

## 6 Module Connection Checklist

| SEQ    | ITEM   | NOTE   | CHECK |
|--------|--|--|-------|
| Safety | Acknowledge and Activate Work Permit   | Call RIB operators (ext. 7500)<br>Call Main Control Room if disconnecting or closing water supply/return in SEQ 0 (ext. 7333)                |       |
| Safety | <ul style="list-style-type: none"> <li>• Electronic dosimeter ✓</li> <li>• Tank Suit ✓</li> <li>• Respirator ✓</li> <li>• Overshoes ✓</li> <li>• Gloves(double) ✓</li> <li>• Safety Glasses / Full Face Respirator ✓</li> </ul>  | Remove and replace overshoes when exiting the pit to reduce risk of spreading contamination.   | OK    |
| Safety | Check the General Field of ITW/ ITE  | RAM or pole monitor ( $\leq 500 \mu\text{Sv/h}$ ) <sup>1</sup> ✓   | OK    |
| Prep   | Check tools: <ul style="list-style-type: none"> <li>• Hex Keys (9/16", 3/16" &amp; 3/8") ✓</li> <li>• Side Cutter ✓</li> <li>• Wrenches (two 1/2") ✓</li> <li>• Wipes ✓</li> <li>• 10" Cable Ties ✓</li> <li>• RAM ✓</li> </ul>  |  | OK    |
| 0      | High Active Cooling Water  | <ul style="list-style-type: none"> <li>• Verify valve for supply water closed ✓</li> <li>• Verify valve for return water closed ✓</li> </ul> | OK    |
| 1      | Shutter ✓  | <ul style="list-style-type: none"> <li>• Cut cable tie ✓</li> <li>• Push down bellow (air cylinder) ✓</li> </ul>                             | OK    |
| 2      | Compressed Air to Shutter and Valves (x2) ✓  | Shutter should be opened (pushed down)   | OK    |
| 3      | Gas Line (5/8" & 11/16")   | <b>FEBIAD target only</b><br><b>Two manual valves are opened</b> ✓   | NA    |
| 4      | ITW/ITE Roughing out   | Ask ISAC operator roughing out ITW/ITE ✓   | OK    |
| 5      | High Current Cables: <ul style="list-style-type: none"> <li>a) (A)Target Oven + ✓</li> <li>b) (B)Target Oven - ✓</li> <li>c) (C)Tube heater - ✓</li> <li>d) (D)Tube Heater + ✓</li> <li>e) (T)60KV Bias ✓</li> <li><del>f) (PQ)Coil + No</del></li> <li><del>g) (RU)Coil - No</del></li> </ul> | <b>f) FEBIAD target only</b><br><b>g) FEBIAD target only</b>   | OK    |
| 6      | Extraction Electrode (I)   | ✓  | OK    |
| 7      | Einzel Lens (Y)  | Einzel lens cable should be routed as far away from all 60 kV corona rings as possible ✓   | OK    |

<sup>1</sup> Ref Dose Estimate Form Document-19905

| Target Module Connection and Disconnection Procedure |               |                          |
|--|---------------|--------------------------|
| Document-141576                                      | Release No. 2 | Release Date: 2018-02-21 |

