

整车OBD数据验证与 型式核准测试



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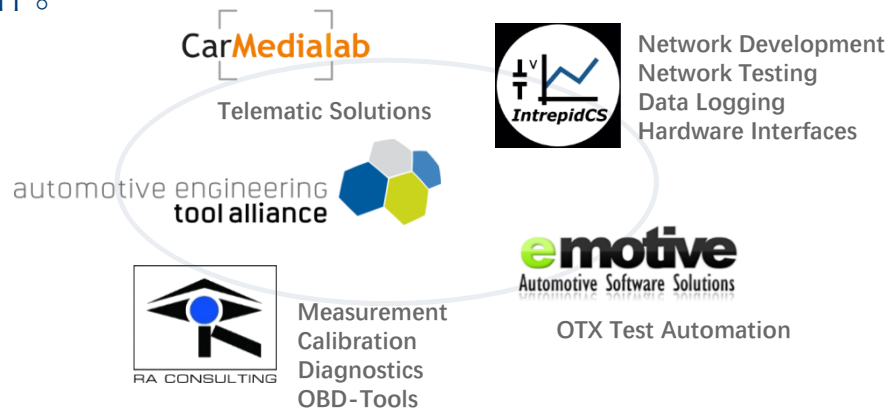




- 总部位于德国的诊断、测量与标定工具软件公司。
- CEO: Armin Rupalla (ASAM 董事会成员)。
- DiagRA® D 和 ODX Viewer 自2011年起成为大众集团 (VW Group) 标配诊断/开发工具。
- Silver Scan Tool™被世界各国检测机构纳为标准OBD型式核准工具。
- 与英特佩斯公司共同成立AETA, 产品优势互补。

(Automotive Engineering Tool Alliance)

- 全资中国子公司位于北京, 无锡设有办事处。
- 支持英特佩斯中国客户的人民币采购业务。





整车OBD数据验证

- 乘用车与商用车OBD标准



什么是On-Board Diagnostics?



- 广义概念：广义上讲，车辆中所有的控制器（ECU） - 均为微处理器系统，都带有针对本身或车辆系统的自诊断功能，包括：电路性诊断和功能性诊断。

英语统一称作：On-Board Diagnostics - OBD，车载诊断。

在诊断出故障后，OBD需要存储故障信息，并针对严重的故障采取必要的保护措施。

- 通常概念：**排放**相关的OBD – Emission related。包括但不仅限于：Engine Control Module、Transmission Control Module、Battery Management Module。车辆中，但凡涉及排放的控制器系统都应当支持排放相关的OBD。

支持OBD的具体意义：

1. 监控影响排放的零部件、作出故障诊断、存储故障信息、针对严重故障采取必要控制措施。
2. 支持国际标准定义的OBD诊断协议，为Off Board诊断仪提供相关信息。

OBD诊断遵循的协议（应用层）



- SAE J1979/ISO 15031-5: 适用于乘用车和部分欧系商用车

功能分组	SID	解释
数据流与车辆信息	0x01	请求诊断就绪状态、动力总成数据等
	0x09	请求车辆信息：VIN, CALID, CVN, IUPR Values。
故障内存	0x03	读取确认故障代码（DTC Diagnostic Trouble Codes）
	0x02	读取确认故障代码冻结帧数据（Freeze Frames）
	0x07	读取未决故障代码
	0x0A	读取永久故障代码
	0x04	清除/重置故障信息（DTCs, Freeze Frames, MIL, Test Result）
元器件测试	0x06	获取针对特定被监控系统的车载监控测试结果：氧传感器, VVT等。
	0x05	获取氧传感器监控测试结果（仅用于K-Line）
	0x08	获取车载系统、测试和元器件的控制

OBD诊断遵循的协议（应用层）



- **SAE J1939**: 广泛应用于美系商用车的CAN网络通讯协议，它由若干标准组成，其中SAE J1939-3是关于OBD应用的指导。
- 与SAE J1979不同，SAE J1939网络中，控制器会周期性发送一部分的诊断信息和数据流到整个网络。但不同的信息和数据流的发送频率是不同的。
- 诊断信息（故障信息，MIL，Readiness等）在J1939中被定义并分组为DMx（Diagnostic Messages，x是序号）。（SAE J1939-73 Application Layer - Diagnostics）
- 每一个网络信号和系统组成数据都有自己单独的SPN（Suspect Parameter Number），具有相同性质的SPN被归组为同一个PGN（Parameter Group Number）。诊断仪通过PGN，对数据进行诊断询问。（SAE J1939-71 Vehicle Application Layer）
- OBD控制器必须支持DM05。
- SAE J1939-84: 型式核准测试标准。



OBD诊断遵循的协议（应用层）



ISO 27145 Road vehicles -- Implementation of World-Wide Harmonized On-Board Diagnostics (WWH-OBD)

communication requirements: 欧六/国六商用车OBD协议

- WWH-OBD当前首先应用于欧六/国六法规的商用车，远景为逐渐在乘用车领域推广。
- 规范采用在新系统中早已使用的4个UDS服务实现OBD数据的读取：

服务	SID	用途
ReadDataByIdentifier	0x22	请求诊断就绪信息、数据流、测试结果、车辆信息、IUPR。
ReadDTCInformation	0x19	读取各类故障代码和冻结帧：当前、历史、确认、未决、永久。
ClearDiagnosticInformation	0x14	删除故障代码与重置诊断信息
RoutineControl	0x31	获取车载系统、测试和元器件的控制

- 总线方面，支持CAN和Ethernet通讯；原则上也支持K-Line和FlexRay。
- 融合J1979和J1939中已定义的数据。

整车OBD数据的验证



ISO 15765-4:2016(E)

