

Status of Pump Tests

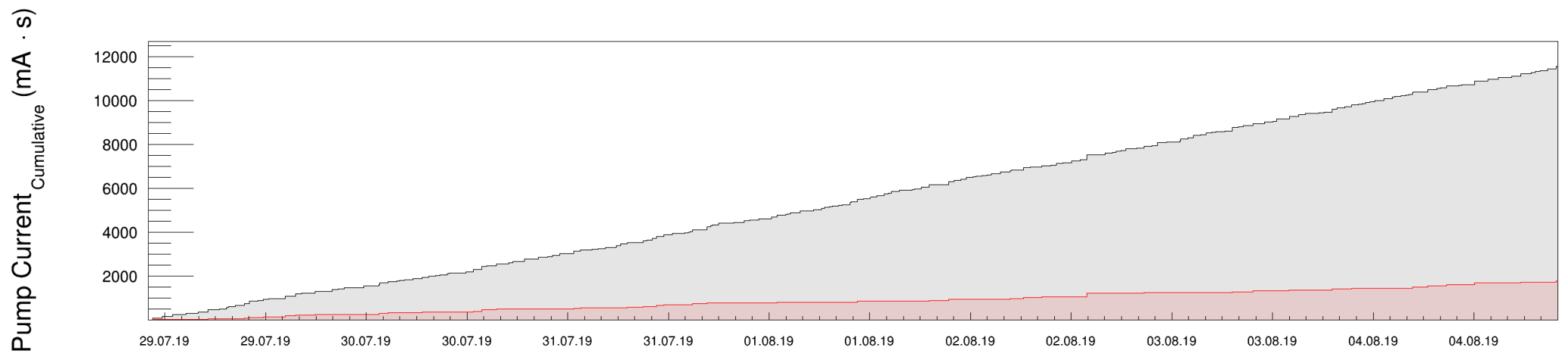
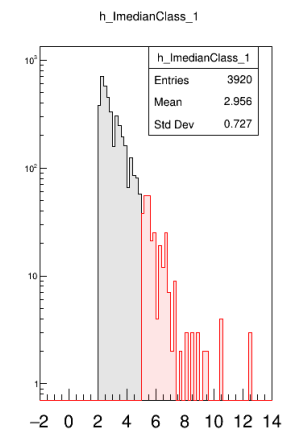
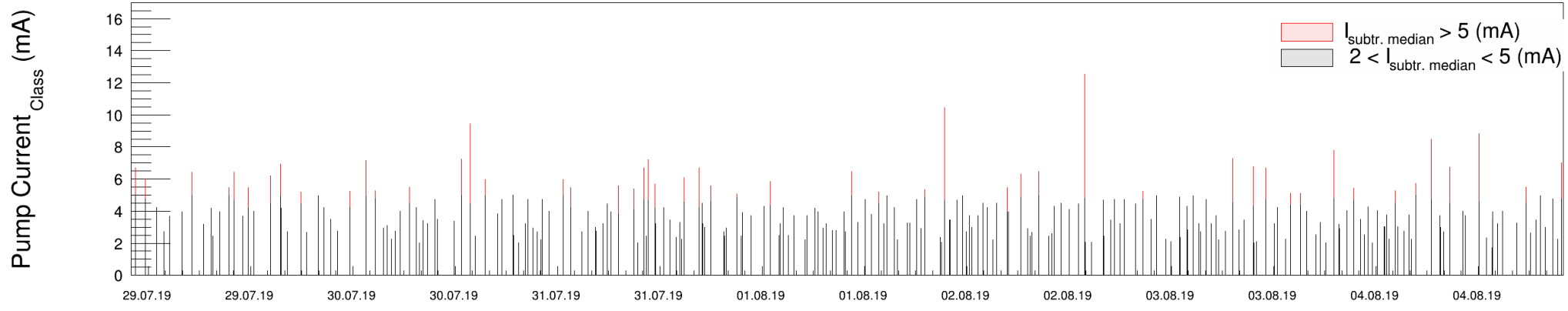
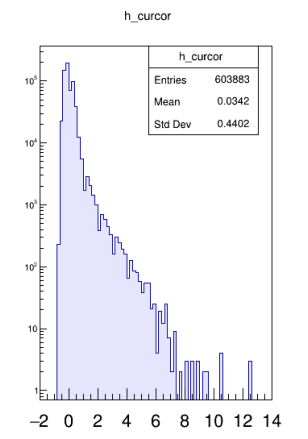
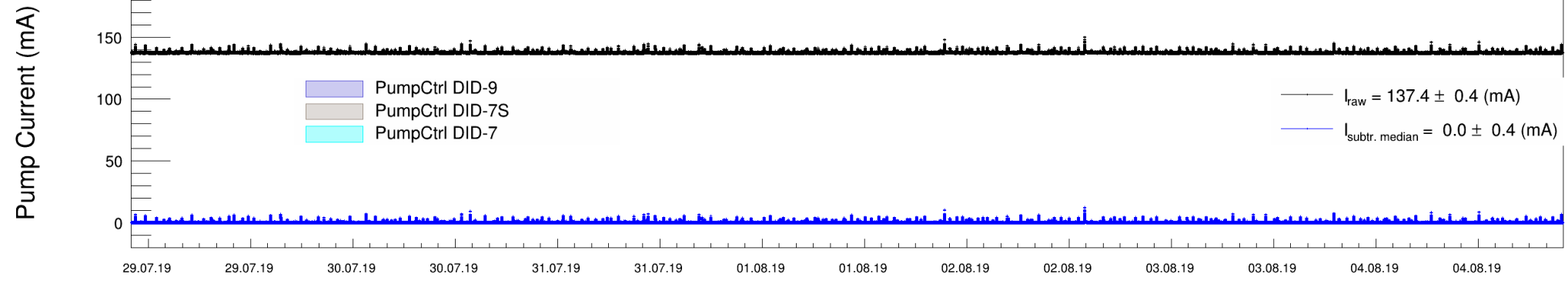
05.08.2019 UTTPS Aachen Meeting

MK #1 (LT-003)

- $T_{\text{pump}} = +15^{\circ}\text{C}$, $T_s = +20^{\circ}\text{C}$
- $T_{\text{pump}} = +10^{\circ}\text{C}$, $T_s = +20^{\circ}\text{C}$
- Pump Inspection (Feb. 13 – 14)
- $T_{\text{pump}} = +10^{\circ}\text{C}$, $T_s = +20^{\circ}\text{C}$ (Feb. 18 – 25)
- $T_{\text{pump}} = +5^{\circ}\text{C}$, $T_s = +15^{\circ}\text{C}$ (Feb. 25 – May. 23)
- Pump Inspection (May 23 – 24) & Restart (May 27)

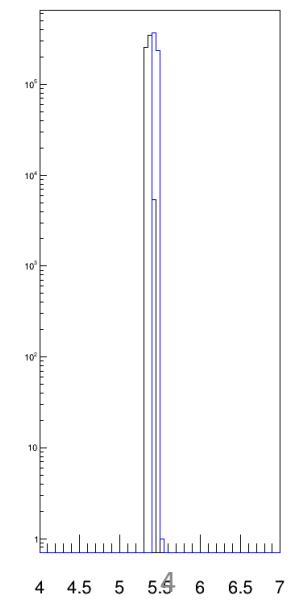
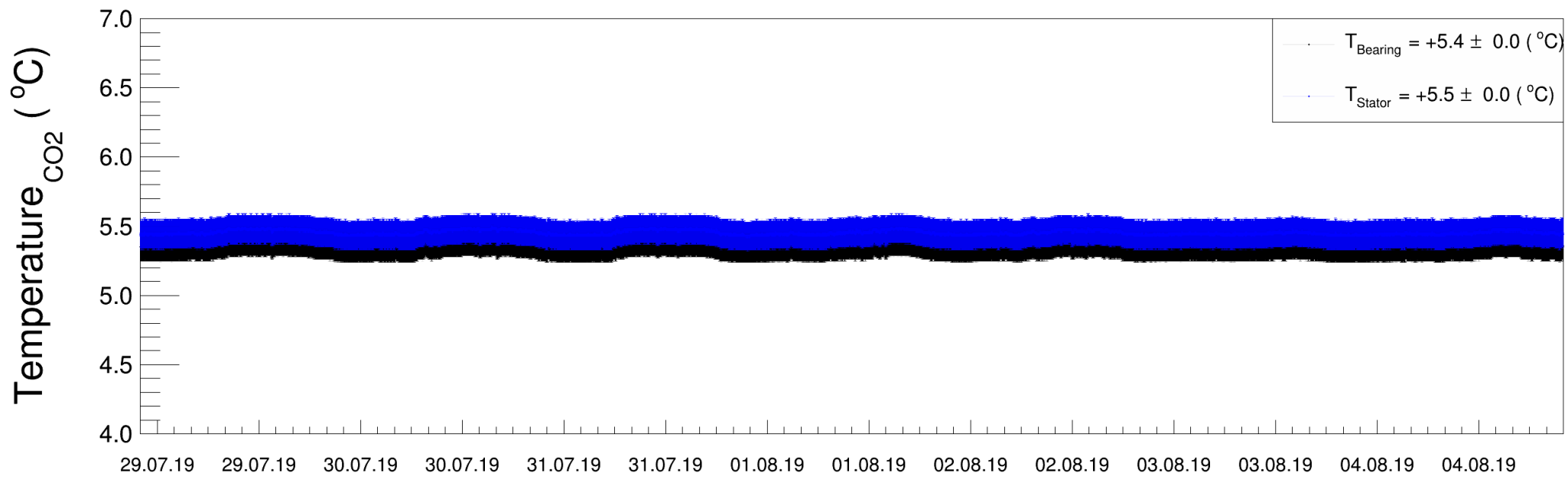
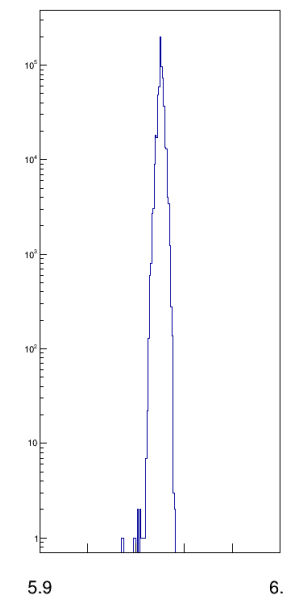
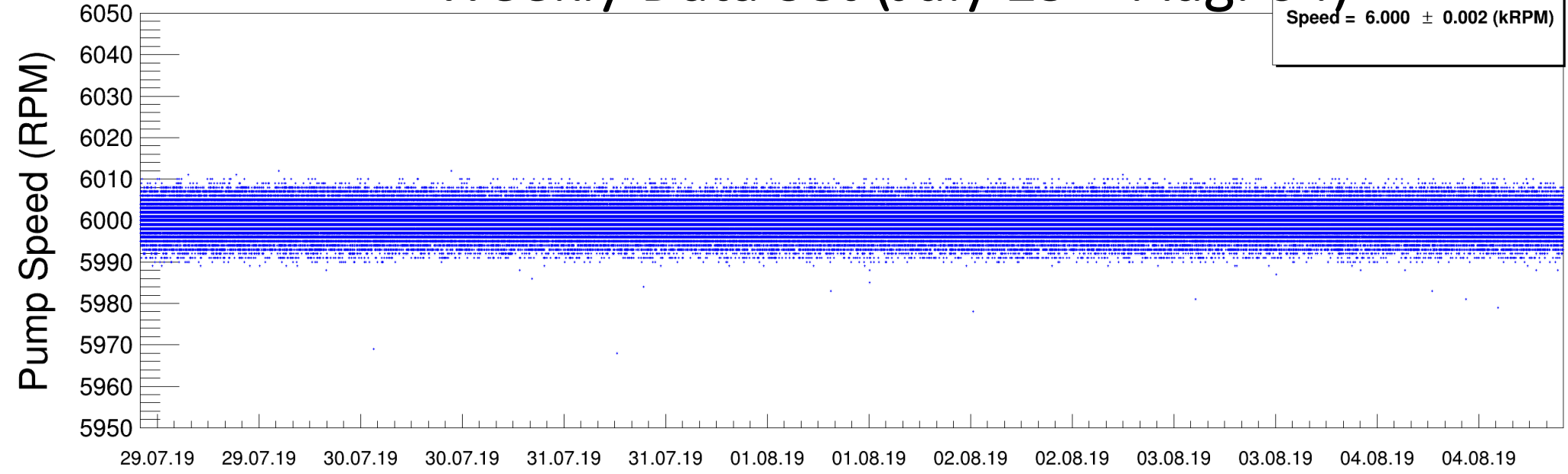
MK1 (LT003)

Weekly Data Set (July 29 – Aug. 04)



MK1 (LT003)

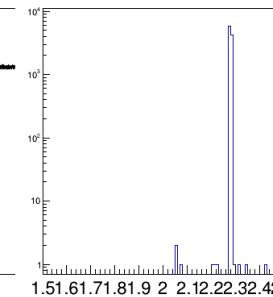
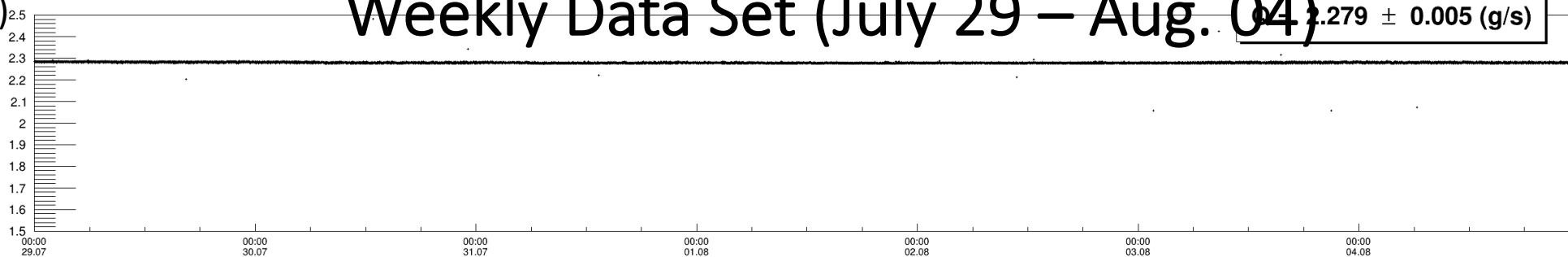
Weekly Data Set (July 29 – Aug. 04)



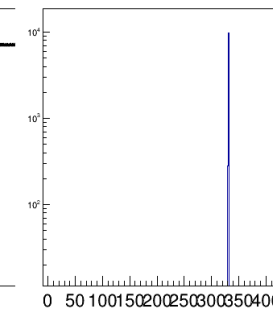
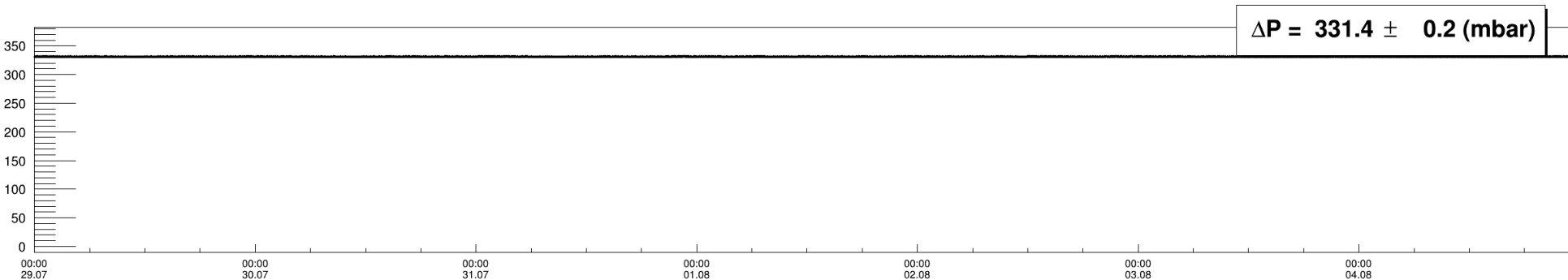
MK1 (LT003)

