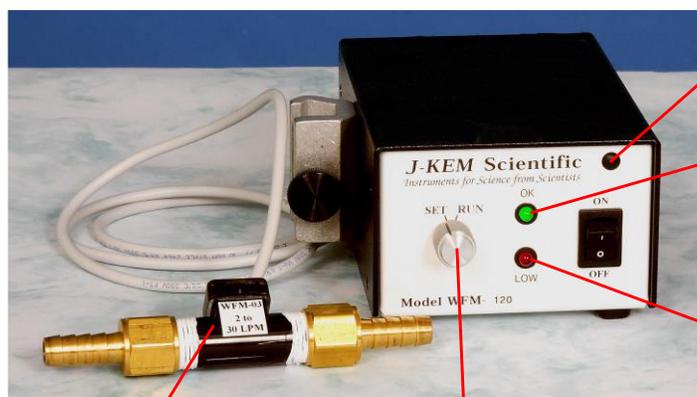


## Water Flow Monitor

The Water Flow Monitor (WFM) measures the flow rate of a coolant, like water, in an attached flow sensor. As long as the flow rate stays above a user set level, the controller supplies power to a 120Vac receptacle on the back of the controller which is used to supply power to an attached piece of laboratory equipment. If the flow rate falls below the set value, then power is turned off to the outlet on the back, which removes power from the piece of equipment plugged into the water flow monitor. If the controller turns the outlet off due to a low flow condition, the outlet stays off until being manually reset.



Flow sensor

Run/Set switch

Manual override button

Lights to indicate adequate flow

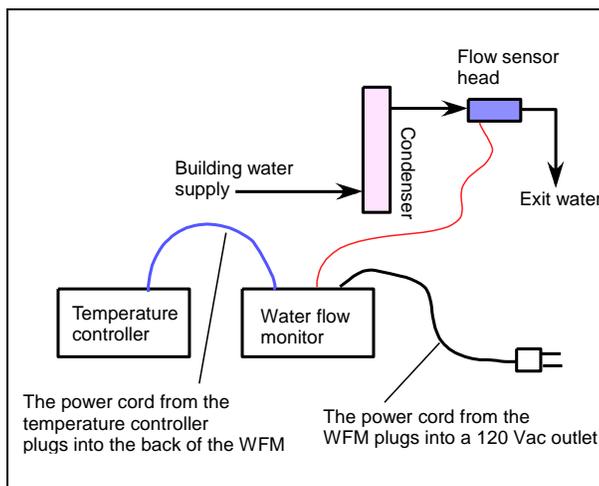
Lights to indicate that flow is low



120Vac outlet

Power Cord

Connector to flow head

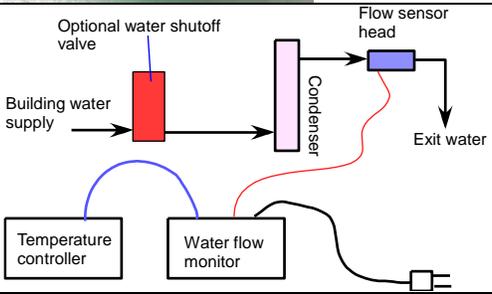


An example of how the WFM might be used is to act as a safety controller for a reaction being refluxed. In this example the power cord from the temperature controller plugs into the back of the WFM, then the power cord from the WFM plugs into the a laboratory power receptacle. Now, set a water flow rate that causes the WFM to power the 120 volt receptacle on the back of the WFM. In this configuration, as long as the water flow rate stays above the safe flow rate set on the WFM, the temperature controller stays powered. But, if the flow rate drops below the level set, then the WFM turns off the 120Vac outlet on the back of the controller and de-powers the temperature controller, thus preventing a heating accident.

## To Operate:

1. Place the flow sensing head on the outlet line of the condenser or whatever piece of equipment the flow rate is to be monitored on. Note the direction of flow printed on the bottom of the sensing head.
2. Turn the monitor's power switch on and turn the flow rate knob to the "SET" position. The *red* 'Low' LED will begin blinking.
3. Increase the flow rate of the liquid until the green LED lights. This indicates the minimal acceptable flow rate. Note that any time you adjust the flow rate of water, you need to wait 5 seconds for the monitor to evaluate the new flow rate to determine if the flow is above the minimally acceptable level. The Water Flow Monitor averages the flow rate through the sensor for 5 seconds before determining if the flow is at an acceptable level.
4. Turn the flow rate knob to the "RUN" position and the *green* 'OK' LED will light continuously.

The flow rate in effect when the Set/Run switch is moved to the Run position establishes the minimally acceptable flow rate, that is, if the flow rate falls below this level for more than 5 seconds, a flow error is declared and power is turned off to the WFM 120 Vac outlet. After establishing the minimum flow rate, the actual flow rate of water can be increased to any desired flow rate. It's a good practice to always increase the water flow rate, by some value above the minimum rate so that slight fluctuation in water flow don't cause the WFM to trigger.

	<p>An optional water shut off valve (Cat# 250WV) is available that can be used to turn off water flow in the event of an accident. For example, if one of the water lines were to fall off the condenser, the WFM would turn power off to the temperature controller, because the flow rate of water through the flow sensor would fall to 0 ml/min. But, water would continue to flow from the outlet thus flooding the lab. The water shut off valve can be used to prevent a flood.</p>
	<p>Plumbing the water between the water outlet in the lab and the inlet of the condenser. The water valve is a <i>normally closed</i> valve, which means that it is closed when not powered.</p>
	<p>If the shut off valve is the only item plugged into the WFM, then it can be plugged directly into the 120 Vac outlet on the back of the WFM. But, if you want to use the WFM with both a temperature controller, or other instrument, and the shut off valve, then both items need to be plugged into the 120 Vac outlet on the back of the WFM. To do this, you can plug a power strip into the WFM, then the controller and shut off valve into the power strip, or you can use J-KEM's dual outlet cord (Cat# DOC-2), shown in this photo.</p>

When the WFM is used with the shut off valve, it's necessary to manually open the valve so that water can flow the flow sensor, and thus allowing you to set the desired flow rate. In order to manually open the water valve, press the manual override button. This supplies power to the shut off valve, which allows water to flow in the system. Set the desired minimum flow rate as described previously, then release the manual override button. In this configuration, if water flow falls below the minimally acceptable level, power to any attached piece of equipment and to the shut off valve are removed.

Any piece of equipment can be plugged into the power receptacle of the water flow monitor as long as it draws less than

15 amps @ 120 volts; 1800 watts, for the Model WFM-120 or  
10 amps @ 230 volts, 2300 watts, for the Model WFM-230.