Technical Regulations: Article 5.24.3

Oil level sensor CAN specification

Oil level sensors should adhere to the CAN specification described in this section, with the aim to:

- Standardise the data collection by the FIA Standard ECU ;
- Provide access to additional software and hardware information ;
- Provide access to additional sensor diagnostics and metrics for improved sensor management.

CAN bus specification:

Base ID	The Base ID may be configurable.
CAN protocol	2.0B with 11bit identifier
BAUD rate	1 Mb/s
Terminating resistor	Not included
Message rate	10 Hz

General requirements:

The sensor must measure the level and temperature of the oil.

The sensor must send a measurement message at 10Hz using the Base ID.

The sensor must send a diagnostic message at 10Hz using the Base ID +1.

The unassigned bytes in the message definition may be used by the supplier for additional information. This must be disclosed to the FIA.

The sensor will be connected to the FIA Standard ECU via a control CAN bus, where the data will be decoded by the standard FIA application.

CAN IDs and associated buffers will be configurable in the FIA Standard ECU.

Message definition:

Message ID	Base ID
Description	Measurement message
Transmit Rate	10Hz
Byte 0	Oil Level
Byte 1	
Byte 2	Sensor PCB Temperature
Byte 3	
Byte 4	Oil Temperature
Byte 5	
Byte 6	Unassigned
Byte 7	

Message ID	Base ID + 1			
Description	Diagnostics message			
Transmit Rate	10Hz			
Byte 0 (MUX ID)	**0**	**1**	**2**	**3**
Byte 1	Software Version	Boot Loader Version	*Unassigned*	*Unassigned*
Byte 2	Min Oil temp since power up	Min PCB temp since power up	Boot Loader checksum	Status Word
Byte 3				
Byte 4	Max Oil temp since power up	Max PCB temp since power up	Software checksum	Service Counter
Byte 5				
Byte 6	Configuration Checksum	Calibration Checksum	Hardware Revision	
Byte 7				
Byte 0 (MUX ID)	**4**	**5**	**6**	**7**
Byte 1	Manufacture Year	*Unassigned*	*Unassigned*	*Unassigned*
Byte 2	Manuf. Month	Sensor Scaling Factor	*Unassigned*	*Unassigned*
Byte 3	Manufacture Day			
Byte 4	Seconds from reset	Raw Level Min	Supply Voltage	Sensor Serial Number
Byte 5				
Byte 6	*Unassigned*	Raw Level Max	Reference Voltage	
Byte 7				

Data definition:

Name	Format	Scaling	Units	Error/Default value	Comment
Oil Level	16 bit signed MSB first	0.1 mm/bit	mm	0xFFFF = unavailable	The sensor supplier must specify if the level is already temperature compensated.
Sensor PCB Temperature	16 bit signed MSB first	0.1 degC/bit	degC	0x8001=open sensor 0x8002=short sensor 0xFFFF=unavailable	
Oil Temperature	16 bit signed MSB first	0.1 degC/bit	degC	0x8001=open sensor 0x8002=short sensor 0xFFFF=unavailable	
Min and Max Temperatures	16 bit signed MSB first	0.1 degC/bit	degC	0xFFFF=unavailable	
Service Counter	32 bit unsigned MSB first	1 min/bit	min		Time since last supplier service
Seconds from reset	16 bit unsigned MSB first	1 s/bit	s		Time since last power up
Supply voltage	16 bit signed MSB first	0.1 V/bit	V		If available
Reference voltage	16 bit signed MSB first	0.1 V/bit	V		If available
Checksums	32 bit unsigned MSB first				
Sensor Scaling Factor	16 bit unsigned MSB first				If applicable
Sensor serial number	32 bit unsigned MSB first				
Hardware revision	16 bit unsigned MSB first				
CAN diagnostics	8bit bitfield MSB first				
Status Word	16bit bitfield MSB first				See definition below
Software Versions	8 bit unsigned MSB first				

Status word definition:

Bit	Meaning
0	Level Measurement Error
1	Oil temperature Error
2	PCB temperature Error
3	PCB over temperature
4	Service Due
5	Microcontroller Restart
6	CAN Error Passive
7	CAN Bus Off
8 to 15	Unassigned