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CAMBIO AUTOMATICO A DOPPIA FRIZIONE

191 - Giulietta

TWIN CLUTCH TRANSMISSION - DESCRIPTION

The new TWIN CLUTCH TRANSMISSION (TCT) system means that the driver does not have to control the clutch pedal and the gear lever, while maintaining the pleasure of driving that comes from the direct control of the drive system.

Compared to a traditional manual gearbox, the transmission of movement from engine to transmission occurs through two clutch plates. In this way, consumption is reduced while driving comfort increases.

The system essentially consists of a manual transmission, with two dry clutch plates and a synchronised manual gearbox managed by an electrohydraulic device.

There are two operating modes for the TCT:

- SEMI-AUTOMATIC (MANUAL) MODE: the driver engages the gears using the lever located on the tunnel.

- AUTOMATIC (AUTO) MODE: the electronic system manages the decision to change gears.

The power assisted system consists of an electrohydraulic unit fitted directly on the gearbox casing which manages the following gearbox movements by means of actuators:

- the gear selection and engagement movement.

- the clutch opening/closing control.

The electrohydraulic unit is controlled by five solenoid valves, which receive hydraulic power from an electric pump and an accumulator.

Having identified the driver's requests from the position of the lever, an electronic control unit manages the gear change independently, controlling the clutch, gearbox and engine torque directly.

The system inhibits requests for incorrect gear changes and prevents the engine from cutting out or over-revving.

Gear engagement and clutch management are carried out through an electrohydraulic device located on the gearbox casing and controlled by a suitable hydraulic control unit in the passenger compartment, under the passenger's feet.

The engaged gear is displayed on a display on the control panel, in the same way as the indications of faults and critical driving conditions.

For more details,

See descriptions 2128 DUAL CLUTCH TRANSMISSION EXTERNAL CONTROLS

TWIN CLUTCH TRANSMISSION - OPERATING DESCRIPTION

The twin clutch transmission control unit M196 controls and regulates the entire transmission management system, whilst the driver's requests are detected by the gear selector control unit M195.

The direct power supply comes from the line protected by fuse F14 of the engine compartment junction unit B001, to pin 28 of connector A of the control unit M196, through the line protected by fuse F18 of B001, to pin 3 of connector A of the control unit M196 and through the line protected by fuse F15 of B001, to pin 27 of connector A of the control unit M196.

The direct power supply comes from the line protected by fuse F30 of B001 and reaches also pin 1 of connector A of the gear selector control unit M195.

The ignition-operated supply (15/54) reaches pin 34 of connector A of M196 and pin 2 of connector A of M195 through the line protected by fuse F16 of the engine compartment junction unit B001.

Pins 1 and 2 of connector A of M196, connector C of M196 and pin 3 of M195 are earthed.

The gear selector control unit M195, through pins 7-8 and 9-10 and the transmission control unit M196, through pins 39-50 and 40-51, communicate through the C-CAN and interface with pins 44 and 45 of connector B of Body Computer control unit M001.

See E1050 CAN CONNECTION LINES

The Body Computer also transmits signals related to the operating status of the transmission to the display on instrument panel E050, via the B-CAN.

The gear controls on the steering wheel are connected through the clock spring D047 to the gear selector control unit M195, pins 11 and 12 of connector A.

The gear shifting signal is also sent to the control unit M196, pin 21 of connector A, from pin 4 of M195.

The "Key lock" function, which locks the key if the gear selector is not in P, is managed by sending a signal from pin 6 of M195 which controls the locking electromagnet L057 incorporated in the ignition switch.

The locking (parking) signal is also sent to the control unit M196, pin 8 of connector A, from pin 5 of M195.

The driver's door open signal is sent by the Body Computer, pin 5 of connector D, to the control unit M196, pin 17 of connector A: it is the same signal that switches the roof lights on temporarily.

Pin 43 of connector A of M196 receives a signal from the brake light switch I030 (N.O. contact), provided with an ignition-operated power supply from fuse F37 of the Body Computer M001.

A suitable voltage regulator M197 controls the twin clutch transmission electric pump N198.

The voltage regulator M197 is connected to the control unit M196, pin 36 of connector A, and receives a control signal, while it returns a feedback signal to pin 19 of connector A of M196.

The pins of connector B of the transmission control unit M196 are connected to sensors and solenoid valves located on the transmission itself.

