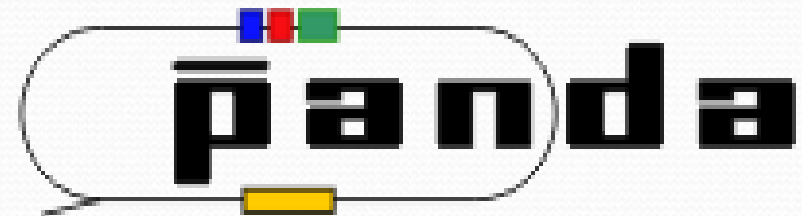


# Status of Coolingbox for measurements with SiPMs

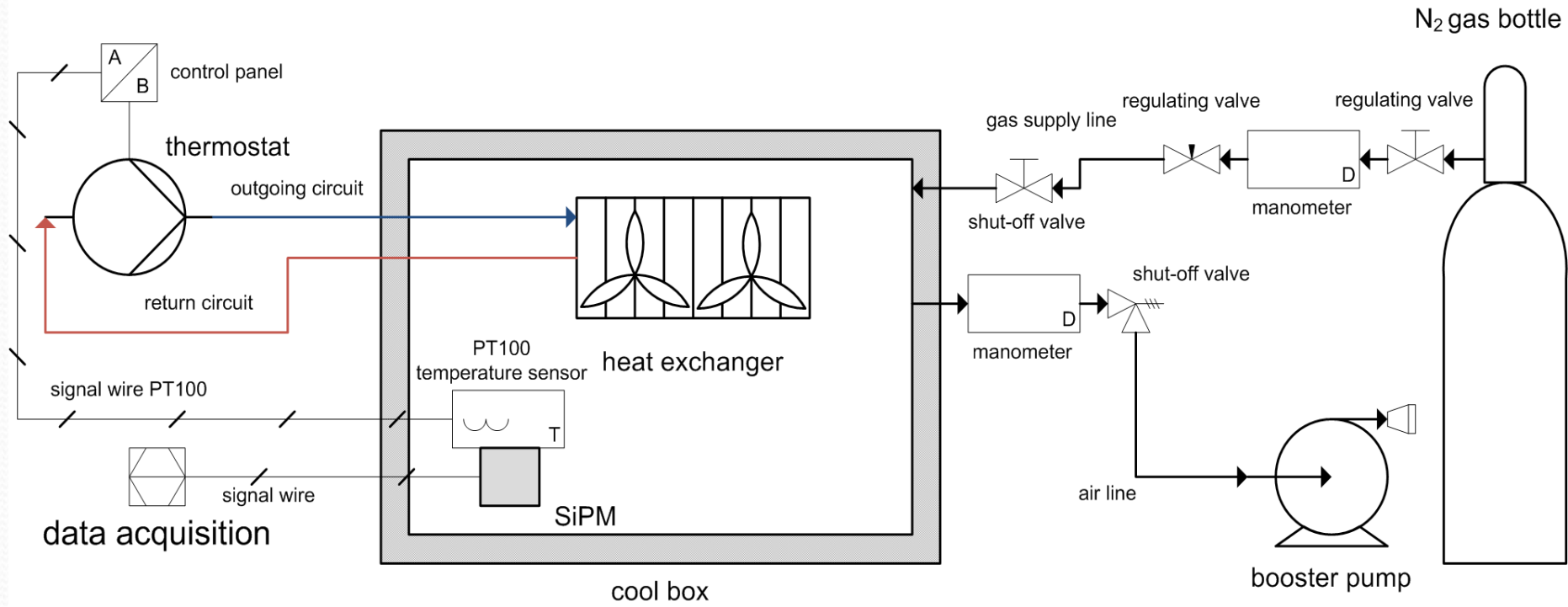
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# cooling box setup

- 3 parts: cooling, box, flushing



# thermostat

- thermostat:  
Huber ministat 230-cc-NR
- extern (process) temperature control
- resolution 0.01K
- heat/cooling system
- RS232 interface
- dimension: 25x45x47cm



# thermostat

- temperature range/power:

