Temperature Controlled Reactor (TCR)

Assembly Manual

Revision 1f - 05/13/2025

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Description and Intended Use

The Temperature Controlled Reactor (TCR) ensures that the temperature is kept constant among a set of 48 micro-vials. It achieves this by guiding coolant through a series of specially designed flow paths in order to ensure that each of the 48 micro-reactors that it holds is being subjected to the same rate of heat transfer. It comprises a two-part anodized aluminum base, a set of gaskets, a collection of O-rings, and a pair of quick-connect fittings. This device supports broad compatibility with a variety of products from Analytical Sales and Services.

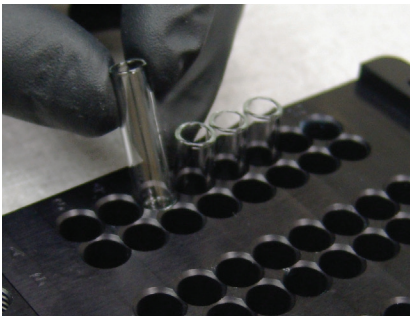
Purpose of this Document

This manual is intended to serve as a guide to the operation and capabilities of the Temperature Controlled Reactor (TCR), a device used to control the temperature of a selection of micro-reactors while conforming to SLAS standard dimensions. Information will be provided on assembly, proper use, and important features.

Parts List

- TCR Vial Rack (block)
- TCR Lid
- PFA Film (489907)
- Blue Flourosilicone Gasket (489906)
- 5/16”-18 screws (489532)
- Tubing with Stainless Steel Quick-connect Fittings

Assembling the TCR

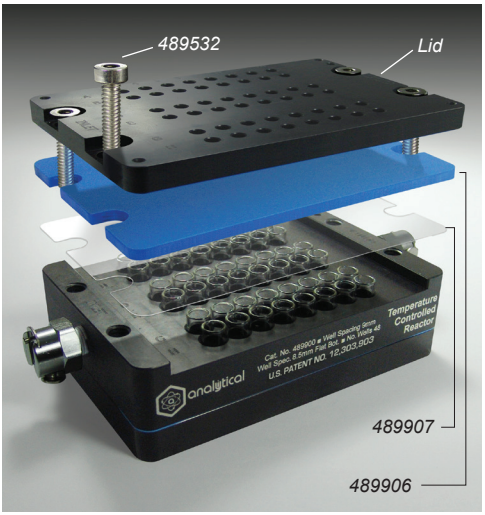


1. Load 48 (8 x 30mm) vials by placing them one-by-one into the reactor by hand. They can be removed in the same manner. The TCR has been designed to ensure that enough of the vial will protrude for it to be easily picked up by hand.

2. Place the PFA Film *(489907)* on top of the vials. Make sure the PFA film is properly aligned with the TCR block.

3. Place the Blue Flourosilicone Gasket *(489906)* on top of the PFA film, making sure it is aligned with the PFA film and block.

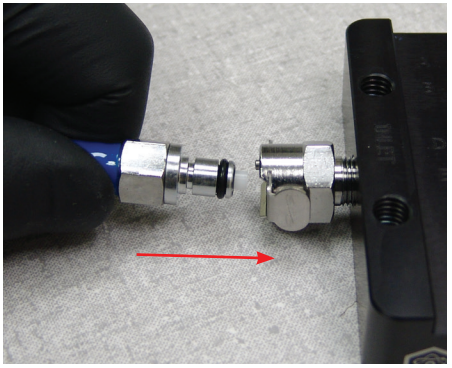
4. Place the lid on top of the blue flourosilicone gasket. Insert the four 5/16”-18 screws *(489532)* in the corners of the reactor to and tighten to 20 in-lbs of torque.



