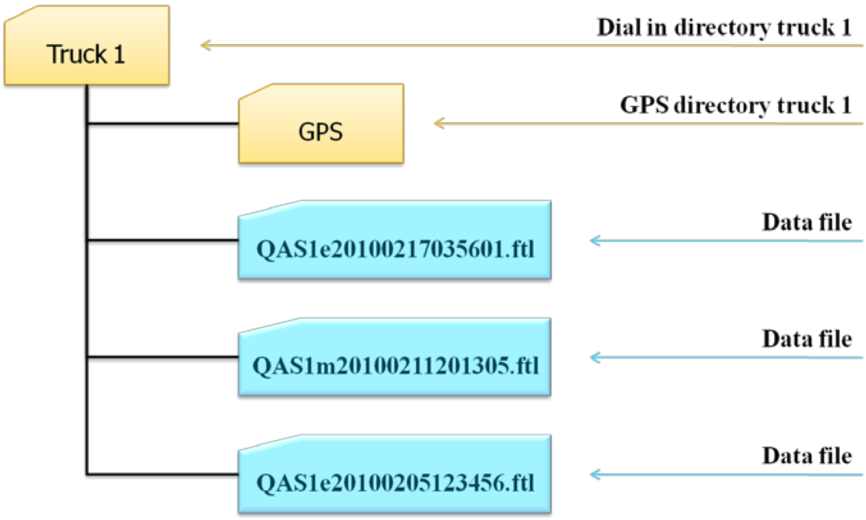
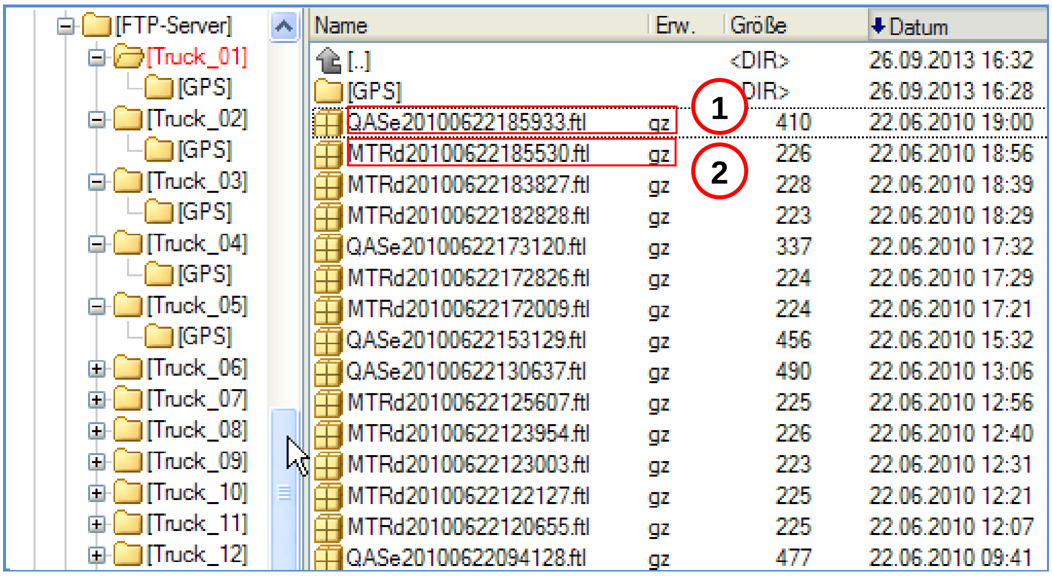


Abb. 6: Structure of the data directory

7.3.6 Data structure for dial directory Truck 1

This could, for example, a content look on the FTP server for Truck 1.

Truck 1



7.3.7 Example of a QAS file (NoMix or MultiSeal).

1 → Contents of the file - **QAS1e20140113082155.ftl**
Accurate explanation of the structure of the event file
.

QAS1e20140113082155.ftl

```
0,20140113082155,1.00
1,20140113082155,FAS,RMTT,00.00,,04.10,,21,
1,20140113082155,FAS,MultiSeal,02.00,,01.70,,11,1002
2,20140113082155,0,RMTT_VEH
6,20140113082155,,,,,,4,,,,,,,,,,,,,,
10,20140113082155,,0,,,1002
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
42,20140113082100,,307,12,1
42,20140113082100,1,2,2
42,20140113082100,2,2,2
42,20140113082100,3,2,2
42,20140113082100,4,2,2
08,20140113082100,9.889163,53.642962,0,10,,0
42,20140113082100,1,1,2
```

```
42,20140113082100,2,1,2
42,20140113082100,3,1,2
42,20140113082100,4,1,2
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
20,20140113082100,67
42,20140113082100,1,13,2
42,20140113082100,2,13,2
42,20140113082100,3,13,2
42,20140113082100,4,13,2
40,20140113082100,1,,0
40,20140113082100,2,,0
40,20140113082100,3,,0
40,20140113082100,4,,0
42,20140113082100,1,1,1
42,20140113082100,2,1,1
42,20140113082100,3,1,1
42,20140113082100,4,1,1
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
20,20140113082100,68
42,20140113082100,1,2,1
42,20140113082100,2,2,1
42,20140113082100,3,2,1
42,20140113082100,4,2,1
42,20140113082100,,307,11,1
...
...
```

7.3.7.1 Darstellung der QAS-Datei mit dem Event Monitor

1 → Contents of the file - **QAS1e20140113082155.ftl**
View with the Event Monitor in plain text.

Explanation of the symbols and the Event Monitor
see chapter 8 "Event Monitor" / page 333.

QAS1e20140113082155.ftl

Datum	Zeit	Ka...	Text
13.01.2014	08:21:55		FTL-Version: 1.00
13.01.2014	08:21:55		Gerät: RMTT
			Hardware: 00.00
			Software: 04.10
			CAN-ID: 21
13.01.2014	08:21:55		Gerät: MultiSeal
			Hardware: 02.00
			Software: 01.70
			CAN-ID: 11
			Serien Nr: 1002
			Fahrzeug: RMTT_VEH (Tankwagen)
			Anzahl der Kammern: 4
			Meter Standort: Tankwagen
13.01.2014	08:21:00	1	Bodenventil - geschlossen
13.01.2014	08:21:00	2	Bodenventil - geschlossen
13.01.2014	08:21:00	3	Bodenventil - geschlossen
13.01.2014	08:21:00	4	Bodenventil - geschlossen
13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - eingescl
13.01.2014	08:21:00	1	API-Kupplung - offen
13.01.2014	08:21:00	2	API-Kupplung - offen
13.01.2014	08:21:00	3	API-Kupplung - offen
13.01.2014	08:21:00	4	API-Kupplung - offen
13.01.2014	08:21:00		GPS-Position: 9.889163 (O) 53.642962 (N)
13.01.2014	08:21:00	1	Bodenventil - offen
13.01.2014	08:21:00	2	Bodenventil - offen
13.01.2014	08:21:00	3	Bodenventil - offen
13.01.2014	08:21:00	4	Bodenventil - offen
13.01.2014	08:21:00		Start des Abgabemodus
13.01.2014	08:21:00		Start des Abgabemodus
13.01.2014	08:21:00		Start des Abgabemodus
13.01.2014	08:21:00		Start des Abgabemodus
13.01.2014	08:21:00		Restmengensensor Nr. 1 - trocken
13.01.2014	08:21:00		Restmengensensor Nr. 2 - trocken
13.01.2014	08:21:00		Restmengensensor Nr. 3 - trocken
13.01.2014	08:21:00		Restmengensensor Nr. 4 - trocken
13.01.2014	08:21:00	1	Kammer Status - leer
13.01.2014	08:21:00	2	Kammer Status - leer
13.01.2014	08:21:00	3	Kammer Status - leer
13.01.2014	08:21:00	4	Kammer Status - leer
13.01.2014	08:21:00	1	Bodenventil - geschlossen

1 → Inhalt der Datei – **QAS1e20140113082155.ftl**
Ansicht mit dem Event Monitor
(Fortsetzung)

			ERROR: 3 Sensor Events in < 2 Min. (Comp=1 Sensor=1)
13.01.2014	08:21:00	2	Bodenventil - geschlossen
			ERROR: 3 Sensor Events in < 2 Min. (Comp=2 Sensor=1)
13.01.2014	08:21:00	3	Bodenventil - geschlossen
			ERROR: 3 Sensor Events in < 2 Min. (Comp=3 Sensor=1)
13.01.2014	08:21:00	4	Bodenventil - geschlossen
			ERROR: 3 Sensor Events in < 2 Min. (Comp=4 Sensor=1)
13.01.2014	08:21:00		Ende des Abgabemodus
13.01.2014	08:21:00		Ende des Abgabemodus
13.01.2014	08:21:00		Ende des Abgabemodus
13.01.2014	08:21:00		Ende des Abgabemodus
13.01.2014	08:21:00	1	API-Kupplung - geschlossen
13.01.2014	08:21:00	2	API-Kupplung - geschlossen
13.01.2014	08:21:00	3	API-Kupplung - geschlossen
13.01.2014	08:21:00	4	API-Kupplung - geschlossen
13.01.2014	08:21:00		Eingang des Restmengensensors (Druckluft) hat sich geändert - ausgesc

7.3.7.2 Example of a meter file (Multiflow).

2 → Contents of the file - **MTR1d20140113085047.ftl**

MTR1d20140113085047.ftl

```
0,20140113085047,1.00
1,20140113085047,FAS,RMTT,00.00,,04.10,,21,
1,20140113085047,FAS,MultiFlow,00.00,,3.61 DE,,1,16DF0032
2,20140113085047,0,RMTT_VEH
6,20140113085047,,,,,,0,,,,,,,,,,,,,,
10,20140113085047,- ? -,0,,,16DF0032
8,20140113084800,+9.889163,+53.642962,40,,7,1
11,20140113084800,119,0,3,16DF0032,0,241,245,-
0.3,,,,,,,,,,,,,,,,,,0...
...
...
```

7.3.7.3 Representation of the meter file with the Event Monitor.

2 → Contents of the file - **MTR1d20140113085047.ftl**
View with the Event Monitor.

MTR1d20140113085047.ftl

	Datum	Zeit	Ka...	Text
	13.01.2014	08:50:47		FTL-Version: 1.00
	13.01.2014	08:50:47		Gerät: RMTT
				Hardware: 00.00
				Software: 04.10
				CAN-ID: 21
	13.01.2014	08:50:47		Gerät: MultiFlow
				Hardware: 00.00
				Software: 3.61 DE
				CAN-ID: 1
				Serien Nr: 16DF0032
				Fahrzeug: RMTT_VEH (Tankwagen)
				Meter Standort: Tankwagen
	13.01.2014	08:48:00		GPS-Position: +9.889163 (O) +53.642962 (N)
	13.01.2014	08:48:00		Abgabe
				Beleg Nr.: 119
				Abgabe vom Fahrzeug / Gemessen vom Fahrzeug
				Produktcode: 3 (Normal-Bleifrei)
				Messanlagen Nr.: 16DF0032
				Umkompensiertes Volumen: 241,0 Liter
				Kompensiertes Volumen: 245,0 Liter
				Mittlere Temperatur: -0,3 °C
				Messtechnisch NICHT geeicht

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7.3.7.4 Structure and format of the event file.

The format of the files is:

- Name of the data source,
- Number of the data source,
- data type,
- Timestamp of creation,
- Extension of the file name.

Example:

QAS1e20140113082155.ftl

```
|   ||    |      |     |
|   ||    |      |     +-- File name extension:
|   ||    |      |           .ftl
|   ||    |      |           .gz = gepackte
|   ||    |      |                (.ftl) Datei
|   ||    |      |
|   ||    |      +--------- Time stamp:
|   ||    |                  Time = hhmmss
|   ||    |                  Time = 08:21:55
|   ||    |
|   ||    +----------------- Time stamp:
|   ||                       Date = YYYYMMDD
|   ||                       Date = 13.01.2014
|   ||
|   |+--------------------- Type:
|   |                        m = manually;
|   |                        e = event (automatic)
|   |                        d = delivery data
|   |
|   +----------------------- Data source number:
|                            1 = Single QAS System
|                            2 =
|
+--------------------------- Data source :
                             QAS = NoMix / MultiSeal
                             MTR = MultiFlow
                             LEV = MultiLevel
```

7.3.7.5 Example of the contents of an event file.

7.3.7.5.1 Identifier “0”

The format of the contents of the file is:

- Identifier, time stamp, and one or more events.

A very frequently used identifier is:

„0“ Version request

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
0,20091215091041,1.00
|      |       |     |
|      |       |     +--- * 1.00  = FTL output code.
|      |       |
|      |       +--------- Time stamp:
|      |                    Time  = hhmmss
|      |                    Time  = 09:10:41
|      |
|      +----------------- Time stamp:
|                           Date = YYYYMMDD
|                           Date = 15.12.2009
|
+------------------------ Time stamp:
(Listing of all identifiers
<dg_ref_source_inline>)
```

7.3.7.5.1.1 Identifier “1”

A very frequently used identifier is:

„1“ Device ID query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
1,20091215091041,FAS,EMIS4,01.01,,04.10EMIS4,,21,JL448
|    |      |      |    |     |  |     |      | |   |
|    |      |      |    |     |  |     |      | |   +-- serial no.
|    |      |      |    |     |  |     |      | |
|    |      |      |    |     |  |     |      | +--- CAN bus node no.
|    |      |      |    |     |  |     |      |
|    |      |      |    |     |  |     |      +----- not used
|    |      |      |    |     |  |     |
|    |      |      |    |     |  |     +------------- software version
|    |      |      |    |     |  |
|    |      |      |    |     |  +------------------- not used
|    |      |      |    |     |
|    |      |      |    |     +----------------------- hardware version
|    |      |      |    |
|    |      |      |    +----------------------------- device type
|    |      |      |
|    |      |      +---------- Manufacturers short code – 3 character
|    |      |
|    |      +------------------ Time stamp:
|    |                           Time  = hhmmss
|    |                           Time  = 09:10:41
|    |
|    +------------------------- Time stamp:
|                                Date = YYYYMMDD
|                                Date = 15.12.2009
|
+------------------------------ Identifier:
                  (Listing of all identifiers
                  see chapter 7.3 "FTL - Data record structure" / page 259)
```

7.3.7.5.1.2 Identifier “8”

A very frequently used identifier is:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43
 |      |         |       |      | | | | |   | |
 |      |         |       |      | | | | |   | |
 |      |         |       |      | | | | |   | +- Driving direction
 |      |         |       |      | | | | |   |      (in degrees)
 |      |         |       |      | | | | |   |
 |      |         |       |      | | | | |   +---- Speed
 |      |         |       |      | | | | |
 |      |         |       |      | | | | +-- Time lag
 |      |         |       |      | | | |       (in seconds)
 |      |         |       |      | | | |
 |      |         |       |      | | | +----- horizontal
 |      |         |       |      | | |         positioning error
 |      |         |       |      | | |
 |      |         |       |      | | +-------- Number of used
 |      |         |       |      | |           satellites
 |      |         |       |      | |
 |      |         |       |      | +----------- Quality of GEO Info
 |      |         |       |      |
 |      |         |       |      +--- altitude
 |      |         |       |
 |      |         |       +------------- latitude
 |      |         |
 |      |         +----------------------- longitude
 |      |
 |      +------------------------------------- Time stamp:
 |                                               Date = YYYYMMDDhhmmss
 |                                               Date = 12.04.2013 / 08:49:53
 |
 +------------------------------------------------- Identifier:
                (Listing of all identifiers
                see chapter 7.3 "FTL - Data record structure" / page 259)
```

7.3.7.5.1.3 Identifier “42”

A very frequently used identifier is:

„42“ Access status

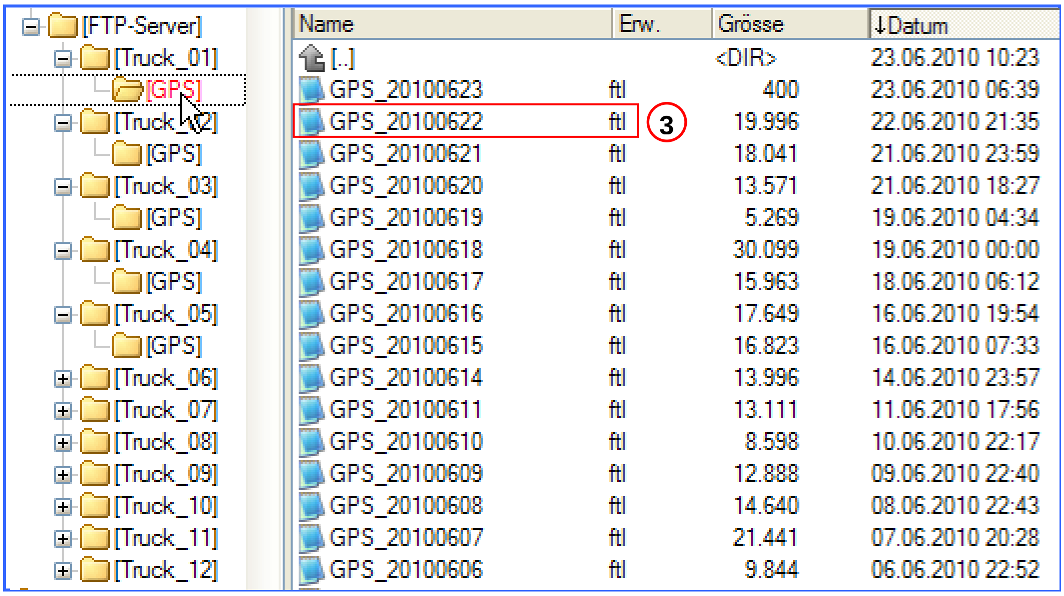
see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
42,20091215091041,2,2,2
 |      |       |     | | |
 |      |       |     | | +--- Status = open
 |      |       |     | |
 |      |       |     | +----- API coupling
 |      |       |     |
 |      |       |     +------- Compartment no.= 2
 |      |       |
 |      |       +------------- Time stamp:
 |      |                        Time  = hhmmss
 |      |                        Time  = 09:10:41
 |      |
 |      +--------------------- Time stamp:
 |                               Date = YYYYMMDD
 |                               Date = 15.12.2009
 |
 +--------------------------- Identifier:
(Listing of all identifiers
see chapter 7.3 "FTL - Data record structure" / page 259)
```

7.3.8 File structure for GPS directory Truck 1

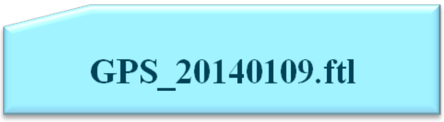
And so could, for example, a table of contents on the FTP server, look for Truck 1 in the GPS directory.



Name	Erw.	Grösse	↓Datum
[..]		<DIR>	23.06.2010 10:23
GPS_20100623	ftl	400	23.06.2010 06:39
GPS_20100622	ftl	19.996	22.06.2010 21:35
GPS_20100621	ftl	18.041	21.06.2010 23:59
GPS_20100620	ftl	13.571	21.06.2010 18:27
GPS_20100619	ftl	5.269	19.06.2010 04:34
GPS_20100618	ftl	30.099	19.06.2010 00:00
GPS_20100617	ftl	15.963	18.06.2010 06:12
GPS_20100616	ftl	17.649	16.06.2010 19:54
GPS_20100615	ftl	16.823	16.06.2010 07:33
GPS_20100614	ftl	13.996	14.06.2010 23:57
GPS_20100611	ftl	13.111	11.06.2010 17:56
GPS_20100610	ftl	8.598	10.06.2010 22:17
GPS_20100609	ftl	12.888	09.06.2010 22:40
GPS_20100608	ftl	14.640	08.06.2010 22:43
GPS_20100607	ftl	21.441	07.06.2010 20:28
GPS_20100606	ftl	9.844	06.06.2010 22:52

7.3.8.1 Structure and format of the GPS file.

3 → Contents of the file - **GPS_20140109.ftl**




```
00,_20140100000000,1.00
02,_20140100000000,0,RMTT_VEH
08,20140109074732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109074932,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075131,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075331,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075531,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075732,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109075933,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080133,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080333,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080534,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080742,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109080942,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081142,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081206,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081314,9.889163,53.642962,40,2,3,1,3600,0,84
```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```
08,20140109081514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109081914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109082914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083114,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083314,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083514,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083714,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109083914,9.889163,53.642962,40,2,3,1,3600,0,84
08,20140109084114,9.889163,53.642962,40,2,3,1,3600,0,84
...
...
```

7.3.8.2 Representation of the GPS file with the Event Monitor.

3 → Contents of the file - **GPS_20140109.ftl**
View with the Event Monitor.

GPS_20140109.ftl

	Datum	Zeit	Ka...	Text
V				FTL-Version: 1.00
				Fahrzeug: RMTT_VEH (Tankwagen)
	09.01.2014	07:47:32		GPS-Position: (extrapoliert) 9.889163 (O) 53.642962 (N)
	09.01.2014	07:49:32		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:51:31		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:53:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:55:31		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:57:32		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	07:59:33		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:01:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:03:33		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:05:34		Time: 00:02:01 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:07:42		Time: 00:02:08 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:09:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:11:42		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:12:06		Time: 00:00:24 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:13:14		Time: 00:01:08 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:15:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:17:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:19:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:21:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:23:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:25:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:27:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:29:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:31:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:33:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:35:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:37:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:39:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:41:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:43:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:45:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:47:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:49:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:51:14		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:53:10		Time: 00:01:56 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:55:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:57:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	08:59:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:01:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:03:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:05:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:07:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:09:10		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:11:09		Time: 00:01:59 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:13:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h
	09.01.2014	09:15:09		Time: 00:02:00 Distance: 0 m Speed: 0,0km/h

. . .

. . .

7.3.8.3 Structure and format of the GPS file

The format of the files is:

- Identifier of the GPS file,
- Timestamp of creation,
- Extension of the file name.

Example:

GPS_20140109.ftl

```
  |       |       |
  |       |       |
  |       |       +---------   File extension:
  |       |                     .ftl
  |       |
  |       +---------------- Time stamp:
  |                           Date = YYYYMMDD
  |                           Date = 09.01.2014
  |
  +---------------------- Type:
                              GPS = GPS file
```

7.3.8.3.1 Example of the contents of a GPS file

7.3.8.3.1.1 Identifier “8”

Da in einer GPS-Datei ausschließlich GPS Positionen protokolliert werden ist dies auch die einzige, bis auf „**0**“ und „**2**“ die zur Eröffnung gehören, gebrauchte Kennung:

„8“ GPS information query.

see chapter 5.1 "E7 Protocol – TDL formatted data" / page 203.

Example:

