Document Number		DVIN0004	
Title		M800OEM - EVO47 and 8RS	
Approved By		*JA*	
Revision	**Date**	**Prepared By**	**Change History**
1	28/06/2002	AD	Added EVO7 to pin 8 and 22, external TCA
2	22/04/2004	AD	Added EVO8 RS changes
3	05/10/2004	DS	Re-formatted – Doc Ref: VIAU0004 EVO47 Adaptor
4	23/8/2006	RB	New format
5	18/12/2006	RB	Added A/C information

Mitsubishi EVO47

This Document refers to MoTeC M800 OEM installations to Mitsubishi Lancer Evo4, 5, 6, 7 and some Evo8 models using the EVO47 adaptor **(MoTeC Part No. 13005A)**. For all other applications please refer to the correct installation notes.

Contents

Introduction

The MoTeC M800 OEM is a MoTeC M800 ECU with an adaptor board that allows it to plug directly into the cars original wiring. ECU functionality is the same as the MoTeC M800 with the exception of peak and hold injector drive function which is not possible on the M800 OEM. Only high impedance injectors or low impedance injectors with a suitable resistor can be used with the M800 OEM. Mitsubishi Evo4-8s have a resistor pack installed in the injector circuit with low impedance injectors.

The EVO47 M800 Adaptor is an interface that allows an M800 OEM to be mounted in the factory ECU case for a Mitsubishi Lancer EVO4 - 8 (four plug connector). This document describes the details of the EVO47 adaptor and the configuration options that are available.

There are two versions of the EVO8. One version uses an ECU with a four plug main connector. This vehicle is supported by the EVO47 OEM adaptor as described in this document. It is also supported by the EVO48 (MoTeC part no.13009A) which supersedes the EVO47 and is covered in a separate

document. The other version uses an ECU with a three plug main connector which is supported by the EVO8 or EVO89 OEM adaptor and installation notes (MoTeC Part Numbers 13007A – EVO8, 13010A – EVO89). There are differences with these applications so it is important to refer to the correct installation document.

The Motec M800 OEM is supplied as an assembly which consists of the M800 OEM ECU and the adaptor board. The adaptor board is vehicle specific and there are links on the adaptor board to allow for variations in different models and functional requirements of the user. A start file is installed which should be sufficient to start the engine prior to tuning. To ensure that the correct adaptor board, link setup and start file is provided, full details of the vehicle must be quoted when ordering. Details should include the factory ECU part number, year, model and version.

Important Note!

The M800 OEM has been made to the highest standards and will provide reliable performance but should not be dismantled in any way due to the risk of damage. If the Link setup needs to be changed this should only be done by an authorised MoTeC dealer or someone with suitable equipment and soldering experience.

Parts Required

MoTeC Part No.	Description	Notes
13005A	ECU M800 OEM EVO47	MoTeC M800 OEM and EVO48 Adaptor board assembly **Note: Now no longer available – use part number 13009A M800 OEM EVO48.**
61046	OEM-CAN Loom	For PC connection to the ECU. Connects to the Communications connector on the OEM adaptor board to provide an external CAN communications connection.

Optional

MoTeC Part No.	Description	Notes
61044	OEM to lambda loom	For lambda sensor connection to the Lambda 2 connector on the OEM adaptor board. One end has a connector which connects to the Lambda 2 connection on the OEM Board, the other end is terminated with a 6 pin female DTM connector. Length is 30 cm.
61051	Lambda extension loom	A 2.5 meter extension to connect between the OEM-Lambda loom and a Bosch LSU wideband lambda sensor. One end has a 6 pin male DTM connector to mate to 61044, the other end has a connector for a Bosch LSU wideband lambda sensor. (MoTeC Europe part no.61050 3.0 metre).
28102	M800 Wideband Lambda	ECU upgrade required to control a wideband lambda sensor (free for the first 8 hours of engine running time).
28101	Logging 1 Mb	ECU data logging (free for the first 8 hours of engine running time).
26105	Advanced functions	ECU upgrade to enable the following functions: Over-run boost (ORB), Launch Control, Traction Control, Gear Change Ignition Cut.
28117	Over-run boost	ECU upgrade to enable Over-run boost (ORB) only without other advanced functions.

Model Specific Information

EVO8 RS

Mitsubishi has released two versions of the EVO8. One version uses a new ECU with a three plug main connector. This vehicle is supported by the EVO8 OEM adaptor. There is also a version which uses an ECU with a four plug main connector that is very similar to EVO7. The EVO47 adaptor can run this vehicle with some minor modifications.

