INTERNATIONAL STANDARD

ISO 16844-7

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Road vehicles — Tachograph systems —

Part 7: Parameters

Véhicules routiers — Systèmes de tachygraphes —

Partie 7: Paramètres

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16844-7 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 16844 consists of the following parts, under the general title *Road vehicles — Tachograph systems*:

— *Part 1: Electrical connectors*

— *Part 2: Recording unit, electrical interface*

— *Part 3: Motion sensor interface*

— *Part 4: CAN interface*

— *Part 5: Secured CAN interface*

— *Part 6: Diagnostics*

— *Part 7: Parameters*

Introduction

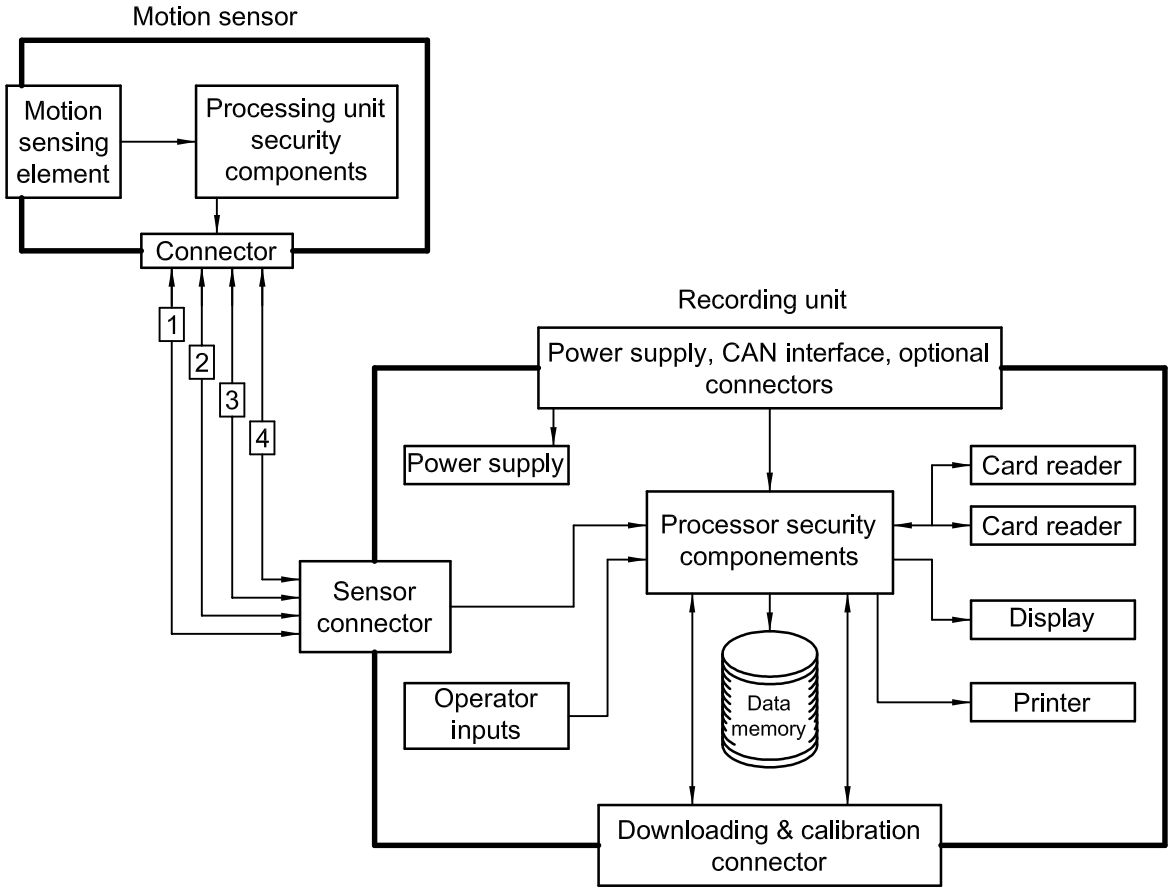
ISO 16844 supports and facilitates the communication between electronic units and a tachograph; the tachograph being based upon Council Regulations (EEC) No. 3820/85 [1] and No. 3821/85 and their amendments Council Regulation (EEC) No. 2135/98 and Commission Regulation (EC) No. 1360/2002 (see Clause 2).

Its purpose is to ensure the compatibility of tachographs from various tachograph manufacturers.

The basis of the digital tachograph concept is a recording unit (RU) that stores data related to the activities of the drivers of a vehicle on which it is installed. When the RU is in normal operational status, the data stored in its memory are made accessible to various entities such as drivers, authorities, workshops and transport companies in a variety of ways: they may be displayed on a screen, printed by a printing device or downloaded to an external device. Access to stored data is controlled by a smart card inserted in the tachograph.

In order to prevent manipulation of the tachograph system, the speed signal sender (motion sensor) is provided with an encrypted data link.

A typical tachograph system is shown in Figure 1.



Key

1 positive supply
2 battery minus
3 speed signal, real time
4 data signal in/out

Figure 1 — Typical tachograph system

Road vehicles — Tachograph systems —

Part 7: Parameters

1 Scope

This part of ISO 16844 specifies the parameters used in the interchange of digital information between a road vehicle's tachograph system and vehicle units or a diagnostic tester, or within the tachograph system itself. The parameters are applicable for real time communication and/or diagnostic services.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8859 (all parts), *Information technology — 8-bit single-byte coded graphic character sets*

ISO 14230-3, *Road vehicles — Diagnostic systems — Keyword Protocol 2000 — Part 3: Application layer*

ISO 16844-4, *Road Vehicles — Tachograph systems — Part 4: CAN interface*

ISO 16844-6, *Road Vehicles — Tachograph systems — Part 6: Diagnostics*

Council Regulation (EEC) No. 3821/85 of 20 December 1985 on recording equipment in road transport

Commission Regulation (EC) No. 1360/2002 of 13 June 2002 adapting for the seventh time to technical progress Council Regulation (EEC) No. 3821/85 on recording equipment in road transport

Council Regulation (EEC) No. 2135/98 of 24 September 1998 amending Regulation (EEC) No. 3821/85 on recording equipment in road transport and Directive 88/599/EEC concerning the application of Council Regulations (EEC) No. 3820/85 and (EEC) No. 3821/85

Council Directive 92/23/EEC relating to tyres for motor vehicles and their trailers and to their fitting

3 Abbreviated terms

CAN controller area network

Cvt. convention

DTC diagnostic trouble code

ECU electronic control unit

KBD keyboard

M mandatory

N/A not applicable

R accessible in reading using diagnostic services

RDI record data identifier[1)]

RMS registering member state

R/W accessible in reading and writing, using diagnostic services

SJW resynchronisation jump width

Tq time quantum

U user option

UTC universal time co-ordinated

VIN vehicle identification number

VRN vehicle registration number

"Tachograph regulation" used throughout this part of ISO 16844 refers to Council Regulation (EEC) No. 1360/2002, Annex 1B.

