

<u>Title</u>	<u>Name</u>	<u>Approval Date</u>
NPB Portfolio Manager	Andrew Broadbent	10/02/2017
Deputy Director for Construction	Erik Johnson	10/02/2017
ESH Manager	Robert Lee	10/02/2017
Quality Assurance Engineer	Joseph Zipper	10/02/2017

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
	PD-XFP-ES-1000					

Deviation & Waiver: _____

OP	Description	Name/Life #	Date	DR
10	TRAVELER INFORMATION This traveler shall be used for the installation and testing of end station equipment previously installed and operated at NSLS or another facility, that is now being installed at NSLSII. This traveler goes beyond the typical installation/test traveler that instructs/documents installation qualification. It will also: 1) confirm that the re-purposing of this equipment was reviewed and approved for its intended use 2) collect upgrade information from subject matter experts (SME) that they deem necessary for the equipment's safe operation at NSLSII, and 3) confirm that any new upgrades have been implemented.	E. FARQUHAR Y5735	8/2/18	

COMPLETE OP#20 THRU OP#130 BEFORE INSTALLATION

20 A. In the space provided at the top of this traveler write in the relevant beamline.

ERIK FARQUHAR Y5735	11/6/17	
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B. In the space below record the name/description of the end station equipment, and its intended use.

NAME/DESCRIPTION: XAS Mono + ENDSTATION

INTENDED USE: Provide monochromatic

x-rays, detectors, and sample

environments for biological XAS

at 17-BM



OP	Description	Name/Life #	Date	DR
30	EQUIPMENT RE-PURPOSING REVIEW - This operation shall be signed off by the Lead Beamline Scientist when all concurrences have been obtained.	ERIK FARQUHAR Y5735	8/1/18	

The undersigned have inspected the end station equipment and agree to the following:

- It is fit for the intended purpose
- It will be used in a manner in which it was intended
- There is no additional radiation safety risk
- There are no additional vacuum/pressure vessel risks

Concurrence:

Lead Beamline Scientist: [Signature]

Program Manager: [Signature]

Project Manager: [Signature]

Beamline Engineer: Michael R. Sullivan

ESH Manager: [Signature]

8-3-11/11/17
PORTFOLIO

40	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Electrical Engineering Group Leader	JOHN ESCALLIER	10/6/17	
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Inspect the equipment for electrical safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

ION PUTAS INSTALLED + BONDDED

BOND RACK ENCLOSURE

ALL ELECTRONICS IN RACK NEED EET PRIOR TO INSTALL

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#40' on the attachment.



17-BM END STATION EQUIPMENT INSTALL/TEST

Doc No. BL-ES-001 Rev: C

Page 3 of 9

Rev Date: 10/02/2017

Author: Joseph Zipper

Approved: 10/02/2017

OP	Description	Name/Life #	Date	DR
50	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Pressure Safety SME	Gelfing 22039	11/0/2017	

Inspect the equipment for pressure safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

- Develop a plan/system to control the hazard of table motion entraping staff
- Post maximum load rating for electronics racks
- Consider adding elbow protection for chameleon burst disk
- Ensure piping/fitting is labeled properly

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#50' on the attachment.

60	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Vacuum Engineer	Final/18710	5/24/17	
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Inspect the equipment for vacuum equipment performance, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#60' on the attachment.



OP	Description	Name/Life #	Date	DR
70	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Radiation Safety SME	25263 M. KENNEDY	11/05/2017	

Inspect the equipment for radiation safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#70' on the attachment.

80 EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Beamline Engineering Group Leader

S. Hullot/17250	6 Nov 2017	
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Inspect the equipment for mechanical safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#80' on the attachment.



OP	Description	Name/Life #	Date	DR
90	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by ESH Staff	Lori Stiegler 19497	11/6/17	

Inspect the equipment for safety hazards, and complete the following:

The equipment is safe as is and there are no upgrades required.

The following upgrades are required:

Re evaluate PDS Search buttons & pattern

Update Beryllium inventory

Evaluate LN2 vent / potential for ODH alarms
Cover the moving parts / pink beam absorber motion

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#90' on the attachment.

100	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by an EPS Controls Engineer	H. Bassan 25677	11/6/17	
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Inspect the equipment for EPS upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#100' on the attachment.



