

How the A1 Adaptive Climate Controller (ACC) : Improves Fan Coil Operation!

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Summary & Overview:

The fan motors used to distribute air from a heating or cooling Fan Coil to occupied space usually at best can be set at one of three fixed speeds - High, Medium or Low (and of course Off or No Speed).

Generally, these three pre-set fixed fan speeds or three pre-set airflows are set by a manual control knob at the Fan Coil unit by the user, regardless of the indoor or occupied space climate conditions and needs. This means Fan Coil Units must be designed to operate effectively at their lowest fixed fan speed or airflow and yet at the same time not be overwhelmed and ineffective at the highest fixed fan speed and airflow.

Simply and very cost effectively **OGD Vhvac**'s new "A1 Adaptive Climate Controller" / A1 ACC gives fan coil motors much improved speed control and airflow. The A1 ACC continuously "tracks & adapts" the fan motor's operation to actual real time indoor space climate conditions and user needs. Instead of three pre-set fixed airflows, the A1 ACC intelligently, automatically, quietly and efficiently "Adapts" the "fan motor's airflow output" to the "Fan Coil unit's Actual Thermal Capacity output", for both heating and cooling modes of operation.

Rather than the normal operation (before the A1 ACC) of too much airflow, if on the preset high speed, or too little airflow if on low speed setting, with the A1 ACC "just the right amount of airflow that is needed is always provided". The A1 ACC measures and knows how much heating or cooling capacity is available, then determines and gently delivers only the airflow that is needed to meet the user's real time comfort needs. The A1 ACC's intelligent and auto response not only better matches fan coil airflow to fan coil thermal output, it also consistently enhances indoor space climate, comfort and quiet. Yet while doing all this, the A1 ACC also saves huge amounts of energy. Not only is the fan motor's electricity reduced but system and equipment thermal savings are also realized!

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How Fan Coils work With OUT the A1 ACC:

In a typical Fan Coil heating system when a local room thermostat or a remote Building Management System (BMS) senses / measures the actual room temperature is below the setting or set point the thermostat (stat) or the BMS sends a signal to the fan coil unit to turn on the source of heat. (If this were cooling mode the same process occurs except when the room temperature goes above set point it triggers sending a signal to the cooling valve source or control versus the heating).

In many cases the fan motor has been on, running constantly at one of the three manually pre-set speeds /airflows blowing air at this speed into the room. In other Fan Coils the fan motor may have been off, along with the heating (or cooling) source, not blowing any air, then both the fan and the thermal source must be turned on by the thermostat /BMS action. This is the indoor space calling for heat (or cool).

As the output heat (or cool) increases it gradually changes from being off and no thermal output to full-on or maximum heat (or cool) output capacity. Yet as the thermal output changes the fan speed does not, it remains fixed at whatever pre-set speed it was at. If the fan was at the fixed low speed setting this means the airflow is at a low amount, so the temperature output of the fan coil should change more rapidly as there is not too much air that might overwhelm the coil's increasing output.

But once the fan coil is at its full thermal output capacity the low speed airflow may not be adequate to push sufficient heat (or cool) capacity into the room / occupied space. It requires manual speed intervention to turn the unit to a higher fan airflow to blow enough heat (or cool) into the room.

If/when the fan is pre-set to a fixed high speed /airflow when the fan coil first begins to increase output from its off state, the fan blows more air than needed, especially at initial call conditions, and may overwhelm the heat (cool) source. Too much air output capacity before the coil unit reaches full heat (or cool) output capacity causes cold drafts and can make the coil take much longer to reach its full output... if ever.... (Have you felt blasts of cold air from the unit even though it is in the heat mode?).

Once the coil finally reaches full output to better match the fan airflow there may be too much heat (or cool) being blown into the room. At this point again manual speed setting intervention is required to lower airflow to cut back if too much heat (or cool) is being blown into the room.

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How a Fan Coil works WITH the A1 Unit:

In a Fan Coil system upgraded with the A1 Adaptive Climate Controller (ACC) the same process for heating or cooling that was in place before its simple installation, stays completely intact and does not need to change or be re-programmed (although some added energy savings can be had with a different set point- see ** below).

