

Version: 1_7_0 preliminary
CAN

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(18 Messages, 137 Signals)

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Please report any errors to:-
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ASC1

Number: 1854, Version: 1

message short name: ASC1
 Identifier: 339 (153h)
 Length: 8 data bytes

Cyclic

7 ms (ITT-Teves)

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V (Bosch) or UBatt greater than 8.5 V (ITT-Teves) and in the latching phase of the DME

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 7ms (tmin = 6ms, tmax = 8ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

10 ms (Bosch)

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V (Bosch) or UBatt greater than 8.5 V (ITT-Teves) and in the latching phase of the DME

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 10ms (tmin = 9ms, tmax = 11ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

20 ms (Bosch)

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V (Bosch) or UBatt greater than 8.5 V (ITT-Teves) and in the latching phase of the DME

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 20ms (tmin = 19ms, tmax = 21ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 ASC_DSC

Receiver:-
 DME1
 Kombi
 RIP

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	S_BFL	S_RWF	L_DDS		L_FLUI D	ASC_D EF	TDR_A KT	S_ALR
Byte6	MD_IND_ASC_LM							
Byte5	W_VDK							
Byte4	MD_IND_MSR							
Byte3	MD_IND_ASC							
Byte2	V1							
Byte1	V1					F_V1	ASC_R EG	L_ASC
Byte0	L_ABS	L_EBV	L_BAS	S_BLS	ASC_S BE	ASC_P AS	B_MSR	B_ASC

Anforderung ASC

B_ASC

ASC request flag

See signal definition for MD_IND_ASC and MD_IND_MSR.

A special phase relationship exists to the signals ASC_REG and DSC_REG. See ASC_REG for examples.

Note: Note that B_ASC and B_MSR are mutually exclusive; if both flags are set then both requests are invalid.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 0)

Code	Name	Description
0	ASC inactive	
1	ASC active	

Anforderung MSR

B_MSR

MSR request flag

See signal definition for MD_IND_ASC and MD_IND_MSR.

A special phase relationship exists to the signals ASC_REG and DSC_REG. See ASC_REG for examples.

Note: Note that B_ASC and B_MSR are mutually exclusive; if both flags are set then both requests are invalid.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 1...Byte 0, Bit 1)

Code	Name	Description
0	MSR inactive	
1	MSR active	

Status ASC passiv

ASC_PAS

ASC passive status

Information on the ASC passive status. The output has no special phase relationship to another signal.

EGS: Winter program is suppressed (exhaust emission test)

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 2...Byte 0, Bit 2)

Code	Name	Description
0	ASC active	
1	ASC passive	

ASC-Schaltbeeinflussung

ASC_SBE

ASC shifting modification

Interface signal between ASC and EGS for modifying the EGS shift curves during ASC action. The output has no special phase relationship to another signal.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 3...Byte 0, Bit 3)

Code	Name	Description
0	passive	
1	active	

Signal Bremslichtschalter

S_BLS

Signal

The signal describes the activation of the brake by the driver; the information from the stop light switch is read in for this purpose. A plausibility check of the stop light switch and the stop light test switch (and thus a test of the stop light switch system) is made in the DME/DDE. The test result is indicated with the F_BS signal of the DME2/DDE2 message. Schematic diagram see DME2/DDE2 message: S_BS and F_BS signal.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 4...Byte 0, Bit 4)

Code	Name	Description
0	Brake not applied	
1	Brake applied	

Lampe elektronische Bremskraftverteilung

L_EBV

Electronic brake-force distribution

The signal indicates the status of a general brake warning light. The light is activated in a steady state. When there is a timeout for the ASC1 message, or (in a vehicle with ASC) when no ASC messages are being received after terminal 15 ON, the light for electronic brake-power proportioning must be turned on. When there is a global timeout in the instrument cluster (i.e. no message from DME, EGS, etc.) the light for electronic brake-power proportioning is on.

Version:1

Sender: ASC_DSC

Receiver: DME1, Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 6...Byte 0, Bit 6)

Code	Name	Description
0	Light for electronic brake-power proportioning OFF	
1	Light for electronic brake-power proportioning ON	

ABS-Defektanzeige

L_ABS

ABS light

Information on the ABS failure indicator. The ABS light is activated independently by the instrument cluster; the light is to be switched on at L_ABS = 1.

Light test (pre-drive check): The light check (visual check by the driver as the ignition is turned on) must be performed from the ABS/ASC control module, since the light's on-period must be synchronised with that of the ASC light, and different on-periods can be realised depending on the system (manufacturer/ supplier).

The output has no special phase relationship to another signal.

Note: Signal not utilised in the instrument cluster (conventional in this case)

Version:1

Sender: ASC_DSC

Receiver: DME1, Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 7...Byte 0, Bit 7)

Code	Name	Description
0	ABS light OFF	
1	ABS light ON	

ASC-Lampe

L_ASC

ASC warning light

The signal indicates the status of the ASC light. The activation of the light can be accomplished in steady-state or switching-mode operation (225 + 50 ms cycle, code sequence). In order to obtain the most accurate possible picture of the activation, analysis must take place within 10 ms.

When there is a timeout for the ASC1 message, or (in a vehicle with ASC) when no ASC messages are being received after terminal 15 ON, the ASC light must be turned on. When there is a global timeout in the instrument cluster (i.e. no message from DME, EGS, etc.) the ASC light is off.

Light test (pre-drive check): The light check (visual check by the driver as the ignition is turned on) must be performed from the ABS/ASC control module, since the light's on-period must be synchronised with that of the ASC light, and different on-periods can be realised depending on the system (manufacturer/ supplier).

Version:1

Sender: ASC_DSC

Receiver: DME1, Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 0...Byte 1, Bit 0)

Code	Name	Description
0	ASC light OFF	
1	ASC light ON	

ABS/ASC-Eingriff

ASC_REG

ABS/ASC intervention

Information on engine and/or braking intervention by the ASC system, MSR control and/or ABS control. This signal remains active only for the duration of a control operation, for example during brief interruptions in the coefficient of friction, only for the duration of compensation.

A special phase relationship exists to the signals B_ASC, B_MSR and DSC_REG.

DME: Masking out of misfire detection during ABS/ASC intervention

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 1...Byte 1, Bit 1)

Code	Name	Description
0	No intervention	
1	Intervention active	

Fehler V1-Signal

F_V1

Error

Note: In the E38, active wheel-speed sensors are employed that have a functional threshold of approx. 10 volts. If the battery voltage drops below this value, it can no longer be ensured that the sensor will function. In this case, the status is set to F_V1.

Version:1
 Sender: ASC_DSC
 Receiver: RIP, DME1, Kombi

initialisation value: 1h

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 2...Byte 1, Bit 2)

Code	Name	Description
0	At least one pickup is OK	
1	Error at least two wheel speed pickups or UBatt less than 10 V (E38)	

Gemittelte Radgeschwindigkeit

V1

Average wheel speed

With the following vehicles, the V1 speed is calculated from:

- Rear-wheel drive: the average of the front-wheel speeds
- Front-wheel drive: the average of the rear-wheel speeds
- Four-wheel drive: reference speed calculated in DSC System. If a DSC sensor (AY, VGI, etc.) is fail then there is the average from the wheel speed sensor.

The internal update rate in the ASC/DSC control module corresponds to the message's cycle time. The low-order figure is found at the low-order address (L/H). (Conversion of the period to an operand, represented with 13 bits.)

Front-wheel or rear-wheel drive: If one of the wheel-speed sensors on the non-driven axle fails, the speed from the wheel-speed sensor that does function is used as the V1 signal (i.e. there is no averaging). If both wheel-speed sensors should fail, the status is set to F_V1. When this happens, the information content of the V1 signal is undefined.

Four-wheel drive: If one or more sensors fail, the average is determined from the wheel-speed sensors that are not defective. If all of the wheel-speed sensors should fail, the status is set to F_V1. When this happens, the information content of the V1 signal is undefined.

Version:1
 Sender: ASC_DSC
 Receiver: RIP, DME1, Kombi

maximum value range: 0 ... 511.9375 km/h

Value range: 0 ... 512 km/h (ASC_DSC)

conversion: (PH) = 0.0625 * (HEX) [km/h]

initialisation value: 1FFFh

error marker: 0h

Signal Type: 13 Bit, Unsigned Integer (Byte 1, Bit 3...Byte 2, Bit 7)

Momenteneingriff für ASC-Funktion

MD_IND_ASC

ASC engine torque reduction request

Request for the indicated desired engine torque. Two things can be determined from the combination of signals: the desirability of a decrease in torque (ASC function), and the desirability of an increase in torque (MSR function). The B_MSR bit designates a drag-torque control for the engine, in which the SAS (trailing throttle fuel cut-off) prohibition is prescribed. The reduction of drive torque in accordance with MD_IND_ASC is made in the DME through ignition timing adjustment and/or injection fade out right into the drag-torque range; with DDE, this is accomplished through injection volume control. With the MD_IND_ASC_LM signal (if present, MDK, ME, etc.) an indicated desired torque via charging intervention is requested.

For engine systems without charging intervention (e.g. DDE, EZA systems), MD_IND_ASC_LM can be output in the same way as with engine systems with charging intervention, or alternatively with FFH. This means in the case of engine systems without charging intervention that the signal MD_IND_ASC_LM is not evaluated.

If MD_IND_ASC greater than MD_IND_ASC_LM then MD_IND_ASC_LM is cut down (that is: MD_IND_ASC_LM = MD_IND_ASC).

The increase in torque according to MD_IND_MSR is accomplished in the DME via the idle speed controller or engine throttle into the drive torque range - idle controller: limited by the maximum air-flow rate of the idle speed controller = f(n)]. The B_ASC bit designates a traction control system. The purpose of the bit is to prevent undesired ASC intervention.

ASC function, i.e. torque reduction with B_MSR=0 and B_ASC=1:

MD_IND_ASC less than FFH

MD_IND_MSR = 00H

MSR function, i.e. torque increase with B_MSR=1 and B_ASC=0:

MD_IND_MSR greater than 00H

MD_IND_ASC = !MD_IND_MSR

The specified torque, MD_x, is based on a maximum torque, MD_NORM. This conversion to a physical value results in a range of 0..99.6094% of MD_NORM.

The signals MD_IND_ASC, MD_IND_ASC_LM, MD_IND_MSR, B_ASC and B_MSR are related to one another.

Schematic diagram of the signal conditioning: See schematic diagram for the MD_IND signal.

EGS: EGS recognizes the extent of the torque intervention from the MD_IND_ASC signal.

DME: ignition intervention, injection intervention, MDK intervention,

DDE (only MD_IND_ASC, MD_IND_MSR)

Version: 1

Sender: ASC_DSC

Receiver: DME1

maximum value range: 0 ... 99.61065 %

Value range: 0 ... 99.6094 % (ASC_DSC)

conversion: (PH) = 0.39063 * (HEX) [%]

initialisation value: FFh

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 3, Bit 0...Byte 3, Bit 7)

Momenteneingriff für MSR-Funktion
MSR engine torque reduction request

MD_IND_MSR

Request for the indicated desired engine torque. Two things can be determined from the combination of signals: the desirability of a decrease in torque (ASC function), and the desirability of an increase in torque (MSR function). The B_MSR bit designates a drag-torque control for the engine, in which the SAS (trailing throttle fuel cut-off) prohibition is prescribed. The reduction of drive torque in accordance with MD_IND_ASC is made in the DME through ignition timing adjustment and/or injection fade out right into the drag-torque range; with DDE, this is accomplished through injection volume control. With the MD_IND_ASC_LM signal (if present, MDK, ME, etc.) an indicated desired torque via charging intervention is requested.

For engine systems without charging intervention (e.g. DDE, EZA systems), MD_IND_ASC_LM can be output in the same way as with engine systems with charging intervention, or alternatively with FFH. This means in the case of engine systems without charging intervention that the signal MD_IND_ASC_LM is not evaluated.

If MD_IND_ASC is greater than MD_IND_ASC_LM then MD_IND_ASC_LM is cut down (that is: MD_IND_ASC_LM = MD_IND_ASC).

The increase in torque according to MD_IND_MSR is accomplished in the DME via the idle speed controller or engine throttle into the drive torque range - idle controller: limited by the maximum air-flow rate of the idle speed controller = f(n)]. The B_ASC bit designates a traction control system. The purpose of the bit is to prevent undesired ASC intervention.

ASC function, i.e. torque reduction with B_MSR=0 and B_ASC=1:

MD_IND_ASC less than FFH

MD_IND_MSR = 00H

MSR function, i.e. torque increase with B_MSR=1 and B_ASC=0:

MD_IND_MSR greater than 00H

MD_IND_ASC = !MD_IND_MSR

The specified torque, MD_x, is based on a maximum torque, MD_NORM. This conversion to a physical value results in a range of 0..99.6094% of MD_NORM.

The signals MD_IND_ASC, MD_IND_ASC_LM, MD_IND_MSR, B_ASC and B_MSR are related to one another.

Schematic diagram of the signal conditioning: See schematic diagram for the MD_IND signal.

EGS: EGS recognizes the extent of the torque intervention from the MD_IND_ASC signal.

DME: ignition intervention, injection intervention, MDK intervention,

DDE (only MD_IND_ASC, MD_IND_MSR)

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range: 0 ... 99.61065 %

Value range: 0 ... 99.6094 % (ASC_DSC)

conversion: (PH) = 0.39063 * (HEX) [%]

initialisation value: 0h

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 4, Bit 7)

Signal Bremsflüssigkeitsniveau

S_BFL

Brake fluid level signal

The signal indicates the state of the brake fluid level, not the physical switch state. The brake fluid switch was previously evaluated only in DSC3; the value 00H is output in the ASC system.

Note: This signal has previously only been provided for the Z3 with DSC3. The instrument cluster employs the signal to activate the warning light. Direct use of the switch signal is planned on the Z3 with ASC (coding in instrument cluster).

Version: 1

(Signal has no sender!!)

Receiver: Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)

Code	Name	Description
0	Brake fluid level too low	
1	Brake fluid level adequately high	

ASC2

Number: 1855, Version: 1

message short name: ASC2
 Identifier: 496 (1F0h)
 Length: 8 data bytes

Cyclic

ITT-ASC: 7 ms and ITT-DSC3: 7ms

Power supply from main DME relay; term. 15 ON and UBatt greater than 9V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 7ms (tmin = 6ms, tmax = 8ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

RB-ASC.: 10 ms

Power supply from main DME relay; term. 15 ON and UBatt greater than 9V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 10ms (tmin = 9ms, tmax = 11ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

RB-DSC3.: 20 ms

Power supply from main DME relay; term. 15 ON and UBatt greater than 9V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 20ms (tmin = 19ms, tmax = 21ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 ASC_DSC

Receiver:-
 DME1

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	TOL_R AD_VL _SGN,T OL_RA D_VR_ SGN,T OL_RA D_HL_ SGN,T OL_RA D_HR_ SGN	TOL_RAD_VL3,T OL_RAD_VR3,TO L_RAD_HL3,TOL_ RAD_HR3		VRD_RH_ASC,VRD_RH_ASC,VRD_RH_ASC,VRD_RH_ASC				
Byte6	VRD_RH_ASC,VRD_RH_ASC,VRD_RH_ASC,VRD_RH_ASC							

Byte5	TOL_RAD_VL2,TOL_RAD_VR2,TOL_RAD_HL2,TOL_RAD_HR2	VRD_LH_ASC,VRD_LH_ASC,VRD_LH_ASC,VRD_LH_ASC
Byte4	VRD_LH_ASC,VRD_LH_ASC,VRD_LH_ASC,VRD_LH_ASC	
Byte3	TOL_RAD_VL1,TOL_RAD_VR1,TOL_RAD_HL1,TOL_RAD_HR1	VRD_RV_ASC
Byte2	VRD_RV_ASC	
Byte1	S_ABGL	ASC2_COD VRD_LV_ASC
Byte0	VRD_LV_ASC	

Radgeschwindigkeit links vorne

VRD_LV_ASC

Wheel speed

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h

Value range: 0 ... 512 km/h (ASC_DSC)

conversion: (PH) = 0.0625 * (HEX) [km/h]

initialisation value: 1FFFh

error marker: 1FFFh

Signal Type: 13 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 1, Bit 4)

Signal Toleranzabgleich

S_ABGL

Tire tolerance compensation completed

The signal indicates that tolerances have been matched on all wheels. See also the description of the signals ASC2_COD and ASC2_MPXx.

