# M2 Viscous Fan and A/C Pressure



Larry Kipfinger 5 posts since Nov 17, 2014

# M2 Viscous Fan and A/C Pressure Oct 7, 2020 12:36 AM

SN# MA6624 2020 Freightliner M2. Does the viscous fan sense refrigerant heat (condenser) as well as coolant heat to drive the fan? This truck does not have a fan pressure switch. It does have a viscous fan. how does the engine know to turn the fan on for high pressure.



Kyle Siebert 4,007 posts since Nov 14, 2014

## Re: M2 Viscous Fan and A/C Pressure Oct 7, 2020 1:12 AM

the fan clutch senses it. The workshop manual shows how to lock it to do a a/c performance test. I've never had to do this. Why do you ask?



Larry Kipfinger 5 posts since Nov 17, 2014

## Re: M2 Viscous Fan and A/C Pressure Oct 7, 2020 1:22 AM

I just happen to be discussing a fan issue on a customers truck and told him to check the Pressure Switch. he said he had. we walked out to this particular truck and "wala", this one does not have a switch. I've never had an issue either, and don't remember ever seeing one so I wanted to know how it works. I assumed but you know where that gets you.



# Michael Palumbo 1,453 posts since Nov 13, 2014

#### Re: M2 Viscous Fan and A/C Pressure Oct 7, 2020 2:49 AM

This product is based on the bimetal sensor located at the front of the viscous fan. This sensor expands or contracts, depending on the temperature imparted through the radiator. The bimetal sensor contracts closing the valve, so the silicone fluid remains in the reservoir chamber. At this stage, the viscous fan coupling is disengaged and turns at around 20% of the rotation speed of the engine. The bimetal sensor expands, rotating the valve and allowing the silicone fluid to move through the entire chamber to the outer edges. This generates enough torque to drive the cooling fan blades at engine operating speeds and remain at a consistent temperature. At this stage, the viscous fan coupling is engaged and turns at around 80% of the rotation speed of the engine.

The bimetal sensor governs the functioning of the viscous fan coupling. Primarily, there are two kinds of bimetal sensor systems: plate and coil. Both of them work under the same principle, as explained previously.

The only difference is that whilst the coil expands and contracts to turn the rotation plate, the bimetal contracts and bends. This moves the slide plate and allows the silicone fluid to move from the reservoir chamber to the cavity. M2 Viscous Fan and A/C Pressure

Quote is from:

https://fpsdistribution.com/articles/viscous-fan-couplings-in-engine-cooling/

This is not specific to your clutch so the 20% and 80% might not be exact.



Michael Palumbo 1,453 posts since Nov 13, 2014

Re: M2 Viscous Fan and A/C Pressure Oct 7, 2020 11:18 AM

The business class m2 WS manual

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20.04 Fan Clutch, Viscous

has a better description of how our viscous fan works.

20.04 Fan Clutch, Viscous 100 Inspection and Operation Check

I have never attempted step 2 of the operational check. It requires placement of a temperature probe 1/2" from the front of the fan clutch. It does not sound safe to me. I'm sure it can be done but I'm afraid my thermocouple would get sucked into the fan.

There is a note at the end of the operational checks that would be easy to try with a \$20 photo tachometer.

If the engine still overheats during operation, even though everything described above checks out properly, use a stroboscope to check peak fan speed. The fan speed should be at least 93 percent of the fan pulley speed when the clutch is fully engaged. Example: 2160 = fan pulley speed x .93 = 2009 = 93 percent of fan pulley speed. Fan speed must be at least 2009 rpm when the fan clutch is fully engaged.

Keep step 8 in mind though

If the engine has been idle for more than 8 hours, the fan clutch may engage as soon as the engine is started. If this happens, the usual noise from the fan will be heard; the noise will stop after 5 minutes or less, when the fan clutch disengages.



Michael Palumbo 1,453 posts since Nov 13, 2014

#### Re: M2 Viscous Fan and A/C Pressure Oct 7, 2020 2:25 AM

Viscous fans never fully disengage. It should pull enough air through the condenser even when the clutches bi-metallic spring is cool. It should pull enough air to prevent the AC pressure from disengaging the clutch via tripping the high pressure cut out of the binary. switch. Your systems binary switch being your systems protection from under and over pressure.

A condenser at 300psi would get hotter than the radiator. With that said, I'm not sure if a condensers volume of heat could effect a viscous clutch by itself. Like Kyle said the manual has you lock the clutch for testing The engine would, in my view, generate and transfer a much larger volume of heat through the radiator which, again in my view, would effect the viscous clutch engagement more.