200°C to -40°C

0°C            380W

-20°C        250W

-40°C        50W

- problem: low power at low temperatures

# cool box

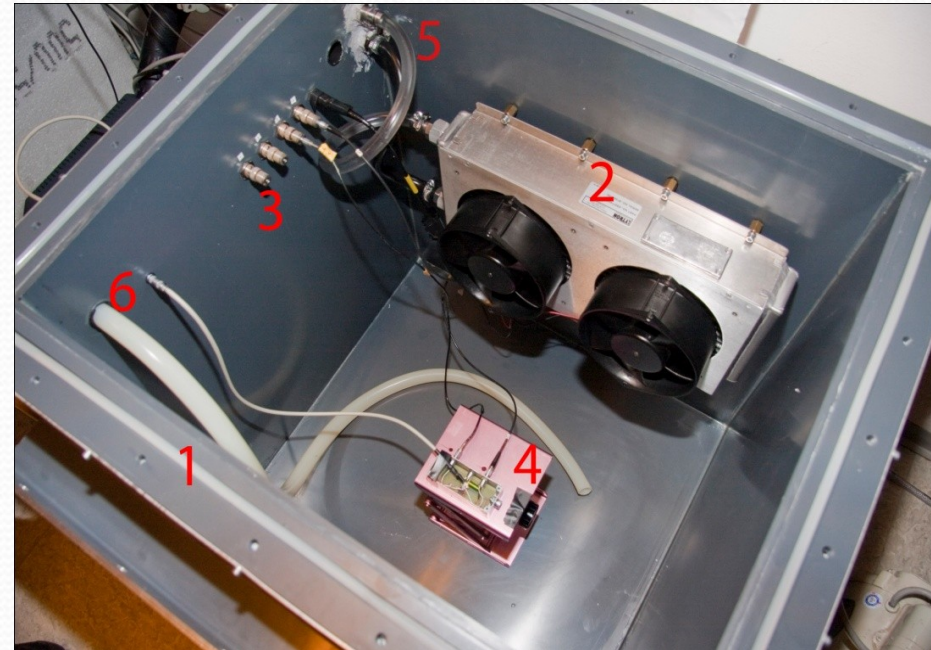
- inside dimension:  
60x50x55 cm, ~ 165l

(1) body:

1cm thick PVC plates  
4cm thick vip-panel  
(vacuum insulated panel)  
aluminium hull

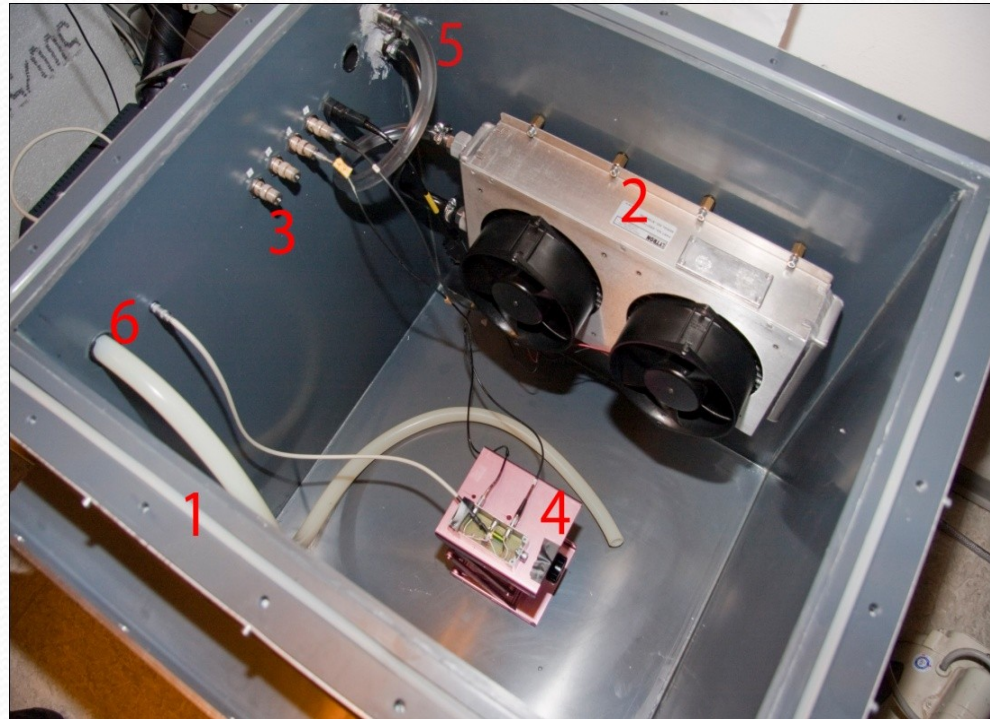
(2) sp. heat exchanger for oily fluid (coolant M60.115.05)  
with two 12-30V/max. 23W DC fans

