FMM650 LVCAN I/O,FMS IO and Tachograph data elements

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Contents

LVCAN, *FMS IO* and *Tachograph data* sections shows I/O elements that can be obtained accordingly from external devices connected to FMM650 device. All I/O configuration is as described I/O elements}

LVCAN

LVCAN elements can be configured in same way like with normal I/O elements. LVCAN IO elements can also be configured remotely via SMS command.

FMS

FMS, or Fleet Management Systems Interface, is a sector to configure and manage events based on vehicle data of commercial vehicles. Vehicle data comes through CAN lines. Event configuring isn't different from those in LVCAN and I/O sectors. The only difference is IDs.

DM1 and DM2

Diagnostic messages reading – DM1, DM2

This feature will be available with the firmware 03.01.01 which should be released till the 2024 Q2 end.

Unexpected vehicle maintenance causes many challenges for logistic companies, especially for heavy duty vehicles. With professional device lineup like FMM650 – Tell Tale information (dashboard

lights) can be read remotely indicating various issues with heavy duty vehicles. New feature of Diagnostic Trouble Code (DTC) reading will help to narrow down the specific faults happening in vehicles – receive DTC information remotely.

With FMC650/FMM650/FMB641 you can read 2 types of DTC messages based on J1939 protocol: DM1 – Active codes DM2 – Previously Active codes

FMM650 is able to read DM codes and pass them to the server in IO element. When active DM1 or DM2 messages appear on CAN line it is broadcasted very often – FMC650 device save the codes into internal memory and does not spam the server with irrelevant information – only new DTC codes are sent to the server.

ACTIVE DIAGNOSTIC TROUBLE CODES (DM1)

- Memory array of 100 elements (4B each) is reserved for DM1 group messages. Memory will be cleared when device will reset or after Ignition OFF.
- When record is saved with previously active DTC code, this code is saved in device memory.
- Only active DTC Code not present in device memory will be saved as record (for each unique code separate record will be created if FMS IO element "Active DTC error Codes" is enabled).
- If memory array is full, oldest code will be overwritten with the new DTC code detected

PREVIOUSLY ACTIVE DIAGNOSTIC TROUBLE CODES (DM2)

- Memory array of 100 elements (4B each) is reserved for DM2 group messages. Memory will be cleared when device will reset or after Ignition OFF.
- When record is saved with previously active DTC code, this code is saved in device memory.
- Only previously active DTC Code not present in device memory will be saved as record If memory array is full, oldest code will be overwritten with the new DTC code detected
- If memory array is full, oldest code will be overwritten with the new DTC code detected

Functioning of DM1 and DM2 happens simultaneously

Active Diagnostic Trouble Codes DM1 Group:

Description	Values
PGN	65226 (0xFECA)
Data Bytes	03 FF 00 00 00 00 FF FF
lampMalfunctionIndicatorStatus_1213	0
lampRedStopStatus_623	0
lampAmberWarningStatus_624	0
lampProtectStatus_987	3
flashMalfunctionIndicator_3038	3
flashRedStop_3039	3
flashAmberWarning_3040	3
flashProtect_3041	3
DTC	0

Active Diagnostic Trouble Codes DM2 Group:

Description	Values
PGN	65226 (0xFECA)
Data Bytes	00 FF 6F F2 E4 01 FF FF
lampMalfunctionIndicatorStatus_1213	0
lampRedStopStatus_623	0
lampAmberWarningStatus_624	0
lampProtectStatus_987	0
flashMalfunctionIndicator_3038	3
flashRedStop_3039	3
flashAmberWarning_3040	3
flashProtect_3041	3
DTC	0
SPN	0
FMI	4
OC	1
CM	0

EV FMS

Heavy duty logistics vehicle manufacturers are swiftly moving towards a more sustainable logistic supply chain by providing electric heavy duty trucks. Most of the main manufacturers are already offering electric versions of their most successful traditional truck lineup.

This change opens up new possibilities and new challenges for telematics companies.

Fortunately, the market remains in agreement for standardized telematics communication protocol – FMS Standard.

This standard implies same communication protocol and same connection practices.

Relative information about AVL IDs can be found in this link.

