Ferrari North America
Technical Information

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Campaign #:
Supersedes: 2344
Section: 3

Model:
Model Year: All
Subject: Replacing CCP pressure sensors

Please note that the following procedures may be performed on the **CCP** unit of the DCT gearbox of the aforementioned models. Whenever a vehicle is brought to the workshop with one of the **DTC errors** indicated on pages **21-23**, the individual component of the CCP may be replaced as described, and it will no longer be necessary to replace the complete **CCP**.

The following table lists the part numbers of the kits to be ordered for the aforementioned procedures **ONLY once the relative diagnosis has been approved by the FNA Help Desk via an ROL (Red On Line)**.

Description	CCP Pressure Sensor Kit Warranty Part No.	CCP Pressure Sensor Kit Customer Pay Part No.
KIT CCP 7.1 40 BAR	70003860*	70004021*
KIT CCP 7.2 60 BAR	70003861	70004022

- IMPORTANT -

*** The kits 70003860/70004021 contain two 40 Bar pressure sensors. BOTH pressure sensors must always be replaced, even if only one of the two 40 Bar sensors (811-812) is faulty.**

The part numbers of the kits required for the procedures concerning the aforementioned components are indicated in the following table.

Procedure	Kit Part No. necessary
1. Replacing clutch pressure sensor C1, "811"	70003860/70004021
2. Replacing clutch pressure sensor C2, "812"	70003860/70004021
3. Replacing system pressure sensor, "880"	70003861/70004022

Protocol for Managing DCT Gearbox Repairs

- ROL approval is required prior to any pressure sensor replacement procedure.
- The Dealer must complete the "DCT Gearbox Pre-Diagnosis Form" from TI 2622 and attach it to a new ROL with complete first level diagnosis..

- IMPORTANT -

Before proceeding with the repair procedures, you are required to complete the "DCT Gearbox Pre-Diagnosis Form" from TI 2622 and attach it to a new ROL.

- IMPORTANT -

The S.T. Schedule for the models listed includes a specific table indicating the corresponding operation codes for the procedures performed, which are necessary to request reimbursement under warranty.

Replaced parts must be kept for at least 60 days, so that they may be returned if requested or authorized for scrapping by SAT.

The following procedures need to be performed to remedy a fault identified on the respective sensor (see error list on pages 21-23):

- Replacing "811" clutch pressure sensor C1 (Fig. 1)
- Replacing "812" clutch pressure sensor C2 (Fig. 1)
- Replacing "880" system pressure sensor (Fig. 2)

In addition to the tools and equipment already specified for Level 1 and Level 2 procedures, the following tools and equipment are necessary to perform these procedures:

- CCP carrier plate **Part No. 95978837 (AV 8837)**;
- 19 mm socket bit Part No. **95978836 (AV 8836)**;

- IMPORTANT -

These tools have been direct shipped Authorized Ferrari Dealers. If you do not have these tools in your possession, they can be ordered from the FNA Spare Parts Department.

Procedure

- IMPORTANT -

The utmost cleanliness must be maintained during the following operations; always wear clean gloves, replacing them as needed, and use absorbent lint-free cloth and heptane to clean and degrease components.

- IMPORTANT -

When carrying out the following replacement procedures, the screws fastening the components (gearbox case and CCP) and the gaskets removed during the procedure must ALWAYS BE REPLACED upon reassembly.

- IMPORTANT -

Check the expiration date of all products used in the following procedures before use. NEVER use EXPIRED products.

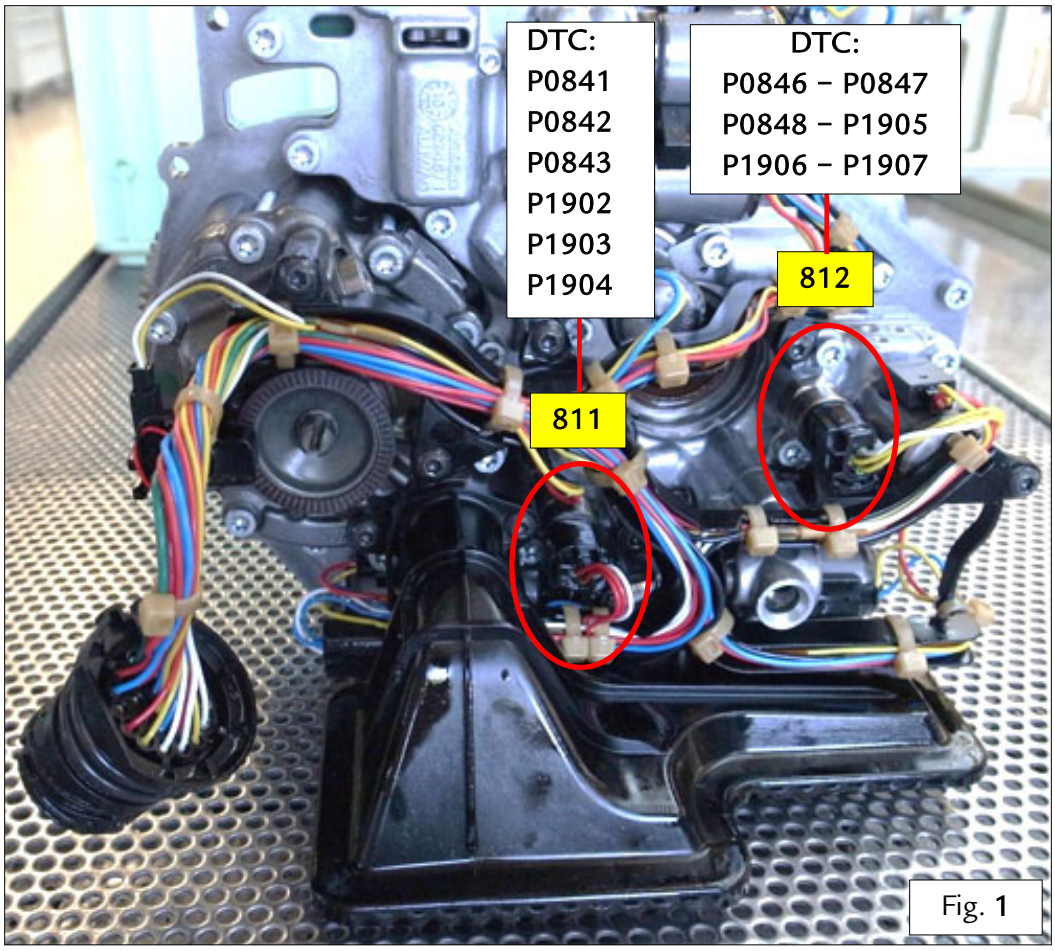
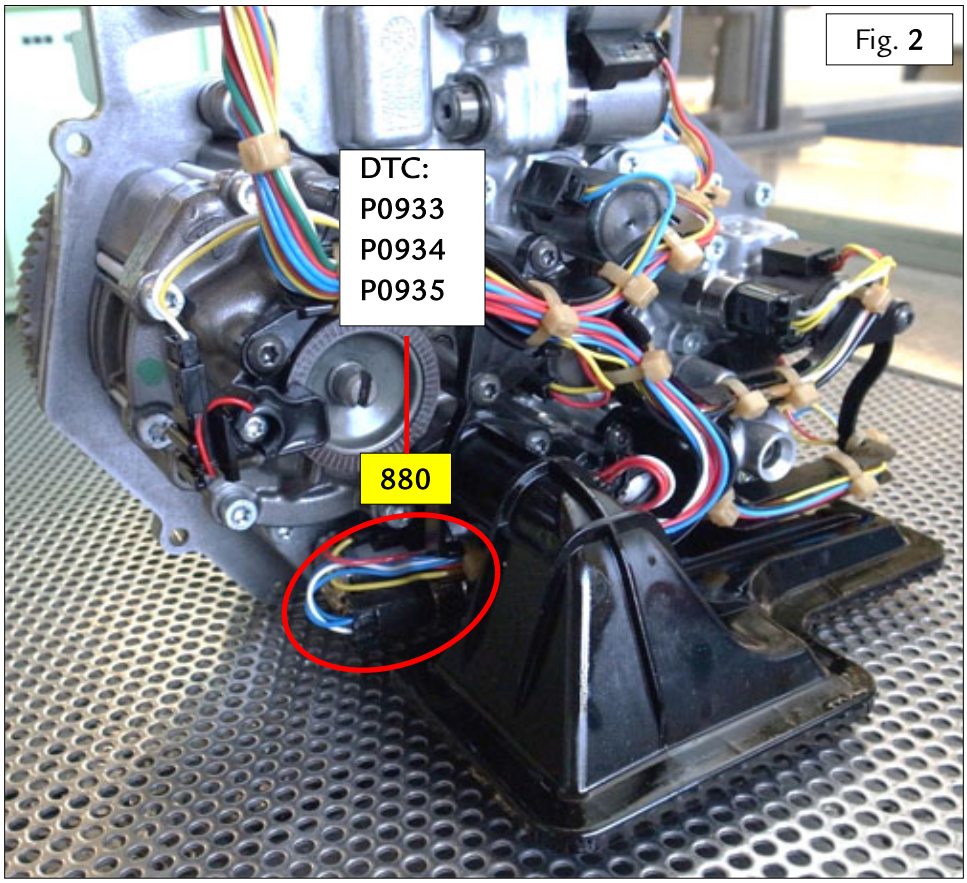
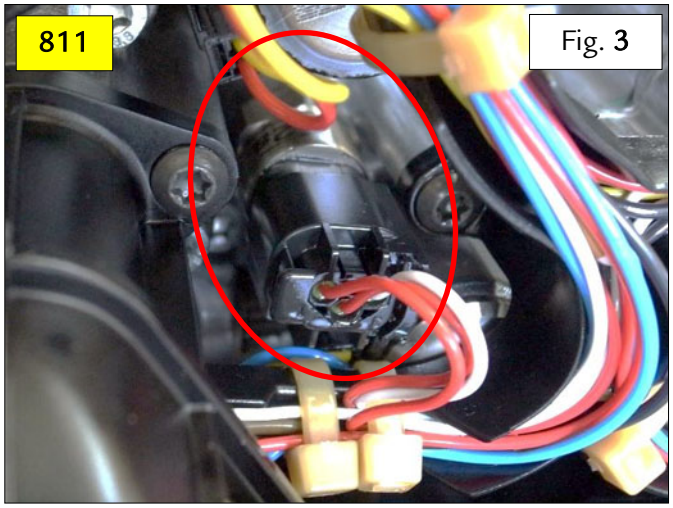


