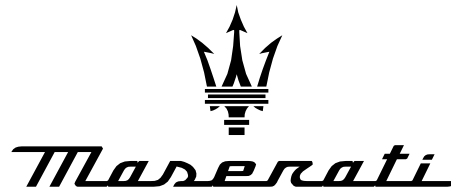


Diagnostic Sheet

FROM: Maserati TSO

TO: Maserati Network



PERSONAL SERVICE LAB

MASTERS OF CARE

Air Suspension System - Fuse F41 blown

ATTENTION! This bulletin supersedes [MAS002814](#) released on May 26, 2023. Please discard/remove all copies of the previous bulletin.

DATE: September 6, 2024

This Diagnostic Sheet serves as a guide and provides additional diagnostic info for Air Suspension system anomalies on Maserati Levante vehicles

MODELS: M161 Levante (All MY).

Issue: Difficulty changing the ride height of the vehicle with warning on the Instrument Panel: "SERVICE AIR SUSPENSION or CHECK AIR SUSPENSION SYSTEM". The vehicle may have a misalignment (front suspension lower than the rear suspension) and/or the compressor fuse (F41 in RDU, Rear Distribution Unit, rear fuse box) is blown.

Faults: possible DTCs stored in ASCM:

C15A1-00 (55A100) - Unable to Obtain Desired Ride Height
 C15D9-00 (55D900) - Low Air Mass
 C1562-98 - Ride Height Air Pump Control-Component or System Over Temperature
 C2212-00 (621200) ECU - in plant mode

CHECKS: If the customer's concern matches this type of anomaly, open a BOL and attach all the requested information.

It's necessary to fill in the attachments: Attachment A: checklist and Attachment C: summary table of vehicle height and angle measurements printed and scanned or in electronic format, as a PDF when attaching to the BOL.

Depending on the information in the Notes section, the checklist may need to be partially or completely filled out.

NOTE: Maserati has already introduced a product improvement on the compressor in the past to mitigate the concern. Vehicles equipped with this improvement are identified as Post-Clean Point. Vehicles not equipped with this factory improvement are identified as Pre-Clean Point.

Pre-Clean Point and Post Clean Point Vehicles:

Lower than: VIN349849 – Assembly Number 6077076 = **Pre-Clean Point**

Higher than: VIN349849 – Assembly Number 6077076 = **Post-Clean Point**

A SW update for the ASCM control unit is available which reduces air compressor operations with the engine off minimizing high electrical current draw from the fuse:

- SW PN MY17-20: 673014079

- SW PN MY21-24: 670295734

Pre-Clean Point vehicles:

- If available, perform an ASCM SW update and fill out **ATTACHMENT A**, replace only the compressor (Component #4 in table 06.24-2) and continue with the checklist from steps 2 to 5 to verify that the vehicle does not have any further anomalies present. **Open a BOL as Factory Info.**
- If no SW update is available for the ASCM: fill out **ATTACHMENT A**, replace only the compressor (Component #4 in table 06.24-2) and continue with the checklist from point 2 to 5 to verify that the vehicle does not have further anomalies. **Open a BOL as Factory Info**

Post-Clean Point vehicles:

- If available, perform the SW update of the ASCM control unit, carry out the checklist from points 1 to 5 to check that the car does not present any further anomalies. Open a BOL as **Factory Info**.
- If no SW update of the ASCM control unit is available, carry out the complete checklist from point 1 to point 9. Open a BOL as **Support request** to share the diagnosis and define the cause of the anomaly.

Labor Times:

For all vehicles:

- For step 4 of the checklist refer to procedure 06.24.001 - COMPLETE COMPRESSOR UNIT FOR AIR SUSPENSION SYSTEM Air system leak test = 0.30 h.

- For step 5, if necessary, carry out procedure 00.20.034 – 35 - CAR HEIGHT CALIBRATION Recording and checking with diagnostic tool, = 0.35 h.

- To carry out the SW update of the ASCM control unit: 6.90.001.9 = 0.30 h

- For the execution of the remaining steps of the checklist from points 1 to 5, 0.25 hours of extra-time will be authorized in BOL using a specific code.

- For the execution of the complete checklist from points 1 to 9, 2 hours of extra-time will be authorized in the BOL using a specific code.

CONSIDERATIONS: Open a BOL of the type requested based on the case history, attaching;

- 1) Scan of the completed diagnosis checklist or completed PDF document
- 2) Completed height table (Annex C: summary table of vehicle corner height measurements).
- 3) Any acquisitions required by the checklist performed with PicoScope (both in psdata and PDF format) of the currents absorbed by the compressor, the reversing valves, and the angle valves during the execution of the active "Vehicle Articulation Routine" and "Actuator Test" diagnoses"

Attachment A: Checklist

Preliminary questions: under what conditions did the anomaly occur?

- a. Loading conditions: number of passengers and cargo in the trunk. Answer:

- b. Vehicle speed. Answer:

- c. Any additional notes on specific maneuvers or conditions that may have triggered the symptoms (i.e. change in vehicle height). Answer

- d. Was the suspension stiffness calibration set to rigid (hard) or soft (soft) mode via the button on the central tunnel?

HARD SOFT

- e. Was the Easy Entry/Exit feature active?