Init: 00h

Note:

Not on ITT/Teves DSC system

Conti Teves MK60 DSC sends TOL_RAD_xx

Version:1
Sender: ASC_DSC
(Signal has no receiver!!)

initialisation value: -

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 7...Byte 1, Bit 7)

Code	Name	Description
0	Tolerance matching not completed	
1	Tolerance matching completed	

Radgeschwindigkeit rechts vorne

VRD_RV_ASC

Wheel speed

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h

Value range: 0 ... 512 km/h (ASC_DSC)

conversion: (PH) = 0.0625 * (HEX) [km/h]

initialisation value: 1FFFh

error marker: 1FFFh

Signal Type: 13 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 3, Bit 4)

Radtoleranz vorne links 1

TOL_RAD_VL1

Wheel tolerance

Bit 0 - 2

The signal TOL_RAD_xx contains the dynamic wheel matching correction value of the associated wheel. Tire tolerance matching compensates for geometrical differences between the individual wheels; drivetrain and driving conditions are not taken into consideration, however.

The process of tire tolerance matching is divided broadly into three phases. The first phase involves enabling of the conditions determined by the driving condition, global enabling signals, and chronological filtering. The second phase entails computation of the tolerance, which is limited by maximum gradients; in the third phase, the correction factor is output, also filtered. Phases 2 and 3 are dependent upon continuous enabling by Phase 1; the matching cycle is otherwise aborted and reset.

Computation and output of this signal has no specified duration owing to internal interrelationships, the driving situation detected, and a number of required filter variables.

The correction values computed internally are output on the CAN bus. Owing to certain internal threshold values, brief deviations (< 2 seconds) of up to

$\pm 0.5\%$ may arise on individual wheels under certain combinations of driving factors. The information on the quality of the TOL_RAD_xx signals supplied which is contained in S_ABGL is output when matching has been completed. Should computation of the tolerance not be possible

the value TOL_RAD_xx = 100H of the respective wheel is employed for error marking.

Version:1
Sender: ASC_DSC
(Signal has no receiver!!)

maximum value range: 03 %

Value range: 0 ... 0.35 % (ASC_DSC)

conversion: (PH) = 0.05 * (HEX) [%]

initialisation value: 100h

error marker: 100h

Signal Type: 3 Bit, Unsigned Integer (Byte 3, Bit 5...Byte 3, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 0

Radtoleranz vorne rechts 1

TOL_RAD_VR1

Wheel tolerance

Bit 0 - 2

The signal TOL_RAD_xx contains the dynamic wheel matching correction value of the associated wheel. Tire tolerance matching compensates for geometrical differences between the individual wheels; drivetrain and driving conditions are not taken into consideration, however.

The process of tire tolerance matching is divided broadly into three phases. The first phase involves enabling of the conditions determined by the driving condition, global enabling signals, and chronological filtering. The second phase entails computation of the tolerance, which is limited by maximum gradients; in the third phase, the correction factor is output, also filtered. Phases 2 and 3 are dependent upon continuous enabling by Phase 1; the matching cycle is otherwise aborted and reset.

Computation and output of this signal has no specified duration owing to internal interrelationships, the driving situation detected, and a number of required filter variables.

The correction values computed internally are output on the CAN bus. Owing to certain internal threshold values, brief deviations (< 2 seconds) of up to $\pm 0.5\%$ may arise on individual wheels under certain combinations of driving factors. The information on the quality of the TOL_RAD_xx signals supplied which is contained in S_ABGL is output when matching has been completed. Should computation of the tolerance not be possible

the value TOL_RAD_xx = 100H of the respective wheel is employed for error marking.

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 0.35 %

Value range: 0 ... 0.35 % (ASC_DSC)

conversion: $(PH) = 0.05 * (HEX) [\%]$

initialisation value: 0h

error marker: 0h

Signal Type: 3 Bit, Unsigned Integer (Byte 3, Bit 5...Byte 3, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Radtoleranz hinten links 1

TOL_RAD_HL1

Wheel tolerance

Bit 0 - 2

The signal TOL_RAD_xx contains the dynamic wheel matching correction value of the associated wheel. Tire tolerance matching compensates for geometrical differences between the individual wheels; drivetrain and driving conditions are not taken into consideration, however.

The process of tire tolerance matching is divided broadly into three phases. The first phase involves enabling of the conditions determined by the driving condition, global enabling signals, and chronological filtering. The second phase entails computation of the tolerance, which is limited by maximum gradients; in the third phase, the correction factor is output, also filtered. Phases 2 and 3 are dependent upon continuous enabling by Phase 1; the matching cycle is otherwise aborted and reset.

Computation and output of this signal has no specified duration owing to internal interrelationships, the driving situation detected, and a number of required filter variables.

The correction values computed internally are output on the CAN bus. Owing to certain internal threshold values, brief deviations (< 2 seconds) of up to $\pm 0.5\%$ may arise on individual wheels under certain combinations of driving factors. The information on the quality of the TOL_RAD_xx signals supplied which is contained in S_ABGL is output when matching has been completed. Should computation of the tolerance not be possible

the value TOL_RAD_xx = 100H of the respective wheel is employed for error marking.

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 035 %

Value range: 0 ... 0.35 % (ASC_DSC)

conversion: (PH) = 0.05 * (HEX) [%]

initialisation value: 0h

error marker: 0h

Signal Type: 3 Bit, Unsigned Integer (Byte 3, Bit 5...Byte 3, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Radtoleranz hinten rechts 1

TOL_RAD_HR1

Wheel tolerance

Bit 0 - 2

The signal TOL_RAD_xx contains the dynamic wheel matching correction value of the associated wheel. Tire tolerance matching compensates for geometrical differences between the individual wheels; drivetrain and driving conditions are not taken into consideration, however.

The process of tire tolerance matching is divided broadly into three phases. The first phase involves enabling of the conditions determined by the driving condition, global enabling signals, and chronological filtering. The second phase entails computation of the tolerance, which is limited by maximum gradients; in the third phase, the correction factor is output, also filtered. Phases 2 and 3 are dependent upon continuous enabling by Phase 1; the matching cycle is otherwise aborted and reset.

Computation and output of this signal has no specified duration owing to internal interrelationships, the driving situation detected, and a number of required filter variables.

The correction values computed internally are output on the CAN bus. Owing to certain internal threshold values, brief deviations (< 2 seconds) of up to

</- 0.5% may arise on individual wheels under cer-tain combinations of driving factors. The information on the quality of the TOL_RAD_xx signals supplied which is contained in S_ABGL is output when matching has been completed. Should computation of the tolerance not be possible

the value TOL_RAD_xx = 100H of the respective wheel is employed for error marking.

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range:	035 %
Value range:	0 ... 0.35 % (ASC_DSC)
conversion:	(PH) = 0.05 * (HEX) [%]
initialisation value:	0h
error marker:	0h
Signal Type:	3 Bit, Unsigned Integer (Byte 3, Bit 5...Byte 3, Bit 7) MULTIPLEXED SIGNAL Selected when ASC2_Code = 3

Radgeschwindigkeit links hinten

VRD_LH_ASC

Wheel speed

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range:	0 ... 511.875 km/h
Value range:	0 ... 512 km/h (ASC_DSC)
conversion:	(PH) = 0.0625 * (HEX) [km/h]
initialisation value:	1FFFh
error marker:	1FFFh
Signal Type:	13 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 4) MULTIPLEXED SIGNAL Selected when ASC2_Code = 0

Radgeschwindigkeit links hinten

VRD_LH_ASC

Wheel speed

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range:	0 ... 511.875 km/h
Value range:	0 ... 512 km/h (ASC_DSC)

conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Radgeschwindigkeit links hinten
Wheel speed

VRD_LH_ASC

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)
conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Radgeschwindigkeit links hinten
Wheel speed

VRD_LH_ASC

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)
conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 3

Radtoleranz vorne links 2

TOL_RAD_VL2

Wheel tolerance

Bit 3 - 5

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 2.8 %

Value range: 0 ... 2.8 % (ASC_DSC)

conversion: (PH) = 0.4 * (HEX) [%]

initialisation value: 0h

error marker: 0h

Signal Type: 3 Bit, Unsigned Integer (Byte 5, Bit 5...Byte 5, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 0

Radtoleranz vorne rechts 2

TOL_RAD_VR2

Wheel tolerance

Bit 3 - 6

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 2.8 %

Value range: 0 ... 2.8 % (ASC_DSC)

conversion: (PH) = 0.4 * (HEX) [%]

initialisation value: 0h

error marker: 0h

Signal Type: 3 Bit, Unsigned Integer (Byte 5, Bit 5...Byte 5, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Radtoleranz hinten links 2

TOL_RAD_HL2

Wheel tolerance

Bit 3 - 5

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 3.5 %

Value range: 0 ... 2.8 % (ASC_DSC)

conversion: (PH) = 0.5 * (HEX) [%]
initialisation value: 0h
error marker: 0h
Signal Type: 3 Bit, Unsigned Integer (Byte 5, Bit 5...Byte 5, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Radtoleranz hinten rechts 2

TOL_RAD_HR2

Wheel tolerance

Bit 3 - 5

Version:1
Sender: ASC_DSC
(Signal has no receiver!!)

maximum value range: 0 ... 2.8 %
Value range: 0 ... 2.8 % (ASC_DSC)
conversion: (PH) = 0.4 * (HEX) [%]
initialisation value: 0h
error marker: 0h
Signal Type: 3 Bit, Unsigned Integer (Byte 5, Bit 5...Byte 5, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 3

Radgeschwindigkeit rechts hinten

VRD_RH_ASC

Wheel speed

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)
conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 0

Radgeschwindigkeit rechts hinten
Wheel speed

VRD_RH_ASC

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)
conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Radgeschwindigkeit rechts hinten
Wheel speed

VRD_RH_ASC

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)
conversion: (PH) = 0.0625 * (HEX) [km/h]
initialisation value: 1FFFh
error marker: 1FFFh
Signal Type: 13 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Radgeschwindigkeit rechts hinten
Wheel speed

VRD_RH_ASC

Version:1
Sender: ASC_DSC
Receiver: DME1

maximum value range: 0 ... 511.875 km/h
Value range: 0 ... 512 km/h (ASC_DSC)

conversion: (PH) = 0.0625 * (HEX) [km/h]

initialisation value: 1FFFh

error marker: 1FFFh

Signal Type: 13 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 4)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 3

Radtoleranz vorne links 3

Wheel tolerance

TOL_RAD_VL3

Bit 6 - 8

Version: 1
Sender: ASC_DSC
(Signal has no receiver!!)

maximum value range: 0 ... 9.6 %

Value range: 0 ... 9.6 % (ASC_DSC)

conversion: (PH) = 3.2 * (HEX) [%]

initialisation value: 0h

error marker: 0h

Signal Type: 2 Bit, Unsigned Integer (Byte 7, Bit 5...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 0

Radtoleranz vorne rechts 3

Wheel tolerance

TOL_RAD_VR3

Bit 6 - 8

Version: 1
Sender: ASC_DSC
(Signal has no receiver!!)

maximum value range: 0 ... 9.6 %

Value range: 0 ... 9.6 % (ASC_DSC)

conversion: (PH) = 3.2 * (HEX) [%]

initialisation value: 0h

error marker: 0h

Signal Type: 2 Bit, Unsigned Integer (Byte 7, Bit 5...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Radtoleranz hinten links 3

TOL_RAD_HL3

Wheel tolerance

Bit 6 - 8

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 9.6 %

Value range: 0 ... 9.6 % (ASC_DSC)

conversion: $(PH) = 3.2 * (HEX) [\%]$

initialisation value: 0h

error marker: 0h

Signal Type: 2 Bit, Unsigned Integer (Byte 7, Bit 5...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Radtoleranz hinten rechts 3

TOL_RAD_HR3

Wheel tolerance

Bit 6 - 8

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

maximum value range: 0 ... 9.6 %

Value range: 0 ... 9.6 % (ASC_DSC)

conversion: $(PH) = 3.2 * (HEX) [\%]$

initialisation value: 0h

error marker: 0h

Signal Type: 2 Bit, Unsigned Integer (Byte 7, Bit 5...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 3

Radtoleranz vorne links Vorzeichen

TOL_RAD_VL_SGN

Wheel tolerance

Version:1

Sender: ASC_DSC

(Signal has no receiver!!)

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 0

Code	Name	Description
0	#NULL#	
1	#NULL#	

Radtoleranz vorne rechts Vorzeichen

TOL_RAD_VR_SGN

Wheel tolerance

Version:1
Sender: ASC_DSC
(Signal has no receiver!!)

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 1

Code	Name	Description
0	#NULL#	
1	#NULL#	

Radtoleranz hinten links Vorzeichen

TOL_RAD_HL_SGN

Radtoleranz hinten links sign

Version:1
Sender: ASC_DSC
(Signal has no receiver!!)

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when ASC2_Code = 2

Code	Name	Description
0	#NULL#	
1	#NULL#	

Radtoleranz hinten rechts Vorzeichen

TOL_RAD_HR_SGN

Wheel tolerance

Version:1
 Sender: ASC_DSC
 (Signal has no receiver!!)

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
 MULTIPLEXED SIGNAL
 Selected when ASC2_Code = 3

Code	Name	Description
0	#NULL#	
1	#NULL#	

This message contains multiplexed signals

Multiplexer = ASC2_Code

Value Signal

0	Radtoleranz vorne links 1
0	Radgeschwindigkeit links hinten
0	Radtoleranz vorne links 2
0	Radgeschwindigkeit rechts hinten
0	Radtoleranz vorne links 3
0	Radtoleranz vorne links Vorzeichen
1	Radtoleranz vorne rechts 1
1	Radgeschwindigkeit links hinten
1	Radtoleranz vorne rechts 2
1	Radgeschwindigkeit rechts hinten
1	Radtoleranz vorne rechts 3
1	Radtoleranz vorne rechts Vorzeichen
2	Radtoleranz hinten links 1
2	Radgeschwindigkeit links hinten
2	Radtoleranz hinten links 2
2	Radgeschwindigkeit rechts hinten
2	Radtoleranz hinten links 3
2	Radtoleranz hinten links Vorzeichen
3	Radtoleranz hinten rechts 1
3	Radgeschwindigkeit links hinten
3	Radtoleranz hinten rechts 2
3	Radgeschwindigkeit rechts hinten
3	Radtoleranz hinten rechts 3
3	Radtoleranz hinten rechts Vorzeichen

ASC3

Number: 1856, Version: 1

message short name: ASC3
 Identifier: 499 (1F3h)
 Length: 8 data bytes

Cyclic

7 ms (ITT-Teves)

Power supply from DME main relay; Term.15 on and UBatt greater than 8.5 V (ITT-Teves)
 and in the latching phase of the DME

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 7ms (tmin = 6ms, tmax = 8ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

20 ms (Bosch)

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V (Bosch) and in
 the latching phase of the DME

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 20ms (tmin = 19ms, tmax = 21ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 ASC_DSC

Receiver:-
 DME1
 LWS

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7					S_FZG STD	L_BFC	L_BKV	DSC_D EF
Byte6	BRE_NORM,BRE_OFFSET,BAS_HYST1,BAS_HYST2							
Byte5	AY_REF							
Byte4	AY_REF		BAS_COD		S_HBA	DSC_R EG	AX_REF	
Byte3	AX_REF							
Byte2	BAS_STAT				BAS_FBR		Q_ACC _BAS	BAS_D EF
Byte1	FDR_P SIPKT_ SGN,F DR_ID	FDR_PSIPKT_MAG,FDR_ID						
Byte0	FDR_PSIPKT_MA G					FDR_PSIPKT_ST ATUS		FDR_C OM

Giergeschwindigkeit (DIN 70 000)

Yaw velocity(DIN 70 000)

FDR_PSIPKT_STATUS

Siehe FDR_PSIPKT in CAN11h Rev. 16

Note: 2 bit; Status Information

Version:1

Sender: ASC_DSC

Receiver: LWS

initialisation value: -

error marker: -

Signal Type: 2 Bit, Enum (Byte 0, Bit 1...Byte 0, Bit 2)
MULTIPLEXED SIGNAL
Selected when FDR_COM = 0

Code	Name	Description
0	FDR_PSIPKT error free	
1	FDR_PSIPKT false	

Giergeschwindigkeit (DIN 70 000); Wert

FDR_PSIPKT_MAG

Yaw velocity(DIN 70 000); Value

See FDR_PSIPKT in CAN11h Rev. 16

Note: 9 bit; Yaw velocity; left-justified, most significant number at most significant address

Version:1

Sender: ASC_DSC

Receiver: LWS

maximum value range: 0 ... 1.08843 rad/s

Value range: 0 ... 1.08976 rad/s (ASC_DSC)

conversion: (PH) = 0.00213 * (HEX) [rad/s]

initialisation value: 0h

error marker: 0h

Signal Type: 9 Bit, Unsigned Integer (Byte 0, Bit 6...Byte 1, Bit 6)
MULTIPLEXED SIGNAL
Selected when FDR_COM = 0

Identifizier für Lenkradwinkelsensor Initialisierung

FDR_ID

Identifier for steering wheel angle sensor initialisation

FDR_ID is only generated when the overall system is being checked at the end-of-line or after repair in a workshop; it is generated by a random-check generator in the diagnosis tester and sent via the FDR control module to the LWS control module.

