# Fault Locating Guide for STable (©) Active Pneumatic Vibration Isolation Tables

Before using this document please read through the User Manual of the STable (©) Active Pneumatic Vibration Isolation Tables.

The vibration isolation system consists of a Quiet Air Compressor and a Vibration Isolation Table. The compressor can be tested by itself, independently of the table. If any malfunction appears in the system, we strongly suggest examining the compressor first. If you are sure, that the compressor works perfectly, you can test the Vibration Isolation Table with the accurate air supply provided by the compressor.

There is a very important aspect to mention. It is written both in the User Manual and in the Installation Manual and in every document issued about STable (©) Active Pneumatic Vibration Isolation Tables. But it must be emphasized now, too. The silicone membranes will blow up in case of overpressure or if you keep the working cylinder in a too high position!

The compressor can be disconnected from the table at the inlet connector of the transparent air filter or the tube inlet of the table. The air filter is fragile. Please never use any tool to tighten its screws! It is enough to tighten them by hand.

This guide has been written to support the work of our partners to find the reason of any fault with STable (©) Active Pneumatic Vibration Isolation Tables, especially in on-site situations. This text was composed according to our current best knowledge. But we may have overlooked some important aspects. If you come across any missing fact or description or any inaccuracy in this manual, please share that information with us to help the future work of our partners. We will insert your experience and suggestions into this manual immediately. Supertech Instruments highly appreciates your help in advance.

In this guide we integrated two alternative approaches. The explanation-based advices are useful for the intuitive and systematic fault locating. The “if–then” styled flowcharts are useful to find the most typical faults quickly. Naturally, the technical specialists of Supertech Instruments will provide a free helpdesk service on the phone and in email for you any time. The text in the sections of fault locating flowcharts has been cut and tabulated according to the following structure:

Description of the fault

Condition(s) A, B, ...

Probable reason(s) of the fault and the solution(s)

Condition(s) C, D, …

Probable reason(s) of the fault and the solution(s)

## Testing the quiet air compressor

The quiet air compressor has an operational pressure regulator circuit. It keeps the pressure of the air in the internal tank in the specified range. Working pressure ranges of the tables:

1.8 to 2.5 Bar for the "small" tables
5.0 to 7.0 Bar for the “large” tables

According to the above specifications, we manufacture two different kinds of compressors. The range between the switching on and switching off pressure, in other words the bottom and top pressure produced by the compressor is the working pressure range of the table. The pressure range produced by a flawless compressor is not harmful for the table. When the air is taken from the tank of the compressor and the pressure decreases, the pressure regulator starts the compressor approximately at 1.8 Bar (for small table) and about 4.0 Bar (for big table) respectively.

The switching actions of the pressure regulator of the compressor should also be checked. Certainly, this feature can be checked only in that case if the compressor works at all. At the back side of the compressor there is a lighting mains switch. If this switch is on, the light produced by the switch indicates, that the 230 VAC supply voltage is present at the mains voltage input of the compressor.

The compressor has several protector circuits. They stop the compressor in emergency cases. The electric fuse at the back side is 8 A “T-type, slow blow” model. There is an internal thermal protector circuit in the compressor, too. It stops the unit, independently of the pressure, if the temperature of the motor is higher than 80 Centigrade. If the thermal protector circuit is activated as a result of overheating, it disables the compressor for 15 to 20 minutes. You can assure, that the thermal protector circuit is inactive (it lets the compressor run if the other working conditions are okay) if you switch the compressor off, leave it switched off (to cool down the thermal protector circuit) and switch it on again 20 minutes later.

At first you should assure, that the motor of the compressor runs. This compressor is really quiet, but you can hear the motor running if you put your ear close to the enclosure of the unit. You can only check the air leakage of the compressor and the proper operation of the pressure regulator after starting the motor.

