

Connection diagrams – Dual Ignition System

Engine 120 LH-SFI



When diagnosing starting or warm up complaints, do not check engine at operating temperature, instead proceed according to specific complaint.

Diagnostic plug (060) to diagnostic socket (X11), disconnect connector "A" from DI control module and connect plug (077) in between	connect, disconnect
Diagnostic plug (060) to dual ignition adaptor (055)	connect, disconnect
Knob to position "T1/1 & T1/2"	turn
Plug of dual ignition adaptor (055) to diagnostic socket (X11) ²⁾	connect, disconnect
TN signal/on-off ratio signal connector ³⁾	connect, disconnect
Trigger clamp (061) on ignition cable "1"	connect, disconnect
Kilovolt clamp (062) and (063) on ignition cable "4" of ignition coil T1/1 and T1/2	connect, disconnect
Oil thermometer (064) in engine oil dipstick tube	insert, remove
DC inductive clamp ¹⁾ (065) to battery G1 ground	connect, disconnect
Exhaust vent hose (014) to exhaust pipe	connect, disconnect
Vacuum connection with Y-adaptor (068) to DI control module (N1/3)	connect, disconnect
Vehicle data	enter.
Engine oil temperature approximately 80 °C	warm engine up.



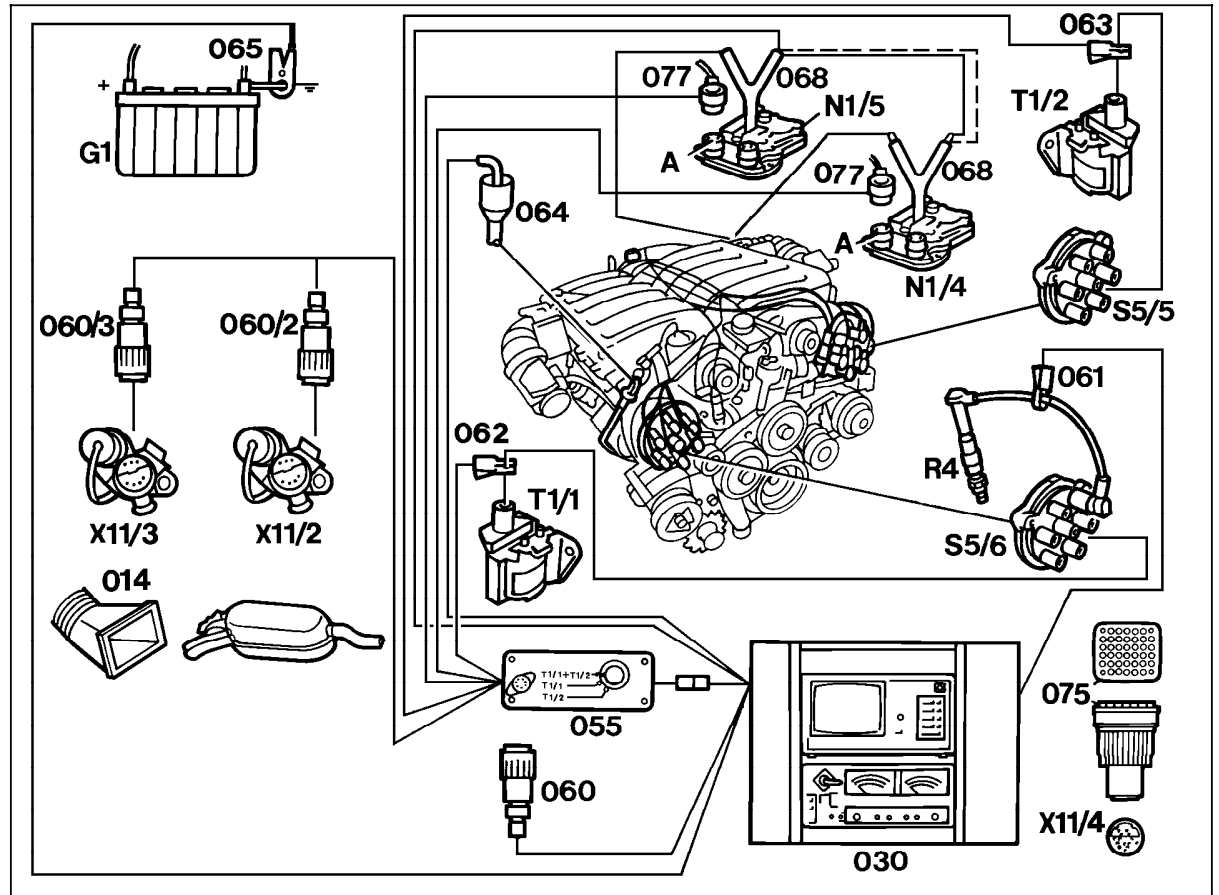
1) On model 129, connect to ground strap between engine, transmission and body (vehicle right side), or for inductive clamp connection to positive battery lead, remove passenger side floor mat and connect to positive cable.
 On model 140, connect to ground strap between engine, transmission and body (vehicle lower left side).
 2) Up to 06/93.
 3) Starting 07/93.

