Mya 4 Reaction Station

Instructions

radleys
accelerating chemistry

October 2023 | Issue 16

Contents

1 Introduction

Thank you for purchasing the Mya 4 Reaction Station.

Please read this instruction manual thoroughly before operating your unit.

Mya 4 Reaction Station

- Four independent zones
- Magnetic and overhead stirring
- -30 °C to +180 °C
- 2 ml to 400 ml
- Software control

www.radleys.com/mya-4

Radleys accepts no liability if users do not observe the instructions for the safe operation of the Mya 4 Reaction Station as set out in this instruction manual.

2 Mya 4 Standard Warranty

The Mya 4 Standard Warranty is included free of charge as part of your Mya 4 Reaction Station purchase. It ensures that you have full remote and on-site support for the first 12 months of your Mya 4 experience.

The Warranty period commences from the delivery date of the Mya 4 Reaction Station.

The Warranty covers all Mya 4 manufactured components, defined as the following:

- Mya 4 Reaction Station
- Mya 4 Control Pad
- Mya 4 Manifold Head
- Mya 4 Reflux Head
- Mya Compact Stirrer
- Mya Inserts
- Data Hub

The Warranty includes:

- priority email and telephone support,
- remote set-up and application support,
- the repair and/or the replacement of any necessary parts,
- on-site repairs anywhere in the world (if deemed necessary by Radleys),
- all travel, accommodation, subsistence and labour costs relating to an on-site visit,
- swap out or loan unit (if deemed necessary by Radleys),
- all shipping charges for loan, swap out, return to base units and parts,
- replacement unit for 'out-of-box' failures (if deemed necessary by Radleys),
  Note An 'out-of-box' failure is defined as a failure of any of the Mya 4 manufactured components (see above) immediately after the product purchase, and when the failure occurs when installing or performing initial configuration of the item. The period to make an 'out-of-box' failure claim is limited to one month from date of delivery.

Any claims under this Warranty must be made before the end of the warranty period in writing to Radleys, Shire Hill, Saffron Walden, Essex, CB11 3AZ. United Kingdom.

All Radleys manufactured components shall be fit and sufficient for the purposes as defined by Radleys, and shall be covered for any defects in material and/or performance.

Please complete and return the Warranty form found at the end of the document to enable us to update our records.

2.1 Mya 4 Warranty Exclusions

The following are excluded from the Mya 4 Standard Warranty:

- Repairs and parts outside the 12 month warranty period (including the cost of labour, travel, accommodation, subsistence and shipping):
    - → It is the customer's responsibility to pay for repairs and parts outside the warranty period. All replacement parts, labour, travel, accommodation, subsistence and shipping will be charged at current list prices.
        - → Purchase orders will be required for all non-warranty work prior to commencement of the work.
- Normal maintenance, damage due to fire, flood or other acts of nature, customer misuse, unsuitable utilities, electrical disturbances, improper installation, improper or unauthorised repairs, or damage incurred during shipping or transit.
- All third-party products. This includes, though is not limited to:
    - → recirculator/chiller
    - → pumps
    - → balances
    - → pH meters & probes
    - → PC or laptop, etc.
    - → Ethernet switch

  Note Radleys will honour the manufacturing warranties of all 'third-party' equipment that it supplies, i.e., equipment not manufactured by Radleys. Radleys will also pursue warranty claims on the customer's behalf for any equipment we undertake to repair. Please note that 'third-party' manufacturers will require proof of purchase and date of purchase before they will process any warranty claim.
- All glassware, consumables and accessories. This includes, though is not limited to:
    - → glass flasks, vessels, tubes, vials, lids, condensers, funnels, adapters, stoppers, etc.
    - → PTFE or glass stirrer shafts/bars
    - → PTFE caps
    - → tubing
- Any financial claims resulting from the unavailability of parts.
- Compensation for labour other than that of Radleys personnel.
- Altering, removing or tampering with the serial number voids all warranties.
- Unauthorised opening or modification of the product, including usage for other than the intended purpose, voids all warranties.
- Radleys reserves the right to make any necessary charges for the late cancellation of an arranged on-site visit, where the cancellation results in additional costs.

3 Safety information

The following comments are included to assist the user in the safe and efficient operation of the Mya 4 Reaction Station

Warning

- Applies when there is a possibility of personal injury or damage to equipment.

Warning

- Caution, hot surface – displayed on the front of the Mya 4 Reaction Station. Do not touch the aluminium inserts or reaction vessels during and after heating/cooling, as there is the risk of burns from hot or extreme cold surfaces (Mya 4 inserts can remain hot for a considerable time after the heating source has been switched off).

Notes

→ Provides the user with additional information.

4 Important warnings

Mya 4 should only be operated by trained and competent personnel.

As with all chemistry, a full risk assessment should be performed prior to using the Mya 4 Reaction Station, and care should be taken to monitor reactions at all stages. If the Mya 4 unit is left unattended whilst in operation, it is the user's responsibility to ensure that local rules for unattended working are complied with.

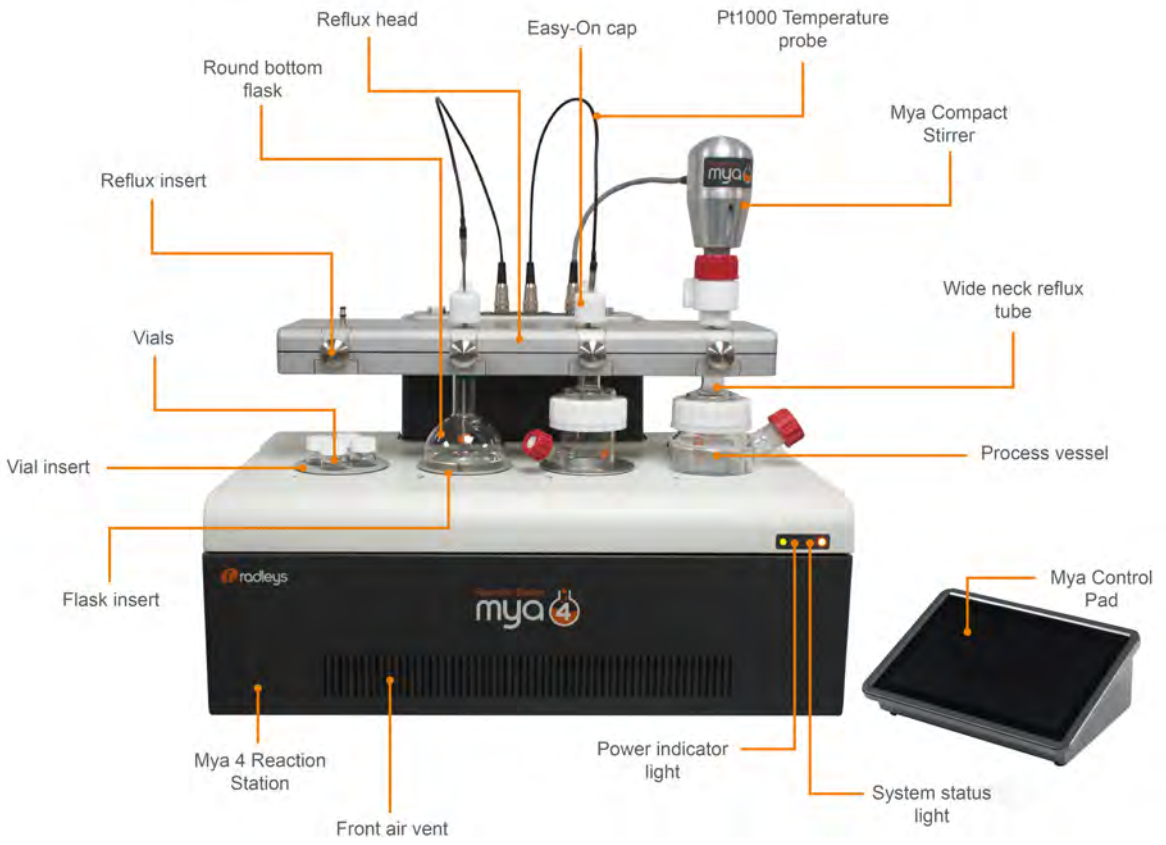
Please read the following warnings before using Mya 4, and ensure you fully understand them.

The user must:

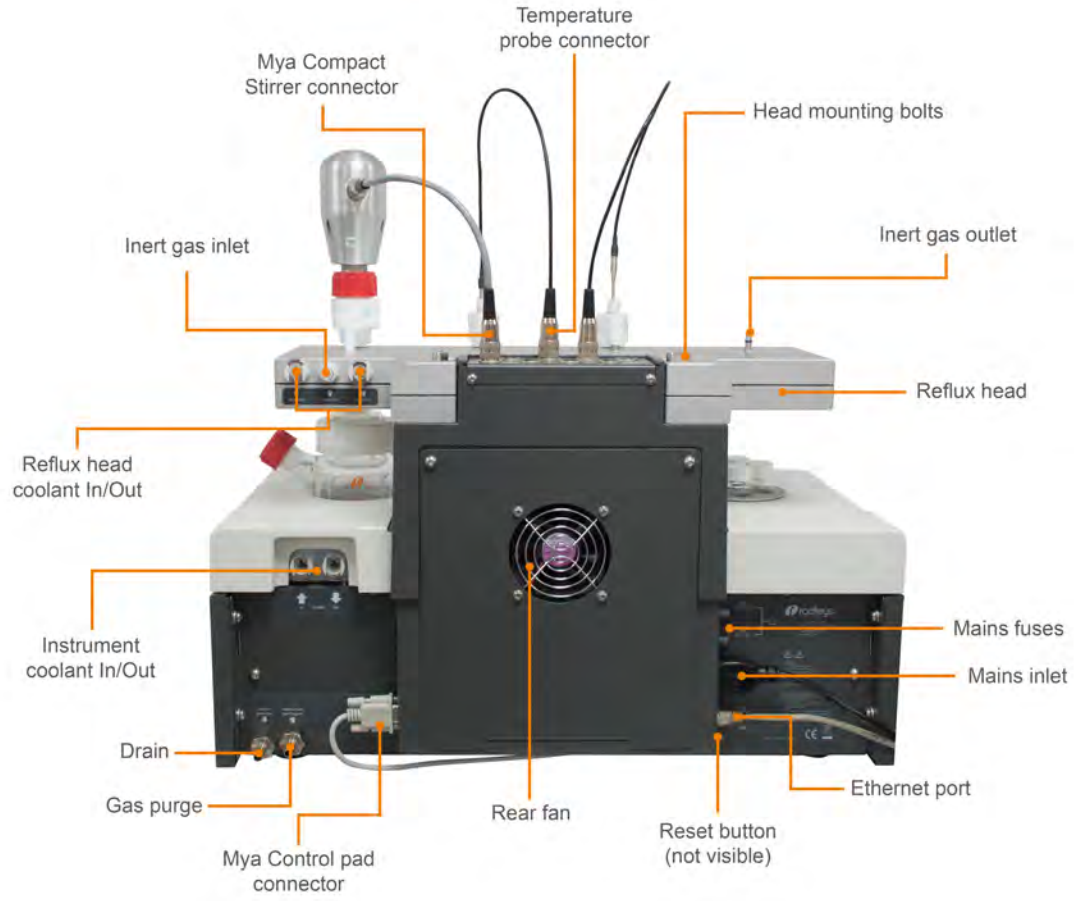
- Consider any manual handling requirements and carry out a necessary risk assessment, before moving the Mya 4. The Reaction Station weighs 33.2 Kg. See 'Getting Started' section 6.2.
- only operate Mya 4 in a fume hood with protective safety sash,
- ensure that Mya 4 is positioned on a level surface, and that all vents and fans are unobstructed,
- always read the instructions for any third-party equipment (e.g. recirculator/chiller, pumps) to ensure no safety recommendations or manufacturing warranties, when used in conjunction with Mya 4, are contravened,
- ensure Mya 4 is correctly set up, and be responsible for the continued maintenance of the Mya 4 Reaction Station, and all of its accessories,
- ensure the working temperature range of the Mya 4 Reaction Station is -30 °C to +180 °C,
  Note Mya 4 can be used at ambient temperatures ranging from 10 to 30 °C.
- take care not to touch the aluminium inserts or reaction vessels during and after heating/cooling, as there is the risk of burns from hot or extreme cold surfaces (Mya 4 inserts can remain hot for a considerable time after the heating source has been switched off),
  Note When the Mya 4 Reaction Station and Control Pad are both on, a heatwave or snowflake warning icon will be displayed on the Control Pad to indicate when a zone is at 40 °C or warmer, or 0 °C or colder.
- check that all fluid hoses and connections are in good condition, fully secure and not leaking, before starting any experiments,
- always wipe away any chemical spills immediately, and avoid exposure to strong vapours such as HCl, etc. Mya 4 external surfaces are resistant to the majority of solvents and splash-resistant to dilute acids and alkalis at room temperature, however, continued exposure to chemical vapours or liquids will cause corrosion to metal and/or plastic components.
  Note Mya 4 can be used with a circulating cooling fluid at a temperature from 5 °C to 35 °C without damage to the unit. Some condensation may be observed when working at the lower temperatures.
- regularly perform careful inspection of all fluid connections to Mya 4.
- ensure all wires and cables connecting auxiliary equipment are in good condition, and secured so that they cannot come into contact with Mya 4 surfaces or moving parts.
- always position the Mya 4 so that it is easy and convenient to access the power switch and power supply cable, we recommend leaving at least 20cm clearance.
- the Mya 4 should only ever be repaired by the manufacturer or a recognised and manufacturer trained representative.
- ensure that the Mya 4 system has been installed and set up correctly and safely.
- ensure that any hazardous substances that may be evolved are suitably managed. The Mya 4 does not have any devices to manage any hazardous substances that may evolve from the user's application.

5 Component guide

Front view



Rear view



6 Set-up and operation

6.1 Requirements

You will need:

- Two mains power sockets,
- a flow of coolant (mains water (supply + drain) or a recirculator/chiller with water/ethylene glycol mix, from 5 °C to 35 °C),
- an inert gas supply (x2 or divided at the source),
- a drain connection (or a container at floor level) to evacuate any water collected inside the Reaction Station due to condensation.

6.2 Getting started

Warning

- The Mya 4 Reaction Station weighs 33.2 Kg. Please consider any manual handling requirements and carry out a necessary risk assessment, following local 'manual handling at work' guidance. We would recommend using a lifting device or two or more people.

Remove the Mya 4 Reaction Station from its packaging and position in a fume hood, ensuring that:

- the front vent and rear fan exhaust of the Reaction Station are unobstructed,
- there is adequate space for the Mya Control Pad to be positioned inside the fume hood or nearby,
- the unit is level and stable,
- the unit is close to suitable services (see **Requirements** above).

6.3 Set-up overview

1. Connect the Reaction Station and the Control Pad to the mains power. Then connect the Reaction Station to the control pad with supplied cable. See page 11.
2. Connect the coolant supply to the Reaction Station. See page 12.
   Note If you will be using a Reflux/Manifold Head and a **single** source of coolant, please skip this step.
3. Connect to the Internal Gas Purge. See page 16.
4. Connect to the Internal Drain. See page 18.
5. If you are attaching a Reflux or Manifold Head, see page 19. Otherwise, skip to point 7.
6. If you are using a Reflux/Manifold Head: connect the coolant supply and inert gas to the Reflux Head (see page 23) or the Manifold Head (see page 38).
7. Choose between magnetic or overhead stirring. See page 53.

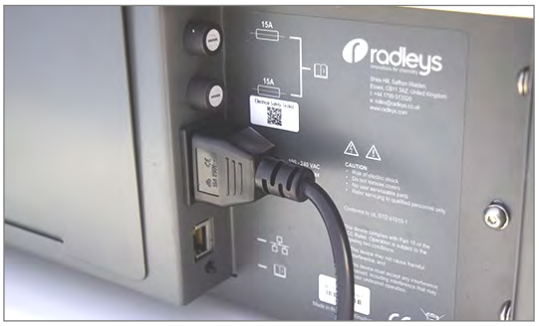
8 Choose and set up your glassware and inserts. See page 55.
9 Turn on the coolant supply/supplies.
10 Turn on the gas source(s).
11 Turn Mya 4 on using the on/off switch on the side of the instrument.
12 Wait for Mya 4 Control Pad to boot up, and display front screen. See Section 7 on page 79.

6.3.1 Connecting the Reaction Station and the Control Pad to the mains power

Step 1

Plug one end of the mains power cable into the mains inlet socket at the rear of the unit.

Plug the other end into the mains supply.



Step 2

Plug one end of the mains power cable into the mains inlet socket at the rear of the Mya Control Pad.

Plug the other end into the mains supply

Step 3

Plug one end of the Mya 4 Control Pad cable into the controller socket at the rear of the unit.

Ensure the cable is fully secured using the securing screws.

Step 4

Plug the other end of the cable into the socket at the rear of the Mya Control Pad.

Again, ensure the cable is fully secured using the securing screws.

6.4 Coolant supply

Mya 4 requires a liquid coolant supply to be connected and running at all times when the unit is in operation. The coolant flows through Mya 4's internal heat exchangers, which are located in each reaction zone, to dissipate heat from the cooling Peltier cells.

Coolant operating limits

Coolant supply	Mains water or ethylene glycol mix (max 30% vol.)
Max coolant temperature	35 °C
Min coolant temperature	5 °C
Max flow rate	5 L/min
Min flow rate	2 L/min
Max coolant pressure	2 bar
Min coolant pressure	0.3 bar
Coolant in/out connectors	Quick release, barbed 9.5 mm for 8–10 mm ID tubing

If using a thermo-regulator:

Min cooling power at 15 °C	1.5 kW
Min cooling power at 0 °C	1.0 kW

6.4.1 Connecting the coolant supply to the Reaction Station

If you are using a Reflux or Manifold Head, and using a single coolant supply, see page 19 for information on how to connect the coolant supply to the Reflux/Manifold Head and the Reaction Station.

To connect the coolant supply to the Reaction Station, you will need these components (supplied with Mya 4):

Coolant flowmeter
RR40633

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the coolant flow within the stated operating limits at all times by using the coolant flowmeter (RR40633) supplied.

→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component, such as a flowmeter.

Warning

♦ **Do not** use a high-pressure water/coolant source above 2 bar as there is the risk of internal leaks, tubing splitting or connectors failing.

Step 1

Remove the orange blanking plugs (RR40828) from the **Coolant In** and **Out** female connectors at the back of the Reaction Station.

Note Keep the blanking plugs safe as you may need to reinsert them if moving Mya 4 to a different location. (See Notes below.)

Step 2

Connect a length of coolant tubing from the coolant supply (tap water or recirculator) to the lower fitting of the coolant flowmeter (RR40633).

Secure with a tubing clamp (RR40634).

Note We recommend reinforced coolant tubing RR40627.

Step 3

Connect another length of coolant tubing to the upper fitting of the coolant flowmeter, securing with a tubing clamp.

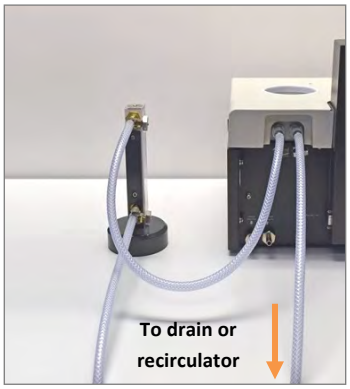
Now attach the quick-release male connector (RR95525) to the other end of this tubing, again securing with a tubing clamp.

Step 4

Insert the end of the tubing + male connector into the **Coolant In** inlet at the rear of Mya 4.

Step 5

Take another length of coolant tubing and attach a quick-release male connector to one end, securing with a tubing clamp. Insert this end into the **Coolant Out** outlet at the rear of Mya 4. Connect the other end to a suitable drain if using tap water, or to the return connector if using a recirculator.



Notes

→ The condition of tubing and connectors should be regularly checked, in line with good laboratory practice.

→ If a quick-release male connector does not fit into a female connector, check that the metal locking mechanism is in the **open** position.

→ Most of the quick-release connectors on the Reaction Station and its accessories feature a non-return shut-off valve to prevent coolant flowing when the unit is disconnected. However, the female connectors at the rear of the Reaction Station do not have shut-off valves. If you need to move Mya 4 to a different location, use the blanking plugs (see Step 1 above) to block these connectors off during transportation.

6.4.2 Optimising cooling performance

When in operation, the temperature and flow rate of the coolant will have an effect on the performance of Mya 4, particularly when performing reactions below ambient temperatures.

- With coolant at 5 °C, block temperatures (Tb) down to -30 °C can be achieved.
- With coolant at 15 °C, block temperatures (Tb) down to -25 °C can be achieved.
- When a zone is being actively cooled, the temperature of the coolant held within Mya 4 will rise. This coolant temperature is monitored for each zone, and if this temperature rises above 35 °C, a warning is displayed and the experiment will stop. (See Error Codes on page 158.)

Notes

- → Coolant must be flowing at all times when running an experiment, even when reactions are not being cooled.
- → If the coolant supply is not switched on before an experiment is started, or the flow rate is too low, an error will be detected, a warning displayed and heating/cooling will stop. (See Error Codes on page 158.)
- → If the coolant temperature is below the minimum temperature (5 °C) an error will be detected, a warning displayed and heating/cooling stopped. Coolant temperature needs to be reset by the user to a value above the minimum.
- → Coolant should be kept running after an experiment or series of experiments have been stopped, until block temperatures have returned to close to ambient temperature. If not, heat (or cold) from the block may transfer to the static coolant in the heat exchanger, causing it to rise above the maximum (or fall below the minimum) coolant temperature, creating an error message.

6.5 Internal gas purge

A flow of inert or dry gas (nitrogen, argon, dry compressed air) is essential to protect the internal components of Mya 4 from ambient hazardous or corrosive gases and vapours, as well as condensation of atmospheric moisture.

Purge gas

Max flow rate	15 L/min
Min flow rate	3 L/min

6.5.1 Connecting to the internal gas purge

To connect to the internal gas purge, you will need these components (supplied with Mya 4):

Gas flowmeter
RR40632

Gas & water tubing
RR40626

Tubing clamps
RR40634

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the purge gas flow within the stated operating limits at all times by using the gas flowmeter (RR40632) supplied.

→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to a connector.

Step 1

Connect a length of gas tubing from the inert/dry gas supply to the lower fitting of the gas flowmeter (RR40632), securing with a tubing clamp (RR40634).

Note We recommend gas & water tubing RR40626.

Step 2

Connect another length of gas tubing to the upper fitting of the gas flowmeter, again securing with a tubing clamp.

Step 3

Now slide the other end of this gas tubing onto the **Internal Inert Gas Purge In** connector at the rear of Mya 4, securing with a tubing clamp.

Notes

→ Mya 4 is not hermetically sealed, therefore the inert/dry gas will escape from the unit into the atmosphere.

Warning

♦ Operating Mya 4 without an inert/dry gas purge can damage the instrument and will void the warranty.

6.6 Internal drain

In the unlikely event of an internal leak from the coolant circuit, fluid will be confined and channelled to the **Internal Drain Out** outlet at the rear of Mya 4. To remove this fluid, you will need to connect the **Internal Drain Out** outlet to a suitable drain.

6.6.1 Connecting to the internal drain

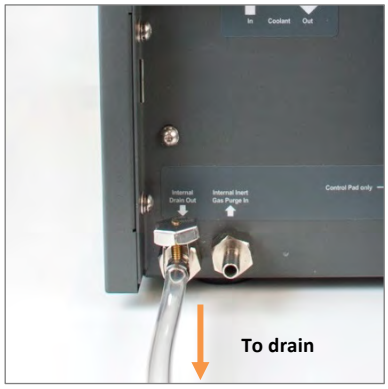
To connect to the internal drain, you will need these components (supplied with Mya 4):

Gas & water tubing
RR40626

Tubing clamps
RR40634

Slide a length of tubing onto the **Internal Drain Out** connector at the rear of Mya 4, securing with a tubing clamp (RR40634).

Now place the other end of this tubing in a suitable drain (or a container that is regularly emptied, if no drain is available).



Notes

→ When operating at low temperatures or in high-humidity conditions, some internal condensation may form within the unit. This condensation is normal and will be confined and channelled to the **Internal Drain Out** outlet, but some residue may remain within the unit.

→ If you need to move Mya 4, it is recommended that you first slightly tilt the unit from left to right, and front to back, to ensure that all residual fluid is removed.

Warning

♦ The tubing leading from the Internal Drain Out to the drain must be level with or lower than the Internal Drain Out connector to ensure liquid properly drains from inside the unit, preventing serious damage.

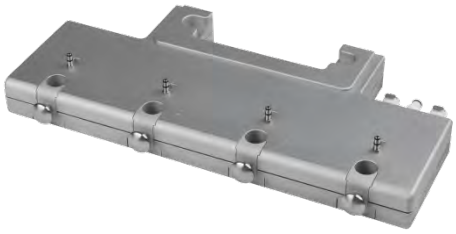
6.7 Reflux & Manifold Heads

Unless you are only using vials and/or tubes in your Mya 4 (see example picture on right) a removable head is required to:

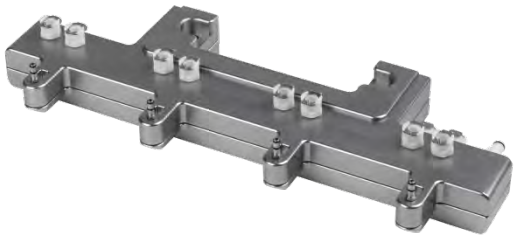
- allow the glassware to stand securely in the Reaction Station,
- distribute inert gas to each position,
- minimise solvent evaporation and allow for refluxing.

Two head options are available for Mya 4: a Reflux Head or a Manifold Head.

Reflux Head



Manifold Head



Reflux Head

Provides fully integrated reflux operation without the need for additional condensers when used with reaction vessels and reflux tubes. It also provides a convenient integrated inert gas supply to each reaction vessel through the Easy-On cap, Easy-On manifold cap or Compact Stirrer Easy-On head. (See page 32 for more information on Easy-On caps.)

Manifold Head

Provides a convenient integrated water supply for use with condensers in each zone and an inert gas supply to each reaction vessel through the Easy-On cap, Easy-On manifold cap or Compact Stirrer Easy-On head. (See page 48 for more information on Easy-On caps.)

The Manifold Head is supplied with 4 x tubing and connectors (RR40816) to connect the Manifold Head to a Mya coil condenser (RR40556) in each of the four positions. (See page 50 for information on how to do this.)

RR40816
Tubing and connectors
Manifold Head to glass condenser

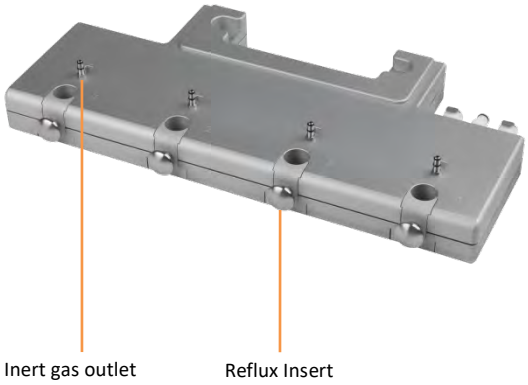
RR40556
Coil condenser for Mya
multi-neck lid

Notes

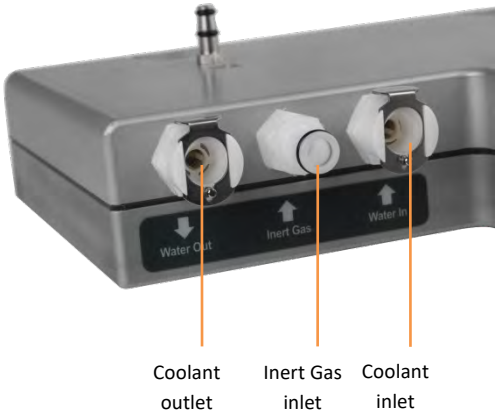
→ You will need to attach the Manifold Head if you are using multi-neck lids. (See page 58 for more information.)

6.7.1 Attaching the Reflux Head to the Reaction Station

Front of Reflux Head

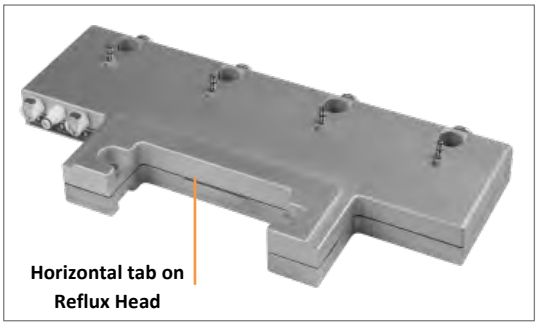


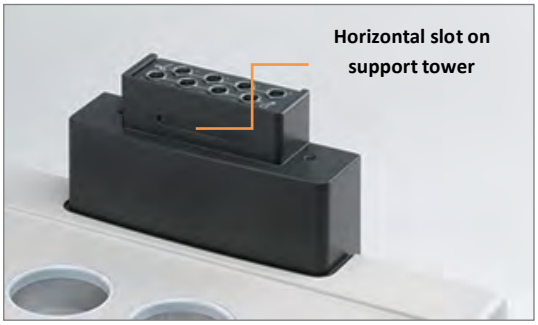
Rear of Reflux Head



Step 1

Position the Reflux Head on the mounting support tower, which is on top of the Mya 4 unit, so that the horizontal tab at the rear of the Reflux Head is aligned with the horizontal slot in the support tower.





Step 2

Push the Reflux Head in firmly so that the tab slots into the support tower, and the mounting holes in the Reflux Head are aligned with the threaded holes on the top face of the support tower.

Step 3

Holding the Reflux Head in position, drop a securing bolt (RR40830) into one of the mounting holes in the Reflux Head, and turn until the threads engage. Then partially tighten the bolt.

Drop a second securing bolt into the remaining mounting hole on the other side of the Reflux Head, and again, partially tighten the bolt.

Fully tighten both securing bolts (by hand should be sufficient). The Reflux Head is now attached.

Notes

→ If necessary, the securing bolts can be loosened by inserting a screwdriver (or coin) into the slots on top of the bolts.

→ When tightening the securing bolts, you must ensure that the Reflux Head remains fully horizontal to avoid excess strain on the bolts, which may cause damage to the threads. This is best achieved by continuing to support the front of the Reflux Head with one hand, whilst tightening the bolts with the other.

Warning

- As the Reflux Head is heavy, you should ensure it is fully supported at all times during the location process. Avoid excessive contact with the surface of the Mya 4 support tower as this may scratch it.
- Once the tab on the Reflux Head is located in the support tower slot, the weight of the Reflux Head will be fully supported, but it is advisable that you continue to manually support the front of the Reflux Head until both securing bolts are partially tightened, to avoid the head slipping and damaging the Mya 4 main unit.

6.7.2 Connecting the coolant supply to the Reflux Head

The flow of water/coolant in the Reflux Head is essential to maintain satisfactory refluxing, and to prevent chemical vapours passing up into the Reflux Head and damaging it. Use of a refrigerated coolant (recirculator/chiller) can further reduce solvent losses.

Coolant requirements

Coolant supply	Mains water or ethylene glycol mix (max 30% vol.)
Max flow rate	5 L/min
Max coolant pressure	2 bar
Coolant in/out connectors	Quick release, barbed 9.5 mm for 8–10 mm ID tubing

Notes

- → All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to a quick-release connector.
- → The condition of tubing and connectors should be regularly checked, in line with good laboratory practice.
- → If the quick-release male connector does not fit into the female connector check that the metal locking mechanism is in the **open** position.
- → The quick-release connectors on the Reflux Head feature a non-return shut-off valve to prevent coolant flowing when the tubing is disconnected.

Warning

- ♦ **Do not** use a high-pressure water/coolant source above 2 bar, as there is a risk of internal leaks, tubing splitting or connectors failing.
- ♦ Liquid coolants other than water can be used in the Reflux Head, but the use of silicone-based coolants, for example silicone oils, should **never** be used as these will damage internal components.

For best performance, it is recommended that a separate coolant supply is used for both the Mya 4 and the Reflux Head to allow independent control of the coolant flow rate and temperature.

To connect the coolant supply to the Reflux Head, you will need these components (supplied with Mya 4):

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

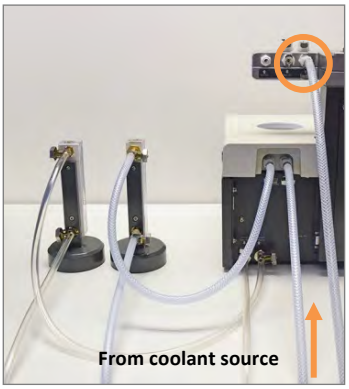
Step 1

Attach a quick-release male connector (RR95525) to the end of the coolant tubing from your coolant source, securing with a tubing clamp (RR40634). **Note** We recommend reinforced coolant tubing RR40627.

Step 2

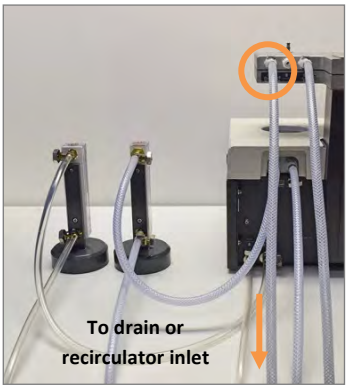
Insert the coolant tubing + male connector into the **Water In** inlet at the rear of the Reflux Head.

Attach a quick-release male connector to the end of another piece of coolant tubing, securing with a tubing clamp.



Step 3

Insert the coolant tubing + male connector into the **Water Out** outlet at the rear of the Reflux Head.
Connect this tubing to a suitable drain (if using tap water), or to the return connector if using a recirculator.



6.7.3 Connecting a single coolant supply to the Reaction Station and Reflux Head

Although a separate coolant supply for both the Mya 4 and the Reflux Head is recommended, in some circumstances, you may wish to use a single coolant supply to service both components.

To do this, you can either:

- split the flow of coolant in two (connect the Reaction Station and Reflux Head in parallel) – see below.
- or connect the Reaction Station and Reflux Head in series – see page 29.

Splitting the flow of coolant in two

When splitting a single source of coolant, care needs to be taken as the flow to the Reaction Station will be reduced. It is imperative to have the coolant flowmeter connected in line with the Reaction Station, after the division of flow, to make sure the flow rate to the unit is within the required specifications (2 to 5 L/min).

To split the flow of coolant in two, you will need these components (supplied with Mya 4):

Coolant flowmeter
RR40633

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

Y-piece tubing connector
RR40628

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the coolant flow within the stated operating limits at all times by using the coolant flowmeter (RR40633) supplied.

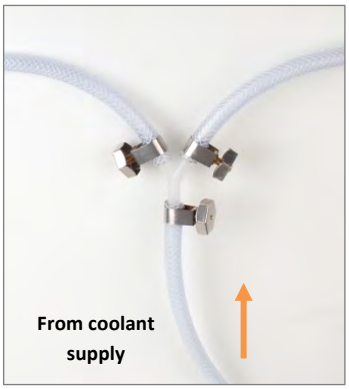
→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component, such as a flowmeter or Y-piece.

Step 1

Remove the orange blanking plugs (RR40828) from the **Coolant In** and **Out** female connectors at the back of the Reaction Station. **Note** Keep the blanking plugs safe as you may need to reinsert them if moving Mya 4 to a different location. (See Notes below.)

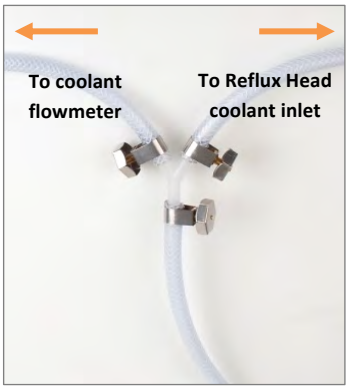
Step 2

Connect coolant tubing from the coolant supply (tap water or recirculator) to the single end of a Y-piece tubing connector (RR40628), securing with a tubing clamp (RR40634).



Step 3

Connect two more lengths of coolant tubing to the two split ends of the Y-piece, securing with tubing clamps. **Note** We recommend reinforced coolant tubing RR40627.



Step 4

Connect the coolant tubing from one of the split ends of the Y-piece to the lower fitting of the coolant flowmeter (RR40633), securing with a tubing clamp.

Step 5

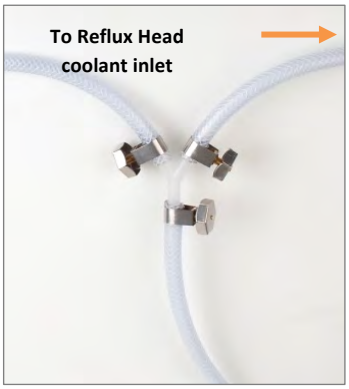
Connect another length of coolant tubing to the upper fitting of the coolant flowmeter, securing with a tubing clamp. Attach the quick-release male connector (RR95525) to the other end of this tubing, securing with a tubing clamp.

Step 6

Insert the end of the tubing + male connector into the **Coolant In** inlet at the rear of Mya 4.

Step 7

Attach a quick-release male connector to the coolant tubing from the remaining split end of the Y-piece, securing with a tubing clamp.

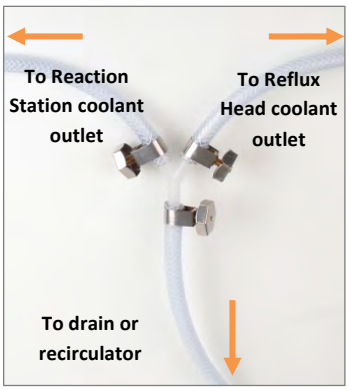


Step 8

Insert the coolant tubing + male connector into the **Water In** inlet at the rear of the Reflux Head.

Step 9

Connect a length of coolant tubing from the coolant return (drain or recirculator) to the single end of a Y-piece tubing connector (RR40628), securing with a tubing clamp. Connect two more lengths of coolant tubing to the two split ends of the Y-piece, securing with tubing clamps.



Step 10

Now attach quick-release male connectors to the other ends of these two lengths of tubing.

Step 11

Insert one tubing + male connector into the **Coolant Out** outlet at the rear of Mya 4.

Step 12

Insert the other tubing + male connector into the **Water Out** outlet at the rear of the Reflux Head.

Notes

- → The condition of tubing and connectors should be regularly checked, in line with good laboratory practice.
- → If a quick-release male connector does not fit into a female connector, check that the metal locking mechanism is in the **open** position.
- → Most of the quick-release connectors on the Reaction Station and its accessories feature a non-return shut-off valve to prevent coolant flowing when the unit is disconnected. However, the female connectors at the rear of the Reaction Station do not have shut-off valves. If you need to move Mya 4 to a different location, use the blanking plugs (see Step 1 above) to block these connectors off during transportation.

Connecting the components in series

Connecting the Reaction Station and Reflux Head in series may result in reduced performance of either component, depending on which is receiving the coolant first. This is due to the coolant being partially warmed from flowing through the first component, before it enters the second component. This configuration should not be used if working at reflux with low-boiling solvents.

If you are planning to use a single source of coolant, and this is a concern, the previous option (splitting the flow of coolant in two – see page 25) is more suitable.

Notes

- → It may be possible to reverse the direction of flow, so that coolant first enters the Reflux Head, then the main unit. This configuration may result in reduced performance of the Mya 4 unit, and should not be used if working with Mya 4 at cold temperatures near to -30 °C.
- → Flow rate of the coolant around the system should not exceed the operating limits (2 L/min to 5 L/min).
- → The lower the temperature of the coolant going through the Reflux Head, the more likely you will observe condensation on the surface of the head.

To connect a single coolant supply in series, you will need these components (supplied with Mya 4):

Coolant flowmeter
RR40633

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the coolant flow within the stated operating limits at all times by using the coolant flowmeter (RR40633) supplied.

