SAM Consumables

A SAM consumable is defined as any piece of hardware in the SAM instrument that has a limited lifetime or a metric worth tracking. What exactly "lifetime" means is dependent on the specific piece of hardware we are interested in and a single consumable may have more than one way to define its lifetime. This page details the logic we use to extract the data for each consumable. Note that this is the master reference, which means the engineers and scientists should ensure that the logic detailed here is correct. All consumable data is available on XINA Online at https://ssed.gsfc.nasa.gov/xina/xo/tool/sam-timeline.

WRP

On Time

WRP on time is determined by calculating the total time that WRP HKIDs 334:WRP1 PWM, 336:WRP2 PWM break the threshold value of 50 for a TID.

Helium

He 1 Pressure

He 1 Tank Pressure is a reading of the current pressure; it is not a consumable where metrics are added between TIDs. The current He 1 Tank Pressure is calculated from PRES_1_He1 and T47_He_1 (HKIDs 89 and 43).

Because gas pressures are temperature sensitive, the pressures were temperature corrected to room temperature (22 degrees Celsius): Pressure = PRES_1_He1 / (T47_He_1 + 273) * (22 + 273).

He 2 Pressure

The He 2 Tank Pressure is a consumable recorded as a loss of pressure; it is a consumable starting at 2.3K psi and each TID records the amount of pressure lost. The He 2 Tank Pressure is calculated using regular expressions to measure Valve 33 and Valve 34 Open Times.

The loss in pressure is then calculated: Loss = (V33_on_time + V34_on_time) * .004 psi/sec.

O2 Gas

On Time

O2 Gas On Time was calculated using regular expressions to look for the quick opening and closing of Valve 35. Each time this event occurred, .02 seconds were added to O2 Gas On Time.

Cal Gas

On Time

Cal Gas On Time was calculated using regular expressions to look for the quick opening and closing of Valve 36. Each time this event occurred, .02 seconds were added to Cal Gas On Time.

TEC A & B

On Time

TEC A & B on times were determined using regular expressions to look for when the heaters corresponding to each TEC (A:61 | B:62) were open loop or off. The on time was determined by subtracting the ON time from the OFF time and summing all of these differences for a TID.

Cycles

TEC A & B on times were determined using regular expressions to look for when the heaters corresponding to each TEC (A:61 | B:62) were open loop or off. Each time a heater switched from ON to OFF, a cycle was added to the corresponding TEC.

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