(3) 4x 1pin-connectors (upgradeable)



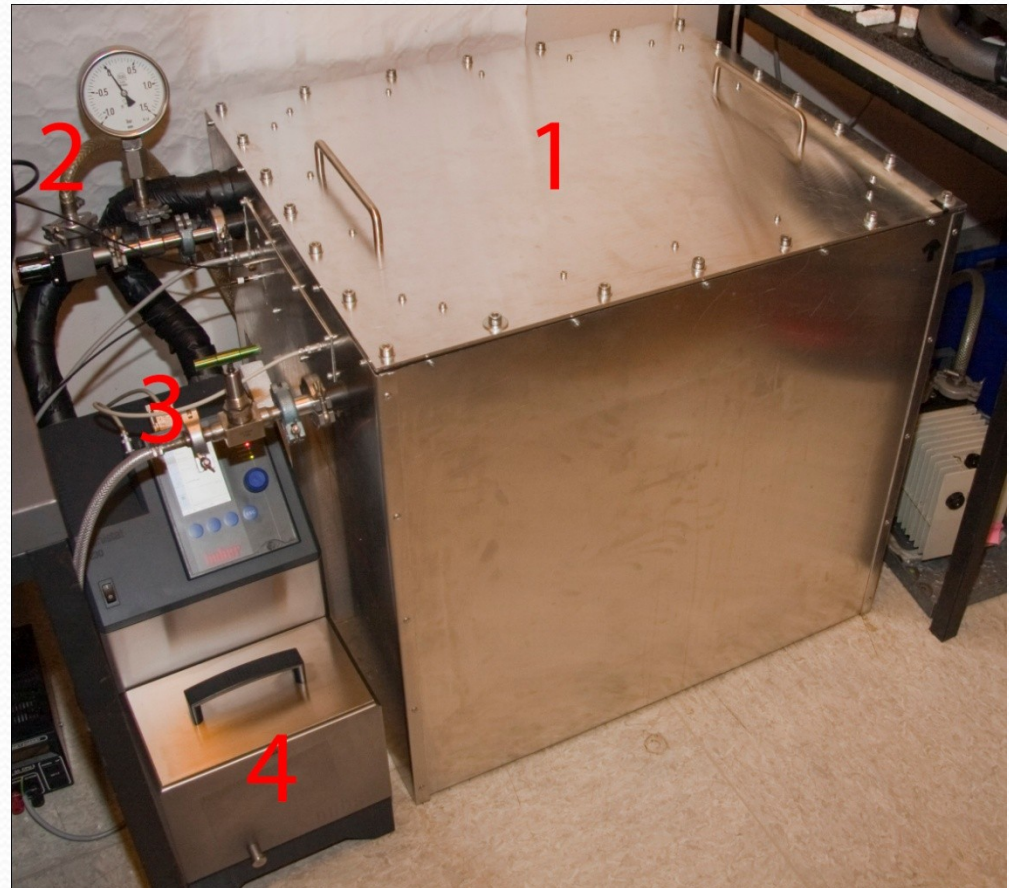
# cooling box

- (4) SiPM + PT100  
temperature sensor
- (5) cooling circuit pipes
- (6) gas supply tube