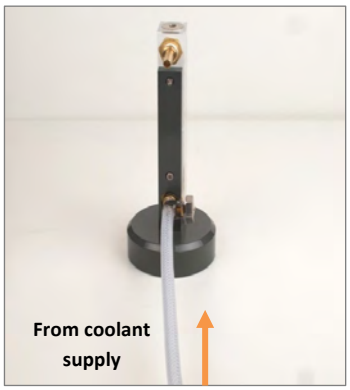
→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component, such as a flowmeter.

Step 1

Remove the orange blanking plugs (RR40828) from the **Coolant In** and **Out** female connectors at the back of the Reaction Station. **Note** Keep the blanking plugs safe as you may need to reinsert them if moving Mya 4 to a different location. (See Notes below.)

Step 2

Connect a length of coolant tubing from the coolant supply (tap water or recirculator) to the lower fitting of the coolant flowmeter (RR40633), securing with a tubing clamp (RR40634). **Note** We recommend reinforced coolant tubing RR40627.

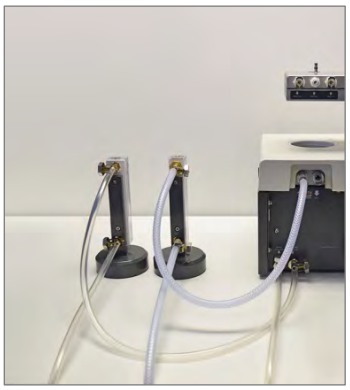


Step 3

Connect another length of coolant tubing to the upper fitting of the coolant flowmeter, securing with a tubing clamp. Now attach a quick-release male connector (RR95525) to the other end of this tubing, again securing with a tubing clamp.

Step 4

Insert the end of the tubing + male connector into the **Coolant In** inlet at the rear of Mya 4.

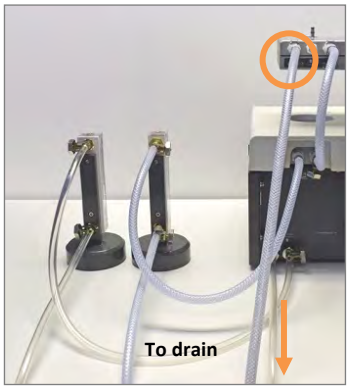


Step 5

Attach two male connectors to either end of another length of coolant tubing, securing with tubing clamps. Then insert one end of this tubing into the **Coolant Out** outlet at the rear of Mya 4, and the other to the **Water In** inlet at the rear of the Reflux Head.

Step 6

Attach a male connector to another length of coolant tubing. Then insert this tubing + male connector into the **Water Out** outlet at the rear of the Reflux Head. Now connect the other end of the tubing to a suitable drain (if using tap water), or to the return connector if using a recirculator.



6.7.4 Connecting the gas/vacuum supply to the Reflux Head

The gas inlet/outlet and distribution system combines with the Easy-On PTFE caps or Mya Compact Stirrers to allow reactions to be performed under an inert (i.e. nitrogen or argon) atmosphere.

Easy-On PTFE cap
RR91070

Easy-On PTFE manifold cap
RR40572

Mya Compact Stirrer
RR40406

Notes

→ Although both Easy-On caps (RR91070 and RR40572) work with both heads, the Easy-On PTFE manifold cap (RR40572) is recommended when using the Manifold Head as it gives extra stability.

To connect the gas/vacuum supply to the Reflux Head, you will need these components (supplied with Mya 4):

Gas tubing
RR40626

Tubing clamps
RR40634

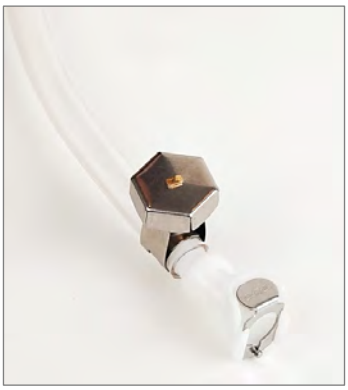
Quick-release female connector
RR40829

Notes

→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component.

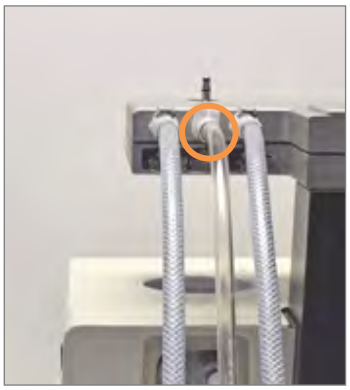
Step 1

Attach a quick-release female connector (RR40829) to a length of gas tubing, securing with a tubing clamp (RR40634). **Note** We recommend gas tubing RR40626. Connect the other end, via a 3-way tap or stopcock, to a vacuum source and inert gas supply (max pressure 1 psi) or directly to the inert gas supply.



Step 2

Insert the female connector + tubing into the **Inert Gas** inlet at the rear of the Reflux Head. By alternately evacuating the system and filling it with inert gas (repeating two to three times) you can achieve an inert atmosphere within the reaction vessels.



Notes

→ If you need to isolate a reaction vessel from the inert gas supply during an experiment, you can simply close the valve on the Easy-On PTFE cap. (See page 64 for information on how to do this.)

→ Any gas outlets that are not in use can be blocked off with an inverted silicone septum. (See page 34 for information on how to do this.)

Warning

- ♦ When applying inerting gas to either Reflux or Manifold Heads, do not exceed 1 psi, as the reaction vessels and Easy-On PTFE caps are not rated for pressure, and there is the risk of explosion. (They are, however, suitable for applying a vacuum.)
- ♦ Mya 4 Reflux and Manifold Heads are not suitable for continuous use under vacuum (e.g. for solvent evaporation or reactions under vacuum), as this may lead to contamination or corrosion inside the head. Vacuum should only be used intermittently as part of a gas purge cycle.

Vessel contents under vacuum

- A continuous vacuum can only be applied to vessel contents on Mya 4 as long as the vacuum is not pulled through the Mya 4 Reflux or Manifold Head.
- A continuous vacuum can be achieved via the side arm of a round bottom flask or process vessel, or through one of the necks of a multi-neck lid.

- In these circumstances the valve on the Easy-On cap must be closed. (See page 64 for more information on how to do this.)

Notes

→ Unless otherwise stated, Mya 4 reaction vessels are suitable for use under vacuum, typically down to 10 mbar, but not for use under positive pressure.

→ The vacuum level that is obtained in a set-up will depend on various factors, including:

- the glassware set-up used,
- the solvent and operating temperature,
- the condition of all the seals or O-rings – these are consumable parts and should be checked and replaced regularly,
- the condition and position of other components such as stirrer guide, stirrer shaft and probes.

Stainless steel gas outlets

The stainless steel gas outlets on top of the Reflux and Manifold Heads feature an upper and lower nitrile O-ring as standard, with optional Viton replacements.

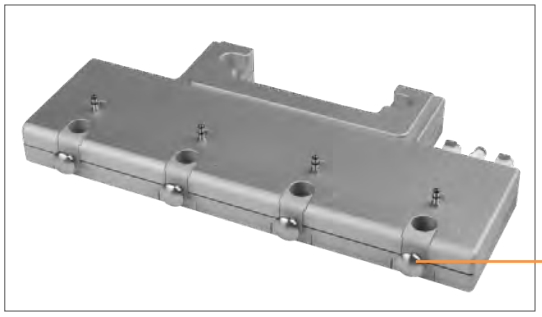
These O-rings may be subject to chemical attack and so require periodic replacement.

RR91060	Nitrile O-rings 4 mm Gas Outlet	Bottom Pack 50
RR91061	Nitrile O-rings 3mm Gas Outlet	Top, Pack 50
RR91062	Viton O-rings 4 mm Gas Outlet	Bottom, Pack 50
RR91063	Viton O-rings 3 mm Gas Outlet	Top, Pack 50

Any gas outlets that are not in use can be blocked off with an inverted silicone septum.

6.7.5 Important tips for optimum refluxing

- With most solvents, a coolant supply to the Reflux Head at temperatures between 5 and 18 ˚C will be sufficient for effective refluxing. However, with coolant above 12 ˚C, care should be taken to carefully control refluxing.
- For low boiling point solvents such as diethyl ether, dichloromethane and acetone, you may require a chilled water supply with a temperature below 12 ˚C.
- Due to the large volume of 4 x 250 ml or 4 x 400 ml reaction vessels, the temperature differential between the block and solution temperatures may be greater than expected. A temperature differential between the block and solution of 15 ˚C would not be unusual at the higher end of the Mya 4 temperature range.
- This differential can be affected by ambient temperature and airflow within your fume hood. Therefore, some experimentation may be necessary to determine the optimum block temperature for your solvent.
- The use of a slight positive pressure of inert gas (not exceeding 1 psi) can help reduce any solvent loss.
- When using the Reflux Head, it is very important to ensure that all of the reflux inserts are inserted and fully seated.



Notes

→ When using a chilled water supply at temperatures below 12 ˚C, you may observe condensation on connecting hoses, and the surface of the Reflux or Manifold Heads, particularly in high-humidity conditions. This should be removed with a dry cloth from time to time to avoid excessive build-up of moisture.

→ To avoid the build-up of limescale in the Reflux or Manifold Head please avoid the use of hard water.

Warning

♦ **Do not** attempt to dismantle the Reflux/Manifold Head as this will invalidate your warranty.

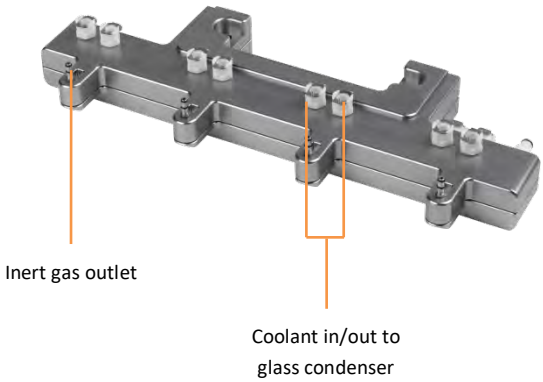
♦ Dismantling the head will compromise the silicone seal between the surfaces and cause a water leak during operation.

♦ In the unlikely event of a water leak from the Reflux/Manifold Head, please stop using the unit immediately.

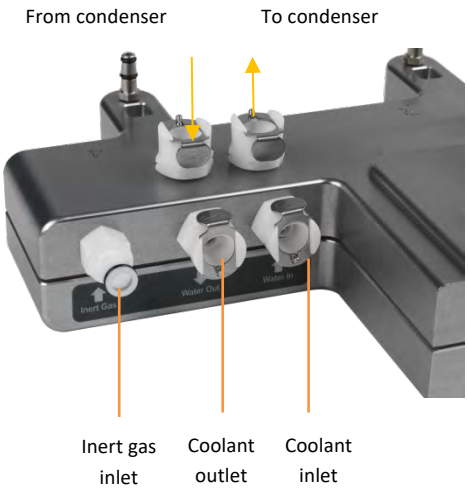
- Switch off the power supply to Mya 4 at the mains.
- Remove the power plug from the mains.
- Do not attempt to repair the leak. This will invalidate your warranty.
- Please contact your Radleys distributor.

6.7.6 Attaching the Manifold Head to the Reaction Station

Front of Manifold Head



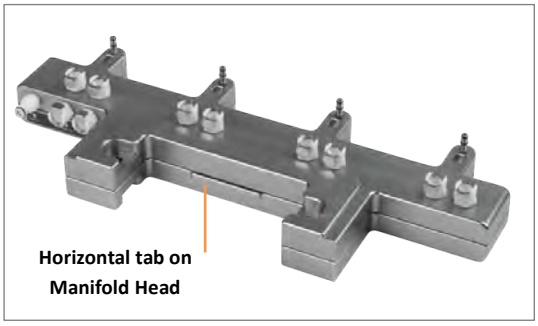
Rear of Manifold Head

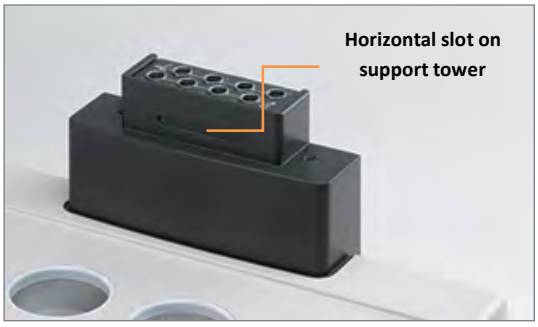


Step 1

Position the Manifold Head on the mounting support tower at the top of the Mya 4 unit, so that the horizontal tab at the rear of the Manifold Head is aligned with the horizontal slot in the support tower.

Push the Manifold Head in firmly so that the tab slots into the support tower, and the mounting holes in the Manifold Head are aligned with the threaded holes on the top face of the support tower.



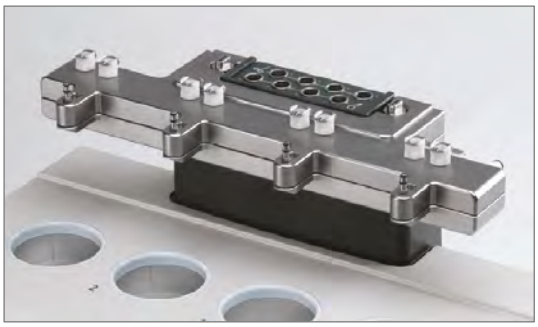


Step 2

Holding the Manifold Head in position, drop a securing bolt (RR40830) into one of the mounting holes in the support tower, and turn until the threads engage. Then partially tighten the bolt.

Drop a second securing bolt into the remaining mounting hole on the other side of the support tower, and again, partially tighten the bolt.

Fully tighten both securing bolts (by hand should be sufficient). The Manifold Head is now attached.



Notes

→ If necessary, the securing bolts can be loosened by inserting a screwdriver (or coin) into the slots on top of the bolts.

→ When tightening the securing bolts, you must ensure that the Manifold Head remains fully horizontal to avoid excess strain on the bolts, which may cause damage to the threads. This is best achieved by continuing to support the front of the Manifold Head with one hand, whilst tightening the bolts with the other.

Warning

- As the Manifold Head is heavy, you should ensure it is fully supported at all times during the location process. Avoid excessive contact with the surface of the Mya 4 support tower as this may scratch it.
- Once the tab on the Manifold Head is located in the support tower slot, the weight of the Manifold Head will be fully supported, but it is advisable that you continue to manually support the front of the Manifold Head until both securing bolts are partially tightened, to avoid the head slipping and damaging the Mya 4 main unit.

6.7.7 Connecting the coolant supply to the Manifold Head

The flow of water/coolant to the Manifold Head is essential to supply Mya glass coil condensers (RR40556) when attached. Use of a refrigerated recirculating coolant can enhance condensation performance, particularly with low-boiling solvents.

Coolant requirements

Coolant supply	Mains water or ethylene glycol mix (max 30% vol.)
Max flow rate	5 L/min
Max coolant pressure	2 bar
Coolant in/out connectors	Quick release, barbed 9.5 mm for 8–10 mm ID tubing

Notes

- → All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to a quick-release connector.
- → The condition of tubing and connectors should be regularly checked, in line with good laboratory practice.
- → If the quick-release male connector does not fit into the female connector check that the metal locking mechanism is in the **open** position.
- → The quick-release connectors on the Reflux Head feature a non-return shut-off valve to prevent coolant flowing when the tubing is disconnected.

Warning

- ♦ **Do not** use a high-pressure water/coolant source above 2 bar, as there is a risk of internal leaks, tubing splitting or connectors failing.
- ♦ Liquid coolants other than water can be used in the Manifold Head, but the use of silicone-based coolants, for example silicone oils, should **never** be used as these will damage internal components.

For best performance, it is recommended that a separate coolant supply is used for both the Mya 4 and the Manifold Head to allow independent control of the coolant flow rate and temperature.

To connect the coolant supply to the Manifold Head, you will need these components (supplied with Mya 4):

Coolant tubing
RR40627

Tubing clamps
RR40634

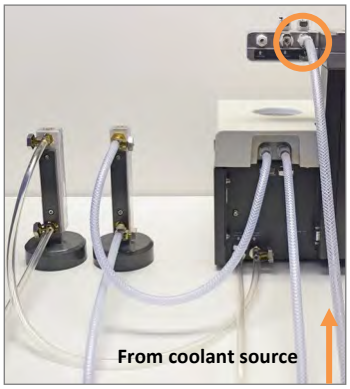
Quick-release male connector
RR95525

Step 1

Attach a quick-release male connector (RR95525) to the end of the coolant tubing from your coolant source, securing with a tubing clamp (RR40634). **Note** We recommend reinforced coolant tubing RR40627.

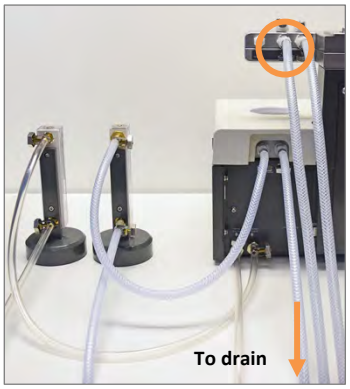
Step 2

Insert the coolant tubing + male connector into the **Water In** inlet at the rear of the Manifold Head.



Step 3

Attach a quick-release male connector to the end of another piece of coolant tubing, securing with a tubing clamp. Insert the coolant tubing + male connector into the **Water Out** outlet at the rear of the Manifold Head. Connect this tubing to a suitable drain (if using tap water), or to the return connector if using a recirculator.



6.7.8 Connecting a single coolant supply to the Reaction Station and Manifold Head

Although a separate coolant supply for both the Mya 4 and the Manifold Head is recommended, in some circumstances, you may wish to use a single coolant supply to service both components.

To do this, you can either:

- split the flow of coolant in two (connect the Reaction Station and Manifold Head in parallel) – see below.
- connect the Reaction Station and Manifold Head in series – see page 44.

Splitting the flow of coolant in two

When splitting a single source of coolant, care needs to be taken as the flow to the Reaction Station will be reduced. It is imperative to have the coolant flowmeter connected in line with the Reaction Station, after the division of flow, to make sure the flow rate to the unit is within the required specifications (2 to 5 L/min).

To split the flow of coolant in two, you will need these components (supplied with Mya 4):

Coolant flowmeter
RR40633

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

Y-piece tubing connector
RR40628

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the coolant flow within the stated operating limits at all times by using the coolant flowmeter (RR40633) supplied.

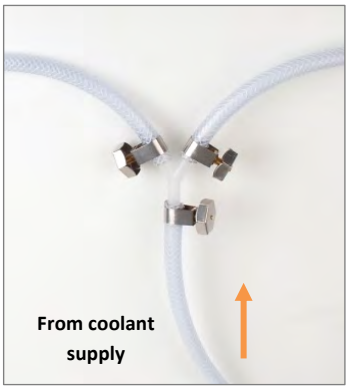
→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component, such as a flowmeter or Y-piece.

Step 1

Remove the orange blanking plugs (RR40828) from the **Coolant In** and **Out** female connectors at the back of the Reaction Station. **Note** Keep the blanking plugs safe as you may need to reinsert them if moving Mya 4 to a different location. (See Notes below.)

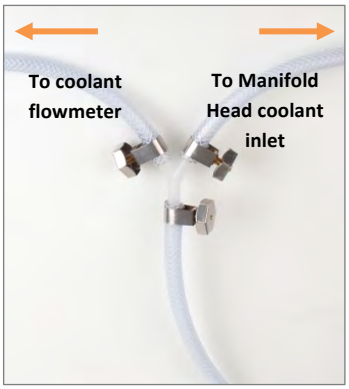
Step 2

Connect coolant tubing from the coolant supply (tap water or recirculator) to the single end of a Y-piece tubing connector (RR40628), securing with a tubing clamp (RR40634).



Step 3

Connect two more lengths of coolant tubing to the two split ends of the Y-piece, securing with tubing clamps. **Note** We recommend reinforced coolant tubing RR40627.



Step 4

Connect the coolant tubing from one of the split ends of the Y-piece to the lower fitting of the coolant flowmeter (RR40633), securing with a tubing clamp.

Step 5

Connect another length of coolant tubing to the upper fitting of the coolant flowmeter, securing with a tubing clamp. Attach the quick-release male connector (RR95525) to the other end of this tubing, securing with a tubing clamp.

Step 6

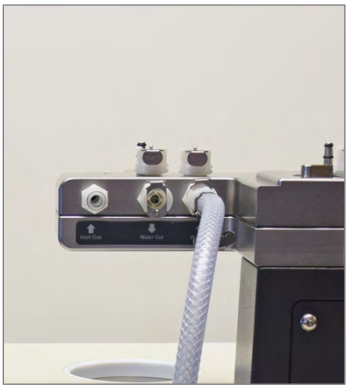
Insert the end of the tubing + male connector into the **Coolant In** inlet at the rear of Mya 4.

Step 7

Attach a quick-release male connector to the coolant tubing from the remaining split end of the Y-piece, securing with a tubing clamp.

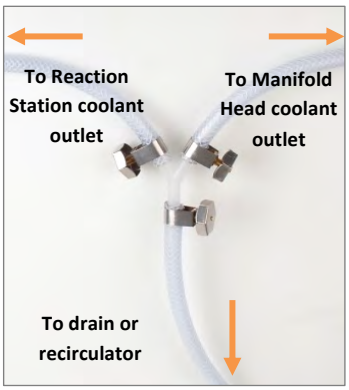
Step 8

Insert the coolant tubing + male connector into the **Water In** inlet at the rear of the Manifold Head.



Step 9

Connect a length of coolant tubing from the coolant return (drain or recirculator) to the single end of a Y-piece tubing connector (RR40628), securing with a tubing clamp. Connect two more lengths of coolant tubing to the two split ends of the Y-piece, securing with tubing clamps.



Step 10

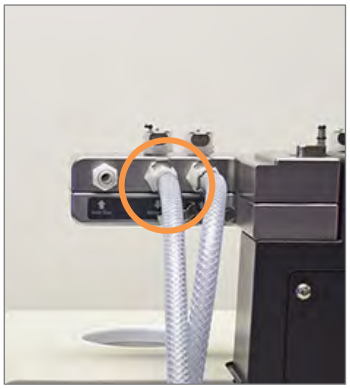
Now attach quick-release male connectors to the other ends of these two lengths of tubing.

Step 11

Insert one tubing + male connector into the **Coolant Out** outlet at the rear of Mya 4.

Step 12

Insert the other tubing + male connector into the **Water Out** outlet at the rear of the Manifold Head.



Notes

- → The condition of tubing and connectors should be regularly checked, in line with good laboratory practice.
- → If a quick-release male connector does not fit into a female connector, check that the metal locking mechanism is in the **open** position.
- → Most of the quick-release connectors on the Reaction Station and its accessories feature a non-return shut-off valve to prevent coolant flowing when the unit is disconnected. However, the female connectors at the rear of the Reaction Station do not have shut-off valves. If you need to move Mya 4 to a different location, use the blanking plugs (see Step 1 above) to block these connectors off during transportation.

Connecting the components in series

Connecting the Reaction Station and Manifold Head in series may result in reduced performance of either component, depending on which is receiving the coolant first. This is due to the coolant being partially warmed from flowing through the first component, before it enters the second component. This configuration should not be used if working at reflux with low-boiling solvents.

If you are planning to use a single source of coolant, and this is a concern, the previous option is more suitable. (See **Splitting the flow of coolant in two** on page 40.)

Notes

- → It may be possible to reverse the direction of flow, so that coolant first enters the Manifold Head, then the main unit. This configuration may result in reduced performance of the Mya 4 unit, and should not be used if working with Mya 4 at cold temperatures near to -30 °C.
- → Flow rate of the coolant around the system should not exceed the operating limits (2 L/min to 5 L/min).
- → The lower the temperature of the coolant going through the Manifold Head, the more likely you will observe condensation on the surface of the head.

To connect a single coolant supply in series, you will need these components (supplied with Mya 4):

Coolant flowmeter
RR40633

Coolant tubing
RR40627

Tubing clamps
RR40634

Quick-release male connector
RR95525

Notes

→ To ensure correct operation of Mya 4, it is important to control and monitor the coolant flow within the stated operating limits at all times by using the coolant flowmeter (RR40633) supplied.

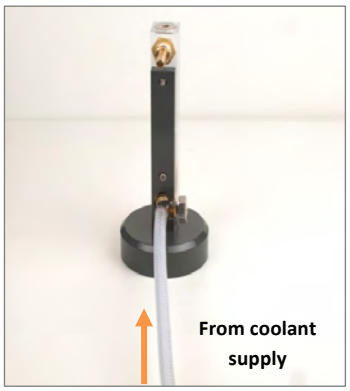
→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component, such as a flowmeter.

Step 1

Remove the orange blanking plugs (RR40828) from the **Coolant In** and **Out** female connectors at the back of the Reaction Station. **Note** Keep the blanking plugs safe as you may need to reinsert them if moving Mya 4 to a different location. (See Notes below.)

Step 2

Connect a length of coolant tubing from the coolant supply (tap water or recirculator) to the lower fitting of the coolant flowmeter (RR40633), securing with a tubing clamp (RR40634). **Note** We recommend reinforced coolant tubing RR40627.

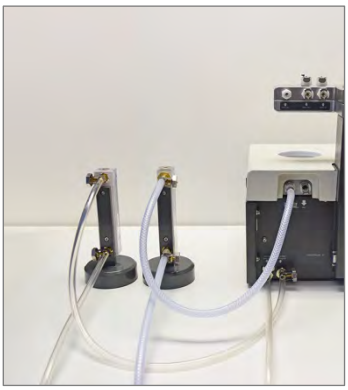


Step 3

Connect another length of coolant tubing to the upper fitting of the coolant flowmeter, securing with a tubing clamp. Now attach a quick-release male connector (RR95525) to the other end of this tubing, again securing with a tubing clamp.

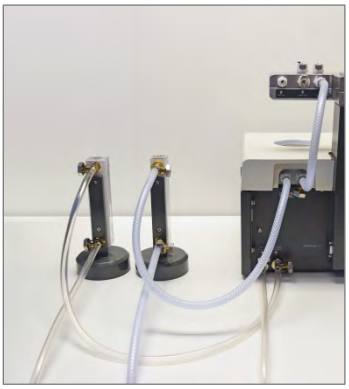
Step 4

Insert the end of the tubing + male connector into the **Coolant In** inlet at the rear of Mya 4.



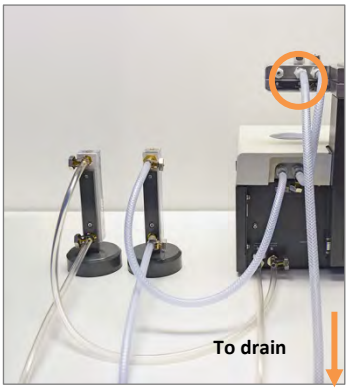
Step 5

Attach two male connectors to either end of another length of coolant tubing, securing with tubing clamps.
Then insert one end of this tubing into the **Coolant Out** outlet at the rear of Mya 4, and the other to the **Water In** inlet at the rear of the Manifold Head.



Step 6

Attach a male connector to another length of coolant tubing.
Then insert this tubing + male connector into the **Water Out** outlet at the rear of the Manifold Head.
Now connect the other end of the tubing to a suitable drain (if using tap water), or to the return connector if using a recirculator.



When connecting the main unit and Manifold Head in series, either a glass coil condenser (RR40556) or Manifold Head bypass (RR40817 – supplied with the Manifold Head) must be attached for water to flow through the unit.

To attach the Manifold Head bypass, connect one end of the bypass to a left female connector on the Manifold Head (**Water in**) in any one of the four zones (it doesn't matter which one). Connect the other end of the bypass to the right female connector for the same zone on the Manifold Head (**Water out**).

To attach the condenser see page 50.

In the absence of a connection between the **Water in** and the **Water out** channels, no flow of coolant will occur through either the main unit or the Manifold Head.

Manifold Head bypass
RR40817

6.7.9 Connecting the gas/vacuum supply to the Manifold Head

The gas inlet/outlet and distribution system combines with the Easy-On PTFE caps or Mya Compact Stirrers to allow reactions to be performed under an inert (i.e. nitrogen or argon) atmosphere.

Easy-On PTFE cap
RR91070

Easy-On PTFE manifold cap
RR40572

Mya Compact Stirrer
RR40406

Notes

→ Although both Easy-On caps (RR91070 and RR40572) work with both heads, the Easy-On PTFE manifold cap is recommended when using the Manifold Head as it gives extra stability.

To connect the gas/vacuum supply to the Manifold Head, you will need these components (supplied with Mya 4):

Gas & water tubing
RR40626

Tubing clamps
RR40634

Quick-release female connector
RR40829

Notes

→ All tubing should be fully secured using a tubing clamp (RR40634). Slide the tubing clamp over the end of the tubing **before** connecting the tubing to either a quick-release connector or other component.

Step 1

Attach a quick-release female connector (RR40829) to one end of a length of gas tubing, securing with a tubing clamp (RR40634). **Note** We recommend gas & water tubing RR40626. Connect the other end of the tubing, via a 3-way tap or stopcock, to a vacuum source and inert gas supply (maximum pressure 1 psi) or directly to the inert gas supply.

Step 2

Slide the female connector + tubing onto the **Inert Gas** inlet at the rear of the Manifold Head.
By alternately evacuating the system and filling it with inert gas (repeating two to three times) you can achieve an inert atmosphere within the reaction vessels.

Notes

→ If you need to isolate a reaction vessel from the inert gas supply during an experiment, you can simply close the valve on the Easy-On PTFE cap. (See page 64 for information on how to do this.)
→ Any gas outlets that are not in use can be blocked off with an inverted silicone septum. (See page 34 for information on how to do this.)

Warning

- When applying inerting gas to either Reflux or Manifold Heads, do not exceed 1 psi, as the reaction vessels and Easy-On PTFE caps are not rated for pressure, and there is the risk of explosion. (They are, however, suitable for applying a vacuum.)
- Mya 4 Reflux and Manifold Heads are not suitable for continuous use under vacuum (e.g. for solvent evaporation or reactions under vacuum), as this may lead to contamination or corrosion inside the head. Vacuum should only be used intermittently as part of a gas purge cycle.

Vessel contents under vacuum

See page 33.

Stainless steel gas outlets

See page 34.

6.7.10 Attaching glass condensers to the Manifold Head

To attach glass coil condensers (RR40556) to the Manifold Head, you will need these components:

RR40816
Manifold Head to glass condenser tubing & connectors

RR40556
Coil Condenser for Mya multi-neck lid

Notes

→ Four pairs of tubing & connectors are supplied with the Manifold Head.

Step 1
Fit the Coil Condenser into one of the necks of the multi-neck lid.

Step 2
Take one length of tubing + connector (RR40816). Attach the GL14 end of the tubing to the bottom connector on the Condenser. Attach the quick-release male connector on the other end of the tubing to the left female connector on the Manifold Head (**Water in**).

Step 3

Take another length of tubing + connector. Attach the GL14 end of the tubing to the top connector on the Condenser. Attach the quick-release male connector on the other end of the tubing to the right female connector on the Manifold Head (**Water out**).

Notes

→ The tubing should be connected so that the water flows into the bottom of the condenser, and out of the top.

6.7.11 Important tips for optimum refluxing

- With most solvents, a coolant supply to the Manifold Head at temperatures between 5 and 18 ˚C will be sufficient for effective refluxing. However, with coolant above 12 ˚C, care should be taken to carefully control refluxing.
- For low boiling point solvents such as diethyl ether, dichloromethane and acetone, you may require a chilled water supply with a temperature below 12 ˚C.
- Due to the large volume of 4 x 250 ml or 4 x 400 ml reaction vessels, the temperature differential between the block and solution temperature may be greater than expected. A temperature differential between the block and solution of 15 ˚C would not be unusual at the higher end of the Mya 4 temperature range.
- This differential can be affected by ambient temperature and airflow within your fume hood. Therefore, some experimentation may be necessary to determine the optimum block temperature for your solvent.
- The use of a slight positive pressure of inert gas (not exceeding 1 psi) can help reduce any solvent loss.

Notes

→ When using a chilled water supply at temperatures below 12 ˚C, you may observe condensation on connecting hoses, and the surface of the Reflux or Manifold Heads, particularly in high-humidity conditions. This should be removed with a dry cloth from time to time to avoid excessive build-up of moisture.

→ To avoid the build-up of limescale in the Reflux or Manifold Head please avoid the use of hard water.

Warning

♦ **Do not** attempt to dismantle the Reflux/Manifold Head as this will invalidate your warranty.

♦ Dismantling the head will compromise the silicone seal between the surfaces and cause a water leak during operation.

♦ In the unlikely event of a water leak from the Reflux/Manifold Head, please stop using the unit immediately.

- Switch off the power supply to Mya 4 at the mains.
- Remove the power plug from the mains.
- Do not attempt to repair the leak. This will invalidate your warranty.
- Please contact your Radleys distributor.

6.8 Stirring options

If you require stirring of your samples, you have two options:

Magnetic stirring
Mya 4's integrated magnetic stirring with magnetic stirring bars.

Overhead stirring
A Mya Compact Stirrer and a choice of stirrer shafts (purchased separately).

A Mya Compact Stirrer

Examples of two different stirrer shafts (more available)

As stirring is controlled independently in each zone, you can use both magnetic and overhead stirring in adjacent zones. The set-up below shows the use of Mya Compact Stirrers in Zones 1 and 2, and integrated magnetic stirring in Zones 3 and 4.

6.8.1 Magnetic stirring

Mya 4 features integrated magnetic stirring as standard. Stirring is independent for each zone, and the stirrer speed can be set between 100 and 1000 rpm. When activated, stirring will smoothly ramp up to the set speed.

Stirring is set, controlled and recorded for an experiment via the Mya 4 Control Pad. (See Section 7 (page 79) for more information about the Control Pad.)

Once you have selected your glassware (see page 55), choose a magnetic stirring bar and place in the reaction vessel. See Section 12 on page 164 for recommended stirring bars for each vessel.

Notes

→ Depending on your glassware and stirring bar set-up, the highest stirring speeds of the range might not be suitable. In some cases you may observe uncoupling of the stirring bars. If this happens, you might need to restart the magnetic stirring from a low speed and increase the speed in 50 rpm increments to find a suitable stirring speed.

→ PTFE magnetic stirring bars can lose their magnetism with time and use, so to optimise stirring performance, replace bars regularly, as required.

Warning

♦ When loading stirring bars, always take care not to drop them as this may fracture the flask. We recommend you use the Stirring Bar Retriever (RR98094) where necessary.

6.8.2 Overhead stirring (also called mechanical stirring)

For applications with viscous liquids, suspensions or fragile crystals, you have the option of using a Mya Compact Stirrer for overhead stirring. Stirring is independent for each zone, and the stirring speed can be set between 100 and 1000 rpm.

Warning

♦ The operating speed range is 100–500 rpm for continuous use. Speeds over 500 rpm should only be selected for intermittent use to avoid wear to the stirrer guide.

Stirring is set, controlled and recorded for an experiment via the Mya 4 Control Pad. (See Section 7 (page 79) for more information about the Control Pad.)

Once you have selected your glassware (see page 55), choose a suitable stirrer shaft and follow the instructions for assembly on page 67. See Section 12 on page 164 for compatible stirrer shafts for each vessel.

6.9 Mya 4 reaction vessel options

A wide range of reaction vessels are available for use with Mya 4. (See Section 12 on page 164 for more information.)

Sizes vary from 2 ml to 400 ml, and the range includes vials, tubes, round bottom flasks (RBFs) and process vessels. RBFs and process vessels are also available with side arms and/or baffles.

Select the reaction vessel for your application based on:

- type (vial, tube, RBF or process vessel),
- volume,
- neck size for RBFs (standard or wide neck),
- whether side arms are required,
- whether baffles are required.

6.10 Mya 4 inserts

For optimum thermal conductivity, Mya 4 uses single-block inserts made of anodised aluminium which slot into the four zones of the Reaction Station, and fit the various reaction vessels.

There are 16 different inserts available:

- 8 to fit vials and tubes,
- 4 to fit RBFs,
- 4 to fit process vessels.

Every reaction vessel from the Mya 4 range will require an appropriate insert, apart from the 400 ml process vessels. These fit directly into the zones in the Reaction Station.

Notes

→ Inserts for vials and tubes will fit any glassware of the right diameter and length.
→ Inserts for RBFs should only be used with the Mya 4-compatible Carousel 6 Plus RBFs.
→ Inserts for process vessels should only be used with Mya 4 process vessels.
→ Each insert has a 'lip' to ease its removal from the Reaction Station. However, at cold temperatures, you may experience difficulty lifting an insert out of a zone. If this happens, once you have removed your reaction vessel from the insert, warming up the empty insert to 30 or 40 °C should make it easier to lift out.
→ If condensation has occurred during an experiment, take care to wipe your inserts before starting the next experiment.

Warning

♦ **Do not** handle inserts if they are over 40 °C as there is a high risk of burn.

Inserts for vials and tubes

Inserts for vials and tubes are single or multi-position. Multi-position inserts have a temperature probe hole.

RR40420	Mya Insert for 8 x 12 mm Vials x 14 mm Deep
RR40422	Mya Insert for 6 x 16 mm Vials/Tubes x 32 mm Deep
RR40424	Mya Insert for 6 x 17 mm Vials/Tubes x 32 mm Deep
RR40425	Mya Insert for 6 x 17 mm Tapered Vials x 45 mm Deep
RR40426	Mya Insert for 1 x 24 mm Vials/Tubes x 32 mm Deep
RR40428	Mya Insert for 4 x 24 mm Vials/Tubes x 32 mm Deep
RR40430	Mya Insert for 4 x 1 inch Vials/Tubes x 32 mm Deep
RR40432	Mya Insert for 4 x 28 mm Vials/Tubes x 32 mm Deep

Inserts for round bottom flasks (RBFs)

Each RBF insert will fit all round bottom flasks (standard or wide neck, with/without side arm and baffles) of the same volume.

RR40434	Mya Insert for 25 ml Round Bottom Flask
RR40436	Mya Insert for 50 ml Round Bottom Flask
RR40438	Mya Insert for 100 ml Round Bottom Flask
RR40440	Mya Insert for 250 ml Round Bottom Flask

Inserts for process reaction vessels

Each process vessel insert will fit all process reaction vessels (with/without side arm and baffles) of the same volume.

RR40442	Mya Insert for 50 ml Process Reaction Vessel
RR40444	Mya Insert for 100 ml Process Reaction Vessel
RR40446	Mya Insert for 150 ml Process Reaction Vessel
RR40448	Mya Insert for 250 ml Process Reaction Vessel

6.11 Reflux tubes and multi-neck lids

In order to connect round bottom flasks (RBFs) and process vessels to the Reflux or Manifold Head, you will need a reflux tube or multi-neck lid.

Reflux tubes (standard and wide-neck) can be used with both the Reflux and Manifold Heads, and allow attachment to the inert gas supply through the Easy-On cap. (See page 64 for information on how to attach the Easy-On cap.)

- When used with the **Reflux Head**, the reflux tube will be actively cooled, and act as a condenser.
- When used with the **Manifold Head**, the reflux tube provides support. The tube will be air-cooled, but is not intended to provide full condensing performance.

Multi-neck lids can only be used with the Manifold Head. The central neck is dedicated to attaching the glassware assembly to the Manifold Head through the use of an Easy-On cap or a Mya Compact Stirrer.

- The 3-neck lid features two B14 necks, in addition to the central neck.
- The 5-neck lid features two B14 necks and two B10 necks, in addition to the central neck.

These additional (two or four) necks can be used for accessories such as condensers, probes or additions funnels.

Standard reflux tube

Will fit standard RBFs only.
Can be used with both the Reflux and Manifold Heads.

Wide-neck reflux tube

Will fit any wide-neck RBFs and process vessels.
Can be used with both the Reflux and Manifold Heads.

Multi-neck lids

3-neck lid

5-neck lid

PTFE 5-neck lid

Will fit any wide-neck RBFs and process vessels.
Can only be used with the Manifold Head.