1. Solder a wire from pin 40 to pin 26 (GND for REF/SYNC)
2. Open LK07, LK08
3. Cut pin 51 and pin 57 on main adaptor connector
4. If pin 57 is the spray bars, then cut pin 55 and solder a wire from ECU side of pin 55 to vehicle side of pin 57 to get spray bar working.

Thematic Fan operation

It is normal operation for the thematic fan to run briefly when the ignition is switched on, when the ECU has been re-set or when the output test menu is open.

Input / Output Test

It is important to carry out an input/output test and check that all sensors are working prior to starting the engine. When carrying out an output test the relay for the thematic fans will need to be removed otherwise they will run constantly and make the test difficult. If outputs are not functioning or sensors are not reading correctly refer to the setup information in the Pinout Diagram.

TPS Setup

The TPS sensor will need to be moved to correctly set the TP hi and TP lo settings. In the standard position the TPS output voltage will go too high and read approximately 102 (max possible is 99). Loosen the TPS retaining screws and open the throttle to wide open. Rotate the sensor until the TP Hi reading is around 98. Tighten the screws and set TP hi and TP lo.

Idle Setup

To achieve good idle stability and improve the idle stepper control function the idle air bypass needs to be adjusted. This must be done with the engine at operating temperature and all electrical and mechanical loads switched off. The idle air bypass screw is located on the throttle assembly.

- Turn the idle air bypass screw out 3 turns.
- Set the Aim Idle speed (ECU Manager) to 200 RPM (this will cause the stepper motor to close completely).
- Adjust the base idle speed using the idle air by-pass screw. Set the base idle speed to about 50 – 100 RPM lower than the desired aim idle speed.
- Re-set the Aim Idle speed.

Mass Air Flow

When using MAF for efficiency measurement it is recommended that the Over Fuel Cut off is active to avoid excessively rich mixtures during over-run. The settings in the table below are recommended but can be adjusted to suit the individual application.

Overrun Fuel Cut	
Parameter	**Value**
Overrun Inactive RPM	1600
Overrun Active RPM	2100
Overrun Throttle position	10
Overrun Recover Fuel	0

Additional Sensors

It is possible to use un-assigned pins for additional sensors. The availability of spare inputs will vary depending on the model of car, refer to the table below and the M800 Pinout for details. There are also spare 5v 8v 0v pins to use with these inputs (refer to M800 Pinout section for details).

Spare input	Model
AT4	EVO7/8 Requires wiring modification
AT5	EVO4/5/6 (Pin24)
AV5	No TCK – Join Link23 (Pin78)
AV6	No TCK – Join Link27 (Pin74)
AV7	Pin43

Using an external thermocouple amplifier (TCA)

1. Close LK27
2. Connect TCA 8V to pin 51
3. Connect TCA 0V to pin 42
4. Connect TCA signal to pin 74

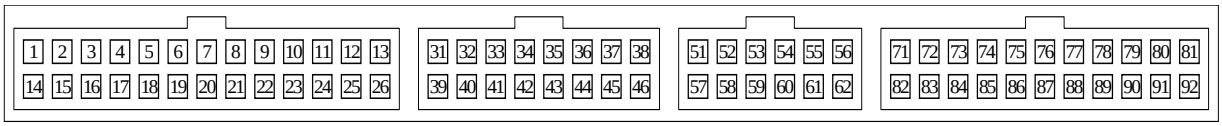
Using the Pinout Diagram

There are 2 Pinout sections in this document.

The M800 Pinout describes the function of each M800 pin with a reference to the OEM pin number it is connected to. There is a description of its function and optional function where applicable as well as notes on functional setup or calibration as necessary. Where there is one or more options for the pin the option is marked with a # or ##. The corresponding OEM Pin, function and setup notes refer to the parameters in M800 ECU Manager and are all marked with # or ## with any changes in link setup or vehicle modifications detailed.

The OEM ECU Pinout lists pins in order of the factory connector with corresponding MoTeC M800 pin and functional description.

