

CHECKING THE ELECTRONIC FUEL INJECTION SYSTEM.

IMPORTANT:- No checks can be carried out without the use of the Special Bosch EF AW 220 Test Unit, which enables every part of the Electronic Fuel Injection system to be checked except for the Electronic Control Unit itself.

NOTE:- In case of malfunctioning of the engine, carry out the normal checks of the ignition system and of the Basic settings and Clutch re-engagement Control on cars with hydraulic gearchange, before suspecting the Injection System.

In the event of trouble attributable to the Electronic Fuel Injection System, the following sequence of checks must be carried out in the order stated :-

- 1) Check the components of the injection system with the Bosch Test Unit, scrupulously following the sequence laid down.

All these components must be checked with the Electronic Control Unit disconnected.

- 2) If no fault is found during the course of the tests the Electronic Control Unit should not yet be pronounced faulty, the five earth leads should be carefully checked first:-

- from the voltage regulator (a) to the battery;
- from the injection system harness (b) to the regulator;
- from the battery (c) to the water pump;
- from the electric fuel pump(d) to the car body;
- from the "battery to the car body (e).

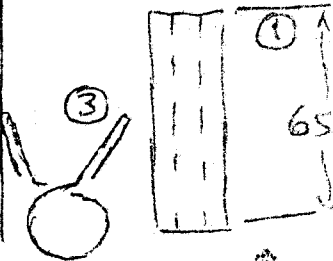
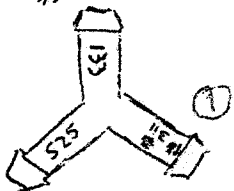
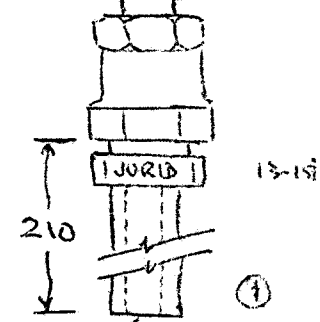
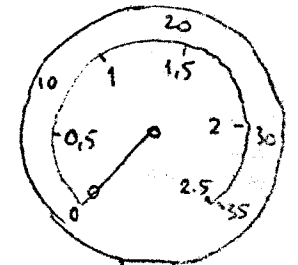
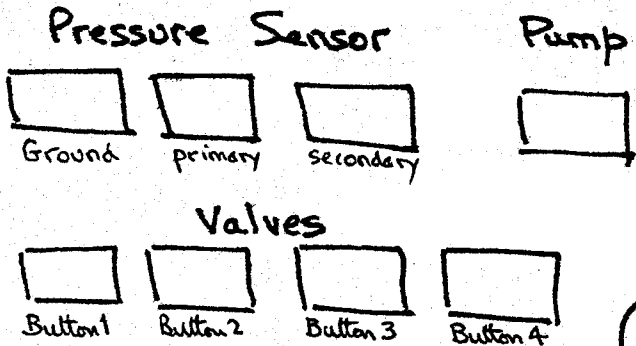
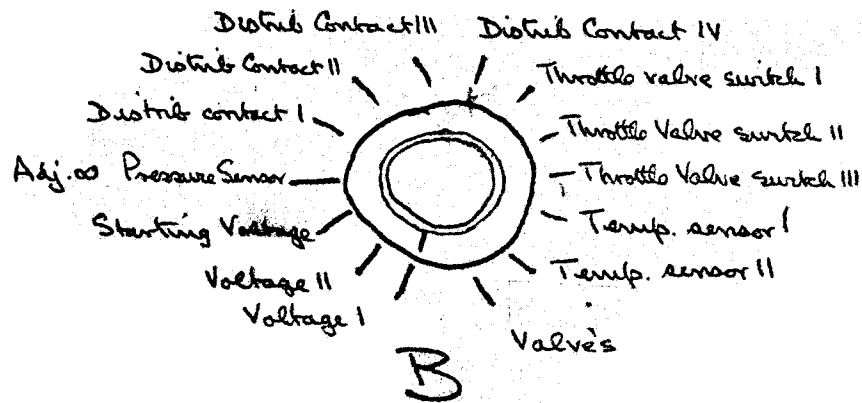
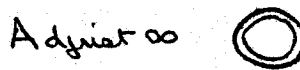
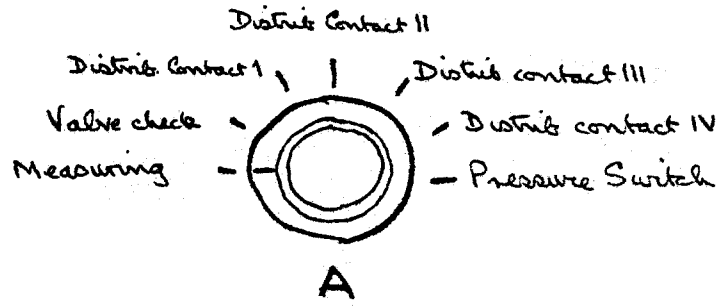
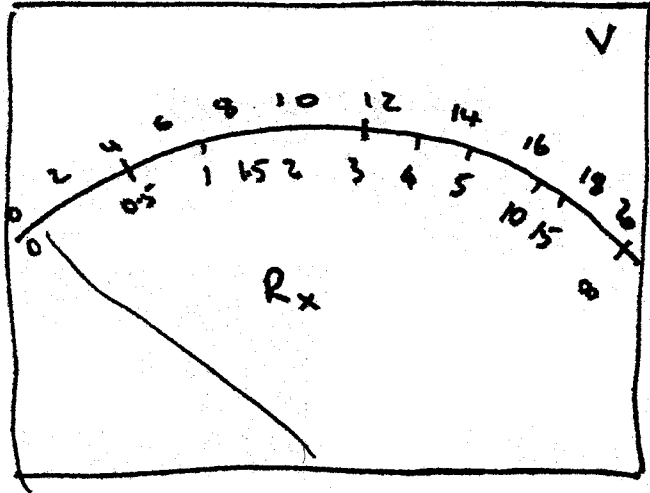
(Check the tightness of the bolts, and pull the leads gently to ensure that they are properly secured to their terminals. Use an ohmmeter to check continuity between terminals.)

