



# The Controller

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This issue marks the 1st year anniversary of The Controller. That gives us six issues full of information designed to help you understand your system. Back issues are available for you to download from our website.

## Ideas for Articles of Interest?

Please submit articles or requests for articles to:

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## Save Money with Vessel Pressure Scheduling!

*by Russ Nagel*

Raising the vessel pressure setpoint will allow the compressor to unload. If the compressor is nearly unloaded, perhaps it can shut down. Either way, it may be possible to reduce your power bill. Does the refrigeration load change at night or on the weekends? Are there certain times during the week when there is no traffic in and out of the freezers? If so, it may be possible to raise the pressure in your vessels by two or three psig. This can be accomplished on the same screen that is used to schedule compressor sequence changes.

From the main screen, select F5 - System Utilities, F4 - Process Master File Editors, F2 - Engine Room Startup Information. If there is only one schedule on this page, and it says STD, compressor or vessel scheduling is not being implemented. You have to understand compressor scheduling in order to schedule changes to a vessel pressure setpoint. From the Engine Room Setup Utility enter the setup code you wish to edit. Select option, 4 - "Change Pressure System Settings", to change the pressure setpoint for the vessel of interest. When the new compressor sequencing

schedule starts, the new vessel pressure setting will take effect.

The operator must determine how many pounds to raise the vessel setpoint, and still maintain room temperatures. It will take some experimentation. Take a conservative approach in a situation like this. Try raising the vessel pressure setpoint by one psig and see if you can still maintain room temperature setpoints.

## Be careful with that alarm!

*by Russ Nagel*

Acknowledging an alarm you don't understand can lead to loss of product, an ammonia release or both! Experienced operators are able to respond properly to most of the alarms they see. At times, the refrigeration control system can generate alarms that aren't seen very often. Some of these seldom seen alarms tell you about a problem with the system. The result of the problem is, the system may not be maintaining temperatures! The system may appear to be working properly when in fact it isn't.

Operators should only acknowledge alarms when they understand the significance of the alarm and how to respond accordingly. When the operator

acknowledges the alarm, they are taking responsibility for understanding what the alarm means, what issues are associated with the alarm, and how to take corrective action.

The solution is simple. When an alarm you don't understand has to be acknowledged, get help immediately. Contact a more experienced co-worker. If no one is available, call us.

## How to Measure Electrical Current

by Russ Nagel

Knowing how to measure electrical current can save time, energy and effort when troubleshooting an analog sensor. Taking a current reading is seldom done because of the difficulties involved. The chief hurdle to measuring current is the inability to break the circuit and force current to flow through the digital multimeter. As a result of these difficulties, most refrigeration technicians don't know how to take a current reading. Fortunately, your refrigeration system provides an ideal opportunity to learn how to take a current reading. We will go over this process in this issue of The Controller.

This article will focus on reading direct current (a.k.a. DC current) in the milliamp range. First, we will discuss some basic direct current circuit theory. Then take what we have learned and apply it to the real world.

The circuit for your analog sensors is nearly as simple as figure one. Current flows from the negative terminal of the power supply, through the sensor and back into the positive terminal of the power supply. Most text books written for

technical training describe current as flowing from negative to positive. This symbology is referred to as "electron flow".

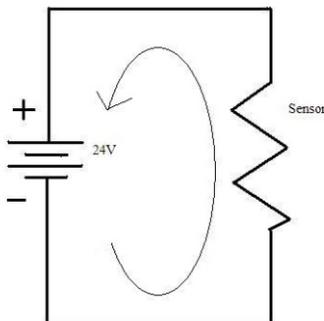


Fig. 1

You may also see direct current shown flowing from positive to negative. This symbology is typically used in engineering texts, and is referred to "conventional current flow". Regardless of the terminology, the amount of current flowing through the circuit will have the same value. Figure one shows a battery and a sensor. We are using a DC power supply in our control system, but it functions the same as a +24 volt battery.

In order to read the amount of current in this circuit, you HAVE TO BREAK THE CIRCUIT AND FORCE THE CURRENT TO FLOW THROUGH THE METER. Refer to figure two to see a representation of this concept.

