Ferrari North America
Technical Information

Date:	December 2016
Bulletin #:	2344
Campaign #:	
Supersedes:	
Section:	3

Model Type: California T
Model Year: All
Subject: **Replacing CCP pressure sensors**

Please note that, in relation to a fault with CCP pressure sensors, the following procedures may be performed on the CCP unit of the DCT gearbox of the **California T**.

As a result, whenever a vehicle is brought to the workshop with one of the errors in the NCR ECU indicated on page 24, the individual component of the CCP may be replaced as described in this document, and it will no longer be necessary to replace the complete CCP.

Protocol for Managing DCT Gearbox Repairs

- Prior to any procedure, you must open a ROL to obtain authorization to order the requested kit.
- The Dealer must attach the completed "DCT Gearbox Pre-Diagnosis Form" on pages **25** to **27** of this document to the ROL.
- This form must be sent together with the order request by e-mail to our Spare Parts Department, at the address dealerservices@ferrariusa.com.

- IMPORTANT -

Only technicians at Authorized Ferrari dealers that have completed the course on Level 2 DCT gearbox repair are authorized to perform the following procedures to replace the CCP pressure sensors.

- IMPORTANT -

After completing first level diagnosis, you are required to complete the "DCT Gearbox Pre-Diagnosis Form" on page 25 to 27 of this document, and attach it to the ROL

- IMPORTANT -

The S.T. Schedule for the model in question 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 6 months, so that they may be returned if requested or authorized for scrapping by SAT.

The following procedures are possible, in relation to the fault identified (see error list on page 22):

- Replacing clutch pressure sensors C1 - "811", and C2 - "812" (Fig. 1)
- Replacing system pressure sensor, "880" (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 will be dispatched directly by Ferrari to Authorized Ferrari dealers that have already completed the course for Level 1 and 2 procedures. Service centers completing these courses at a later date will have to order them from our Spare Parts Department.

The parts to be installed, in relation to the type of operation necessary, are as follows:

- CCP 7.1 KIT, 40 BAR **Part No. 70003860*** Q. ty **1**
- CCP 7.2 KIT, 60 BAR **Part No. 70003861*** Q. ty **1**

The aforementioned spare part numbers may be ordered by you **solely** for vehicles covered by the manufacturer's warranty or subject to a valid extended warranty and **ONLY once the relative diagnosis has been submitted to our Help Desk via ROL (Red On Line) and approved**.

- IMPORTANT -

* The kit contains 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, requiring the KIT 70003860.

The part numbers of the kits required for this procedure are indicated in the following table.

The following kits must be ordered by you directly from our Spare Parts Department in the quantities needed.

	California T
1. Replacing clutch pressure sensors C1-“811” and C2-“812”	70003860
2. Replacing system pressure sensor, “880”	70003861

Procedure

- IMPORTANT -

The utmost cleanliness must be maintained during all the following operations; always wear clean gloves, replacing them frequently, 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 expiry date of all products used in the following procedures before use.
NEVER use EXPIRED products.

- 811: Clutch pressure sensor C1 (Fig. 1)
- 812: Clutch pressure sensor C2 (Fig. 1)
- 880: System pressure sensor (Fig. 2)

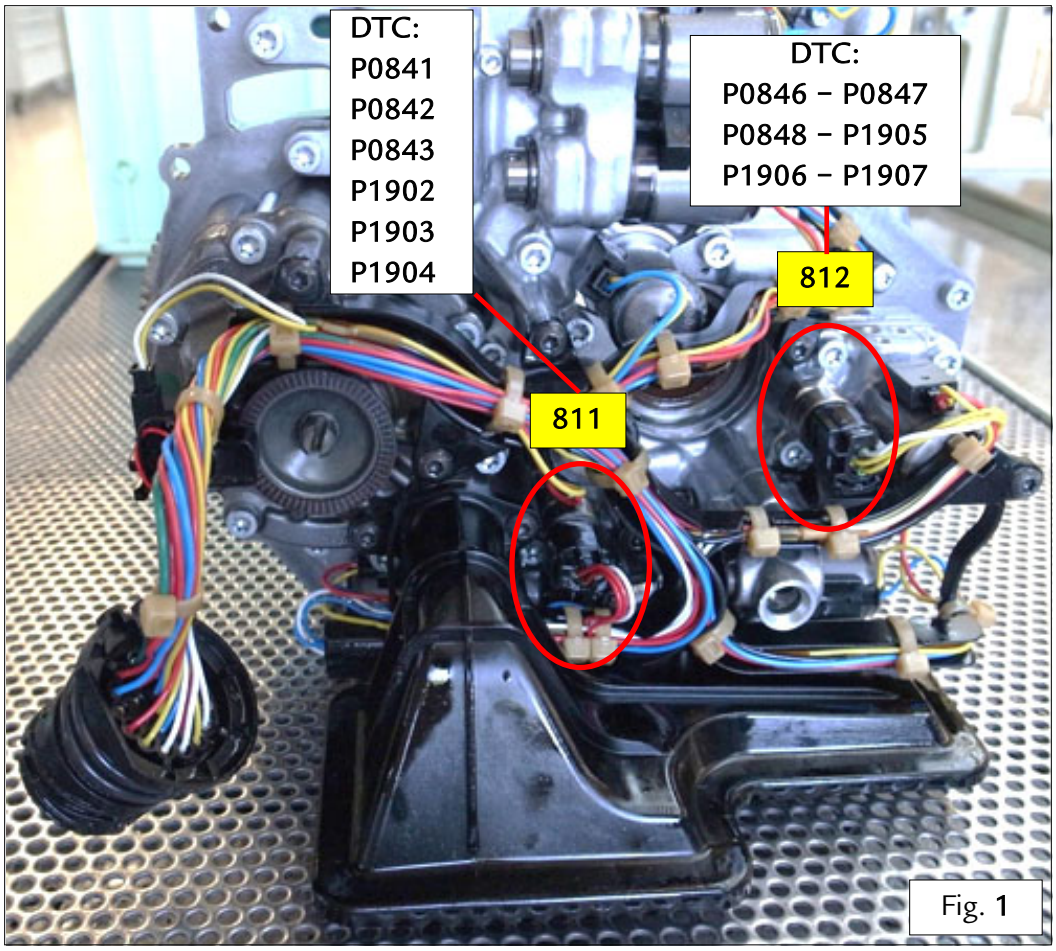
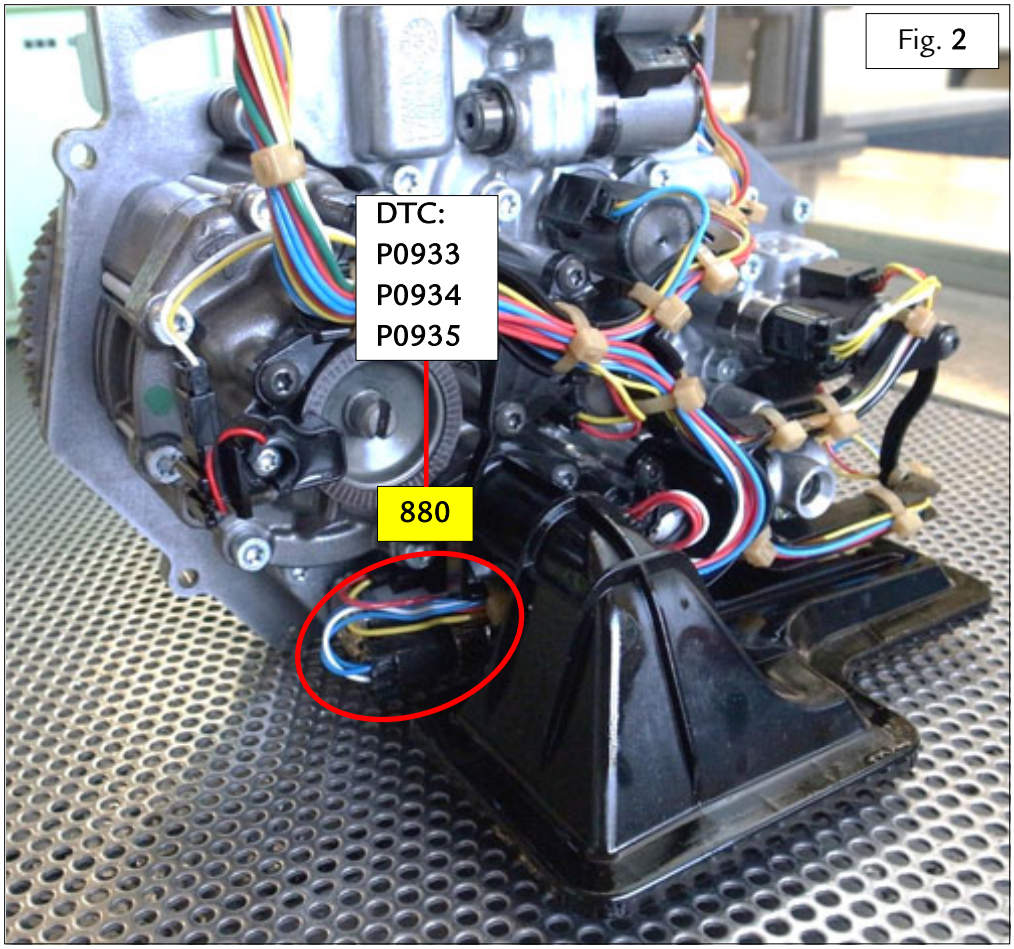


