A. The Chamber

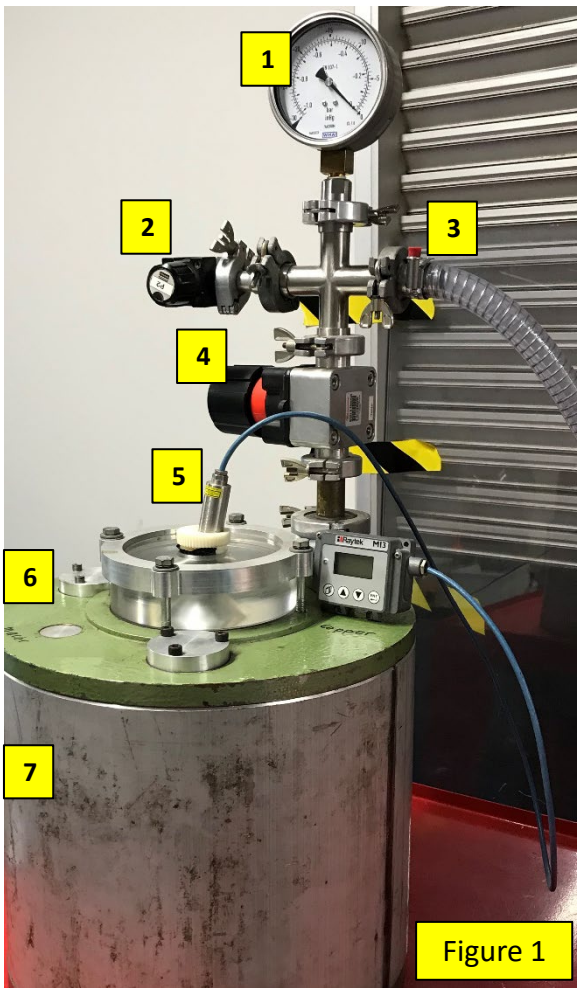


Figure 1

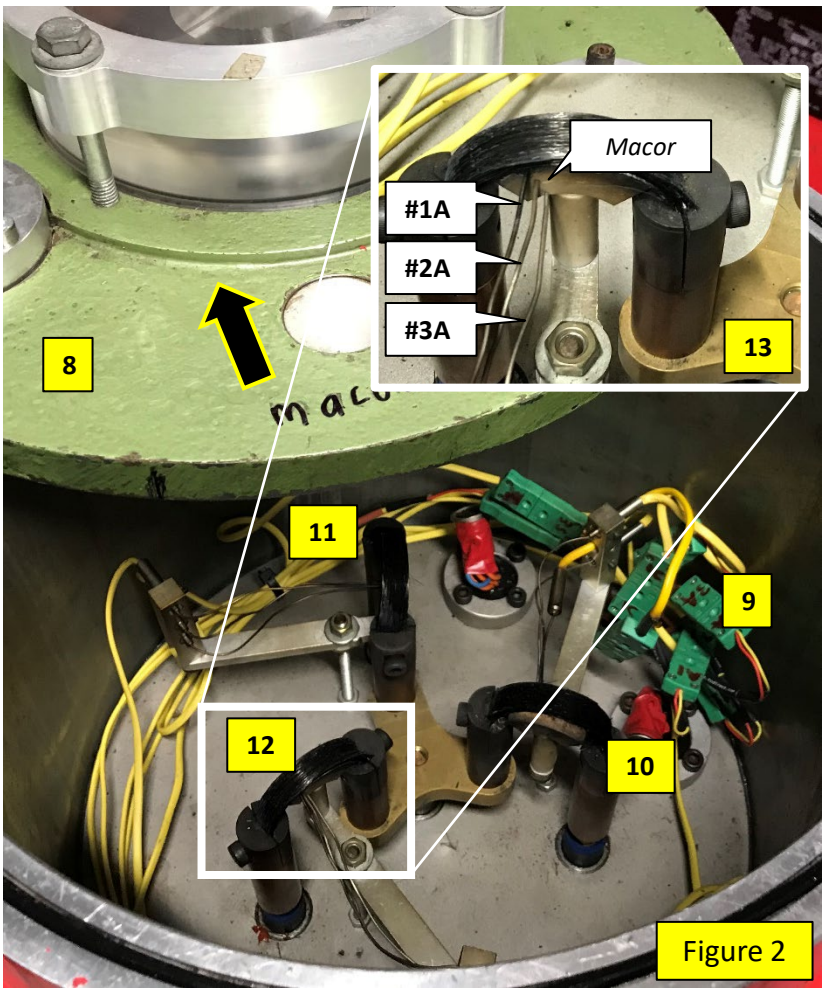


Figure 2

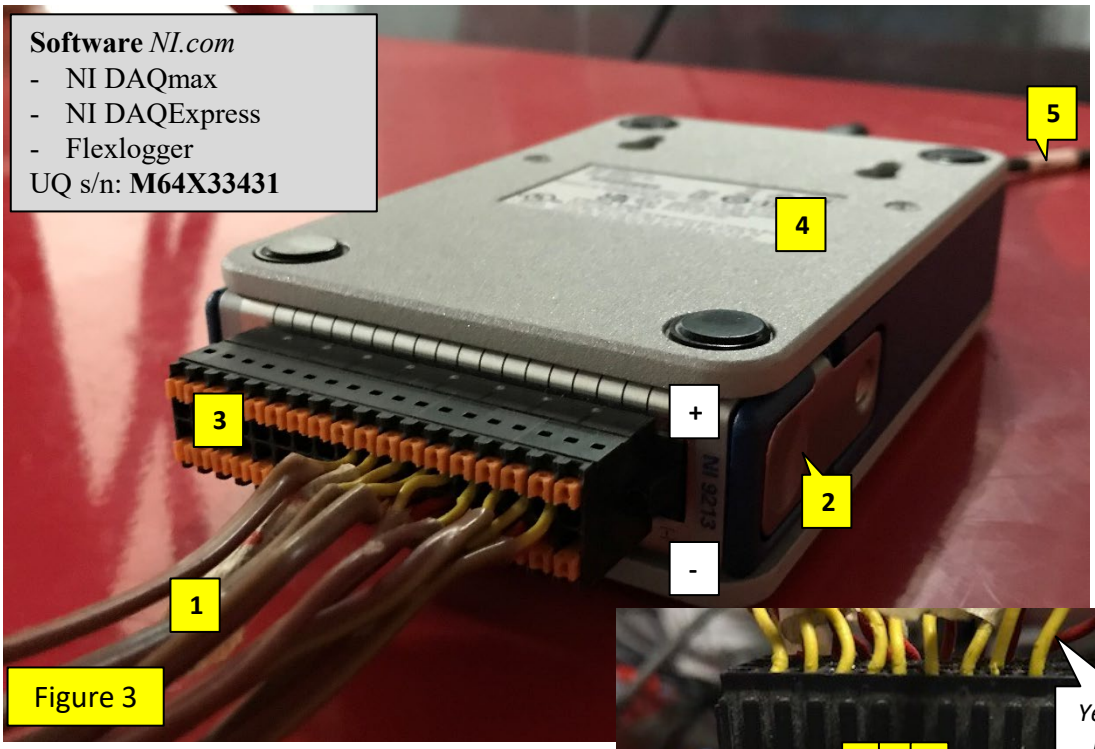
Figure 1: The chamber fixtures

1. Vacuum gauges
2. Fine vent to balance vacuum of the chamber
3. Connection to a vacuum pump
4. Main valve to the chamber(*default: OPEN*)
5. Probe of infrared temperature sensor (*IR Thermometer*) of *Raytek M13* comm module
6. Lid of the chamber (*slide-able to access inside*)
7. The chamber

Figure 2: Inside the chamber

8. Push the lid sideway (*the arrow show direction of the push*) to expose the inside;
9. Connectors of *Thermocouples* to *a thermocouple module*, which is outside the chamber
10. Specimen (*Copper*)
11. Specimen (*Stainless Steel*)
12. Specimen (*Macor*)
13. Typical connections of three thermocouple on each specimen, and their identification

