

FlexStat Economizer Change of MAT to DAT

Revision A

Applicable Models

FlexStats with firmware R2.1.0.18 (July 2016) or later.

Issue

To reduce the chance that cooling coils might be exposed to excessively cold air, the economizer function uses a DAT (Discharge Air Temperature) sensor instead of a MAT (Mixed Air Temperature) sensor in firmware R2.1.0.18 and later.

In earlier firmware, if economizer mode is enabled and operating, the potential exists under certain conditions for excessively cold cooling coils. If the space is calling for cooling, and the unit is economizing but still not meeting load conditions, mechanical cooling will be enabled. In units with staged cooling, the potential exists for a combination of cool economizer air and one or both stages of cooling to produce excessively cold air across the cooling coil, potentially leading to frozen coils.

The solution is to change the reference sensor for the economizer dampers from the mixed air location to the supply side of the fan. Then an economizer in this situation senses the excessively cold discharge air, backs the economizer off to maintain setpoint, and reduces the chance of the coil freezing.

With a desired DAT reset range of 55° to 70°F, the original configuration of the sensor in the MAT position allows for a 2° F rise across the supply fan, giving the controller a setpoint range of 53° F to 68° F. Changing the sensor to the DAT location removes the need for the inclusion of the 2° F fan rise in the setpoint range, changing the controller's reset range to 55° F to 70° F.

R2.1.0.18 firmware made a number of changes:

- Replaced all references and aliases of MAT to DAT.
- Removed the option to select Discharge Air Temp for IN2 in the Advanced > Application > Additional Setup > Sensors menu. (IN2 options are now for Fan Status or Not Used.)
- Changed the default value of AV43 (DAT MIN) from 53 to 55° F and changed the default value of AV44 (DAT MAX) from 68 to 70° F. (The duct temperature at the DAT sensor is slightly higher than the temperature at the former MAT sensor position because of the temperature rise caused by the fan.)
- Changed Trend2 to use AI3 instead of AI2, but only if the damper economizer is configured as Modulating. (Otherwise, no trend is created automatically.)
- Changed the Low Limit Alarm reference from the MAT sensor to the DAT sensor.

NOTE: The DAT sensor previously was only used for trends by the built-in programs, not for control.

These changes created operation and installation requirements that are different from previous documentation (e.g., installation guides).

NOTE: Because multiple factors affect economizers and cooling coils, KMC Controls cannot guarantee that a FlexStat will prevent a coil from freezing under all circumstances. KMC Controls cannot be held responsible for any damage to equipment connected to a FlexStat. Product specifications and design are subject to change without notice. In no event shall KMC Controls be liable for any damages, direct or incidental, arising out of or related to the use of the product or its documentation.

Solution (in Installations)

New FlexStat Installations

MAT is referenced in various current FlexStat documents. See the AHU example on the next page.

In relevant FlexStat installation guide drawings, the (STE-1416) MAT sensor would be eliminated, and the (STE-1402) DAT sensor should be connected to IN3 in its place. An averaging sensor is no longer needed since the AHU fan mixes the air upstream of the DAT sensor.

The option to select Discharge Air Temp for IN2 in the Advanced > Application > Additional Setup > Sensors menu is no longer available.

Existing FlexStat Installations

Unless the firmware of an older FlexStat is upgraded, you do not need to do anything.

If the firmware is ever upgraded to get the benefit of additional protection during economizer operation or a future benefit:

- Disconnect the MAT sensor from IN3.
- Disconnect the DAT sensor from IN2 and connect to IN3.
- Verify that IN2 is configured as Not Used.
- Change any Control Basic customization, rotation values display, sequence of operations, or other use from MAT to DAT on IN3.