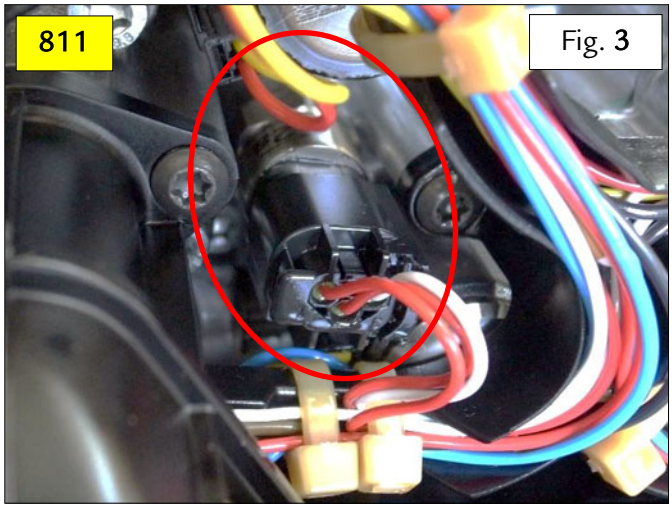
Fig. 1



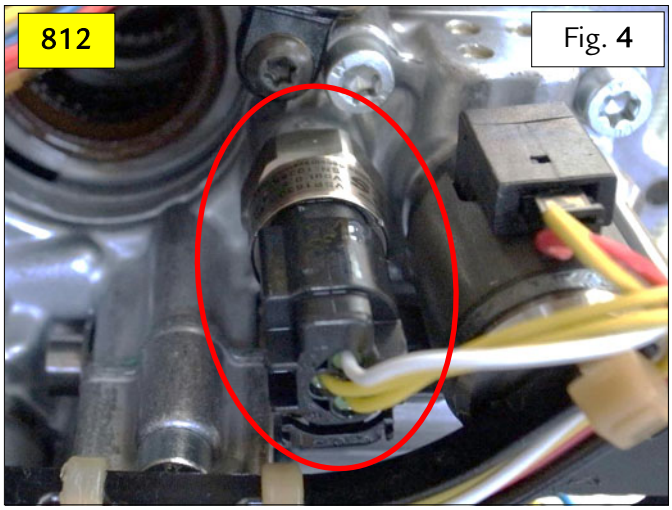
The relative pressure sensors are illustrated on the following pages:

Ferrari North America

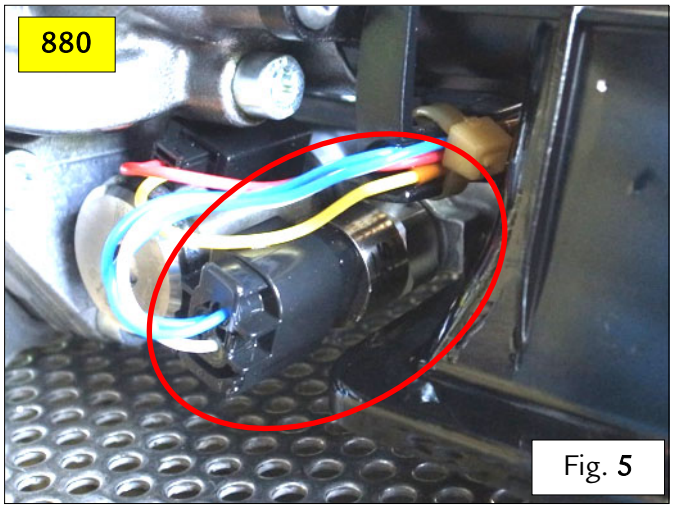
- 811 - Clutch pressure sensor C1 – Fig. 3.



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



- 880 - System pressure sensor – Fig. 5.



