**ESS Tuning Dump Screen System**

**Mechanical Assembly Check Procedure**

**Document Change Record**

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| Version | Date | Section/Sheet | Comment |
| 1.0 | 15/10/19 |  | First Issue |

**Document Purpose**

This document defines the build procedure for the ESS tuning dump vessel prior to testing. This check procedure is not exhaustive, but covers the main tasks involved in assembling the dump vessel.

This document should be printed and completed by hand during assembly. Once completed with all signatures, a scanned copy should be sent to the project manager for storage in the document management system.

**Unit**

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| Module name: |  |

**Approval**

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| Approved | Print | Signature | Date |

P**rocedure:**

This is a generic build procedure for ESS tuning dump vessel and associated components. Please feel free to adjust the procedure as per requirement when carrying out the tasks described here.

Step 1-3 should be carried out before test day while step 4 and onward should be carried out on test day.

This document covers the assembly of the actuator, limit switches, view port, top flange with bearing assembly and screen frame onto the tuning dump vessel. If you are unsure of any of the steps in this document or if any of the procedures are unclear, stop and seek further clarification from the lead technician or project manager before continuing.

*Note: All fasteners used shall be stainless steel A2-70 or A4-70 unless specifically indicated otherwise*

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| **Step** | **Task – Prep Assembly Area** | **Initial / Date** |
|  | Prepare the designated assembly area for the task.  Assembly area must be cleaned from debris, other unwanted assemblies and all other hindrances.  Assembly area should have access to crane, electricity and all other tools required.  Assembly area should be big enough to do unpacking and assembling in the same place.  A standard worktop table should also be available in the assembly area. |  |

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| **Step** | **Task – Test Stand Setup** | **Initial / Date** |
|  | Unpack the test stand (289-11816) from the crate and setup the stand as shown in dwg 289-11816 in the designated assembly area.  Note that test stand has been delivered already fully assembled to ETC. Make sure test stand is setup in upright position. |  |
|  | Use base of the crate as cushion between test stand and ground. Bolt test stand feet to the crate base using M12 self-tapping screws. |  |
|  | Remove the H-bars from the test stand as shown below. |  |

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| **Step** | **Task – Dump Vessel Setup** | **Initial / Date** |
|  | Unpack tuning dump vessel in the crate. |  |
|  | Lift the vessel using available crane from the crate.  Vessel should be rotated vertically up so that beam line pipe and view port pipe are horizontally parallel to the ground as shown in 289-10963 isometric view. Picture below also shows COG w.r.t centre of vessel.    COG Coordinates: X: -38.2mm, Y: 48.1mm, Z: 67.6mm |  |
|  | Carefully lower the vessel into the test stand. Ensure that vessel is oriented as shown below. Ensure that vessel is sitting on beam pipes on test stand and not on flanges. |  |
|  | Assemble the H frame back on the test stand. Make sure that the beam pipe is captured inside the H frame and there is enough space to access the bolts between H frame and pipe flange. |  |
|  | At the view port side, secure the vessel using suitable strap by wrapping it around beam pipe and view port pipe as shown below in top view. |  |
|  | Remove the blank flange from the view port pipe and install the DN250 view port in place with gasket.  Note that the blank flange is captured by two half-moon rings at the back. These rings will fall down as soon as the blank flange is removed. Ensure that these half-moon rings are captured securely before removing the blank flange.  After removing blank flange ensure that pipe ID is immediately covered using aluminium foil and not left open to atmosphere.  Prepare the half-moon rings by installing M8x65Lg screws into the threaded holes.  Remove foil from pipe and install DN250 view port with gasket in place. Slide the half-moon rings from behind into the view port holes. Capture the ring and view port in place by tightening nuts.  Use M8x65Lg hex head screw (fully threaded) and torque to 25Nm (+/-10%).  Note that the screws must be fed from the ring side and not the view port side. |  |
|  | Assemble the VAT 90deg valve to the DN250-DN40 adaptor and install it on the beam line pipe flange towards the H frame side as shown below.  Use M8x65Lg hex head bolt and torque to 20Nm (+/-10%). |  |

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| **Step** | **Task – Prep Top Flange Assembly** | **Initial / Date** |
|  | Assemble bearing guide assembly to the bottom or gasket face of DN350 top flange of vessel as shown below if not already done so by supplier.  When assembling make sure that bearing guide assembly is positioned loosely to allow feeding of central screen frame rod thorough it. Final position will be adjusted on the test day. |  |
|  | Unpack linear actuator and lay it down on the work table.  Assemble limit switches to actuator bracket using screws and back plate provided in actuator packaging. For position of limit switches on bracket refer to actuator dwg HLSML64-20895-001. |  |
|  | Assemble actuator on top flange with gaskets mating with DN63 flange on top.  Note that the orientation of actuator on top flange is important. So, the actuator should be assembled at 45⁰ from lifting eye bolt holes as shown below.  Use M8x55Lg and M8x40Lg socket cap head screws and torque to 25Nm (+/-10%). |  |
|  | This step to be carried out on test day by Greyson Christoforo.  Connect the motor controller to the stepper motor and drive the top flange of the actuator downward to the correct position required.  Remove the motor controller if required. |  |
|  | This step to be carried out on test day.  Feed the Aluminium screen frame from the bearing guide assembly side into the bellow of actuator until the central rod comes out of the top flange of actuator.  The central rod must be fed using corners of the rod to align with V groove of the bearing assembly as shown below.  The resultant orientation of the aluminium frame must be perpendicular to beam line. |  |
|  | Assemble L brackets to DN63 top flange using M4x12Lg Vented Socket cap head screw as shown below.  These bolts should not be torqued but rather hand tight in place. |  |
|  | This step to be carried out on test day.  Assemble the top flange to the central rod of aluminium frame as shown below.  Use M6x50Lg hex head bolt and hand tight in place. Make sure that the central rod is freely able to swing around M6 bolt. |  |
|  | This step to be carried out on test day.  Connect the top DN63 flange to the top flange of actuator with gasket as shown below.  Use M8x35Lg hex head screws and torque to 25Nm (+/-10%). |  |
|  | This step to be carried out on test day.  Assemble M12 eyebolts in place on top DN350 flange as shown below. |  |
|  | This step to be carried out on test day.  Lift the entire top flange assembly using eyebolts and crane and hang it vertically in air.  Assemble the screens to the aluminium frame. This will be done by Greyson Christoforo. |  |

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| **Step** | **Task – Top Flange to Vessel Assembly** | **Initial / Date** |
|  | This step to be carried out on test day.  Remove the blank flange at the top of the vessel. This flange is held in place by two half-moon rings. Be careful as the half-moon rings will fall down once bolts are removed. Make sure that half-moon rings are securely captured before removing the bolts. |  |
|  | This step to be carried out on test day.  Position the flange assembly on top of the vessel and carefully lower it into the vessel making sure that the aluminium frame does not hit the internal walls of vessel. |  |
|  | This step to be carried out on test day.  Prepare the half-moon rings by assembling M10x80Lg hex head screws (fully threaded) into threaded holes.  Slide the rings into position to mate with the top DN350 flange and tight the nuts.  Use M10x80Lg hex head screw (fully threaded) and torque to 25Nm (+/-10%).  Note that the screws must be fed from the ring side and not the flange side. |  |

**Continuation Sheet:**

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| **Step Number** | **Comment** |
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