OP	Description	Name/Life #	Date	DR
110	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by a Mechanical Utilities Engineer	O'BRIEN 24021	11/16/17	

Inspect the equipment for mechanical utility upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

PRESSURE TEST REPORT REQUIRED.

HOSES USED SHOULD BE RATED

AT OR ABOVE 225 PSIG. (190 PSIG IS ACCEPTABLE) (WD) 7/11/18

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#110" on the attachment.

120	EQUIPMENT UPGRADE INFORMATION - This operation shall be completed by the Survey Group	HUBBARD 20503	11/18/17	
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Inspect the equipment for survey/alignment upgrades, and complete the following:

The equipment is acceptable as is and there are no upgrades required.

The following upgrades are required:

Note: If there is not enough space provided here please write "See attachment" and reference 'OP#120" on the attachment.



OP	Description	Name/Life #	Date	DR
130	<p>END STATION DRAWING</p> <p>A. On the space provided on page 1 for part number record the released drawing number for this end station equipment.</p> <p>B. Verify that the drawing includes envelope dimensions, location from source, critical interfaces, performance specifications, and upgrade information from the SME's. For clarity purposes the drawing may also include a photo of the equipment but its not required.</p>	E. FAIRQUHAR Y5735	8/2/18	

COMPLETE OP#140 THRU OP#250 AFTER INSTALLATION & UPGRADE

140	<p>Follow the ESH and PPE requirements for the area. Wear safety glasses, safety shoes and gloves for physical installation as applicable</p>	D. abel X9000	7/11/18	
150	<p>Verify measuring and test equipment used for this procedure contains a valid calibration label in accordance with NSLS-II Calibration Procedure PS-QAP-0901, where applicable.</p> <p>The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with NSLS-II Discrepancy Reporting Procedure PS-QAP-0002.</p>	D. abel X9000	7/11/18	
160	<p>Verify installation of the end station components per its released drawing.</p>	E. FARQUHAR/ Y5735	8/2/18	
170	<p>Verify windows and viewports (overpressure, Be) are installed and compliant with NSLSII requirements</p>	D. abel X9000	7/11/18	
180	<p>Verify access to the end station and adjacent equipment is acceptable and unimpeded.</p>	D. abel X9000	7/18/18	



OP	Description	Name/Life #	Date	DR
190	MAGNETIC FIELD SAFETY VERIFICATION - This operation shall be completed by BNL Safety and Health Services Division Personnel A. Measure location of 5 Gauss Line. B. In the space provided below make recommendations on shielding, barricades, and/or signage. _____ _____ _____ C. Confirm recommendations have been installed and are acceptable.	N/A Y5735 E. FARQUHAR	7/17/18	
200	FOR END STATION EQUIPMENT WITH CRYOGENICS A. Verify cyro lines are securely supported B. Veriy over pressure relief device is installed.	D. abd 79000	7/11/18	
210	VACUUM TESTING A. Perform vacuum testing as per traveler BL-VA-001. B. Attach completed BL-VA-001 travelers to this traveler.	P.T. 18710	5/21/18	



OP	Description	Name/Life #	Date	DR
220	<p>UPGRADE INSTALLATION VERIFICATION - This operation shall be signed off by the Lead Beamline Scientist once all signoffs are obtained from the SME's.</p> <p>SME's shall sign-off below that requested upgrades have been installed and are acceptable. If no upgrades were requested then write "N/A".</p> <p>Electrical Engineering Group Leader: <u>George V. Zucko 7/17/18</u></p> <p>Pressure Safety SME: <u>N/A 7/11/2018</u></p> <p>Vacuum Engineer: <u>[Signature]</u></p> <p>Radiation Safety SME: <u>N/A</u></p> <p>Beamline Engineering Group Leader: <u>N/A</u></p> <p>ESH Staff: <u>Chai Stey 7/16/18</u></p> <p>EPS Controls Engineer: <u>N/A</u></p> <p>Mechanical Utilities Engineer: <u>[Signature]</u></p> <p>Survey Group: <u>N/A</u></p>	E. FARQUHAR Y5735	7/30/18	
230	<p>SURVEY GROUP</p> <p>A. Survey and align all components per released drawings.</p> <p>B. Attach survey report to this traveler.</p>	HUBBARD 20563	8/2/18	
240	<p>Motion Testing with Motion Control System:</p> <p>A. Verify the motion of all motorized axes of the end station components listed above. Also verify the function of travel limits, over-travel limits, encoders, and home switches where applicable.</p> <p>B. Document results and attach test report.</p>	E. FARQUHAR Y5735	8/2/18	
250	Verify All Traveler Operations Complete	E. FARQUHAR Y5735	8/2/18	
260	<p>REVISION HISTORY (This step is informational and does not require signoff)</p> <p>Rev - Description - Date C First Release</p>			



