

The pin numbers for the engine management ECU are given below: refer to Fig 2

Low power board (yellow connector) High power board (blue connector)

Pin No.	Function	Pin No.	Function
1	Battery voltage correction and ignition sense	1	Ignition drive
2	Water thermister input	2	Earth return for air pump relay
3	Neutral switch input	3	Transducer ground
4	Serial input	4	Bypass feed to ignition module
5	ZF gear change input	5	Purge solenoid valve
6	Lambda monitor	6	Spare
7	ZF select shift input	7	Earth return for fuel pump relay
8	Road speed input	8	EGR thermister input
9	Lambda disable input	9	ZF injector pulse time output
10	Idle trim input	10	Live with ignition supply input
11	Buffered missing tooth output	11	Heavy current ground
12	VCM 1 fault line output	12	Injector supply
13	Engine speed live input	13	Injector drive
14	Throttle wiper input	14	Battery live supply
15	VCM 2 Fuel used output	15	Idle speed A output
16	Airflow meter input	16	Idle speed B output
17	Lambda sensor live input	17	Injector supply
18	Lambda ground	18	Idle speed C output
19	Serial output	19	Idle speed D output
20	Fuel/air thermister input	20	EGR drive
21	Air conditioning input	21	Spare
22	Positive to throttle potentiometer	22	Live with ignition supply input
23	Spare	23	Heavy current ground
24	Engine speed ground	24	Small signal ground
25	Spare	25	Injector drive

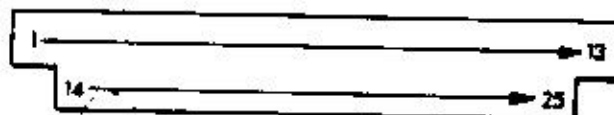
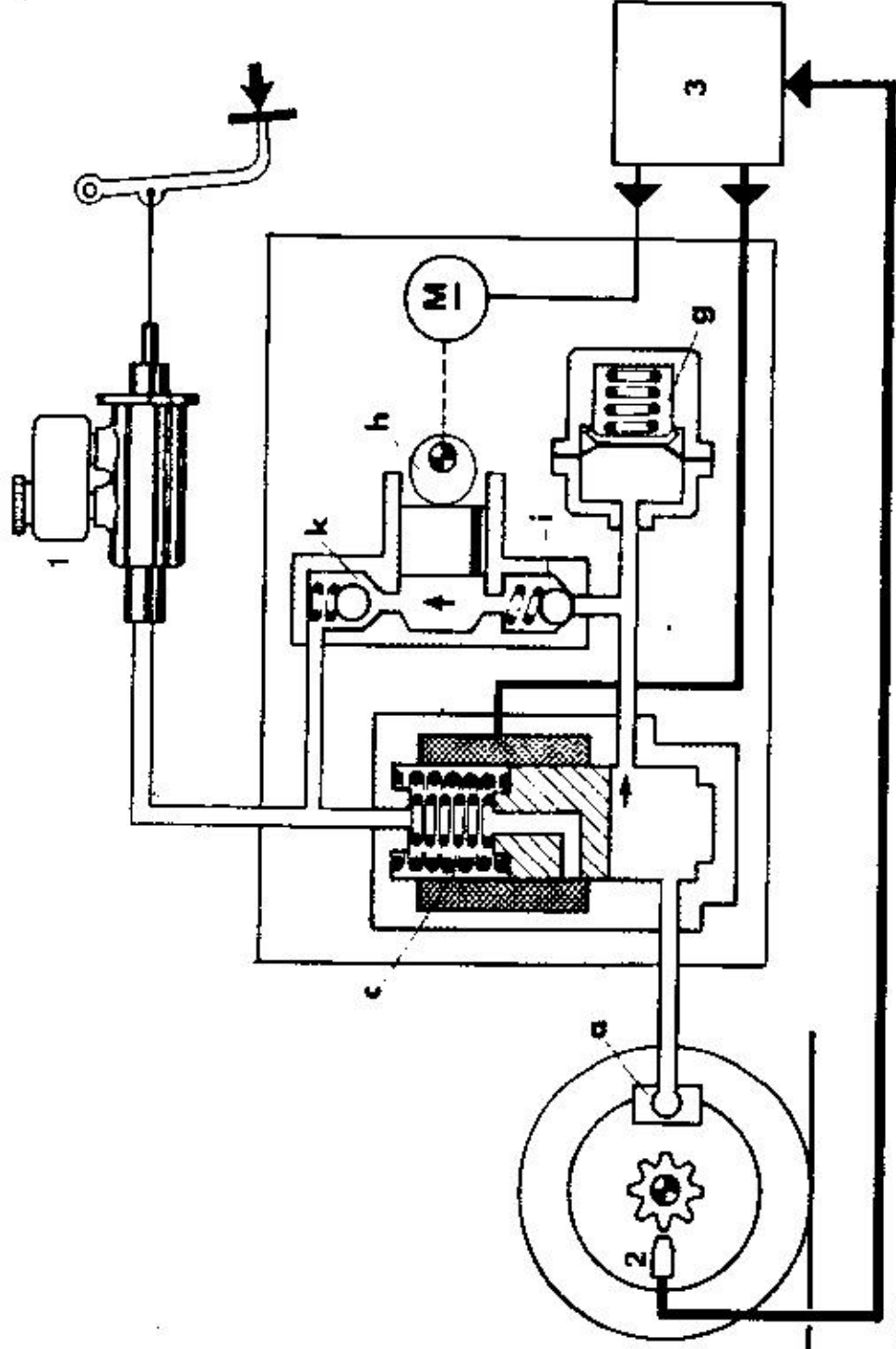