B. Thermocouple module



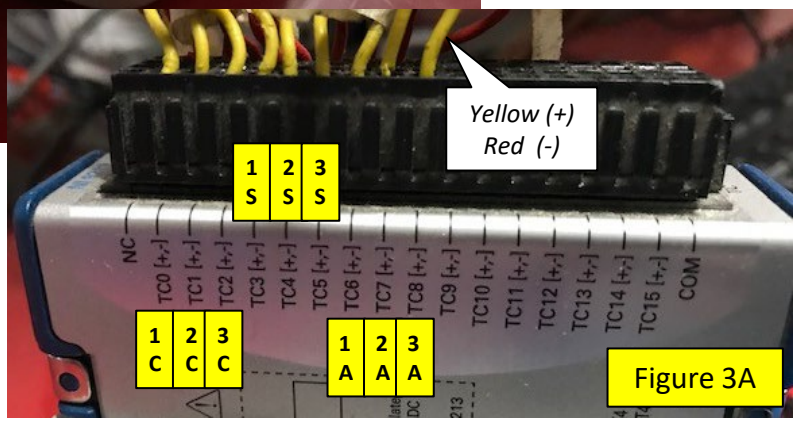


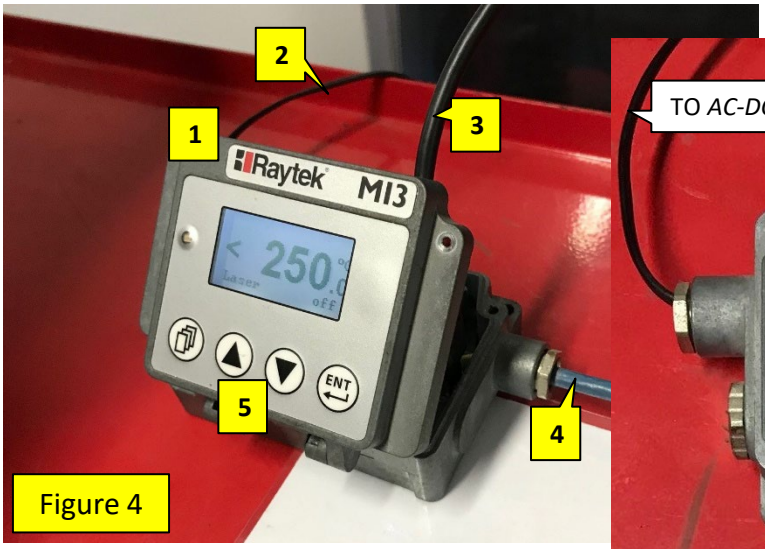
Figure 3: NI-cDAQ 9171 & NI-9213 Thermocouple module

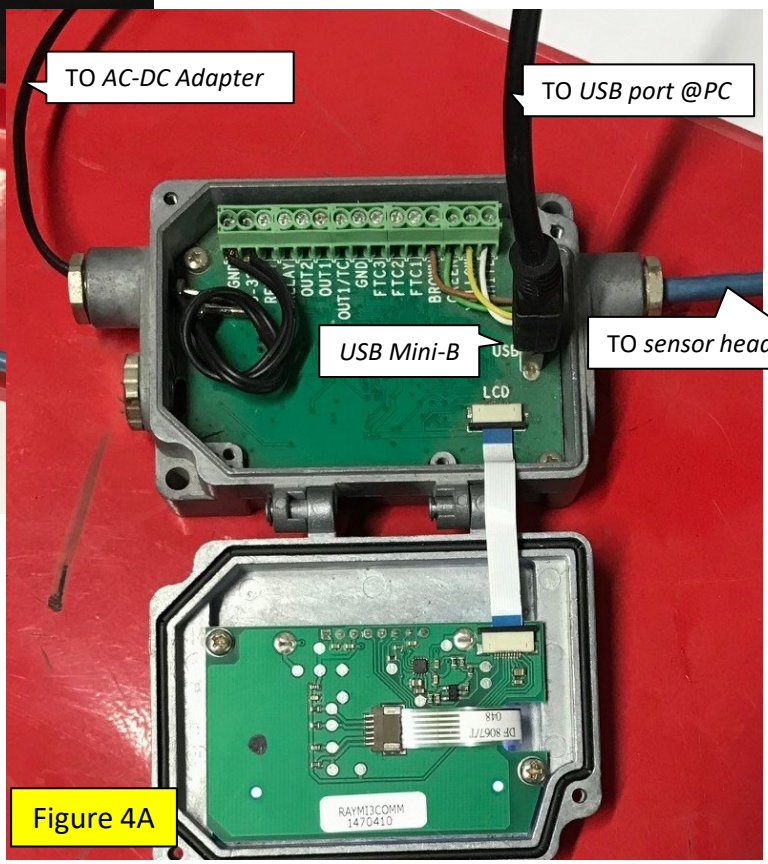
1. Thermocouples' cables from inside the chamber (*see Figure 2 #9*)
2. NI-9213 Thermocouple module's latches to lock the module to NI-cDAQ 9171 chassis
3. NI-9213 terminal assignments, with detachable spring-terminal connectors
4. NI-cDAQ 9171 slot, a USB CompactDAQ Chassis
5. Connection to PC