Fig. 1

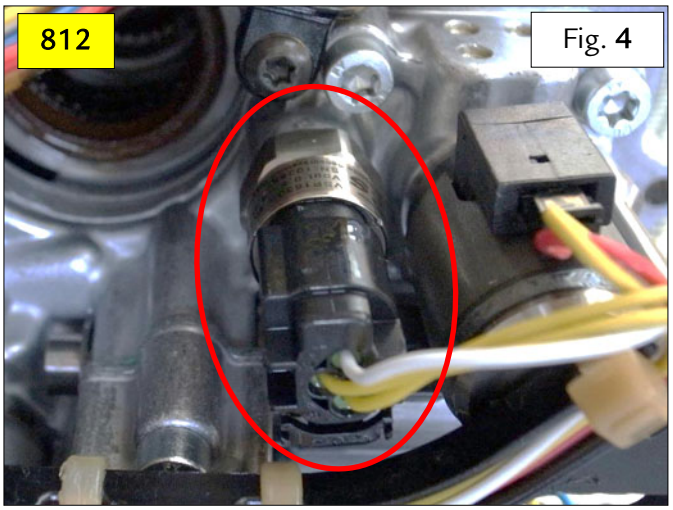


The relative pressure sensors are illustrated in detail below:

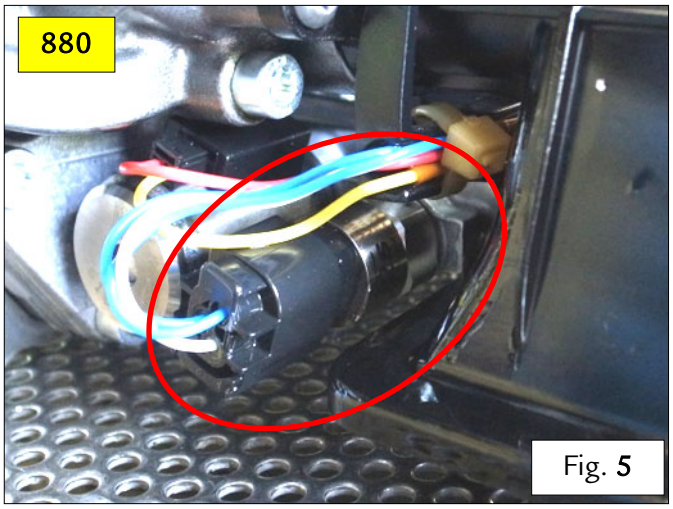
- 811 - Clutch pressure sensor C1 – Fig. 3.



- 812 - Clutch pressure sensor C2 – Fig. 4.



- 880 - System pressure sensor – Fig. 5.