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Although the heating or cooling operating sequence described above remains the same, the fan operating sequence does not. Unlike the standard operation of the fan, where in most cases the fan motor has been on constantly running at a fixed manually pre-set speed the A1 ACC has the fan on ‘auto pilot’. The fan is on, but with the A1 ACC, the fan has been running at ***an “energy saving very low idle speed” gently mixing / blowing the air in the room, at a rate that “blends the room airflow with room air temp”***. This creates a better distribution and mixing of the indoor occupied space or room. This low but continuous airflow virtually eliminates hot and cold spots, poor stratification and stagnant air throughout the entire room or occupied space!

Yet as soon as the thermostat or BMS turns on the source of heat (or cool) the very low airflow with the A1 ACC will not overwhelm the coil but will allow the coil to increase its heat (or cool) output without interference. However unlike the standard manual fixed speed fans where the fan airflow is on and manually fixed at its low speed (or high or medium), with the A1 ACC, as the coil’s heat (or cool) output gradually increases from being off to full on, ***the A1 ACC senses / measures the heat (cool) output increase and begins to increase the fan speed / airflow to match it!***

As the coil’s heating (or cooling) output steadily increases the A1 ACC continues to auto change and gradually increases the fan’s air speed / airflow so it too increases proportionately. The still warming (or cooling) air is gently, quietly and automatically blown into the occupied space in a much more balanced, gradual and effective manner, instead of being too hot or too cold, it feels and is just right.

The A1 ACC’s, intelligent “Adaptive” auto airflow control, determines real actual heating (or cooling) output capacity at all times and adjusts or changes accordingly. So when indoor space or climate conditions change or are different so is the A1 ACC’s response. For instance, on an unusually cold (or hot) day, slower capacity output from the coil (heating or cooling) may take much longer for the coil to reach full output capability. The A1 ACC intelligently senses /measures this slower rate of change and will “Adapt” / change the airflow output rate so it will not blow more air than the amount of heat (or cool) available.

The A1 ACC “waits and allows the fan coil thermal output to “catch up” to these colder (or warmer) room space conditions by not blowing too much of this colder (or hotter) room air. But as the fan coil output eventually increases and reaches full output, the A1 dynamically, automatically “Adapts” and accelerates to full airflow. This keeps the balance of actual fan speed airflow output to coil thermal btu capacity output.

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If the airflow does ever get ahead of the coil's thermal / btu output and blows too much air slowing or dropping the coil's output capacity the A1 will dynamically "back off" and wait to let the unit catch-up again... Keeping the balance and optimum blend of heat, cool, airflow parameters.

While the A1 ACC does all this auto control to the fan, the other fan coil unit controls that operate the heat (or cool) mechanisms can continue to function as they always did without any added programming** or complexity from the A1 ACC!

**** However in many rooms, after A1 ACC installation, it has been found that the thermostat setting or BMS set point can be much less aggressive and still the occupied space comfort is much better! For instance the set point in heating mode has been lowered by up to 4* F and the occupants are more comfortable and warmer than they were without the A1 ACC at the higher set point temperature! Similar results have been found for cooling mode also!**

In fact the same Fan Coil unit once upgraded with the A1 ACC is now able to operate much more effectively in both heating and cooling modes! Because the A1 is auto "Adapting" and Optimizing the fan coil system's output to much better match the occupied space real time changing needs. Fan coil systems upgraded with the A1 ACC have consistently shown a much enhanced occupied space climate. Especially in cooling modes much lower humidity has been maintained with less cooling costs and cycling than the same unit without the A1 ACC!...

Also of major import the A1 has been proven to save huge amounts of energy! The "Adaptive" way the A1 controls the speed of the fan motor; its energy use is decreased often by more than 40%! In addition to less electric energy use by the fan motor, the coil heating /cooling system also works more efficiently, cycling on less often which lowers system fuel energy use.

The list of real benefits goes on and on but one that has surprised and sold more customers than expected is the "**extra quiet**" that the A1 ACC "idle speed" brings to the fans... Many comments such as; "I can hardly tell its running", are heard where prior statements like; "I can't think, work or sleep, because of the noise from my fan coil".

The "Quiet Factor" is a major feature of using the A1 "Adaptive Climate Controller" ...

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