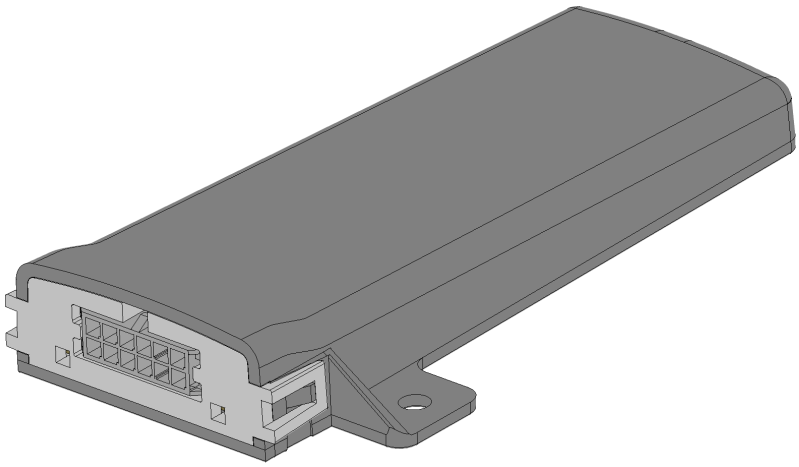
Webasto

Webasto
Feel the Drive



Quick Manual - FDM

Field Data Monitoring

Abbreviations

B2B	Business to Business
BMC	Battery Management Controller
BMS	Battery Management System
CAN	Controller Area Network
CAT	Categorie
CV	Commercial Vehicle
DC	Direct Current
DoD	Depth of Discharge
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
FCC	Federal Communications Commission
FDM	Field Data Monitoring
GSM	Global System for Mobile Communications
HV	High Voltage
HVIL	High Voltage Interlock
LTE	Long Term Evolution
QM	Quality Management
PE	Potential Equalization
RF	Radio Frequency
SoC	State of Charge
SoH	State of Health
VIB	Vehicle Interface Box
VIC	Vehicle Interface Controller

Contents

1 Introduction

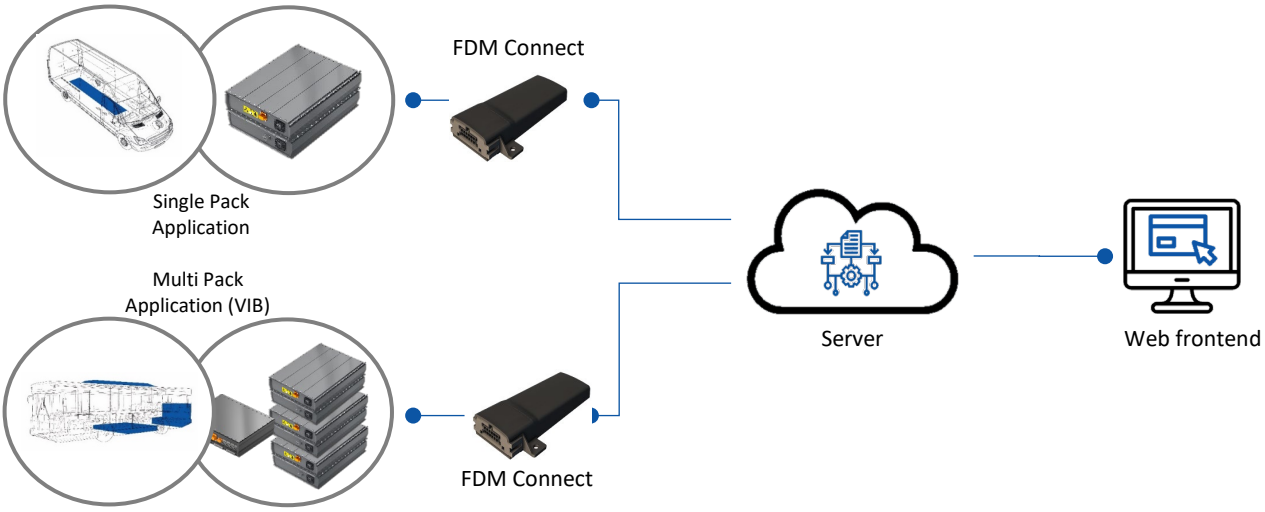
The FDM Quick Manual gives an overview of the characteristics and functions of the Field Data Monitoring device (FDM) which is used alongside the battery pack and battery management system (BMS) developed by Webasto for use in commercial vehicles (CV).