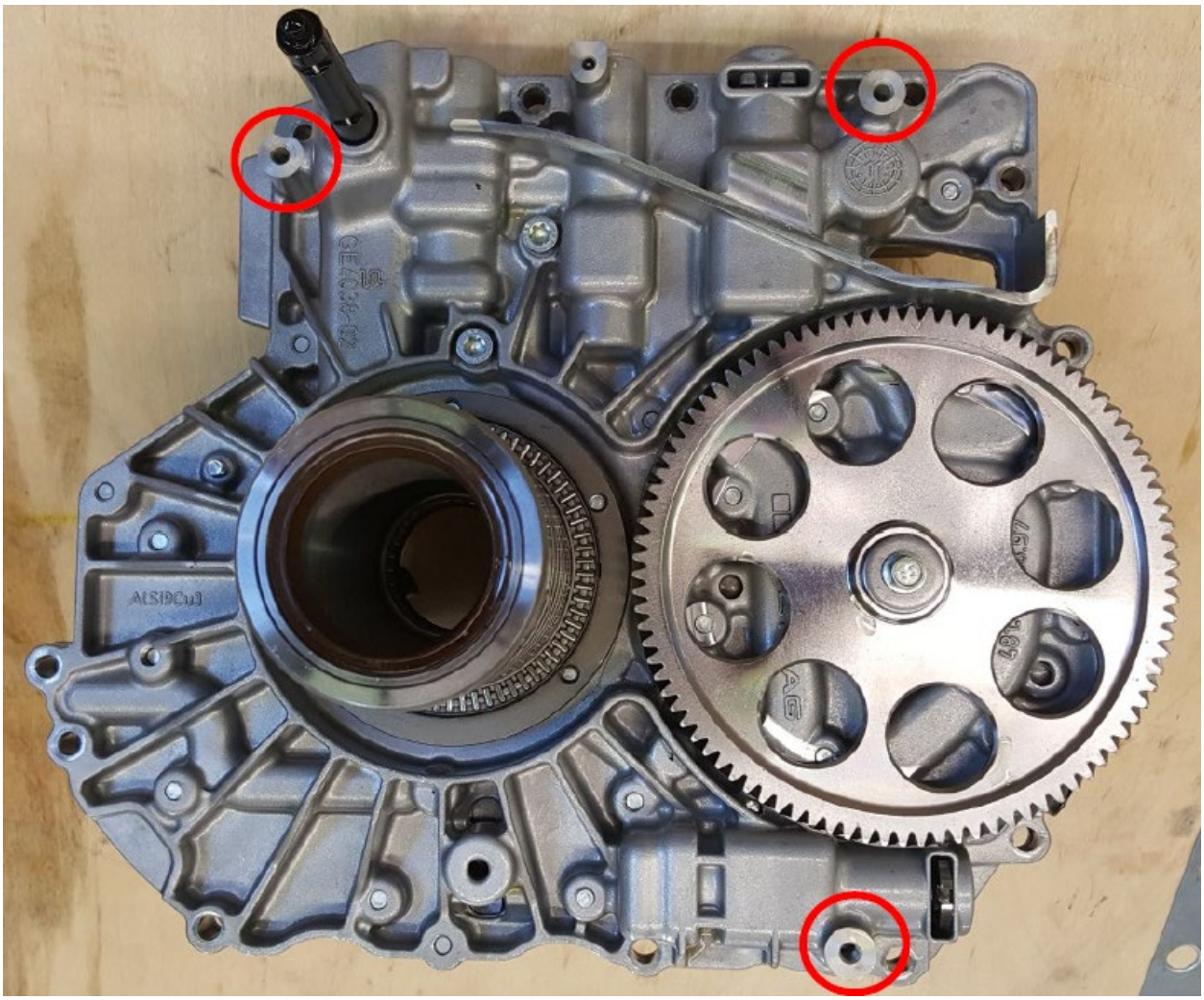


Replacing pressure sensors

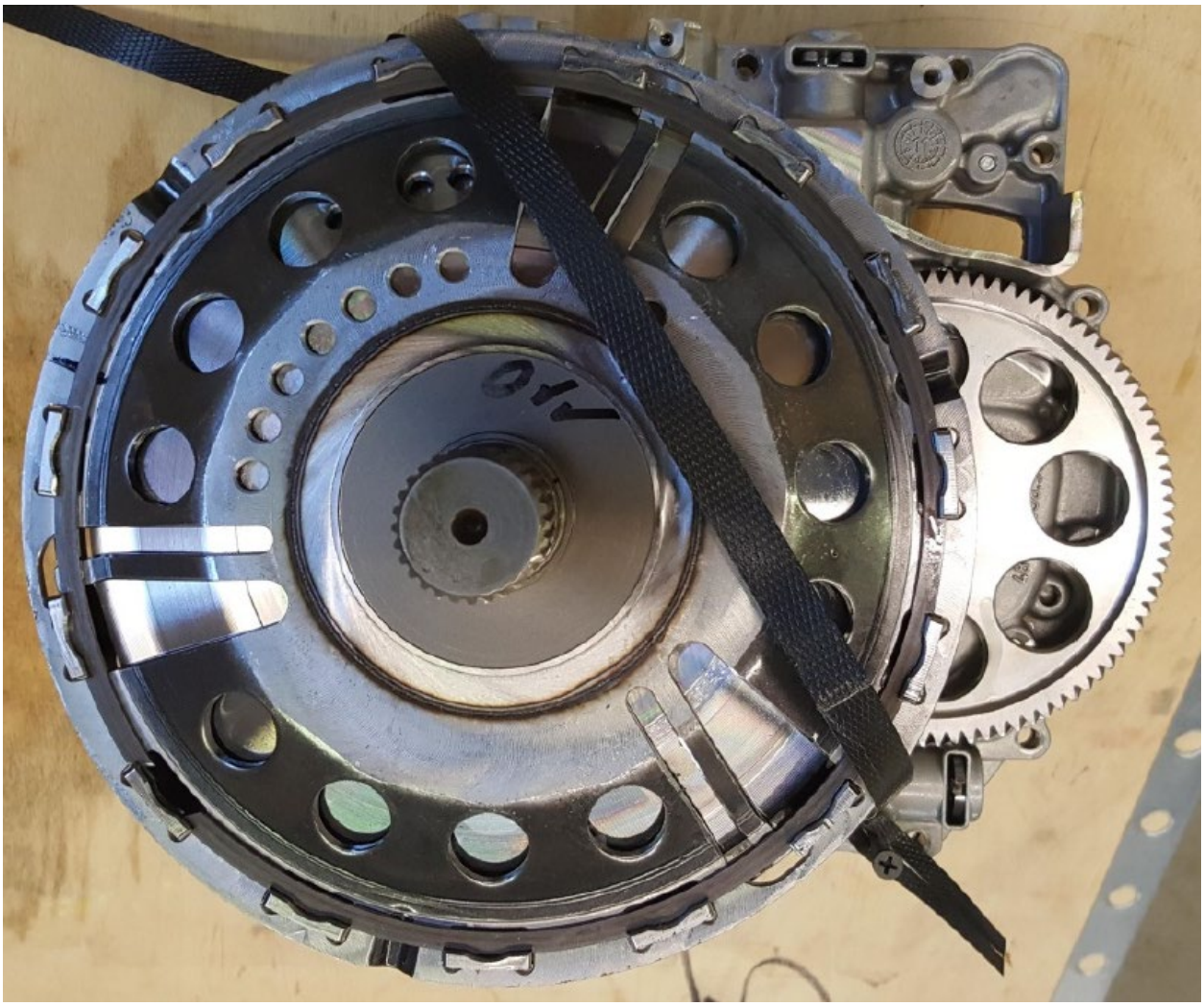
- Remove the CCP (as indicated in **TI 2620**).

- IMPORTANT -

Before mounting the CCP to the relative carrier, the clutch basket must be fastened to the CCP to avoid damaging the seals. You can zip tie the clutch basket to the oil pump sprocket or fasten the clutch basket onto the CCP with a strap like shown below

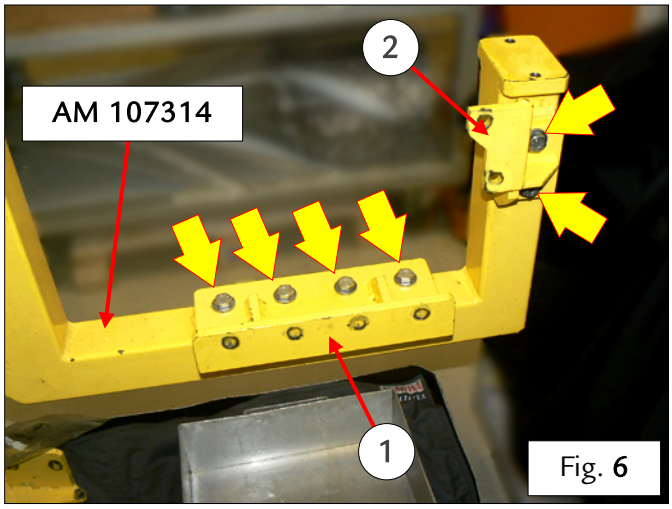


strap / retainer

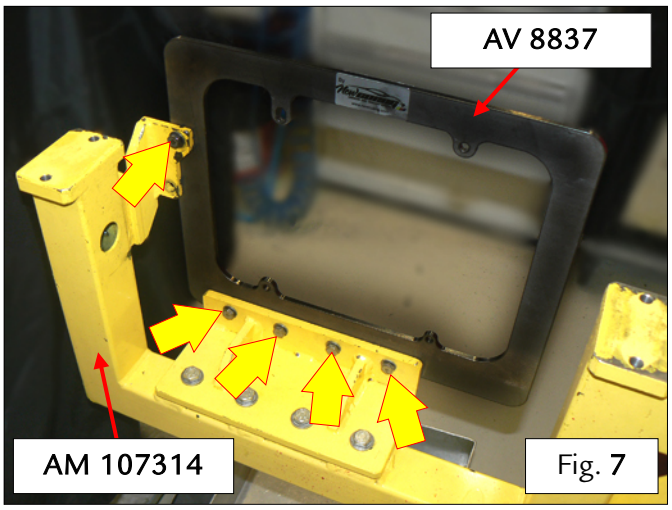


The following procedure is for the replacing pressure sensor 880. The procedure for replacing pressure sensors 811 and 812 is the same, with the exception of the specific steps indicated.