The protocol is expanded to support electric vehicle information which can be read with FMC650/FMM650: Battery voltage/temperature, coolant information and many new electric FMS related information can be found in new tab "EV FMS IO":

EV FMS IO

Input Name	Units	Priority	Low Level	High Level	Event Only	Operand
High voltage battery Voltage	mV	None Low High Panic	0	0	Yes No	Monitoring
High voltage battery Current	mA	None Low High Panic	0	0	Yes No	Monitoring
Internal Charger Status		None Low High Panic			Yes No	Monitoring
Generic state of charge		None Low High Panic			Yes No	Monitoring
EV Ignition		None Low High Panic			Yes No	Monitoring
Ext Energy Src Conn Status		None Low High Panic			Yes No	On Change
Seatbelt switch		None Low High Panic			Yes No	Monitoring
EVSE1 AC RMS Current	mA	None Low High Panic	0	0	Yes No	Monitoring
EVSE1 AC RMS Voltage	mV	None Low High Panic	0	0	Yes No	On Entrance
DC Charging State		None Low High Panic			Yes No	Monitoring
High Voltage Battery Highest Cell Temp	°C	None Low High Panic	0	0	Yes No	Monitoring
High Voltage Battery Lowest Cell Temp	°C	None Low High Panic	0	0	Yes No	Monitoring
Motor Coolant Fan1 Control Temp	°C	None Low High Panic	0	0	Yes No	Monitoring
Air Conditioner Compressor Status		None Low High Panic			Yes No	Monitoring
High Voltage Battery Temp	°C	None Low High Panic	0	0	Yes No	Monitoring
HVESS Thermal Management System Heater Status		None Low High Panic			Yes No	Monitoring
Fuel Supply Estimated Remaining Dist	km	None Low High Panic	0	0	Yes No	Monitoring
Trailer Weight	kg	None Low High Panic	0	0	Yes No	Monitoring
Cargo Weight	kg	None Low High Panic	0	0	Yes No	Monitoring
Powered Vehicle Weight	kg	None Low High Panic	0	0	Yes No	Monitoring
Gross Combination Vehicle Weight	kg	None Low High Panic	0	0	Yes No	Monitoring
Highest cell voltage	mV	None Low High Panic	0	0	Yes No	Monitoring
Lowest cell voltage	mV	None Low High Panic	0	0	Yes No	Monitoring
HVESS State of Health	%	None Low High Panic	0	0	Yes No	Monitoring

Tachograph Data

Tachograph data can be taken from Tachograph via K-Line, ALLCAN, Tacho CAN or FMS. Data here is constantly refreshed. As the other elements' windows, this one also has all the options to configure event generating.

Vehicle Data Priority Settings

K Line Priority		AllCan Priority		TachoCan Priority		FMS Priority	
Disable	Priority 1	Disable	Priority 1	Disable	Priority 1	Disable	Priority 1
Priority 2	Priority 3	Priority 2	Priority 3	Priority 2	Priority 3	Priority 2	Priority 3
Priority 4		Priority 4		Priority 4		Priority 4	

By defaulf, FMM650 sends Tachograph data included into regular record, but device can be configured to send Tachograph data as separate AVL packet

Tachograph Settings

Tachograph periodic record timeout (s): 0

Include Tachograph data into regular record: **Disable** | Enable

Send data with last good value: Disable | **Enable**

If Tachograph data included into regular record is Disabled, Tachograph periodic record timeout will define how often Tachograph Data will be sent to the server as separate AVL packet.

Send data with last good value Added a feature which allows to choose to generate Tachograph data record or not depending on remembered last good value. If parameter is enabled and if there were good data values received but now no new data is receiving, when record will be generated it will be filled with last good data values.

In base version as well as in this special firmware there is a 30 seconds timeout during which Kline values are still being stored in RAM.

If last good value parameter is disabled and good data stopped streaming, data will still be available for 30 seconds.

Tachograph Counter related elements

Newly added IO elements (AVL ID 10504-10517 from 01.02.12 firmware version) include data

reading from Tachograph Counter functionality – displaying daily/weekly remaining driving and rest times on tachograph menu.

Note that these parameters can be optional on your tachograph - meaning that by default not all the tachographs have this feature enabled/supported from the factory.

For example – VDO DTCO tachographs support the Counter functionality from version 2.0, however in OEM tachograph versions – non universal tachograph – meant specifically for truck manufacturer i.e. Mercedes/DAF – Counter functionality can be disabled from the factory.

In order to properly read these IO elements with FMX640 – Counter functionality has to be enabled.

VDO DTCO 2.1 tachograph can be updated via "DTCO VDO Counter Update Card" – **P/N A2C5951660366**

❌ Newer DTCO versions can have the Counter functionality enabled by entering the license key provided by the manufacturer.

