

Automatic Gearbox system fault finding and other references:

4HP14	Diagnosis : 4HP14 automatic gearbox :
4HP20	Diagnosis : 4HP20 automatic gearbox : BVA4 & HP20 Gear engagement thresholds:
AL4	Diagnosis : AL4 automatic gearbox : Diagnosis : Origin of possible oil leaks - AL4: AL4 Gear engagement thresholds:
MB3	Diagnosis : MB3 automatic gearbox :

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Diagnosis : Autoactive automatic gearbox (type AL4) :

BVA AL4 AND AL4 (HP16) AND AL4 AUTOMATIC GEARBOX

1. Diagnostic tools

1.1. ELIT : 4125-T test unit

The tool can be used for :

- Identifying of the ECU
- Fault reading
- Erasing the faults
- Parameter measurements
- Operating the actuating components
- Pedal initialisation
- Configuring the ECUs
- Updates to be downloaded into the ECU

1.2. PROXIA : 4165-T diagnostic station

The tool can be used for :

- Identifying of the ECU
- Fault reading
- Erasing the faults
- Parameter measurements
-

Operating the actuating components

- Pedal initialisation
- Configuring the ECUs
- Updates to be downloaded into the ECU
- Consultation of the electrical wiring diagrams

1.3. LEXIA : 4171-T diagnostic station

The tool can be used for :

- Identifying of the ECU
- Fault reading
- Erasing the faults
- Parameter measurements
- Operating the actuating components
- Pedal initialisation
- Configuring the ECUs
- Updates to be downloaded into the ECU
- Consultation of the electrical wiring diagrams

1.4. Electrical harness 4199-T

The tool is used to connect the gearbox ECU to the electrical test unit to perform tests using the voltmeter and the ohmmeter :

- The sensors
- The actuators

The automatic gearbox harness

1.5. Electrical harness C.0338.L

The tool allows ohmmeter checks to be carried out on :

- The multifunction switch
- The electrovalves
- The gearbox temperature and input speed sensors

2. Fault finding chart

2.1. Fault list

- (1) Ignition controlled + supply .
- (2) ECU .
- (3) Automatic gearbox input speed (turbine speed) .
- (4) Automatic gearbox output speed (vehicle speed) .
- (5) Engine speed .
- (6) Stop lamp switch connection .
- (7) Power supply to sensors , Temperature , Pressure , Position of the accelerator pedal .
- (8) Oil temperature .
- (9) Oil pressure .
- (10) Pedal position via the throttle potentiometer .
- (11) Display on instrument panel (low speed series signal) .
- (12) Pressure modulation electrovalve (pressure EVM) .

(13) Lock-up electrovalve (lock-up EVM) .

(14) Torque reduction .

(15) Engine torque signal .

(16) Throttle potentiometer via the engine ECU .

(17) Electrovalve with sequence of 1 to 6 .

(18) Exchanger flow electrovalve .

(19) "shift lock" gear lever locking .

(20) "Full throttle" position (kick down) .

(21) Multifunction switch connections .

(22) OBD output .

CAUTION : Before making any repairs to the gearbox, complete the diagnostic check by reading the engine ECU faults .

URGENT : For any fault or malfunction indicated on the automatic gearbox, check the oil level and quality .

2.2. **Fault code 1** : Ignition controlled + supply

"sport" and "snow" warning lamps are flashing : **Yes** .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Ignition controlled + supply	Connected	27 - 28	Fuse F 17	Diagnostic equipment : Voltmeter . Ignition off : U = 0 V . Ignition on : U = U battery	Selection of back-up mode

2.3. Fault code 2 : ECU

"sport" and "snow" warning lamps are flashing : Yes .

Clear the fault and check that the fault does not reappear , Otherwise, perform the test with a new ECU .

2.4. Fault code 3 : Automatic gearbox input speed (turbine speed)

"sport" and "snow" warning lamps are flashing : Yes .

The ECU checks the coherence of the information relating to the engine speed and gearbox input and output speeds .

If the gearbox input speed fault is stored in the memory, a gearbox output speed fault cannot be memorised .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Gearbox input speed sensor connection (in the hydraulic valve block (1635))	Connected	-	-	Diagnostic equipment reading the parameters : Variable Engine running , The value must follow the engine speed allowing for the slipping of the converter . Locked up converter , The input speed must be the same as the engine speed	If the gearbox input speed fault is accompanied by an engine speed or gearbox output speed fault : Selection of back-up mode

	Disconnected	45 - 46	D1 - D2 . 33 - way grey	Diagnostic equipment : Ohmmeter . R = 300 ?	If not, the automatic gearbox input speed is calculated using the gearbox output speed , And the turbine overspeed, declutching on stopping, lock-up and torque reduction functions are no longer in operation
				Check the continuity and isolation of the gearbox ECU - Gearbox input speed sensor connection	-

2.5. Fault code 4 : Automatic gearbox output speed (vehicle speed)

"sport" and "snow" warning lamps are flashing : **Yes** .

The ECU checks the coherence of the information relating to the engine speed and gearbox input and output speeds .

If the vehicle speed fault is stored in the memory, any possible gearbox input speed fault will not be memorised .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode

Gearbox output speed sensor (1621)	Connected	-	-	Diagnostic equipment reading the parameters : Variable	If the gearbox output speed fault is accompanied by an engine speed or gearbox input speed fault : Selection of back-up mode
				The figure increases with the vehicle speed	
				Check that the status of the electrovalves and regulators corresponds to the expected gear	
	Disconnected	48 - 47	1 - 2 . 2 -way black	Diagnostic equipment : Ohmmeter . R 1,2 Kohms	If not, the gearbox output speed is calculated from the gearbox input speed and the gear engaged , The declutching on stopping and forward/ reverse gear engagement safety functions are no longer in operation
				Check the continuity and isolation of the gearbox ECU - Sensor connection ((1621))	-

2.6. Fault code 5 : Engine speed

"sport" and "snow" warning lamps are flashing : **Yes**.

The ECU checks the coherence of the information relating to the engine speed and gearbox input and output speeds .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Engine speed	Connected	-	-	Diagnostic equipment reading the parameters . Engine running , Check the engine speed figure with the tachometer figure and that taken during the engine ECU diagnostic check . Check that there is no fault in the engine ECU memory . The faults present in the engine ECU memory must be dealt with as a priority . Erase the fault codes	The ECU uses default values . No declutching on stopping
		49 - 28	-	Ignition on : U 11 V	

				Engine running : U 6,6 V in DC	
				Open circuit : U = U battery	If the engine speed fault is accompanied by a gearbox input speed or output speed fault : Selection of back-up mode
	Disconnected	49	44 (XU7JP4/L4). 6 (XU10J4R/L3 and XU7JP4/L3). 11 (XUD9BTF/L3)	Diagnostic equipment : Ohmmeter	-
				Check the continuity and isolation of the gearbox ECU - Engine ECU connection	-

2.7. Fault code 6 : Stop lamp switch connection

CAUTION : There is only one stop switch .

