

Circulator Troubleshooting

Do it Once. Do it Right!



Alan Mercurio

Do it Once. Do it Right." is one of my favorite sayings from our friends at Taco Comfort Solutions. It's something all technicians and installers try to live up to when servicing customers. I'd like to share some information on how troubleshooting and installing Taco's 007e and 0018e has been made easier with Taco's innovative technology. See **Figure 1**.

Taco's 007e Circulator

Let's start with the circulators and questions you might have, such as what do the solid and flashing lights mean? The Taco 007e® is a variable speed, high-efficiency wet rotor circulator with an ECM motor. For installations, the 007e performance is ideal for hydronic zoning to reduce velocity noise or banging of zone valves closing against high head pressure circulators. Remember when we used to remove one of the springs



Figure 1

from an older style zone valve to prevent this from happening? No need to worry about that anymore because the 007e has an additional Green Mode operating curve that will self-adjust automatically. *How cool is that?* This circulator also reduces power consumption by up to 85% compared to equivalent AC permanent split capacitor circulators.

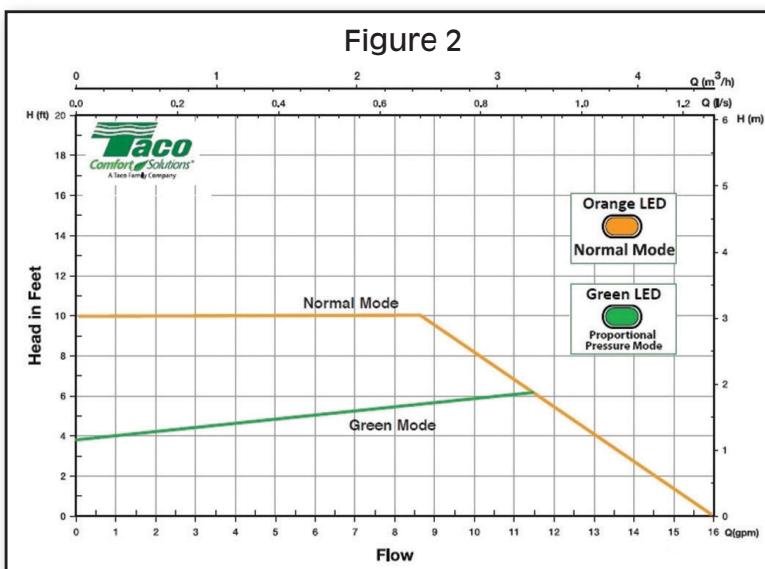
Here's how it works—the circulator will start in what's called the normal mode; you'll see the Orange LED during this mode. After seven days of constant running, the 007e will adjust its curve to Low Proportional Pressure curve for power optimization. This is the Green Mode; the Green LED will be displayed during this period. The 007e will reset to the original normal mode curve every time it cycles OFF. See **Figure 2**.

Now for some troubleshooting; if you encounter a White LED flashing on the circulator, this is an indication that the system is air-bound and you'll need to purge the system. Believe it or not, this circulator is capable of attempting to self-purge itself. Here's how—if the circulator becomes air-bound, it drops itself down to seven watts of power, and then quickly jumps up 42 watts, in most case this will burp the air out of the circulator and hopefully get caught and removed by your air eliminator in the system. If you encounter a

solid Red LED, this indicates that there's a blocked rotor and the circulator was not able to dislodge whatever is causing the blockage.

If anything impedes the flow of the impeller, the circulator recognizes this and will go to its flashing Red & White mode, drops itself down to its lowest power, then returns to full power, and proceeds to spin the impeller forward-and-backwards to cause a vibration that attempts to dislodge the blockage. Once the blockage is dislodged, the circulator will resume its normal operation. If it's not able to dislodge the blockage, the circulator makes 100 attempts to restart (that process lasts approximately 15 minutes). Every restart is signaled by a short White flash of the LED light. If the locking is not removed through the automatic release process after 100 attempts to restart the circulator, it goes into standby and the LED remains a solid Red.

In this case, follow the manual procedure: during any attempt, the Red LED light keeps blinking; after that the circulator tries again to start. If the locking is not removed through the automatic release process (the warning light returns to Red), perform these manual steps to unlock the circulator:



1. Disconnect power to the circulator.
2. Close both isolating valves and allow cooling. If there are no isolation valves, drain the system so that the fluid level is beneath that of the circulator. This would also be a good time to consider installing isolation valves.
3. Loosen the four motor bolts and remove the motor

from casing. Carefully pull the rotor/impeller from the motor.