Table 7 — 11 bit legislated OBD/WWH-OBD CAN identifiers

CAN identifier	Description
7DF ₁₆	CAN identifier for functionally addressed request messages sent by external test equipment
7E0 ₁₆	Physical request CAN identifier from external test equipment to ECU #1
7E8 ₁₆	Physical response CAN identifier from ECU #1 to external test equipment
7E1 ₁₆	Physical request CAN identifier from external test equipment to ECU #2
7E9 ₁₆	Physical response CAN identifier from ECU #2 to external test equipment
7E2 ₁₆	Physical request CAN identifier from external test equipment to ECU #3
7EA ₁₆	Physical response CAN identifier from ECU #3 to external test equipment
7E3 ₁₆	Physical request CAN identifier from external test equipment to ECU #4
7EB ₁₆	Physical response CAN identifier ECU #4 to the external test equipment
7E4 ₁₆	Physical request CAN identifier from external test equipment to ECU #5
7EC ₁₆	Physical response CAN identifier from ECU #5 to external test equipment
7E5 ₁₆	Physical request CAN identifier from external test equipment to ECU #6
7ED ₁₆	Physical response CAN identifier from ECU #6 to external test equipment
7E6 ₁₆	Physical request CAN identifier from external test equipment to ECU #7
7EE ₁₆	Physical response CAN identifier from ECU #7 to external test equipment
7E7 ₁₆	Physical request CAN identifier from external test equipment to ECU #8
7EF ₁₆	Physical response CAN identifier from ECU #8 to external test equipment

While not required for current implementations, it is strongly recommended (and may be required by applicable legislation) that for future implementations, the following 11 bit CAN identifier assignments be used:

- 7E0₁₆/7E8₁₆ for ECM (engine control module);
- 7E1₁₆/7E9₁₆ for TCM (transmission control module).

Table 9 — 29 bit legislated OBD/WWH-OBD CAN identifiers

CAN identifier	Description
18 ₁₆ DB ₁₆ 33 ₁₆ F1 ₁₆	Functional request CAN identifier from external test equipment to ECUs with #33 ₁₆
18 ₁₆ DA ₁₆ XX ₁₆ F1 ₁₆	Physical request CAN identifier from external test equipment to ECU #XX ₁₆
18 ₁₆ DA ₁₆ F1 ₁₆ XX ₁₆	Physical response CAN identifier from ECU #XX ₁₆ to external test equipment

While not required for current implementations, it is strongly recommended (and may be required by applicable legislation) that for future implementations, the physical ECU addresses be used in accordance with the assignments found in SAE J2178/1.

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整车OBD数据的验证



ISO 15765-4:2016(E)

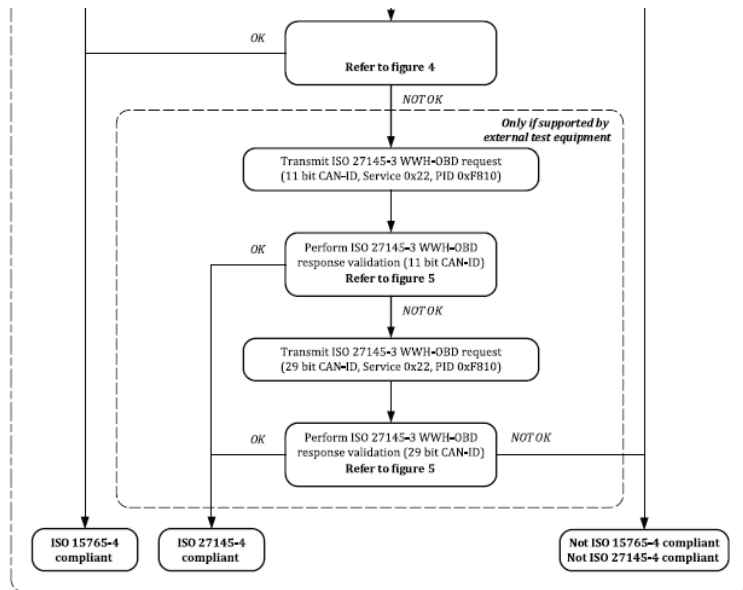
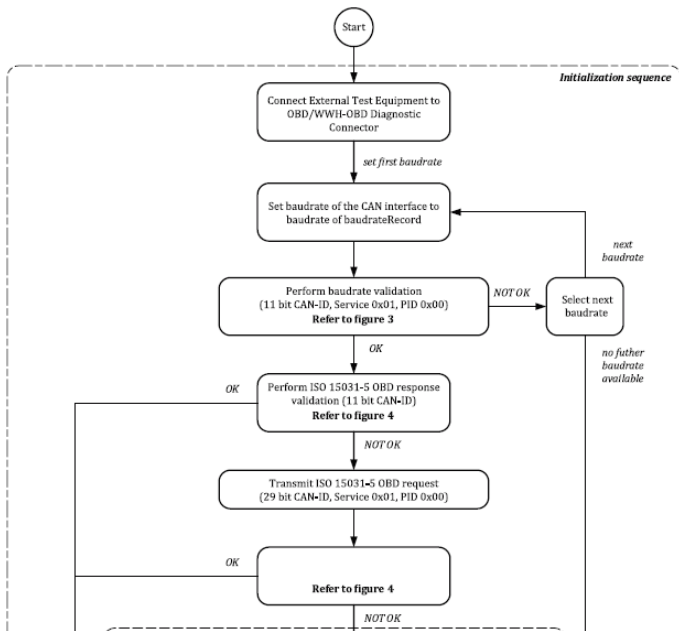


Figure 2 — Initialization sequence overview

整车OBD数据的验证 (DiagRA D/SST)



The screenshot displays the Silver Scan Tool interface. The main window shows a list of OBD data points with columns for PID, Value, and Unit. A pop-up window titled "List of supported Modes and PIDs" is open, showing a table of supported PIDs and their corresponding modules.