"sport" and "snow" warning lamps are flashing : No .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode

Stop switch (2100)	Connected	16 - 28	-	Diagnostic equipment : Voltmeter . Brake pedal released : U = 0 V . Brake pedal applied : U = U battery	No declutching on stopping
	Disconnected	16	2 . 3 -way brown	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Stop lamp switch connection	No shift lock function . No converter lock-up function

2.8. **Fault code 7** : Power supply to sensors , Temperature , Pressure , Position of the accelerator pedal

"sport" and "snow" warning lamps are **flashing** : If the accelerator position is directly relayed by the throttle potentiometer to the automatic gearbox ECU without passing via the engine ECU, the "sport" and "snow" warning lamps will begin to flash (XU7JP4/L3 and XU10J4R/L3 engines) .

The analogue sensors (oil temperature, oil pressure and throttle potentiometer) receive an electrical supply from a common source which is distributed to individual connector pins .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode

Supply to the analogue sensors, gearbox ECU output	Connected	24 - 25	-	Diagnostic equipment : Voltmeter . Throttle potentiometer disconnected . 33 -way grey connector disconnected	Oil pressure control : Operating in an open loop
		52 - 51		Check that the ECU supply voltage is > 8 V (terminal 27 of the gearbox ECU) . Ignition on : U > 4,5 volts	Oil temperature fixed at 100 °C
	Disconnected	24	C1 (1635) . 33 -way grey	Diagnostic equipment : Ohmmeter	If the throttle position is given by the potentiometer : Selection of back-up mode
		52	3 (1316) . 3 -way blue	Check the continuity and isolation of the gearbox ECU - Hydraulic valve block connections	-
		-	-	Check the continuity and isolation of the gearbox ECU - Throttle potentiometer connection (if the connection exists)	-

2.9. Fault code 8 : Oil temperature

"sport" and "snow" warning lamps are flashing : **No**.

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Oil temperature sensor connection (in the hydraulic valve block (1635))	Connected	54 - 53	-	Diagnostic equipment : Voltmeter	Oil temperature fixed at 100 °C
				Check that the sensor supply voltage is > 4,5 V (terminal 52 of the gearbox ECU)	
				Temperature at 20 °C , U 3,6 V	
				Temperature at 40 °C , U 2,8 V	
				Temperature at 60 °C , U 2 V	
				Open circuit : Temperature at 100 °C	
	Disconnected	54 - 53	B1 - B4 . 33 - way grey	Diagnostic equipment : Ohmmeter	
				Temperature at 20 °C , R = 2500 Ohms	
				Temperature at 40 °C , R = 1200 Ohms	

				Temperature at 60 °C , R = 600 Ohms
				Check the continuity and isolation of the gearbox ECU - Oil temperature sensor connection

2.10. Fault code 9 : Oil pressure

"sport" and "snow" warning lamps are flashing : Yes .

The pressure sensor supplies the gearbox ECU with a voltage proportional to the line pressure .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Oil pressure sensor (in the hydraulic valve block (1635))	Connected	55 - 25	-	Diagnostic equipment : Voltmeter . Check that the sensor supply voltage is > 4,5 V (terminal 24 of the gearbox ECU) , If not, refer to paragraph 2.8	Line pressure control : Operating in an open loop
				Diagnostic equipment reading the parameters	Retention of the fault until the next engine start

				Ignition on , Engine running (oil temperature > 15 °C)	-
				Position N or P : Oil pressure = 2,5 bars . U 1,4 V	-
	Disconnected	24 . 55 . 25	C1 . C2 . C3 . 33 -way grey	Diagnostic equipment : Ohmmeter	-
				Check the continuity and isolation of the gearbox ECU - Oil pressure sensor	-

2.11. **Fault code 10** : Pedal position via the throttle potentiometer

"sport" and "snow" warning lamps are flashing : **Yes** .

This fault can only occur on the **XU7JP4/L3 and XU10J4R/L3 engines** .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Throttle butterfly potentiometer (1316B)	Connected	56 - 51	-	Diagnostic equipment : Voltmeter	Pedal setting at maximum

				Ignition on , Engine stopped : Check that the sensor supply voltage is > 4,5 V (terminal 52 of the gearbox ECU)	No kick- down diagnosis
				Pedal released : U 0,5 V	Selection of back-up mode
				Full throttle : U 3,5 V	-
	Disconnected	51	2	Diagnostic equipment : Ohmmeter	-
		52	3	R 51-52 = 2,07 Kohms	-
		56	1	Pedal released : R 51-56 = 1,1 Kohms	-
		-	3 -way blue	R 52-56 = 2,7 Kohms	-
		-	-	Full throttle : R 51-56 = 1,6 Kohms	-
		-	-	R 52-56 = 2,2 Kohms	-
		-	-	Check the continuity and isolation of the gearbox ECU - Throttle potentiometer connection	-

2.12. **Fault code 11** : Display on instrument panel (low speed series signal)

"sport" and "snow" warning lamps are flashing : **Yes** .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Instrument panel (0004)	Connected	4 - 28	-	Move the gear selector lever and check the display . Diagnostic equipment : Voltmeter Check that U battery > 10,5 V Ignition on , U varies constantly between 1,8 and 3,8 V	No more commands from the gearbox ECU output stage
	Disconnected	4	15 . 26 -way blue	Check the continuity and isolation of the gearbox ECU - Instrument panel	

2.13. **Fault code 12** : Pressure modulation electrovalve (pressure EVM)

"sport" and "snow" warning lamps are flashing : **Yes** .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode

EVM electrovalve (in the hydraulic valve block (1635))	Connected	26 - 20	-	Diagnostic equipment reading the parameters . Check : Oil pressure . OCR of EVM pressure . Diagnostic equipment : Voltmeter	Selection of back-up mode
				Check the supply to the electrovalve (channel 26 from the ECU : U = U battery)	The line pressure is at its maximum
				Ignition on : U = 0 V	Retention of the fault until the next engine start
				Engine running , Position N : U 3 V	-
	Disconnected	20	B9	Diagnostic equipment : Ohmmeter	-

		26	B12 . 33 -way grey	Check the continuity and isolation of the gearbox ECU - Hydraulic valve block connections (supply and control of the pressure modulation electrovalve)	-
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Refer to the procedure : Location of the electrovalves in the hydraulic valve block .

2.14. **Fault code 13** : Lock-up electrovalve (lock-up EVM)

"sport" and "snow" warning lamps are flashing : **Yes .**

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Lock-up electrovalve (in the hydraulic valve block (1635))	Connected	26 - 19	-	Diagnostic equipment reading the parameters . Check , While driving : The converter lock-up (gear engaged) . OCR of EVM pressure . Diagnostic equipment : Voltmeter	No lock-up and declutching on stopping functions

				Check the supply to the electrovalve (channel 26 from the ECU : U = U battery)	
				Ignition on : U = 0 V	
				Engine running , Position N or P : U 1,5 V	
	Disconnected	19	B6	Diagnostic equipment : Ohmmeter	Retention of the fault until the next engine start
		26	B12 . 33 -way grey	Check the continuity and isolation of the gearbox ECU - Hydraulic valve block connections (supply and control of the lock-up electrovalve)	-

Refer to the procedure : Location of the electrovalves in the hydraulic valve block .

