

## **Knowledge Acquisition conclusions:**

### Starting problems:

Does the sound switch make some strange sound like a kind of squeak? If yes, the solution is to service it.

Does the switch make a single dry sound and does not even try to start? If yes, a battery test should be performed first, as the vehicle may have battery problems.

Does the switch look good physically (no wearing marks or loose key)? If the answer is yes, or if the above does not work, a test of the switch should be performed, as it may be a problem with the key.

In case of none of the previous work, the ignition system should be checked. If there is a scraping or squeaking sound when the ignition is turned on, an expert should be called to replace the key.

As an auxiliary measure in the case of a mechanical car, the starter can be pushed.

### Air conditioning operation problems:

#### Bad odors:

Is the air conditioner releasing bad odors? The air conditioning filter should be checked as it may be clogged, it can be serviced or replaced additionally the vehicle's fragrance can be used so that when the air is turned on the smell is that of the fragrance.

is there any physical damage to the vehicle's hoses? If yes, this is the cause of the odor as outside air is flooding the system (outside air includes the air that circulates around the vehicle and may contain odors such as burnt oil or gasoline).

Is the system in internal air mode? If the answer is no that is the problem as the vehicle is using the street air to bring it into the vehicle bringing in external odors with it.

#### Hot air:

Have you already performed the vehicle air test? In case the answer is negative, it is indicated that the test remains on the screen where it manages the air and is a button that says test A/C, in case it is positive, it continues with the following questions.

Do the fuses that have the A/C badge look black or smell fishy/burnt? In case of positive answer, the solution is to replace them.

Do the electrical systems of the car feel clumsy or sluggish? If yes, the user is asked if he/she has already checked if the connection that takes the current to the compressor is well connected? In case of negative it can be said that this is the solution because the current is not enough to properly pump air into the system, in case of negative answer to the next question if I already checked the level of the A / C which may be indicated either on the display of the vehicle or in the component itself? In case you say yes you are asked what level you had if low (<10%), medium (between 11% and 40%) or high (>40%) in case you answer low that is the problem and a refrigerant recharge should be performed, in case you answer no you are asked to check the level and you are asked again.

## Problems with the vehicle lights:

Do I check that the ignition system of the lights is pressed correctly? If not, if yes, continue with next question

Do I check if the connector of the vehicle lights is properly connected? If not, this is the problem, otherwise continue with the next question.

Is the fuse marked "lights" black, or does it smell fishy/burnt? If yes, it should be replaced, otherwise continue with the next question.

Is the vehicle battery well charged? If not, that may be the problem, otherwise continue with the next question.

If none of the above is a solution, it is likely that the lights will be burned out.

## Engine problems:

Are the hoses connecting to the engine leaking? If yes, that is the problem, and the leaks should be sealed. If not, next question.

How high is the fuel level low (<1/4 tank or reserve), medium (between 1/4 and 1/2 tank), high (>1/2 tank) in case the answer is low that is the problem because the engine system will not start the engine without a fuel level of at least 1/4 tank, if medium it is recommended to raise the fuel level a little and try again, in case of high pass next question.

Do the injectors look blunt, or do they have no rubbers? If the answer is positive, the injectors should be changed and that is the solution to the problem, otherwise pass to the next question.

Does the ignition coil (a small device like a watch coil) look burnt or have threads that are touching? If the answer is yes, this may be the problem.

If the answer to all questions is negative, an expert should be called in as the problem cannot be easily solved.

Electrical problems:

is the battery charged? If the answer is no, this is the solution and the battery should be charged, otherwise continue with the next question.

Does the alternator look good physically (no water damage marks or missing parts)? If yes, it is probably the solution to the next question.

Does the wiring look good physically? If yes, an expert electrician should be called in to test for leaks or shorts, otherwise that is the solution, and an expert electrician should be called in to replace the wiring.

Probabilities of each case:

Starting Problems

1. Switch makes strange sound (maintenance): 25% (Moderately common problem; usual wear and tear).

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Switch makes a dry sound and does not attempt to start (battery test): 50% (Low battery is very common cause of starting problems).

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3. Switch with physical damage or loose key (switch problem): 10% (Physical problems with switch are less common; wear and tear usual).

(Physical problems with the switch are less frequent).

4. Scratching/squeaking sound on startup (faulty boot system): 10% (Less common, but important problem).

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5. Push start (mechanical vehicle): 5%.

(More rare, but useful as an emergency solution).

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## **Air Conditioning Operation Problems**

Bad odors

1. Clogged air filter (maintenance or replacement): 40%.

(Common cause of bad odors in the A/C).

2. Physical damage to hoses (external air with odors): 20%.

(Less common, but significant problem).

3. External air mode activated: 20%.

(Common cause if the system is incorrectly configured).

Hot air

1. Air test (A/C test button): 10% (Useful for start-up, but not for operation).

(Useful for starting, but not a direct cause).

2. Black or blown fuses: 30%.

(Frequent problem in the air electrical system).

3. Power tie improperly connected to compressor: 15%.

(Incorrect connections can limit A/C power).

4. Low refrigerant level (recharge needed): 35%.

(Main cause of loss of A/C performance).

5. Clumsy or slow electrical systems: 10%.

(Could be a secondary cause).

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## **Vehicle Lights Problems**

1. Ignition system incorrectly depressed: 15% (Human error; unlikely but possible).

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2. Light connector misconnected: 20% (Moderately common; usually occurs after repairs).

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3. Black or blown fuses: 40%

(Major cause of electrical problems in lights).

4. Flat battery: 20% (Frequent problem related to lights).

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5. Lights burned out: 5% (More rare, but possible if no other cause applies).

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### **Engine Problems**

1. Engine hose leaks: 30% (Common cause of engine related problems.) 2.

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2. Low fuel level: 20%.

(Frequent cause of failures, especially under specific conditions).

3. Blunt injectors or damaged rubbers: 25%.

(Moderately common if regular maintenance is not performed).

4. Ignition coil burned or wires touching: 15%.

(Less common, but critical if it occurs).

5. Unknown problem (call expert): 10%.

(Recommended when common causes do not apply).

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### **Electrical Problems**

1. Discharged battery: 50%.

(Most common cause of electrical problems).

2. Alternator with damage marks: 20%.

(Less frequent, but important problem).

3. Faulty wiring (call expert): 30%.

(Main reason for persistent electrical failures).