FIG 2 -View on ECU mounting face

### Pressure Dropping Phase

If the braked wheel still tends to lock in spite of constant hydraulic pressure, e. g. because of road surface changing from dry to slippery, pressure in wheel brake cylinder must be reduced. Current higher than approx. 5 amperes on the electric solenoid valve causes a greater piston stroke, which opens the outlet.

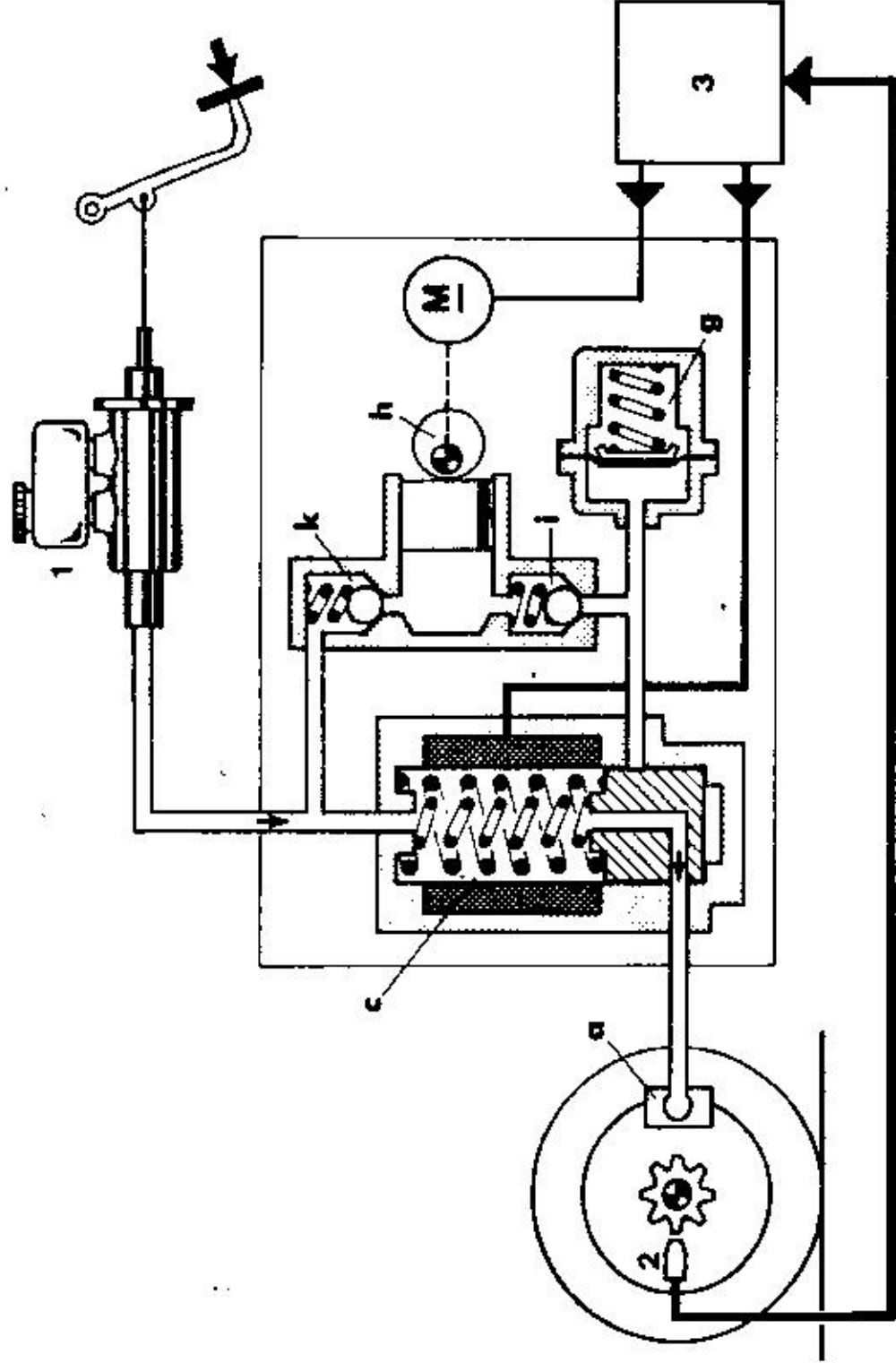
Hydraulic fluid flows to pump reservoir and return delivery pump. Return delivery pump returns the brake fluid into the brake master cylinder against existing pressure. A damper is provided in each brake circuit to suppress the delivery noise. The pump always runs during regulation, even if return delivery is not required.