2.15. Fault code 14 : Torque reduction

"sport" and "snow" warning lamps are flashing : No .

CAUTION : Torque reduction may be prevented if the oil temperature is lower than a specified point . For petrol models, torque reduction is achieved by altering the ignition timing . For diesel models (XUD9BTF), torque reduction occurs by reducing the fuel delivery .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Gearbox ECU (1630)	Connected	5 - 28	-	Diagnostic equipment reading the parameters : Check activation of the torque reduction function when changing gear	No more commands from the gearbox ECU output stage (snatching on changing gear)
	Disconnected	5	7 (XU7JP4/L4). 31 (XU10J4R/L3 and XU7JP4/L3)	Diagnostic equipment : Ohmmeter	Retention of the fault until the next engine start
			2 (component 1631)	Check the continuity and isolation of the gearbox ECU - Engine ECU connection	-

2.16. Fault code 15 : Engine torque signal

This information only exists for the XU7JP4/L4 engine .

The faults present in the engine ECU memory must be dealt with as a priority .

If the engine ECU detects a fault, it informs the automatic gearbox ECU and the message on the diagnostic equipment will read : "engine torque signal fault" .

Otherwise the message on the diagnostic equipment will read : "engine torque connection fault" .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Engine ECU connection	Connected	22 - 28	-	Read the torque value using diagnostic equipment to measure the parameters . Vehicle stationary : Torque = 0 Nm	The engine torque is calculated from the automatic gearbox ECU map
	Disconnected	22	25 (XU7JP4/L4)	Diagnostic equipment : Ohmmeter Check the continuity and isolation of the gearbox ECU - Engine ECU connection	

2.17. **Fault code 16** : Throttle potentiometer via the engine ECU

"sport" and "snow" warning lamps are flashing : **Yes** .

This fault can only occur on the **XUD9BTF/L3 and XU7JP4/L4 engines** .

The faults present in the engine ECU memory must be dealt with as a priority .

Check whether the fault was seen as intermittent by the gearbox ECU memory .

If the engine ECU detects a fault, it informs the automatic gearbox ECU and the message on the diagnostic equipment will read : "INJ throttle potentiometer fault" .

Otherwise the message on the diagnostic equipment will read : "accelerator position connection fault" .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Throttle position via engine ECU	Connected	23 - 28	-	Diagnostic equipment : Voltmeter	Without torque information : Pedal setting at maximum : Selection of back-up mode
				Engine stopped, ignition on . Pedal released : U 8,5 V . Mid-travel : U 6,7 V	-
				Full throttle : U 5 V . Open circuit : U 10,8 V	-
	Disconnected	23	16 (XU7JP4/L4)	Diagnostic equipment : Ohmmeter	With torque information : Pedal setting at 50 % (no pedal released or Kick-down functions)
			26 (XUD9BTF/L3)	Check the continuity and isolation of the gearbox ECU - Engine ECU connection	The required pressure is calculated using the torque

2.18. **Fault code 17** : Electrovalve with sequence of 1 to 6

"sport" and "snow" warning lamps are flashing : **Yes .**

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode	
Sequence electrovalve (on the hydraulic valve block (1635))	Connected	10 - 1 (EVS1)	B11	Diagnostic equipment : Voltmeter , Ohmmeter	Deactivation of the sequence electrovalves	
		9 - 1 (EVS2)	B8	-	-	
		7 - 1 (EVS3)	B10	Check the supply to the electrovalves (channel 1 from the ECU : U = U battery)	Selection of back-up mode	
		8 - 1 (EVS4)	B7	-	-	
		13 - 1 (EVS5)	B5	Values : Refer to above table	Supply to the electrovalves cut off	
		14 - 1 (EVS6)	B2	-	-	
	Disconnected	10 - 9	B11 - B8	Diagnostic equipment : Ohmmeter	-	
		7 - 8	B10 - B7	-	-	
		13 - 14	B5 - B2 . 33 - way grey	Check the continuity and isolation of the gearbox ECU - Hydraulic valve block	-	
	-	EVS1	EVS2	EVS3	EVS4	EVS5
Resistor	R 10 - 1 = 40 ?	R 9 - 1 = 40 ?	R 7 - 1 = 40 ?	R 8 - 1 = 40 ?	R 13 - 1 = 40 ?	R 14 - 1 = 40 ?
Gears	U 10-1	U 9-1	U 7-1	U 8-1	U 13-1	U 14-1

1 selected	0	0	U battery	U battery	0	0
2 selected	0	U battery	0	U battery	0	0
3 selected	0	0	0	0	0	0
4 selected	U battery	U battery	0	0	0	0
Rear	0	0	0	0	0	0
Reverse lock-up	0	0	0	0	U battery	0
N/P	0	0	U battery	0	0	0

Refer to the procedure : Location of the electrovalves in the hydraulic valve block .

2.19. **Fault code 18** : Exchanger flow electrovalve

"sport" and "snow" warning lamps are flashing : **Yes .**

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Exchanger flow electrovalve (on the hydraulic valve block (1635))	Connected	12 - 2	-	Diagnostic equipment : Voltmeter	If there is a short circuit to the battery "+" : No more commands from the gearbox ECU output stage
				Ignition on , Check the supply to the electrovalve (channel 2 of the ECU) . If the oil temperature is > 60 °C and the engine speed is > 2000 rpm ,	If it is a short circuit to earth or open circuit : Selection of back-up mode . Electrovalve supply cut-off

				The electrovalve is activated and $U = U_{\text{battery}}$. If not : $U = 0 \text{ V}$	
				Diagnostic equipment reading the parameters : Check the activation of the electrovalve	-
				Disconnected	12
				E2 . 33 -way grey	
				Diagnostic equipment : Ohmmeter	-
				R 2-12 = 40 ?	-
				Check the continuity and isolation of the gearbox ECU - Hydraulic valve block	-

2.20. Fault code 19 : "shift lock" gear lever locking

"sport" and "snow" warning lamps are flashing : No .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Solenoid for blocking the lever via the relay (1642)	Connected	11 - 28	-	Diagnostic equipment : Voltmeter	If the control is short circuited to earth, the selector lever will never be blocked

				Engine stopped, ignition on , Position P : U = U battery	If not , No more commands from the gearbox ECU output stage
				Apply the brake pedal and keep it depressed : U = 0 V	-
	Disconnected	11	2 (relay 1642)	Diagnostic equipment : Ohmmeter	-
			5 -way grey	Check the continuity and isolation of the gearbox ECU - Lever blocking relay connection	-

2.21. **Fault code 20** : "Full throttle" position (kick down)

"sport" and "snow" warning lamps are flashing : **No** .