The flow rate solenoid valve K1 (odd gears) L111 is connected to pins 64 and 57 of connector B of M196.

The pressure solenoid valve K2 (even gears) L112 is connected to pins 66 and 59 of connector B of M196.

The pressure solenoid valve V1 (3rd-2nd gear and reverse engagement) L113 is connected to pins 65 and 58 of connector B of M196.

The pressure solenoid valve V2 (1st-6th-4th-5th gear engagement) L114 is connected to pins 63 and 56 of connector B of M196.

The pressure solenoid valve V-S (shifter) L115 is connected to pins 62 and 55 of connector B of M196.

The control unit M196, connector B - powers the various sensors from pins 53, 71, 72 and 73 at 5 V, while the reference earths come from pins 78, 79 and 70.

Pin 67 receives the clutch K1 position sensor signal from sensor K224.

Pin 75 receives the shifter selection position sensor signal from sensor K220.

Pin 61 receives the clutch K2 pressure sensor signal from sensor K222.

Pin 53 receives the line pressure signal from sensor K223.

Pin 70 receives the clutch K2 revolution sensor signal from sensor unit K221.

Pin 74 receives the clutch K1 revolution sensor signal from sensor unit K221.

Pin 60 receives the electrohydraulic unit temperature sensor signal from the sensor unit K221

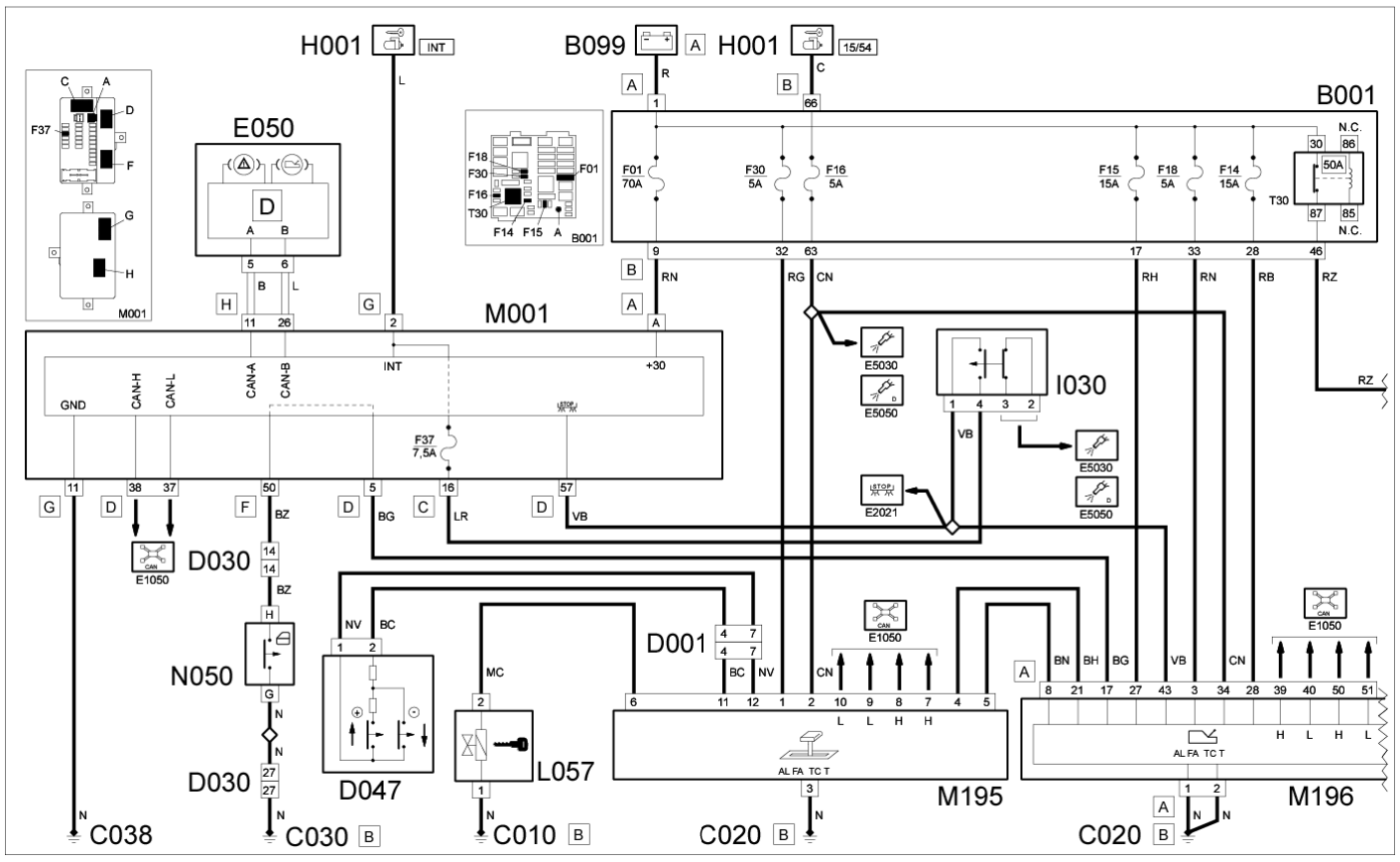
Pin 76 receives the 1st and 3rd gear position sensor signal from the sensor unit K221