The compressor itself can produce air leakage. If the motor of the compressor is able to work, you can check whether or not the compressor produces internal air leakage. To test it, switch off the compressor and disconnect the 6 mm (internal diameter) output tube of the compressor from the air inlet of the table. Then please close the end of the 6 mm tube very well with mole-grips to ensure there is no air leakage at the end of the tube. Please start the compressor with the dead-end tube. Use a leak detector spray to check the success of closing the end of the tube. Then observe please, how frequently the compressor starts. Under normal conditions the compressor starts only once. It increases the pressure until reaching the switch off pressure (the top pressure limit) then the motor is stopped by the pressure regulator and the compressor keeps the pressure, since the output tube is closed. A good compressor keeps the pressure for a day at least. You can always monitor the pressure at the front plate pressure meter. If you can see the pressure decreasing with the tube closed, then there is an internal air leakage somewhere in the compressor.

If there is an air leakage in the compressor, please change the complete unit. The repair of the compressor is more complex, it cannot be carried out on-site.

The switching actions of the compressor's pressure regulator can be checked if you temporarily close and open the free end of the output tube of the compressor with your finger or with mole-grips. If you close it, the pressure increases and the pressure regulator will stop the compressor at the top pressure. If the compressor is stopped, because the pressure was high enough, you should slightly open the output tube. The pressure should decrease until the switching on pressure. At that point the pressure regulator will start the compressor again.

After completing the above steps with good result, you are sure, that the compressor works perfectly. In this case you should connect the output tube of the compressor to the inlet of the air filter or the table. Before pushing back the 6 mm tube to the air filter, please cut a few centimeters from the destroyed end of the 6 mm tube before reconnecting it to the filter of the table.

**Fault locating flowchart for the compressor**

During these tests we suppose, that the compressor is disconnected from the table. Furthermore you should have mole-grips within striking-distance to be able to close the free end of the output tube of the compressor tightly.

Motor of the compressor does not work (20 minutes of cool down period is spent)

> 0 < P < 1.7 Bar is on the front panel pressure meter. Mains switch at the back side of the compressor is turned on, but it is dim, the motor does not run
>
> > There is no 230 VAC voltage in the power point or the mains cable or the 8 A "T-type, slow blow" fuse is faulty. Locate and eliminate the fault.
>
> 0 < P < 1.7 Bar is on the front panel pressure meter. Red mains switch at the back side of the compressor lights if it is switched on. Yellow LED on the front plate of the compressor does not light
>
> > 8 A "T-type, slow blow" fuse is faulty. Change it. During change of the fuse you must disconnect the mains cable of the compressor
>
> 0 < P < 1.7 Bar is on the front panel pressure meter. Mains switch at the back side of the compressor lights if it is switched on. Yellow LED on the front plate lights
>
> > Probably the internal thermal protector circuit of the compressor is activated because the temperature of the motor was higher than 80 Centigrade. Wait for 20 minutes to cool down the motor. If this situation appears, it shows that the compressor is overworked, which indicates that there is an air leakage in the table. From here please jump to the fault location section of the table!

Compressor works continuously or it stops only sometimes for short periods

> Output tube of the compressor is tightly closed by the mole-grips.
> 0 < P < 1.7 Bar is on the front panel pressure meter most of the time
>
> > There is an internal air leakage in the compressor. Change

the complete unit.

The compressor has been stopped by its internal thermal protector circuit. After 20 minutes of switched off period it can not be switched on

Yellow LED on the front plate lights

There is a fault in the motor of the compressor or in the thermal protector circuit. Change the complete unit.

Motor of the compressor does not run, 0 Bar is on the front panel pressure meter

Yellow LED on the front plate lights. You can hear a hum noise from the compressor

There is a fault in the motor of the compressor or in the pressure regulator circuit or in the starter circuit. Change the complete unit.

Compressor works, but the output pressure range (in other words switch on and switch off pressure) is not correct

Output tube of the compressor is opened and closed by finger or by the mole-grips repetitively to initiate the switching on and switching off actions.

The internal pressure regulator should be adjusted or changed. Change the complete unit.

## Testing the table

During these tests we suppose, that the compressor works perfectly, because before starting the tests of the table the compressor passed every test.