Weekly Data Set (July 29 – Aug. 04)

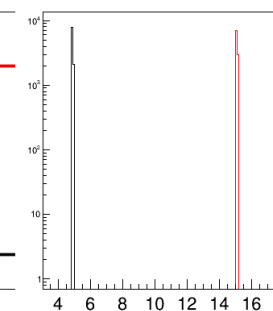
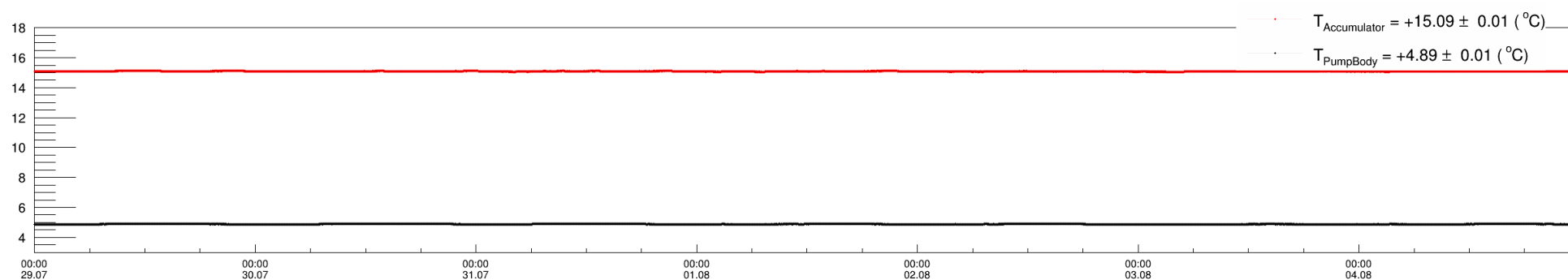
Flow Rate (g/sec)



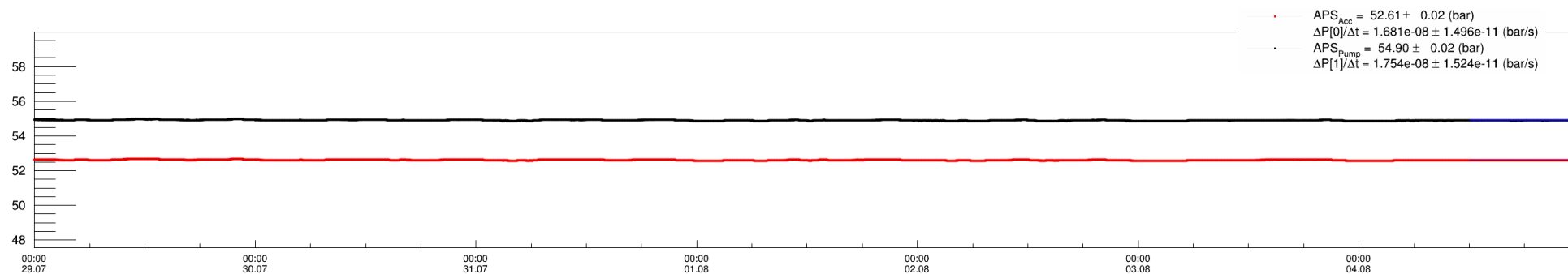
ΔP (mbar)



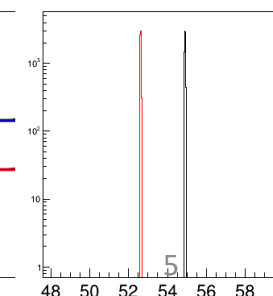
Temperature (°C)



APS (bar)

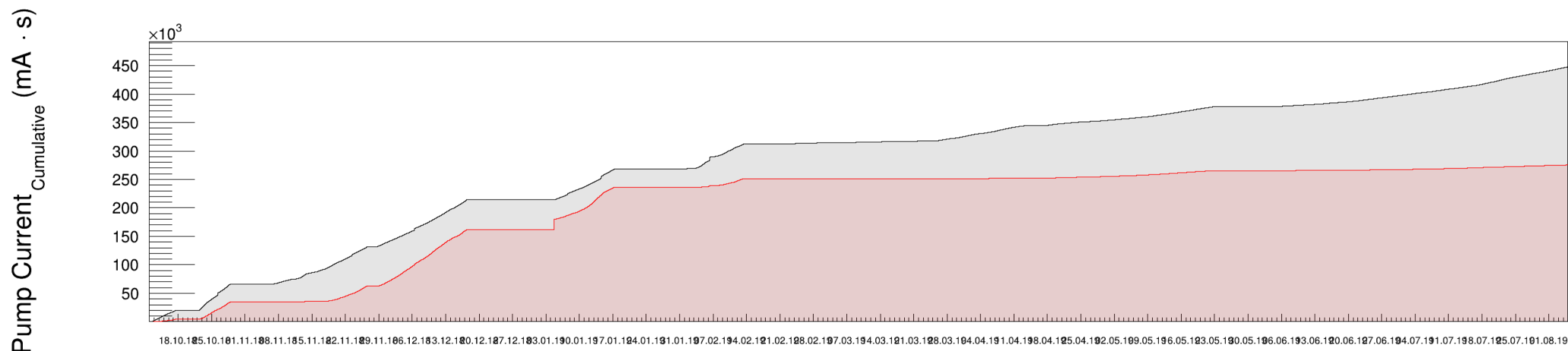
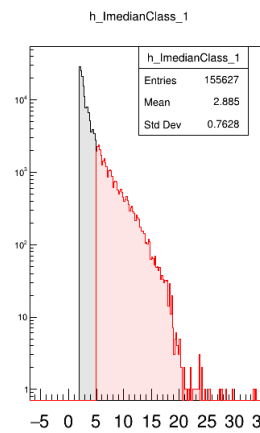
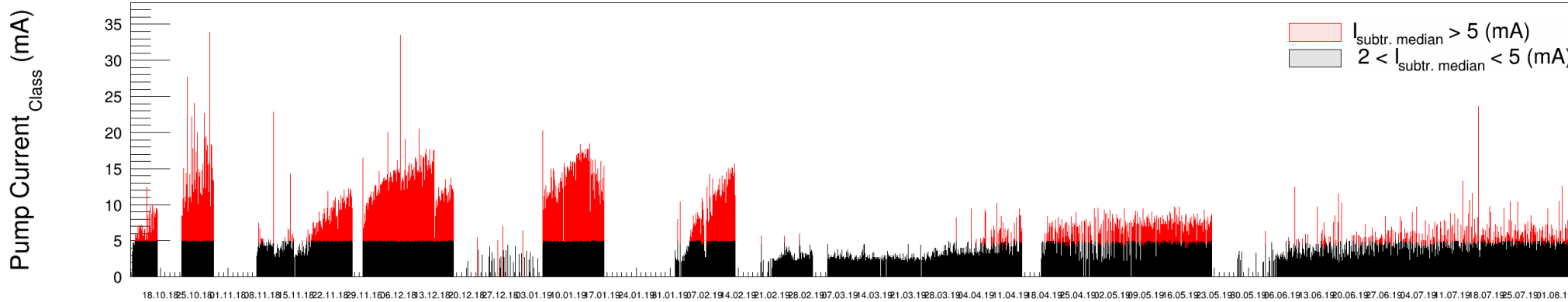
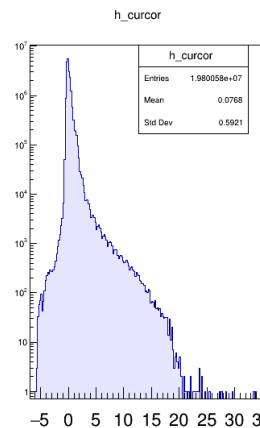
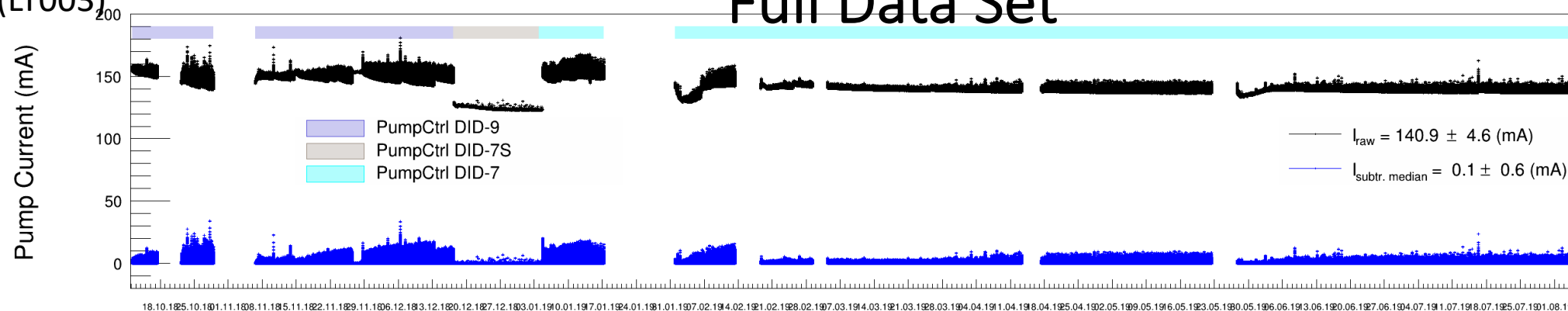


$\Delta P[0]/\Delta t = 1.681e-08 \pm 1.496e-11$ (bar/s)
 $\Delta P[1]/\Delta t = 1.754e-08 \pm 1.524e-11$ (bar/s)



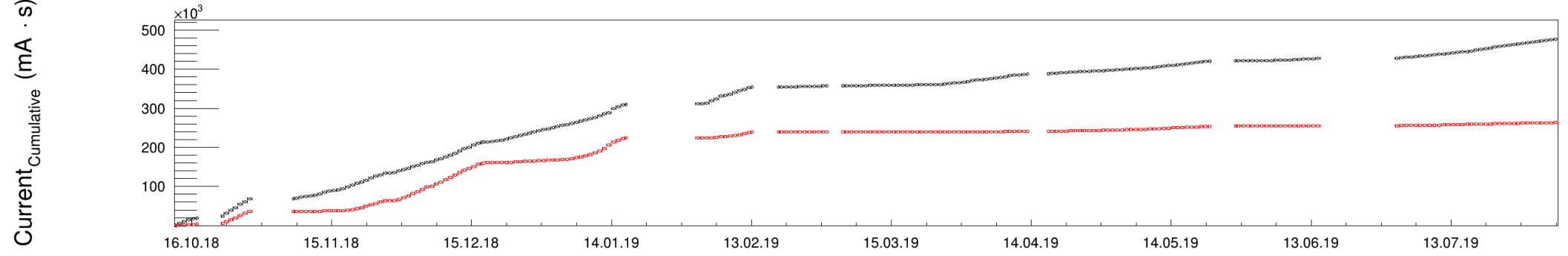
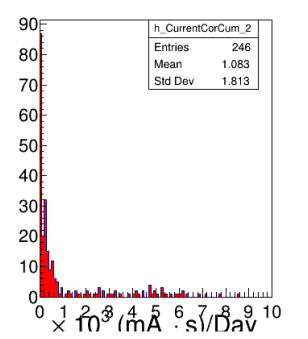
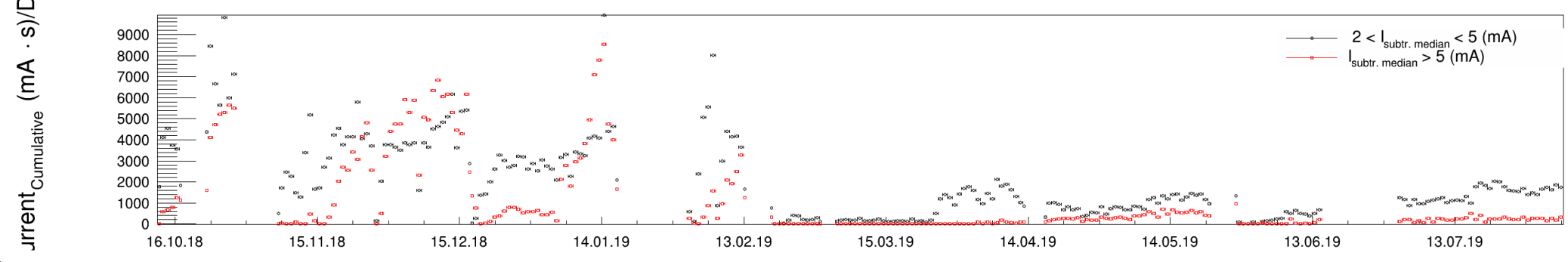
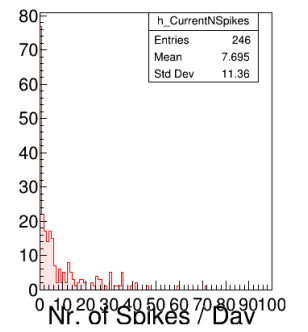
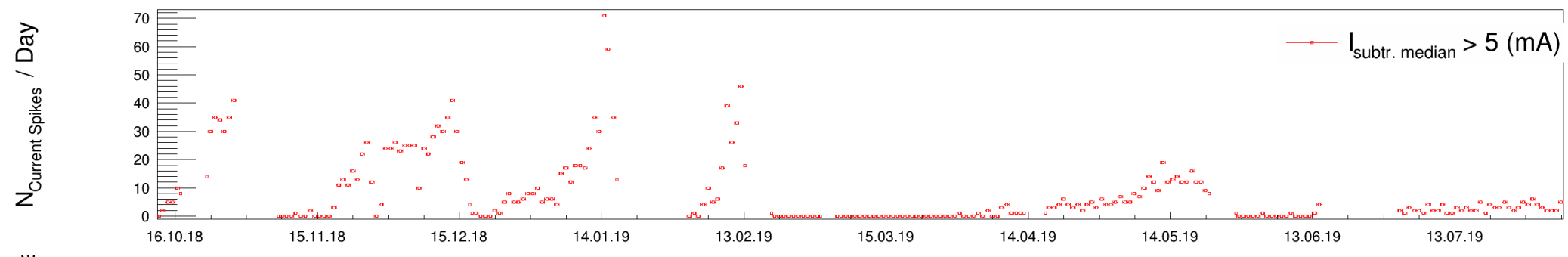
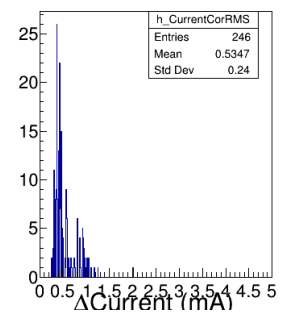
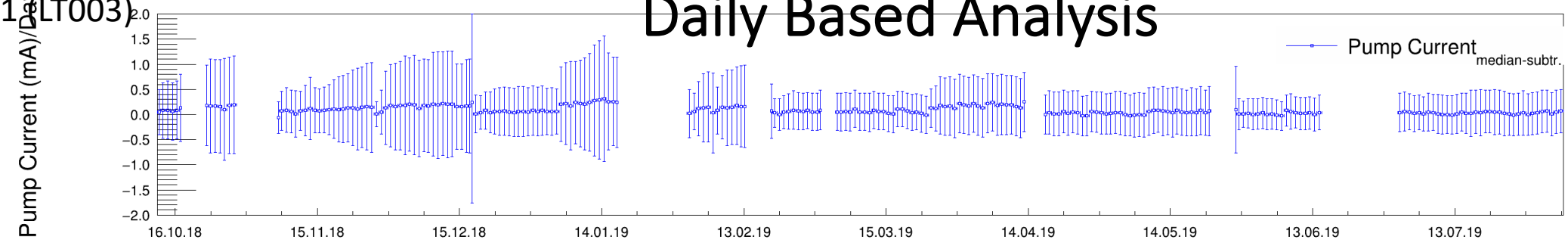
MK1 (LT003)