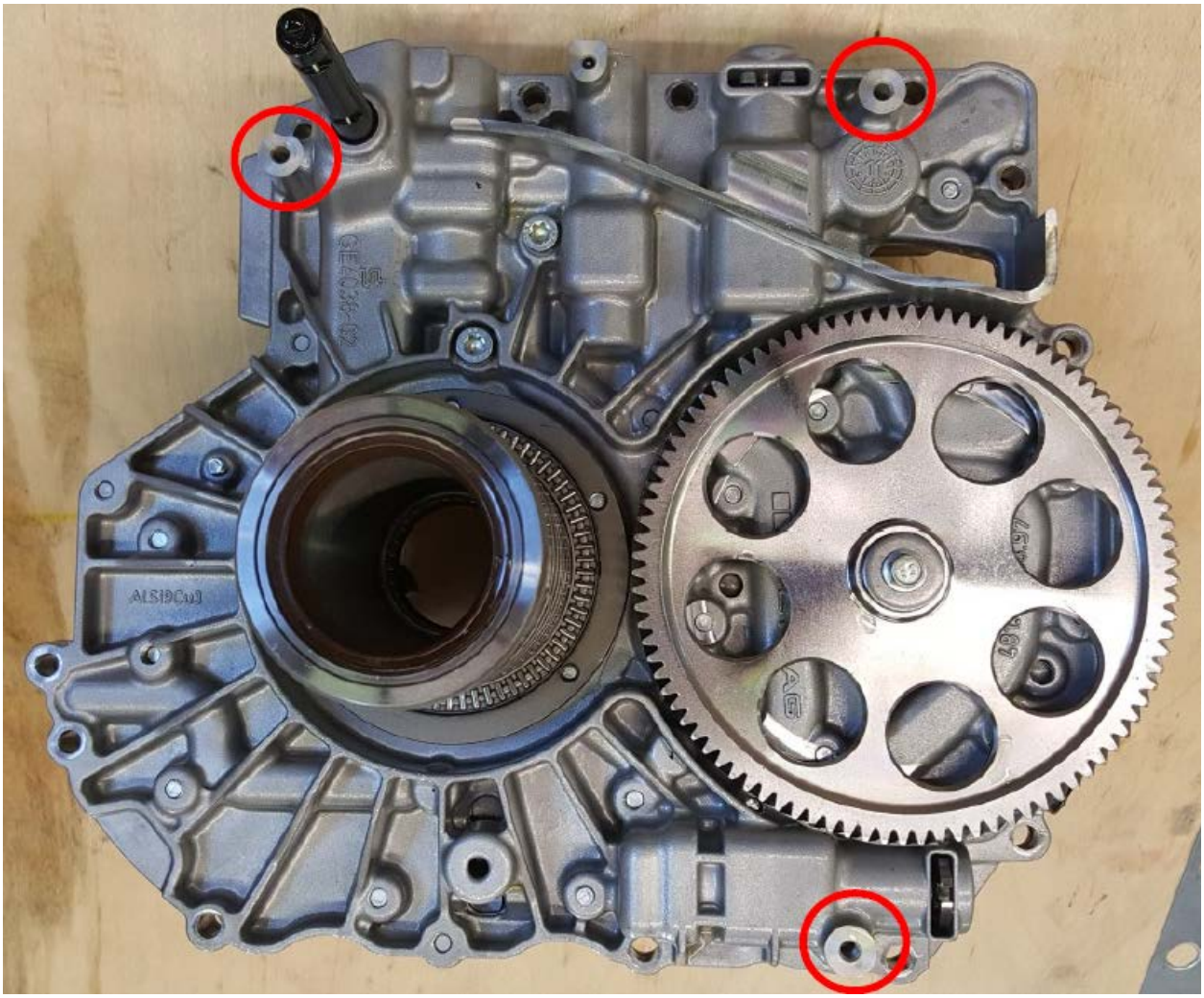
Procedure

Replacing pressure sensors

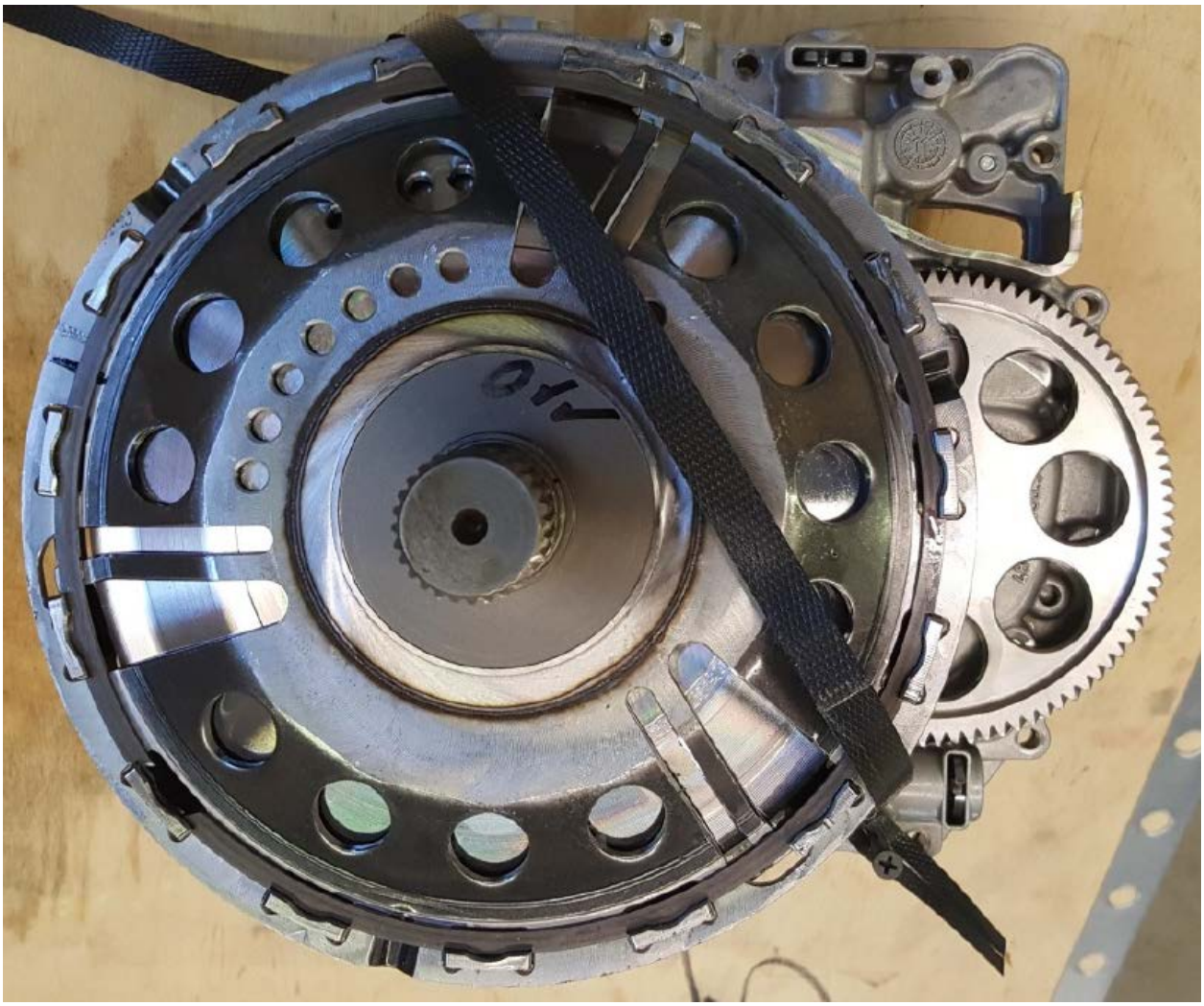
- Remove the CCP (as per TI **2330** of February 2016).