Important installations rules can also be found in this document.

2 General Information about FDM

With Field Data Monitoring (FDM) it is possible to collect, transmit, save and visualize data from the Webasto CV battery system. The FDM control unit is acting as the central interface between the battery and the mobile network.

The battery data is transferred via 2G or LTE CAT M1 to a server and visualized by a web frontend.



FDM Connect is intended for B2B commerce only.

2.1 Supported Countries

The FDM device may be used in the following countries only:

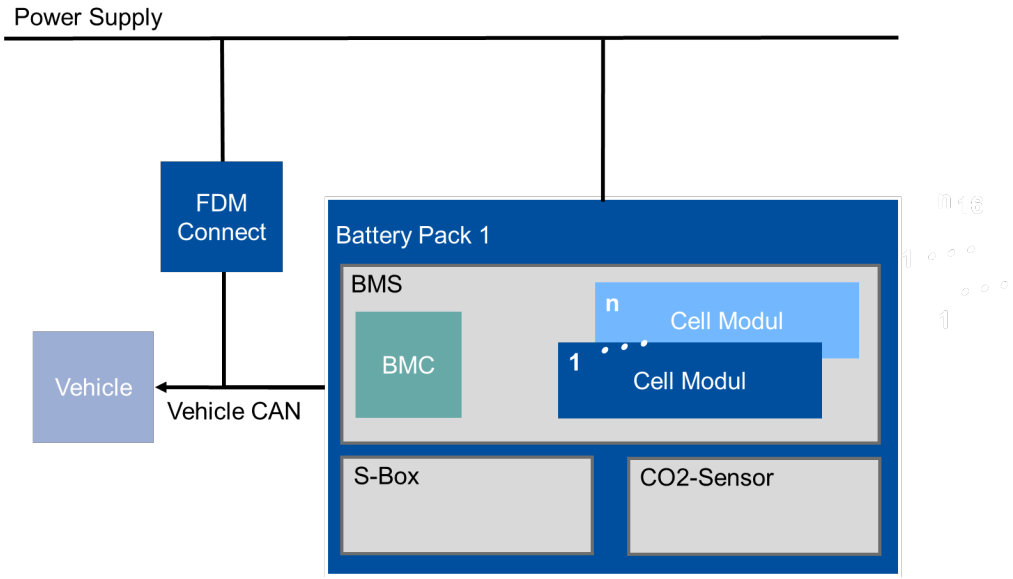
Countries of European Union, Norway, Switzerland, United Kingdom

Because of roaming restrictions, the permanent usage outside the listed countries is not permitted. Contact your sales representative for temporal usage restrictions outside the listed countries.