4 Identifier specifications

4.1 Record data identifiers

The record data identifiers used in the diagnostic services specified in ISO 16844-6 shall be in accordance with Table 1.

Table 1 — Record data identifiers

Hex	Identifier description	Cvt.	Simplified mnemonic	R or R/W
F187	VehicleManufacturerSparePartNumber	U	VMSPN	R/W
F188	VehicleManufacturerECUSoftwareNumber	U	VMECUSWN	R/W
F189	VehicleManufacturerECUSoftwareVersionNumber	U	VMECUSWVN	R/W
F18A	SystemSupplierIdentifier	**M**	SSID	R
F18B	ECUManufacturingDate	**M**	ECUMD	R
F18C	ECUSerialNumber	**M**	ECUSN	R
F190	VehicleIdentificationNumber	**M**	VIN	R/W
F191	VehicleManufacturerECUHardwareNumber	**M**	VMECUHWN	R/W
F192	SystemSupplierECUHardwareNumber	**M**	SSECUHWN	R
F193	SystemSupplierECUHardwareVersionNumber	**M**	SSECUHWVN	R
F194	SystemSupplierECUSoftwareNumber	**M**	SSECUSWN	R

1) RecordDataIdentifier with 262144 values available and, for instance, used in ReadDataByIdentifier, WriteDataByIdentifier InputOutputControlByIdentifier services.

Table 1 (*continued*)

Hex	Identifier description	Cvt.	Simplified mnemonic	R or R/W
F195	SystemSupplierECUSoftwareVersionNumber	**M**	SSECUSWVN	R
F196	ExhaustRegulationOrTypeApprovalNumber	**M**	EROTAN	R
F197	SystemNameOrEngineType	U	SNOET	R/W
F198	RepairShopCodeOrTesterSerialNumber	U	RSCOTSN	R/W
F199	ProgrammingDate	U	PD	R/W
F19A	CalibrationRepairShopCodeOrCalibrationEquipementSerialNumber	**M**	CRSCOCESN	R/W
F19B	CalibrationDate	**M**	CD	R/W
F19C	CalibrationEquipmentSWNumber	**M**	CESWN	R/W
F19D	ECUInstallationDate	**M**	EID	R/W
F19E	ODXFileIdentifier	**M**	OFID	R/W
F900-F9FF	Reserved for tachograph systems	**M**	—	—
F902	TachographVehicleSpeed	**M**	TVS	R
F903	Driver1WorkingState	**M**	D1WS	R
F904	Driver2WorkingState	**M**	D2WS	R
F905	DriveRecognize	**M**	DR	R
F906	Driver1TimeRelatedStates	**M**	D1TRS	R
F907	DriverCardDriver1	**M**	DCD1	R
F908	OverSpeed	**M**	OS	R
F909	Driver2TimeRelatedStates	**M**	D2TRS	R
F90A	DriverCardDriver2	**M**	DCD2	R
F90B	TimeDate	**M**	TD	R/W
F90C	ResetHeartbeatMessage	**M**	RHM	R/W
F90D	AdjustLocalMinuteOffset	**M**	ALMO	R/W
F90E	AdjustLocalHourOffset	**M**	ALHO	R/W
F90F	PriorityLevelOfTCO1Message	**M**	PLOTM	R/W
F912	HighResolutionTotalVehicleDistance	**M**	HRTVD	R/W
F913	HighResolutionTripDistance	**M**	HRTD	R/W
F914	ServiceComponentIdentification	**M**	SCI	R
F915	ServiceDelayCalendarTimeBased	**M**	SDCTB	R
F916	Driver1Identification	**M**	D1I	R
F917	Driver2Identification	**M**	D2I	R
F918	KFactor	**M**	KF	R/W
F919	SpeedMeasurementRange	**M**	SMR	R
F91A	NumberOfTeethOnPhonicWheel	U	NOTOPW	R/W
F91B	TachographOutputShaftSpeed	**M**	TOSS	R
F91C	LFactorTyreCircumference	**M**	LFTC	R/W
F91D	WVehicleCharacteristicFactor	**M**	WVCF	R/W

Table 1 (*continued*)

Hex	Identifier description	Cvt.	Simplified mnemonic	R or R/W
F91E	PulsesPerRevolutionOfOutputShaft	**M**	PPROOS	R/W
F91F	SecurityViolation	**M**	SV	R
F920	TransmissionRepetitionRateOfTCO1Message	**M**	TRROTM	R/W
F921	TyreSize	**M**	TS	R/W
F922	NextCalibrationDate	**M**	NCD	R/W
F923	Driver1ContinuousDrivingTime	**M**	D1CDT	R
F924	Driver2ContinuousDrivingTime	**M**	D2CDT	R
F925	Driver1CumulativeBreakTime	**M**	D1CBT	R
F926	Driver2CumulativeBreakTime	**M**	D2CBT	R
F927	Driver1Current DurationOfSelectedActivity	**M**	D1CDOSA	R
F928	Driver2Current DurationOfSelectedActivity	**M**	D2CDOSA	R
F92C	SpeedAuthorised	**M**	SA	R/W
F930	TachographCardSlot1	**M**	TCS1	R
F931	Driver1Name	**M**	D1N	R
F932	Driver2Name	**M**	D2N	R
F933	TachographCardSlot2	**M**	TCS2	R
F936	OutOfScopeCondition	**M**	OOSC	R
F937	ModeOfOperation	**M**	MOO	R
F938	Driver1CumulatedDrivingTimePreviousAndCurrentWeek	**M**	D1CDTPACW	R
F939	Driver2CumulatedDrivingTimePreviousAndCurrentWeek	**M**	D2CDTPACW	R
F940	RealTimeSpeedPulses	**M**	RTSP	R/W
F95A	EngineSpeed	U	ES	R/W
F960	CalibrationInputOutput	**M**	CIO	R/W
F979	SynchronizationJumpWidth	**M**	SJW	R/W
F97A	SamplePoint	**M**	SP	R/W
F97B	TimeOutMessageErrorDelay	**M**	TOMED	R/W
F97C	ErrorManagementInitialisationInhibition	**M**	EMII	R/W
F97D	RegisteringMemberState	**M**	RMS	R/W
F97E	VehicleRegistrationNumber	**M**	VRN	R/W
F97F	VehicleRegistrationDate	**M**	VRD	R/W

4.2 Routine identifiers

The routine identifiers used in the diagnostic services specified in ISO 16844-6 shall be in accordance with Table 2.

