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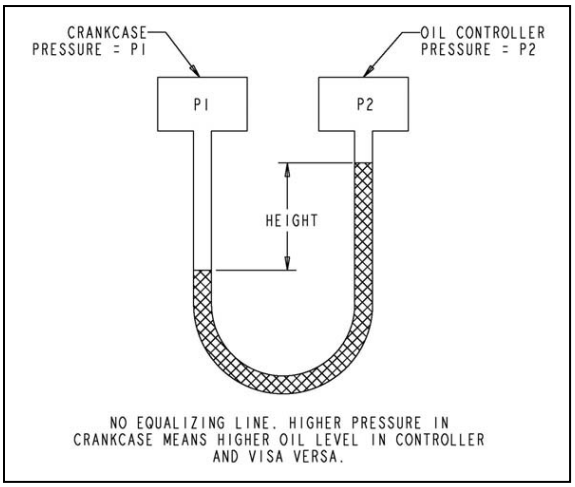
OIL LEVEL CONTROLLER BASICS

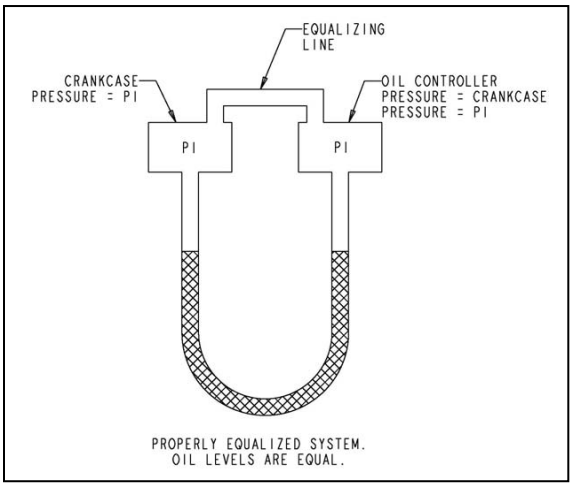
The purpose of the oil controller is to maintain the oil level in the crankcase of an engine or compressor. This is accomplished by a float operated valve inside the controller. As the oil level in the crankcase drops, the controller float drops and opens the valve to the oil supply inlet allowing oil to flow into the controller. The housing of the controller is connected to the crankcase which allows the oil to flow from the housing into the crankcase. As the oil level rises, so does the controller float which shuts off the flow of oil when the desired level in the crankcase is reached. It is important to mention that the oil level in the controller maintains the running oil level in the crankcase. When the engine or compressor is shut down, the oil flowing through the engine or compressor will all run to the bottom of the crankcase causing the oil level in the controller housing to rise. This will make the oil level in the controller sight window look high when the engine or compressor is shut off.

The basics of operation are as follows:

- The supply oil is fed to the controller through the oil inlet port. Oil usually comes from an unpressurized supply tank on a stand above the oil controller. In this type of application, the oil is gravity fed from the tank to the controller. The vertical distance between the oil level in the supply tank and the oil inlet on the controller is important. We call this vertical distance "head" and the pressure that is generated by it is called "head pressure". The greater the distance, the more "head pressure" there is at the oil inlet. Some operators will use a pressurized oil supply tank to deliver oil to the controller. In this case, the head pressure must be added to the tank pressure to arrive at the pressure at the oil inlet of the controller. All oil controllers have a minimum and maximum pressure range they can operate in. The allowable oil inlet pressure is driven by the size of the controller oil inlet orifice. There is a direct relationship between the oil inlet orifice size, the oil inlet pressure, and the level inside the controller where the oil valve shuts off. If any of these values are outside of their operating parameters, the result will be an oil level that shuts off too low, too high, or maybe not at all. When a new controller has filling problems, the first questions asked need to be what controller do you have, what is the pressure at the oil inlet, and what kind of oil are you using? Some synthetic oils have a slightly different specific gravity than conventional oils. This difference will have an impact on the oil level in the controller. Heavier oils will shut off early (low) and lighter oils will shut off late (high).

- Another very important factor in the proper operation of an oil controller is equalization. This refers to the pressure inside the oil controller housing matching the pressure inside the crankcase. If the pressures are not equal, the oil level in the controller will not be the same as the oil level in the crankcase. If the pressure in the crankcase is higher than the pressure inside the controller, the oil level in the controller will be higher than the oil level in the crankcase. The controller oil level may look fine, but the crankcase will be low on oil. To counteract this problem, an equalization line is connected between the controller and the crankcase. If this line is not too small in diameter or too long, it will equalize the pressure between the crankcase and the oil controller.





- A pressure difference of 0.032 psi will result in an oil level difference of 1" between the oil controller and the crankcase when using 40W oil with a specific gravity of 0.89. 0.064 psi would be 2"; 0.128 psi would be 4" and so on. 1 psi pressure difference results in an oil level difference of 31"! This large effect on the oil level resulting from such a small difference in pressures is why proper equalization is so important.

<u>Top recommendations for oil controller setup to ensure proper equalization are as follows</u>:

- Use as large of a vent (equalizing) line as possible. Kenco recommends that the line be 3/8" I.D. or larger, as short as possible, and should run from the crankcase to the controller at a downhill angle all along the run. At NO POINT should the line run horizontally or uphill after it has been running downhill! This can create an oil trap in the line, blocking it and prevent proper equalization. It is okay if the line runs uphill straight out of the crankcase and then makes one turn downhill to the controller. In fact, this is sometimes the preferred method as it allows the oil that may splash into the vent line to flow back into the crankcase. A properly sized and plumbed equalizing line is arguably the single most important factor in good oil controller performance.

- When using a controller with a direct mount adapter, equalization is handled by the internal porting of the direct mount adapter and the vent port on the controller will be plugged.