Connection Diagrams – Dual Ignition System

Engine 120 LH-SFI up to 06/93 with Diagnostic Socket (X11)

Figure 1

- G1 Battery
- N1/4 Left DI control module
- N1/5 Right DI control module
- R4 Spark plug
- S5/5 Left high-voltage distributor
- S5/6 Right high-voltage distributor
- T1/1 Ignition coil 1 (right cylinder bank)
- T1/2 Ignition coil 2 (left cylinder bank)
- X11/2 Left diagnostic socket (9-pole)
- X11/3 Right diagnostic socket (9-pole)
- X11/4 Data link connector (DTC readout)
- O14 Exhaust vent hose
- O30 Engine analyzer
- O55 Dual ignition adaptor
- O60 Diagnostic plug
- O60/2 Diagnostic plug – left diagnostic socket
- O60/3 Diagnostic plug – right diagnostic socket
- O61 Trigger clamp (cylinder 1)
- O62 Kilovolt clamp, right (on ignition coil)
- O63 Kilovolt clamp, left (on ignition coil)
- O64 Oil thermometer
- O65 DC inductive clamp
- O68 Y-adaptor (vacuum)
- O75 Impulse counter scan tool adaptor
- O77 TN signal plug (in wiring diagram connector "A")



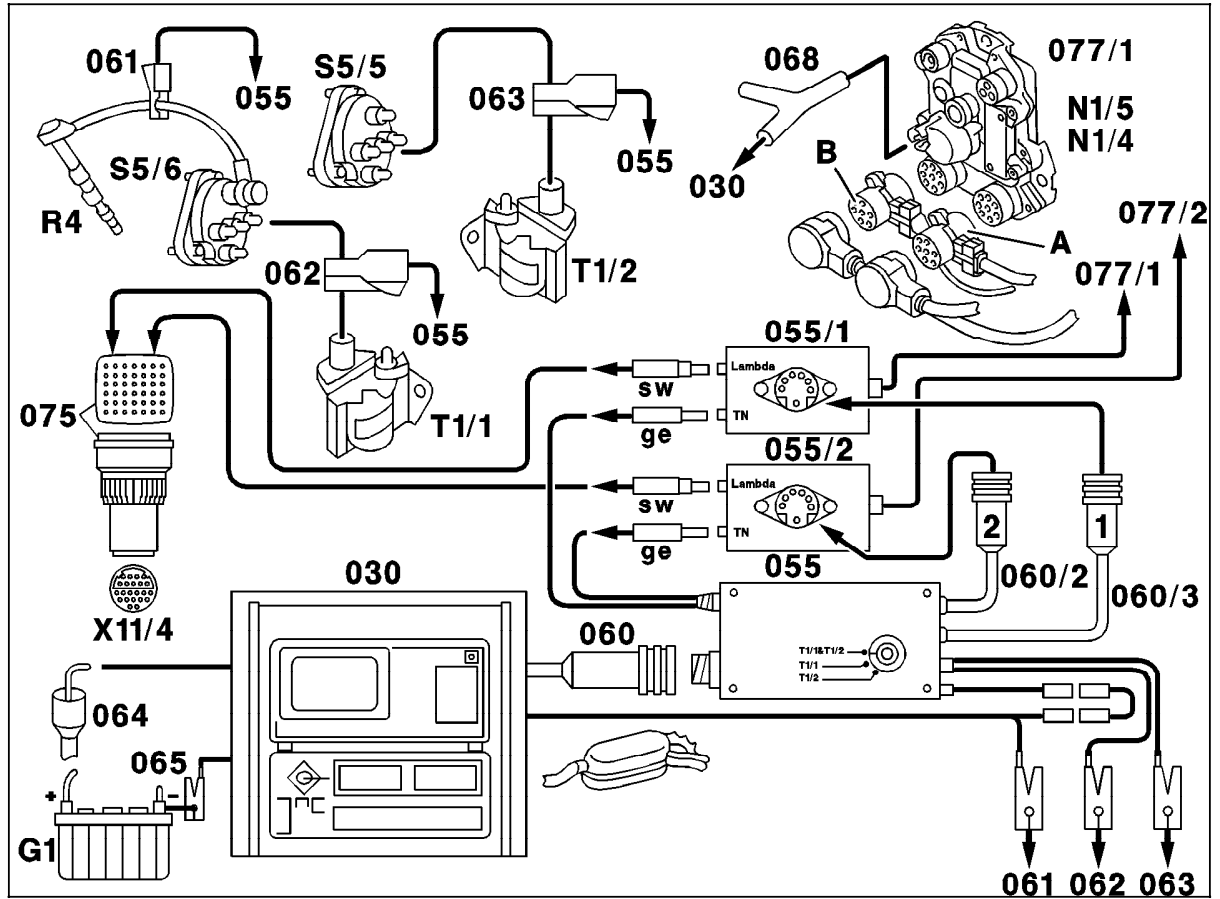
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Connection Diagrams – Dual Ignition System