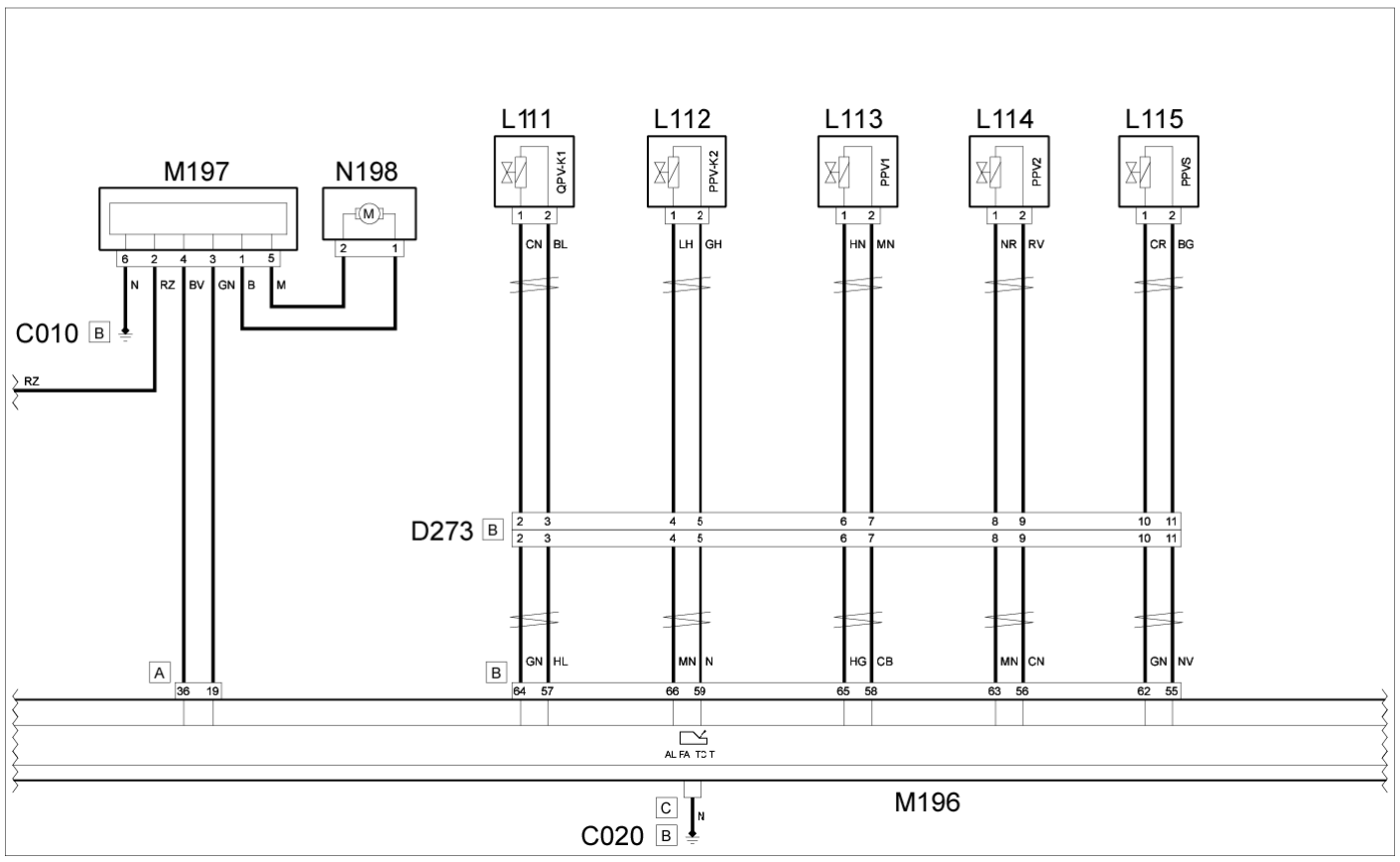
Pin 69 receives the 2nd and 4th gear position sensor signal from the sensor unit K221