M800 Pinout



Plug B59 Yellow | Plug B60 Yellow | Plug B61 Yellow | Plug B62 Yellow

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Power				
12V	12, 25	12v Switched (ECU Relay)		
GND	13, 26	ECU Earth		
8V ENG		8V to TCK Module		
5V ENG	81, 31	5V sensor supply		
0V ENG	92,	OV sensor supply		
8V AUX	51	8V to internal comms connector	8V to pin 87 for comms or extra sensors	
5V AUX		5 V to internal barometer		
0V AUX	42	0V to internal Comms Connector and Internal barometer	Spare 0V to pin 42 for extra sensors	
Outputs				
INJ1	1	Injector Cylinder 1		
INJ2	2	Injector Cylinder 3		
INJ3	15	Injector Cylinder 4		
INJ4	14	Injector Cylinder 2		
INJ5	22, #33,	22. A/C Clutch (Cars without immobiliser) 22. Fuel pump (Evo6/7 with immobiliser)	#33 Alternator control (EVO457 if not using A/C)	**Function:** (Cars without immobiliser) 104 Air Conditioner Clutch Parameters can be set to switch compressor off at high speed. **Function:** (Evo6/7 with immobiliser) 101 Fuel Pump Parameters: Delay 5 Polarity 0 Output Mode 0 **#Optional Function** #Join Link17 113 Alternator Control Parameters Set as required. The alternator can be switched off at full throttle if desired. Use battery voltage and throttle position as table axis and configure so that the alternator is only cut when battery voltage is sufficiently high.

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
INJ6	55, #39, #40	Spray Bar Output (Evo7)	#39 Fuel pump Speed control ##40 Shift light	**Function:** 114 Spray Bars Parameters: Mode 1 On Value 85 Off Value 80 On Time 2.0 Off Value 7.0 Source 0 MAP (optional) 1 TP 2 Efficiency point 3 Load point 4 Air Temp Logic Polarity 0 Settings may vary depending on requirements. **#Optional Function** Cut Link21 and Link24, Join Link14 **##Optional Function** Cut Link21 and Link24, Join Link19
INJ7	53, #19	53. 2nd Air Solenoid for use with ORB (EVO7/8)	#19 Airflow meter re-set	**Function:** 115 Status Output Parameters: Selection 31 (ORB) Logic Polarity 0 Output Mode 0 Flash 0 Flash rate 0 **#Optional Function:** #Join Link16
INJ8	8	Fuel Pump (no Immobiliser) AC clutch output (with immobiliser		**Function: (No immobiliser)** 101 Fuel Pump Parameters: Delay 5 Polarity 0 Output Mode 0 **Function: (with immobiliser)** 104 Air Conditioner Clutch Parameters can be set to switch compressor off at high speed.
IGN1	10	Ignition Cylinder 1&4		
IGN2	23	Ignition Cylinder 2&3		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
IGN3	21 #34	Thematic fan (Evo4/5/6)	#34Thematic fan control 4kHz (Evo7)	**Function:** 102 Thematic Fan Parameters On Temp 90 Off Temp 80 Time Out 10 Frequency 4000 (Evo7) Polarity 1 Output Mode 0 Min Duty 0 **#EVO7/8 Pin assignment** Cut Link18, Join Link04
IGN4	20,32, 34	A/C Fan (Evo 4/5/6)	#Spare output (Evo7)	**Function:** 103 A/C Fan Parameters: On Temp 30 Off Temp 25 On Speed 50 Off Speed 50 Hold Time 0
IGN5	36, #9	36Warning light (or shift light. Uses engine check light.	#9. Purge control	**Function:** 108 Driver Warning Parameters: Hold Time 2 Logic Polarity 0 Output Mode 0 Power Hold 1 **#Optional Function** 3 Aux table #Cut Link25, Join Link12
IGN6	58	Tacho Signal		**Function:** 4 Tacho Output Parameters Calibration 0
AUX1	60, #38 #3	60. Lambda Heater (LA-1)	#38 Power Hold ##3 Fuel Pressure solenoid	**Function:** 9 Lambda Sensor Heater Parameters: Lambda Sensor 1 **#Optional Function** 118 Power Hold #Cut Link26, join Link15 **##Optional Function** 3 Aux table #Cut Link26, join Link1