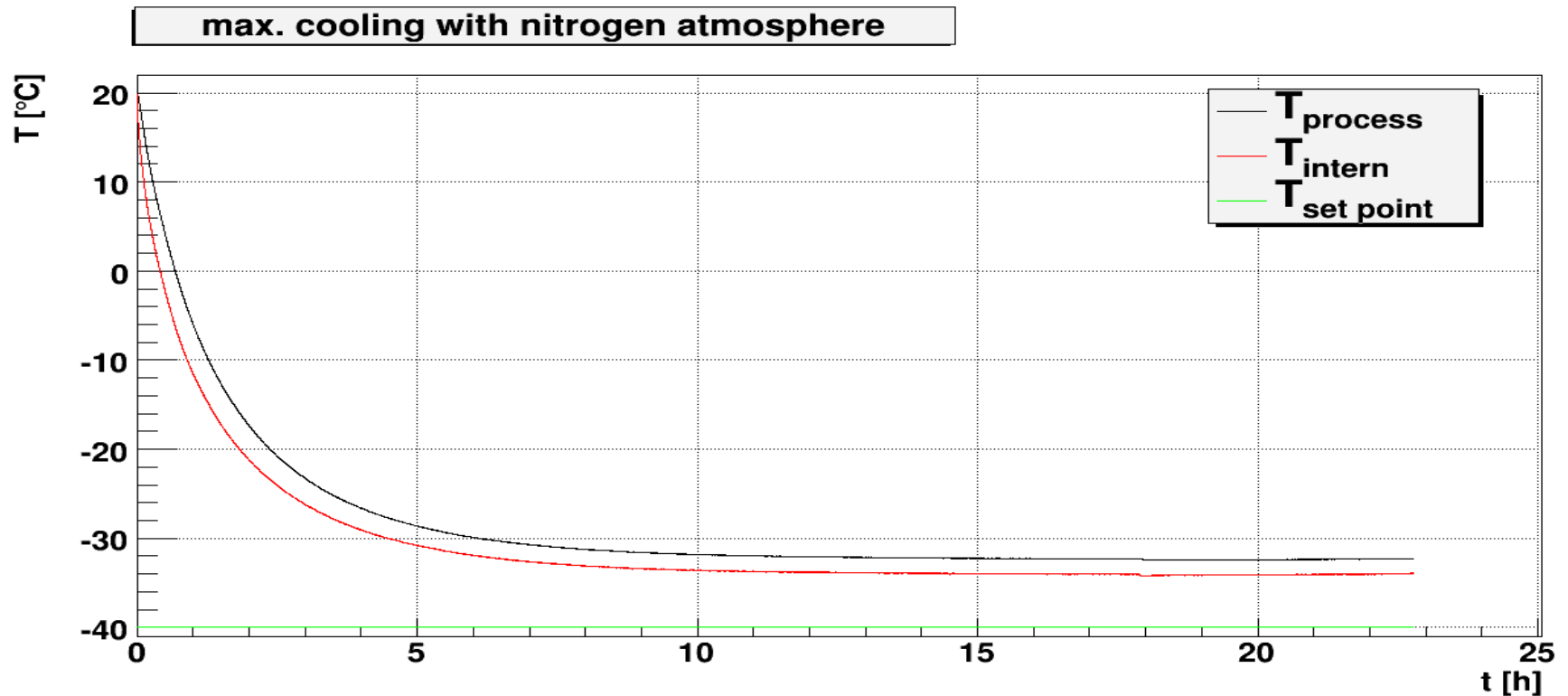
# flushing elements

- closed cooling box
- (1) isolated system
- (2) output: air tube
- (3) input: gas supply tube
- (4) thermostat
