CLAIMS:

1. A method for operating a refrigeration unit, the method comprising:

measuring a first characteristic of the refrigeration unit;

calculating a compressor middle stage pressure based on the first measured characteristic;

determining if a first comparison and a second comparison are satisfied based on the first measured characteristic and the calculated compressor middle stage pressure; and

opening an economizer solenoid valve when the first comparison and the second comparison are satisfied,

wherein the first characteristic comprises a flash tank pressure, the first comparison comprises comparing the calculated compressor middle stage pressure with a critical pressure modified by a first pressure constant, and the second comparison comprises comparing the flash tank pressure with the critical pressure.

2. The method of claim 1, wherein the first characteristic comprises a plurality of characteristics.

3. The method of claim 2, wherein the first characteristic comprises a flash tank pressure, a compressor suction pressure, and a discharge port pressure.

4. The method of claim 3, wherein the compressor middle stage pressure is calculated based on the compressor suction pressure and the discharge port pressure as $P_{mid} = k_1 \times (P_{suc} \times P_{dis})^{k_2} + k_3$, wherein k_1, k_2, k_3 are known parameters.

5. The method of claim 1, further comprising:

monitoring a second characteristic;

determining if a third comparison or a fourth comparison are satisfied based on the second characteristic; and

closing the economizer solenoid valve when either the third comparison or the fourth comparison are satisfied.

6. The method of claim 5, wherein the second characteristic is at least one of (i) a time that a flash tank pressure exceeds a critical pressure modified by a first pressure constant and (ii) the flash tank pressure.

7. The method of claim 6, wherein the third comparison is satisfied if the time that the flash tank pressure exceeds the critical pressure modified by the first pressure constant exceeds a predetermined time.

8. The method of claim 6, wherein the fourth comparison is satisfied if the flash tank pressure exceeds the critical pressure modified by a second pressure constant.

9. The method of claim 5, further comprising, after closing the economizer solenoid valve, determining if the economizer solenoid valve should be opened again.

10. A refrigeration unit comprising:

at least one sensor configured to measure a first characteristic of the refrigeration unit;

a controller configured to calculate a compressor middle stage pressure based on the first characteristic the controller further configured to determine if a first comparison and a second comparison is satisfied based on the first characteristic and the calculated compressor middle stage pressure;

an economizer solenoid valve configured to open when the first comparison and the second comparison are satisfied; and

a flash tank, wherein the first characteristic comprises a flash tank pressure, the first comparison comprises comparing the calculated compressor middle stage pressure with a critical pressure modified by a first pressure constant, and the second comparison comprises comparing the flash tank pressure with the critical pressure.

11. The refrigeration unit of claim 10, wherein the first characteristic comprises a plurality of characteristics.

12. The refrigeration unit of claim 11, further comprising a flash tank, wherein the first characteristic comprises a flash tank pressure, a compressor suction pressure, and a discharge port pressure.

13. The refrigeration unit of claim 12, wherein the compressor middle stage pressure is calculated based on the compressor suction pressure and the discharge port pressure as $P_{mid} = k_1 \times (P_{suc} \times P_{dis})^{k_2} + k_3$, wherein k_1, k_2, k_3 are known parameters..

14. The refrigeration unit of claim 10, wherein the controller is configured to determine if a third comparison or a fourth comparison are satisfied and wherein the economizer solenoid valve is configured to close when either the third comparison or the fourth comparison are satisfied.

15. The refrigeration unit of claim 14, wherein the controller is configured to monitor a second characteristic, wherein the second characteristic is at least one of (i) a time that a flash tank pressure exceeds a critical pressure modified by a first pressure constant and (ii) the flash tank pressure

16. The refrigeration unit of claim 15, wherein the third comparison is satisfied if the time that the flash tank pressure exceeds the critical pressure modified by the first pressure constant exceeds a predetermined time.

17. The refrigeration unit of claim 15, wherein the fourth comparison is satisfied if the flash tank pressure exceeds the critical pressure modified by a second pressure constant.

18. The refrigeration unit of claim 14, wherein the controller is further configured to determine if the economizer solenoid valve should be opened again after the economizer solenoid valve is closed.