Table 2 — Routine identifiers

Hex	Routine identifier	Cvt.	Simplified mnemonic
014F	MotionSensorVehicleUnitPairing	**M**	MSVUP
0150	DisplayTest	**M**	DT
0151	LCDNegativeModeTest	**M**	LNMT
0152	PrinterTest	**M**	PT
0153	HardwareTest	**M**	HT
0154	CarderReaderTest	**M**	CRT
0155	Reserved by document	U	RBD
0156	ButtonTestLoop	**M**	BTL

5 Parameters and values

5.1 Transmitted signal ranges

For the ranges used to determine the validity of a transmitted signal, see Table 3.

For the ranges used to denote the state of a discrete parameter, see Table 4.

For the ranges used to denote the state of a control mode command, see Table 5.

The values of the error indicator range provide a means for a module to immediately indicate that valid parameter data are currently not available due to error in the sensor, sub-system or module.

The values in the *not available* range provide a means for a module to transmit a message which contains a parameter not available or not supported in the module. The values in the *not requested* range provide a means for a device to transmit a command message and identify those parameters where no response is expected from the receiving device.

If a component failure prevents the transmission of valid data of a parameter, the error indicator as specified in Tables 3 and 4 shall be used instead of the parameter data. However, the error indicator shall not be used if the measured or calculated data have yielded a value but exceed the specified parameter range. Instead, the data shall be transmitted using the appropriate minimum or maximum parameter value.

When a specified parameter of this part of ISO 16844 is transmitted using diagnostic services, padding bits shall be added to increase its length to the next integer number of bytes in the case where its length is not an integer number of bytes. This padding shall be made by setting the relevant most significant bits to zero.

EXAMPLE Driver1WorkingStates, RDI $F903_{16}$, 3 bit length: when this parameter value is 010, it is transmitted as one byte of the value of 02_{16}.

Table 3 — Transmitted signal ranges

Range name	1 byte	2 bytes	4 bytes	ASCII
Valid signal	0 to 250	0 to 64 255	0 to 4 211 081 215	1 to 254
	00_{16} to FA_{16}	0000_{16} to $FAFF_{16}$	00000000_{16} to $FAFFFFFF_{16}$	01_{16} to FE_{16}
Parameter specific indicator	251	64 256 to 64 511	4 211 081 216 to 4 227 858 431	none
	FB_{16}	$FB00_{16}$ to $FBFF_{16}$	$FBxxxxxx_{16}$	
Reserved range for future indicator bits	252 to 253	64 512 to 65 023	4 227 858 432 to 4 261 412 863	none
	FC_{16} to FD_{16}	$FC00_{16}$ to $FDFF_{16}$	$FC000000_{16}$ to $FDFFFFFF_{16}$	
Error indicator	254	65 024 to 65 279	4 261 412 864 to 4 278 190 079	0
	FE_{16}	$FExx_{16}$	$FExxxxxx_{16}$	00_{16}
Not available or not requested	255	65 280 to 65 535	4 278 190 080 to 4 294 967 294	255
	FF_{16}	$FFxx_{16}$	$FFxxxxxx_{16}$	FF_{16}

Table 4 — Transmitted values of discrete parameters (measured)

Range name	Transmitted value
Disabled (off, passive, etc.)	00
Enabled (on, active, etc.)	01
Error indicator	10
Not available or not installed	11

Table 5 — Transmitted values of control commands (status)

Range name	Transmitted value
Command to disable function (turn off, etc.)	00
Command to enable function (turn on, etc.)	01
Reserved	10
Don't care/take no action (leave function as is)	11

The data type may be either *status* or *measured*.

— **Status** specifies the present state of a multi-state parameter or function as a result of action taken by the transmitting node. This action is the result of a calculation which uses local and/or network measured and/or status information.

— **Measured** data convey the current value of a parameter as measured or observed by the transmitting node to determine the condition of the specified parameter.

5.2 Parameter specifications

5.2.1 Seconds

The UTC parameter part Seconds shall provide

data length	1 byte
resolution	0,25 s/bit gain, 0 s offset
operating range	0 to 59,75 s
type	measured

The RDI is not used. The parameter part Seconds may be addressed through RDI attached to Time/Date.

5.2.2 Minutes

The UTC parameter part Minutes shall provide

data length:	1 byte
resolution:	1 min/bit gain, 0 min offset
operating range:	0 to 59 min
type:	measured

The RDI is not used. The parameter part Minutes may be addressed through RDI attached to Time/Date.

5.2.3 Hours

The UTC parameter part Hours shall provide

data length:	1 byte
resolution:	1 h/bit gain, 0 h offset
operating range:	0 to 23 h
type:	measured

The RDI is not used. The parameter part Hours may be addressed through RDI attached to Time/Date.

5.2.4 Month

The UTC parameter part Month shall provide

data length:	1 byte
resolution:	1 month/bit gain, 0 month offset
operating range:	1 to 12 months
type:	measured

The RDI is not used. The parameter part Month may be addressed through RDI attached to Time/Date.

NOTE A value of 0 for the month is null. The value 1 identifies January; 2 identifies February; etc.

5.2.5 Day

The UTC parameter part Day shall provide

data length: 1 byte

resolution: 0,25 day/bit gain, 0 day offset

operating range: 0,25 to 31,75 days

type: measured

The RDI is not used. The parameter part Day may be addressed through RDI attached to Time/Date.

NOTE 1 A value of 0 for the date is null. The values 1, 2, 3, and 4 are used to identify the first day of the month, while 5, 6, 7, and 8 identify the second day of the month, etc.

NOTE 2 This parameter does not influence or change the hours parameter above.