If the kick-down switch is no longer operational, the kick-down function should still operate . Otherwise adjust the accelerator cable and re-initialise the pedal .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode

Kick-down switch (1637)	Connected	-	-	Diagnostic equipment reading the parameters : Full throttle : The "kick-down" function is activated and the "kick-down switch" becomes 0	The ECU considers that there is kick-down when the pedal position is above a specified point
		15 - 28	-	Diagnostic equipment : Voltmeter	
				Depress the accelerator pedal fully : U = 0 V	
		If not : U = U battery			
	Disconnected	15	1	Diagnostic equipment : Ohmmeter	
			2 -way brown	Check the continuity and isolation of the gearbox ECU - Kick-down switch connection	

2.22. Fault code 21 : Multifunction switch connections

"sport" and "snow" warning lamps are flashing :

- Yes , For an unstable or forbidden position
- No , For an intermediate position

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Multifunction switch via the electro-hydraulic connector	Connected	-	-	Diagnostic equipment : Voltmeter . See the table 1 below	Selection of back-up mode
	Disconnected	37 . 31 . 32	A9 . A10 . A11	Diagnostic equipment : Ohmmeter . See the table 2 below	Fault code for display
		33 . 34	A12 . A8 . 33 - way grey	Check the continuity and isolation of the gearbox ECU - Multifunction switch connections	No selector lever safety blocking function

Table 1 : ECU connected

Lever position	37 (S1)	31 (S2)	32 (S3)	33 (S4)	34 (P/N)	ECU connector
P	U battery	0 V	U battery	U battery	0 V	42 (multifunction switch earth)
*	U battery	0 V	U battery	0 V	0 / U battery	
R	U battery	0 V	0 V	0 V	U battery	
*	U battery	0 V	0 V	U battery	0 / U battery	
N	U battery	U battery	0 V	U battery	0 V	
*	U battery	U battery	0 V	0 V	0 / U battery	
D	U battery	U battery	U battery	0 V	U battery	

*	0 V	U battery	U battery	0 V	U battery
3	0 V	U battery	0 V	0 V	U battery
*	0 V	U battery	0 V	U battery	U battery
2	0 V	0 V	0 V	U battery	U battery

(*) : Intermediate .

Table 2 : ECU disconnected

-	37	31	32	33	-	ECU connector
Lever position	A9	A10	A11	A12	Multifunction switch connector	-
P	=	R = 0 ohm	=	=	A7	42
*	=	R = 0 ohm	=	R = 0 ohm		
R	=	R = 0 ohm	R = 0 ohm	R = 0 ohm		
*	=	R = 0 ohm	R = 0 ohm	=		
N	=	=	R = 0 ohm	=		
*	=	=	R = 0 ohm	R = 0 ohm		
D	=	=	=	R = 0 ohm		
*	R = 0 ohm	=	=	R = 0 ohm		
3	R = 0 ohm	=	R = 0 ohm	R = 0 ohm		

*	R = 0 ohm	=	R = 0 ohm	=		
2	R = 0 ohm	R = 0 ohm	R = 0 ohm	=		

(*) : Intermediate .

Check the continuity of A4 - Body earth .

Check the continuity and isolation of the connection A8 (electro-hydraulic connector) - 34 (automatic gearbox ECU) .

2.23. Fault code 22 : OBD output

This fault can only exist with L4 emission standard (engine XU7JP4/L4) .

Location of components	ECU connector	Test connector box no	Component connections	Test values	Emergency mode
Engine ECU connection	Connected	6 - 28	-	Diagnostic equipment : Voltmeter . Square-wave signal : 0 - 12 V	No more commands from the gearbox ECU output stage
				Inactive : Duration = 20 s	Retention of the fault until the next engine start
				Active : Duration = 2 s	-

Disconnected

6

67 (XU7JP4/
L4)Diagnostic
equipment :
Ohmmeter .
Check the
continuity and
isolation of
the gearbox
ECU - Engine
ECU
connection

-

3. Symptoms detectable in downgraded modes

3.1. Back-up mode

If the "sport" and "snow" warning lamps flash simultaneously, it signifies :

- That the gearbox oil has overheated
- That the gearbox oil is old (see : used oil counter)
- Break in the connection between the gearbox ECU and the instrument panel
- Uninitialised accelerator pedal
- ECU inactive (ECU faulty or not supplied)
- A forced request by the diagnostic tool (actuator test)

The flashing may also be caused by the following faults :

- Oil pressure
- Throttle position (through the double track potentiometer or the engine ECU)
- Gearbox input speed
- Gearbox output speed
- Engine speed

Exchanger flow electrovalve

- Pressure modulation electrovalve
- Maximum pressure regulation
- Sequence electrovalve
- ECU or ECU supply
- Multifunction switch connections

Hesitation when changing gear may be caused by the following faults :

- Gearbox input speed
- Gearbox output speed
- Engine speed
- Torque reduction
- Torque information from the engine ECU

The function to release the gear lever from position "P" may be prevented by the following faults :

- Brake switch
- Shift-lock relay control

Low impact effects (consumption, comfort, etc.) : Low impact effects may be caused by the following faults :

- Heat exchanger flow control electrovalve control (in short circuit to "+")
- Control of the lock-up modulation electrovalve
- Kick-down switch connection

Gearbox oil temperature information

3.2. Selection of back-up mode

N.B. : Only 3rd gear and reverse are available .

The clutch slips when starting .

Emergency mode with the possibility of locking up the converter may be caused by the following faults :

- Sequence electrovalves
- Throttle position if the engine ECU supplies the torque information
- Pressure modulation electrovalve
- Multifunction switch connections
- Exchanger flow electrovalve
- Main hydraulic pressure regulation
- Uninitialised accelerator pedal

Emergency mode without the possibility of locking up the converter may be caused by the following faults :

- If the gearbox input speed fault is accompanied by an engine speed or gearbox output speed fault
- If the gearbox output speed fault is accompanied by an engine speed or gearbox input speed fault
- Automatic gearbox ECU

4. Electrical checks

4.1. List of checks

- (1) Programme selector connection .
- (2) Reversing lamp control .
- (3) Position "P" not selected audible warning (key lock) .
- (4) Excessively high oil temperature .
- (5) Pressure regulation fault .
- (6) Lock-up fault .
- (7) Engine starting authorisation .
- (8) Diagnostic line .