YES NO

NOTE: After carrying out the Active Diagnoses reported in this diagnosis sheet, it is normal for the DTC C2212-00 (621200) ECU in In Plant Mode to be stored in the ASCM control unit. Through the diagnosis tool, select the ASCM module and carry out the active diagnosis ASCM > Active Diagnosis > Exit In-Plant Mode function

STEPS TO BE CARRIED OUT:

1. Is fuse F41 in the RDU (Rear Distribution Unit) blown?

YES NO

- If the answer is YES, replace it, then proceed with the steps below
- If the answer is NO, proceed with the steps below

2. With the engine running, manually level the vehicle using the appropriate button on the central tunnel.

If the vehicle does NOT change height even after replacing the F41 fuse, check if the DTC C2212-00 (621200) ECU in In Plant Mode is stored. If this DTC is stored, enter the ASCM module with the diagnosis tool and perform the Active Diagnosis > Exit in Plant Mode in the ASCM module

Was it possible to change the height of the Vehicle?

YES NO

Did the compressor make excessive noise during its operation?

YES NO

- With the Diagnostic tool, through Active Diagnosis > Ride Height and Component Air Pressures & Mass Readings of the ASCM module (see Figure 1), check the total air mass (Total System Air Mass) and the system pressure (Tank Pressure parameter Air). The acceptable pressure value (Air Tank Pressure) is between 5 bar and 12 bar. The acceptable value of total air mass of the system is between 109 bar-liter and 159 bar-liter. The nominal value is 129 bar liter.

Note: It is advisable to carry out this Active Diagnosis with the engine running. It is normal for the message "Airmass Too Low" to appear as soon as the procedure is launched. In this situation it is recommended to keep the engine running for at least a few minutes, then click on the Update button. If the Active Diagnosis continues to return the "Airmass Too Low" message with all parameters = 0 (zero), continue with the steps below.



Figure 1: air suspension system pressure reading with the Active Diagnosis of the ASCM ECU.

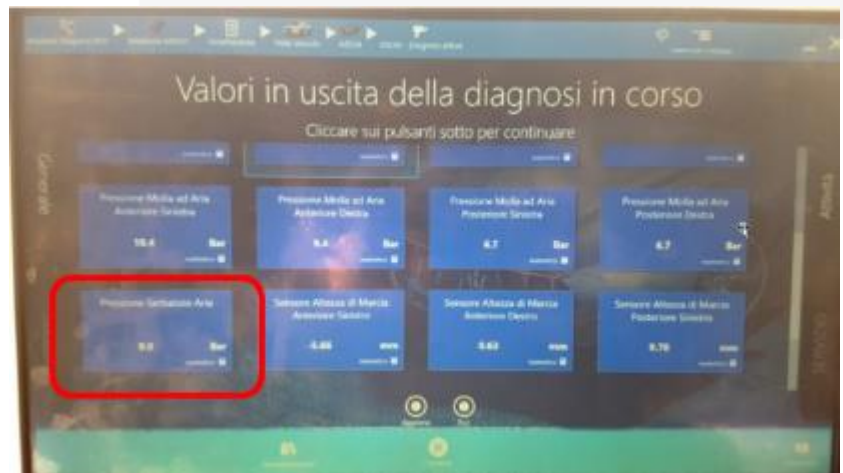


Figure 1: results of the system pressure reading Active Diagnosis.

4. Carry out test 06.24.001 - COMPLETE AIR SUSPENSION SYSTEM COMPRESSOR UNIT - Air system air leak test to check for any air leaks in the air suspension system: have any air leaks been found in the air suspension system?

YES NO

- If the answer is YES, fix this leak first.
- If the answer is NO, proceed with the steps below

5. Measure vehicle height at each corner. Carry out this height measurement as shown in Figure 3 reporting the results in the attached table in millimeters (mm).



Figure 3: measuring method of the Vehicle Height at each corner.

- Do the corner heights of the same axle have a difference GREATER than 5 [mm] (example: left front spring height: 450 mm; right front spring height: 460 mm)?

YES NO

If YES, proceed from step 5.1; otherwise go to step 6.

- 5.1 Carry out the procedure in the Workshop Manual 00.20.034 – 35 - CAR HEIGHT CALIBRATION - Recording and checking with a diagnostic tool.
- 5.2 Measure vehicle height at each corner as shown in Figure 3.

Note: Fill in the column shown in Table 1 of Annex C: summary table of vehicle height and angle measurements

Manually level the vehicle and carry out 3 complete leveling cycles from Aero 2 to Off Road 2 and back, verify that the system is operational and no DTCs appear/set

Operations to be performed with MD-EVO

Below are the steps to carry out using the Diagnostic tool (MD EVO), continuation of the previous section

- 6. Carry out the Active Diagnosis > Pressure Vent Valve Actuator Test of the ASCM module three times, as shown in Figure 4

The purpose of this step is to evaluate the functioning of the reversal valves (internal to the compressor), the vent valve and the pressure sensor, which is located inside the valve block.

Using this diagnosis, the air circuit between the tank and the pressure sensor is forced to empty via the vent valve.

The expected result on a properly functioning car is that:

- hear a hiss/vent sound
- the height of the four corners of the vehicle must not be reduced (tolerance 5 mm).
- the active diagnosis ends correctly.