5.2.6 Year

The UTC parameter part Year shall provide

data length: 1 byte

resolution: 1 year/bit gain, +1985 year offset

operating range: 1985 to 2235 year

type: measured

The RDI is not used. The parameter part Year may be addressed through RDI attached to Time/Date.

NOTE A value of 0 for the year identifies the year 1985; a value of 1 identifies 1986; etc.

5.2.7 Local minute offset

The parameter LocalMinuteOffset shall provide

data length: 1 byte

resolution: 1 min/bit gain, −125 min offset

operating range: −59 to +59 min;

type: measured

The RDI is not used. The parameter part Local Minute Offset may be addressed through RDI attached to Time/Date.

NOTE 1 For the recording unit, it represents an offset from UTC set by the driver.

NOTE 2 European legislation restricts the full range of use in tachographs. Only three (3) fixed values, 0, +30 min and –30 min, are used.

5.2.8 Local hour offset

The parameter LocalHourOffset shall provide

data length: 1 byte

resolution: 1 h/bit gain, −125 h offset

operating range: −23 to +23 h

type: measured

The RDI is not used. The parameter part Local Hour Offset may be addressed through RDI attached to Time/Date.

NOTE For the recording unit, it represents an offset from UTC set by the driver.

5.2.9 Vehicle identification number

The parameter VehicleIdentificationNumber as assigned by the vehicle manufacturer shall provide

data length: variable — up to 200 characters

resolution: ASCII

operating range: ASCII

type: measured

RDI (hex): F190

access: R/W

In this application, the VIN-length shall be 17 characters.

NOTE The ASCII character "*" is reserved as a delimiter.

5.2.10 Trip group 1

The parameter TripGroup1 is a command signal used only to reset trip distance.

00 take no action

01 reset

Type: status

5.2.11 System event

The parameter SystemEvent indicates an occurred tachograph event. This parameter shall be set true when a tachograph event (over-speed, continuous driving time exceeded, maintenance due, etc.) has occurred.

This parameter shall be used to drive a tachograph visual warning signal to the driver, as follows.

00 no tachograph event

01 tachograph event

Type: status

RDI is not used.

5.2.12 Handling information

The parameter HandlingInformation shall indicate that handling information is present, as follows. Information may include “no printer paper”, “no driver card”, etc.

00	no handling information
01	handling information
Type:	status

RDI is not used.

5.2.13 Tachograph performance

The parameter TachographPerformance shall be set while the tachograph is performing the auto test and indicate as follows.

00	normal performance
01	performance analysis
Type:	status

RDI is not used.

5.2.14 Direction indicator

The parameter DirectionIndicator shall indicate the direction of the vehicle motion (if any), as follows.

00	forward
01	reverse
Type:	measured

RDI is not used.

5.2.15 Requested illumination percentage

The parameter RequestIlluminationPercentage which shall provide

data length:	1 byte
resolution:	0,4 % bit gain, 0 % offset
data range:	0 to 100 %
type:	measured

RDI is not used.

5.2.16 Engine speed

The parameter EngineSpeed shall provide the actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders, and shall provide

data length:	2 bytes
resolution:	0,125 r/min per bit gain, 0 r/min offset (upper byte resolution = 32 r/min per bit)
data range:	0 to 8031,875 r/min
type:	measured
RDI (hex):	F95A
access:	R/W

5.2.17 Tachograph vehicle speed

The parameter TachographVehicleSpeed shall be the current speed of the vehicle measured by the tachograph and shall provide

data length:	2 bytes
resolution:	1/256 km/h/bit gain, 0 km/h offset
upper byte resolution	= 1,0 km/h/bit;
operating range:	0 to 250,996 km/h
type:	measured
RDI (hex):	F902
access:	R

5.2.18 Driver 1 working state

The parameter Driver1WorkingState shall indicate the state of work of driver 1, i.e. activity currently selected on the recording unit for the driver, as follows.

000	break/rest
001	availability
010	work
011	driving
100-101	reserved
Type:	measured
RDI (hex):	F903
Access:	R

5.2.19 Driver 2 working state

The parameter Driver2WorkingState shall indicate the state of work of driver 2, i.e. activity currently selected on the recording unit for the co-driver, as follows.

000	break/rest
001	availability
010	work
011-101	reserved
Type:	measured
RDI (hex):	F904
Access:	R

5.2.20 Drive recognize

The parameter DriverRecognize indicates whether or not motion of the vehicle is detected. Vehicle motion shall be indicated when more than one (1) pulse per second (imp/s) is detected by the recording unit from the motion sensor for at least five (5) seconds, as follows.

00	vehicle motion not detected
01	vehicle motion detected
Type:	measured
RDI (hex):	F905
Access:	R

5.2.21 Driver 1 time related states

The parameter Driver1TimeRelatedStates shall be used to indicate if driver 1 approaches/exceeds working time limits, (or other limits), as follows. Only the values 0001 and 0010 are required (mandatory). Limit #3 to limit #6 are optional warnings according to the tachograph regulation. If they are implemented, the format is as given here.

0000	no time-related warning detected
0001	limit #1: 15 min before 4 1/2 h
0010	limit #2: 4 1/2 h reached (continuous driving time exceeded)
0011	limit #3: 15 minutes before optional warning 1
0100	limit #4: optional warning 1 reached
0101	limit #5: 15 min before optional warning 2
0110	limit #6: optional warning 2 reached
0111–1100	reserved
1101	other
Type:	measured

RDI (hex): F906

Access: R

5.2.22 Driver card, driver 1

The parameter DriverCardDriver 1 shall be used to indicate the presence of the driver card of driver 1, i.e. that the card is placed in the driver slot of the recording unit, as follows. If another card is inserted (workshop, control or company card), the parameter driver card, driver 1, is equal to 00 (driver card not present).

00 driver card not present

01 driver card present

Type: measured

RDI (hex): F907

Access: R

5.2.23 Overspeed

The parameter Overspeed shall be used to indicate that the current vehicle speed has exceeded the authorised speed of the vehicle during a period of more than 60 s, as follows.

00 no overspeed

01 overspeed

Type: measured

RDI (hex): F908

Access: R

5.2.24 Driver 2 time related states

The parameter Driver2TimeRelatedStates shall be used to indicate that driver 2 (co-driver) approaches/exceeds working time limits, or other limits, as follows.