```
08,20130412084953,+9.889163,+53.642962,16,1,7,1,7200,0,43
```

```
|         |              |          |         |  |  |  |  |    |  |
|         |              |          |         |  |  |  |  |    |  |
|         |              |          |         |  |  |  |  |    |  +- Driving direction
|         |              |          |         |  |  |  |  |    |     (in degrees)
|         |              |          |         |  |  |  |  |    |
|         |              |          |         |  |  |  |  |    +---- Speed
|         |              |          |         |  |  |  |  |
|         |              |          |         |  |  |  |  +-- Time lag
|         |              |          |         |  |  |  |      (in seconds)
|         |              |          |         |  |  |  |
|         |              |          |         |  |  |  +----- horizontal
|         |              |          |         |  |  |         positioning error
|         |              |          |         |  |  |
|         |              |          |         |  |  +-------- Number of used
|         |              |          |         |  |            satellites
|         |              |          |         |  |
|         |              |          |         |  +----------- Quality of GEO Info
|         |              |          |         |
|         |              |          |         +--- altitude
|         |              |          |
|         |              |          +------------- latitude
|         |              |
|         |              +------------------------ longitude
|         |
|         +--------------------------------------- Time stamp:
|                                                    Date = YYYYMMDDhhmmss
|                                                    Date = 12.04.2013 / 08:49:53
|
+------------------------------------------------- Identifier:
                   (Listing of all identifiers
                   see chapter 7.3 "FTL - Data record structure" / page 259)
```

7.4 FTL - Record structure

7.4.1 Scope

☞ This document outlines the communication between an OBC and the a MultitTask device via FTL protocol.

7.4.2 Record type groups

Record types are grouped in order to facilitate decoding and improve readability of the protocol file.

Record type	Description
0 to 9	System data
10 to 19	Measuring results
20 to 29	Operating data, e.g. working times
30 to 39	Reserved
40 to 49	Quality, safety and sealing data (e.g. crossover prevention, overfill prevention)
50 to 59	GSM data
60 to 69	Reserved
70 to 79	Reserved
80 to 89	Reserved
90 to 99	Maintenance data
100 and above	Reserved

7.4.3 Storage Classes

Class	Short	Description
Fixed	FI	Value is built-in into software and can only be changed by a software update
Hardware-Adjusted	HA	Value is determined by a hardware setting (e. g. DIP switch or jumper)
Non-Volatile	NV	Value will remain the same after power-up or restart
Volatile	VO	Value will be set to default on every power-up or restart
Other	OT	None of the above

7.4.4 Value Generation Types

Type	Short	Description
Set Telegram	ST	Value is set by the OBC by means of a SET telegram
Parameter	PA	Value is considered part of the TCD's parameterization
Computed Internally	CI	MultiTask software computes value from internal state
MTS Pushed	MP	Value is sent to the TCD by another MTS device spontaneously, i. e. without being queried by the TCD.
OBC Polled	OP	Value is queried from another MTS device each time the OBC requests it

Polled at Power-up	PP	Field is received from another MTS device only during power-up sequence
GPS	GP	Value is received from a GPS device that is connected to a COM port.
Other	OT	None of the above

7.4.5 Access Modes

Mode	Short	Description
Read	RD	Field can be read
Write	WR	Field can be written to
Clear	CL	Field can be cleared
Write Service	WS	Field can be written to if service password is set
Trigger	TR	Write operation to field triggers an action
Other	OT	None of the above

7.4.6 Data Format Types

Data types in this documents are categorized according to [4], Table 3 – "Format identifiers". The following table shows a summary of those. "(…)" indicates that the original description provides more information. For further details and examples please refer to [4], Table 3.

Format Identifier	Description
B	Boolean; only the values "0" and "1" are valid
F$x	Floating point value; total max. x characters before and after decimal point, including sign if applicable
FC$	GPS position value (latitude, longitude, corresponds to DOK-411's FloatC)
Nx	Integer decimal value with max x characters (including sign character)
Nx.y	Floating point value; max x digits in front of the point; including sign character; max y digits behind the point. (…)
Cx	Text with a maximum number of x characters (…)
S	Time stamp; CCYYMMDDhhmmss (…)
D	Date (CCYYMMDD)
D$	Date (DD.MM.CCYY)
IP$	IPv4-Adresse xxx.xxx.xxx.xxx
T	Time (hhmmss)
T5$	Time (hh:mm)
T8$	Time (hh:mm:ss)
Hx	Unsigned hexadecimal value with max x characters. (…)

Note: Fx, FC, D$, T5$ and T8$ are not conform to the FTL standard.

7.4.7 FTL Variable Kinds

Kind Identifier	Description
SV	Single-value
LV	List of values, individual values do not possess a specific order.
AV	Array of values; individual values are indexed with a number in brackets. Counting starts at "(1)".

7.4.8 FTL Value Types

Kind Identifier	Description
SF	Single-field; one data entry per value
MF	Multiple-field, string of comma-separated data entries. Also referred to as “record”

7.4.9 Data Structure Support and Parameterization

The MultiTask OBC Interface supports two root nodes, “FAS” and “FTL”. The “FTL” root node is defined in [2]. The “FAS” node is used for the parameterization of MultiTask and also shall be used to provide additional data, which is supported by the MultiTask system but not considered by FTL.

The handling of data which is available in the FAS sub-nodes shall be identical to the data which is available in the FTL sub-node. For example, selection of predefined parameter values is typically done numerically (e.g. 7.5.2 FTL,PRN,TYPE).

The mentioned parameters listed in this document are based on the current state of implementation and on the “EPR270 - Software Specification - NextGeneration Tank Truck Electronics - MultiTask - V1.00”. Due to the ongoing implementation of different modules of the MultiTask project, parameters mentioned in this document may differ from the final implementation. The format may change, parameters will disappear and additional parameters will be added.

Nodes wich includes only parameters witch access mode RD can be combined in one record FTL-Style.

7.5 FAS - Data Tree and Field Description of MultiTask

7.5.1 SYSTEM

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
FEATUREKEY	Device specific functions can be enabled and disable by entering a unique, system dependent key, which is generated from FMC and provided to the according customer.	NV	PA	RD, WR	C50	CSetGeneralNonWM.sFeatureKey	-
CULT_USER	User language/culture according to ISO3166 Alpha-2 and ISO639-1; Format-Example: "en-GB"	NV	PA	RD, WR	C5	CSetGeneralNonWM.iCultureUser	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
CULT_CUST	Customer language/culture according to ISO3166 Alpha-2 and ISO639-1; Format-Example: "en-GB"	NV	PA	RD, WR	C5	CSetGeneralNonWM.iCultureCustomer	-

7.5.1.1 ACCESS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LEVEL	Current user access level	NV	PA	RD	N1	CRunDriver. iLevel	0: TBD 1: TBD …

7.5.1.2 DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
NAME	Name of the TCD; e.g. “MULTITASK“	NV	PA	RD	C15	CSetGeneralWM. sDeviceID	Coded into software
SERIALHMI	Serial number of the FMC Global HMI; e.g. “18DL0001”	NV	PA	RD	C10		From unique serial device (HMI)
SERIALAPP	Serial number of the FMC Application-Interface ; e.g. “18DL0002”	NV	PA	RD	C10		From unique serial device (Application-Interface)
OSVERSHMI	SW-Version FMC Global HMI Linux	NV	PA	RD	C10	CSetGeneralNonWM. sOsVersHmi	Coded into OS software
OSVERSAPP	SW-Version FMC Application-Interface Linux	NV	PA	RD	C10	CSetGeneralNonWM. sOsVersApp	Coded into OS software
SWVERSHMI	SW-Version FMC Global HMI Application	NV	PA	RD	C10	CSetGeneralNonWM. sSwVersHmi	Coded into application software
SWVERSAPP	SW-Version FMC Application-Interface Application	NV	PA	RD	C10	CSetGeneralNonWM. sSWVersApp	Coded into application software
SLEEP	Inactivity timeout for entering standby mode	NV	PA	RD, WR	N2	CSetGeneralNonWM. iSleep	Value range 1-10 ; Default 5min
RESET	a SET executes "reboot"	ST	OT	WR	B	-	
ID_NECESS	Identification is necessary	VO	CI	RD/ WR	B	CSetGeneralNonWM.xIdentificationNecessary	
SETUP_SEC	Setup is activ and secured	VO	CI	RD/ WR	B	CSetGeneralNonWM.xSetup	If set, non W&M parameters are also secured by pwd

7.5.1.3 REMOTE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
ENABLE	(De)activate Remote Access	NV	CI	RD, WR	B	CSetGeneralNonWM. bRemoteEnable	
LEVEL	Unrestricted, Restricted access	NV	CI	RD, WR	N2	CSetGeneralNonWM. iRemoteLevel	
IP_SYNC	Initiate System-Information-File-Update	ST	OT	WR	C1	xxx *	

(*) A SET to FAS,SYSTEM,REMOTE,IP_SYNC calls the method xxx which initiates the "System-Information-File-Update"

7.5.1.4 STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTERROR	Last error of MultiTask main modul	VO	CI	RD	C50	CRunTruck.sLasterror	Additional error to FTL,SYSTEM,SYS_ERR, ERRORS refering to internal SW-Modules
MODE	Mode of MultiTask main modul	VO	CI	RD	N3	CRunTruck.iMode	Mode refering to internal SW-Modules, reports status-list of enabled MultiTask functionalities 0: READY 1: BUSY 2: ERROR n: TBD

7.5.1.5 UPDATE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
CUSTOMERID	Customer Group-ID for software update procedure (0…998) 0: Update disabled	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iCustomerID	-
MONTH	1…12	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iMonth	-
DAY	1…31	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iDay	-
WEEKDAY	1…7	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iWeekday	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
HOUR	0…23	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iHour	-
MINUTE	0…59	NV	PA	RD, WS	N2	CSetFtpSwUpdate. iMinute	-
REMOTE	Remote update config: auto, manual	NV	PA	RD, WS	B	CSetFtpSwUpdate. bRemote	Auto = 0 ; Manual = 1

7.5.2 ORDER,DELIVERY

☞ This node is identical to FTL,ORDER,DELIVERY + all additional delivery data which is supported by MultiTask

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
???	For all delivery data which is not part of FTL,ORDER	NV	PA	RD	C50		-

7.5.3 PRODUCT, ARTICLE(n)

☞ This node is identical to FTL,PRODUCT,ARTICLE + all additional product data which is supported by MultiTask.

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PROD_CODE	Product identification code	NV	PA	RD	N3	CSetProductWM . iProductCode	According to EN14116
PROD_TYPE	Product type	NV	PA	RD	N1	CSetProductWM . eProductType	0: UNKNOWN, 1: DISABLED, 2: FLOW, 3: ADD, 4: PACK
PROD_NAME	Product name	NV	PA	RD	C30	CSetProductWM . sProductName	= FTL,PRODUCT,ARTICLE,a_art_txt
PROD_ALTRN	Alternative product name	NV	PA	RD	C30		
COMP_SEL	Enable / disable temperature compensation	NV	PA	RD	B	CSetProductWM . bCompSelect	-
COMP_TEMP	Reference temperature for temperature compensation: 0..99 Cel	NV	PA	RD	N5	CSetProductWM . iCompTemp	-
DENSITY	Product reference density for temperature compensation	NV	PA	RD	N5.3	CSetProductWM . dDensity	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
API_TABLE	API Table used for temperature compensation	NV	PA	RD	N2	CSetProductWM . eApiTable	0: APIUnknown, 1: No API table => no compensation 2: API table 54A 3: API table 54B 4: API table 54D: lube oil 5: API table 54X: liquid pressurized gas 6: API table 6A 7: API table 6B 8: formular for 3rd grade polynome 9: PTB formular for linear approximation
FACTOR1	Factor 1 for linear & polinomal approximation	NV	PA	RD	N5.3	CSetProductWM . dFactor1	-
FACTOR2	Factor 2 for linear & polinomal approximation	NV	PA	RD	N5.3	CSetProductWM . dFactor2	-
FACTOR3	Factor 3 for linear & polinomal approximation	NV	PA	RD	N5.3	CSetProductWM . dFactor3	-
MIN_TEMP	Min. temp. for linear & polinomal approximation	NV	PA	RD	N5	CSetProductWM . iMinTemp	-
MAX_TEMP	Max. temp. for linear & polinomal approximation	NV	PA	RD	N5	CSetProductWM . iMaxTemp	
FLOAT_COR	Correction of the float dip depth (in 1/1000 mm)	NV	PA	RD	N5	CSetProductWM . iFloatCorrection	-
TAG_CODE	Product Tag code	NV	PA	RD	N3	CSetProductNon WM. iTagCode	-
HALL_CODE	Product Hall code	NV	PA	RD	N2	CSetProductNon WM. iHallCode	-
OP_CODE	Product GWG code	NV	PA	RD	N5	CSetProductNon WM. iGWGCode	-
PROD_CLASS	Product danger class (AI / AIII)	NV	PA	RD	N5	CSetProductNon WM. iDangerClass	-
A_LDG_CODE	Alternate product for loading	NV	PA	RD	N3	CSetProductNon WM. iAltLdgCode	-
A_DIS_CODE	Alternate product for discharge	NV	PA	RD	N3	CSetProductNon WM.iAltDlvCode	Alternate product for discharge
UNIT_TXT	Unit text	NV	PA	RD	C6	CSetProductNon WM. sUnitTxt	= FTL,PRODUCT,ARTICLE, a_unit_txt
UNIT_MSR	Unit of measure	NV	PA	RD/ WR	N1	CSetProductNon WM. sUnitTxt	= FTL,PRODUCT,ARTICLE, a_unit_msr Unit of measure 0 litres 1 gallons 2 kilograms 3 cubic metres 4 millimetres 5 hPa (pressure) 6 pieces

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PID_QALI	PID quality	NV	PA	RD	C6	CSetProductNonWM. sPidQali	= FTL,PRODUCT,ARTICLE, a_pid_grd
P_COMPC	Company code	NV	PA	RD	C6	CSetProductNonWM. sPComPc	= FTL,PRODUCT,ARTICLE, a_p_compc
P_PRODC	product code	NV	PA	RD, WR	C6	CSetProductNonWM. sPProdC	= FTL,PRODUCT,ARTICLE, a_p_prodc
VAP_LOAD	Product must be vapour recoding at loading	NV	PA	RD	B	CSetProductNonWM.bVapourRecordingAtLoading	-
VAP_DELV	Product must be vapour recoding at ldischarge	NV	PA	RD	B	CSetProductNonWM.bVapourRecordingAtDischarge	-
VAP_MEAS	Product is available for: 0: no measurement 1: measurem. 1 2: measurem. 2	NV	PA	RD	N1	CSetProductNonWM.iProductForMeasurement	-

7.5.4 TRUCK

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
VEH_TYPE	Vehicle type	NV	PA	RD, WR	N1	CSetGeneralNonWM. iVehicleType	s. 5.12.1 L0202 0 Tankfahrzeug (Festaufbau) 1 Zugfahrzeug 2 Sattelauflieger 3 Anhänger 4 Hydrantenfahrzeug 5 IBC 6 Sonstige
DIP_STICK	Electronic dipstick system	NV	PA	RD, WR	N1	CSetGeneralNonWM. iDipStick	Electronic dipstick system 0 no dipstick system 1 dipstick not metrologically approved 2 dipstick metrologically approved
CNT_MEAS	Number of measurements	NV	CI	RD/ WR	N1	CSetGeneralNonWM.i NrOfMeasurement	Number of measuring systems 0 - 2
DELV_TYPE	Tank truck type	NV	PA	RD, WR	N1	CSetGeneralNonWM.iTruckType	0 undefined 1 direct outlet 2 flow metering system(s) (with collector(s)) 3 Hybrid system (1 and 2)

Field Name	**Description**	**Storage**	**Value Generation**	**Access Mode**	**Data Type**	**Class. Member**	**Additional Information**
DELV_SIDE	Delivery side(s)	NV	PA	RD, WR	N1	CSetGeneralNonWM. iDeliverySide	0 undefined 1 left 2 right 3 left and right 4 rear 5 left and rear 6 right and rear 7 left and right and rear
LOAD_SIDE	Loading side(s)	NV	PA	RD, WR	N1	CSetGeneralNonWM. iLoadingSide	
WLEG_CONF	Wetleg configuration	NV	PA	RD, WR	N1	CSetGeneralNonWM. iWetlegConfiguration	0 none 1 one sensor low in each pipe 2 one sensor left, one right, both in low position 3 one sensor low, one sensor high in each 4 one sensor in each compartment 5 combination of 4 + 1 6 combination of 4 + 2 7 combination of 4 + 3 8 other configuration with four or more sensors
NO_CPTS	Number of compartments	NV	PA	RD, WR	N2	CSetGenerelWM.iNrOfComp	Number of compartments 1 - 24
MANLID_MON	Dome cover monitoring	NV	PA	RD, WR	N1	CSetGeneralNonWM iMonManlid	0 none, free access 1 none, covers mechanically sealed 2 per compartment 3 common for all compartments
API_MON	API monitoring (of closed state)	NV	PA	RD, WR	B	CSetGeneralNonWM. bMonApi	
BV_MON	Foot valve monitoring	NV	PA	RD, WR	N1	CSetGeneralNonWM. iMonButtomValve	0 none 1 pneumatic monitoring of "closed state" 2 pneumatic monitoring of "fully opened state" 3 combination of 1 and 2 4 electromechanical monitoring of "closed state" 5 electromechanical monitoring of "fully opened state" 6 combination of 4 and 5
CV_MON	In line valve monitoring	NV	PA	RD, WR	N1	CSetGeneralNonWM iMonCV	
CNT_VAPOUR	Number of vapour nozzles	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iNrOfVapourNozzle	Number of 2" vapour noozles 0 - 4

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
NO_OP	Number of OP	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iNrOfOP	
COM_VAP	Common vapour is available	NV	CI	RD/ WR	B	CSetGeneralNonWM.x CommonVapur	-
GEO_LD_ON	Loading and discharge is allowed (from Geofencing)	NV	CI	RD/ WR	B	CSetGeneralNonWM.x EnableLoadingAndDischarge	-
LDG_MODE	Loading mode Truck	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLoadingmodeTruck	-
AUTOCHANGE	Automatic mode change is allowed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xAutoModeChange	-
HSV	Monitoring the filllevel Hose supervision	NV	CI	RD/ WR	B	CSetGeneralNonWM.xMonitoringFillLevel	-
SWITCH_LV	Switch line valve alone without bottom valve	NV	CI	RD/ WR	B	CSetGeneralNonWM.xSwitchLineValve	-
MAX_LDG	Number of loadings at once	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iNrOfLoadingAtOnce	-
MAX_DIS	Number of discharged at once	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iNrOfDischargeAtOnce	-
MAN_LP	Manual enter of loadingplan is allowed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xManualCreateLoadinplan	-
MAN_LP_TO	Timeout manual loadingplan, Loading will be stopped automatically after timeout when loading plan was changes manualy	NV	CI	RD/ WR	N2	CSetGeneralNonWM.xManualLoadingplanTimeout	
CODE_CORR	Enable productcode correction is allowed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xEnableProductCodeCorrection	-
FILL_COMP	1: with compartment is not empty, 2: only empty compartments 3: with restamount	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iFillingCompartment	
DIS_AT_LS	Discharge on loading side	NV	CI	RD/ WR	B	CSetGeneralNonWM.xDischargeAtLoadingside	-
BV_PRESS	BottomValve pressue balance	NV	CI	RD/ WR	B	CSetGeneralNonWM.xBottomValvePressBalance	-
ANA	Use deadman switch	NV	CI	RD/ WR	B	CSetGeneralNonWM.xUseANA	-
MC_DELAY	Magnetic Code Delay	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iMagnetic CodeDelay	-
WL_DEL_ON	Wetleg Sensor Delay ON	NV	CI	RD/ WR	N1	CSetGeneralWM.WetlegWetDebounce	-
WL_DEL_OFF	Wetleg Sensor Delay OFF	NV	CI	RD/ WR	N1	CSetGeneralWM.WetlegSensorDelayON	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
OFFS_PITCH	Sensor offset for pitch slope	NV		RD/ WR		CSetGeneralWM .dSensPitchSlope	
OFFS_ROLL	Sensor offset for roll slope	NV		RD/ WR		CSetGeneralWM .dSensRollSlope	
IOFFSPITCH	Installation offset for pitch slope	NV		RD/ WR		CSetGeneralWM .dInstPitchSlope	
IOFFSROLL	Installation offset for roll slope	NV		RD/ WR		CSetGeneralWM .dInstRollSlope	
VEHICLE_ID	ID of the truck (name plate)	NV		RD/ WR	C15	CSetGeneralWM. sTruckID	
RECEIPT_NO	Consecutive receipt number	NV		RD/ WR	N9	CSetGeneralWM.uiReceiptNumber	

7.5.4.1 SENSOR,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LOAD	Number of the sensor for the loading signal	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iLoadingSignalSensor	-
LOAD_ST	Type of the sensor for the loading signal	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iLoadingSignalSensorType	
DIS	Number of the sensor for the discharge signal	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iDischargeSignalSensor	-
DIS_ST	Type of the sensor for the discharge signal	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iDischargeSignalSensorType	
BRAKE	Number of the sensor for the parking brake	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iParkingBrakeSensor	-
BRAKE_ST	Type of the sensor for the parking brake	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iParkingBrakeSensorType	
PRESS_H	Number of the sensor for high pressure sensor	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iHighPressureSensor	-
PRESS_H_ST	Type of the sensor for high pressure sensor	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iHighPressureSensorType	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PRESS_L	Number of the sensor for low pressure sensor	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iLowPressureSensor	-
PRESS_L_ST	Type of the sensor for low pressure sensor	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iLowPressureSensor Type	
CAB_L	Number of the sensor for the left cabinet	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iLeftCabinetSensor	-
CAB_L_ST	Type of the sensor for the left cabinet	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iLeftCabinetSensorType	
CAB_R	Number of the sensor for the right cabinet	NV	PA	RD, WR	N3	CSetGlobalSensorNonWM. iRightCabinetSensor	-
CAB_R_ST	Type of the sensor for the right cabinet	NV	PA	RD, WR	N1	CSetGlobalSensorNonWM. iRightCabinetSensorType	

7.5.4.2 SENSOR,SETUP,COMP(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
WETLEG_1	Number of the wetleg sensor 1 for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iWetlegSensor1	-
WETLEG_2	Number of the wetleg sensor 2 for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iWetlegSensor2	-
WETLEG_3	Number of the wetleg sensor 3 for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iWetlegSensor3	-
TEMP	Number of the temperature sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iTempSensor	-
LEVEL	Number of the level sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iLevelSensor	-
BOTTOM_V	Number of the bottom valve output for this compartment	NV	PA	RD, WR	N3	CSetCompSensorNonWM. iBottomValve	-
BOTTOM_VS	Number of the bottom valve sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorNonWM.iBottomValveSensor	
BOTTOM_VST	Type of the bottom valve sensor for this compartment	NV	PA	RD, WR	N1	CSetCompSensorNonWM.iBottomValveSensorType	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LINE_V	Number of the line valve output for this compartment	NV	PA	RD, WR	N3	CSetCompSensorNonWM. iLineValveSensor	
LINE_VS	Number of the line valve sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorNonWM.iLineValveSensor	
LINE_VST	Type of the line valve sensor for this compartment	NV	PA	RD, WR	N1	CSetCompSensorNonWM.iLineValveSensorType	
MAN_LID	Number of the man lid sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iManLidSensor	
MAN_LID_ST	Type of theManLid sensor for this compartment	NV	PA	RD, WR	N1	CSetCompSensorNonWM.iManLidSensorType	
API	Number of the API coupling sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iApiCouplingSensor	
API_ST	Type of the API coupling sensor for this compartment	NV	PA	RD, WR	N1	CSetCompSensorNonWM.iApiCouplingSensorType	
WATER	Number of the water sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorNonWM . iWaterSensor	
OVERFILL	Number of the overfill sensor for this compartment	NV	PA	RD, WR	N3	CSetCompSensorWM. iOverfillSensor	
HALL	Number of the hall sensor for this compartment	NV	PA	RD, WR	N3	CStCompSenesorWM. iHallSensor	
MIN_PITCH	Min. pitch slope allowed for this compartment	NV	PA	RD, WR	N2.1	CSetCompLevelWM.dMinPitch	
MAX_PITCH	Max. pitch slope allowed for this compartment	NV	PA	RD, WR	N2.1	CSetCompLevelWM.dMaxPitch	
MIN_ROLL	Min. roll slope allowed for this compartment	NV	PA	RD, WR	N2.1	CSetCompLevelWM.dMinRoll	
MAX_ROLL	Max. roll slope allowed for this compartment	NV	PA	RD, WR	N2.1	CSetCompLevelWM.dMaxRoll	

7.5.4.3 SENSOR,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
ACT_PITCH	Actual pitch slope in 1/1000 degree	VO	CI	RD	N3	CRunTruckSensorWM. iActualPitch	-
ACTL_ROLL	Actual roll slope in 1/1000 degree	VO	CI	RD	N3	CRunTruckSensorWM. iActualRoll	-
SLOPE_ ST	Status of slope sensor	VO	CI	RD	N3	CRunTruckSensorWM. iSlopeSensorStatus	-
A_PITCH_C	Change status of actual pitch	VO	CI	RD	N3	CRunTruckSensorWM. bActualPitchChanged	set to true every time the internal variable is modified set to false when status is polled
A_ROLL_C	Change status of actual roll	VO	CI	RD	N3	CRunTruckSensorWM. bActualRollChanged	set to true every time the internal variable is modified set to false when status is polled
SLOPE_ ST_C	Change status of actual roll	VO	CI	RD	N3	CRunTruckSensorWM. bSlopeSensorStatusChanged	set to true every time the internal variable is modified set to false when status is polled
LOAD_SIG	Status of the loading signal	VO	CI	RD	N3	CRunTruckSensorNonWM. iLoadingSignal	-
DIS_SIG	Status of the discharge signal	VO	CI	RD	N3	CRunTruckSensorNonWM. iDischargeSignal	-
BRAKE	Status of the parking brake	VO	CI	RD	N3	CRunTruckSensorNonWM. iParkingBrake	-
PRESS_HIGH	Status of the high pressure switch	VO	CI	RD	N3	CRunTruckSensorNonWM. iHighPressure	-
PRESS_LOW	Status of the low pressure switch	VO	CI	RD	N3	CRunTruckSensorNonWM. iLowPressure	-
CAB_LEFT	Status of the left cabinet sensor	VO	CI	RD	N3	CRunTruckSensorNonWM. iLeftCabinet	-
CAB_RIGHT	Status of the right cabinet sensor	VO	CI	RD	N3	CRunTruckSensorNonWM. iRightCabinet	-
PER_LDG	Status of the magnetic valve for permission loading	VO	CI	RD	N3	CRunTruckSensorNonWM.i PermissionLoading	-
PER_DIS	Status of the magnetic valve for permission discharge	VO	CI	RD	N3	CRunTruckSensorNonWM.i PermissionDischarge	-
CAB_VALVE	Status of the magnetic valve for the cabinet	VO	CI	RD	N3	CRunTruckSensorNonWM.i CabinetValve	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
MEAS1_VALV	Status of the magnetic valve for measurement 1	VO	CI	RD	N3	CRunTruckSensorNonWM. iMeasurement1Valve	-
MEAS2_VALV	Status of the magnetic valve for measurement 2	VO	CI	RD	N3	CRunTruckSensorNonWM. iMeasurement2Valve	-
VAPOUR1	Status of the vapour nozzle 1	VO	CI	RD	N3	CRunTruckSensorNonWM. iVapourNozzle1Status	-
VAPOUR2	Status of the vapour nozzle 2	VO	CI	RD	N3	CRunTruckSensorNonWM. iVapourNozzle2Status	-
VAPOUR3	Status of the vapour nozzle 3	VO	CI	RD	N3	CRunTruckSensorNonWM. iVapourNozzle3Status	-
VAPOUR4	Status of the vapour nozzle 4	VO	CI	RD	N3	CRunTruckSensorNonWM. iVapourNozzle4Status	-
COMM_VAP	Status of the common vapour nozzle	VO	CI	RD	N3	CRunTruckSensorNonWM. iCommonVapourNozzleStatus	-
MEAS1_S	Status of the measurement hose 1	VO	CI	RD	N3	CRunTruckSensorNonWM. iMeasurement1Valve	-
MEAS2_S	Status of the measurement hose 2	VO	CI	RD	N3	CRunTruckSensorNonWM. iMeasurement2Valve	-
OVERFILL1	Status of the overfill sensor 1 for this compartment	VO	CI	RD	N3	CRunTruckSensorNonWM. iOverfill1Sensor	
OVERFILL2	Status of the overfill sensor 2 for this compartment	VO	CI	RD	N3	CRunTruckSensorNonWM. iOverfill2Sensor	
OVERFILL3	Status of the overfill sensor 3 for this compartment	VO	CI	RD	N3	CRunTruckSensorNonWM. iOverfill3Sensor	

7.5.4.4 SENSOR,STATUS,COMP(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
WETLEG_1	Status of the wetleg sensor 1 for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iWetlegSensor1	-
WETLEG_2	Status of the wetleg sensor 2 for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iWetlegSensor2	-
WETLEG_3	Status of the wetleg sensor 3 for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iWetlegSensor3	-
TEMP	Value of the temperature sensor for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iTempSensor	-
TEMP_ST	Status of the temperature sensor for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iTempSensorStatus	-
LEVEL	Value of the level sensor for this compartment	VO	CI	RD	N6	CRunCompSensorWM. iLevelSensor	-
LEVEL_ST	Status of level sensor for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iLevelSensorStatus	-
LEVEL _WMST	W&M Status of level sensor for this compartment	VO	CI	RD	N3	CRunCompSensorWM. iLevelSensorWMStatus	-
LEVEL_CRC	Checksum of the level sensor data	VO	CI	RD	N6	CRunCompSensorWM. wLevelSensorCRC	-
LEVEL_ SER	Serial of the level sensor data	VO	CI	RD	N6	CRunCompSensorWM. iLevelSensorSerial	-
LEVEL_PCRC	Parameter CRC of the level sensor	VO	CI	RD	N6	CRunCompSensorWM. wLevelParameterCRC	-
LEVEL_FW	Firmware version of the level sensor	VO	CI	RD	N6	CRunCompSensorWM. wLevelFirmware	-
LEVEL_FCRC	Firmware CRC of the level sensor	VO	CI	RD	N6	CRunCompSensorWM. wLevelFirmwareCRC	-
TAG_STAT	Tag scanner status for this compartment	NV	PA	RD	N3	CRunCompSensorNonWM. iTagScannerStatus	-
TAG_SERIAL	Tag scanner serial number for this compartment	NV	PA	RD	N3	CRunCompSensorNonWM. iTagScannerSerialNr	-
TAG_CODE	Product TAG code	VO	CI	RD	N3	CRunCompNonWM.iTAGCode	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LINE_V	Status of the magnetic valve for the line valve for this compartment	VO	CI	RD	N3	CRunCompSensorWM.i LineValve	-
LINE_VS	Status of the line valve sensor for this compartment	VO	CI	RD	N3	CRunCompSensorWM.i LineValveSensor	-
BOTTOM_V	Status of the magnetic valve for the bottom valve sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iBottomValve	-
BOTTOM_VS	Status of the bottom valve sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iBottomValveSensor	-
MAN_LID	Status of the man lid sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iManLidSensor	-
API	Status of the API coupling sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iApiCouplingSensor	-
WATER	Status of the water sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iWaterSensor	-
HALL_STAT	Status of the hall sensor for this compartment	VO	CI	RD	N3	CRunCompSensorNonWM. iHallSensor	-
HALL_CODE	Product Hall code	VO	CI	RD	N3	CRunCompNonWM.iHallCode	

7.5.4.5 LOADPLAN,COMP(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
COMP_STATE	Compartment status: nothing connected, error,ready,loading,discharge ,seal override	VO	CI	RD	N1	CRunCompNonWM.iCompState	-
FILL_STATE	Filling status: empty, not empty, restamount	VO	CI	RD	N1	CRunCompNonWM. iFillingState	-
PROD_NAME	Product name	VO	CI	RD	C30	CRunCompNonWM.strProductName	
TAG_CODE	Product TAG code	VO	CI	RD	N3	CRunCompNonWM.iTAGCode	
OP_CODE	Product OP code	VO	CI	RD	N3	CRunCompNonWM.iOPCode	
HALL_CODE	Product Hall code	VO	CI	RD	N3	CRunCompNonWM.iHallCode	
CONN_OP	Connected OP for this compartment	VO	CI	RD	N3	CRunCompNonWM.iOverrideOP	-

7.5.5 SEAL_WM

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LEVEL	Level in the compartment in different states	VO	CI	RD	B	CRunSealState WM. bSealState	-
COUNT	Increased every time the seal is set	VO	CI	RD	B	CRunSealState WM. iSealCounter	-
SETTIME	Date/time when the seal was set	VO	CI	RD	S	CRunSealState WM. oSetTime	-
USER_NAME	User who set the seal	VO	CI	RD	C50	CRunSealState WM. sSetUserName	-
GPS_SET	GPS position where the seal was set	VO	CI	RD	CXX	CRunSealState WM. oSetGpsPosition	Same format as used for FTL,GPS,TVE (see #L08_GPS_INFO in [2])
VERS_SET	LRP software version (format "xx.yy")	VO	CI	RD	C5	CRunSealState WM. sSetLrpVersion	-
SWHASH_SET	LRP software hash	VO	CI	RD	C50	CRunSealState WM. oSetLrpSoftware Hash	-
PHASH_SET	LRP Parameter hash	VO	CI	RD	C50	CRunSealState WM. oSetLrpParamet erHash	-
BRK_TIME	Date/time when the seal was broken	VO	CI	RD	C50	CRunSealState WM. oBreakTime	-
USR_NAME	User who broke the seal	VO	CI	RD	C50	CRunSealState WM. sBreakUserNam e	-
GPS_BRK	GPS position where the seal was broken	VO	CI	RD	CXX	CRunSealState WM. oBreakGpsPositi on	Same format as used for FTL,GPS,TVE (see #L08_GPS_INFO in [2])
VERS_BRK	LRP software version (format "xx.yy")	VO	CI	RD	C5	CRunSealState WM. sBreakLrpVersio n	-
SWHASH_BRK	LRP software hash	VO	CI	RD	C50	CRunSealState WM. oBreakLrpSoftw areHash	-
PHASH_BRK	LRP Parameter hash	VO	CI	RD	C50	CRunSealState WM. oBreakLrpPara meterHash	-

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7.5.6 LGM

7.5.6.1 LGM,SETUP(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LEVEL_ZERO	Zero point of the level sensor	NV	PA	RD, WR	N9	CSetCompLevel WM. iLevelZero	-
OFFS_ICE	Offset of the ice protection device	NV	PA	RD, WR	N9	CSetCompLevel WM. iOffsetIce	-
OFFS_SLOPE	Offset of the slope correction table	NV	PA	RD, WR	N9	CSetCompLevel WM. iOffsetSlopeTbl	-
OFFS_FLOAT	Offset for the float ("Eintauchtiefe")	NV	PA	RD, WR	N9	CRunSealState WM. iOffsetFloat	-
OFFS_LEV_X	X-Offset of the level sensor installation (in mm)	NV	PA	RD, WR	N9	- CRunSealState WM. iLevelOffsetX	
OFFS_LEV_Y	Y-Offset of the level sensor installation (in mm)	NV	PA	RD, WR	N9	CRunSealState WM. iLevelOffsetY	-
OFFS_TEMP	Offset of the temperature sensor (in degree celsius)	NV	PA	RD, WR	N9.3	CRunSealState WM. dTempOffset	-
VOL_COMP	Compartment Volume	NV	PA	RD, WR	N9.3	CRunSealState WM. iCompVolume	-
VOL_RES	Meassured Residual Volume in ml	NV	PA	RD, WR	N9	CRunSealState WM. iResidualVolume	-
VOL_PIPE	Meassured Pipe Volume in ml	NV	PA	RD, WR	N9	CRunSealState WM. iPipeVolume	-
MIN_LEVEL	Min. possible value (corrected) of the level in 1/1000mm	NV	PA	RD, WR	N9	CRunSealState WM. iMinLevel	-
MAX_LEVEL	Max. possible value (corrected) of the level in 1/1000mm	NV	PA	RD, WR	N9	CRunSealState WM. iMaxLevel	-
CORRECTION	Correction factor for level gauging table	NV	PA	RD, WR	N9.3	CRunSealState WM. dCorrection	-
MIN_DLV_V	Min. delivery volume	NV	PA	RD, WR	N9	CRunSealState WM. iMinDlvVolume	-
COMP_MON_V	Max. allowed volume deviation for compartment monitor	NV	PA	RD, WR	N9	CRunSealState WM. iCompMonitorVo l	-
MAX_DIFF15	Max.allowed difference of V15 between loading & discharge	NV	PA	RD, WR	N9	CRunSealState WM. iMaxDiffV15	-
PRE_STOP	Level to stop before delivery of residual volume starts	NV	PA	RD, WR	N9	CSetCompLevel NonWM. iPreStopLevel	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
SLOPE_STOP	Level to stop if slopes are not correct	NV	PA	RD, WR	N9	CSetCompLevel NonWM. iSlopeStopLevel	-
OVERFILL_V	Level for integrated overfill prevention	NV	PA	RD, WR	N9	CSetCompLevel NonWM. iOverfillVolume	-
PRES_CORR	Volume to stop before preset is reached	NV	PA	RD, WR	N9	CSetCompLevel NonWM. iPresetCorrectio n	-
DEF_PRES	Default preset in Liter (not mL !!)	NV	PA	RD, WR	N9	CSetCompLevel NonWM. iDefaultPreset	-

7.5.6.2 LGM, STATUS(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
USED	Indicated if the compartment is in use for loading, delivery or not	VO	CI	RD	N1	CRunProcessW M. iUsed	-
VOL_UFILL	Actual filling volume of the compartment	VO	CI	RD	N9	CRunProcessW M. iUncompFillingV olume	-
VOL_UCOMP	Uncompensated Volume in ml	VO	CI	RD	N9	CRunProcessW M. iUncompVolume	-
VOL_COMP	Compensated Volume in ml	VO	CI	RD	N9	CRunProcessW M. iCompVolume	-
MASS	Mass always in g (Gramm)	VO	CI	RD	N9	CRunProcessW M. iMass	-
LEVEL	Actual filling level	VO	CI	RD	N9	CRunProcessW M. iLevel	-
AV_TEMP	Average temperature of liquid in 1/1000 °C	VO	CI	RD	N9	CRunProcessW M. iAverageTemp	-
FLOW_ACT	Actual flow rate	VO	CI	RD	N9	CRunProcessW M. iFlowRate	-
FLOW_AV	Average flow rate	VO	CI	RD	N9.3	CRunProcessW M. dAverageFlow	-
TIMESTAMP	Timestamp, updated on every change of values	VO	CI	RD	S	CRunProcessW M. oTimeStamp	-
VOL_CFILL	Compensated filling volume: will be increased during loading & decreased during delivery	VO	CI	RD	N9	CRunProcessW M. iCompFillingVolu me	-
VOL_VALID	Flag	VO	CI	RD	B	CRunProcessW M. bVolumeValid	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
COMP_STAT	Compartment status	VO	CI	RD	B	CRunProcessWM. iCompartmentStatus	-
START_TIME	Start time of the delivery	VO	CI	RD	S	CRunProcessWM. oStartTime	-
START_LVL	Start filling level	VO	CI	RD	N9	CRunProcessWM. iStartLevel	-
START_VOL	Start filling volume	VO	CI	RD	N9	CRunProcessWM. iStartVolume	-
END_TIME	End time of the delivery	VO	CI	RD	S	CRunProcessWM. oEndTime	-
END_LEVEL	End filling level	VO	CI	RD	N9	CRunProcessWM. iEndLevel	-
END_VOL	End filling volume	VO	CI	RD	N9	CRunProcessWM. iEndVolume	-
UNMETERED	true on unmetered delivery	VO	CI	RD	N9	CRunProcessWM. bUnmetered	-
WM_APPROV	true: Measurement approved by W&M	VO	CI	RD	N9	CRunProcessWM. bWMApproved	-
VOL_ADD	true: Volume are added if wetleg falls dry	VO	CI	RD	N9	CRunProcessWM. iAddVolume	-
COMP_M_AL	Set true if the measurement is not valid due to an compartment monitor alarm: another inactive compartment changed it's volume during delivery of this compartment	VO	CI	RD	B	CRunProcessWM. bCompMonAlarm	-
RECEIPT_NO	Consecutive receipt number	VO	CI	RD	N9	CRunProcessWM. iReceiptNumber	-
ERROR	Several error flags	VO	CI	RD	N9	CRunProcessWM. iError	-
CAN_SRC	Reason for interrupting a running process	VO	CI	RD	N9	CRunProcessWM. iCancelSource	-
CLNT_TXT	Selected client text	VO	CI	RD	N9	CRunProcessNonWM. iClntTxt	-
RECEIPTTYP		VO	CI	RD	N9	CRunProcessNonWM. iReceiptType	-
CUST_NO		VO	CI	RD	N9	CRunProcessNonWM. iCustomerNumber	-
PAY_MODE		VO	CI	RD	N9	CRunProcessNonWM. iPaymentMode	-
MATCH_CODE		VO	CI	RD	N9	CRunProcessNonWM. iMatchCode	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
SHIFT_NO		VO	CI	RD	N9	CRunProcessNonWM. iShiftNumber	-
TOUR_NO		VO	CI	RD	N9	CRunProcessNonWM. iTourNumber	-
DEPOT_NO		VO	CI	RD	N9	CRunProcessNonWM. iDepotNumber	-
STATION_NO		VO	CI	RD	N9	CRunProcessNonWM. iStationNumber	-
DRIVER_ID		VO	CI	RD	N9	CRunProcessNonWM. iDriverID	-
PRESET		VO	CI	RD	N9	CRunProcessNonWM. iPreset	-
GPS_POS	GPS position at start of process	VO	CI	RD	CXX	CRunSealStateWM. oGpsPosition	Same format as used for FTL,GPS,TVE (see #L08_GPS_INFO in [2])

7.5.7 COP

7.5.7.1 COP,STATUS

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
DIS_MODE	0 = Unknown Discharge mode, 1 = Discharge mode NoMix, 2 = Discharge mode QSS-ASS	VO	CI	RD	N1	CRunTruck.iDischargeMode	

7.5.7.2 COP,SETUP,LOADING

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PLV_ON	0 = Open the Permission Loading Valve at controlmode loading 1 = Open the Permission Loading Valve at status connected	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iPermissionLoadingValveON	
PLV_OFF	0 = Close the Permission Loading Valve at compartment error 1 = Close the Permission Loading Valve at system error 2 = Close the Permission Loading Valve at loading error	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iPermissionLoadingValveOFF	
ETEST	1: yes without override 2: yes with override 3: no	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iCompartmentEmptyTest	
CC_ETEST	The compartment will closed after the compartment empty test	NV	CI	RD/ WR	B	CSetGeneralNonWM.xCloseCompartmentAfterEmptyTest	
OPEN_COMP	1: yes 2: not at manual loadingplan 3: no	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iAutomaticOpenCompartment	
CLOSE_COMP	The compartment will be closed after loading	NV	CI	RD/ WR	B	CSetGeneralNonWM.xCloseCompartmentAfterLoading	

7.5.7.3 COP,SETUP,DISCHARGE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
DIS_MODE	1: COP 2: OP-HSV 3: COP & OP-HSV	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iDischargeMode	
OVERR_MODE	1: HSV_AND_QSS 2: HSV_NOT_QSS 3: HSV_QSS_NO_CODE 4: no	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iOverrideMode	
NO_OV_ASS	Disable all overrides if ASS is scanned	NV	CI	RD/ WR	B	CSetGeneralNonWM.xDisableOverrideAtASS	
ENABLE_OV	Enable overide at discharge	NV	CI	RD/ WR	B	CSetGeneralNonWM.xEnableOverride	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
OV_LOG	Log info for override is standard or detailed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xOverrideLogInfoStandard	
NR_OVR	Number of allowed overrides 1 - 2	NV	CI	RD/ WR	N1	CSetGeneralNonWM.iNrOfOverride	
TAGDEL_OFF	Delay time the TAG sensor code will be shown after disconnected	NV	CI	RD/ WR	N3	CSetGeneralNonWM.iTAGSensorDelayOFF	
TIMEOUT_OV	Override timeout, started delivery with active override will be stopped automatically	NV	CI	RD/ WR	N2	CSetGeneralNonWM.xOverride Timeout	

7.5.7.4 COP,SETUP,LOGGING

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LOG_ANA	Log ANA	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLogANA	
LOG_HALL	Log Hall sensor	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLogHall	
LOG_OP	Log GWG sensor	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLogGWG	
LOG_TAG	Log TAG info	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLogTAGInfo	
LOG_QS	Log QS	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLogQS	
LOG_VAPOUR	Log Vapur info	NV	CI	RD/ WR	B	CSetGeneralNonWM.xLOogVapur	

7.5.8 SPD

7.5.8.1 SPD,SEAL(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
REPORT_NR	Always the same for each (n)	VO			N6	CRunCompNonWM.iSealCounter	
PRODUCT	Product code of compartment	VO				CRunCompNonWM.strProductName	See FAS,TRUCK,COMP(n),STATUS, PROD_NAME
SEAL_STATE	seal state of compartment	VO				CRunCompNonWM.bSealState	See FAS,TRUCK,COMP(n),STATUS,COMP_STATE
SEAL_CNT_L	Counter of manual seals for loading	VO	CI	RD	N3	CRunCompNonWM. iSealCounter	-
SEAL_CNT_D	Counter of manual seals for discharge	VO	CI	RD		CRunCompNonWM. iDischargeSealCounter	
SET_TIME	Date/time when the seal was set	VO	CI	RD	S	CRunCompNonWM.oSetTime	
SET_USER	User who set the seal	VO	CI	RD	C30	CRunCompNonWM.sSetUserName	
SET_GPS	GPS position where the seal was set	VO	CI	RD		CRunCompNonWM.oSetGpsPosition	
BREAK_TIME	Date/time when the seal was broken	VO	CI	RD	S	CRunCompNonWM.oBreakTime	
BREAK_USER	User who broken the seal	VO	CI	RD	C30	CRunCompNonWM.sBreakUserName	
BREAK_GPS	GPS position where the seal was broken	VO	CI	RD		CRunCompNonWM.oBreakGpsPosition	

7.5.8.2 SPD,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
NR_L_MSEAL	Number of allowed manual seals for loading	NV	CI	RD/WR	N1	CSetGeneralNonWM. iSealCounter	Display manual seal (see CRunCompNonWM too) Example: - 2L-SEAL for second manual seal - FL-SEAL for last possible manual seal
NR_D_MSEAL	Number of allowed manual seals for discharge	NV	CI	RD/ WR	N1	CSetGeneralNonWM. iDischargeSealCounter	Display manual seal (see CRunCompNonWM too) Example: - 2D-SEAL for second manual seal - FD-SEAL for last possible manual seal
MANUALSEAL	Manual seal is allowed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xManualSeal	Yes; No,
SEAL_REST	Sealing at restamount is allowed	NV	CI	RD/ WR	B	CSetGeneralNonWM.xSealingAtRestamount	
P_OFF_BS	Power off breaks seal	NV	CI	RD/ WR	B	CSetGeneralNonWM.xPowerOffBreaksSeal	

7.5.9 DISPLAY

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
BRIGHT	Brightness	NV	PA	RD, WR	N3	CSetDisplay. iBright	-
COLOR	Color intense	NV	PA	RD, WR	N3	CSetDisplay. iColor	-
CONTRAST	Contrast	NV	PA	RD, WR	N3	CSetDisplay. iContrast	-
COL_SWITCH	Switch black&white <-> color if supported	NV	PA	RD, WR	B	CSetDisplay. iColSwitch	0: Color 1: B/W

7.5.10 TOUCH

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
CALIB	Start touchscreen calibration	ST	OT	WR	B	XXX	A SET to FAS,TOUCH,CALIB calls the method xxx which initiates the calibration 0: NO 1: YES

7.5.11 COM(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTERROR	Last error of COM(n) modul	VO	CI	RD	C50	CRunCom. sLastError	Set according to last TCD's error status; cleared on next REQUEST to this field
MODE		FI	CI	RD	N1	CRunCom iMode	0: READY 1: BUSY 2: ERROR n: TBD
TYPE	Type of port	NV	PA	RD, WR	N1	CSetCom iType	0 = "RS232" 1 = "RS485"
BAUD	Baudrate	NV	PA	RD, WR	N6	CSetCom iBaud	-
DATA	Databits	NV	PA	RD, WR	N1	CSetCom iData	-
STOP	Stopbits	NV	PA	RD, WR	N1	CSetCom iStop	-
PARITY	Parity	NV	PA	RD, WR	N1	CSetCom iParity	-
FLWCTRL	Flowcontrol	NV	PA	RD, WR	B	CSetCom iFlwCtrl	0:NO 1:YES
QUEUE	Interface dedicated to PRN or OBC?	NV	PA	RD, WR	B	CSetCom iQueue	0: PRN 1: OBC 2: GPS

COM(0) = RS232/485
COM(1) = RS232
COM(2) = RS232/485 (internal fixed for GPS)

7.5.12 PRN

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PORT	Current COM port used for printing	NV	PA	RD, WR	N1 ~~C6~~	CSetPrn iPort	s. FTL,PRN,PORT 0=COM(0) 1=COM(1) 2=COM(2)
