Road vehicles — Tachograph systems

Part 6: Diagnostics

National foreword

This British Standard is the UK implementation of ISO 16844-6:2015.

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Part 6:
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Véhicules routiers — Systèmes tachygraphes —

Partie 6: Diagnostic

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

This second edition cancels and replaces the first edition (ISO 16844-6:2004), which has been technically revised.

The committee responsible for this document is 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: Electrical interface with recording unit*

— *Part 3: Motion sensor interface*

— *Part 4: CAN interface*

— *Part 5: Secured CAN interface*

— *Part 6: Diagnostics*

— *Part 7: Parameters*

Introduction

This International Standard supports and facilitates the communication between electronic control units and a tachograph. The tachograph is based upon the European Council Regulation (EC) No 561/2006[3] and (EEC) No 3821/85[4] as last amended.

The digital tachograph concept is based upon an RU storing data, related to the activities of the various drivers driving the vehicle, on which it is installed.

During the normal operational status of the RU, data stored in its memory are accessible to different entities (drivers, authorities, workshops, transport companies) in different ways (displayed on a screen, printed by a printing device, 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

This part of ISO 16844 has been established in order to enable the implementation of unified diagnostic services on CAN and on K-Line.

To achieve this, it is based on the Open Systems Interconnection (OSI) Basic Reference Model specified in ISO/IEC 7498-1[1] and ISO/IEC 10731,[2] which structures communication systems into seven layers. When mapped on this model, the services specified by ISO 16844 are divided as given in Table 1.

Table 1 — Diagnostics implementation reference applicable to the OSI layers

Applicability	OSI seven layer	Diagnostics according to this part of ISO 16844	
		On CAN	**On K-Line**
Seven layer according to ISO 7498-1 and ISO/IEC 10731	Application (layer 7)	ISO 14229-1/ISO 16844-6/ISO 16844-5	
		ISO 14229-3	ISO 14229-6
	Presentation (layer 6)	Vehicle manufacturer specific	
	Session (layer 5)	ISO 14229-2	
	Transport (layer 4)	ISO 15765-2	—
	Network (layer 3)		
	Data link (layer 2)	ISO 16844-4	ISO 14230-2/ ISO 14230-1
	Physical (layer 1)		

Road vehicles — Tachograph systems —

Part 6:
Diagnostics

1 Scope

This part of ISO 16844 defines diagnostic communication and services for tachograph systems of road vehicles. The communication is specified both for CAN communication mode and K-line communication mode.

The diagnostic services based on ISO 14229-1 and most services are common for the two communication interfaces. Interface specific implementations are specified in the respective sections.

2 Normative reference

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

ISO 14229-1, *Road vehicles — Unified diagnostic services (UDS) — Part 1: Specification and requirements*

ISO 14229-2, *Road vehicles — Unified diagnostic services (UDS) — Part 2: Session layer services*

ISO 14229-3, *Road vehicles — Unified diagnostic services (UDS) — Part 3: Unified diagnostic services on CAN implementation (UDSonCAN)*

ISO 14229-6, *Road vehicles — Unified diagnostic services (UDS) — Part 6: Unified diagnostic services on K-Line implementation (UDSonK-Line)*

ISO 14230-1, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 1: Physical layer*

ISO 14230-2, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 2: Data link layer*

ISO 15765-2, *Road vehicles — Diagnostic communication over K-Line (DoK-Line) — Part 2: Transport protocol and network layer services*

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

ISO 16844-5, *Road vehicles — Tachograph systems — Part 5: Secured CAN interface*

ISO 16844-7, *Road vehicles — Tachograph systems — Part 7: Parameters*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
recording unit
RU
part of the tachograph system which acquires and stores data concerning the vehicle and its driver(s) and their activities

Note 1 to entry: A recording unit is also referenced as a vehicle unit in other standards, both are synonyms.

