

General Information

System Name	Common Rail (6M60T)
SCC	\$EB03
Diagnostic Communication Type	UDS on CAN
OBD-2	X
Communication Speed (250/500kbps)	500kbps
ECU Address (Physical)	\$10
ECU Address (Functional)	\$33
Tester Address	\$F1

Supported Diagnostic Service

Diagnostic Service Name	Hex	Support
<b>Diagnostic and Communication Management functional unit</b>		
<b>Diagnostic Session Control</b>	<b>\$10</b>	<b>X</b>
Default Session – Positive Response Required	\$01	X
Extended Diagnostic Session – Positive Response Required	\$03	X
<b>Security Access</b>	<b>\$27</b>	<b>X</b>
Request Seed – Positive Response Required	\$01	X
Send Key – Positive Response Required	\$02	X
<b>Tester Present</b>	<b>\$3E</b>	<b>X</b>
Positive Response Required	\$00	X
No Positive Response Required	\$80	X
<b>Data Transmission functional unit</b>		
<b>Read Data By Identifier</b>	<b>\$22</b>	<b>X</b>
Vehicle Manufacture Specific -Data	\$01 60 - \$CF FF	X
Network Configuration Data For Tractor Trailer Application	\$F0 00 - \$F0 0F	-
Diagnostic Variant Code (Read SCC)	\$F1 0C	X
Hardware Part Number	\$F1 18	X
Software Part Number	\$F1 28	X
ECU Part Number	\$F1 38	X
Hardware Version Information	\$F1 50	-
Software Version Information	\$F1 51	-
Hardware Supplier Identifier	\$F1 54	X
Software Supplier Identifier	\$F1 55	X
Read Software Fingerprint	\$F1 5B	X
ECU Serial Number	\$F1 8C	X
<b>Stored Data Transmission functional unit</b>		
<b>Clear Diagnostic Information</b>	<b>\$14</b>	<b>X</b>
Emission Related Systems	\$000000	-
All Groups / All DTCs	FFFFFF	X
Individual DTC	XXXXXX	-
<b>Read DTC Information</b>	<b>\$19</b>	<b>X</b>
Report Number Of DTC By Status Mask	\$01	X
Report DTC By Status Mask	\$02	X
<b>Input Output Control functional unit</b>		
<b>Input Output Control By Identifier</b>	<b>\$2F</b>	<b>X</b>
Return Control To ECU	\$00	X
Freeze Current State	\$02	X
Short Term Adjustment	\$03	X
Vehicle Manufacture Specific –Input/Output Control	\$D0 00 - \$DF FF	X

Service Data (Variable data)