TYPE	Printer-Type	OT	CI	RD	N2	CRunPrn. iType	s.7.5.4 FTL,PRN,TYPE
STATUS		FI	CI	RD	N1~~1~~ ~~0~~	CRunPrn.iStatus	s.7.5.5 FTL,PRN,STATUS
RESERVED	Port reservation state	VO	OT	RD/ WR	N1	CRunPrn. iReserved	s. 7.5.6 FTL,PRN,RESERVED 0 = not reserved 1 = reserved by != PRN >1 = TBD
TX_TEXT	Transmit text	VO	ST	WR	C120	CRunPrn. sTX_Text	S. 7.5.8 FTL,PRN,TX_TEXT

7.5.13 OBC

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PORT	Current port used by OBC	NV	PA	RD, WR	N1	CSetObc iPort	0=COM(0) 1=COM(1) 2=COM(2)

7.5.14 CAN(n)

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTERROR	Last error of CAN(n) modul	VO	CI	RD	N1	CRunCan. sLastError	Set according to last TCD's error status; cleared on next REQUEST to this field
MODE	e. g. "READY", "SERVICE"	FI	CI	RD	N3	CRunCan iMode	Set according to CAN's current mode 0: READY 1: BUSY 2: ERROR n: TBD
BITRATE	Bitrate	NV	PA	RD, WR	N6	CSetCan iBitRate	-

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PROTCOL	E. g. “FAS”, “TMC”	NV	PA	RD, WR	N1	CSetCan iProtocol	“FAS”, “TMC”, “FMS” 0: FAS 1: TMC 2: FMS

CAN(0) … CAN(2).

7.5.15 CAN_FAS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
IO_IF	Number of available IO-Inteterfaces	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfOutputI F	
AS_IF	Number of available Overfill-prevention-interfaces	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfOvrAm pIF	
TAG_IF	Number of available TAG-Interfaces	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfTagIF	
HALL_IF	Number of available HALL-Interfaces	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfHallIF	
SENSOR_IF	Number of available Sensor-Interfaces (Namur)	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfNamurI F	
EUROTOP_IF	Number of available Eurotop-Interfaces	NV		RD/ WR	N1	CSetGeneralNon WM.iNrOfEuroTo pIF	For future use only

7.5.16 CAN_FASWM

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LEVEL_IF	Number of available Level-Interfaces	NV		RD/ WR	N1	CSetGeneralWM.i NrOfLevelIF	
FPI_IF	Number of available FPI-Interfaces	NV		RD/ WR	N1	CSetGeneralWM.i NrOfMeterIF	
WETLEG_IF	Number of available Wetleg-Interfaces	NV		RD/ WR	N1	CSetGeneralWM.i NrOfWetlegIF	

7.5.17 CAN_TMC

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Node	Device node on the TMC-CAN-Bus			RD/ WR	N2		

7.5.17.1 CAN_TMC,CALIB

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
ENABLE	Enable communication with calibration unit			RD/ WR	B		
NODE	Node of calibration unit on the TMC-CAN-Bus			RD/ WR	N2		

7.5.18 USB

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTERROR	Last error of USB modul	VO	CI	RD	N1	CRunUsb. sLastError	Set according to last TCD's error status; cleared on next REQUEST to this field
MODE		FI	CI	RD	N1	CRunUsb. iMode	Set according to current USB mode 0: READY 1: BUSY 2: ERROR n: TBD

7.5.19 GPS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTDATA	Same format as used for FTL,GPS,TVE	VO	CI	RD	N9	CGps	

7.5.19.1 GPS,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Name	Product name >> $PGRMT,<1> to " VER" e.g. "GPS 17" [1])	FI	CI	RD	C15	CGps. sName	
SERIAL	const "GPS"	FI	CI	RD	C15	-	Value not supported from GPS modul
SWVersion	Software version >> $PGRMT,<1> from "VER" e.g. "2.05" [1])	FI	CI	RD	C10	CGps. sSwVersion	

7.5.19.2 GPS,PORT

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
PORT	Last error of COM(n) modul	NV	PA	RD, WR	N1	CSetGps. iPort	0=COM(0) 1=COM(1) 2=COM(2)
RESERVED	Port reservation state	VO	OT	RD/ WR	N1	TBD CRunGps. iReserved	s. 7.5.6 FTL,PRN,RESERVED 0 = not reserved 1 = reserved by =! GPS >1 = TBD
TX_TEXT	Transmit text	VO	ST	WR	C120	TBD CRunGps. sTX_Text	S. 7.5.8 FTL,PRN,TX_TEXT

7.5.19.3 GPS,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LASTERROR	Last error of GPS modul	VO	CI	RD	C50	CRunGps. sLastError	Set according to last TCD's error status; cleared on next REQUEST to this field
MODE		VO	CI	RD	N1	CRunGps. iMode	Set according to GPS's current mode 0: READY 1: BUSY 2: ERROR n: TBD

7.5.19.4 GPS,SETUP

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Enable	"0" GPS not supported "1" GPS activated				N1		Enable GPS functionality
TimeSync	"0" the MultiTask time will NOT be synchronised with the GPS time "1" the MultiTask time will be synchronised with the GPS time (+UTCOffset)	NV	PA	RD, WR	N1	CSetGps. iTimeSync	-
UTCOffset	"-hhmm00 " - "+hhmm00 " Offset which will be added to the UTC time for the MultiTask time synchronisation	NV	PA	RD, WR	C7	CSetGps. iUTCOffset	Format for MultiTask is "-hhmm00" respective "+hhmm00"

7.5.19.5 GPS,DATA

☞ Same data as available for chapter 7.6.3 "FTL,GPS" / page 318.

7.5.19.6 GPS,SUBDATA

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
QUALI	Quality indicator >> $GPGGA<6>	VO	CI	RD	N9	CGps. iQuali	-
HDOP	Horizontal Dilution of Precision >> $GPGGA<8>	VO	CI	RD	C3.3	CGps. dHorPosError	-
AGEDIFF	Always empty	VO	CI	RD		-	Value not supported from GPS modul
ID	Always empty	VO	CI	RD		-	Value not supported from GPS modul

7.5.19.7 GPS,LASTDATA

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information

7.5.19.8 GPS,LASTSUBDAT

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
QUALI	Quality indicator >> $GPGGA<6>	VO	CI	RD	N9	CGps. iQuali	-
HDOP	Horizontal Dilution of Precision >> $GPGGA<8>	VO	CI	RD	C3.3	CGps. dHorPosError	-
AGEDIFF	Always empty	VO	CI	RD		-	Value is not supported from the GPS modul
ID	Always empty	VO	CI	RD		-	Value is not supported from the GPS modul

7.5.19.9 GPS,TRACKING

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
STATUS	Status of GPS tracking	NV	PA	RD, WR	N1	CGpsTracking. iStatus	0 = OFF, 1 = INTERVAL 2 = DISTANCE 3 = STOP
FORMAT	Data format (FTL,GPX,…)	NV	PA	RD, WR	N1	CGpsTracking. iFormat	0 = FTL 1 = GPX (currently not used)
INTERVAL	0, 10 to 3600 sec. 0: no interval measurement	NV	PA	RD, WR	N4	CGpsTracking. iInterval	
DISTANCE	0, 100, 100.000 m 0: no distance measurement	NV	PA	RD, WR	N4	CGpsTracking. iDistance	
SPEEDLEVEL	5 to 120 km/h below SpeedLevel measurement is switched to interval measurement	NV	PA	RD, WR	N3	CGpsTracking. iSpeedLevel	

7.5.19.10 GPS,GEOFENCING

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description
Enable	NV	ST	RD, WR	SV	B	Enable / disable geofencing, 0: OFF 1: ON
Radius	NV	SR	RD, WR	TBD	TBD	Valid Radius from Geofencing-Position
OVERRIDE	NV	PA	RD, WR	TBD	B	Override geofencing permission

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description
LIST	NV	ST	RD, WR, CL	LV	MF	• List of position data Returns the list of all drivers according to the record structure described below. • A SET adds a new dataset to the list. (Only if access-level >= Master) • A CLR removes all datasets from the database on the TVE. (Only if access-level >= Master)

LIST record structure:

LAT (N3.6) Latitude in degrees (S. [2] #L0803)
LONG (N4.6) Longitude in degrees (S. [2] #L0802)
RADIUS (N4) Radius in meter used for geofencing calculation

7.5.20 GSM

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
ATCommand	SET: Writes AT-Command to GSM-Module Triggers REPORT with GSM echo	VO	ST	RD, WR	C24 8	CRunGsm. sATCommand	Example: SET,GSM,ATComm and=”AT+CSQ” REPORT,GSM,ATC ommand=”+CSQ:27, 99<CR><LF>OK” Control sequences will be sent in brackets e.g. <CR><LF>.
LOCKEDRAD	0, 100 bis 9999 radius in m (1 to 99 : NAK) in which GSM is switched off 1 : always ON. OFF position from list of known loads	NV	PA	RD, WR	N4	CSetGsm.iLocke dRadius	
PIN	Personal Identification number	NV	PA	RD, WR	N8	CSetGsm.iPIN	
TimeOut	-	NV	PA	RD, WR	N3	CSetGsm.iTime Out	
RSSI_CHECK	Check interval in s for getting current RSSi and BER information from GSM module	NV	PA	RD, WR	N3		30 – 180s

7.5.20.1 GSM,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Name	Type of the GSM module	FI	CI	RD	C15	CRunGsm. sName	
SWVersion	Software version	FI	CI	RD	C40	CRunGsm. sSWVersion	
PhoneNo	Phone number of the GSM module	NV	PA	RD, WR	N16	CSetGsm. sPhoneNo	
IMSI	International Mobile Subscriber Identity	FI	CI	RD	C15	CRunGsm. sIMSI	
IMEI	International Mobile Equipment Identity	FI	CI	RD	C15	CRunGsm. sSerial	

7.5.20.2 GSM,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LastError	Last occurred error of the GSM device	FI	CI	RD	C50	CRunGsm. sLastError	
Mode	„NO_NETWORK“ „REGISTERED“ „ROAMING“ „FAILED“	FI	CI	RD	N1	CRunGsm. sMode	
RSSI	Signal quality	FI	CI	RD	N2	CRunGsm. iRSSI	
BER	Bit error rate	FI	PA	RD	N1	CRunGsm. iBER	
PIN	Pin required by SIM -Card	FI	PA	RD	N1	CRunGSM.bPIN Requested	

7.5.20.3 GSM,GPRS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
UserName	Username / provider	NV	PA	RD, WR	C20	CSetGsmGprs. sUserName	
Password	Password / provider	NV	PA	RD, WR	C20	CSetGsmGprs. sPassword	
APN	Access point name / provider	NV	PA	RD, WR	C50	CSetGsmGprs. sAPN	
DNS1	IPv4 address of the domain name server #1	NV	PA	RD, WR	IP$	CSetGsmGprs. sDNS1	
DNS2	IPv4 address of the domain name server #2	NV	PA	RD, WR	IP$	CSetGsmGprs. sDNS2	
TimeOut	3 to 60 seconds; default=60	NV	PA	RD, WR	N3	CSetGsmGprs. iTimeOut	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
IP_SYNC	A flag, write only	VO	ST	WR			A SET starts an OpenVPN connection to the server

7.5.20.4 GSM,GPRS,STATUS

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Mode	Mode of GSM-GPRS connection	VO	CI	RD	N1	CRunGsmGprs. sMode	0: OFFLINE 1: STARTED 2: ONLINE 3: SHUTDOWN
Interface	Interface used by ppp daemon	VO	CI	RD	N3	CRunGsmGprs. sInterface	
tty_device	tty_device used by ppp daemon	VO	CI	RD	N3	CRunGsmGprs. sTtyDevice	
speed	speed of ppp connection	VO	CI	RD	N3	CRunGsmGprs. iSpeed	
Local_ip	Local IP address of ppp connection	VO	CI	RD	IP$	CRunGsmGprs. sLocalIp	
Rem_ip	Remote IP address of ppp connection	VO	CI	RD	IP$	CRunGsmGprs. sRemoteIp	

7.5.21 FTP

7.5.21.1 FTP,DATA

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Domain	Domain name of FTP server	NV	PA	RD, WR	C100	CSetGsmGprsFtpData .sFtpServiceDomain	
UserName	User name on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpData.sFtpServiceUsername	
Password	Password for user on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpData.sFtpServicePassword	
Path	Working directory after connection established	NV	PA	RD, WR	C200	CSetGsmGprsFtpData.sFtpServicePath	
ZIP	Data compression (“0”: no compression, “1” apply compression)	NV	PA	RD, WR	B	CSetGsmGprsFtpData.bFtpServiceZip	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
TimeOut	3 to 60 seconds; default = 60	NV	PA	RD, WR	N3	CSetGsmGprsFtpData.iFtpServiceTimeout	
Test	SET: Triggers file storage onto FTP-Server	-	-	WR	B	CRunTriggerFtpTransfer.bStartDataTestFileTransfer	
LastGPS	Logbook event number of the last transferred GPS logbook entry	NV	PA	RD, WR	N10	CSetGsm.uiLastGPSTrackingID	
LastDel	Logbook event number of the last transferd delivery logbook entry	NV	PA	RD, WR	N10	CSetGsm.uiLastAutoLogbookID	
LASTERROR	Show possible FTP-Transfer errors	VO	CI	RD			Information shall include timestamp

7.5.21.2 FTP,SERVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Domain	Domain name of FTP server	NV	PA	RD, WR	C100	CSetGsmGprsFtpService.sDomain	
UserName	User name on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpService.sUserName	
Password	Password for user on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpService.sPassword	
Path	Working directory after connection established	NV	PA	RD, WR	C200	CSetGsmGprsFtpService.sPath	
ZIP	Data compression (“0”: no compression, “1” apply compression)	NV	PA	RD, WR	B	CSetGsmGprsFtpService.xZIP	
TimeOut	3 to 60 seconds; default = 60	NV	PA	RD, WR	N3	CSetGsmGprsFtpService.iTimeOut	
Test	SET: Triggers file storage onto FTP-Server	-	-	WR	B	CRunTriggerFtpTransfer.bStartServiceTestFileTransfer	
LASTERROR	Show possible FTP-Transfer errors	VO	CI	RD			Information shall include timestamp

7.5.21.3 FTP,UPDATE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Domain	Domain name of FTP server	NV	PA	RD, WR	C100	CSetGsmGprsFtpUpdate. sDomain	
UserName	User name on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpUpdate. sUserName	
Password	Password for user on FTP server	NV	PA	RD, WR	C20	CSetGsmGprsFtpUpdate. sPassword	
Path	Working directory after connection established	NV	PA	RD, WR	C200	CSetGsmGprsFtpUpdate. sPath	
ZIP	Data compression ("0": no compression, "1" apply compression)	NV	PA	RD, WR	B	CSetGsmGprsFtpUpdate. xZIP	
TimeOut	30 to 999 seconds / default = 60	NV	PA	RD, WR	N3	CSetGsmGprsFtpUpdate. iTimeOut	
Test	Name of the test file (+ extension ".tst")	-	ST	WR	B	CSetGsmGprsFtpUpdate.iTimeOut	SET: Triggers file storage onto FTP-Server
INITIATE	Initiate a software update test	-	ST	WR	B	CRunTriggerFtpTransfer.bStartUpdateTestFileTransfer	SET: Triggers a software update check
LASTERROR	Show possible FTP-Transfer errors	VO	CI	RD			Information shall include timestamp

7.5.22 VPN

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
ENABLE	Enable VPN-Functionality						
WAIT_TIME	Time in seconds the system waits until it starts the OpenVPN session	NV	PA	WR, RD	N3	CSetGsmGprs. iWaitTime	
SERVER_IP	IP address of the OpenVPN server	NV	PA	WR, RD	IP$	CSetGsmGprs. sServerIp	IP address of the OpenVPN server

7.5.23 BT

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LastError	Last occurred error of the BlueTooth device	FI	CI	RD	C50	CRunBlueTooth. sLastError	
Mode		FI	CI	RD	N3	CRunBlueTooth. sMode	0: READY 1: BUSY 2: ERROR n: TBD
Enable	Enable / Disable BlueTooth communication	NV	PA	RD, WR	B	CSetBlueTooth. bEnable	
Visible	Show or hide BT device				B		
Scan	Triggers a bluetooth scann, reports a list of availabe BT devices	-	ST	RD	C25 5	CRunBlueTooth. sScann	
CON_DEV	List of connected devices	FI	CI	RD	C10 0	CRunBlueTooth. sConnectedDev	
CONNECT	Iinitiate BT bindind with dedicated device						
SYS_UPDATE	Enable system update via BT	NV	PA	RD, WR	B	CSetBlueTooth. bSysUpdate	0: NO 1: YES

7.5.23.1 BT,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Serial	Serial number of the BlueTooth module	FI	CI	RD	C20	CRunBlueTooth. sSerial	
Name	Type of the BlueTooth module	FI	CI	RD	C15	CRunBlueTooth . sName	
SWVersion	Software version	FI	CI	RD	C40	CRunBlueTooth . sSWVersion	
DEV_ID	Device ID of the BlueTooth module	FI	CI	RD	C10	CRunBlueTooth. sDevID	

7.5.24 WLAN

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LastError	Last occurred error of the BlueTooth device	FI	CI	RD	C50	CRunWlan. sLastError	
Mode		FI	CI	RD	C10	CRunWlan . iMode	

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Enable	Enable / Disable WLAN communication	NV	PA	RD, WR	B	CSetWlan. bEnable	0: OFF 1: ON 2: HOTSPOT
SSID	SSID for Hotspot	NV	PA	RD, WR	C20	CSetWlan . dSSID	
KEY	Key for hotspot	NV	PA	RD, WR	C50	CSetWlan . sKey	
SCAN	Scan WLAN network. Reports a list of availabe WLAN networks	-	ST	WR	B	CRunWlan . bTriggerScan	
CON_NET	Connect to WLAN network						List is result from network scan
SECURITY	WLAN security	NV	PA	RD, WR	N1	CSetWlan. iSecurity	0: WEP 1: WPA 2: WPA2
NET_KEY	Network key	NV	PA	RD, WR	C50	CSetWlan. sNetKey	
AUTO_CON	Autom. Network connect	NV	PA	RD, WR	B	CSetWlan. bAutoConnect	
SYS_UPDATE	Enable system update via WLAN	NV	PA	RD, WR	B	CSetWlan. bSysUpdate	

7.5.24.1 WLAN,DEVICE

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Serial	Serial number of the WLAN module	FI	CI	RD	C20	CRunWlan . sSerial	
Name	Type of the WLAN module	FI	CI	RD	C15	CRunWlan . sName	
SWVersion	Software version	FI	CI	RD	C40	CRunWlan . sSWVersion	

7.5.25 ETH

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
LastError	Last occurred error of the Ethernet device	FI	CI	RD	C50	CRunEth . sLastError	
Mode		FI	CI	RD	N1	CRunEth sMode	0: READY 1: BUSY 2: ERROR n: TBD

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
Enable	Enable / Disable Ethernet communication	NV	PA	RD, WR	B	CSetEth . bEnable	0: OFF 1: ON
IP	Ethernet IP-Address	FI	CI	RD	TBD		

7.5.26 TOTAL

Field Description

Field Name	Description	Storage	Value Generation	Access Mode	Data Type	Class. Member	Additional Information
SYS_VT	Totalizer complete system	FI		RD	N9	CRunTotalizerNonWM .iVTTotal	
SYS_V15	Totalizer complete system	FI		RD	N9	CRunTotalizerNonWM .iV0Total	
SYS_MASS	Totalizer complete system	FI		RD	N9	CRunTotalizerNonWM .iMassTotal	
VT(n)	Per Compartment				N9		
V15(n)	Per Compartment				N9		
MASS(n)	Per Compartment				N9		
SYS_VT_T	Totalizer per Tour	FI		RD/ WR	N9	CRunTotalizerNonWM .iVTDay	
SYS_V15_T	Totalizer per Tour	FI		RD/ WR	N9	CRunTotalizerNonWM .iV0Day	
SYS_MASS_T	Totalizer per Tour	FI		RD/ WR	N9	CRunTotalizerNonWM .iMassDay	
VT_T(n)	Totalizer per Tour & per Compartment				N9		
V15_T(n)	Totalizer per Tour & per Compartment				N9		
MASS_T(n)	Totalizer per Tour & per Compartment				N9		
RESET	Reset Tour-Totalizer				B		

7.6 FTL - Data Tree and Field Description

7.6.1 FTL

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Vehicle_ID	NV	PA	RD	SV	MF	#L02; see 7.6.12.1 Definitions for LH_File Records	x

7.6.2 FTL,SYSTEM

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
FTL_Vers	FI	CI	RD	SV	MF	#L00; "1.00"; see	x
FTL_Format	FI	CI	RD	SV	SF / C3	"CSV"	-
DateTime	OT	CI	RD, WR, TR	SV	SF / S	<RTC value> If this value is written to, the realtime clock of MultTask is set to the "DateTime".	x
Baud	NV	ST	RD, WR	SV	SF / N6	Default: "9600"	-
SYS_Err	NV	CI	RD	SV	MF	#L09; This field is cleared when the OBC performs a read access on it.	-
NodeList	FI	CI	RD	LV	SF	List of all supported nodes	x

7.6.3 FTL,GPS

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
TVE	VO	CI	RD	SV	MF	#L08; see 7.6.12.2 Definitions for L_File Records	-

7.6.4 FTL,PRN

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Port	NV	ST	RD, WR	SV	SF / N1	Class/variable: CRunPrn.iPort Printer port to access Describing the printer port to use. V = 0 means default printer port. Returns currently selected port used for printing. Value range from 0 to 9	-
Type	OT	CI	RD	SV	SF /	Class/variable: CRunPrn.iType	x

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
					N2	Type of printer Numeric value, one of 0: no printer at this port 1: printer installed but generally not available for OBC 2: generalized FTL-printer (UTF-8 shall be used) 3: printing to file 4: unknown printer Printers from STAR (10 to 19): 10: STAR SP298 11: STAR DP8340 Printers from EPSON (20 to 29): 20: EPSON TM290 21: EPSON TM295 22: EPSON LQ570 Other printers (90 to 99) manufacturer specific	
Status	OT	CI	RD	SV	N1	Class/variable: CRunPrn.iStatus Status of selected printer Set to 1 tries to reserve printer for usage by OBC. Set to 0 frees the printer Numeric value, one of 0: ready 1: no paper on top (upper sensor) 2: no paper on bottom (lower sensor) 3: no paper (both sensors) 4: printer offline	-
Reserved	VO	OT	RD, WR	SV	N1	Class/variable: CRunPrn.iReserved Reserving the printer required if FTL,PRN,Type is greater than 0 Numeric value, one of 0: idle, free for usage 1: currently reserved for OBC > 1: reserved by MultiTask	-
Tx_Text	VO	ST	WR	SV	C120	Class/variable: CRunPrn.sTxText Text to print A SET prints the text and returns an ACK-frame after the text was successfully printed, NAK-ID frame otherwise	-

- The printer could be in use by TVE or another client. In this case, the TVE reserves the printer itself.
- If the OBC tries to reserve the printer by writing V=1, while the printer is already reserved by TVE or another client, the TVE shall answer with a NAK-ID frame.
- When the printer was reserved by the OBC and a further request by the OBC for reservation is done, the TVE shall answer with an ACK and shall leave the value at V=1.

7.6.5 FTL,COMP

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Count	VO	OP	RD	SV	N2	Value from *CSetGeneralWM.sDeviceID*	-
Status	VO	OP	RD	AV	MF	Returns array with status of all compartments or the status of compartment n. #L40; see 7.6.12.2 Definitions for L_File Records Generate one record for each compartment	-
Content	VO	OP	RD	AV	MF	Returns array with the current load of all compartments or the current load of compartment n #L13; see 7.6.12.2 Definitions for L_File Records Generate one record for each compartment	-
PID_Info	VO	OP	RD	AV	MF	Returns a list of CSV records with all detected PIDs for all compartments. #L45; see 7.6.12.2 Definitions for L_File Records	-
Loading	VO	OP	RD, CL	AV	MF	Returns array with loading information for each compartment stored by loading gantry (OBC). A CLR erases all previous loading information for all compartments. An access with index n returns a CSV record with loading information for compartment n stored from loading gantry (OBC). #L11; see 7.6.12.2 Definitions for L_File Records	-

7.6.6 FTL,NOTIFY

⌦ Not supported

7.6.7 FTL,DRIVER

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Drivers	NV	ST	RD, WR, CL	LV	MF	List of drivers Returns the list of all drivers according to the record structure described below. A SET adds a new driver to the list. (Only if access-level >= Master) A CLR removes all drivers from the database on the TVE. (Only if access-level >= Master) Tab.7 / p.34: DRV_PIN only available if access-level >= Master	-
Current	NV	ST	RD, WR	SV	MF	This variable affects both directions. When a driver logs into MultiTask, the MultiTask shall update this node. Alternatively, when the driver logs into OBC, the OBC shall set this node. When the driver logs out, this shall be indicated by value 0 in field DRV_ID.	-

Record structure:

DRV_ID (N6) Identification number of driver #L0302
DRV_NAME (C30) Name of driver in recommended format <name> <surname>.
LNG_ID (C2) ID of language according to ISO 639-1 shall be used for this driver.
DRV_PIN (N6) PIN code of driver.
PIN_TIME (S) Timestamp of last login.

7.6.8 FTL,FS

⌧ Not supported

7.6.9 FTL,AUX

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Out	NV	ST	RD, WR	AV	B	TBD	-
In	NV	und ef.	RD	AV	B	TBD	-

7.6.10 FTL,ORDER

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Data Format	Description	required
Order	NV	ST	RD, WR, CL	LV	MF	It shall contain general header data which are valid for all positions, namely address information. Data may be used by TVE when printing tickets, or when asking the driver for confirmation of order processing. FTL,ORDER is a list limited to one element. A CLR clears ORDER.Order, ORDER.Plan, ORDER.Delivery and set ORDER.State to zero. See [2] Tab. 9 below	-
Plan	NV	ST	RD, WR	LV	MF	The TVE shall be configurable not to allow any delivery unless a data set is set in the node "ORDER.ORDER" with an order number greater than 0. See [2] Tab. 10 below.	-
State	VO	CI	RD	SV	SF	Numerical code according to the following list: 0 undefined, no order present 2 order data received, at least one order plan item present, TVE ready for processing 3 planned order is being processed 4 unplanned order in process (manual start on TVE, if enabled) 9 order processing finished, but with error 10 order processing finished without error	-
Delivery	NV	MP	RD	LV	MF	#L11; see 7.6.12.2 Definitions for L_File Records	-

Index	Field Name	Value Generation	Data Format	Value Generation
0	plan_id	COrderPlan.iPlanId	N2	Unique index number of this position (will be used by MultiTask when returning order results)
1	art_no	-	-	-
2	art_id	-	-	-
3	art_txt	-	-	-
4	unit_msr	0	N1	Unit of measure (0 = litres)
5	ord_amnt	COrderPlan.iOrderAmnt	N8.2	Quantity ordered (positive number in case of delivery, negative number for loadings)
6	base_tmp	-	-	-
7	dens_t0	-	-	-
8	cpt_no	COrderPlan.iCptNo	N2	compartment number referred, or 0 if free choice by driver
9	tnk_loc	-	-	-
10	met_prd	COrderPlan.iMetPrd	N2	metrological product code according to EN 14116 message #2
11	pmp_rate	-	-	-
12	ord_no	COrderPlan.sOrderNr	C15	host order number for this position
13	del_path	-	-	-
14	down_grade	-	-	-
15	PID_grade	-	-	-

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7.6.11 FTL,PRODUCT

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Deta Format	Description	required
Article			RD	LV	MF	[2] Tab. 5 / p. 16	-

7.6.12 FTL,LOG

Field Description

Field Name	Storage	Value Generation	Access Mode	Variable Kind	ValueType / Deta Format	Description	required
LH_File	NV	CI, OP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
L_File	NV	CI, OP, MP	RD	LV	MF	[2] Tab. 13 / p. 49 and definitions below	x
TimeStamp	NV	ST, CI	RD, WR	SV	SF	Timestamp of last transmitted L_File record and start time for next L_File enquiry.	-
SnapShot	-	ST	WR	SV	SF	Triggers the generation of a “snapshot” set of L_File records.	-

** MultiTask provides only the mandatory L_File and LH_File records.*

7.6.12.1 Definitions for LH_File Records

00 FTL_VERS (required)			Req.	Source / Data Generation
L0000	dataset_id	N2	x	„0“
L0001	timestamp	S	x	current time stamp read from MultiTask OS
L0002	ftl_vers	N2.2	x	„1.00“

Number of data sets: 1

01 DEVICE_ID (required)			Req.	Source / Data Generation	Description
L0100	dataset_id	N2	x	„1“	
L0101	timestamp	S	x	current time stamp read from MultiTask OS	
L0102	man_name	C32	x	e. g. „F. A. Sening“	Manufacturer name
L0103	dev_code	C16	x	CSetGeneralWM.sDeviceID	Manufacturer specific device code
L0104	hard_vers	C8		CSetGeneralWM.sHmiHwVers	Hardware version
L0105	hard_conf	C64		“” (empty)	Hardware configuration
L0106	soft_vers	C8		CSetGeneralWM.sAppOsVers	Software version
L0107	soft_vers	C64		CSetGeneralWM.sAppOsVers	Software configuration
L0108	dev_id	N3	x	CSetGeneralWM.sDevID	Unique code number for the device within the system (e.g. bus address). This number is used to identify the data source, also in case of several devices of the same type.

01 DEVICE_ID (required)			Req.	Source / Data Generation	Description
L0109	dev_serial	C20			Serial number of the device which shall be unique for each manufacturer.
L0110	App_name	C20		“” (empty)	Name of application
L0109	Seal_cnt	N8		“” (empty)	Seal counter if present

Number of data sets: one for MultiTask

02 VEHICLE_ID (required)			Req.	Source / Data Generation	Description
L0200	dataset_ID	N2	x	„2“	
L0201	timestamp	S	x	current time stamp read from MultiTask OS	
L0202	veh_type	N1	x	CSetGeneralNonWM.iTruckType	Vehicle type: 0 tank truck (rigid) 1 tractor 2 semitrailer 3 trailer 4 hydrant vehicle 5 IBC 6 other
L0203	veh_no	C16	x	CSetGeneralWM. sTruckID	Vehicle identifier (e.g. number plate)

Number of data sets of this type: 1

03 DRIVER_ID (optional)	Not supported

Number of data sets: 0

04 TOUR_ID (optional)	Not supported

Number of data sets: 0

05 COMP_ID (optional)	Not supported

Number of data sets: 0

06 TRUCK_SETUP (required)			Req.	Source / Data Generation	Description
L0600	dataset_id	N2	x	„6“	
L0601	timestamp	S	x	current time stamp read from MultiTask OS	
L0602	outp_drv	N2	-	empty	
L0603	dip_stick	N1	X	CSetGeneralNonWM. iDipStick	Electronic dipstick system 0 no dipstick system 1 dipstick not metrologically approved 2 dipstick metrologically approved
L0604	delv_type	N1	X	CSetGeneralNonWM.iTruckType	Tank truck type 0 undefined 1 direct outlet 2 flow metering system(s) (with collector(s)) 3 Hybrid system (1 and 2)
L0605	delv_side	N1	X	CSetGeneralNonWM. iDeliverySide	Delivery side(s) 0 undefined 1 left 2 right 3 left and right 4 rear 5 left and rear 6 right and rear 7 left and right and rear

06 TRUCK_SETUP (required)			**Req.**	**Source / Data Generation**	**Description**
L0606	load_side	N1	x	CSetGeneralNonWM. iLoadingSide	Loading side(s) See L0604
L0607	no_cpts	N2	x	CSetGeneralWM .iNrOfComp	Number of compartments
L0608	no_ops	N1	-	“” (empty)	
L0609	bv_presbal	B	-	“” (empty)	
L0610	wleg_conf	N1	x	CSetGeneralNonWM.iWetlegConfiguration	Wetleg configuration 0 none 1 one sensor low in each pipe 2 one sensor left, one right, both in low position 3 one sensor low, one sensor high in each 4 one sensor in each compartment 5 combination of 4 + 1 6 combination of 4 + 2 7 combination of 4 + 3 8 other configuration with four or more sensors
L0611	sep_cvctrl	B	-		
L0612	cab_lock	N1	-		
L0613	load_mode	N1	-		
L0614	load_start	N1	-		
L0615	load_stop	N1	-		
L0616	ld_auto_op	N1	-		
L0617	ld_auto_cl	B	-		
L0618	rpmon	N1	-		
L0619	**rpm_remop**	**B**	**-**		
L0620	delv_lside	N1	-		
L0621	mhole_mon	N1	x	CSetGeneralNonWM.iMonManlid	Dome cover monitoring 0 none, free access 1 none, covers mechanically sealed 2 per compartment 3 common for all compartments
L0622	api_mon	B	x	CSetGeneralNonWM.bMonApi	API monitoring (of closed state)
L0623	bv_mon	N1	x	CSetGeneralNonWM.iMonButtomValve	Foot valve monitoring 0 none 1 pneumatic monitoring of "closed state" 2 pneumatic monitoring of "fully opened state" 3 combination of 1 and 2 4 electromechanical monitoring of "closed state" 5 electromechanical monitoring of "fully opened state" 6 combination of 4 and 5
L0624	cv_mon	N1	x	CSetGeneralNonWM.iMonCV	In line valve monitoring as L0623
L0624 to L0630 not supported					

Remarks:
Number of datasets: 1.

07 COMP_PROP (optional)	**Not supported**

Number of data sets: 0

10 METER_ID (required)			Req.	Source / Data Generation	Description
L1000	dataset_ID	N2	x	„10“	
L1001	timestamp	S	x	current time stamp read from MultiTask OS	
L1002	cntr_no	N8		CSetGeneralWM. sDeviceID	Metrological meter number
L1006	met_no	C16	x		Measuring point number

Number of data sets: 1

90 CALIBR (required)			Req.	Source / Data Generation	Description
L9000	dataset_ID	N2	x	„90“	
L9001	timestamp	S	x	current time stamp read from MultiTask OS	
L9002	cntr_no	N8	x	CSetGeneralWM. sDeviceID	Metrological meter number
L9003	met_no	C16	x		Measuring point number
L9004	met_prod	N3	x		Metrological product code according to EN 14116 Message #2
L9005	base_temp	N3.1	x		Base temperature for this product (if temperature compensation is enabled)
L9006	density_t0	N4.1	M		Density in kg m-³ at base temperature
L9007	comp_coeff	N1.4			Thermal coefficient of expansion for this product in %/°C
L9008	tvc_type	N1	x		Temperature compensation method for this product 0 no temperature compensation 1 Method B according to DIN 51757 3 Method D according to DIN 51757 4 Method X according to DIN 51757 5 linear (using L9007)
L9009	cal	N2.4	x		Main meter factor (determined during official preverification

Number of data sets: as provided by the individual data sources.

91 NODE_CONF (required)			Source / Data Generation
L9100	dataset_ID	N2	„91“
L9101	timestamp	S	current time stamp read from MultiTask OS
L9102	dev_id	N3	See L0108; device id of the MultiTask
L9103	*node_0_id*	C20	Identifier of top-level node, e. g. “ADMIN”
L9104	*node_1_id*	C20	Identifier of node level 1 e. g. “CLOCK”; empty if not applicable
L9105	*node_2_id*	C20	Identifier of node level 2; empty if not applicable
L9106	*node_3_id*	C20	Identifier of node level 4; empty if not applicable
L9107	*var_id*	C20	Identifier of variable
L9108	*var_type*	C3	One of {“B”, “Nx”, “Nxy”, ”Cx”, “S”, “D”, “T”, “Hx”}
L9109	*format_x*	N2	Specifier “x” for “Nx”, “Nxy”, ”Cx”, “Hx” if applicable
L9110	*format_y*	N2	Specifier “y” for “Nxy” if applicable
L9111	*val_B*	B	Value if var_type = “B”
L9112	*val_Nx*	N99	Value if var_type = “Nx”
L9113	*val_Nxy*	N99.99	Value if var_type = “Nxy”
L9114	*val_Cx*	C99	Value if var_type = “Cx”
L9115	*val_S*	S	Value if var_type = “S”
L9116	*val_D*	D	Value if var_type = “D”
L9117	*val_T*	T	Value if var_type = “T”
L9118	*val_Hx*	H99	Value if var_type = “Hx”

Number of data sets: 1 per config variable as listed below.

92 NODE_STAT (required)			**Source / Data Generation**
L9200	dataset_ID	N2	„92“
L9201	timestamp	S	current time stamp read from MultiTask OS
L9202	dev_id	N3	See L0108; device id of the MultiTask
L9203			See #L91
…			

Number of data sets: 1 per config variable as listed below.

7.6.12.2 Definitions for L_File Records

08 GPS_INFO			**Source / Data Generation**	**Description**
L0800	dataset_id	N2	“8”	
L0801	timestamp	S	CGps. oDateTime	
L0802	geo_long	N4.6	CGps. dLatitude	Longitude in degrees (positive values for east, negative values for west)
L0803	geo_lat	N3.6	CGps. dLongitude	Latitude in degrees (positive values for north, negative values for south)
L0804	geo_hght	N4	CGps.dAltitude	Altitude above sea level in metres
L0805	geo_qlty	N2	CGps.iValidity	Quality of position data 0 no position data or unknown quality 1 Matching Postcode only 2 Matching Town only 3 Matching Postcode and Town (uncertain) 4 Matching Postcode and Town (exact match) 5 Matching up to Town district (uncertain) 6 Matching up to Street (uncertain) 7 Matching up to Street No. (uncertain) 8 Matching up to Town District (exact match) 9 Matching up to Street (exact match) 10 Matching up to Street No. (exact match) 11 GPS positioning (unknown quality) 12 Manually assigned in digital map 13 GPS positioning (dead reckoning) 14 GPS positioning (single measurement) 15 GPS positioning (differential) 16 GPS positioning (averaged) If no GPS data available: 0, else 14
L0806	sat_in_use	N2	CGps.iSatellites	Number of satellites used
L0807	hdop	N4	CGps.dHorPosError	horizontal positioning error in metres (estimated from HDOP)
L0808	time_diff	N3	CGps.iTimeOffset	Time difference in seconds (local, GPS synchronized time — system time) If no GPS data avaliable: 0, else GPS time minus RTC value.
L0809	speed	N3	CGps.dSpeed	speed in km/h
L0810	drv_dir	N3	CGps.dCourse	Driving direction, in degrees (0 to 359) (at rest, keep last direction before stop)

09 SYS_ERR			**Source / Data Generation**
L0900	dataset_id	N2	"9"
L0901	timestamp	S	time of registration of the error condition
L0902	dev_id	N3	See Table 4: NAK-IDs and Error Codes
L0903	error_code	N5	
L0907	err_add	N2	See Table 4: NAK-IDs and Error Codes
L0908	err_info*0*	C20	
…	…		
L090*n*	err_info*n*		

☞ This field will be filled with an appropriate error code record directly when a NAK-ID frame was sent to the OBC or at the moment an error occurs. The relationship between NAK-IDs and error codes (is shown in Table 4: NAK-IDs *and Error Codes*" / p. 328)

NAK-ID	**Description**	**dev_id**	**error_code L0903**			**err_add**	**err_info*0*…err_info*n***
			Group	**Source**	**Type**		
10100	Unknown opcode received	node(TCD) see #L0108	0	01	02	as needed for description (20 char each)	<NAK-ID> + ":" + description
10101	Unknown subnode or variable accessed						
10102	Transmission of frame failed						
10103	Type identifier not correct						
10106	Array index out of boundaries						
10107	Frame exceeded internal buffer size						
10200	Assigned value was trimmed to fit buffer						
10201	Assignment denied, incorrect frame						
10202	Assignment denied, value out of boundaries						
10203	Assignment denied, invalid value type						
10300	Write access denied, variable read-only						
10301	Write access denied, because subnode/variable in use						
10302	Write access denied, list capacity exceed						
10400	Time/date change not permitted out of bounds						
10500	Printer occupied			02	00		
10501	No paper in printer				02		
10502	Printer offline				01		
10503	Printer not reserved for OBC				00		
10504	No answer from printer						
10600	Subnode/variable not capable of notification			01	02		
10700	Not enough disk space						
10701	Invalid filename						
10702	Invalid file access mode						
10703	File doesn't exist						
10704	File is read only						
10705	No wildcards allowed						
10706	Directory doesn't exist						
10707	Can't create directory						
10708	No file or directory given						
10709	File/Directory not opened						
10710	Relative path not permitted						

Table 4: NAK-IDs and Error Codes

11 TRANSFER			**Source / Data Generation**	**Description**
L1100	dataset_ID	N2	"11"	
L1101	end_time	S		
L1102	rcpt_no	N6		
L1103	dl_type	N1		
L1104	met_prod	N3		
L1105	cntr_no	N8		
L1106	unit_msr	N1		
L1107	vol_grs	N8.2		
L1108	vol_t0	N8.2		
L1109	avg_temp	N4.1		
L1110	cpt_no	N2		
L1111	del_path	N2		
L1112	add_no	N3		
L1115	add_vol	N4.3		
L1116	vol_sum	N10.2		
L1117	start_time	T		
L1118	ord_amnt	N6.2		
L1122	vol_weight	N6.2		
L1124	ord_no	C8		
L1125	pmp_rate	N4		
L1126	del_stat	N1		
L1127	approved	B		
L1140	metp_no	C16		

TBD

Collected data from deliveries. Number of records of this type equals number of deliveries.

12 DELV_MODE		

13 COMP_CONT			**Source / Data Generation**	**Description**
L1300	dataset_id	N2	"13"	
L1301	timestamp	S	time of registration of the error condition	
L1302	cpt_no	N3	Number of the compartment	
L1304	met_prod	N3		
L1305	unit_msr	N1	"0"	
L1306	vol_grs	N6.2		

TBD

14 DENSITY	**No record generated.**	

15 INCLINOM0	**No record generated.**	

16 BATTVOLT	**No record generated.**	

17 PRESSURE	**No record generated.**	

20 EVENT	TBD	

22 SHIFT	No record generated	

23 ODOMETER	No record generated.	

24 DISTANCE	No record generated.	

25 AUTEHTLV	No record generated.	

26 DATETIME	No record generated.	

40 COMP_STAT			Source / Data Generation	Description
L4000	dataset_id	N2	“40”	
L4001	timestamp	S	from current RTC value	
L4002	cpt_no	N2	Number of the compartment	
L4003	met_prod	N3	TBD siehe Comp_setup	
L4004	cpt_state	N1		
L4005	seal_state	N1		

41 PROD_INFO		

42 ACC_STAT	Manufacturer specific extensions for L4203:

Number	Source Device	Description
101	LGM	State of DIP switch has changed
102		State of wetleg sensor digital input has changed
103		State of temperature sensor has changed
104		State of inclination sensor has changed
105		State of level sensor has changed
106		State of level sensor has changed
107		State of level interface digital input has changed
108		State of valve interface digital input has changed
109		Read / Write parameter chipcard (L4204=0: Read, L4204=1: Write)
110		Read /Write gauging table chipcard (L4204=0: Read, L4204=1: Write)
111		Read / Write slope table chipcard (L4204=0: Read, L4204=1: Write)
112		Read /Write layout chipcard (L4204=0: Read, L4204=1: Write)
108…199		Reserved for LEVEL extensions
301	COP	AccuLoad connection status
302		State of DIP-switch has changed
303		Hall sensor magnet code
305		Number of overfill preventions in use
306		State of valve interface digital input has changed
307		State of wetleg sensor digital input has changed
301…300	COP	Reserved for COP extensions

Manufacturer specific extensions for L4204:

Number	**Source Device**	**Description**
51	LGM	No error
52		Timeout
53		Transmission checksum error
54		General failure
55		RAM error
56		Parameter checksum error
57		Float gauge position
58		Reference position
59		Float gauge installation
60		Reference installation
61		Overflow

TBD

45 PID_INFO	**Not supported.**	

46 BYPASS	**TBD**	

47 ABORT	**TBD**	

51 GSM_STATUS	**Not supported.**	

52 GSM_CALL	**Not supported.**	

53 SMS_CALL	**Not supported.**	

93 DR_ACT	**TBD**	

8 Event Monitor

8.1 Overview

8.1.1 The Event Monitor window

The Event Monitor is used to display the event files clearly and to provide an overview of the tank truck structure on the FTP server and on the local PC. Another key feature of the Event Monitor is the replication, i.e. saving and copying, of the LOG data from the FTP server to the local PC.

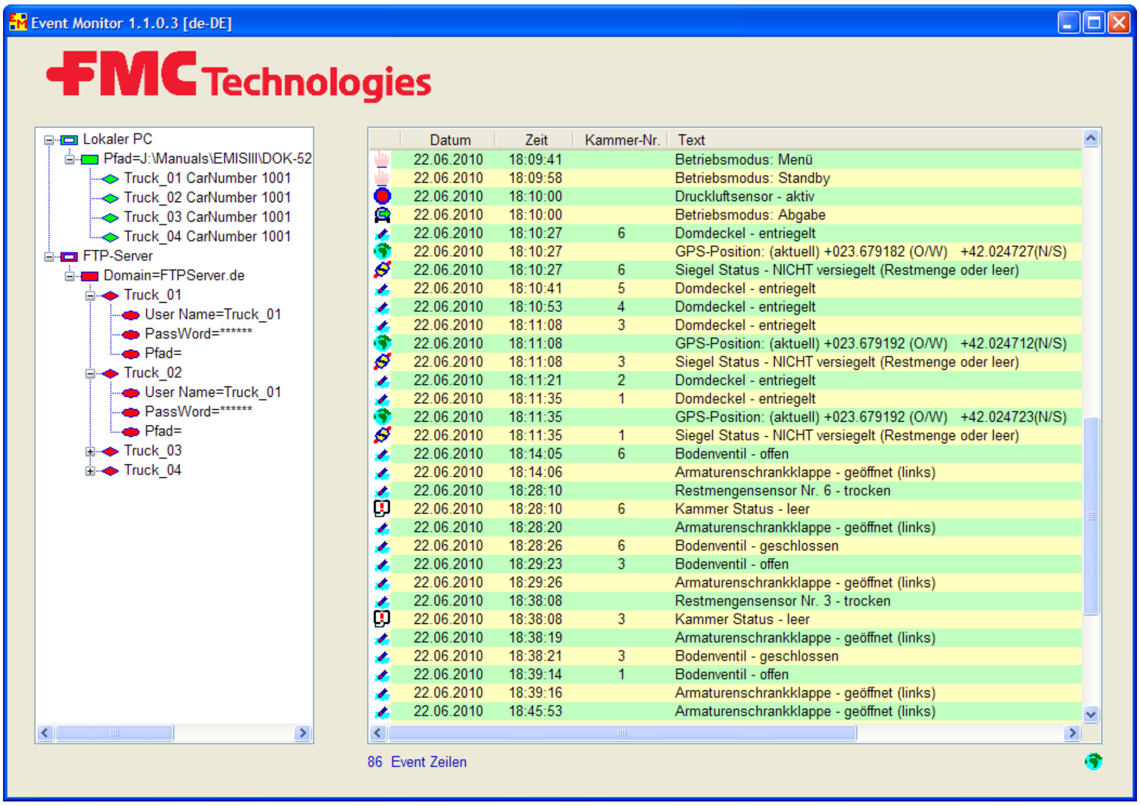


Fig. 7: The Event Monitor window

There are 2 windows displayed: on the left, the tree structure of the tank truck with the local PC and the FTP server data; on the right, the LOG data from the *.gz, *.tdl or *.ftl data sets in clear text. The data is interpreted and translated in accordance with the EN 15969-1 standard, and is provided with the key identifiers - these can be found in the Appendix to this document.

The Event Monitor can be configured using a configuration file, which is described in more detail in chapter 8.1.2 "XML – configuration file for the Event Monitor" / page 340. When you access the Event Monitor program, the settings data or changes are automatically adopted from the configuration file. However, there is NO automatic synchronization with the FTP server.

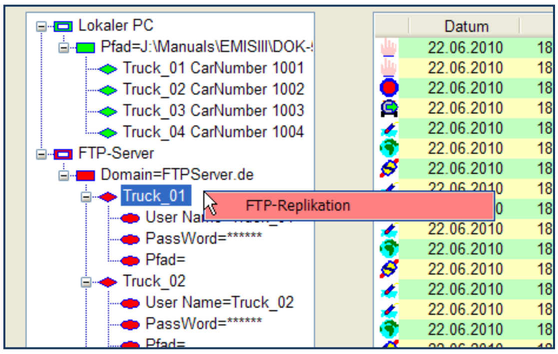
8.1.1.1 FTP replication

The replication with the FTP server and the local PC refers to the multiple saving of the same data to various locations and the synchronization of the two data sources. Only the differences between the two directories are transferred. The entire directory is copied to the local PC only the first time.

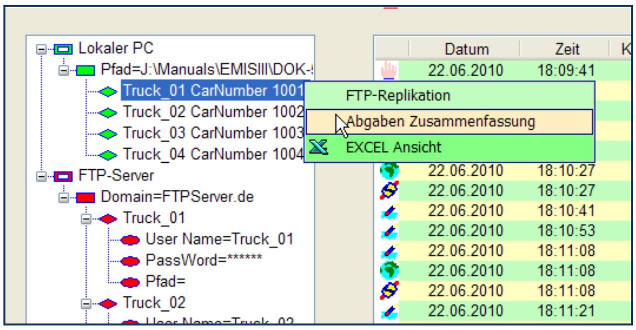
This must be done manually for each individual tank truck. Click the appropriate vehicle and press the right mouse button to initiate Replication. By doing so, a connection to the FTP server is established. All access data are stored, and can be adjusted, in the configuration file.

An example of how to access FTP replication is provided below:

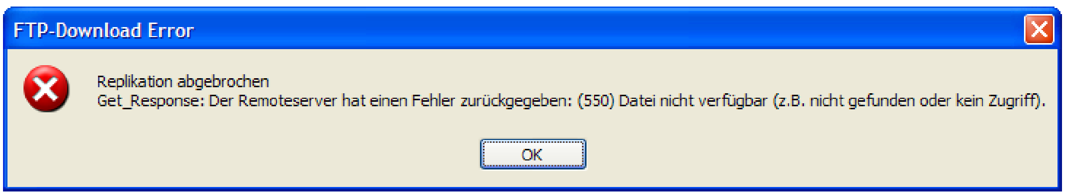
▶ Right-click the desired tank truck:



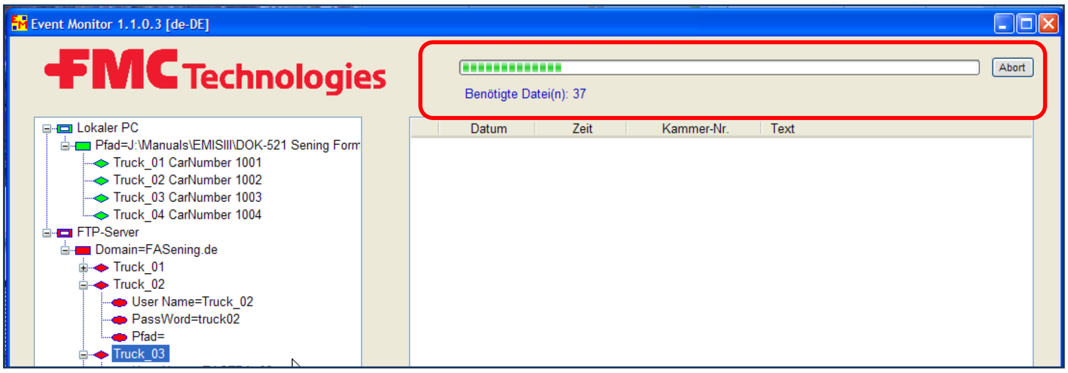
Or via the directory of the local PC:



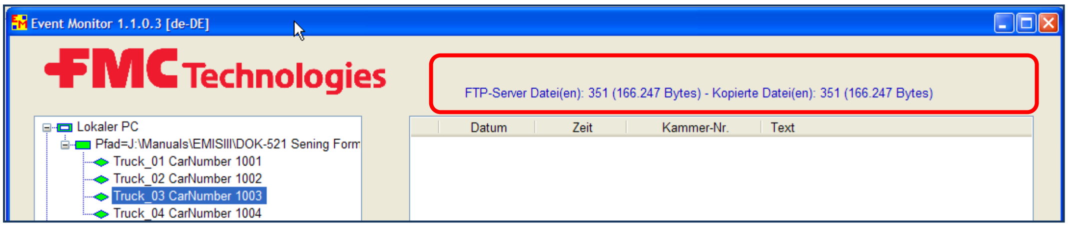
If no connection to the FTP server can be established, the following download error screen will be displayed:



☺ OR – the transfer will start if the connection is established successfully:



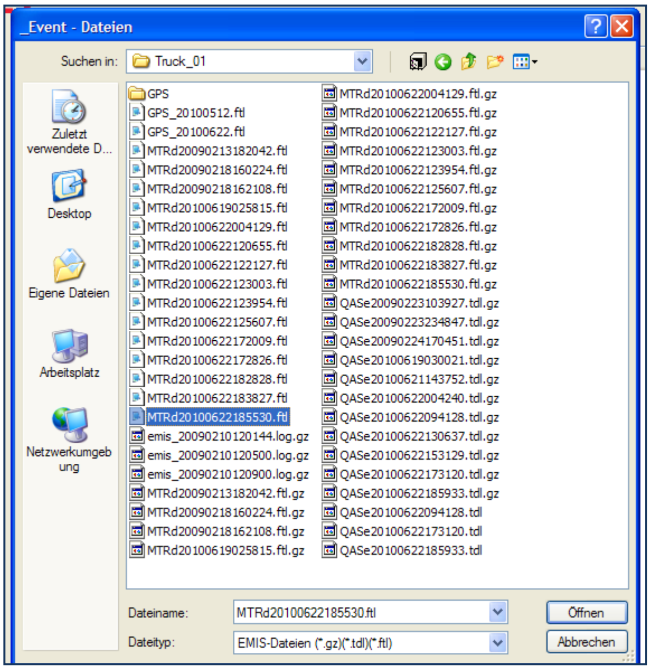
☺ AND – once the transfer has been COMPLETED, the number of the transferred files and bytes will be displayed:



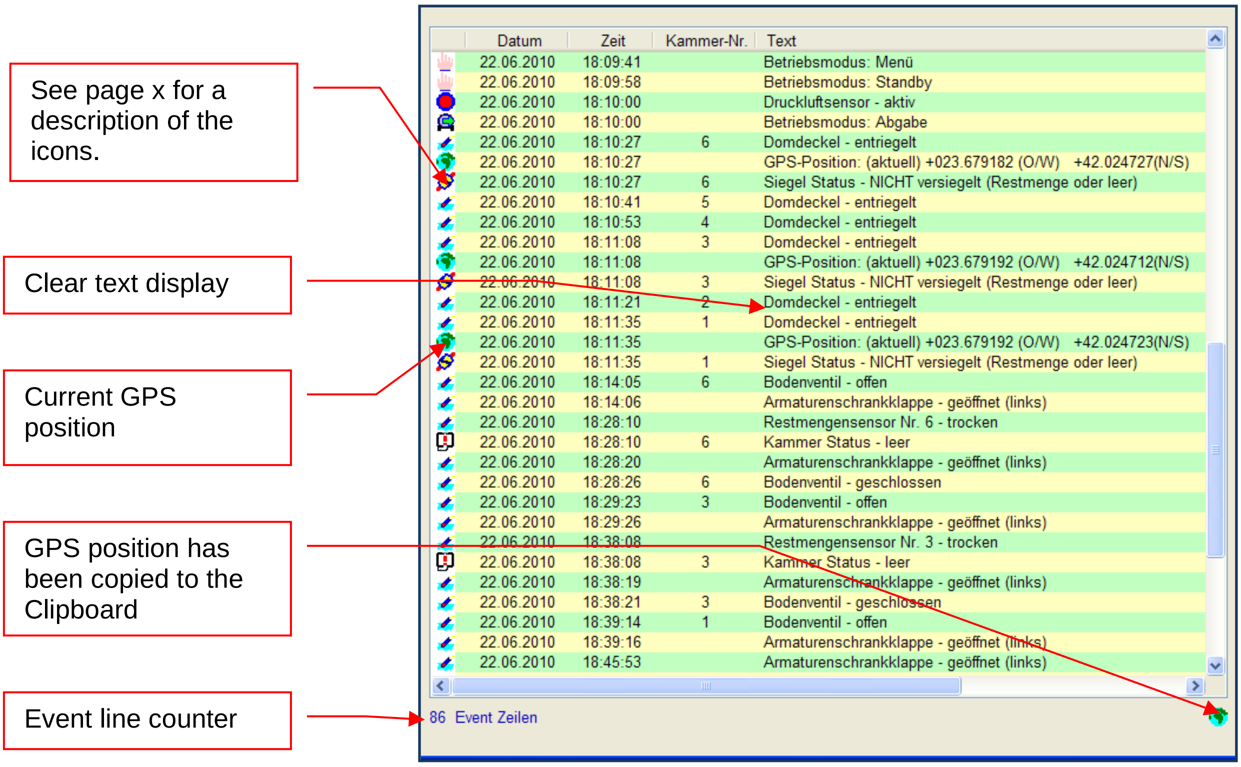
Once the FTP replication has been successfully completed, the data is located on the local PC and can be selected and viewed using the Event Monitor.

8.1.1.2 Selecting the log files, and display

☞ Double-click the relevant tank truck directory to open the selection window with the **„_Event – Files“** (log files); now you can call up and view them.



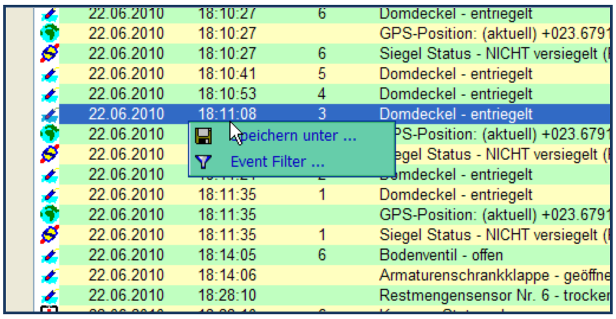
☞ Example of the contents of a log file:



8.1.1.2.1 Saving the log file

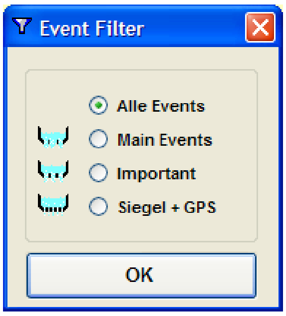
☞ The list of displayed data can be saved as a text file in any directory. All messages and events can be saved except for the icons. Right-click anywhere in the window to display a small menu. You can now save the LOG data in any directory via a selection window:

using "*Save as …*"



☞ You can also set some key filters in the menu to provide a better overview:

using "event filter..."



8.1.1.2.2 Intermediate storage of the GPS position

☞  = GPS position

Anywhere you see this small globe icon shows the current GPS position for the relevant LOG data. If this line is clicked, the  GPS icon will apear at the bottom right to show that this data has been copied to the clipboard.

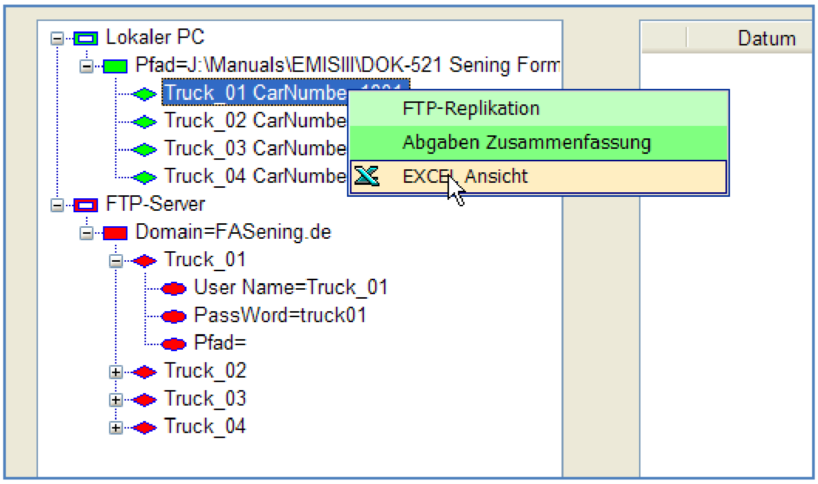
☞ If you access, for example, Google Maps, this GPS position can be copied from the clipboard as coordinates and be displayed as usual in Google Maps.

☞ The position that has been saved will be valid and remain in the clipboard until a new one is selected.

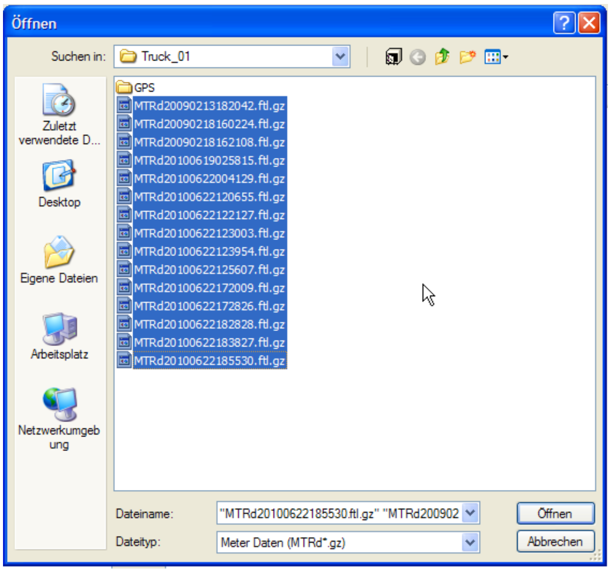
8.1.1.2.3 Displaying the LOG data in an EXCEL view.

You can view several log files in an XML view and „*save*“ as a file, or convert it into an „*EXCEL file*“. You can also highlight and display the log files you want - this is possible from the tank truck directory in the local PC directory.

Right-click the tank truck directory to display the "*EXCEL view* " or "*Summarize information*" menu.

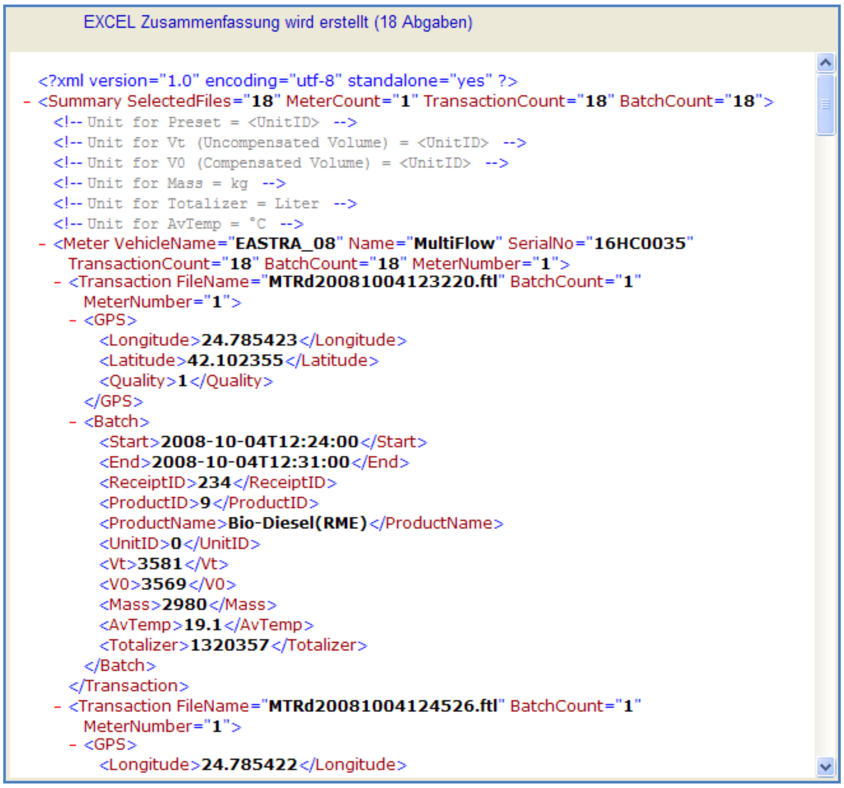


Now you can highlight and open to confirm the relevant LOG files as usual in Windows.



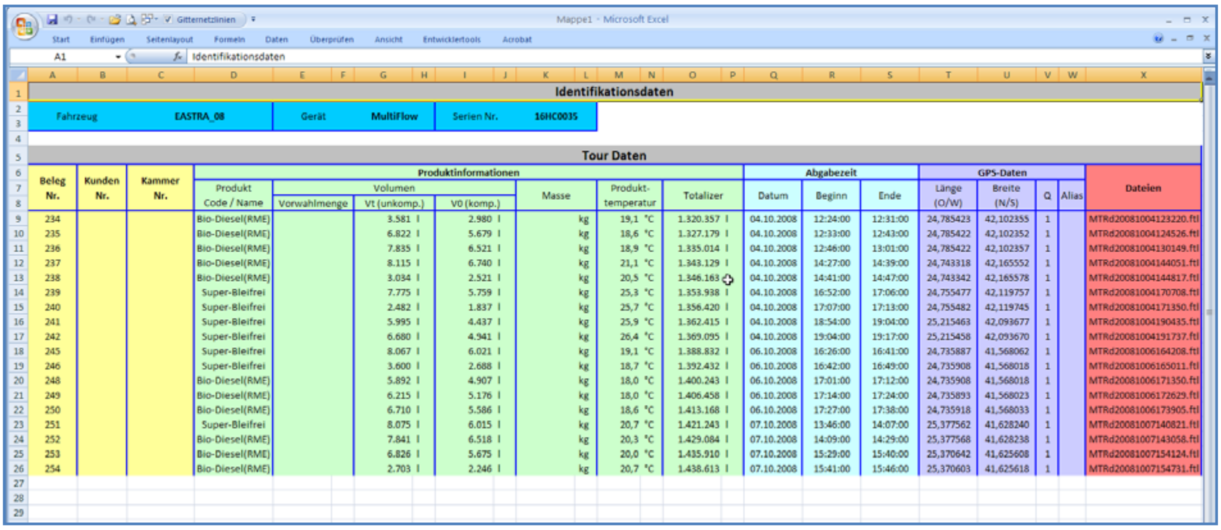
The LOG files will be summarized and converted into a XML file automatically.

If you click "*Summarize information*" in the top section of the menu, you can save this XML file by right-clicking anywhere in this window, and a corresponding menu will appear.