The ID value is recreated for each new adjustment; the 00H value remains reserved as the initialisation value.

After successful adjustment of the steering angle to the straight-ahead position, the ID is integrated into the LWS1 Message.

Note: Only for compatibility reason, actually the vehicle identification number is used

Version:1

Sender: ASC_DSC

Receiver: LWS

initialisation value: 0h

error marker: -

Signal Type: 8 Bit, - (Byte 1, Bit 0...Byte 1, Bit 7)
MULTIPLEXED SIGNAL
Selected when FDR_COM = 1

Giergeschwindigkeit (DIN 70 000); Vorzeichen
Yaw velocity(DIN 70 000)

FDR_PSIPKT_SGN

See FDR_PSIPKT in CAN11h Rev. 16
Note: 1 Bit; Sign; 1 for negative yaw velocities
Version:1
Sender: ASC_DSC
Receiver: LWS

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 1, Bit 7...Byte 1, Bit 7)
MULTIPLEXED SIGNAL
Selected when FDR_COM = 0

Code	Name	Description
0	Sign positive (+)	
1	Sign negative (-)	

DSC-Eingriff
DSC-Intervention

DSC_REG

This signal is used to indicate that DSC driving stability control is currently running. A special phase relationship exists to the signals B_ASC, B_MSR and ASC_REG. See ASC_REG for examples.
Note: ITT Automotive's DSC system currently transmits the information "DSC_REG=1 when DSC braking or DSC engine intervention is active" with this signal; the date for an update has not yet been specified.
Version:1
Sender: ASC_DSC
Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 4, Bit 2...Byte 4, Bit 2)

Code	Name	Description
0	No intervention	
1	Intervention active	

This message contains multiplexed signals

Multiplexer = FDR_COM

Multiplexer = BAS_Code

Value Signal

0	Giergeschwindigkeit (DIN 70 000)
0	Giergeschwindigkeit (DIN 70 000); Wert
0	Giergeschwindigkeit (DIN 70 000); Vorzeichen
0	Normierungsfaktor für Bremsschnittstelle
1	Identifizier für Lenkradwinkelsensor Initialisierung
1	Offset für die Umrechnung der Bremsenschnittstelle
2	Ansprechhysterese 1
3	Ansprechhysterese 2

ASC4

Number: 1857, Version: 1

message short name: ASC4
 Identifier: 504 (1F8h)
 Length: 8 data bytes

Cyclic

20 ms (Bosch)

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 120ms, tmax = 200ms)

Cycle time: ttyp = 20ms (tmin = 15ms, tmax = 25ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 ASC_DSC

Receiver:-
 DME1

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	TW_IND_MSR							
Byte6	TW_IND_MSR							
Byte5	TW_IND_ASC							
Byte4	TW_IND_ASC						RDR_VR,TW_IND_ASC	
Byte3	RDR_VR,RDR_HR		RDR_VR,RDR_HL		RDR_VR		RDR_VL	
Byte2	P_BRAKE							
Byte1	B_OFF ROAD	B_TW_ASC	B_TW_MSR	DSC_S BE	L_HDC	S_HDC		
Byte0	S_WHEEL_ACC							

Signal Radbeschleunigung
 Signal Wheel Acceleration

S_WHEEL_ACC

This value is the maximum wheel acceleration calculated by the ABS ECU for any of the four wheels during a certain time period.

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range: 0 ... 20.32 g

Value range: 0 ... 20.32 g (ASC_DSC)

conversion: (PH) = 0.08 * (HEX) [g]

initialisation value: 0h

error marker: FFh

Signal Type: 8 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 0, Bit 7)

MSR Anforderung zur Momentenerhöhung aktiv

B_TW_MSR

MSR only torque increase request active

A flag to indicate when MSR is active. When active, the torque value TW_IND_MSR must be achieved by the engine and transmission systems.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 5...Byte 1, Bit 5)

Code	Name	Description
0	MSR passive	
1	MSR active	

ASC Anforderung zur Momentenreduzierung aktiv

B_TW_ASC

ASC only torque decrease request active

A flag to indicate when ASC is active. When active, the torque value TW_IND_ASC must be achieved by the engine and transmission systems.

Version:1

Sender: ASC_DSC

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 1, Bit 6...Byte 1, Bit 6)

Code	Name	Description
0	ASC passive	
1	ASC active	

ASC Anforderung zur Reduzierung des absoluten Moments an den Rädern

TW_IND_ASC

Absolute torque at wheels decrease request from ASC

Indicated* ASC requested torque at the wheels. This torque value is an ideal value, NOT accounting for any losses in the engine and transmission systems. Actual torque at wheels may be obtained by subtracting the torque loss TW_REIB.

This torque value is scaled as a percentage of TW_NORM.

The following conditions must be set for the request to be actioned:

- B_TW_ASC = 1
- B_TW_MSR = 0

- TW_IND_ASC < FFFFH
- TW_IND_MSR = 0000H

Note: For R50 only

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range: 0 ... 100.26702 %

Value range: 0 ... 100 % (ASC_DSC)

conversion: (PH) = 0.00153 * (HEX) [%]

initialisation value: FFFEh

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 7)

MSR Anforderung zur Erhöhung des indizierten Moments an den Rädern

TW_IND_MSR

Absolute torque at wheels increase request from MSR

Indicated* MSR requested torque at the wheels. This torque value is an ideal value, NOT accounting for any losses in the engine and transmission systems. Actual torque at wheels may be obtained by subtracting the torque loss TW_REIB.

This torque value is scaled as a percentage of TW_NORM.

The following conditions must be set for the request to be actioned:

- B_TW_ASC = 0
- B_TW_MSR = 1
- TW_IND_ASC = !TW_IND_MSR
- TW_IND_MSR greater than 0000H

Note: The symbol '!' indicates that the 'ones complement' function should be applied.

e.g. ! 01010101B = 10101010B

Version:1

Sender: ASC_DSC

Receiver: DME1

maximum value range: 0 ... 100.26702 %

Value range: 0 ... 100 % (ASC_DSC)

conversion: (PH) = 0.00153 * (HEX) [%]

initialisation value: FFFEh

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 7)

CVT1

Number: 1862, Version: 1

message short name: CVT1
 Identifier: 1103 (44Fh)
 Length: 8 data bytes

Cyclic

KL87 on and UBATT greater than 9V

Start time: ttyp = 150ms

Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 GIB_B

Receiver:-
 DME1

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	NUM_SWARE				P_CON_SEC			P_DUTY_SEC
Byte6	P_DUTY_SEC							
Byte5			STAT_L_F		CON_CLU_CODE			CLU_RAT_A
Byte4	CLU_RAT_A							
Byte3		STAT_L_D			CON_MOT_CODE			POS_MOT_A
Byte2	POS_MOT_A							
Byte1	S_STAT_H							
Byte0	S_STAT_L							

Schalterstatus Low

S_STAT_L

Switch Status Low

This signal reports on the status of eight of the switch inputs associated with the control system. If a particular switch is closed then the corresponding bit of the message shall be set, otherwise it shall be cleared. Since switch closures can occur concurrently, is a separate bit for each switch in the system.

Version: 1

Sender: GIB_B

Receiver: DME1

initialisation value: 0b

error marker: -

Signal Type: 8 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 7)

Code	Name	Description
-----0	Park Switch open	
-----1	Park Switch closed	
-----0-	Reverse Switch open	

-----1-	Reverse Switch closed
-----0--	Neutral Switch open
-----1--	Neutral Switch closed
----0---	Drive Switch open
----1---	Drive Switch closed
---0----	Manual Switch open
---1----	Manual Switch closed
--0-----	Gear Shifter Plus switch open
--1-----	Gear Shifter Plus switch closed
-0-----	Gear Shifter Minus switch open
-1-----	Gear Shifter Minus switch closed
0-----	Mode Switch open
1-----	Mode Switch closed

Schalterstatus High

S_STAT_H

Switch Status High

This signal reports on the status of four switch inputs associated with the control system. If a particular switch is closed then the corresponding bit of the message shall be set, otherwise it shall be cleared. Since switch closures can occur concurrently, there is a separate bit for each switch in the system.

Version: 1

Sender: GIB_B

Receiver: DME1

initialisation value: 0b

error marker: -

Signal Type: 8 Bit, Enum (Byte 1, Bit 0...Byte 1, Bit 7)

Code	Name	Description
-----0	Extra Plus Switch open	
-----1	Extra Plus Switch closed	
-----0-	Extra Minus Switch open	
-----1-	Extra Minus Switch closed	
----0--	Spare Switch 1 open	
----1--	Spare Switch 1 closed	
----0---	Spare Switch 2 open	
----1---	Spare Switch 2 closed	
---0----	EEPROM Checksum OK	
---1----	EEPROM Checksum Fault	
--0-----	Control OK	
--1-----	Control Impossible	

Istmotorstellung

POS_MOT_A

Actual Motor Position

Actual position of the ratio control linear actuator. This figure represents the current motor position as calculated by the GIB.

Version:1

Sender: GIB_B

Receiver: DME1

maximum value range: 0 ... 255 steps

Value range: 0 ... 255 steps (GIB_B)

conversion: $(PH) = 0.5 * (HEX) [steps]$

initialisation value: 0h

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 3, Bit 0)

Motorbedingungscode

CON_MOT_CODE

Motor Condition Codes

The second part of the segment is a look-up table of fault codes associated with the motor. The GIB is able to test for all these fault conditions and can set the bits according to the status of the motor.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 3, Bit 1...Byte 3, Bit 3)

Code	Name	Description
0	Initialising	
1	Motor Open Circuit	
2	Motor Short Circuit	
3	Motor Drive Over-temperature	
4	Motor Defaulted	
5	No Fault with Motor	

PRNDM LED Fahrstatus

STAT_L_D

PRNDM Led Drive Status

This signal defines the status of the LED drives in the GIB.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 3, Bit 4...Byte 3, Bit 6)

Code	Name	Description
0	Initialising	
1	Park LED Set	
2	Reverse LED Set	
3	Neutral LED Set	
4	Drive LED Set	
5	Manual LED Set	

Kupplungs-Istarbeitsverhältnis

CLU_RAT_A

Actual Clutch Duty Ratio

Actual duty ratio of the clutch control solenoid. This figure represents the clutch solenoid duty ratio delivered by the GIB.

Version:1

Sender: GIB_B

Receiver: DME1

maximum value range: 0 ... 100.0008 %

Value range: 0 ... 100 % (GIB_B)

conversion: (PH) = 0.19608 * (HEX) [%]

initialisation value: 1FFh

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 0)

Kupplungs-Bedingungscodes

CON_CLU_CODE

Clutch Condition Codes

This signal defines fault codes associated with the clutch solenoid. The GIB is able to test for all these fault conditions and can set the bits according to the status of the solenoid.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 5, Bit 1...Byte 5, Bit 3)

Code	Name	Description
0	Initialising	
1	Clutch Drive Open Circuit	
2	Clutch Drive Short Circuit	
3	Clutch Solenoid Defaulted	
4	Clutch Drive OK	

PRNDM LED Fehlerstatus

STAT_L_F

PRNDM LED Fault Status

This signal defines operation conditions associated with the LED drives in the GIB. The GIB is capable of diagnosing all these conditions and can set bits accordingly.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 2 Bit, Enum (Byte 5, Bit 4...Byte 5, Bit 5)

Code	Name	Description
0	Initialising	
1	LED Drives Open Circuit	
2	LED Drives Over-Current	
3	LED Drives OK	

Sekundärdruck-Istarbeitsverhältnis

P_DUTY_SEC

Actual Secondary Pressure Duty Ratio

Actual duty ratio of the secondary pressure solenoid. This figure represents the secondary pressure solenoid duty ratio delivered by the GIB.

Version:1

Sender: GIB_B

Receiver: DME1

maximum value range: 0 ... 100.0008 %

Value range: 0 ... 100 % (GIB_B)

conversion: (PH) = 0.19608 * (HEX) [%]

initialisation value: 1FFh

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 0)

Sekundärdruck-Bedingungscodes

P_CON_SEC

Secondary Pressure Condition Codes

This signal defines fault codes associated with the secondary pressure solenoid. The GIB is able to test for all these fault conditions and can set the bits according to the status of the sole-noid.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 7, Bit 1...Byte 7, Bit 3)

Code	Name	Description
0	Initialising	
1	Secondary Pressure Drive Open Circuit	
2	Secondary Pressure Drive Short Circuit	
3	Secondary Pressure Solenoid Defaulted	
4	Secondary Pressure Drive OK	

Software-Nummer

NUM_SWARE

Software Number

This segment of the message is to confirm to the EMS what the software revision number in the GIB is.

Version:1

Sender: GIB_B

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 4 Bit, - (Byte 7, Bit 4...Byte 7, Bit 7)

DME1_DDE1

Number: 1864, Version: 1

Transmission parameters - conditions

Message		DME1
System		DME
Output period	10 ms	
Tolerance for output period	± 8 ms	
Latency time	Max. 5 ms	
Transmission conditions	Power supply from main DME relay; term. 15 ON and UBatt greater than 6V and in the DME's hold-on time	
Remote operation	No	
Ready to receive after power-up	£ 50 ms	
Ready to send after power-up	120 £ t2 £ 140 ms	
Phase relationship to another message	No	
Message		DDE1
System		DDE4.0, DDE4.1
Output period	20 ms	
Tolerance for output period	± 8 ms	
Latency time	Max. 5 ms	
Transmission conditions	Term. 15 ON and UBatt greater than 6V	
Remote operation	No	
Ready to receive after power-up	150 ms	
Ready to send after power-up	150 ms	
Phase relationship to another message	No	

message short name: DME1_DDE1
 Identifier: 790 (316h)
 Length: 8 data bytes

Cyclic

DME: Power supply from main DME relay; term. 15 ON and UBatt greater than 6V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 50ms, tmax = 140ms)

Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

DDE: Term. 15 ON and UBatt greater than 6V

Start time: ttyp = ??? (tmin = 150ms)

Cycle time: ttyp = 20ms (tmin = 12ms, tmax = 28ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-

DME1

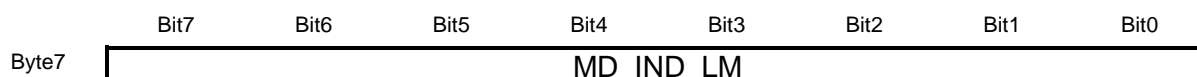
Receiver:-

RIP

Kombi

ASC_DSC

Signals (Message layout):



Byte6	F_SSG	L_TP_SW	TP_SW	S_EZA	S_SPO_RT	S_KAT_H2	S_KAT_H1
Byte5	MD_REIB						
Byte4	MD_IND						
Byte3	N_MOT						
Byte2	N_MOT						
Byte1	MD_IND_NE						
Byte0	F_TL_MES	S_KOR_EL	STAT_MD_E	F_GE	Q_ASC	F_N_MOT	S_KL15

Kl.15 ein

Term. 15 ON

S_KL15

Status of the ignition lock. The output has no special phase relationship to another signal.
Schematic diagram of the signal conditioning: None

Version:1
Sender: DME1
(Signal has no receiver!!)

initialisation value: 1h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 0)

Code	Name	Description
0	15 OFF	
1	Term. 15 ON	

Fehler N_MOT-Signal

Error

F_N_MOT

The F_N_MOT signal designates an error in the gap search or in the registration of the engine speed.

A special phase relationship exists between the N_MOT and F_N_MOT signals.

Version:1
Sender: DME1
Receiver: RIP, Kombi, ASC_DSC

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 1...Byte 0, Bit 1)

Code	Name	Description
0	No fault	
1	Engine speed sensor fault	

Quittung ASC

Acknowledgment

Q_ASC

Monitoring of the ASC message; The DME checks whether - within an applicable amount of time (BMW suggestion: 500 ms) - at least one new ASC messages has been transmitted and no plausibility error has arisen during torque intervention. If this is the case, the bit is set, otherwise it is reset.