| 8  | 52 Pin Connector (H)  | Ground to bias stand  |    |
|----|---|---|----|
| 9  | <p>a) Water Lines</p> <ol style="list-style-type: none"> <li>1. Target Oven ✓</li> <li>2. Tube Heater ✓</li> <li>3. MSP ✓</li> <li>4. EE ✓</li> <li>5. HS ✓</li> <li>6. Window ✓</li> <li>7. Coil 2 ✓</li> <li>8. Coil 1 (ITE only) ✓</li> </ol> <p>b) Open water (after step a) ✓</p> <p>c) No Drip Leaks on Quick Connector (QC) ✓</p> <p>d) No contact between SST Elbows and QC ✓</p> | <p>a) Water Lines</p> <ol style="list-style-type: none"> <li>1. With bypass loop between Ta+ and Ta- on module</li> <li>2. With bypass loop between Tu+ and Tu- on module</li> <li>3. Bypassed (looped) on station. Cable tie to station.</li> <li>4. Connected to module always</li> </ol> <p>b) Open supply and return valves</p> <ol style="list-style-type: none"> <li>1. Hand check, wipe away water if necessary</li> <li>2. <b>SST elbows and quick connectors must be clear of each other, otherwise an electrical short will be produced.</b></li> </ol> | OK |
| 10 | <p>Vacuum System</p> <ol style="list-style-type: none"> <li>a) TP1 Controller ✓</li> <li>b) TP2 Controller ✓</li> <li>c) TP1 BV1 ✓</li> <li>d) TP2 BV2 ✓</li> <li>e) IG1 ✓</li> <li>f) PNG4 (TM4 only) ✓ N/A</li> <li>g) TP1 TP2 Fans ✓</li> </ol>  | <ol style="list-style-type: none"> <li>a) Connector on pump body</li> <li>b) Connector on pump body</li> <li>c) KF 25 and O-ring, Connector for BV 24 V DC</li> <li>d) KF 25 and O-ring, Connector for BV 24 V DC</li> <li>e) Align the gauge pins</li> <li>f) Beside the shutter, use PNG1 cable</li> <li>g) Attach and switch on all fans (2 of 110 V Plugs for ITW, switch on Extension bar for ITE)</li> </ol>  | OK |
| 11 | <p>Steers</p> <p><u>ITE</u></p> <ul style="list-style-type: none"> <li>• Left, top ✓</li> <li>• Bottom (Right) ✓</li> </ul> <p>ITW:</p> <ul style="list-style-type: none"> <li>• X</li> <li>• Y</li> <li>• Common</li> </ul>  | 3 HV connectors   | OK |
| 12 | ISAC Control Page set up (plug, connector)  | Surface with <u>EINZEL LENS</u> , IGLIS, and FEBIAD ✓   | OK |
| 13 | TP1 TP2 Controllers Reset   | Electrical room, TP1 and TP2 controllers ✓  | OK |

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|    |  |  |                          |
|----|--|--|--------------------------|
| 14 | <p>Water Signals Check</p> <p>a) Target Module:</p> <ol style="list-style-type: none"> <li>1. Target, ✓</li> <li>2. Tube, ✓</li> <li>3. MSP ✓</li> <li>4. HS ✓</li> <li>5. EE ✓</li> <li>6. Coil (1) ✓</li> <li>7. Coil 2(ITE only) ✓</li> <li>8. Module Window ✓</li> </ol> <p>b) Beamline 2A:</p> <ol style="list-style-type: none"> <li>1. Tank ✓</li> <li>2. Dump(Plug) ✓</li> <li>3. Dump Shielding ✓</li> <li>4. 2A Window ✓</li> <li>5. Collimator ✓</li> </ol> | <p>In Electrical room, water signal panels:</p> <p>Yellow lights should flick at certain frequency and green lights should be constantly on</p> <p>*If signal is not right, go back to pit and visually check wheel spin in flow sensor for trouble shooting</p> <p>TM2 and TM4 GE line are not in use (leak), No signal</p> | OK                       |
| 15 | Double Check Module Connection   | General, visually check all connections<br>Verify voltage gaps free of cables and waterlines ✓   | OK                       |
| 16 | HV Fence and HV Cover on TM Service Cap  | Limit switches and cables ✓<br>Retract HV Keys ✓   | OK                       |
| 17 | Restore HV Keys to Electrical Room   | Limit switches signals check in electrical room ✓  | OK                       |
| 18 | Start TP1 TP2  | ITW/ITE: CG4/CG4S below 200 mTorr ✓<br>(ask ISAC OP)   | OK                       |
| 19 | All Turbo Pumps(six) Current Draw Check at Normal Status   | Check current draw for each pump on TP controller, current draw at full speed (38kRPM) ≤ 2.0 A<br>Visually confirm TPBVs in pit are opened (red button sticks out)   | ← TP2 was replaced<br>OK |
| 20 | Return Work Permit and E-log entry   | Call RIB operators (ext. 7500)<br>Call Main Control Room (ext. 7333)   | OK                       |

NOTES:

TARGET: ~~AAA~~ UCx #24      DATE: 2018-09-04

TARGET MODULE: TM1    TM2    TM3    TM4

STATION: ITW    ITE

SIGNATURE 1:       DOSE 1: 0.25    mSv

SIGNATURE 2:      DOSE 2:      mSv