```
<?xml version="1.0" encoding="utf-8" standalone="yes" ?>
- <Summary SelectedFiles="18" MeterCount="1" TransactionCount="18" BatchCount="18">
    <!-- Unit for Preset = <UnitID>  -->
    <!-- Unit for Vt (Uncompensated Volume) = <UnitID>  -->
    <!-- Unit for V0 (Compensated Volume) = <UnitID>  -->
    <!-- Unit for Mass = kg  -->
    <!-- Unit for Totalizer = Liter  -->
    <!-- Unit for AvTemp = °C  -->
  - <Meter VehicleName="EASTRA_08" Name="MultiFlow" SerialNo="16HC0035"
      TransactionCount="18" BatchCount="18" MeterNumber="1">
    - <Transaction FileName="MTRd20081004123220.ftl" BatchCount="1"
        MeterNumber="1">
      - <GPS>
          <Longitude>24.785423</Longitude>
          <Latitude>42.102355</Latitude>
          <Quality>1</Quality>
        </GPS>
      - <Batch>
          <Start>2008-10-04T12:24:00</Start>
          <End>2008-10-04T12:31:00</End>
          <ReceiptID>234</ReceiptID>
          <ProductID>9</ProductID>
          <ProductName>Bio-Diesel(RME)</ProductName>
          <UnitID>0</UnitID>
          <Vt>3581</Vt>
          <V0>3569</V0>
          <Mass>2980</Mass>
          <AvTemp>19.1</AvTemp>
          <Totalizer>1320357</Totalizer>
        </Batch>
      </Transaction>
    - <Transaction FileName="MTRd20081004124526.ftl" BatchCount="1"
        MeterNumber="1">
      - <GPS>
          <Longitude>24.785422</Longitude>
```


☞ In "*EXCEL view* ", the EXCEL program will automatically start from the EVENT moniitor and the generated XML file will be converted to and displayed as EXCEL.



Identifikationsdaten

Fahrzeug	EASTRA_08	Gerät	MultiFlow	Serien Nr.	16HC0035

Tour Daten

Beleg Nr.	Kunden Nr.	Kammer Nr.	Produktinformationen: Produkt Code / Name	Volumen: Vorwahlmenge	Volumen: Vt (unkomp.)	Volumen: V0 (komp.)	Masse	Produkt-temperatur	Totalizer	Abgabezeit: Datum	Abgabezeit: Beginn	Abgabezeit: Ende	GPS-Daten: Länge (O/W)	GPS-Daten: Breite (N/S)	Q	Alias	Dateien
234			Bio-Diesel(RME)		3.581 l	2.980 l	kg	19,1 °C	1.320.357 l	04.10.2008	12:24:00	12:31:00	24,785423	42,102355	1		MTRd20081004123220.ftl
235			Bio-Diesel(RME)		6.822 l	5.679 l	kg	18,6 °C	1.327.179 l	04.10.2008	12:33:00	12:43:00	24,785422	42,102352	1		MTRd20081004124526.ftl
236			Bio-Diesel(RME)		7.835 l	6.521 l	kg	18,9 °C	1.335.014 l	04.10.2008	12:46:00	13:01:00	24,785422	42,102357	1		MTRd20081004130149.ftl
237			Bio-Diesel(RME)		8.115 l	6.740 l	kg	21,1 °C	1.343.129 l	04.10.2008	14:27:00	14:39:00	24,743318	42,165552	1		MTRd20081004144051.ftl
238			Bio-Diesel(RME)		3.034 l	2.521 l	kg	20,5 °C	1.346.163	04.10.2008	14:41:00	14:47:00	24,743342	42,165578	1		MTRd20081004144817.ftl
239			Super-Bleifrei		7.775 l	5.759 l	kg	25,3 °C	1.353.938 l	04.10.2008	16:52:00	17:06:00	24,755477	42,119757	1		MTRd20081004170708.ftl
240			Super-Bleifrei		2.482 l	1.837 l	kg	25,7 °C	1.356.420 l	04.10.2008	17:07:00	17:13:00	24,755482	42,119745	1		MTRd20081004171350.ftl
241			Super-Bleifrei		5.995 l	4.437 l	kg	25,9 °C	1.362.415 l	04.10.2008	18:54:00	19:04:00	25,215463	42,093677	1		MTRd20081004190435.ftl
242			Super-Bleifrei		6.680 l	4.941 l	kg	26,4 °C	1.369.095 l	04.10.2008	19:04:00	19:17:00	25,215458	42,093670	1		MTRd20081004191737.ftl
245			Super-Bleifrei		8.067 l	6.021 l	kg	19,1 °C	1.388.832 l	06.10.2008	16:26:00	16:41:00	24,735887	41,568062	1		MTRd20081006164208.ftl
246			Super-Bleifrei		3.600 l	2.688 l	kg	18,7 °C	1.392.432 l	06.10.2008	16:42:00	16:49:00	24,735908	41,568018	1		MTRd20081006165011.ftl
248			Bio-Diesel(RME)		5.892 l	4.907 l	kg	18,0 °C	1.400.243 l	06.10.2008	17:01:00	17:12:00	24,735908	41,568018	1		MTRd20081006171350.ftl
249			Bio-Diesel(RME)		6.215 l	5.176 l	kg	18,0 °C	1.406.458 l	06.10.2008	17:14:00	17:24:00	24,735893	41,568023	1		MTRd20081006172629.ftl
250			Bio-Diesel(RME)		6.710 l	5.586 l	kg	18,6 °C	1.413.168 l	06.10.2008	17:27:00	17:38:00	24,735918	41,568033	1		MTRd20081006173905.ftl
251			Super-Bleifrei		8.075 l	6.015 l	kg	20,7 °C	1.421.243 l	07.10.2008	13:46:00	14:07:00	25,377562	41,628240	1		MTRd20081007140821.ftl
252			Bio-Diesel(RME)		7.841 l	6.518 l	kg	20,3 °C	1.429.084 l	07.10.2008	14:09:00	14:29:00	25,377568	41,628238	1		MTRd20081007143058.ftl
253			Bio-Diesel(RME)		6.826 l	5.675 l	kg	20,0 °C	1.435.910 l	07.10.2008	15:29:00	15:40:00	25,370642	41,625608	1		MTRd20081007154124.ftl
254			Bio-Diesel(RME)		2.703 l	2.246 l	kg	20,7 °C	1.438.613 l	07.10.2008	15:41:00	15:46:00	25,370603	41,625618	1		MTRd20081007154731.ftl

Now you can further process and analyze the LOG data in the same way as with EXCEL.

You can also view and analyze several MultiFlows or MultiLevels that are installed on a tank truck.

8.1.2 XML – configuration file for the Event Monitor

This **"EventMonitor.Config.xml"** configuration file will be applied with standard values the first time you access the Event Monitor, and is located in the home directory of the program. The configuration file can be modified using the usual editor and changed and adjusted according to the local conditions. The extension of the tank truck and adaptation of the *User Names* and *Passwords should be mentioned in particular.* For this, the folders:

Example:

```
<Folder Title="Truck_xx" SubTitle="CarNumber xx">
    <UserName>Truck_01</UserName>
    <PassWord>truck01</PassWord>
    <FileName />
</Folder>
```

must be marked and copied. After this, the names for Folder Title and SubTitle must be adapted. For security reasons, it is also recommended that you change the passwords individually. In order to apply the changes, Event Monitor needs to be restarted. Unavailable Truck directories will then also be applied.

Example of the content of the "EventMonitor.Config.xml" file:

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>

<Config Application="EventMonitor" ConfigFileVersion="1.0.0.1">

  <Local_PC>
    <Path>c:\Programme\FMC
      Technologies\EventMonitor\EventMonitor.Config.xml</Path>
  </Local_PC>

  <FTP_Server Domain="FTPServer.de">
    <Folder Title="Truck_01" SubTitle="CarNumber 1001">
      <UserName>Truck_01</UserName>
      <PassWord>truck01</PassWord>
      <FileName />
    </Folder>

    <Folder Title="Truck_02" SubTitle="CarNumber 1001">
      <UserName>Truck_01</UserName>
      <PassWord>truck01</PassWord>
      <FileName />
    </Folder>

    <Folder Title="Truck_03" SubTitle="CarNumber 1001">
      <UserName>Truck_01</UserName>
      <PassWord>truck01</PassWord>
      <FileName />
    </Folder>
```

```
    <Folder Title="Truck_04" SubTitle="CarNumber 1001">
      <UserName>Truck_01</UserName>
      <Password>truck01</Password>
      <FileName />
    </Folder>
  </FTP_Server>

  <Setup>
    <!--Show="true" / "false", CultureName="en-GB"-->
    <Culture Show="false" CultureName="de-DE" />

    <!--FilterStatus=1..4 - 1 >> Show all-->
    <FilterStatus>1</FilterStatus>

    <!--PrePing="true" / "false"- true >> Ping before FTP-Connect-->
    <PrePing>true</PrePing>

    <!--ShowPassWord="true" / "false"- false >> NO password dislay-->
    <ShowPasswords>false</ShowPasswords>
  </Setup>

</Config>
```