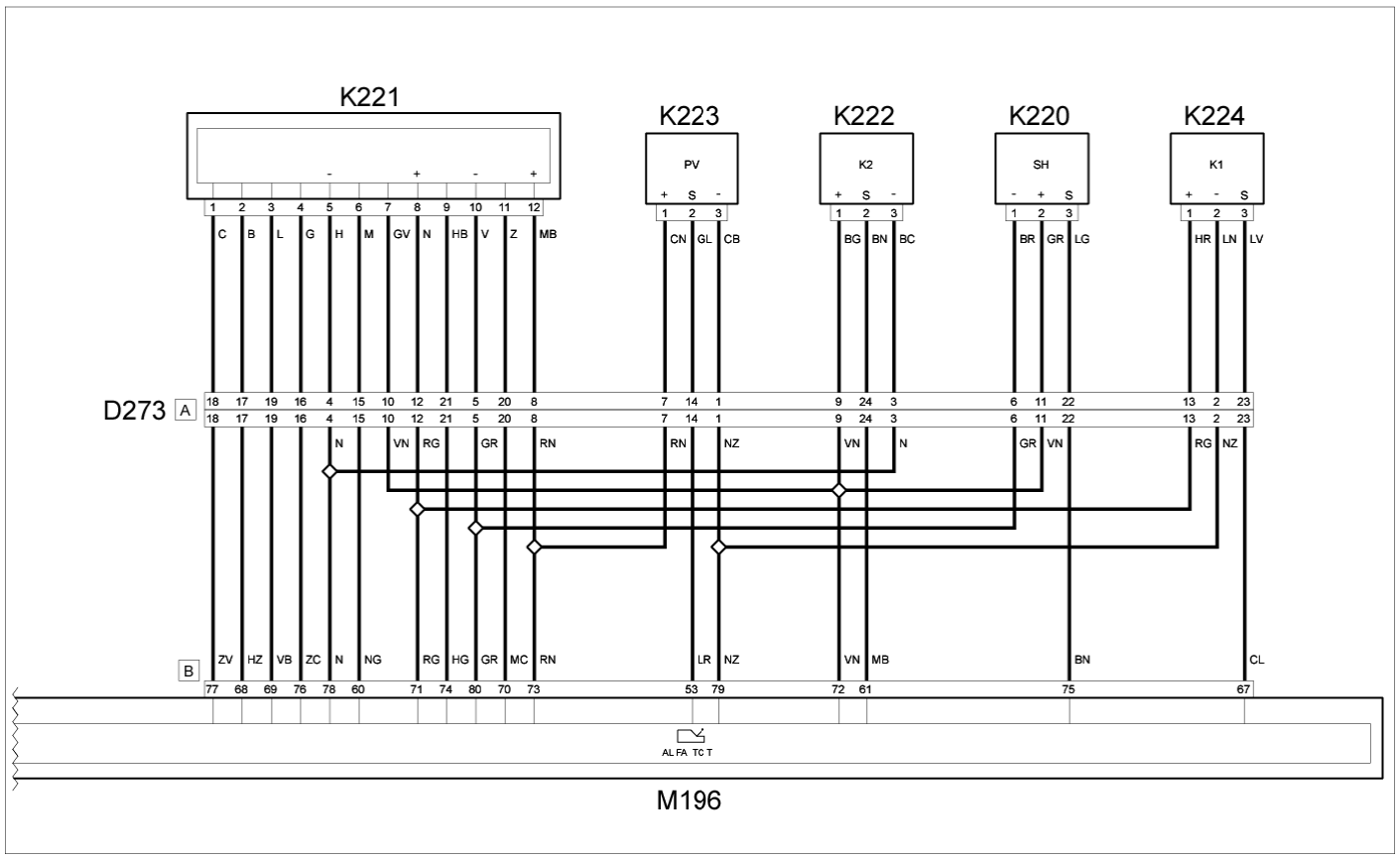
Pin 68 receives the 5th gear and reverse sensor signal from the sensor unit K221