Data Identifier		Service Data		Value		Remark
Byte No	No	Item Name	Conversion	Unit		
0200	1	01	Engine Revolution	X*15	rpm	
	2	02	Reference Injection Quantity	X*1	%	
	3					
	4					
0201	1	05	Gas-flow Resistance Of Filter	X*0.002	-	
	2					
	3	07	Reference Common Rail Pressure	X*1	%	
	4					
0202	1	09	Actual Common Rail Pressure	X*1	%	
	2	0A	EGR Reference Position	X*1	%	
	3					
	4	0C	Difference Common Rail Pressure	X*1	%	
0203	1	0E	EGR1 Actual Position	X*1	%	
	2	0F	EGR3 Actual Position	X*1	%	
	3					
	4	11	Regeneration Interruption Flag	X*1	-	
0204	1					
	2	13	DPF Regeneration Request Value	X*1	-	
	3	14	2ND Stage Lapse Time	X*1	min	
	4					
0205	1	16	Post Injection Quantity(REG)	X*1	kg	
	2					
	3					
	4					
0207	1					
	2					
	3	1F	Intake Throttle Target Position	X*1	%	
	4	20	Intake Throttle actual position	X*1	%	
0208	1	21	WG valve reference position	X*1	%	
	2	22	Accel Pedal Position(unfiltered)	X*1	%	
	3	23	Accel Pedal Position(filtered)	X*1	%	
	4	24	Accel Pedal Sensor Voltage 1	X*0.02	V	
0209	1	25	Accel Pedal Sensor Voltage 2	X*0.02	V	
	2	26	Boost Pressure	X*2	kPa	
	3	27	Intake Air Temperature	X-40	°C	
	4	28	Intake Air Temperature(EGR)	X-40	°C	
020A	1	29	DPF Temperature 1 (inlet)	X-40	°C	
	2					
	3	30	DPF Temperature 2 (outlet)	X-40	°C	
	4					
020B	1					
	2					
	3	32	DPF relative pressure	X*1	kPa	
	4					
020C	1	33	Exhaust gas pressure	X*1	kPa	
	2					
	3	35	Water Temperature	X-40	°C	
	4					
020D	1	36	Fuel Temperature (inlet)	X-40	°C	
	2	37	Fuel Temperature (leak)	X-40	°C	
	3	38	Atmospheric Pressure	X*1	kPa	
	4					
020E	1	3A	Air Flow Sensor Output	X*1000/3600	g/s	
	2					
	3	3C	Vehicle Speed	X*1	km/h	
	4					
020F	1					
	2	3E	Q Adjustment Resistor No.	SPECIAL1	-	
	3	3F	PTO Accel Position	X*1	%	
	4	40	PTO Accel Sensor Voltage	X*0.02	V	
0210	1	41	PTO Adjustment Resistor No.	SPECIAL1	-	
	2	42	Power Supply Voltage	X*0.5	V	
	3	43	Reference Regeneration Time	X*1	min	
	4	44	Reference Oxygen Flow Quantity	X*0.1	kg	
0211	1	45	Oxygen Accumulation Value	X*0.1	kg	
	2					
	3	46	Exhaust Gas Flow	X-1000	m3/h	
	4		47	Regeneration Duration	X*1	min

Service Data (Variable data)

Data Identifier		Service Data		Value		Remark
Byte No	No	Item Name	Conversion	Unit		
0212	1	49	Auto Cruise Reference Speed	X*1	km/h	
	2	4A	Speed Limiter Reference Speed	X*1	km/h	
	3					
	4					
0213	1	4D	Driving Mode(Injection)	X*1	-	
	2	4E	Driving Mode(Exhaust Brake)	X*1	-	
	3	4F	Driving Mode(Intake Throttle)	X*1	-	
	4	50	Driving Mode(EGR)	X*1	-	
0214	1	51	Driving Mode(W/G)	X*1	-	
	2					
	3					
	4	52	Mileage after regeneration	X*1	km	
0215	1	53	Driving time after regeneration	X*0.1	h	
	2					
	3	54	Injection Quantity after reg.	X*0.1	kg	
	4					
0216	1	55	Average Vehicle Speed after reg.	X*1	km/h	
	2					
	3					
	4					
0217	1					
	2					
	3					
	4	58	Exhaust Gas Temperature	X-40	°C	
0218	1					
	2	5A	Pump Adjustment State	SPECIAL2	-	
	3	5B	Pump Adjustment Value(Last Time)	X*2-255	mA	
	4	5C	Pump Adjustment Value(This Time)	X*2-255	mA	
0219	1	5D	Reg. Control Code(Final)	X*1	-	
	2	5E	Reg. Control Code(Temporary) 1	X*1	-	
	3	5F	Reg. Control Code(Temporary) 2	X*1	-	
	4					
021A	1	61	Flow Damper (#1)	X*1	-	
	2	62	Flow Damper (#2)	X*1	-	
	3	63	Flow Damper (#3)	X*1	-	
	4	64	Flow Damper (#4)	X*1	-	
021B	1	65	Flow Damper (#5)	X*1	-	
	2	66	Flow Damper (#6)	X*1	-	
	3					
	4					