4. Remove impurities and deposits from the impeller and casing. Then reinsert the rotor/impeller into the motor, restore the power and check to see that impeller is rotating freely.

If the circulator still doesn't run it will need to be replaced.

Taco's 0018e Circulator

The Taco 0018e circulator is awesome; it features Bluetooth technology and is a versatile, variable



Figure 3

speed, high-efficiency wet rotor circulator with an ECM motor. It's ideal for closed loop hydronic heat-

ing, open loop or domestic water applications. If you download the Taco 0018e Mobile App, you can see and control real-time system performance, as well as run system operation and validation reports, including performance diagnostics and history. You'll know the most efficient setting based on real-time feedback and alleviate the problems of over-pumping. You can now design systems with precision. See **Figure 3**.

Once you've downloaded the App to your device (phone or iPad), you can adjust the performance curves with accuracy. For a panel radiator with this circulator's variable speed capabilities, you can set it up for a proportional pressure mode, so the circulator maintains a proportional pressure differential as the heating load increases or decreases. Your selection options here are **Medium** and **High**. See **Figure 4**.

A system with zone valves can be placed in the constant pressure mode. In this mode, the circulator will main-

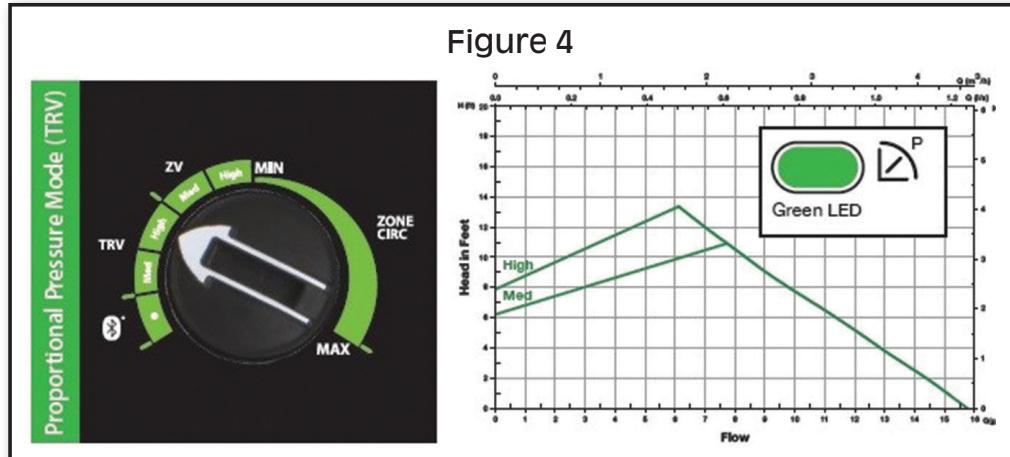
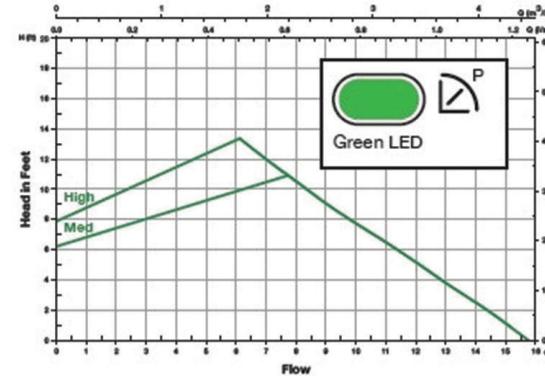


Figure 4



tain a constant pressure differential in the system as the heating load increases or decreases. Once again, your selection options here will also be **Medium** and **High**. See **Figure 5** for the equivalent 00 model at each setting.

Finally, a system zone circulator can be placed in the fixed speed mode, where the circulator will be infinitely adjustable and operate between its minimum and maximum speed. This allows you to control the circulator's flow rate to precisely match the design load conditions. See **Figure 6** for the equivalent 00 model at each variable speed setting.

