# Cryomodule 2K operation

The MKS2 regulation on/off is controlled by the bit m141.0 from the CM PLC.

The MKS2 PID SP is defined by the sequence parameter on HNOSS PLC (pv: CstatH-Ctrl:SQ9:cP\_CM\_SP\_MKS2) (alias CM-Ctrl:S8:cP\_SP\_PT01)

1. **Step4** – *Precooling 2K line…* Cool down the 2K transfer line going through HX01
   1. Open CV01 to 5 %
   2. Keep the CV02 PID on
   3. Open slowly (2% /min) CV01 to the value defined by S8\_P\_CV01 (*CV01 when cooling*)
   4. Wait until CM-CM:TT08 goes below 10K and VBox:TT03 goes below 9K then goto Step6
2. **Step6** *– 2K operation…* - 2K sequence on HNOSS
   1. Start the 2K operation sequence on HNOSS
   2. Close CV02
   3. Set CV01 to S8\_P\_CV01 and then turn on PID on CV01(LT01 level) when LT01 >= LT01\_Trig
   4. Wait until operator’s request to proceed to 4K operation, then goto Step7
3. **Step7** – *Transition to 4K…* Turn off the CV01 PID regulator (LT01) and set CV01 to the value defined by S8\_P\_CV01\_Step7 (*CV01 @ pressure rise)*. Wait until SQ9 on HNOSS reaches step 20 then start to precooling of the line between 4K tank and the CM by opening CV02 to 5%. After VBox:TT02 drops below 10K goto Step8
4. **Step8** – *Stopping…* Proceed to S6 (4K operation)
   1. Stop SQ9 on HNOSS
   2. Exit S8 (2K operation) on CM PLC.

## Sequence parameters

* S8\_P\_CV01 – the final setting for step 4; the initial setting for step6
* S8\_P\_CV01\_Step7 – the setting for step 7
* Parameters on HNOSS for SQ9:
  + Final pressure (threshold for transition from state 14 to 16) of CM-CM:PT02 (CstatH-LHe:PT101)
  + Set-point for the 2K tank pressure PID
  + Table for control of CV551 while pumping down

## Data exchange needed between different systems

* State of SQ9 on HNOSS (from HNOSS PLC to CM PLC)
* VBox:TT03, VBox:TT03 & CM:TT08 from CM IOC to CM PLC