0000 no time related warning detected

0001 reserved

0010 reserved

0011 limit #3: 15 min before optional warning 1

0100 limit #4: optional warning 1 reached

0101 limit #5: 15 min before optional warning 2

0110 limit #6: optional warning 2 reached

0111–1100 reserved

1101 other

Type measured

RDI (hex): F909

Access: R

5.2.25 Driver card, driver 2

The parameter DriverCardDriver2 shall be used to indicate the presence of the driver card of driver 2, i.e. that the card is placed in co-driver slot of the recording unit, as follows. If another card is inserted (workshop, control or company card), the parameter driver card, driver 2, is equal to 00 (driver card not present).

00	driver card not present
01	driver card present
Type:	measured
RDI (hex):	F90A
Access:	R

5.2.26 Time date

The parameter group TimeDate shall be transmitted from the recording unit, i.e. all parameters shall be supported, as follows.

Byte:	1: seconds (see 5.2.1)
	2: minutes (see 5.2.2)
	3: hours (see 5.2.3)
	4: months (see 5.2.4)
	5: days (see 5.2.5)
	6: years (see 5.2.6)
	7: local minute offset (5.2.7)
	8: local hour offset (see 5.2.8)
RDI (hex):	F90B
Access:	R/W

5.2.27 Reset heartbeat message

The parameter ResetHeartbeatMessage shall be used to indicate if the reset heartbeat message is used, as follows.

00	disabled (the reset heartbeat message is not used by the recording unit)
01	enabled (the reset heartbeat message is used by the recording unit)
Type:	status
RDI (hex)	F90C
Access	R/W

5.2.28 Adjust local minute offset

The parameter AdjustLocalMinuteOffset shall be used to set the local offset in minutes from UTC, which influences the local minute offset only, and shall provide

data length: 1 byte

resolution: 1 min/bit gain, −125 min offset

operating range: −59 to +59 min

type: measured

RDI (hex): F90D

access: R/W

NOTE European legislation restricts the full range of use in tachographs. Only three (3) fixed values, 0, +30 min and –30 min, are used.

5.2.29 Adjust local hour offset

The parameter AdjustLocalHourOffset shall be used to set the local offset in hours from UTC which influences local hour offset only, and shall provide

data length: 1 byte

resolution: 1 h/bit gain, −125 h offset

operating range: −23 to +23 h

type: measured

RDI (hex): F90E

access: R/W

5.2.30 Priority level of TCO1 message

The parameter PriorityLevelOfTCO1Message shall be specified by end of line programming, and shall provide

data length: 3 bits

000 highest priority

001 priority 1

010 priority 2

011 priority 3, default value

100 priority 4

101 priority 5

110 priority 6

111 lowest

type: status

RDI (hex): F90F

access: R/W

5.2.31 High resolution total vehicle distance

The parameter HighResolutionTotalVehicleDistance shall indicate accumulated distance travelled by the vehicle during its operation, and shall provide

data length: 4 bytes

resolution: 5 m/bit gain, 0 m offset

operating range: 0 to +21 055 406 km

type: measured

RDI (hex): F912

access: R/W

5.2.32 High resolution trip distance

The parameter HighResolutionTripDistance shall indicate travelled distance during all or part of a journey, and shall provide

data length: 4 bytes

resolution: 5 m/bit gain, 0 m offset

operating range: 0 to +21 055 406 km

type: measured

RDI (hex): F913

access: R/W

5.2.33 Service component identification

The parameter ServiceComponentIdentification shall identify the component having the nearest time until the next service inspection (see Table 6), and shall provide

service inspection: periodic inspection for the recording unit; card expiry date for the driver cards

data length: 1 byte

resolution: 1 component ID/bit

operating range: 0 to 250

type: measured

RDI (hex): F914

access: R

Table 6 — Service component identification

Identification	Component
0	Service check for entire vehicle
1	Brake lining; left front axle
2	Brake lining; right front axle
3	Brake lining; left rear axle
4	Brake lining; right rear axle
5	Clutch lining
6–15	Not defined
16	Regulated general check for entire vehicle
17	Brake system special check
18	In-between check
19	Check trip recorder
20	Check exhaust gas
21	Check vehicle speed limiter
22–31	Not defined
32	Engine oil — engine No. 1
33	Engine oil — engine No. 2
34	Not defined
35	Steering oil
36	Not defined
37	Transmission oil — transmission No. 1
38	Transmission oil — transmission No. 2
39	Not defined
40	Intermediate transmission oil
41	Not defined
42	Front axle oil
43	Rear axle oil
44-47	Not defined
48	Tires
49	Engine air filter
50	Engine oil filter
51–60	Not defined
61	Tachograph
62	Driver card 1
63	Driver card 2
64–239	Not defined
240–249	Manufacturer specific
250–251	Reserved
252	Reset all components
253	No action to be taken
254	Error
255	Component identification not available

5.2.34 Service delay/calendar time based

The parameter ServiceDelay/CalendarTimeBased shall be the time in weeks until the next vehicle service inspection is required. A negative value shall be transmitted if the service inspection has been passed. The component that requires service shall be identified by the service component identification.

This time is computed as the difference between the week when service inspection is required and the current week. For the purpose of this computation, week means the period between 00:00 hours UTC on Monday and 24:00 UTC on Sunday. This parameter shall provide

data length: 1 byte

resolution: 1 week/bit gain, −125 weeks offset

operating range: −125 to +125 weeks

type: measured

RDI (hex): F915

access: R

5.2.35 Driver 1 identification

The parameter Driver1Identification shall be used to obtain the driver 1 identity from a driver card inserted in the recording unit, and shall contain three (3) bytes for the issuing member state of the driver card, and sixteen (16) bytes for the card number (see the tachograph regulation, Appendix 1: Nation Alpha and Card Number format), and shall provide

data length: 19 bytes ASCII

type: measured

byte: 1–3 issuing member state

4–19 card number

RDI (hex): F916

access: R

5.2.36 Driver 2 identification

The parameter Driver2Identification shall be used to obtain the driver 2 identity from a driver card inserted in the recording unit, and shall contain three (3) bytes for the issuing member state of the driver card, and sixteen (16) bytes for the card number (see the tachograph regulation, Appendix 1: Nation Alpha and Card Number format), and shall provide

data length: 19 bytes ASCII

type: measured

byte: 1–3 issuing member state

4–19 card number

RDI (hex): F917

access: R

5.2.37 K factor

The parameter KFactor shall be the current constant of the recording equipment, as the numerical characteristic giving the value of the input signal required to show and record a distance travelled of 1 km, resulting from the most recent calibration, and shall provide