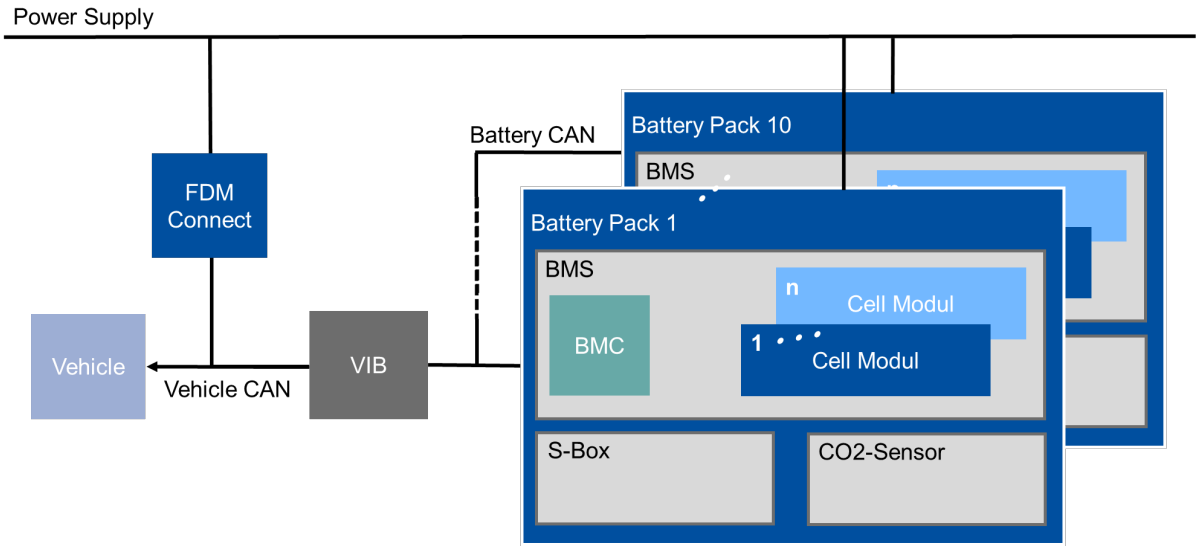
2.2 System Diagram

The power supply of the FDM as well as the battery system shall be provided from the vehicle.

2.2.1 Single pack battery system



2.2.2 Multi pack battery system



2.3 Technical Characteristics

Features			
Network module	Quad-band GSM, LTE CAT M1		
GNSS module	BeiDou, Galileo, GLONASS, GPS / QZSS		
CAN	2.0B J1939		
Body			
Weight	53 g		
Material	LUPOY GN5007FH PC/ABS		
Power	**Minimum**	**Typical**	**Maximum**
Voltage (V_{bb}, V+)*	9 VDC	-	32 VDC
Power consumption (I_{bb} average at 24 VDC)	10 mADC	12 mADC	60 mADC

* Terminal 30 connection

Environment	Minimum	Typical	Maximum
Moisture	-	-	95% RH
Operating temperature	-40 °C	-	+80 °C
IP classification*	-	IP42	-

* Device should be installed so that connector side is pointing downwards.

Safety
IEC 62368-1
Regulatory approvals
CE, ECE-R10, FCC Part 15B

2.4 FCC Part 15B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference thatmay cause undesired operation.

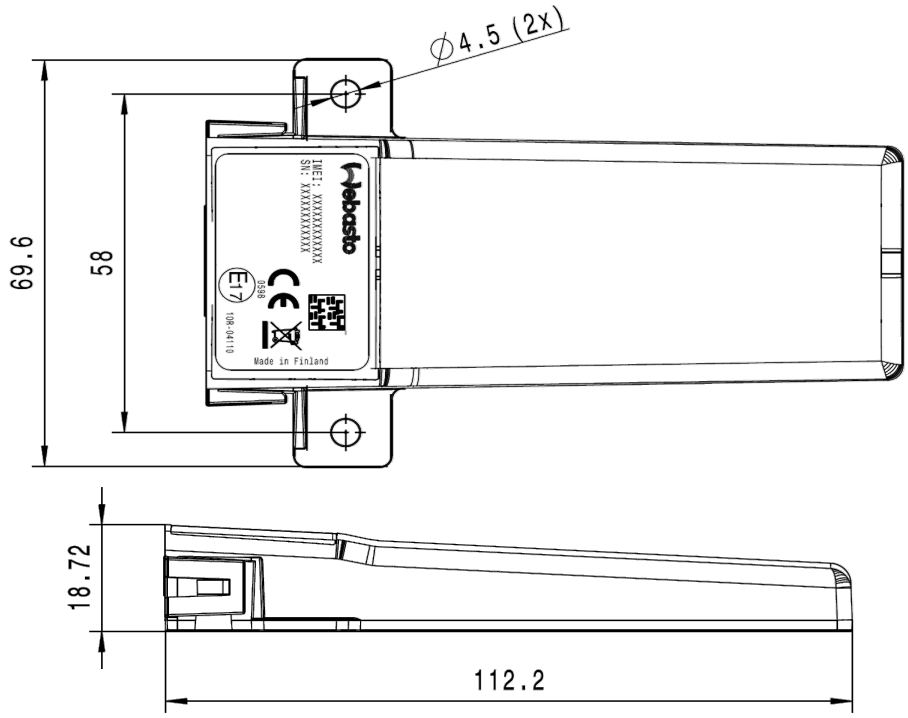
Any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3 Mechanical Information

The dimensions of the FDM are 112.2 mm x 69.6 mm x 18.72 mm.