Plausibility check for torque intervention:

Testing criteria: ASC operation SB1: (B_ASC=1) & (B_MSR=0) & (MD_IND_ASC less than FFH) & (MD_IND_MSR=00H); MSR operation SB2: (B_ASC=0) & (B_MSR=1) & (MD_IND_ASC less than FFH) & (MD_IND_MSR!=MD_IND_ASC); (Note on SB2/MSR operation: MD_IND_ASC = ones' compliment to MD_IND_MSR; i.e.; MD_IND_ASC less than FFH corresponds here to MD_IND_MSR greater than 00H); No intervention SB3: (B_ASC=0) & (B_MSR=0) & (MD_IND_ASC=FFH) & (MD_IND_MSR=00H)

Fault-setting criteria: !(SB1 v SB2 v SB3) for n ASC1 message transmissions (applicable; BMW suggestion: n=10)

Fault recovery criteria: Ignition off; monitoring is restarted, when plausibility is OK for at least one CAN transmission.

The output has no special phase relationship to another signal.

Version:1

Sender: DME1

Receiver: ASC_DSC

initialisation value: 0h

error marker: 0h

Signal Type: 1 Bit, Enum (Byte 0, Bit 2...Byte 0, Bit 2)

Code	Name	Description
0	Error	ASC message not received within an applicable amount of time (see signal definition), or a plausibility fault has arisen in the torque intervention
1	No fault	ASC message received and no plausibility fault

Status Momenteneingriff

STAT_MD_E

Status

The STAT_MD_E information is used to let the ACC, ASC, and EGS systems know whether in-jec-tion, charging, and ignition intervention are permissible and to what degree.

Version:1

Sender: DME1

Receiver: ASC_DSC

initialisation value: 0h

error marker: -

Signal Type: 2 Bit, Enum (Byte 0, Bit 4...Byte 0, Bit 5)

Code	Name	Description
0	Desired intervention is performed	Desired intervention is performed - ignition, charging (for spark ignition engines)/ injection volume (for diesel engines).No statement is made on the setting accuracy; this means that the affected CAN participant determines the MD_IND_NE deviation for the MD_IND_ASC / _GS / _ACC desired torque itself at the MD-interface.

1	Desired intervention in the ignition	For spark ignition engines only:The desired intervention in the ignition cannot be executed fully. The maximum ignition timing adjustment (latest possible timing adjustment) has been reached (e.g. temperature of catalytic converter, knock limit...).The charging intervention can be fully executed. Depending on the request, the overall desired torque cannot be completely set.
2	Desired intervention in the charging	For spark ignition engines:The desired intervention in the charging cannot be executed fully (actuator limit or system error).The ignition intervention can be executed fully.For diesel engine:Limitation of the injection volume is necessary.Smooth running impaired.Depending on the request, the overall desired torque cannot be completely set.Cross reference:Fail-safe/ diagnosis concept for the DME/DDE
3	Desired intervention for the ignition and injection	The desired intervention for the ignition and injection/ charging will not be executed fully. An internal error in the DME/DDE has arisen.Cross reference:Fail-safe/ diagnosis concept for the DME/DDE

Ansteuerung Klimakompressorrelais

S_KOREL

Triggering of the conditioning compressor relay

The S_KOREL signal characterises the triggering of the air conditioning compressor relay. The output has no special phase relationship to another signal.

Schematic diagram of the signal conditioning:

Note: Not used by BMW, since this is integrated in the torque interface! Used by Rover only!

Version:1

Sender: DME1

Receiver: Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 6...Byte 0, Bit 6)

Code	Name	Description
0	Air conditioning compressor relay OFF	
1	Air conditioning compressor relay ON	

Indiziertes Moment nach Momenteneingriffen

MD_IND_NE

Indicated engine torque after torque interventions

The MD_IND_NE signal contains the actual (as calculated in the engine management unit) in-dicated engine torque (lambda control, knock control, CAT protector, temperature influences, ASC and EGS torque intervention, etc. are taken into consideration). The signal MD_IND_LM contains the theoretical engine torque computed from the measured/computed

air mass and the ignition timing, without external ignition interventions. This signal serves to indicate a charging intervention to external systems.

The specified torque, MD_x, is based on a maximum torque, MD_NORM. This conversion to a physical value results in a range of 0..99.6094% of MD_NORM.

A special phase relationship exists with the MD_IND_x and F_TL_MES signals. The calculation of MD_IND_x for F_TL_MES = 1 is based upon the substitute air mass. The accuracy of MD_IND_x decreases.

EGS requires these signals to check the torque intervention. Update 10 ms; ASC requires these signals to check and control the torque intervention. Update less than 50 ms

Note: Use of MD_IND_LM and its initialisation value with regard to the reverse compatibility under discussion

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range:	0 ... 99.61065 %
Value range:	0 ... 99.6094 % (DME1)
conversion:	(PH) = 0.39063 * (HEX) [%]
initialisation value:	0h
error marker:	-
Signal Type:	8 Bit, Unsigned Integer (Byte 1, Bit 0...Byte 1, Bit 7)

Motordrehzahl

N_MOT

Engine speed

The N_MOT signal is generated using a measurement of the length of a period across a crankshaft segment (e.g. for an 8-cylinder engine, this corresponds to 90 crankshaft degrees). In this case, the time is measured using a free-running timer that is operated at a clock pulse of less than 2 ms. The signal N_MOT is displayed as a 16-bit value. Either the signal is not subject to a filter function, or the maximum filter period must be within the output period.

Representation of the numerical value: 16-bit engine speed information; low-order number at lower-order address (L/H). The F_N_MOT signal designates an error in the gap search or in the registration of the engine speed.

A special phase relationship exists between the N_MOT and F_N_MOT signals.

Version:1

Sender: DME1

Receiver: RIP, Kombi, ASC_DSC

maximum value range:	0 ... 10239.84375 1/min
Value range:	0 ... 10239.8 1/min (DME1)
conversion:	(PH) = 0.15625 * (HEX) [1/min]
initialisation value:	0h
error marker:	-
Signal Type:	16 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 3, Bit 7)

Indiziertes Motormoment

MD_IND

Indicated engine torque

In systems without electronic engine performance control, the MD_IND signal is determined from the measured air mass (HFM), which corresponds to the theoretical engine torque due to the driver's specification. This means that - with systems without electronic engine performance control - the effect of the ASC system's prethrottle (e.g. 8-cylinder engine without electronic engine performance control) is included in the calculation of the MD_IND signal.

Further ASC and EGS interventions are not taken into consideration in MD_IND.

In systems with an integrated electronic engine performance control function (ME, MDK, Diesel, without prethrottle) and in systems with single cylinder deactivation (EZA) it is not possible to assign the air mass directly to the engine torque; for this reason, here, the MD_IND signal corresponds to the driver's specification (accelerator pedal or, with a rigid clutch, throttle accelerator pedal, also throttle angle).

Furthermore, in systems with electronic engine performance control, the cruise control (FGR) is integrated; thus, when the integrated cruise control is active, MD_IND reflects its torque requirements.

Due to functions such as the speed limit and torque-limiting internal engine control functions such as engine speed limit, diagnostic functions, warm-up regulation, and knock regulation, the engine torque MD_IND has an upper limit that is independent of intervention by other systems (see MD_IND_NE).

The MD_IND_ACC signal is generated in the ACC control module (Adaptive Cruise Control); it meets the requirements of an external cruise control. When a torque or braking request is made by the ACC system, the connection with the MD_IND_ACC, BRE_ACC, B_MD, and B_BRE signals must be taken into consideration. The driver has the option of overruling the integrated cruise control or ACC-desire.

If the HFM signal (air mass) fails, a substitute value is derived from alpha/n-operating map (only for systems without electronic engine performance control /EZA!). The substitute value is designated with the F_TL_MES signal.

The specified torque, MD_x, is based on a maximum torque, MD_NORM. This conversion to a physical value results in a range of 0..99.6094% of MD_NORM.

A special phase relationship exists between the MD_IND and F_TL_MES signals (only for systems without electronic engine performance control/ EZA!).

Schematic diagram of the signal conditioning:

HFM Load from hot-film air-mass meter

K-Reg Knock control

Diagn. Cylinder diagnosis

n_max Engine speed limit

v_max Speed limit

Example of torque intervention:

Sample calculation (MDK system):

MD_IND_ASC Overall desired torque

MD_IND_ASC_LM Torque that is provided through charging intervention MDK/LLFS) (The amount of torque that is reduced through ignition timing adjustment is derived from the difference of these two values).

MD_IND_ASC	MD_IND_ASC_LM	Control	Remarks
1	400 Nm / 100 %	400 Nm / 100%	No controlling -
2	100 Nm / 25 %	120 Nm / 30 %	MDK/LLFS and ZWV DME reduces with MDK/LLFS to 120 Nm and with ZWV by another 20 Nm to 100 Nm, MDK-charging compensation through additional ZWV

3	100 Nm / 25 %	100 Nm / 25 %	MDK/LLFS without ZWV	Special case for 2: no ZWV takes place, MDK-charging compensation ζ through additional ZWV
4	100 Nm / 25 %	400 Nm / 100 %	ZWVwithout MDK/LLFS	Special case for 2: no charging intervention takes place; only ZWV is performed
5	100 Nm / 25 %	80 Nm / 20 %	MDK/LLFS without ZWV	According to CAN Spec.: when MD_IND_ASC "greater than" MD_IND_ASC_LM, MD_IND_ASC_LM = MD_IND_ASC followsControl situation as in 3
6	0 Nm / 0 %	100 Nm / 25 %	(Arbitrary value)	ZA (during ASC control) Only for a short period of time since refinement decreases (20 ms "less than" tControl "less than" 300 ms)

MD_IND_EGS	ControlRemarks
------------	----------------

7	100 Nm / 25 %	-	ZWV	Only ZWV for $t_{\max} = 2.5$ s
---	---------------	---	-----	---------------------------------

ζ Due to the throttle's inertia and to the time it takes for the gas to flow through the intake tract, the engine torque, which is temporarily too high (until the air control takes full effect!) is compensated for by reducing engine torque through ignition timing adjustment (dynamic ignition angle correction).

The compensation for engine throttle inertia/ the correction for the flow times for the gas can be reduced as required until the compensation is shut off; if no compensation takes place in the DME, the torque will be too high in this state. For this reason compensation must take place via slip detection in the ASC control module (ASC control loop: slip/ engine speed reduction).

Abbreviations

MDK Motordrosselklappe (engine throttle), controls main collector (charging intervention)

ZWV Zündwinkelverstellung (ignition timing adjustment), retarded

LLFS Leerlauffüllungssteller (idle speed charge control valve), parallel to the MDK, controls turbulent- action collector (charging intervention)

ZA Zylinderausblendung (cylinder deactivation) through injection suppression

EZA Einzelzylinderausblendung, (single-cylinder deactivation), torque reduction without MDK or electronic engine performance control, pre-throttle

Schematic diagram:

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 99.61065 %

Value range: 0 ... 99.6094 % (DME1)

conversion: (PH) = 0.39063 * (HEX) [%]

initialisation value: 0h

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 4, Bit 7)

Reibmoment

MD_REIB

Frictional torque

The MD_REIB signal characterises the current engine loss moment. It is stored as a function of T_{MOT} and N_{MOT} ($\text{MD_REIB} = f(T_{\text{MOT}}, N_{\text{MOT}})$) in the form of an operating map.

The operating map is corrected under idling condition based on the current load.

The MD_REIB signal contains the following influencing variables:

- Engine friction = $f(T_{\text{MOT}}, n, m)$ m = friction coefficient = $f(\text{oil}, \dots)$ (not valid for diesel)

- Gas exchange work
- Valve train
- Air conditioning compressor - compensation for interference variable (intermittent)
- Ancillary components (e.g. water pump, alternator, power steering pump) The losses of engine torque are dominant among the above mentioned influencing variables.

Load peaks are not taken into consideration in the calculation.

The torque provided by the engine (flywheel torque) is thus calculated as follows:

$$M_d = M_{D_IND} - M_{D_REIB}$$

The specified torque, M_{D_x} , is based on a maximum torque, M_{D_NORM} . This conversion to a physical value results in a range of 0..99.6094% of M_{D_NORM} .

The output has no special phase relationship to another signal.

Note:

Transmission of the frictional torque: Due to the transmission of M_{D_IND} and M_{D_REIB} , each control module connected to the system can calculate for itself the amount of net torque currently available. When ASR torque intervention takes place, this type of transmission makes it possible to reduce to absolute zero (i.e. full utilisation of the engine's braking torque).

Since the MSR attempts to control based on the friction torque when the wheels spin,

M_{D_REIB} is also used as a pre-controlling value.

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 99.61065 %

Value range: 0 ... 99.6094 % (DME1)

conversion: (PH) = 0.39063 * (HEX) [%]

initialisation value: 0h

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 5, Bit 0...Byte 5, Bit 7)

DME2_DDE2

Number: 1865, Version: 1

Transmission parameters - conditions

Message		DME2
System		DME
Output period	10 ms	
Tolerance for output period	± 8 ms	
Latency time	Max. 5 ms	
Transmission conditions	Power supply from main DME relay;	
term. 15 ON and UBatt greater		than
6V and in the DME's hold-on time		
Remote operation	No	
Ready to receive after power-up	£ 50 ms	
Ready to send after power-up	120 £ t2 £ 140 ms	
Phase relationship to another message	No	
Message		DDE2
System		DDE4.0, DDE4.1
Output period	20 ms	
Tolerance for output period	± 8 ms	
Latency time	Max. 5 ms	
Transmission conditions	Term. 15 ON and UBatt greater than 6V	
Remote operation	No	
Ready to receive after power-up	150 ms	
Ready to send after power-up	150 ms	
Phase relationship to another message	No	

message short name: DME2_DDE2
 Identifier: 809 (329h)
 Length: 8 data bytes

Cyclic

DME: Power supply from main DME relay; term. 15 ON and UBatt greater than 6V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 50ms, tmax = 140ms)

Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

DDE: Term. 15 ON and UBatt greater than 6V

Start time: ttyp = ??? (tmin = 150ms)

Cycle time: ttyp = 20ms (tmin = 12ms, tmax = 28ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-

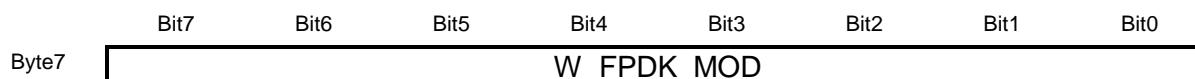
DME1

Receiver:-

Kombi

ASC_DSC

Signals (Message layout):



Byte6	S_SHIFTLOCK	B_FGR	S_KD	F_BS	S_BS
Byte5	W_FPDK				
Byte4	W_VP_FGR				
Byte3	BED_FGR	S_ML	S_WL	Q_ACC_DME	S_NIV_LL
Byte2	P_LUFT				
Byte1	T_MOT				
Byte0	MUL_COD	CAN_STAND,EG_INFO,OBD_STEUER,MD_NORM			

CAN-Stand

CAN_STAND

CAN status

Current CAN status. Since the DME/DDE receives no feedback from the other bus participants as to whether or not the CAN status is correct, these control module may not transmit if they do not have the correct CAN status. If the DME/DDE does not send a message after the engine has started, the other control modules detect the CAN status "CAN_IO" (CAN OK). When MUL_COD = 00B is transmitted, the MUL_INFO signal receives the CAN_STAND information (for more on this see also MUL_INFO and MUL_COD). The output has a special phase relationship with the MUL_COD and MUL_INFO signals. All ECUs: Compatibility of the ECUs that are installed must be ensured by checking the CAN status.

Version:1

Sender: DME1

(Signal has no receiver!!)

initialisation value: 11h

error marker: -

Signal Type: 6 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 5)
MULTIPLEXED SIGNAL
Selected when = 0

Code	Name	Description
11	CAN11h	

Motor-/Getriebe-Informationen

EG_INFO

Engine/Gearbox information

This signal indicates the configuration of the engine and gearbox of the current vehicle. Note: For the R50 vehicle, bit pattern 'xxx01x' is used to describe 'CVT step mode'. (CVT Step Mode is only active for certain engine types.), L20 (M47R, from 6/00)

Version:1

(Signal has no sender!!)