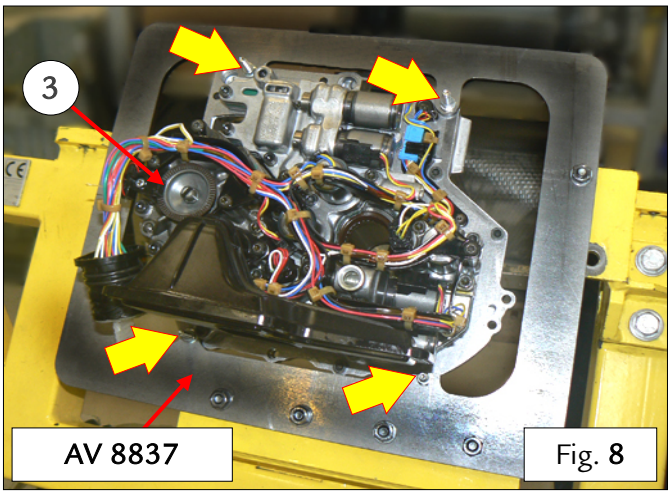
- Fit the additional lower plate (1) and the additional right hand lateral plate (2) on tool **AM 107314**, fastening with the indicated screws that are included with the tool – Fig. **6**.



- Fit the CCP carrier plate **AV 8837** on tool **AM 107314**, fastening with the indicated screws and nuts that are included with the tool – Fig. **7**.



- Mount the CCP (3) on the relative carrier plate **AV 8837**, fastening with the indicated screws and nuts that are included with the tool – Fig. **8**.



For pressure sensor C1 “811” ONLY

- Remove the pickup (4), undoing the indicated screws – Fig. 9.

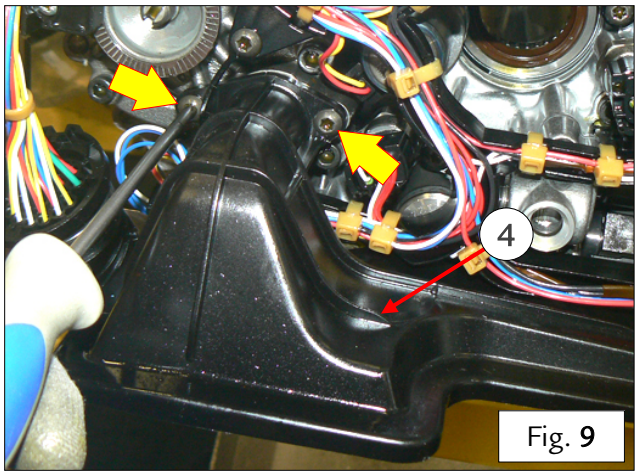


Fig. 9

For pressure sensor C1 “811” ONLY

- Undo the indicated screws on the wiring harness fastener bracket (5) to allow access to the pressure sensor “811” – Fig. 10.

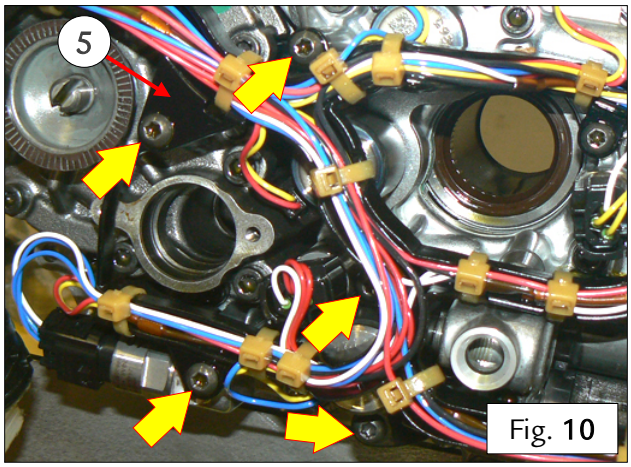


Fig. 10

- Release the retainer clip (1) of the connector by pressing on the top of the connector as shown – Fig. 11 - 12.

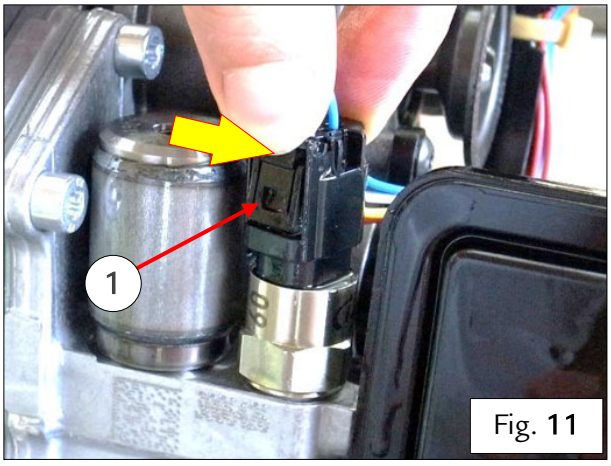


Fig. 11

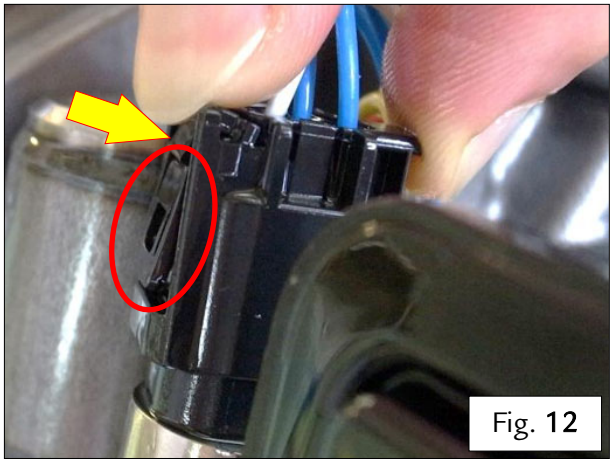


Fig. 12

- Detach the connector from the sensor while keeping the retainer clip pressed **(1)** – Fig. **13**.