Figure 3A: Connection detail of thermocouples to NI-9213 terminals

- TC0 – 1C
- TC1 – 2C
- TC2 – 3C
- TC3 – 1S
- TC4 – 2S
- TC5 – 3S
- TC6 – 1A
- TC7 – 2A
- TC8 – 3A

B. Raytek MI3 Infrared Sensor





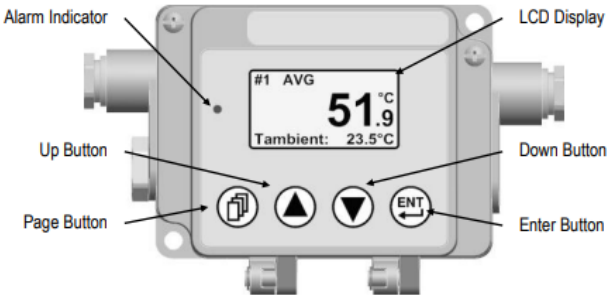
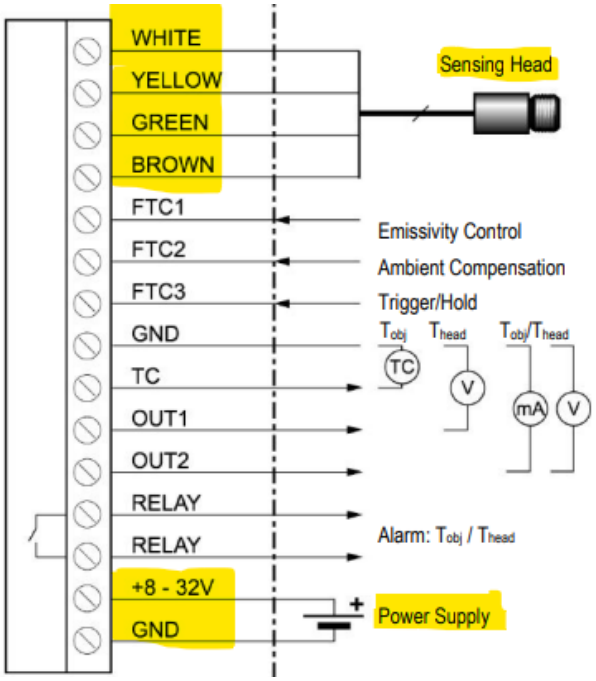


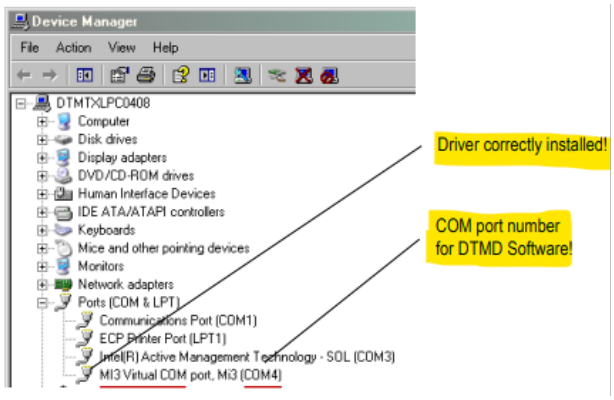
Figure 4: Raytek MI3 Infrared Temperature sensor