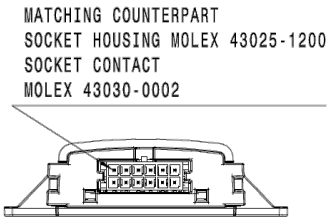


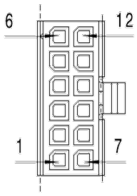
Two mounting holes of each 4.5mm can be used to fix the FDM.

4 Electrical Interfaces

4.1 Connector

The FDM has a 10 pol Molex connector. The counterpart connector is Molex 43025-1200 with socket contacts Molex 43030-0002. Matching derivats can be used as well.





1	OUTPUT1
2	GND
3	1WIRE/INPUT2
4	BTN_TEMP
5	INPUT1
6	CAN1HI
7	VS+
8	BTN_GND
9	BTN_LED
10	BTN_SW
11	LIN/WBUS
12	CAN1_LO

4.2 Pinout

Pin	Name	Function	Min voltage	Max voltage	Max current
1	OUTPUT1	(Reserved for future use)	-	-	-
2	GND	Ground, battery minus	-	-	1 A
3	IN1	(Reserved for future use)	-	-	-
4	EXT_TEMP	(Reserved for future use)	-	-	-
5	Reserved	(Reserved for future use)	-	-	-
6	CAN_HI	CAN bus high signal	2,5V	3,5V	3 mA
7	VS+	Power supply V_{bb}	9 VDC	32 VDC	2 A
8	BTN_GND	(Reserved for future use)	-	-	-
9	BTN_LED	(Reserved for future use)	-	-	-
10	BTN_SW	(Reserved for future use)	-	-	-
11	LIN/WBUS	(Reserved for future use)	-	-	-
12	CAN_LO	CAN bus low	1,5V	2,5V	-

4.3 CAN Communication

4.3.1 CAN Interface

The FDM is attached to the vehicle CAN and uses high-speed CAN communication in accordance with the norm ISO 11898-2.

For CAN communication with the vehicle, the extended CAN protocol is used.

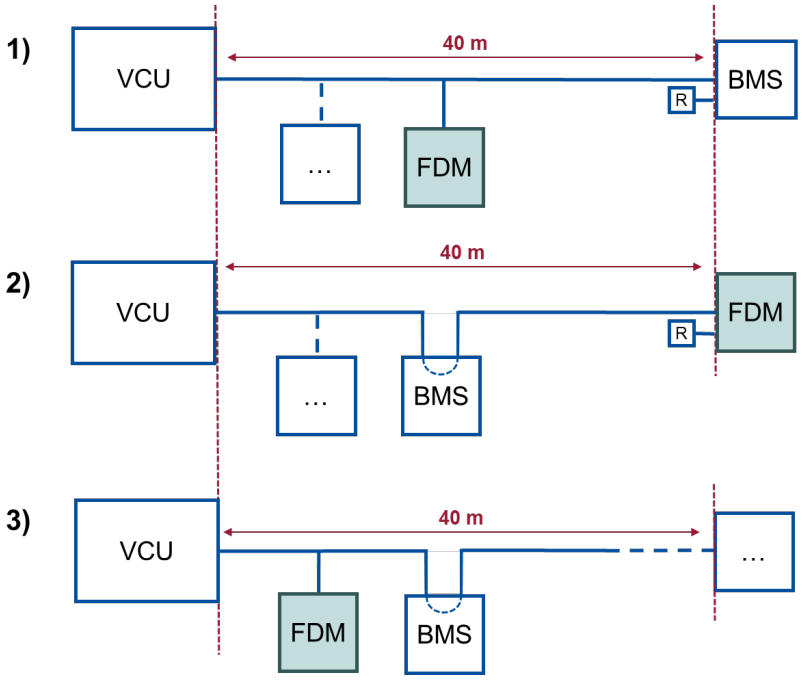
The baud rate is 500 Kbps.

4.3.2 CAN Termination

Depending on where FDM Connect is to be integrated in the vehicle CAN, the bus termination must be adapted to the topology.