data length: 2 bytes

resolution: 0,001 pulse/m /bit gain, 0 offset

operating range: 0 to 64,255 pulse/m

type: measured

RDI (hex): F918

access: R/W

5.2.38 Speed measurement range

The parameter SpeedMeasurementRange of the tachograph shall provide

data length: 2 bytes

resolution: 1/256 km/h/bit gain, 0 km/h offset, upper byte resolution = 1,0 km/h/bit

operating range: 0 to 250,996 km/h

type: measured

RDI (hex): F919

access: R

5.2.39 Number of teeth of phonic wheel

The parameter NumberofTeethofPhonicWheel shall provide

data length: 1 byte

resolution: 1 tooth/bit gain, 0 tooth offset

operating range: 0 to 250

type: measured

RDI (hex): F91A

access: R/W

5.2.40 Tachograph output shaft speed

The parameter TachographOutputShaftSpeed shall contain the calculated speed of the transmission output shaft, and shall provide:

data length: 2 bytes

resolution: 0,125 r/m/bit gain, 0 rpm offset (upper byte resolution = 32 r/min per bit)

operating range: 0 to 8031,875 r/min

type measured

RDI (hex): F91B

access: R

5.2.41 L factor

The parameter LFactor shall be the current effective circumference of the wheel tyres, given as the average of the distances travelled by each of the wheels moving the vehicle (driving wheels) in the course of one complete rotation resulting from the most recent calibration, and shall provide

data length: 2 bytes

resolution: 0,125 10-3 m /bit gain, 0 offset

operating range: 0 to 8,031 m

type: measured

RDI (hex): F91C

access: R/W

5.2.42 W factor

The parameter WFactor shall be the current numerical characteristic giving the value of the output signal emitted by the part of the vehicle linked with the recording equipment (gearbox output shaft or axle) while the vehicle travels a distance of 1 km under standard test conditions, resulting from the most recent calibration, and shall provide

data length: 2 bytes

resolution: 0,001 pulse/m /bit gain, 0 offset

operating range: 0 to 64,255 pulse/m

type: measured

RDI (hex): F91D

access: R/W

NOTE For more details, see the tachograph regulation.

5.2.43 Pulses/revolution of output shaft

The parameter Pulses/RevolutionOfOutputShaft shall be the number of pulses per revolution of the gearbox output shaft, and shall provide

data length: 2 bytes

resolution: 0,001 pulse/r/bit gain, 0 offset

operating range: 0 to 64,255 pulse/r

Type: measured

RDI (hex): F91E

access: R/W

5.2.44 Transmission repetition rate of TCO1 message

The parameter TransmissionRepetitionRateOfTCO1Message shall be specified by the end-of-line programming, and shall provide

data length: 2 bit

00 20 ms

01 50 ms (default value)

type: status

RDI (hex): F920

access: R/W

5.2.45 Tyre size

The parameter TyreSize shall be the designation of the current dimensions of the tyres (external driving wheels), in accordance with Council Directive 92/23/EEC, resulting from the most recent calibration, and shall provide

data length: 15 characters

resolution: ASCII

operating range: ASCII

type: measured

RDI (hex): F921

access: R/W

5.2.46 Next calibration date

The parameter NextCalibrationDate shall be carried out by the authorised inspection authority, and shall provide

data length: 3 bytes

1 month

2 day

3 year

type: measured

RDI (hex): F922

access: R/W

5.2.47 Driver 1 continuous driving time

The parameter Driver1ContinuousDrivingTime shall be computed as the current accumulated driving times of a particular driver, since the end of his/her last availability or break/rest or unknown period of 45 min or more — the 45 min may be split into several periods of 15 min or more. This parameter shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F923

access: R

The computations involved take into account, as needed, past activities stored on the driver card. When the driver has not inserted his/her card, the computations involved are based on the data memory recordings related to the current period where no card was inserted and related to the relevant slot.

NOTE For more details, see the tachograph regulation.

This way of computing the continuous driving time and the cumulative break time serves into the recording equipment for computing the continuous driving time warning. It does not prejudge the legal interpretation to be made of these times.

Unknown periods correspond to periods when the driver card was not inserted in the recording equipment and for which no manual entry of driver activities was made.

5.2.48 Driver 2 continuous driving time

The parameter Driver2ContinuousDrivingTime shall be according to the same as Driver 1 continuous driving time, and shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F924

access: R

5.2.49 Driver 1 cumulative break time

The parameter Driver1CumulativeBreakTime shall be computed from driving time as the current accumulated availability or break/rest or unknown times of 15 min or more of a particular driver, since the end of his/her last availability or break/rest or unknown period of 45 min or more — the 45 min may be split into several periods of 15 min or more. This parameter shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F925

access: R

The computations involved take into account, as needed, past activities stored on the driver card. Unknown periods of negative duration (start of unknown period to end of unknown period) due to time overlaps between two different recording equipment, are not taken into account for the computation.

When the driver has not inserted his/her card, the computations involved are based on the data memory recordings related to the current period where no card was inserted and related to the relevant slot.

NOTE For more details, see the tachograph regulation.

This way of computing the continuous driving time and the cumulative break time serves into the recording equipment for computing the continuous driving time warning. It does not prejudge the legal interpretation to be made of these times.

Unknown periods correspond to periods where the driver's card was not inserted in the recording equipment and for which no manual entry of driver activities was made.

5.2.50 Driver 2 cumulative break time

The parameter Driver2CumulativeBreakTime shall be according to driver 1 cumulative break time, and shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F926

access: R

5.2.51 Driver 1 current duration of selected activity

The parameter Driver1CurrentDurationOfSelectedActivity shall indicate the current duration of the selected activity, since selected and which may be the current driving period, availability period, rest period or work period. This parameter shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F927

access: R

5.2.52 Driver 2 current duration of selected activity

The parameter Driver2CurrentDurationOfSelectedActivity shall indicate the current duration of the selected activity, since selected, and which may be the current availability period, rest period or work period. This parameter shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F928

access: R

5.2.53 Speed authorised

The parameter SpeedAuthorised shall be used for speed limit setting, and shall provide

data length: 2 bytes

resolution: 1/256 km/h/bit gain, 0 km/h offset, upper byte resolution = 1,0 km/h/bit

operating range: 0 to 250,996 km/h

type: measured

RDI (hex): F92C

access: R/W

5.2.54 Tachograph card, slot 1

The parameter TachographCardSlot1 shall be used to indicate the presence of a tachograph card in the driver slot of the recording unit, and shall provide

data length: 1 byte

resolution: 1 type/bit

operating range: 0: tachograph card not present (or card present, but the type has not been recognized by the recording unit)

1: driver card present

2: workshop card present

3: control card present

4: company card present

5 to 250 not used

type: measured

RDI (hex): F930

access: R

5.2.55 Driver 1 name

The parameter Driver1Name shall be used to obtain the driver 1 name containing the surname and first name read from the driver card currently inserted in the recording unit, and shall provide

data length: 72 bytes ASCII

type: measured

byte: 1: code page for surname

2–36: surname

37: code page for first name

38–72: first name

RDI (hex): F931

access: R.