## Pressure Building Up Phase

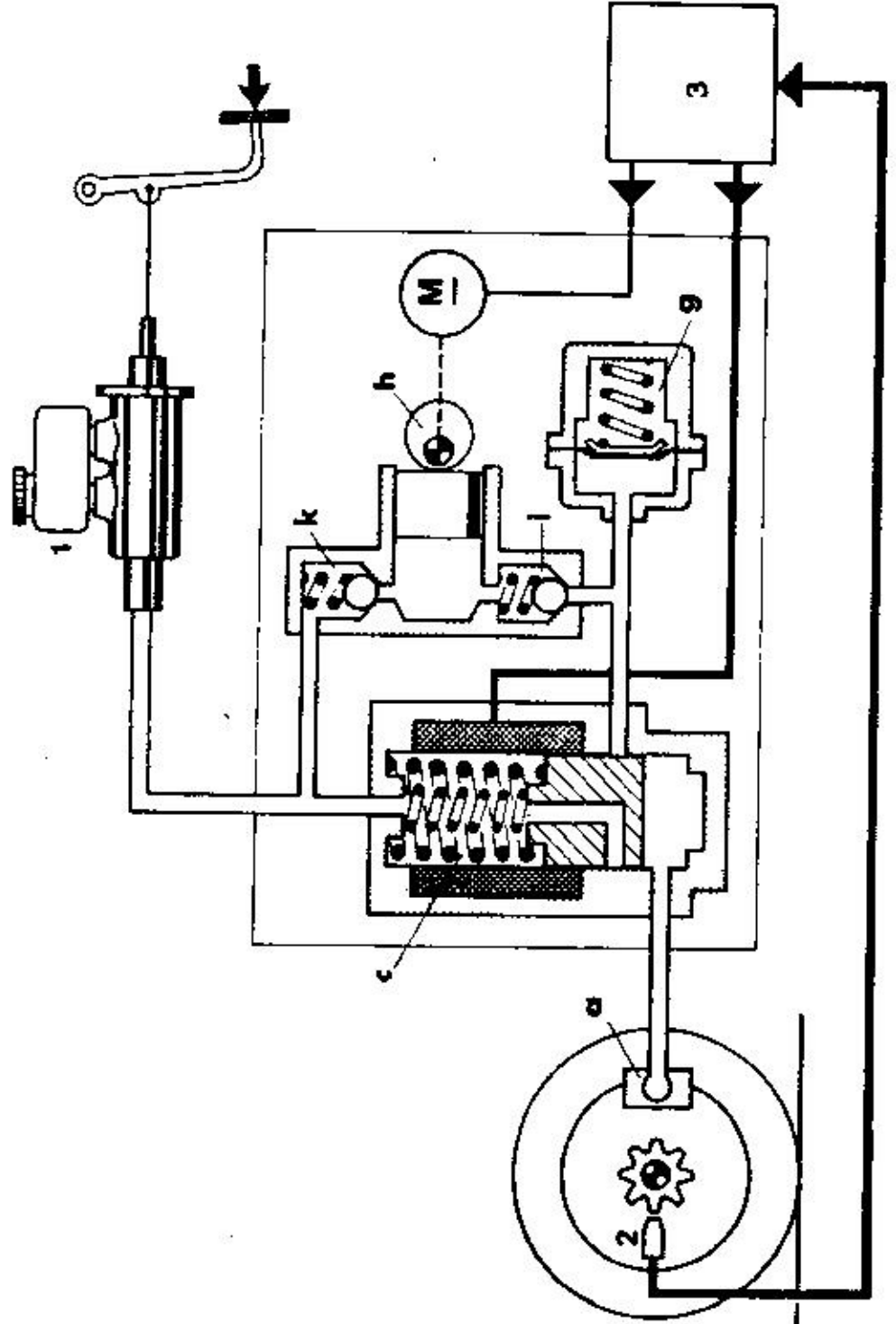
Electric solenoid valves are without electric power in the pressure building up phase. Pressure coming from the brake master cylinder can be effective in full amount in wheel brake cylinders.