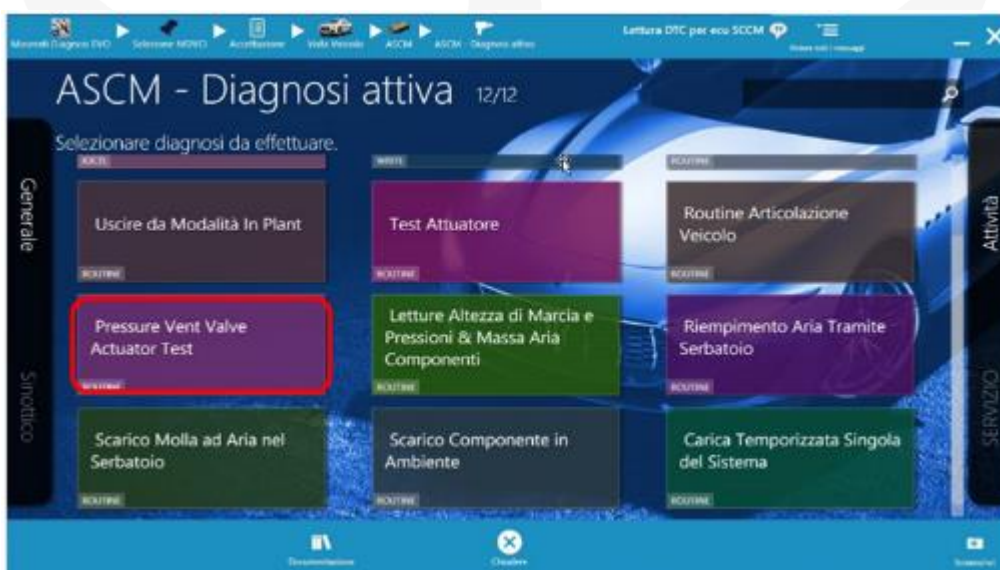


Figure 4: Active Diagnosis > Pressure Vent Valve Actuator Test.

6.1 Did the procedure complete correctly?

YES NO

If the active diagnosis does NOT end correctly, repeat it. In any case, continue from step 6.2

6.2 Was there a hissing/vent sound?

YES NO

6.3 Measure the heights on the 4 corners (as shown in Figure 3), reporting the results in Table 1 of Annex C: summary table of vehicle corner height measurements.

6.4 Have the heights on the 4 corners changed, compared to step 6, by more than 5 mm?

YES NO

7. Carry out the Active Diagnosis > Unload component in the ASCM module environment, selecting the following settings:

- Deflating Mode: Fixed short time deflating mode, as in Figure 5.
- Deflating component: one at a time FL, FR, RL, RR, as in Figure 5.

The purpose of this step is to evaluate the operation of the vent valve and the valve of each air spring.

Using this diagnosis, the air circuit of the single air spring is forced to empty via the vent valve.

The expected result on a properly functioning car is that:

- should hear a hiss/vent;
- the heights of the 4 corners of the vehicle must be reduced by a value greater than 5 mm.

By carrying out this active diagnosis, individually, for all four air springs, it is possible to evaluate they are functioning.

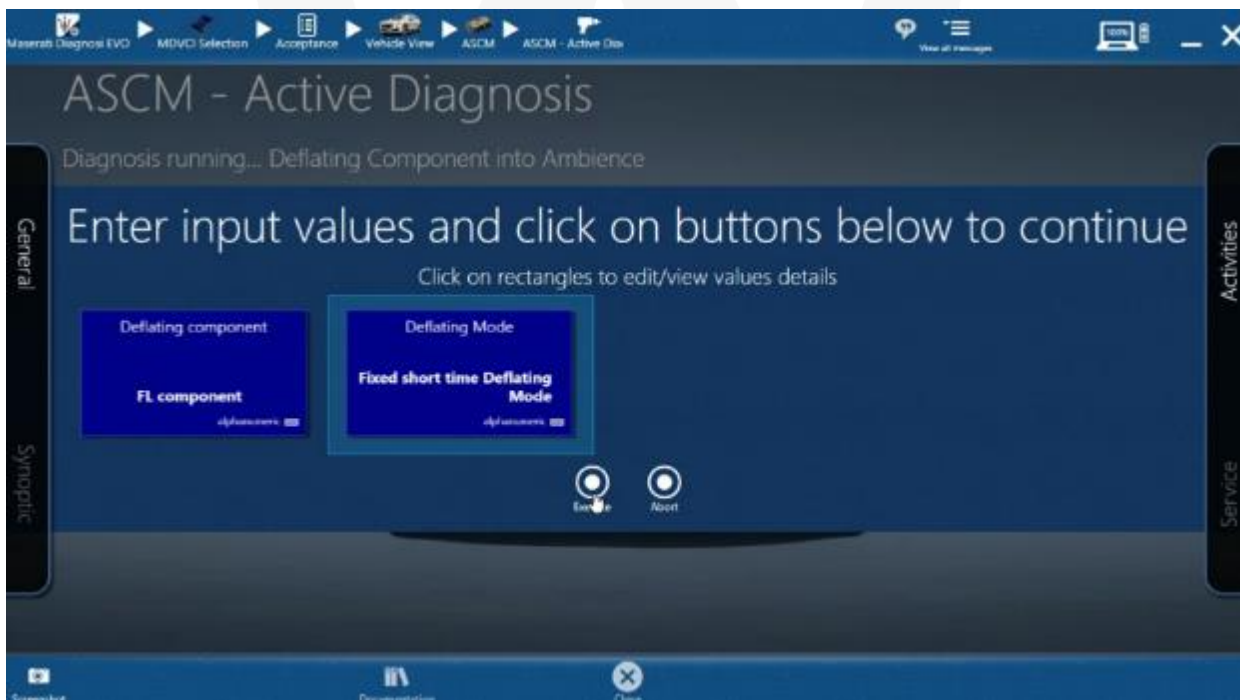


Figure 2: Active Diagnosis > Deflating Component into Ambience of the ASCM module.

7.1 Did you hear a hissing/venting noise?

YES

NO

7.2 Measure vehicle height at each vehicle corner (as shown in Figure 3) reporting the results in Table 1 of Annex C: summary table of vehicle corner height measurements.

Have the heights on the 4 corners changed by more than 5 mm compared to point 7?