<u>Title</u>	<u>Name</u>	<u>Approval Date</u>
Interface and Beamline Manager	Andrew Broadbent	06/10/2014
ES&H Operations Manager	Lori Stiegler	06/10/2014
CSX Group Leader	Stuart Wilkins	06/10/2014
Quality Assurance Engineer	Joseph Zipper	06/10/2014

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
17B4 XFP	Vacuum Sec 2					
Deviation & Waiver: _____						

OP	Description	Name/Life #	Date	DR
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10 Follow the ES&H and Personal Protective Equipment Requirements for the area.

D. Abel / fccc	7/5/18	
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15 Verify measuring and test equipment used for this procedure contains a valid calibration label in accordance with NSLS-II Calibration Procedure PS-QAP-0901, where applicable.

D. Abel / x9000	7/5/18	
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The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with NSLS-II Discrepancy Reporting Procedure PS-QAP-0002.

20 Vacuum Component/Section Information - This step shall be performed by the cognizant beamline engineer/scientist (CE/CS)

E. FARGUMAR / D. Abel 45739	7/5/18	
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A. Record the Beamline name (in the space provided) at the top of each page of this traveler.

B. For a vacuum component, record the part number and description on this sheet in the box for "Part No".

C. For a vacuum section, record the section number on this sheet in the box for "Part No"

D. Record required base pressure for Vacuum Comp/Sec.

1 x 10⁻⁴ (Torr)

E. Review this entire traveler and if a step (OP#) does not apply, write in that operation's sign-off box: "NA per OP#20"



OP	Description	Name/Life #	Date	DR
30	<p>Configuration- This step shall be performed by the CE/CS.</p> <p>A. Is component/section in its final configuration? (circle one)</p> <p style="margin-left: 40px;"><u>YES</u> or NO</p> <p>B. If "NO", provide a brief description of component/vacuum section</p>	D. Abel x9000	7/5/18	
40	<p>Visual Inspection</p> <p>Prior to pumping down, visually inspect that all flanges and vacuum connections to component/sector are tight and secure. Confirm the presence of burst disk (as required by the assembly drawing) and inspect for damage. Confirm all vacuum forces are restrained through the use of bolted stands/supports and appropriate bellows restraints. Any deviations from the assembly drawing shall be noted and the Cognizant Beamline Engineer shall be notified prior to proceeding.</p>	D. Abel x9000	7/5/18	
50	<p>Leak check</p> <p>Leak check component/vacuum section using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ mbar l/sec He.</p>	D. Abel x9000	7/5/18	
60	<p>RGA scan</p> <p>Acquire RGA data. The CS/CE or Vacuum Engineer (VE) will acquire and interpret RGA and prescribe corrective action if necessary. Initial RGA scan shall include a baseline scan of RGA isolated from vacuum section/component to confirm RGA cleanliness.</p>	D. Abel N A x9000	7/5/18	
70	<p>Bakeout</p> <p>Confirm that bakeout was performed according to procedure PS-C-XFD-PRC-013 (NSLS-II Beamline Vacuum Bake-Out Procedure) and the manufacturer's requirements with temperature ramp rate(s) soak time(s), soak temperature(s) and maximum temperature(s) all controlled within acceptable limits.</p>	D. Abel N A x9000	7/5/18	
80	<p>Hot leak check</p> <p>With the component/sector at the soak temperature, perform leak check using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ std cc/sec He (mbar l/sec He).</p>	D. Abel N A x9000	7/5/18	
90	<p>Crossover to ion pumps</p> <p>Confirm with the Cognizant Beamline Engineer prior to switching from turbopump to ion pump(s). Record the date and time the ion pumps are turned on and the turbopump valved out.</p>	D. Abel N A x9000	7/5/18	

