

What are the different switches for?

There is one switch for enabling 1, 2 or 4 panels, and there is another one with 2 modes: high and low. In high mode, the LEDs can operate at higher current while only one LED is in use, allowing for higher power (i.e. higher photon flux). In low mode, multiple colours can be enabled simultaneously.

What are the parameters that can be controlled during the reaction?

You can control the stirring speed (batch), the wavelength, the light intensity, the temperature and the reaction time (batch) or the residence time via the flowrate (flow).

Can I scale-up in Kg scale?

Although the PhotoCube was not design for that scale, you could scale up to ca. 100 g a day in a continuous flow mode for some cases.

What would be the maximum volume that can be used in the PhotoCube?

If you are performing continuous flow chemistry it is probably better to consider the flowrate range rather than a maximum volume. Depending on the conditions in hand (reaction time, concentration, loop size etc.) the flowrate range can be anywhere between the  $\mu\text{L}$  to tens of mL/min. On the practical side, the loop that is coiled around the holder can range from ca. 2 to 20 mL.

If you are doing batch chemistry, it depends on the vial size. Standard holders can contain until 8x4 mL or 4x30 mL vials. Therefore, the maximum volume with the standard size vials would be 120 mL. However, it is possible to have custom-made holders for any size you are looking for as long as it fits into the chamber.

Can I use multiple wavelengths simultaneously, e.g. 395 nm and 457 nm at the same time?

Yes, in low mode, you can use multiple wavelengths at the same time.

What if I want to optimise to the 254 nm irradiation?

Unfortunately, the specifications of the PhotoCube does not include 254 nm wavelength LED. The lower wavelength available is in the near UV, at 365 nm. High power 254 nm LEDs with a reasonable lifetime are not available at the moment (the LED technology is not there yet).

Can I perform moisture- and air-sensitive reaction?

This can be done in a very similar fashion as for any other batch or flow setups. In batch mode, you need to perform inertization before placing the vial into the PhotoCube. When running a flow reaction, the feeding and collection vessels might be placed under a small positive pressure of dry Ar or N<sub>2</sub> using the appropriate needles, septa etc.

What is the maximum stirring speed?

The maximum stirring speed to be set is 1500 RPM. However, please note that the geometry of the stir bar, the stirring speed and the viscosity of the stirred material will affect the efficiency of the stirring. The user must determine the appropriate combination of these parameters to optimize magnetic stirring. The working speed will mainly depend on the size of your stirring bar.

Can I use the H-Cube Pro and the PhotoCube in combination?

Yes, you can, but be aware that since the tubing for the PhotoCube is made of PEF or PFA, you will not be able to reach as high pressure as with the H-Cube Pro alone.

Can I perform pressurized reaction? If yes, what would be the maximum pressure?

The standard vials which are typically used with the PhotoCube cannot be pressurized. However, one can use other vials with customized holders. In such case, the user has to make sure to work under safe operating conditions with the vials in hand.

If you are doing flow chemistry, it can be easily achieved by connecting a back-pressure regulator to the system. Please note that the pressure capability will be limited by the tubing, made of PEF or PFA.

Can I introduce any external gas?

Yes, you can by connecting a gas module or a mass flow controller to the system. You could for example perform oxidation reactions using oxygen gas.

Can I perform refluxing reactions?

Unfortunately, it cannot be done due to space and technical limitations.

Which thermostating liquid can be used and is there any specification about the temperature?

The heat exchanger is made from aluminium. Therefore, any thermostating liquid compatible with that can be used. If the temperature range allows it, water can be used efficiently.

Can I handle slurry material?

In batch mode, it will not be an issue at all. In flow mode, it is possible after few considerations. You must ensure that you have the right pump (peristaltic pump probably) and also there will not be any clogging of your material in your tubing.

What is minimum and maximum flow of the HPLC pump?

This pump can range from 0.1 to 10 mL/min. But you can also use a syringe pump for example if your reaction requires a lower flowrate. The choice of the pump will actually depend on your application.

Do I need to use a third-party magnetic stirrer?

The PhotoCube features in-built magnetic stirring.

What is the maximum lamp lifetime?

The lamp life time will depend on the conditions applied. Under mild conditions (low current, temperature) some LEDs can run for more than ten thousand hours without significant decrease in light intensity. When run at maximum current the normalized luminescence can drop below 90% after a few thousand hours, but even around a ten thousand hours lifetime the normalized luminescence value is expected to be above 70%.

Can light sources be customized as per customer requirement in PhotoCube?

Yes, customized solutions are available from ThalesNano. If you have a specific setup in mind please contact us at [askthechemist@thalesnano.com](mailto:askthechemist@thalesnano.com).