Engine 120 LH-SFI starting 07/93 without Diagnostic Socket X11

Figure 2

- G1 Battery
- N1/4 Left DI control module
- N1/5 Right DI control module
- R4 Spark plug (cylinder 1)
- S5/5 Left high-voltage distributor
- S5/6 Right high-voltage distributor
- T1/1 Ignition coil 1 (right cylinder bank)
- T1/2 Ignition coil 2 (left cylinder bank)
- X11/4 Data link connector (DTC readout)
- 030 Engine analyzer
- 055 Dual ignition adaptor
- 055/1 TN signal/on-off ratio signal adaptor
- 055/2 TN signal/on-off ratio signal adaptor
- 060 Diagnostic plug
- 060/2 Diagnostic plug 2 – right diagnostic socket
- 060/3 Diagnostic plug 1 – left diagnostic socket
- 061 Trigger clamp (cylinder 1)
- 062 Kilovolt clamp, right (on ignition coil)
- 063 Kilovolt clamp, left (on ignition coil)
- 064 Oil thermometer
- 065 DC inductive clamp
- 068 Y-adaptor (vacuum)
- 075 Impulse counter scan tool adaptor
- 077/1 TN signal plug to right N1/5 (in wiring diagram connector "A")
- 077/2 TN signal plug to left N1/4 (in wiring diagram connector "B")



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Connection diagrams – Dual Ignition System

The DI control modules on model 129.076 are located in the engine compartment on the left wheelhousing. The 9-pole diagnostic sockets (X11/2, X11/3) are above the DI control modules (N1/4, N1/5).

The assignment of the components to the respective ignition circuit is as follows:

- The DI control module (N1/4) and the diagnostic socket (X11/2) for ignition circuit T1/2 (cylinders 7 – 12) are in the front, as viewed in the driving direction. The connectors “A” and “B” are easily accessible (Figure 6 and 8).
- The DI control module (N1/5) and the diagnostic socket (X11/3) for ignition circuit T1/1 (cylinders 1 – 6) are in the rear, as viewed in the driving direction. The connectors “A” and “B” are not accessible. The hot wire MAF sensor must be removed by opening 2 clamps on front of the air filter housing to make the test connections. The MAF sensor together with the formed hose (leading to the throttle valve) can then be pushed aside.

- The connectors “A” and “B” of the DI control module (N1/5) are now accessible and the necessary connections to the TN signal/on-off ratio signal adaptor can now be performed.

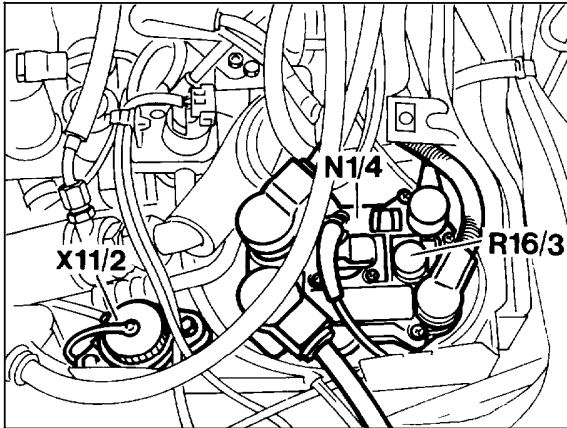


The MAF sensor must be installed again for the engine diagnosis, since otherwise it can lead to interferences in the engine performance.

The location of the ignition coils is similar to that of model 129 with engine 119. The outer ignition coil belongs to ignition circuit T1/2 (cylinders 7 – 12), the ignition coil towards the engine belongs to ignition circuit T1/1 (cylinders 1 – 6).

