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Mitsubishi EVO8

This Document refers to MoTeC M800 OEM installations to Mitsubishi Lancer Evo8 using the EVO8 adaptor **(MoTeC Part No. 13007A)**. For all other applications please refer to the correct installation notes.

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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. The Mitsubishi Evo8 has a resistor pack installed in the injector circuit with low impedance injectors.

The EVO8 M800 Adaptor is an interface that allows an M800 OEM to be mounted in the factory ECU case for a Mitsubishi Lancer EVO 8 (three plug connector). This document describes the details of the EVO8 adaptor and the configuration options that are available.

There are two versions of the EVO8. One version uses an ECU with a three plug main connector. This vehicle is supported by the EVO8 OEM adaptor. The other version uses an ECU with a four plug main connector which is supported by the EVO48 OEM Adaptor (MoTeC part no. 13009A).

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

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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
13007A	ECU M800 OEM EVO8	MoTeC M800 OEM and EVO8 Adaptor board assembly.
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

Some Evo8 variants have 2 boost control valves. The second valve is connected to OEM pin 6 and requires a link wire from pin 41 to pin6 on the OEM adaptor board.

Thematic Fan operation

The thematic fan relay is wired for high side drive, 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 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 can be removed to stop the fans from running continuously. The relay is located in the relay box to the left of the engine compartment. 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 99.0). 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. AV7 and AV8 are available to use as sensor inputs (Analogue Voltage inputs). AT5 or AT6 is available as a spare input (Analogue Temp or switched) depending on Air conditioning installation. There are spare 5v 8v 0v pins which are connected by joining links (refer to M800 Pinout section for details)

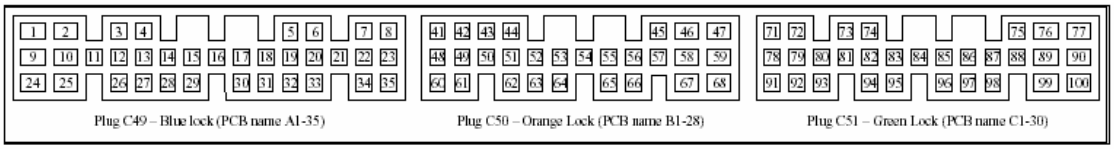
Using the Pinout Information

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, functional description and typical wire colour.

M800 Pinout



M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Power				
12V	47, 59	12v Switched (ECU Relay)		
GND	46, 58	ECU Earth		
8V ENG		8V to TCK Module		
5V ENG	42, #77	5V sensor supply	# Spare 5V to pin 77 for extra sensors	#Join Link22 to connect extra 5V to pin 77
0V ENG	34, 49, #75, #76	OV sensor supply	# Spare 0V to pins 75 & 76 for extra sensors	#Join Link08 to connect extra 0V to pin 75 and 76
8V AUX	#87	8V to internal comms connector	# Spare 8V to pin 87 for extra sensors	#Join Link12 to connect extra 8V to pin 87
5V AUX		5 V to internal barometer		
0V AUX		0V to internal Comms Connector and Internal barometer		
Outputs				
INJ1	1	Injector Cylinder 1		
INJ2	24	Injector Cylinder 3		
INJ3	2	Injector Cylinder 4		
INJ4	9	Injector Cylinder 2		
INJ5	20, #48	A/C Clutch	# Fuel Pressure Regulator Solenoid (manifold pressure port). For fuel pressure against ambient (active) or against manifold (inactive).	**Function:** 104 Air Conditioner Clutch Parameters can be set to switch compressor off at high speed. **#Optional Function** # Cut Link4, Join Link5. An Auxiliary Table can be used to control Fuel pressure Regulator Solenoid connected to pin 48

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
INJ6	35, #56##67	Spray Bar Output (Evo8) #Spray Bar Output (Evo9) on pin 56. Both Pins are connected to INJ6	##Manual spray bar forces spray bars to operate independent of ECU	**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
INJ7	5	2nd Air Solenoid for use with ORB		**Function:** 115 Status Output Parameters: Selection 31 (ORB) Logic Polarity 0 Output Mode 0 Flash 0 Flash rate 0
INJ8	21	Fuel Pump		**Function:** 101 Fuel Pump Parameters: Delay 5 Polarity 0 Output Mode 0
IGN1	11	Ignition Cylinder 1&4		
IGN2	12	Ignition Cylinder 2&3		
IGN3	41,#6,	Boost Control	#Some models have 2nd solenoid on pin 6 (Link wire required)	**Function:** 1 Boost control. Parameters: Frequency 30 Hz **#Option** # Solder a link wire between pin 41 and pin 6.