SPECIAL1

Conversion	Value
01	1
02	2
03	3
04	4
05	5
06	6
07	7
08	8
09	9
0A	10
0B	11
AA	NON

SPECIAL2

Conversion	Value
00	It is adjusting
01	Temporary end
02	Complete end
03	It's readjusting
FF	Unadjustment

Service Data (Switch data)

Data Identifier		Service Data		Value		Remark	
Byte No	Bit	No.	Item Name	Bit = 1	Bit = 0		
0300	1	7	71	Starter SW (\$)	ON	OFF	
		6	72	Starter SW (M)	ON	OFF	
		5	73	Accel SW	ON	OFF	
		4	74	Brake SW	ON	OFF	
		3	75	DPF SW	ON	OFF	
		2	76	Auxiliary Brake SW 1	ON	OFF	
		1	77	Auxiliary Brake SW 2	ON	OFF	
		0	78	Clutch SW	ON	OFF	
	2	7	79	Clutch SW (INOMAT)	ON	OFF	
		6	7A	Neutral SW	ON	OFF	
		5	7B	Idle Up Cancel SW	ON	OFF	
		4	7C	Air Conditioner SW 1	ON	OFF	
		3	7D	Parking Brake SW	ON	OFF	
		2	7E	Cold Start SW	ON	OFF	
		1	7F	Torque Cut SW	ON	OFF	
		0					
	3	7					
		6	82	PTO SW	ON	OFF	
		5	83	Diagnosis SW	ON	OFF	
		4					
		3					
		2	86	Auxiliary Brake Cut SW	ON	OFF	
		1	87	Auxiliary Brake M/V 1	ON	OFF	
		0	88	Exhaust M/V	ON	OFF	
	4	7	89				
		6					
		5					
		4	8C	Auxiliary Brake Indicator Lamp	ON	OFF	
3		8D	Glow Relay	ON	OFF		
2		8E	Glow Relay Indicator Lamp	ON	OFF		
1		8F	Starter Safety Relay	ON	OFF		
0		90	EDU Relay	ON	OFF		
0301	1	7	91	MIL Lamp	ON	OFF	
		6	92	Diagnosis Lamp	ON	OFF	
		5	93	DPF Lamp	ON	OFF	
		4	94	W/G M/V	ON	OFF	
		3					
		2					
		1					
		0					
	2	7					
		6					
		5					
		4					
		3					
		2					
		1					
		0					
	3	7					
		6					
		5					
		4					
		3					
		2					
		1					
		0					
	4	7					
		6					
		5					
		4					
3							
2							
1							
0							

DTC Status Mask

DTC Status Mask	Parameter name
\$04	Pending DTCs Same as Mode \$07)
\$08	Confirmed/Stored DTCs