4   Abbreviated terms

For the purpose of this document, the following abbreviated terms apply.

Cvt.   convention

M   mandatory

U   user option

C   conditional

DID   data identifier

5   Overview and conventions

5.1   Service description conventions

The service description conventions according to ISO 14229-1 shall be used.

5.2   Addresses

5.2.1   General

All ECUs shall be able to respond to both functional and physical diagnostic addresses.

5.2.2   Functional addresses

The recording equipment shall respond to the functional address 238_{10} as the system address and the functional address 255_{10} addressing all ECUs in the vehicle.

5.2.3   Physical addresses

Each ECU that is part of the recording unit shall have a physical address. The specific ECU containing the data memory for recorded data shall have the address 238_{10}. All other addresses shall be vehicle-manufacturer specific.

5.3   Parameters

If a parameter value or a record value consists of more than one byte, the most significant byte shall always be transmitted first, followed by bytes of decreasing significance.

6   Diagnostic services implementation

6.1   General and overview

The diagnostic services shall be implemented in accordance with ISO 14229-1 and the restrictions given in this clause. Table 2 gives a summary and an overview of all diagnostic services that may be available in the tachograph, specifying which sessions and services are mandatory in the tachograph and in which diagnostic sessions the diagnostic services are to be used.

Table 2 — Diagnostic service usage and identifier value summary and overview

Diagnostic service name (according to ISO 14229-1)	SID value[a]	Diagnostic session						Document reference
		DS[b]	PRGS[c]	EXTDS[d]	VMS[e]	SSS[f]	RS[g]	
Diagnostic and communication management functional unit								
DiagnosticSessionControl	10_{16}	M	M	M	M	M	M	**6.2.1**
ECUReset	11_{16}	U	U	U	U	U	U	**6.2.2**
SecurityAccess	27_{16}	N	M	U	M	M	N	**6.2.3**
CommunicationControl	28_{16}	N	M	U	U	U	N	**6.2.4**
TesterPresent	$3E_{16}$	M	M	M	M	M	M	—
AccessTimingParameters	83_{16}	N	U	U	U	U	N	—
SecuredDataTransmission	84_{16}	N	U	U	U	U	N	**6.2.5**
ControlDTCSetting	85_{16}	N	U	U	U	U	N	—
ResponseOnEvent	86_{16}	U	U	U	U	U	U	**6.2.6**
LinkControl	87_{16}	N	U	U	U	U	N	**6.2.7**
Data transmission functional unit								
ReadDataByIdentifer	22_{16}	M	M	M	U	U	M	**6.3.1**
ReadMemoryByAddress	23_{16}	N	N	N	U	U	N	—
ReadScalingDataByIdentifier	24_{16}	M	M	M	U	U	M	—
ReadDataByPeriodicIdentifier	$2A_{16}$	N	U	U	U	U	N	**6.3.2**
DynamicallyDefineDataIdentifier	$2C_{16}$	U	U	U	U	U	U	**6.3.3**
WriteData ByIdentifier	$2E_{16}$	N	M	U	U	U	N	**6.3.4**
WriteMemoryByAddress	$3D_{16}$	N	N	N	U	U	N	—
Stored data transmission functional unit								
ReadDTCInformation	19_{16}	M	M	M	U	U	M	**6.4.2**
ClearDiagnosticInformation	14_{16}	M	M	U	U	U	M	**6.4.1**
Input/Output control functional unit								
InputOutputControlByIdentifier	$2F_{16}$	N	N	M	U	U	N	**6.5.1**
Remote activation of routine functional unit								
RoutineControl	31_{16}	N	U	M	U	U	M	**6.6.1**

M   the service is mandatory in this diagnostic session

U   the service may be available in this diagnostic session

N   the service is not allowed in this diagnostic session

[a]   Assigns the service identifier values for the request message.

[b]   These services of the defaultSession (DS) may be implemented in each server (ECU), if the electronic system supports the functionality of these services. This session is mandatory.