Notes

→ When using a multi-neck lid, ensure the two B14 necks are at the front to avoid clashing with the Manifold Head and potentially damaging the lid.

6.11.1 Assembling glassware and a reflux tube

If you are using glassware with the Reflux Head, you will first need to attach a standard or wide-neck reflux tube to the glassware.

The type of reflux tube you need will depend on what glassware you are using:

- glassware with an integrated reflux tube, i.e. a reaction tube (RR40583) or RBF with an integrated reflux tube (RR99919/1),
- a standard RBF,
- wide-neck glassware (wide-neck RBF or process reaction vessel).

Glassware with integrated reflux tube	Standard RBF	Wide-neck glassware
		

Glassware with integrated reflux tube

If you are using glassware with an integrated reflux tube – a reaction tube (RR40583) or RBF with an integrated reflux tube (RR99919/1) – you will not need to add a separate reflux tube. The next step is to attach an Easy-On cap. (See page 64 for information on how to do this.)

Standard RBF

If you are using a standard RBF, you will need to attach a standard reflux tube (RR99918/1) with a Rodaviss® ground glass joint.

Notes

→ Rodaviss is an extra-safe borosilicate glass joint for connecting laboratory glassware. Rodaviss is safe under vacuum or pressure, grease-free, interchangeable with standard 1:10 tapered ground joints (including A and B lengths), will not stick or jam, is extremely strong and can be used up to 200 ˚C.

Step 1

Place the cone of the reflux tube through the red connecting cap.

Step 2

Roll the O-ring up over the cone until it drops past the shoulder of the cone.

Step 3

Clip the black loosening ring between the top of the connecting cap and glass rim on the cone.

Step 4

Now insert the cone of the reflux tube into the neck of the flask. Screw down the connecting cap onto the thread on the flask neck to compress the O-ring, which will ensure a perfect seal and a rigid assembly.

Notes

→ To remove the reflux tube from the flask, simply unscrew the red connecting cap back onto the loosening ring. This should easily push apart the glass joints.

Wide-neck glassware

If you are using a wide-neck round bottom flasks (RBF) or process vessel, you will need to attach a wide-neck reflux tube (RR99924).

Step 1

Fit the nitrile O-ring around the support collar.

Step 2

Slide the upper coupling over the top of the wide-neck reflux tube.

Step 3

Prise apart the open edges of the lower coupling and place around the neck of the flask.

Step 4

Place the adjoined support collar and O-ring onto the flat flange of the flask.

Step 5

Place the reflux tube on top of the flask and screw the upper and lower couplings together.

6.11.2 Attaching an Easy-On cap to a reflux tube

- Assemble the reflux tube and Easy-On cap by screwing together.
- This process requires a ¼ turn of the cap; hand tighten until the cap feels secure.
- The nitrile O-ring forms a seal with the outside of the reflux tube.

A septum is located in the top of each Easy-On cap, which allows you to:

- monitor reactions through the withdrawal of aliquots,
- add reagents during synthesis,
- insert a temperature probe.

Easy-On caps feature a replaceable nitrile O-ring as standard with an optional Viton replacement. These O-rings will be subject to chemical attack and will require periodic replacement.
Septa require periodic replacement. The standard material is silicone, but Viton is also available.

RR98060	Nitrile O-rings for Caps 24 mm	Pack 100
RR98160	Viton O-rings for Caps 24 mm	Pack 100

RR98076	Silicone Septa for PTFE Caps	Pack 100
RR98176	Viton Septa for PTFE Caps	Pack 100

Notes

→ When you screw on the Easy-On cap, ensure it 'seals' on the nitrile O-ring before you fully tighten it. This will effect a double seal on the PTFE inner of the cap and nitrile O-ring.

Warning

♦ **Do not** over-tighten the Easy-On caps, as this may damage the cap and fracture the reflux tube.

Using Easy-On caps

When using the Easy-On caps to ensure the flow of inert gas, the valve must be in the 'open' position (see A).
A quarter turn (anti-clockwise or clockwise) will 'close' the valve, isolating the reaction flask (see B).

A Open

B Close

6.11.3 Assembling a reaction vessel and a multi-neck lid

Step 1

Fit the nitrile O-ring around the support collar.

Step 2

Prise apart the open edges of the upper coupling and place around the neck of the multi-neck lid.

Step 3

Attach the quick-thread adapter onto the central neck of the lid by screwing the Rodaviss connection.

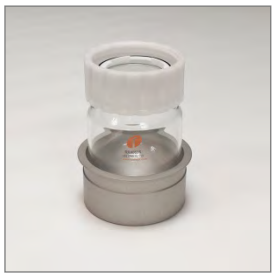
Step 4

Prise apart the open edges of the lower coupling and place around the neck of the reaction vessel.

Step 5

Place the adjoined support collar and O-ring onto the flat flange of the flask. Screw the middle coupling onto the thread of the lower coupling.





Step 6

Place the multi-neck lid onto the flask assembly. Screw couplings together until the lid is fully secured on the flask.


Using Easy-On caps with multi-neck lids

The part of the Easy-On cap that attaches to the gas nozzle on the Manifold Head needs to be positioned away from the two B14 necks on the multi-neck lid. (See picture 1.)

When using a **5-neck lid** (as shown in the pictures here), the gas nozzle should be positioned exactly in the middle of the two B10 necks, i.e. the two smaller necks on the 5-neck lid. (See picture 2.)

Picture 1

Picture 2

To enable the Easy-On cap to be turned, first unscrew the Rodaviss connector.

Now rotate the Easy-On cap to the correct orientation and screw the Rodaviss connector back on.

Note The pictures here show a manifold cap, but these instructions apply to *all* Easy-On caps.

6.12 Using overhead stirrers

Mya Compact Stirrers can be used with wide-neck RBFs or process vessels, together with either a wide-neck reflux tube or a multi-neck lid.

You will need to attach a stirrer shaft to the Mya Compact Stirrer. A wide range of Mya stirrer shafts are available. See Section 12 on page 164 for stirrer shaft/glassware compatibility.

Mya Compact Stirrers can additionally be used with standard RBFs and reflux tubes, using the centrifugal stirrer shaft (RR40712) which can be inserted through the narrower neck.

Mya Compact Stirrers can also be used with quick-thread reaction tubes (RR40583), using the flat stirrer shaft (RR40714).

6.12.1 Assembling the Mya Compact Stirrer

Step 1

Attach the Mya Compact Stirrer Easy-On head to your chosen reflux tube or multi-neck lid using the quick-thread adapter. **Note** Picture shows assembly with a multi-neck lid.

Step 2

Unscrew the coupling.

Step 3

Feed the stirrer shaft through the underside of the lid into the guide at the bottom of the Easy-On head until it protrudes through the locking collet. **Note** The rounded top section of the shaft must fully protrude through the collet to ensure that the shaft fully locks when the coupling is tightened.

Step 4

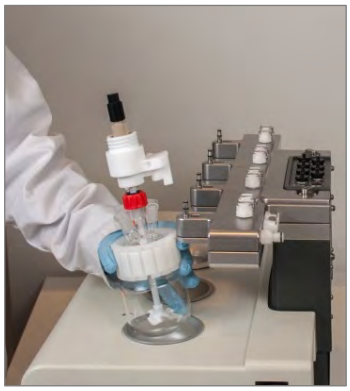
Screw the coupling back onto the collet. Hand tighten, holding the collet to ensure the shaft is firmly gripped. **Note** Turn the shaft by hand to check it can rotate freely. The shaft must always be turned clockwise (when looking from above) to avoid unscrewing the collet from the head.

Step 5

Attach the lid assembly to the reaction vessel, and tighten the lid coupling. **Note** If you need to adjust the height of the stirrer shaft, loosen the coupling at the top of the shaft and move the shaft up or down by the required amount, then retighten the coupling.

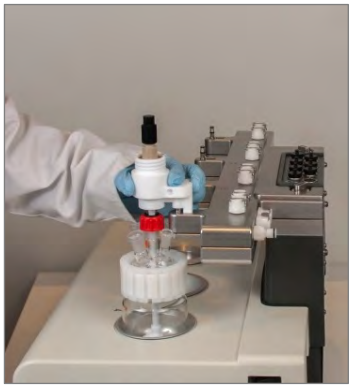
Step 6

Fit the appropriate insert into the Mya 4 zone that is to be used. Place the assembled glassware into the insert, ensuring the Easy-On stirrer head is directly above the inert gas nozzle on the Reflux/Manifold Head. **Note** Angle the glassware as you place it into the insert, before standing upright.



Step 7

Now engage the stirrer Easy-On head with the Reflux/Manifold Head, ensuring that it is correctly located on the inert gas supply nozzle.



Step 8

Lower the Compact Stirrer onto the Easy-On head until the locking nut engages with the thread on the head. Hand tighten. **Note** The stirrer should self-align when it engages with the coupling on the stirrer head, but may require a slight twist if any resistance is felt when tightening the locking nut.

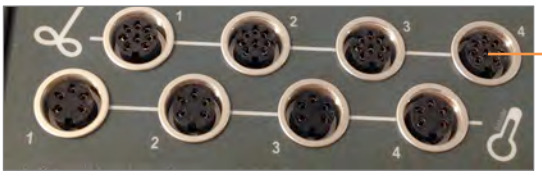
Step 9

Insert one end of the Mya Compact Stirrer cable into the socket at the back of the Compact Stirrer.
Hand tighten the screw fitting on the cable connector to secure it.

Step 10

Insert the other end of the Compact Stirrer cable into the correct overhead stirrer socket in the connector panel on the support tower. Use the alignment tab on the cable connector to ensure the holes in the socket line up with the pins of the cable plug.
Hand tighten the screw fitting on the cable connector.

Note Each numbered overhead stirrer socket on the connector panel corresponds to one of the four reaction zones. Ensure the Mya Compact Stirrer cable is attached to the correct socket for the zone you wish to use.



Your Mya 4 Compact Stirrer is now ready to use.

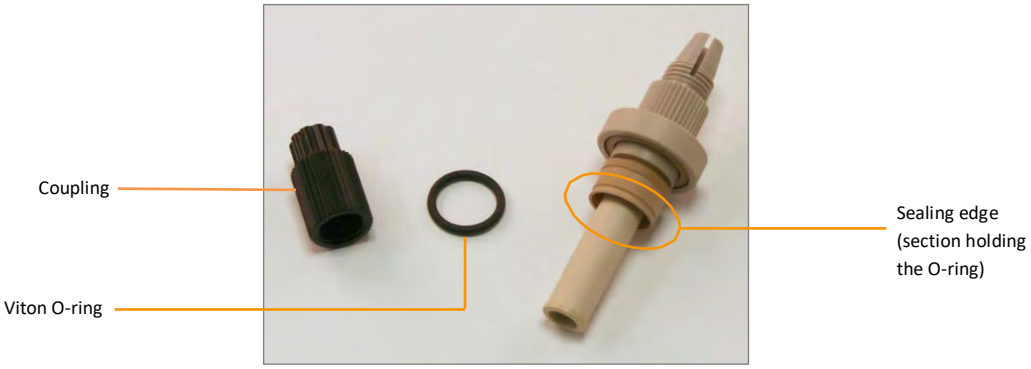
Notes

→ You should ensure that the reaction vessel is securely positioned in the Reaction Station, and that the stirrer Easy-On head is engaged with the Reflux/Manifold Head **before** attaching the Compact Stirrer. This will avoid placing pressure on the glassware, which could cause it to break.

6.12.2 Stirrer Guide Care

The Mya stirrer guide is a precision-engineered component of your Mya 4 that allows proper connectivity, sealing, and alignment of the Mya Compact Stirrer, stirrer shaft, and Mya 4 glassware.

Always handle the Mya Stirrer Guide – PEEK Bearing Sub-Assembly with great care to avoid damage to the sealing surfaces and features. The sealing edge is very flexible and could easily be deformed if mishandled – damage to this part could affect the sealing performance as well as cause unwanted friction during use.



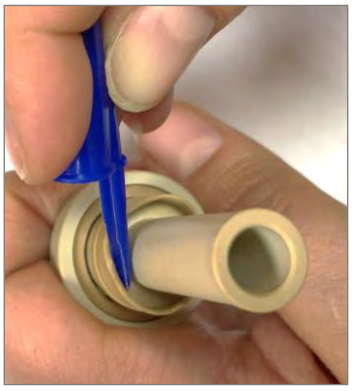
Mya Stirrer Guide – PEEK Bearing Sub-Assembly

If the sealing edge (the section of the stirrer guide holding the O-ring) becomes deformed, gently reform it to a perfect circular shape (see Steps 1 and 2 below).

Spare O-rings (RR40834) come with a positioning tool to make the replacement easier. Follow Steps 3 to 6 to place an O-ring onto a circular shaped sealing edge.

Step 1

If the sealing edge is misshapen, carefully reshape using a fingernail or soft instrument (e.g. pen cap).



Step 2

Ensure the seal profile resembles a circular shape and is not cracked. Note If the seal is cracked, please contact Radleys or your local supplier.

Step 3

Use the Positioning Tool provided with every spare O-ring (RR40834).
Place the O-ring on the bottom end of the tool.

Step 4

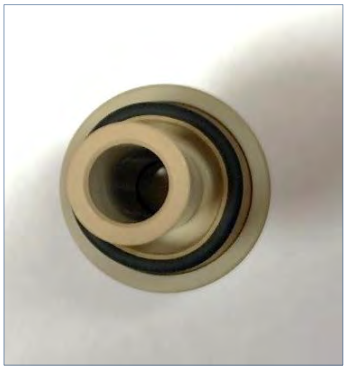
Insert the tool onto the bottom of the stirrer guide, until a hard stop is reached.

Step 5

Ensure the tool does not fall from the stirrer guide in vertical position.
Note If the tool will not hold by friction alone, please contact Radleys or your local supplier.
Roll the O-ring on the tool until it located into the sealing edge on the stirrer guide.

Step 6

Gently remove the Positioning Tool.
The O-ring should stay in place and the seal should remain a circular shape.



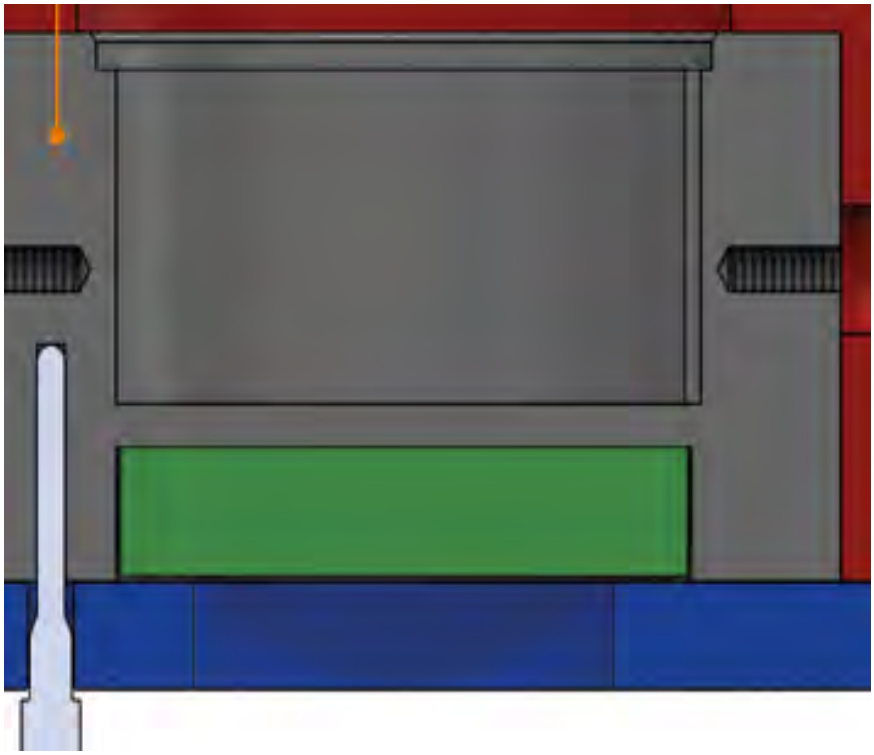
Notes

→ In order to limit the risk of deforming the sealing edge of the stirrer guide, the O-ring should only be removed when it needs replacing. For cleaning, leave the O-ring in place.

→ Please remember to check the chemical compatibility of all parts with your cleaning solvents before use. For example, the Viton O-ring is not compatible with acetone.

6.13 Using external temperature probes

Each of the four reaction zones is based on a thermally controlled aluminium block. A Pt100 temperature sensor is located internally within each block, which monitors, controls and reports the block temperature (Tb) at all times when the reaction station is powered on.



Mya 4 features optional **external Pt100 temperature probes** that you can connect to each zone of the Reaction Station. The external Pt100 provides additional temperature monitoring and control of either the reactor contents, or the aluminium insert if tubes or vials are being used.

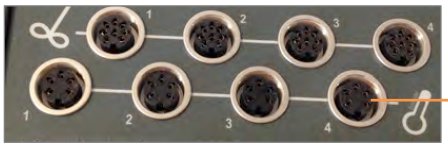
Notes

→ Mya Pt100 temperature probes are available in two lengths (150 and 225 mm) and two different finishes: stainless steel, and PTFE-coated stainless steel for additional chemical resistance.

6.13.1 Connecting an external temperature probe

Plug the probe connector into the probe socket on the connector panel, at the top of the support tower. Use the alignment tab on the probe connector to ensure that the holes in the probe socket line up with the pins of the probe connector. Hand tighten the screw on the probe connector to fully secure it.

Note Each numbered probe socket on the connector panel corresponds to one of the four reaction zones. Ensure the probe is attached to the correct socket for the zone you wish to use.



Options for securing an external temperature probe

There are several options for securing a probe to the Reaction Station:

- through an Easy-On cap,
- through a sidearm,
- through a neck of a multi-neck lid,
- in the probe hole of a multi-vial insert.

Through an Easy-On cap

When securing a probe through an Easy-On cap, you will need a long probe (225 mm). Push the probe through the silicone septum in the top of the cap (cut a small hole first), then down through the reflux tube, and into the reaction mixture.

Through a sidearm

When securing a probe through the sidearm of a vessel, use a temperature probe adapter to secure the probe. (See picture 1 below.) You may need a long probe (225 mm). Alternatively, push the probe through the septum in the sidearm (cut a small hole first). (See picture 2 below.)

Notes

→ Using a temperature probe adapter is highly recommended when using overhead stirring as this will secure the probe firmly in place and reduce the risk of the probe making contact with the stirrer shaft.

Picture 1

Picture 2

Through a neck of a multi-neck lid

When using a probe in a multi-neck lid, you will need a long probe (225 mm). Use a temperature probe adapter to secure the probe. (See picture 1 below.) Alternatively, push the probe through a Suba-Seal in one of the necks of the lid (cut a small hole first). (See picture 2 below.)

Notes

→ Using a temperature probe adapter is highly recommended when using overhead stirring as this will secure the probe firmly in place and reduce the risk of the probe making contact with the stirrer shaft.

Picture 1

Picture 2

In the probe hole of a multi-vial insert

When using a probe with multi-vial inserts, rotate the insert so that the probe hole is accessible, then push the probe into the probe hole. It is recommended that you use a probe with a stainless steel finish, as the coating on a PTFE-coated probe could become damaged when moving it in and out of inserts. However, the probe holes in the multi-position inserts can fit either probe.

Notes

→ For all of the above options, the probe must be secured and positioned so that it is immersed in the reaction solvent (or vial insert) by at least 10 mm at all times.

→ If a probe is not secured or correctly positioned, the probe may not accurately record the reaction temperature, or errors may occur in controlling by Tr.

7 The Mya 4 Control Pad

The Mya 4 Reaction Station can be controlled with the Mya 4 Control Pad.

The Control Pad allows you to set up and control experiments in **Manual** or **Profile** mode.

Manual mode: reaction parameters can be changed at any time by the user.
Profile mode: a predefined experiment can be created and then run in a fully automated way.

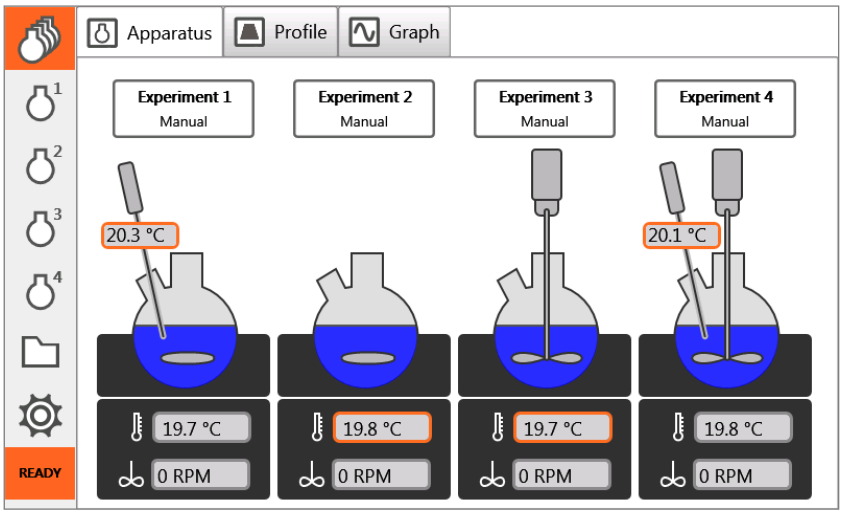
Both modes offer:

- full graphical touch-screen display,
- capture of data during an experiment,
- storage of data at the end of an experiment (stored experiments can be rerun, or exported via the USB or Ethernet ports).

7.1 Set-up and operation

- Attach the Mya 4 Control Pad to the Mya 4 Reaction Station with the **Mya 4 to Control Pad** cable. (See page 11 for more details.)
- Ensure the connector cable is fully secured at both ends using the securing screws.
- Ensure the mains power cable is plugged into the mains inlet socket at the rear of the Mya 4 Control Pad and to the mains power supply.
- Once the Mya 4 unit is powered up, the Control Pad will automatically boot up. Loading of the software may initially take a few seconds.
- When the **Overview** screen is displayed, the Control Pad is ready to use.

Overview screen



Warning

- **Never** connect the Mya 4 Control Pad to a laptop or PC as this may result in serious damage to your device.
- The Mya 4 Control Pad screen is made of chemically resistant glass. However, any chemical or liquid spills on the screen should be **cleaned up immediately**.
- **Do not** expose the screen to **excessive mechanical force**, as this may result in serious damage to the screen.

7.2 Using the Control Pad

- The Control Pad has a touch-screen, which you tap to operate. You should ensure your hands are clean and dry before touching the screen.
- Tap precisely on the required point/icon on the screen to get a response. Viewing the screen directly from above will aid accuracy**.**
- When you tap on an icon or active part of the screen, you will hear a beep. If no beep is heard, try tapping the screen again, ensuring to tap precisely on the required point/icon.
- You may prefer to use a capacitive stylus (RR40823, supplied with Mya 4). In this case, lightly touch the screen with the capacitive end of the stylus on the required point/icon to get a response.

Notes

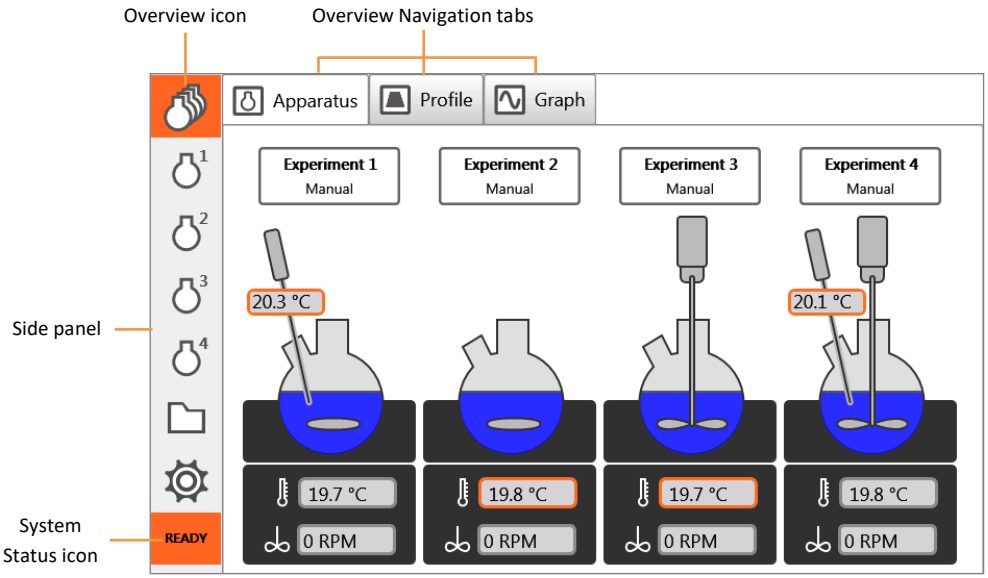
→ The touch-screen should still respond if you are wearing light, disposable gloves, but ensure gloves are clean, dry and uncontaminated**.**

→ If using a stylus, ensure it is a capacitive type (other types of stylus won't work).

→ The maximum experiment length when using the Control Pad is seven days. A warning will be displayed after six days, and the experiment will automatically shut down (heating/cooling and stirring will be turned off) after seven days.

7.3 Overview screen

The **Overview** screen provides a summary view of all four zones of the Mya 4 unit, and is for information only. You cannot enter or edit values from the Overview screen.



- Tap the **Overview** icon in the side panel for an overview of all four zones of the Mya 4 unit.
- From here, you can access three different overviews – **Apparatus**, **Profile** or **Graph** – via the **Overview Navigation tabs**.
- The Apparatus, Profile and Graph Overview screens are for information only, and it's not possible to enter or edit any values from these views.

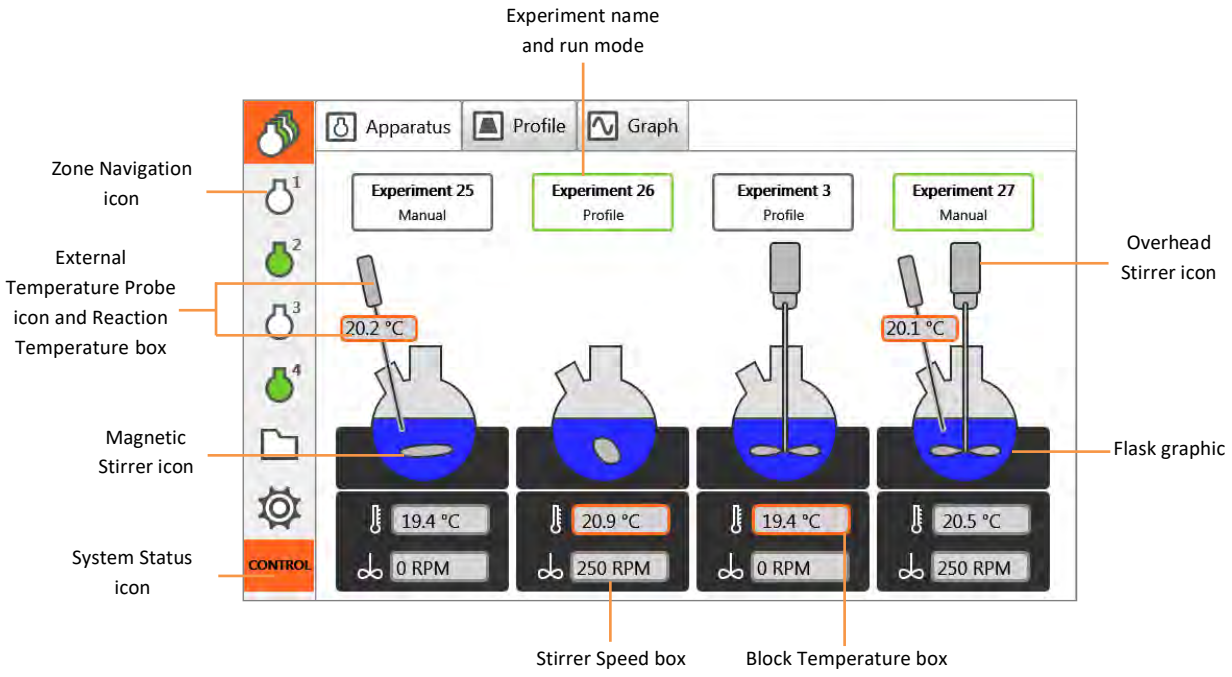
Notes

→ When you first tap on the Overview icon, the default screen will be the **Apparatus** Overview screen.

→ As no experiments are currently running, the System Status icon reads **READY.** (This will change to **CONTROL** when an experiment is running.)

7.3.1 Apparatus

The Apparatus Overview screen displays the current set-up for all four zones.



Experiment name and run mode

Above each zone, a box displays the name of the experiment that has been loaded and the selected run mode – **Manual** or **Profile.** (See pages 89 and 92 for more information on Manual and Profile run modes.) A green highlight around this box indicates that the experiment is currently running.

Zone Navigation icons

Each of the four individual zones is represented by a numbered flask in the side panel. If a flask is green, it indicates that an experiment is currently running in that particular zone.

External Temperature Probe icon and temperature box

If a Mya Pt100 temperature probe is connected to any zone, the **External Temperature Probe** icon will be displayed for that zone. The current probe temperature, which is the reaction temperature (Tr), is shown in the **Reaction Temperature** box. An orange highlight around the Reaction Temperature box indicates control of the experiment by Tr. (See page 89 for more information about controlling an experiment by reaction (Tr) or block (Tb) temperature.)

Block Temperature box

The current block temperature (Tb) for each zone is displayed in the box under the flask graphic. An orange highlight around the **Block Temperature** box indicates control of the experiment by Tb. (See page 89 for more information about controlling an experiment by reaction (Tr) or block (Tb) temperature.)

Overhead Stirrer icon

Mya 4 features integrated magnetic stirring in each zone as standard. You also have the option to connect an overhead Mya Compact Stirrer. (See page 53 for more information on stirring options.) When no overhead stirrer is connected, magnetic stirring will be activated and the **Magnetic Stirrer** icon displayed. If a Mya Compact Stirrer is connected to a zone, the **Overhead Stirrer** icon will be displayed for that zone, and overhead stirring will automatically be activated.

Stirrer Speed box

The current stirrer speed for each zone is displayed in the **Stirrer Speed** box.

System Status icon

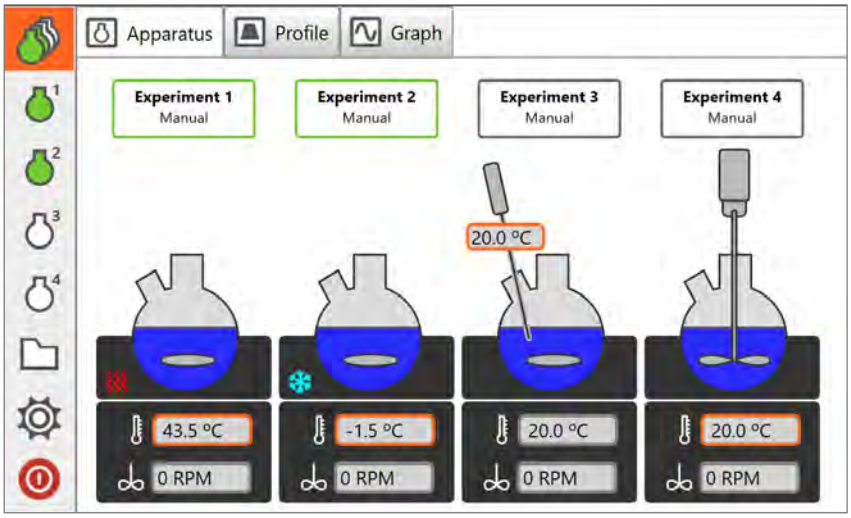
If any experiments are currently running, the **System Status** icon will read **CONTROL**.

Notes

→ In the unlikely event that the Control Pad is unable to communicate with the Mya 4 Reaction Station, the Control Pad will automatically shut down after 15 seconds giving you the option to shutdown or switch to demo mode and the System Status icon will change to a power symbol (see image below). To switch back to READY mode, go to System Settings (see page 123) and switch Demo mode off.

Temperature warning icons

- Whether an experiment is running or not, when the block temperature is above 40 °C, a red heatwave icon will be displayed to the left of the flask graphic. When the block temperature is below 0 °C, a snowflake icon will be displayed.



- There is also a 'Caution, hot surface' symbol on the front of the Mya 4 Reaction Station.

Warning

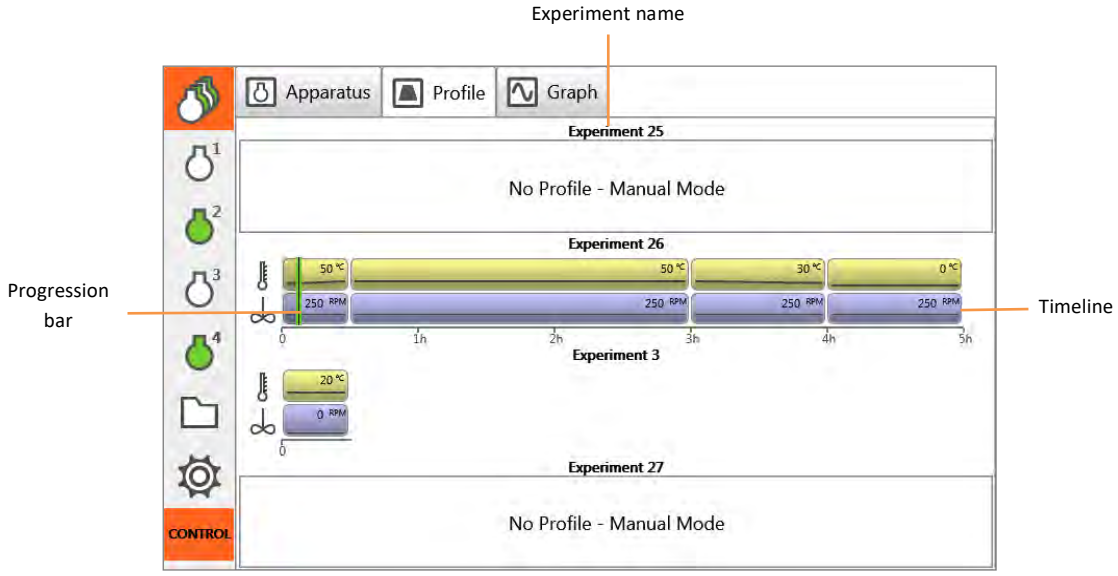
- Caution, hot surface – displayed on the front of the Mya 4 Reaction Station. Do not touch the aluminium inserts or reaction vessels during and after heating/cooling, as there is the risk of burns from hot or extreme cold surfaces (Mya 4 inserts can remain hot for a considerable time after the heating source has been switched off).

Notes

→ The **Apparatus** overview is for information only and you cannot enter or edit values from this screen.
→ To set or change values for an individual experiment, tap once anywhere on the relevant flask graphic (or one of the numbered Zone Navigation icons in the side panel) to go to the individual **Zone View** screen.

7.3.2 Profile

The **Profile** Overview screen displays a timeline for each zone where a profile for an experiment has been set. For zones where no profile is set, i.e. if zones are running in **Manual** mode, then no profile is displayed in this view.



Experiment name

The experiment name for each individual zone is displayed above the timeline.

Timeline

- The timeline is segmented to show the details of each individual step set in the profile. The yellow segments represent the temperature and the blue segments represent the stirrer speed.
- The end temperature and stirrer speed that have been set for each step are displayed at the top right corner of each segment of the timeline. The axis along the bottom shows the time elapsed.
- The segment for the longest step will be displayed in full, and segments for shorter steps will be resized according to the space available on screen, so shorter steps might not always be visible.

Progression bar

When a profile experiment is started, a green progression bar is displayed, which tracks the current position along the timeline.

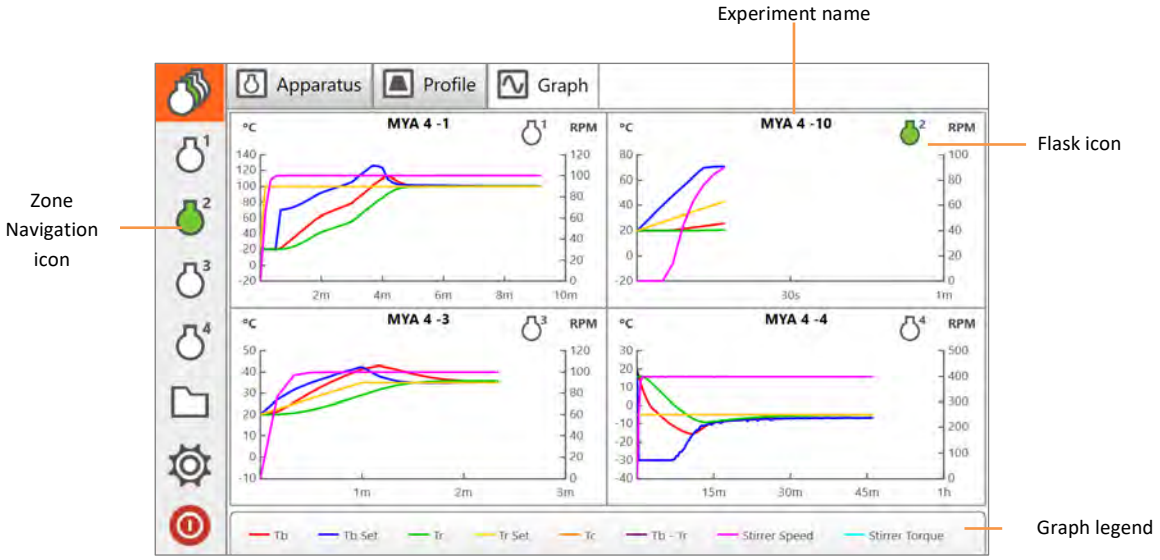
Notes

→ The **Profile** overview is for information only and you cannot enter or edit values from this screen.

→ To set or change values for the steps in a profile experiment, tap once anywhere on the relevant timeline (or one of the numbered Zone Navigation icons in the side panel) to go to the **Profile Set-up** screen for that individual experiment. (See page 92 for information on setting up a profile.)

7.3.3 Graph

The **Graph** Overview screen displays a graph for each zone where an experiment is or has been running. The graph will continuously update as the experiment progresses. No graph is displayed for zones where an experiment hasn't been created, or the experiment hasn't started.



Experiment name

The experiment name for each individual zone is displayed above its graph.

Flask icon

The Flask icon to the right of the experiment name is green when an experiment is in progress. (The Zone Navigation icon in the side panel will also be green.)

Axes

Temperature is plotted against the left-hand Y axis and stirrer speed against the right-hand Y axis.

Graph legend

For more information about the graph legend, see page 99.

Notes

→ To view an individual graph in more detail, tap once anywhere on the graph to go to the individual **Zone View** screen where a **Zoom** function is available. (See page 100 for more information on the Zoom function.)

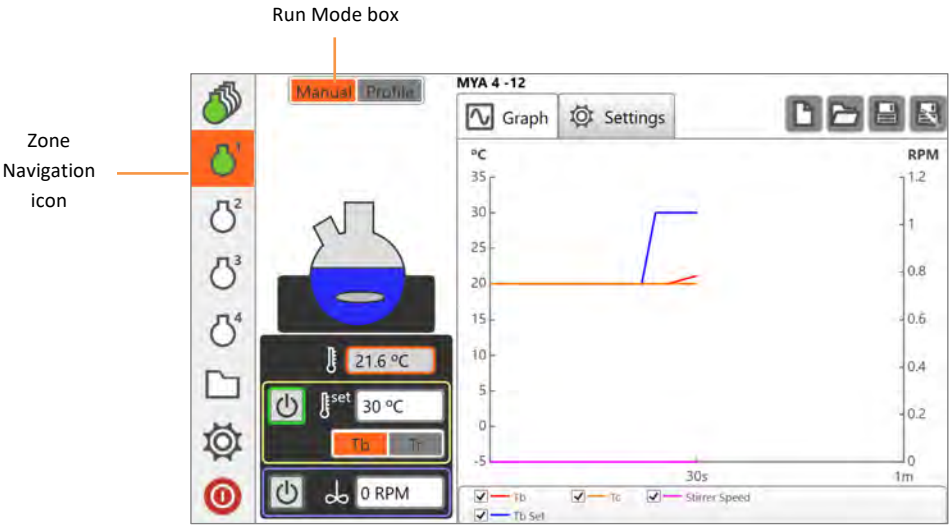
→ If you have zoomed in on a graph in one of the individual Zone View screens, the same expanded view will be displayed on the Graph Overview screen. To view the full graph in the Graph Overview screen, you will need to go back to the individual Zone View screen and tap on the Zoom-out icon.