A normally working, flawless table starts the compressor three times for one minute per day as maximum. Connected to a perfect table, you should leave the compressor switched on continuously. The total work-time of the motor built into the compressor is 1000 hours. This means that the lifetime of the compressor used with a faultless table will be approximately 30 years. If you observe that the compressor starts more frequently than three times a day or even it works continuously, it is a sure sign of an air leakage somewhere in the table. In such a case please stop the compressor and try to fix the fault! If you do not repair the air leakage in the table, the compressor will go wrong sooner or later too.

The motor of the compressor has not been designed for continuous operation. There is an internal thermal protector circuit in the compressor. It stops the unit, independently of the pressure, if the temperature of the motor is higher than 80 Centigrade. If the thermal protector circuit activates, it disables the compressor for 15 to 20 minutes. With a flawless table the thermal protector circuit never activates. Activation of the thermal protector circuit is a sure sign of an air leakage somewhere in the table or in the tubing between the table and the compressor. In such a case please stop the compressor and try to fix the fault! If you do not repair the air leakage in the table, the compressor will go wrong sooner or later too.

The first technical step in the process of finding the leakage in the table is to check the tube connections. Please use an industrial gas leak detector spray. Please spray all the tube connectors on the table to discover possible leakage with the leak detector spray.

There are three pneumatic valves on the table. All of them have an open tube connector. They should also be checked for leakage. Under normal working (floating) position of the top plate those open tube connectors of the valves must not allow air to come out, except one small air bubble in a minute in worst case.

If the tube connectors and the open tube connectors of the valves do not leak, then there are two more places to check for potential leakage:

**First potential place of air leakage in a table**

One of the possible leakage points is the plastic body of one of the valves. The valves are made by Festo, Germany. Sometimes the body of a valve breaks. There are three pieces of valves on the table. You should flood the (working, pressurized) valves one by one with professional air leak detector foam spray. Apply normal pressure to the table please, switch the compressor on. Prepare a bucket or some towels to be able to soak up the water under the leg system because there is bound to be a puddle. Flood the working (pressurized) valves with the air leakage detector foam.

The valve is the most backside component on the Valve Assembly (please see User Manual Figure. 3). The most probable reason of the leakage is a small fissure on the plastic body of the valve. In our long manufacturing past of vibration isolation tables there was one (or may be two) special faults. It was the internal rupture in a valve. It was a very tricky fault. Fortunately it is not frequent at all. If the result is an outside rupture, you can detect the leakage on the outer body of the valve. The tricky case is if the leakage allows the air to come out via the open tube connector of the valve. To discover it, on the pressurized, working table please flood the open tube connectors of the valves, too. You should keep the foam on the open tube connector for a minute by your finger to detect the number of out-coming air bubbles. In normal case it is allowed one small air bubble appearing in a minute in worst case.

On a working table there are three possible working states of the valve, depending on the position of the Height Sensing Lever (see User Manual Figure. 4):
A) Piston in the Working Cylinder is too low: valve passes air to the Working Cylinder to lift up the top plate.
B) Piston in the Working Cylinder is too high: valve releases air on the open tube connector to the environment to lower the position of the top plate.
C) Piston in the Working Cylinder is in “Optimal” position: the valve is inactive, no air is coming in or out of it. The valve is in its dead zone, top plate is in stable position. There is no air movement in or out of the Working Cylinder. In this state there must not come out more than two air bubbles (detected by the leak detector foam) on the open tube connector of the valve. Please check the number of small bubbles in a minute, but only in the Optimal, working situation! More than 2 bubbles coming out in a minute shows an internal rupture of the valve.

If you find a leakage on a valve, then the complete valve assembly should be changed. There is a downloadable document at our website explaining the method in detail.

The style of the screws what fix the valve assemblies to the legs was changed in the meantime. You may not be able to use your currently installed old screws with the new valve

assemblies. For this reason we always send you a set of appropriate screws with the new valve assembly.