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
IGN4	22, 57	22. Driver Warning Light with power hold function. (Uses Engine Check Light) 57. ECU relay (via driver warning) Controlled by the ignition switch via a circuit on the adaptor and M800 output shared with the warning light		**Function:** 108 Driver Warning Alarm Parameters: Hold Time 2 Logic Polarity 0 Output Mode 0 Power Hold 1 (minimum)
IGN5	90	ORB Status light (Uses intercooler spray light)		**Function:** 115 Status Output Intercooler spray lamp: ON if ORB is enabled, FLASHING if ORB table 2 is selected. Used when DIG4 function is set to 25 (ORB Select) Parameters Selection 20 Logic Polarity 0 Output Mode 0 Flash 33 Flash rate 2 **#Optional Parameters** Intercooler Spray lamp ON if table 2 is selected. Used when DIG4 function is set to 24 (ORB Table Select) Selection 33 Logic Polarity 0 Output Mode 0 Flash 0 Flash rate 0
IGN6	45	Tacho Signal		**Function:** 4 Tacho Output Parameters Calibration 0
AUX1	18	Thermo Fan	Also switches condenser fan pins 30 &31 when main fan starts	**Function:** 102 Thematic Fan Parameters On Temp 90 Off Temp 80 Time Out 10 Frequency 4000 Polarity 1 Output Mode 0 Min Duty 0

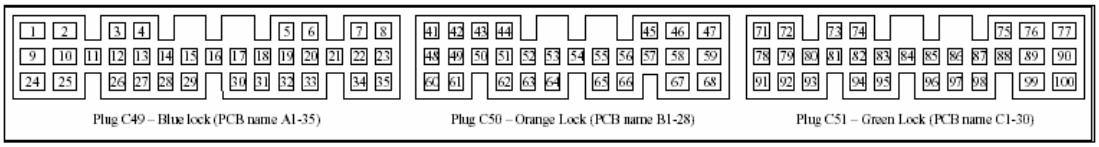
M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX2	3, #INT	Lambda heater	#Lambda heater (using internal lambda connector)	**Function:** 9 Lambda Sensor Heater Parameters: Lambda Sensor 2 **#Optional Function** Cutting Link18 will disconnect AUX2 from the ECU connector (pin3)
AUX3	19 #79	19 AFM reset	#79 ACD Idle signal.	
AUX4	8, #16	Alternator Control	# Canister purge	**Function:** 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. **#Optional Function** Join Link2, cut Likn1 3 Aux table
AUX5	14	Idle Stepper Motor		**Function:** 8 Stepper Idle Speed Control Parameters; Refer to Idle Control section Uses Aux 6, 7 & 8.
AUX6	28	Idle Stepper Motor		
AUX7	15	Idle Stepper Motor		
AUX8	29	Idle Stepper Motor		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Notes
Inputs				
REF	43	Ref Sensor (Hall)		
SYNC	50	Sync Sensor (Hall)		
AT1	62	Air temperature (AFM Pin2)		Calibration: 1
AT2	44	Engine Temp		Calibration: 1
AT3	99	Ignition Switch		**Function:** 8 Ignition Switch Parameters: Logic Polarity 1 Delay 0 Latch 0
AT4	83	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	#General AT input. Blocking diode can be by-passed by joining Link09	**Function:** 5 Air conditioning Request Parameters: Logic Polarity 1 Set AT levels: Low 5.5v High 6.0v. A/C request via pressure switches to switched 12v (IG2) from A/C ECU or manual switch O/C at connector A42 when A/C not fitted. **#Optional Function** Join Link 09 to use as a spare AT input on Pin 83.
AT5	65	A/C Switch 12V switched to ECU	#General AT input. Blocking diode can be by-passed by joining Link6	For A/C Switch set AT levels: Low 5.5v High 6.0v. **#Optional Function** #Join Link6 to use as a spare AT input on Pin 65.
AT6	68	Cranking signal		
AV1	78	Throttle Position		Calibration: 9
AV2	52	Alternator input		Voltage proportional to load
AV3	51	BAP (MAF meter)		Mass air flow sensor has in-built air pressure sensor
AV4	INT	Internal Barometer		Calibration: 62
AV5	91	Spare input (No TCK)	#EGT TC-. Requires TCK module. Connect EGT TC- to pin 91	#Cut Link17 & Link18
AV6	81	Spare input (No TCK)	#EGT TC+. Requires TCK module. Connect EGT TC- to pin 81	#Cut Link17 & Link18
AV7	73	Spare AV input		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Notes
AV8	74	Spare AV input		
DIG1	80	Vehicle Speed		**Function:** 1 Speed Measure Parameters: Units 1 Calibration 248 Active Edge 0
DIG2	61	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	54	Power Steering Oil Pressure Switch		**Function:** 18 Power Steering Set AT levels: Low 5.5v High 6.0v.
DIG4	66	ORB Select Function - Momentary auto water spray switch toggles ORB mode and spraybar.	#ORB Table Select – Selects between ORB table sets.	**Function:** 25 ORB Select Toggles ORB between Off, Table Set 1 and Table Set 2 Parameters: Polarity 0 Spray Bars 1 Logging As required, this can be set so that logging will only start when ORB table 1 or 2 are selected. **#Optional Function** 24 ORB Table Select Selects between the ORB Table Sets 1 & 2 Parameters Polarity 0 Momentary 1