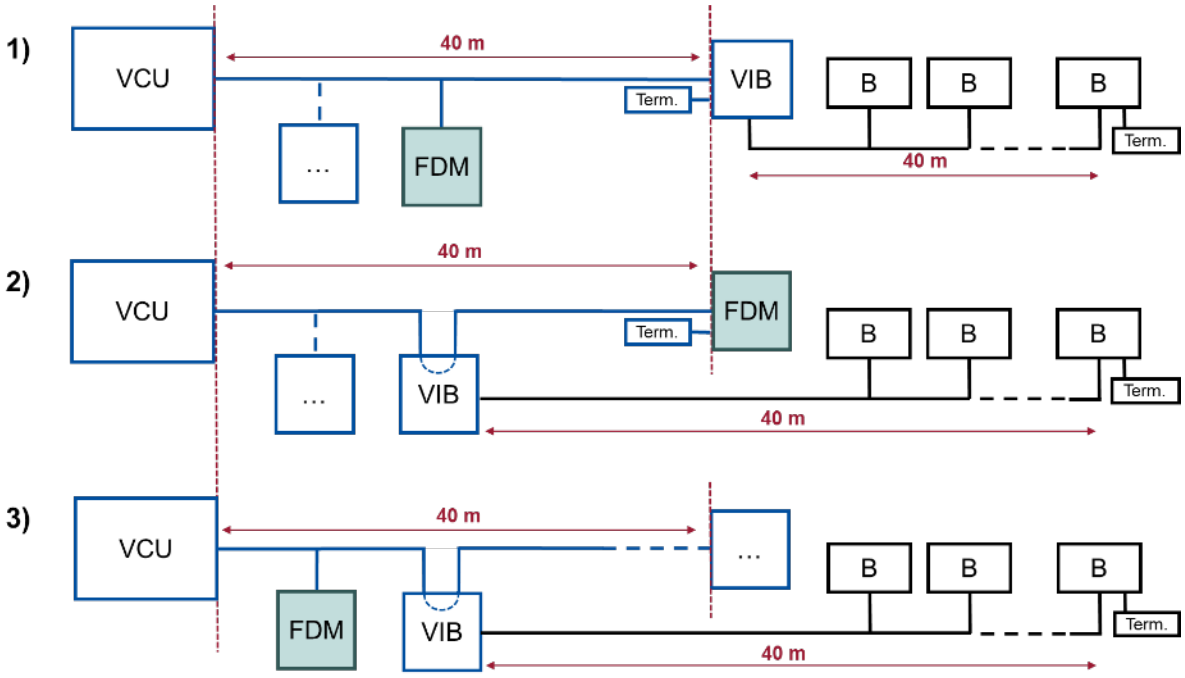
The FDM device itself doesn't have a 120Ω bus termination integrated. The termination must be within the wiring harness.

Single Pack Battery:



1. The FDM device is connected somewhere on the vehicle CAN via a stub line, but is not the first or last CAN device on the bus. The FDM device must not have a termination.
2. The FDM device is the last device to be connected to the vehicle CAN via the CAN line of the VIB. The FDM must be terminated with 120 Ω.
3. The FDM device is connected on the vehicle CAN between VCU and VIB via a stub line. The FDM device must not have a termination.

Multi Pack Battery System:



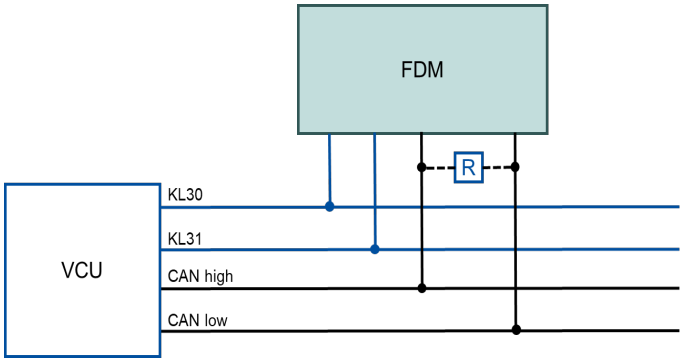
1. The FDM device is connected somewhere on the vehicle CAN via a stub line, but is not the first or last CAN device on the bus. The FDM device must not have a termination.
2. The FDM device is the last device to be connected to the vehicle CAN via the CAN line of the VIB. The FDM must be terminated with 120 Ω.
3. The FDM device is connected on the vehicle CAN between VCU and VIB via a stub line. The FDM device must not have a termination.

