**Commissioning of the EU enhancements on the JT-60SA tokamak**

**2022**

This is a draft document to define a commissioning procedure for the EU enhancements for the JT-60SA tokamak under the Broader Approach Agreement.

Relevant people:

* EUROfusion Project Leader and operations team
* F4E Enhancements – G. Philipps
* QST group/section leader
* JT-60SA Commissioning Leader
* JT-60SA Project Manager

Identify:

* Machine areas for access
* Key systems – protection, safety, etc.
* Key personnel – who is responsible for personnel and machine safety, protection systems, responsible officer for key systems for the interfaces
* Operational processes – what assessments/authorizations are required (risk, work authorization)
* Relevant meetings where the document and interfaces are discussed/approved, work is coordinated.

Questions:

* Will the procedure be used in paper form or electronically?
* English-Japanese: will the procedure be available both in English and Japanese? Who approves the translation? The records should be available in English as well.
* Storage of the procedure: Relevant section on the DMS?

Include strategy, limits, temporary limits for testing (sign changing limit, sign limits changed back)

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| **Revision history** | | | |
| **Issue** | **Date** | **Author’s name or e-mail** | **Comment** |
| 1 |  |  | New procedure |
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| **JT-60SA Commissioning Procedure**  **for the EU Enhancements** | | | | | | |
| **Procedure status:** ExistingModified1 New  **Procedure ID**: JT-60SA\_CP\_SYSID\_nn\_yyyy.v.docx  **Procedure title:** Commissioning of the ...  **Estimated duration (days): Hold Point:** | | | | | | **System Category**  Safety  Protection  Other |
| **Work control** | | | | | | |
| **Is a Risk Assessment applicable to this work?**Yes  No  Risk Assessment No:  **Is a Authorisation Form required?** Yes No  AF No: | | | | | | |
| **Prerequisites2** | | | | | | |
| **Required services** | | | **JT-60SA status** | | **List of commissioned subsystems** | |
| Mains power  Pulsed power  Protection sys  Cooling water  Compressed air  Machine control  IT  Networks  Remote access  Other (specify): | | | TH sole access  TH locked  Vacuum  Plasma | |  | |
| **Areas to be accessed during commissioning** | | | | | | |
| Control Room | Server Room | Torus Hall | | Basement | | Area 1 |
| Area 2 | Area 3 | Area 4 | | Area 5 | | Area 6 |
| Area 7 | Area 8 | Area 9 | | Area 10 | | Area 11 |
| **Additional key resources (staff) required during commissioning3** | | | | | | |
|  | | | | | | |
| **Special requirements4** | | | | | | |
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1 Describe modifications in the Revision history table.

2 Specify services (cooling, compressed air, etc.), JT-60SA machine status and list subsystems that must be commissioned prior to this one. Details to be specified in sections B2 and D1 of this document.

3 Specify names of the additional staff from other groups required to perform commissioning tasks.

4 Specify any special requirements (e.g. access to specific areas during machine operation, sole access, etc.).

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| **The undersigned declare that this is an adequate procedure for the subsystem commissioning and that all interfaces’ comments have been considered.** | | |
| Author:  EUROfusion Project Leader | Reviewer5  F4E/QST | Approved by6:  QST |
| Name: | Name: | Name: |
| Signed: | Signed: | Signed: |
| Date: | Date: | Date: |

**5** Reviewer is appointed by the JT-60SA Operations Coordination Meeting

6 Relevant Person1 for safety related systems and JT-60SAProgramme Manager or nominee for all other systems.

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| **Key people involved in the commissioning** |
| **Commissioning team:**  1. Name: ................................................. Email: .................................... Affiliation: .........................  2. Name: ................................................. Email: .................................... Affiliation: .........................  3. Name: ................................................. Email: .................................... Affiliation: ......................... |

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| **Timeline** |
| **Estimated duration (days):** |
| **Record start date of the commissioning:**  **Name:** ………………………………  **Signature:** ………………………………  **Date:** ……………………………… |
| **Actual duration (days):** |
| **Record end date of the commissioning:**  **Name:** ………………………………  **Signature:** ………………………………  **Date:** ……………………………… |

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| **System**7 | **Interface’s name** | **Comments included** | **Signature** |
| Machine Services |  |  |  |
| Vacuum Systems |  |  |  |
| Power Supplies |  |  |  |
| NBI |  |  |  |
| ECRH |  |  |  |
| Machine Control |  |  |  |
|  |  |  |  |
| Machine Protection |  |  |  |
| Plasma Control |  |  |  |
| Diagnostics |  |  |  |
| CODAS |  |  |  |
| Person responsible for personnel and machine safety8 |  |  |  |
| Chief Engineer9 |  |  |  |

7 Adapt the list to suit the system being commissioned, i.e. delete if not required and add new item if not already in the list.