Connection Diagrams – Dual Ignition System

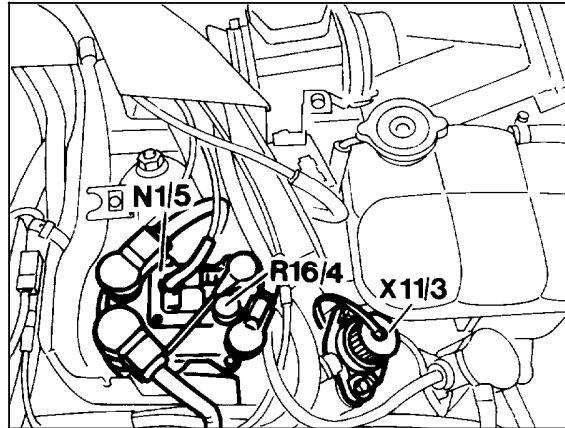
Component Locations



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Figure 3
Model 140

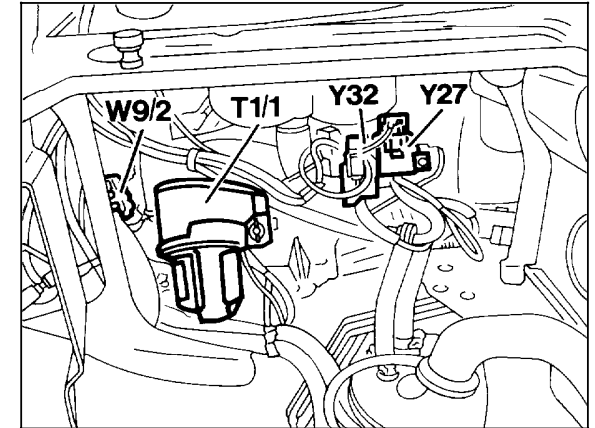
- N1/4 Left DI control module
- R16/3 Left reference resistor (DI)
- X11/2 Left diagnostic socket (9-pole)



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Figure 4
Model 140

- N1/5 Right DI control module
- R16/4 Right reference resistor (DI)
- X11/3 Right diagnostic socket (9-pole)

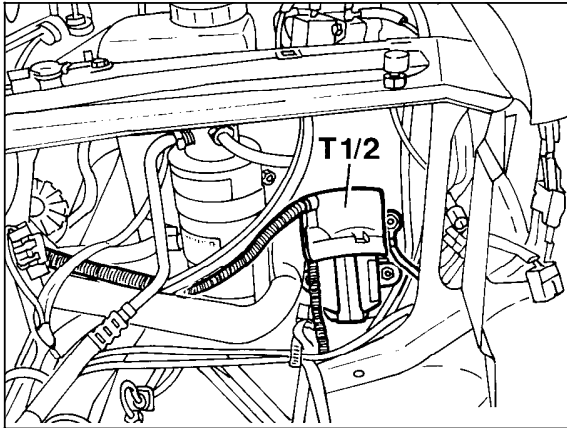


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Figure 5
Model 140

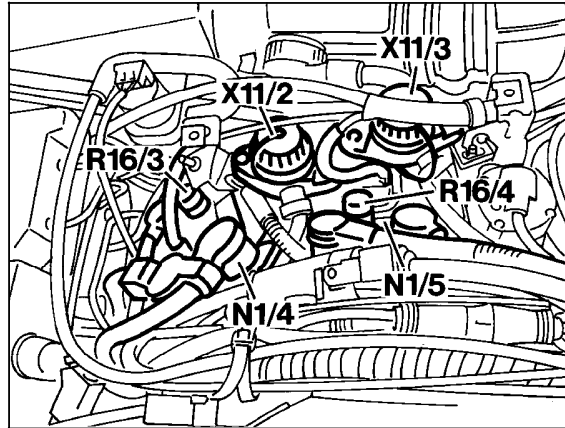
- T1/1 Ignition coil 1 (right cylinder bank)

Connection Diagrams – Dual Ignition System



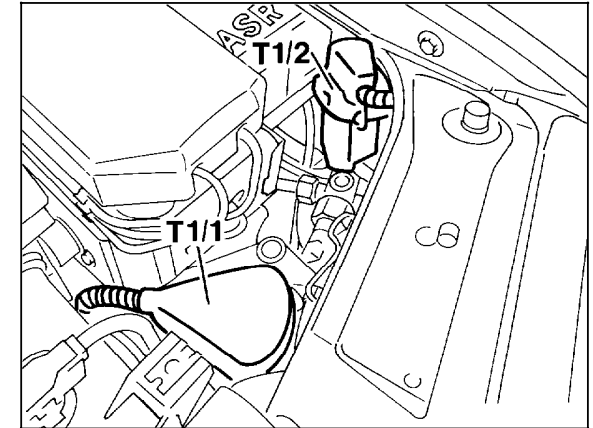
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Figure 6
Model 140
T1/2 Ignition coil 2 (left cylinder bank)