- 3) If the earth-leads are in good condition, disconnect the field (excitation) lead (yellow sleeve) from the alternator and drive the car. If the trouble disappears, check the alternator and regulator; replace whichever is faulty.
If trouble persists, change the Electronic Control Unit.

IMPORTANT :- Certain actions must be avoided at all costs, as they will damage the components of the Electronic Fuel Injection System, in particular the Electronic Control Unit:-

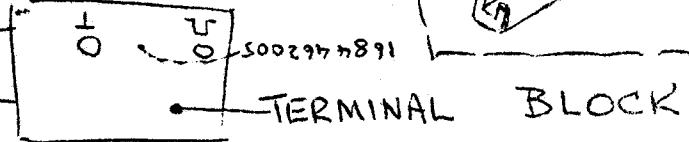
- 1) Never use a rapid charger, never carry out arc or spot welding on the car without first having disconnected both battery leads.
- 2) Never use a test lamp to check continuity of circuits (damage to micro-contacts).
- 3) Never strike a spark to test whether a lead, is alive.
- 4) Never start a vehicle with a voltage exceeding 12 volts.
- 5) Never force a connector onto the unit concerned, take note of the inhibitor chamfers on the connector.

BOSCH



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NOTE:- This is a universal tester. The following positions are not used on the DS21:-
 Switch A:- Distrib. Contact III; Distrib. Contact IV.
 Switch B:- Distrib. Contact III; Distrib. Contact IV.
 - Temp. Sensor I;



TRAINING CENTRE - JUNE 1973

ELECTRONIC FUEL INJECTION DS 21 - DS 23 - SM

Test sequence using Bosch Tester E.F.A.W. 228

MODEL:
REG. NO:
MILEAGE:
DATE:

Check the following 5-earth connections:—

- 1/ at voltage regulator
- 2/ at fuel injection loom
- 3/ at battery lead
- 4/ at electrical fuel pump
- 5/ at chassis.

Before starting the test, ensure that the battery is well charged.

Disconnect E.C.U. (Electronic Control Unit) and electrical lead (s), ignition distributor to H.T. coil (s).