YES

NO

Note: As indicated in the "Considerations" section, proceed with points 8 and 9 only for Post-Clean Point vehicles.

8. Perform 10 operations from Off Road 2 to Aero 2 to stress the system. Return the car to 'Normal' height level.

Carry out the active diagnosis ASCM > Active diagnosis > Vehicle Articulation Routine twice, as described below.

Between the first and second runs, bring the car back to 'Normal' height level.

Before and after the first execution of the two necessary ones, record, in Table 2 of Annex C: summary table of vehicle corner height measurements, the height of all the corners of the car.

This active diagnosis activates the individual springs both in extension and in compression, opening the individual valves for a duration of 5 seconds, in the following order::

- a. Front left.
- b. Front right.
- c. Rear left.
- d. Rear right.

At the same time, in order to monitor the current absorbed by the compressor, the valve block and reversing valves inside the compressor during the various actuations, it is necessary to measure the current absorbed by these two system components, according to the methods described in Annex B: compressor current absorption test. For this reason, therefore, point 8 must be repeated twice.

First execution of the active diagnosis:

- a. Channel A: current absorbed by the compressor (B1: current absorbed by the compressor), and, at the same time
- b. Channel B: current absorbed by the valve block (B2: current absorbed by the valve block).

Second run of active diagnosis:

- a. Channel A: current absorbed by the compressor (B1: current absorbed by the compressor), and, at the same time
- b. Channel B: current absorbed by the valve block (B3: current absorbed by the reversing valves)

Note: Save a psdata file and a PDF file of the measurements carried out with PicoScope for each execution of the active diagnosis to obtain a total of four files relating to this point 8.

If fuse F41 blows while carrying out this test, replace it

Did fuse F41 blow while performing this test?

YES

NO

9. Return the Vehicle to 'Normal' height level.

Carry out, twice as described below, the active diagnosis ASCM > Active diagnosis > Actuator Test, selecting (one at a time):

- FL (Front Left).
- FR (Front Right).
- RL (Rear Left).
- RR (Rear Right).

Between the first and second runs, bring the car back to 'Normal' height level.

Before and after the first execution of the two necessary ones, record, in Table 2 of Annex C: summary table of vehicle corner height measurements, the height of all the corners of the car.

The diagnostic tool screen is shown in Figure 6 for reference.

Using this diagnosis, the reversal valves inside the compressor and the valve of each air spring are activated to deflate each individual air spring, one by one.

The expected result on a properly functioning car is:

- All springs deflate (reaching the same height).
- The springs deflate one at a time: this means that you must not deflate more than one at a time.

First execution of the active diagnosis:

- a. Channel A: current absorbed by the compressor (B1: current absorbed by the compressor), and, at the same time
- b. Channel B: current absorbed by the valve block (B2: current absorbed by the valve block).

Second run of active diagnosis:

- a. Channel A: current absorbed by the compressor (B1: current absorbed by the compressor), and, at the same time
- b. Channel B: current absorbed by the valve block (B3: current absorbed by the reversing valves).



Figure 6: Active Diagnosis > Actuator Test.

Note: Save a psdata file and a PDF file of the measurements carried out with PicoScope for each execution of the active diagnosis to obtain a total of four files relating to this point 9.

If fuse F41 blows while carrying out this test, replace it.
Did fuse F41 blow while performing this test?

YES

NO

Annex B: Compressor current absorption test, valve block and compressor reversing valves

Note: Before starting the current measurement with a clamp meter, it is necessary to reset the current reading, i.e. make sure that, in the absence of currents, the value read on PicoScope is equal to zero. To reset the clamp meter, use the zeroing knob on the clamp

B1: Current absorbed by the compressor

The measurement of the current absorbed by the air suspension system compressor can be easily done by accessing the X090 connector located near the rear differential.

The location of the X090 connector, in the car, is shown in Figure 7.



Figure 7: position of the X090 connector for the current measurement absorbed by the compressor during the actuations.

To access it, we recommend releasing the blue connector shown in Figure 8.



Figure 8: secondary lock (blue, indicated by the arrow) of the X090 connector..

The air suspension system compressor power cable is the red cable shown in Figure 9.



Figure 9: power supply wiring to the air suspension compressor.



Figure 10: current clamps to be used for the measurement of current absorbed by the compressor

To measure the current absorbed by the compressor, it is necessary to follow these steps:

1. You can use the TA167 current clamp (with a capacity of 2000 A to be set in 200 A configuration, using the selector on the clamp itself), or the TA019 clamp (with a capacity of 600 A).
2. Connect the current clamp to connector A on the PicoScope instrument.
3. Choose correct parameter on the PicoScope software. Click on channel A and choose:
 - a. 2000 A clamp in 200A configuration if the TA167 clamp meter is used, or
 - b. 600 A clamp if using the TA019 clamp.