This valve position is given for every "normal brake application", i. e. when regulation is not required. If the system fails, the valve remains in this position to guarantee normal brake operation.



### Pressure Holding Phase

If the braked wheel reaches the lock limit by way of hydraulic pressure from the brake master cylinder, further pressure increase in the wheel brake cylinder will be prevented. The solenoid will receive current of approx. 2 amperes, valve piston is activated and outlet as well as inlet of solenoid valve are closed. Hydraulic pressure between hydraulic unit and wheel brake cylinder remains constant.



Model: XJ6 3.6

Date: JUNE, 1988

KEY POINTS: VCM FAULT CODES

Beginning with VIN 521255, XJ6 3.6 vehicles incorporate high compression engines. These vehicles are equipped with either a DBC 3713 or DBC 4413 Engine Management Control Unit.

To provide a more detailed description of a feedback fueling fault (displayed on the VCM), three of the eight fuel failure codes have been changed. Previously, all feedback fueling faults were displayed as a single fuel failure code, code number 4.

The VCM fault code identification is as follows:

<u>CODE</u>	<u>DESCRIPTION</u>
*1	Lambda sensor open circuit.
2	Air mass meter failure (open circuit/short circuit to ground).
3	Coolant temperature sensor failure.
*4	Feedback fueling full rich.
5	Air mass meter failure (low throttle potentiometer voltage with high air mass meter voltage).
6	Air mass meter failure (high throttle potentiometer voltage with low air mass meter voltage).
*7	Feedback fueling full lean.
8	Intake manifold air temperature sensor failure (open circuit/short circuit to ground).

\* = Revised Codes

Code numbers 4 and 7, "Feedback fueling" refers to the extent that the lambda sensor would have in altering the fuel mixture.

Example: If a large intake manifold air leak existed, the lambda would sense an abnormally lean exhaust gas. The ECU, acting on the lambda sensor's input, would enrichen the fuel mixture to compensate. Because the lambda's control is relatively small, the feedback fueling would be full rich and the failure code number 4 would be displayed.

Low compression engine vehicles incorporating ECU (DBC 2911, or 3711) will retain the original fueling failure codes. Additional fuel failure code information can be found on page 29 of the XJ6 3.6 Technical Introduction Book, (S 20).

**CAUTION:** Part numbers included in Service Bulletins are for reference only and should always be cross referenced with the latest parts information.

See

ENGINE MANAGEMENT

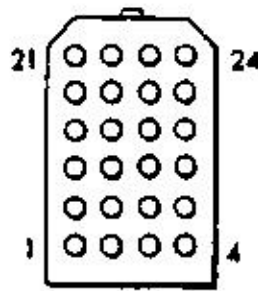
FAULT DESCRIPTION CODE	FUNCTION
11 Idle pot or associated wiring.	Looks for idle trim pot out of normal operating range.
12 Air flow meter or associated wiring.	Looks for air flow meter signal out of normal operating range.
14. Coolant thermistor or associated wiring.	Looks for coolant thermistor resistance out of range or static during engine warm up.
16 Air thermistor or associated wiring.	Looks for air thermistor resistance out of range.
17 Throttle pot or associated wiring	Looks for throttle pot resistance out of range.
18 Throttle pot/air flow meter calibration.	Looks for low throttle pot signal at high air flow.
19. Throttle pot/air flow meter calibration.	Looks for high throttle pot signal at low air flow.
22 Fuel pump drive.	Looks for ECU output to fuel pump relay.
23 Fuel supply	Looks for poor feedback control in rich direction.
24. Ignition drive	Looks for ECU output to ignition amplifier module.