8 Relevant Person responsible for personnel and machine safety is mandatory interface for safety systems

9 JT-60SA Chief Engineer is mandatory interface for machine protection systems

**Signatories' Comments:**

**(**All comments must be addressed before final approval by the Person for safety systems, JT-60SA Chief Engineer for protection systems or Department Manager or delegate for all other systems.)

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| --- | --- | --- |
| **Interface/Reviewer Name** | **Interface/Reviewer Comments** | **Author’s Response** |
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**Section A Documentation**

##### (Give details of documentation needed to perform the commissioning: drawings, instructions, manuals, etc.)

**A1 Required for the commissioning**

A.1.1

A.1.2

A.1.3

**A.2 For reference only**

A.2.1

A.2.2

A.2.3

**Section B Scope**

**B1 Brief description of the aim of the commissioning procedure**

###### (Describe briefly the main aim of this commissioning procedure)

**B2 Systems involved and services required**

###### (Describe briefly the system being commissioned and all services required to perform the commissioning, e.g. cooling, vacuum, power supplies, CODAS)

**B3 List of systems and signals tested in this document**

###### (Provide the list systems and signals to commission)

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|  | **System** | **Description** |
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**Section C Equipment**

##### (Mention below all the equipment needed to perform the commissioning, calibration records if available, etc.)

C1 Remote access

C2 Standard equipment

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|  | **Equipment** | **Available?**  (✓ OR N/A) |
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**Section D General Test Procedures**

**D1 Prerequisites for system commissioning**

##### (Mention below status of the plant needed to perform the commissioning and all commissioning procedures that have to be completed prior to the start of the commissioning)

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|  | **Prerequisite** | **Available?**  **(**✓ **OR N/A)** |
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**D2 Procedure description – specific to these commissioning tasks**

##### (Describe the methodology used in this commissioning procedure)

**Section E Test Reports**

**E1 Test Report for [Unit 1]**

E1.1 Initial conditions for the E1 tests (optional)

E1.2 Main body of the E1 tests

E1.3 Plant state at the end of the E1 tests (optional)

**E2 Test Report for [Local Unit 2]**

E2.1 Initial Conditions for the E2 tests (optional)

E2.2 Main body of the E2 tests

E2.3 Plant state at the end of the E2 tests (optional)

**En Test Report for [Local Unit n]**

En.1 Initial Conditions for the En tests (optional)

En.2 Main body of the En tests

En.3 Plant state at the end of the En tests (optional)

**En Post Test Action – Return to initial conditions**

[e.g. set temporary protection limit thresholds back to standard]

En.1 Initial Conditions for the En tests (optional)

En.2 Main body of the En tests

En.3 Plant state at the end of the En tests (optional)

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| **JT-60SA COMMISSIONING PROCEDURE**  **for the EU Enhancements** |
| **Section: READINESS FOR OPERATION10** |
| **Procedure title: Commissioning of the ...**  **Procedure ID: JT-60SA\_CP\_SYSID\_nn\_yyyy.v.docx** |
| **Category of the system being commissioned:** Safety  Protection  Other |
| **Summary of the commissioning task:** |
| **Commissioning team:**  1. Name: ................................................. Signature: .................................... Date: .........................  2. Name: ................................................. Signature: .................................... Date: .........................  3. Name: ................................................. Signature: .................................... Date: ......................... |
| **Comments/Exceptions:**  (State any non-conformances that might limit system performance. If appropriate raise a non-conformance report and state the NCR reference. If necessary, continue on the next pages and support with additional documents describing the exceptions.) |
| **Declaration by the Section Leader**  ***I confirm that, with the exceptions mentioned in box above, the equipment covered by this report has been commissioned and is safe and ready for operation****.*  Name: ….............................................. Signature: …......................................... Date: ………....................... |

10 Scanned (PDF) copy of the completed procedure must be submitted to the Restart Management for archiving

11 Not including delays due to services, plant or staff unavailability

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| **JT-60SA COMMISSIONING PROCEDURE**  **For the EU Enhancements** |
| **Section - Final remarks** |
| **Procedure Title: Commissioning of the ...**  **Procedure ID: JT-60SA\_CP\_SYSID\_YYYY.V.DOCX** |
| **Lessons learned / additional comments:** |
| **Proposed considerations/modifications for the next commissioning cycle:** |