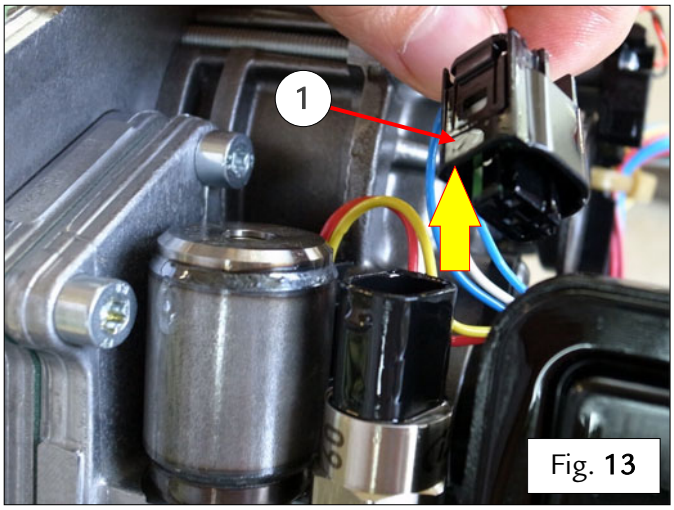


Fig. 13

- Fit the **19 mm** socket bit **AV 8836** onto the hexagonal profile **(3)** of the pressure sensor – Fig. **14**.

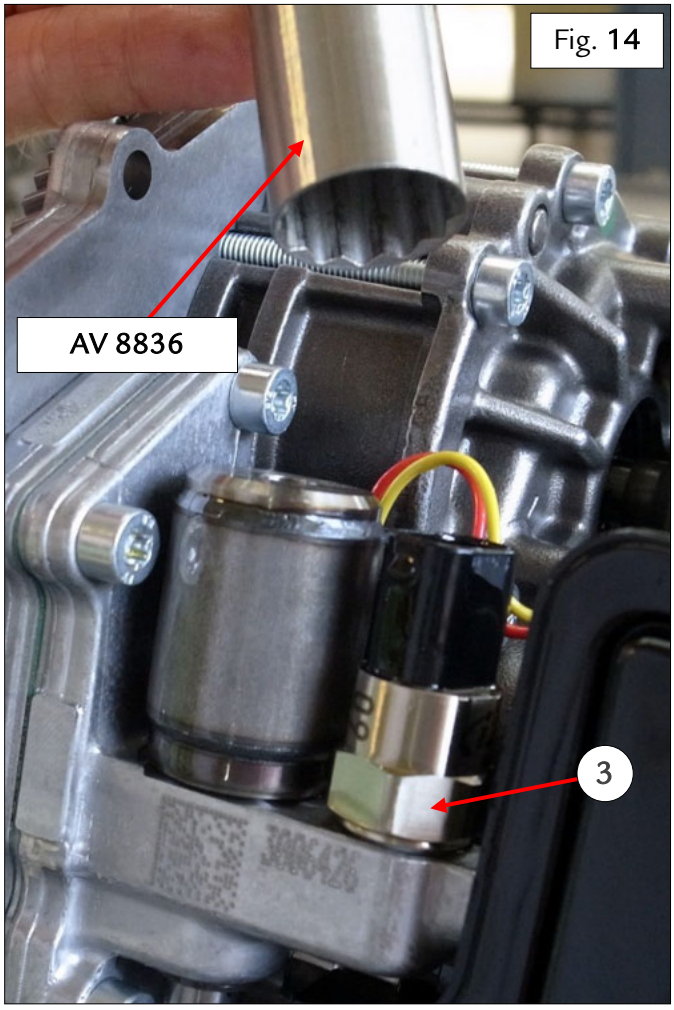
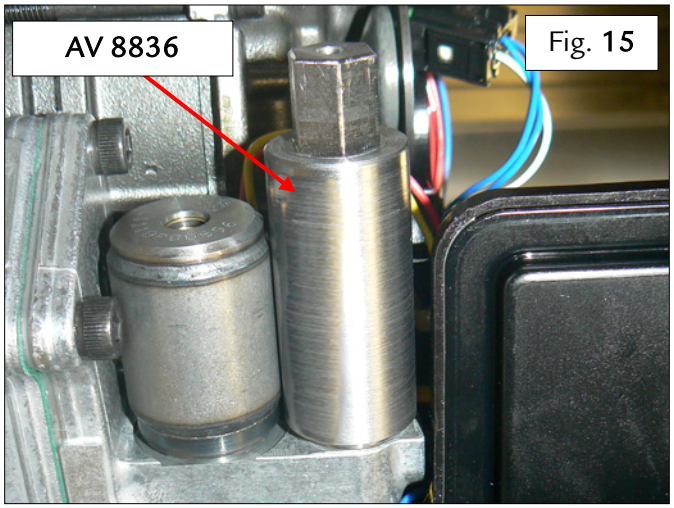
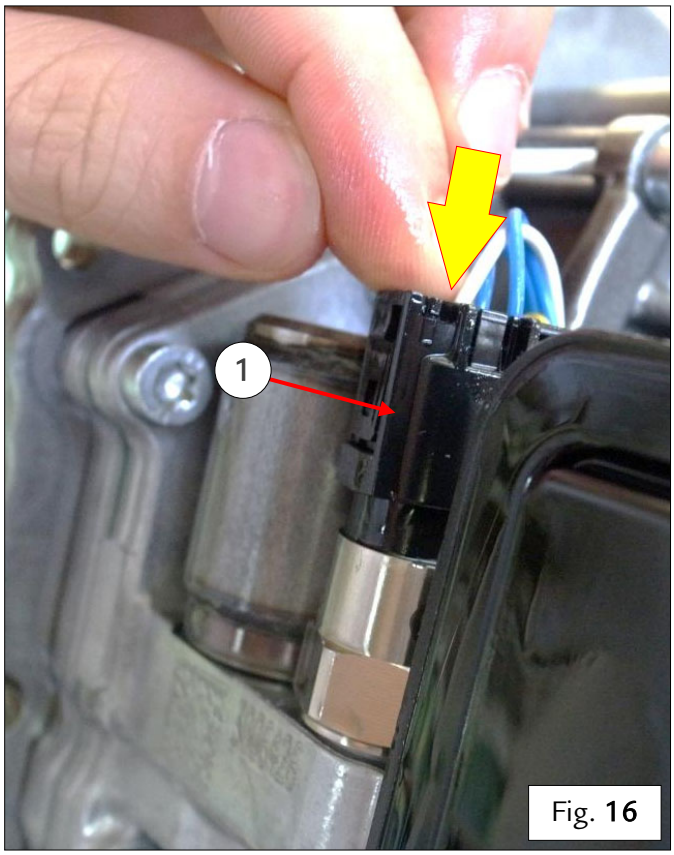


Fig. 14

- Use the socket **AV 8836** to unscrew the pressure sensor – Fig. **15**.
  Note: Keep dirt and dust out of the sensor seat and off the CCP in general.
- Handling very carefully, screw the new sensor into the seat – Fig. **15**.
- Tighten the new pressure sensor to a torque of **9 Nm** – Fig. **15**.



- Ensure that the connector is turned the correct way **(1)**, matching the notches on the connector and the sensor – Fig. **16**.
- Press the connector **(1)** into its seat on the pressure sensor – Fig. **16**.



- The connector is only installed correctly (**OK**) if the retainer clip is fastened completely onto the sensor as shown in Fig. 17.

  Note: Fig. 18 shows an example of an INCORRECTLY installed connector (**NOT OK**), with the connector fitted into the seat but with the retainer clip not fastened correctly.