7.4 Zone View screens

Each of the four Mya 4 zones has its own individual screen.

From an individual Zone View screen, you can:

- create and run a new experiment (see page 105 for information on how to create a new experiment),
- view or edit an experiment that's currently running,
- view an experiment that's previously run,
- rerun an experiment (see page 105 for information on how to rerun an experiment).



Zone Navigation icons

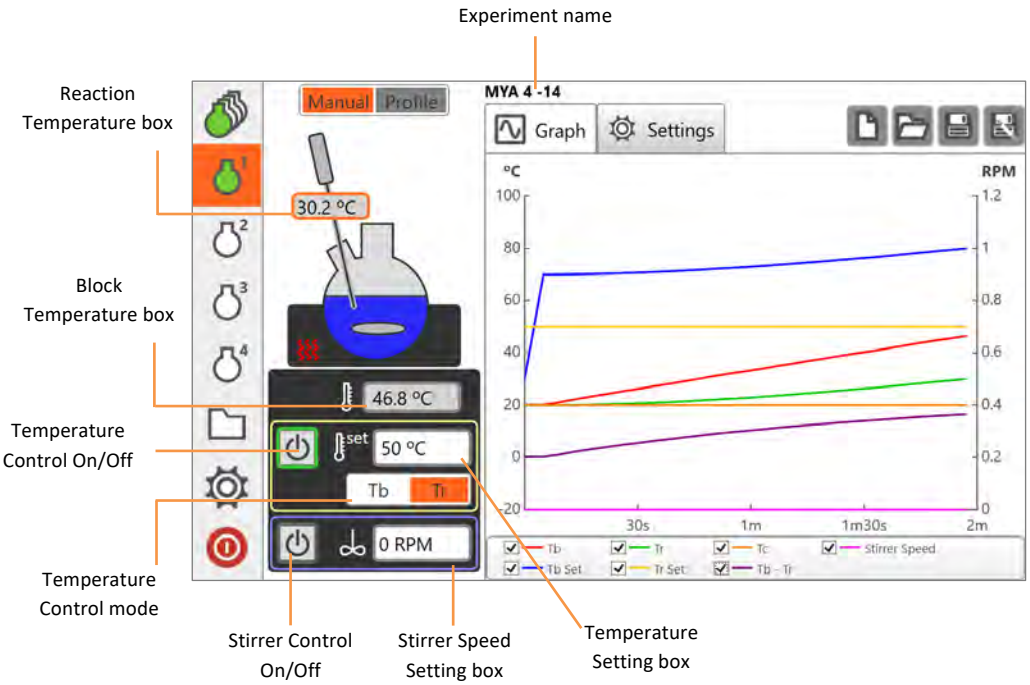
- Each of the four individual zones is represented by a numbered flask icon displayed in the side panel.
- To create, run, view or edit an experiment, simply tap once on one of the numbered flasks to go to the screen for the corresponding zone. The selected flask will display an orange highlight.
- If a flask is green, it indicates that an experiment is currently running in that particular zone.

Run Mode box

- Experiments can be set up and controlled in **Manual** or **Profile** mode. Tap once on **Manual** or **Profile** in the **Run Mode** box to choose the mode you require.
- The mode that is selected will display an orange highlight.
- You cannot change the mode once an experiment has started.

7.4.1 Manual mode

In **Manual** mode, temperatures and stirrer speeds are manually entered and can be changed at any time by the user.



Experiment name

The name of the current experiment is displayed above the **Graph** and **Settings** tabs. An asterisk next to the experiment name indicates that there are unsaved changes. (See page 105 for information on how to save an experiment.)

Temperature Control mode

To control the experiment temperature, you can:

- use the internal Pt100 probe which controls the **block** temperature (tap **Tb** once),
- or, place an additional external temperature probe directly in the reaction vessel, or in a multi-vial insert, to control the **reaction** temperature (tap **Tr** once).

The Temperature Control mode that is selected (**Tb** or **Tr**) will display an orange highlight. In **Manual** mode, you can switch the Temperature Control mode at any time during the experiment.

Notes

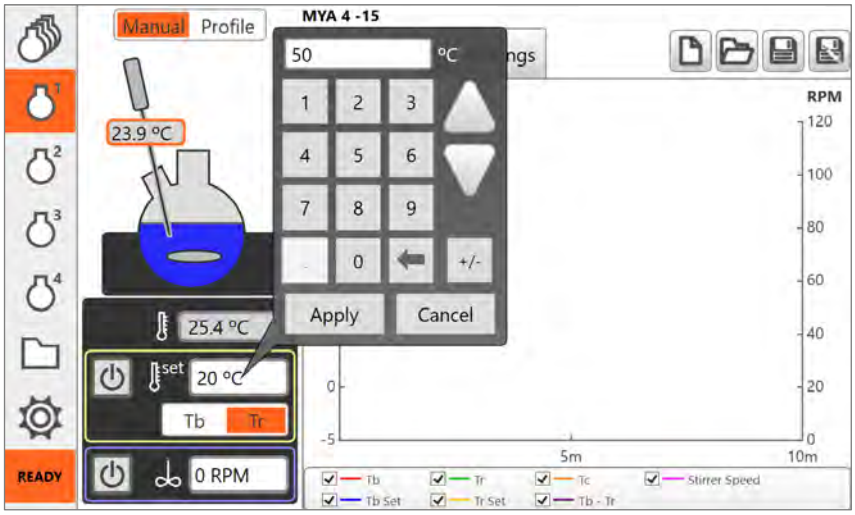
→ You will only be able to select **Tr** if an external temperature probe is attached. (See page 76 for information on how to do this.) If no external temperature probe is attached, the **Tr** option will be disabled.

Block and Reaction Temperature boxes

- When **Tb** is selected in Temperature Control mode, the **Block Temperature** box will display an orange highlight.
- When **Tr** is selected in Temperature Control mode, the **Reaction Temperature** box will display an orange highlight.
- The Block and Reaction Temperature boxes only report the current temperatures. Select the **Temperature Setting** box to set or change a temperature.

Temperature Setting box

- Once you have selected **Tb** or **Tr**, tap once on the **Temperature Setting** box to set the temperature of the experiment.
- Enter the required temperature using the pop-up keypad and tap **Apply**.
- You can enter any value between the minimum and maximum safety limits applied in **Settings.** (See page 101 for more information on zone settings.)
- In **Manual** mode, you can set a temperature at the start of the experiment, and then change it at any point while the experiment is running.



Temperature Control On/Off icon

- Tap once on the **Temperature Control** icon to start or stop temperature control.
- Once started, heating or cooling will be activated, and the temperature will be controlled at the value set in the **Temperature Setting** box. The temperature will begin plotting on the graph. (See page 98 for more information on using graphs.)
- You can turn off temperature control during an experiment without ending the experiment, if the stirring control is still active.
- If both **temperature control** and **stirrer control** are turned off, the experiment will end and it cannot be restarted.

Stirrer Speed Setting box

- Tap once on the **Stirrer Speed Setting** box to set the stirring speed of the experiment.
- Enter the required stirrer speed using the pop-up keypad. You can enter any value between 100 rpm and the maximum safety limit applied in **Settings** (see page 101).
- In **Manual** mode, you can set a stirrer speed at the start of the experiment, and then change it at any point while the experiment is running.

Notes

→ The recommended maximum speed when using a Mya Compact Stirrer for continuous use is 500 rpm.

→ To temporarily disable stirring whilst keeping the experiment running, you can either set the stirrer speed to 0 rpm, or turn it off if temperature control is still active.

Stirrer Control On/Off icon

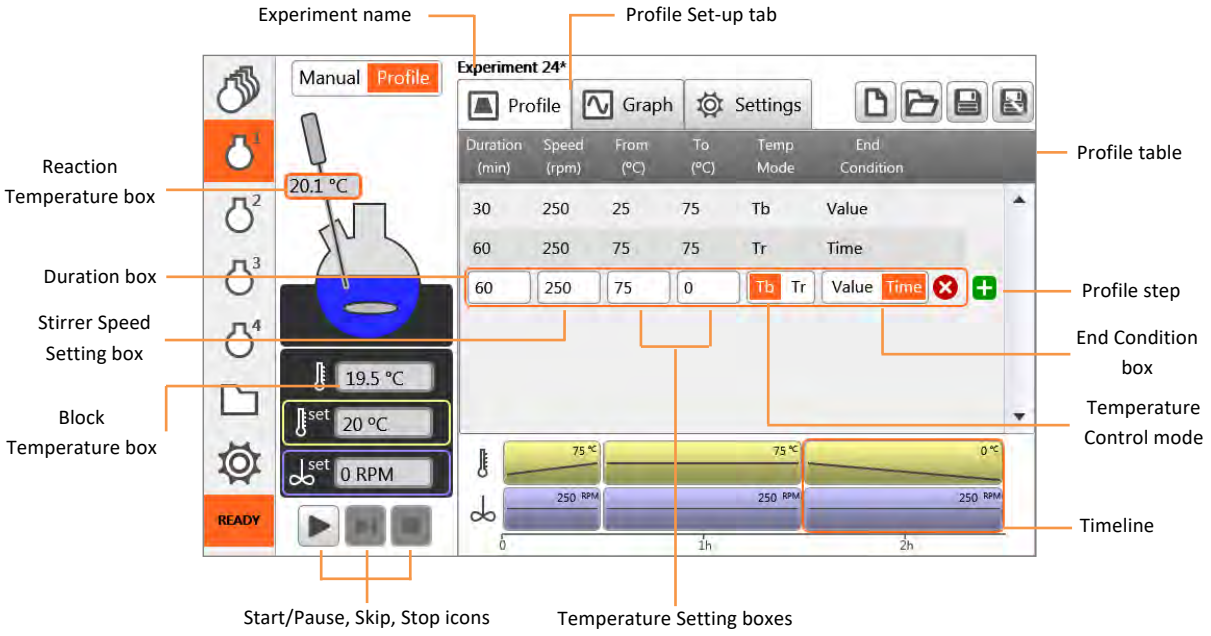
- Tap once on the **Stirrer Control** icon to start or stop stirrer control.
- Once started, the stirring speed will be controlled at the value set in the **Stirrer Speed Setting** box. The Stirrer Speed Setting box will flash until the set stirrer speed has been reached.
- You can turn off stirrer control during an experiment without ending the experiment, if the temperature control is still active.
- If both **temperature control** and **stirrer control** are turned off, the experiment will end and it cannot be restarted.

7.4.2 Profile mode

In **Profile** mode, a predefined experiment can be created and then run in a fully automated way.

With the **Profile Set-up** tab selected, you can create a sequence of steps in the **Profile table** (up to a maximum of 10 for each experiment), each with its own independent values.

Once an experiment has started, you can pause or skip steps. You can also edit any of the values for a particular step, as long as that step hasn't already started. You cannot edit values for a step once it has started.

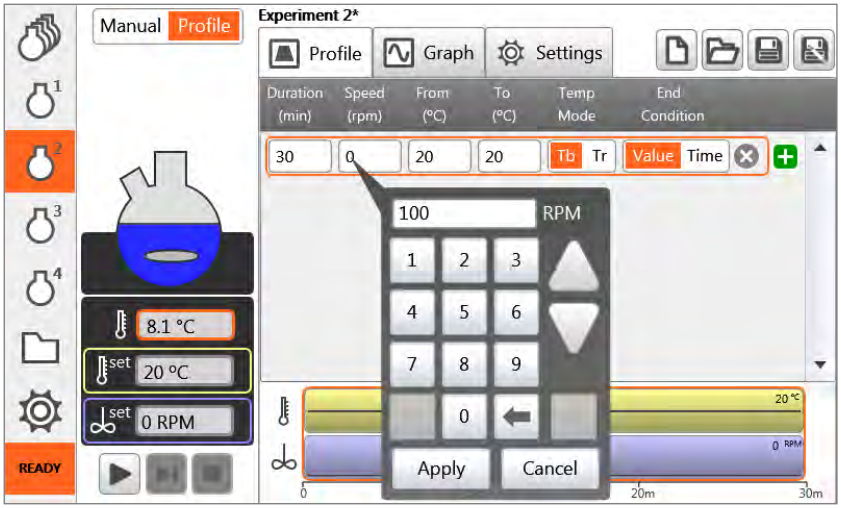


Experiment name

- The name of the current experiment is displayed above the Profile Set-up, Graph and Settings tabs.
- An asterisk next to the experiment name indicates that there are unsaved changes. (See page 105 for information on how to save an experiment.)

Profile step

- With the Profile Set-up tab selected, the **Profile table** will display a default first **Profile step**. Tap once anywhere on the default step to select it. It will display an orange highlight.
- Tap any of the boxes in the default Profile step to change the values on the pop-up keypad, and then tap **Apply**.



- To add a new step, tap once on the **+** icon.
- To delete a step, tap once on the **x** icon.

Notes

→ When you tap the **+** icon to create a new step, the values from the previous step will be duplicated. Tap on any of the boxes in the new step to change the values.

→ The Profile table can only display a maximum of six steps. If you have created more than six steps for a single experiment, use the scroll bar to move up and down the Profile table in order to view them.

→ Once you have created 10 steps, the **+** icon will become disabled.

→ When any Profile step is selected, it will display an orange highlight.

Temperature Control mode

To control the temperature of each step of the experiment, you can:

- use the internal Pt100 probe, which controls the **block** temperature (tap **Tb** once),
- or, place an additional external temperature probe directly in the reaction vessel, or in a multi-vial insert, to control the **reaction** temperature (tap **Tr** once).

The Temperature Control mode that is selected (**Tb** or **Tr**) will display an orange highlight. In **Profile** mode, you cannot switch the Temperature Control mode for a step once that step has started.

Notes

→ If you have selected Tr control for one or more steps, but you haven't attached an external temperature probe (see page 76 for information on how to do this), when you tap **Play**, a message will be displayed to remind you to insert a probe, or change the Temperature Control mode to Tb.

Duration

- Tap once on the **Duration** box to set the length of the profile step using the pop-up keypad.
- The minimum duration that you can set for a step is one minute, and the maximum is 960 minutes (16 hours).

Notes

→ If you need to create a step that's longer than 960 minutes, you will have to split it over several steps.

Stirrer Speed Setting box

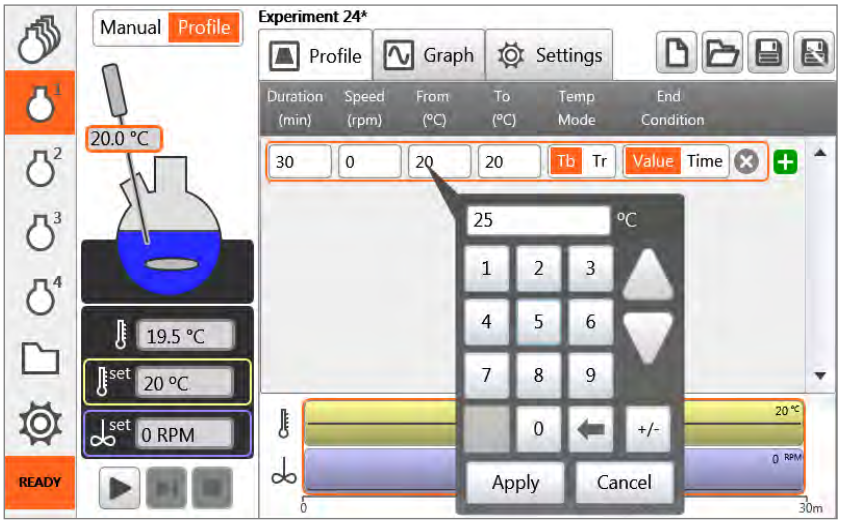
- Tap once on the **Stirrer Speed Setting** box to set the stirring speed for each step of the experiment.
- Enter the required stirrer speed using the pop-up keypad. You can enter any value between 100 rpm and the maximum safety limit applied in **Settings.** (See page 101 for more information on zone settings).
- If you don't need stirring for a step, enter 0 rpm in the Stirrer Speed Setting box.

Notes

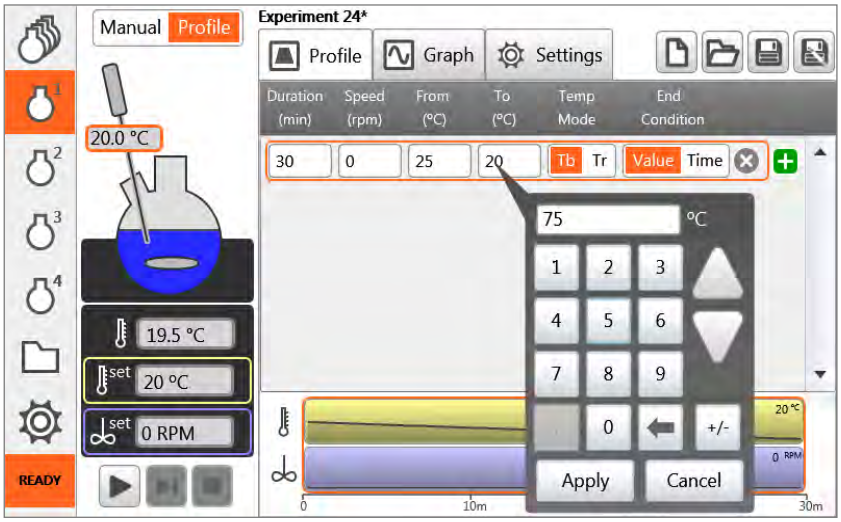
→ The recommended maximum speed when using a Mya Compact Stirrer for continuous use is 500 rpm.

Temperature Setting boxes

- Tap once on the **From** Temperature Setting box to set the start temperature for a step. Enter the required value on the pop-up keypad and select **Apply**.



- Then tap once on the **To** Temperature Setting box to set the end temperature for a step. Again, enter the required value on the pop-up keypad and select **Apply**.



- For both the step start and step end temperatures, you can enter any value between the minimum and maximum safety limits applied in **Settings**. (See page 101 for more information on zone settings.)

Notes

→ If the start and end temperatures for a step are different, Mya 4 will calculate a linear gradient between the two temperatures over the set duration, and will then track this gradient as closely as possible.

End Condition box

Tap once on either **Value** or **Time** to set the end condition of the step. The end condition that is selected will display an orange highlight.

If Time is selected:
The step will end when the length of time set in the **Duration** box has been reached, regardless of what the current block or reaction temperatures are. If further steps have been programmed, the next step will begin. If there are no further steps, the experiment will end.

If Value is selected:
When the time set in the **Duration** box is up, if the set end temperature (the value in the **To** Temperature Setting box) has not yet been reached, the step will continue until it has. Then, if further steps have been programmed, the next step will begin. If there are no further steps, the experiment will end.

If the set end temperature cannot be reached by Mya 4 – for example, if the reaction temperature is set higher than the solvent boiling point – the step will not complete. In this case, you can tap once on the **Skip** icon to skip the current step and continue the experiment.

Notes

→ Regardless of whether **Time** or **Value** has been selected as the end condition, a step will not complete until the length of time set for it in the **Duration** box has been reached, even if the set end temperature is achieved in a shorter time.

Block and Reaction Temperature boxes

- When **Tb** is selected in Temperature Control mode, the **Block Temperature** box will display an orange highlight once the step has started (and for the duration of that step).
- When **Tr** is selected in Temperature Control mode, the **Reaction Temperature** box will display an orange highlight once the step has started (and for the duration of that step).
- The Block and Reaction Temperature boxes only report the current temperatures. Select the **Temperature Setting** boxes to set or change a temperature.

Timeline

- There is a timeline under the Profile table, which is segmented to show the details of each individual profile step set for an experiment.
- The yellow segments represent the temperature and the blue segments represent the stirrer speed.
- The end temperature and stirrer speed that have been set for each step are displayed at the top right corner of each segment of the timeline.
- The axis along the bottom shows the time elapsed.
- When you select a particular step in the Profile table, both the step and the corresponding segment in the timeline will display an orange highlight.

Start/Pause, Skip and Stop icons

- Tap the **Start** icon once to start a profile experiment. The Start icon will change to the **Pause** icon, and the Zone Navigation icon in the side panel will be green for the relevant zone.
- Tap the **Pause** icon once to hold the experiment step at the current temperature and stirring speed. The Start/Pause icon, the Zone Navigation icon in the side panel, and the progression bar will all flash green.
- To resume an experiment step, tap the **Start** icon again.
- Tap the **Skip** icon to instantly abort the current step, and move on to the start of the next step.
- Tap the **Stop** icon once to stop both the temperature control and stirring and end the current experiment. Once stopped, it is not possible to resume an experiment.

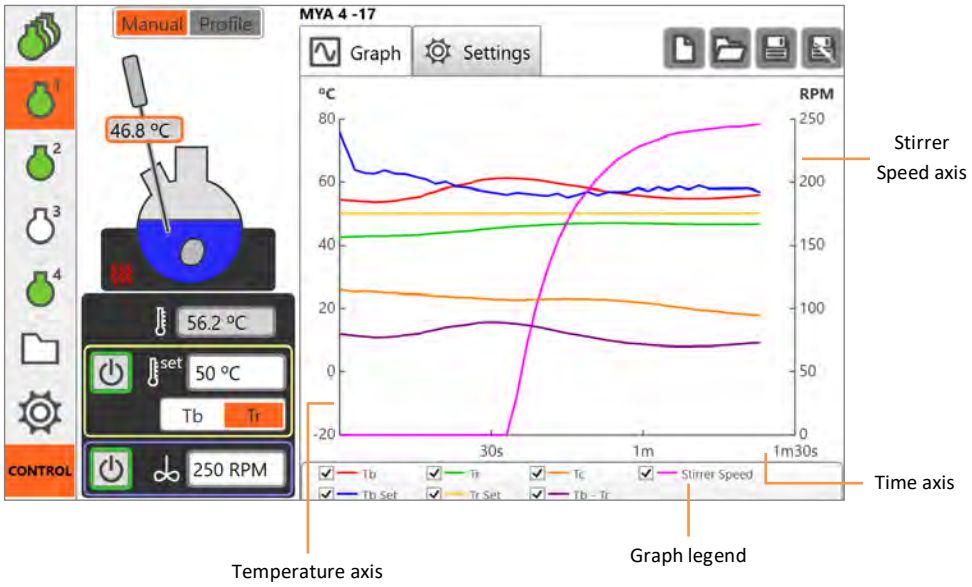
7.4.3 Using graphs in Zone View

- **In Manual mode:** When you view the set-up for an individual experiment in **Manual** mode, the graph for that experiment is displayed on the same screen.
- **In Profile mode:** To view the graph for an experiment in **Profile** mode, tap once on the **Graph** navigation tab.

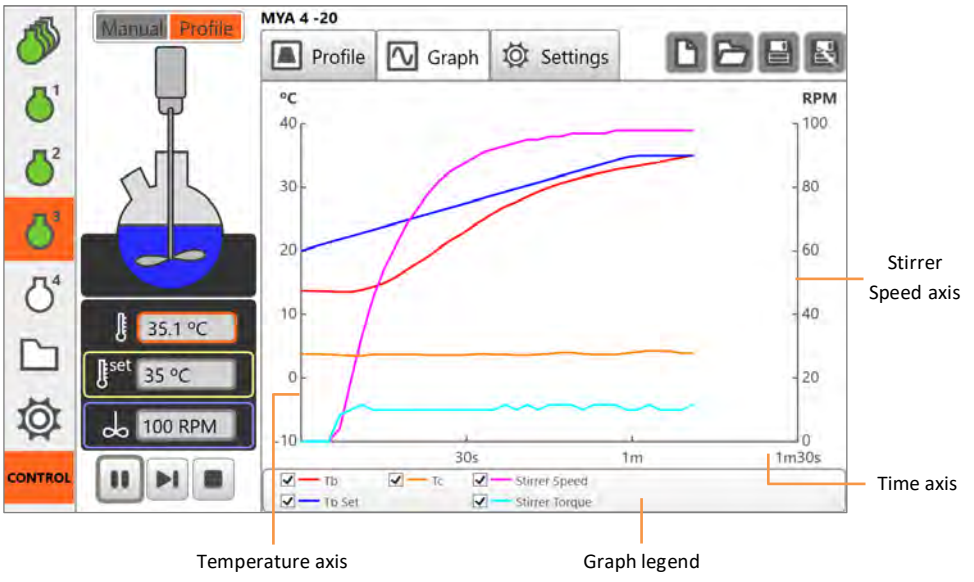
Notes

→ In both modes, graph data for the most recently completed experiment will be displayed until a new experiment is saved.

Graph view in Manual mode



Graph view in Profile mode



Once an experiment starts, a new graph is created, and data plotting automatically begins. Each set of values that is plotted on the graph is represented by a different-coloured line as follows:

Red	Actual block temperature (Tb)
Blue	Set block temperature (Tb Set)
Green	Actual reaction temperature (Tr)
Yellow	Set reaction temperature (Tr Set)
Purple	Tb – Tr (ΔT)
Orange	Internal coolant temperature (Tc)
Pink	Stirrer Speed
Light blue	Stirrer Torque

(This is also indicated in the Graph legend. Details below.)

Initially, the graph is updated every two seconds, but as the experiment progresses, the update time increases.

Graph axes

- The graph plots the temperature against the left-hand Y axis and the stirrer speed against the right-hand Y axis.
- The time is plotted on the X axis.
- Both X and Y axes will automatically rescale, so that all data is always displayed.

Graph legend

The graph legend features tick boxes that indicate which values will be plotted on the graph for an experiment.

- If no external temperature probe or overhead stirrer are connected, only the **Tb** (actual block temperature), **Tb Set** (set block temperature) and **Stirrer Speed** tick boxes will be displayed. These boxes will be automatically checked and only those values will be plotted on the graph.
- If an external temperature probe is connected, the **Tr** (actual reaction temperature) and **Tr Set** (set reaction temperature) tick boxes will also be displayed. These boxes will be automatically checked and those values will be plotted on the graph too.
- If an overhead stirrer is connected, the **Stirrer Torque** tick box will be displayed. This box is **not** automatically checked, so you must tick the box if you want this value plotted on the graph.

Notes

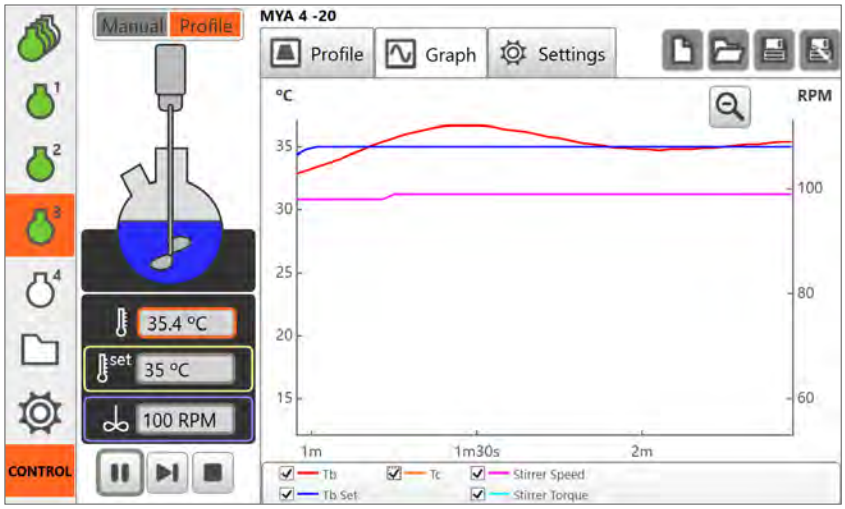
→ In the default setting, all tick boxes are checked (with the exception of the Stirrer Torque tick box) and data is continually plotted on the graph for each.

→ You can choose which values you want to plot on the graph by tapping once on any of the tick boxes in the graph legend to check or uncheck it. You can do this at any point before, during or after an experiment has run.

→ Tapping either the tick box or the tick box label will activate the toggle.

Graph Zoom function (expanded view)

To zoom in on a specific part of the graph, double tap on the area of interest.



- You can zoom in further by continually double tapping the area of interest.
- To return to full screen mode, tap once on the **Zoom Out** icon:
- After you have finished viewing the graph in expanded view, it's recommended that you return to the full screen mode. If left in the expanded view, the graph will automatically be returned to full screen view after approximately eight minutes.

Notes

→ After each double tap, the **Zoom** function is momentarily disabled and the **Zoom Out** icon becomes greyed out. When the Zoom Out icon becomes active again, you can continue. The longer an experiment has been running, the slower the response time for this function.

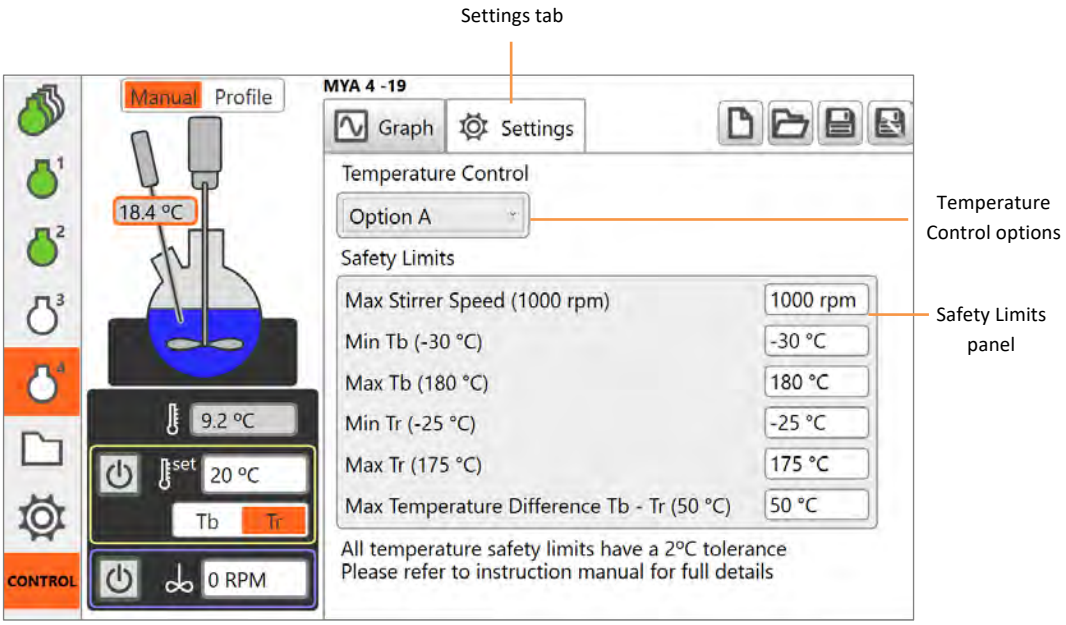
→ When you zoom in, both axes are expanded. You cannot expand just one axis.

→ When viewing a graph in expanded view, the graph continues to be updated. New data may only be visible when you zoom back out.

→ If you have zoomed in on a graph, the same expanded view will be displayed on the Graph Overview screen. To view the full graph in the Graph Overview screen, you will need to go back to the individual Zone View screen and tap on the Zoom Out icon.

7.4.4 Zone settings

Each individual Zone View screen has a **Settings** tab, which allows independent temperature control and safety limits to be set for this zone.



Notes

- → The selected Temperature Control option and set safety limits are saved and stored with the experiment data. If this experiment is rerun, the same Temperature Control option and safety limits will be applied to it.
- → Once a Temperature Control option and safety limits have been set for a zone, all subsequent experiments run in that zone will use these settings until they are either changed, or a previous experiment is loaded to that zone that uses a different Temperature Control option and/or safety limits.
- → You cannot change the Temperature Control option or safety limits values once an experiment has started.

Temperature Control options

Mya 4 uses bespoke PID algorithms to facilitate the control of both the block (**Tb**) and reaction (**Tr**) temperatures, ensuring best performance (minimum overshoot and minimum fluctuation) in a range of different scenarios.

There are four different Temperature Control options (A, B, C and D), which may be independently selected in each zone.

Tap once on the **Temperature Control** box and select your preferred option from the drop-down menu. (If no Control option is selected, the default is set to Option A.)

OPTION A

This is the default option for all experiments. It gives the best performance over the whole operating temperature range of Mya 4, but, in some circumstances, other options may give a better performance.

OPTION B

This option will give the best performance at moderate temperatures (e.g. 0 to 120 °C) but may be slow.

OPTION C

This option will give the best performance when warming from a very low temperature to a sub-ambient temperature, e.g. -20 to -5 °C.

OPTION D

This option will give the best performance when cooling slightly from a very high temperature, e.g. from 155 to 135 °C.

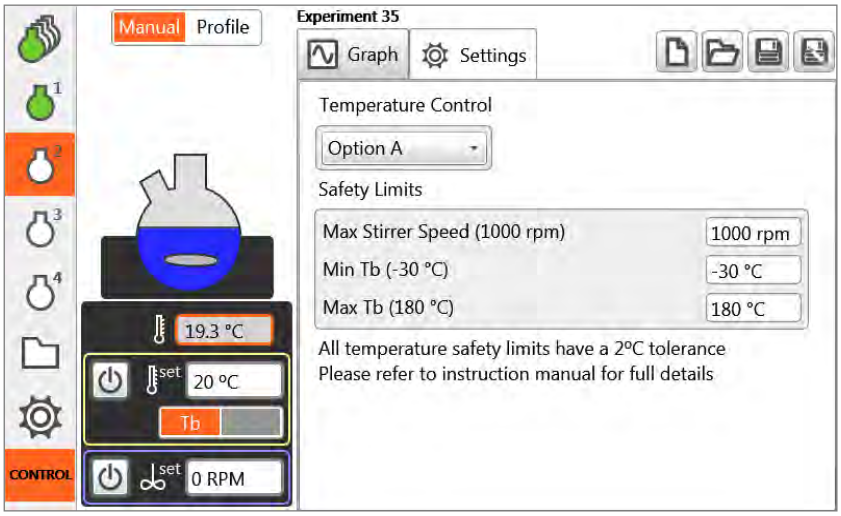
For more information about PID and Temperature Control, see Section 9 on page 137.

Safety Limits panel

- You can set independent safety limits for each zone. To do this, tap once on any of the boxes in the grey **Safety Limits** panel and enter the value on the pop-up keypad.
- Once safety limits have been set for a zone, users will be unable to enter values in Manual or Profile mode that are outside of these limits.

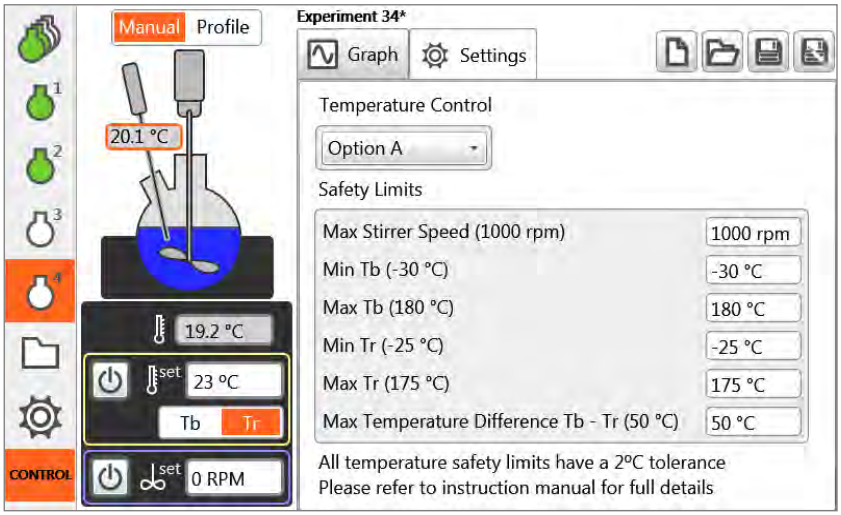
The safety limit settings available are dependent on the experiment set-up.

No external temperature probe is attached



- You can set a maximum stirrer speed of between 100 and 1000 rpm.
- You can set the minimum (**Min Tb**) and maximum (**Max Tb**) block temperatures between -30 and 180 °C, but you cannot enter a **Max Tb** value that is lower than the **Min Tb** value, or a **Min Tb** value that is higher than the **Max Tb** value.

An external temperature probe is attached



- You can set a maximum stirrer speed of between 100 and 1000 rpm.
- You can set the minimum (**Min Tb**) and maximum (**Max Tb**) block temperatures between -30 and 180 °C, but you cannot enter a **Max Tb** value that is lower than the **Min Tb** value or a **Min Tb** value that is higher than the **Max Tb** value.
- You can set the minimum reaction temperature (**Min Tr**) between -25 and 175°C, but you cannot enter a **Min Tr** value that is lower than the **Min Tb** value.
- You can set the maximum reaction temperature (**Max Tr**) between -25 and 175 °C, but you cannot enter a **Max Tr** value that is higher than the **Max Tb** value.
- The maximum temperature difference between block and reaction – $(Tb–Tr)_{max}$ – can be set between 1 and 50 °C.

Warning

- **Max Tb** should always be at least 5 °C higher than the set Tb for an experiment to allow for any overshoot when first reaching temperature. Failure to observe this will result in a block 'over temperature' error.
- **Min Tb** should always be at least 5 °C lower than the set Tb for an experiment to allow for any overshoot when first reaching temperature. Failure to observe this will result in a block 'under temperature' error.
- Setting **Max Tb** lower than ambient temperature will result in an immediate 'over temperature' error.
- Setting **Min Tb** higher than ambient temperature will result in an immediate 'under temperature' error.
- **Max Tr** should always be set at least 5 °C higher than the set Tr for an experiment to allow for any overshoot when first reaching temperature. Failure to observe this will result in a probe 'over temperature' error.
- **Min Tr** should always be set at least 5 °C lower than the set Tr for an experiment to allow for any overshoot when first reaching temperature. Failure to observe this will result in a probe 'under temperature' error.

Notes

→ If during an experiment the temperature limit is exceeded, the software will automatically switch off heating or cooling to that zone, and display the relevant error message but stirring will continue. (See Error Codes on page 158.)

→ If during an experiment the stirrer speed limit is exceeded, the software will switch off both stirring and heating in that zone and display the relevant error message. The experiment will be complete. (See Error Codes on page 158.)

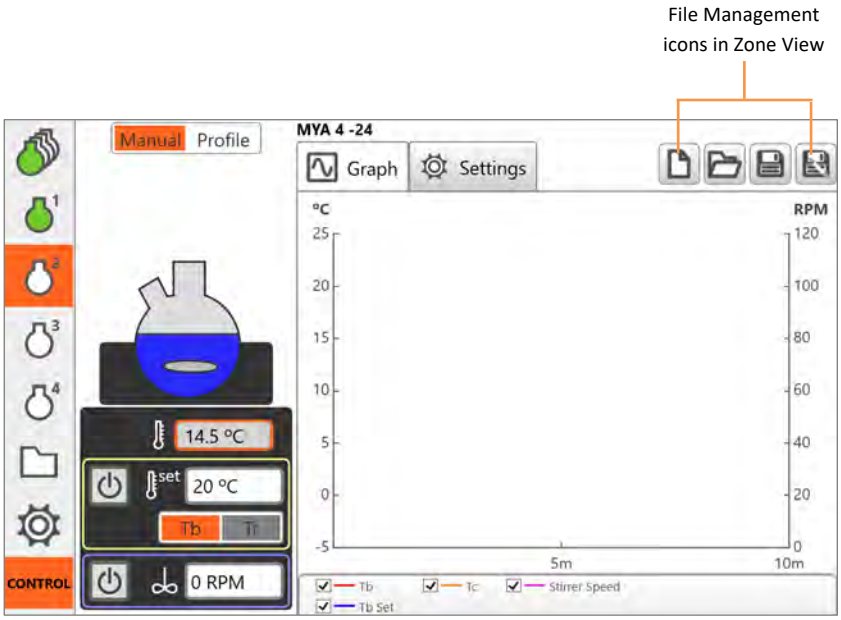
→ For reference, factory default values for safety limits are shown in brackets. You cannot set safety limit values that fall outside this range.

