

# Water Cooling System

**Chosen liquid cooling system:** ThermoTek P307

**Cooling/Heating Specifications:** The laser must be maintained at a temperature between 16 and 18 degrees Celsius, with a requirement of 400 W of cooling for the EOS laser and an unknown amount for the ANU laser. This chiller can provide 720 W of cooling at an ambient temperature of 20 degrees, and 570 W at an ambient temperature of 35 degrees, with a stability of 0.1 degrees, maintaining a temperature between 10 and 35 degrees; if the ANU laser uses a much larger amount of power, the higher models, such as the P310, etc, can provide even more cooling with largely the same design.

**Power Supply:** Single-Phase, 230 VAC, 6.5 A, 50 Hz. The current power supply for the inside of the telescope is single-phase and the amount of power available to the telescope is not currently a problem.

**Placement:** The chiller will be placed within the auxiliary electrical cabinet on the third floor; failing this, it will be placed beside it instead, so that large amounts of water tubes are not needed.

**Operation and Maintenance:** The chiller has a volume of 2 litres (higher models go to 2.5 liters), and it cools itself by airflow through the side panels and out the rear panel, or by water. For the purposes of its use in the telescope, it will operate with the air-water system, instead of the water-water system, due to the difficulty of providing it with enough water flow in such a remote location. The water inside the loop, 2 litres, will need to be periodically refilled though; this can be done with any water of enough purity.

**Control System:** The cooling system will be controlled by a cooler switch in the communications box which is located on the first floor of the telescope. This will be controlled by an Ethernet cable routed from the main control room, but the signal from the switch to the chiller itself will be an RS-232 cable.

**Other Notes:** EOS does have a chiller available, but it is currently being used for a different application at a different temperature, making it unusable for our purposes; in addition it does not have enough cooling power to meet the requirements of 400 W.