OK

Fig. 17

NOT OK

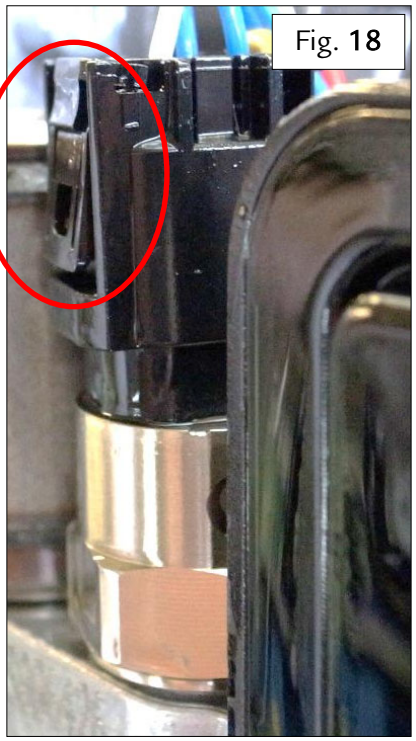


Fig. 18

- IMPORTANT -

Make sure that the retainer clip of the connector is fastened correctly onto the sensor.

- Before reassembling the transmission, check that the newly installed sensor functions correctly, following the respective procedure described below for the specific pressure sensor installed.

The following equipment and materials are necessary for this procedure:

- Voltmeter (use the lowest measurement range possible for greater precision);
- Stabilized power supply (with output voltage set to **5±0.1 V**);
- Wires for connecting to CCP sensor complete with probe as shown in Fig. **19**.

- IMPORTANT -

The wires must be fitted with the terminals shown in Fig. 19 - 20 to prevent the risk of short circuit.

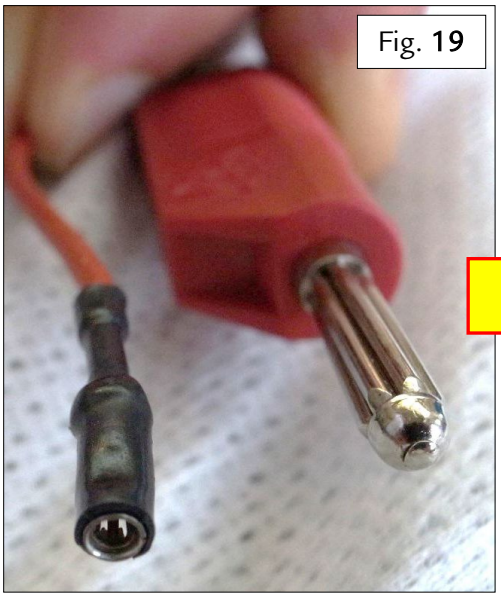


Fig. 19

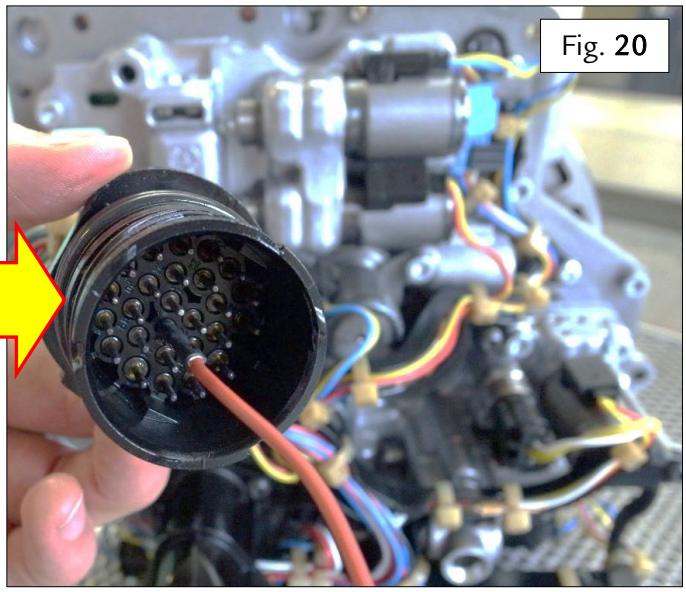
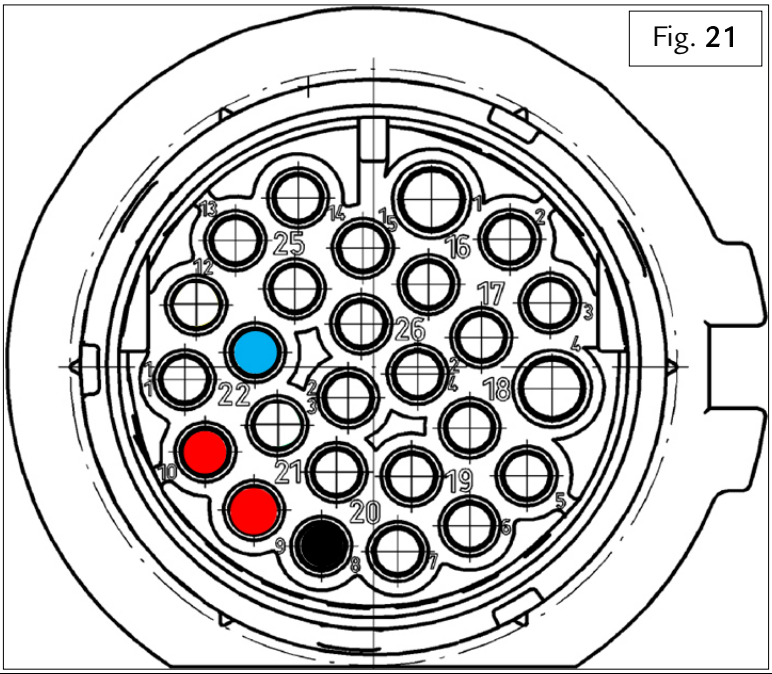


Fig. 20

Checking clutch pressure sensor C1 (811)

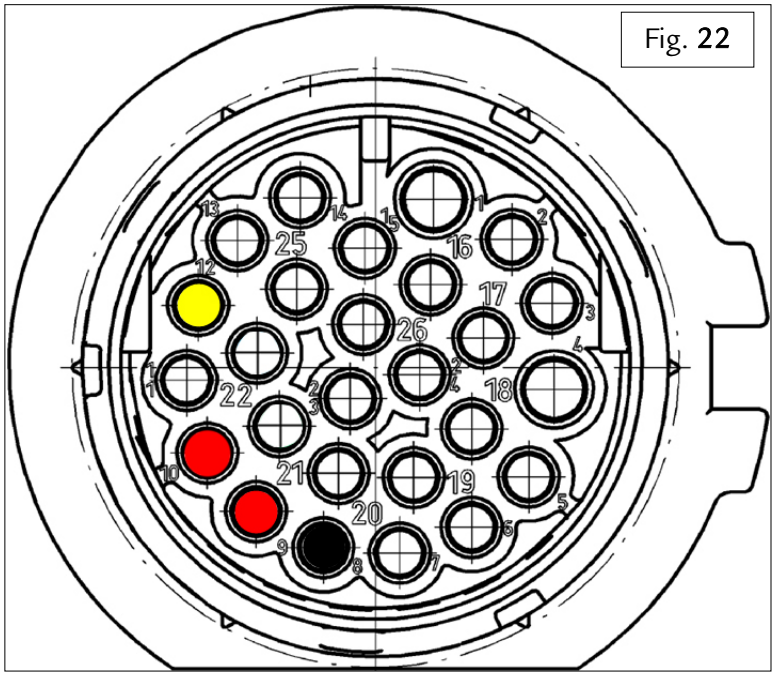
- Apply a voltage of **5±0.1 V** to **pin 10** (red), after connecting to **pin 9** (red) **(POWER)** – Fig. **21**.
- Connect the negative wire of the voltmeter to **pin 8** (black) **(GND)** – Fig. **21**.
- Connect the positive wire of the voltmeter to **pin 22 (blue) (SIGNAL)**, and read the value – Fig. **21**.
- For the sensor to function correctly, the output voltage measured must be between **0.44 and 0.56 V**.