7.5 File Management

To manage experiment files for **each individual zone**, use the **File Management** icons in the Zone View.

For general file management (**for all zones**), use the **System File Manager** (folder icon) on the side panel.

7.5.1 Individual zone file management



Each zone has a set of **File Management** icons that allow you to:

- create a new experiment,
- open a previous experiment,
- save a current experiment,
- save a current experiment as a new experiment.

New experiment

- Tap this icon once to create a new experiment.
- A default experiment name will be displayed on the pop-up keypad.
- You can overwrite the default name by typing into the pop-up keypad.
- Tap **Create** to save your new experiment, and start entering or editing the values for the experiment.

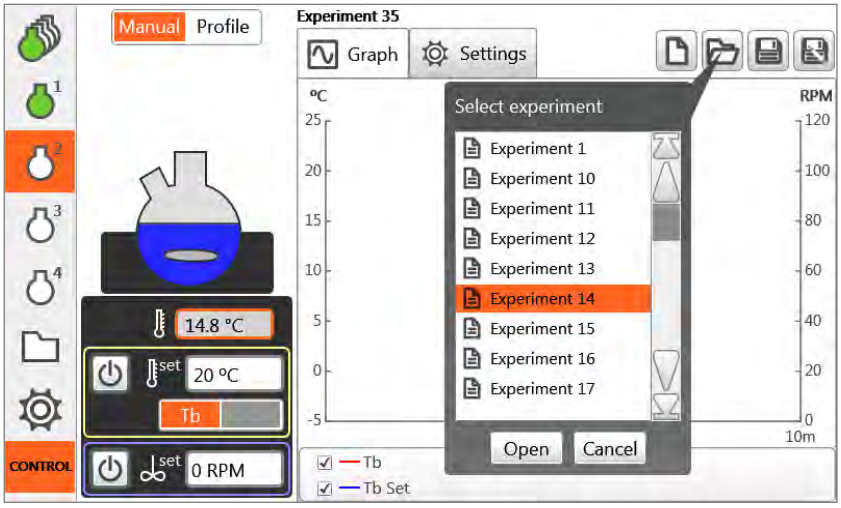
Notes

→ The experiment name is limited to a maximum of 17 characters. A mixture of letters and numbers can be used.

→ When you initially create a new experiment, the current set values for zone settings, e.g. safety limits and the Temperature Control option, will be applied (see page 101). These may be changed once the experiment has been created.

Open file

- Tap once on this icon to open up a list of previously saved experiments.
- Use the arrows in the scroll bar on the right to move up and down the list. Experiments are listed alphabetically and numerically.
- You can open any of the stored experiments by tapping on the name of the experiment once (selected experiment will display an orange highlight) and then tapping once on **Open**.
- The experiment will now be loaded to the current zone, either for viewing, or to edit and/or rerun it. If the experiment is to be edited and/or rerun you will be prompted to enter a new experiment name in the pop-up keypad.

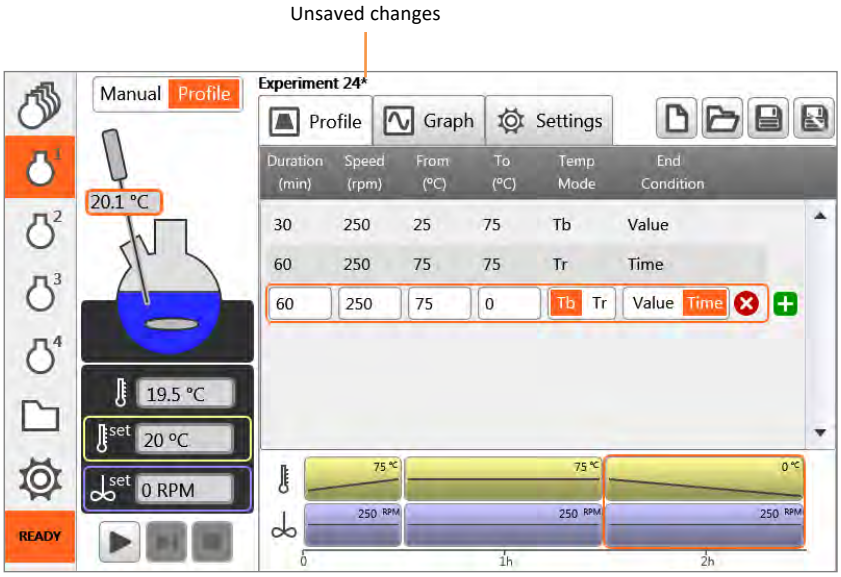


Notes

→ All control and safety settings associated with the opened experiment will be loaded, and will overwrite any settings associated with the previous experiment in that zone.

Save experiment

- Once you have created a new experiment, tap once on this icon to save all the values you have entered.
- An asterisk next to the experiment name indicates that some changes you've made to the experiment values haven't been saved yet.
- If the Mya 4 unit is switched off with the asterisk still displayed, any unsaved changes will be lost.



Notes

→ It is advisable to tap on the **Save experiment** icon as soon as you have finished creating the profile, as changes are not automatically saved.

Save experiment as

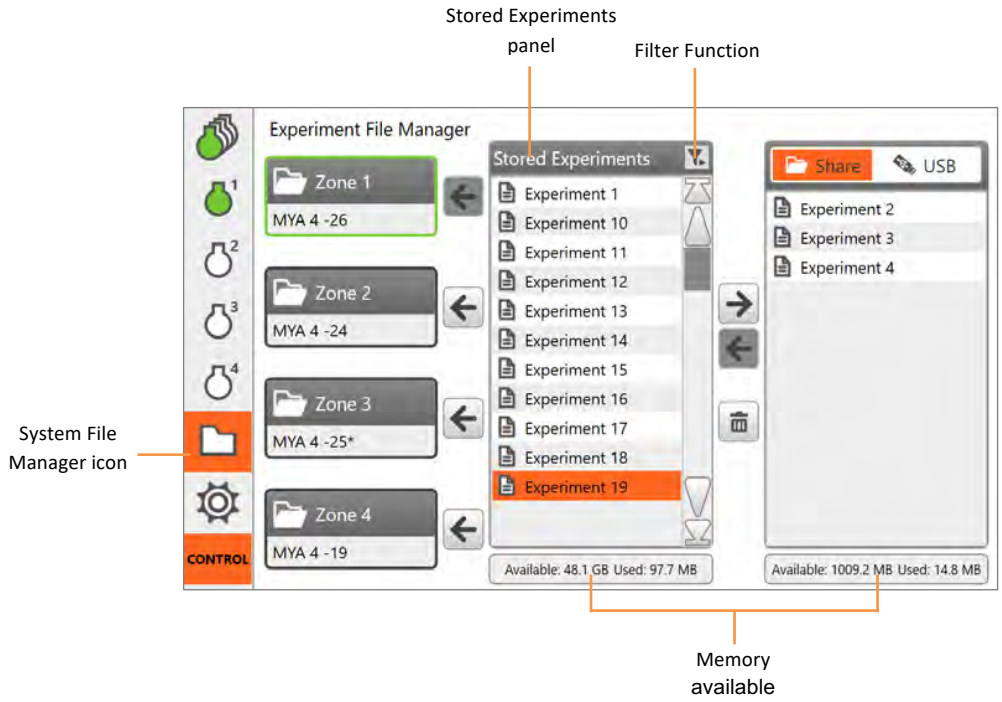
- Tap once on this icon to save the currently displayed experiment as a new experiment (with all the same settings) that can be run again.
- You will be prompted to enter a new name for the duplicated experiment on the pop-up keypad (or you can use the default name provided) and to save it.
- The duplicated experiment can then be accessed by tapping on the **Open file** icon (see above) or from tapping on the **System File Manager** icon in the side panel. (See **General file management** below.)

Notes

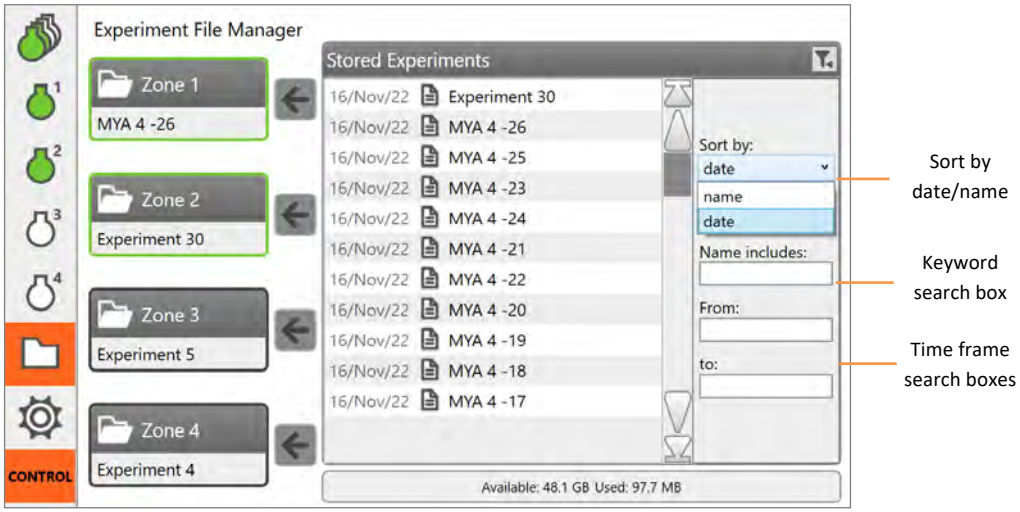
→ The duplicated experiment will have the same system settings, such as safety limits and Temperature Control option, as the original experiment.

7.5.2 General file management (all zones)

Tap once on the **System File Manager** icon in the side panel to access the **File Manager** screen. (The System File Manager icon will display an orange highlight when selected.)



- The central **Stored Experiments** panel contains a list of saved experiments (including those that are currently running), which are listed alphabetically.
- Use the arrows in the scroll bar on the right to move up and down the list.
- Tap on an experiment to select it (it will display an orange highlight).
- Once you have selected an experiment, you can load it to one of the four zones, or export it to a Network Share area or USB storage device.



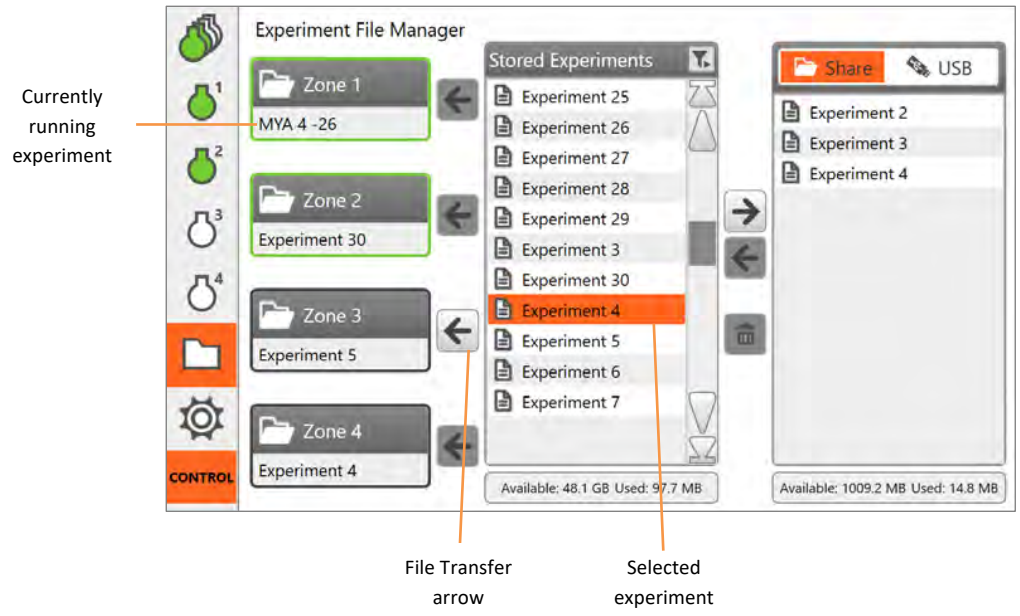
- You can also use the **Filter Function** to search for a saved experiment.

- Tap the filter icon and type in a keyword from the experiment name you are trying to find in the **Name includes:** box.
- You can also search for an experiment within a certain time frame by adding a start and end date to the **From:** and **To:** boxes.
- Tap on an experiment to select it (it will display an orange highlight).
- You can sort the stored experiments by name or date, selecting your choice from the **Sort by:** drop down menu.
- Once you have selected an experiment, you can load it to one of the four zones, or export it to a Network Share area or USB storage device.

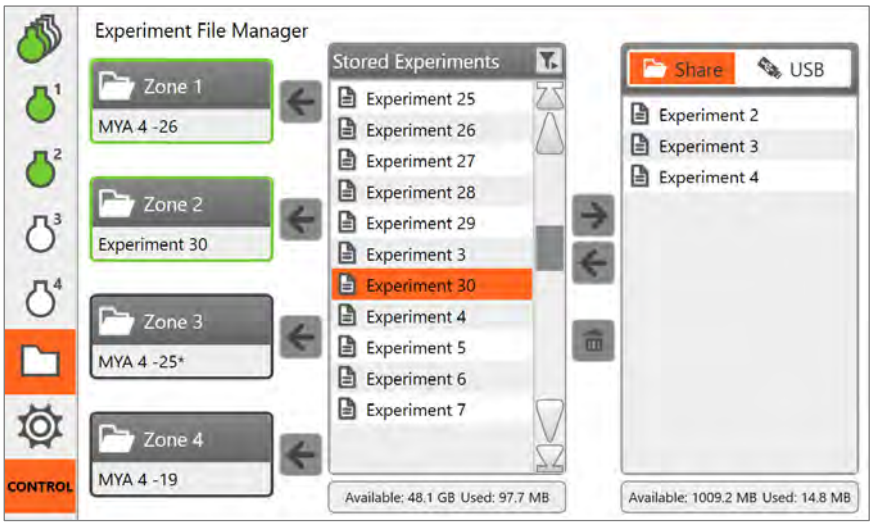
Loading an experiment file to one of the four zones

With the selected experiment highlighted in orange, you can tap on a **File Transfer** arrow to transfer the experiment to one of the four corresponding zones. Once the experiment has loaded to a zone, you can either view the experiment data or edit/rerun the experiment from the Zone View screen (tap on the numbered Zone Navigation icon in the side panel to access the zone).

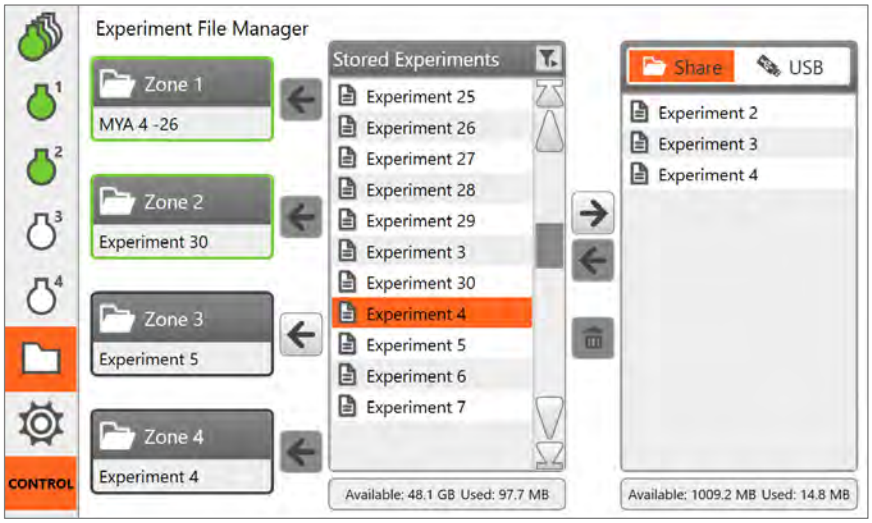
However, you cannot load an experiment into a zone in which another experiment is already running (indicated by a green flask icon in the side panel). In the example below, the File Transfer arrow for Zones 1 & 2 are disabled as there is already an experiment running in this zone.



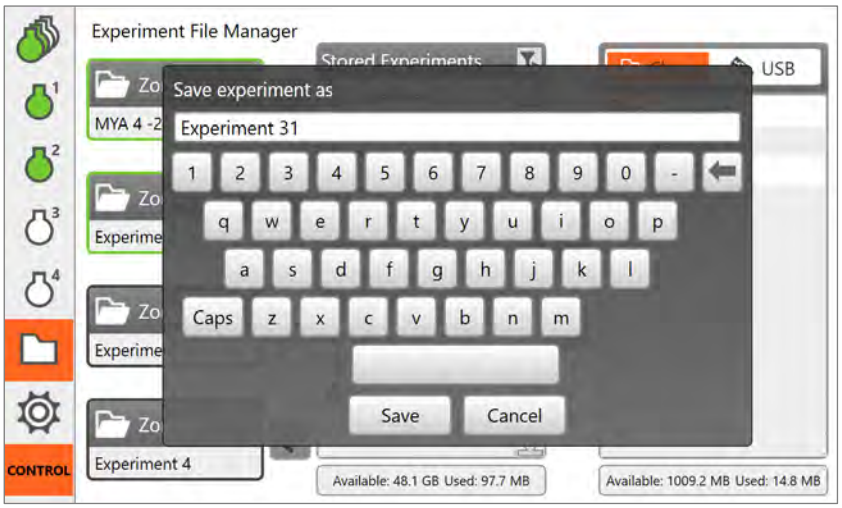
You cannot transfer an experiment that is currently running into another zone. In the example below, Experiment 30 has been selected, but as it is currently running in Zone 2, all transfer arrows are disabled.



You cannot transfer an experiment into a zone if that experiment is already loaded in that zone. In the example below, Experiment 4 has been selected, but as it is already loaded in Zone 4, the transfer arrow to that zone is disabled. The transfer arrows to Zones 1 and 2 are also disabled as experiments are already running in those zones (see green flask icons in the side panel).



However, Experiment 4 can be loaded into Zone 3 by tapping once on the Zone 3 transfer arrow. A pop-up keypad will be displayed with a default experiment name which you can overwrite by typing into the keypad.



Once a new experiment name has been created, it will appear in Zone 3.

Notes

→ You cannot create two experiments with the same file name anywhere in the system.

Exporting an experiment file

Any experiment in the **Stored Experiments** list can be exported to:

- an external USB storage device,
- a Share area within the Control Pad, which can be accessed via an Ethernet network connection.

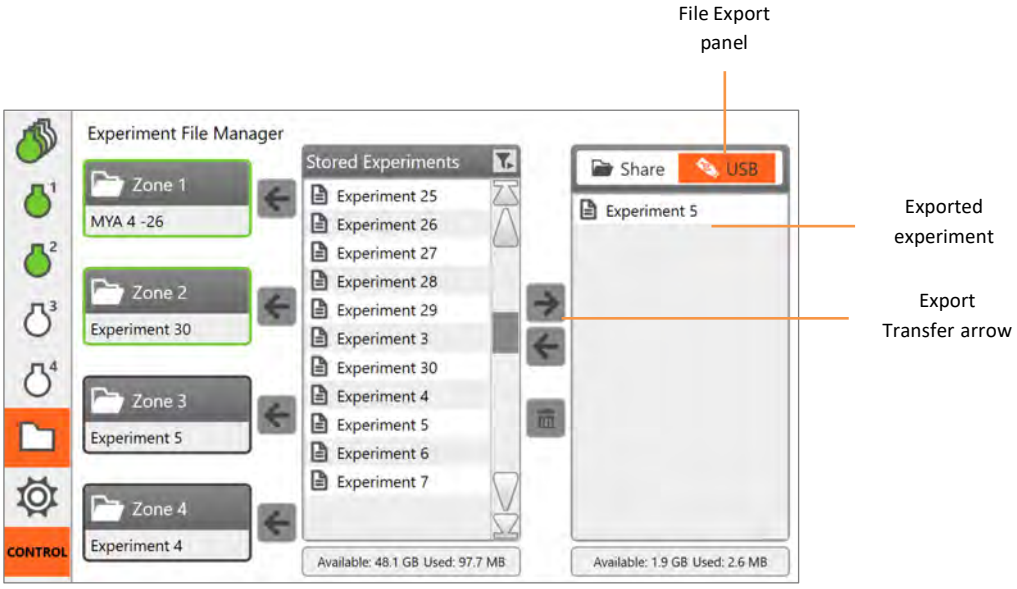
Notes

When an experiment file is exported, either to a USB storage device or to a network, two files are created:

→ An expc file, which cannot be opened on a PC. This file contains all the settings associated with the experiment, and can be transferred back onto the original Mya 4 Control Pad, or any other Mya 4 Control Pad. Using this file allows experiments to be transferred from one Mya 4 unit to another.

→ A .csv file which contains all the data from the experiment, which may be used to manipulate the data and create graphs in programs such as Microsoft Excel.

To export to an external USB storage device



- Connect a USB storage device to the USB socket on the side of the Mya 4 Control Pad.
- Tap once on the **USB** tab in the **File Export** panel (tab will display an orange highlight).
- Select the experiment to be exported from the **Stored Experiments** list (experiment will display an orange highlight).
- Tap once on the **Export Transfer** arrow. The experiment name will now appear in the File Export panel and the experiment file will be transferred onto the USB storage device.

Notes

→ If the USB tab is selected when no USB device is connected, a warning message will be displayed. To clear this message, tap **Ok**.

→ More than one experiment can be transferred to the USB device, but experiments must be selected from the Stored Experiments list and transferred one at a time.

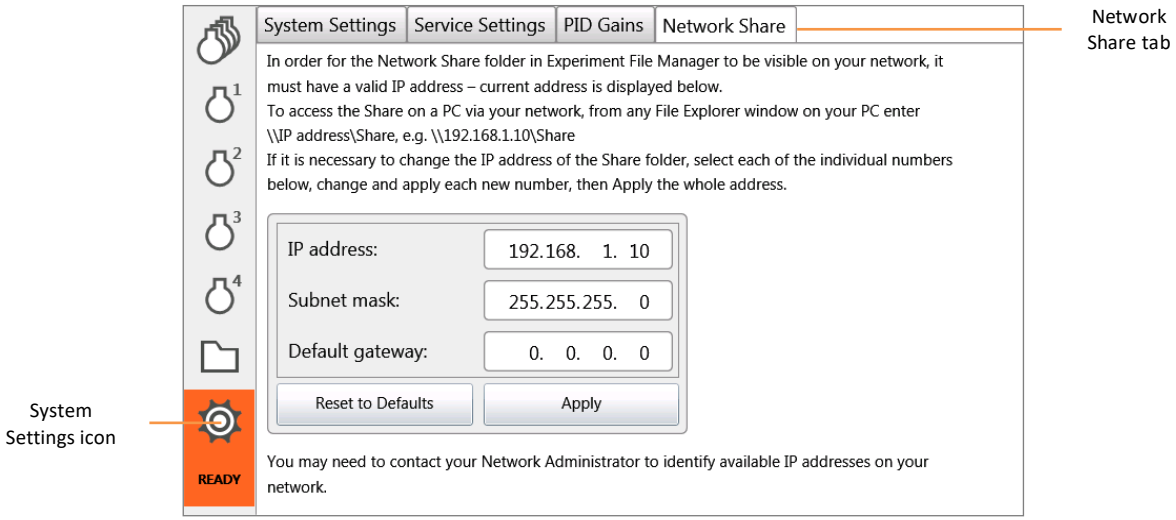
→ File transfer may take a few seconds. Some USB devices feature a flashing light to indicate when file transfer is active. Once the light has stopped flashing, file transfer is complete, and the USB device can be removed. If a USB device with no visual indicator is used, wait at least 10 seconds to allow the file to transfer before removing the device. Failure to allow enough time may result in incomplete data transfer.

→ Once the USB device is removed from the Mya 4 Control Pad, the USB transfer area will still temporarily show the transferred experiment file(s). To clear the transfer area, select the **Share** tab.

To export via an Ethernet network

Before you can transfer experiment files via an Ethernet network, the Network Share area must be configured to allow the Ethernet network to access it.

Configuring the Network Share area

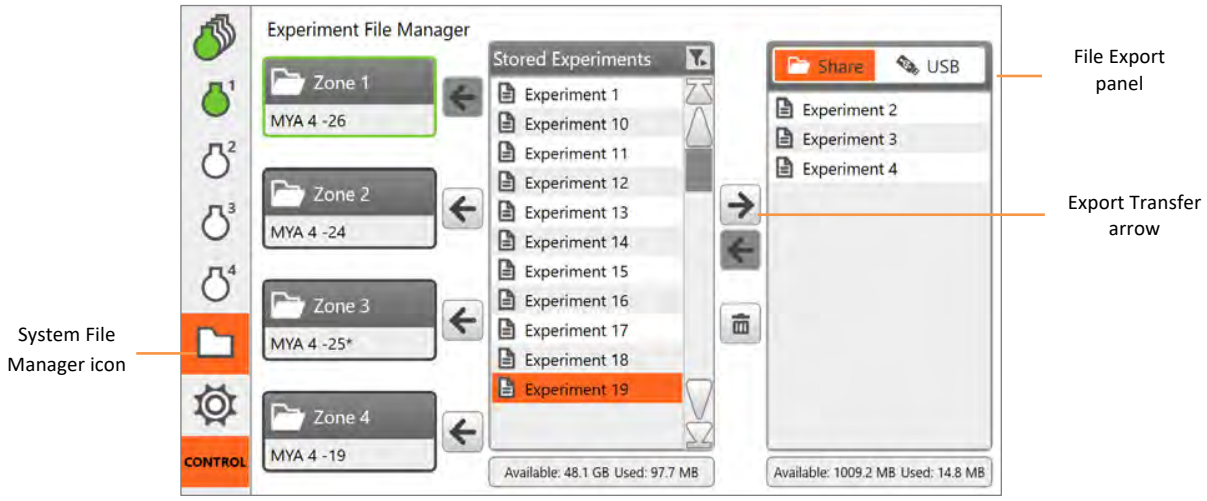


- Tap once on the **System Settings** icon in the side panel to go to the System Settings screen.
- Tap once on the **Network Share** tab. The Share configuration area is now displayed.
- To change the IP address of the Share area, tap once on each of the individual numbers and overwrite them on the pop-up keypad. Then tap on **Apply**. Once a valid IP address has been set, the Share area (and files in it) should be accessible from the network.

Notes

→ The default IP address (and Subnet mask and Default gateway) must be compatible with your network. You may need to contact your network administrator to confirm you are using a compatible IP address.

Exporting files from the Share area



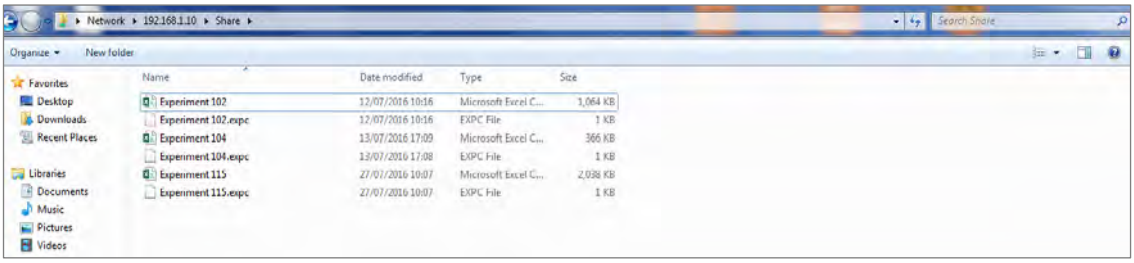
- Connect an Ethernet cable to the Ethernet socket on the side of the Mya 4 Control Pad.
- Connect the other end to an available Ethernet socket on your network.
- If you're not already in the **File Manager** screen, tap once on the **System File Manager** icon in the side panel to access it (icon will display an orange highlight).
- Now tap once on the **Share** tab in the **File Export** panel (tab will display an orange highlight).
- Select the experiment to be exported from the **Stored Experiments** list (experiment will display an orange highlight).
- Tap on the **Export Transfer** arrow. The experiment file will be transferred to the **Share** area.

Notes

→ More than one experiment can be transferred to the Share area, but experiments must be selected from the Stored Experiments list and transferred one at a time.

Viewing experiment files on your PC/laptop

- Connect your PC/laptop to your network and type in the configured IP address in a file explorer window in the format \\IPaddress\Share (e.g. \\192.168.1.10\Share).
- The Mya 4 Share area with the loaded files should be displayed in the file explorer. See notes page 114.



Additional System File Manager functions

With the **System File Manager**, you can also:

- import experiment files,
- delete experiment files,
- duplicate experiment files,

Import experiment files

- The System File Manager can be used to import experiment files to the Mya 4 Control Pad, either from an external USB storage device or from a network via Ethernet. In this way experiments can be transferred from one Mya 4 unit to another.
- To import files, follow the same procedure as for exporting files (see **Exporting an experiment file** on page 114).
- Files available to be imported will appear in the **File Export** panel. With your chosen file selected, tap the **Import Transfer** arrow to transfer files from either the USB storage device or the Share area to the **Stored Experiments** list.

Notes

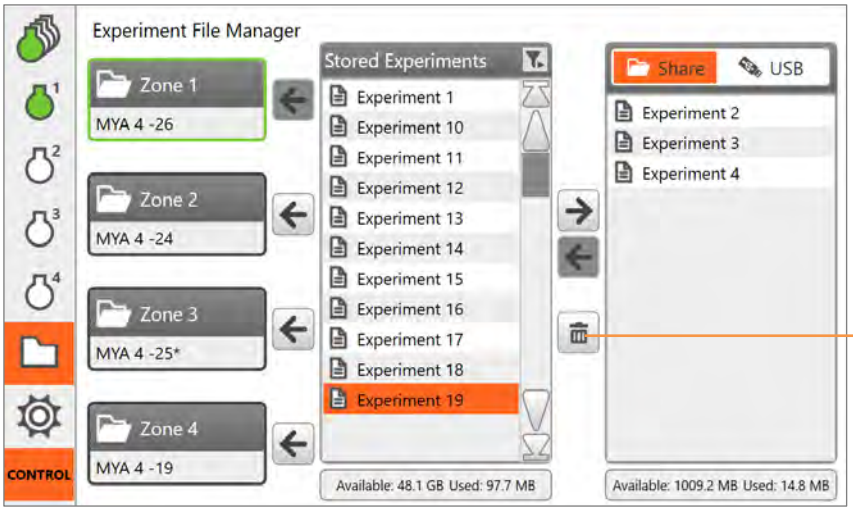
→ If you simply want to transfer experiments from one Mya 4 unit to another, you only need to import the .expc experiment file, which contains the experiment settings.

→ If you also require the data from an experiment, for example, to create graphs in a program such as Microsoft Excel, then you should also import the associated .csv file.

→ Ensure that any files to be imported to the Mya 4 Control Pad are not stored in a folder.

Delete experiment files

- Tap once on the experiment file you want to delete in the **Stored Experiments** list (the experiment will display an orange highlight).
- Now tap the **Delete** icon and this permanently deletes the selected file.



Notes

→ To delete multiple files, you will need to select each experiment individually and then delete them one by one.

→ An experiment that is currently loaded into a zone, whether it is running or not, cannot be deleted from the **Stored Experiments** list (the **Delete** icon will be disabled).

→ If you need to delete an experiment that is currently loaded in a zone, you must first replace the experiment in that zone. You can do this by selecting an existing experiment from the **Stored Experiments** list and then transferring it to that zone using the **File Transfer** arrow. The experiment that was originally in the zone will now appear back in the Stored Experiments list and can be deleted.

→ Alternatively, go to Zone View (tap on the numbered flask icon in the side panel) and create a new experiment by tapping on the **New Experiment** file icon. When you return to the System File Management screen, the experiment will now be in the Stored Experiments list and can be deleted.

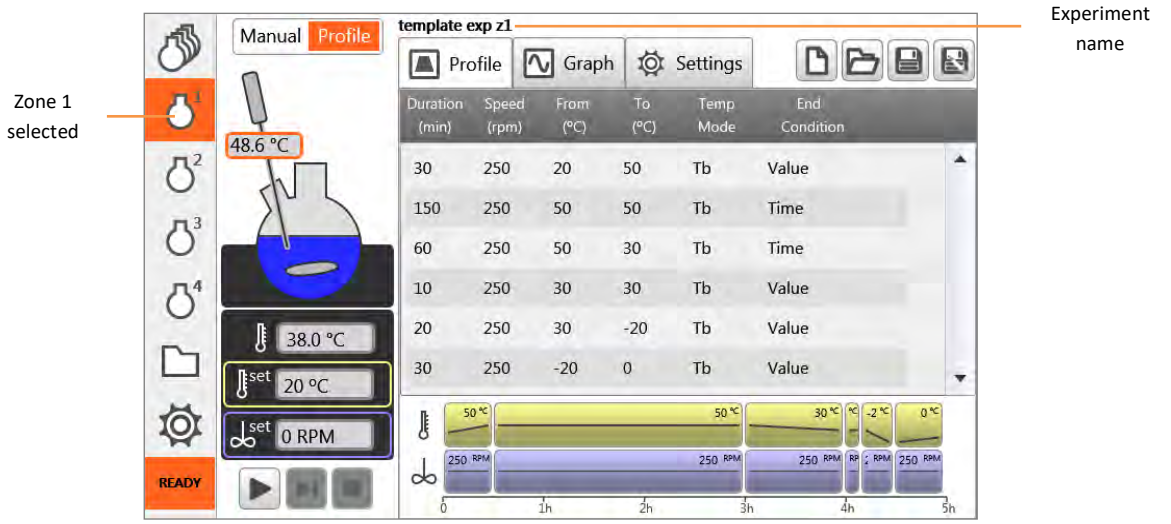
Duplicate experiment files

You can create the exact same experiment in multiple zones. In **Manual** mode, you will need to access each zone individually and enter the same values in each zone. In **Profile** mode, you can create a profile for an experiment in one zone and then copy it to any of the other zones using the **Open File** icon in each zone, or the **System File Manager**.

With the Open File icon

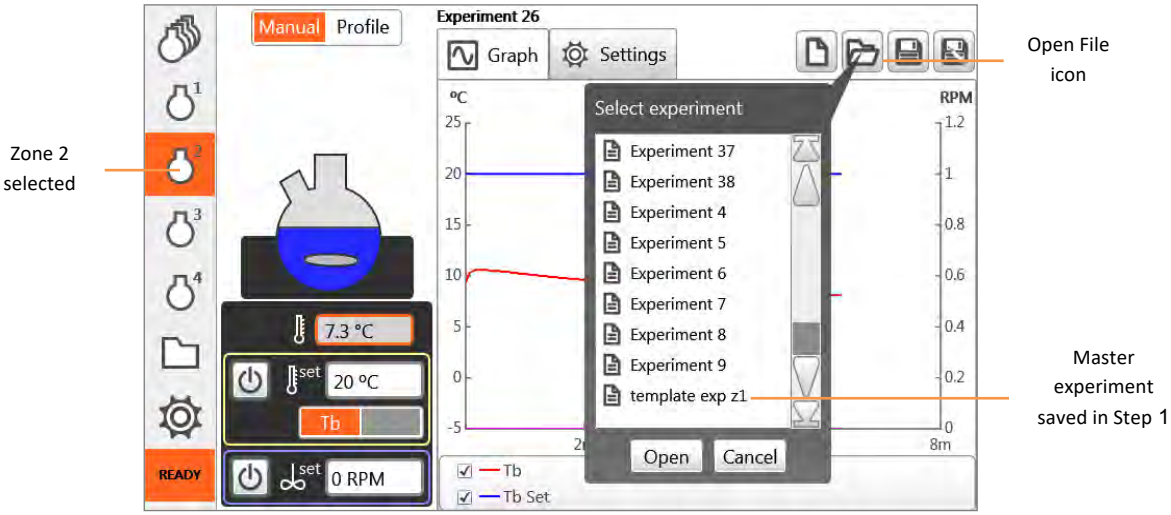
Step 1

- Create your master experiment in **Profile** mode and save it.
- In the example below, the experiment is called **template exp z1** and has been saved in Zone 1.



Step 2

- Tap on one of the Zone Navigation icons in the side panel to select a different zone. (In the example below, Zone 2 has been selected.)
- Tap once on the **Open File** icon and find the master experiment that you saved in Step 1 in the list.

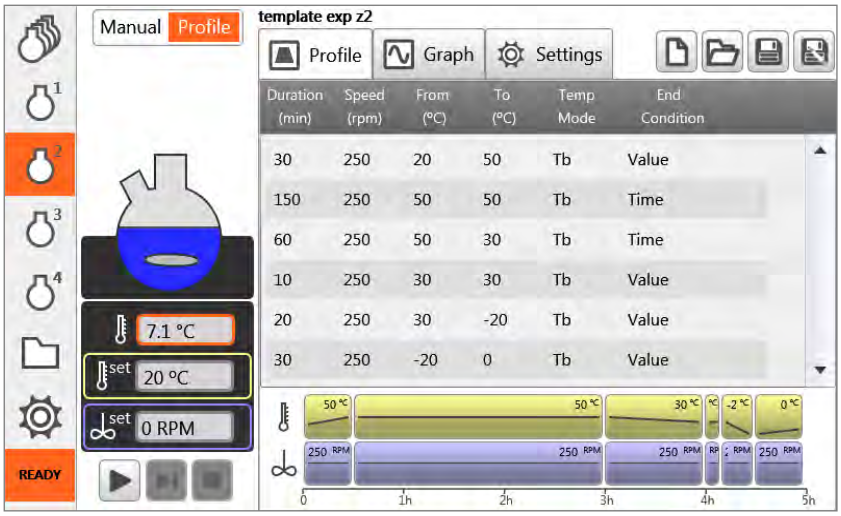


Step 3

- Select the master experiment (it will display an orange highlight) from the list and then tap **Open**.
- Type in a new name for the experiment using the pop-up key pad, and tap **Save.** In the example below, the new experiment is called **template exp z2** and has been saved to Zone 2.

Step 4

- The same experiment profile from Zone 1, together with all the safety settings, will now be loaded into Zone 2 under the new experiment name.