4.2. Check 1 : Programme selector connection

Location of components	ECU connector	Test connector box no	Component connections	Test values
Snow programme selection (on selector (1640))	Connected	-	-	Diagnostic equipment reading the parameters : Snow switch : Goes to 0 while the snow button is pressed down . Snow selection : After pressing the snow button . Check that the warning lamp in the instrument panel is on

		40 - 28	4 - 6 . 7 -way grey	Diagnostic equipment : Voltmeter . Ignition on : Snow button pressed down : U = 0 V . Snow button released : U = U battery
	Disconnected	40	4 . 7 -way grey	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Programme selector connection
Sport programme selection (on selector (1640))	Connected	-	-	Diagnostic equipment reading the parameters : Sport switch : Goes to 0 while the sport button is pressed down . Sport selection : After pressing the sport button . Check that the warning lamp in the instrument panel is on
		41 - 28	7 - 6 . 7 -way grey	Diagnostic equipment : Voltmeter . Ignition on : Sport button pressed down : U = 0 V . Sport button released : U = U battery

	Disconnected	41	7 . 7 -way grey	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Programme selector connection
Normal programme selection (on selector (1640))	Connected	-	-	Diagnostic equipment reading the parameters : When neither the sport nor the snow programme are selected : Selection : ECO . Snow switch : 1 . Sport switch : 1
		40 - 28	4 - 6 . 7 -way grey	Diagnostic equipment : Voltmeter . Ignition on : U = U battery
		41 - 28	7 - 6 . 7 -way grey	
	Disconnected	40	4	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Programme selector connection
		41	7 . 7 -way grey	

1st gear imposed selection (on selector (1640))	Connected	-	-	The selector lever is in position 2 . Diagnostic equipment reading the parameters : 1st gear imposed : Passes to 0 while the 1st gear imposed button is down . Check that the warning lamp in the instrument panel is on
		36 - 28	2 - 6 . 7 -way grey	Diagnostic equipment : Voltmeter . Ignition on : 1st gear imposed button held down : $U = 0$ V . 1st gear imposed button released : $U = U$ battery
	Disconnected	36	2 . 7 -way grey	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Programme selector connection

4.3. Check 2 : Reversing lamp control

Electro-hydraulic block connector (1635)	Terminals on the electro-hydraulic block (1635)	Terminals on the reversing lamp unit	Test values
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Connected	A2 - A1	-	Diagnostic equipment : Voltmeter . Ignition on : Check that $U = U$ battery at terminal A1 . If not : Check fuse F12 . Position R : $U = 0 \text{ V}$
Disconnected	A1	1 (3 -way yellow) (2631)	Diagnostic equipment : Ohmmeter
		4 (4 -way blue) (2632) or 4 (4 -way white) (C310) , If towing equipment is fitted	Check the continuity and isolation of the electro-hydraulic block connection - Reversing lamps

4.4. Check 3 : Position "P" not selected audible warning (key lock)

Electro-hydraulic block connector (1635)	Terminals on the electro-hydraulic block (1635)	Terminals on the instrument panel (0004)	Test values
Connected	A3 - A4	-	Diagnostic equipment : Voltmeter . If the ignition is switched off in any position other than P, the audible warning will sound
			Ignition on , In position "P" : $U = 0 \text{ V}$. Any other position : $U 12 \text{ V}$
Disconnected	A3	18 (26 -way yellow)	Diagnostic equipment : Ohmmeter . In position "P" : $R (A3 - A4) = 0 \text{ } \Omega$. Any other position : $R (A3 - A4)$. Check the continuity and isolation of the electro-hydraulic block connection - Instrument panel

4.5. Check 4 : Excessively high oil temperature

If the oil temperature exceeds the limit of 118 °C : The "sport" and "snow" warning lamps flash .

Check that the flow electrovalve in the exchanger is not short circuited to battery + .

Check by reading the parameters with the diagnostic tool : Excessively high oil temperature .

Emergency mode :

- The gears change at the lowest speed possible and converter lock-up occurs as soon as possible
- The "sport" and "snow" warning lamps stop flashing once the temperature returns to < 118 °C

4.6. Check 5 : Pressure regulation fault

"sport" and "snow" warning lamps are flashing : Yes .

There are 2 possible cases :

- Fault linked to the auto-adaptive values in the ECU memory to generate the line pressure
- Fault linked to an error in the regulation loop , That is to say that there is an increase in the difference between the calculated line pressure and the line pressure actually measured

Check :

- The oil level
- The operation of the pressure modulation electrovalve
- The oil pressure sensor

Emergency mode :

- Selection of back-up mode
- Setting the line pressure to maximum
- Regulation in open loop

4.7. Check 6 : Lock-up fault (and not EVM lock-up)

The ECU has detected clutch slip .

Emergency mode : No lock-up and declutching on stopping functions .

4.8. Check 7 : Engine starting authorisation

Location of components	Terminals on the electro-automatic gearbox connector	Component connections	Test values
Relay (1005)	-	1	Diagnostic equipment : Voltmeter . Check the supply of relay U = Battery +
	A5	2 . 5 -way brown	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Diagnostic socket connection

4.9. Check 8 : Diagnostic line

Location of components	ECU connector	Test connector box no	Component connections	Test values

Centralised diagnostic socket (C001) (16 -way black)	Disconnected	17 . 18	15 . 7 . 16 -way black	Diagnostic equipment : Ohmmeter . Check the continuity and isolation of the gearbox ECU - Diagnostic socket connection
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5. Downloading

Downloading an update into the gearbox ECU : Follow the diagnostic equipment procedure .

The downloading operation makes it possible to update the automatic gearbox ECU, or to adapt it to an engine ECU evolution .

Before the downloading operation, the value of the used oil counter in the automatic gearbox ECU must be read .

After the downloading operation has been performed, the following must take place :

- Erase the faults
- Initialise of the pedal
- Initialise the auto-adaptives
- Configuration (if necessary)
- Enter the value of the previously read used oil counter
- Perform a road test

URGENT : The engine ECU must be updated each time the automatic gearbox ECU is updated .

6. Updating the value of the used oil counter

6.1. PROXIA diagnostic station

The used oil counter is read or entered using the menu : "configuration (integrated circuit button) / oil counter" .

The value of the oil counter is adjusted in incremental steps of 2000 .

6.2. LEXIA diagnostic station - ELIT test unit

The used oil counter is read or entered using the menu : "oil counter" .

The value of the oil counter is adjusted by entering the 5 figures from the oil counter directly .

7. Configuration

ECU configuration procedure : Follow the diagnostic equipment procedure .

A new or recently configured ECU is always configured with the following options :

- "shift lock" gear lever locking
- Without OBD output (L4 emission standard)

If the ECU is to be fitted on a vehicle equipped for L4 emission standard or not fitted with the shift-lock safety function : Perform a configuration operation .

8. Pedal initialisation

The pedal must be initialised in the following cases :

- Replacement of the automatic gearbox ECU
- Replacement of the automatic gearbox
- Downloading a program to the ECU
- Accelerator cable replacement or adjustment
- Replacement of the throttle potentiometer

9. Contexts associated with the faults

For each memorised fault, the following is given (when reading faults) :

- The type of fault (temporary or permanent)
- The fault mode (short circuit, open circuit)
- 3 associated variables memorised when the fault appeared

There are 4 types of context

Type of context	Nature of the fault	Variable	Variable	Gears
1	Gearbox output speed	Engine speed	Gearbox input speed	Gear engaged
2	Engine speed	Gearbox output speed	Gearbox input speed	Gear engaged
3	Gearbox input speed	Gearbox output speed	Engine speed	Gear engaged
4	Other fault codes present	Status of the multifunction switch	ECU supply voltage	Gear engaged

When several faults with the same type of associated context are memorised, only the context of the oldest fault is given .

