Cryogenics Operations 2018

Contribution ID: **15** Type: **not specified**

Development of cool-down control logic and its application result of KSTAR campaign in 2016,2017

Korea Superconducting Tokamak Advanced Research (KSTAR) is fully superconducting (SC) magnet tokamak which consists of 30 magnets and is made of Nb3Sn and NbTi superconductor.

To keep the superconducting (SC) magnet coils of the KSTAR Tokamak at proper operating conditions, other cold components such as SC bus-lines, thermal shields, magnet structures, and current leads should be kept in their respective cryogenic temperatures as well as coils.

The Helium Refrigeration System (HRS) with an exegetic equivalent cooling power of 9kW at 4.5K is dedicated to cool down and keep the KSTAR SC magnets in cryogenic temperature.
Cool down process which is to be run after making a vacuum state of the KSTAR is one of the important procedures that requires a lot of manpower and time.

The largest part of Cool down process is flow control of the KSTAR cold components through the manual operation of HRS Cool down valves.
In order to improve the efficiency of it, the need of developing the Control logic has raised its head and then the work commenced in 2015, after which the device was for the first time applied in the campaign in 2016.
This poster will describe development study of KSTAR cool-down control logic for the helium refrigeration system and its application result of KSTAR campaign in 2016, 2017.

Summary

The designing of control logic for entire KSTAR cooling circuit including helium refrigeration system, helium distribution system and KSTAR SC magnets system shall be required for system stability, reliability and efficiency.
During the KSTAR cool-down period in 2016, 2017, the stable and reliable operation of control logic based on optimization philosophy was demonstrated.

Primary author: Mr MOON, Kyung mo (National Fusion Research Institute)

Co-authors: Dr PARK, Dong Seong (National Fusion Research Institute); Mr JOO, Jae Joon (National Fusion Research Institute); Mr SONG, Nak Hyung (National Fusion Research Institute); Mr KIM, Nam Won (National Fusion Research Institute); Mr KWAG, Sang Woo (National Fusion Research Institute); Dr KIM, Yaung Soo (National Fusion Research Institute); Mr YONG-YONG-BOK, Yong-Bok Chang (National Fusion Research Institute); Dr LEE, Young Ju (National Fusion Research Institute)

Presenter: Mr MOON, Kyung mo (National Fusion Research Institute)