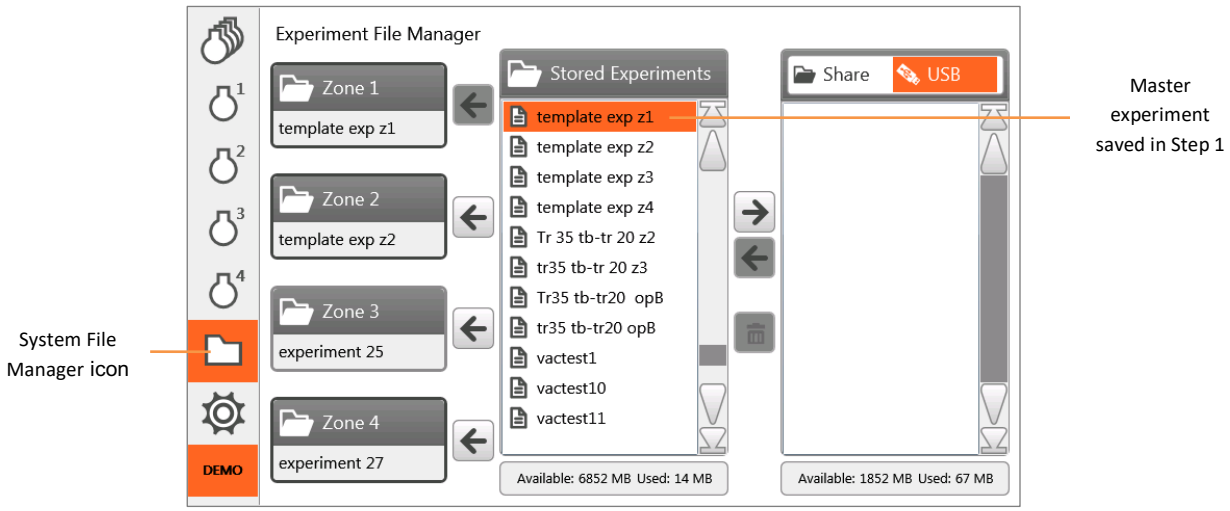
With the System File Manager

Step 1

- Create your master experiment in **Profile** mode and save it.

Step 2

- Tap on the **System File Manager** icon in the side panel (it will display an orange highlight).
- Find the master experiment that you saved in Step 1 in the **Stored Experiments** list.

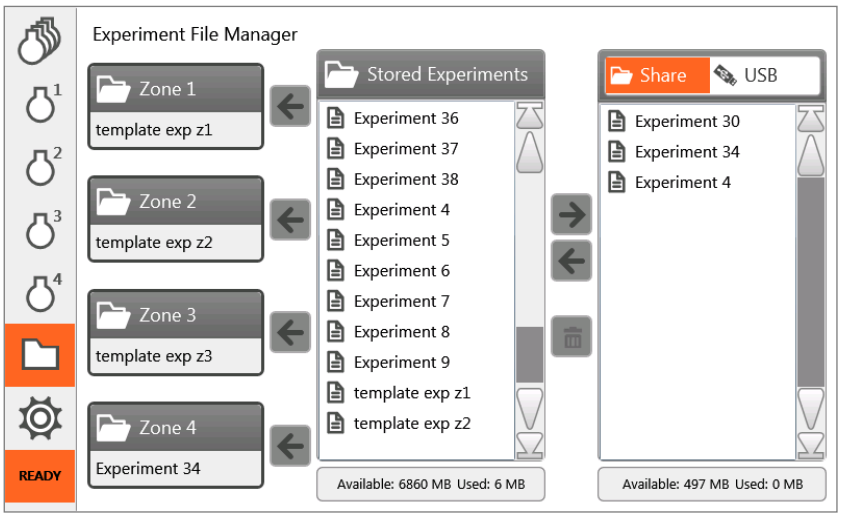


Step 3

- Select the master experiment (it will display an orange highlight).
- Then tap on one of the **Export Transfer** arrows to transfer the experiment to a different zone (the Export Transfer arrow for the current zone will be disabled).

Step 4

- You will be prompted to type in a new name for the experiment using the pop-up key pad (or you can use the default name provided).
- Now tap **Save.**
- The same experiment profile from Zone 1, together with all the safety settings, will now be loaded into the new zone under the new experiment name. In the example below, the duplicated experiment is called template exp z3 and has been loaded to Zone 3.



Notes

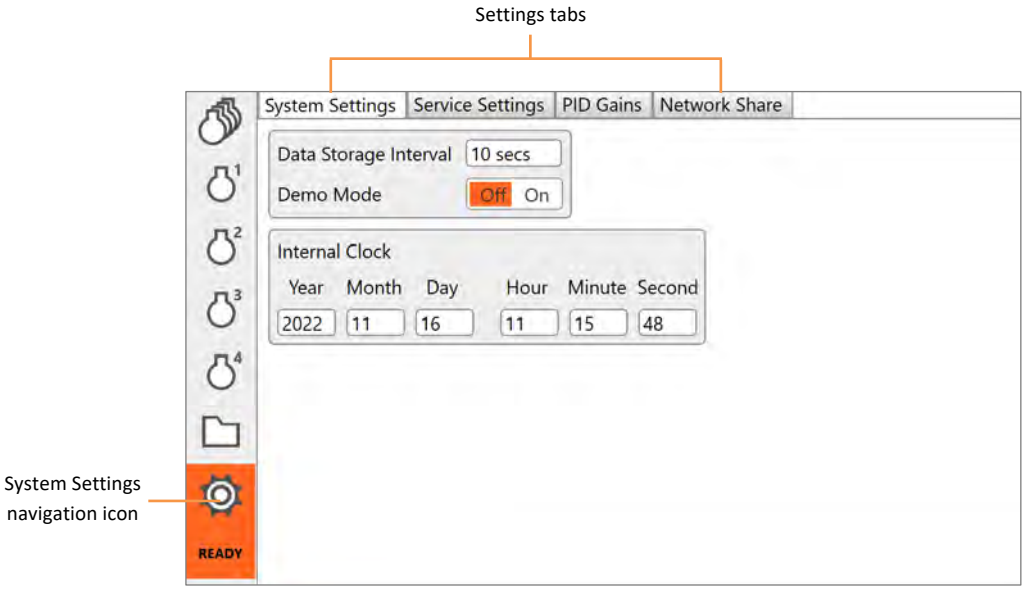
→ You cannot duplicate an experiment if it has already started.

→ If a duplicated experiment hasn't yet started, you can edit and resave it. This is useful when you are conducting a series of similar experiments where there are only minor variations in the parameters set for each experiment.

7.6 System Settings

Tap once on the **System Settings** navigation icon to go to the Settings screen, where there are four **Settings** tabs:

- System Settings
- Service Settings
- PID Gains
- Network Share



Notes

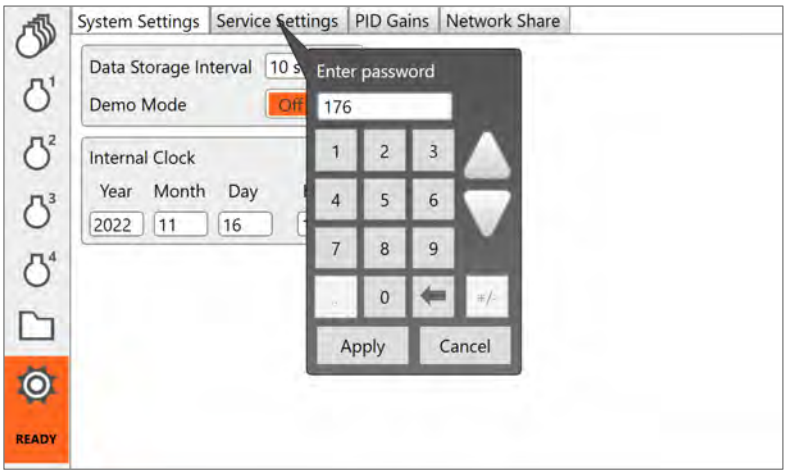
→ If an experiment is running in any of the zones, none of the information or settings on the four System Settings tabs can be changed or exported. You will need to end the experiment(s) or wait for it to finish.

Password protected tabs

The Service Settings and PID Gains tabs are both password protected to restrict access to casual users.

A new password is generated by the Control Pad every day, and you cannot create your own password.

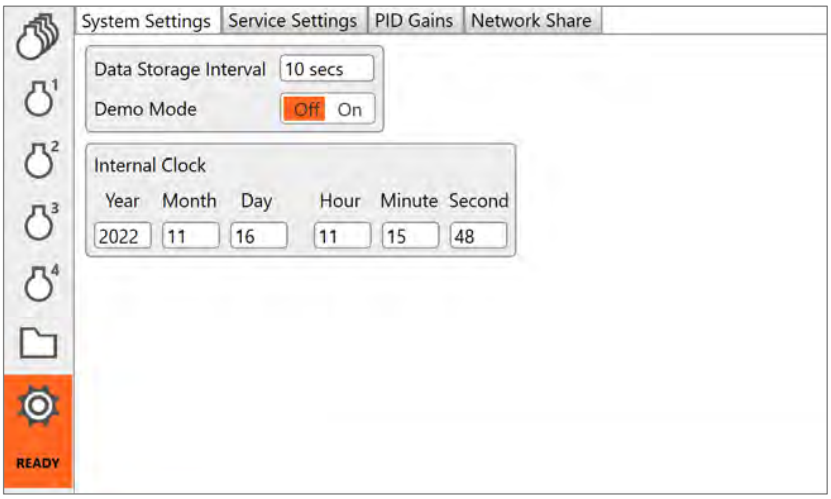
- The password will always be the product of a sum based on the current date (i.e. number of day x number of month). For example, on 16 Nov, the password would be **176,** because 16 x 11 = 176.
- Enter the password on the pop-up keypad and then tap **Apply** to gain access.



Notes

→ The daily password is generated using the date set in the internal clock (see page 126). If the password entered fails to open the required tab, check that the date is correctly set.

7.6.1 System settings tab



Data Storage Interval

- When an experiment is running, data is reported and plotted on the graph every two seconds. This value cannot be changed.
- The **Data Storage Interval** box displays how often this reported data is actually stored with the experiment file.
- The default value is set at every 10 seconds, but this can be changed by the user (for the system, not individual zones).
- To do this, tap once on the **Data Storage Interval** box, enter the required interval time on the pop-up keypad, and then tap **Apply**. You can set an even value of 2–360 seconds. If you enter an odd number, it will be rounded up to the next even number.

Notes

→ Only data that is stored will be available if an experiment is exported or reopened in a zone or on a PC. For example, at the default Data Storage Interval setting, although data is reported every two seconds, it will only be saved (and therefore available later) every 10 seconds.

→ If an experiment is running in any of the zones, you cannot change the Data Storage Interval time.

→ If you rerun an old experiment, the current Data Storage Interval time will be applied to that experiment, not the Data Storage Interval time that was set when the experiment was originally run (unless both are the same).

→ If a short time interval is set, e.g. two seconds, then experiment files will be significantly larger. This will have an impact on any file handling speeds and file storage space for the system.

Demo Mode

- The **Demo Mode** is not intended for general use, but is available for fault finding and general diagnostic situations.
- The default Demo Mode setting is **Off**.
- Tapping **On** in the Demo Mode box will set the Mya 4 Control Pad to Demo mode. This allows the Control Pad to simulate an experiment without actually activating any temperature and stirrer controls on the Mya 4 unit.

Internal Clock

- The internal clock should be set when the unit is first installed.
- Set the date and time by tapping on the relevant boxes and entering values on the pop-up keypad.
- Then tap **Apply**.

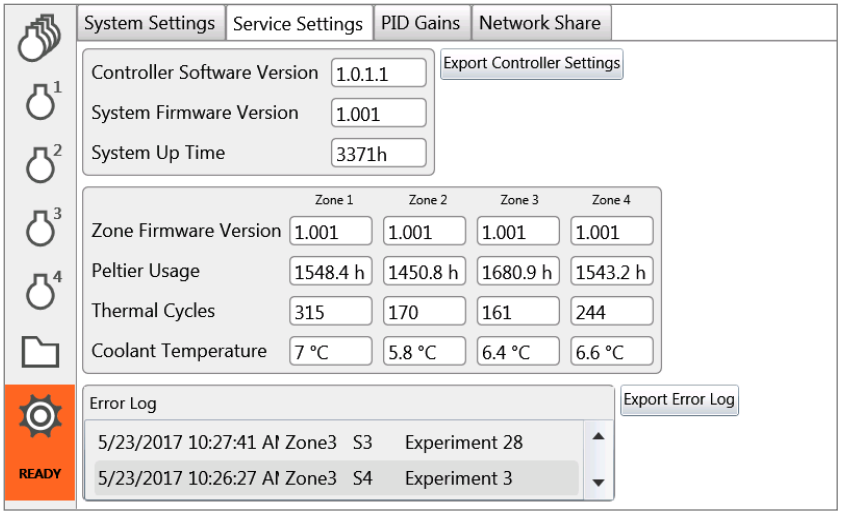
Notes

→ The internal clock provides a time and date stamp for exported experiment files. It must therefore be set correctly to produce accurate timings in the file.

→ The internal clock will not automatically adjust to allow for seasonal time changes, and will need to be reset manually.

7.6.2 Service Settings tab

When you tap on the **Service Settings** tab, you will be prompted to enter a password to gain access. (See page 123 for more information on password protected tabs.)



Service Information

- A wide range of service information is displayed in the Service Settings tab relating to the current system set-up, previous running history, and diagnostic information for service support.
- You may be requested to supply these when remote support from your supplier is required.

Export Controller Settings

- You can export the current system configuration and settings (controller settings) to either a USB storage device or a network via Ethernet.

To export to a USB storage device

- Insert a USB storage device into the USB port on the side of the Control Pad.
- Make sure the **USB** tab is selected in **File Manager**. (See page 110 for more information on File Manager.)
- Tap once on **Export Controller Settings**.
- A folder named **Mya 4 Controller Export** will be created on the external USB storage device, containing:
    - an XML document listing all system settings,
    - experiment data for each experiment currently loaded in the four zones.

To export to a network via Ethernet

- Make sure the **Share** tab is selected in **File Manager.** (See page 110 for more information about File Manager.)
- Tap once on **Export Controller Settings**.

- A folder named **Mya 4 Controller Export** will be created, containing:
  - an XML document listing all system settings,
  - experiment data for each experiment currently loaded in the four zones.

Notes

→ The controller settings will only be available for export when there are no experiments running on Mya 4. You will need to stop running any experiments (or wait for them to be completed) in order to export the controller settings (e.g. to send them to Technical Support).

Export Error Log

Any error generated whilst Mya 4 is in operation will be reported and logged in an Error Log. This log records details of the error, along with when and where it occurred. This log may be exported for diagnostic purposes to either a USB storage device or a network via Ethernet.

To export to a USB storage device

- Insert a USB storage device into the USB port on the side of the Control Pad.
- Make sure the **USB** tab is selected in **File Manager**. (See page 110 for more information about File Manager.)
- Tap once on **Export Error Log**.
- A .csv file named **Error Log** will be created on the external USB storage device.

To export to a network via Ethernet

- Make sure the **Share** tab is selected in **File Manager**. (See page 110 for more information about File Manager.)
- Tap once on **Export Error Log**.
- A .csv file **Error Log** will be created in the Share area.

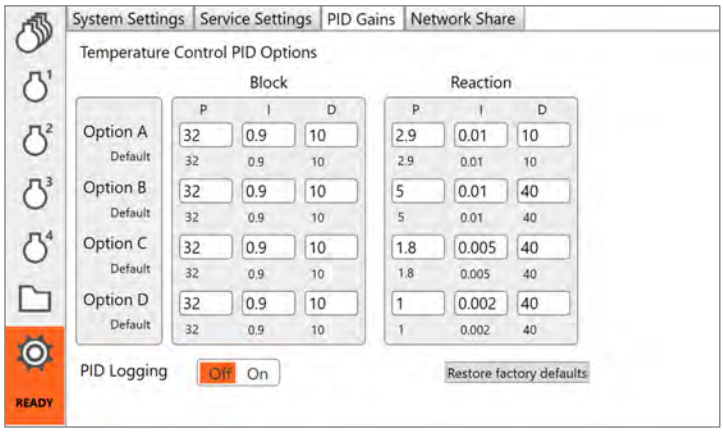
Notes

→ The **Error Log** will only be available for export when there are no experiments running on Mya 4. You will need to stop running any experiments (or wait for them to be completed) in order to export the Error Log (e.g. to send it to Technical Support).

→ Although only the 10 most recent errors are displayed on the screen, the exported Error Log will contain **all** errors that have occurred.

7.6.3 PID Gains tab

When you tap on the **PID Gains** tab, you will be prompted to enter a password to gain access. (See page 123 for more information on password protected tabs.)



- Mya 4 is supplied with four pre-set Temperature Control options: A, B, C and D (see page 137). These Control options have been optimised to cover most general applications, and are displayed on the PID Gains screen.
- Each option is associated with a set of P, I and D values for both **Block** and **Reaction** control.
- Each of these values may be customised for a specific application, if required.
- To change a value, tap on the relevant box and enter the new value using the pop-up keypad. Then tap **Apply**.
- Toggle the PID data logging on/off button to **on** to start data logging of the PID settings.
- Toggle the PID data logging on/off button to **off** to stop data logging of the PID settings.

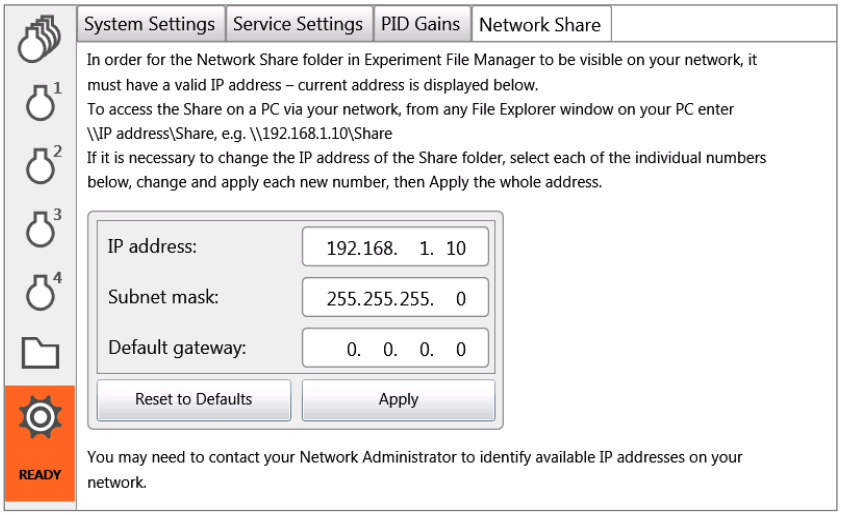
Notes

→ For reference, factory default values are displayed below each box.
→ For convenience, the **Restore factory defaults** icon allows all factory values to be restored.

For more details on Temperature Control options and PID optimisation, see Section 9 on page 137.

7.6.4 Network Share tab

The **Network Share** tab allows the configuration of the Share area in File Manager.
To access the Share area on a network via an Ethernet connection, the Control Pad must have a valid IP address for the network.

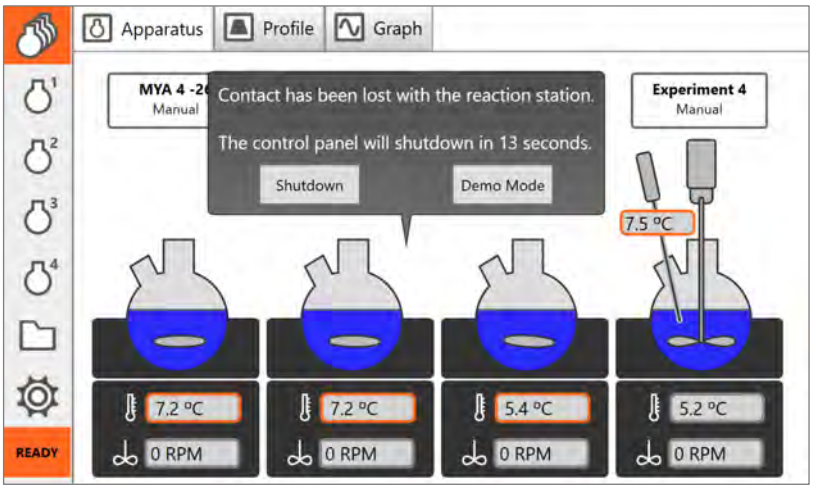


- Tap on the **Network Share** tab. The configuration area will now be displayed. Follow the instructions on the screen.
- To return to factory settings, tap on the **Reset to Defaults** icon.
- See page 115 for more information on configuring the Share area, and importing/exporting files to and from it.

7.7 Shutting down the Mya 4 unit & Control Pad

When you're finished using the Mya 4 and are ready to turn off follow these steps:

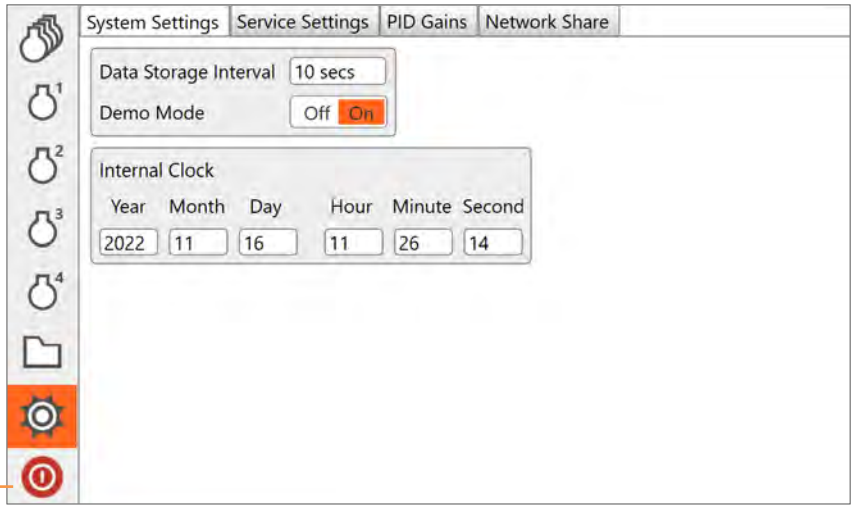
- Press the off switch on the right-hand side of the Mya 4 unit.
- A pop-up will appear on the control pad (see image below).
- After 15 seconds the control pad will automatically shut down.
- After one minute switch both the Mya 4 unit and the Control Pad off at the mains



Switching off from Demo Mode

To switch off the control pad when in **Demo mode** follow these steps:

- Press the **Power Button** in the bottom left of the screen.
- The Control Pad will turn off.
- After one minute Switch the Control Pad off at the mains.



To restart the Control Pad see section 7.1.

8 Safety

Mya 4 is designed for safe use in a laboratory environment. However, it is the user's responsibility to ensure that the system is installed and operating correctly, that a full risk assessment is performed before use, and that all local safety rules are complied with.

8.1 Chemical resistance

External

Mya 4's external surfaces and accessories are resistant to the majority of solvents, and are splash-resistant to alkalis and dilute acids at room temperature. However, it is recommended that you clean up any spillages or areas that have become contaminated immediately.

Internal

Mya 4 contains sensitive electronic components. Whilst every effort has been made to protect these from chemical exposure, additional care must be taken to avoid damaging them.

- Do not operate Mya 4 in fume hood (or other areas) where chemicals or vapours from open vessels are present in the atmosphere as this may result in serious internal damage to delicate components.
- A good air flow around the Reaction Station is essential. The vents at the front and the exhaust at the back must not be obstructed in any way.

Notes

→ Mya 4 features an internal gas purge to further protect internal components. The purge inlet must be connected to a suitable dry gas supply (nitrogen, argon or compressed air), which is switched on at all times during operation.

→ The flow of dry gas is essential to protect the internal components of Mya 4 from ambient hazardous or corrosive gases and vapours, as well as condensation of atmospheric moisture.

→ See page 16 for information on gas purge connection.

Warning

♦ Operating Mya 4 without a gas purge can damage the instrument and will void the warranty.

8.2 Electrical safety

- Mya 4 requires two mains electrical supplies of either 110 V or 230 V. One for the Mya 4 unit and one for the control pad. The Mya 4 electrical supplies are protected with a 15 A fuse, and internal earthing.
- The electrical supply to internal Printed Circuit Boards (PCBs) is monitored, and protected by 'safe state' software control if operation outside the normal range is detected.
- Mya 4 features an independent back-up thermal fuse in each reaction zone, which is in addition to all other temperature safety controls. This results in power being removed from a zone if the block temperature exceeds 220 °C.
- Mya 4 has been tested and complies with CE regulations to International Standards EN61 326–1 and EN61 010–1, American equivalent UL 61010–1 and Canadian equivalent IEC 61010-1.

Notes

→ If a thermal fuse trips in any zone, that zone will no longer function and Mya 4 will need to be repaired by Radleys or a Radleys authorised service engineer.

8.3 Temperature safety

Temperature sensors ensure that thermal control is maintained at all times. Errors are reported and automatically acted upon to achieve safe working conditions.

Notes

→ It is the responsibility of the user to ensure that all temperature settings and overrides are correct and appropriate for the experiment being performed, in conjunction with the experimental risk assessment.

8.3.1 Printed Circuit Board (PCB) sensors

Internal PCBs contain embedded thermal sensors to monitor and report both local temperatures on the board, and ambient temperatures adjacent to the boards.

To ensure a safe operating environment, safety cut-outs are activated if the manufacturer's pre-set safety values for these sensors are exceeded.

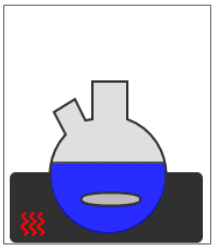
8.3.2 Block temperature (Tb) sensors

Each of the four reaction zones is based on a thermally controlled aluminium block. A Pt100 temperature sensor is located within each block, which monitors, controls and reports the block

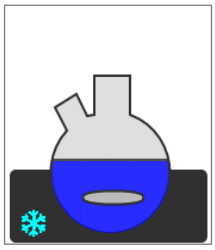
temperature at all times when the Reaction Station is powered on. These sensors cannot be accessed by the user.

- The minimum (**Default Min Tb**) and maximum (**Default Max Tb**) operating temperatures for these sensors are pre-set by the manufacturer. These are the values shown in brackets in the **Safety Limits** panel for each zone (under the **Settings** tab – see page 101 for more information).
- Although you can set the minimum and maximum operating temperatures for each zone in the Safety Limits panel, you will not be able to enter values that fall outside the manufacturer's pre-set range.
- If the temperature of a block exceeds the manufacturer's pre-set limits, the zone will revert to a safe state. (See Error Codes on page 158.)
- For user safety, temperature warning icons will be displayed when the block temperature is above 40 °C or below 0 °C (regardless of whether an experiment is running or not).

A red heatwave icon will be displayed to the left of the flask graphic when the block temperature is above 40 °C.



A blue snowflake icon will be displayed to the left of the flask graphic when the block temperature is below 0 °C.



8.3.3 Coolant temperature (Tc) sensors

Each of the four reaction zones requires a coolant to be passed through a heat exchanger. This is to remove the heat generated by the Peltier devices when cooling is activated. This coolant must be circulating at all times when the unit is running any experiment, not just when cooling is active.

- The heat exchanger temperature in each zone is monitored with an embedded thermistor temperature (Tc) sensor, which cannot be accessed by the user. A dual-level safety cut-out is present to maintain the heat exchangers at a safe operating level.
- If the heat exchanger in any zone exceeds 35 °C, an 'over temperature' error will be triggered, and the software will set the zone to a safe state.

Notes

→ A Tc sensor only monitors the temperature of a zone's heat exchanger (where the coolant flows through the Reaction Station). It is not related to the block or reaction temperatures.

- In the unlikely event that the 'over temperature' error fails to trigger, or the heat exchanger exceeds 40 °C after the error has been triggered (for example, due to thermal lag), the system firmware will shut down power to the affected zone.

- To avoid excessive internal condensation, the heat exchanger temperature must always be at or above 5 °C. If the temperature falls below 5 °C, an 'under temperature' error will be triggered, and the software will set the zone to a safe state.

Notes

→ The software will activate an error trigger to alert the user and to set the zone to a safe state, but it will not actively increase the coolant temperature if this is too cold.

Warning

♦ **Never** set the coolant temperature below 5 °C, as this will damage the Mya 4 unit.

8.3.4 Reaction temperature (Tr) sensors

Mya 4 features optional external Pt100 temperature probes that you can connect to each zone of the Reaction Station. The external Pt100 provides additional temperature monitoring and control of either the reactor contents, or the aluminium insert if tubes or vials are being used.

- If an external temperature probe is used whilst operating with block (Tb) control, the probe will only **monitor** and **record** reaction temperatures.
- If the external temperature probe is used whilst operating with reaction (Tr) control, the probe will **control** the temperature of the reaction mixture, as well as monitor and record it.
- The minimum (**Default Min Tr**) and maximum (**Default Max Tr**) operating temperatures for these sensors are pre-set by the manufacturer. These are the values shown in brackets in the **Safety Limits** panel for each zone (under the **Settings** tab – see page 101 for more information).
- Although you can set the minimum and maximum operating temperatures for each zone in the Safety Limits panel, you will not be able to enter values that fall outside the manufacturer's pre-set range.
- If a reaction temperature is being measured by a Pt100 connected to Mya 4, and it exceeds the manufacturer's pre-set limits, the corresponding zone will revert to a safe state. (See Error Codes on page 158.)

Warning

♦ When the external temperature probe is being used for reaction (Tr) control, you must ensure that the probe tip is immersed in the reaction mixture (or the aluminium insert) by at least 10 mm at all times. This is to prevent inaccurate temperature control, which may lead to dangerous conditions.

♦ It is the user's responsibility to ensure that the apparatus is correctly assembled in line with the experimental risk assessment.

8.3.5 Max temperature difference $(Tb–Tr)_{max}$

Mya 4 features additional thermal safety measures for when the external temperature probe is connected. The difference between the Tb (block temperature) and Tr (reaction temperature) is constantly calculated, and limited by default to 50 °C.

This prevents:

- large temperature differences between the block and reaction mixture, thereby minimising any potential for thermal shock, leading to glassware breakage,
- rapid increases in temperatures of both block and reaction mixture, thereby minimising temperature overshoot beyond the required set temperature,
- thermal runaway if the external temperature probe is not positioned correctly in the reaction mixture, and the experiment is set to Tr control. The block temperature will never exceed 50 °C above the external Pt100 temperature (typically ambient temperature in this scenario).

Notes

→ If an external temperature probe is not correctly positioned in the reaction mixture, error handling **will not** be initiated. Temperature control will continue, but it will be inaccurate, and limited by the $(Tb–Tr)_{max}$ feature.

→ $(Tb–Tr)_{max}$ is factory set to 50 °C, but may be independently adjusted for each zone to any value between 1 °C and 50 °C for every experiment.

→ You cannot change the $(Tb–Tr)_{max}$ maximum value once an experiment has started.

→ Lowering the $(Tb–Tr)_{max}$ maximum value will have an effect on how quickly the required set temperature is reached; the lower the value, the longer it will take.

9 Temperature control

Mya 4 uses bespoke PID algorithms to facilitate the control of both the block (**Tb**) and reaction (**Tr**) temperatures, ensuring best performance (minimum overshoot and minimum fluctuation) in a range of different scenarios.

9.1 Minimising temperature overshoots

Mya 4 is designed to reach the set temperature as quickly as possible. However, because of the thermal lag present in any heating or cooling system, the faster the heating/cooling, the more likely the system is to initially overshoot the set temperature, before stabilising and reaching equilibrium.

If it is necessary to minimise this initial overshoot, you will need to slow down the heating/cooling process. This can be done is several ways, including:

- using the pre-set Temperature Control (PID) options (see Section 9.1.1 below),
- creating a ramped profile step (see Section 9.1.2 on page 145),
- adjusting the Max Temperature Difference: $(Tb–Tr)_{max}$ (see Section 9.1.3 on page 148).

Notes

→ For more advanced temperature control, see **Configuring your own PID values** on page 150.

9.1.1 Pre-set Temperature Control options (PID settings)

Temperature control of a thermal process is dependent on many variables, such as:

- flask size,
- reaction volume,
- set temperature,
- difference between current and set temperature,
- ambient temperature,
- endo- and exothermic reactions.

For ease of use, Mya 4 features four pre-set **Temperature Control** options (A, B, C and D) which compensate for these variables, but the response will be different from one set of variables to another. It is therefore difficult to define which Temperature Control option will give the best performance for a given set of experiments, although the manufacturer can provide some guidance.

The time required to reach a stable state, and the initial overshoot of the set temperature, can vary depending on which Temperature Control option is chosen. Generally, once an experiment has reached a stable state, temperature control will be in the region of +/- 0.5 °C.

Temperature Control options for block temperature (Tb) control

The aluminium block that locates the reaction flask (and any insert required) has been designed to give maximum thermal performance. Block temperature (Tb) control, via an internal temperature sensor, is therefore fast and accurate, with minimal overshoot and fast stabilisation at the set temperature.

As the PID values for all the pre-set Temperature Control options are identical for Tb control (optimised settings for Mya 4), if your experiment is being controlled by block temperature, all options (A, B, C and D) will give the same rapid and accurate response.

Temperature Control options for reaction temperature (Tr) control

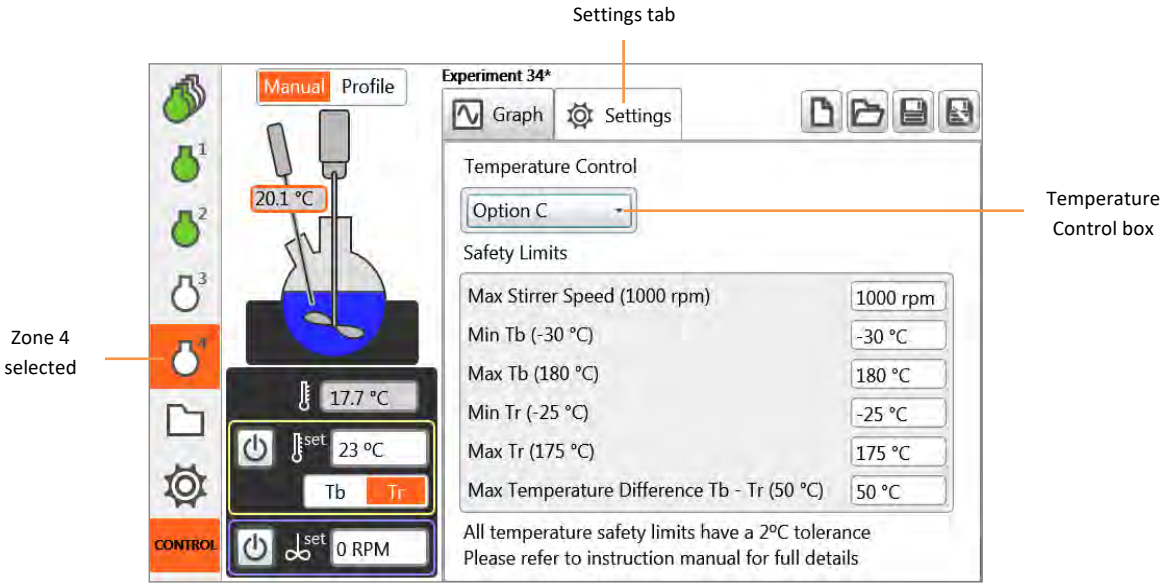
Reduced thermal transfer between contact surfaces, the additional thermal load of the glass reaction flask (and any insert required), as well as the reaction contents themselves, result in a system thermal lag.

This thermal lag can produce an overshoot of the set temperature when controlling an experiment by reaction temperature (Tr), via an external temperature probe. In this case, you can select one of the four pre-set Temperature Control options (A, B, C and D) based on your application.

Selecting a Temperature Control option

Temperature Control options can be selected independently for each zone.

- To access them, tap on the **Settings** tab in the required Zone View screen.
- To change the Temperature Control option for an experiment, tap once on the **Temperature Control** box and select your preferred option from the drop-down menu (A, B, C or D).
- The new Control option is now displayed.



Notes

→ You cannot change the Temperature Control option for a zone once an experiment has started.

OPTION A

- Option A is the default Temperature Control option for all experiments, and is recommended for normal operation over the full temperature range, where a small initial overshoot of 0.5 °C to 5 °C is acceptable.
- Heating and cooling rates are fast, and resultant temperature control is good.
- Performance may be compromised in some situations (for example, when cooling from high to moderate temperatures, e.g. 150 °C to 100 °C).

OPTION B

- Provides enhanced temperature control at moderate temperatures, but may be slow. It might also produce bigger overshoots at extreme temperatures (above 120 °C and below 0 °C).
- If you are operating in the temperature range 0 to 120 °C, then consider using Option B to minimise the small initial overshoot.

OPTION C

- Provides a slow temperature profile which can reduce temperature overshoots when warming from low temperatures to a sub-ambient temperature (e.g. from -20 °C to -5 °C).

OPTION D

- Provides a slow temperature profile which can reduce temperature overshoots when attempting to cool slightly from high temperatures (e.g. from 155 °C to 135 °C).

Notes

→ For experiments where temperature control is critical, it would be advised to run trial experiments to determine which Temperature Control option is best.

→ As you can select independent Temperature Control options for each zone, it is possible to run the four options in parallel – one in each zone – to select the most appropriate for the application.

To see examples of the effect of different Temperature Control options, see page 141.

In **Manual** mode, Mya 4 will achieve the set temperature in the quickest time possible, dependent only on the Control option (A, B, C or D) selected.

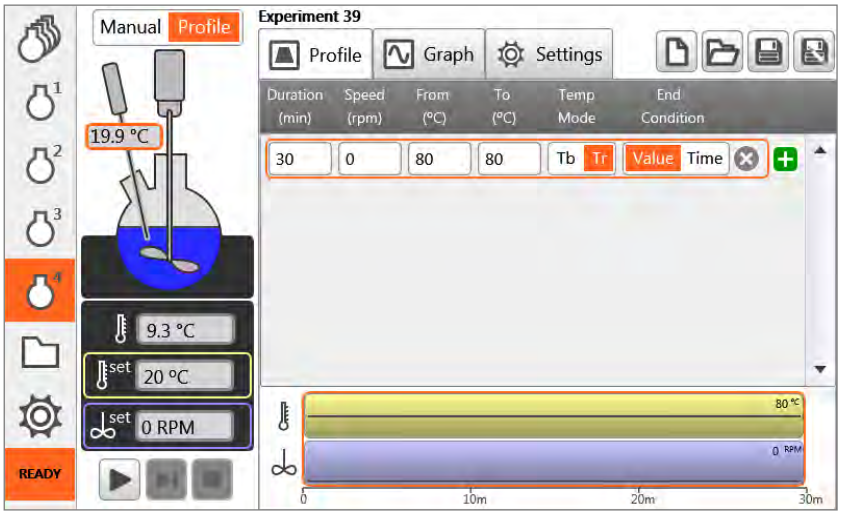
To do the same in **Profile** mode, in addition to selecting a suitable Temperature Control option, you will need to create a **single setpoint profile step**.

To create a single setpoint profile step in Profile mode, enter the same required final temperature in both the **From** and **To** temperature boxes, and ensure that **Value** is selected in the **End Condition**

box (to ensure the set temperature is reached, even if this takes longer than the time set for the step in the Duration box).

Example of creating a single setpoint profile step to reach the set temperature as quickly as possible

In the example below, the current reaction temperature (Tr) is 19.9 °C and a profile step has been created with both a start and end Tr of 80 °C (single setpoint profile step), for a duration of 30 minutes, and the End Condition set as Value.



In this case, the system will heat to 80 °C as quickly as possible, as determined by the Temperature Control option selected. After 30 minutes, if the set reaction temperature (Tr) of 80 °C has been reached, the step will end. If the reaction temperature has not reached 80 °C, the step will continue until it does, and then end.