- still some leaks



# cooling

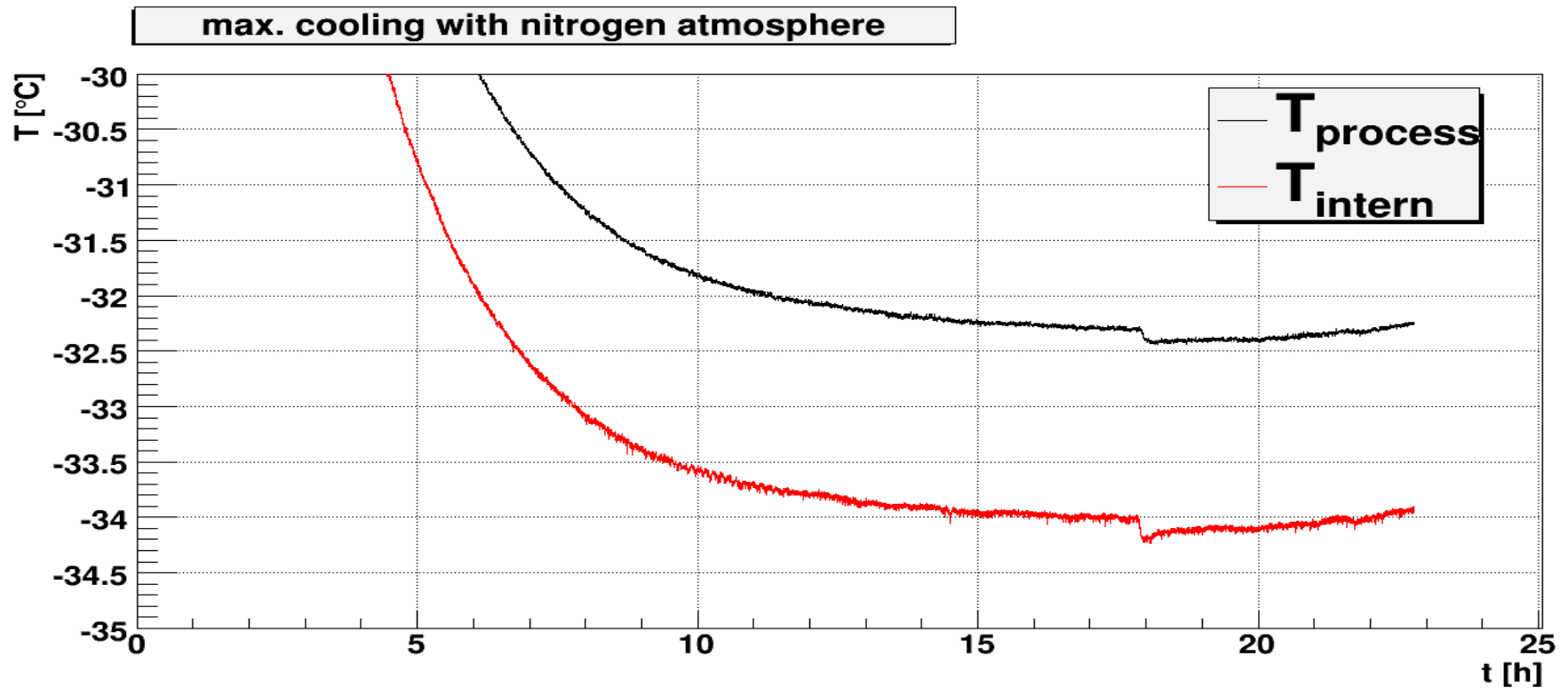
- cooling limit  $\sim -32^\circ\text{C}$
- cap of coolingbox not perfect isolated  $\rightarrow$  styropor housing