Date _____ Time _____

OP	Description	Name/Life #	Date	DR
100	Final RGA scan When the component/section has reached room temperature, acquire RGA data. The CS/CE/VE will acquire and interpret the data to determine conformance to section 4.7.3 of spec LT-ENG-RSI-SR-VA-002 and prescribe corrective action if necessary. Attach RGA scan.	NA ^{D. Abel} x9000	7/5/13	
110	Base pressure measurement. Confirm the required base pressure in OP 20 is met. The CE/BE/VE shall make this determination. Record base pressure measurement. <u>7×10^{-8}</u> (Torr)	D. Abel x9000	7/5/18	
120	Forward this traveler and all attachments to QA for archiving.	D. Abel x9000	7/5/18	
130	REVISION HISTORY (This step is informational and does not require signoff)			

Rev - Description - Date
 B INITIAL RELEASE



Title	Name	Approval Date
Interface and Beamline Manager	Andrew Broadbent	06/10/2014
ES&H Operations Manager	Lori Stiegler	06/10/2014
CSX Beamline Scientist	Stuart Wilkins	06/10/2014
Quality Assurance Engineer	Joseph Zipper	06/10/2014

Serial No	Part No	Part Rev	ECN	Rev	ECN	Rev
17-BM XFP	MONO VAC SEC 3					
Deviation & Waiver: _____						

OP	Description	Name/Life #	Date	DR
10	Follow the ES&H and Personal Protective Equipment Requirements for the area.	P. Todd / 18710	7/5/18	
15	Verify measuring and test equipment used for this procedure contains a valid calibration label in accordance with NSLS-II Calibration Procedure PS-QAP-0901, where applicable. The technician is responsible for notifying the technical supervisor and/or the cognizant engineer of any discrepancies occurring during the performance of this procedure. All discrepancies shall be identified and reported in accordance with NSLS-II Discrepancy Reporting Procedure PS-QAP-0002.	R. Todd / 18710	7/5/18	
20	Vacuum Component/Section Information - This step shall be performed by the cognizant beamline engineer/scientist (CE/CS) A. Record the Beamline name (in the space provided) at the top of each page of this traveler. B. For a vacuum component, record the part number and description on this sheet in the box for "Part No". C. For a vacuum section, record the section number on this sheet in the box for "Part No" D. Record required base pressure for Vacuum Comp/Sec. <u>1x10⁻⁴</u> (Torr) E. Review this entire traveler and if a step (OP#) does not apply, write in that operation's sing-off box: "NA per OP#20"	E. FARQUHAR / Y5735	7/5/18	



OP	Description	Name/Life #	Date	DR
30	<p>Configuration- This step shall be performed by the CE/CS.</p> <p>A. Is component/section in its final configuration? (circle one)</p> <p><input checked="" type="radio"/> YES or NO</p> <p>B. If "NO", provide a brief description of component/vacuum section</p> <hr/>	R.T.O/18710	7/5/18	
40	<p>Visual Inspection</p> <p>Prior to pumping down, visually inspect that all flanges and vacuum connections to component/sector are tight and secure. Confirm the presence of burst disk (as required by the assembly drawing) and inspect for damage. Confirm all vacuum forces are restrained through the use of bolted stands/supports and appropriate bellows restraints. Any deviations from the assembly drawing shall be noted and the Cognizant Beamline Engineer shall be notified prior to proceeding.</p>	D. Abel X9000	7/5/18	
50	<p>Leak check</p> <p>Leak check component/vacuum section using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ mbar l/sec He.</p>	D. Abel X9000	7/5/18	
60	<p>RGA scan</p> <p>Acquire RGA data. The CS/CE or Vacuum Engineer (VE) will acquire and interpret RGA and prescribe corrective action if necessary. Initial RGA scan shall include a baseline scan of RGA isolated from vacuum section/component to confirm RGA cleanliness.</p>	NA ^{D. Abel} X9000	7/5/18	
70	<p>Bakeout</p> <p>Confirm that bakeout was performed according to procedure PS-C-XFD-PRC-013 (NSLS-II Beamline Vacuum Bake-Out Procedure) and the manufacturer's requirements with temperature ramp rate(s) soak time(s), soak temperature(s) and maximum temperature(s) all controlled within acceptable limits.</p>	NA ^{D. Abel} X9000	7/5/18	
80	<p>Hot leak check</p> <p>With the component/sector at the soak temperature, perform leak check using calibrated He MSLD. Confirm total leak rate < 2x10⁻¹⁰ std cc/sec He (mbar l/sec He).</p>	NA ^{D. Abel} X9000	7/5/18	
90	<p>Crossover to ion pumps</p> <p>Confirm with the Cognizant Beamline Engineer prior to switching from turbopump to ion pump(s). Record the date and time the ion pumps are turned on and the turbopump valved out.</p>	D. Abel X9000	7/5/18	