Mode	PID	Modules	Comment
Mode 1	****	****	Current powertrain diagnostic data
1	00	E8 E9 EA EB EC ED EF	PIDs supported 01-1F
1	01	E8 E9 EA EB EC	Monitor status since DTCs cleared
1	03	E8	Fuel system A status, Fuel system B status
1	04	E8	Calculated load value
1	05	E8	Engine coolant temperature
1	06	E8	Short term fuel trim - Bank 1, Short term fuel trim - Bank 3
1	07	E8	Long term fuel trim - Bank 1, Long term fuel trim - Bank 3
1	0A	E8 EB	Fuel pressure (gauge)
1	0B	E8	Intake manifold absolute pressure
1	0C	E8	Engine RPM
1	0D	E8	Vehicle speed sensor
1	0E	E8	Ignition timing advance for #1 cylinder
1	0F	E8	Intake air temperature
1	10	E8	Air flow rate from mass air flow sensor
1	11	E8	Absolute throttle position
1	13	E8	Location of oxygen sensors
1	14	E8	Oxygen sensor output voltage, Short term fuel trim
1	15	E8	Oxygen sensor output voltage, Short term fuel trim
1	1C	E8	OBD requirements to which vehicle or engine is certified
1	1F	E8	Time since engine start
1	20	E8 E9 EA EB EC ED EF	PIDs supported 21-3F
1	21	E8	Distance traveled while MIL is activated
1	2E	E8	Commanded evaporative purge
1	2F	E8	Fuel level input
1	30	E8	Number of warm-ups since DTCs cleared
1	31	E8	Distance traveled since DTCs cleared
1	32	E8	Evap system vapor pressure
1	33	E8	Barometric pressure
1	3C	E8	Catalyst temperature Bank 1 Sensor 1
1	40	E8 E9 EA EB EC ED EF	PIDs supported 41-5F
1	41	E8	Monitor status this driving cycle
1	42	E8 E9 EA EB EC ED EF	Control module voltage

整车OBD数据的验证 (DiagRA D/SST)



文件 触发器 功能 附加选项 外观 选项 帮助 33 Scan-Tool ISO 15765-4 (CAN)

标准 扩展 内存 J1979 J1939/ISO27145

E8 ECM-发动机控制模块

PID	数值	单位	
04	99.6	%	计算负荷值
05	102	°C	发动机冷却液温度
06	-100.0	%	短期燃油调整值 - 气缸组1
	-100.0	%	短期燃油调整值 - 气缸组3
07	-100.0	%	长期燃油调整值 - 气缸组1
	-100.0	%	长期燃油调整值 - 气缸组3
08	-100.0	%	短期燃油调整值 - 气缸组2
	-100.0	%	短期燃油调整值 - 气缸组4
09	-100.0	%	长期燃油调整值 - 气缸组2
	-100.0	%	长期燃油调整值 - 气缸组4
0A	0	kPa	油压(计)
0B	254	kPa	进气歧管绝对压力
0C	6183	1/min	发动机转速
0D	254	km/h	车速传感器
0E	63.0	°	气缸#1点火提前角
0F	202	°C	进气温度
10	653.90	g/s	空气流量传感器中气流比率
11	99.6	%	绝对节气门位置
12	0000 0000	Bit	请求二次进气状态
13	0000 0000	Bit	氧传感器位置
14	0.000 V		氧传感器输出电压
	-100.0	%	短期燃油调整值
15	0.000 V		氧传感器输出电压
	-100.0	%	短期燃油调整值
16	0.000 V		氧传感器输出电压
	-100.0	%	短期燃油调整值
17	0.000 V		氧传感器输出电压
	-100.0	%	短期燃油调整值
18	0.000 V		氧传感器输出电压
	-100.0	%	短期燃油调整值

D 执行服务序列

执行 打开 清除列表 保存

TX / RX	地址	数据
TX	7DF	01 0D
RX	7E8	41 0D FE 00 00 00 00
TX	7DF	09 02
RX	7E8	49 02 01 4C 44 43 31 32 33 34 35 36 37 38 39 30 31 32 33 34
TX	7DF	09 00
RX	7E8	49 FF FF FF FF FF FF

添加 重复 移除 编辑 上移 下移 关闭

Mode 1 Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Mode 7 Mode 8 Mode 9 Mode A 循环 单次

整车OBD数据的验证 (DiagRA D/SST)



Silver Scan Tool 7.39.39.41255

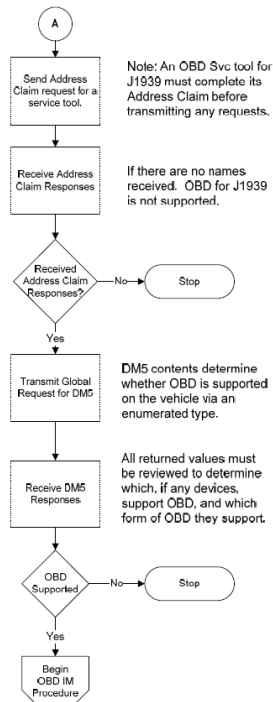
File Trigger Functions Extras View Graphic Options Help 33 Scan-Tool SAE J1939-03 (CAN)

J1979 J1939/ISO27145

00 Engine 1

Readiness Status	Value	PGN	Group description
Value description			
Active Diagnostic Trouble Code Count		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Previously Active Trouble Codes		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
OBD Compliance		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Continuously Monitored Systems Support/Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Misfire monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Misfire monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Fuel system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Fuel system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Comprehensive component monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Comprehensive component monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Non-continuously Monitored Systems Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Non-continuously Monitored Systems Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
EGR system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
EGR system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor heater monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor heater monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
A/C system refrigerant monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
A/C system refrigerant monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Secondary air system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Secondary air system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Evaporative system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Evaporative system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Heated catalyst monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Heated catalyst monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Catalyst monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Catalyst monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NMHC converting catalyst system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NMHC converting catalyst system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NOx converting catalyst and/or NOx adsorber system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NOx converting catalyst and/or NOx adsorber system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Diesel Particulate Filter (DPF) system monitoring Support		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Diesel Particulate Filter (DPF) system monitoring Status		SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared

SPN_3031 failed, PGN 65110 = SF56



Silver Scan Tool 7.39.39.41255

File Trigger Functions Extras View Graphic Options Help 33 Scan-Tool SAE J1939-03 (CAN)

J1979 J1939/ISO27145

00 Engine 1 01 Engine 2 3D Exhaust Emission Controller

Readiness Status	Value	PGN	Group description
Value description			
Active Diagnostic Trouble Code Count	1	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Previously Active Trouble Codes	5	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
OBD Compliance	HD OBD	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Continuously Monitored Systems Support/Status	0000 0000	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Misfire monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Misfire monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Fuel system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Fuel system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Comprehensive component monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Comprehensive component monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Non-continuously Monitored Systems Support	0000 0000 0000 0000	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Non-continuously Monitored Systems Status	0000 0000 0000 0000	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
EGR system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
EGR system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor heater monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor heater monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Exhaust Gas sensor monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
A/C system refrigerant monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
A/C system refrigerant monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Secondary air system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Secondary air system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Evaporative system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Evaporative system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Heated catalyst monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Heated catalyst monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Catalyst monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Catalyst monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NMHC converting catalyst system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NMHC converting catalyst system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NOx converting catalyst and/or NOx adsorber system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
NOx converting catalyst and/or NOx adsorber system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Diesel Particulate Filter (DPF) system monitoring Support	not supported	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared
Diesel Particulate Filter (DPF) system monitoring Status	test complete	SFCE	Diagnostic Readiness 1, Monitor status since DTCs cleared

SPN_3031 failed, PGN 65110 = SF56

整车OBD数据的验证 (DiagRA D/SST)



Silver Scan-Tool 7.39.39.41255

File Trigger Functions Extras View Graphic Options Help 33 Scan-Tool ISO 27145 (ISO-CAN)

J1979 J1939/ISO27145

00 ECM-EngineControl

Read Fault Memory

ConfirmedAndActiveDTCsAndClass - Confirmed and Active DTCs and their associated class

Value	Value description
reportWWHOBDDTCByMaskRecord	Report Type
Emissions system group	Functional Group ID
1111 1111	Status Availability Mask
1111 1111	Severity Availability Mask
SAE_J1939-73	DTC Format Identifier

Nr	DTC	Diagnostic Trouble Code	FMI	Failure Mode Identifier	DTC Severity	DTC Class	Status
1	38912	(38912)	18	Data valid but below normal operating range - Moderately severe level	noSeverityAvailable	Class B1	Pendi
2	66305	(66305)	9	Abnormal update rate	noSeverityAvailable	Class A	Pendi
3	1540	Reel Speed Actuator Position	18	Data valid but below normal operating range - Moderately severe level	noSeverityAvailable	Class A	Pendi
4	269073	(269073)	7	Mechanical system failure	noSeverityAvailable	Class A	Pendi
5	10784	(10784)	17	Data valid but below normal operating range - Least severe level	noSeverityAvailable	Class B2	Pendi
6	40992	(40992)	19	Received network			
7	3622	J2012 DTC Occurrence Count	19	Received network			
8	8742	Auxiliary Valve 13 Exit/Reason Code	18	Data valid but below normal operating range - Moderately severe level	noSeverityAvailable	Class B1	Pendi

Communication Monitor

Timestamp	TX / RX	Address	Length	Data
116048	TX	18DA00F1	5	19 42 33 0C 10
116050	RX	18DAF100	46	59 42 33 FF 04 04 00 98 12 04 02 01
118063	TX	18DB33F1	3	22 F8 10

Silver Scan-Tool 7.39.39.41255

File Trigger Functions Extras View Graphic Options Help 33 Scan-Tool ISO 27145 (ISO-CAN)

J1979 J1939/ISO27145

00 ECM-EngineControl

Read Fault Memory

ConfirmedAndActiveDTCsAndClass - Confirmed and Active DTCs and their associated class

Value	Value description
reportWWHOBDDTCByMaskRecord	Report Type
Emissions system group	Functional Group ID
1111 1111	Status Availability Mask
1111 1111	Severity Availability Mask
SAE_J2012-DA WWH-OBDDTC	DTC Format Identifier

Nr	Diagnostic Trouble Code	Failure Type	Failure Mode Identifier	DTC Severity	DTC Class	Status of DTC	GTR Status
P0098	Intake Air Temperature Sensor 2 Circuit High Bank 1	12	Circuit Short To Battery	noSeverityAvailable	Class B1	Pending DTC	Potential
P0103	Mass or Volume Air Flow Sensor "A" Circuit High	29	Signal Invalid	noSeverityAvailable	Class A	Pending DTC	Potential
P0406	EGR Sensor "A" Circuit High	12	Circuit Short To Battery	noSeverityAvailable	Class A	Pending DTC	Potential
P1118	(Manufacturer Controlled DTC)	87	Missing Message	noSeverityAvailable	Class A	Pending DTC	Potential
P202A	Reductant Tank Heater Control Circuit/Open	11	Circuit Short To Ground	noSeverityAvailable	Class B2	Pending DTC, Confirmed DTC	Confirmed and Active
P20A0	Reductant Purge Control Valve "A" Circuit/Open	13	Circuit Short To Ground	noSeverityAvailable	Class B2	Pending DTC, Confirmed DTC	Confirmed and Active
P260E	Particulate Filter Regeneration Lamp Control Circuit/Open	13	Circuit Short To Ground	noSeverityAvailable	Class B2	Pending DTC, Confirmed DTC	Confirmed and Active
P2622	Throttle Position Output Circuit High	12	Circuit Short To Battery	noSeverityAvailable	Class B1	Pending DTC	Potential