CCP connector PIN number	*Signal name*	*TCU PIN*	*Signal description*	*Connection*
8	GND_LOC_3	29	Fixed Ground for sensor Ground loop	**GND**
9	VREF1	58	Sensor supply for ps_K2(812), ps_sys (880)	**+5 V (connected with pin 10)**
10	VREF2	57	Sensor supply for ps_K1(811)	**+5 V (connected with pin 9)**
22	CLUTCH1_PRESS	8	Clutch 1 Pressure sensor (ps_K1 / 811)	**Voltmeter**

Checking clutch pressure sensor C2 (812)

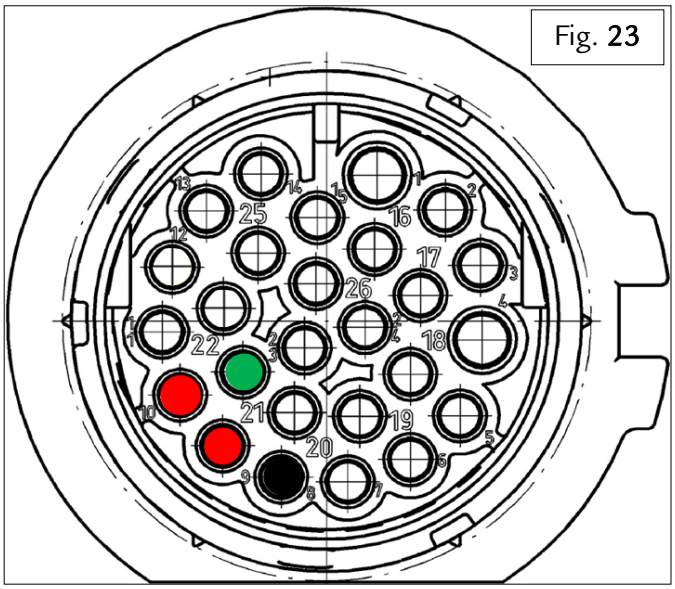
- Apply a voltage of **5±0.1 V** to **pin 9** (red), after connecting to **pin 10** (red) **(POWER)** – Fig. 22.
- Connect the negative wire of the voltmeter to **pin 8** (black) **(GND)** – Fig. 22.
- Connect the positive wire of the voltmeter to **pin 12 (yellow) (SIGNAL)**, and read the value – Fig. 22.
- For the sensor to function correctly, the output voltage measured must be between **0.44 and 0.56 V**.



CCP connector PIN number	*Signal name*	*TCU PIN*	*Signal description*	*Connection*
8	GND_LOC_3	29	Fixed Ground for sensor Ground loop	**GND**
9	VREF1	58	Sensor supply for ps_K2(812), ps_sys(880)	**+5 V (connected with pin 10)**
10	VREF2	57	Sensor supply for ps_K1(811)	**+5 V (connected with pin 9)**
12	CLUTCH2_PRESS	6	Clutch 2 Pressure sensor (ps_K2 / 812)	**Voltmeter**

Checking system pressure sensor (880)

- Apply a voltage of **5±0.1 V** to **pin 9** (red), after connecting to **pin 10** (red) **(POWER)** – Fig. **23**.
- Connect the negative wire of the voltmeter to **pin 8** (black) **(GND)** – Fig. **23**.
- Connect the positive wire of the voltmeter to **pin 21 (green) (SIGNAL)**, and read the value – Fig. **23**.
- For the sensor to function correctly, the output voltage measured must be between **0.44 and 0.56 V**.



CCP connector PIN number	*Signal name*	*TCU PIN*	*Signal description*	*Connection*
8	GND_LOC_3	29	Fixed Ground for sensor Ground loop	**GND**
9	VREF1	58	Sensor supply for ps_K2(812), ps_sys(880)	**+5 V (connected with pin 10)**
10	VREF2	57	Sensor supply for ps_K1(811)	**+5 V (connected with pin 9)**
21	SYSTEM PRESS	23	System Pressure sensor (ps_sys / 880)	**Voltmeter**

For pressure sensor C1 “811” ONLY

- Fasten the wiring harness bracket (5), tightening the two screws indicated to a torque of **6 Nm** class B – Fig. **24**.

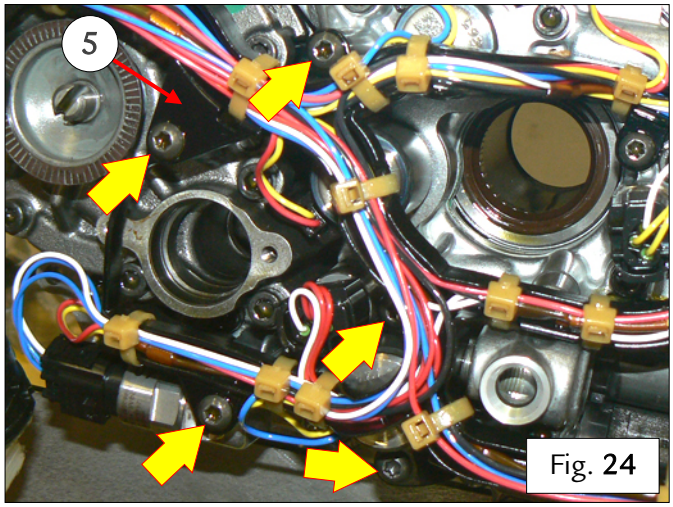


Fig. **24**

For pressure sensor C1 “811” ONLY

- Fit and fasten the pickup (4), tightening the indicated screws to a torque of **6 Nm** class B – Fig. **25**.

  Note:Ensure that the O-ring is fitted correctly on the mating side of the pickup.

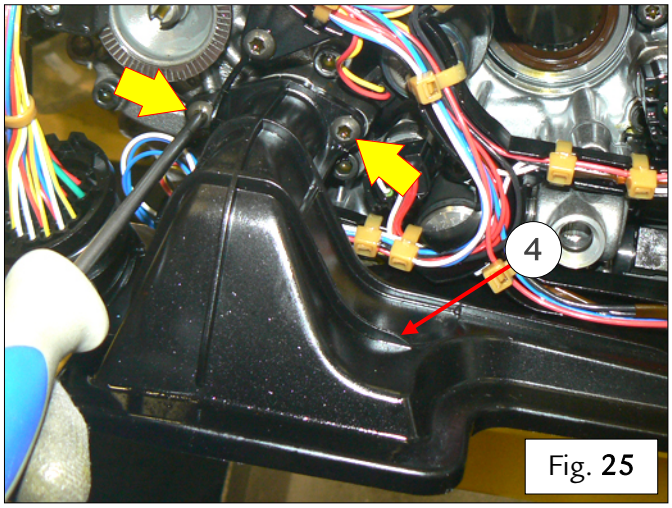
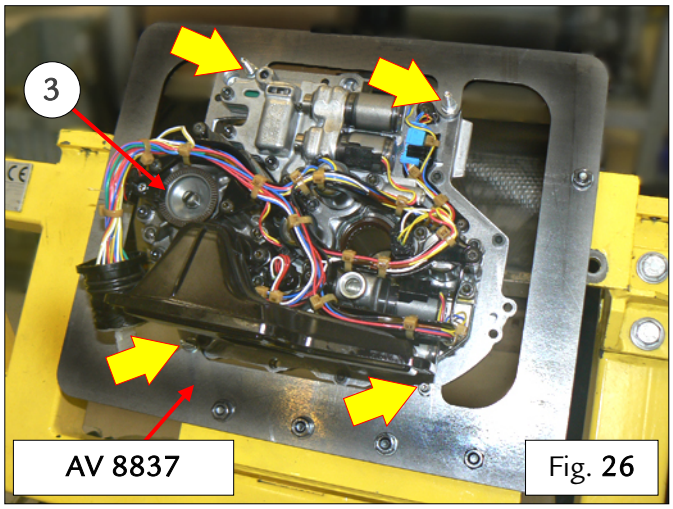
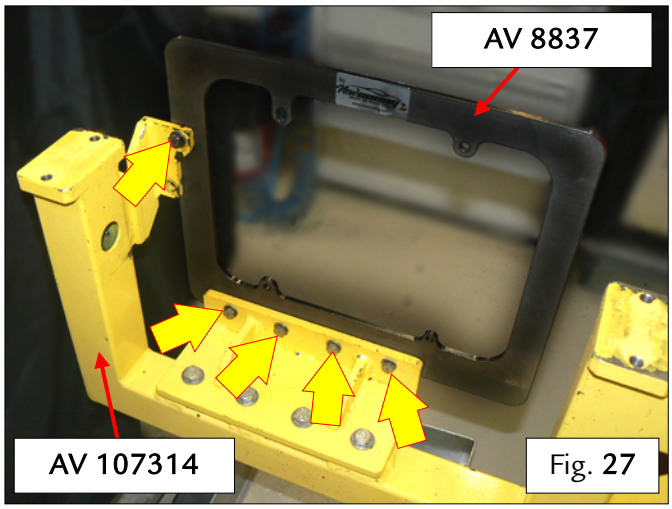