The settings are shown in Figure 11

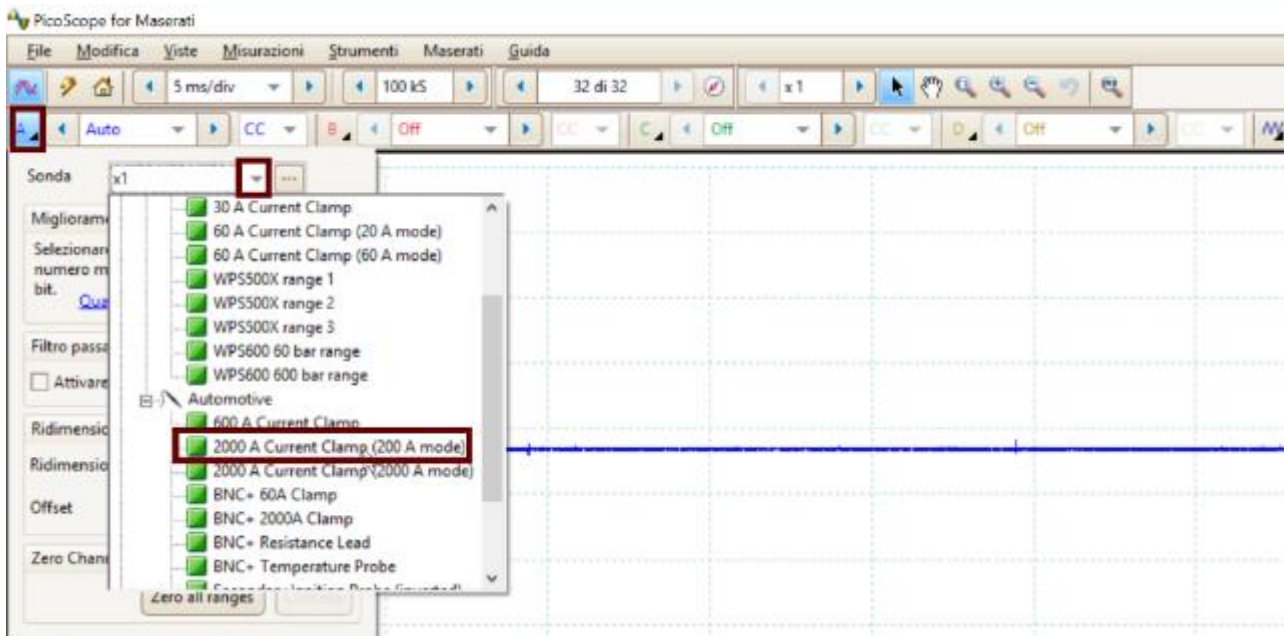


Figure 11: settings of PicoScope for the choice of the current clamp.

1. Set the correct scale from the "scale setting" drop-down menu next to channel A: -100A/200A.
2. Set 2 s/div and sample rate to 100 kS. In this way it is possible to have a sampling frequency equal to 5 kHz: the sampling refers to the number of samples stored in the total window of 10 divisions that is displayed on the screen: with 2 s/div I will have 10 divisions and therefore on the screen I will see a measurement of 20 s. By doing so, therefore, the frequency will be equal to

$$f = \frac{\text{Samples}}{\text{Sample Time}} = \frac{100 \text{ kS}}{20 \text{ s}} = \frac{100000}{20 \text{ s}} = 5000 \text{ Hz}$$

PicoScope connections and settings	
Channel A scope	Current clamp TA019 (capacity 600 A) or current clamp TA167 set to 200 A
Channel A scale setting	-100 A/200 A DC
Time scale settings	2 s/div
Sampling	100 100 kS (100.000 samples)

3. Save measurements in psdata and PDF format.

Figure 12 shows the typical current absorption profile of the compressor during levelling.

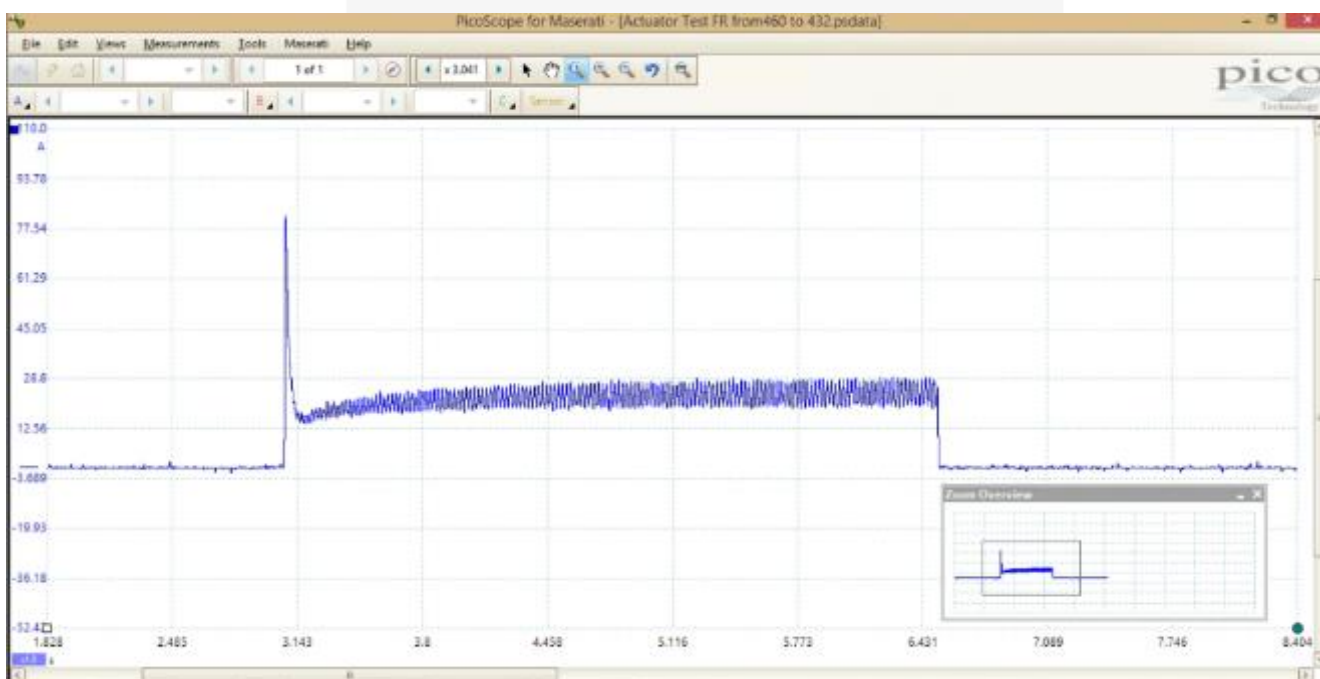


Figure 12: typical compressor current absorption profile during levelling.