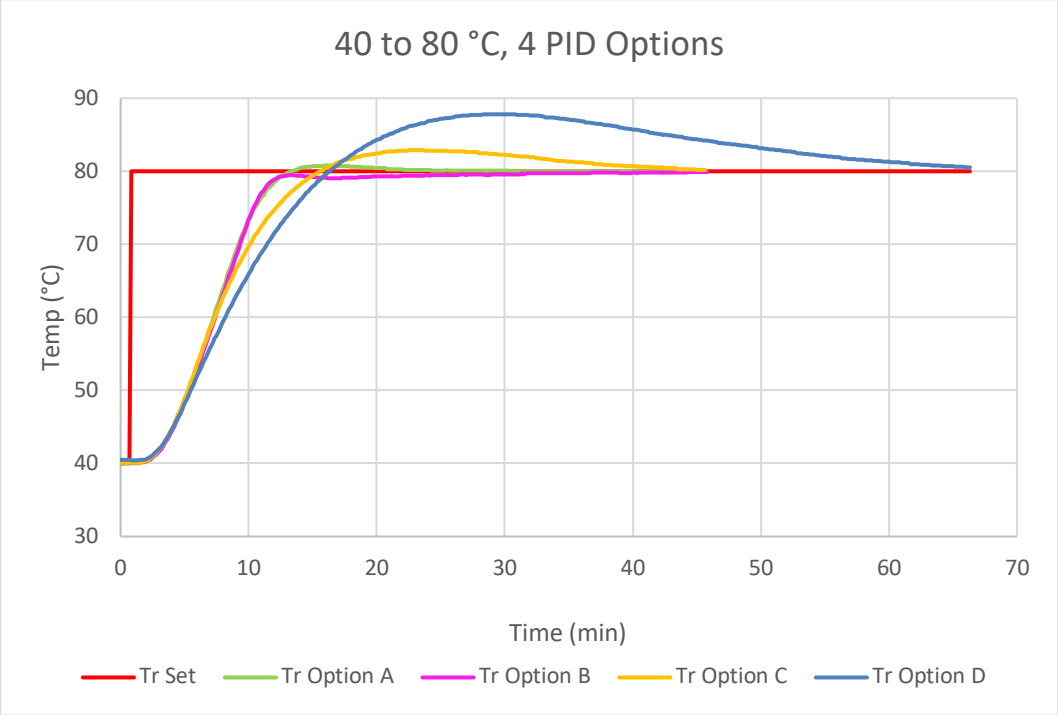
Examples of effects of Temperature Control PID option selection

The set-up for examples 1 to 4 shown below is as follows:

- a 250 ml round bottom flask,
- 120 ml reaction contents,
- control by reaction temperature with an external probe directly in the reaction mixture.

Example 1

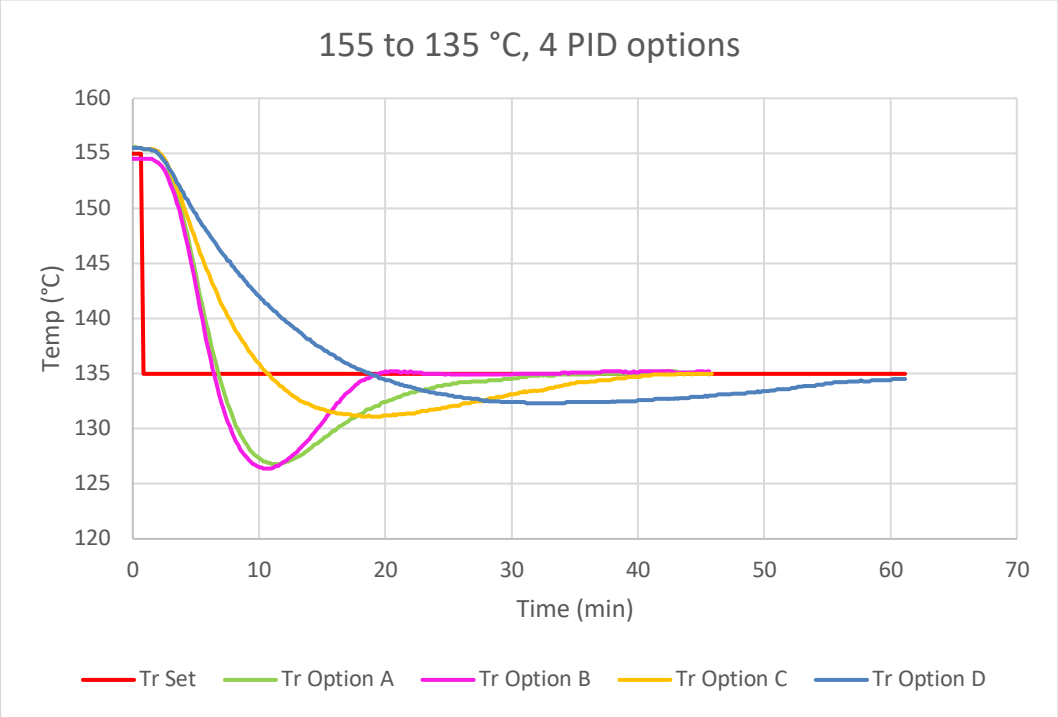
Single setpoint profile step, heating from 40 °C to 80 °C



Option A gives a slight overshoot, but reaches the set temperature the quickest.
Option B gives no overshoot, but takes longer to reach the set temperature.
Options C and **D** give a significant overshoot, and take a long time to stabilise.

Example 2

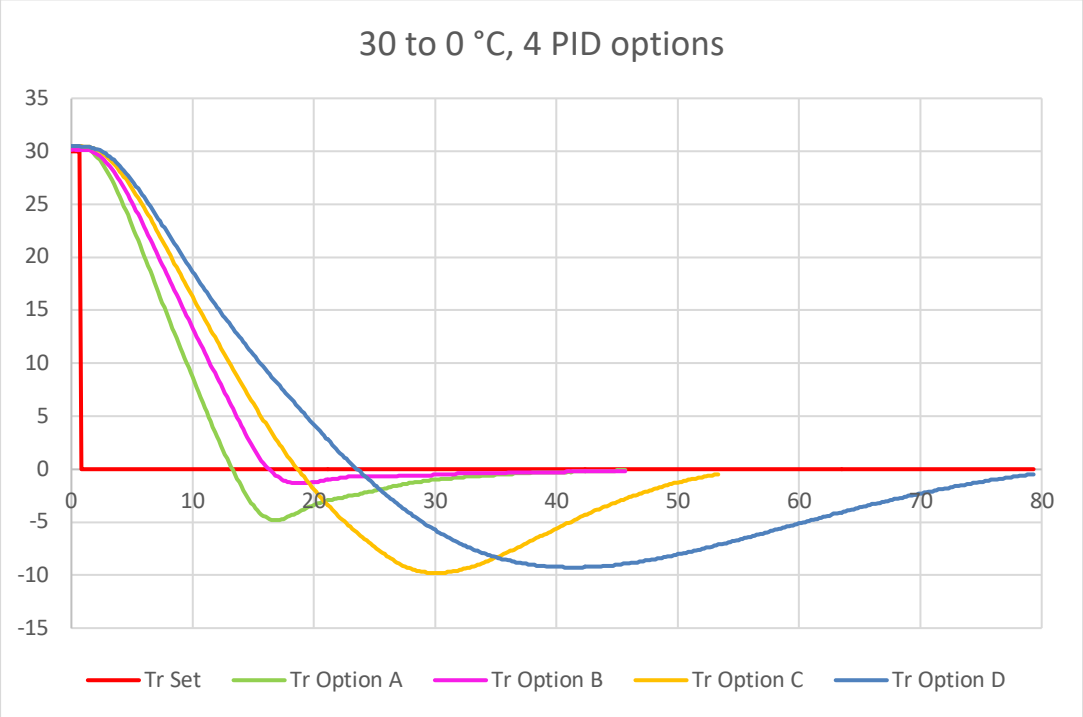
Single setpoint profile step, cooling from 155 °C to 135 °C



Options A and **B** both overshoot by around 8 °C.
Option C overshoots by 4 °C.
Option D gives the smallest overshoot (about 2.5 °C) but takes a very long time to reach a stable set temperature.

Example 3

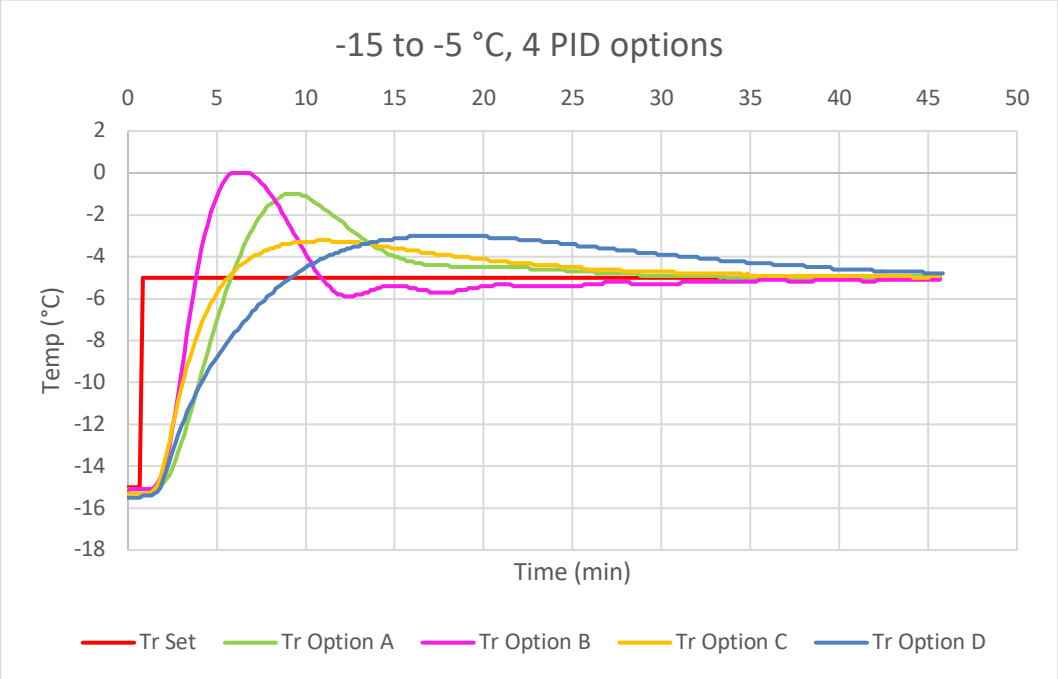
Single setpoint profile step, cooling from 30 °C to 0 °C



Option A produces an overshoot of about 5 °C.
Option B produces minimal overshoot (about 1 °C).
Options C and **D** produce overshoots of about 10 °C, and take a long time to stabilise.

Example 4

Single setpoint profile step, heating from -15 °C to -5 °C



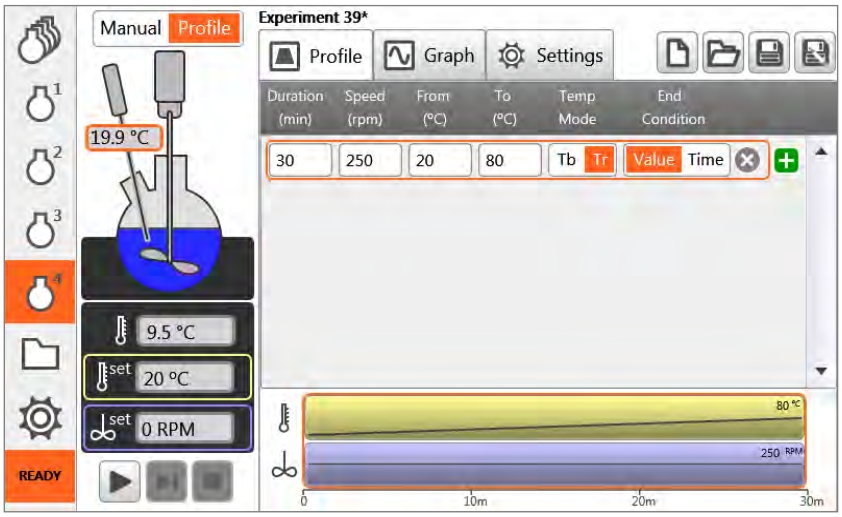
Options A and **B** overshoot by 4 °C and 5 °C respectively.
Options C and **D** produce minimal overshoot (about 2 °C) but take a long time to stabilise.

9.1.2 Creating a ramped profile step

When heating/cooling as fast as possible, overshoots are to be expected. So if temperature control to minimise overshoots is critical, creating a **ramped profile step** for each step is the recommended method. Generally, the longer the ramp time, the lower the overshoot will be.

- To create a ramped profile step, enter the current temperature in the **From** temperature box, and the required final temperature in the **To** temperature box.
- In this case, the temperature will rise slowly, according to the calculated linear profile from start temperature to end temperature over the time period selected. This gives an additional level of control on top of the Temperature Control option, and is likely to produce much better results for critical applications where minimal initial overshoot is necessary.

Example of creating a ramped profile step to minimise temperature overshoots
In the example below, a ramped profile step has been created with a start reaction temperature (Tr) of 20 °C to an end temperature of 80 °C, with a duration of 30 minutes, and the End Condition set as Value.



In this case, the system will heat to 80 °C in a calculated linear profile determined by the set duration (in this case 30 minutes). After 30 minutes, if the set reaction temperature (Tr) of 80 °C has been reached, the step will end. If the reaction temperature has not reached 80 °C, the step will continue until it does, and then end.

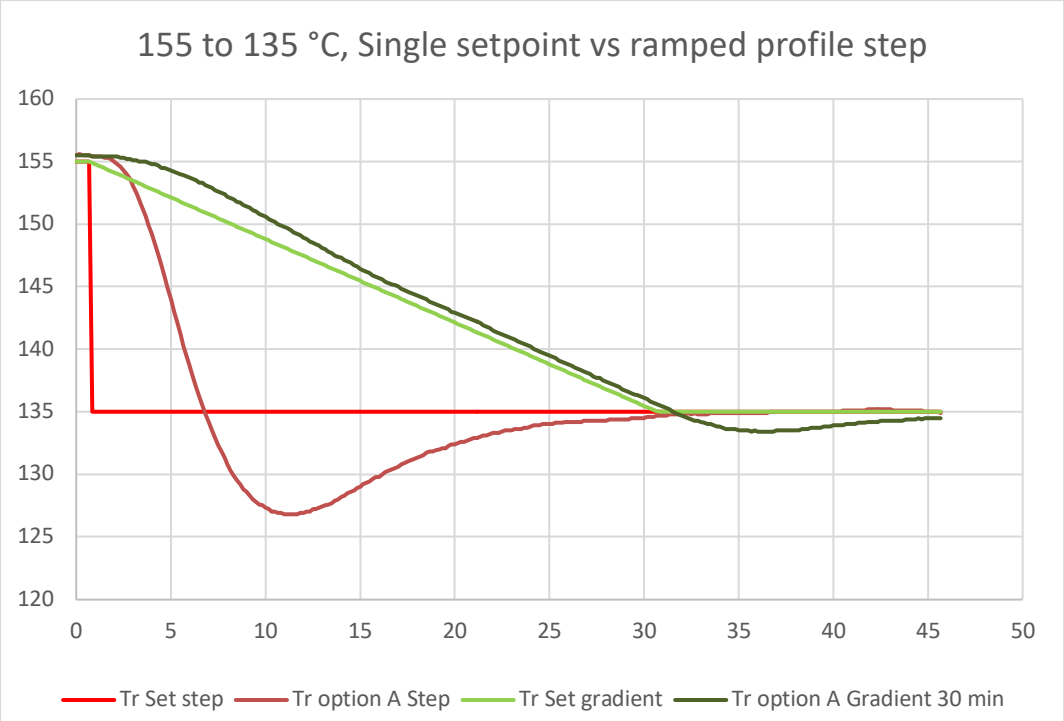
Examples of temperature control obtained using ramped profile steps

The set-up for examples 5 and 6 shown below is as follows:

- a 250 ml round bottom flask,
- 120 ml reaction contents,
- control by reaction temperature with an external probe directly in the reaction mixture,
- Temperature Control Option A.

Example 5

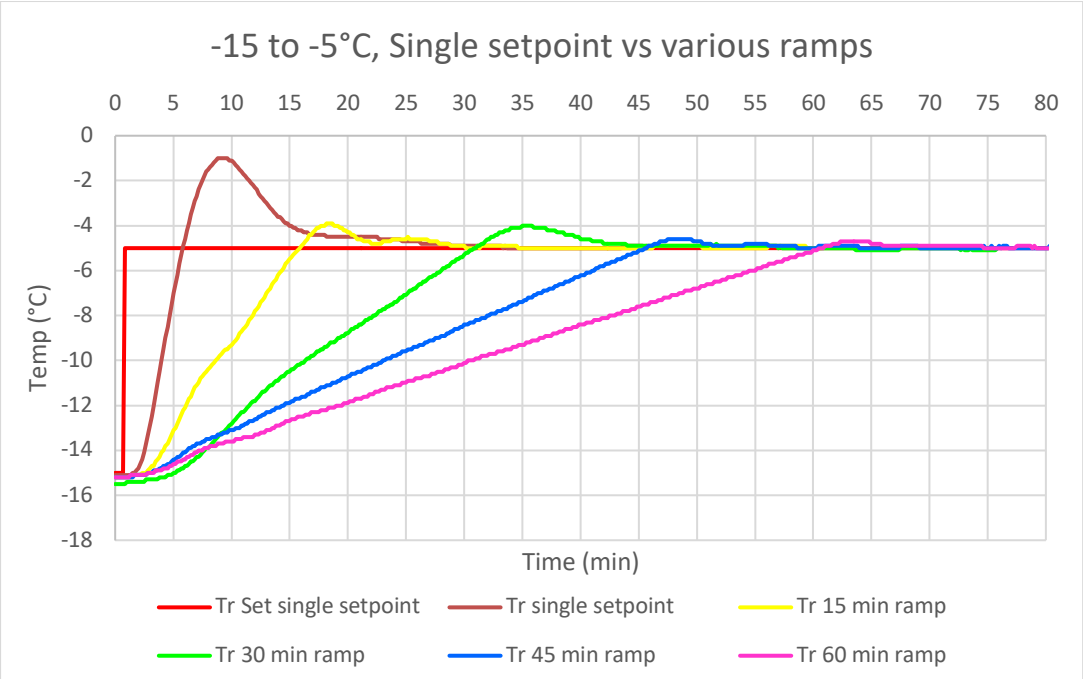
Cooling from 155 °C to 135 °C, comparing a single setpoint profile step with a 30-minute ramped profile step



Option A was shown to give poor temperature control for this process when using a single setpoint profile step (see Example 2).
However, by applying the temperature change over a 30-minute ramped profile step, the temperature overshoot can be significantly reduced (from 8 °C to 2 °C).

Example 6

Heating from -15 °C to -5 °C, comparing a single setpoint profile step with various ramped profile steps, using Option A.

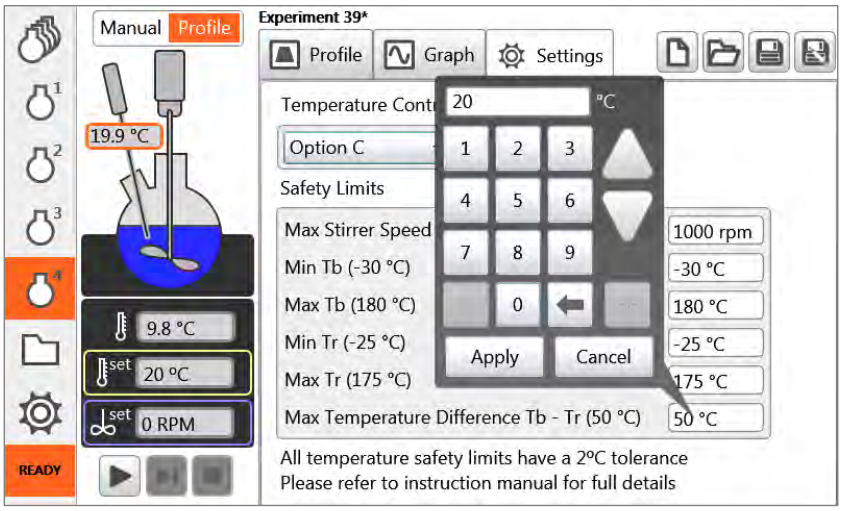


Option A was shown to give poor temperature control for this process when using a single setpoint step (see Example 4).
However, by applying the temperature change over a 15- or 30-minute ramped profile step, the temperature overshoot can be significantly reduced (from 4 °C to 1 °C).
Further improvement can be made by increasing the length of the ramped profile step. In this case, by extending the gradient to 60 minutes, the overshoot for this process was reduced to <0.5 °C.

9.1.3 Adjusting the Max Temperature Difference: $(Tb–Tr)_{max}$

Another way to optimise temperature control is by adjusting **$(Tb–Tr)_{max}$** (the maximum temperature difference between the block and reaction mixture, also referred to as **delta T max**) for a given experiment.

- Reducing $(Tb–Tr)_{max}$ will slow down any change in heating or cooling, and help to reduce any temperature overshoot. This is particularly effective when attempting a **single setpoint profile step** (a sudden change from one temperature to another).
- Each zone has a factory default value of 50 °C for $(Tb–Tr)_{max}$, and this can be changed independently in each zone.
- To change $(Tb–Tr)_{max}$ go to the required zone, and tap the **Settings** tab. Then select the value box, and change the value (between 1 and 50) using the pop-up keypad.



Notes

→ $(Tb-Tr)_{max}$ is limited to 50 °C to reduce the risk of thermal shock (and therefore of vessel breakage) that can be caused by a large temperature difference between both the inside and outside of the glass vessel (i.e. between contents and insert/block).

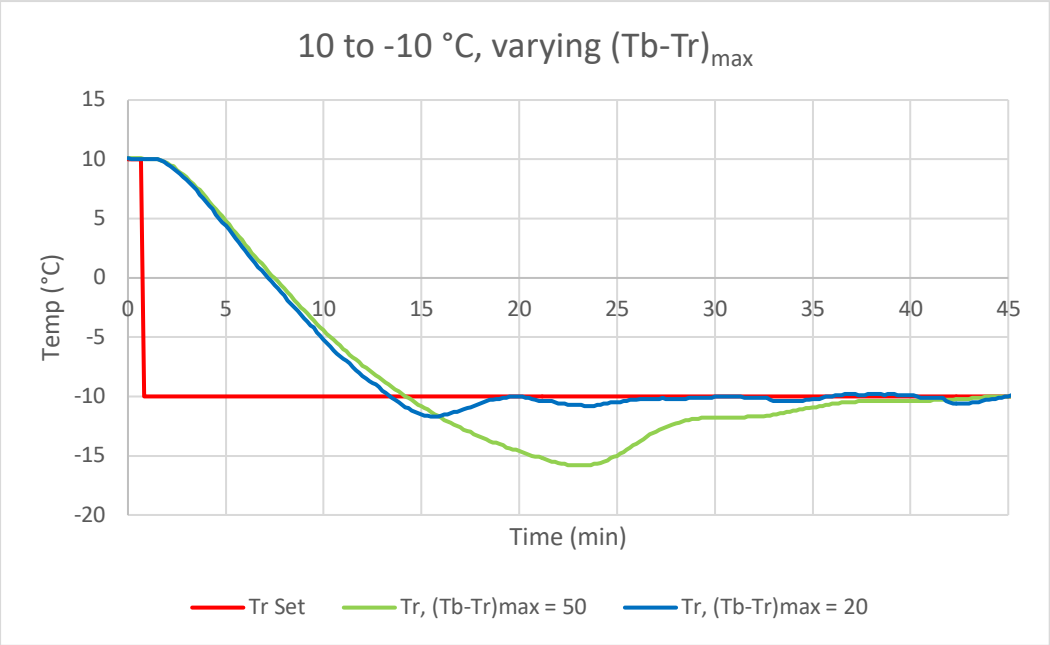
Example of the effect on temperature control of adjusting $(Tb–Tr)_{max}$

The set-up for the example shown below is as follows:

- a 250 ml round bottom flask,
- 120 ml reaction contents,
- control by reaction temperature with an external probe directly in the reaction mixture,
- Temperature Control Option A.

Example 7

Cooling from 10 °C to -10 °C, varying $(Tb–Tr)_{max}$



With the default $(Tb–Tr)_{max}$ setting of 50 °C, an overshoot of about 6 °C is observed.
However, when reducing the $(Tb–Tr)_{max}$ value to 20 °C, the overshoot is reduced to about 2 °C.

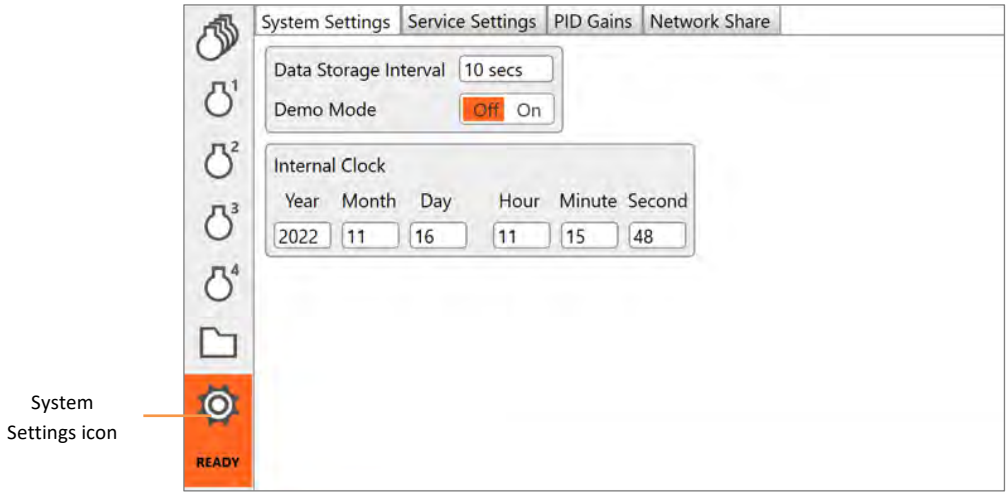
9.2 Configuring your own PID values

The four pre-set Temperature Control options should be suitable for most applications. However, in extreme cases, it may be necessary to optimise beyond what the pre-set options can achieve for a given application. It is possible, therefore, to configure your own PID values.

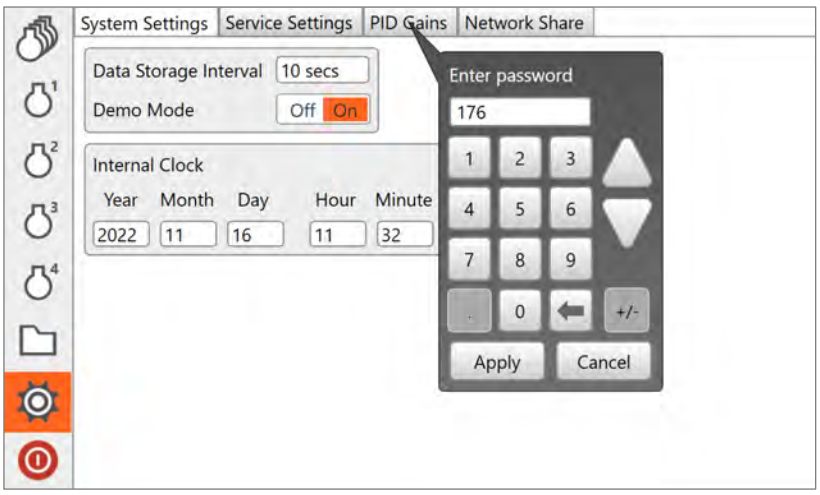
Warning

- Configuring your own PID values is not recommended, unless you have a good understanding of PID control.

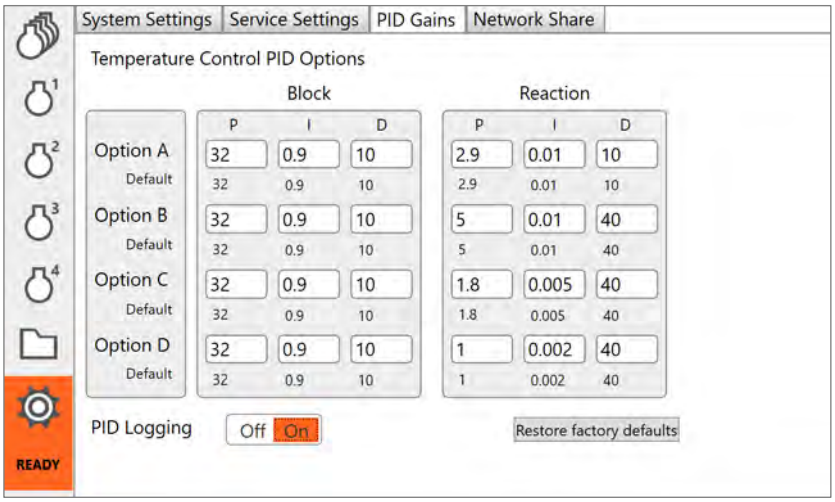
To access and edit PID values, select the **System Settings** icon from the side navigation panel. The **System Settings** screen will now be displayed.



Select the **PID Gains** tab, and enter the password when prompted. (See page 123 for more information about passwords protected tabs.)



The **PID Gains** screen will now be displayed.



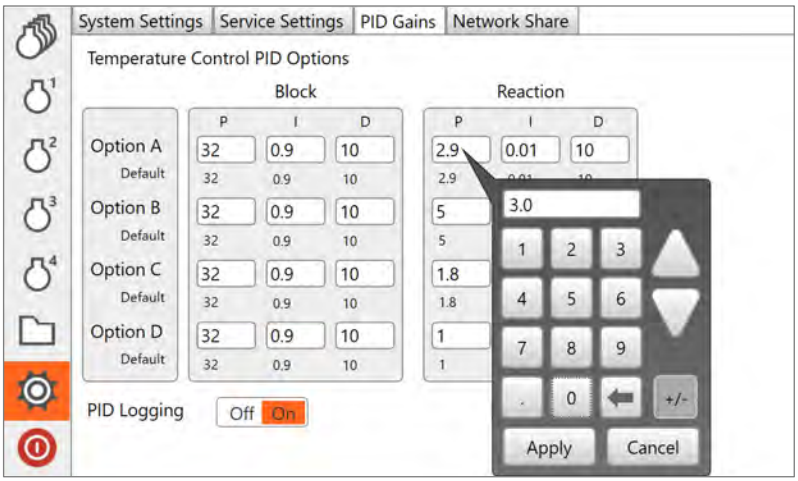
For each option, there is a set of PID values for control of the block, and a set of PID values for control of the reaction. Both the currently set values (shown in the white boxes) and the default values (shown underneath the white boxes) are displayed.

Block PID values

- It is recommended that you do not change the block PID values, unless there is a strong need to minimise temperature overshoot of the block itself. The block responds rapidly to any temperature change requested, and the factory installed values have been optimised for this.
- Any overshoot in the block temperature will have minimal impact when running in reaction control mode (external probe directly in the reaction mixture), because of the thermal lag in the system.

Reaction PID values

- If necessary, you can adjust the reaction PID values to reduce the temperature overshoot (and change the speed of response) when operating in reaction control.
- To adjust a reaction PID value, tap on the appropriate box and set a new value using the pop-up keypad, then select **Apply**.



Notes

- → As a guideline, when attempting to optimise the PID values, begin by adjusting just the 'P' value by a small amount, up or down. Then run your experiment, and observe the effect.
- → You can optimise the PID values for Options A–D and then run each option in one of the four zones at the same time.
- → If further optimisation is needed, adjust the 'I' value by a small amount, up or down. Then run your experiment and observe the effect.
- → We recommend turning the PID logging on to be able to generate the file to study their effect

Temperature control results are dependent on many parameters (e.g. flask shape and size, reaction volume, ambient temperature, air flow, system coolant temperature) and the exact nature of the process you are trying to control. This means that one set of optimised PID values may not work as well if any one of these variables is changed.

For example, the control of an increase in temperature from 20 °C to 60 °C may behave very differently with the same PID values compared to the control of an increase in temperature from 40 °C to 60 °C.

Notes

- → PID values cannot be modified while an experiment is running.
- → Once a PID value has changed, it will instantly become active. Any experiment saved with a Temperature Control option will use the corresponding PID values as they are saved in the system at the time the experiment is started.
- → If necessary, to revert back to the original pre-set values for any of the PID settings, select the appropriate box, and enter the default value displayed under that box.
- → At any time, the unit can be set back to the original recommended values for all Control options by pressing the **Restore factory defaults** button.

10 Error handling

Mya 4 features built-in error detection to allow safe operation of the equipment at all times.

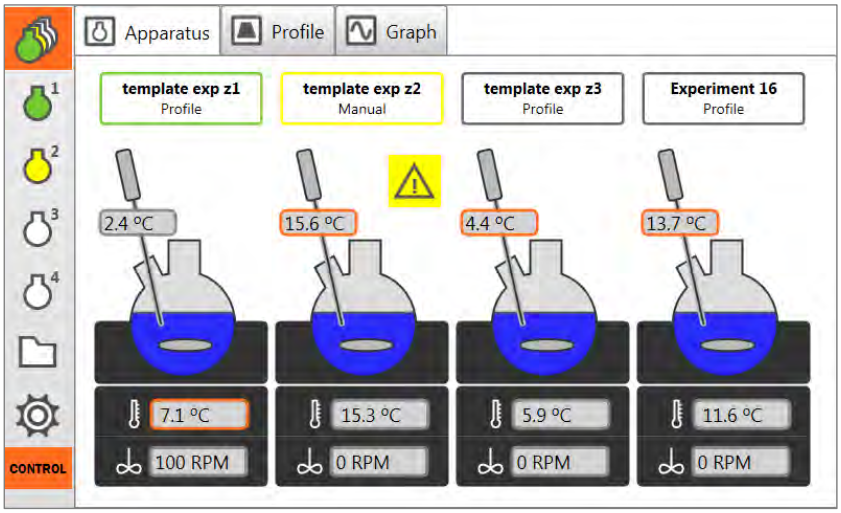
If an error is detected, it will be reported on the Mya 4 Control Pad, along with relevant information about the error, and instructions on how to continue.

Mya 4 will automatically respond to the error and set the unit to a pre-defined safe state. Several different levels of safe state are available depending on the nature of the error.

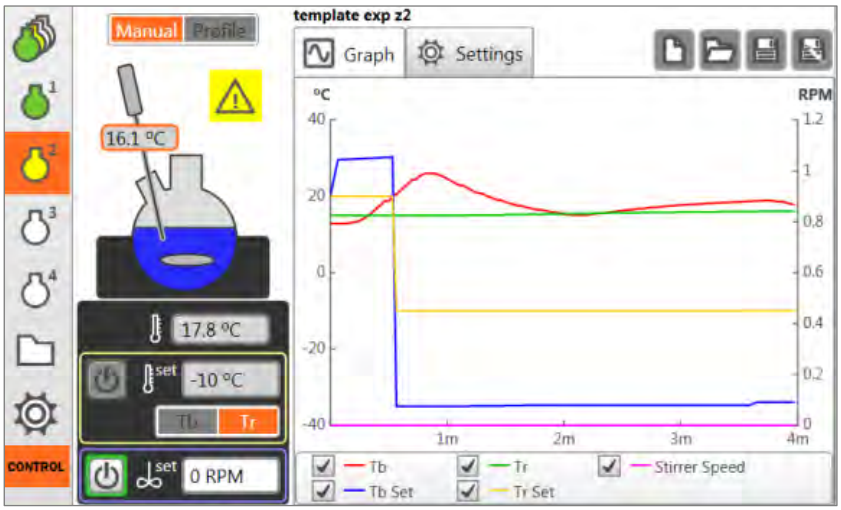
10.1 Yellow Zone error

When a **Yellow Zone error** occurs, the flask navigation icon for the affected zone will be yellow, and a yellow warning icon is displayed. For example, a Yellow Zone error in Zone 2 would look like this:

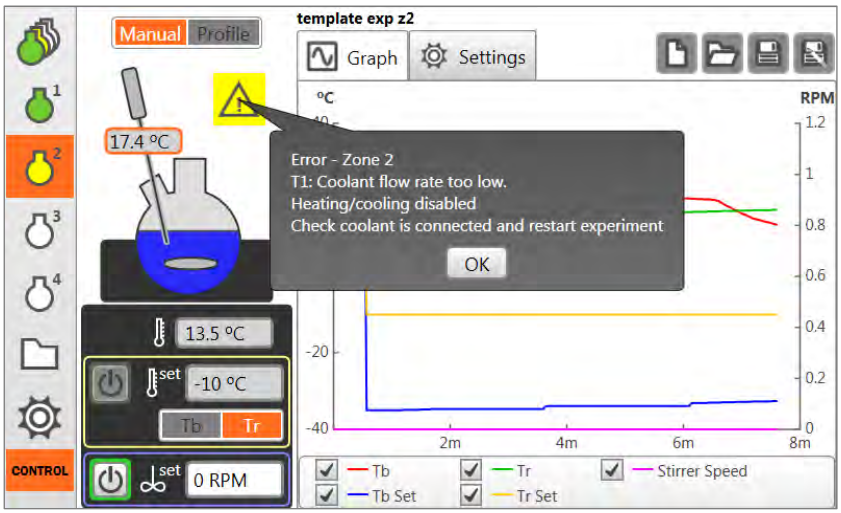
Apparatus view



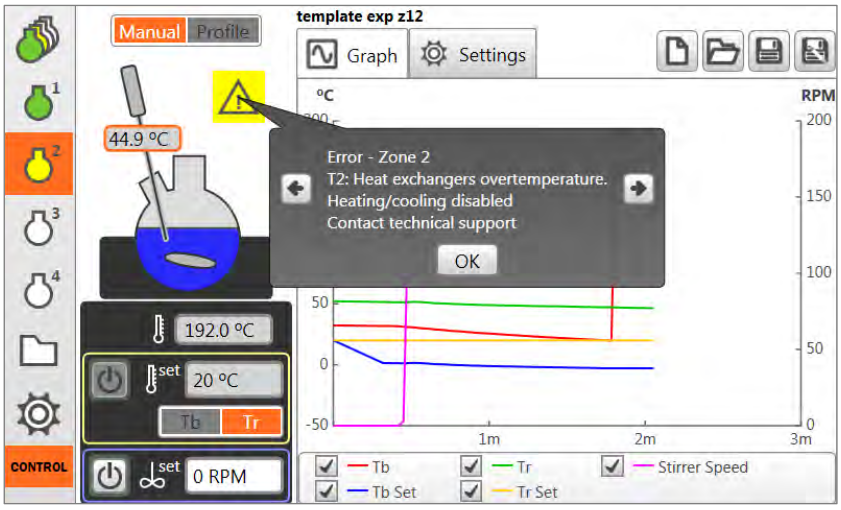
Zone view



In **Zone view**, tap once on the yellow warning icon to display the **Error Message** box. The Error Message box shows the error location, error description, safe state status and troubleshooting instructions.



If more than one error has been detected, you can scroll between different Error Message boxes using the arrows.



A **Yellow Zone error** will turn off active temperature control in the affected zone, but stirring at the current set speed will be maintained.

Notes

→ A Yellow Zone error only acts on the zone where the error occurred; other zones will continue operating normally.

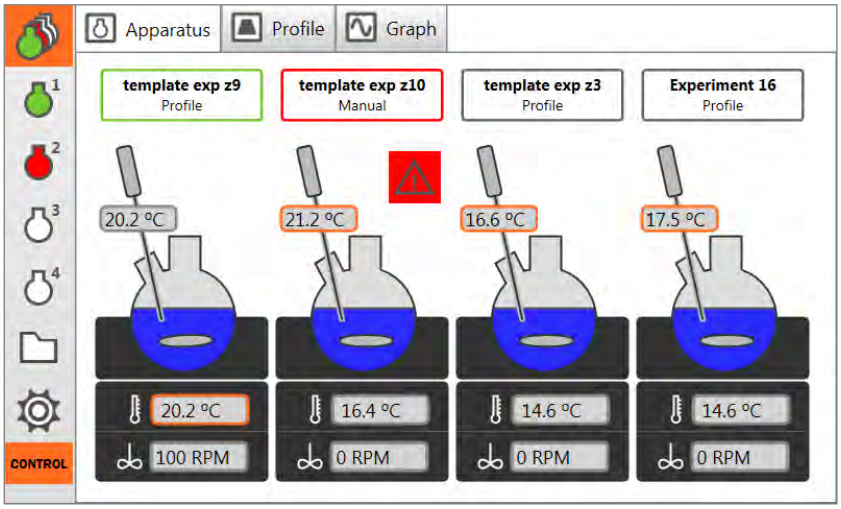
→ Some Yellow Zone errors can be cleared by following the instructions in the Error Message box. You can then resume the experiment by manually restarting the temperature or profile control.