26	Air leak	Looks for poor feedback control in lean direction.
29	ECU self check	Checks microprocessor function.
33	Injector drive fault	Checks for ECU output to injectors.
34	Injector drive and associated wiring.	Looks for injector dribble.
37	EGR drive	Looks for ECU output to EGR switch valve.
39	EGR check sensor	Looks for correct operation of EGR.
44	Lambda sensor of associated wiring.	Looks for feedback out of control rich or weak.
46	Idle speed control coil 1 drive	Looks for ECU output to idle speed control stepper motor
47	Idle speed control coil 2 drive	Looks for ECU output to idle speed control stepper motor.
48	Idle speed control motor or valve	Looks for stepper motor being wildly out of position with engine temperature hot and less than 86 degrees F. (30 degrees C)

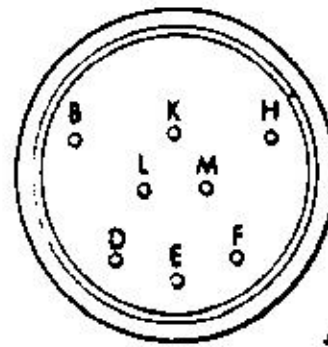


- |    |   |  |
|----|---|--|
| 68 | Road speed sensor or associated wiring. | Looks for road speed indicating less than 5 km/h at high engine air flow |
| 69 | Drive/neutral switch or wiring          | Looks for cranking in 'D' or high air flow in 'N'.                       |
| 89 | Purge valve drive                       | Looks for ECU output to purge valve.                                     |

# ROTARY TRANSMISSION SWITCH CONNECTIONS - PIN LOCATIONS



GB1



J06 011

GB7

## CONNECTOR GB1

PIN	SIZE (mm <sup>2</sup> )	CABLE COLOUR	FUNCTION
1	1.0	BK	Switch common
2	0.5	LGB	Code X output
3	0.5	LGP	Code Y output
4	0.5	LGW	Code Z output
5	0.5	WP	Start inhibit ground
6	0.5	RW	Start inhibit output
7	-	-	-
8	0.5	SG	Reverse lights output
9	1.0	RY	Solenoids output
10	1.0	YB	MV1 solenoid
11	1.0	YP	MV2 solenoid
12	1.0	YU	MVWK solenoid
13	-	-	-
14	1.0	OG	Pressure regulator
15	0.5	R	Road speed sensor
16	0.5	U	Road speed sensor
17	-	-	-
18	-	-	-
19	-	-	-
20	0.5	W	Ground (screen)
21	-	-	-
22	-	-	-
23	-	-	-
24	-	-	-

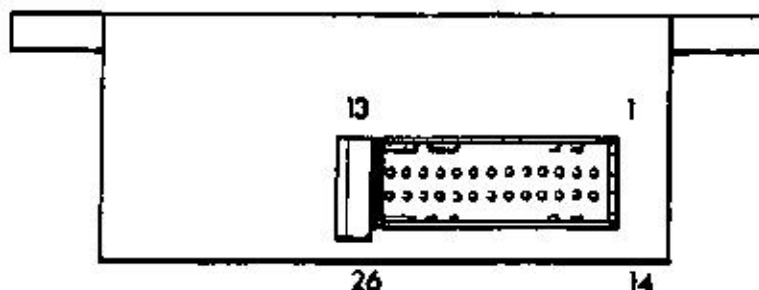
*Normally open Solenoids*

	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
MV1 solenoid	OFF	ON	ON	OFF
MV2 solenoid	ON	ON	OFF	OFF
MVWK solenoid	OFF	OFF	OFF	OFF

## CONNECTOR GB7

PIN	SIZE (mm <sup>2</sup> )	CABLE COLOUR	FUNCTION
B	1.0	OG	Pressure regulator
D	-	-	-
E	0.5	U	Road speed sensor
F	0.5	R	Road speed sensor
H	1.0	YB	MV1 solenoid
K	1.0	YP	MV2 solenoid
L	1.0	YU	MVWK solenoid
M	1.0	RY	Solenoids supply