[c]   These services of the ProgrammingSession (PRGS) may be implemented to allow for programming of memory (e.g. flash), variant coding, parameters, etc. in the server (ECU). This session is mandatory.

[d]   These services of the ExtendedDiagnosticSession (EXTDS) may be implemented to allow for adjustment of input/output signals of the server (ECU). This session is mandatory.

[e]   These services of the vehicleManufacturerSpecificSession (VMS) shall be specified by the vehicle manufacturer. This session is optional and may be as selected by the vehicle manufacturer.

[f]   These services of the systemSupplierSpecificSession (SSS) shall be specified by the system supplier. This session is optional and may be as selected by the vehicle manufacturer.

[g]   These services of the remoteSession (RS) shall be implemented to allow for remote company card authentication and data download.

Table 2 *(continued)*

Upload/Download functional unit								
RequestDownload	34_{16}	N	U	N	U	U	N	—
RequestUpload	35_{16}	N	U	U	U	U	M	—
TransferData	36_{16}	N	U	U	U	U	M	—
RequestTransferExit	37_{16}	N	U	U	U	U	M	—
Data link layer services according to ISO 14230-2								
startCommunication	81_{16}	M	M	M	M	M	M	**11.2**
stopCommunication	82_{16}	M	N	N	N	N	M	**11.2**
accessTimingParameters	83_{16}	U	U	U	U	U	U	**11.2**

M the service is mandatory in this diagnostic session

U the service may be available in this diagnostic session

N the service is not allowed in this diagnostic session

[a] Assigns the service identifier values for the request message.

[b] These services of the defaultSession (DS) may be implemented in each server (ECU), if the electronic system supports the functionality of these services. This session is mandatory.

[c] These services of the ProgrammingSession (PRGS) may be implemented to allow for programming of memory (e.g. flash), variant coding, parameters, etc. in the server (ECU). This session is mandatory.

[d] These services of the ExtendedDiagnosticSession (EXTDS) may be implemented to allow for adjustment of input/output signals of the server (ECU). This session is mandatory.

[e] These services of the vehicleManufacturerSpecificSession (VMS) shall be specified by the vehicle manufacturer. This session is optional and may be as selected by the vehicle manufacturer.

[f] These services of the systemSupplierSpecificSession (SSS) shall be specified by the system supplier. This session is optional and may be as selected by the vehicle manufacturer.

[g] These services of the remoteSession (RS) shall be implemented to allow for remote company card authentication and data download.

6.2 Diagnostic and communication management functional unit

6.2.1 DiagnosticSessionControl service

The convention of the DiagnosticSessionControl subfunction parameter, DiagnosticSessionType, shall be in accordance with Table 3.

Table 3 — DiagnosticSessionControl subfunction parameter DiagnosticSessionType

bit 6−0	Description	Cvt.	Mnemonic
01_{16}	defaultSession	M	DS
02_{16}	programmingSession	M	PRGS
03_{16}	extendedDiagnosticSession	U	EXTDS
YY[a]	remoteSession This diagnostic session enables all diagnostic services required to allow for remote company card authentication and data download.	M	RS
[a] The value used for remoteSession shall be determined using DID F900$_{16}$ (see ISO 16844-7).			

6.2.2 ECUReset service

The convention of the ECUReset subfunction parameter, ResetType, shall be in accordance with Table 4.

Table 4 — ECUReset subfunction parameter ResetType

Value	Description	Cvt.
01_{16}	hardReset	U
02_{16}	keyOffOnReset	M
03_{16}	softReset	U

6.2.3   SecurityAccess service

The convention of the SecurityAccess subfunction parameter, AccessType, shall be in accordance with Table 5. The maximum delay time for the positive response according to ISO 14229-1 shall be 10 s.