8.1.3 Description of icons for the Event Monitor

8.1.3.1 Log icons

 = Compressed air enabled

 = Compressed air disabled

 = Action

= Empty

 = Compensated volume

 = Chamber condition

 = Chamber status empty

 = Device

 = Discharge

 = Error

 = Event start

 = Next event

 = Open file

 = Filter

 = GPS position

 = Input green

 = Input yellow

 = Line yellow

 = Filling

= Manual input
= Not sealed
= Output green
= Output yellow
= Power OFF
= Power ON
= Product information 2
= Product information
= Sealed
= Sealed_2
= Sealed UnK
= Sensor status
= Configuration
= Error status
= Save
= TAG key
= Text
= Timeout
= Event trigger
= Version

8.1.3.2 Directory icons

8.1.3.2.1 Icons on the local directory

= Directory for local PC
= Local path for truck directory
= Local truck directory
= UserName / PassWord / Path

8.1.3.2.2 Icons on the FTP server

= Directory for the FTP server
= Domain=Name of the FTP server
= Truck directory of the FTP server
= UserName / PassWord / Path

8.1.3.3 Filter icons

= Excel
= Filter_1
= Filter_2

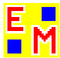
 = Filter_3

 = Filter_4

 = GPS Position

 = Query

 = Save

 = Event Monitor

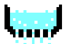
8.1.3.4 Filter icons

 = Excel

 = Filter_1

 = Filter_2

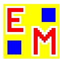
 = Filter_3

 = Filter_4

 = GPS position

 = Query

 = Save

 = Event Monitor

9 EMIS Organizer

9.1 Background

A number of different settings are required in setup for different printer types and the optional GPS functionality. You need special software in order to be able to make these settings with the EMIS2 or EMIS4 interface.

9.2 Required software

- Software Version ***EMIS2*** ***3.18** to **3.22*** or higher
- Software Version ***EMIS4*** ***x.xx*** or higher
- Software Version ***MultiFlow*** ***3.56 / MID 5.01*** or higher
- Software Version ***MultiTask*** ***x.xx*** or higher

9.3 Installing the EMIS Organizer

9.3.1 Step 1: Open folder

9.3.2 Step 2: Save batches

☞ Save batches to a location where you will be able to find them again.

▶ E.g. "My Documents" or the EMIS Organizer root directory ***"c:\Programs\FMC Technologies\EMIS-Organizer\JOBs\GetPRNParameter.job"***

9.3.3 Step 3: Run setup

☞ *Run setup and follow the instructions.*

▶ Once installation is complete, the following icon will appear on your desktop:

9.4 EMIS2

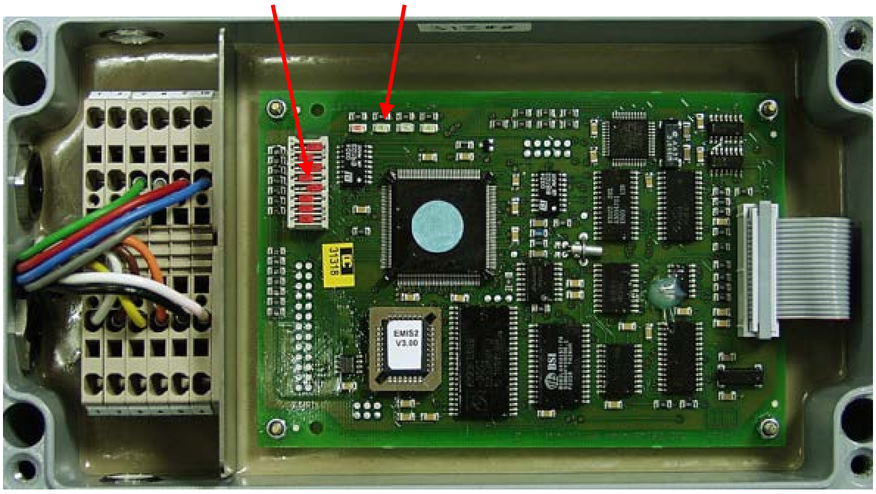
9.4.1 Preparation for EMIS2

☞ Connect the EMIS2 interface to a laptop in line with (drawing no. **51.352216** / page (terminals 2, 4, 8)).

☞ Use cable with Sening part number **EMIS2-OBC-KA** **(**drawing no. **51.352241** / page **)** for this.

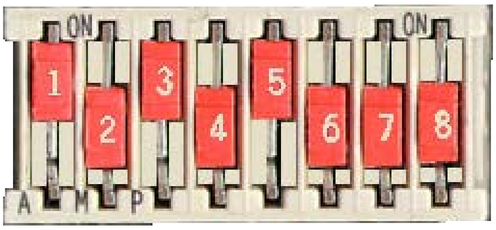
☞ If the laptop does not have a serial interface, use a standard USB adapter at RS 232.

DIP switch **LED 2**



9.4.1.1 Dip switch settings for EMIS2

- Dip switches **1 - 3 - 5** to **ON**
- Dip switches **2 - 4 - 6 - 7 - 8** to **OFF**

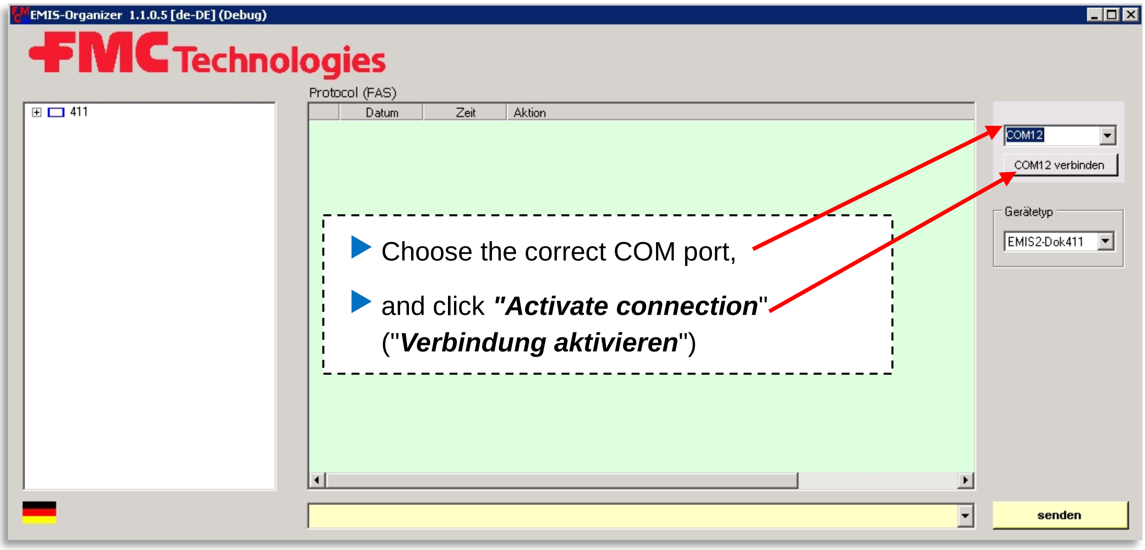


☞ Power up, wait 30 seconds.

☺ The device is now ready for parameterization with the EMIS Organizer.

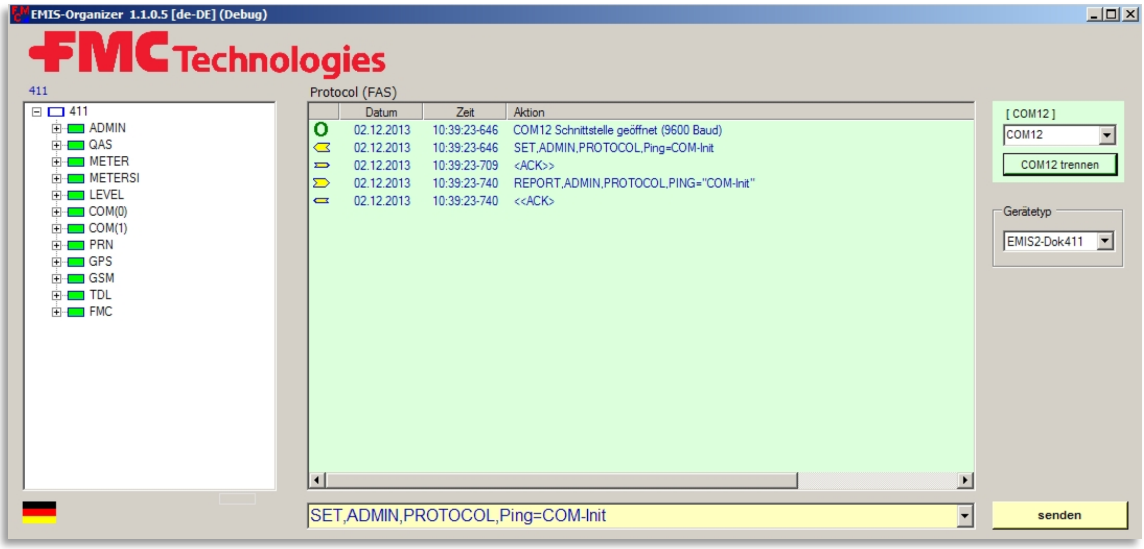
9.4.2 Starting the program

9.4.2.1 Step 1: Double-click to run program



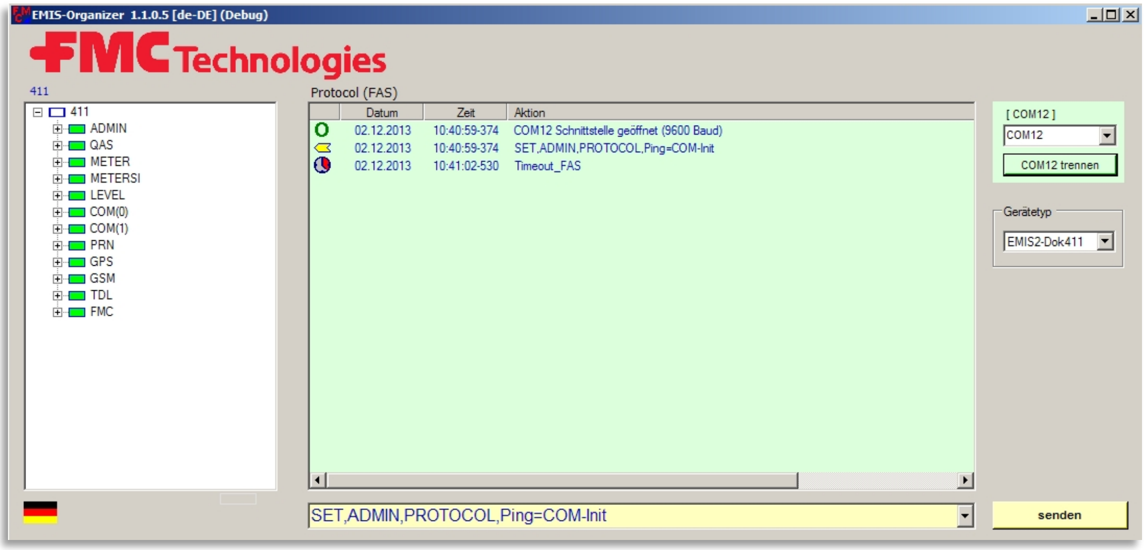
9.4.2.2 Step 2: Info window

☺ he following telegrams now appear in the info window



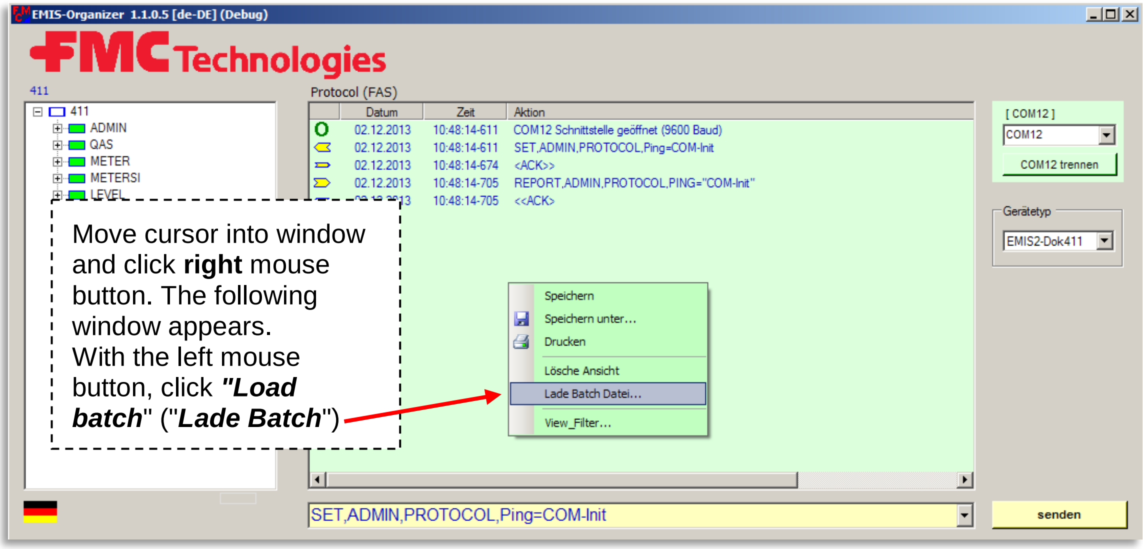
9.4.2.3 Step 3: Check cable connections

☹ If the following error message appears, check COM port and make sure all cables are properly connected



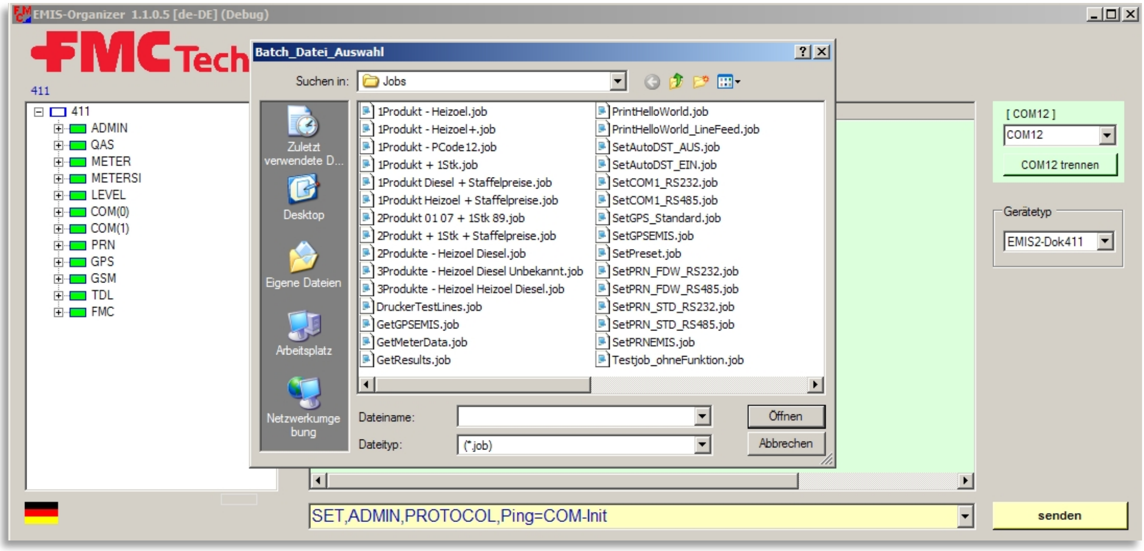
9.4.2.4 Step 4: Automatic parameterization using "Batches"

Manual parameterization can be carried out in the left-hand window, but should not be attempted until you have received instruction from a service technician.



☞ *Browse to the folder containing the batches, select the appropriate one and click open.*

The necessary adjustments will now be made automatically.



For the new settings to take effect, you now have to switch EMIS2.

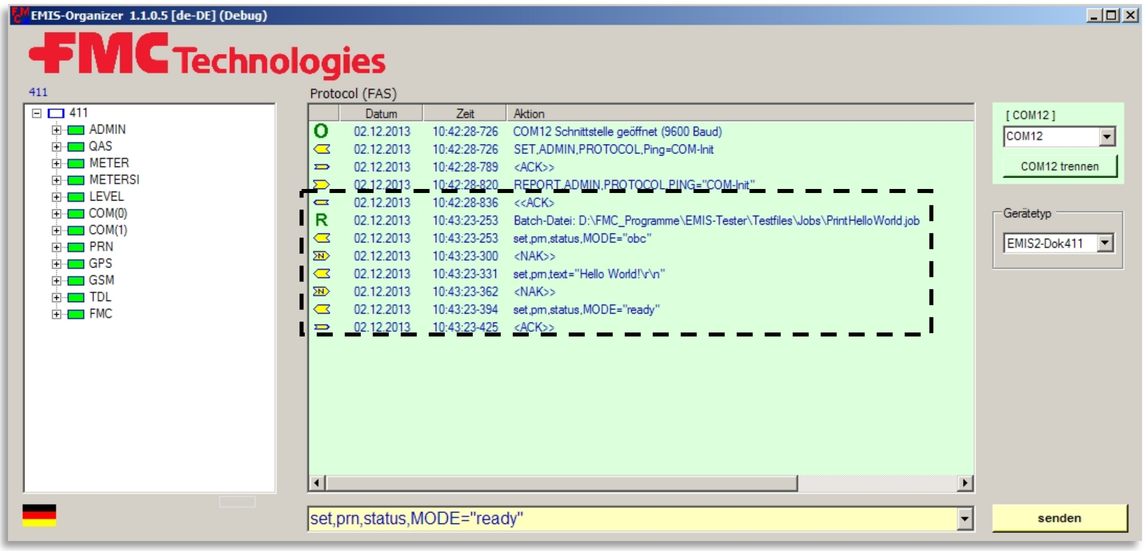
☞ ***OFF** and then back **ON** again.*

9.4.2.5 Step 5: Check printer function

☞ *To check the printer function, please insert paper in the printer and load **Batch no. 6 "Hello World"***

More telegrams appear in the info window and the printout is started.

The printer should now print out the text "Hello World".



☞ ***Exit the program.***

You can now connect the **O**n-**B**oard **C**omputer using cable **EMIS2-OBC-KA**.

9.4.3 Batch overview

9.4.3.1 MultiFlow

Printer	Interface	Protocol	Parity	Data Bits	Batch no.
GPS	RS232	-	None	8	1
DR-295-FDW	RS232	FDW	None	8	2
DR-298-FDW	RS232	FDW	None	8	2
FDW Converter	RS485	FDW	None	8	3
DR-295	RS232	STD	Even	8	4
DR-U295	RS232	STD	Even	8	4
DR-298	RS232	STD	Even	8	4
DR-590	RS232	STD	Even	8	4
DR-570	RS485	STD	Even	8	5

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Printer	Interface	Protocol	Parity	Data Bits	Batch no.
Test Drucker	-	-	-	-	6
Test GPS	-	-	-	-	7

9.4.4 Batch contents

9.4.4.1 Batch 1: GPS

SET,PRN,SETUP,PORT="NONE"

SET,GPS,SETUP,PORT="COM(1)"

SET,GPS,SETUP,TIMESYNC=”1”

SET,GPS,SETUP,UTCOFFSET=”+01:00”

SET,COM(1),SETUP,PROTOCOL="9600:8:N:1"

SET,COM(1),SETUP,MODE="RS232"

SET,ADMIN,STATUS,RESET="1"

9.4.4.2 Batch 2: DR-295-FDW / DR-298-FDW

SET,GPS,SETUP,PORT="NONE"

SET,PRN,SETUP,PORT="COM(1)"

SET,PRN,SETUP,PROTOCOL="FDW"

SET,COM(1),SETUP,PROTOCOL="9600:8:N:1"

COM(1),SETUP,MODE="RS232"

SET,ADMIN,STATUS,RESET="1"

9.4.4.3 Batch 3: FDW-Converter (RS 485)

SET,GPS,SETUP,PORT="NONE"

SET,PRN,SETUP,PORT="COM(1)"

SET,PRN,SETUP,PROTOCOL="FDW"

SET,COM(1),SETUP,PROTOCOL="9600:8:N:1"

COM(1),SETUP,MODE="RS485"

SET,ADMIN,STATUS,RESET="1"

9.4.4.4 Batch 4: DR-295 / DR-U295 / DR-298 / DR-590

SET,GPS,SETUP,PORT="NONE"

SET,PRN,SETUP,PORT="COM(1)"

SET,PRN,SETUP,PROTOCOL="STD"

SET,COM(1),SETUP,PROTOCOL="9600:8:E:1"

COM(1),SETUP,MODE="RS232"

SET,ADMIN,STATUS,RESET="1"

9.4.4.5 Batch 5: DR-570

SET,GPS,SETUP,PORT="NONE"

SET,PRN,SETUP,PORT="COM(1)"

SET,PRN,SETUP,PROTOCOL="STD"

SET,COM(1),SETUP,PROTOCOL="9600:8:E:1"

COM(1),SETUP,MODE="RS485"

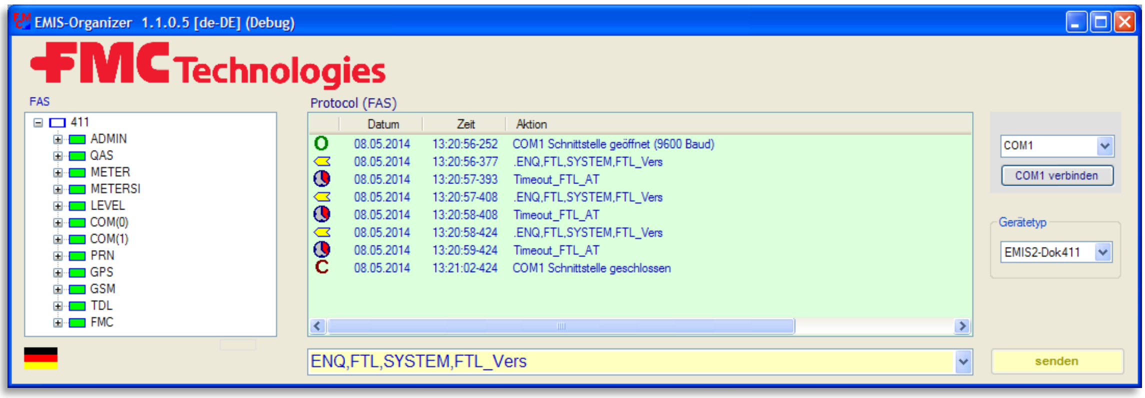
SET,ADMIN,STATUS,RESET="1"

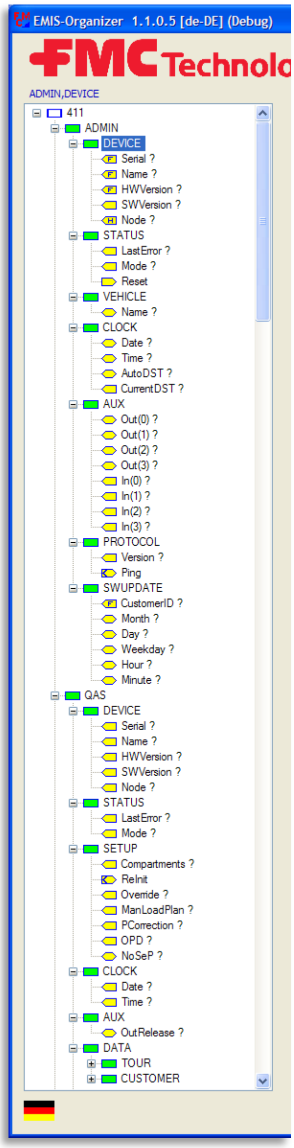
9.4.4.6 Batch 7: Test-GPS

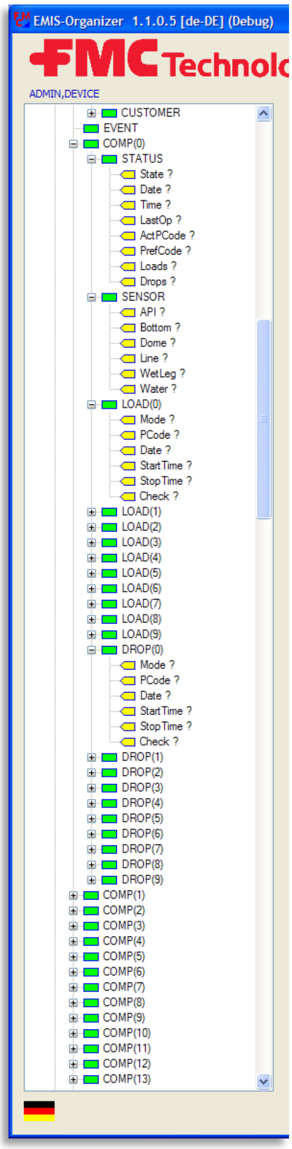
REQUEST,GPS,DATA,Lat

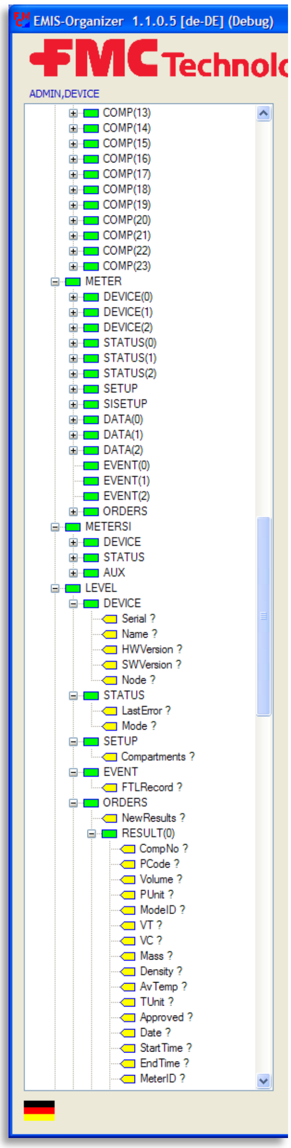
REQUEST,GPS,DATA,Lon

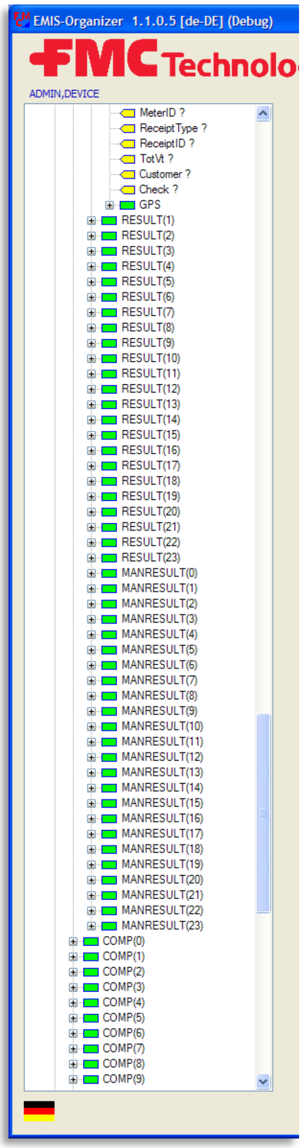
9.4.5 Menu - Quick Overview for EMIS2-Dok411