- 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 respective fastener screws included with the tool – Fig. 6.

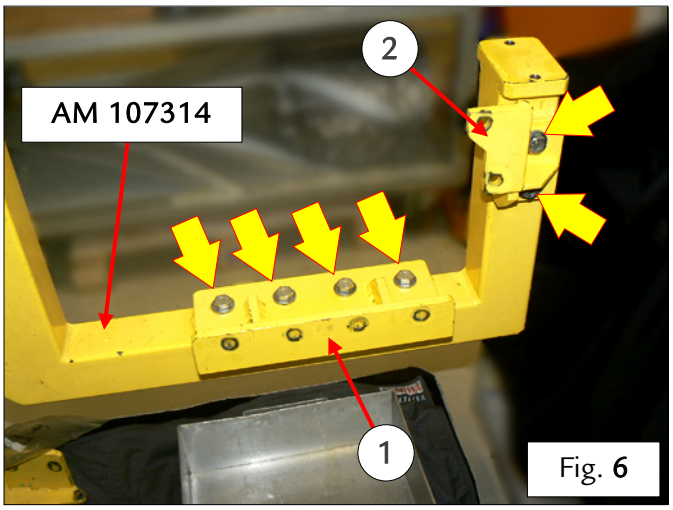


Fig. 6

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

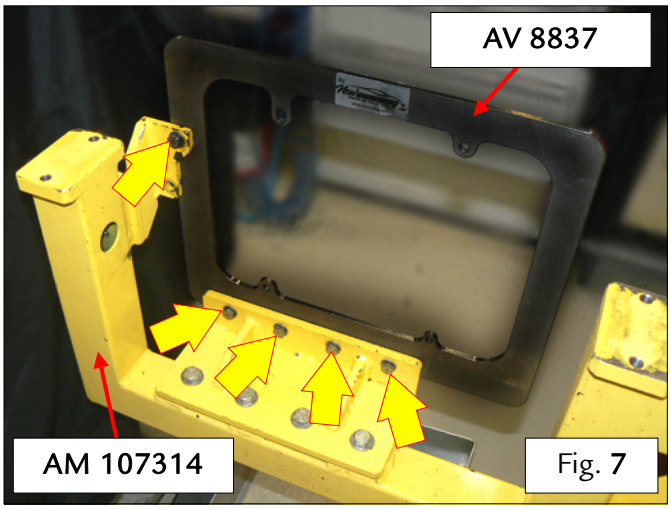


Fig. 7

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

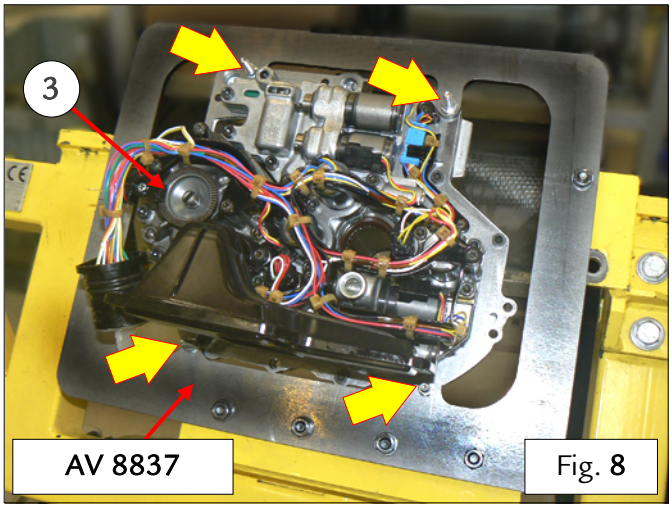


Fig. 8

For pressure sensor C1 "811" ONLY

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

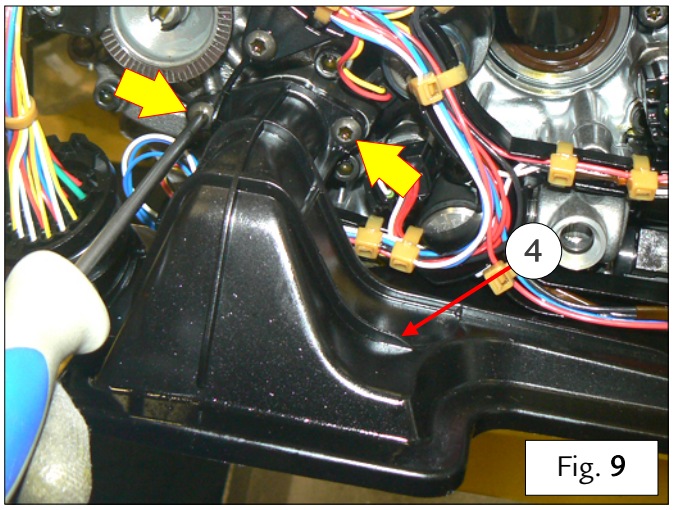


Fig. 9

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.

