

## 4.4.5 Transfer Protocol

### Aftertreatment Sensor Communication Protocol

Data format:

- Transfer rate                      250 kBaud
- Repetition                         50 msec
- Data format                        Intel
- Identifier                         extended

Transmit signals:

**Standard transmit address** (Pin5 open):

**18F00F52h** (PGN = 61455, in HEX: F00F; After Treatment outlet - position, bank 1)

Alternative transmit address (Pin5 to GND):

18F00E51h (PGN = 61454, in HEX: F00E; After Treatment intake - position, bank 1)


Overview Transmit signals:

	7	6	5	4	3	2	1	0
<b>0</b> (L-Byte)	NOx	NOx	NOx	NOx	NOx	NOx	NOx	NOx ←
<b>1</b> (H-Byte)	NOx ←	NOx	NOx	NOx	NOx	NOx	NOx	NOx
<b>2</b> (L-Byte)	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub> ←
<b>3</b> (H-Byte)	O <sub>2</sub> ←	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>	O <sub>2</sub>
<b>4</b>	Status Byte	Status Byte	Status Byte	Status Byte	Status Byte	Status Byte	Status Byte	Status Byte
<b>5</b>	not used**	Status Heater Mode	Status Heater Mode	Error* Heater	Error* Heater	Error* Heater	Error* Heater	Error* Heater
<b>6</b>	not used**	not used**	not used**	Error* NOx	Error* NOx	Error* NOx	Error* NOx	Error* NOx
<b>7</b>	not used**	not used**	not used**	Error* O <sub>2</sub>	Error* O <sub>2</sub>	Error* O <sub>2</sub>	Error* O <sub>2</sub>	Error* O <sub>2</sub>

\* Error as FMI = **F**ailure **M**ode **I**ndicator

(see after treatment sensors communication protocol REV 0.1, Appendix A)

\*\* not used bits = 0

	
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	Range Coding	Definition
<b>NOx</b>	-200 ... 3012 [ppm]  signal: unsigned integer	Transmitted is the NOx-concentration which is detected by the NOx-Sensor. The transmission is in 0.05 ppm NOx/bit +200 ppm. (f.e.: 7500 corresponds to 175ppm NOx → $7500 * 0,05 - 200 = 175 \text{ ppm}$ )
<b>O<sub>2</sub></b>	-12... 21 [%]  signal: unsigned integer	Signal of the actual oxidation factor (%O <sub>2</sub> ): The transmission is in 0.000514%/bit +12%. (f.e.: 64202 corresponds to 21% O <sub>2</sub> )

### Status-Byte:

D7	D6	D5	D4	D3	D2	D1	D0
S3	S3	S2	S2	S1	S1	S0	S0

### S0: Status Supply in Range

D1	D0	
0	0	Supply not in range
0	1	Supply in range
1	0	Not used => Error
1	1	Not available (=Initial value)

### S1: Status NOx-Sensor temperature heater element

D3	D2	
0	0	Sensor not at temperature
0	1	Sensor at operating temperature
1	0	Not used => Error
1	1	Not available (=Initial value)

### S2: Status NOx-Signal

D5	D4	
0	0	NOx-signal not valid
0	1	NOx-signal valid
1	0	Not used => Error
1	1	Not available (=Initial value)

### S3: Status Oxygen-Signal

D7	D6	
0	0	O <sub>2</sub> -signal not valid
0	1	O <sub>2</sub> -signal valid
1	0	Not used => Error
1	1	Not available (=Initial value)

The status information will switch from “not available” to “signal not valid” after the dew point has been received.

## Status Heater Mode:

D6	D5	
0	0	Automatic mode
0	1	Heatup slope 3 or 4
1	0	Heatup slope 1 or 2
1	1	Heater off / Preheating mode

## Error Heater: D4 D3 D2 D1 D0

Error as FMI = **F**ailure **M**ode **I**ndicator

D4 ... D0:	<b>31</b> (1Fh)	FMI not available / no error exists
	<b>05</b>	open wire
	<b>03</b>	short circuit

## Error NOx: D4 D3 D2 D1 D0

Error as FMI = **F**ailure **M**ode **I**ndicator


D4 ... D0:	<b>31</b> (1Fh)	FMI not available / no error exists
	<b>05</b>	open wire
	<b>03</b>	short circuit

## Error O<sub>2</sub>: D4 D3 D2 D1 D0

Error as FMI = **F**ailure **M**ode **I**ndicator

D4 ... D0:	<b>31</b> (1Fh)	FMI not available / no error exists
	<b>05</b>	open wire
	<b>03</b>	short circuit

The error information will change from not available to a diagnosis result after the first diagnosis cycle was completely finished with an error result

	
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Receive signals:

Receive ID: 18FEDFXXh \*\* (PGN = 65247, in HEX: FEDF, Dewpoint-SPN = 3238)

Overview receive signals :

	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
<b>0</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>1</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>2</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>3</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>4</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>5</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>6</b>	tbd.	tbd.	tbd.	tbd.	Tbd.	tbd.	tbd.	tbd. ←
<b>7</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b>	<b>Start-Code</b> ←

Start Code depending on sensor position

	Range Coding	Definition
<b>Start-code</b>	0000 <b>DD00</b> (04h)	After Treatment Outlet Gas 1 (exhaust Bank 1)
<b>Start-code</b>	0000 <b>00DD</b> (01h)	After Treatment Intake Gas 1 (exhaust Bank 1)

**DD=00:** Dewpoint not reached

**DD=01:** Dewpoint reached, sensor heating up started

DD=11: not valid

DD=10: not valid


The dew point byte (start code) must only be sent, if the exhaust gas contains no liquid water or other fluids.

Recommended repetition rate is >100msec

\*\* **"XX"**: Send-node "00" and "3D" would be accepted in parallel

Recommended repetition rate is >100msec

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