Date 2/20/18 Time 1300



OP	Description	Name/Life #	Date	DR
100	Final RGA scan When the component/section has reached room temperature, acquire RGA data. The CS/CE/VE will acquire and interpret the data to determine conformance to section 4.7.3 of spec LT-ENG-RSI-SR-VA-002 and prescribe corrective action if necessary. Attach RGA scan.	NA D-Abel x9000	7/5/18	
110	Base pressure measurement. Confirm the required base pressure in OP 20 is met. The CE/BE/VE shall make this determination. Record base pressure measurement. 5×10^{-9} (Torr)	B. Abel x9000	7/5/18	
120	Forward this traveler and all attachments to QA for archiving.	D. Abel x9000	7/5/18	
130	REVISION HISTORY (This step is informational and does not require signoff)			

Rev - Description - Date

B INITIAL RELEASE



17-BM XAS Endstation Controls Status
2 August 2018
Erik Farquhar

Attached are summaries of the motor plan for the XAS endstation at 17-BM, as well as a status snapshot as of Thursday, 2 August 2018. In brief, essential components for first light at the XAS endstation are ready, with additional capabilities being brought on-line as resources permit.

A summary of status by component, as of 2 August 2018:

- **Pre-mono slits:** all individual motion axes are functional. Coordinated slit gap and translation motions are being developed (Controls trac ticket #2077).
- **Monochromator components:** theta motion is operational with motor shaft encoder feedback, as are both picomotor driven motions for the crystal assembly. These will be aligned and calibrated during commissioning activities. A Heidenhain angle encoder is available, with an interpolator for readback on order (scheduled delivery in October 2018).
- **Pink beam absorber diagnostic:** this device has been bench tested on the Delta Tau level and is undergoing EPICS integration.
- **Monochromatic ADC slits:** an ADC blue slits assembly is installed. This device is not critical for first light commissioning, but will be needed for beam characterization later in the commissioning program. At this time, the individual vertical slits are fully active, while troubleshooting is ongoing for the horizontal slits (device was fully functional on bench). Coordinated slit gap and translation motions are being developed (Controls trac ticket #2077).
- **XAS endstation Table:** 3 individual Y lift motors are functional. These are being tied together in a coordinated Y lift motion (Controls trac ticket #2077). This functionality is not critical for first light, but will be required for final alignment of components.
- **XAS endstation motion stages:** individual stepper motor stages for alignment of the sample (X, Y, Z) and detector (Y) are available and functional. Future developments include an X-axis stage for detector alignment.

Additional instrumentation has been integrated into EPICS for commissioning, including:

- XIA filter box assembly with 4 independent AI filters
- Weiner MPOD Micro crate with 8-channel HVPS for ionization chambers
- Weiner VME crate with MVME3100 CPU card and SIS3820 scaler

Additional capabilities will be brought online as the commissioning program proceeds.