Table 5 — SecurityAccess subfunction parameter AccessType

Value	Description	Cvt.
01_{16}	requestSeed	M
02_{16}	sendKey	M
03_{16}, 05_{16}, 07_{16} to 41_{16}	requestSeed	U
04_{16}, 06_{16}, 08_{16} to 42_{16}	sendKey	U
61_{16} to $7E_{16}$	system supplier specific range	U

6.2.4   CommunicationControl service

The convention of the CommunicationControl subfunction parameter, ControlType, shall be in accordance with Table 6. The convention of the CommunicationControl CommunicationType, parameter shall be in accordance with Table 7.

Table 6 — CommunicationControl subfunction parameter ControlType

Value	Description	Cvt.
00_{16}	enableRxAndTx	M
01_{16}	enableRxAndDisableTx	M
02_{16}	disableRxAndEnableTx	U
03_{16}	disableRxAndTx	U

Table 7 — CommunicationControl CommunicationType parameter

Value	Description	Cvt.
001_2	normalCommunicationMessages	M
010_2	networkManagementCommunicationMessages	U
100_2	diagnosticCommunicationMessages	U

6.2.5   SecuredDataTransmission service

The convention of the SecuredDataTransmission service shall be implemented in accordance with ISO 16844-5.

6.2.6   ResponseOnEvent service

The convention of the ResponseOnEvent subfunction parameter, EventType, shall be in accordance with Table 8. The convention of the ResponseOnEvent EventWindowTime parameter shall be in accordance

with Table 9. The convention of the ResponseOnEvent serviceToRespondToRecord parameter shall be in accordance with Table 10.

Table 8 — ResponseOnEvent subfunction parameter EventType

Value	Description	Cvt.
00_{16}	stopResponseOnEvent	M
01_{16}	onDTCStatusChange	M
02_{16}	onTimerInterrupt	M
03_{16}	onChangeOfDataIdentifier	M
04_{16}	reportActivatedEvents	U
05_{16}	startResponsOnEvent	M
06_{16}	clearResponseOnEvent	M
07_{16}	OnComparisonOfValues	M

Table 9 — ResponseOnEvent EventWindowTime parameter

Value	Description	Cvt.
02_{16}	infiniteTimeToResponse	M

Table 10 — ResponseOnEvent ServiceToRespondToRecord parameter

Value	Description	Cvt.
22_{16}	readDataByIdentifier	U
19_{16}	readDTCInformation	M
31_{16}	routineControl	U
$2F_{16}$	inputOutputControlByIdentifier	U

6.2.7   LinkControl service

The convention of the LinkControl subfunction parameter, LinkControlType, shall be in accordance with Table 11. The convention of the LinkControl BaudrateIdentifier parameter shall be in accordance with Table 12.

Table 11 — LinkControl subfunction parameter LinkControlType

Value	Description	Cvt.
01_{16}	verifyBaudrateTransitionWithFixedBaudrate	U
02_{16}	verifyBaudrateTransitionWithSpecificBaudrate	U
03_{16}	transitionBaudrate	U

Table 12 — LinkControl BaudrateIdentifier parameter

Value	Description	Cvt.
01_{16}	PC9600Baud	U
02_{16}	PC19200Baud	U
03_{16}	PC38400Baud	U
04_{16}	PC57600Baud	U
05_{16}	PC115200Baud	U

6.3 Data transmission functional unit

6.3.1 ReadDataByIdentifier service

The convention of ReadDataByIdentifier parameter shall be according to ISO 14229-1, with the DIDs specified in ISO 16844-7. The implementation on this service shall support at least eight DIDs with one request/response.

6.3.2 ReadDataByPeriodicIdentifier service

The convention of the ReadDataByPeriodicIdentifier TransmissionMode parameter shall be according to Table 13.