Communication Monitor

Timestamp	TX / RX	Address	Length	Data
7016	TX	18DB33F1	3	22 F8 10
7018	RX	18DAF100	46	62 F8 10 01
7766	TX	18DA00F1	5	19 42 33 0C 10
7768	RX	18DAF100	46	59 42 33 FF 04 04 00 98 12 04 02 01 03 29 04
9778	TX	18DB33F1	3	22 F8 10

整车OBD数据的验证 (DiagRA D/SST)



The screenshot displays the Silver Scan Tool interface for a J1939/ISO27145 vehicle. The main window shows a list of Freeze Frame Data with columns for Value, Identifier, and Group description. A secondary window, 'Communication Monitor', is open, showing a list of data points with hex values. A red box highlights the value 'F4 0C 00 00 F4 00' in the 'Data' column, with a red arrow pointing to it from the 'Freeze Frame Data' window. Another 'Communication Monitor' window is also visible, showing a list of data points with hex values, including '00 00' highlighted in a red box.

Value description	Value	Identifier	Group description
Report Type	reportDTCSnapshotRecordByDTCNumber	S00	DTC Extended Data Record By DTC Number
Diagnostic Trouble Code	EB 0D 03	S00	DTC Extended Data Record By DTC Number
Status of DTC	Test failed this monitoring cycle, Pending DTC, Confirmed DTC, Test failed since last clear, Warning indicator requested	S00	DTC Extended Data Record By DTC Number
OTR Status	Confirmed and Active	S00	DTC Extended Data Record By DTC Number
Record Number	00	S00	DTC Extended Data Record By DTC Number
Number Of DIDs	25	S00	DTC Extended Data Record By DTC Number
Calculated Load value	0.0 %	SF404	DTC Extended Data Record By DTC Number
Engine Coolant Temperature	-40 °C	SF405	DTC Extended Data Record By DTC Number
Engine RPM	0.00 1/min	SF40C	DTC Extended Data Record By DTC Number
Intake Air Temperature	-40 °C	SF40F	DTC Extended Data Record By DTC Number
Time Since Engine Start	0.0 s	SF41F	DTC Extended Data Record By DTC Number
Fuel Level Input			
Barometric Pressure			
Control module voltage			
Ambient air temperature			
Accelerator Pedal Position D			
Engine Oil Temperature			
Fuel Injection Timing			
Engine Fuel Rate			
Driver's Demand Engine - Percent Torque			
Actual Engine - Percent Torque			
Support of Auxiliary Inputs / Outputs Data			
Power Take Off (PTO) Status			
Support of EGR System Data			
Commanded EGR A Duty Cycle/Position			
Actual EGR A Duty Cycle/Position			
Support of Fuel Pressure Control System Data			
Commanded Fuel Rail Pressure A			
Fuel Rail Pressure A			
Support of Boost Pressure Control Data			
Commanded Boost Pressure A			
Boost Pressure Sensor A			

整车OBD型式核准测试



要求举例：

- OBD协议：有且只有一种。一种的意义不仅表示应用层协议，也涵盖CAN ID和波特率。
- 通讯参数：是否能够在规定时间内提供正确的诊断响应？
- 车辆信息：VIN/CALID/CVN等数据正确响应。
- 数据流：PID/MID/TID/DID的支持与读取是否吻合？数据是否在有效范围内？
- 故障出现顺序与读取：Pending -> Confirmed -> Permanent。
- 故障删除：对于Clear DTC服务的Positive与Negative响应是否正确。
- 特别重点测试项：
 - 乘用车：IUPR - OBD总分母、各分项监控的就绪位和分子分母。
 - 商用车：MIL状态与B1故障。不同工况下的亮灯状态，B1故障计数器。



乘用车OBD型式核准测试



SAE J1699-3 Vehicle OBD II Compliance Test Cases

Static Tests: 静态测试

章节	内容
5	TEST VEHICLE WITH NO MALFUNCTIONS, NO DTCS SET: 车辆无故障状态
	5.1 – 5.7 Engine Off: MIL灯的初始状态、确认车辆OBD协议、Service 04及MIL灯状态、Service 06、Service 01、Service 08 (如果车辆支持)。
	5.8 – 5.21: Engine Running: 确认车辆OBD协议、Service 04及MIL灯状态、Service 01、Service 02、Service 03、Service 05 (仅对K-Line协议)、Service 06、Service 07、Service 08 (如果车辆支持)、Service 09、Service 01下supported Data倒序测试 (PIDs E0 -> C0 -> A0 -> 80 -> 60 -> 40 -> 20 -> 00)、测试OBD通讯在最大允许时间间隔的有效性 (Idle Message Timing)、测试OBD通讯在最大允许刷新频率下的有效性 (Burst Message Timing)、测试OBD系统对于保留/不用的诊断服务的响应及后果: 00, 0B - 0F与服务 01, PID00。
6	TEST VEHICLE AND SET A PENDING CODE BY INDUCING A FAULT: 测试人员制造可以在两个或者三个驾驶循环内点亮MIL灯的电路故障
	6.1 Engine Off: 在某个ECU上制造影响连续监控的电路故障 (断开传感器信号), 但不能影响发动机的启动。
	6.2 – 6.5 Engine running: 确认车辆OBD协议、30秒内Service 07的响应中有Pending故障报出、Service 03的响应中应该没有故障报出 (Service 01, PID01的反馈中也对应的故障数量是0, MIL Bit置0)、Service 02的响应中能正确输出 (在支持/不支持Pending故障时)。
	6.6: 继续制造电路故障驾驶循环 (仅对非OBD II/CN VI)。
7	TEST VEHICLE AND SET A CONFIRMED CODE AND MIL BY RETAINING FAULT: 测试Confirmed故障与MIL灯状态
	7.1 Engine Off: 车辆下电并保持此电路故障。
	7.2 – 7.5 Engine running: 确认车辆OBD协议、30秒内Service 07的响应中有Pending故障报出、Service 03的响应中应该报出Confirmed故障 (Service 01, PID01的反馈中也对应正确的故障数量, MIL Bit置1)、仪表盘上MIL灯点亮、Service 02的响应中能正确输出所对应的故障代码的冻结帧。