Full Data Set



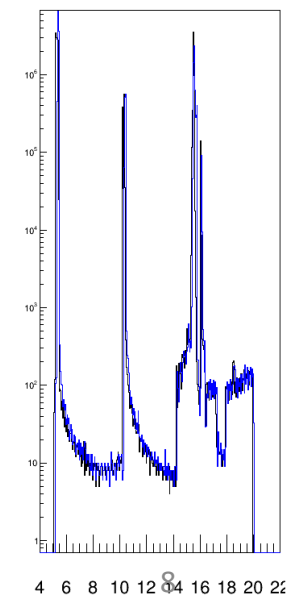
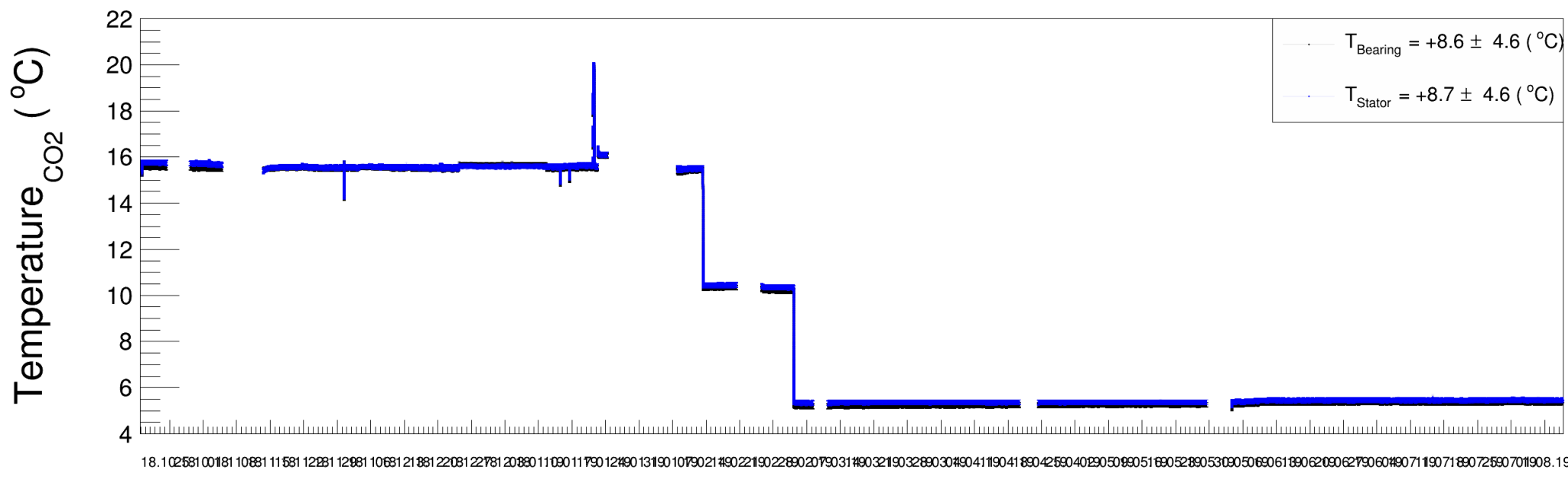
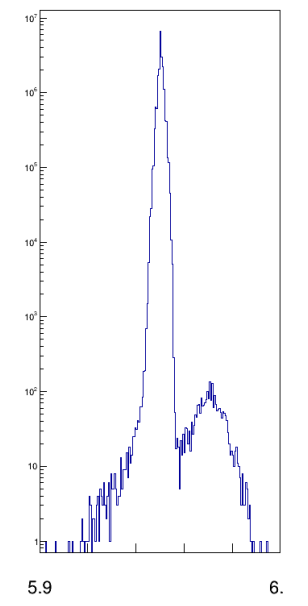
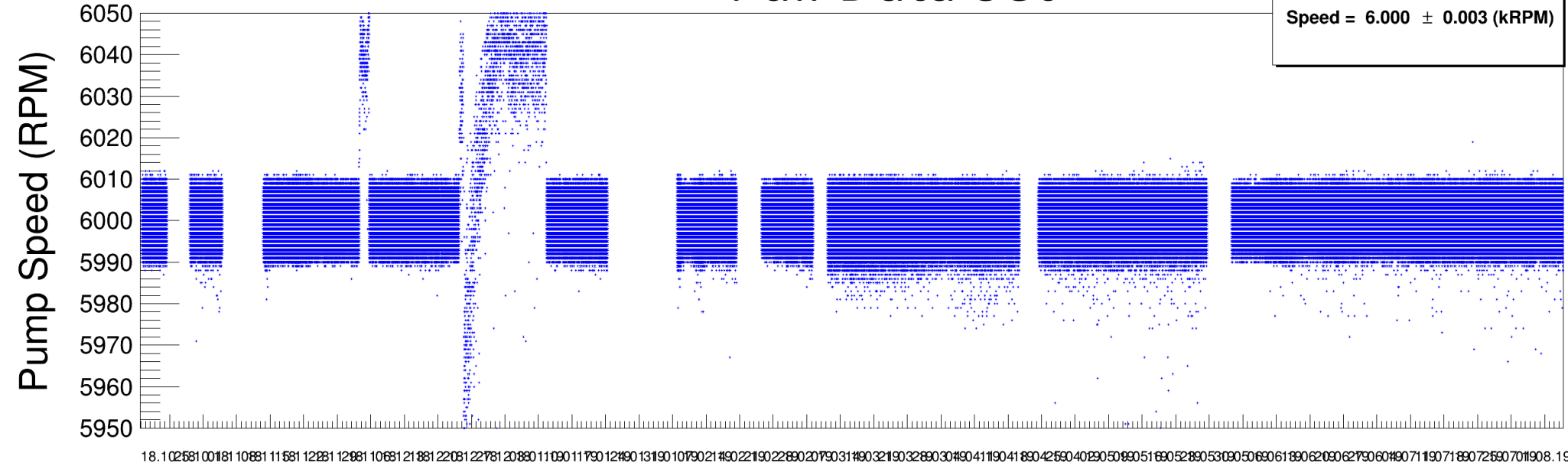
MK1 (LT003)

Daily Based Analysis



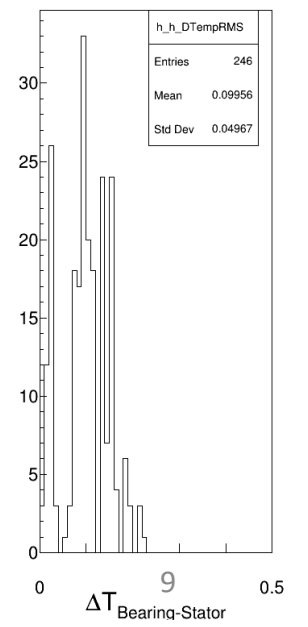
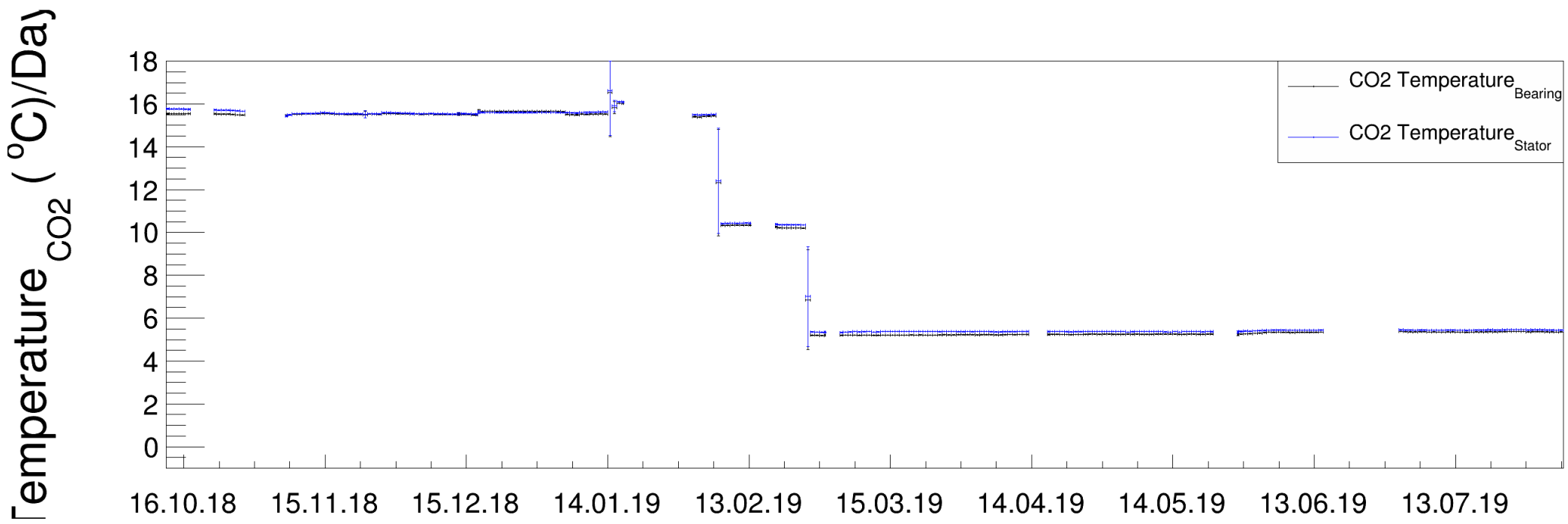
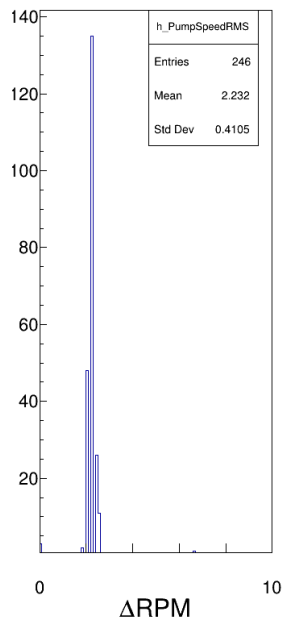
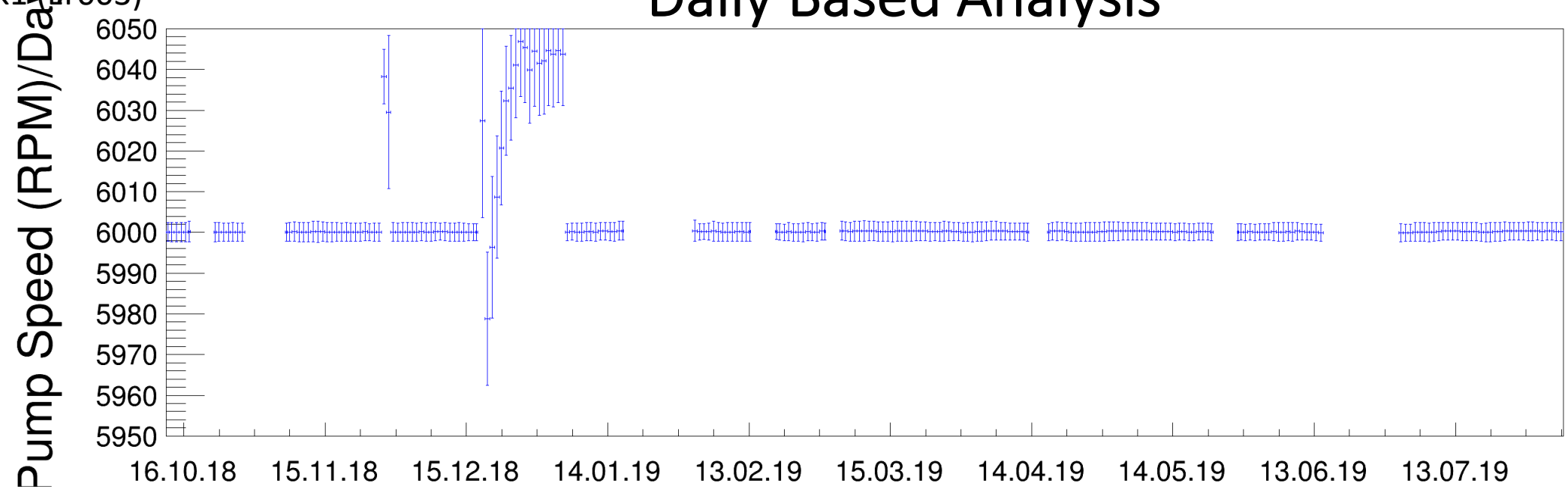
MK1 (LT003)

Full Data Set



Daily Based Analysis

MK1 (T003)