Table 13 — ReadDataByPeriodicIdentifier TransmissionMode parameter

Value	Description	Cvt.
01_{16}	sendAtSlowRate	U
02_{16}	sendAtMediumRate	U
03_{16}	sendAtFastRate	U
04_{16}	stopSending	C[a]
a This parameter shall be supported if sendAtSlowRate, sendAtMediumRate, and/or sendAtFastRate are supported.		

6.3.3 DynamicallyDefineDataIdentifier service

The convention of the DynamicallyDefineDataIdentifier subfunctions shall be in accordance with Table 14.

Table 14 — DynamicallyDefineDataIdentifier subfunctions

Value	Description	Cvt.
01_{16}	defineByIdentifier	U
02_{16}	defineByMemoryAddress	C[a]
03_{16}	clearDynamicallyDefinedDataIdentifier	U
a DefineByMemoryAddress shall not be used in defaultSession, programmingSession, and extendedDiagnosticSession.		

6.3.4 WriteDataByIdentifier service

The convention of the WriteDataByIdentifier service shall be in accordance with ISO 14229-1, with the DIDs specified in ISO 16844-7.

6.4 Stored data transmission functional unit

6.4.1 ClearDiagnosticInformation service

The convention of the ClearDiagnosticInformation GroupOfDTC parameter shall be in accordance with Table 15.

Table 15 — ClearDiagnosticInformation GroupOfDTC parameter

Value	Description	Cvt.
000000_{16} to $FFFFFE_{16}$	Individual DTC	M
$FFFFFF_{16}$	allDTCs	M

6.4.2 ReadDTCInformation service

The convention of the ReadDTCInformation subfunctions shall be in accordance with Table 16. The convention of the ReadDTCInformation DTC status bits shall be in accordance with Table 17.

Table 16 — ReadDTCInformation subfunctions

Value	Description	Cvt.
01_{16}	reportNumberOfDTCByStatusMask	M
02_{16}	reportDTCByStatusMask	M
03_{16}	reportDTCSnapshotIdentification	U
04_{16}	reportDTCSnapshotRecordByDTCNumber	U
05_{16}	reportDTCSnapshotRecordByRecordNumber	U
06_{16}	reportDTCExtendedDataRecordByDTCNumber	M
07_{16}	reportNumberOfDTCBySeverityMaskRecord	M
08_{16}	reportDTCBySeverityMaskRecord	M
09_{16}	reportSeverityInformationOfDTC	U
$0A_{16}$	reportSupportedDTC	U
$0B_{16}$	reportFirstTestFailedDTC	U
$0C_{16}$	reportFirstConfirmedDTC	U
$0D_{16}$	reportMostRecentTestFailedDTC	U
$0E_{16}$	reportMostRecentConfirmedDTC	U
$0F_{16}$	reportMirrorMemoryDTCByStatusMask	U
10_{16}	reportMirrorMemoryDTCExtDataRecordByDTCNumber	U
11_{16}	reportNumberOfMirrorMemoryDTCByStatusMask	U

Table 17 — ReadDTCInformation DTC status bits

Bit	Description	Cvt.
0	testFailed	M
1	testFailedThisOperationCycle	C[a]
2	pendingDTC	U

[a] Bit 1 (testFailedThisMonitoringCycle) is

— mandatory, if bit 2 (pendingDTC) is supported, or

— user optional, if bit 2 (pendingDTC) is not supported.

Table 17 *(continued)*

Bit	Description	Cvt.
3	confirmedDTC	M
4	testNotCompletedSinceLastClear	M
5	testFailedSinceLastClear	M
6	testNotCompletedThisOperationCycle	M
7	warningIndicatorRequested	M
a	Bit 1 (testFailedThisMonitoringCycle) is — mandatory, if bit 2 (pendingDTC) is supported, or — user optional, if bit 2 (pendingDTC) is not supported.	

6.5 Input/Output control functional unit

6.5.1 InputOutputControlByIdentifier service

The convention of the InputOutputControlByIdentifier InputOutputControlParameter shall be in accordance with Table 18.