Driver1Name shall include

— a code page value specifying the part of the ISO/IEC 8859 used to code the surname and the first name, and

— the surname (family name) and first name coded in accordance with the ISO/IEC 8859 code page.

NOTE For more details, see the tachograph regulation.

5.2.56 Driver 2 name

The parameter Driver2Name shall be used to obtain the driver 2 surname and first name read from a co-driver card currently inserted in the recording unit (co-driver slot), and shall provide

data length: 72 bytes ASCII

type: measured

byte: 1: code page for surname

2–36: surname

37: code page for first name

38–72: first name

RDI (hex): F932

access: R

Driver2Name shall include

— a code page value specifying the part of the ISO/IEC 8859 used to code the surname and the first name, and

— the surname (family name) and first name coded in accordance with the ISO/IEC 8859 code page.

NOTE For more details, see the tachograph regulation.

5.2.57 Tachograph card, slot 2

The parameter TachographCardSlot2 shall be used to indicate the presence of a tachograph card in the co-driver slot of the recording unit, and shall provide

data length: 1 byte

resolution: 1 type/bit

operating range: 0: tachograph card not present (or card present, but type has not been recognized by the recording unit)

1: driver card present

2: workshop card present

3: control card present

4: company card present

5 to 250: not used

type: measured

RDI (hex): F933

access: R

5.2.58 Out of scope condition

The parameter OutOfScopeCondition shall be used to indicate whether an out of scope specific condition is currently open (see specification in tachograph regulation), and shall provide

operating range: 00: no out of scope condition opened

01: out of scope condition opened

type: measured

RDI (hex): F936

access: R

5.2.59 Mode of operation

The parameter ModeOfOperation shall be used to indicate the current mode of operation of the recording unit according to the valid tachograph cards inserted (as specified in the tachograph regulation), and shall provide

data length: 1 byte

operating range: 0: operational mode

1: control mode

2: calibration mode

3: company mode

4–250: reserved

type: measured

RDI (hex): F937

access: R

5.2.60 Driver 1 cumulated driving time previous and current week

The parameter Driver1CumulatedDrivingTimePreviousAndCurrentWeek shall be computed as the current accumulated driving times of driver 1 (driver), for the previous and the current week, and shall provide

data length: 2 bytes

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F938

access: R

5.2.61 Driver 2 cumulated driving time previous and current week

The parameter Driver2CumulatedDrivingTimePreviousAndCurrentWeek shall be computed as the current accumulated driving times of driver 2 (co-driver), for the previous and the current week, and shall provide

data length: 2 byte

resolution: 1 min/bit gain, 0 min offset

operating range: 0 to 64255

type: measured

RDI (hex): F939

access: R.

5.2.62 Real time speed pulses

The parameter RealTimeSpeedPulses shall allow simulation (e.g. short-term adjustment) or monitoring of the frequency values received from the motion sensor. The motion sensor signal may be replaced by use of the service InputOutputControlByIdentifier, the recordIdentifier set to RealTimeSpeedPulses (F940H) and InputOutputControlParameter set to ShortTermAdjustment. The speed calculated from the replacement value can be read at the display or by the service readDataByIdentifier and the recordIdentifier set to TachographVehicleSpeed (F902H).

The simulated value shall not influence recorded data. If the tachograph detects sensor speed during this test, the test will be automatically aborted.

This parameter shall provide

data length: 2 bytes

resolution: 0,1 pulses/s per bit gain, 0 offset

operating range: 0 to 6425,5 pulses/s

type: measured

RDI (hex): F940

access: R/W

5.2.63 CalibrationInputOutput

The parameter CalibrationInputOutput shall allow controlling of the test and calibration pin function of the recording unit front connector with the InputOutputControlByIdentifier service. The actual setting may be read by the ReadDataByIdentifier service.

The test and calibration pin shall be used to input a replacement signal for the motion sensor (test signal) with the calibrationInputOutput parameter set to “enable as speedSignalInput”. The motion sensor signal may alternatively be replaced by use of the service InputOutputControlByIdentifier, with the recordIdentifier set to RealTimeSpeedPulses (F940H) and InputOutputControlParameter set to ShortTermAdjustment (see 5.2.63).

The test and calibration pin shall be used to measure the motion sensor signal, with the calibrationInputOutput parameter set to enable as realTimeSpeedSignalOutputSensor. The motion sensor value may alternatively be read by the service readDataByIdentifier and with the recordIdentifier set to RealTimeSpeedPulses.

The test and calibration pin shall be used to measure the UTC clock signal with the calibrationInputOutput parameter set to “enable as RTCOutput”.

This parameter shall provide

data length: 1 byte

resolution: …

operating range: 0 to 3

type: N/A

RDI (hex): F960

access: R, I/O control

The possible values for the controlState parameter/dataRecord shall be in accordance with Table 7.

Table 7 — Possible controlState/dataRecord values for calibrationInputOutput

Mode	Value	Description
Disable	0	I/O line is disabled (default state)
Enable	1	Enable as speedSignalInput
Enable	2	Enable as realTimeSpeedSignalOutputSensor
Enable	3	Enable as RTCOutput

5.2.64 Synchronization jump width

The parameter SynchronizationJumpWidth shall be modified by diagnosis, and according to the manufacturer's discretion, in order to take into account the different topologies of CAN network, and shall provide

data length: 1 byte

resolution: 1 Tq

data range: 1 to 4 Tq

type: measured

RDI (hex): F979

access: R/W

The default value shall be according to ISO 16844-4.