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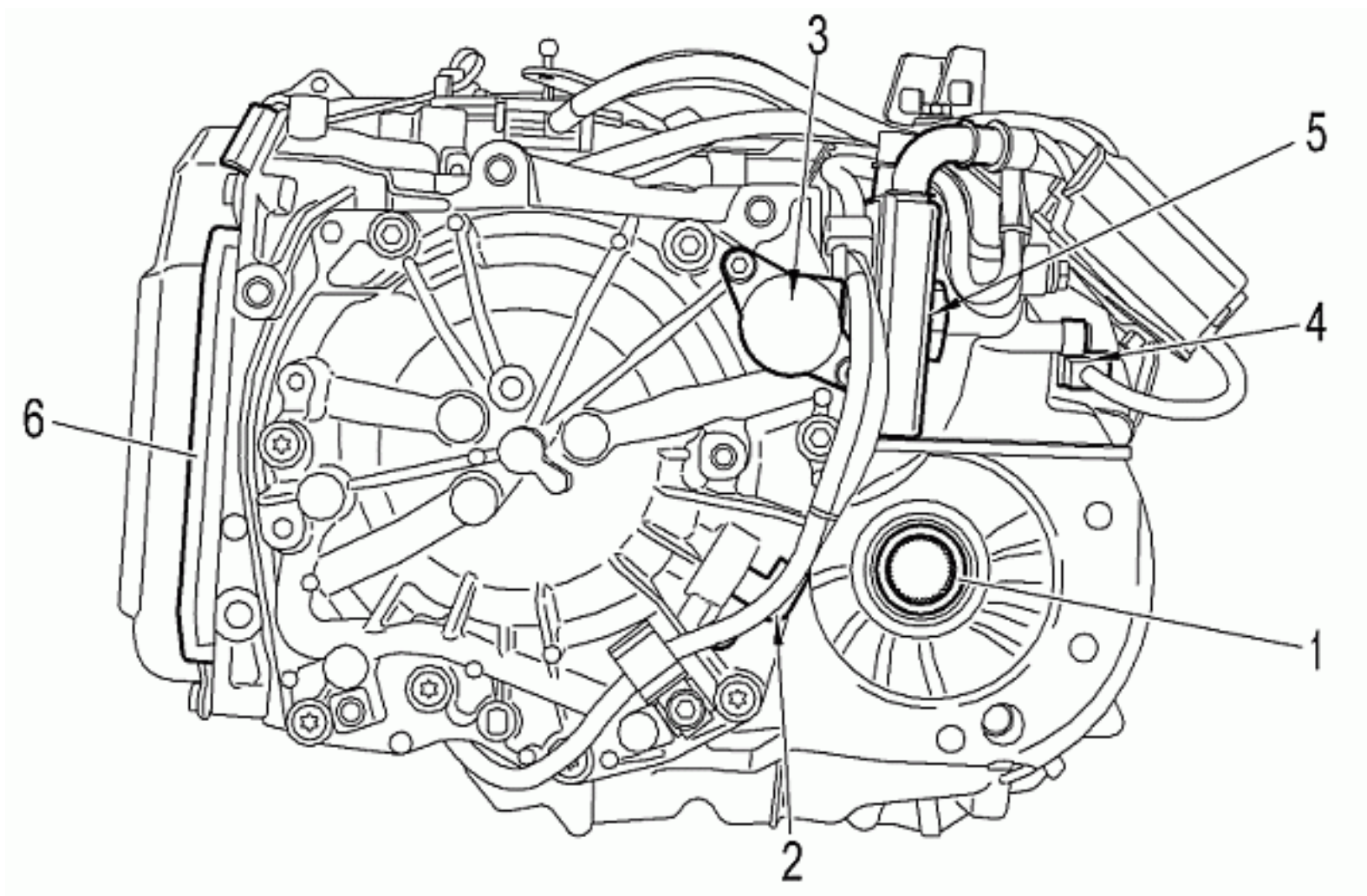
Diagnosis : Origin of possible oil leaks - AL4:

BVA AL4 AND AL4 (HP16) AND AL4 AUTOMATIC GEARBOX

CAUTION : An oil leak from the automatic gearbox could cause it to malfunction or be damaged .

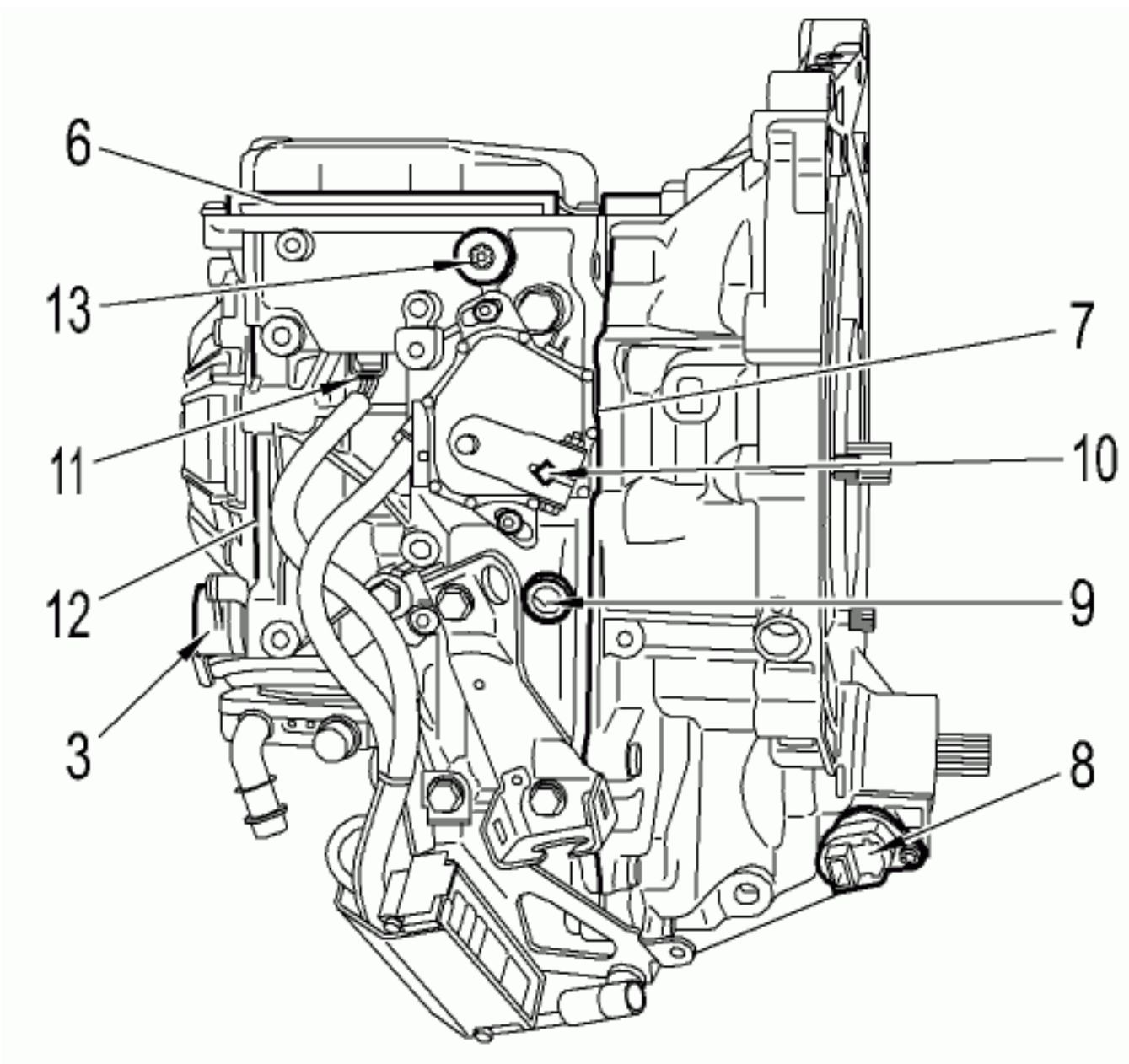
URGENT : After any repair, check the fluid level .