The ControlState parameter shall be present only when the InputOutputControlParameter is set to ShortTermAdjustment in the InputOutputControl service.

The setting may be read by the service ReadDataByIdentifier. The DataRecord in the response shall be equal to the parameter ControlState.

Table 18 — InputOutputControlByIdentifier InputOutputControlParameter

Value	Description	Cvt.
00_{16}	returnControlToECU	M
01_{16}	resetToDefault	U
02_{16}	freezeCurrentState	U
03_{16}	shortTermAdjustment[a]	M
a	ShortTermAdjustment shall not be used in defaultSession	

6.6 Remote activation of routine functional unit

6.6.1 RoutineControl service

The convention of the RoutineControl subfunctions shall be in accordance with Table 19. The convention of the RoutineControl parameter RoutineStatusRecord shall be in accordance with Table 20 when used for exiting status.

Table 19 — RoutineControl subfunctions

Value	Description	Cvt.
01_{16}	startRoutine	M
02_{16}	stopRoutine	U
03_{16}	requestRoutineResults	U

Table 20 — RoutineControl RoutineStatusRecord parameter

Value	Description	Cvt.
61_{16}	normalExitWithResultsAvailable	U
62_{16}	normalExitWithoutResultsAvailable	U
63_{16}	abnormalExitWithResultsAvailable	U
64_{16}	abnormalExitWithoutResultsAvailable	U

7 Application layer requirements

7.1 General

The application layer services shall be implemented according to ISO 14229-1.

7.2 Application layer protocol

7.2.1 General

The application layer protocol shall be implemented according to ISO 14229-3 or ISO 14229-6, or both, as well as according to the additional requirements of this clause.

7.2.2 Application layer timing

7.2.2.1 Timing parameters for CAN

For CAN, using the data link layer in accordance with ISO 11898-1, the ECU(s) shall respond to a request message within $P2_{CAN}$. The application timing parameter values for CAN and their requirements shall be in accordance with Table 21.

Table 21 — Application layer timing parameters for CAN

Parameter	Values [ms]		Description/Requirement
	Min	Max	
$P2_{CAN}$	0	100	Time between request message and the receipt of all unsegmented response messages and all first frames of segmented response message(s). Each ECU shall start sending its response message within $P2_{CAN}$ after the request message has been correctly received.
$P2^*_{CAN}$	0	5000	Time between the successful reception of a negative response message with response code 78_{16} and the next response message (positive or negative message).

7.2.2.2 Timing parameters for K-line

The normal timing parameter, set in accordance with ISO 14230-2 (K-line), shall apply, using the data link layer according to 11.2.

8 Presentation layer requirements

The presentation layer shall be implemented according to ISO 14229-2.

9 Session layer requirements

Session layer timeout ($S3_{server}$) shall be 5 000 ms in the remoteSession.

10 CAN protocol layers

10.1 General

Requirements given in this section apply, if a diagnostic communication through CAN is used.

10.2 Transport layer

The transport layer shall be implemented according to ISO 15765-2.

10.3 Network layer (CAN only)

10.3.1 General

The network layer shall be implemented in accordance with ISO 15765-2, and according to the additional requirements in this section.

10.3.2 Communication parameters

The following values shall be used for the named parameters.

— The parameter N_WFTmax shall be set to 0, meaning "No FlowControl wait frames are allowed".

— The time parameter N_Br shall be < 100 ms.

— The time parameter N_Cs shall be < 100 ms.

10.4 CAN data link layer

10.4.1 General

The CAN data link layer shall be implemented as defined in ISO 16844-4 and ISO 15765-2.

10.4.2 Protocol

The protocol used shall be in accordance with ISO 16844-4.

10.4.3 Address coding method

The address coding method "Normal fixed addressing", in accordance with ISO 15765-2, shall be used.

10.5 CAN physical layer

The physical layer used for diagnostic communication on CAN shall be in accordance with ISO 16844-4.