B2: current absorbed by the valve block

The measurement of current absorbed by the valve block of the air suspension system can be made from pin 23 of connector B of the ASCM module, as shown in Figure 13.

Since, in this case, the current values are lower than those of section B1: current absorbed by the compressor, in addition to the fact that these measurements must be made at the same time as the measurement of current absorbed by the compressor, it is required in this to connect the TA018 current clamp, which has a capacity of 60A.

This clamp is shown in Figure 14.

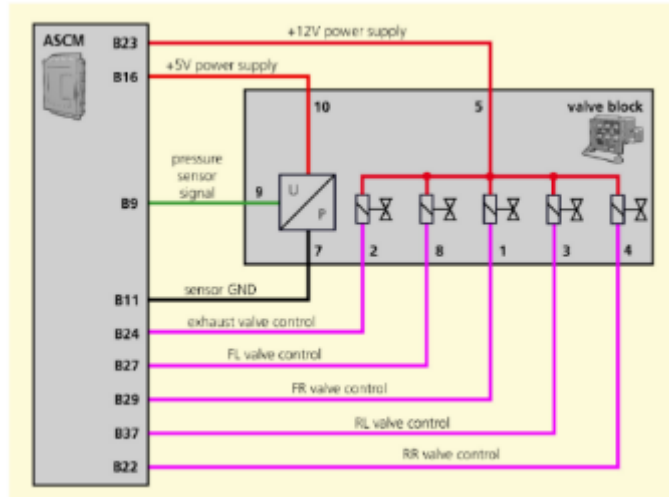


Figure 13: outline of the wiring diagram of the valve block



Figure 14: TA018 current clamp.

Since the X090 connector shown in B1: compressor current draw is easily accessible than the ASCM connector B, measure the current by accessing pin 16 of the yellow-green harness of the X090 connector, as shown in Figure 15.



Figure 15: pin 16 of connector X090 (yellow-green wiring).

To measure the current absorbed by the valve block, it is necessary to follow these steps:

1. Use the TA018 current clamp (with a capacity of 60 A to be set in 20 A configuration, using the selector on the clamp itself).
2. Connect the current clamp to connector B on the PicoScope instrument.
3. Choose correct parameter on the PicoScope software. Click on channel B and choose the 60 A Current Clamp (20 A mode).

The settings are shown in Figure 16.

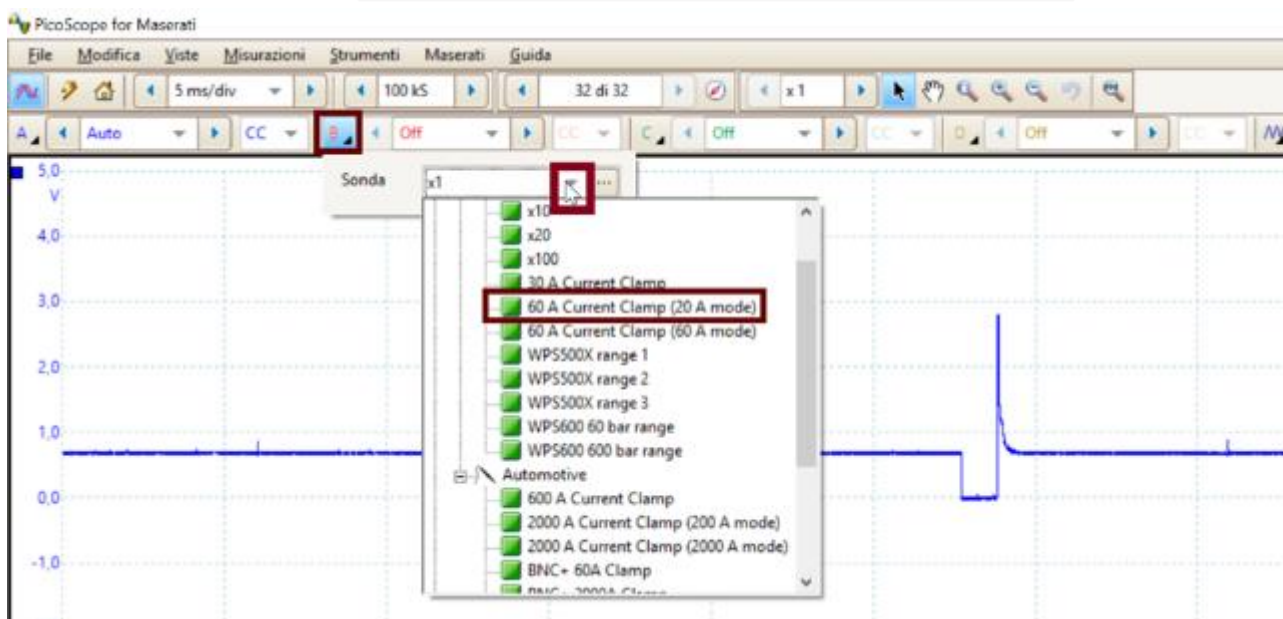


Figure 16: settings of the 60 A current clamp..

4. Set the correct scale from the "scale setting" drop-down menu next to channel A: -/+5A.
5. Set 2 s/div and sample rate to 100 kS.