Receiver: ASC_DSC

initialisation value: -

error marker: -

Signal Type: 6 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 5)
MULTIPLEXED SIGNAL
Selected when = 1

Code	Name	Description
-----0	Petrol/gasoline	
-----1	Diesel	
---00-	Manual	
---01-	Semi-automatic	
---10-	Automatic	
---11-	CVT	
-00---	Type of engine: 01..04 Zyl.	
-01---	Type of engine: 05..07 Zyl.	
-10---	Type of engine: 08..11 Zyl.	
-11---	Type of engine: 12..xx Zyl.	
0-----	Information is not correct (e.g. learning function not finished)	
1-----	Information is correct	

Normierungsfaktor für Momentenschnittstelle

MD_NORM

Scaling factor for torque interface

The MD_NORM value indicates the torque that the MD_xxx values are based on. The conversion to a physical variable results in a range of 0..99.6094% of MD_NORM that can be represented for the corresponding signals. A special phase relationship exists between the output and the MUL_COD signal.

Init: engine-specific

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 1008 Nm

Value range: 0 ... 1008 Nm (DME1)

conversion: (PH) = 16 * (HEX) [Nm]

initialisation value: -

error marker: -

Signal Type: 6 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 0, Bit 5)
MULTIPLEXED SIGNAL
Selected when = 3

Motortemperatur

T_MOT

Engine temperature

Engine temperature is registered in the DME via an A/D converter and converted to degrees Celsius.

The output has no special phase relationship to another signal.

Instrument cluster (Display of the coolant temperature), EGS (Control of the shifting point, quantisation: 3°C)

Version:1

Sender: DME1

Receiver: Kombi

maximum value range: -48 ... 142.5 °C
 Value range: -48 ... 142.5 °C (DME1)
 Offset: -48 [°C]
 conversion: (PH) = 0.75 * (HEX) -48 [°C]
 initialisation value: FFh
 error marker: FFh
 Signal Type: 8 Bit, Unsigned Integer (Byte 1, Bit 0...Byte 1, Bit 7)

Winkel Fahrpedal/Drosselklappe Angle

W_FPDK

The W_FPDK signal is a measurement for the throttle position (in systems without electronic engine performance control) or for the position of the accelerator pedal (in systems with electronic engine performance control: MDK, ME, diesel). The value for the throttle angle is determined via a potentiometer that is mechanically connected with the throttle. The voltage value that is adjusted by the voltage divider in the potentiometer is registered in the DME by an A/D converter. The lower mechanical stop (idle) is registered by an adaptive algorithm (offset). The values that are transmitted as the W_FPDK signal, are scaled between the idle angle (mechanical stop) and the throttle's vertical position in a range from 0..99.2%. This corresponds to a value range of 00..FEH. The accelerator pedal angle is scaled between the lower mechanical stop and the kickdown pressure point.

Throttle:

Thus, the W_FPDK signal is derived as follows: $W_FPDK = k * (Wdkpot - Wdklm)$ [HEX]

Wdkpot Angle, throttle

Wdklm Angle, throttle in idle, average value; learned potentiometer value at the mechanical stop (Offset)

k Factor for conversion to W_FPDK.

If values arise in the calculation that are larger than 0FEH and there is no sensor fault, the value that is transmitted is limited at 0FEH.

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 99.22002 %
 Value range: 0 ... 99.2187 % (DME1)
 conversion: (PH) = 0.39063 * (HEX) [%]
 initialisation value: 0h
 error marker: FFh
 Signal Type: 8 Bit, Unsigned Integer (Byte 5, Bit 0...Byte 5, Bit 7)

Code	Name	Description
0	Accelerator pedal not pressed down / Idle (potentiometer value is learned)	

FE	Accelerator pedal pressed down fully / Throttle vertical or at kickdown pressure point
FF	Error in the determination of the position / Error in the determination of the position

Fahrgeschwindigkeitsregler aktiv Status

B_FGR

Bit 51: Setting conditions. Bits 52 and 53 from B_FGR reflect the current cruise control status. Here, a differentiation is made between constant driving, resume (WA), set/acceleration (S/B) and deceleration. Resume is defined by actuation of the control lever/multi-function steering wheel (MFL) until the desired speed is reached. Setting/Acceleration, as with deceleration, is defined by actuation until release of the operating panel. With an FGR "TIP function," there is no output for acceleration or deceleration.

For the vehicle variations with ACC, the ACC_STAT status is transmitted in B_FGR when the FGR request can be implemented by the ACC. When the ACC is suppressed by the driver, FGR = "passive" is transmitted, even though ACC is active. If an internal switch-off condition arises that prevents FGR/ACC operation B_FGR = "FGR/ACC shutoff" is transmitted.

Version:1
Sender: DME1
Receiver: Kombi

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 6, Bit 3...Byte 6, Bit 5)

Code	Name	Description
0	FGR passive	
1	FGR active	
2	ACC control "standard"	
3	FGR active	
4	ACC control "more dynamic" *	
5	FGR active	
6	FGR/ACC shutoff	
7	FGR active	

This message contains multiplexed signals

Multiplexer = MUL_COD

Value Signal

- 0 CAN-Stand
- 1 Motor-/Getriebe-Informationen
- 2 OBD-Steuerfunktionen
- 3 Normierungsfaktor für Momentenschnittstelle

DME4_DDE4

Number: 1866, Version: 1

Transmission parameters - conditions

Message		DME4
System		DME
Output period	10 ms	
Tolerance for output period	± 8 ms	
Latency time	less than 5 ms	
Transmission conditions	Power supply from main DME relay;	
term. 15 ON and UBatt greater		than
6V and in the DME's hold-on time		
Remote operation	No	
Ready to receive after power-up	£ 50 ms	
Ready to send after power-up	120 £ t2 £ 140 ms	
Phase relationship to another message	No	
Message		DDE4
System		DDE4.0, DDE4.1
Output period	20 ms	
Tolerance for output period	± 8 ms	
Latency time	less than 5 ms	
Transmission conditions	Term. 15 ON and UBatt greater than 6V	
Remote operation	No	
Ready to receive after power-up	150 ms	
Ready to send after power-up	150 ms	
Phase relationship to another message	No	

message short name: DME4_DDE4
 Identifier: 1349 (545h)
 Length: 8 data bytes

Cyclic

DME: Power supply from main DME relay; term. 15 ON and UBatt greater than 6V and in the DME's hold-on time

Start time: ttyp = ??? (tmin = 50ms, tmax = 140ms)

Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

DDE: Term. 15 ON and UBatt greater than 6V

Start time: ttyp = ??? (tmin = 150ms)

Cycle time: ttyp = 20ms (tmin = 12ms, tmax = 28ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-

DME1

Receiver:-

Kombi

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	L_P_OI		N_LL_SOLL				S_DDS	
	L							

Byte6	BEDARF_EKP							
Byte5	S_KL30 H	I_DMESYS			GEN_L AST	GEN_H TAR	GEN_D EF	
Byte4	M_OEL_TEMP							
Byte3	SCHAL T	TMOT_KALT		TMOT_ STA	MOL_S F	MOL_V L	MOL_V B	
Byte2	VERBRAUCH							
Byte1	VERBRAUCH							
Byte0	BATT_ ANZ	S_TDL	L_BCF	L_DIAG	L_FGR	S_SHL	L_MIL	L_HEIZ

Check-Engine-Lampe (CARB/OBDII)

L_MIL

Check-Engine-Light (CARB/OBDII)

MIL (malfunction indication light)

The signal indicates the status of the check engine light. The activation of the light can be accomplished in steady-state or switching-mode operation (500 ms cycle, code sequence). In order to obtain the most accurate possible picture of the activation, analysis must take place within 10 ms. In the event of a bus timeout, the value 0 should be assumed. A pre-drive check by the instrument cluster must not be made!

Note: Realisation for the DDE for 9/99

Version:1

Sender: DME1

Receiver: Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 1...Byte 0, Bit 1)

Code	Name	Description
0	Check-engine light on the instrument cluster OFF	
1	Check engine light on the instrument cluster ON	

Bereitschaftsanzeige Mainswitch

L_FGR

Stand-by indicator

The L_FGR stand-by indicator indicates the availability of the cruise control (FGR), which is activated from the multi-function steering wheel. The cruise control function is effected in the DME/DDE system, or in the ACC system where fitted (in which case the cruise control function is deactivated in the DME/DDE).

Version:1

Sender: DME1

Receiver: Kombi

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 3...Byte 0, Bit 3)

Code	Name	Description
0	FGR OFF	
1	FGR ON	

Diagnoseanzeige

L_DIAG

Diagnosis indicator

Diagnosis indicator, DDE/DME, with integrated EML functionality

The L_DIAG signal characterises a fault in the DDE (for a diesel engine) that was determined by data, or a fault that was determined by data in the integrated EML-functionality of the DME.

The light can be activated in a steady-state or switched mode.

In order to obtain the most accurate possible picture of the activation, analysis must take place within 10 ms. In the event of a bus timeout, the value 0 should be assumed.

Init: 00h (DME), 01h (DDE)

Instrument cluster (Activation of the light / light identical with pre-heating light)

Note: In the instrument cluster variation for a diesel engine, the default value is pre-assigned (initialisation) with 01H (= light ON / error present).

Version:1

Sender: DME1

Receiver: Kombi

initialisation value: -

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 4...Byte 0, Bit 4)

Code	Name	Description
0	No fault	
1	Fault present	

Verbrauchssignal

VERBRAUCH

Fuel consumption

The DME/DDE uses the "VERBRAUCH" (consumption) signal to pass the current fuel consumption on to the instrument cluster. The value that is transmitted is the sum of the injection volumes. The injection volume is calculated from the injection periods (minus the valve delay times) and the pitch of the corresponding injector. The injection volumes are added up at the time that they occur; the current "VERBRAUCH" value is transmitted in 10 ms (DME) or 20 ms (DDE) time reference. The signal is transmitted as a 16-bit value. In order to arrive at the current amount of injected fuel, the old value must be subtracted from the new value.

$KVA = s * (tEV -)$

Fuel consumption = $k * \dot{a}(KVA) tEV$

k: Correction value (typically = 1)

s: Pitch [µl/ms]

KVA: Injection volume

VERBRAUCH: Consumption signal via CAN in µ-liters

Representation of the numerical value:

16-bit information; low-order number at low-order address

The output has no special phase relationship to another signal.

Schematic diagram of the signal conditioning:

Functional requirements:

Signal conditioning active:

- Term. 15 ON AND
- Engine is running AND
- Not in the stop time

The control module's hold-on time:

If term. 15 is switched off (S_KL15=0 signal), the DME is post-energised for a defined amount of time. During this period, the last "VERBRAUCH" value that was calculated is transmitted. If term. 15 is switched back on during the hold-on time (S_KL15=1 signal), the DME executes a reset, in which the Initialisation value is retransmitted.

Note: Due to the summation of the injection pulses to form a consumption signal, unsteadiness can arise in the evaluation if the transmitter or receiver cannot continuously monitor the signal due to a reset. For this reason, suitable plausibility checks must be provided for the receiver. The DDE has no post-energising phase. The DDE's output period is 20 ms.

Version:1

Sender: DME1

Receiver: Kombi

maximum value range: 0 ... 65535 µl

Value range: 0 ... 65535 µl (DME1)

initialisation value: 0h

error marker: -

Signal Type: 16 Bit, Unsigned Integer (Byte 1, Bit 0...Byte 2, Bit 7)

DME5

Number: 1867, Version: 1

System DME
 Output period 10ms
 Tolerance for output period $\pm 8\text{ms}$
 Latency time 5 ms (maximum)
 Transmission conditions KL15 On, KL87 On and VBATT greater than 6V
 Remote operation NO
 Ready to receive after power-up 150ms
 Ready to send after power-up 150ms
 Phase relationship to another message None

message short name: DME5
 Identifier: 1381 (565h)
 Length: 8 data bytes

Cyclic

KL15 On, KL87 On and UBATT greater than 6V
 Start time: ttyp = ??? (tmin = 150ms)
 Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)
 active condition = KL_15
 start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 DME1

Receiver:-
 GIB_B
 RIP

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	P_MAP_G							
Byte6								
Byte5						SEC_P_CODE		SEC_P_RAT
Byte4	SEC_P_RAT							
Byte3						CLUTCH_CODE		CLUTCH_RAT
Byte2	CLUTCH_RAT							
Byte1	MOT_SPEED				MOT_SCODE			MOT_POS
Byte0	MOT_POS							

Wunschmotorstellung
 Desired Motor Position

MOT_POS

Calculated desired position for the ratio control linear actuator.

Version:1
 Sender: DME1
 Receiver: GIB_B

maximum value range: 0 ... 255 steps

Value range: 0 ... 255 steps (DME1)

conversion: (PH) = 0.5 * (HEX) [steps]

initialisation value: 1FFh

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 1, Bit 0)

Spezielle Motor-Codes

Motor Special Codes

MOT_SCOPE

MOT_SCOPE is a three-bit look-up table to describe the desired motor move type. This can be to default the motor to the safety position, move it normally, do a reference, reset the position, or set the GIB into test mode. None of these operations can happen concurrently.

Version: 1
Sender: DME1
Receiver: GIB_B

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 1, Bit 1...Byte 1, Bit 3)

Code	Name	Description
0	Default Motor	
1	Move Motor	
2	Reference Motor	
3	Reset Motor Position	
4	Test Mode	
5	Sleep Mode	

Wunschmotordrehzahl

Desired Motor Speed

MOT_SPEED

This signal defines the desired speed at which the ratio control linear actuator should move towards its desired position. The speed is calculated according to the safe working limits of the motor and transmission.

Version: 1
Sender: DME1
Receiver: GIB_B

initialisation value: 0h

error marker: -

Signal Type: 3 Bit, Enum (Byte 1, Bit 5...Byte 1, Bit 7)

Code	Name	Description
0	Default Motor Speed	
1	50	

2	125	
3	167	
4	250	
5	71	
6	83	

Kupplungs-Wunscharbeitsverhältnis

Desired Clutch Duty Ratio

CLUTCH_RAT

Desired clutch solenoid duty ratio.

Version:1

Sender: DME1

Receiver: GIB_B

maximum value range: 0 ... 100.0008 %

Value range: 0 ... 100 % (DME1)

conversion: (PH) = 0.19608 * (HEX) [%]

initialisation value: 1FFh

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 3, Bit 0)

Spezielle Kupplungs-Codes

Clutch Special Codes

CLUTCH_CODE

This signal describes the desired clutch solenoid control. This can be to default the clutch sole-noid to the safe duty ratio, or to control it normally. Neither operation can happen concurrently.

Version:1

Sender: DME1

Receiver: GIB_B

initialisation value: 0h

error marker: -

Signal Type: 2 Bit, Enum (Byte 3, Bit 1...Byte 3, Bit 2)

Code	Name	Description
0	Default Clutch Duty Ratio	
1	Control Duty Ratio Normally	

Sekundärdruck-Wunscharbeitsverhältnis

Desired Secondary Pressure Duty Ratio

SEC_P_RAT

Desired secondary pressure solenoid duty ratio

Version:1

Sender: DME1

Receiver: GIB_B

maximum value range: 0 ... 100.0008 %

Value range: 0 ... 100 % (DME1)

conversion: (PH) = 0.19608 * (HEX) [%]

initialisation value: 1FFh

error marker: 1FFh

Signal Type: 9 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 0)

Spezielle Sekundärdruck-Codes

SEC_P_CODE

Secondary Pressure Special Codes

This signal describes the desired secondary pressure solenoid control. This can be to default the secondary pressure solenoid to the safe duty ratio, or to control it normally. Neither operation can happen concurrently.

Version:1

Sender: DME1

Receiver: GIB_B

initialisation value: 0h

error marker: -

Signal Type: 2 Bit, Enum (Byte 5, Bit 1...Byte 5, Bit 2)

Code	Name	Description
0	Default Secondary Pressure Duty Ratio	
1	Control Duty Ratio Normally	

Krümmerdruck

P_MAP_G

Manifold pressure

This signal supports an optional boost pressure gauge. The gauge is driven from a signal relative to the manifold pressure.