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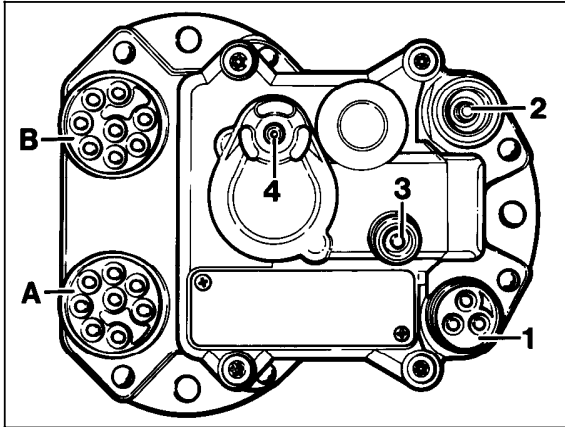
Figure 7
Model 129
N1/4 Left DI control module
N1/5 Right DI control module
R16/3 Left reference resistor (DI)
R16/4 Right reference resistor (DI)
X11/2 Left diagnostic socket (9-pole)
X11/3 Right diagnostic socket (9-pole)



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Figure 8
Model 129
T1/1 Ignition coil 1 (right cylinder bank)
T1/2 Ignition coil 2 (left cylinder bank)

Connection Diagrams – Dual Ignition System



P15-2030-13A

Figure 9

Model 129, 140

- 1 Connector for knock sensor (A16)
- 2 Connector for CKP sensor (L5)
- 3 Connector for reference resistor (R16/3, R16/4)
- 4 Vacuum connector
- A 8-pole connector
- B 8-pole connector

Connection Diagrams – Dual Ignition System**Testing with dual ignition adaptor (055)**

The dual ignition adaptor provides engine diagnosis on engines with dual ignition systems (engine 120) when using the Bear DACE (Model 40-960) engine analyzer.

With the dual ignition adaptor (055), the single ignition circuits T1/1 and T1/2 are combined to a 12-cylinder ignition circuit. This enables the display of the single circuits and the complete ignition circuit on the oscilloscope. Next to the standard measurements, the diagnostic measuring methods for dynamic compression test, idle quality test and ignition system analysis can be performed. The switch on the dual ignition adaptor allows the selection of measurements on a single ignition circuit, for example: dwell angle, ignition timing, on-off ratio and voltage values of the primary/secondary ignition circuit.

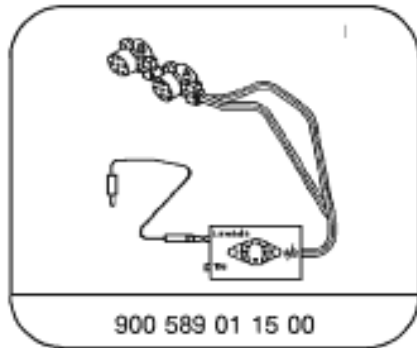
In the total display (switch position T1/1 & T1/2) with the oscilloscope in the parade setting, the ignition impulse of ignition circuit T1/1 is shown first. At the end of the fade-out process, switch over to ignition circuit T1/2 occurs and according to firing order the next cylinder, including dwell and current draw are displayed.

Connection Diagrams – Dual Ignition System

	Engine analyzer		Switch position Dual ignition adaptor (055)
	Cyl. number	Trigger clamp	
Dwell angle	6 cylinder	Cylinder 1	T1/1 or T1/2
Ignition timing	6 cylinder	Cylinder 1 Cylinder 12	T1/1 T1/2
On-off ratio	12 cylinder	Cylinder 1	T1/1 or T1/2
Ignition oscilloscope	12 cylinder	Cylinder 1 Cylinder 1 Cylinder 12	T1/1 & T1/2 (possible only up to 4400 rpm) T1/1 firing order 1 – 5 – 3 – 6 – 2 – 4 T1/2 firing order 12 – 8 – 10 – 7 – 11 – 9
Compression	12 cylinder	Cylinder 1	T1/1 & T1/2
Idle quality	12 cylinder	Cylinder 1	Idle quality test. Set engine analyzer to TN signal

Connection diagrams – Dual Ignition System

Special Tools



On-off ratio signal adapter

Equipment

Engine analyzer ¹⁾	Bear DACE (Model 40-960) Sun MEA-1500 MB
Dual ignition system adaptor	Bear 43-322

¹⁾ Available through the MBUSA Standard Equipment Program.