Channel B scope	
Channel B scale setting	-5 A/5 A DC
Time scale settings	2 s/div
Sampling	100 kS (100.000 samples)
Channel B scope	TA018 Current Clamp (capacity 60 A) with selector on 20 A

6. Save the measures in psdata and PDF formats.

Figure 17 is the typical current absorption profile by the valve block when performing an Actuator Test is shown.

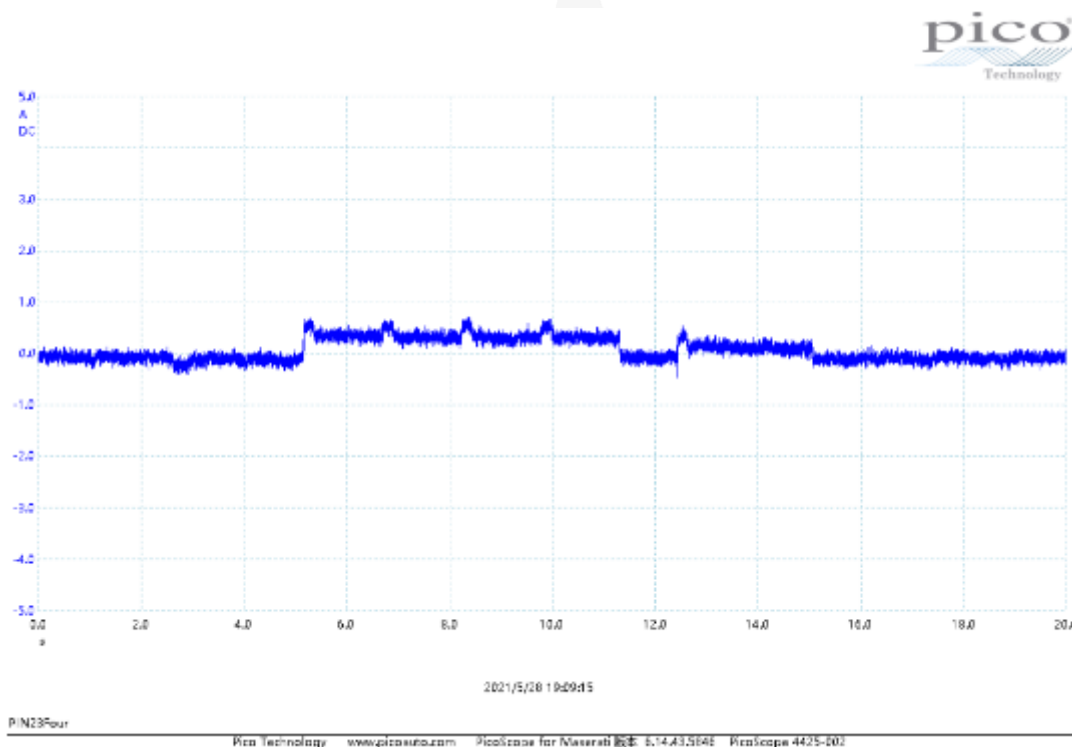


Figure 17: typical valve block current absorption profile during the execution of an Actuator Test.

B3: current absorbed by the reversing valves

The measurement of the current absorbed by the reversing valves of the air suspension compressor can be done from pin 46 of connector B of the ASCM module, as shown in Figure 18.

In this case as well, as in the case B2: current absorbed by the valve block, the values of current are lower than those measured in the section B1: current absorbed by the compressor, in addition to the fact that these measurements must be made at the same time as the measure of the current absorbed by the compressor, it is required in this to use the current clamp TA018, which has a capacity of 60 A. This clamp is shown in Figure 14.

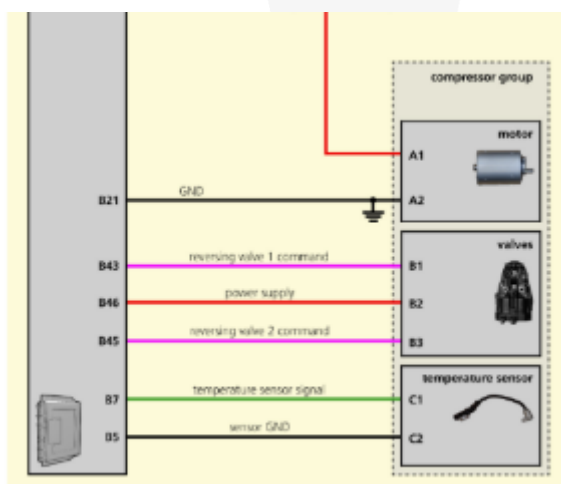


Figure 18: outline wiring diagram of the air suspension compressor.

As the connector X090 shown in B1: current absorbed by the compressor is more accessible than the connector B

of the ASCM, measure the current by accessing the grey-green wiring pin 8 of connector X090, shown in Figure 19.