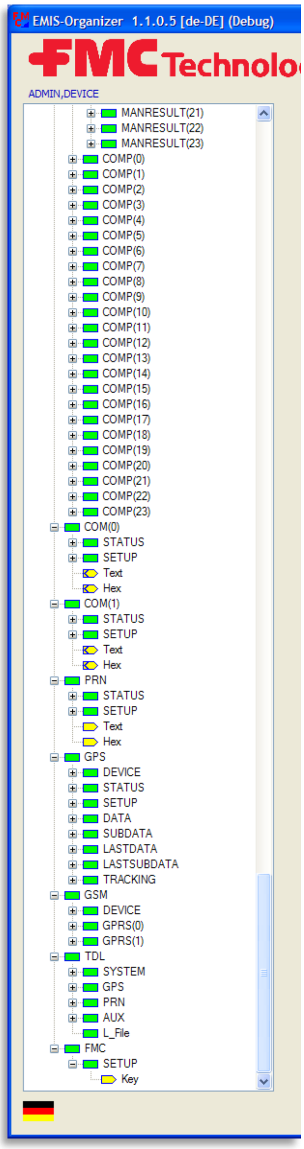




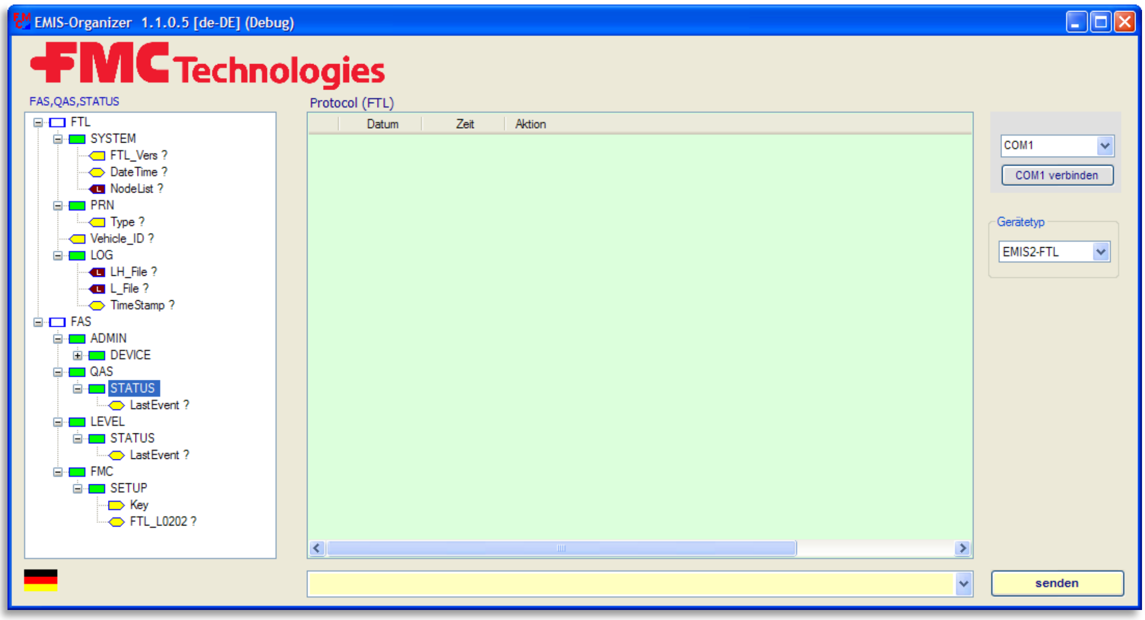





EMIS-Organizer 1.1.0.5 [de-DE] (Debug)
FMC Technolo
ADMIN,DEVICE
MeterID ?
ReceiptType ?
ReceiptID ?
TotVt ?
Customer ?
Check ?
GPS
RESULT(1)
RESULT(2)
RESULT(3)
RESULT(4)
RESULT(5)
RESULT(6)
RESULT(7)
RESULT(8)
RESULT(9)
RESULT(10)
RESULT(11)
RESULT(12)
RESULT(13)
RESULT(14)
RESULT(15)
RESULT(16)
RESULT(17)
RESULT(18)
RESULT(19)
RESULT(20)
RESULT(21)
RESULT(22)
RESULT(23)
MANRESULT(0)
MANRESULT(1)
MANRESULT(2)
MANRESULT(3)
MANRESULT(4)
MANRESULT(5)
MANRESULT(6)
MANRESULT(7)
MANRESULT(8)
MANRESULT(9)
MANRESULT(10)
MANRESULT(11)
MANRESULT(12)
MANRESULT(13)
MANRESULT(14)
MANRESULT(15)
MANRESULT(16)
MANRESULT(17)
MANRESULT(18)
MANRESULT(19)
MANRESULT(20)
MANRESULT(21)
MANRESULT(22)
MANRESULT(23)
COMP(0)
COMP(1)
COMP(2)
COMP(3)
COMP(4)
COMP(5)
COMP(6)
COMP(7)
COMP(8)
COMP(9)


EMIS-Organizer 1.1.0.5 [de-DE] (Debug)
FMC Technolo
ADMIN,DEVICE
MANRESULT(21)
MANRESULT(22)
MANRESULT(23)
COMP(0)
COMP(1)
COMP(2)
COMP(3)
COMP(4)
COMP(5)
COMP(6)
COMP(7)
COMP(8)
COMP(9)
COMP(10)
COMP(11)
COMP(12)
COMP(13)
COMP(14)
COMP(15)
COMP(16)
COMP(17)
COMP(18)
COMP(19)
COMP(20)
COMP(21)
COMP(22)
COMP(23)
COM(0)
STATUS
SETUP
Text
Hex
COM(1)
STATUS
SETUP
Text
Hex
PRN
STATUS
SETUP
Text
Hex
GPS
DEVICE
STATUS
SETUP
DATA
SUBDATA
LASTDATA
LASTSUBDATA
TRACKING
GSM
DEVICE
GPRS(0)
GPRS(1)
TDL
SYSTEM
GPS
PRN
AUX
L_File
FMC
SETUP
Key

9.4.6 Menu - Quick Overview for EMIS2-FTL



9.5 EMIS4

9.5.1 Preparation for EMIS4

Connect the EMIS4 interface to a laptop in line with (drawing no. **P000007800** / page (terminals 4, 5, 6)).

If the laptop does not have a serial interface, use a standard USB adapter at RS 232.

SIM card:

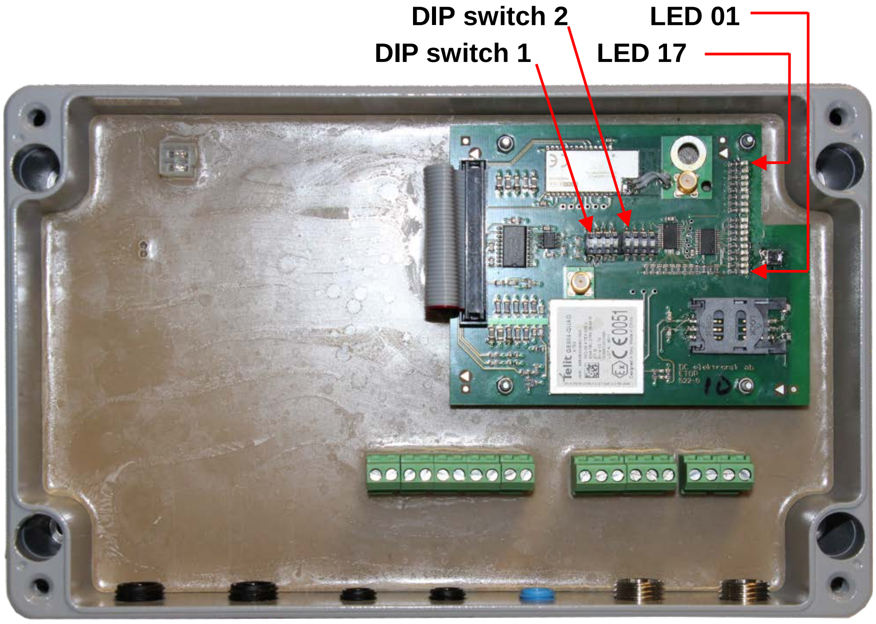
- For the transmission of GPS, charge and discharge data to an FTP server a SIM card is required.

FTP server:

- It must have access to an FTP server be established.
- For the main folder a user with password and with rights must be created for adding and reading.
- There must be a subfolder "GPS" be created, for which the same user is set up as for the main directory, but with rights to modify.
- There must be a subfolder "Log" be created, for which the same user is set up as for the main directory, but with rights to add and read.

Configuration in EMIS4:

- With the EMIS Organizer the parameters for the SIM card must be configured in EMIS4.
- With the EMIS Organizer the parameters for the FTP server and the user must be configured in EMIS4.
- With the EMIS Organizer must be configured to determine whether GPS data is transmitted periodically or depending on the distance to the FTP server.



9.5.1.1 LEDs on Communication Board EMIS4

- LED 1 (green) : Power
- LED 2 (green) : Status
- LED 3 (red) : not used
- LED 4 (yellow) : FTL
- LED 5 (yellow) : GPS
- LED 6 (yellow) : CAN
- LED 7 (red) : Bluetooth
- LED 8 (red) : Bluetooth
- LED 9 (green) : USB
- LED 10 (green) : GSM
- LED 11 (yellow) : GPRS
- LED 12 (yellow) : not used
- LED 13 (green) : not used
- LED 14 (green) : not used
- LED 15 (yellow) : not used
- LED 16 (yellow) : not used

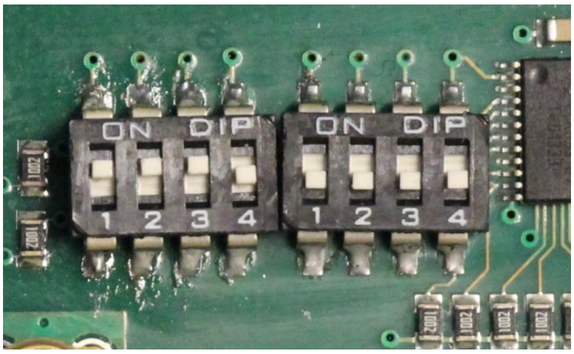
- LED 17 (red) : not used

9.5.1.2 Dip switch settings for EMIS4

▶ DIP switches-**1**: **1 - 2 - 3** to **ON / 4 -** to **OFF**

▶ DIP switches-**2**: **1 - 2 - 3 - 4** to **OFF**

DIP switches-**1** DIP switches-**2**

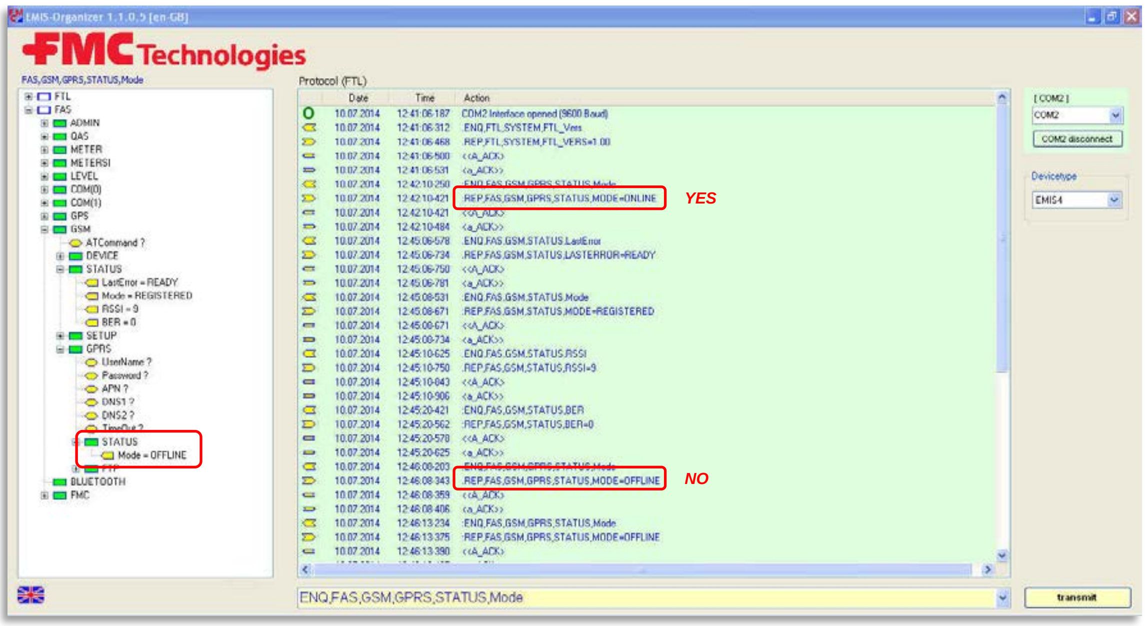


☞ Spannung einschalten und 30 Sekunden warten.

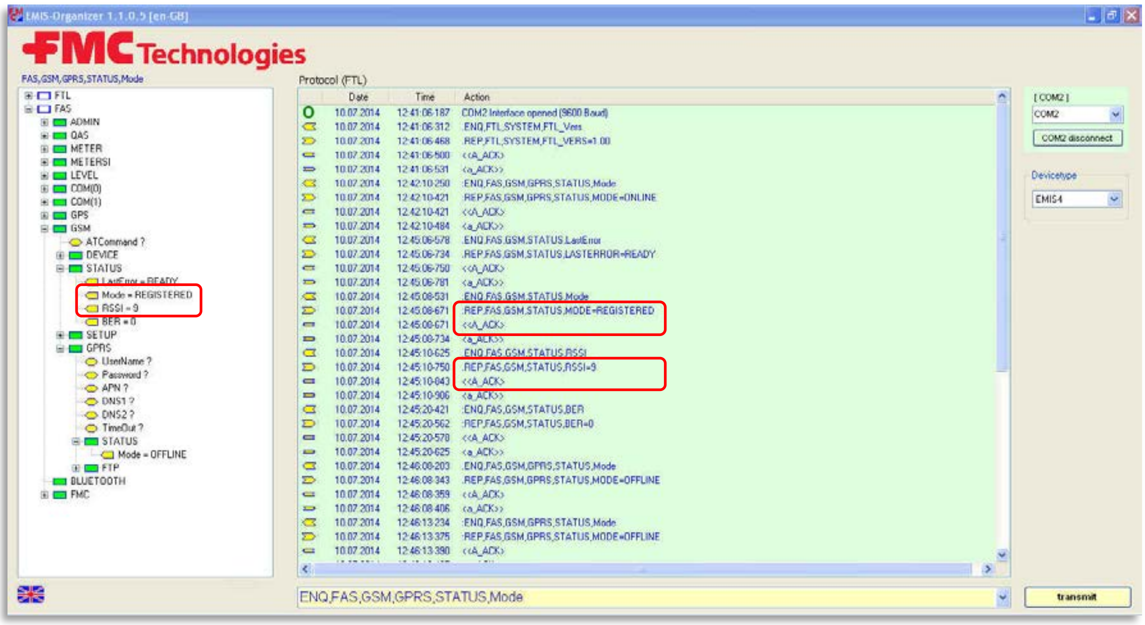
☺ Das Gerät ist jetzt bereit für die Parametrierung mit dem EMIS Organizer.

9.5.1.3 Parameter settings for EMIS4

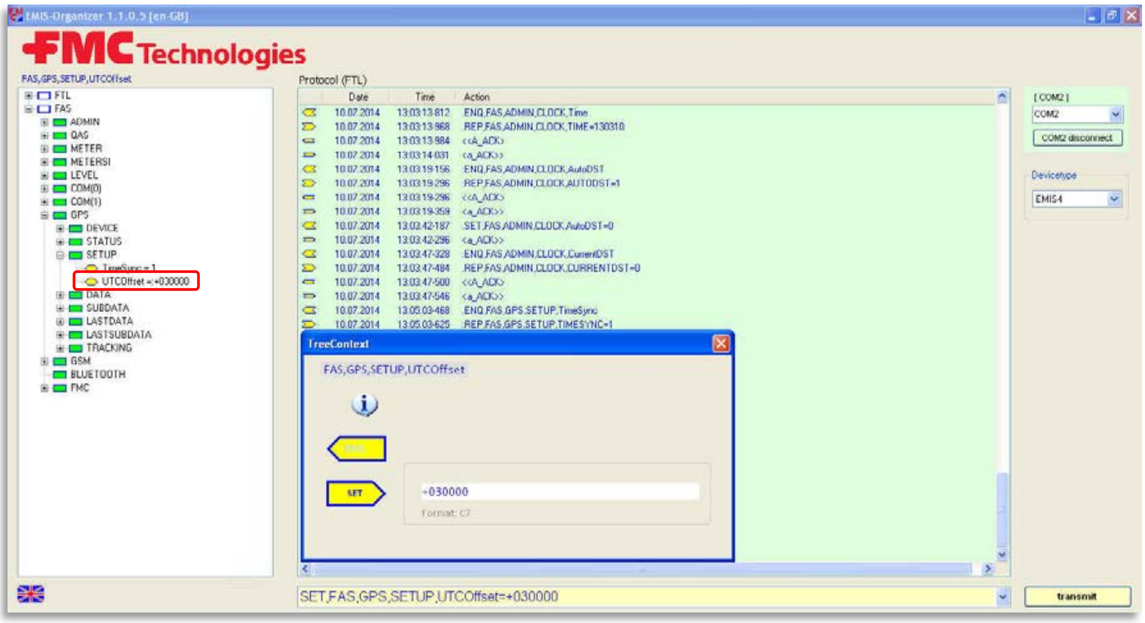
9.5.1.3.1 OnlineTest / GPRS-STATUS



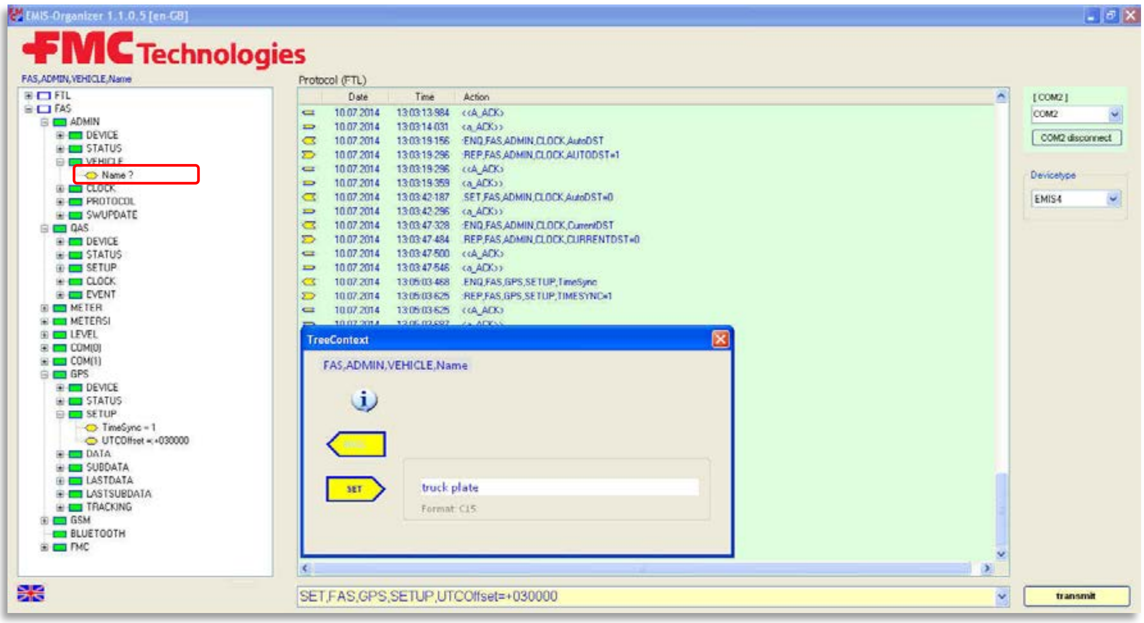
9.5.1.3.2 Test if Registered / Test Signal



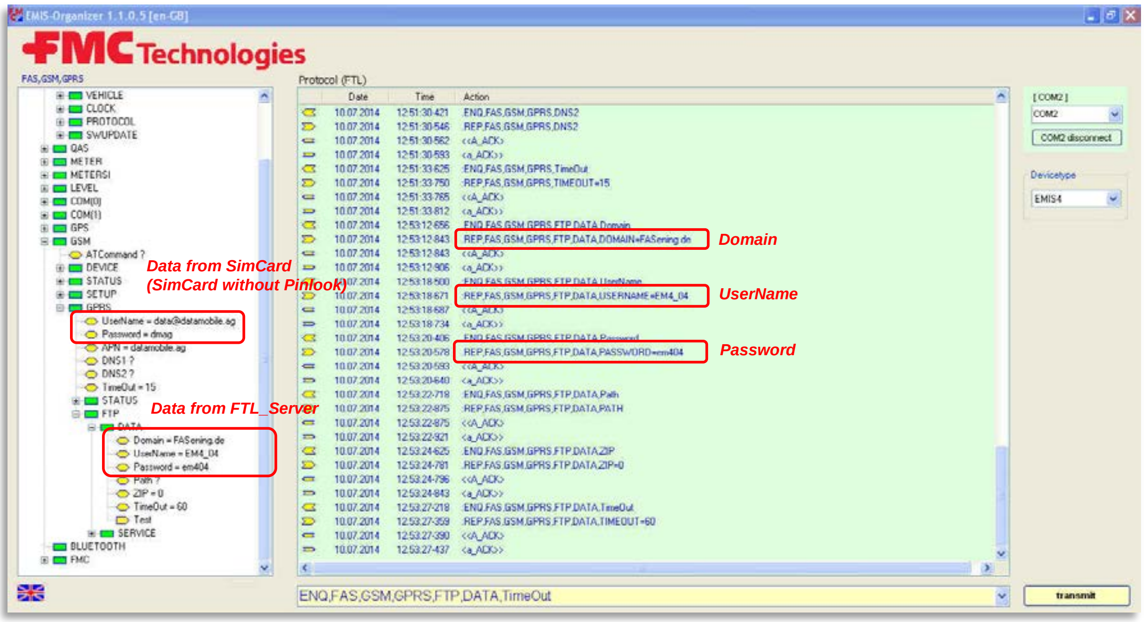
9.5.1.3.3 Offset UTC Time



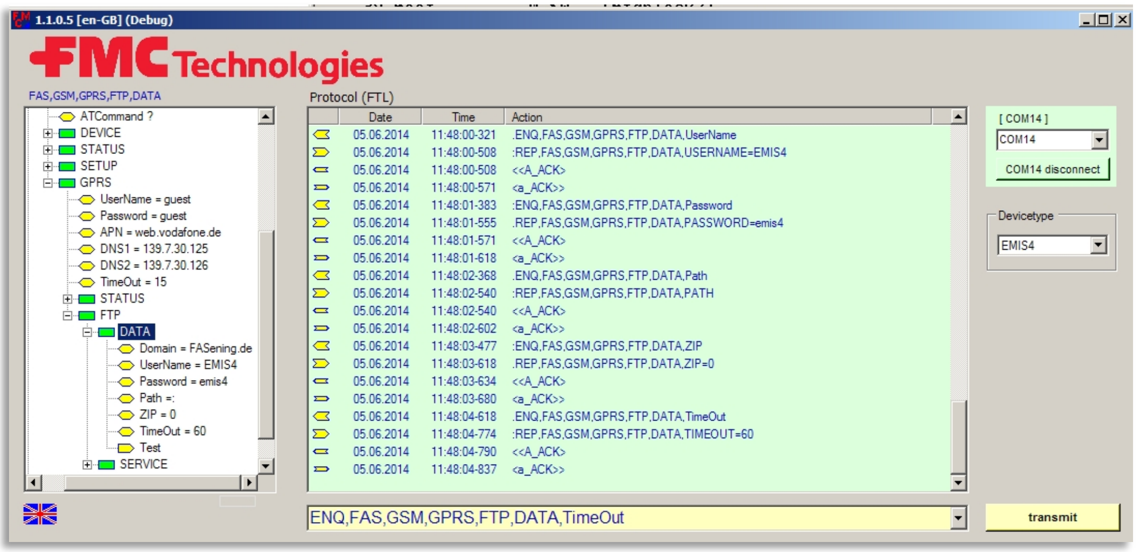
9.5.1.3.4 Truck Plate



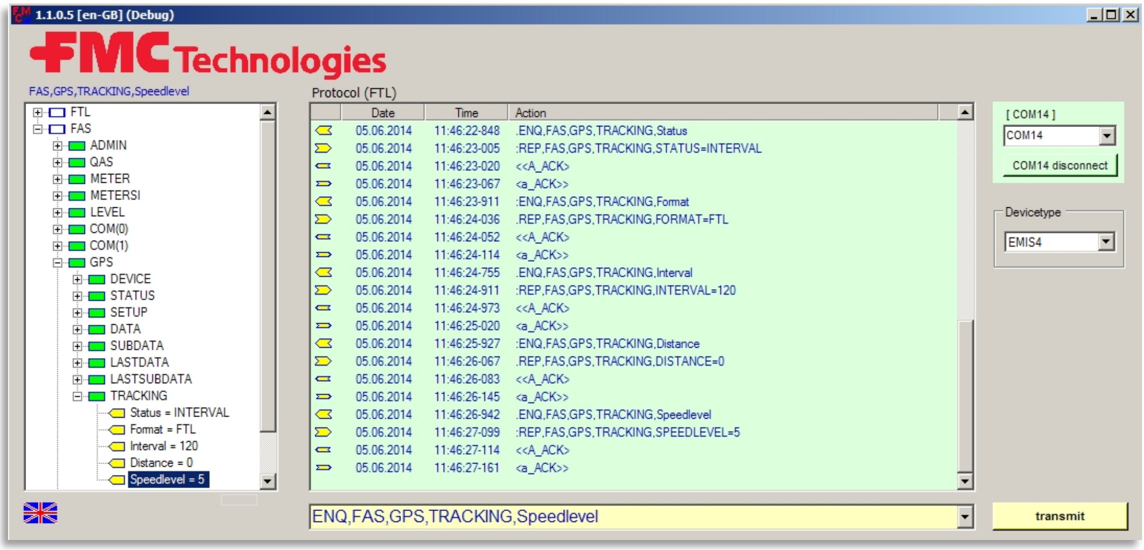
9.5.1.3.5 Data SimCard / Data FileServer