The gauge pressure is calculated as: Gauge Pressure (P_MAP_G) = Manifold Absolute Pressure (MAP) - Atmospheric Pressure (MAP_UP)

Version:1

Sender: DME1

Receiver: RIP

maximum value range: -1 ... 1.54 bar

Value range: -1 ... 1.54 bar (DME1)

Offset: -1 [bar]

conversion: (PH) = 0.01 * (HEX) -1 [bar]

initialisation value:	FFh
error marker:	FFh
Signal Type:	8 Bit, Unsigned Integer (Byte 7, Bit 0...Byte 7, Bit 7)

DME6

Number: 1869, Version: 1

message short name: DME6
 Identifier: 822 (336h)
 Length: 8 data bytes

Cyclic

KL15 On, KL87 On and UBATT greater than 6V

Start time: ttyp = ??? (tmin = 150ms)

Cycle time: ttyp = 10ms (tmin = 2ms, tmax = 18ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 DME1

Receiver:-
 ASC_DSC

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	TW_TQI_REQ							
Byte6	TW_TQI_REQ							
Byte5	TW_REIB							
Byte4	TW_REIB							
Byte3							Q_TW_ ASC	B_TW_ FAULT
Byte2	TW_NORM							
Byte1	TW_IND_NE							
Byte0	TW_IND_NE							

Indiziertes Drehmoment an Rädern

TW_IND_NE

Indicated torque at wheels

Indicated* torque at the wheels. This torque value is an ideal value, NOT accounting for any losses in the engine and transmission systems. Actual torque at wheels may be obtained by subtracting the torque loss TW_REIB.

This signal is scaled as a percentage of TW_NORM.

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 100.26702 %

Value range: 0 ... 100 % (DME1)

conversion: (PH) = 0.00153 * (HEX) [%]

initialisation value: 0h

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 1, Bit 7)

Maximales indiziertes Drehmoment an Rädern

TW_NORM

Maximum indicated* torque at wheels

This signal defines the maximum indicated* torque at the wheels. This value is a reference point against which all other indicated torque values will be scaled as a percentage.

Note: The value set for TW_NORM will be higher than that which can actually be achieved by the engine and transmission systems, to prevent saturation of the torque at wheels values.

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 5099.9898 Nm

Value range: 0 ... 5100 Nm (DME1)

conversion: (PH) = 20.0787 * (HEX) [Nm]

initialisation value: 0h

error marker: FFh

Signal Type: 8 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 2, Bit 7)

Momenteneingriff-Ausfall

B_TW_FAULT

Torque intervention failure

A flag to indicate whether the torque being requested can be achieved by the engine and gear-box systems.

Note: There are two reasons why the requested torque cannot be achieved:

- Firstly, a system fault exists such that torque requests are rejected.
- Secondly, the request exceeds the limits of torque reduction.

Version:1

Sender: DME1

Receiver: ASC_DSC

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 3, Bit 0...Byte 3, Bit 0)

Code	Name	Description
0	ASC or MSR torque request can be achieved	
1	ASC or MSR torque request cannot be achieved	

Drehmoment an den Rädern Anfragebestätigung

Q_TW_ASC

Torque at wheels request acknowledgement

Monitoring of the torque at wheels ASC message; The DME checks whether - within an applicable amount of time (BMW suggestion: 500 ms) - at least one new ASC4 message has been transmitted and no plausibility error has arisen during torque intervention. If this is the case, the bit is set, otherwise it is reset.

Plausibility check for torque intervention:

Init: 0h

Note: ##* Note: In the code above '!' indicates the 'Ones Complement' of a variable obtained by in-verting all bits in that variable.

Version: 1

Sender: DME1

Receiver: ASC_DSC

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 3, Bit 1...Byte 3, Bit 1)

Code	Name	Description
0	ASC4 message not received within an applicable amount of time	
1	ASC4 message received and no data plausibility fault	

Drehmomentverlust an den Rädern

TW_REIB

Torque losses at wheels

This signal defines the torque losses at the wheels. This value includes the losses in the engine and transmission systems.

This signal is scaled as a percentage of TW_NORM.

Version: 1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 100.26702 %

Value range: 0 ... 100 % (DME1)

conversion: (PH) = 0.00153 * (HEX) [%]

initialisation value: 0h

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 5, Bit 7)

Indizierte Drehmomentanforderung Fahrer/Tempomat

TW_TQI_REQ

Driver/Cruise torque request

Indicated* torque at the wheels request. When cruise control is active, this value will be that re-quired by the cruise function. Otherwise, this value will be the torque requested by the driver pedal.

This torque value is an ideal value, NOT accounting for any losses in the engine and transmission systems. Actual torque at wheels may be obtained by subtracting the torque loss TW_REIB.

This signal is scaled as a percentage of TW_NORM.

Version:1

Sender: DME1

Receiver: ASC_DSC

maximum value range: 0 ... 100.26702 %

Value range: 0 ... 100 % (DME1)

conversion: (PH) = 0.00153 * (HEX) [%]

initialisation value: 0h

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 7)

EGS1_SMG1

Number: 1872, Version: 1

message short name: EGS1_SMG1
 Identifier: 1087 (43Fh)
 Length: 8 data bytes

Cyclic

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V and in the DME's hold-on time

Event-driven output, otherwise every 100 ms, All new systems: 10 ms, or 25 ms cyclically

Start time: ttyp = ??? (tmin = 100ms, tmax = 140ms)

Cycle time: ttyp = 100ms (tmin = 90ms, tmax = 110ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Event Driven

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V and in the DME's hold-on time

Debounce time: tmin = 10ms

active condition = KL_15

sending condition = SIGNALCHANGE

Cyclic

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V and in the DME's hold-on time

All new systems: 10 ms cyclically

Start time: ttyp = ??? (tmin = 100ms, tmax = 140ms)

Cycle time: ttyp = 10ms (tmin = 9ms, tmax = 11ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Cyclic

Power supply from DME main relay; Term.15 on and UBatt greater than 6 V and in the DME's hold-on time

All new systems: 25 ms cyclically

Start time: ttyp = ??? (tmin = 100ms, tmax = 140ms)

Cycle time: ttyp = 25ms (tmin = 22.5ms, tmax = 27.5ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
DME1

Receiver:-
ASC_DSC
RIP

Kombi

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	MD_GETRIEBE							
Byte6	STR_VERST							
Byte5	STR_VERST		S_GON G	S_GOT	S_GSU	GS_TY P	L_GS	
Byte4	N ABTR							

Byte3	MD_IND_GS,SK_VAR			MD_IND_GS,ALIVE_CNT		
Byte2	PRG_INF_ANZ,PRG_INF_A NZ			N_ABTR_LB,SMG_WHL_ANZ		N_ABTR_LB,OB D_STAT_GS
Byte1	OBD_STAT_GS,OBD_STAT _GS			OBD_STAT_GS,GAN G_WHL _ANZ	GANG_WHL_ANZ,GANG_W HL_ANZ	GANG_WHL_A NZ,S_K UPPL
Byte0	S_WK, S_KUP PL	S_WK, A_MOD US	S_GTS, PRG_I NF_AN Z_MAX	OBD_F	S_SCH ALT	GANG_INF

Zielgang (Gang_INF)

GANG_INF

Target gear (Gang_INF)

GANG_INF indicates the gear that the transmission is currently in, or - during shifting (S_SCHALT) - which gear will be reached.

Note: Gear changes of more than one gear can occur. In P or N, the power connection is interrupted hydraulically. In the emergency program, depending on the type of fault, either the fourth or fifth gear (forward) or the R-gear (reverse) is put in. S_SCHALT indicates whether a gearshift is taking place in the transmission. A special phase relationship exists between the GANG_INF and S_SCHALT signals.

Init: GANG_INF: 000B for P/N; 100B when not in P/N

Version:1

Sender: DME1

Receiver: RIP, Kombi, ASC_DSC

initialisation value: -

error marker: -

Signal Type: 3 Bit, Enum (Byte 0, Bit 0...Byte 0, Bit 2)

Code	Name	Description
0	When N or P is recognized (no power connect.)	
1	1st gear	
2	2nd gear	
3	3rd gear	
4	4th gear	
5	5th gear	
6	6th gear (if present)	
7	Reverse	

Schaltung aktiv

S_SCHALT

Shifting active

GANG_INF indicates the gear that the transmission is currently in, or - during shifting (S_SCHALT) - which gear will be reached.

Note: Gear changes of more than one gear can occur. In P or N, the power connection is interrupted hydraulically. In the emergency program, depending on the type of fault, either the fourth or fifth gear (forward) or the R-gear (reverse) is put in. S_SCHALT indicates whether a gearshift is taking place in the transmission. A special phase relationship exists between the GANG_INF and S_SCHALT signals.

Version:1

Sender: DME1

Receiver: ASC_DSC

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 3...Byte 0, Bit 3)

Code	Name	Description
0	No shifting	
1	Shifting in progress	

Positionswählhebel für Anzeige im Kombi

GANG_WHL_ANZ

Position-selector lever display

EGS: The position (P, R, N...) that was recognized via the coded selector lever. The intermediate position is a position of the selector lever that cannot be clearly identified. In this case, the EGS continues to calculate with the last known position.

SMG: This signal indicates the gear currently engaged. The signal serves only to activate the display in the instrument cluster, as it is filtered specially for this purpose.

The output has a special phase relationship to SK_VAR.

Note: Application: EGS (Indication of selector lever position), SMG (Selector lever position display in instrument cluster), Not for E36/5/7!

Version:1

Sender: DME1

Receiver: RIP, Kombi

initialisation value: 0h

error marker: 0h

Signal Type: 4 Bit, Enum (Byte 1, Bit 0...Byte 1, Bit 3)
MULTIPLEXED SIGNAL
Selected when = 0

Code	Name	Description
0	Intermediate position (display dark; only search illumination)	
1	1	
2	2	
3	3	
4	4	
5	D (SMG: A)	
6	N	
7	R	
8	P (SMG: not used)	
9	5	

A	6	
B	L (low ratio)	only R50

Positionswählhebel für Anzeige im Kombi

GANG_WHL_ANZ

Position-selector lever display

EGS: The position (P, R, N...) that was recognized via the coded selector lever. The intermediate position is a position of the selector lever that cannot be clearly identified. In this case, the EGS continues to calculate with the last known position.

SMG: This signal indicates the gear currently engaged. The signal serves only to activate the display in the instrument cluster, as it is filtered specially for this purpose.

The output has a special phase relationship to SK_VAR.

Note: Application: EGS (Indication of selector lever position), SMG (Selector lever position display in instrument cluster), Not for E36/5/7!

Version:1

Sender: DME1

Receiver: RIP, Kombi

initialisation value: 0h

error marker: 0h

Signal Type: 4 Bit, Enum (Byte 1, Bit 1...Byte 1, Bit 4)

MULTIPLEXED SIGNAL

Selected when = 1

Code	Name	Description
0	Intermediate position (display dark; only search illumination)	
1	1	
2	2	
3	3	
4	4	
5	D (SMG: A)	
6	N	
7	R	
8	P (SMG: not used)	
9	5	
A	6	
B	L (low ratio)	only R50

Programminformation für die Anzeige im Kombi

PRG_INF_ANZ

Program information indicator

Program information for the display in the Instrument cluster.

The output has no special phase relationship to another signal.

Note: Only "S" is displayed on the basic instrument cluster for the E39. Only "M" and "S" can be displayed on the E39 High/ E38 instrument cluster. Not in the E36/5/7!

Version:1

Sender: DME1

Receiver: RIP, Kombi

initialisation value: 5h

error marker: 5h

Signal Type: 3 Bit, Enum (Byte 2, Bit 5...Byte 2, Bit 7)
MULTIPLEXED SIGNAL
Selected when = 0

Code	Name	Description
0	'E' (SMG: No bar)	
1	'M' (SMG: One bar)	
2	'S' (SMG: Two bars)	
3	'W' (SMG: Three bars)	
4	'A' (SMG: Four bars)	
5	Display dark no search illumination (SMG: Five bars)	
6	' ' (SMG: Six bars)	
7	'*' (SMG: Undefined)	

Programminformation für die Anzeige im Kombi

PRG_INF_ANZ

Program information indicator

Program information for the display in the Instrument cluster.

The output has no special phase relationship to another signal.

Note: Only "S" is displayed on the basic instrument cluster for the E39. Only "M" and "S" can be displayed on the E39 High/ E38 instrument cluster. Not in the E36/5/7!

Version:1

Sender: DME1

Receiver: RIP, Kombi

initialisation value: 5h

error marker: 5h

Signal Type: 3 Bit, Enum (Byte 2, Bit 5...Byte 2, Bit 7)
MULTIPLEXED SIGNAL
Selected when = 1

Code	Name	Description
0	'E' (SMG: No bar)	
1	'M' (SMG: One bar)	
2	'S' (SMG: Two bars)	
3	'W' (SMG: Three bars)	
4	'A' (SMG: Four bars)	
5	Display dark no search illumination (SMG: Five bars)	
6	' ' (SMG: Six bars)	
7	'*' (SMG: Undefined)	

Störanzeige Getriebesteuerung

L_GS

Fault indication

This signal is used to indicate the state of the transmission control (GS). For the display in the instrument cluster, it must be observed that, internally within the instrument cluster, the initialisation value of 1 = "LIGHT ON" is valid until reception or until after timeout (filtering period typ. 750 ms) of the EGS1 message.

The pre-drive check is made by the instrument cluster (2 s).

Version:1

Sender: DME1

Receiver: RIP, Kombi

initialisation value: 0h

error marker: -

Signal Type: 2 Bit, Enum (Byte 5, Bit 0...Byte 5, Bit 1)

Code	Name	Description
0	No fault	
1	Emergency transmission program	

This message contains multiplexed signals

Multiplexer = GS_Typ

Value Signal

0	Schalter Getriebeschutz
0	Wandlerkupplung
0	Positionswählhebel für Anzeige im Kombi
0	OBD-Status Getriebesteuerung
0	Abtriebsdrehzahl low
0	Programminformation für die Anzeige im Kombi
0	Momenteneingriff für EGS/SMG-Funktion
1	Maximale Anzahl der Fahrstufen
1	Zusätzliches Automatik-Symbol
1	Kupplung Status
1	Positionswählhebel für Anzeige im Kombi
1	OBD-Status Getriebesteuerung
1	SMG-Wählhebelstellung
1	Programminformation für die Anzeige im Kombi
1	Alive-Zähler
1	Sicherheitsvariable

INSTR1

Number: 1876, Version: 1

message short name: INSTR1
 Identifier: 1552 (610h)
 Length: 8 data bytes

On Request

Term. 15 ON and UBatt greater than 9 Volt

Remote access, i.e. request by LWS when driving begins

Start time: ttyp = ??? (tmin = 50ms, tmax = 140ms)

active condition = KL_15

Sender:-
 Kombi

Receiver:-
 LWS

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7								
Byte6								
Byte5								SCALEI NFO
Byte4	FGSTNR							
Byte3	FGSTNR							
Byte2	FGSTNR							
Byte1	FGSTNR							
Byte0	FGSTNR							

Fahrgestellnummer

FGSTNR

Vehicle identification number

This signal is used to transmit the test number, the 5 numbers and the two symbols of the vehicle identification number that is assigned to the vehicle. The test number is currently not being used!

Note: Information must be available immediately after the system has been run up.

Version: 1

Sender: Kombi

Receiver: LWS

maximum value range: 0 ... 1099511627775

Value range: 0 ... 1099511627775 (Kombi)

initialisation value: 0h

error marker: -

Signal Type: 40 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 4, Bit 7)

Einheit des Tachoziffernblatts

SCALEINFO

Unit on the speedometer dial

This signal is used to inform the participant making the request whether the speed is displayed in Km/h or in mph.

Note: INSTR1: Remote access

Version:1

Sender: Kombi

Receiver: LWS

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 5, Bit 0...Byte 5, Bit 0)

Code	Name	Description
0	Speedometer display in km/h	
1	Speedometer display in mph	

INSTR2

Number: 1877, Version: 1

Kl. 30 Reset: Sendeverzögerung bis 650 ms
 Kl. 15 EIN: Sendeverzögerung 160...200 ms

message short name: INSTR2
 Identifier: 1555 (613h)
 Length: 8 data bytes

Cyclic

Term. 15 ON and UBatt greater than 9 Volt
 Start time: ttyp = ??? (tmax = 200ms)
 Cycle time: ttyp = 200ms (tmin = 190ms, tmax = 210ms)
 active condition = KL_15
 start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 Kombi

Receiver:-
 DME1

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7								
Byte6	FST_LB				FST_RECHTS			
Byte5	FST_RECHTS		FST_LINKS					
Byte4	REL_ZEIT							
Byte3	REL_ZEIT							
Byte2	S_FST	FST						
Byte1	KM_ST							
Byte0	KM_ST							

Kilometerstand

KM_ST

Kilometer reading

Information on the total distance that the vehicle has been driven. It is always indicated in kilometres, even in US vehicles! If more kilometres have been driven than can be represented, the maximum value is transmitted (upper cut off). When restarted, the value is 0 Km.