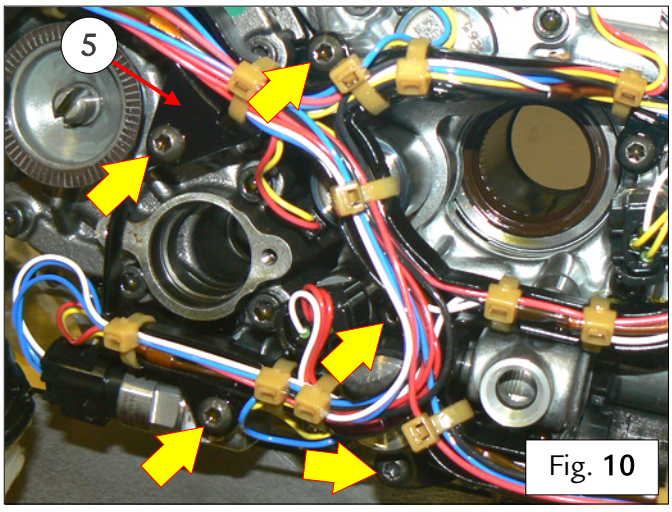


Fig. 10

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

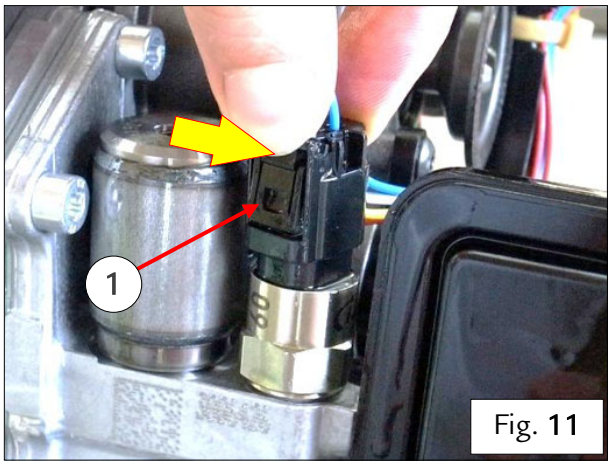


Fig. 11

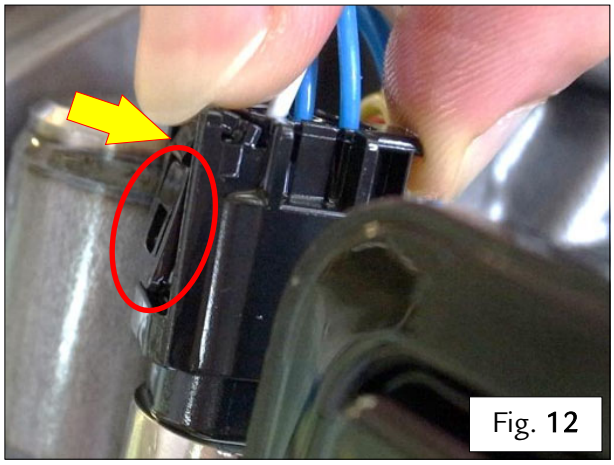


Fig. 12

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

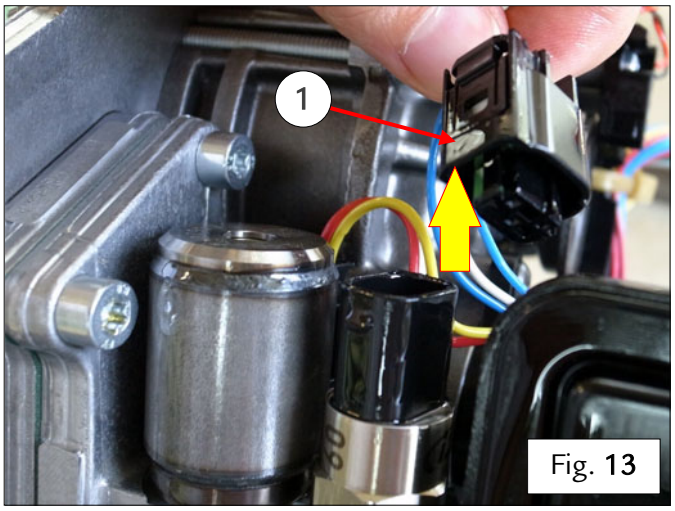
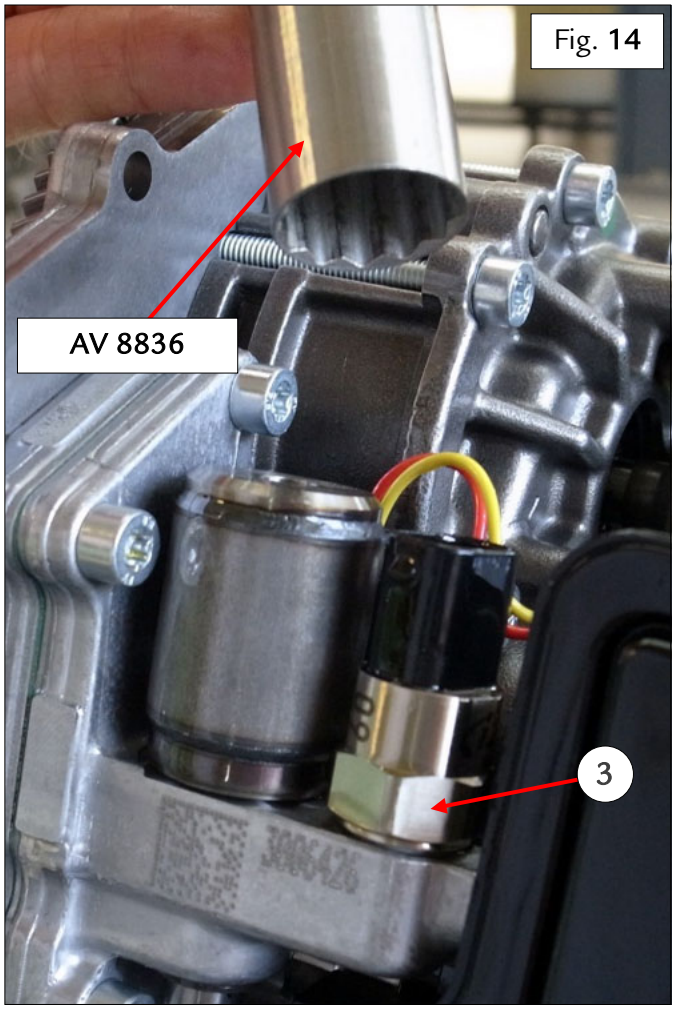
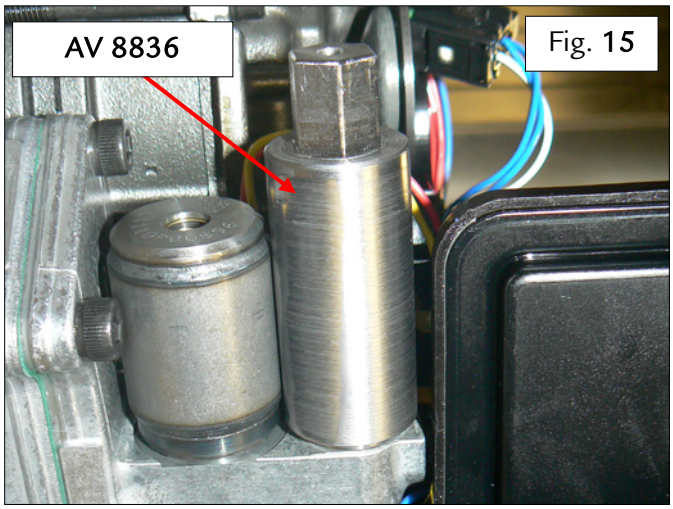