DTC Specification

DTC	DTC Name	Remark
P0016	Ne SNSR Offset/Backup Mode	
P0069	Boost Press SNSR (Correlation)	
P0087	CRS (Too Low)	
P0088	CRS (Too High)	
P0089	MPROP (Over Load)	
P0091	MPROP (Low)	
P0092	MPROP (High)	
P0093	CRS (Fuel Leak)	
P0097	INT Air Temp SNSR2(Low)	
P0098	INT Air Temp SNSR2(High)	
P0101	Airflow Sensor (Plausibility)	
P0102	Airflow Sensor (Low)	
P0103	Airflow Sensor (High)	
P0112	INT Air Temp SNSR (Low)	
P0113	INT Air Temp SNSR (High)	
P0115	Water Temp SNSR	
P0116	Water Temp SNSR (Plausibility)	
P0117	Water Temp SNSR (Low)	
P0118	Water Temp SNSR (High)	
P0122	Accel Pedal Sensor 1	
P0123	Accel Pedal Sensor 1	
P0148	CRS (Fuel Delivery)	
P0181	Fuel Temp Sensor (Plausibility)	
P0182	Fuel Temp Sensor (inlet) Low	
P0183	Fuel Temp Sensor (inlet) High	
P0187	Fuel Temp Sensor (outlet)	
P0188	Fuel Temp Sensor (outlet)	
P0191	CRS Pressure SNSR (Plausibility)	
P0192	CRS Pressure SNSR (Low)	
P0193	CRS Pressure SNSR (High)	
P0201	Injector M/V-Cylinder 1(Load)	
P0202	Injector M/V-Cylinder 2(Load)	
P0203	Injector M/V-Cylinder 3(Load)	
P0204	Injector M/V-Cylinder 4(Load)	
P0205	Injector M/V-Cylinder 5(Load)	
P0206	Injector M/V-Cylinder 6(Load)	
P0219	Engine Overrunning	
P0222	Accel Pedal Sensor 2	
P0223	Accel Pedal Sensor 2	
P0226	Throttle Valve Position	
P0227	PTO Accel Sensor	
P0228	PTO Accel Sensor	
P0234	Over Boost	
P0236	Boost Press SNSR (Plausi)	
P0237	Boost Press SNSR (Low)	
P0238	Boost Press SNSR (High)	
P0243	Wastegate M/V	
P0245	Wastegate M/V (Low)	
P0246	Wastegate M/V (High)	
P0253	Common Rail Pressure Defect	
P0254	Common Rail Pressure Defect	
P0256	Common Rail Pressure High(Pump)	
P0257	Common Rail Pressure Low(Pump)	
P0259	Common Rail Pressure High(Pump)	
P0299	Turbocharger (Underboost)	
P0336	Engine Revolution SNSR	
P0339	Engine Revolution SNSR (Plausi)	
P0340	Camshaft Position SNSR	
P0344	Camshaft Position SNSR (Plausi)	
P0383	Relay for Glow Relay	
P0384	Relay for Glow Relay	
P0401	EGR Flow (Insufficient)	
P0402	EGR Flow (Excessive)	
P0403	EGR1 (Actuator Circuit)	
P0404	EGR System	
P0409	EGR1 (Position Sensor)	
P0427	EXH Gas Temp SNSR1(Low)	
P0428	EXH Gas Temp SNSR1(High)	
P0471	DPF Press SNSR (Plausi)	
P0472	DPF Press SNSR (Low)	
P0473	DPF Press SNSR (High)	
P0477	Exhaust Brake PWR (Low)	
P0478	Exhaust Brake PWR (High)	
P0500	Vehicle Speed Sensor	
P0502	Vehicle Speed Sensor (Low)	
P0503	Vehicle Speed Sensor (High)	
P0508	Idle Volume & Idle Acc (Low)	
P0509	Idle Volume & Idle Acc (High)	
P0512	Starter SW	
P0545	DPF Temp SNSR(upstream)Low	
P0546	DPF Temp SNSR(upstream)High	
P0562	Power Supply Voltage (Low)	
P0563	Power Supply Voltage (High)	
P0600	CAN Communication	

DTC Status Mask

DTC Status Mask	Parameter name
\$04	Pending DTCs \$Same as Mode \$07)
\$08	Confirmed/Stored DTCs