1. Description of the seals



Reference	Description
1	Left hand driveshaft seal
2	Input speed sensor O ring
3	Oil flow modulation electrovalve O ring

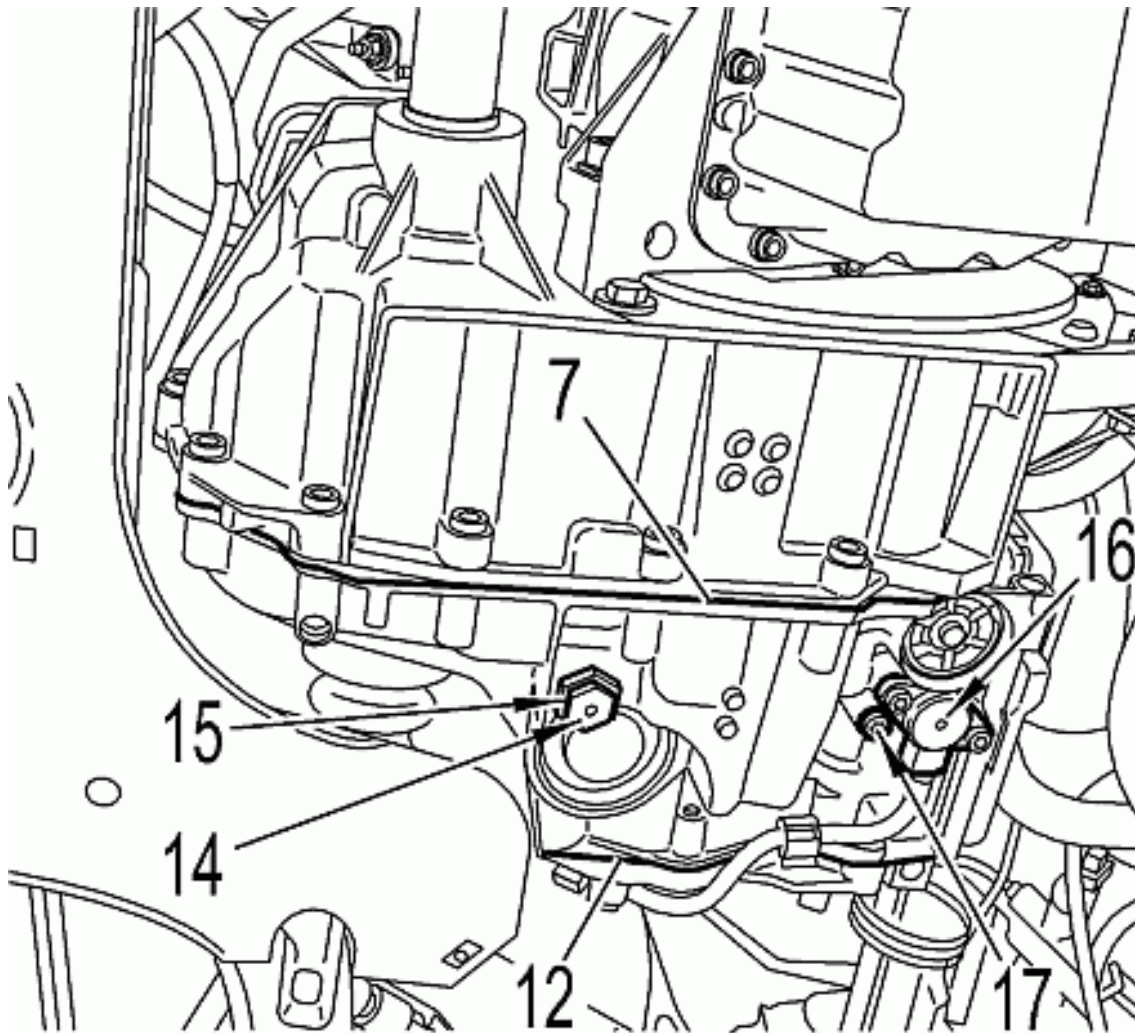
4	Output speed sensor O ring
5	Heat exchanger and fixing bolt O ring (x3)
6	Hydraulic valve block cover seal



Reference	Description
3	Oil flow modulation electrovalve O ring
6	Hydraulic valve block cover seal
7	Housing seal
8	Vehicle speed sensor O ring