Fig. 13

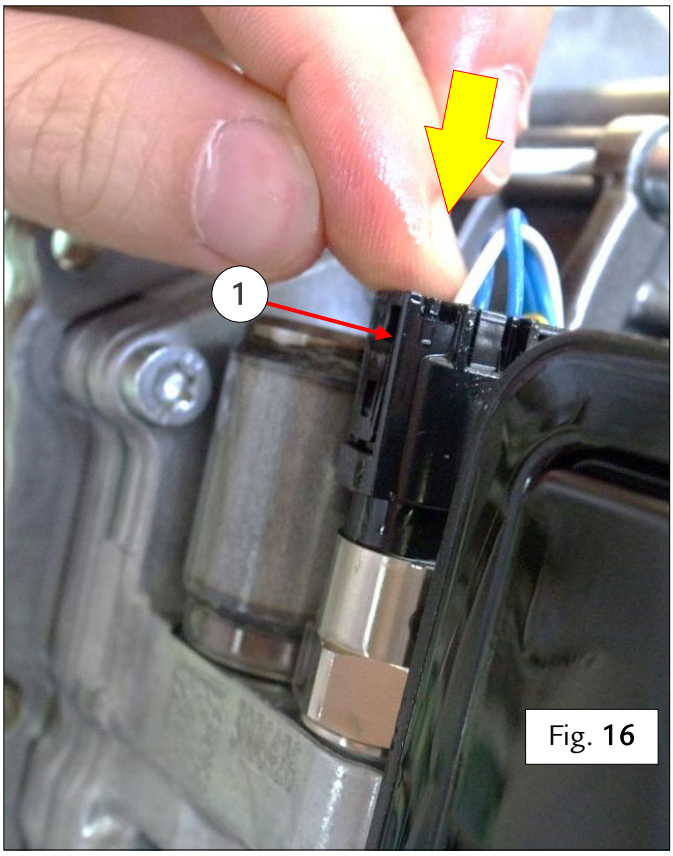
- Fit the **19 mm socket bit AV 8836** onto the hexagonal profile **(3)** of the pressure sensor – Fig. **14**.



- Use the socket **AV 8836** to unscrew the pressure sensor – Fig. **15**.
  Note: Take care to 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 right way around **(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

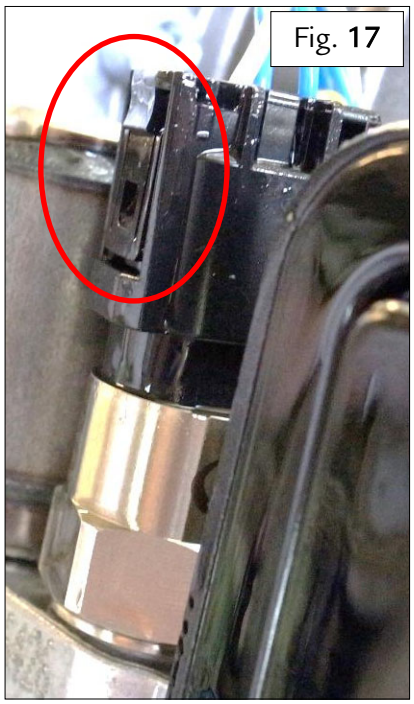


Fig. 17

NOT OK

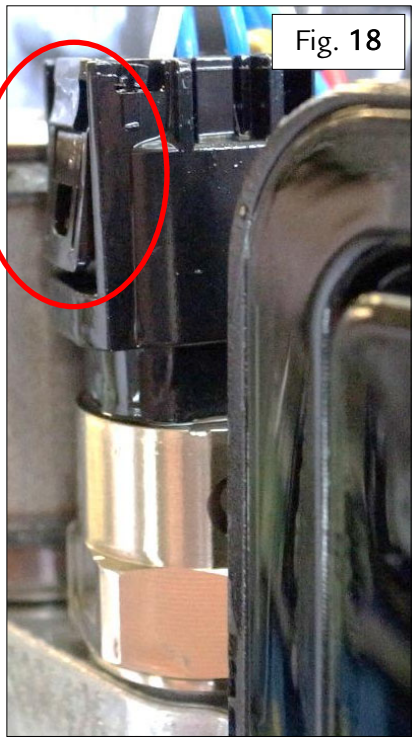


Fig. 18

- 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.

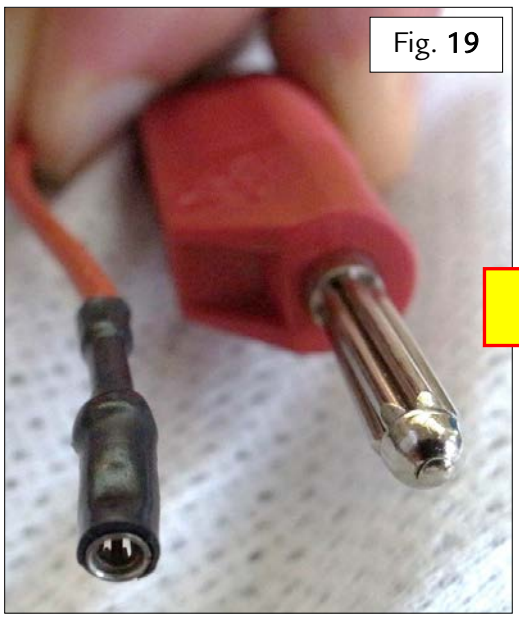


Fig. **19**

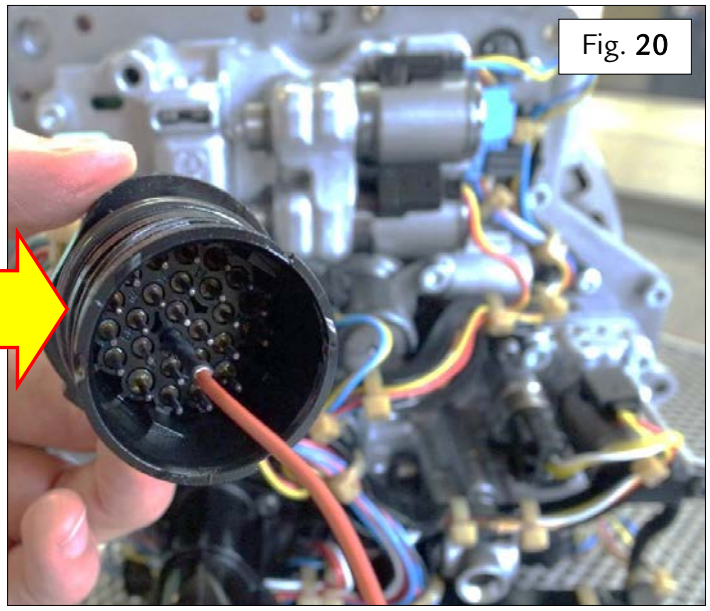
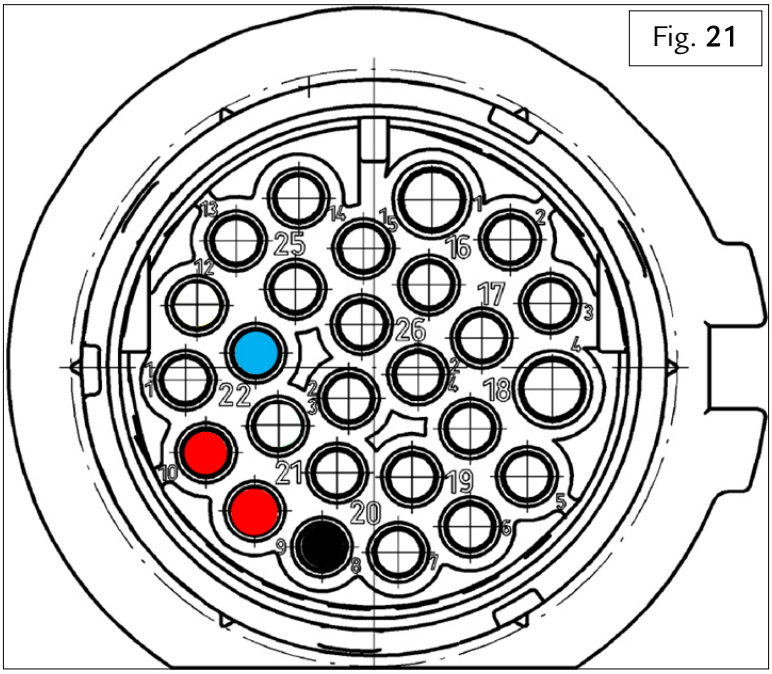