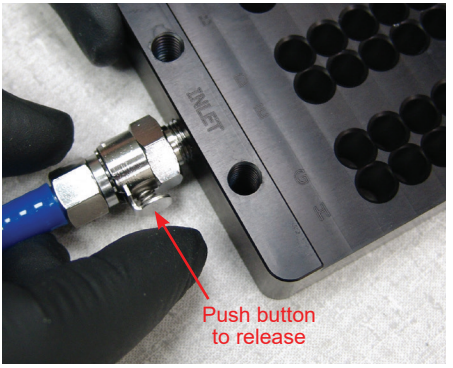
Note: Do not remove the ten socket head cap screws on the underside of the device. They are not user-serviceable and are meant to be accessed only by the highly trained production personnel of Analytical Sales and Services during assembly only.

5. Connect the tubing. Insert the stainless steel mating connectors of the tubing into the quick-connect fitting receptacles until they click into place. Connect the other end of the tubing to a recirculating chiller. To remove tubing from the TCR, press the button on the fitting to release the male connector. Please note that while the connectors are leak-proof, a few drops are normal and expected during disconnection.

Note: the female end of the fitting that is screwed into the TCR block should not be removed.



Connect tubing



Disconnect tubing

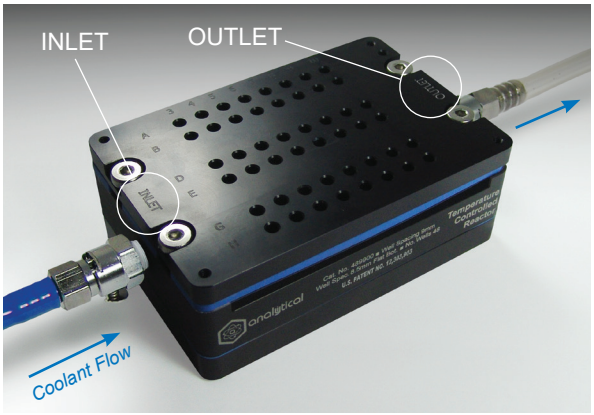
TCR block assembly is now complete and ready for setup and experimentation

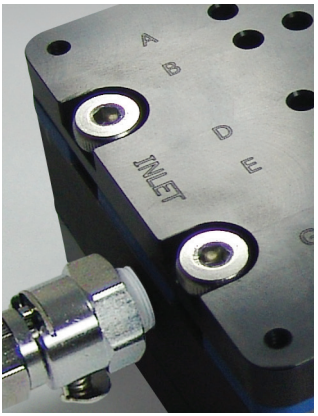
Notes on Using the TCR

This information should be kept in mind when using the TCR.

1. Inlet/Outlet Order

The TCR is designed to have coolant running through it in only one direction. Fluid should enter the unit through the side marked “Inlet” and exit the unit through the side marked “Outlet”. Reversing these could lead to higher than expected temperature gradients.





2. Temperature Limits

The TCR is designed to be used at temperatures between -40°C and 82°C. This range ensures that experiments can be conducted at a variety of temperatures that are of immediate use to the scientific community.

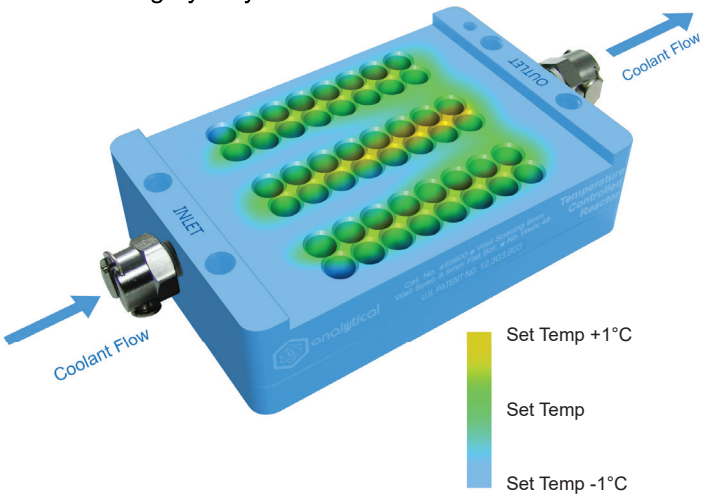
3. Chemical Compatibility

The TCR is compatible with the following coolants; water (down to 5°C), silicone-based coolants such as SYLTHERM™, propylene glycol, and ethylene glycol.