DTC Specification

DTC	DTC Name	Remark
P0604	ECU Hardware (RAM)	
P0605	ECU System(Hardware)	
P0606	ECU Hardware (Main CPU)	
P0607	ECU System	
P0611	No adjustment data of injector	
P0616	Starter Safety Relay (Low)	
P0617	Starter Safety Relay (High)	
P062B	Abnormal adjustment data of inj	
P062F	ECU System (EEPROM)	
P0642	Sensor Supply Voltage 1 (Low)	
P0643	Sensor Supply Voltage 1 (High)	
P0652	Sensor Supply Voltage 2 (Low)	
P0653	Sensor Supply Voltage 2 (High)	
P0685	EDU Relay (Open)	
P0686	EDU Relay (Low)	
P0687	EDU Relay (High)	
P0688	EDU Relay (Over Load)	
P1169	Abnormal adjustment data of AFS	
P1170	Abnormal adjustment data of Q	
P1171	Q Adjustment Resistor (Low)	
P1172	Q Adjustment Resistor (High)	
P1176	PTO Adjustment Resistor (Low)	
P1177	PTO Adjustment Resistor (High)	
P1240	Flow Limiter - Cylinder 1	
P1241	Flow Limiter - Cylinder 2	
P1242	Flow Limiter - Cylinder 3	
P1243	Flow Limiter - Cylinder 4	
P1244	Flow Limiter - Cylinder 5	
P1245	Flow Limiter - Cylinder 6	
P1410	Exhaust Absolute Pressure(High)	
P1411	Excessive exhaust Temperature	
P1412	DPF Temp Abnormal1(Auto)(Low)	
P1413	DPF Temp Abnormal2(Auto)(Low)	
P1414	DPF Temp Abnormal3(Auto)(High)	
P1415	DPF Interval Abnormal(Auto)	
P1416	DPF Temp Abnormal1(Manual)(Low)	
P1417	DPF Temp Abnormal2(Manual)(Low)	
P1418	DPF Temp Abnormal3(Manual)(High)	
P1421	PM accumulation amount level 1	
P1422	PM accumulation amount level 2	
P1435	Exhaust Relative Pressure(Low)	
P1436	Exhaust Relative Pressure(High)	
P1442	Automatic Reg Error (n>=2)	
P1443	DPF Interval Abnormal (Manual)	
P1445	Auto Reg 2nd stage time out n=1	
P1446	Auto Reg 2nd stage time out n>=2	
P1464	Auxiliary Brake choke	
P1475	DPF Pressure Sensor(High)	
P1632	CAN (EGR Time out)	
P1634	CAN (EGR3 Time out)	
P1635	CAN (Intake Throttle)	
P1660	DPF Lamp Control Circuit(Low)	
P1661	DPF Lamp Control Circuit(High)	
P1930	Powertrain Relay (Low)	
P2002	DPF MFF	
P2032	Exhaust Gas Temp (Low)	
P2033	Exhaust Gas Temp (High)	
P2080	DOC Temp SNSR	
P2084	DOC Temp SNSR(Plausibility)	
P2102	TVA (Short)	
P2108	TVA (Controller)	
P2120	Acc Switch	
P2135	TVA SNSR (Voltage)	
P2146	Injector Bank 1 (Plausibility)	
P2147	Injector Bank 1 (Low)	
P2148	Injector Bank 1 (High)	
P2149	Injector Bank 2 (Plausibility)	
P2150	Injector Bank 2 (Low)	
P2151	Injector Bank 2 (High)	
P2153	Injector Bank 3 (Low)	
P2154	Injector Bank 3 (High)	
P2170	Exhaust Valve Act (Gnd)	
P2171	Exhaust Valve Act (Batt)	
P2199	EGR Temp Sensor (Correlation)	
P2228	Atm Press SNSR (Low)	
P2229	Atm Press SNSR (High)	
P2413	EGR System	
P2453	DPF Diff SNSR (Plausi) & MFF	
P2454	DPF Diff SNSR (Low) & MFF	
P2455	DPF Diff SNSR (High) & MFF	
P2510	Main Relay (abnormal)	
P2511	Main Relay (stuck)	
U0002	Powertrain Local CAN Bus Off	
U0029	Vehicle Communication Bus Off	