To see if new IO elements will be read from your tachograph, we recommend contacting your local workshop, specifying the tachograph part number and following the workshop instructions if any are required.

Tachograph data parameters which support different communications:

Parameter	K-Line	K-Line (Front Panel)	ALLCAN	TachoCAN	FMS
Timestamp	+	+	-	+	-
Driver recognize	+	+	-	+	+
Overspeeding	+	+	-	+	+
Vehicle speed	+	+	+	+	+
Odometer	+	+	+	+	+
Distance	+	+	+	+	+
VIN	+	+	-	+	+
VRN	+	+	-	+	-
Driver 1 working state	+	+	+	+	+
Driver 2 working state	+	+	+	+	+
Driver 1 card	+	+	+	+	+
Driver 2 card	+	+	+	+	+
Driver 1 time related state	+	+	-	+	+
Driver 2 time related state	+	+	-	+	+
Driver 1 ID number	+	+	+	+	+
Driver 2 ID number	+	+	+	+	+
Card 1 issuing state	+	+	-	+	-
Card 2 issuing state	+	+	-	+	-
Driver 1 Continuous drive time	-	+	+	+	-
Driver 2 Continuous drive time	-	+	+	+	-
Driver 1 cumulative break time	-	+	+	+	-
Driver 2 cumulative break time	-	+	+	+	-
Driver 1 selected activity duration	-	+	+	+	-
Driver 2 selected activity duration	-	+	+	+	-
Driver 1 cumulative driving time	-	+	+	+	-
Driver 2 cumulative driving time	-	+	+	+	-
Data Source	+	+	+	+	+
From Firmware 01.02.12:					
Drivers hours rules pre warning time delay	-	+	-	+	-
Out of scope condition	-	+	-	+	-
Next calibration date	-	+	-	+	-

Driver1 end of last daily rest period	-	+	-	+	-
Driver2 end of last daily rest period	-	+	-	+	-
Driver1 end of last weekly rest period	-	+	-	+	-
Driver2 end of last weekly rest period	-	+	-	+	-
Driver1 end of second last weekly rest period	-	+	-	+	-
Driver2 end of second last weekly rest period	-	+	-	+	-
Driver1 current daily driving time	-	+	-	+	-
Driver2 current daily driving time	-	+	-	+	-
Driver1 current weekly driving time	-	+	-	+	-
Driver2 current weekly driving time	-	+	-	+	-
Driver1 time left until new daily rest period	-	+	-	+	-
Driver2 time left until new daily rest period	-	+	-	+	-
Driver1 number of times 9h daily driving times exceeded	-	+	-	+	-
Driver2 number of times 9h daily driving times exceeded	-	+	-	+	-
Driver1 Name	-	+	-	+	-
Driver1 SurName	-	+	-	+	-
Driver2 Name	-	+	-	+	-
Driver2 SurName	-	+	-	+	-
Driver 1 Time Left Until New Weekly Rest Period	-	+	-	+	-
Driver 2 Time Left Until New Weekly Rest Period	-	+	-	+	-
Driver 1 Minimum Daily Rest	-	+	-	+	-
Driver 2 Minimum Daily Rest	-	+	-	+	-
Driver 1 Minimum Weekly Rest	-	+	-	+	-
Driver 2 Minimum Weekly Rest	-	+	-	+	-
Driver 1 Duration Of Next Break Rest	-	+	-	+	-
Driver 2 Duration Of Next Break Rest	-	+	-	+	-
Driver 1 Remaining Time Until Next Break Or Rest	-	+	-	+	-
Driver 2 Remaining Time Until Next Break Or Rest	-	+	-	+	-
From Firmware 03.01.00.Rev.00					
Driver 1 Remaining Current Driving Time	-	+	-	+	-
Driver 1 Remaining Driving Time On Current Shift	-	+	-	+	-
Driver 1 Remaining Driving Time Of Current Week	-	+	-	+	-
Driver 1 Open Compensation In The Last Week	-	+	-	+	-
Driver 1 Open Compensation In Week Before Last	-	+	-	+	-
Driver 1 Open Compensation In 2nd Week Before Last	-	+	-	+	-
Driver 1 Additional Information	-	+	-	+	-
Driver 1 Remaining Time Of Current Break Rest	-	+	-	+	-
Driver 1 Time Left Until Next Driving Period	-	+	-	+	-
Driver 1 Duration Of Next Driving Period	-	+	-	+	-