5 Vehicle Integration

To ensure that the FDM operates properly, it is necessary to observe the following vehicle integration guideline.

5.1 Power Supply

The FDM device must be connected to the vehicle terminal 30 and terminal 31 to ensure a consistent data connectivity.



5.2 General Mounting Position

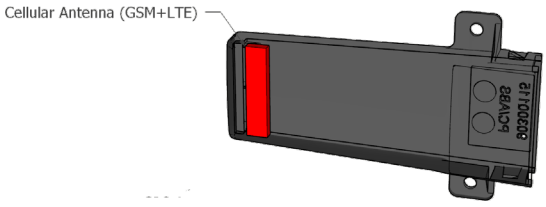
The FDM device must be installed inside the vehicle in a dry place. Installation shall be as high as possible to get the best mobile connectivity.

The mouting holes can be used to fix the device.

5.3 Additional Mounting Instructions

For vehicle integration, there are some additional requirements to be considered for FDM mounting.

The reason for this is because the FDM device contains an integrated SMD antenna for cellular networks (GSM, LTE).

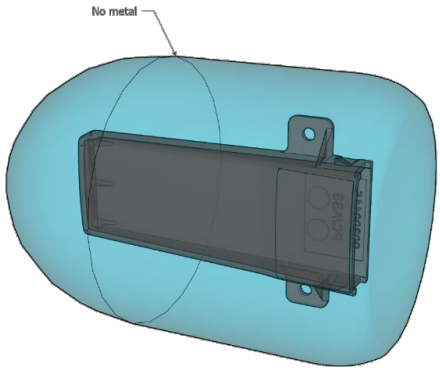


Antennas need ground base for antenna current. PCB's copper layers are ground in this design. It means that all part of the device (enclosure, PCB, wiring harness) will affect to the RF performance. All metal structures surrounding the device are also affecting RF.

If the unit is installed near metal structures, RF power may be reflected onto the unit, heating up critical components and causing accelerated ageing or even permanent damage.

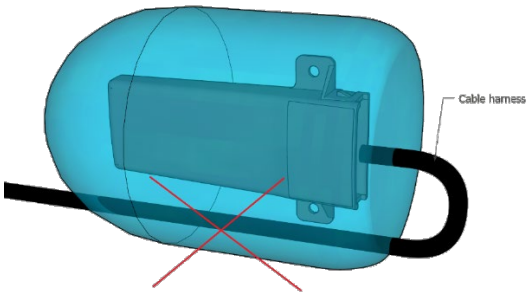
5.3.1 Metal Free Area

Metals near the FDM antenna can ruin RF performance. To avoid this, the unit must be mounted so that there is no metal 3 cm around the unit.



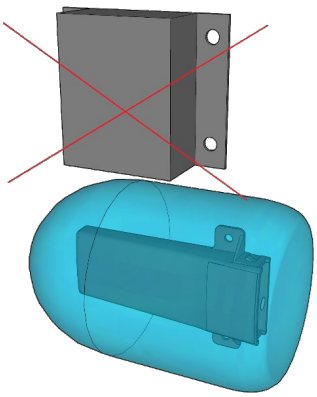
5.3.2 Routing of Cables

Any cables or wiring harnesses - including the own FDM wiring harness - should also not be routed near the FDM antenna.



5.3.3 Avoid other Control Devices

Also, other devices i.e. vehicle control modules, airbags, radios and other antennas should not be near the FDM device because transmitted RF signals can cause problems.



5.4 Mouting Summary

It is essential to observe these rules when integrating the FDM into the vehicle:

- Interior installation only
- Connect to terminal 30 and terminal 31
- Install high as possible
- Do not mount the FDM onto metal
- Keep at least 3 cm away from metal around the FDM
- Do not shield the FDM
- Keep FDM device away from other control units