Pin 77 receives the 6th gear position sensor signal from the sensor unit K221

TWIN CLUTCH TRANSMISSION - WIRING DIAGRAM

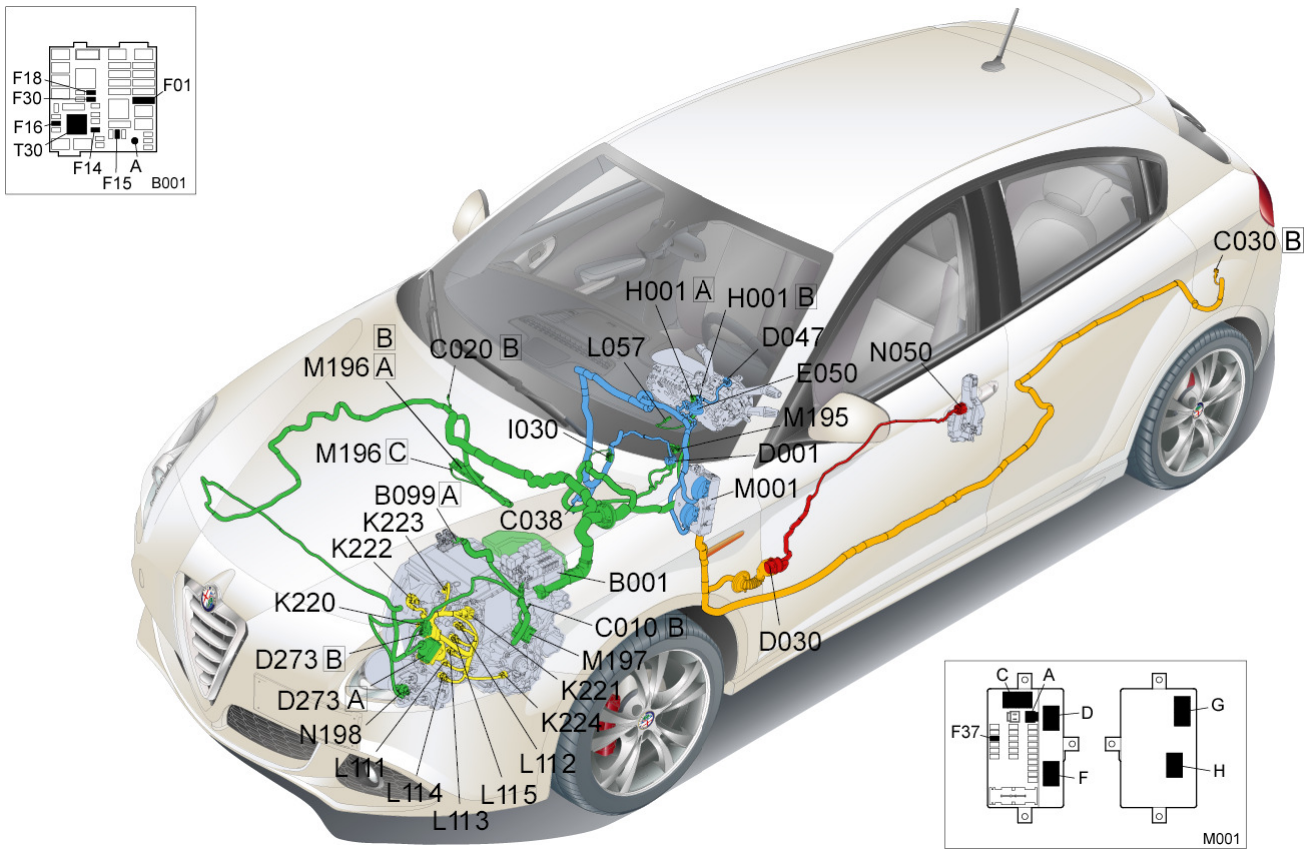






Component code	Description	Assembly reference
B001	JUNCTION UNIT	Op. 5505A28 CONTAINER FOR ADDITIONAL JUNCTION UNIT IN ENGINE COMPARTMENT - R.R.
B099	MAXI FUSE BOX ON BATTERY	Op. 5530B40 SUPPLY BOX ON BATTERY (LINK BATTERY AND FUSE BOX) - R R
C010	LEFT FRONT EARTH	-
C020	PASSENGER SIDE DASHBOARD EARTH	-
C030	LEFT REAR EARTH	-
C038	EARTH ON CENTRE TUNNEL	-
D001	FRONT/DASHBOARD COUPLING	-
D030	LEFT FRONT DOOR COUPLING	-
D047	CLOCK SPRING COUPLING	Op. 5550A10 STALK UNIT ASSEMBLY - R+R
D273	Coupling for the double clutch automatic transmission sensors	-
E050	INSTRUMENT PANEL	Op. 5560B10 CONTROL PANEL - R+R
H001	IGNITION SWITCH	Op. 5520A18 IGNITION SWITCH CONTACT CARRIER LOCK BARREL - R.R.
I030	BRAKE PEDAL SWITCH	Op. 5550D10 BRAKE LIGHT SWITCH - R+R Op. 1060G38 BRAKE PEDAL SWITCH - R.R
K220	Shifter selection position sensor	Op. 2128E06 GEAR SELECTOR POSITION SENSOR - R.R.
K221	Solenoid valve position sensor and transmission input rpm integrated module	Op. 2128E09 ELECTROHYDRAULIC UNIT SENSOR WIRING - R.R.
K222	Clutch K2 pressure sensor	Op. 2128E05 PRESSURE SENSOR FOR EVEN GEAR CLUTCH CONTROL ACTUATOR - R.R.
K223	Hydraulic line pressure sensor	Op. 2128E04 PRESSURE SENSOR OF THE ELECTROHYDRAULIC UNIT - R.R.
K224	CLUTCH K1 POSITION SENSOR	Op. 2128E09 ELECTROHYDRAULIC UNIT SENSOR WIRING - R.R.
