[Note: This is a supplemental reference to accompany "Randall Observations of Steam Generated by Rossi's Device in the Ny Teknik Video"]

Detailed Analysis of the Rossi Device

Mitch Randall, MSEE, MSPHYS, Member IEEE

The Configuration of the Rossi Device

This configuration of the Rossi device is based on publically available information. Certainly, the inner workings of the purported reactor core and catalyst material are not known, but from what we can see, from our knowledge of the inputs and outputs, and from observation of what is not present, we can make definitive conclusions about many of the features of the system.

Figure 1 shows a block diagram of the Rossi device and system.

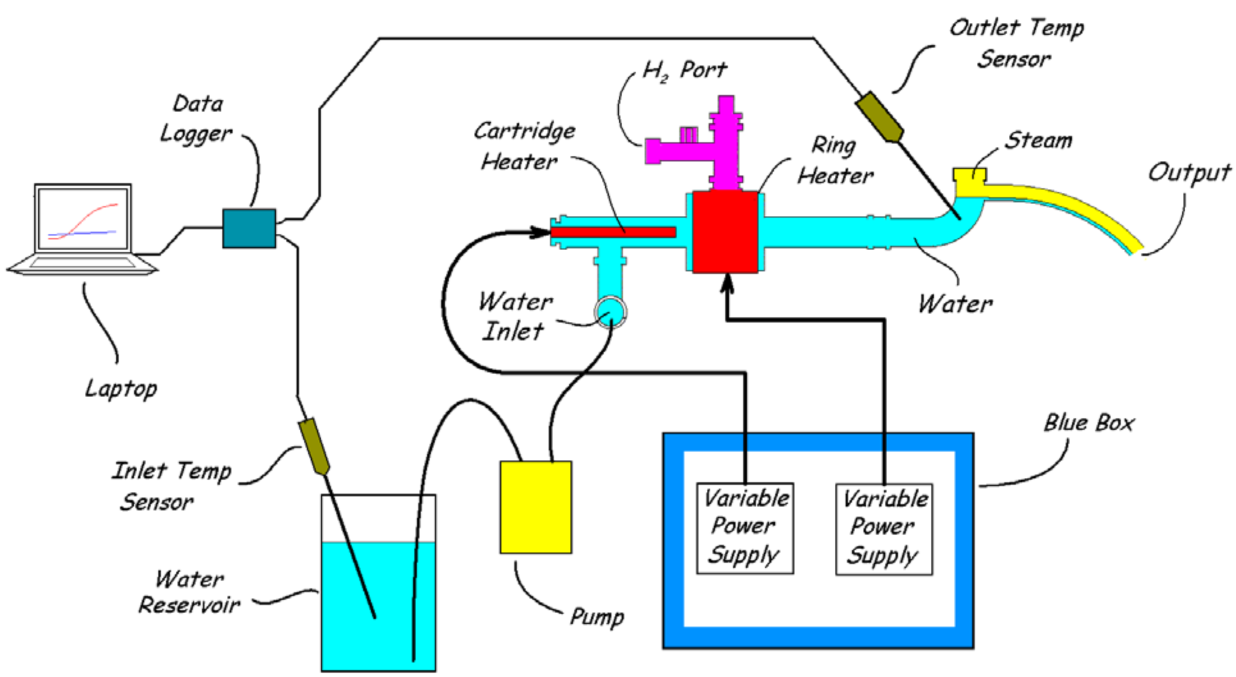

Figure 1

- **Temperature Monitoring System**

Rossi uses a laptop computer to monitor three temperatures: Inlet temperature, Outlet temperature, and ambient temperature (see page three of the Levi report regarding the Jan 14 demonstration)[1].

Figure 2 is an annotated screenshot from the Ny Teknik video[2]. It shows the data logger connected to the laptop computer. Two connections extend from the data logger to the inlet temperature sensor and the other to the outlet temperature sensor. No other connections go to the laptop computer other than power. This is significant and is explained below.