After changing the valve assemblies, please release the fixing screws of the height sensing springs. When you switch the compressor on, please be ready to switch it off quickly in case of high position of any of the working cylinders. You can correct the height with the appropriate height sensing spring (for the details see the User Manual and the Installation Manual).

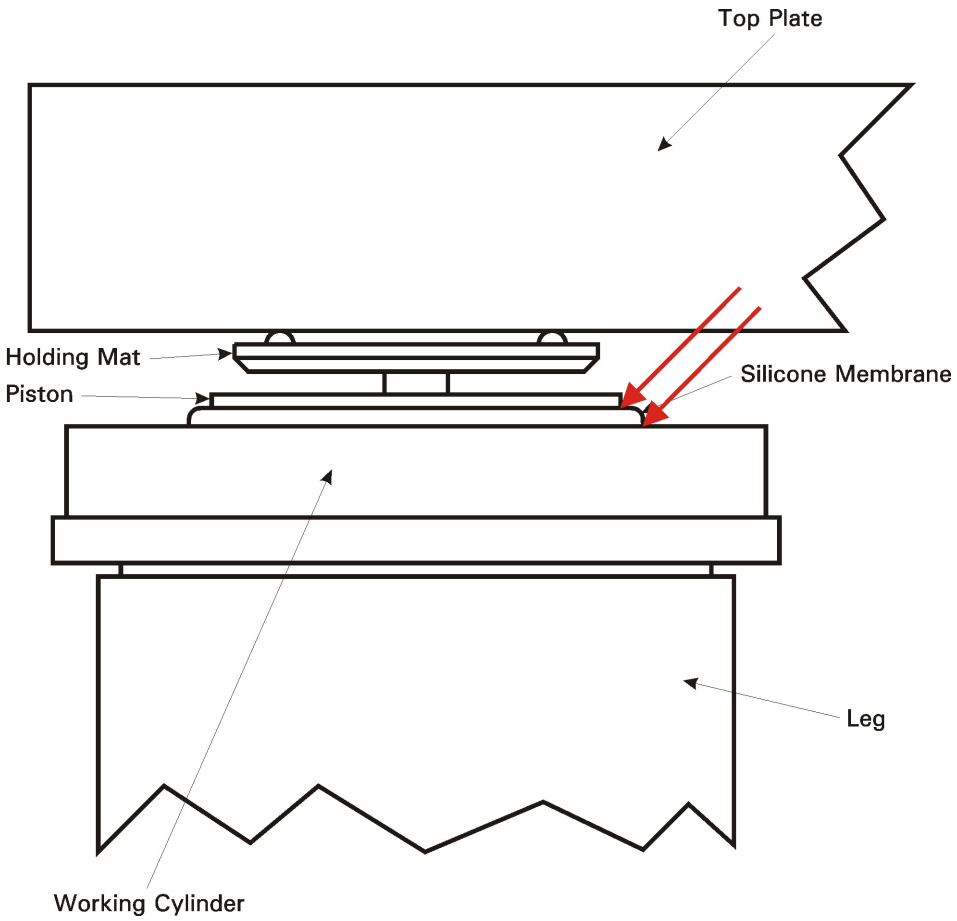
**Second potential place of air leakage in a table**

The other possible leakage point is a silicone membrane. If the fault is not in the compressor, not in the tubing, not in the tube connectors, not a broken body of a valve, then probably a silicone membrane is broken in one of the working cylinders.

If there is a broken membrane in the table, the compressor works continuously, but its output pressure can not increase, because the compressed air goes out in the broken membrane.

In most cases, the broken membrane can be identified by the small whistling noise of the outgoing air. For this purpose please switch off every other equipment in the room except the compressor to establish a silent environment. Crouch under the table and try to hear the weak noise of the air leakage. A better way is to use a one meter long flexible tube, with one of its ends put in or very close to one of your ears. With the other, open end of the flexible tube you can listen around all the membranes. This way you will nearly surely hear the sound of the leakage.