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
LA1S	71	Narrow band Lambda		Calibration: 37 Front Lambda sensor. Bias resistor is connected via link 11 (default setting).
LA1P	72		#Use if vehicle wiring is being modified to use a wide band lambda sensor	#Link7 must be cut to disconnect Bias resistor.
LA2S	INT	Wide band lambda using internal lambda connector		Calibration: 38
LA2P	INT	Wide band lambda using internal lambda connector		
Communications				
RS232 TX	INT, #85	Internal Comms Connector	#85 Comms (pin7), ACD and SRS ECUs. Do not use this pin for Comms if airbags are functional.	#Join Link7 to connect to pin 85.
RS232 RX	INT, #97, ##79	Internal Comms Connector	#97 Comms to spare pin ##79 ACD	#Cut Link21, join Link16 ##Cut Link16 & Link20, Join Link21
CAN LO	INT, #88	Internal Comms Connector	#Connects pin 88 to CAN Lo.	#Join Link13
CAN HI	INT, #89	Internal Comms Connector	#Connects pin 89 to CAN Hi.	#Join Link14

OEM ECU Pinout



OEM Pin	M800 Pin	Function	Wire Colour
1	INJ1	Injector cylinder 1	Orange
2	INJ3	Injector cylinder 4	Red
3	#AUX2	#Lambda heater (Link 18)	Blue-red
4	O/C	Not used	
5	INJ7	Secondary air bypass (ORB)	Brown
6	O/C	2nd Boost control solenoid (some models)	
7	O/C	Not used	
8	AUX4	Alternator control	Blue white
9	INJ4	Injector cylinder 2	White-red
10	O/C	Not used	
11	IGN1	Ignition cylinders 1 & 4	Black-yellow
12	IGN2	Ignition cylinders 2 & 3	Black-green
13	O/C	Not used	
14	AUX5	Stepper idle speed	Yellow-blue
15	AUX7	Stepper idle speed	Red-black/Red-green
16	#AUX4	Canister purge (Link 17)	Yellow-green
17	O/C	Not used	
18	AUX1	Thematic fan	Blue
19	#AUX3	Not Used	
20	INJ5	A/C compressor clutch	Pink
21	INJ8	Fuel pump	Purple
22	IGN4	Driver warning light	White-blue
23	O/C	Not used	
24	INJ2	Injector cylinder 3	Green
25	O/C	Not used	
26	O/C	Not used	
27	O/C	Not used	
28	AUX6	Stepper idle speed	Yellow
29	AUX8	Stepper idle speed	Lt Green
30	N/A	A/C Fan Lo (see notes on A/C Fan)	Green
31	N/A	A/C Fan Hi (see notes on A/C Fan)	Blue
32	O/C	Not used	
33	O/C	Not used	
34	0V ENG	Sensor 0V	Black-yellow
35	INJ6	Spray bar (Evo8)	Red-white
41	IGN3	Boost Control Valve	Lt blue-lt green
42	5V ENG	Sensor 5V supply	Grey