## DECODER MODULE PIN CONNECTIONS



J88 H2

PIN	DESCRIPTION	LOADING	PIN	DESCRIPTION	LOADING
1	Third gear	Gnd/open circuit	14	Neutral	Gnd/open circuit
2	Second gear	Gnd/open circuit	15	Park	Gnd/open circuit
3	Reverse	Gnd/open circuit	16	-	-
4	Drive	Gnd/open circuit	17	-	-
5	First gear	Gnd/open circuit	18	-	-
6	-	-	19	-	-
7	-	-	20	Logic ground	Gnd to battery
8	-	-	21	Power ground	Gnd
9	Not-park	Gnd/open circuit	22	-	-
10	Ign supply	12V 0.5A supply	23	-	-
11	Y input	Gnd/open circuit	24	-	-
12	Z input	Gnd/open circuit	25	Cruise inhibit	Gnd (250mA) or open circuit
13	X input	Gnd/open circuit	26	Idle fuel	Gnd/open circuit

FIG 17

## DECODER MODULE LOGIC FUNCTIONS

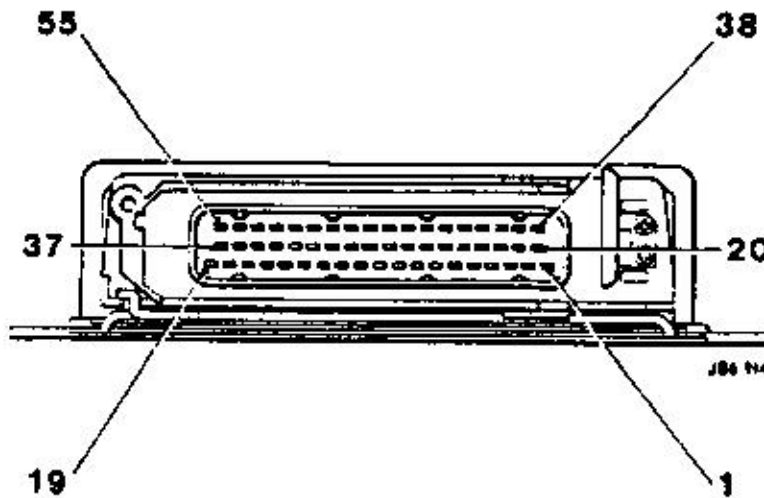
INPUTS			OUTPUTS									
X	Y	Z	P	R	N	D	3	2	1	CRUISE CONTROL INHIBIT	NOT-PARK SIGNAL	IDLE FUEL SIGNAL
0	1	1	0	1	1	1	1	1	1	1	1	0
0	0	1	1	0	1	1	1	1	1	1	0	1
1	0	1	1	1	0	1	1	1	1	1	0	0
1	0	0	1	1	1	0	1	1	1	0	0	1
0	0	0	1	1	1	1	0	1	1	0	0	1
0	1	0	1	1	1	1	1	0	1	0	0	1
1	1	0	1	1	1	1	1	1	0	1	0	1

0 = Ground

1 = Open circuit

## TRANSMISSION

MODEL	PIN 9	PIN 28
XJ6 Catalyst	Grounded	Open circuit
XJ6 Non-catalyst	Open circuit	Open circuit



### ECU CONNECTIONS - PIN LOCATIONS

#### PIN FUNCTION

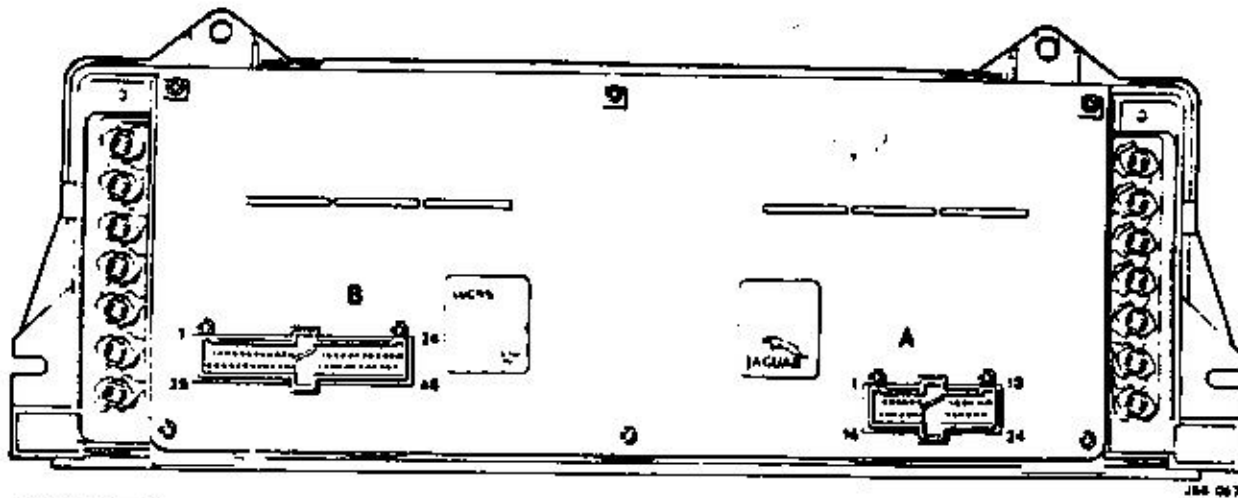
1	Ignition power supply (+)
2	Vehicle speed sensor (+)
3	Engine speed signal
4	-
5	Solenoid valve MV1
6	Pressure control valve
7	Digital ground
8	Throttle potentiometer signal
9	Pin code 1 - catalyst
10	Pin code 3
11	-
12	-
13	-
14	Position code Y
15	Diagnostic L-line
16	System fault indicator
17	-
18	-
19	Solenoid valves supply
20	Vehicle speed sensor screen
21	Injector time ti (torque signal)
22	-
23	-
24	Solenoid valve MV2
25	Torque control (select)
26	Power ground
27	-
28	Pin code 2