1. The metal Comm Box, top unscrewed, *RAYMI3COMM*
2. Power cable, to an AC-DC adapter to *supply 8-32VDC, power consumption max 6W*
3. Data connection to PC through *USB to USB Mini-B cable*
4. Sensing head cable to a sensing head of *LT, G5, 1M, 2M*
5. Control panel; *refer to the inset*

Figure 4A: Terminal wiring for this Comm Box



Software *flukeprocessinstruments.com*
- Raytek DataTemp Multidrop DTMD 5.4.1



D. Power connection

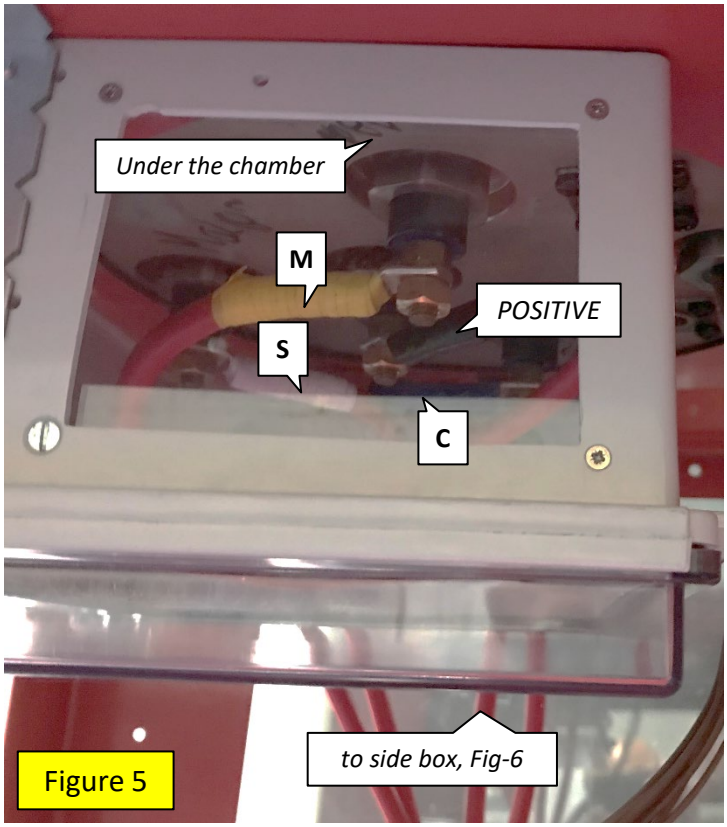


Figure 5

Figure 5: Power connections (under the chamber)

Four connections inside the safety box of the bottom of the chamber, and they are:

- Yellow tape – **M** connection
- White tape – **S** connection
- Blue tape – **C** connection
- Black tape – ***positive terminal***

Figure 6: The power connection for tutors to shift during the prac session is **ONLY**:

- The **Green-Yellow** tape

ASSURE TO TURN OFF THE POWER SOURCE BEFORE OPENING THIS BOX

BE CAREFUL NOT TO CONNECT THE *YELLOW-GREEN* & THE *BLACK* or *RED* TAPED CABLES

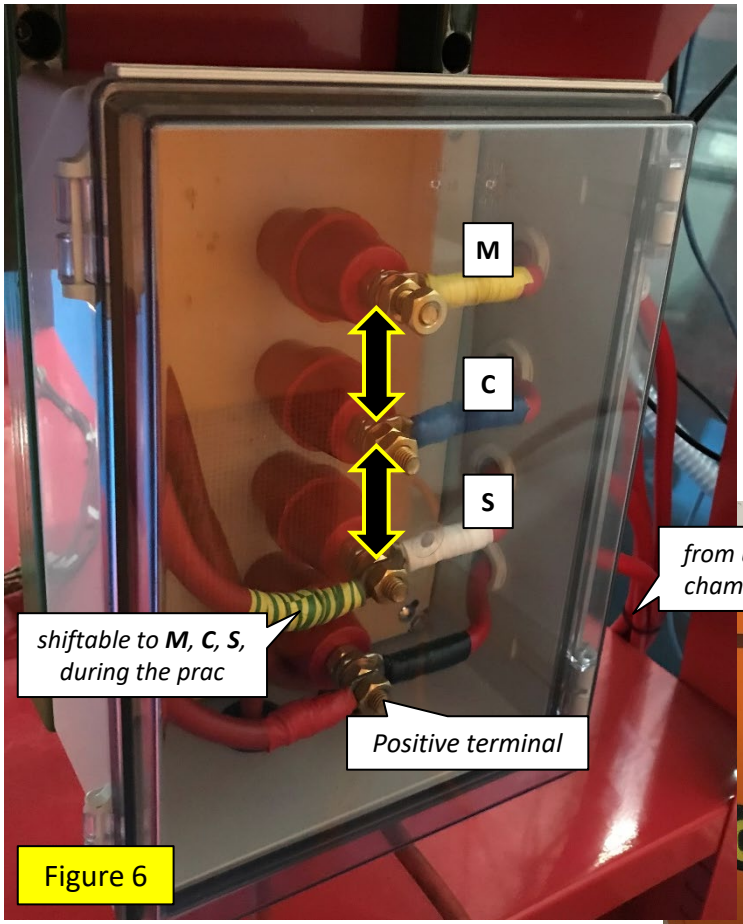


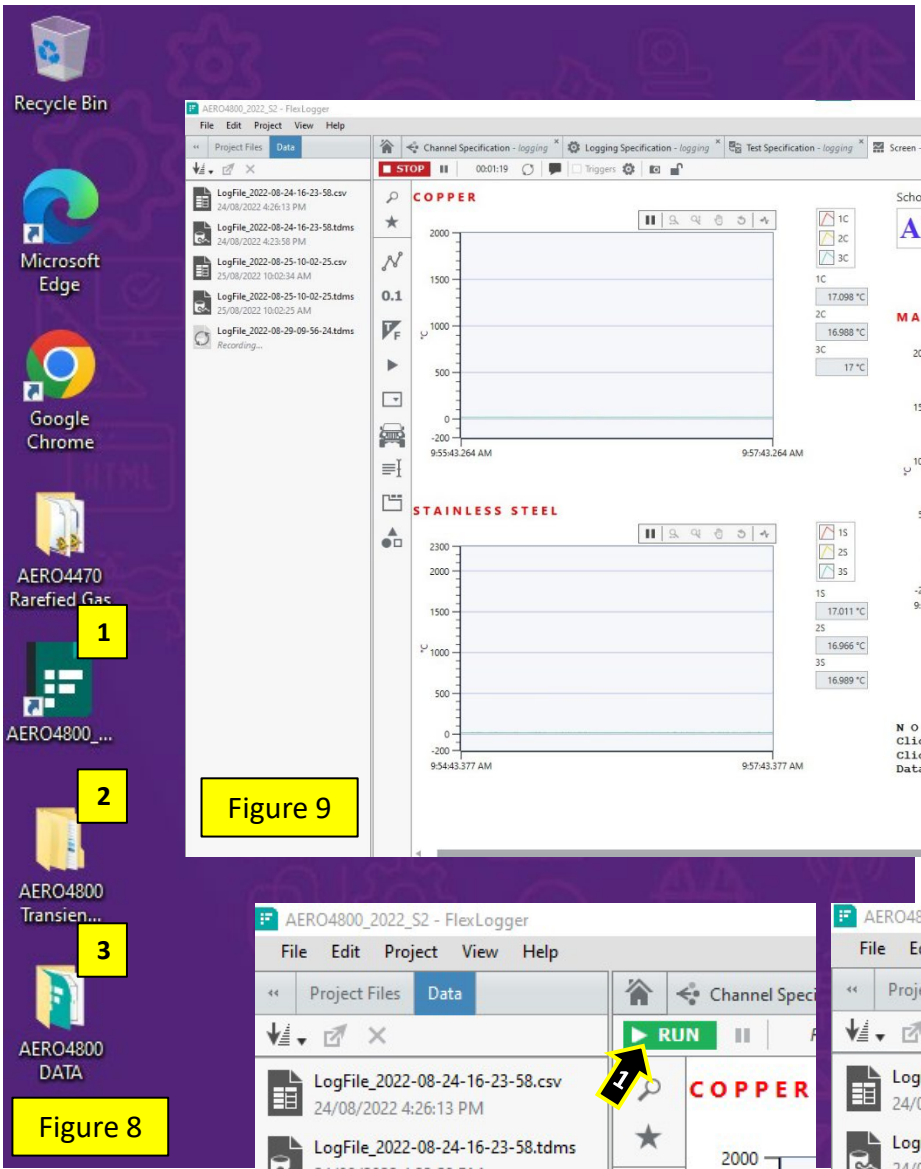
Figure 6

Figure 7: The power source output to the box: *DC Output*: 10 Volts & **250 Amps**

CAUTION: THIS POWER SOURCE IS A HIGH AMP UNIT

Figure 7

E. Flexlogger test software



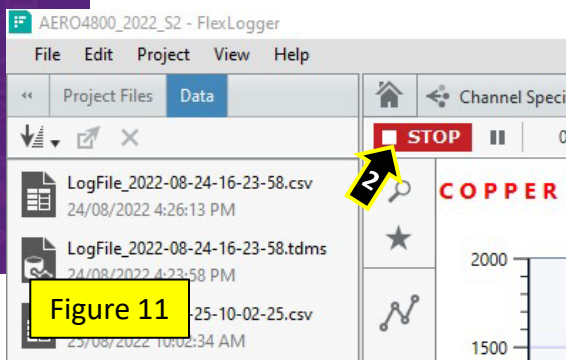


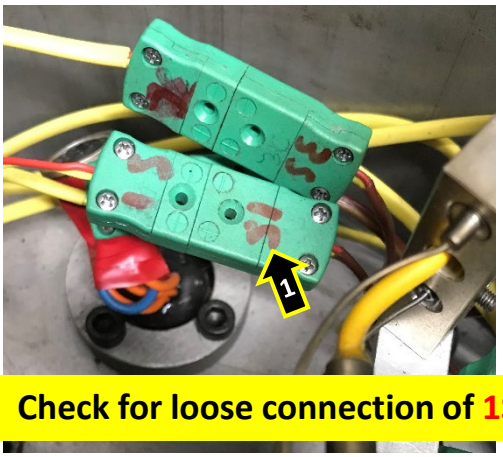
Figure 8 shows the PC dashboard with three-important shortcut and folders, as:

1. The shortcut to the *exe* file, to check sensors-connections of this apparatus
2. The folder where software files are located
3. The folder where data is saved

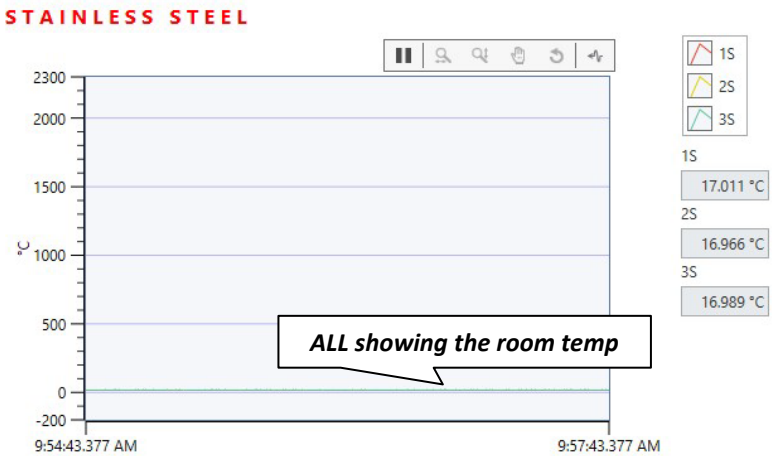
Figure 9: the dashboard showing three running graphs of materials tested and a legend on each graph.
Note that in this figure all thermocouples showing room temperature of 16~17°C (*inside the X-Lab 50-c104, in August*)

Figure 10-11: Click "RUN" to record data, and click "STOP" to save the series into the destinated folder (*see Figure 8 #3*).