Actuator Test

Data Identifier	Actuator Test		Remark
	No	Item Name	
D000	A1	EGR1,3	Refer to Application & Session Layer Section8.7.2 (2)
D002	A3	W/G M/V	
D004	A5	DPF Regeneration (Manual)	See DID_SD004(DPF Regeneration) Sheet
D006	A7	Intake throttle1	Refer to Application & Session Layer Section8.7.2 (2)
D007	A8	DPF Lamp	
D008	A9	EDU Relay	
D00A	AB	Exhaust Brake M/V1+M/V2	
D00B	AC	Auxiliary Brake M/V 1	
D00C	AD	Auxiliary Brake M/V 2	
D00D	AE	Auxiliary Brake Indicator Lamp	
D00E	AF	Relay for Glow Relay	
D00F	B0	Glow Indicator Lamp	
D010	B1	Starter Safety Relay	
D012	B3	MIL Lamp	
D013	B4	Diagnosis Lamp	
D015	B6	Air Conditioner SW 1	
D017	B8	Idle Up Cancel SW	
D018	B9	Fuel Leak Check	
D01A	BB	Injector Test 1	
D01B	BC	Injector Test 2	
D01C	BD	Injector Test 3	
D01D	BE	Injector Test 4	
D01E	BF	Injector Test 5	
D01F	C0	Injector Test 6	

Case of controlling the DPF Regeneration (Data Identifier: \$D004)

Table1 Input Control Condition for DPF Regeneration

Data Identifier	Control State no. 1	Control State no. 2
DPF Regeneration = \$D004	SXX: DPF Regeneration Mode Control State - \$00: Controlled by ECU (Normal Operation) - \$01: ON	SXX: DPF Regeneration Control State - \$00: Controlled by ECU (Normal Operation) - \$01: ON

<Step1: Freeze Current State>

Table2 Report Current State for I/O Local Identifier example (\$D004)

(a) Request Message

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$2F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Freeze Current State)	\$02

(b) Response Message - Positive Response

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$6F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Freeze Current State)	\$02
5	Control State no. 1 (Current DPF Regeneration Mode Control State =OFF)	\$00
6	Control State no. 2 (Current DPF Regeneration Control State =OFF)	\$00

(c) Response Message - Negative Response

Data byte no.	Parameter name	Data value
1	Negative Response	\$7F
2	Input Output Control By Identifier	\$2F
3	Sub-function = [Negative Response Trouble Code]	\$XX

<Step2: Short Term Adjustment>

Table3 Short Term Adjustment for I/O Local Identifier example (\$D004)

(a) Request Message

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$2F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Short Term Adjustment)	\$03
5	Control State no. 1 (Desired DPF Regeneration Mode Control State =ON)	\$01

(b) Response Message - Positive Response

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$6F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Short Term Adjustment)	\$03
5	Control State no. 1 (Desired DPF Regeneration Mode Control State =ON)	\$01
6	Control State no. 2 (Desired DPF Regeneration Control State =ON) (After DPF SW = ON on vehicle)	\$01

(c) Response Message - Negative Response

Data byte no.	Parameter name	Data value
1	Negative Response	\$7F
2	Input Output Control By Identifier	\$2F
3	Sub-function = [Negative Response Trouble Code]	\$XX

<Step3: Return Control To ECU>

Table4 Return Control To ECU for I/O Local Identifier example (\$D004)

(a) Request Message

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$2F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Return Control To ECU)	\$00

(b) Response Message - Positive Response

Data byte no.	Parameter name	Data value
1	Input Output Control By Identifier Request Service Id	\$6F
2	Data Identifier (MSB)	\$D0
3	Data Identifier	\$04
4	Input Output Control Type (Return Control To ECU)	\$00

(c) Response Message - Negative Response

Data byte no.	Parameter name	Data value
1	Negative Response	\$7F
2	Input Output Control By Identifier	\$2F
3	Sub-function = [Negative Response Trouble Code]	\$XX



Details of Security Access Service

1. Access Mode Specification

Access Mode		Security Access Mode	Use
Seed	Key		
\$01	\$02	Protected No-Volatile Parameter Access	Execute Diagnostic Session Service

2. Relationship of Seed & Key

$$\text{Key1} = 2 * \text{Seed1} + \text{Seed4}$$

$$\text{Key2} = \text{Seed1} + \text{Seed2} - \text{Seed4}$$

$$\text{Key3} = 2 * \text{Seed1} - \text{Seed2} + \text{Seed3} + \text{Seed4}$$

$$\text{Key4} = \text{Seed4}$$