UPG
Technical Services

APPLICATION ENGINEERING
BULLETIN Number # AE-011-07

TOPIC:
Operational changes to the simplicity control for enhanced operation in low ambient conditions

SCOPE & PURPOSE:
To explain operational changes to the Simplicity control board during low ambient operation

CONTENT:
Changes to Simplicity controls to better work in low ambient conditions. 4-9-07

1. A compressor will not be started if its Low Pressure Switch input (LPSx) is open. If the compressor would otherwise be turned on, this is a Low Pressure trip, and if not in Low Ambient condition will result in the compressor being locked out after 3 such trips until power is cycled. (The 5 minute Anti-Short Cycle Delay is counted between trips.) This is a change to the first trip only.

2. If the Low Ambient switch is closed (low temperature), and the Low Pressure Switch (LPSx) opens while the compressor is running, it will be ignored during the first 2 minutes of compressor run time. If the Low Ambient Switch is open (normal/high temperature), the Low Pressure Switch opening will be ignored for the first 30 seconds of run time, which is the current operation. After the 2 minutes (or 30 seconds, as appropriate) of run time, if the Low Pressure Switch has been open for 5 seconds, or opens for 5 seconds at any later time, the compressor will be turned off for the Low Pressure trip. This timing is the same as current operation.

3. If the Low Ambient Switch is closed (low temperature), and there is a request to turn on the first compressor (no compressor is currently on), the Fan will be turned on for a pre-run time. This time will be settable through communications (MODbus) for a range from 0 to 255 seconds. The default will be 60 seconds. The compressor will not be turned on until this pre-run time for the Fan has finished.
Note: If the Fan has already been on for this amount of time, no additional delay is necessary.

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4. If the Freeze Stat (FSx) is open when there is a request to turn on the first compressor, the Fan will be turned on for a pre-run time, the same time as for Low Ambient being closed.
If the Freeze Stat is still open after the pre-run Fan time, a Freeze Stat trip has occurred. The Fan will remain on, and if 2 more trips occur after ASCD delays the compressor will be locked out.

5. as long as the Low Ambient Switch is closed (low temperature); trips for Low Pressure Switch and Freeze Stat are not counted. It can stay in such a condition indefinitely without the compressors being locked out even though they are not allowed to run.
Note: The lockout times and counts can begin as soon as the Low Ambient Switch opens. This is no change from the current operation.

6. While cooling is requested but compressors are being held off because Low Ambient is closed, and either Low Pressure or Freeze Stat is open, the Fan will be kept on.
The Status LED will flash the code for Low Ambient Lockout. (This is a status indication, not an alarm. Low Pressure and Freeze Stat flash codes would represent alarms.)

During the low ambient operation, the unit will be operating in the 10 minutes on, 5 minutes off mode. In the re-start after the 5 minute off, with NO loss of the "Y" call, the LPSx and the Freeze Stat will be ignored for the 2 minutes.

Applications:

It should be noted that the use of our equipment for process cooling during low ambient conditions, conditions at or below 40 degrees F the addition of a low ambient control will also have to be used in conjunction with the on off function provided by the Simplicity board itself. This would be in a situation where there is no economizer available or is not in use and mechanical cooling will have to be operated at or below 40 degrees. Such as in a computer room or switch gear room.

The reason for the change in the operation of the simplicity board was to enhance the low ambient operation of the equipment during a process type installation where mechanical cooling is needed.

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