OEM Pin	M800 Pin	Function	Wire Colour
43	REF	Ref sensor input	Brown-green
44	AT2	Engine temperature sensor	Yellow-white
45	IGN6	Tacho signal	Green-white
46	GND	ECU Earth	Black
47	VBAT	ECU 12V Supply (from ECU relay)	Red-yellow
48	#INJ5	Fuel pressure solenoid (optional)	White-black
49	0V ENG	Sensor 0V	Black
50	SYNC	Sync sensor input	Blue-red
51	AV3	Barometric pressure sensor (MAF Meter)	Yellow-blue
52	AV2	Alternator input	White
53	O/C	Not used	
54	DIG3	Power steering oil pressure switch	Red-white
55	O/C	Not used (Fuel pump low speed on factory ECU)	Red-black
56	#INJ6	Spray bar output (Evo9)	Red-white
57	IGN4	ECU Relay (via driver warning light)	Red
58	GND	ECU Earth	Black
59	V BAT	ECU 12 Volts	Red-yellow
60	O/C	Not used (constant 12V)	Red-black
61	DIG2	MAF Frequency measurement	White-red
62	AT1	Air temperature (in AFM)	Red-blue
63	O/C	Not used	
64	O/C	Not used	
65	AT5	A/C Switch #Spare switched input	Green-yellow
66	DIG4	ORB select function	Blue-white
67	#INJ6	Spray bars (manual)	Black-red
68	AT6	Starting signal switch to 12v for factory ECU	Black-red
71	LA1-S	Narrow band lambda sensor (front)	White
72	LA1-P	# Wide band lambda sensor (requires wiring modification)	N/A
73	AV7	Spare AV input	
74	AV8	Spare AV input	
75	#0V ENG	#Spare 0V (Link 03)	
76	#0V ENG	#Spare 0V (Link 03)	
77	#5V ENG	#Spare 5 V (Link 01)	
78	AV1	Throttle position	Green
79	AUX3 #RX232	Load/RPM signal to ACD	Red-yellow
80	DIG1	Vehicle speed	Black-yellow
81	K12, #AV6	TCK Module, #Spare input	
82	K13	TCK Module	
83	AT4	Air conditioning request	Pink
84	O/C	Not used	
85	#TX-232,	#TX-232 via diagnostic plug (optional)	Orange
86	GND	Comms 0V (optional)	

OEM Pin	M800 Pin	Function	Wire Colour
87	#8V AUX	#Spare 8V	
88	#CAN-Lo	CAN-Lo (user option)	
89	#CAN-Hi	CAN-Hi (user option)	
90	IGN5	ORB status	Red-yellow
91	AV5 #K12	Spare input, #TCK Module (Link17)	White
92	O/C	Not used	
93	O/C	Not used	
94	O/C	Not used	
95	O/C	Not used	
96	#TX-232	RS232 comms (user option)	
97	#RX-232	RS232 comms (user option)	
98	O/C	Not used Immobiliser comms	Red-white
99	AT3	Ignition switch	Black-red
100	O/C	ECU programming voltage – not used	Green-white

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	The Evo8 has no MAP sensor. Efficiency and load must be calculated by MAF unless a MAP sensor is installed
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

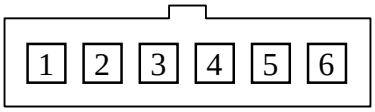
Bat V	10	11	12	13	14	15
Dwell	5.3	4.6	4.0	3.6	3.2	3.0

Link Table

Links by link #	Option
LK02 open; LK01 closed	AUX4 alternator control*
LK01 open; LK02 closed	AUX4 canister purge
LK20 closed; LK03, LK21 open	AUX3 signal to diff control*
LK03 closed; LK20 open	AUX3 MAF meter re-set
LK05 open; LK04 closed	INJ5 A/C clutch and fan low speed*
LK04 open; LK05 closed	INJ5 fuel pressure solenoid (no A/C)
LK06 open	AT5 active high A/C 2 request*
LK06 closed	AT5 spare input pin 65
LK07 closed	La1 narrow band sensor*
LK07 open	La1 wideband sensor
LK08 closed	spare 0V-ENG on pins 75 76
LK022 closed	spare 5V-ENG on pin 77
LK09 open	AT4 active high A/C request*
LK09 closed	AT4 spare input pin 65
LK21 closed; LK16, LK20 open	RX-232 from diff controller
LK10 closed	TX232 on pin 85 (diag pin7)
LK11 closed	oV for can on spare pin 86
LK12 closed	spare 8V-AUX on pin 87
LK13; LK14 closed	CAN-LO on pin 88 CAN-HI on pin 89
LK15 closed	RS232 Tx on pin 96
LK16 closed;Lk21 open	RX232 on spare pin 97
LK17.LK18 closed	AV5 & 6 spare inputs on 91 & 74*
LK17,LK18 open	TCK installed
LK19 closed	CAN terminator*
LK19 open	No CAN terminator

* Denotes default setup

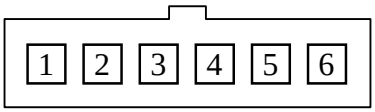
Lambda 2 Connector



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

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

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