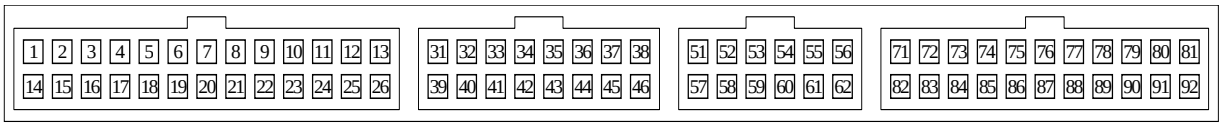
M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX2	INT	Lambda heater (LA-2) Uses the Lambda sensor connection on the adaptor board.		**Function:** 9 Lambda Sensor Heater Parameters: Lambda Sensor 2
AUX3	11	Boost Control		**Function:** 1 Boost control. Parameters: Frequency 30 Hz
AUX4	6	2nd Air Solenoid for use with ORB	#EGR Solenoid (Evo7)	**Function:** 115 Status output Parameters: Selection 31 (ORB) Logic Polarity 0 Output Mode 0 Flash 0 Flash Rate 0 **#Optional Function** 3 Aux table
AUX5	4	Idle Stepper Motor A1		**Function:** 8 Stepper Idle Speed Control Parameters; Refer to Idle Control section Uses Aux 6, 7 & 8 (Automatically allocated).
AUX6	17	Idle Stepper Motor B1		
AUX7	5	Idle Stepper Motor A2		
AUX8	18	Idle Stepper Motor B2		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Inputs				
REF	89	Ref Sensor (Hall)		
SYNC	88	Sync Sensor (Hall)		
AT1	72	Air temperature (AFM Pin2)		Calibration: 1
AT2	83	Engine Temp		Calibration: 1
AT3	82	Ignition Switch		**Function:** 8 Ignition Switch Parameters: Logic Polarity 1 Delay 0 Latch 0
AT4	45	A/C Request (Evo 4/5/6) Evo7/8: A/C Request (Via pressure switches) Pressure Switch Operation: Low pressure side ON > OFF: 196 kPa OFF> ON: 221 kPa High Pressure Side ON> OFF: 3138 kPa OFF> ON: 2550 kPa 12V Switched to ECU	#Spare input with wiring modifications to Evo7/8	**Function: - Evo 4/5/6** 5 Air conditioning Request Parameters: Logic Polarity 1 Set AT levels: Low 5.5v High 6.0v.
AT5	24	A/C 2 request Evo7	#Spare AT input (Evo4/5/6).	**Function: - Evo7/8** Can be used as A/C Request instead of AT4 but request will not be dependant on pressure switches. Set up as per AT4. 5 Air conditioning Request Parameters: Logic Polarity 1 Set AT levels: Low 5.5v High 6.0v. **#Optional Function – Evo4/5/6** #Join Link 20 to use as a spare switched input. Blocking diode is by-passed.
AT6	LA2-4	Lambda Sensor calibration resistor		
AV1	84	Throttle Position		Calibration: 9
AV2	73	Manifold differential pressure sensor (Evo7)	Spare input Evo4/5/	
AV3	85	BAP (MAF meter)		Mass air flow sensor has in-built air pressure sensor
AV4	INT	Internal Barometer		Calibration: 62
AV5	K-9, #78	TCK - Knock	78. Spare AV input	Join Link23
AV6	K-10, #74	EGT TC+. Requires TCK module. Connect EGT TC- to pin 74	74. Spare AV input	Join Link27

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AV7	43	Spare AV Input		
AV8	44	ORB Select Function		**Function:** 24 ORB Table Select Parameters Polarity 0 Momentary 1 or 25 ORB Select Parameters: Polarity 0 Spray Bars 1 Logging As required
DIG1	86	Vehicle Speed		**Function:** 1 Speed Measure Parameters: Units 1 Calibration 248 Active Edge 0
DIG2	90	MAF Frequency Measurement (AFM Pin3)		**Function:** (For V2* ECU manager only, Setup in Input setup for V3 Open collector frequency output. Refer to MAF Calibration Table.) 21 MAF Measurement Parameters: Calibration 0.33 Active Edge 0 Filter 60 +/- 60
DIG3	37	Power Steering Switch		**Function:** 18 Power Steering Set AT levels: Low 5.5v High 6.0v
DIG4	87	Idle Switch (Evo456)		
LA1S	76	Narrow band Lambda	#Wide band sensor	Calibration: 37 Front Lambda sensor. Bias resistor is connected via link 4 (default setting). #Cut Link5 (wiring modification required see LA-1P)