乘用车OBD型式核准测试



章节	内容
8	TEST VEHICLE WITH FAULT REPAIRED: 修复车辆故障
	8.1 下电熄火至少30秒、插上传感器、启动发动机并怠速1分钟、下电熄火至少30秒完成此无故障的驾驶循环、再次启动发动机并怠速1分钟。
	8.2 – 8.6 Engine Running: 确认车辆OBD协议、Service 07的响应中无Pending故障报出、Service 03的响应中应该报出至少一个Confirmed故障 (Service 01, PID01的反馈中也对应正确的故障数量, MIL Bit置1)、仪表盘上MIL灯仍然是点亮状态、Service 02的响应中能正确输出所对应的故障代码的冻结帧、Service 0A的响应中应该报出至少一个在前次驾驶循环中存储的Permanent故障。
9	TEST VEHICLE WITH NO FAULTS AFTER 3 OR 4 DRIVING CYCLES COMPLETED: 清除故障代码
	9.1: 下电熄火至少30秒 (完成两个无故障的驾驶循环)、启动发动机并怠速1分钟、下电熄火至少30秒 (完成三个无故障的驾驶循环)、再次启动发动机MIL灯应该是熄灭状态。
	9.2 – 9.7 Engine running: 确认车辆OBD协议、Service 07的响应中无Pending故障报出、Service 03的响应中应该报出至少一个Confirmed故障 (Service 01, PID01的反馈中也对应正确的故障数量, MIL Bit置0)、Service 02的响应中能正确输出所对应的故障代码的冻结帧、Service 0A的响应中没有Permanent故障。
	9.8: 制造电路故障引起Pending和Confirmed故障 – 下电熄火并断开传感器信号、上电怠速1分钟、下点熄火30秒并保持传感器断开、上电怠速1分钟、下点熄火30秒并保持传感器断开、上电但不启动发动机。
	9.9 – 9.12 Engine off: 确认车辆OBD协议、Service 03的响应中应该报出至少一个Confirmed故障 (Service 01, PID01的反馈中也对应正确的故障数量, MIL Bit置1)、Service 0A的响应中应该报出至少一个在前次驾驶循环中存储的Permanent故障、下点熄火30秒后插上传感器、上电但不启动发动机。
	9.13 – 9.16 Engine off: 确认车辆OBD协议、使用Service 04清除故障代码、检查Service 01, PID01的反馈中的故障数量和MIL Bit通过Service 04重置、Service 0A的响应中应该还报出至少一个Permanent故障、启动发动机并怠速1分钟、下电熄火至少30秒完成此无故障的驾驶循环、再次启动发动机并怠速1分钟。
	9.17 – 9.23 确认车辆OBD协议、Service 0A的响应中应该还报出至少一个Permanent故障、完成CARB循环、上电并启动发动机、确认车辆OBD协议、Service 0A的响应中应该没有Permanent故障、下电熄火至少30秒、上电确认车辆OBD协议、执行Service 04并检查响应。

乘用车OBD型式核准测试



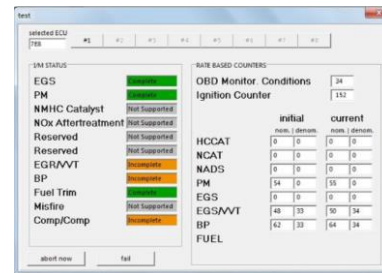
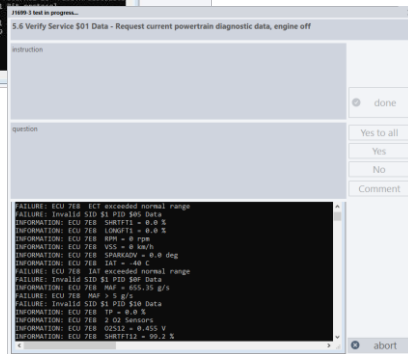
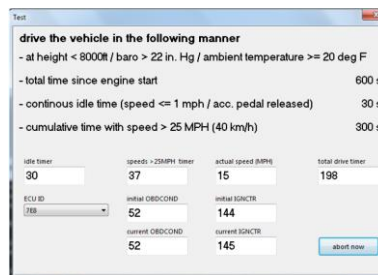
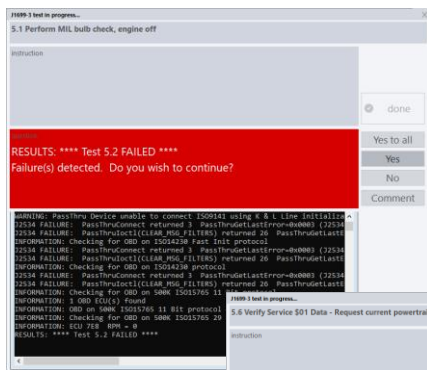
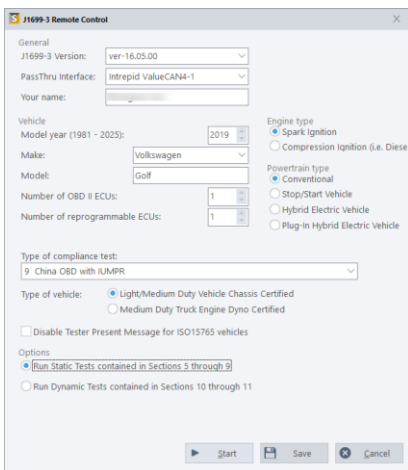
Dynamic Tests: 动态测试 (IUPR)