L057	Ignition switch electro-magnet	Op. 2128E11 IGNITION KEY LOCK REMOVAL MAGNET SOLENOID VALVE - R.R.
L111	Capacity solenoid valve K1 (odd gears)	Op. 2128E10 ELECTROHYDRAULIC UNIT SOLENOID VALVE WIRING - R.R.
L112	Pressure solenoid valve K2 (even gears)	Op. 2128E10 ELECTROHYDRAULIC UNIT SOLENOID VALVE WIRING - R.R.
L113	Pressure solenoid valve V1 (engagement of gears 3 - 2 - reverse)	Op. 2128E10 ELECTROHYDRAULIC UNIT SOLENOID VALVE WIRING - R.R.
L114	Pressure solenoid valve V2 (engagement of gears 1 - 6 - 4 - 5)	Op. 2128E10 ELECTROHYDRAULIC UNIT SOLENOID VALVE WIRING - R.R.
L115	Pressure solenoid valve V-S (shifter)	Op. 2128E10 ELECTROHYDRAULIC UNIT SOLENOID VALVE WIRING - R.R.
M001	BODY COMPUTER	Op. 5505A35 MAIN BODY COMPUTER/JUNCTION UNIT - R.R.
M195	Dual clutch automatic transmission gear selector control unit	Op. 2128A05 MOUNTING FOR GEAR SELECTION LEVER - R.R.
M196	Dual clutch automatic transmission control unit	Op. 2128E01 ELECTRONIC CONTROL UNIT (TCU) - R.R.
M197	Voltage regulator for double clutch gearbox pump	Op. 2128E07 CURRENT ADJUSTMENT CONTROL UNIT FOR ELECTRIC PUMP - R.R.
N050	DRIVER'S FRONT DOOR LOCK GEARED MOTOR	Op. 7005N20 FRONT SIDE DOOR LOCK MOTOR/CATCH ASSEMBLY, LEFT OR RIGHT - R.R WITH DOOR PANEL AND SUPPORT FRAME REMOVED
N198	Dual clutch automatic transmission pump	Op. 2128C05 POWER UNIT ENGINE - R.R.

TWIN CLUTCH TRANSMISSION - COMPONENT LOCATION



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