5.2.65 Sample point

The parameter SamplePoint shall specify the point of time at which the bus level is read and interpreted as the value of that respective bit. This parameter shall be specified by end of line programming, and shall provide

data length: 1 byte

resolution: 0,4 %/bit gain (recommended)

data range: 60 % to 100 %

type: measured

RDI (hex): F97A

access: R/W

For RDI and access, the resolution shall be adjusted according to the hardware.

The default value shall be 87,5 %.

5.2.66 Time out message error delay

The parameter TimeOutMessageErrorDelay shall contain the number of emission cycles of the specified message before time out failure is declared.

EXAMPLE If the parameter is equal to 3,5, and if a message is sent every 20 ms (i.e. the message was missing during more than $3,5 \times 20 = 70$ ms), a time out failure on this message is declared.

This value shall be specified by the vehicle manufacturer. The parameter shall provide

data length: 1 byte

resolution: 0,5/bit gain, 0 offset

data range: 0 to 125

type: status

RDI (hex): F97B

access: R/W

The default value shall be 3.

5.2.67 Error management initialisation inhibition

The parameter ErrorManagementInitialisationInhibition shall specify the inhibition period of the CAN network error management system at the key switch on event.

In order to take into account the different reset timings of the ECUs connected to the CAN network, the management of the network error shall be inhibited during a period of time. This value I shall be at the manufacturer's discretion.

The parameter shall provide

data length: 1 byte

resolution: 0,1 s/bit gain, 0 s offset

data range: 0 to 25,0 s

type: status

RDI (hex): F97C

access: R/W

The default value shall be 2 s.

5.2.68 Registering member state

The parameter RegisteringMemberState shall be assigned by the registration centre. For the code specification, see the tachograph regulation, Appendix 1, Nation Alpha Format. The parameter shall provide

data length: 3 bytes

resolution: ASCII

operating range: ASCII

type: measured

RDI (hex): F97D

access: R/W

NOTE The ASCII character "*" is reserved as a delimiter.

5.2.69 Vehicle registration number

The parameter VehicleRegistrationNumber shall be as assigned by the registration centre. The VRN shall include

— a code page value specifying the part of ISO/IEC 8859 used to code the VRN, and

— the VRN coded in accordance with the ISO/IEC 8859 code page.

NOTE For more details, see the tachograph regulation.

The parameter shall provide

data length: 14 bytes ASCII

type: measured

byte: 1: code page

2–14: VRN

RDI (hex): F97E

access: R/W

5.2.70 Vehicle registration date

The parameter group VehicleRegistrationDate shall be transmitted to the recording unit. All parameters shall be supported, and shall provide

byte:	1	seconds
	2	minutes
	3	hours
	4	month
	5	day
	6	year
	7	local minute offset
	8	local hour offset
RDI (hex):		F97F
access:		R/W

6 DTCs for tachograph system

The diagnostic trouble codes for tachograph systems shall be in accordance with Table 8.

Table 8 — DTCs in tachograph systems

Item	Description	Hex					Cvt.
		DTC severity	Functional unit	DTC High Byte	DTC Middle Byte	DTC Low Byte (failure type)	
1	Sensor power supply						
	above maximum	80	00	00	20	07	
	below minimum	80	00	00	20	03	**M**
	no signal	80	00	00	20	04	
2	Tachograph power supply						
	Above maximum	80	00	00	00	07	**M**
	Below minimum	80	00	00	00	03	
	No signal	80	00	00	00	04	
3	Driver Card 1 error	40	00	00	02	00	**M**
4	Driver Card 2 error	40	00	00	03	00	**M**
7	Printer paper out, no paper	80	00	00	06	60	**M**
8	No speed signal from sensor						
	No signal	80	00	00	21	80	**M**
9	Invalid speed signal or data link error						
	Invalid signal	80	00	00	22	80	**M**
10	Speed sensor — Recording Unit: no data link signal						
	No signal	80	00	00	23	80	**M**
11	Sensor / Tachograph signature mismatch	80	00	00	24	52	**M**

Table 8 (*continued*)

Item	Description	Hex					Cvt.
		DTC severity	Functional unit	DTC High Byte	DTC Middle Byte	DTC Low Byte (failure type)	
13	Time / Date error	80	00	00	08	00	**M**
19	No ignition, but speed pulses present	40	00	00	09	00	**M**
20	CAN, internal error	40	00	00	0A	70	**M**
21	CAN, bus off	40	00	00	0B	78	**M**
22	CAN communication instrument <-> recording unit No signal	80	00	00	11	77	**M**
23	Program memory, checksum error	80	00	00	0C	31	**M**
24	Calibration memory, read/ write error	80	00	00	0D	33	**M**
25	Calibration error	80	00	00	0D	40	**M**
26	Printer error	40	00	00	07	00	**M**
27	Card reader 1 error	40	00	00	04	00	**M**
28	Card reader 2 error	40	00	00	05	00	**M**
29	Buttons / KBD error	40	00	00	0F	00	**M**
30	Error in Internal display	40	00	00	10	30	U
31	Internal error in sensor	80	00	00	25	08	U
32	Error pin B5	40	00	00	31	00	U
33	Error pin B6	40	00	00	32	00	U
34	Speed pulse output recording unit (B7)	40	00	00	30	00	**M**
35	Error pin B8	40	00	00	33	00	U
36	Error pin C1	40	00	00	40	00	U
37	Error pin C2	40	00	00	41	00	U
38	Error pin C3	40	00	00	42	00	U
39	Error pin C4	40	00	00	43	00	U
40	Error pin C5	40	00	00	44	00	U
41	Error pin C6	40	00	00	45	00	U
42	Error pin C7	40	00	00	46	00	U
43	Error pin C8	40	00	00	47	00	U
44	Error pin D1	40	00	00	48	00	U
45	Error pin D2	40	00	00	49	00	U
46	Error pin D3	40	00	00	4A	00	U
47	Error pin D4	40	00	00	4B	00	U
48	Error pin D5	40	00	00	4C	00	U
49	Error pin D6	40	00	00	4D	00	U
50	Error pin D7	40	00	00	4E	00	U
51	Error pin D8	40	00	00	4F	00	U
52	Recording Unit, internal error	40	00	00	01	39	**M**
53	Driving without card (Driver card or Workshop card)	80	00	00	12	60	**M**

Bibliography

[1] Council Regulation (EEC) No. 3820/85 of 20 December 1985 on the harmonization of certain social legislation relating to road transport

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