XAS-17BM-MotorPlan

Comp.	Motor	Motor Cable No.	Encoder Cable No.	Ctrl:Ax	Rack	Encoder	Status/Notes
XAS@XFP	FREE	17BM-100087-RG:A1-AHBA-B	17BM-100119-RG:A1-AHBA-B	MC5:4	A1		to ES:3
XAS@XFP	FREE	17BM-100088-RG:A1-AHBA-B	17BM-100120-RG:A1-AHBA-B	MC5:5	A1		to ES:3
XAS@XFP	Table3:Y1	17BM-100089-RG:A1-AHBA-B	17BM-100121-RG:A1-AHBA-B	MC5:6	A1	N	component of virt mtr Table3:Y
XAS@XFP	Table3:Y2	17BM-100090-RG:A1-AHBA-B	17BM-100122-RG:A1-AHBA-B	MC5:7	A1	N	component of virt mtr Table3:Y
XAS@XFP	Table3:Y3	17BM-100091-RG:A1-AHBA-B	17BM-100123-RG:A1-AHBA-B	MC5:8	A1	N	component of virt mtr Table3:Y
XAS@XFP	premono-slit-top	17BM-100145-RG:A2-AHTA3-B	17BM-100161-RG:A2-AHTB3-B	MC6:1	A2	N	component of virt mtr premono_Y
XAS@XFP	premono-slit-bot	17BM-100146-RG:A2-AHTA3-B	17BM-100162-RG:A2-AHTB3-B	MC6:2	A2	N	component of virt mtr premono_Y
XAS@XFP	premono-slit-inb	17BM-100147-RG:A2-AHTA3-B	17BM-100163-RG:A2-AHTB3-B	MC6:3	A2	N	component of virt mtr premono_X
XAS@XFP	premono-slit-outb	17BM-100148-RG:A2-AHTA3-B	17BM-100164-RG:A2-AHTB3-B	MC6:4	A2	N	component of virt mtr premono_X
XAS@XFP	ADC-slit-top	17BM-100149-RG:A2-AHTA3-B	17BM-100165-RG:A2-AHTB3-B	MC6:5	A2	N	component of virt mtr ADC_X
XAS@XFP	ADC-slit-bot	17BM-100150-RG:A2-AHTA3-B	17BM-100166-RG:A2-AHTB3-B	MC6:6	A2	N	component of virt mtr ADC_X
XAS@XFP	ADC-slit-inb	17BM-100151-RG:A2-AHTA3-B	17BM-100167-RG:A2-AHTB3-B	MC6:7	A2	N	component of virt mtr ADC_Y
XAS@XFP	ADC-slit-outb	17BM-100152-RG:A2-AHTA3-B	17BM-100168-RG:A2-AHTB3-B	MC6:8	A2	N	component of virt mtr ADC_Y
XAS@XFP	mono_theta	17BM-100153-RG:A2-AHTA3-B	17BM-100169-RG:A2-AHTB3-B	MC7:1	A2	Y	Oct 2018: Heidenhain angle encoder readback
XAS@XFP	PB-diag-Y	17BM-100154-RG:A2-AHTA3-B	17BM-100170-RG:A2-AHTB3-B	MC7:2	A2	N	no limits
XAS@XFP	FREE	17BM-100155-RG:A2-AHTA3-B	17BM-100171-RG:A2-AHTB3-B	MC7:3	A2		
XAS@XFP	Det_Y	17BM-100156-RG:A2-AHTA3-B	17BM-100172-RG:A2-AHTB3-B	MC7:4	A2	Y	
XAS@XFP	Det_X	17BM-100157-RG:A2-AHTA3-B	17BM-100173-RG:A2-AHTB3-B	MC7:5	A2	Y	to be implemented
XAS@XFP	Cryo_Y	17BM-100158-RG:A2-AHTA3-B	17BM-100174-RG:A2-AHTB3-B	MC7:6	A2	Y	
XAS@XFP	Cryo_X	17BM-100159-RG:A2-AHTA3-B	17BM-100175-RG:A2-AHTB3-B	MC7:7	A2	Y	
XAS@XFP	Cryo_Z	17BM-100160-RG:A2-AHTA3-B	17BM-100176-RG:A2-AHTB3-B	MC7:8	A2	N	
XAS@XFP	mono_chi	-	-	MC8:1	-	-	NewFocus 8742 picomotor driver
XAS@XFP	mono_bender	-	-	MC8:2	-	-	NewFocus 8742 picomotor driver
XAS@XFP	FREE	-	-	MC8:3	-	-	NewFocus 8742 picomotor driver
XAS@XFP	FREE	-	-	MC8:4	-	-	NewFocus 8742 picomotor driver