The other method to locate the broken membrane is to use the leak detector spray according to the picture below. The disadvantage of this method is the usage of big quantity of foam resulting huge stains everywhere under the table and starting rust on the table.




In case of finding an injured membrane all the working cylinders should be changed (one is faulty and the other three pieces as preventive renewing). This task needs a lifting trolley, because the top plate should be removed from the legs. A broken membrane is very rare case, during normal operation the membrane nearly works for eternity. Most of the time a membrane blows up during an improper installation.

If you have to change the working cylinders, you can find a downloadable document at our website explaining in detail, how to do it.

Fault in a valve is more probable than fault in a silicone membrane according to our statistics in our last 20 years of manufacturing experience of vibration isolation tables. A broken membrane usually results such a level of air leakage, that the compressor would not be stop at all. Usually (because most of the customers do not take care of listening to or inspecting the compressor periodically) the broken membrane causes an override of the lifetime of the compressor, too. In such a case the compressor should also be changed.

The last step described in the document presenting the procedure of changing the working cylinders is the adjustment of the heights of the pistons in the working cylinders. To complete that task you should keep the compressor on. After changing the working cylinders and adjusting their heights there is one remaining task to do. You should correct the vertical angle position of the pistons in the working cylinders. It is explained in detail in the User Manual. Here only the steps of this task are listed. To do this task, you should switch the compressor off. After switching the compressor off, you should release the air manually from that leg which is to be corrected. The release of the air can be done by lifting up the appropriate corner of the top plate (which is the closest to the leg to be corrected) manually 5

to 6 times, as long as you can hear the air moving out of it. After it, when that working cylinder is dead (empty of air) you should lift that corner of the top plate manually a little bit higher and you can move the released holding mat (User Manual Figure. 2) with a few millimeters away on the bottom of the top plate. During this action please take special care of your fingers, because the heavy top plate can hurt your fingers! After moving the holding mat at the bottom surface of the top plate, leave the top plate and switch the compressor back on. Crouching in front of the table you can see the result. If the vertical angle is not perfect, you should restart the angle adjustment procedure. Leave this adjustment to the end of repair, because a small angle difference will not disturb the basic functions of the table.

**Fault locating flowchart for the table**

During these tests we suppose, that the compressor is already passed every test. Furthermore the output tube of the compressor is connected to the air filter of the table.

Top plate is not lifted up

Compressor works continuously. Crouching under the table you can hear a weak noise of out-coming air

You should locate the place of the air leakage. According to the location you can do one of the followings:

1) Tube connection: you can repair it
2) Broken tube: change it
3) Working cylinder: change all working cylinders
4) Open tube connector of the valve: move the height sensing lever up and down manually a few times. There can be a small piece of dust in the valve or internal “tightening”. This way you will have a chance to solve the issue. If movements of the height sensing lever does not solve the trouble, change the complete valve assembly
5) Body of the valve: change the complete valve assembly

One of the working cylinders is hung up, its position is too high

Height sensing lever lies on the security bumper

Switch the compressor off IMMEDIATELY and free the height sensing lever, before blowing up the silicone membrane

Height sensing lever is not on the security bumper, it touches the bottom surface of the top plate. If you lift up the top plate manually, it releases air on the open tube connector of the valve, the top plate is lifted down for a short time (then it will be lifted up again)

Adjustment of the height sensing spring is not perfect. Readjust it (for the details see the User Manual)

Height sensing lever is not on the security bumper, it touches the bottom surface of the top plate. If you lift up the top plate manually, there is no air coming out on the open tube connector of the valve

Switch the compressor off IMMEDIATELY, before blowing up the

silicone membrane. The valve assembly is faulty. Change the valve assembly

One of the working cylinders is in too low position

If you push down the height sensing lever for a short time, the top plate is lifted up by the working cylinder

Adjustment of the height sensing spring is not perfect. Readjust it (for the details see the User Manual)

The table seems to be working accurately, but

The compressor switches on too frequently

There is an air leakage somewhere in the table. Locate the fault and repair it. If you leave the air leakage, the compressor will go wrong