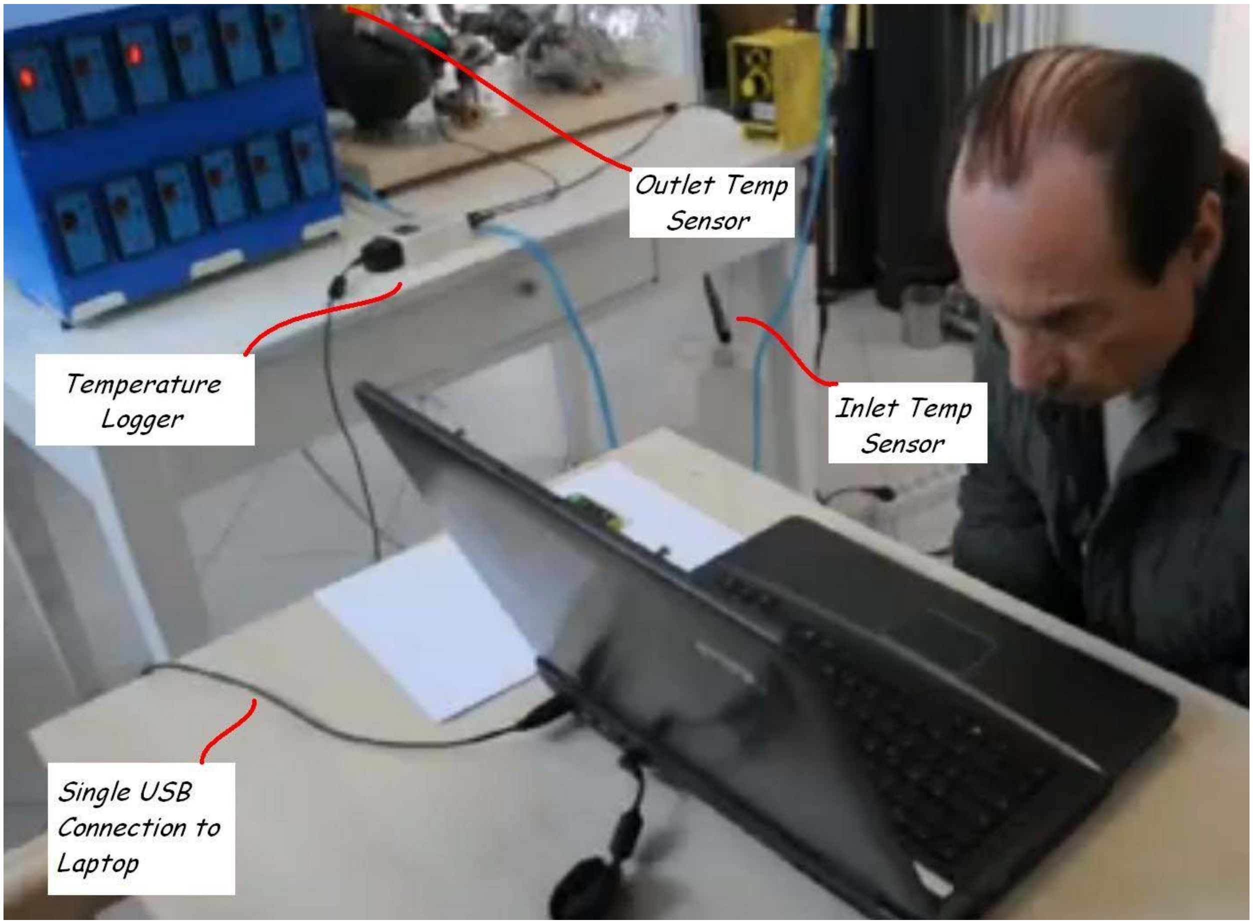

Figure 2

Although the entire length of the USB cord is not visible in figure 2, the hypothesis that the image shows a single cable is well supported by other similar images and statements from the various demonstrations. In addition, various other images also support a hypothesis that the laptop computer does not connect to the blue box.