Fig. **20**

Checking clutch pressure sensor C1 (811)

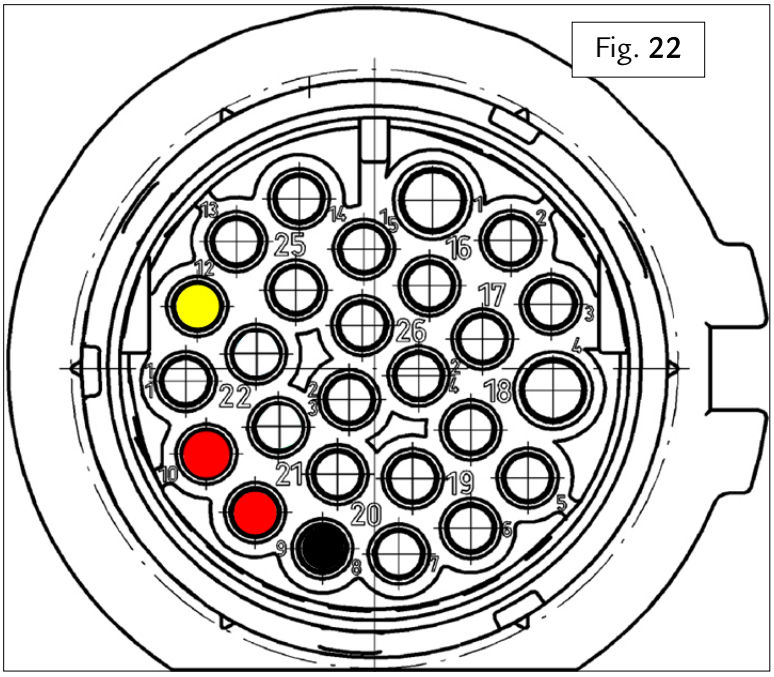
- Apply a voltage of **5±0.1 V** to **pin 10** (red), after connecting to **pin 9** (red) **(POWER)** – Fig. **21**.
- Connect the negative wire of the voltmeter to **pin 8** (black) **(GND)** – Fig. **21**.
- Connect the positive wire of the voltmeter to **pin 22 (blue) (SIGNAL)**, and read the value – 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)

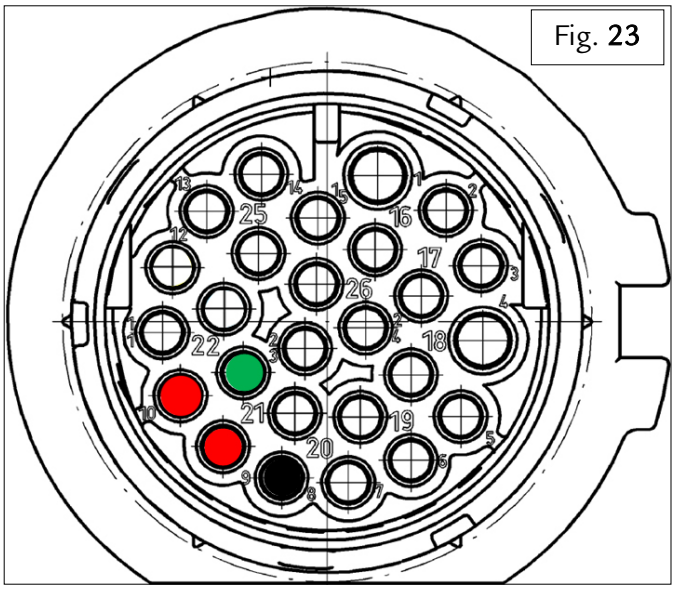
- Apply a voltage of **5±0.1 V** to **pin 9** (red), after connecting to **pin 10** (red) **(POWER)** – Fig. **22**.
- Connect the negative wire of the voltmeter to **pin 8** (black) **(GND)** – Fig. **22**.
- Connect the positive wire of the voltmeter to **pin 12 (yellow) (SIGNAL)**, and read the value – 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**.

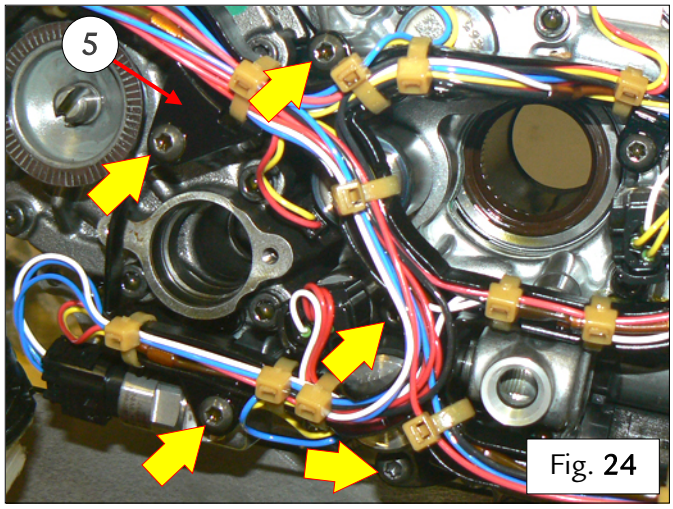


Fig. 24

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.