Connect the Bosch Tester without the E.C.U. for tests 1 to 15 and reconnect it (with the tester) for tests 17 to 19.

Switch on ignition.

	ITEMS TESTED	SWITCH "A"	SWITCH "B"	OPERATE BUTTON OR ACTION	READING REQUIRED	DS 21	DS 23	SM
1	Voltage to ECU (Term 16)	Measuring	Voltage I		11 to 12.5 V.			
2	Voltage to ECU (Term 24)	"	Voltage II		11 to 12.5 V			
3	Cranking voltage at starter motor relay	"	Starting Voltg.	Operate starter until pointer stabilises.	9 V. minimum			
4	Resistance, pressure sensor windings to earth	"	Adjust oo/ Pres. sensor	"Adjust oo"	oo			
				"Ground"	oo			
5	Pressure sensor primary winding	"	Pres-sensor	Primary	0.8 to 1.2 Rx			
6	Pressure sensor secondary winding	"	"	Secondary	3 to 4 Rx			
7	Resistance, triggering contacts in distributor.	"	Distributor Contacts I	Operate starter	0 to oo then oscillates			
			Distributor Contacts II	" "	"			
8	Engage clutch on hydraulic gearchange 'D' models. Acceleration contacts, throttle spindle switch.	"	Throttle valve Switch I	Open throttle fully, slowly	8 to 10 oscillations from 0 to oo			
			Throttle Valve Switch II					

	ITEMS TESTED	SWITCH "A"	SWITCH "B"	OPERATE BUTTON OR ACTION	READING REQUIRED	DS 21	DS 23	SM
9	Throttle spindle switch setting	Measuring	Throttle valve Switch III	Throttle closed	0			
				.7 mm feeler at excentric	0			
				1.4 mm " "	oo			
10	Resistance of air thermal sensor	"	Temp. Sensor 1		2 to 5 Rx			
11	Resistance of coolant thermal sensor	"	Temp. Sensor II		0.3 to 3.0 (Rx) falls with rising temperature			
12	Resistance of injector windings. Connect Citroën 1730 adaptor in white 6 way connector (157) on RH side of car electrical harness for SM cars.	"	Adjust oo	Adjust oo	oo			
			Valves	1	2 to 3 Rx			Cyl 1 Cyl 2
				2	2 to 3 Rx			Cyl 4 Cyl 5
				3	2 to 3 Rx			Cyl 3
				4	2 to 3 Rx			Cyl 6
13	Remove cold start injector and insert pressure gauge. Fuel pressure (Pump)	Valve check	Any	Pump	2kg/cm ² while pumping			X
				On release of button	Rapid fall to 1.2			
				Pump	2kg/cm ² while pumping	X	X	
				On release of button	Rapid fall to 1.7	X	X	
14	Injectors (delivery) Do not test more than once or twice, or engine will flood.	Valve check	Any	Touch 1	Pressure drop			1/2
				Touch 2	" "			4/5
				Touch 3	" "			3
				Touch 4	" "			6
15	Cold starting injector (delivery) If coolant temp. above 25°C, earth the grey female connector.	" "	"	Operate starter motor	Fuel spray while starter operating.			
16	Remove pressure gauge + 1780 adaptor, connect ECU coil(s) to distributor Lead(s).							
17	Triggering contacts in base of distributor,	Contact I	"	Run engine at 1500 rpm	Oscillates at both switch positions. The main point of oscillation must be within 2 divs. on the volt scale.			
		Contact II	"					

	ITEMS TESTED	SWITCH "A"	SWITCH "B"	OPERATE BUTTON OR ACTION	READING REQUIRED	DS 21	DS 23	SM
18	Throttle spindle switch, throttle closed	Contact I or II	Any	Engine at idle, disconnect at manifold, hose to supplementary air control	Engine rpm rises and falls 1100 – 1800—1100—1800 and so on.			
				Open throttle slightly	Engine rpm stabilises			
19	Engage clutch on hydraulic gearchange 'D' models. Full load switch.	Contact IV	"	Engine stopped ign. on	0 to 4 V.			
				Engine stopped ign. on	4 to 6 V.			
				Engine idling snap throttle open,	∞ sudden drop towards 0			