- **Heater Drivers**

The front panel of the blue box is shown in figure 3, taken from a screenshot of the Ny Teknik video[3]. The image shows twelve identical modules. Two of the modules can be seen to be lit, while the remaining 10 modules do not appear to be active, showing only a decimal point.

Figure 3

In a personal communication[4] Lewan sent me a high-resolution image of one of the modules. In his communication he indicated this module was a digital power adjuster. The image is shown in Figure 4.

Figure 4

A web search reveals this to be an infrared lamp power adjuster used in the plastic injection molding industry[5]. A digital power adjuster operates just as does a light dimmer to set an amount of power delivered to an external load. The power adjuster can be seen in operation in a YouTube video[6]. In the video, Rossi holds the up arrow button causing the numeric display to increase from 0 to 9, presumably increasing the power delivered to an external load from 0 to maximum. Such a power adjuster is not a controller. In other words, a power signal comes out of the power adjuster, but no sensor signal is fed back to the power adjuster to close a loop. It is a “dumb” device that simply provides a manually adjustable amount of power to a load. Since it is apparent that the display is a single digit, it is likely that 9 corresponds to maximum. This is also supported by the video segment where the number stops increasing when it reaches nine, even though Rossi appears to be still holding the up arrow button.

- **Heater Connections**

Other than the two temperature sensors, the device is seen to have exactly two cables leading from it as shown in the screenshot[7] of figure 5 from the Ny Teknik video at 1:14.

Figure 5

Views at 1:16 and 1:20 show the device right side and left side respectively to aid in confirming that no other wires enter or exit the device.

Although the Ny Teknik video does not show a clear shot of the other end of these wires, they can be seen in the image of Figure 6 from the Essen/Kullander demonstration of 29 March 2011[8].

Figure 6

It is again shown in the annotated screenshot of Figure 7 from the Krivit video[9].

