

# ISO 15765-3:2004-10 (E)

## Road vehicles - Diagnostics on Controller Area Networks (CAN) - Part 3: Implementation of unified diagnostic services (UDS on CAN)

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
Introduction .....		vi
1	Scope .....	1
2	Normative references .....	1
3	Terms, definitions and abbreviated terms .....	2
4	Conventions .....	2
5	Unified diagnostic services (UDS) applicability to OSI model .....	2
6	Application and session layers .....	2
6.1	Application layer services .....	2
6.2	Application layer protocol .....	2
6.3	Application layer and diagnostic session management timing .....	2
6.3.1	General .....	2
6.3.2	Application layer timing parameter definitions .....	4
6.3.3	Session layer timing parameter definitions .....	6
6.3.4	Client and server timer resource requirements .....	6
6.3.5	Detailed timing parameter descriptions .....	9
6.3.6	Error handling .....	27
7	Network layer interface .....	29
7.1	General information .....	29
7.2	FlowControl N_PCI parameter definition .....	29
7.3	Mapping of A_PDU onto N_PDU for message transmission .....	29
7.4	Mapping of N_PDU onto A_PDU for message reception .....	29
8	Standardized diagnostic CAN identifiers .....	30
8.1	Legislated 11 bit OBD CAN identifiers .....	30
8.2	Legislated 29 bit OBD CAN identifiers .....	30
8.3	Enhanced diagnostics 29 bit CAN identifiers .....	30
8.3.1	General information .....	30
8.3.2	Structure of 29 bit CAN identifier .....	31
8.3.3	Structure of address .....	33
8.3.4	Message retrieval .....	35
8.3.5	Routing .....	36
9	Diagnostic services implementation .....	40
9.1	Unified diagnostic services overview .....	40
9.2	Diagnostic and communication control functional unit .....	42
9.2.1	DiagnosticSessionControl (10 hex) service .....	42
9.2.2	ECUReset (11 hex) service .....	42
9.2.3	SecurityAccess (27 hex) service .....	43
9.2.4	CommunicationControl (28 hex) service .....	43
9.2.5	TesterPresent (3E hex) service .....	43
9.2.6	SecuredDataTransmission (84 hex) service .....	44
9.2.7	ControlDTCSetting (85 hex) service .....	44

9.2.8	ResponseOnEvent (86 hex) service .....	44
9.2.9	LinkControl (87 hex) service .....	47
9.3	Data transmission functional unit .....	47
9.3.1	ReadDataByIdentifier (22 hex) service .....	47
9.3.2	ReadMemoryByAddress (23 hex) service .....	47
9.3.3	ReadScalingDataByIdentifier(24 hex) service .....	48
9.3.4	ReadDataByPeriodicIdentifier (2A hex) service .....	48
9.3.5	DynamicallyDefineDataIdentifier (2C hex) service .....	54
9.3.6	WriteDataByIdentifier (2E hex) service .....	54
9.3.7	WriteMemoryByAddress (3D hex) service .....	54
9.4	Stored data transmission functional unit .....	54
9.4.1	ReadDTCInformation (19 hex) service .....	54
9.4.2	ClearDiagnosticInformation (14 hex) service .....	56
9.5	Input/Output control functional unit .....	56
9.5.1	InputOutputControlByIdentifier (2F hex) service .....	56
9.6	Remote activation of routine functional unit .....	56
9.6.1	RoutineControl (31 hex) service .....	56
9.7	Upload/Download functional unit .....	57
9.7.1	RequestDownload (34 hex) service .....	57
9.7.2	RequestUpload (35 hex) service .....	57
9.7.3	TransferData (36 hex) service .....	57
9.7.4	RequestTransferExit (37 hex) service .....	57
10	Non-volatile server memory programming process .....	58
10.1	General information .....	58
10.2	Detailed programming sequence .....	61
10.2.1	Programming phase #1 -- Download of application software and/or application data .....	61
10.2.2	Programming phase #2 -- Server configuration .....	66
10.3	Server reprogramming requirements .....	69
10.3.1	Programmable servers and their categories .....	69
10.3.2	Requirements for all servers to support programming .....	70
10.3.3	Requirements for programmable servers to support programming .....	70
10.3.4	Software, data identification and fingerprints .....	74
10.3.5	Server routine access .....	77
10.4	Non-volatile server memory programming message flow examples .....	78
10.4.1	General information .....	78
10.4.2	Programming phase #1 -- Pre-Programming step .....	78
10.4.3	Programming phase #1 -- Programming step .....	79
10.4.4	Programming phase #1 -- Post-Programming step .....	86
	Annex A (normative) Network configuration dataIdentifier definitions .....	87
	Bibliography .....	92