Fig. **25**

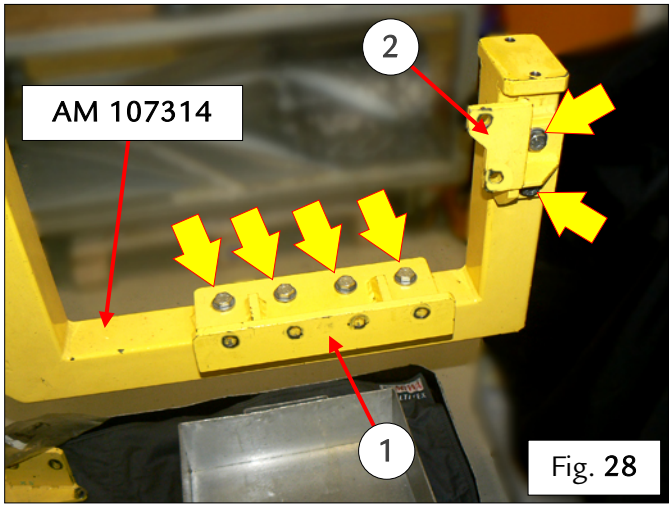
- While supporting the CCP (3), undo the screws and nuts indicated then remove the CCP from the plate AV 8837 – Fig. 26.



- Remove the CCP carrier plate AV 8837 from tool AM 107314, undoing the respective screws and nuts indicated – Fig. 27.



- Remove the lower additional plate (1) and the right hand lateral additional plate (2) from tool AM 107314, undoing the indicated fastener screws – Fig. 28.



- Refit the CCP onto the gearbox (as indicated in Technical Information **2620**).

- Perform the **Self-acquisition** procedure as described as follows.

Self-acquisition procedure

After replacing the sensor(s), reinstalling the gearbox in the vehicle and filling all oil circuits correctly, the following self-acquisition procedure must be performed to allow the system to reacquire all operating parameters necessary.

1. Connect the DEIS diagnostic tester to the vehicle.
2. Start the engine and run until the gearbox gear oil reaches operating temperature (as described in the Workshop Manual);
3. Check the gearbox gear oil level and the clutch hydraulic system oil level (as described in the Workshop Manual).

- IMPORTANT -

If any fault warning indicators illuminate or any errors are generated during the aforementioned procedures, stop the procedure and diagnose the cause of the error.

4. Perform the cycle "**40 NCR Valve cleaning test**" with the DEIS tester.
5. Test drive the vehicle normally for **30 minutes**, checking if any fault warning indicators illuminate or any gearbox malfunctions are noted during the test drive.
6. Upon returning to the service centre, check that:
   - no fault warning indicators are lit;
   - there are no signs of gearbox malfunction such as a slipping clutch, excessively harsh gear engagement or noise from the gearbox;
   - there are no errors indicated on the DEIS diagnostic tester;
   - there are no leaks.

- IMPORTANT -

- If any error codes relative to internal components of the gearbox are generated, diagnose the cause of the fault.

Note: All DEIS calibration cycles must be performed with the vehicle on a flat surface with the longitudinal accelerometer calibrated correctly (with DEIS cycle "20 NCR Accelerometer self-acquisition"), and waiting at least 30 seconds between steps.

Thank you for your co-operation.

With reference to Technical Information 2149, the DTCs relative to the CCP pressure sensors are indicated as follows

DTC read on NCR	Description of DTC	Fault	Component involved
P0841	ODD clutch (1) pressure sensor signal, invalid signal	Electric fault in ODD clutch pressure sensor.	Pressure sensor 811*
P0842	ODD clutch (1) clutch pressure sensor, too low	Electric fault in ODD clutch pressure sensor.	Pressure sensor 811*
P0843	ODD clutch (1) clutch pressure sensor, too high	Electric fault in ODD clutch pressure sensor.	Pressure sensor 811*
P0846	EVEN clutch (2) pressure sensor signal, invalid signal	Electric fault in EVEN clutch pressure sensor.	Pressure sensor 812*

P0847	EVEN clutch (2) clutch pressure sensor, too low	Electric fault in EVEN clutch pressure sensor.	Pressure sensor 812*
P0848	EVEN clutch (2) clutch pressure sensor, too high	Electric fault in EVEN clutch pressure sensor.	Pressure sensor 812*
P0933	Hydraulic pressure sensor, invalid signal	Electric fault in hydraulic pressure sensor.	Pressure sensor 880
P0934	Hydraulic pressure sensor, too low	Electric fault in hydraulic pressure sensor.	Pressure sensor 880
P0935	Hydraulic pressure sensor, too high	Electric fault in hydraulic pressure sensor.	Pressure sensor 880
P1902	APP_CLUTCH_ PRESSURE_ODD, too high (odd shaft pressure command signal too high)	ODD clutch (1) pressure sensor or ODD clutch solenoid valve malfunctioning.	Pressure sensor 811*
P1903	APP_CLUTCH_ PRESSURE_ODD, too low (odd shaft pressure command signal too low)	ODD clutch (1) pressure sensor or ODD clutch solenoid valve malfunctioning.	Pressure sensor 811*
P1904	APP_CLUTCH_ PRESSURE_ODD, invalid signal (odd shaft pressure command signal not valid)	ODD clutch (1) pressure sensor or ODD clutch solenoid valve malfunctioning.	Pressure sensor 811*

P1905	APP_CLUTCH_ PRESSURE_EVEN, too high (even shaft pressure command signal too high)	EVEN clutch (2) pressure sensor or EVEN clutch solenoid valve malfunctioning.	Pressure sensor 812*
P1906	APP_CLUTCH_ PRESSURE_EVEN, too low (even shaft pressure command signal too low)	EVEN clutch (2) pressure sensor or EVEN clutch solenoid valve malfunctioning.	Pressure sensor 812*
P1907	APP_CLUTCH_ PRESSURE_EVEN, invalid signal (even shaft pressure command signal not valid)	EVEN clutch (2) pressure sensor or EVEN clutch solenoid valve malfunctioning.	Pressure sensor 812*