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
LA1P	75		#75 Use if vehicle wiring is being modified to use a wide band lambda sensor – Connect shield wire to Pin75.	
LA2S		Wide band lambda using internal Lambda 2 connector		Calibration: 38 LA-2 connector on Adaptor
LA2P		Wide band lambda using internal Lambda 2 connector		
Communications				
RS232 TX	62, 52	Internal Comms Connector 62. Comms (pin7), ACD and SRS ECUs. Do not use this pin for Comms if airbags are functional. 52. Comms connector		
RS232 RX	56, 59	Internal Comms Connector 56. RX-232 connection via diagnostic connector (pin7). 52. Comms connector		
CAN LO	61#62	Internal Comms Connector 61. Comms connector	#62. Comms connector (pin7),	# Join Link2 and cut Link9 to connect CAN Lo to Pin 62 disconnects Tx232 from Pin62
CAN HI	54, #56	Internal Comms Connector 54. Comms connector	#56. Comms connector (pin1),	Join Link3 and cut Link22 to connect CAN Hi to pins 56 disconnects Rx232 from Pin56

OEM ECU Pinout



Plug B59 Yellow Plug B60 Yellow Plug B61 Yellow Plug B62 Yellow

OEM Pin	M800 Pin	Function
1	INJ1	Injector Cylinder 1
2	INJ2	Injector Cylinder 3
3	#AUX1	Fuel Pressure Solenoid
4	AUX5	Idle stepper control
5	AUX7	Idle stepper control
6	AUX4	Secondary Air Control Solenoid
7	O/C	Not used
8	INJ8	Fuel Pump (no immobiliser)/AC clutch (with immobiliser)
9	#IGN5	Purge Control (EVO7 optional)
10	IGN1	Ignition Cylinders 1&4
11	AUX3	Boost control output
12	VBAT	12 V
13	GND	GND
14	INJ4	Injector Cylinder 2
15	INJ3	Injector Cylinder 4
16	O/C	Not used
17	AUX6	Idle stepper motor
18	AUX8	Idle stepper motor B2
19	#INJ7	#Airflow Meter re-set
20	IGN4	A/C Fan1 (Evo4/5/6)
21	IGN3	Thematic fan (Evo4/5/6/7)
22	INJ5	A/C clutch / Fuel pump (Evo6/7 with immobiliser)
23	IGN2	Ignition Cyl 2&3
24	AT5	A/C2 Request (Evo7) /#Spare AT input(Evo4/5/6)
25	VBAT	12 V
26	GND	GND
31	5V AUX	Spare 5V pin
32	IGN4	A/C fan Evo7)
33	INJ5	Alternator control
34	IGN4 ,#IGN3	A/C fan Evo7)
35	N/A	Spray bar lamp (Evo7)
36	IGN5	Shift /Warning light
37	DIG3	Power steering oil pressure switch
38	#AUX1	ECU Relay (optional)
39	#INJ6	Fuel pump speed (optional)
40	#INJ6	Shift light (optional)

OEM Pin	M800 Pin	Function
41	O/C	Not used
42	0V AUX	Spare 0V pin
43	AV7	Spare AV input
44	AV8	ORB Select (Evo7) / #Spare AV input
45	AT4	A/C request /map selector input
46	O/C	Not used
51	8V-AUX	8V – RS232 and CAN Comms connector
52	TX232	Tx - RS232 and CAN Comms connector
53	INJ7	2nd air solenoid (Evo7) or spare output
54	CAN-Hi	CAN-Hi - RS232 and CAN Comms connector
55	INJ6	Spray bars spare output
56	CAN-Hi/#RX232	CAN Hi to ADL via diagnostic connector/#Rx-232 to ADL via diagnostic connector
57	GND	0V – RS232 and CAN Comms connector
58	IGN6	Tacho
59	RX-232	Rx– RS232 and CAN Comms connector
60	AUX1	LA1 Heater (Evo5/6/7)
61	CAN-Lo	CAN-Lo– RS232 and CAN Comms connector
62	TX232, #CAN Lo	RS232 telemetry / #CAN connection to ADL (optional)
71	O/C	Not used
72	AT1	Intake air temperature sensor
73	AV2	Manifold Differential pressure sensor (Evo7) / Spare input (Evo4/5/6/)
74	K12, AV6	Exhaust temp TC+ / spare AV input
75	LA1-P	LA1 pump for wideband lambda sensor (requires wiring modification)
76	LA1-S	Narrow band lambda. #LA1 sense for wideband
77	K13	Exhaust temp TC
78	K1, #AV5	Knock monitoring/spare AV input
79	O/C	Not used
80	O/C	Not used
81	5V ENG	5 V sensor supply
82	AT3	Ignition switch
83	AT2	Engine Temp sensor
84	AV1	Throttle Position Sensor
85	AV3	Barometric pressure sensor (in Airflow Meter)
86	DIG1	Vehicle speed sensor
87	DIG4	Throttle idle switch (EVO456) signal from yaw and diff ECUs (EVO7)
88	SYNC	Sync sensor (Hall)
89	REF	Ref sensor (Hall)
90	DIG2	Mass Airflow Sensor
91	INJ6	Manual I/C spray (momentary switch, Evo7)
92	0V ENG	Sensor 0V