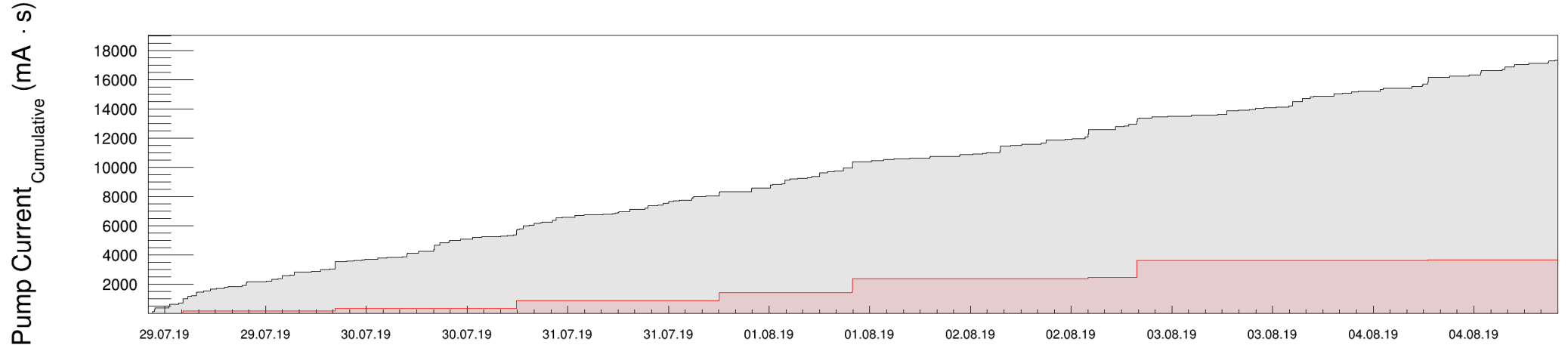
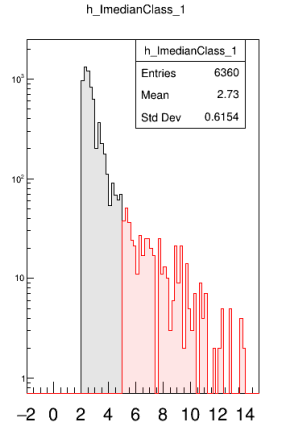
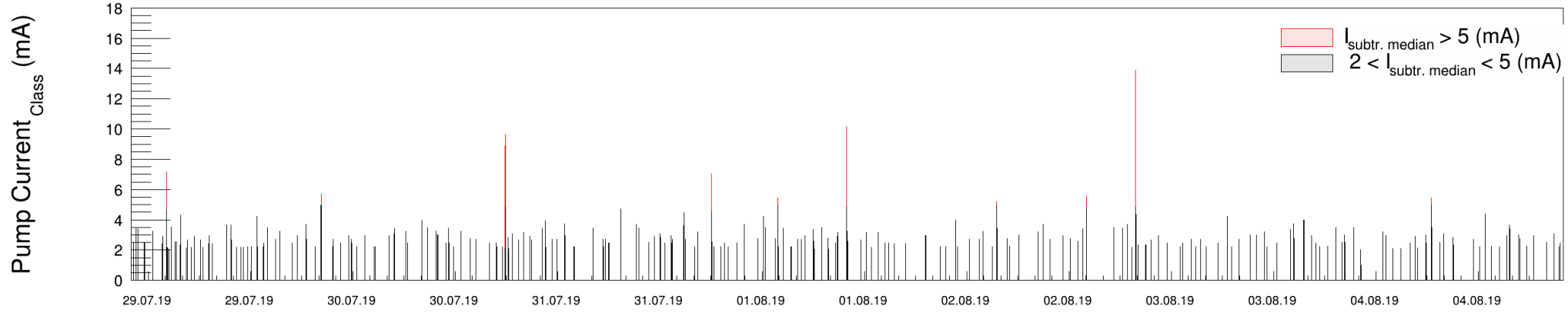
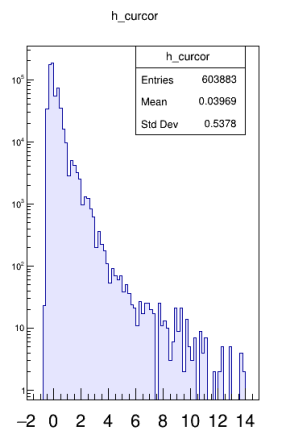
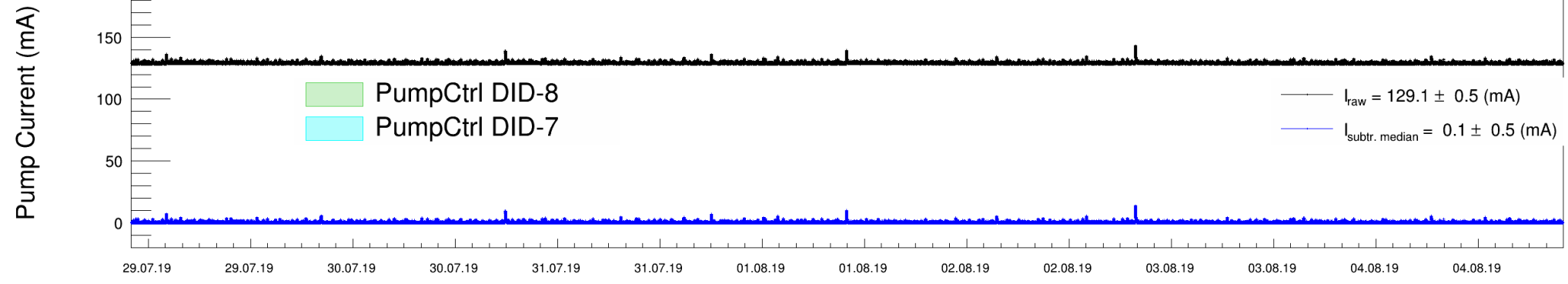


MK #2
(LT-002)

- $T_{\text{pump}} = +0^{\circ}\text{C}$, $T_s = +5^{\circ}\text{C}$ (constant condition)

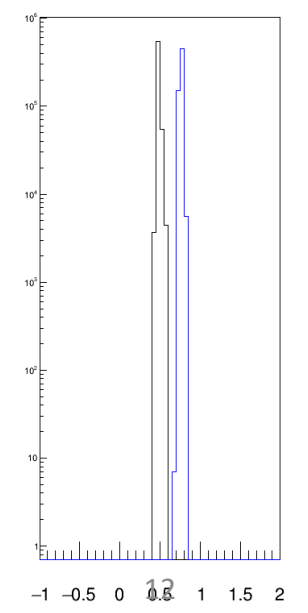
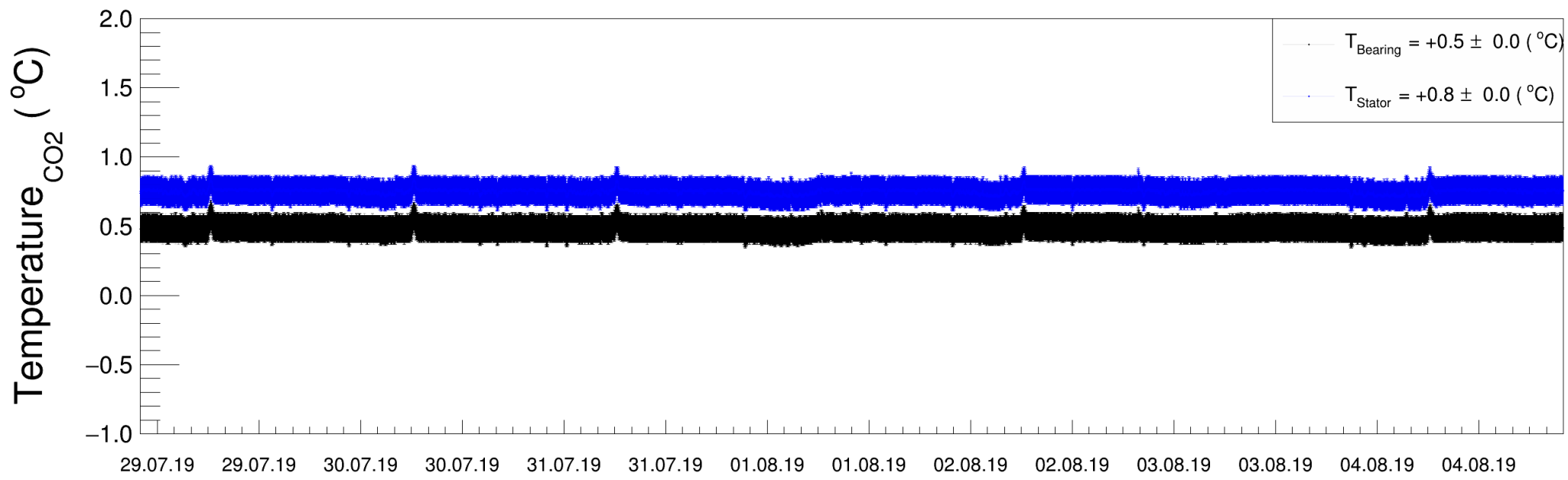
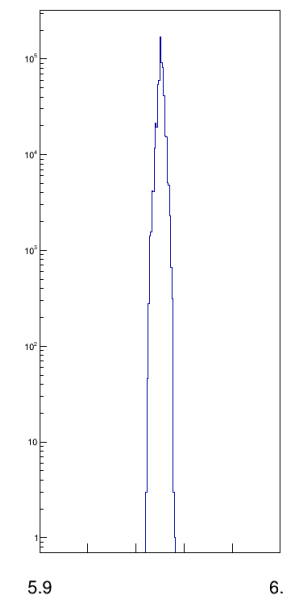
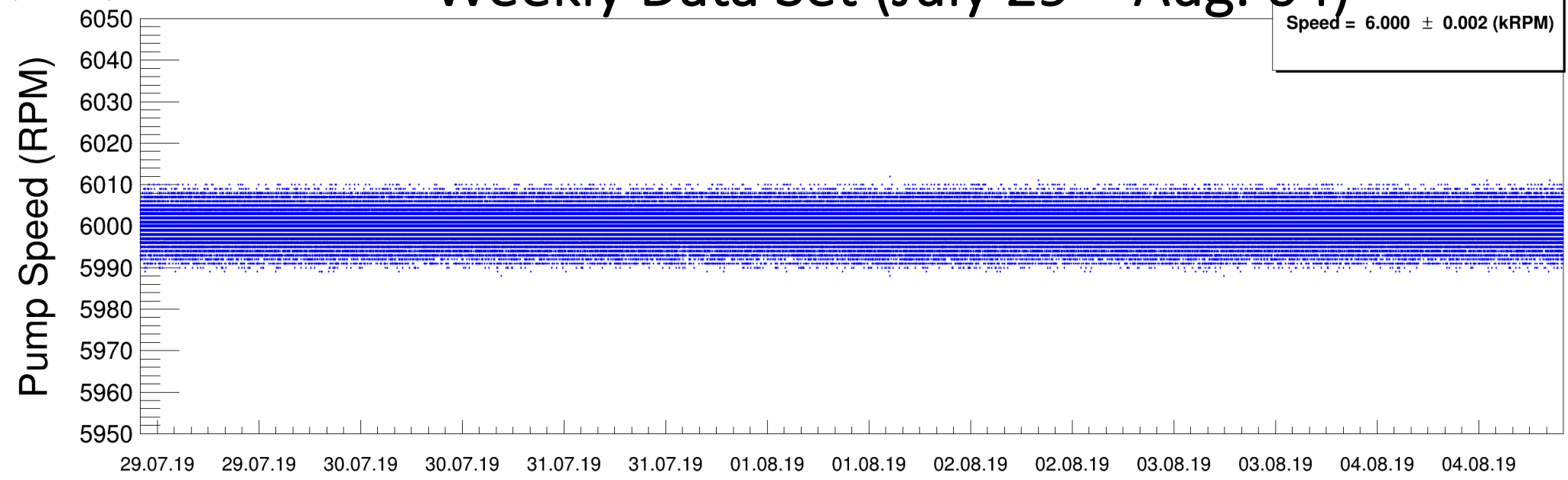
MK2 (LT002)

Weekly Data Set (July 29 – Aug. 04)



MK2 (LT002)

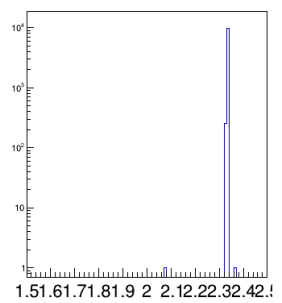
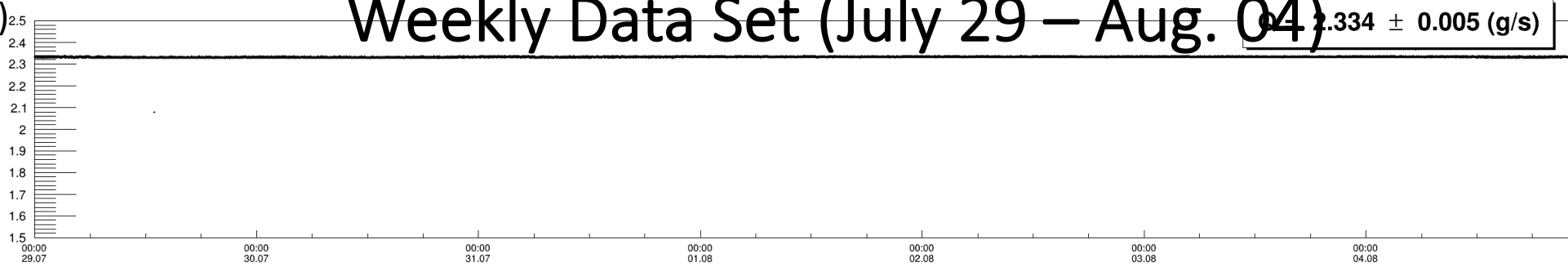
Weekly Data Set (July 29 – Aug. 04)



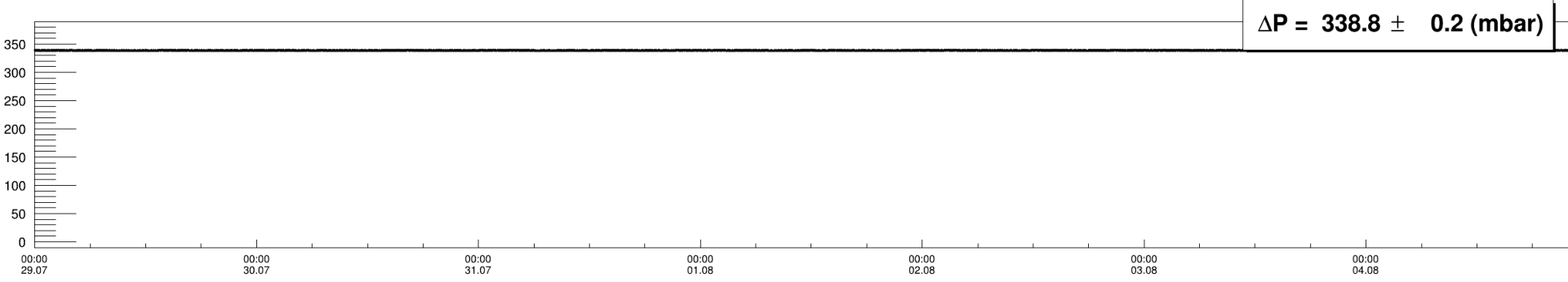
MK2 (LT002)

Weekly Data Set (July 29 – Aug. 04)

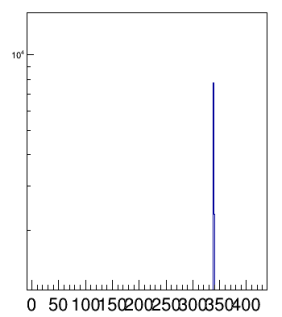
Flow Rate (g/sec)



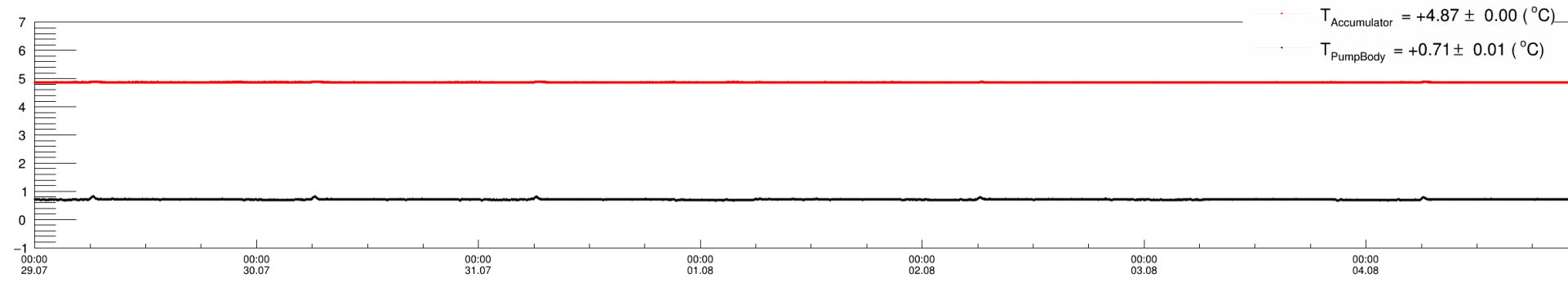
ΔP (mbar)



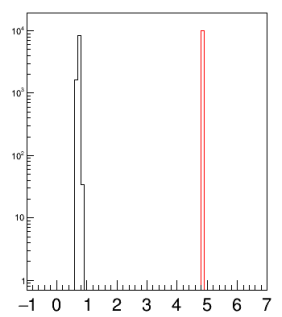
$\Delta P = 338.8 \pm 0.2$ (mbar)