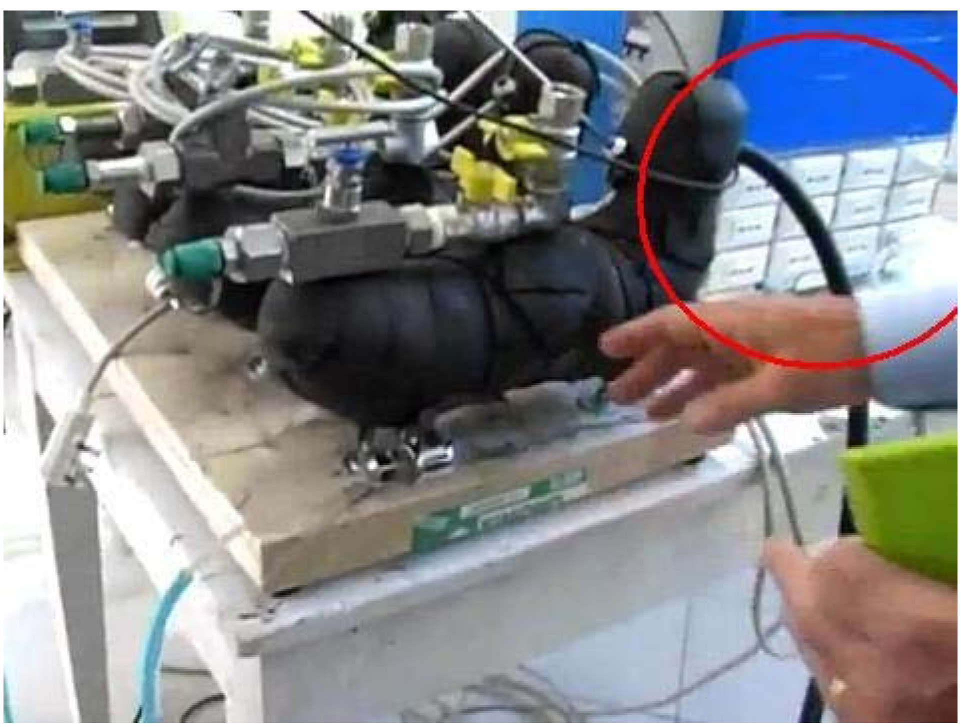

Figure 7

In each image, one taken earlier than the Ny Teknik video, and the other taken later, the heater cables are seen to connect to the blue control box through standard Italian AC outlet plugs. There are twelve AC outlet plates on the back of the blue box. It seems reasonable to assume each of these outlet plates is powered by a corresponding digital power adjuster. This assumption is further reinforced in that the first and third digital power adjusters are active (see figure 3) and the first and third outlet plates are connected to the Rossi device.

The AC outlet standard used by Rossi[10] is shown in Figure 8.

Figure 8

It is known as a Type L or technically as a CEI 23-16/VII. They come in two types rated at 10 and 16 Amps. The plug can be inserted in the socket in either direction (reversible).

Figure 9

Figure 9 shows an image from the 14 January 2011 Levi demo[11] where cables similar to the ones used in the Ny Teknik video are seen to be comprised of two wires. In the image they connect to the blue box by a pair of lugs colored red and black. In this earlier demo, there was only one Rossi device with five resistive heaters[12].

From the images presented, and the fact that the plug used is reversible, it seems reasonable to assume that each cable comprises two wires. Because the plug is reversible, and because two of the three prongs would be dedicated to delivering power to a heater, it would seem reasonable to assume that there are no other wires in the cables used for returning signals to the blue box. It seems reasonable to assume that if sensor wires were to return signals to the blue box, a connector more suitable than a Type L AC power connector would have been chosen.

- **Heaters**

In the Ny Teknik video, the Rossi device is mounted on a frame next to what is apparently three similar Rossi devices, but without insulation. Figure 10 shows a screenshot[13] of the cartridge heater mounted at the end of one of the adjacent devices.

Figure 10

It is clear from the image that there are two wires emerging from the heater element. A web search of typical cartridge heaters (often used in the plastic injection molding industry) shows the typical use of striped wires[14].

Wrapped around the assumed reactor core is a nozzle heater[15] as shown in figure 11.

Figure 11

Nozzle heaters are also used in the plastic injection molding industry and are powered through two wires.

It is reasonable to conclude that the two cables leading to the Rossi device connect to a cartridge heater and a nozzle heater with two wires each.

- **Control of the Rossi Device**

Notably, the diagram of figure 1 does not indicate any type of closed loop control of the Rossi device. This is because careful inspection of the overall system as above accounts for all of the connections with no additional connections available to possibly close a control loop of any kind.

As the diagram of figure 1 shows, two open loop power adjusters are used to send an un-regulated amount of power to two resistive heaters. The only monitoring of the system is the inlet and outlet temperatures, which are displayed on a laptop computer. There is physically no output from the laptop computer to allow the temperature information to be used to affect the operation of the device.

In the Krivit video[16], Rossi claims that the blue box measures temperature and pressure. However, there is no physical connection from the device to the blue box that could carry either a temperature or pressure measurement. Further, there is no temperature, pressure, flow rate, or water level sensor apparent on the Rossi device or the three naked device replicas sitting adjacent it.

- **Water Overflow**

The temperature of the steam exiting the Rossi device has been measured and logged in each demonstration and has never been seen to appreciably exceed 100 degrees. Thus, it can be assumed that it is controlled to be 100C. Because there are no physical connections apparent that would allow the implementation of an active control system, the control system, if any, must be passive. The simplest way to achieve such temperature control is to place the heat generating element under water. It seems a challenge to imagine any other passive control system that could so reliably maintain the steam temperature at 100C.

In the experiments, a presumably constant flow of water is pumped into the device. If the heat-generating element were generating too much heat, the rate of steam production would outpace the rate of inlet water flow, and the heat-generating element would run dry and likely over-temperature. On the other hand, if the heat-generating element were generating too little heat, liquid water would eventually fill the device and spill out the outlet hose without being vaporized.