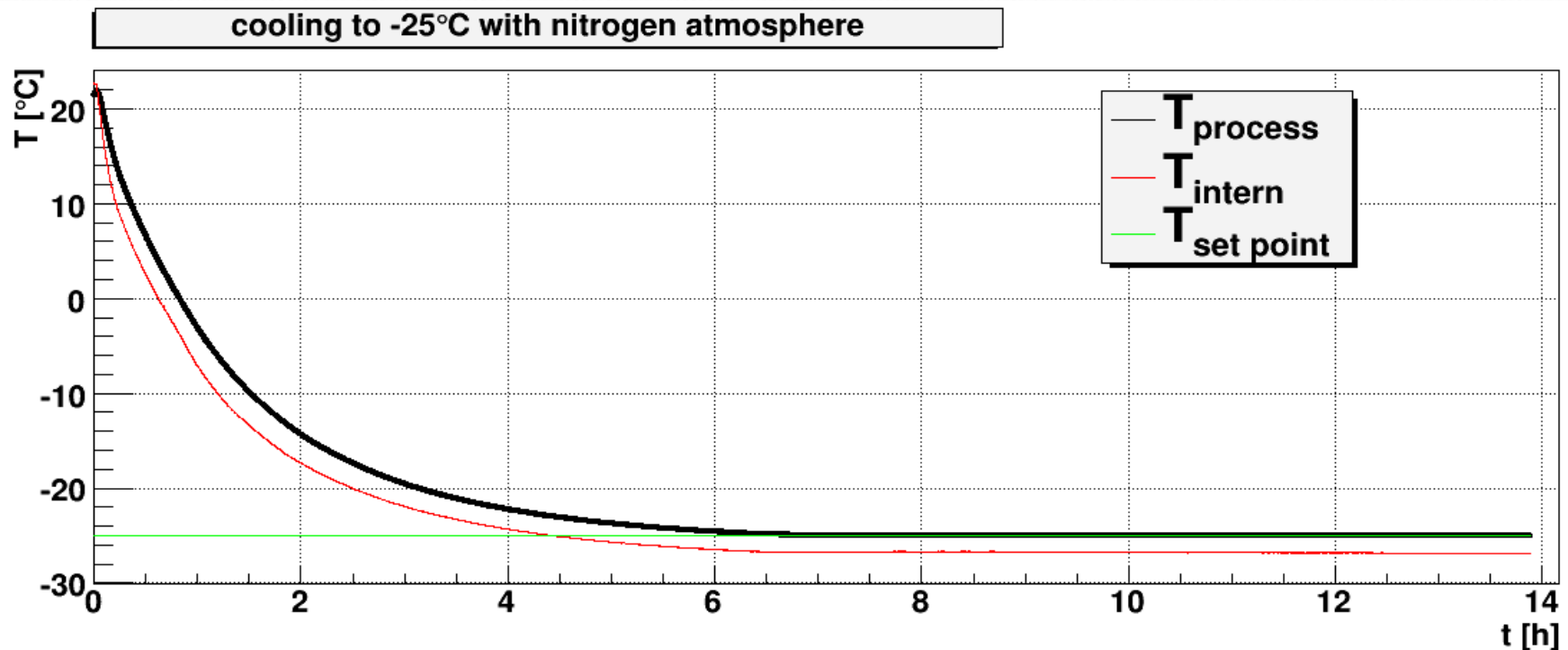
# cooling

- semistable around  $-32^{\circ}\text{C}$

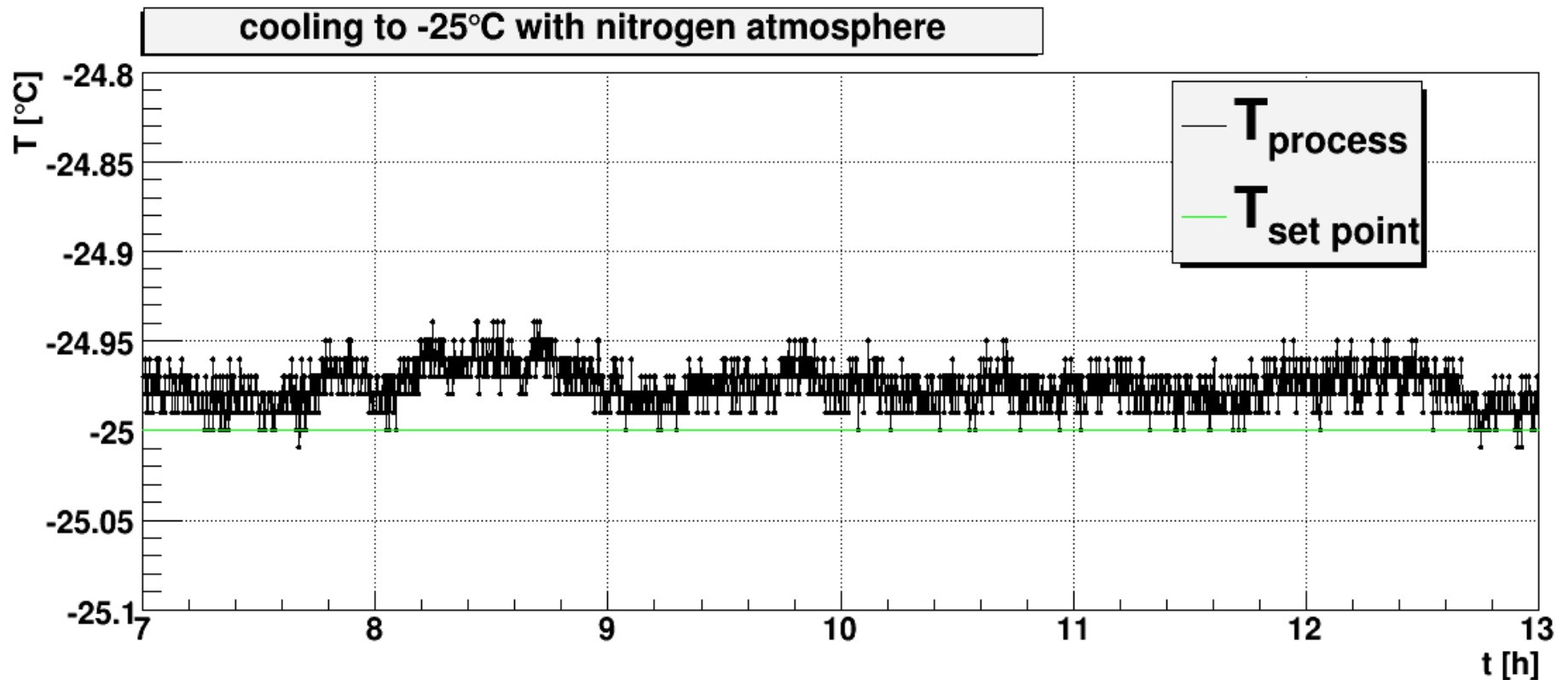


# temperature stability

- after 6h cooling - temperature constant with  $\Delta T = 0.04\text{K}$



# temperature stability



# outlook

- measurements with different detectors and readout circuits
- box upgrade (more connectors + laser feedthrough)