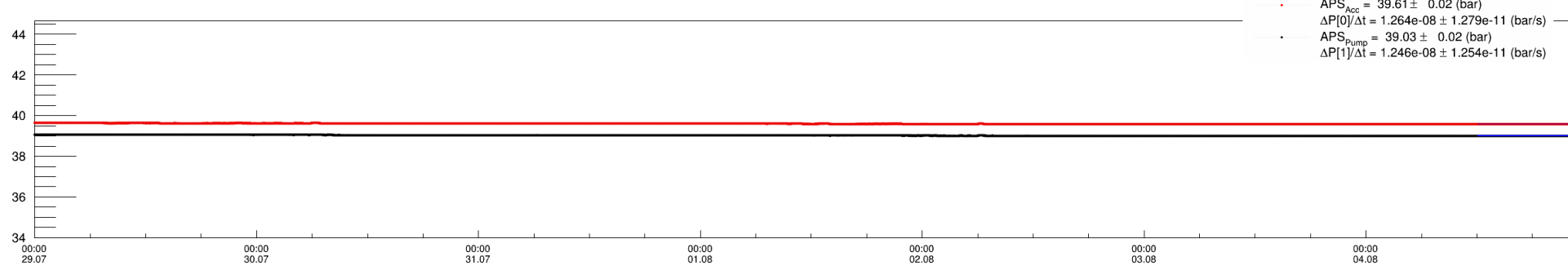
Temperature (°C)



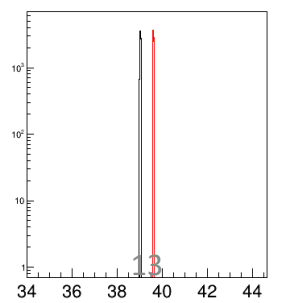
$T_{\text{Accumulator}} = +4.87 \pm 0.00$ (°C)
 $T_{\text{PumpBody}} = +0.71 \pm 0.01$ (°C)



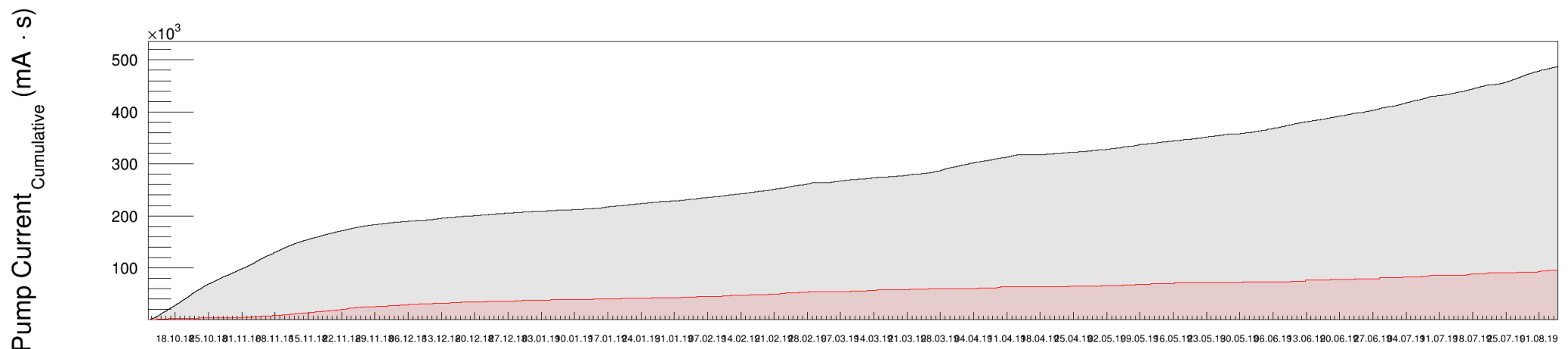
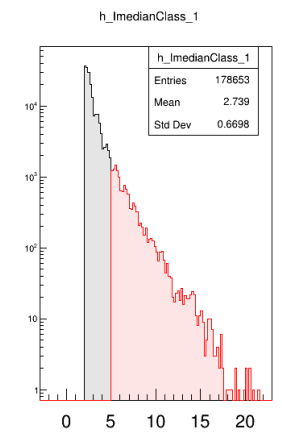
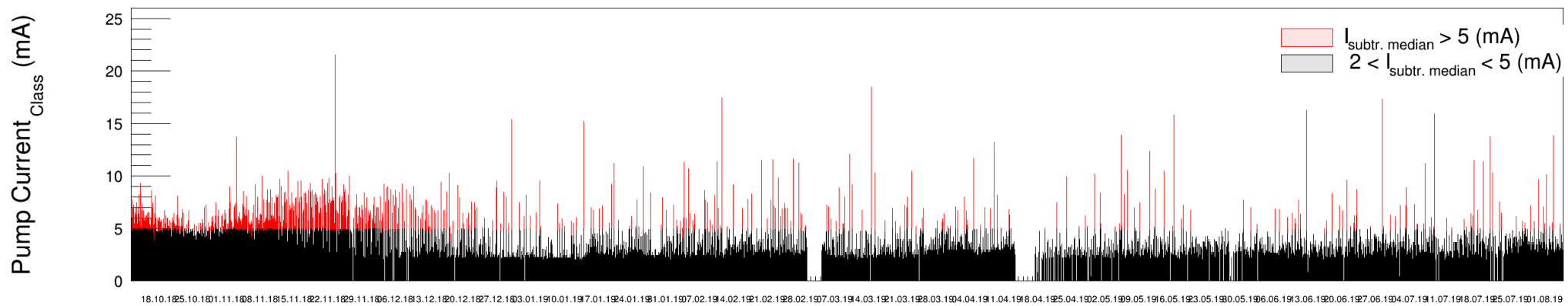
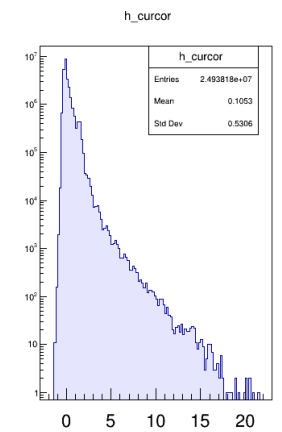
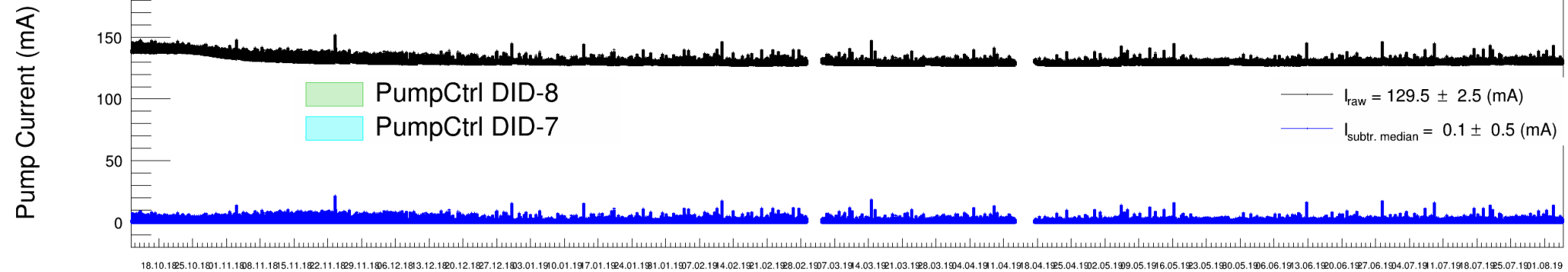
APS (bar)



$APS_{\text{Acc}} = 39.61 \pm 0.02$ (bar)
 $\Delta P[0]/\Delta t = 1.264e-08 \pm 1.279e-11$ (bar/s)
 $APS_{\text{Pump}} = 39.03 \pm 0.02$ (bar)
 $\Delta P[1]/\Delta t = 1.246e-08 \pm 1.254e-11$ (bar/s)

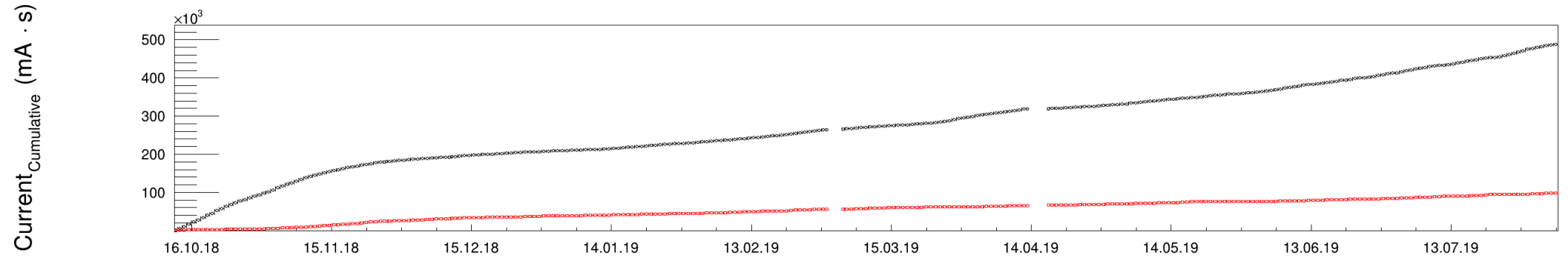
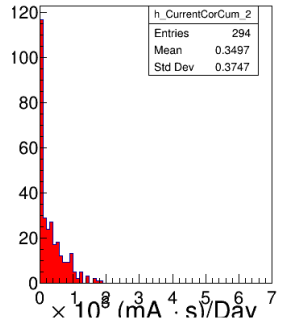
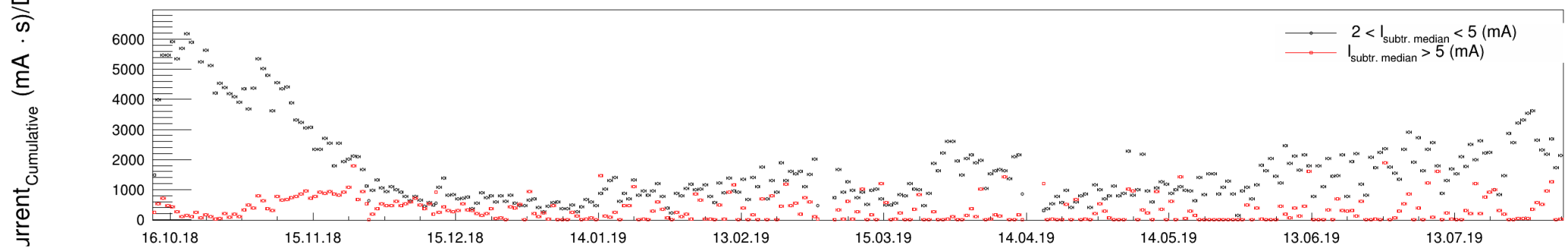
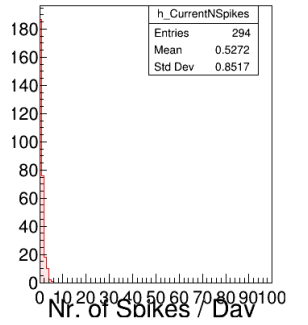
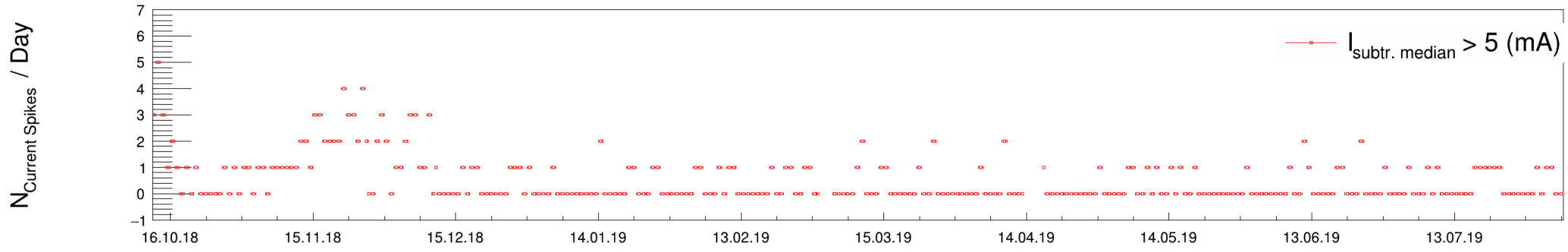
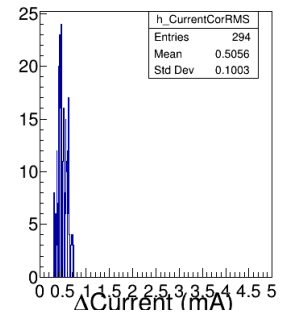
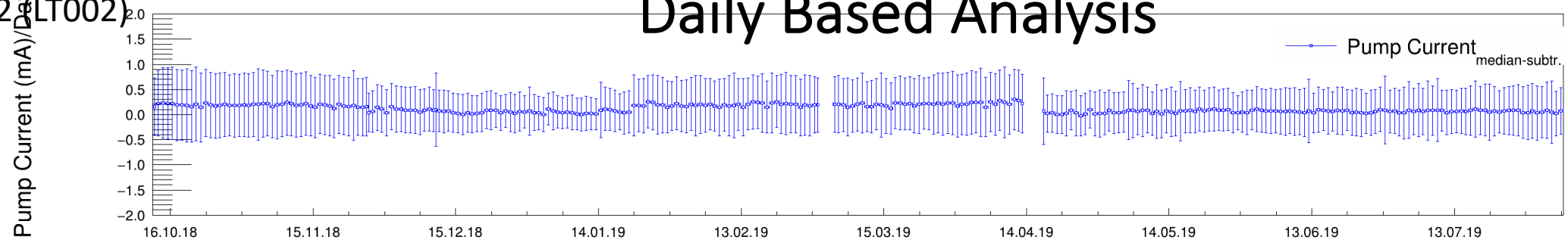