章节	内容
10	TEST VEHICLE WITH NO FAULTS TO VERIFY IUMPR COUNTERS, SERVICES \$06 AND \$01: 测试IUPR数据的总分母
	10.1 – 10.9 Engine Off: 确认车辆OBD协议、Service 01中的supported Data和数据合理性、Service 09车辆数据 (VIN/CVN/CALID)、Service 04、验证Service 01的PID01 IM Readiness、Service 06、Service 07、Service 03、Service 09的IUPR数据、下电熄火60秒。
	10.10 – 10.14: 上电并启动发动机、确认车辆OBD协议、完成CARB循环 (连续怠速30秒、累计车速大于40km/h工况300秒、总计时间600秒)、Service 01中的supported Data和数据合理性、Service 09的IUPR数据中OBD总分母是否增加。
11	TEST VEHICLE WITH NO FAULTS TO VERIFY IUMPR COUNTERS, SERVICE \$06, I/M READINESS: 测试IUPR数据各分项的分子和分母
	11.1 – 11.3 车辆上电并怠速1分钟 (如需)、读取Service 01的PID01 IM Readiness (获取监控支持和完成度)、Service 09的当前IUPR数据、完成厂商自定义驾驶循环 (最终结果: 给分项监控显示完成且分子分母增长)、下点熄火至少30秒、上电不启动、。
	11.4 – 11.12 确认车辆OBD协议、Service 01的动力总成数据、Service 06、Service 09车辆数据 (VIN/CVN/CALID)、Service 01的PID01 IM Readiness、Service 03、Service 07、Service 04、Service 09的IUPR值在Service 04后未改变。

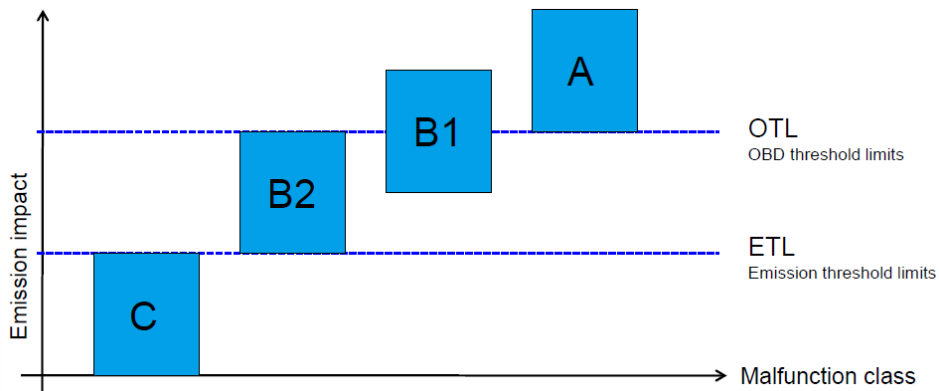
DiagRA D/SST软件与J1699-3



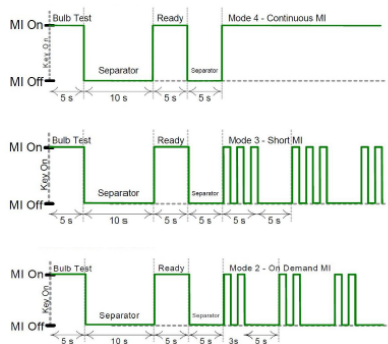
- DiagRA D/SST软件中提供执行 J1699-3测试程序的上位机程序。
- 每章节测试都有辅助提示



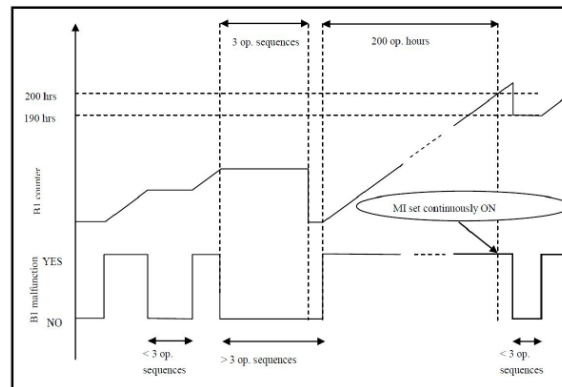
商用车OBD型式核准测试



- **Class A** Continuous-MI
- **Class B1** Short-MI or Continuous-MI
- **Class B2** Short-MI
- **Class C** On-Demand-MI



■ B1 Counter Activation Principles



Class B1 failures lead to continuous MI after 200 hours

- How to verify this in a reasonable time?

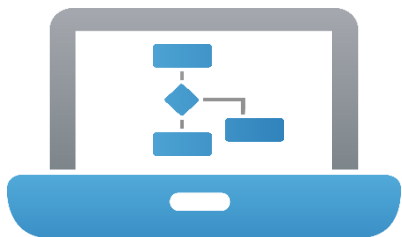
User can choose between

- Test bench mode
Modify calibration of time interval, reset value and upper limit to reduce time required
- Real driving mode
Suspend test after confirmation of B1 failure and continue at a later time

商用车OBD型式核准测试



- Compliance Test for ISO 27145 WWH-OBD
- Project initiated by ACEA working group of European truck manufacturers (European Automobile Manufacturers' Association)
- Specification created by RA Consulting **Peter Stoss** and ACEA based on experience of SAE J1699-3
- Implementation of compliance test tool by RA Consulting **Lei Zhao**
- Compliance Test covers verification of all communication and protocol issues, Class A, B1, B2 and C failures including MI illumination, IUMPR and Readiness



