Installing and cooling the M8cool

1 Technical data

The technical data is the same as for the M5 HB:
http://www.keller-druck.ch/picts/pdf/english/M5HB_e.pdf

Unlike the M5 HB, however, the M8cool can be used with media up to 1000 °C in temperature if cooled with compressed air or water. The TOB1 temperature can be read off via Modbus or KELLER bus at the RS485 interface, providing a basis for designing the cooling system, for instance.

Maximum chip temperature in operation	180 °C
Temperature resistance of the chip	200 °C
Media temperature (with active cooling)	1000 °C

2 Installation

The M8cool is screwed into an M8 x 0,75 thread and sealed in place with a copper ring. The maximum tightening torque is 6 Nm.

Thread	M8 x 0,75
Seal	Copper ring
Maximum tightening torque	6 Nm

3 Cooling system design

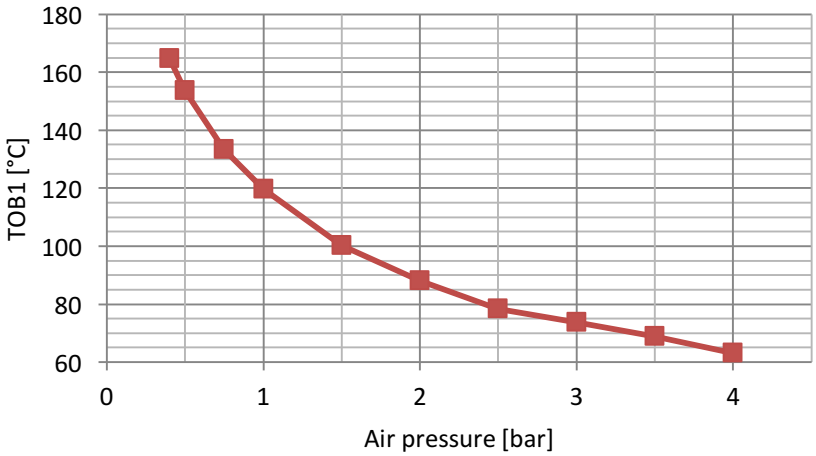
The M8cool can be cooled with compressed air or water depending on availability and the specific application. The design of the M8cool's cooling system depends on the relevant application and construction and must thus be determined based on experience. The cooling system must be set up in such a way that the chip temperature (TOB1) is always below 200 °C (180 °C in measurement mode).
Note: after switching the equipment off, the M8cool must continue to be cooled until the temperature in the area immediately surrounding where it is installed is below 200 °C. If cooling switches off during operation at a temperature above 200 °C, the M8cool will suffer damage (ranging from a shift in its zero point to total failure).

3.1 Cooling with compressed air

Compressed air is available virtually everywhere and is usually very quick and easy to obtain. If the M8cool is cooled with compressed air, the infeed must be connected to one of the coolant pipes and the other left exposed without a hose attached. To improve the cooling performance, the compressed air must be run as close as possible to the M8cool with as large a cross section as possible (≥ 6 mm) and only adapted to fit a 4 mm hose right at the end.

3.1.1 Practical example: measuring exhaust gas

The following measurement scenario shows how the temperature behaviour of the chip (TOB1) changes with the pressure being applied. A 4 mm pneumatic hose 30 cm long is positioned between the pressure measurement point and the M8cool. The exhaust gas has a temperature of 660 °C. The graph provides the starting point for designing the cooling system. The cooling performance actually required has to be determined based on the equipment and the specific application.

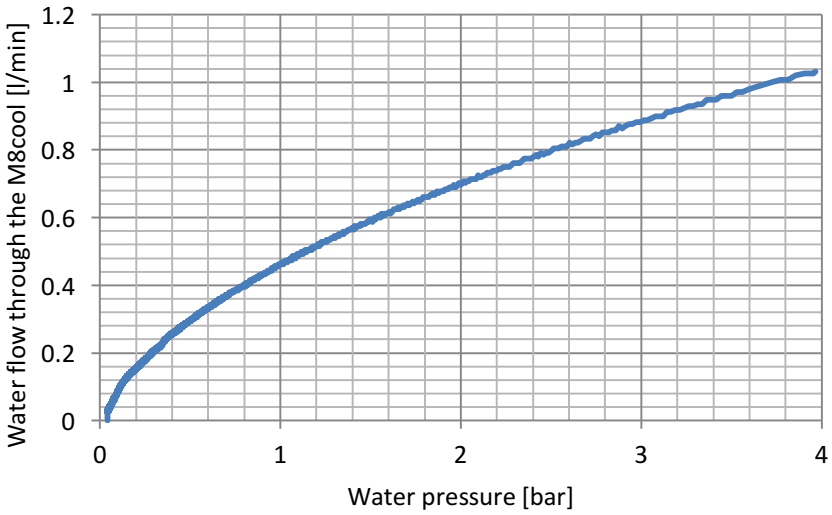


3.2 Cooling with water

Cooling with water is much more efficient than with compressed air. Either an open or a closed system can be used. The cooling water must be clean and free of any suspended matter. Otherwise, the very small cooling chambers of the M8cool could easily become blocked, damaging or even destroying the transmitter through overheating.

3.2.1 Flow of the cooling media through the M8cool

The graph below shows how the flow changes with pressure. In this case, the M8cool was operated in an open system with 70-cm-long 4 mm pneumatic hoses on both sides.



3.2.2 Practical example: measuring exhaust gas

At a constant exhaust gas temperature of 827 °C ± 6 °C, the temperature of the M8cool's chip (TOB1) reaches approximately 37 °C at a cooling water temperature of 17 °C in an open cooling system at 200 ml/min and approximately 50 °C at 100 ml/min.