Full Data Set



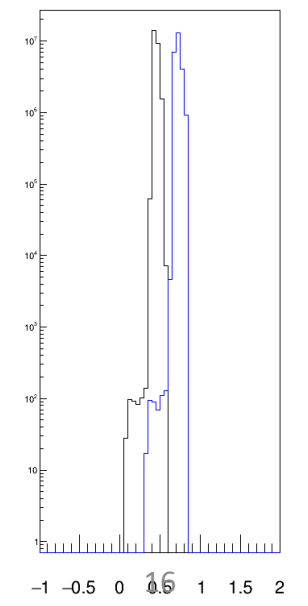
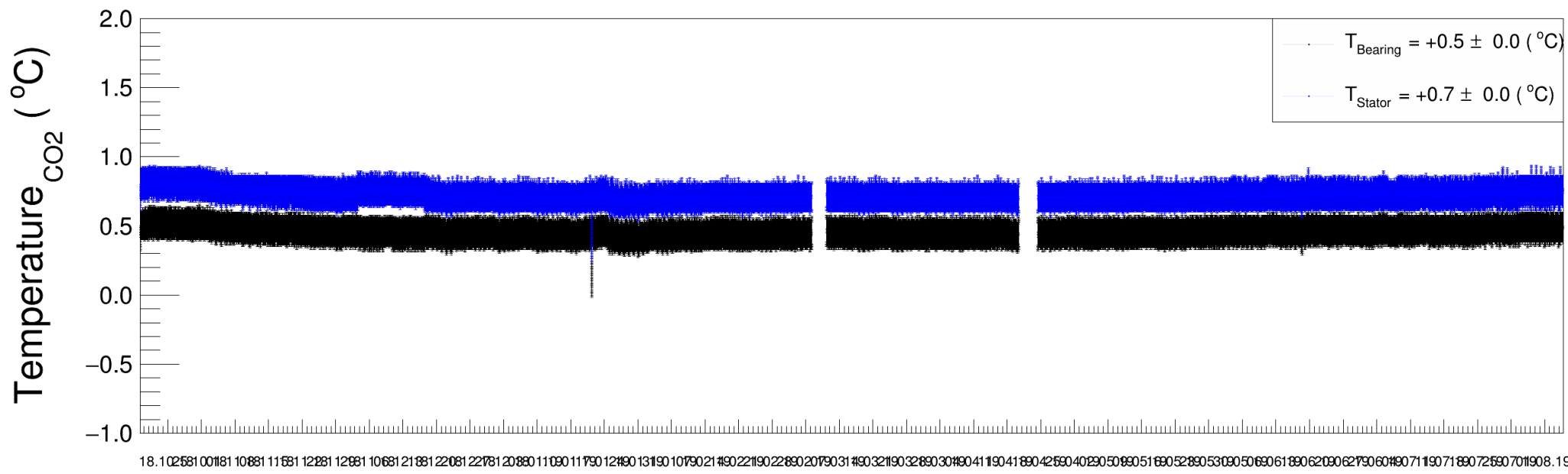
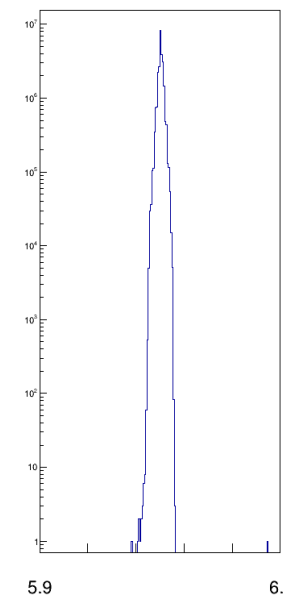
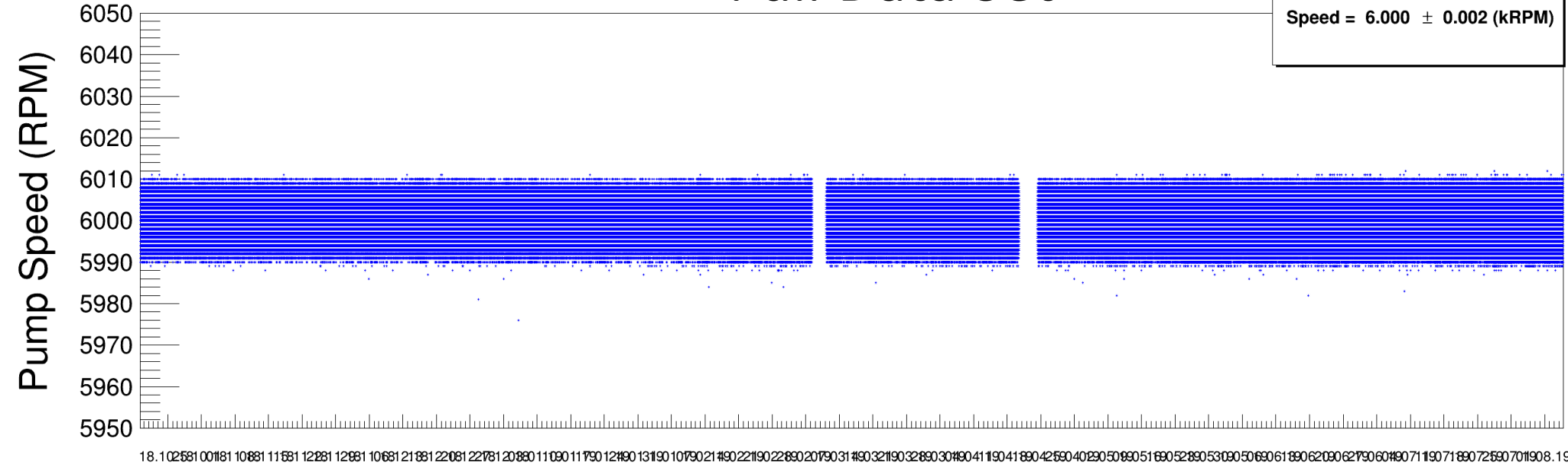
Daily Based Analysis

MK2 (TLT002)



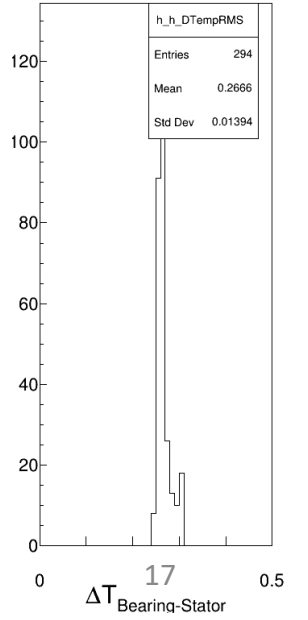
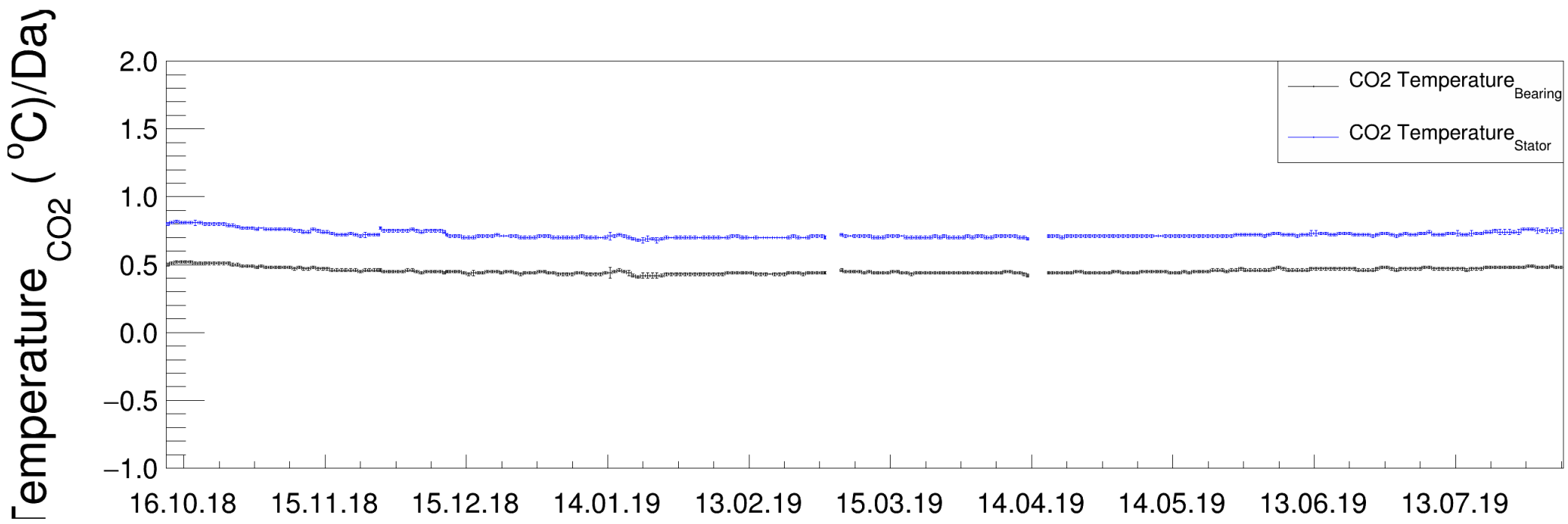
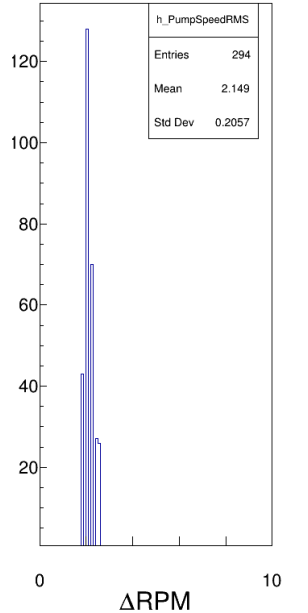
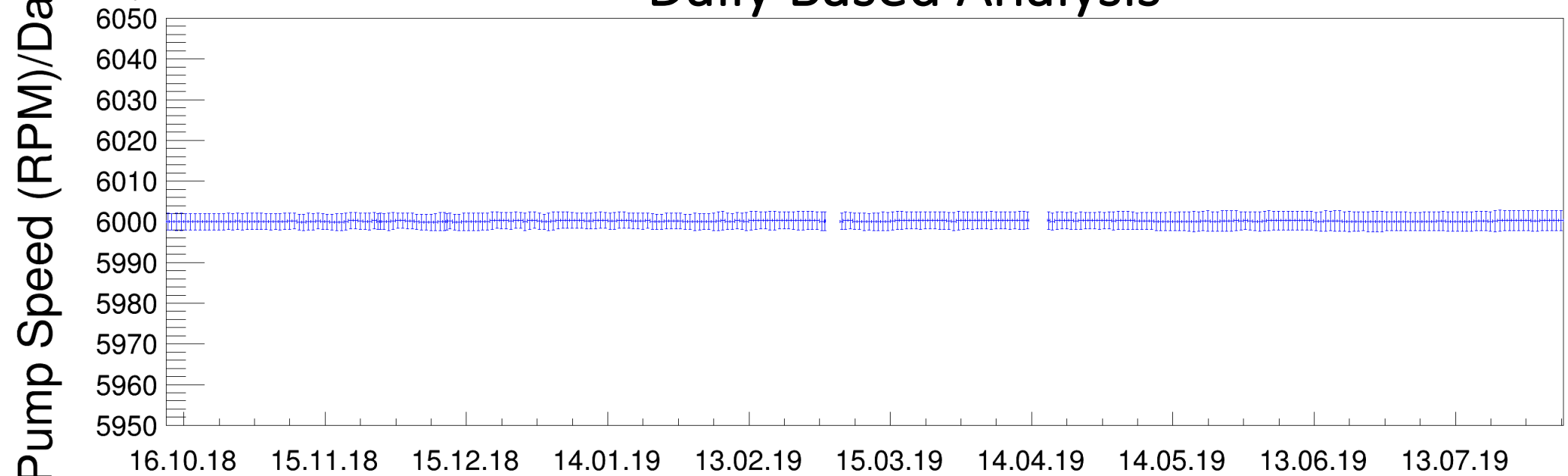
MK2 (LT002)

Full Data Set

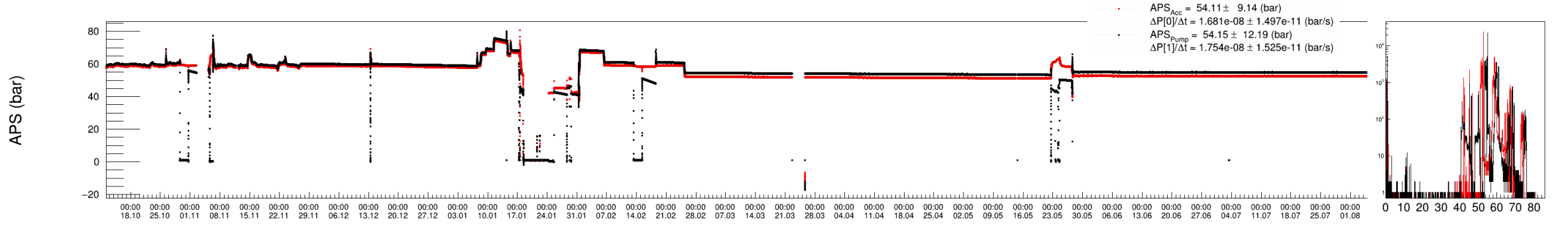
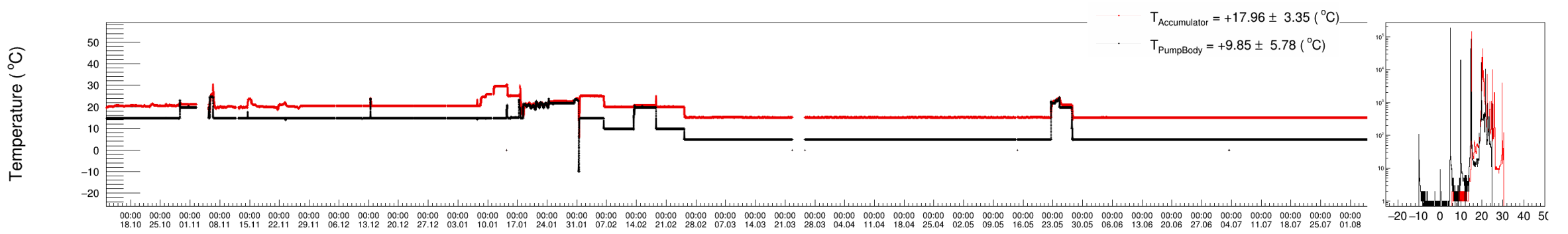
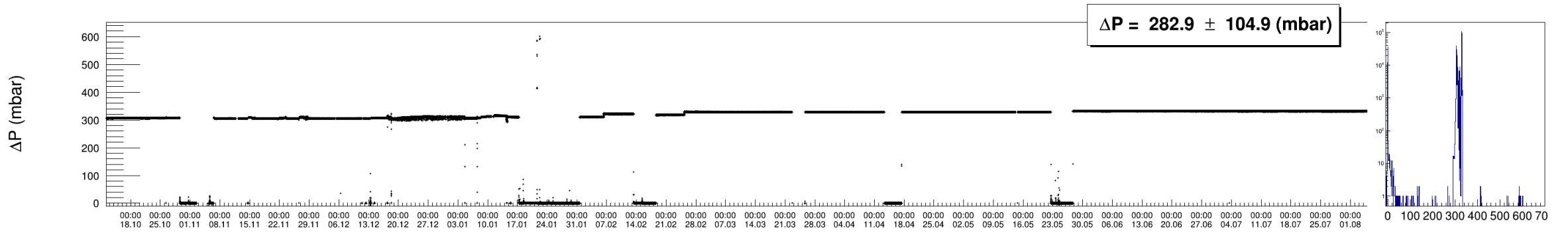
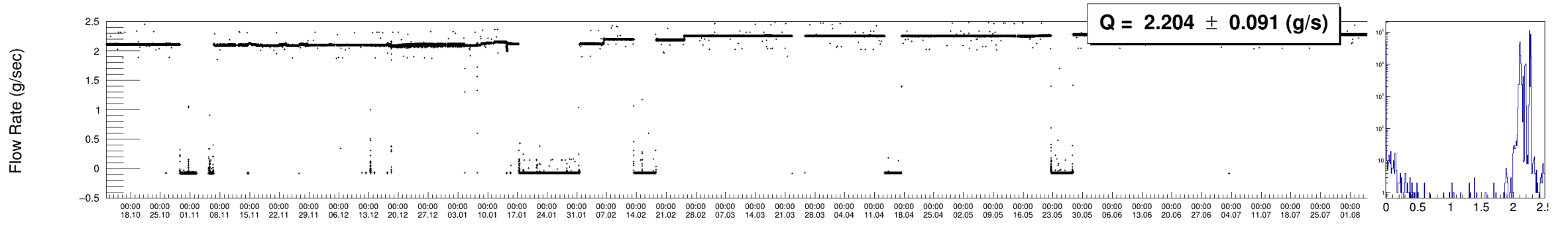