Init: Current kilometre status

Version: 1

Sender: Kombi

Receiver: DME1

maximum value range: 0 ... 655340 km

Value range: 0 ... 655350 km (Kombi)

conversion: (PH) = 10 * (HEX) [km]

initialisation value: -

error marker: FFFFh

Signal Type: 16 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 1, Bit 7)

Füllstand

FST

Filling status

The FST signal indicates the tank capacity (damped signal).

Version:1

Sender: Kombi

Receiver: DME1

maximum value range: 0 ... 126 l

Value range: 0 ... 126 l (Kombi)

initialisation value: 0h

error marker: 7Fh

Signal Type: 7 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 2, Bit 6)

INSTR3

Number: 1878, Version: 1

Kl. 30 Reset: Sendeverzögerung bis 650 ms
 Kl. 15 EIN: Sendeverzögerung 160...200 ms

message short name: INSTR3
 Identifier: 1557 (615h)
 Length: 8 data bytes

Cyclic

Term. 15 ON and UBatt greater than 9 Volt

Start time: ttyp = ??? (tmax = 200ms)

Cycle time: ttyp = 200ms (tmin = 190ms, tmax = 210ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 Kombi

Receiver:-
 DME1

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7						KEY_INFO		
Byte6	V_ANZ							
Byte5	V_ANZ		F_K_O BD	A_EKP_CRASH		BLINKER		F_K_A CC
Byte4	S_REGIME				S_SUSP		S_HBR	S_DOO R
Byte3	T_UMG _SGN	T_UMG_MAG						
Byte2	ST_RU ECK	LB_NLL	LB_USOLL					
Byte1	N_EL				S_MH	S_TNS	S_ANH	S_HZL
Byte0	S_AC	S_KO	S_NTK W	LM_KK				

Schalter Klimakompressor
 Switch

S_KO

The signal transmits the air conditioning system's request that the air conditioning compressor be connected. It is transmitted by the instrument cluster. There is a direct connection with the LM_KK signal.

Version: 1

Sender: Kombi

Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 6...Byte 0, Bit 6)

Code	Name	Description
0	Switch air conditioning compressor OFF	
1	Switch air conditioning compressor ON	

Schalter Klimabereitschaft

Switch

S_AC

The signal transmits the air conditioning system's stand-by status. It is transmitted by the instrument cluster.

Version: 1
Sender: Kombi
Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 0, Bit 7...Byte 0, Bit 7)

Code	Name	Description
0	Air conditioning not on stand-by	
1	Air conditioning on stand-by	

Handbremsschalter

Handbrake switch

S_HBR

This signal indicates whether the handbrake is on or off.

No special phase relationship of the output with another signal.

Note: Rover, BMW (E38/39 from 9'98 onwards; E46 open, E46 and E39 M-GmbH)

Version: 1
Sender: Kombi
Receiver: DME1

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 4, Bit 1...Byte 4, Bit 1)

Code	Name	Description
0	Handbrake off	
1	Handbrake on	

INSTR4

Number: 1879, Version: 1

message short name: INSTR4
 Identifier: 1560 (618h)
 Length: 4 data bytes

Cyclic

Term. 15 ON and UBatt greater than 9 Volt

Start time: ttyp = ??? (tmin = 50ms, tmax = 140ms)

Cycle time: ttyp = 200ms (tmin = 190ms, tmax = 210ms)

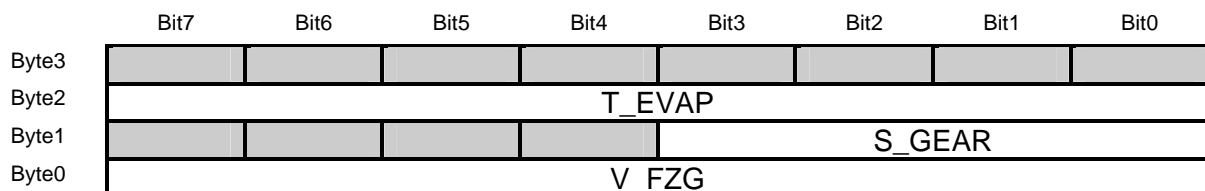
active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 Kombi

Receiver:-
 DME1

Signals (Message layout):



Verdampfertemperatur
 Evaporator temperature

T_EVAP

This signal is required by the engine management unit in order to calculate the load caused by the variable stroke compressor from the air conditioning system. The engine management unit needs both the ambient temperature and the evaporator temperature to accurately determine the level of the load placed on the engine. Knowledge of the extra load enables the engine to raise its torque to compensate for the increased load.

No special phase relationship of the output with another signal.

Note: For Rover only

Version:1

Sender: Kombi

Receiver: DME1

maximum value range: -30 ... 62.456 °C

Value range: -30 ... 62.456 °C (Kombi)

Offset: -30 [°C]

conversion: (PH) = 0.364 * (HEX) -30 [°C]

initialisation value: 0h

error marker: FFh

Signal Type: 8 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 2, Bit 7)

INSTR5

Number: 1880, Version: 1

message short name: INSTR5
 Identifier: 1562 (61Ah)
 Length: 8 data bytes

Cyclic

Die Versendung erfolgt bei UBatt größer als 9 Volt und "wachem" Kombi, d.h. bei KL.R ein bis einschließlich der Nachlaufzeit von ca. 1 Minute nach KL.R aus oder bei KL.30 während der Aktivierung des Kombis durch den Fahrer ("ODO-Preview": Anzeige des Gesamtwegstreckenzählers durch Betätigen der Tageswegstrecken-Rückstelltaste bei KL.30).

Start time: ttyp = ??? (tmin = 100ms, tmax = 140ms)

Cycle time: ttyp = 200ms (tmin = 190ms, tmax = 210ms)

active condition = KL_15

start condition = KL_15_ON, stop condition = KL_15_OFF

Sender:-
 Kombi

Receiver:-
 RIP

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7				ST_DIA G_MOD	V_COMP_MODE			
Byte6	V_COMP							
Byte5	V_COMP							
Byte4	V_COMP_UNIT			V_TRIP1				
Byte3	V_TRIP1							
Byte2	V_ODO _U	V_SIA			V_ODO			
Byte1	V_ODO							
Byte0	V_ODO							

Kilometerzähler-Anzeigewert

V_ODO

Odometer display value

Used to display the accumulated distance travelled on the RIP.

Note: For R50 only.

The display units for this signal are defined by V_ODO_U.

Version: 1

Sender: Kombi

Receiver: RIP

maximum value range: 0 ... 1048574 miles or km

Value range: 0 ... 999999 miles or km (Kombi)

initialisation value: 0h

error marker: FFFFFh

Signal Type: 20 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 2, Bit 3)

Code	Name	Description
F4240 . . FFF FE	display '-----'	
FFFFF	display blank	

SIA Anzeige Modus

V_SIA

SIA display mode

Used to display the SIA mode on the RIP.

Note: R50 only.

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 0b

error marker: 0b

Signal Type: 3 Bit, Enum (Byte 2, Bit 4...Byte 2, Bit 6)

Code	Name	Description
000	Display blank	
--1	INSPECTION	
-1-	OIL SERVE	
1--	CLOCK MARK	

Einheit für Kilometerstandsanzeige

V_ODO_U

Units for odometer display

This signal defines the display units for the odometer.

Note: R50 only.

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 2, Bit 7...Byte 2, Bit 7)

Code	Name	Description
0	km	
1	miles	

Tageskilometer 1 Anzeigewert

V_TRIP1

Trip 1 display value

This signal is used to give the Trip 1 display value to the RIP.

Note: R50 only.

Version:1

Sender: Kombi

Receiver: RIP

maximum value range: 0 ... 1638.2 miles or km

Value range: 0 ... 999.9 miles or km (Kombi)

conversion: (PH) = 0.1 * (HEX) [miles or km]

initialisation value: 0h

error marker: 3FFFh

Signal Type: 14 Bit, Unsigned Integer (Byte 3, Bit 0...Byte 4, Bit 5)

Code	Name	Description
3FF7	- (only minus sign in odo field)	
3FF8	rst & - (only minus sign in odo field)	
3FF9	SIA & - (only minus sign in odo field)	
3FFA	SIA & END	
3FFB	END (in ODO field)	
3FFC	rSt	
3FFD	SIA	
3FFE	display '---.'	
3FFF	display blank	

Einheit Fahrtcomputeranzeige

V_COMP_UNIT

Trip computer display units

Used to define the trip computer display units on the RIP.

Note: R50 only.

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 0b

error marker: -

Signal Type: 2 Bit, Enum (Byte 4, Bit 6...Byte 4, Bit 7)

Code	Name	Description
00	Display blank	
01	Metric	
10	Imperial	
11	European	

Fahrtcomputeranzeige

V_COMP

Trip computer display value

This signal gives the trip computer display value to the RIP.

Note: R50 only.

Version: 1

Sender: Kombi

Receiver: RIP

maximum value range: -3276.7 ... 3276.7 miles or km

Value range: 3276.8 ... 3275.1 miles or km (Kombi)

conversion: (PH) = 0.1 * (HEX) [miles or km]

initialisation value: 0h

error marker: 7FFFh

Signal Type: 16 Bit, Signed Integer (Byte 5, Bit 0...Byte 6, Bit 7)

Code	Name	Description
7FFE	display '----'	
7FFF	display blank	

Fahrtcomputer Modus

V_COMP_MODE

Trip computer mode

This signal defines the required trip computer mode.

Note: R50

Version: 1

Sender: Kombi

Receiver: RIP

initialisation value: 0h

error marker: Fh

Signal Type: 4 Bit, Enum (Byte 7, Bit 0...Byte 7, Bit 3)

Code	Name	Description
0	Trip computer distance display	
1	Average speed display	
2	Outside temperature display	
3	Distance to empty display	
4	Average fuel consumption display	
5	Acceleration timer display	
6	'Time to empty' display	
7	Digital Speedo	
8	Spare	
9	Spare	
A	Display blank	
B	Spare	
C	Spare	

D	Spare	
E	Spare	
F	Error marker	

Status Diagnose Modus

ST_DIAG_MOD

Status diagnostic mode

Testfunktionen Modus Flag

Version: 1

Sender: Kombi

Receiver: RIP

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 7, Bit 4...Byte 7, Bit 4)

Code	Name	Description
0	Diagnostic mode off	
1	Diagnostic mode on	

INSTR6

Number: 1881, Version: 1

message short name: INSTR6
 Identifier: 1567 (61Fh)
 Length: 8 data bytes

Event Driven

Die Versendung erfolgt bei UBatt größer als 9 Volt und "wachem" Kombi, d.h. bei KL.R ein bis einschließlich der Nachlaufzeit von ca. 1 Minute nach KL.R aus oder bei KL.30 während der Aktivierung des Kombis durch den Fahrer ("ODO-Preview": Anzeige des Gesamtwegstreckenzählers durch Betätigen der Tageswegstrecken-Rückstelltaste bei KL.30).

Debounce time: tmin = 50ms

active condition = KL_R

sending condition = SIGNALCHANGE

Cyclic

Die Versendung erfolgt bei UBatt größer als 9 Volt und "wachem" Kombi, d.h. bei KL.R ein bis einschließlich der Nachlaufzeit von ca. 1 Minute nach KL.R aus oder bei KL.30 während der Aktivierung des Kombis durch den Fahrer ("ODO-Preview": Anzeige des Gesamtwegstreckenzählers durch Betätigen der Tageswegstrecken-Rückstelltaste bei KL.30).

Cycle time: ttyp = 1000ms (tmin = 900ms, tmax = 1100ms)

active condition = KL_R

start condition = KL_R_ON, stop condition = KL_R_OFF

Sender:-
 Kombi

Receiver:-
 RIP

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7								
Byte6								
Byte5					V_WL_EVENT			
Byte4	V_WL_EVENT							
Byte3	V_WL_EVENT							
Byte2	V_WL_EVENT		V_SIDE _ILL		V_OPE RATE_ 2	V_OPERATE		
Byte1	V_LCD_ILLUM							
Byte0	V LCD ILL GRAD							

LCD-Backlight Leuchtänderungsgradient

V_LCD_ILL_GRAD

LCD backlight illumination change gradient

This signal defines the rate of change of LCD backlight illumination to be applied.

This signal is scaled as a percentage of the maximum illumination available.

Init: 00H

Note: For R50 only. Special values of this signal include FFH, C0H, A0H, 00H, and 7FH. The application may take special action based on these values.

Version:1
 Sender: Kombi
 Receiver: RIP

maximum value range: -49.8 ... 50.211 %/s

Value range: 0 ... 49.8 %/s (Kombi)

Offset: -49.8 [%/s]

conversion: (PH) = 0.3922 * (HEX) -49.8 [%/s]

initialisation value: 0b

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 0, Bit 7)

Code	Name	Description
0-----	positive	
1-----	negative	
00000000	Attain final luminance value V_LCD_ILLUM then continue linearly.	
01111111	Starting from luminance value V_LCD_ILLUM with gradient +127 (+49	
10100000	Starting from luminance value V_LCD_ILLUM with gradient -32 (-12	
11000000	Has no effect on LCD rear lighting. Do not evaluate V_LCD_ILLUM.	
11111111	Jump to luminance V_LCD_ILLUM then continue linearly.	

LCD-Backlight Leuchtwert

LCD backlight illumination level

V_LCD_ILLUM

This signal defines the LCD backlight illumination level to be applied.

Note: For R50 only.

Version:1
 Sender: Kombi
 Receiver: RIP

maximum value range: 0 ... 100.011 %

Value range: 0 ... 100 % (Kombi)

conversion: (PH) = 0.3922 * (HEX) [%]

initialisation value: 0h

error marker: -

Signal Type: 8 Bit, Unsigned Integer (Byte 1, Bit 0...Byte 1, Bit 7)

Betriebsstatus RIP

V_OPERATE

RIP operational status request

This signal represents the ignition lock position status.

Note: R50

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 7h

error marker: 7h

Signal Type: 3 Bit, Enum (Byte 2, Bit 0...Byte 2, Bit 2)

Code	Name	Description
000	Kl.R, K.15, Kl.50 inactive	
--1	Kl.R active	
-1-	Kl.15 active	
1--	Kl.50 active	

RIP Betriebsstatus 2

V_OPERATE_2

RIP operational status request 2

This signal defines the required operational status of the RIP.

Formula: $V_OPERATE_2 = (KL.R == ON) \vee (KL.15 == ON) \vee (KL.50 == ON) \vee$
„ODO-Preview“ OR „Hazard-Warning“.

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 2, Bit 3...Byte 2, Bit 3)

Code	Name	Description
0	Sleep indication	
1	Wakeup / Alive	

Status Seitenbeleuchtung

V_SIDE_ILL

Sidelights illumination status

This signal defines the required status of the sidelights illumination on the RIP.

Note: R50

Version:1

Sender: Kombi

Receiver: RIP

initialisation value: 0h

error marker: -

Signal Type: 1 Bit, Enum (Byte 2, Bit 5...Byte 2, Bit 5)

Code	Name	Description
0	Sidelights not active	
1	Sidelights active	

Status Warnlampen

V_WL_EVENT

Warning lamp status request

This signal defines the required status of the RIP warning lamps.