#### PIN FUNCTION

29	-
30	-
31	-
32	Torque control
33	Position code Z
34	-
35	-
36	-
37	-
38	Vehicle speed sensor (-)
39	Permanent battery supply
40	-
41	Kick-down switch
42	Solenoid valve lock-up
43	Programme push-button (sport)
44	Throttle potentiometer ground
45	Throttle potentiometer supply
46	-
47	-
48	-
49	Programme indication lamp (sport)
50	Position code X
51	Diagnostic K-line
52	-
53	-
54	-
55	-

# INSTRUMENT PACK CONNECTORS

## PIN LOCATIONS



### SOCKET A

Socket	Circuit Input	Socket	Circuit Input
1	Fuel flow	13	Serial input (1)
2	12V ignition feed	14	Serial input (2)
3	Ground	15	Speed sensor input
4	Ground	16	Speed sensor input (0 Volts)
5	Battery feed	17	Speed sensor screen
6	Spare	18	Charge warning
7	—	19	Coolant temperature
8	—	20	Fuel level
9	—	21	Oil pressure
10	Illumination (bulb feed)	22	—
11	—	23	—
12	—	24	Tachometer input (negative)

### SOCKET B

Socket	Circuit Input	Socket	Circuit Input
1	—	25	Average speed
2	Speed out	26	Average fuel
3	—	27	Fuel
4	—	28	Range
5	—	29	Clear
6	—	30	VCM
7	Brake pad feed	31	Inst. fuel
8	Fuse (4)	32	Distance
9	Low brake pressure	33	Ground keyboard
10	Brake fluid level	34	Brake pad sense
11	Brake lights	35	Fuse (1)
12	Fuse (3)	36	Fuse (2)
13	Wash fluid level	37	Coolant level
14	Sport mode	38	Side light (on)
15	Seat belt	39	Caravan (on)
16	Boot open	40	Left D.I. (on)
17	Park brake (on)	41	Right D.I. (on)
18	D.I. bulb fail	42	Imp/Metric slide switch
19	Elec supply fail (controller)	43	General bulb fail
20	Door open (LH rear)	44	Gearbox fail
21	Door open (RH rear)	45	Elec supply fail (brakes)
22	Check engine (fuel fault)	46	Door open (LH front)
23	Catalyst warning	47	Door open (RH front)
24	Main beam	48	Anti-lock fail

## 1990 MY SEDAN

### ENGINE SET-UP

The following procedures for 1990 MY sedan engine set-up should be followed until JDS capability has been provided.

First, the throttle potentiometer voltage should be checked and, if necessary, adjusted.

Then, the base idle should be checked/adjusted.

Finally, the controlled idle speed should be verified.

Lambda feedback may not be accessed or adjusted at this time.

#### A. Throttle potentiometer adjustment

- Locate the throttle potentiometer connector; a blue PM4 clipped to the body below the air intake elbow.
- Set a DVOM to the millivolt scale.
- Probe the GY wire through the back of the connector with the positive test lead.
- Probe the BY wire through the back of the connector with the negative test lead.
- Switch the ignition on.
- The throttle potentiometer voltage in the idle position should be 570 to 620 millivolts.

Adjustment is performed in the same manner as for 1988 and 1989 MY XJ6.