Calibration Tables

Mass Air Flow Sensor DIG2

g/s 1 decimal place

Input (Hz)	0.0	10.0
g/s	0.0	3.3

Setup

Parameter	Value	Notes
Injector Current	0.0	
Injector Battery Comp	4	See Injector Battery Comp Table
Peak and hold ratio	4	
Eff Calc Method	5 Mass per induction	
Load Calc Method	5 Mass per induction	
Number of Cylinders	4	
Ref/Sync Mode (REF)	16	
Crank Ref Teeth (CRT)	0 (Not used)	
Tooth Ratio	20	
Crank Index Position(CRIP)	615.0	
Ignition Type (IGN)	1	
Number of Coils (COIL)	2	
Ignition Dwell Time (DELL)	3.0	See Ignition Dwell Table
Ignition Delay Time	50	
Firing Order	1, 3, 4, 2	

Injector Battery Comp

Bat V	5	6	7	8	9	10	11	12	13	14	15
U sec	2500	2500	2400	2140	1660	1320	1060	880	740	660	580

Ignition Dwell Table

Bat V	10	11	12	13	14	15
Dwell	5.3	4.6	4.0	3.6	3.2	3.0

Link Table

Open Links	Closed Links	Function
01, 15	26	• AUX1 Lambda heater
01, 26	15	AUX1 ECU Power Control
15, 26	01	AUX1 Fuel Pressure VSV
14, 19	21, 24	•INJ6 Spray bar Control (7)
19, 21, 24	14	INJ6 Fuel Pump Speed
14, 21, 24	19	INJ6 Shift light 2 (4)
17		•INJ5 A/C Clutch
	17	INJ5 alternator shutdown (4,5,7)
12	25	•IGN5 Check engine light
25	12	IGN5 purge control (7)
16		•INJ7 2nd Air Solenoid (7)
	16	INJ7 MAF reset signal
04	18	•A/C Fan Control (7)
18	04	A/C Fan Control (4,5,6)
20		•AT5 Active high A/C 2 request (7)
	20	AT5 spare temp input
06		•AT4 Active high A/C request
	06	AT4 spare temp input
	7, 8, 10, 11	•Comms via spare pins
7, 8, 10, 11		No Comms on spare pins
02, 03	09, 22	•RS232 via diag
09, 22	02, 03	CAN via diag
	05	•La1 narrow band sensor
05		La1 wide band sensor
23, 27		•TCK module installed
	23, 27	AV5,6 spare voltage inputs
13		•No CAN terminator
	13	CAN terminator

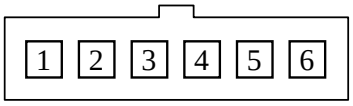
Note:

- Default options suit EV07. A/C Fan Control MUST be changed for other models.

On-board BAP sensor calibration – AV4 , Calibration = 62

Pressure kPa	Vout (V)	M800 AD counts
15	0.2	54
115	4.8	1284

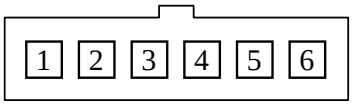
Lambda 2 Connector



Looking at pins on male plug (into connector)

OEM	M800	Function
La2-1	LA2-P	La2 header – Pump
La2-2	0V-AUX	La2 header - 0V to sensor
La2-3	LA2-S	La2 header – Sense
La2-4	AT6	La2 header - calibration R
La2-5	VBAT	La2 header - +12 heater
La2-6	AUX2	La2 header – heater

Comms Connector



Looking at pins on male plug (into connector)

OEM	CAN – Part # 61046	D9F – Part # 61043	Function
C-1	5	1	CAN Hi
C-2	4	6	CAN Lo
C-3	-	2	Tx RS232
C-4	-	3	Rx RS232
C-5	3	8	8V AUX
C-6	1	5	0V COMMS