Note: For R50 only

Version: 1

Sender: Kombi

Receiver: RIP

initialisation value: 0b

error marker: -

Signal Type: 22 Bit, Enum (Byte 2, Bit 6...Byte 5, Bit 3)

Code	Name	Description
---- ---- ---- -0	WL21 OFF	Warning light position 21 OFF
---- ---- ---- -1	WL21 ON	Warning light position 21 ON
---- ---- ---- 0-	WL22 OFF	Warning light position 22 OFF
---- ---- ---- 1-	WL22 ON	Warning light position 22 ON
---- ---- ---0 --	WL23 OFF	Warning light position 23 OFF
---- ---- ---1 --	WL23 ON	Warning light position 23 ON
---- ---- --0- --	WL24 OFF	Warning light position 24 OFF
---- ---- --1- --	WL24 ON	Warning light position 24 ON
---- ---- -0-- --	WL25 OFF	Warning light position 25 OFF
---- ---- -1-- --	WL25 ON	Warning light position 25 ON
---- ---- 0--- --	WL26 OFF	Warning light position 26 OFF
---- ---- 1--- --	WL26 ON	Warning light position 26 ON

----- -----0 -----	WL27 OFF	Warning light position 27 OFF
----- -----1 -----	WL27 ON	Warning light position 27 ON
----- -----0- -----	WL28 OFF	Warning light position 28 OFF
----- -----1- -----	WL28 ON	Warning light position 28 ON
----- -----0- -----	WL29 OFF	Warning light position 29 OFF
----- -----1- -----	WL29 ON	Warning light position 29 ON
----- -----0- -----	WL30 OFF	Warning light position 30 OFF
----- -----1- -----	WL30 ON	Warning light position 30 ON
----- -----0- -----	WL31 OFF	Warning light position 31 OFF
----- -----1- -----	WL31 ON	Warning light position 31 ON
----- -----0- -----	WL32 OFF	Warning light position 32 OFF
----- -----1- -----	WL32 ON	Warning light position 32 ON
----- -----0- -----	WL33 OFF	Warning light position 33 OFF
----- -----1- -----	WL33 ON	Warning light position 33 ON
----- -----0- -----	WL34 OFF	Warning light position 34 OFF
----- -----1- -----	WL34 ON	Warning light position 34 ON
----- -----0- -----	WL35 OFF	Warning light position 35 OFF
----- -----1- -----	WL35 ON	Warning light position 35 ON
WL36 OFF	Warning light position 36 OFF	-----1- -----
WL36 ON	Warning light position 36 ON	-----0- -----
WL37 OFF	Warning light position 37 OFF	-----1- -----
WL37 ON	Warning light position 37 ON	-----0- -----
WL38 OFF	Warning light position 38 OFF	-----1- -----
WL38 ON	Warning light position 38 ON	-----0- -----

WL39 OFF	Warning light position 39 OFF	---1 ---- -
WL39 ON	Warning light position 39 ON	--0- ---- -
WL40 OFF	Warning light position 40 OFF	--1- ---- -
WL40 ON	Warning light position 40 ON	-0-- ---- -
WL41 OFF	Warning light position 41 OFF	-1-- ---- -
WL41 ON	Warning light position 41 ON	0--- ---- -
WL42 OFF	Warning light position 42 OFF	1--- ---- -
WL42 ON	Warning light position 42 ON	

LWS1

Number: 1882, Version: 1

LWS_CAN: SE 9'96 steering wheel angle sensor, only for E38, LWS5: SE 9'97 steering wheel angle sensor, with diagnostic interface, can be coded for E38, E39, E46

message short name: LWS1
 Identifier: 501 (1F5h)
 Length: 8 data bytes

Cyclic

*1) System; *2) Output period; *3) Tolerance for the output; *4) Latency time

*1) LWS_CAN: SE 9'96 steering wheel angle sensor, only for E38, LWS5: SE 9'97 steering wheel angle sensor, with diagnostic interface, can be coded for E38, E39, E46

*2) The start of the LWS1 transmission begins 6 ms or 16 ms after receipt of the ASC2 message. This prevents bus collisions and makes automatic adjustment to different sampling rates possible (within certain limits). If no ASC2 message is received within a period of approx. 24 ms, the LWS1 message is transmitted in 10 ms intervals without synchronisation. If ASC2 messages are then received again, after a synchronising phase, the LWS1 message is transmitted synchronously with ASC2 as usual.

*3) The tolerance for the output is essentially determined by the synchronising mechanism.

*4) For DSC3 systems with an ASC1 or ASC2 output period of 20 ms: In order to keep the time delay between the steering wheel angle sampling (or output on the CAN bus) and the use of these CAN signals in the DSC3 system to a minimum, the LWS1 message must be available on the CAN bus at least 1 ms before the ASC1 message.

Phase diagram for the LWS operation that is synchronous with ASC2 - for DSC3 with an output period of 20 ms for ASC1 or ASC2:

General:

The signals of the LWS1 message are defined according to the coordinate system in accordance with DIN 70000 (ISO-8855), Section 1.2.

Start time: ttyp = ??? (tmin = 120ms, tmax = 500ms)

Cycle time: ttyp = 10ms (tmin = 6ms, tmax = 14ms)

active condition = KL_87

start condition = ASC2 received, stop condition = KL_87_OFF

Sender:-

LWS

Receiver:-

ASC_DSC

Signals (Message layout):

	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte7	LWS_A Y_SGN, LWS_P SIPKT_ SGN,L WS_BK _SGN,L WS_AN A	LWS_AY_MAG,LWS_PSIPKT_MAG,LWS_BK_MAG,LWS_ANA						
Byte6	LWS_AY_MAG,LWS_PSIPKT_MAG,LWS_BK_MAG,LWS_ANA							
Byte5	LWS CNT				LWS STAT			

Byte4	LWS_ID	
Byte3	LWS_L RWPKT _SGN	LWS_LRWPKT_MAG
Byte2	LWS_LRWPKT_MAG	
Byte1	LWS_L RW_SG N	LWS_LRW_MAG
Byte0	LWS_LRW_MAG	

LWS-Lenkradwinkel

LWS_LRW_MAG

LWS steering wheel angle

See DIN 70000, Section 4.1.5.6

The steering wheel angle is registered by a sensor on the steering wheel. Here, an angle is measured that is resolved between -180 degrees and +180 degrees. The absolute position of the angle is determined from the sensor signal, the stored zeroing value when the steering wheel is at the straight ahead position, and the steering wheel rotations, which are counted in the LWS control module. The zeroing of the steering wheel angle at the end-of-line or in a workshop is accomplished through positioning to the straight ahead position using the diagnostic interface or via CAN interface (FDR_ID signal of the ASC3 CAN message). By conducting plausibility checks (e.g. with other CAN signals; see FDR_PSIPKT, VRD_LV_ASC, VRD_RV_ASC, etc.) the quality of the signal can be checked and passed on as different status data (see LWS_STAT). If the steering wheel angle can not be calculated from the sensor signals, nor from redundant variables, an error marking of the LWS_LRW signal is made in addition to the corresponding bits in the status (LWS_STAT). In this case, the steering wheel angle that is transmitted is 8000H.

See LWS_LRW_SGN

Version:1

Sender: LWS

Receiver: ASC_DSC

maximum value range: 0 ... 1439.78198 °

Value range: 0 ... 1439.96 ° (LWS)

conversion: (PH) = 0.04394 * (HEX) [°]

initialisation value: 0h

error marker: 0h

Signal Type: 15 Bit, Unsigned Integer (Byte 0, Bit 0...Byte 1, Bit 6)

LWS-Lenkradwinkel Vorzeichen

LWS_LRW_SGN

LWS steering wheel angle sign

See LWS_LRW_MAG

Version:1

Sender: LWS

Receiver: ASC_DSC

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 1, Bit 7...Byte 1, Bit 7)

Code	Name	Description
0	+	
1	-	

LWS-Lenkradwinkel-Geschwindigkeit

LWS_LRWPKT_MAG

LWS steering wheel angle gradient

The calculation of the steering wheel angle speed (see LWS5 Specification) is made using the digital differentiation of the steering wheel angle in a way that is "conform to the steering wheel angle sampling"; this means that the time intervals for the differentiation are based on the steering wheel angle's sampling time and not on the output of the steering wheel angle on the CAN bus.

By conducting plausibility checks (e.g. with other CAN signals; see FDR_PSIPKT, VRD_LV_ASC, VRD_RV_ASC, etc.) the quality of the signal can be checked and passed on as different status data (see LWS_STAT).

If the steering wheel angle speed cannot be calculated due to a lack of steering wheel angle signals, in addition to the corresponding bits in the status (LWS_STAT), an error marking for the LWS_LRWPKT signal. When this is the case, 8000H is the steering wheel angle speed value that is transmitted.

Sign see LWS_LRWPKT_SGN

Version: 1

Sender: LWS

Receiver: ASC_DSC

maximum value range: 0 ... 1440.10965 °/s

Value range: 0 ... 1439.96 °/s (LWS)

conversion: (PH) = 0.04395 * (HEX) [°/s]

initialisation value: 0h

error marker: 0h

Signal Type: 15 Bit, Unsigned Integer (Byte 2, Bit 0...Byte 3, Bit 6)

LWS-Lenkradwinkel-Geschwindigkeit Vorzeichen

LWS_LRWPKT_SGN

LWS steering wheel angle gradient sign

see LWS_LRWPKT_MAG

Version: 1

Sender: LWS

Receiver: ASC_DSC

initialisation value: 1h

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 3, Bit 7...Byte 3, Bit 7)

Code	Name	Description
0	+	
1	-	

Lenkradwinkelsensor Identifier

LWS_ID

ID from zeroing of steering wheel angle sensor

A fixed assignment of the LWS to the vehicle is necessary for safety reasons. For this reason, during the steering wheel angle sensor zeroing (end-of-line or workshop), a vehicle-specific identifier is stored in the LWS EEPROM. This identifier is then verified each time that the vehicle is started and, if necessary, steering wheel angle sensor zeroing is requested. This makes it possible to detect the installation of an LWS that was previously installed in another vehicle or is new from the factory.

Since no vehicle-specific identifier can be circulated on the CAN bus until the "Bauteilkurzbez" goes into series production (9'96), a substitute variable (LWS-ID) with the corresponding characteristics must also be created. This LWS identifier is generated using an 8-bit random number generator in the diagnostic device and is stored or verified in the DSC3 control module as well as in the LWS as needed. Due to the high statistical repetition rates for the LWS ID (8 bit), this concept is only suitable for low production numbers and therefore is only a provisional solution.

Beginning with the series implementation of the LWS5 (9'97) the vehicle identification number, which can be transmitted by CAN bus beginning in 9'97, will serve the function described above.

Init: 00H (for non-initialised sensors)

Version: 1

Sender: LWS

Receiver: ASC_DSC

maximum value range: 0 ... 255

Value range: 0 ... 254 (LWS)

initialisation value: 0h

error marker: 0h

Signal Type: 8 Bit, Unsigned Integer (Byte 4, Bit 0...Byte 4, Bit 7)

Interne Status

LWS_STAT

Internal status

Bits 40 ... 43 represent the current status of the LWS1 signals: LWS_LRW, LWS_LRWPKT, LWS_AY, LWS_PSIPKT, LWS_BK, and LWS_ANA.

A special phase relationship exists between the output and the LWS_LRW, LWS_LRWPKT, LWS_AY, LWS_PSIPKT, LWS_BK, LWS_ANA, and LWS_CNT signals.

Error marking: 06H / 07H

Version: 1

Sender: LWS

Receiver: ASC_DSC

initialisation value: -

error marker: -

Signal Type:

4 Bit, Enum (Byte 5, Bit 0...Byte 5, Bit 3)

Code	Name	Description
-000	LRW_ABS_VER	Steering wheel angle signal, absolute and verified Steering wheel angle: Absolute, ± 1433.6 degrees with steering wheel angle independent signal verified LRW speed: ± 1433.6 degrees/s Virt. sensor: Virt. sensor: Only when individual wheel speed present, otherwise initialization value
-001	LRW_ABS	Lenkradwinkelsignal absolut Lenkradwinkel: absolut, $\pm 1433,6$ Grad Lrw-Geschw.: $\pm 1433,6$ Grad/s virt. Sensorik: nur wenn Einzelradgeschw. vorhanden, sonst Initwerte.
-010	LRW_REL	Lenkradwinkelsignal relativ Lenkradwinkel: relativ, ± 180 Grad Lrw-Geschw.: $\pm 1433,6$ Grad/s virt. Sensorik: nur wenn Einzelradgeschw. vorhanden, sonst Initwerte
-011	LRW_DIAG	Lenkradwinkelsignal während Diagnose Lenkradwinkel: ungültig Lrw-Geschw.: ungültig virt. Sensorik: Initwerte Bei bestimmten Diagnosefunktionen kann es bei der Lenkradwinkel-berechnung systembedingt zu Unregelmäßigkeiten kommen.
-100	LRW_RAD(not yet realized)	Lenkradwinkelsignal aus Radgeschwindigkeiten Lenkradwinkel: syn Lenkradwinkel, $\pm 1433,6$ Grad Lrw-Geschw.: mit syn Lrw, $\pm 1433,6$ Grad/s virt. Sensorik: nur wenn Einzelradgeschw. vorhanden, sonst Initwerte Lenkradwinkel u. Lrw-Geschw. lassen sich nur aus Einzelradgeschwindigkeiten abschätzen, evtl. Fehler im Lenkradwinkelsensorelement, Auswerteelektronik i.O.
-101	Reserve	
-110	NO_LRW_SEN	kein Lenkradwinkelsignal - Sensorfehler Lenkradwinkel: Fehlerwert Lrw-Geschw.: Fehlerwert virt. Sensorik: nur wenn Einzelradgeschw. vorhanden, sonst Initwert Fehler im Lenkradwinkelsensorelement, Auswerteelektronik i.O.
-111	NO_LRW_EL	kein Lenkradwinkelsignal - Elektronikfehler Lenkradwinkel: Fehlerwert Lrw-Geschw.: Fehlerwert virt. Sensorik: Fehlerwert Fehler in Auswerteelektronik (ROM, EEPROM usw)
0---	LRW_NOFTOL	Lenkradwinkelsignal außerhalb Fehlertoleranzphase Lenkradwinkel: je nach Zustand Bit 40, 41, 42 Lrw-Geschw.: je nach Zustand Bit 40, 41, 42 virt. Sensorik: je nach Zustand Bit 40, 41, 42
1---	LRW_FTOL	Lenkradwinkelsignal während Fehlertoleranzphase Lenkradwinkel: letzter gültige Wert Lrw-Geschw.: 0 Grad/s

LWS-QuerbeschleunigungLWS_AY_M
AG

LWS lateral acceleration

virt. Sensorik: nur wenn Einzelradgeschw. vorhanden, sonst
InitwertVersion:1
Sender: LWS
Receiver: ASC_DSC

maximum value range: 0 ... 65.534 m/s²

conversion: (PH) = 0.002 * (HEX) [m/s²]

initialisation value: -

error marker: 0h

Signal Type: 15 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 0

LWS-Giergeschwindigkeit

LWS_PSIPKT_MAG

LWS-Yaw velocity

Version:1
Sender: LWS
Receiver: ASC_DSC

maximum value range: 0 ... 6.5534 rad/s

conversion: (PH) = 0.0002 * (HEX) [rad/s]

initialisation value: -

error marker: 0h

Signal Type: 15 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 1

LWS-Bahnkrümmung

LWS_BK_MAG

LWS path curvature

Version:1
Sender: LWS
Receiver: ASC_DSC

maximum value range: 0 ... 1.31068 1/m

conversion: (PH) = 0.00004 * (HEX) [1/m]

initialisation value: -

error marker: 0h

Signal Type: 15 Bit, Unsigned Integer (Byte 6, Bit 0...Byte 7, Bit 6)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 2

LWS-Debuginformationen
LWS Debug information

LWS_ANA

Version:1
Sender: LWS
Receiver: ASC_DSC

initialisation value: -

error marker: -

Signal Type: 16 Bit, - (Byte 6, Bit 0...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 3

Vorzeichen LWS-Querbeschleunigung
Sign LWS lateral acceleration

LWS_AY_SGN

Sign for LWS_AY_MAG
Version:1
Sender: LWS
Receiver: ASC_DSC

initialisation value: -

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 0

Code	Name	Description
0	Sign positive (+)	
1	Sign negative (-)	

Vorzeichen LWS-Giergeschwindigkeit
Sign LWS-Yaw velocity

LWS_PSIPKT_SGN

Sign for LWS_PSIPKT_MAG
Version:1
Sender: LWS
Receiver: ASC_DSC

initialisation value: -

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 1

Code	Name	Description
0	Sign positive (+)	
1	Sign negative (-)	

Vorzeichen LWS-Bahnkrümmung

LWS_BK_SGN

Sign LWS path curvature

Sign for LWS_BK_MAG

Version: 1

Sender: LWS

Receiver: ASC_DSC

initialisation value: -

error marker: 1h

Signal Type: 1 Bit, Enum (Byte 7, Bit 7...Byte 7, Bit 7)
MULTIPLEXED SIGNAL
Selected when LWS_CNT = 2

Code	Name	Description
0	Sign positive (+)	
1	Sign negative (-)	

This message contains multiplexed signals

Multiplexer = LWS_CNT

Value Signal

0	LWS-Querbeschleunigung
0	Vorzeichen LWS-Querbeschleunigung
1	LWS-Giergeschwindigkeit
1	Vorzeichen LWS-Giergeschwindigkeit
2	LWS-Bahnkrümmung
2	Vorzeichen LWS-Bahnkrümmung
3	LWS-Debuginformationen