11 K-Line protocol layers

11.1 General

Requirements given in this section apply if a diagnostic communication through K-Line is used.

11.2 K-line data link layer

11.2.1 General

The K-line data link layer, including the data link layer services, shall be implemented as defined in ISO 14230-1 and ISO 14230-2 with the restrictions given in this section.

11.2.2 Protocol specific key bytes

Only the key byte word $2\ 026_{10}$ (key byte #1 = $8F_{16}$, key byte #2 = $E9_{16}$) along with the corresponding protocol implementation shall be used.

11.2.3 Initialisation

Only the fast initialisation (FAST_INIT) shall be used.

11.2.4 Timing

The normal timing parameter set according to ISO 14230-2 shall apply.

11.3 K-line physical layer
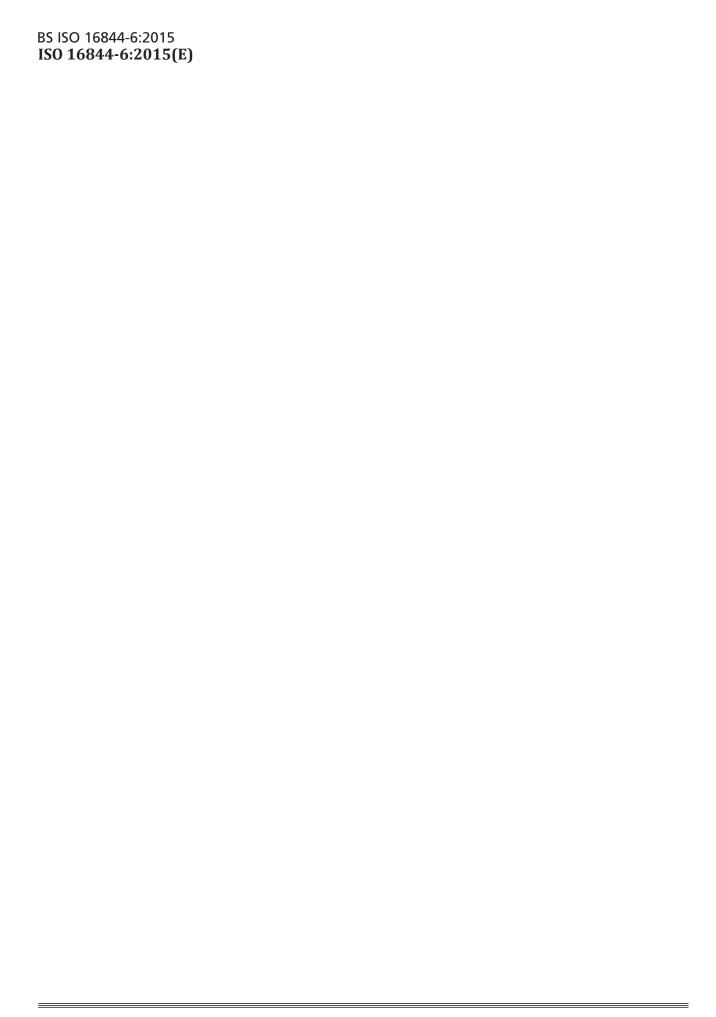
11.3.1 General

The physical layer shall be implemented as defined in ISO 14230-1.

11.3.2 Configuration

The RU shall support only the one-wire (K-line only) communication.

Bibliography

[1]   ISO 7498-1:1994, *Information technology — Open systems interconnection — Basic reference model: The basic model — Part 1*

[2]   ISO/IEC 10731:1994, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*

[3]   Regulation (EC) No 561/2006 of the European Parliament and the Council of 15. March 2006 on the harmonisation of certain social legislation relating to the road transport and amending Council Regulations (EEC) No 3821/85 and (EC) No 2135/98 and repealing Council Regulation (EEC) No 3820/85

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

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