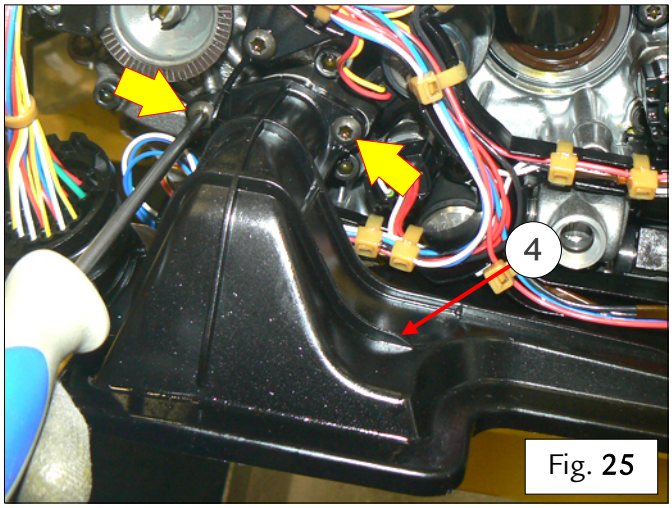


Fig. 25

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

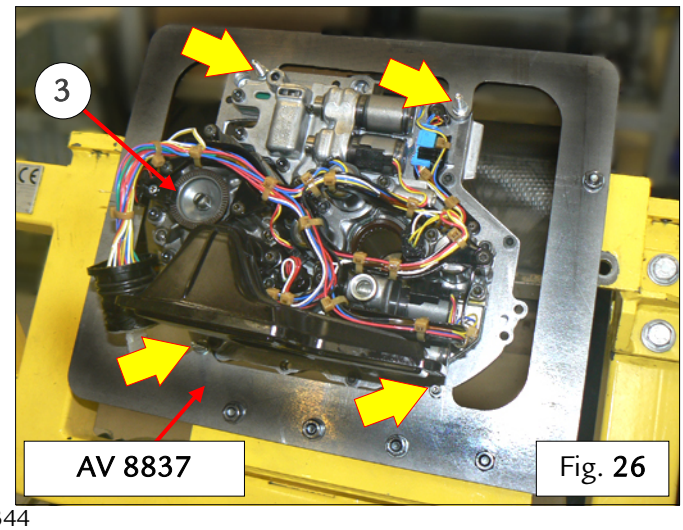
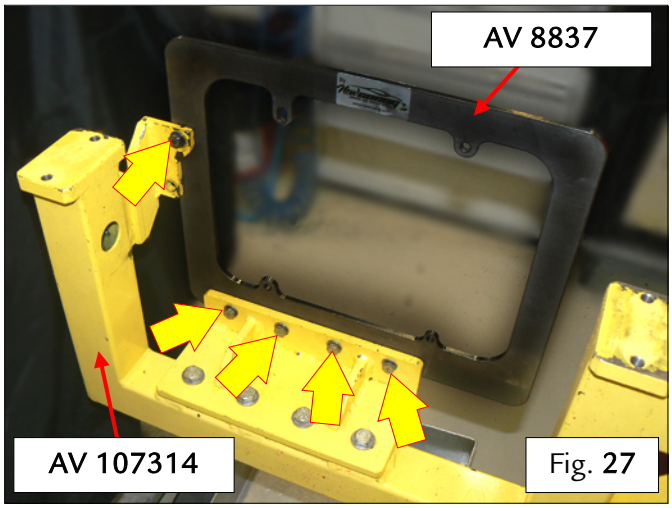
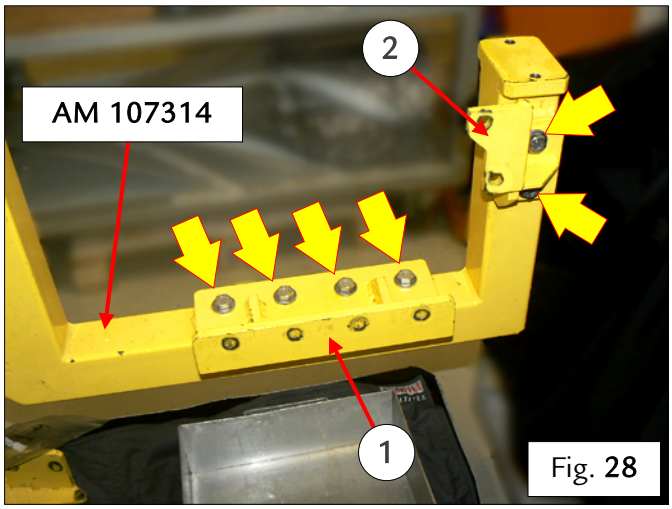


Fig. 26

- 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 **2330** of February 2016).
- 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 perform the procedure to warm the gearbox gear oil to operating temperature (as described in paragraph **A3.03** of the Workshop Manual for the DCT F-3 ATF hydraulic clutch system oil; as described in paragraph **A3.02** of the Workshop Manual for the Shell Transaxle 75W-90 GL5 oil);
3. Check the levels of the gearbox gear oil and the hydraulic clutch system oil (as described in paragraph **A3.03** of the Workshop Manual for the DCT F-3 ATF hydraulic clutch system oil; as described in paragraph **A3.02** of the Workshop Manual for the Shell Transaxle 75W-90 GL5 oil);

- 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 center, 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*

* Replace both 40 Bar pressure sensors (811−812).

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
Ferrari California T	July 2016

VEHICLE FILE	
Date:	Chassis number:
Model:	Dealer:
Market:	Vehicle Km/mi:
Gearbox No.:	ROL No. (if available):
Warranty start date:	Warranty end date:
Prior procedures on DCT gearbox (date and type of procedure):	

DIAGNOSTIC FILE
Provide description of oil leakage found (attach photos), specifying number of leaks, in reference to the drawings from page 2 to 4 of Technical Information 2149:
List any DTC errors in NCR (in reference to the list from page 7 to 15 of Technical Information 2149):

In the event of NOISE from gearbox/differential, specify:

Conditions in which noise occurs:

Vehicle speed:

Gear selected: N ☐ 1st ☐ 2nd ☐ 3rd ☐ 4th ☐ 5th ☐ 6th ☐ 7th ☐ R ☐

During gear shift? YES ☐ NO ☐

If noise occurs during gear shifting, specify: Upshifts ☐ Downshifts ☐

Automatic mode ☐ Manual mode ☐ Performance mode ☐

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
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If noise occurs with gear engaged, specify when:	Under acceleration ☐	When lifting off throttle ☐	Constant throttle (cruise) ☐
Noise is heard when:	Driving straight ☐	Turning right ☐	Turning left ☐
	Negotiating traffic circle ☐	Negotiating tight bend ☐	Negotiating wide bend ☐
Describe the type of noise heard:	Whistle ☐	Rumble ☐	Gear noise ☐
	Differential bevel gear ☐	Vibration ☐	Clunking ☐

Check the levels of the clutch hydraulic oil system (ATF) and the gearbox gear oil system (GL)

Oil level (ATF)	Too high ☐	Too low ☐	OK ☐
Oil level (GL)	Too high ☐	Too low ☐	OK ☐

Is metal debris found on plug?

JOB FILE

Procedure performed (from operation list on page 2):

Kit Part Nos. ordered:

DCT Gearbox Pre-Diagnosis Form

Model	Updated on
Ferrari California T	July 2016

Job performed on:	
CCP	**SAP**
Identification No. of old CCP:	Identification No. of old SAP:
Identification No. of new CCP:	Identification No. of new SAP:
Any faults noted during repair procedure:	

Task performed by (Dealer):

_____

_____

Technical Manager:

First name _____ Surname _____

(Print) (Print)

Company stamp

_____

Full signature