Daily Based Analysis

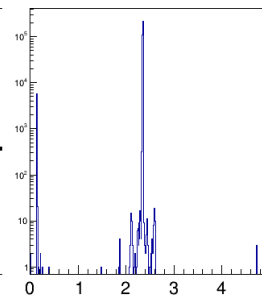
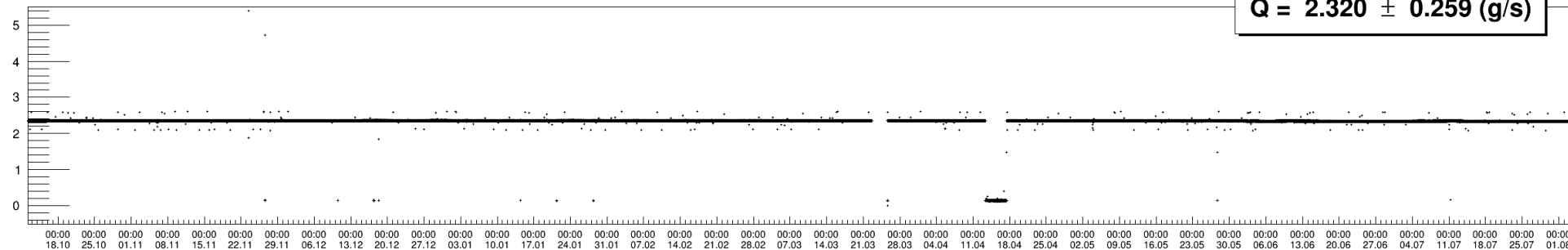
MK2 (T002)



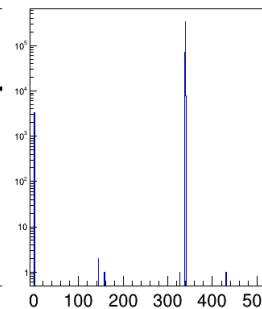
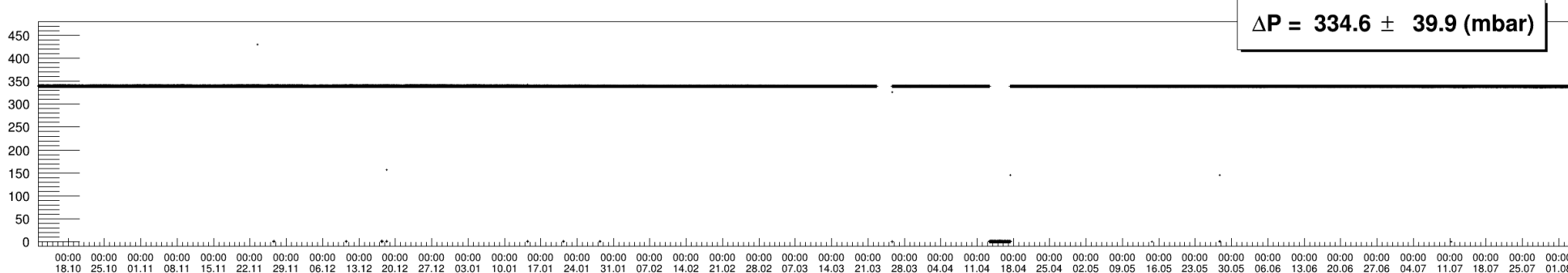
Appendix



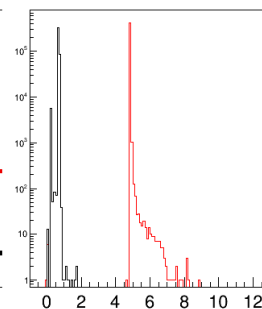
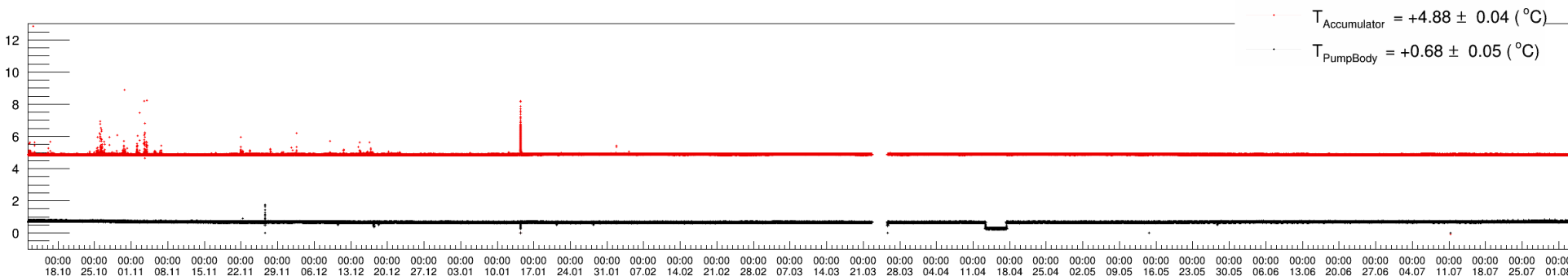
Flow Rate (g/sec)



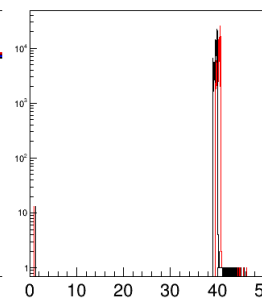
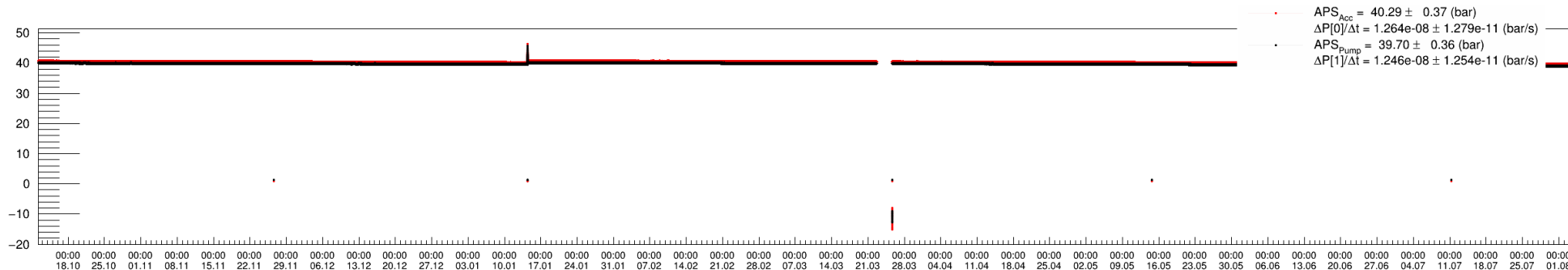
ΔP (mbar)



Temperature ($^{\circ}C$)



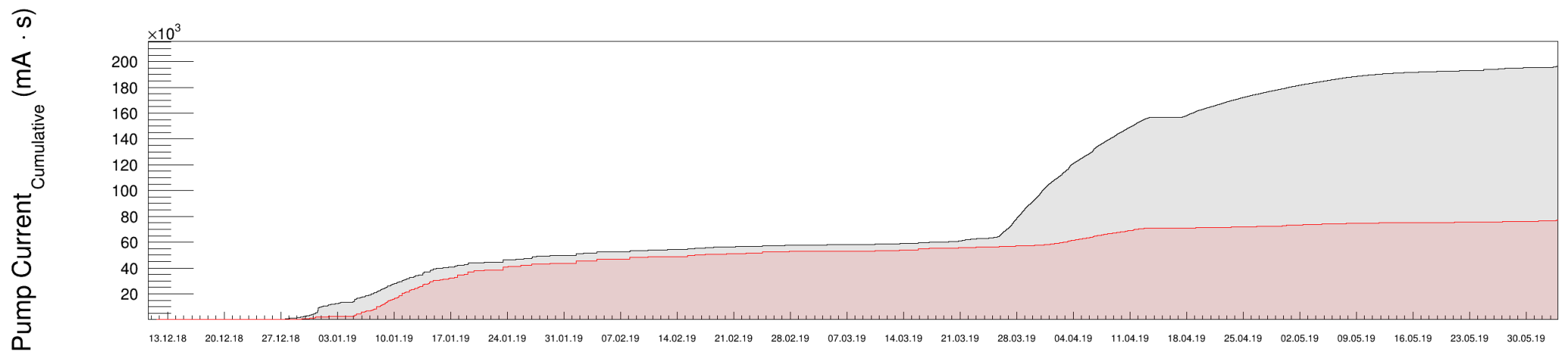
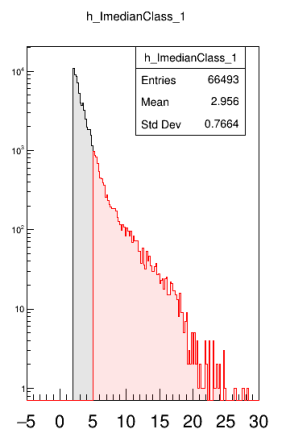
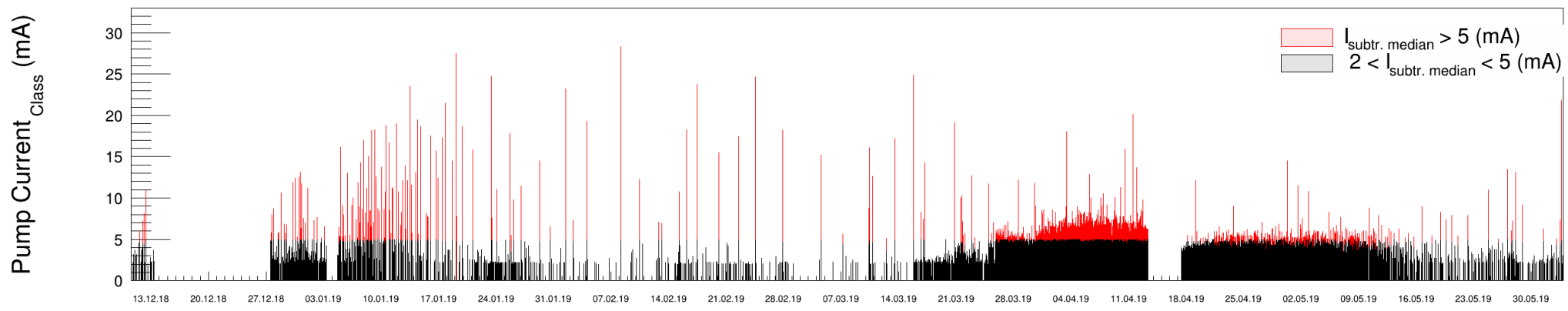
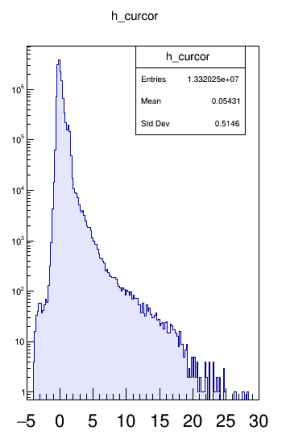
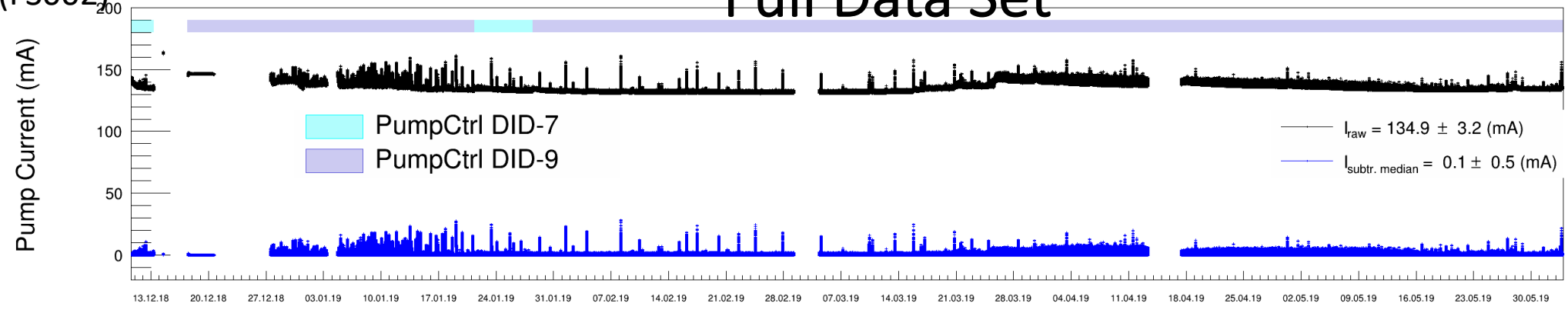
APS (bar)



MK #3 (FS-002)