As shown in figure two, your meter, we will now call it a current meter, is part of the circuit. The current that flows through the circuit now flows through the meter. The fact that current has to flow through the meter is the main reason people are unfamiliar with taking current

readings. In most electrical circuits, it is not an easy step (for high power circuits) to break current flow and insert your meter into the circuit.

Now that the concept of reading current has been covered, it's time to start working on the details. The first thing we need to look at is your current meter, or digital

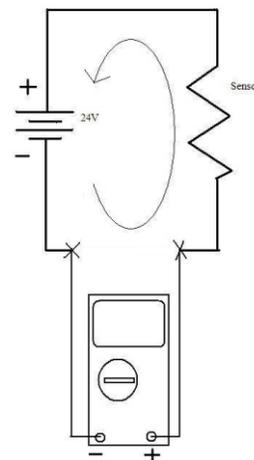


Fig. 2

multimeter. You probably refer to it as your volt meter, but I won't refer to it as a volt meter since we are concerned about reading current.

Figure three shows a DMM configured to read DC volts. In this case, it is reading a +24 volt power supply. Your refrigeration system supplies the analog sensors with a +24 volt source, similar to what we see in figures 1 & 2. Notice the lower right hand corner where the test leads are plugged in. The black lead is inserted into the common input (or COM hole). The red lead is inserted in the hole with a red background and markings indicating voltage and resistance. The dial is set to read DC volts and the display shows 24.03 VDC.

Figure four shows the same DMM set up to read current.

Notice the lower portion of the meter where the test leads are plugged in. Again, the black lead is plugged in to the common connection. The red test lead has been moved to the connection labeled 300 mA. This will allow you to read up to 300 milliamps or 0.3 amps. The rotating dial is also set to read DC amps.

Refer to the manual for your DMM to learn exactly how your particular meter is configured to read DC milliamps. The examples here



Fig. 3

reflect the requirements for the meter being used.

Most meters should be similar to the one shown. As stated earlier, breaking into a circuit to read current is, generally, not an easy thing. But in this case, your control system has a very convenient place to break into a sensor circuit and take a current reading. Locate where your analog sensor field wiring terminates in your panel. The middle level terminal is your signal return wire. Disconnect this wire and insert your meter, configured to read current, into the circuit at this point. Alligator leads, as shown in figure three, are a good thing to have at this point. Put the black meter lead on the field wire and the

## Training Info & Schedule

### Operator Level Sessions

This class session provides in-depth coverage of the use of our system to maintain the daily operations of a refrigerated facility. The class is conducted by Ralph Nodal who has many years of experience as a plant manager and refrigeration operator. In effect, the classes are taught in layman's terms by someone who fully understands the issues faced by refrigeration operators.

**Wednesday, July 14 thru Friday, July 16**  
**Wednesday, August 11 thru Friday, August 13**

### Training Enrollment

**Operator training sessions are \$450 per person and advanced training sessions are \$750 per person. We provide lunch for each class day; however, all other travel expenses are your responsibility.**

Seating is limited so make your reservations early by contacting Kim Smith or Cindy Gaffney @ 770-389-4964

red meter lead on the terminal where you just disconnected the wire. There is one last issue. You can't do this with a temperature sensor; they are not 4-20mA signals. It will have to be a level, pressure or NH3 sensor. To familiarize yourself with this technique, use a NH3 sensor. You will need to deactivate the scan on the sensor. To deactivate the scan for this sensor, go to the analog page for the sensor of interest and select item three. The scan active flag will now say **INACTIVE**. The current reading for an ammonia



Fig. 4

sensor should be around four milliamps. Four milliamps will equate to an ammonia sensor that isn't detecting any ammonia. Stimulating the sensor with test gas should get a higher reading. Once you have completed taking readings, be sure to reconnect the NH3 Sensor, and REACTIVATE the scan!

## New Product Announcement: Screw Compressor Controller

Last year, in partnership with Freeze Engineering of South Africa, we developed a screw compressor controller. After initial run-testing, it was installed at the end-users facility. The compressor in the picture has been running smoothly for several months. The software for this microcontroller is not Windows-based. As is always the case with LOGIC Technologies Inc, you get a superbly engineered product at a great price!

For more information, contact Mike  
Vinson at ext. 6610.



This controller was shipped to Freeze Engineering of South Africa in December of 2009



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