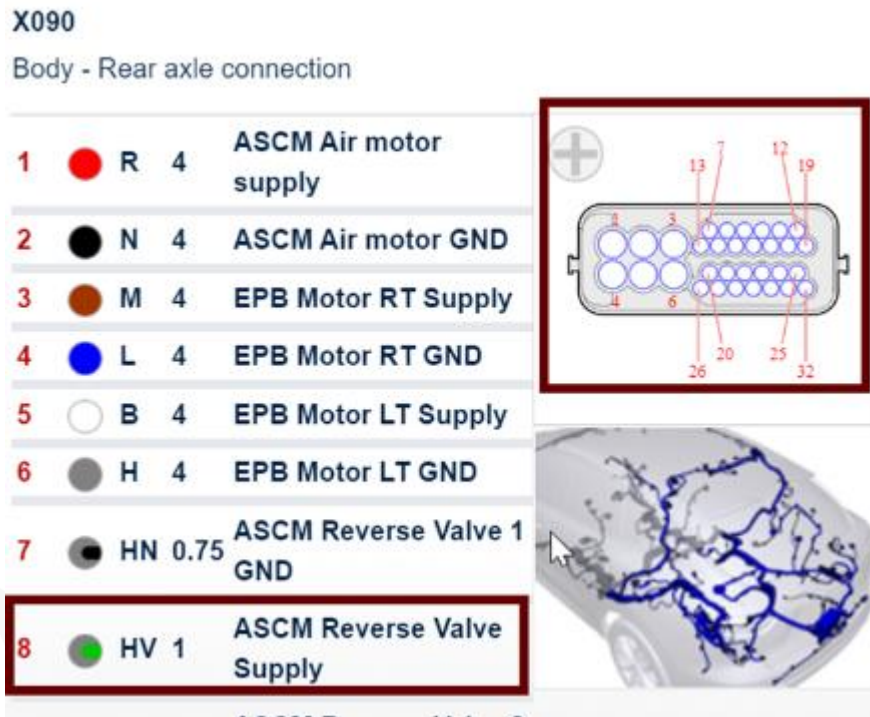


Figure 19: pin 8 of connector X090 (grey-green wiring).

The TA018 current clamp can be located close to the TA0167 or TA019 current clamp, the latter being used to measure the current absorbed by the air suspension compressor.

In order to perform the measurement of current absorbed by the valve block, follow these steps:

1. Use the TA018 current clamp (with a capacity of 60 A to be set in configuration 20 A, by selector on the clamp itself).
2. Connect the current clamp to connector B of the PicoScope tool.
3. Choose correct claps on PicoScope software. Click on channel B and choose the clamp 60 A Current Clamp (20 A mode).
The settings are shown in Figure 16.
4. Set the correct scale from the "scale setting" drop-down menu next to channel A : -/+5A.
5. Set 2 s/div and sampling frequency to 100 kS.

PicoScope connections and settings	
Channel B scope	TA018 Current Clamp (capacity 60 A) with selector on 20 A
Channel B scale setting	-5 A/5 A DC
Time scale settings	2 s/div
Sampling	100 kS (100.000 samples)

6. Save the measurements in psdata and PDF formats.

In Figure 20 a typical profile of the current absorption by the reversing valves group when performing an Actuator Test is shown.

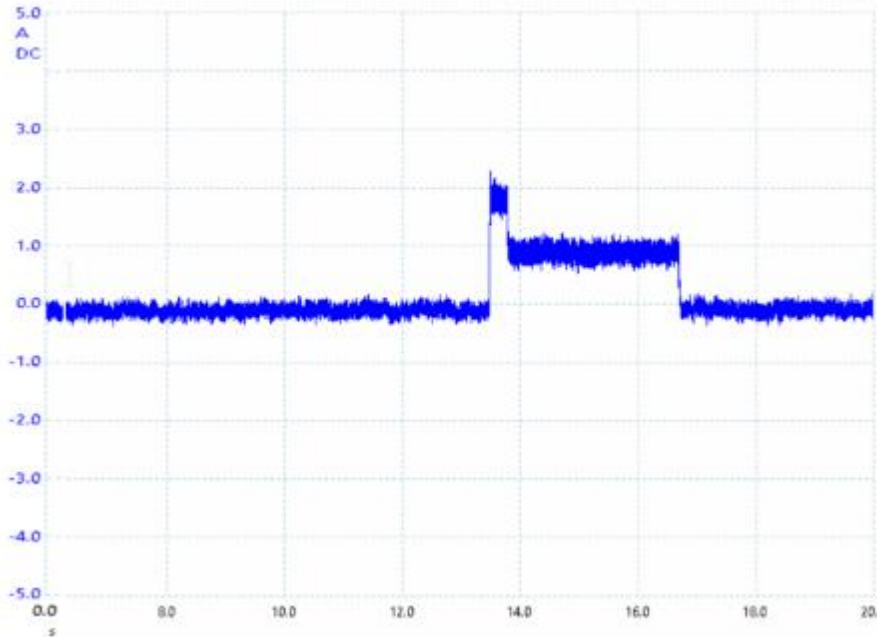


Figure 20: typical current absorption profile of the compressor reversing valve assembly when performing an Actuator Test..

The expected values (normal values) are summarized below for compressor, valve block and reversing valves:

a. Compressor:

Average maximum current ≤ 36 A

Initial peak current ≤ 120 A during a time interval ≤ 200 ms.

b. Valve block power supply:

Maximum peak current $\leq 0,75$ A

Maximum constant current $\leq 0,5$ A

c. Reversing valves inside the compressor:

Maximum peak current ≤ 2 A

Maximum constant current $\leq 1,2$ A

Attachment C: summary table of the Vehicle Heights of each Vehicle corner

Table 1: table to register the Vehicle Heights for steps 5, 6, and 7..

	Step 5 (mm)	After Step 5.2* (mm)	After Step 5* (mm)	After Step 6 (mm)	After Step 7 (mm)
Front Left					
Front Right					
Rear Left					
Rear Right					

* if needed.

Table 2: table to register the Vehicle Heights at steps 8 and 9.

	Before Vehicle Articulation Routine (mm)	After Vehicle Articulation Routine (mm)	Before Actuator Test (mm)	After Actuator Test (mm)
Front Left				
Front Right				
Rear Left				
Rear Right				