The diagram of Figure 1 includes the most likely passive system to keep the water level high enough to ensure the heater is immersed. By necessity the passive water level control system requires that the inlet water flow is set to be greater than the amount of water that is vaporized to steam by the heater. Thus, liquid water is shown exiting the reactor along with the steam as is required by design.

Conclusion

In summary, it has been shown and reasoned that the diagram of figure 1 accurately represents the Rossi device based on tangible evidence and deduction.

Temperature sensors connected to a laptop computer through a data logger monitor the inlet, outlet, and ambient temperature. The laptop, however, cannot send any signals or commands to the device due to lack of any physical connection to do so.

Two of twelve available digital power adjusters (light dimmers) send an uncalibrated level of power to two resistive heaters mounted on the Rossi device. The cables connect from the blue box to the Rossi device through an Italian AC power connector that physically does not allow for any monitoring signals to come back to the blue box. No other connections appear to exist between the Rossi device and the blue box.

The heaters (as well as the digital power adjusters) are from the plastic injection molding industry. The heaters have two wires each and do not include any kind of sensor (or wire for a sensor) in order to return any parameters back to the blue box. Thus, the blue box is not physically capable of providing closed-loop control of any kind to the device, be it temperature, pressure, flow rate, safety, or otherwise.

The diagram of figure 1 shows no form of internal sensing or closed-loop control provided of any kind. This includes any type of safety shutdown. These possibilities have been definitively eliminated by careful scrutiny of the interconnections of the system.

The outlet steam temperature is seen to be fixed at about 100C. It is reasoned that the temperature remains constant because the heat-generating element is submersed. Thus the water level must be passively controlled to ensure submersion. It is argued that this is accomplished by setting the inlet water flow rate to be greater than the rate of steam generation such that liquid water spills out the outlet hose as shown in Figure 1.

The configuration of the device as shown in Figure 1 is derived through deductive reasoning. A collection of images and references provides evidence in support of the diagram of figure 1.

References

1) Levi, G, "Report on heat production during preliminary tests on the Rossi "Ni-H" reactor", http://www.nyteknik.se/incoming/article3076881.ece/BINARY/Levis+and+Bianchinis+rapport+(pdf)

2) Ny Teknik Video, Screenshot 0:01, 28 April 2011, http://www.youtube.com/watch?v=x8SeOteFPtM

3) Ny Teknik Video, Screenshot 1:04, 28 April 2011, http://www.youtube.com/watch?v=x8SeOteFPtM

4) Email communication from Lewan to Mitch Randall, 7 June 2011.

5) Power adjuster for infrared lamps used in the molding industry : http://www.gsei.it/motore.html : G.S.E.I Elettronica

6) "The Magic of Mr. Rossi", http://www.youtube.com/watch?v=NzL3RIlcwbY, at 4:21

7) Ny Teknik Video, Screenshot 1:14, 28 April 2011, http://www.youtube.com/watch?v=x8SeOteFPtM

8) "Experimental test of a mini-Rossi device at the Leonardocorp, Bologna 29 March 2011", Figure 10, Cropped, http://www.nyteknik.se/incoming/article3144960.ece/BINARY/Download+the+report+by+Kullander+and+Ess%C3%A9n+%28pdf%29

9) Krivit video, http://www.youtube.com/watch?v=m-8QdVwY98E, 2:56

10) Type L Italian socket identification: http://electricaloutlet.org/type-l

11) Image of Levi test of 14 January 2011

12) Levi report of reference 3, page 3, referring to five cables for "resisters inside the reactor".

13) Ny Teknik Video, Screenshot 2:12, 28 April 2011, http://www.youtube.com/watch?v=x8SeOteFPtM

14) TEMPCO home page: http://www.tempco.com/new/products5.html

15) Ny Teknik image from Essen-Kullander demo of 29 March 2011

16) Krivit video, http://www.youtube.com/watch?v=m-8QdVwY98E, 5:23