Features and Capabilities of the TCR

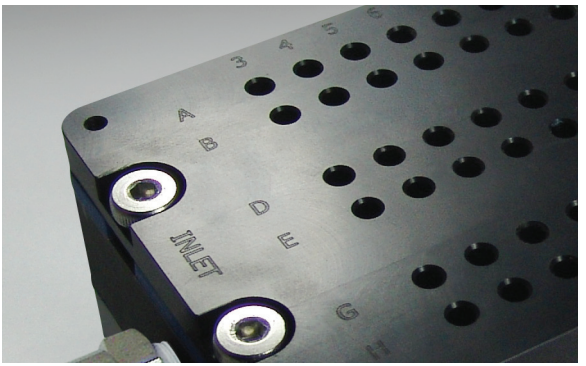
1. Temperature Uniformity

The TCR is capable of maintaining a very low temperature gradient, with vial temperatures differing by only +/-1°C.



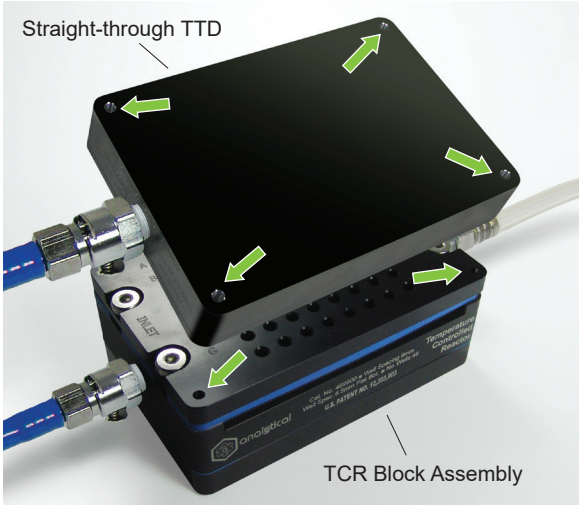
2. Using the TCR with Autosamplers

This 48 well design conforms to SLAS outer dimensions and the wells have a standard 9mm pitch. In order to keep the design within the SLAS footprint, rows C and F and columns 1, 2, 11, and 12 have been removed. The TCR has been engraved to clearly reflect this change and further technical documentation detailing the change is available on the Analytical Sales and Services website. The holes in the lid have been specially sized to 4mm in order to allow for easy use with a wide variety of autosampler needles.



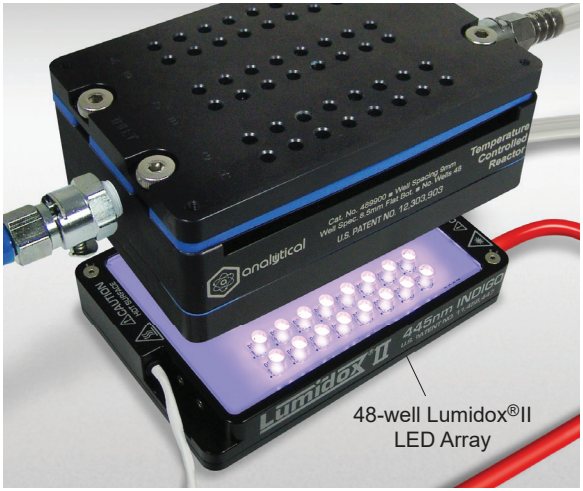
3. Accessory Attachment

The lid has 6-32 threaded holes on top to allow for the use of a variety of Analytical Sales and Services accessories. This includes the TTD, TTD+, and Straight-Through TTD. These devices can be paired with a 48-well Lumidox to more completely utilize the potential of the Temperature Controlled Reactor.



4. Lumidox Compatibility

The TCR is compatible with the 48-well Lumidox®II LED array which has a lens mat designed to fit within the 48-well base of the TCR. This will allow users to perform constant temperature photocatalysis.



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