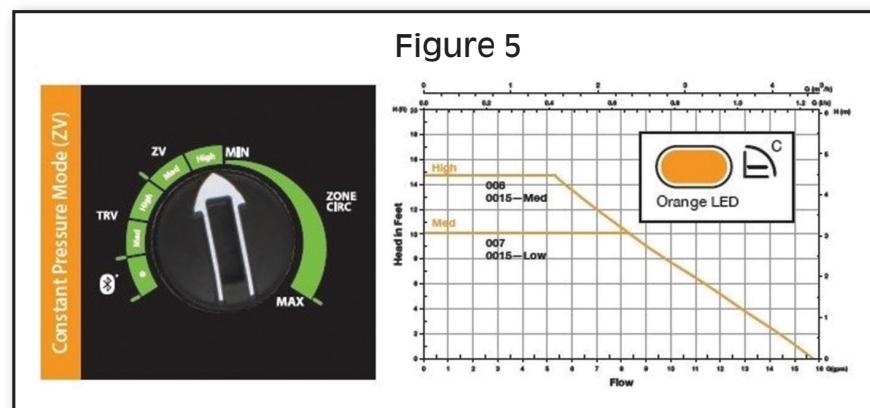


Figure 5

Note: As far as the troubleshooting goes with this circulator, all steps pertaining to the 007e as relates to the Red & White lights applies to this circulator as well.

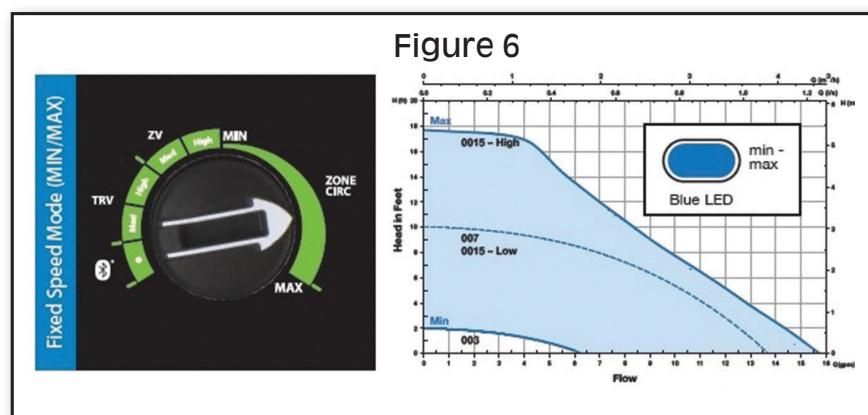


Figure 6

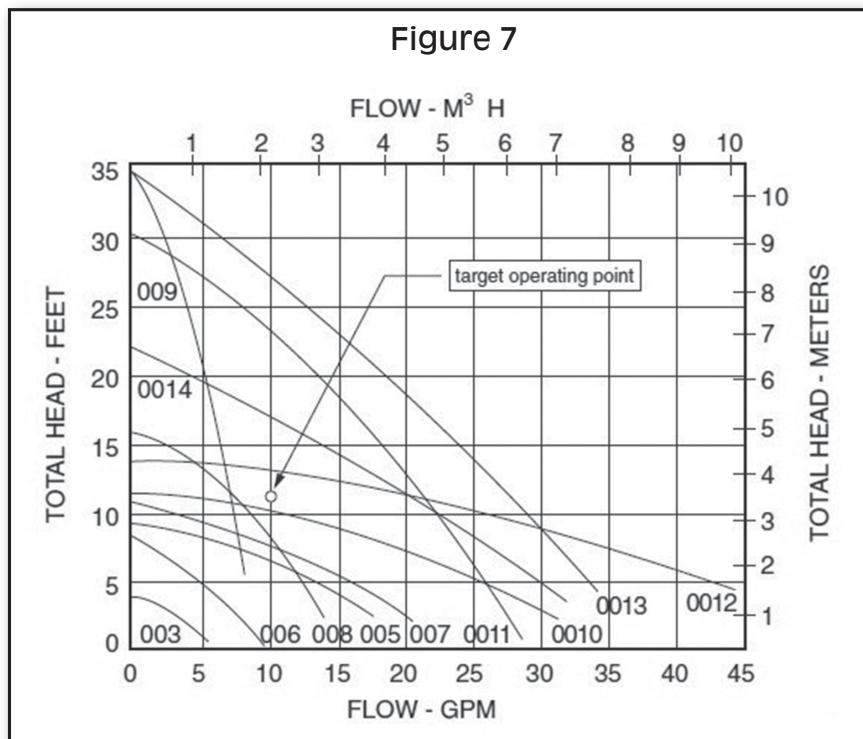
Circulator Troubleshooting

Circulators

These are just two of the many circulators available and happen to be favorites of mine. There are many others, both in type and brand, and choosing the right circulator is something many—including myself—have not taken into consideration over the years. *Guilty as charged.*

Let's be honest—how many of us believed for years that the Taco 007e was the right circulator for just about any scenario? Just because it worked and was heating the home doesn't mean it was the right application, nor was it likely providing the optimum performance and comfort that our customers deserved. This is why it's important to size a circulator using the chart provided by the circulator manufacturers. See **Figure 7. ICM**

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