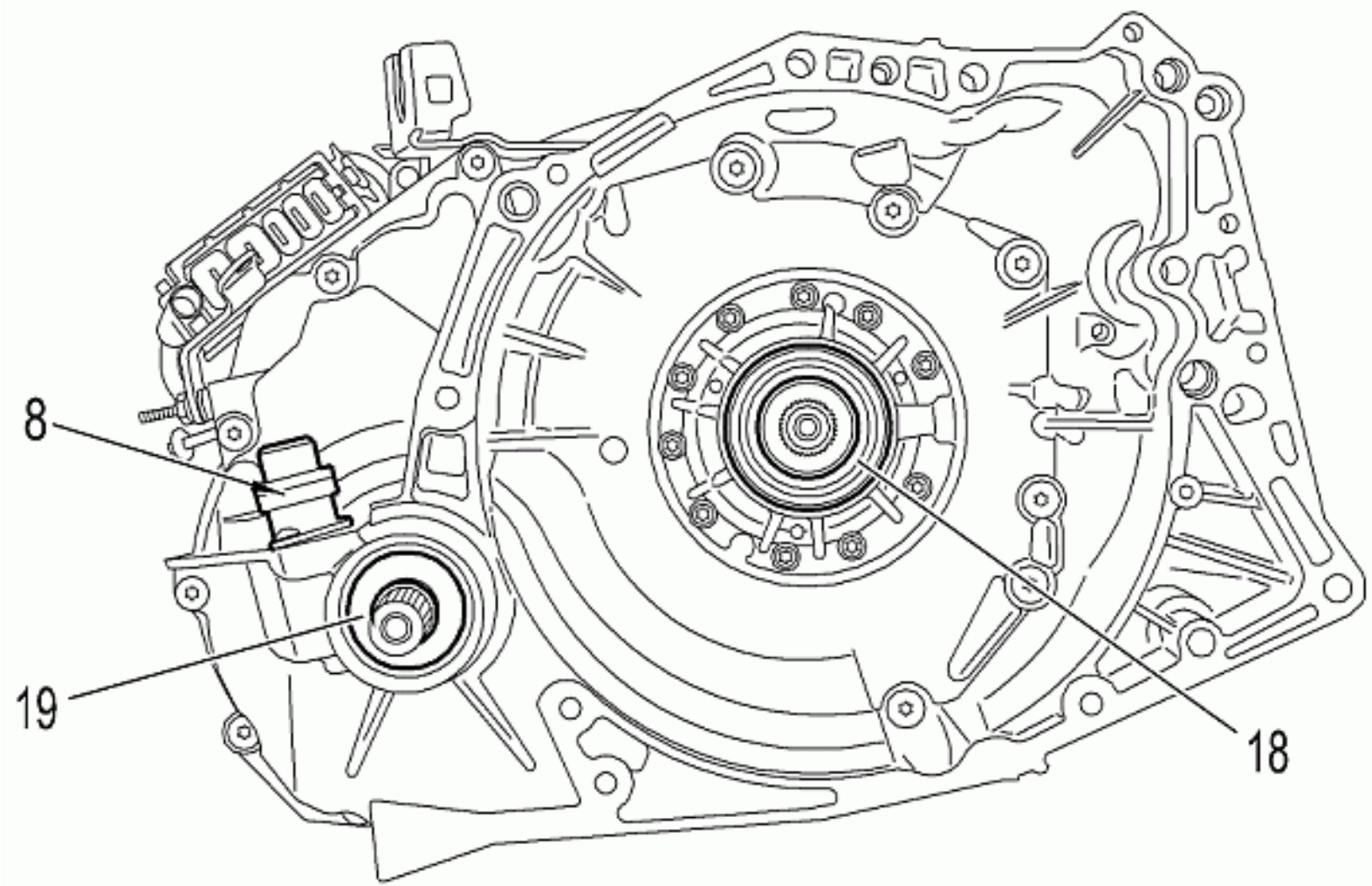
9	Gearbox oil filler plug seal
10	Gear selection lever lipped seal
11	Wiring harness interconnection seal in the hydraulic valve block
12	Gearbox cover seal
13	Quadrant shaft O ring

CAUTION : Removal of the seal (13) entails a systematic adjustment of the selector lever in the hydraulic valve block.



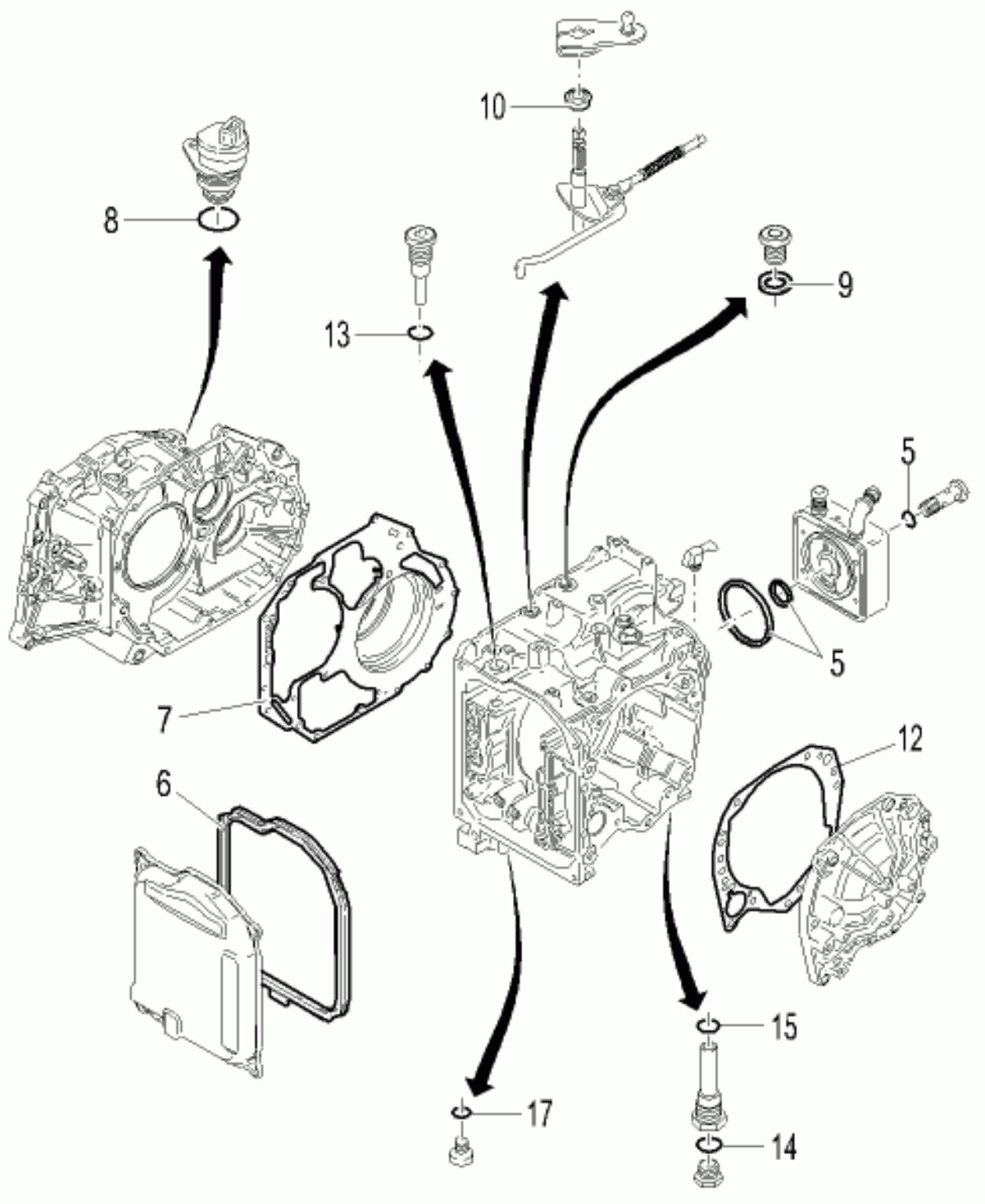
Reference	Description
7	Housing seal
12	Gearbox cover seal
14	Gearbox oil level plug seal

15	Overflow seal
16	Oil pressure sensor seal
17	Plug seal



Reference	Description
8	Vehicle speed sensor O ring
18	Convertor sealing ring
19	Right hand driveshaft seal

2. Location of the various seals



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