#### B. Base Idle Adjustment

1. Switch off the A/C system. Be sure the transmission is in park. Run the engine to normal operating temperature. The dashboard gauge will be one needle's width below the N position when normal operating temperature is reached. Connect an accurate inductive type tachometer to a spark plug lead.
- 2a. Switch the ignition off.  
Switch the ignition on (do not start).  
Wait 5 seconds, then disconnect the idle speed controller (ISC plug)
- b. Switch the ignition off.  
Reconnect the ISC plug.

Switch the ignition on, (do no start).  
Wait 5 seconds, then disconnect the ISC plug.

- c. Switch the ignition off.  
Reconnect the ISC plug.  
Switch the ignition on (do not start).  
Wait 5 seconds, then disconnect the ISC plug.

**DO NOT RECONNECT THE ISC PLUG THIS TIME!**

3. Start the Engine.

Wait one full minute for the base idle speed to stabilize.  
Using a 7/32" Allen Wrench, adjust the idle speed controller bypass screw for a base idle of 575 to 625 RPM.

4. Switch the ignition off.  
Reconnect the ISC plug.

The on board diagnostic feature will have recognized an ISC failure and the "check engine" warning will be lit.

To erase the fault from the ECU, momentarily disconnect the vehicle battery.

Reset radio and clock memories.

Finally, verify that the controlled idle speed is maintained at between 650 and 800 RPM (700 RPM nominal).

# XJ40

XJ40 intro  
Page # + 2-8-89

## Coefficient of Drag.

- XJ40 - .37 C.D.
- mk IX - .39
- mk II - .38
- XJ6 - .40
- XJS coupe .38
- XJS convert. 39

Low Compression Engine (B) Upto Vin # J2521254  
- 3.59 Liters Base idle speed 650  
- 219 CID  
- Compression 8.2:1  
- 221 ft/lbs Torque @ 4750 RPM  
- 151 B.H.P. @ 4750 RPM

High Compression Engine (A) From Vin # 521255  
- 9.6:1 Compression Base idle speed 570-620  
- **233** ft/lbs of Torque @ **4000** RPM  
- **195** B.H.P. @ 5000 RPM.

## Rear end Gearing

1988 - 2.58 : 1 From Engine # 7U122724  
1989 - 3.58 : 1



H

Interior Lighting

- state = points to state position
- locate = locate the switch for use.

The 3.6 Engine

- Cannot cut the Crank
- Pent Roof Head Design -
- Drive the Contact Before Head Removal
- When setting valve clearance on the Bench add 0.003" for Head torque change - also add 0.001" for new shim wear if a new shim is used

- Crank sensor Pick up Setting 700-1500 2 Resistance  
 0.031" ± 0.010" 1.0 VAC



XJ40 9-10-89

XJ40 - Climate Control

- freaky cal fans on startup - Ball bearing fan installation of a resistor to the contact temp switch.

XJ40 ELECTRICS

- BK - Black & Pink - Logic Ground wires
- Logic Ground - all meet at the stud behind the ground cable side of the unit.
- Three Different type Relays Page 79 Back Back
  - ⊙ Single Contact
  - ⊙ Single Contact Heavy Duty
  - ⊙ Change over Contact

Electronics XJ40 (ret)

- Check side of the Relay for internal Diode
- Diodes - Diodes are in the Relay + warning system  
To stop turn off Voltage spike. Page 75 Black's.
- Capacitors - Page 77 Black Book.
  - PM 4 - Positive motor. The Round capacitor.
  - PMHD - Positive motor <sup>High Density</sup> ~~Heavy Duty~~. - Square
  - RB - Right Hand Drive
  - LB - L Hand Drive
  - B - Back wheel

Spec of stuff  
for model year

1990 XT40

\*NP 90\*

L/F by foot Rest. 2 in Line fuses (#5-#6) for ABS pump  
Computer.

Trottle pos. @ idle <sup>1990</sup> 570-620 (600mv) (G/Y - B/R)

XJ3 : 310-360 mv. XJ40 - 2.75-3.25mv. (1988-1989)

R/S scuttle: new ecomoseal (red): key on: grounded.

will erase check eng. lite. - With eng. running: will  
give pulsation.

Stall speed Trans: 2000 rpm (90) (89) 2250 (88) 1950

Resistance for solenoids:

MV1 : 35 ohm

Speed sensor: 325 ohm - @ 15 mph

MV2 : 35 ohm

5.5 V AC.

MVWk : 5-6 ohm.

To balance <sup>drive shaft</sup> output shaft: install hose clamp. if it increases: 90°

(37 2624)

Repair Kit for Bosch Harness :

RAM

Vera #9104K

(800) 542-6060