→ If an error cannot be cleared, you must end the experiment by manually, turning off the stirrer, or stopping profile control, and taking appropriate servicing action. Refer to the displayed error message, or **Error Codes** on page 158.

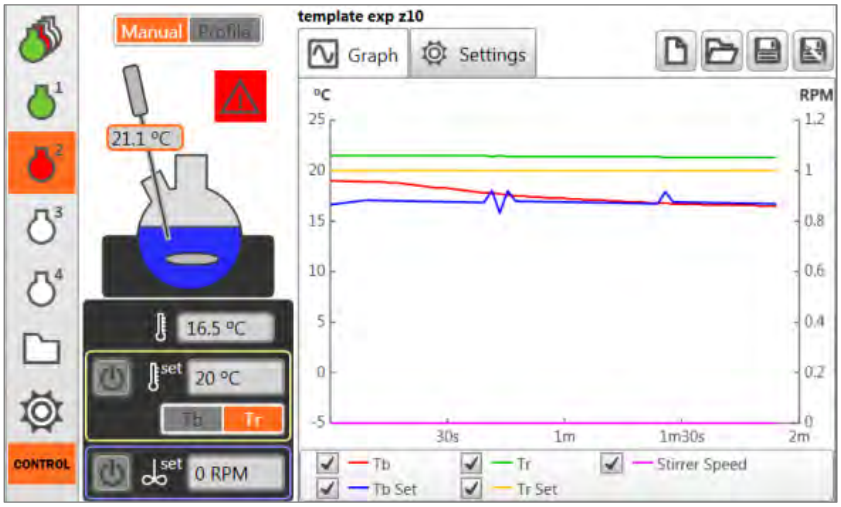
10.2 Red Zone error

When a **Red Zone error** occurs, the flask navigation icon for the affected zone will be red, and a red warning icon is displayed. For example, a Red Zone error in Zone 2 would look like this:

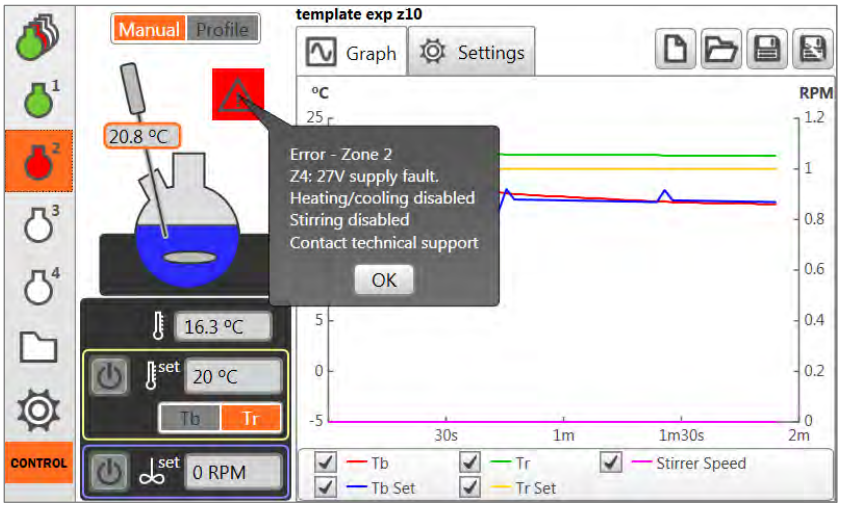
Apparatus view



Zone view



In **Zone view**, tap once on the red warning icon to display the **Error Message** box. The Error Message box shows the error location, error description, safe state status and troubleshooting instructions.



A **red zone error** will turn off active temperature control and stirring in the affected zone.

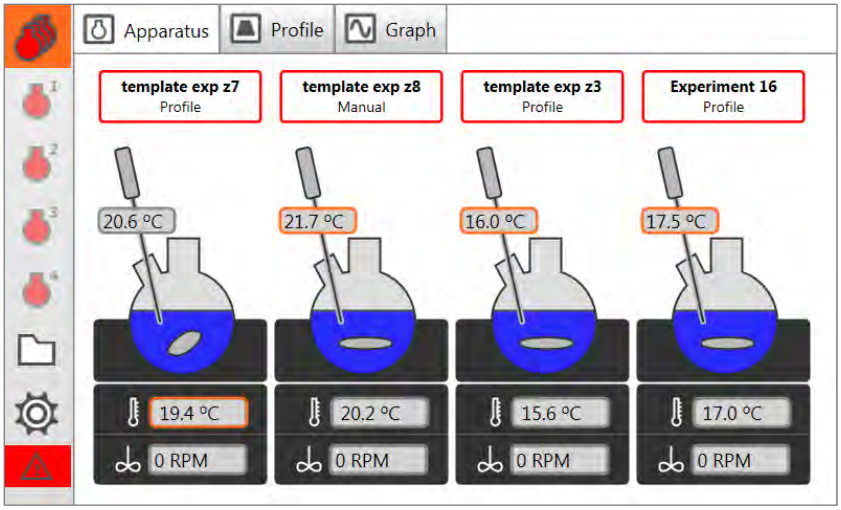
Notes

→ A Red Zone error only acts on the zone where the error occurred; other zones will continue operating normally.

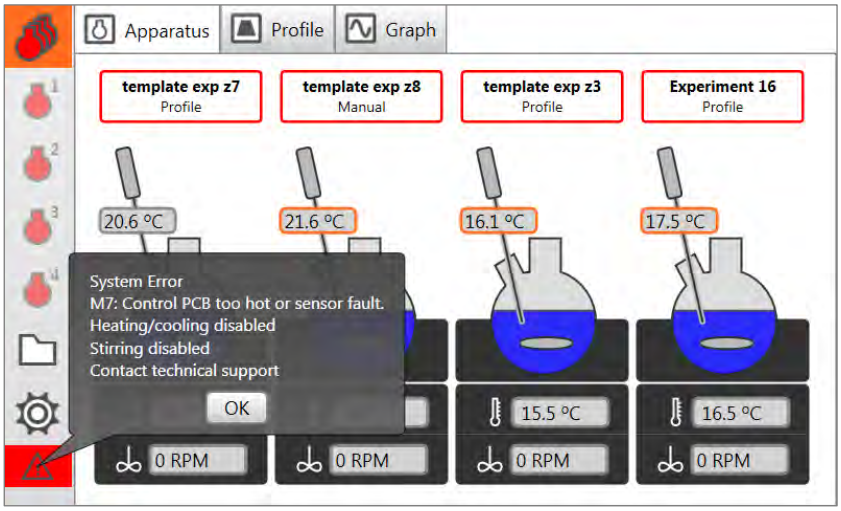
→ A Red Zone error will terminate the experiment in the affected zone, and it cannot be restarted. If the error can be cleared, for example, by switching off mains power to the unit and then switching back on again, a new experiment may be created and started. If the error cannot be cleared, contact Technical Support.

10.3 Red System error

A **Red System error** affects all zones and will force the Apparatus overview screen to be displayed. All flask icons will be red, and a red warning icon will be in the side navigation panel.



Tap once on the red warning icon to display the **Error Message** box. The Error Message box shows the error description, safe state status and troubleshooting instructions.



A **Red System error** will turn off active temperature control and stirring in **all** zones.

Notes

→ A Red System error will terminate the experiments in all zones, and they cannot be restarted. If the error can be cleared, for example, by switching off the mains power to the unit and switching it back on again, then new experiments may be created and started. If the error cannot be cleared, contact Technical Support.

10.4 Error codes

RZ = Red Zone **YZ = Yellow Zone** **RS = Red System**

ID	Error reported	Likely cause	Resolution	Error type
S1	Magnetic stirrer has exceeded defined setpoint for zone	Jammed or uneven operation of stirrer	Check stirrer is free to rotate	RZ
S2	Overhead stirrer has exceeded defined setpoint for zone	Jammed or uneven operation of stirrer	Check stirrer is free to rotate	RZ
S3	System configuration changed	Overhead stirrer disconnected during an experiment	Restart experiment with correct stirrer configuration	RZ
S4	System configuration changed	Overhead stirrer connected during an experiment (when using magnetic stirrer)	Restart experiment with correct stirrer configuration	RZ
Z1	Zone communication error	Fault with zone board or connecting ribbon	Board or ribbon may need replacing	RZ
Z2	3V3 supply fault	Fault on zone PCB	Board may need replacing	RZ
Z3	5V supply fault	Fault on zone PCB	Board may need replacing	RZ
Z4	27V supply fault	Fault on zone PCB	Board may need replacing	RZ
Z5	12V supply fault	Fault on zone PCB	Board may need replacing	RZ
Z6	Block sensor fault	Fault with internal sensor	Sensor may need replacing Contact supplier	YZ
Z7	Heat exchanger sensor fault	Fault with internal sensor	Sensor may need replacing Contact supplier	YZ
Z8	PCB too hot or sensor fault	Internal system temperature too high	Reduce operating temperature, allow system to cool, and retry Check rear fan is turning and not obstructed Check front vent is not obstructed	YZ
Z9	Overhead stirrer fault	Motor failure, or electrical fault in motor circuit	Contact supplier	RZ
Z10	Magnetic stirrer fault	Motor failure, or electrical fault in motor circuit	Contact supplier	RZ
Z11	Peltier fault	Mechanical or electrical failure of Peltier cooling chip (chip may need replacing)	Chip may need replacing Contact supplier	YZ
Z12	Heater 1 fault	Mechanical or electrical failure of internal heater	Heater may need replacing Contact supplier	YZ
Z13	Heater 2 fault	Mechanical or electrical failure of internal heater	Heater may need replacing Contact supplier	YZ
Z14	Heater 3 fault	Mechanical or electrical failure of internal heater	Heater may need replacing Contact supplier	YZ
Z15	Heater 4 fault	Mechanical or electrical failure of internal heater	Heater may need replacing Contact supplier	YZ
Z16	Thermal fuse fault	Mechanical or electrical failure of internal safety fuse	Fuse may need replacing Contact supplier	YZ
Z17	Reaction has reached the maximum run time of 7 days	Experiment has reached maximum run time	Experiment has automatically been ended Restart experiment	RZ
Z18	Reaction is approaching maximum run time of 7 days	Warning to user that an experiment has reached 6 days and is approaching the maximum run time	Be prepared that this experiment will automatically end in 1 days' time	
M1	3V3 supply fault	Fault on system control PCB	PCB may need replacing Contact supplier	RS
M2	5V supply fault	Fault on system control PCB	PCB may need replacing Contact supplier	RS

M3	27V supply fault	Fault on system control PCB	PCB may need replacing Contact supplier	**RS**
M4	3V3Q supply fault	Fault on system control PCB	PCB may need replacing Contact supplier	**RS**
M5	EEPROM missing	Fault on system control PCB	PCB may need replacing Contact supplier	**RS**
M6	ADC missing	Fault on system control PCB	PCB may need replacing Contact supplier	**RS**
M7	PCB too hot or sensor fault	Internal system temperature too high	Check rear fan is turning and not obstructed Check front vent is not obstructed Reduce ambient temperature if possible Allow system to cool, and retry	**RS**
T1	Coolant flow rate too low	Cooling water supply not connected, or not turned on	Check coolant is turned on Increase coolant flow if possible Check for water flowing from the rear drain – if there is, this may indicate an internal leak	**YZ**
T2	Heat exchangers over temperature	Cooling water supply not connected, or not turned on	Check coolant is turned on Allow system to cool and then restart	**YZ**
T3	Block over temperature	Block has exceeded the defined maximum block temperature (Max Tb) Default value is 180 °C	Check correct Temperature Control option is selected Check PID values	**YZ**
T4	Block under temperature	Block has exceeded the defined minimum block temperature (Min Tb) Default value is -30 °C	Check correct Temperature Control option is selected Check PID values	**YZ**
T5	Reaction over temperature	Reaction has exceeded the defined maximum reaction temperature (Max Tr) Default value is 175 °C	Check correct Temperature Control option is selected. Check PID values	**YZ**
T6	Reaction under temperature	Reaction has exceeded the defined minimum reaction temperature (Min Tr) Default value is -25 °C	Check correct Temperature Control option is selected Check PID values	**YZ**
T9	(Tb–Tr) exceeded	The difference between block temperature and reaction temperature has exceeded the defined maximum Tb–Tr Default value is 50 °C	Check external probe has not been removed from the reaction	**YZ**
T10	System configuration changed	Temperature probe disconnected during a run	Restart experiment with correct probe configuration	**YZ**
T11	System configuration changed	Temperature probe connected during a run	Restart experiment with correct probe configuration	**YZ**
T12	Block temperature over maximum system operating range	Block temperature has exceeded 180 °C	Check correct Temperature Control option is selected Check PID values	**YZ**
T13	Coolant temperature too low	Coolant temperature is below 5 °C	Coolant supply must be above 5 °C to avoid internal condensation Check coolant supply temperature, then restart experiment	**YZ**

11 Technical specifications

Power supply

Mya 4 Main Unit		**Mya Control Pad**	
Voltage	100-240 V AC	Voltage	100-240 V AC
Frequency	50/60 Hz	Frequency	50/60 Hz
Mains supply fluctuation	+/- 10%	Mains supply fluctuation	+/- 10%
Power consumption	1.5kW (max)	Power consumption	60 w (max)
Fuse rating	15A, Slo-Blo, 5s-60s @ 200% of A rating	Fuse rating	13A
Over voltage category	OVC II	Over voltage category	OVC II

Operating conditions

Ambient temperature	+10 to +30°C
Relative humidity	10 – 80%
Intended for	Indoor use
Altitudes up to	2000m
Pollution degree	PD 2

Temperature

Block (with coolant at 5 °C & 2 L/min)	-30 to 180 °C
Block (with coolant at 15 °C and 2 L/min)	-25 to 180 °C
Maximum differential between zones	200 °C
Solution (with coolant at 5 °C and 2 L/min)	-25 to 175 °C
Solution (with coolant at 5 °C and 2 L/min)	-20 °C to 175 °C
Resolution (set point)	±1 °C
Reading (reading)	0.1 °C
Accuracy	±1 °C
Monitoring frequency	2 seconds

Stirring

Overhead stirring	
Maximum speed (intermittent)	1000 rpm
Maximum speed (continuous)	500 rpm
Minimum speed	100 rpm
Resolution	1 rpm
Torque	16 N·cm

Viscosity (max)	60000 mPa·s
Vacuum achievable	10mbar

Magnetic stirring

Maximum speed	1000 rpm
Minimum speed	100 rpm
Resolution	1 rpm

Cooling of the instrument

Coolant supply	Mains water or ethylene glycol mix (max 30%)
Max coolant temperature	35 °C
Min coolant temperature	5 °C
Max flow rate	5 L/min
Min flow rate	2 L/min
Max coolant pressure	2 bar
Min coolant pressure	0.3 bar

If using a recirculator (chillller/thermoregulator)

Min cooling power at 15 °C	1.5 kW
Min cooling power at 0 °C	1.0 kW

Purge gas

Max flow rate	15 L/min
Min flow rate	3 L/min

Connections

Reaction Station

Mains socket	IEC C20
Mains cable	IEC C19
To Control Pad	9 way D type
Ethernet	RJ45
Coolant in/out	3/8” barb
Gas purge	3/8” barb
Internal drain	3/8” barb

Control Pad

Mains Socket	Screw locking DC Jack Socket
To Reaction Station	9 way D type
USB	2.0
Ethernet	RJ45

Materials of construction

Reaction Station	
Top cover	Epoxy painted aluminium
Lower chassis	Epoxy painted steel
Reaction blocks	Anodised aluminium
Gas feed nozzle	316 stainless steel with nitrile O-rings
Coolant in/out connectors	Acetal with internal 316 stainless steel & Buna seals
Gas purge connector	Zinc plated brass
Internal drain connector	Zinc plated brass
Control Pad	
Top cover	Epoxy painted aluminium
Lower chassis	Epoxy painted steel
LCD screen	Capacitive glass
Compact Stirrer	
Motor body	Anodised aluminium
Stirrer guide body	PTFE
Stirrer guide seal	Viton
Stirrer guide inner	Borosilicate glass, PEEK
Other	
Reflux/Manifold Head	Anodised aluminium
Reaction inserts	Anodised aluminium
Easy-On caps	PTFE
Reaction vessels	Borosilicate glass
External temperature probes	316 stainless steel

Ingress protection

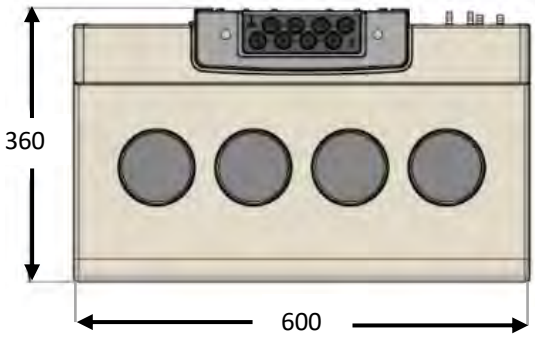
IP rating	IP2X

Dimensions

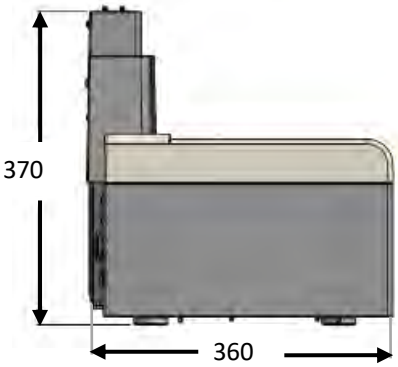
Reaction Station

600 (W) X 360 (D) X 370 (H)

Top view



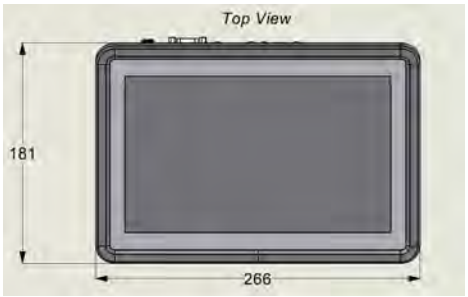
Side view



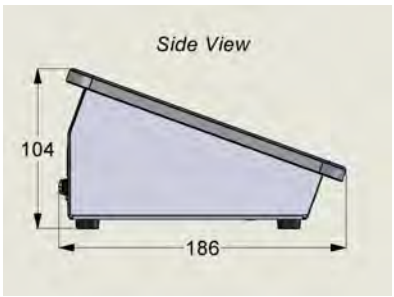
Control Pad

Touch-screen dimensions: 10” Display

Top view



Side view



Weights

Mya 4 Reaction Station	33.2 kg
Mya Control Pad	2.3 kg
Reflux Head	8.8 kg
Manifold Head	5.3 kg

12 Maintenance

The Mya 4 is a high-performance piece of equipment that needs to be regularly maintained. It is the end user's responsibility to ensure the unit is maintained correctly.

We would recommend that the user should:

- turn the unit off and disconnect the mains supplies (to both the Mya 4 main unit and the Control Pad) before carrying out any maintenance.
- wipe down all surfaces of the Mya 4 main unit and Control pad after each use to remove any contamination and avoid any staining or discolouration of the surfaces. We would recommend the use of warm water and mild detergents only.
- ensure that the External temperature probe and Compact Stirrer connection panel is clean and clear from any debris (remember to use protective caps when not in use).
- ensure that the wells have been wiped out after each use.
- ensure that all gas and coolant connections are secure.
- regularly inspect all O-ring seals used with the Mya 4 accessories (these parts are all considered to be consumables and are likely to need changing on a regular basis to ensure maximum performance):
    a. Glass vessel to lid seals
    b. Easy-On PTFE cap to glass tube seals
    c. Mya 4 Compact Stirrer guide seals
- regularly check and inspect the Mya Compact Stirrer guide – see Section 6.12.2 Stirrer Guide Care, of these Instructions.
- regularly check and inspect external temperature probes and replace if damaged.
- ensure that that coolant and purge gas is turned on and running during use, and that both are stopped when not in use.
- drain any coolant from the Mya 4 main unit if the unit is not likely to be used for a prolonged time period.
- store the Mya Compact Stirrer motors and stirrer guide assemblies outside of the fume hood when not in use to minimise corrosion from aggressive vapours.
- ensure that the Mya Stirrer guide assemblies are thoroughly dry after cleaning. We would recommend by the use of a drying cabinet.
- always follow recommended laboratory practice. Don't leave open chemical containers in the fume hood where the Mya 4 is located to avoid damage to the system from vapours.

Warning

♦ The user should NOT open up the Mya 4 main unit or the Control Pad, this will void any warranty. This should only ever be undertaken by a Radleys trained engineer.

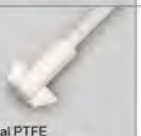
Notes

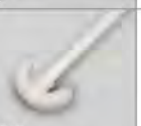
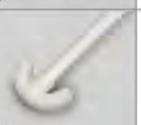
→ Radleys offer a range of Preventative Maintenance and Extended Warranty options. Please contact Radleys directly or your local Radleys distributor if you would like to know more.

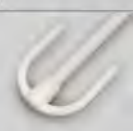
13 Component compatibility guide

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts		
12x32 mm Vial 2 ml RR40580	 8 x 12 mm Vials 14 mm deep RR40420	V-shape stirring bar 5 x 11 mm RR40640			
28x61 mm Vial 20 ml RR40585	 4 x 28 mm Vials/Tubes 32 mm deep RR40432	Octagonal stirring bar 13 mm RR98070			
 17x83 mm Tapered Microwave Vial 2 ml RR40581	 6 x 17 mm Tapered Vials 45 mm deep RR40425	V-shape stirring bar 5 x 11 mm RR40640			
 17x83 mm Microwave Vial 5 ml RR40582	 6 x 17 mm Vials/Tubes 32 mm deep RR40424	Cross shape stirring bar 10 mm RR98075			
16x100 mm Reaction Tube 7 ml RR99612	 6 x 16 mm Vials/Tubes 32 mm deep RR40422	Micro stirring bar 13 x 3 mm RR40638			
 Quick-Thread Glass Reaction Tube 24x150 mm RR91080	 4 x 24 mm Vials/Tubes 32 mm deep RR40428	Cross shape stirring bar 16.5 mm RE RR98091			
 25x150 mm Reaction Tube 50 ml RR40584	 4 x 1 inch Vials/Tubes 32 mm deep RR40430	Cross shape stirring bar 16.5 mm RE RR98091			
 Quick-Thread Glass Reaction Tube 24x200 mm RR40583	 1 x 24 mm Vials/Tubes 32 mm deep RR40426	Cross shape stirring bar 16.5 mm RE RR98091	 Flat PTFE stirrer shaft 272 x 15 mm RR40714		

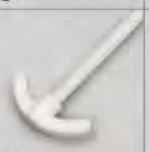
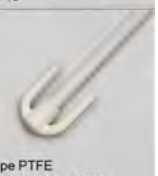
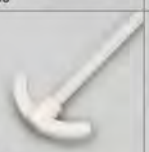
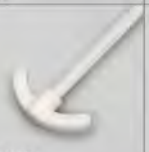
Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts	
 25 ml Reaction flask RR99145	 25 ml Round bottom flask RR40434	 Cross shape stirring bar 16.5 mm RE RR98091	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	 Flat PTFE stirrer shaft 272 x 15 mm RR40714
 50 ml Reaction flask RR99070	 50 ml Round bottom flask RR40436	 Cross shape stirring bar 16.5 mm RE RR98091	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	 Flat PTFE stirrer shaft 272 x 15 mm RR40714
 50 ml Reaction flask with B14/23 sidearm RR99071	 50 ml Round bottom flask RR40436	 Cross shape stirring bar 16.5 mm RE RR98091	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	 Flat PTFE stirrer shaft 272 x 15 mm RR40714
 100 ml Reaction flask RR99054	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	
 100 ml Reaction flask with B14/23 sidearm RR99074	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	
 250 ml Reaction flask RR99041	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts		
 250 ml Long neck reaction flask RR99919	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		
 250 ml Reaction flask with B24/29 sidearm RR99077	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		
 250 ml Reaction flask with B14/23 sidearm RR99047	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		
 250 ml Reaction flask with 2 x B14/23 sidearms RR99087	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		
 250 ml Reaction flask with 2 x B24/29 sidearms RR99088	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		
 250 ml Reaction flask with B14/23 and B24/29 sidearms RR99089	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712		

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts	
 50 ml Wide neck flask RR99926	 50 ml Round bottom flask RR40436	 Cross shape stirring bar 16.5 mm RE RR98091	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 50 ml Wide neck flask with B14/23 sidearm RR99927	 50 ml Round bottom flask RR40436	 Cross shape stirring bar 16.5 mm RE RR98091	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 100 ml Wide neck flask RR99928	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 100 ml Wide neck flask with B14/23 sidearm RR99929	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 100 ml Wide neck flask with 2 x B14/23 sidearm RR99930	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 100 ml Baffled wide neck flask with B14/23 sidearm RR99931	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts		
 50 ml Process reaction vessel RR40505	 50 ml Process reaction vessel RR40442	Cross shape stirring bar 16.5 mm RE RR98091	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	 Flat PTFE stirrer shaft 272 x 15 mm RR40714	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706
 50 ml Process reaction vessel with B14/23 sidearm RR40506	 50 ml Process reaction vessel RR40442	Cross shape stirring bar 16.5 mm RE RR98091	 Centrifugal PTFE stirrer shaft 272 x 35 mm RR40712	 Flat PTFE stirrer shaft 272 x 15 mm RR40714	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706
 100 ml Process reaction vessel RR40510	 100 ml Process reaction vessel RR40444	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 46 mm RR40708
 100 ml Process reaction vessel with B14/23 sidearm RR40511	 100 ml Process reaction vessel RR40444	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 46 mm RR40708
 100 ml Baffled process reaction vessel RR40513	 100 ml Process reaction vessel RR40444	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706
 100 ml Baffled process reaction vessel with B14/23 sidearm RR40512	 100 ml Process reaction vessel RR40444	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts	
 100 ml Baffled wide neck flask with 2 x B14/23 sidearms RR99932	 100 ml Round bottom flask RR40438	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700
 250 ml Wide neck flask RR99933	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702
 250 ml Wide neck flask with B24/29 sidearm RR99934	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702
 250 ml Wide neck flask with 2 x B24/29 sidearms RR99935	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702
 250 ml Baffled wide neck flask with B24/29 sidearm RR99936	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702
 250 ml Baffled wide neck flask with 2 x B24/29 sidearms RR99937	 250 ml Round bottom flask RR40440	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 261 x 35 mm RR40703	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts		
 150 ml Process reaction vessel RR40515	 150 ml Process reaction vessel RR40446	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 150 ml Process reaction vessel with B14/23 sidearm RR40516	 150 ml Process reaction vessel RR40446	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 150 ml Baffled process reaction vessel RR40518	 150 ml Process reaction vessel RR40446	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706
 150 ml Baffled process reaction vessel with B14/23 sidearm RR40517	 150 ml Process reaction vessel RR40446	 Elliptical stirring bar 25 mm RE RR99064	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 37 mm RR40700	 U-shape PTFE stirrer shaft 281 x 30 mm RR40706
 250 ml Process reaction vessel RR40525	 250 ml Process reaction vessel RR40448	 Oval stirring bar 40 mm RR95920	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 250 ml Process reaction vessel with B24/29 sidearm RR40526	 250 ml Process reaction vessel RR40448	 Oval stirring bar 40 mm RR95920	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710

Vessel	Insert	Recommended Stirring Bar	Compatible Stirrer Shafts		
 250 ml Baffled process reaction vessel RR40528	 250 ml Process reaction vessel RR40448	 Oval stirring bar 40 mm RR95920	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 250 ml Baffled process reaction vessel with B24/29 sidearm RR40527	 250 ml Process reaction vessel RR40448	 Oval stirring bar 40 mm RR95920	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 400 ml Process reaction vessel RR40540	Not required	 Oval stirring bar 50 mm RR95921	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 400 ml Process reaction vessel with B24/29 sidearm RR40541	Not required	 Oval stirring bar 50 mm RR95921	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 400 ml Baffled process reaction vessel RR40543	Not required	 Oval stirring bar 50 mm RR95921	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710
 400 ml Baffled process reaction vessel with B24/29 sidearm RR40542	Not required	 Oval stirring bar 50 mm RR95921	 Turbine PTFE stirrer shaft 276 x 35 mm RR40704	 Anchor PTFE stirrer shaft 277 x 55 mm RR40702	 U-shape PTFE stirrer shaft 281 x 49 mm RR40710

Rare Earth PTFE Magnetic Stirring Bars

- RE in the product name of a magnetic stirring bar stands for rare earth. Rare earth stirring bars are usually identified by a (chemically inert) black spot on the stirring bar.
- Rare earth magnets provide significantly increased magnetic strength compared to standard magnets – stronger attraction between stirring bar and drive magnet, useful for stirring viscous samples.
- Rare earth magnets are more resistant to demagnetisation, in contrast to standard stirring bars, which lose their magnetism with time and so require regular replacement.

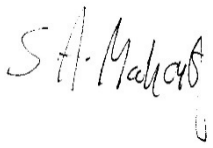
14 CE Declaration of Conformity

EC Declaration of Conformity

In accordance with BS EN ISO/IEC 17050-1:2010

Equipment Name:	Mya 4 Reaction Station
Equipment Description:	Laboratory sample chiller, heater and stirrer.
Equipment Cat No:	RR40400
Manufacturer/Supplier:	Radleys (R B Radley & Co Ltd)
Address:	Shire Hill, Saffron Walden, Essex, CB11 3AZ, UK
Authorised Representative:	24hour-AR
Address:	Van Nelleweg 1, 3044 BC Rotterdam, The Netherlands
Directives:	EMC 2014/30/EU Electromagnetic Compatibility Directive LVD 2014/35/EU Low Voltage Directive ROHS 2 2011/65/EU Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment Directive
European Standards:	BS EN 61010-1 :2010 +A1 :2019
International Standards:	IEC 61010-1: 2010 +A1 : 2019
American equivalent:	UL 61010-1 (3rd Ed.); Am. 1
Canadian equivalent:	CAN/CSA-C22.2 No 61010-1 + Amd 1
Tests carried out by:	Stafford Aero Technologies EMC Test Dept.
Address:	4 Chalk Hill House, 19 Rosary Road, Norwich, Norfolk, NR1 SZ, UK
Test Document Number:	EMC1551, LVD1551
Declaration:	We hereby declare that the above Equipment complies with the required Emission and Immunity and safety standards stated above.

Authorised by Radleys:

Signature 

CE

Name Simon Moorhouse

Position Director Operations

Date 3rd May 2023

EC Declaration of Conformity

In accordance with 2014/30/EU

Equipment Name:	Mya 4 Control Pad
Equipment Description:	Touch-screen control pad for the Mya 4
Equipment Cat No:	RR40805
Manufacturer/Supplier:	Radleys (R B Radley & Co Ltd)
Address:	Shire Hill, Saffron Walden, Essex, CB11 3AZ, UK
Authorised Representative:	24hour-AR
Address:	Van Nelleweg 1, 3044 BC Rotterdam, The Netherlands
Directives:	EMC 2014/30/EU Electromagnetic Compatibility Directive
European Standards:	EN 61 326-1:2021 Emission / Immunity
International equivalent:	IEC 61 326-1:2020
Tests carried out by:	Stafford Aero Technologies EMC Test Dept.
Address:	4 Chalk Hill House, 19 Rosary Road, Norwich, Norfolk, NR1 SZ, UK
Test Document Number:	EMC1644
Declaration:	We hereby declare that the above Equipment complies with the required Emission and Immunity and safety standards stated above.

Authorised by Radleys:

CE

Signature 

Name Benjamin Taylor

Position R&D Manager

Date 25th November 2022

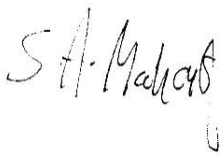
15 UKCA Declaration of Conformity

Declaration of Conformity

In accordance with BS EN ISO/IEC 17050-1:2010

Equipment Name:	Mya 4 Reaction Station
Equipment Description:	Laboratory sample chiller, heater and stirrer.
Equipment Cat No:	RR40400
Manufacturer/Supplier:	Radleys (R B Radley & Co Ltd)
Address:	Shire Hill, Saffron Walden, Essex, CB11 3AZ, UK
Directives:	Electromagnetic Compatibility Regulations 2016 Electrical Equipment (Safety) Regulations 2016
European Standards:	BS EN 61010-1 :2010 +A1 :2019
International equivalent:	IEC 61010-1: 2010 +A1: 2019
American equivalent:	UL 61010-1 (3rd Ed.); Am. 1
Canadian equivalent:	CAN/CSA-C22.2 No 61010-1 + Amd 1
Tests carried out by:	Stafford Aero Technologies EMC Test Dept.
Address:	4 Chalk Hill House, 19 Rosary Road, Norwich, Norfolk, NR1 SZ, UK
Test Document Number:	EMC1551, LVD1551
Declaration:	We hereby declare that the above Equipment complies with the required Emission and Immunity and safety standards stated above.

Authorised by Radleys:

Signature 

Name Simon Moorhouse

Position Director Operations

Date 3rd May 2023

EC Declaration of Conformity

In accordance with 2014/30/EU

Equipment Name:	Mya 4 Control Pad
Equipment Description:	Touch-screen control pad for the Mya 4
Equipment Cat No:	RR40805
Manufacturer/Supplier:	Radleys (R B Radley & Co Ltd)
Address:	Shire Hill, Saffron Walden, Essex, CB11 3AZ, UK
Directives:	EMC 2014/30/EU Electromagnetic Compatibility Directive
British Standards:	BS EN 61 326-1:2021 Emission / Immunity
International equivalent:	IEC 61 326-1:2020
Tests carried out by:	Stafford Aero Technologies EMC Test Dept.
Address:	4 Chalk Hill House, 19 Rosary Road, Norwich, Norfolk, NR1 SZ, UK
Test Document Number:	EMC1644
Declaration:	We hereby declare that the above Equipment complies with the required Emission and Immunity and safety standards stated above.

Authorised by Radleys:

Signature 

Name Benjamin Taylor

Position R&D Manager

Date 25th November 2022

16 MET (NRTL) Certification Record

eurofins | E&E

Certification Record

Listing#: E115827
Report #: 128571
Original Certification Date: October 24, 2023

This Certification is issued to:
RB Radley & Co Ltd
Shire Hill, Saffron Walden,
Essex, CB11 3AZ,
United Kingdom

Stating that the product(s):
Chemistry reaction station and control pad,
Models: Mya 4 Reaction Station, Control Pad

Product Rating(s):
Mya 4 Reaction Station: 100 – 240 VAC, 2 kW, 50/60 Hz,
Control Pad: 12-20 VDC, 60 W (Control pad is supplied and powered with a certified external power supply providing 12 VDC, 5.0 A output)

Achieved Certification to the following standard(s):
CSA C22.2 No 61010-1-12 + Amd1:18 (R2022) / UL 61010-1:2019 (3rd Ed.) Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General requirements, Rev. July 19, 2019
CSA C22.2 No. 61010-2-010:19 / UL 61010-2-010:2019 (4th Ed.) Safety requirements for electrical equipment for measurement, control and laboratory use, Part 2-010: Particular requirements for laboratory equipment for the heating of materials

Hon Keung IP
Certification Engineer,
Eurofins Electrical and Electronic Testing North America, Inc.

All changes proposed in the previously identified product that affects the above information must be submitted to Eurofins for evaluation prior to implementation to assure continued NRTL Certification status. The covered product(s) shall be subject to follow-up inspections to ensure that the Certified product(s) are identical to the product sample evaluated by Eurofins E&E NA and that all responsibilities are being fulfilled as specified in the Applicants' Responsibility section of the Certification Report. The Applicant named above has been authorized Eurofins E&E NA to represent the product(s) listed in this record as "MET Certified" and to mark this/these product(s) according to the terms and conditions of the Eurofins E&E NA Applicant Contract, Listing Reports, and the applicable agreements. Only the product(s) bearing the MET Mark and under a follow-up service are considered to be included in this Certification program. This certification has been granted under a System 3 program as defined in ISO/IEC 17067.

SCC Accredited CB-P/S

Eurofins E&E North America, Inc. is accredited by OSHA and the Standards Council of Canada.

NRTL

SAFJ TEMP-130-0, NRTLC Certification Record
7-19-2021 Page 1 of 1

17 CB Test Certificate

	Ref. Certif. No.
IEC IECEE CB SCHEME	DE-6-G5231151

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	Chemistry reaction station and control pad
Name and address of the applicant	R B Radley & Co Ltd Shire Hill, CB11 3AZ Saffron Walden United Kingdom
Name and address of the manufacturer	R B Radley & Co Ltd Shire Hill, CB11 3AZ Saffron Walden United Kingdom
Name and address of the factory *Note: When more than one factory, please report on page 2ff.*	RB Radley & Co Ltd Shire Hill, CB11 3AZ Saffron Walden United Kingdom
Ratings and principal characteristics	Mya 4 Reaction Station: 100 – 240 VAC, 2 kW, 50/60 Hz, Control Pad 12-20 VDC, 60 W
Trademark / Brand (if any)	radleys accelerating chemistry (radleys)
Customer Test Facility (CTF) Stage used	
Model / Type Ref.	Mya 4 Reaction Station Control Pad
Additional information (if necessary may also be reported on page 2ff.)	
A sample of the product was tested and found to be in conformity with	IEC 61010-1:2010 IEC 61010-1:2010/AMD1:2016 IEC 61010-2-010:2019
As shown in the Test Report Ref. No. which forms part of this Certificate	C14993TR1, C14994TR1

This CB Test Certificate is issued by the National Certification Body

eurofins

Eurofins Product Service GmbH
Storkower Strasse 38C
DE-15526 Reichenwalde b. Berlin
Germany

EUROFINS PRODUCT SERVICE GMBH · CERTIFICATION BODY ·

Date: 2023-08-25

Signature: Holger Schaffer

Warranty – Email Back

sales@radleys.com

To qualify for your warranty please complete, scan and email this form to Radleys

Product Name/Model	
Product Batch or Serial No. (If shown)	
Date of purchase	
Supplier's name and address	
Organisation name	
First name	
Last name	
Job Title	
Department	
Address	
Country	
Postal/Zip Code	
Email	
Phone	
Mobile	

Type of Organisation: *Tick all relevant boxes*			
Academic		Lab Equipment Dealer/Manufacturer	
Animal/Marine/Vetinary		Medical/Clinical/Diagnostic/Device	
Automation/Engineering/Electronics/Instrumentation		Metals/Mining	
Chemical/Agrochem		Natural Products/Tobacco	
Consumer/Cosmetics/Textile		Petrochem/BioFuels	
CRO/CMO/CDMO		Speciality Chemicals/Materials	
Defence		Testing Services	
Energy		Waste/Water/Recycling/Environmental	
Engineering Contracts/Facility Mgmnt/ Instrumentation Service		Other _____	
Food/Flavourings/Farming/Beverages			

Field of work: *Tick all relevant boxes*			
Analytical Chemistry		Liquid Handling & Micro Plates	
Automation/HTS		Material Sciences	
Biochemistry		Medical Devices	
Biological Sciences		Medicinal Chemistry	
Catalysis		Microbiology/Tissue Culture	
Chromatograohy		Molecular Biology	
Clinical/Medical/Pathology		Neurology	
Colloids		Organic Chemistry	
Construction		Parallel Chemistry/Combi-Chem	
Crystallisation		Polymers & Oils	
Drug Discovery		Process Dev/ Scale-Up	
Environmental Health		Process Safety/Calorimetry	
Estate & Facilities Management		Purchasing/Stores	
Food & Agriculture		QC/QA	
Formulation		Separation/SPE	
Geology		Support/Engineering	
Health & Safety		Temperature Control	
Inorganic Chemistry/Metallurgy		Veterinary	

www.radleys.com

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