商用车OBD型式核准测试



章节	内容
5	Test vehicle with no malfunctions, no DTCs set
6	Test vehicle and set a pending code by inducing a Class A fault
7	Test vehicle and set a confirmed code and MI by retaining a Class A fault
8	Test vehicle with fault repaired, first driving cycle
9	Test vehicle with fault repaired, second driving cycle
10	Test vehicle with fault repaired, third and fourth driving cycle
12	Test vehicle and set a pending code by inducing a Class B2 fault
13	Test vehicle and set a confirmed code and MI by retaining a Class B2 fault
14	Test vehicle and set a pending code by inducing a Class C fault
15	Test vehicle and set a confirmed code and MI by retaining a Class C fault
16	Test vehicle and set a pending code by inducing a Class B1 fault
17	Test vehicle and set a confirmed code and MI by retaining a Class B1 fault
18	Test vehicle with Class B1 fault repaired
19	Test vehicle with Class B1 fault re-induced
20	Test vehicle with Class B1 fault repaired

商用车OBD型式核准测试



```
D:\Work Files\CT\CT_WWH OBD_1.0.203\CT_WWH OBD.exe
13: Intrepid - Intrepid neoVI Plasma/ION
14: Intrepid - Intrepid neoVI Plasma/ION VNETA
15: Intrepid - Intrepid RADGalaxy
16: Intrepid - Intrepid ValueCAN3
17: Intrepid - Intrepid ValueCAN4-1
18: Intrepid - Intrepid ValueCAN4-2
19: Intrepid - Intrepid ValueCAN4-2EL
20: Intrepid - Intrepid ValueCAN4-4
21:
22: RA Consulting GmbH - DoIP_v0 (version 0)
23: RA Consulting GmbH - DiagRA S
24:
Enter device number (1-24): 16
INFORMATION: Loading API-DLL "C:\windows\system32\icsJ2534VCAN3.dll"

Number of emission-related ECUs in the vehicle: 1
Select test case to start with:
1: Start at the beginning with test case 5
2: Re-enter Class B1 counter verification at test case 17.7
3: Run dynamic test to verify IUMPR and I/M Readiness at test case 22
Enter number (1-3): 1
INFORMATION: J2534_PassThruOpen success: DeviceId=1
INFORMATION: Firmware version: Gen = 3 App 04.02 Manf 00/00/00 BRev 00.00 BLVer 00.00
INFORMATION: Dll version: 3.900.0.81
INFORMATION: Api version: 04.04

TEST: ***** 5.1 Perform malfunction indicator check, engine off *****
PROMPT: Turn ignition off for 30 s or longer, as appropriate for the ECU. (Press Enter to c
```

```
20190726_133154.log - Notepad
File Edit Format View Help
00021515ms INFORMATION: Checking for protocol "15765-4 29-bit 250 kbps"
00021531ms INFORMATION: J2534_PassThruConnect(DeviceId=1232; ProtocolId=5; BaudRate=250000) success: ChannelId=0
00021531ms INFORMATION: J2534_Ioct1(SetConfig-Loopback) success
00021531ms INFORMATION: J2534_Ioct1(ClearMsgFilters) success
00021531ms INFORMATION: J2534_StartMsgFilter(Mask=1FFFFFF0; Header=18DAF100) success: 0
00021547ms REQ_MSG: Flags: 00000140 Data: 18 DB 33 F1 03 22 F8 10 AA AA AA AA
00021547ms TX_MSG: Time: 3416793 Staus: 00000101 Data: 18 DB 33 F1 03 22 F8 10 AA AA AA AA
00021562ms RX_MSG: Time: 3436327 Staus: 00000100 Data: 18 DA F1 00 04 62 F8 10 01 AA AA AA
00022562ms INFORMATION: 1 ECU(s) found
00022562ms INFORMATION: protocol "15765-4 29-bit 250 kbps" detected
00022640ms INFORMATION: J2534_PassThruDisconnect(ChannelId=0) success

00022672ms INFORMATION: J2534_PassThruConnect(DeviceId=1232; ProtocolId=6; BaudRate=250000) success: ChannelId=0
00022672ms INFORMATION: J2534_Ioct1(SetConfig-Loopback) success
00022672ms INFORMATION: J2534_StartMsgFilter(FLOW_CONTROL_FILTER Pattern=18DAF100; FlowControl=18DA00F1) success

00022672ms REQ_MSG: Flags: 00000140 Data: 18 DA 00 F1 22 F4 0C
00022672ms TX_MSG: Time: 0 Staus: 00000109 Data: 18 DA 00 F1
00022672ms TX_MSG: Time: 4550868 Staus: 00000101 Data: 18 DA 00 F1 22 F4 0C
00022672ms RX_MSG: Time: 455645 Staus: 00000100 Data: 18 DA F1 00 62 F4 0C 00 00
00022672ms INFORMATION: ECU 18DAF100 RPM = 0 1/min

00022687ms TEST: ***** 5.2 PASSED *****

00022687ms TEST: ***** 5.3 Verify consistency of reported support information of DIDs, engine off *****

00022687ms REQ_MSG: Flags: 00000140 Data: 18 DA 00 F1 22 F4 00
00022687ms TX_MSG: Time: 0 Staus: 00000109 Data: 18 DA 00 F1
00022687ms TX_MSG: Time: 4559735 Staus: 00000101 Data: 18 DA 00 F1 22 F4 00
00022687ms RX_MSG: Time: 4567517 Staus: 00000100 Data: 18 DA F1 00 62 F4 00 98 3B A0 17
00022687ms REQ_MSG: Flags: 00000140 Data: 18 DA 00 F1 22 F4 20
00022687ms TX_MSG: Time: 0 Staus: 00000109 Data: 18 DA 00 F1
```

技术支持与业务咨询



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Right Price