



MusicMedic LEAK TESTER

← FLOW GAUGE ADJUSTMENT DIAL

← REGULATOR ADJUSTMENT DIAL

Finding Leaks with The Mag

1. Set the Mag.

With the power chord connected, turn your mag on. Turn the flow gauge knob clockwise until the ball indicator rests on the bottom of the gauge. Now, turn the pressure regulator knob counter-clockwise until the dial indicator on the Mag stops moving. With both knobs in the off position, open the flow gauge to .2. Then turn the larger knob on the Mag until the needle reads 8 when the tool is on and not in the instrument.

If the air pressure setting from the vertical gauge is too strong and blows closed keys open you can lower the pressure or adjust the instruments spring tension as needed. You can also adjust this accordingly for different types of instruments, flute, clarinet, oboe, saxophone, brass.

2. Test for a Leak on an Individual Pad

When using the leak isolator, you can determine how much a single pad is leaking. Lubricate the O rings with Jim Schmidt's Magic Dust or graphite. Move the isolator slowly into the body tube. Be careful not to put the tool in too fast as soldered or sharp tone hole edges can damage the O ring. If the O ring becomes twisted or damaged you may need to replace it. If the Mag will not read zero when not located near a tone hole check for a torn or twisted O ring. A visual inspection of the 'O' rings is usually effective. Position the leak isolator under the tone hole you wish to test and with light finger pressure close the key. The Mag should read less than 1 (with light pressure) if the pad is seating properly.

3. Test for Leak on the Body of the Instrument

To measure the body of the instrument use rubber plugs (not the leak isolator) to stop up the instrument. If you are testing the entire instrument plug one end with a rubber stopper. You can also plug the open holes on a flute or cover them with moistened fingers. Depending on the grade of the flute the Mag should give you a reading between 2 and 4. A measurement of 2 is considered an excellent reading when the flute is padded well. A measurement of 4 maybe suspect for intermediate and professional flutes buy may be sufficient for a student flute. If you are not satisfied with the reading you can press down on individual keys to determine which pads are at fault or if there is another part of the instrument that contains a leak. Remember that the Mag is not a replacement for feeler gauges and leak lights, but is used as a secondary check. The Mag can also be an integral part of testing an instrument in front of a customer, especially when giving quotes on work.

NOTE: The Mag and MiniMag machines must be used in vertical position (sitting on the rubber feet). The instruments are very sensitive and calibrated with gravity considered. If the machine is not used in proper position, the readings will not be accurate (usually the instrument will appear to leak more than it does).

How to Re-Zero the Mag Gauge

It is normal for the Mag or MiniMag gauge to require re-zeroing occasionally. If the machine is turned off and the test hose is open to the atmosphere, the gauge should read zero. If it doesn't, the gauge should be re-zeroed.

For the Mag Machine

To re-zero the gauge on the Mag Machine, simply adjust the screw on the gauge face under the dial in the center (the only screw on the gauge face) until the pointer points to zero.

For the MiniMag

To re-zero the MiniMag gauge, press your palm firmly against the face of the gauge and unscrew the cover in a counter-clockwise direction. It may be necessary to open the case of the machine and hold the back of the gauge while turning the face. If you try to unscrew the cover of the gauge and the whole gauge turns within the case stop and open the case to hold the gauge in place so as not to damage any of the tubing inside the machine. If the cover is difficult to remove, place a sheet of rubber or a comparable material between your palm and the gauge face for added friction. Once the cover is removed from the gauge, turn the zero-adjust screw located behind the scale at the pair marked "zero" Use the Allen wrench included with your MiniMag to turn the screw until the pointer points to zero.

Interpreting the Mag Readings

The Mag machine indicates any leak present in the area being tested. This is its superiority over conventional padding tools such as feeler gauges and leak lights, but can also be frustrating without a proper understanding of the materials being used and the way the machine works. No matter how well a flute pad is seated it will not give a good reading if there is a leak around the pad screw or a perforation in the pad skin. Likewise, each natural pad skin has a different amount of porosity that, when testing the whole instrument, can add up to a seemingly poor reading. Because of the extremely low pressure and airflow the Mag Machine uses, it will pick up all these issues and they will be reflected in the reading. Knowing these things and adjusting your expectations accordingly will help save you time and frustration chasing a pad leak that isn't there. If your flute pad is giving a poor reading even after seating it well, check for a leak around the pad screw or a hole in the skin. If your clarinet is giving a poor reading keep in mind that if your fingers are dry when covering the tone holes, 0.2 - 0.5 in. water of pressure will leak out through the fingerprint of each finger. When identifying leaks be sure to consider all the variables. The Mag gauge indicates pressure in Inches of Water. One inch of water is equal to 0.036 psi. The flow meter indicates air flow in Standard Cubic Feet per Hour. One SCFH equals 0.125 gallons per minute.

Understanding the Mag Machine.

Many technicians use the Mag machine and do not understand how or why it works. They simply set the gauges so the Mag reads "8" and the flow meter is around ".4" This method is very effective and to work effectively with the Mag, a technician need not understand further how the Mag Machine works. However, for those technicians out there who hope to gain a complete understanding of the MusicMedic.com Mag machine and how it works, we offer this explanation.

The Mag Machine is basically comprised of 4 low pressure components.

1. A flow gauge to regulate the volume of air allowed through system.
2. A low-pressure regulator, which sets the maximum pressure in the system.
3. A Magnehelic differential pressure gauge.
4. A special low-pressure Diaphragm air pump.

Overview:

The Magnehelic gauge measures the difference in air pressure between two systems. In the case of the MusicMedic.com Mag gauge, these systems consist of the tubing before the flow meter (first system) and the tubing after the flow meter (second system). The second system is connected to the musical instrument the technician is working with. As such, the instrument becomes part of the second system. Basically, the Mag measures the difference between the pressured air column inside the machine and the pressured air column in the instrument.

Let's assume that the hose coming from the machine is open and not sealed in any way (this is the most leakage). When the Mag is turned the pump starts and the mag begins to pressure the systems. The adjustment valve in the flow meter restricts the air flow from the first system to the second creating a back-pressure in the first system. Because the Mag is open at one end the gauge will not be able to pressure the second system. Now, the Mag gauge will read the difference between these two systems. For the sake of discussion, let's say the difference is "8" on the gauge. This number indicates the difference in pressure between the first system and the second system. As the second system is open, the "8" indicates that the first system is pressured to "8" and the second system is "0". Hence the difference between the systems is "8".

When the end of the hose is plugged the second system will begin to pressure and the needle will start to drop. If the end is plugged partially the needle will drop to a lower number than "8", let's say "4". When the needle reads "4" this means that the first system is pressured to "8" and the second system will only hold pressure to "4". Thus, the difference between the first system (pressure 8) and the second (pressure 4) is "4". "4" is the number that will read on the gauge.

If the hose is plugged completely the second system will pressure up to "8" and the needle will read "0". This means the difference between the two systems is "0" or there is no leak.

The Speed at which the needle moves is related to how fast the pump can pressure the inside of the instrument. With the flow meter more open and the regulator turned up, the system will pressure up faster causing the needle to move faster. With this faster pressurization and increased air flow comes the possibility of blowing open pads. This is where the technician must understand the Mag machine and use his or her own judgment.