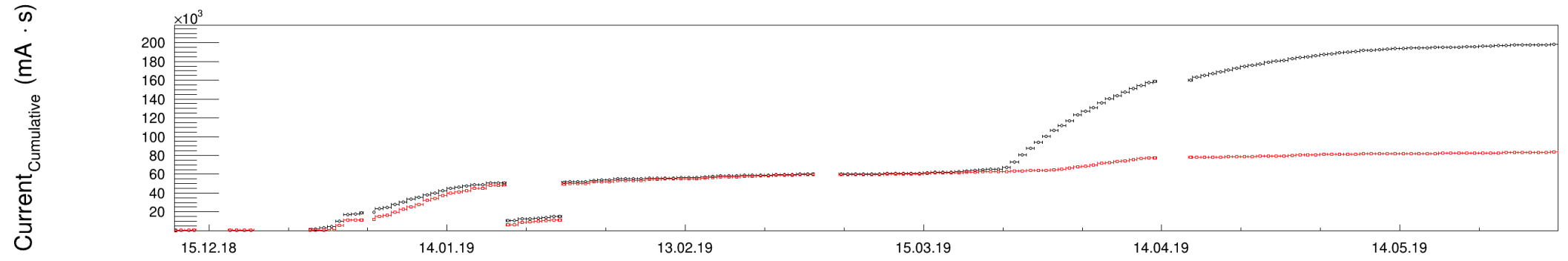
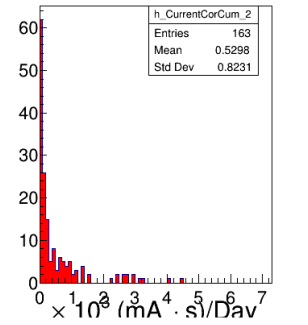
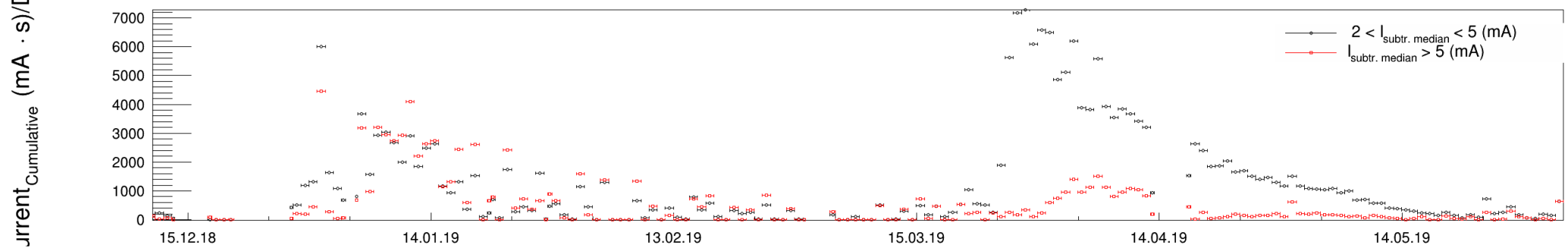
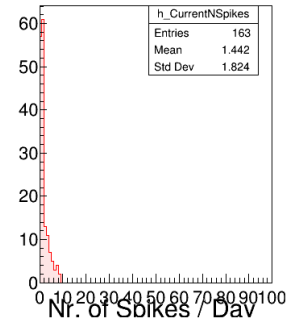
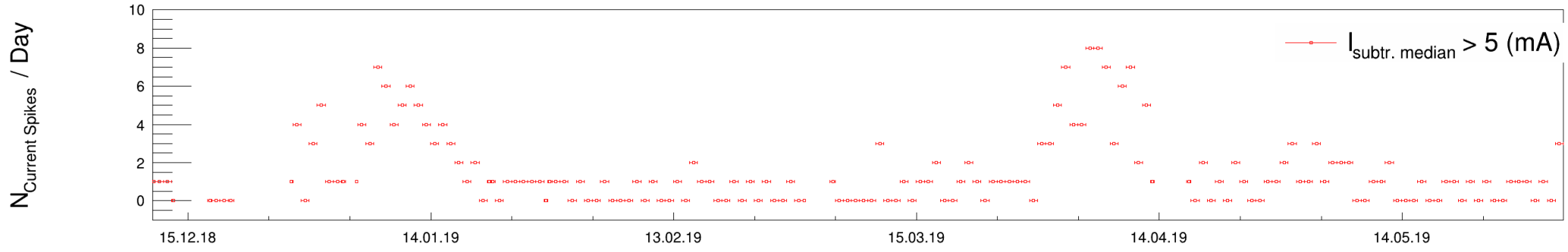
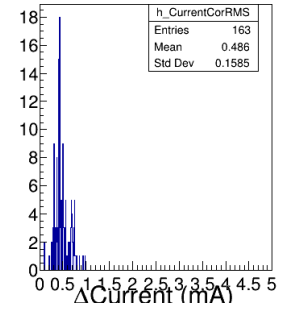
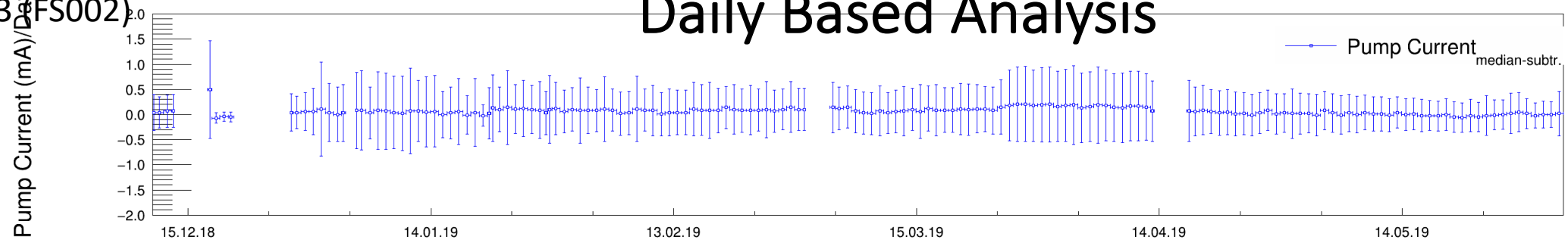
- $T_{\text{pump}} = +15^{\circ}\text{C}$ with IPA (Dec. 17-20, 2018)
- $T_{\text{pump}} = +0^{\circ}\text{C}$, $T_s = +5^{\circ}\text{C}$ (constant condition)
- Stop running pump on 03.06.2019

Full Data Set



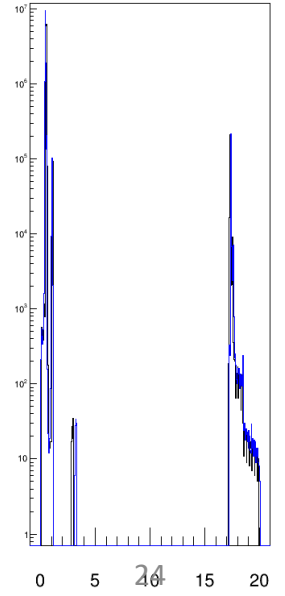
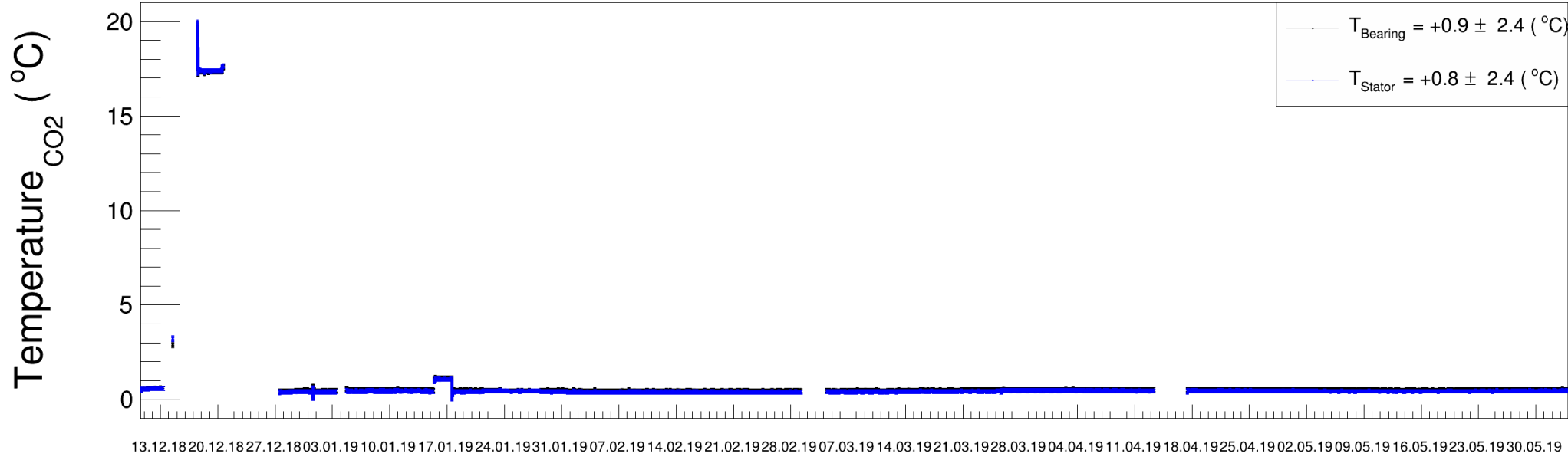
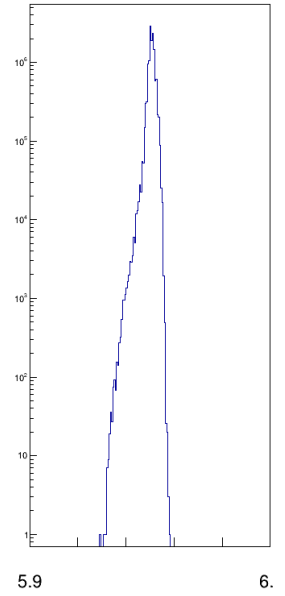
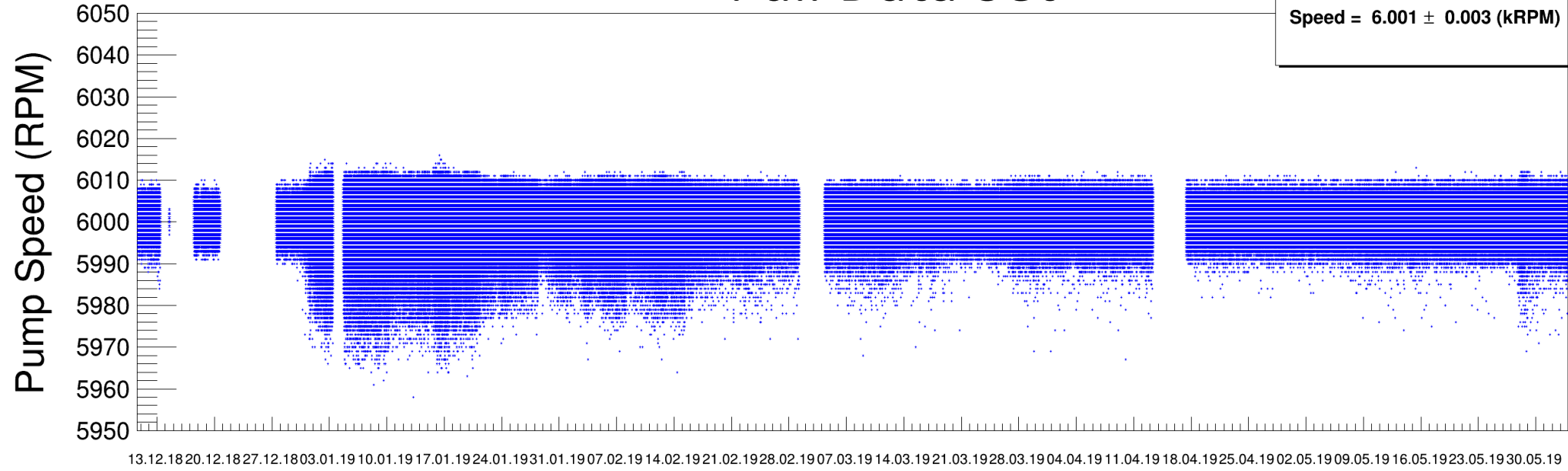
Daily Based Analysis

MK3 (FS002)



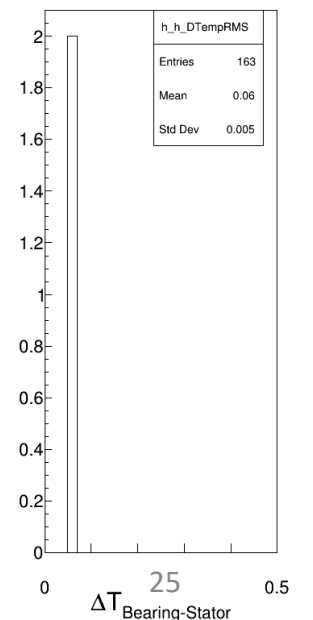
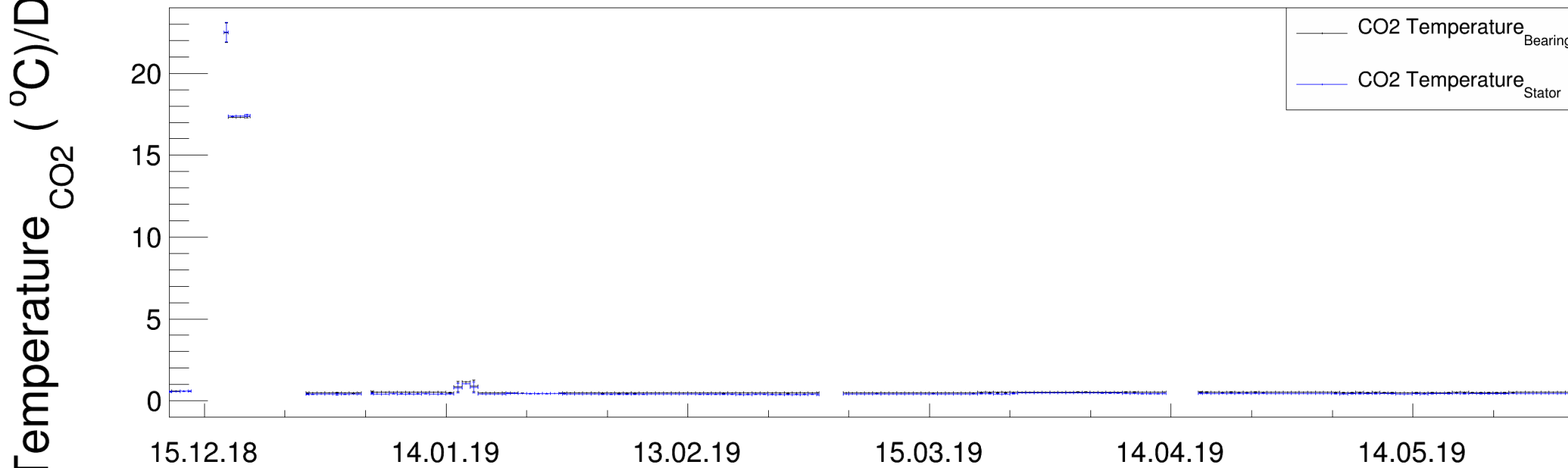
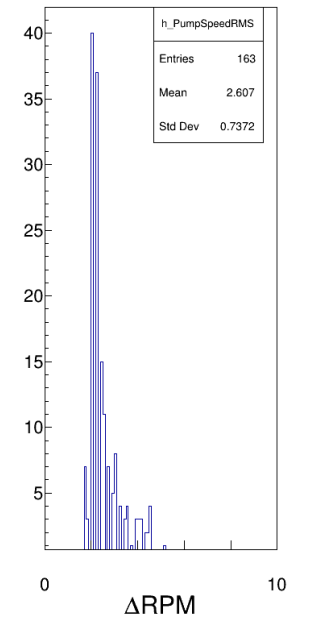
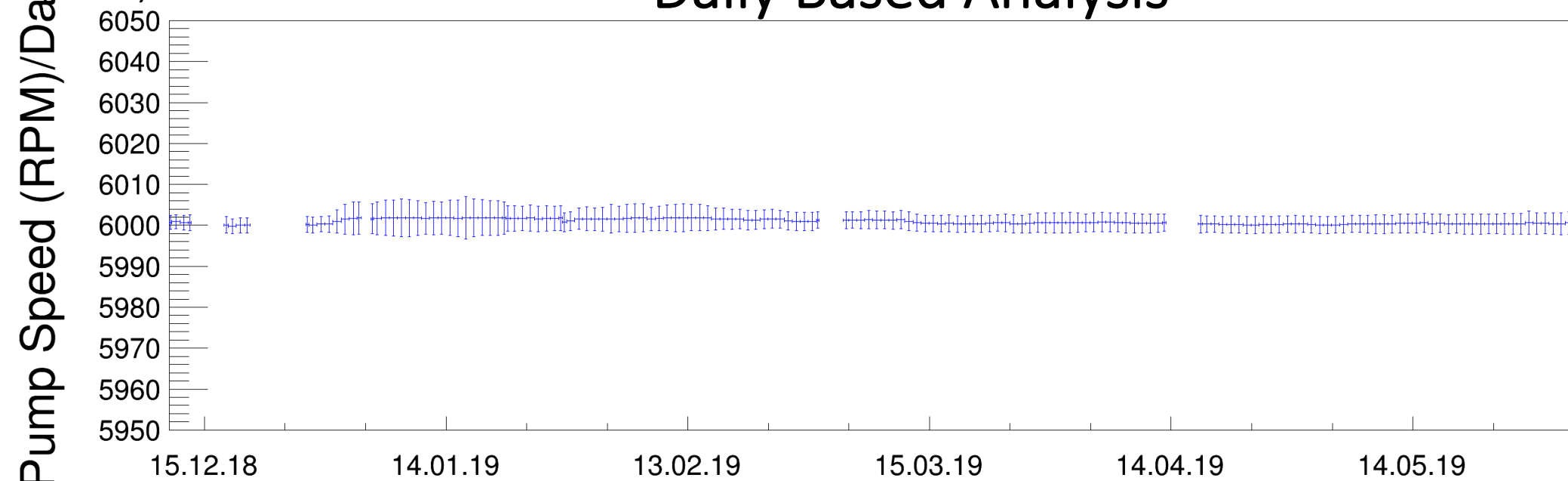
MK3 (FS002)

Full Data Set



Daily Based Analysis

MK3 (FS002)



MK3

