JT-60SA Newsletter
No.6, 30 June 2010

Dummy conductors provided to manufacturer for validation

Two dummy conductors, made of copper not superconducting cables, for the equilibrium field coil 4 (EF4), were delivered from the Naka Fusion Institute in Japan to the manufacturer's factory in May. One of them is being used to adjust the winding machine and the other is being used to validate the feasibility of making the EF4 double pancake coil on the winding machine.

Superconducting conductors manufactured

From April to May, five NbTi cables each 444 m long for the EF4, five NbTi cables each 423 m long for the EF6, and thirty conduits for the EF4, were delivered to the Naka Fusion Institute as planned.

The following items were also delivered at the end of April: a welding machine for the superconducting conductor conduit, some of the long conduits for the EF at the high field side, a jacketing machine for the superconducting cable, and some of the conductors for the central solenoid (CS) and the EF at the low field side and the high field side.

Jacketing the superconducting cables and winding them around drums 3 m in diameter were performed at the Superconducting Conductor Jacketing Building at the Naka Fusion Institute in May. A cable helium leak test, pressure test and airtightness test were also performed and successfully met the specification.

Technical specification of switching network unit finalized

The Switching Network Units (SNU) are connected to the Power Supply circuits of the poloidal field coil system (CS1-4, EF3 and EF4 in JT-60SA) to produce a sharp change in the derivatives of the respective currents in order to induce a high voltage for the plasma breakdown and the following current ramp-up.

Each SNU, at a predefined time of the scenario, inserts an appropriate resistor, in series with the relevant coil, producing a coil current discontinuity. As a consequence, an over-voltage (> 4 times the basic PS voltage) is generated in the vacuum chamber to trigger plasma breakdown. In this way, the basic PS voltage can be limited at 1kV during plasma breakdown.

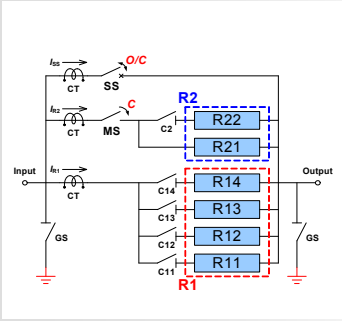


fig. 1: SNU functional scheme

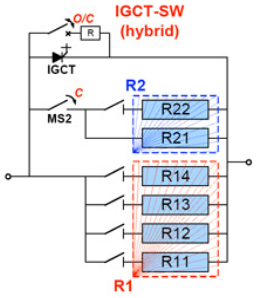


fig. 2: JT-60SA SNU suggested scheme

In the SNU functional scheme (fig.1) the SS switch connects and disconnects the selected resistor. In the actual scheme for the JT-60SA SNU, a hybrid solution (see fig.2) for the SS switch has been proposed, following a 2001 design for an ENEA project. The switching is carried out by a static circuit breaker (using e.g. an Integrated Gate Commutated Thyristor (IGCT), fig.3) in parallel with an electromechanical switch. The advantages in comparison with the traditional solution are a higher commutation speed and accuracy and only minor servicing (particularly for the switch contacts).

fig. 3: ABB -Asymmetric IGCT 5SHY 35L4512

The technical specifications of the SNU have been finalized and the four units of the central solenoid circuits will be procured by ENEA in Italy.

Raw materials for in-vessel components delivered

CFC (type I) material for bolted CFC tiles (part 1)

CFC (type I) material for bolted CFC tiles (part 2)

CFC (type II) material for mono-block targets

44 (part 1) and 230 (part 2) CFC (type I) material pieces for bolted CFC tiles, and 400 mono-block target and 310 bolted CFC (type II) material target pieces were delivered to the Naka site by the end of March 2010.

Launcher disassembled from JT- 60

Peripheral waveguides of the launcher

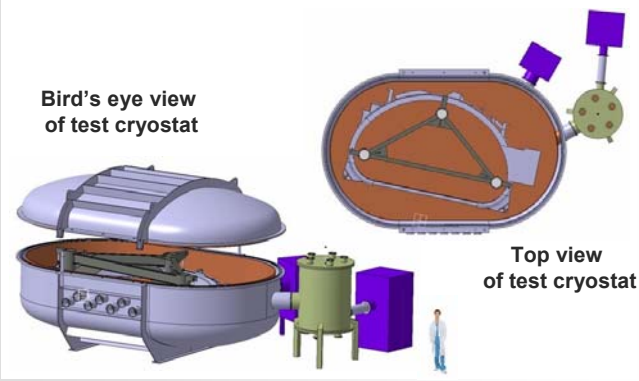
Disassembly of the JT-60 facilities has been making steady progress and a lower hybrid C launcher (5 m in length and 6 t in weight), one of the items forming the high frequency heating system, was removed from the vacuum vessel of JT-60.

Part of the launcher, about 3 m long, inserted into the vacuum vessel, was removed using a motor suitable for adjusting movement by a few cm, after

disassembled peripheral devices such as waveguides and a vacuum pumping system had been removed and stored in containers. The work was implemented, carefully monitoring the motor in order to prevent its overload and/or overheat, by measuring the current and temperature. The launcher was hoisted and separated from its supporting frame structure, hoisted over JT-60, and put down in a temporary storage area in the JT-60 Assembly hall.

The launcher is being disassembled and placed in containers stored in a storage building at the Naka Fusion institute.

Test cryostat for cryogenic test facility contracted



Cryogenic tests to verify the performance of the 18 superconducting TF coils for JT-60SA will be performed in Europe. The contract for the fabrication of the test cryostat as part of the cryogenic test facility was signed in June 2010 between the Belgian Euratom Association SCK-CEN (Studiecentrum voor Kernenergie- Cenre d'Étude de l'Énergie Nucléaire) and the manufacturing company ALM - Ateliers de la Meuse. The contract was signed by the Presidents of the Boards of the two organisations, and their Directors, witnessed attentively by various people involved in the process.

Calendar

August 1-6, 2010
Applied Superconductivity Conf.
Washington, D.C., USA

September 15-16, 2010
9th Technical Coordination Meeting
Naka, Japan

September 27-October 1, 2010
26th Symposium on Fusion Technology
Oporto, Portugal

October 11-16, 2010
23rd IAEA Fusion Energy Conference
Daejon, Republic of Korea

October 19, 2010
7th Meeting of the STP Project Committee
Japan and EU (Remote)

Local

In June, the rainy season in Japan, a hydrangea festival is held in many places, especially at temples, and colourful hydrangeas brighten up this gloomy season.

A garden of the Keigan temple in Mito City, Ibaraki prefecture, is known as one of the gardens that Lord Mitsukuni Tokugawa, the second lord of the Mito dynasty (1628-1700), loved, and he named it Howa-en, a garden of keeping peace. It is a typical Japanese garden and has a pond and miniature hill. The Ajisai-matusri (hydrangea festival) is held at the temple in June and about 6,000 hydrangeas of 30 different species are in bloom, including Hydrangea macrophylla, the most well-know species which is native to Japan. The garden is illuminated by many paper lanterns at night-time during the festival.

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team. Suggestions and comments are welcome and can be sent to masayasu.sato@jt60sa.org.

For more information please visit the website: http://www.jt60sa.org/