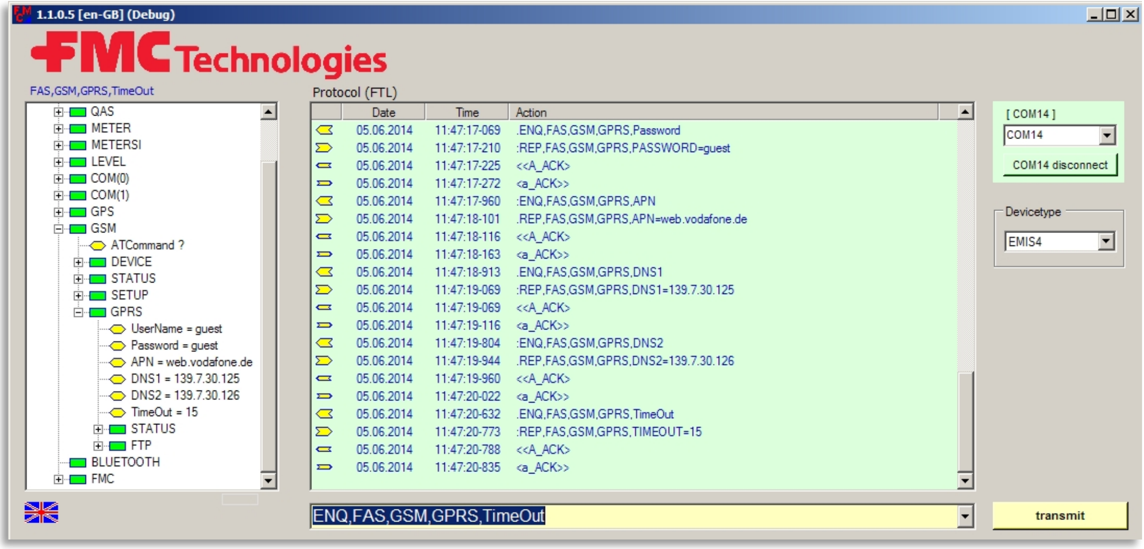
9.5.1.3.6 GPRS Daten



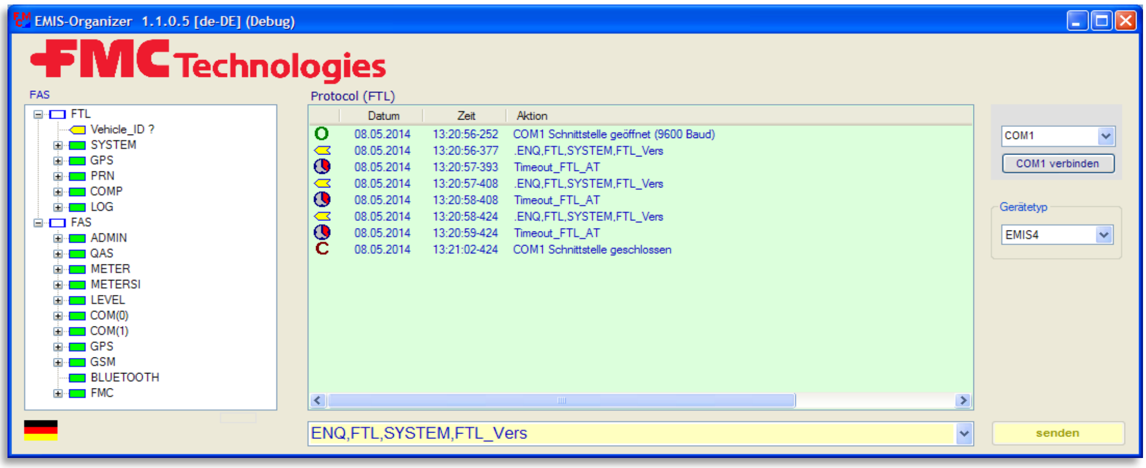
9.5.1.3.7 GPS Parameter

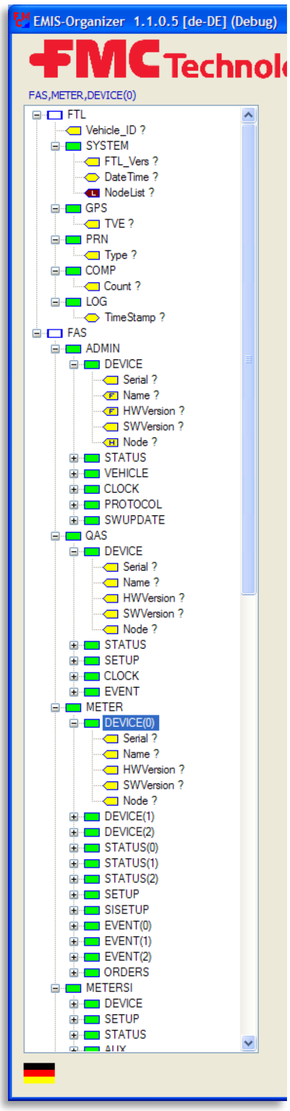


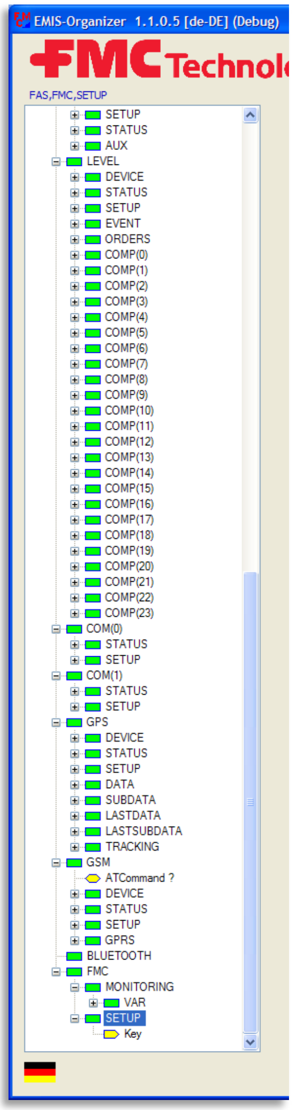
9.5.1.3.8 GPRS Parameter



9.5.2 Menu - Quick Overview for EMIS4







9.6 MultiTask

9.6.1 Preparation for MultiTask

☞ Connect the MultiTask interface to a laptop in line with (drawing no. **P000007800** / page (terminals 4, 5, 6)).

☞ If the laptop does not have a serial interface, use a standard USB adapter at RS 232.

☞ SIM card:

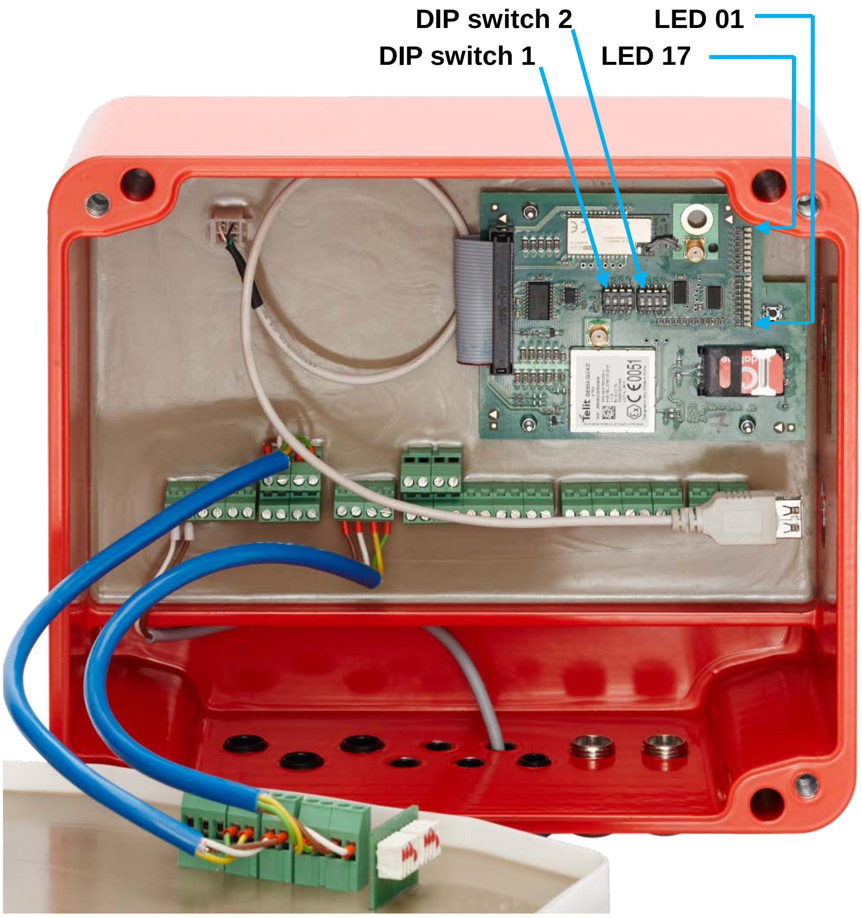
- For the transmission of GPS, charge and discharge data to an FTP server a SIM card is required.

☞ FTP server:

- It must have access to an FTP server be established.
- For the main folder a user with password and with rights must be created for adding and reading.
- There must be a subfolder "GPS" be created, for which the same user is set up as for the main directory, but with rights to modify.
- There must be a subfolder "Log" be created, for which the same user is set up as for the main directory, but with rights to add and read.

☞ Configuration in MultiTask:

- With the EMIS Organizer the parameters for the SIM card must be configured in MultiTask.
- With the EMIS Organizer the parameters for the FTP server and the user must be configured in MultiTask.
- With the EMIS Organizer must be configured to determine whether GPS data is transmitted periodically or depending on the distance to the FTP server.



9.6.1.1 LEDs on Communication Board MultiTask

- LED 1 (green) : Power
- LED 2 (green) : Status
- LED 3 (red) : not used
- LED 4 (yellow) : FTL
- LED 5 (yellow) : GPS
- LED 6 (yellow) : CAN
- LED 7 (red) : Bluetooth
- LED 8 (red) : Bluetooth
- LED 9 (green) : USB
- LED 10 (green) : GSM
- LED 11 (yellow) : GPRS
- LED 12 (yellow) : not used
- LED 13 (green) : not used
- LED 14 (green) : not used
- LED 15 (yellow) : not used
- LED 16 (yellow) : not used

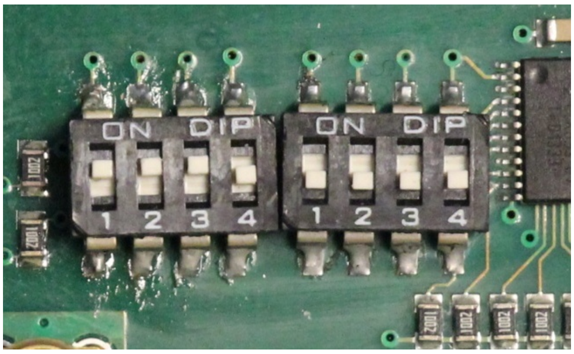
- LED 17 (red) : not used

9.6.1.2 Dip switch settings for MultiTask

▶ DIP switches-**1**: **1 - 2 - 3** to **ON / 4 -** to **OFF**

▶ DIP switches-**2**: **1 - 2 - 3 - 4** to **OFF**

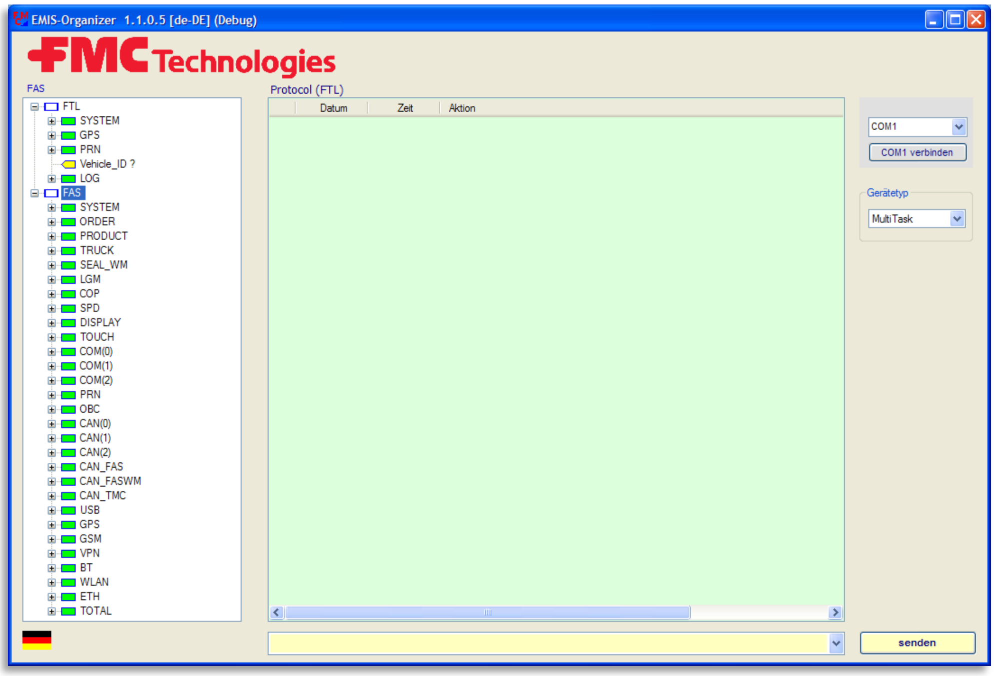
DIP switches**-1** DIP switches**-2**

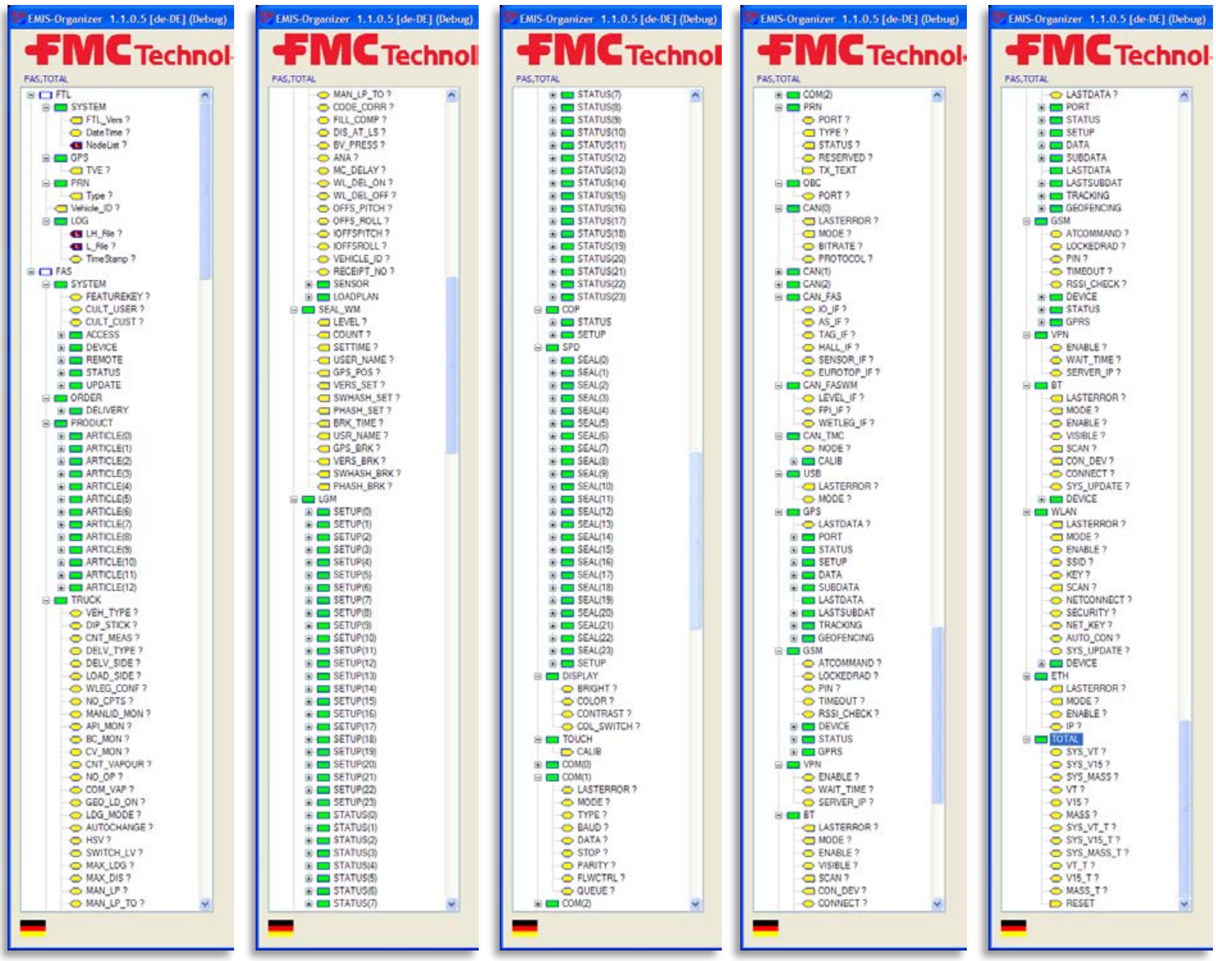


☞ Spannung einschalten und 30 Sekunden warten.

☺ Das Gerät ist jetzt bereit für die Parametrierung mit dem EMIS Organizer.

9.6.2 Menu - Quick Overview for MultiTask





10 Address and contact details

Our service department will be happy to assist and can be contacted as follows:

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Web:	www.fmctechnologies.com/seningttp	

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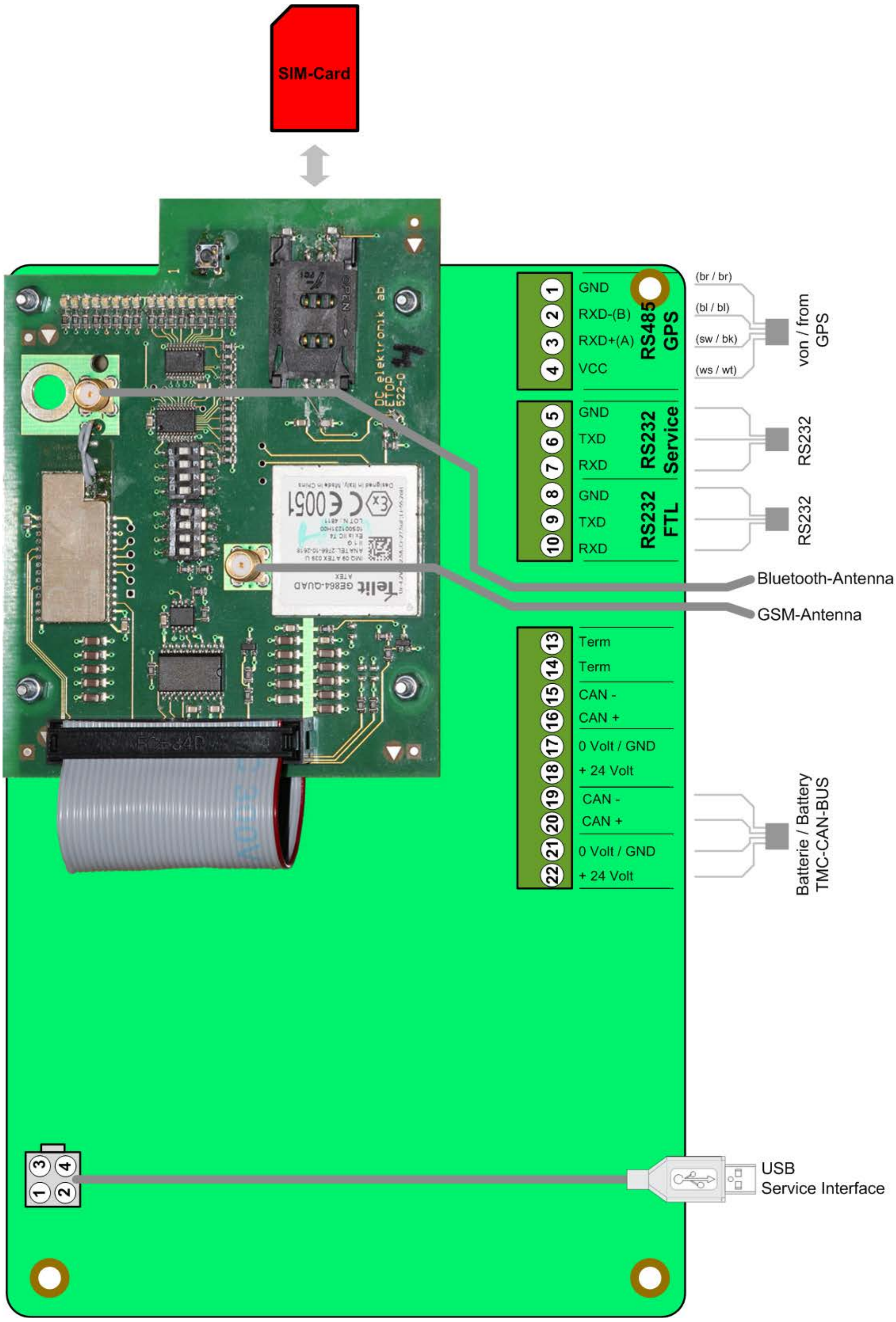
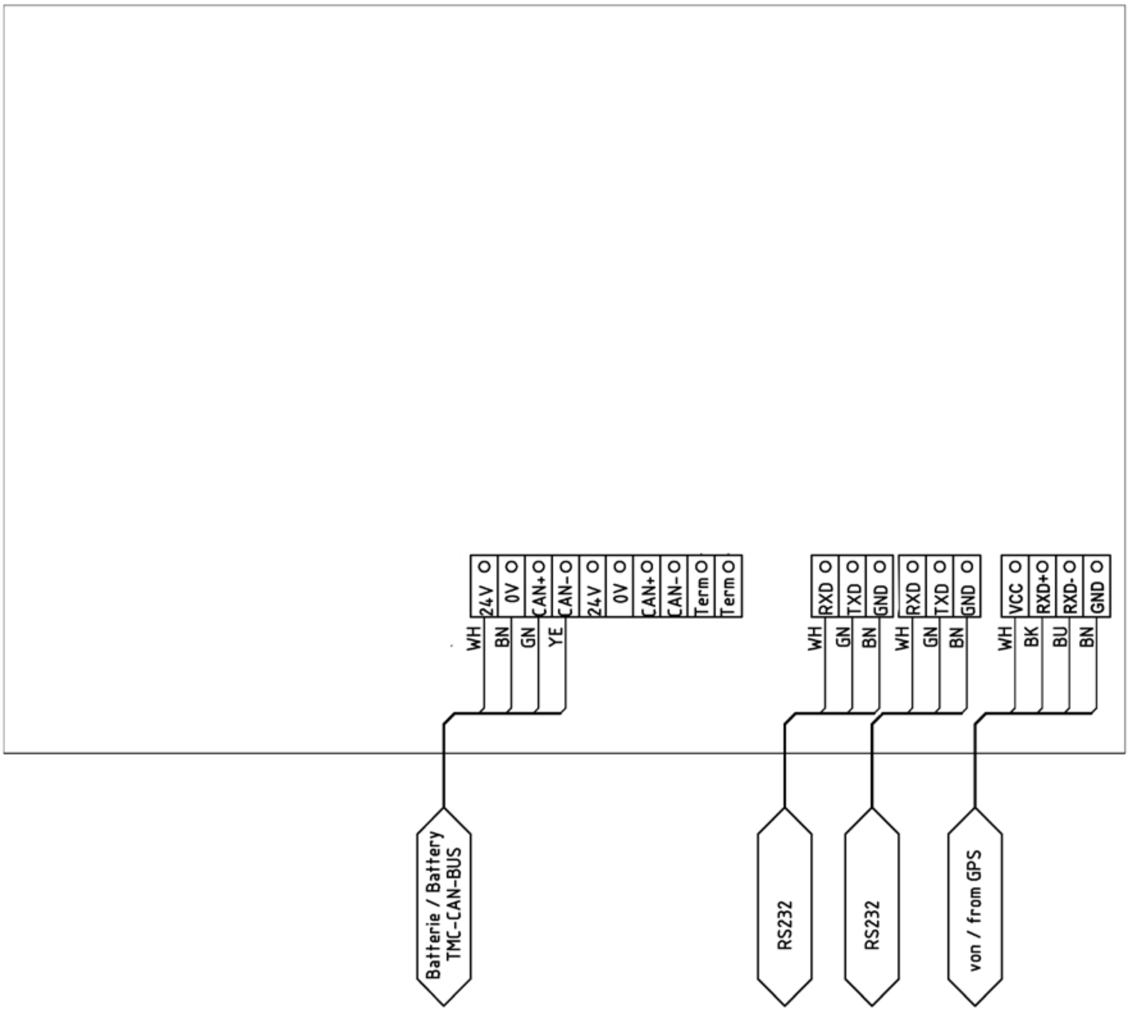
Drawings

P8000007800 - Wiring Diagramm MultiTask/EMIS4





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FMC Technologies
F.A.Sening GmbH, Regentstr. 1, 25474 Ellerbek, Germany

Method 1	Method 3		Date / Datum	Name
		Drawn	07.10.2013	Larsen
		Checked	08.10.2013	Arndt

Item name / Benennung
Anschlussplan / Wiring Diagram
made for / zugehörig zu
EMIS4

Scale / Maßst.	1:1.25	Item-No. / Teile-Nr.	Drawing No. / Zeichnungs-Nr.	Rev.	Sheet / Blatt 1
Size / Format	ISO - A4		P8000007800	000.00	of / von 1
Weight / Gewicht	0,0 kg				

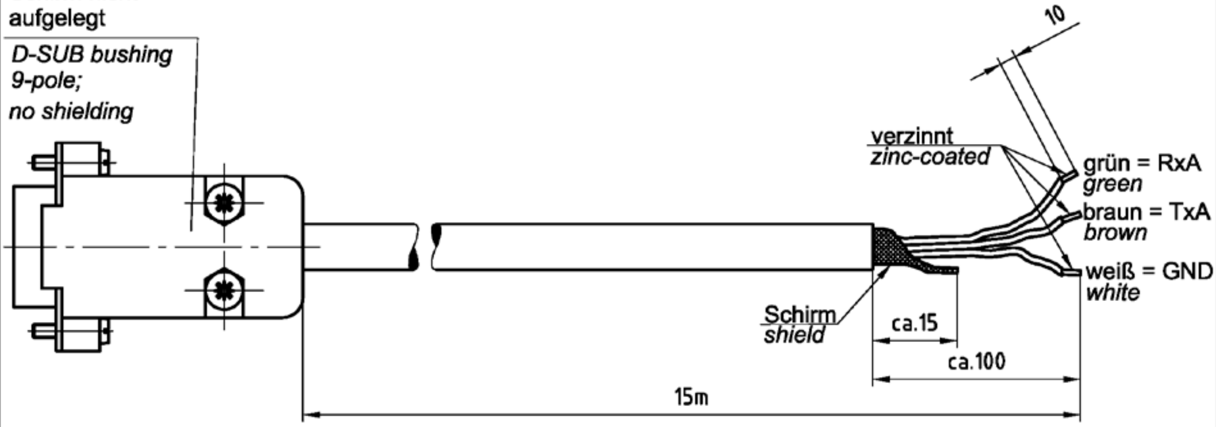
51.352241 - Interface cabel EMIS-OBC-KA

OBC

EMIS2-RS232

D-SUB Buchse
9-polig;
Schirm nicht
aufgelegt

D-SUB bushing
9-pole;
no shielding



Schritt 1:
- Kabelmantel 100 mm abisolieren
- Schirmgeflecht freilegen und auf 15 mm kürzen

Step 1:
- *Strip cable sheath by 100 mm*
- *Expose shielding braid and shorten to 15 mm*

Schritt 2:
- Kabeldurch Überwurfmutter führen
- Kabel in Klemmeneinsatz führen
- Schirmgeflecht über Klemmeneinsatz stülpen
- Schirmgeflecht muss O-Ring ca. 2 mm überdecken

Step 2:
- *Feed cable through union nut*
- *Feed cable through terminal insert*
- *Place shielding braid over terminal insert*
- *Shielding braid must extend over O-ring approx. 2mm.*

Schritt 3:
- Klemmeneinsatz in Zwischenstutzen stecken
- Verschraubung montieren & festziehen
- Fertig !

Step 3:
- *Insert terminal insert into adapter piece*
- *Attach screw connection & tighten*
- *Done !*

Nr.:	Farbe/*Colour*	[EMIS2]
1		
2	braun / *brown*	TxA (4)
3	grün / *green*	RxA (8)
4		
5	weiß / *white*	GND (2)
7	)	
8		
9		

7 und 8 am Stecker verbinden
7 and 8 connected at plug

Schnittstellenkabel
Interface cable

FMC Technologies — F.A. Sening GmbH, D-25474 Ellerbek, Germany

Weight :	Date :	Name :
kg	14.04.2010	Larsen

Part-No. EMIS2-OBC-KA

Changed: ECN No.	Date	Name
	07.06.10	RL;
	21.03.11	RL;

Drawing No.: 51.352241

Rev.

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Contact information is subject to change. For the most current contact information, visit our website at www.fmctechnologies.com/measurementsolutions and click on the "Contact Us" link in the left-hand column.

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