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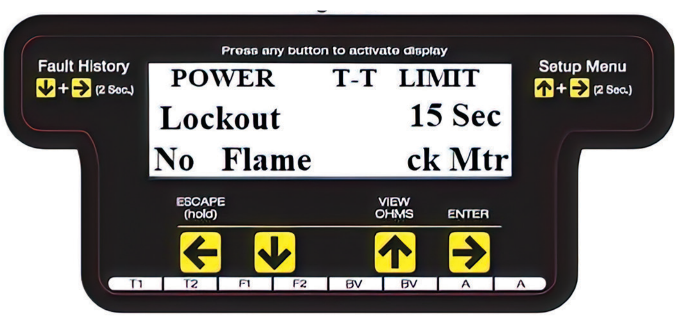
Troubleshooting & Control Settings in the 21st Century

Alan Mercurio

In *ICM*'s July/August issue, I mentioned how I looked forward to writing about the Carlin Pro-X 70200 Primary Control. The diagnostic capabilities of this control, as my friend Michael Warn of Carlin/Hydrolevel would say, provide you with a roadmap to determine what component to check as well as what caused that component to fail.

Let's use an example of the control showing a fault code that says "Check Motor" "High Amps" (**Figure 1**).

Figure 1



Notice it does not say *replace motor*; it is just pointing you in a direction that will likely lead to solving the issue(s) in a more efficient way. If you see that message, make sure the power is off to the appliance, then flip the igniter back (open) to expose the burner's blower wheel. Push it forward to see if it feels tight/sluggish. Then remove the motor from the burner housing and turn the burner's blower wheel again. If it moves with ease, then I would suspect it was the fuel unit binding up, and likely is in need of replacement. You can confirm this by using the burner coupling to turn the shaft on the fuel unit, and confirm it is in fact binding up.

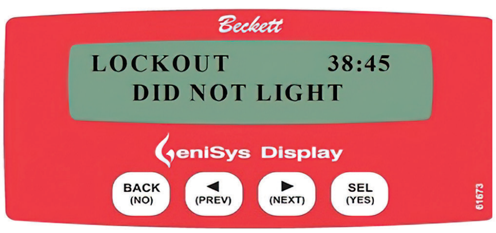
If the burner blower wheel is hard to turn after removal, then it is the motor that needs replacement. However, still check the fuel unit. For this scenario, let's pretend it *is* the fuel unit. Although we know it will be replaced, there are still some diligent steps we need to take in the hopes of preventing a call-back.

The 5 Whys

In my workshops, I often talk about cause, effects and chain of events. In the National Oilheat Research Alliance's (NORA) *Oilheat Technicians Manual–Silver*, we refer to this as asking the *5 Whys*. It is great that we have determined what part needs to be replaced, but we need to ask ourselves *what caused it to fail in the first place?* In this case, check for water in the fuel and the condition of the fuel filter and strainer. You'd more than likely replace those at this time and also check the system vacuum. All of these steps don't really take that long, and they will most likely lead us to what actually caused the fuel unit to fail.

To check the system vacuum, you first need to know the anticipated vacuum. To determine that, just remember 1' of vertical lift = 1" vacuum and 10' of horizontal run = 1" vacuum. Then add any filters, fittings and valves. If the vacuum is lower than your anticipated vacuum, you have a leak somewhere and this needs to be fixed. If your vacuum is higher than your anticipated vacuum, you have a restriction somewhere and that needs to be corrected.

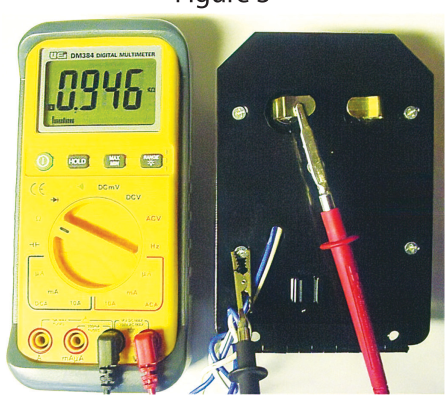
Figure 2



Further testing

Another fault code, in this case from the Beckett GeniSys via the contractor tool (**Figure 2**), shows the message "DID NOT LIGHT." This could be something as simple as the electrodes are out of alignment, which you could check with an electrode gauge; it could also be a faulty igniter. There are a couple of ways to check this. One way to test the igniter is the secondary coil test—place an ohmmeter across the igniter output terminals

Figure 3



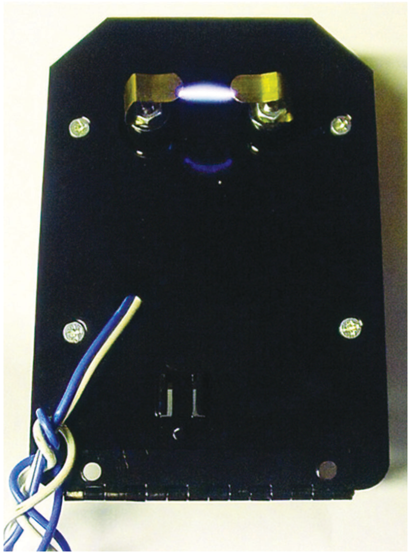
with the power off and measure the resistance between both springs/clips. The reading should be less than 2,000 Ohms and should equal the reading you get from both spring/clip to ground reading +/- 10%

Then measure the resistance from each igniter post to ground (**Figure 3**). The igniter is considered good if the resistance from each post to ground has no more than a 10% difference between posts.

Each manufacturer is different and they should be consulted for the proper output range and differential. It's also important that you verify continuity between the igniter case ground and true ground.

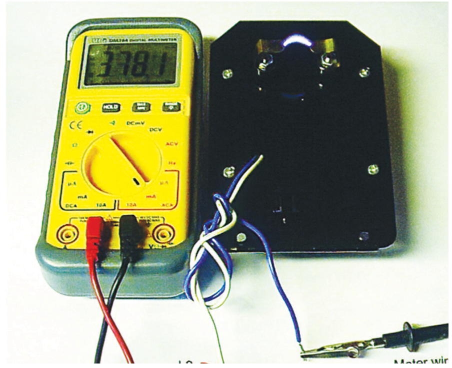
Another test that is approved by most manufacturers is to bring the igniter output terminals to within ½ to ¾ of an inch apart and turn on the power (**Figure 4**). A strong, blue spark should be generated. Let it spark for about five minutes to see if the spark changes from blue to orange; if it does, replace the igniter.

Figure 4



Finally, you could also test the igniter with what is referred to as the input current test. Bring the igniter output terminals to within ½ to ¾ of an inch apart, as described earlier. Then using a multi-meter capable of reading milliamps, put it in series with the hot line going to the igniter and turn it on (**Figure 5**). Again, the reading should stay steady and not vary for at least five minutes with a strong blue spark throughout the test, while staying within 10% of the rated amperage draw for the device.

Figure 5



If you have any questions as to how to check and test any of the items referred to in this article, you can find the information in NORA's *Oilheat Technicians Manual – Silver*, or feel free to E-mail me. **ICM**

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