PROBLEM SOLVING – HIGH TEMPERATURE READING ON THE GRAPH



Check for loose connection of 1S on [1] inside the chamber and [2] NI-9213 terminals



Safe Work Procedure
AERO4800 Prac_Shifting Power Terminals

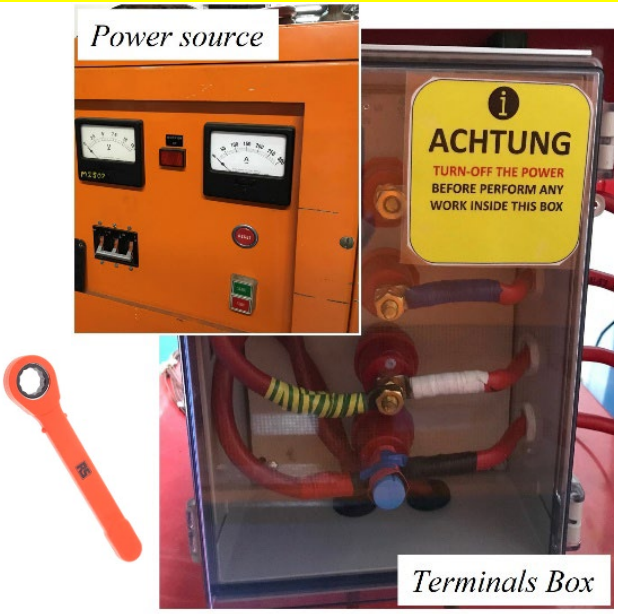
DO NOT use this machine unless you have been instructed in its safe use and operation

PERSONAL PROTECTIVE EQUIPMENT

Safety glasses must be worn during this operation

Sturdy footwear must be worn at all times in work areas.

Gloves should be worn to insulate hands in this task



POTENTIAL HAZARDS AND INJURIES

- Minor electric shock
- Minor injury; DON'T touch terminal when power ON
- Minor burns; DON'T touch terminal when power ON
- Fire due to loose terminal screws
- Failure of the power supply

PRE-OPERATIONAL SAFETY CHECKS

- Check power cord and terminal inside the *terminal box*
- Remove metal/conductor from inside the *terminal box*
- Check power cord prior to connect the *power source* to the main/wall power outlet
- Assure air gap around the *power source*

OPERATIONAL SAFETY CHECKS

- **DO NOT TOUCH** terminals inside the *terminal box* when the *power source* is still ON
- Turn off the power of the *power source* **before** opening the *terminal box*' cover to shift the negative terminal
- **ONLY** shifting the negative terminal (green & gold)
- Use the provided tool (an insulated spanner) when shifting terminals
- Tighten the terminal screw of 1-2 fingers of the spanner
- Completely shut the *terminal box'* cover, two clips ON
- Turn ON the *power source* to continue the prac-session

ENDING OPERATIONS AND CLEANING UP

- **Switch OFF** the machine when work completed.
- Leave the apparatus in clean and tidy state.
- Assure inside the *terminal box* is free of foreign items, metal, conductor, and tool
- Leave the spanner in the drawer
- Unplug connection of the wall power point

DON'T

- Do not use faulty equipment; **STOP!** and **immediately** report suspect equipment to the *course coordinator*
- Never leave the *power source* **ON** unattended.
- Do not over tighten the TERMINAL SCREW, the force of 1-2 fingers on the spanner is sufficient.

EMERGENCY

- Call UQ Security **53333**
- Unplug connection off the wall power point
- Complete Incident report

This SOP may not cover all hazards associated with this item of plant and should be used in conjunction with other reference material, such as Operation handbooks, Code of Practice, Australian Standards.

It is a guide only used to supplement training.

It's reminder to workers prior to equipment use.

Contact: labsupport@mechmining.uq.edu.au for any feedback