free axis

Module	Pre-Mono Slits				Monochromator			Pink Beam Diag.	Monochromatic ADC Slits		
Component	Slt:PrM-Ax:T	Slt:PrM-Ax:B	Slt:PrM-Ax:I	Slt:PrM-Ax:O	Mono:1-Ax:Theta	Mono:1-Ax:th2f	Mono:1-Ax:ch2f	WBS:1-Ax:Y	Slt:ADC-Ax:T	Slt:ADC-Ax:B	Slt:ADC-Ax:I
Axis	Premono Y Top	Premono Y Bot	Premono X Inb	Premono X Out	Mono Theta	Pico th2f - bender	Pico ch2f - chi	PB Diagnostic Y	ADC Slt Y Top	ADC Slt Y Bot	ADC Slt X Inb
Controller	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06	xf17bma-mc07	xf17bma-mc08	xf17bma-mc08	xf17bma-mc07	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06
Axis number	1	2	3	4	1	1	2	2	5	6	7
Motor type	1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper	0.9° stepper	picomotor	picomotor	1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper
Encoder type	none	none	none	none	incr. rotary, Heidenhain angle	N/A	N/A	none	none	none	none
EU	mm	mm	mm	mm	deg	micron	micron	mm	mm	mm	mm
+ limit	11.100	11.700	6.500	6.350	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- limit	-10.900	-11.700	-6.500	-6.250	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Range	22.000	23.400	13.000	12.600	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resolution (steps/EU)	25850.01	25850.01	51699.76	51699.76	2110885	-	-	59254	14285.7	14285.7	14285.7
Resolution (EU/step)	3.86847E-05	3.86847E-05	1.93425E-05	1.93425E-05	4.737350E-07	2.10E-02	2.10E-02	1.68765E-05	7.0000E-05	7.0000E-05	7.0000E-05
Speed (EU/s)	0.5	0.5	0.25	0.25	0.01	20	20		0.25	0.25	0.25
Max. Speed (EU/s)	0.5	0.5	0.25	0.25	0.02	N/A	N/A		0.25	0.25	0.25
lxx77 setting	1000	1000	1000	1000	2000	N/A	N/A	500	1000	1000	1000
+ limit checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
- limit checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Motion direction checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF	EF/MS 2018-07-31	EF/MS 2018-07-13	EF/MS 2018-07-13	in progress 2018-08-02	EF 2018-08-02	EF 2018-08-02
Velocity Set/Checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF	EF/MS 2018-07-31	EF/MS 2018-07-13	EF/MS 2018-07-13	in progress 2018-08-02	EF 2018-08-02	EF 2018-08-02
Full range motion checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	in progress	EF 2018-08-02	EF 2018-08-02	In Progress (EF) 2018-08-02
EPICS interface checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF	EF 2018-07-31	EF 2018-07-13	EF 2018-07-13	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01
EPICS calibration checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF	EF 2018-07-31	N.A.	N.A.	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01
Overtravel limits checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF	EF 2018-08-01	N.A.	N.A.	EF 2018-08-02	EF 2018-08-02	EF 2018-08-02
Overall status	Ready	Ready	Ready	Ready	Ready	Ready	Ready	In Progress	Ready	Ready	In Progress
Notes	Virtual motor integration ongoing (8/2/18)	fully validate in commissioning, Heidenhain encoder readback integration planned Oct 2018	UHV motor function validated, complete setup in commissioning	axis functional on bench, motion to be tested during commissioning	Bench tested, integration ongoing at time of checkout	Limits to be set in commissioning, Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning, Virtual motor integration ongoing (8/2/18)	Functioned on bench, issue with reliable movement found in checkout. <i>Not required for first light.</i>			

Slit:ADC-Ax:O	Table3			Detector Motion	Sample/Cryo Motion		
	Tbl:3-Ax:YUI	Tbl:3-Ax:YO	Tbl:3-Ax:YDI	Stg:8-Ax:Y	Stg:9-Ax:Y	Stg:9-Ax:X	Stg:9-Ax:Z
ADC Slit X Out	Table3 Y Upstream	Table3 Y Center	Table 3 Y Downstream	Detector Y	XAS Cryo Y	XAS Cryo X	XAS Cryo Z
xf17bma-mc06	xf17bma-mc05	xf17bma-mc05	xf17bma-mc05	xf17bma-mc07	xf17bma-mc07	xf17bma-mc07	xf17bma-mc07
8	6	7	8	4	6	7	8
1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper	0.9° stepper	0.9° stepper	0.9° stepper	0.9° stepper
none	none	none	none	incr. rotary	incr. rotary	incr. rotary	not implemented
mm	mm	mm	mm	mm	mm	mm	mm
N/A	N/A	N/A	N/A	96.000	96.500	75.000	404.500
N/A	N/A	N/A	N/A	-96.000	-96.500	-75.000	0.000
N/A	N/A	N/A	N/A	192.000	193.000	150.000	404.500
14285.7	62500	62500	62500	6280.02	6280.02	2534.85	2520.16
7.0000E-05	1.6000E-05	1.6000E-05	1.6000E-05	1.59235E-04	1.59235E-04	3.94501E-04	3.96800E-04
0.25	0.25	0.25	0.25	1.00	0.75	1.50	5.00
0.25	0.25	0.25	0.25	0.75	0.50	2.00	5.00
1000	1000	1000	1000	1000	1000	1000	2000
N.A.	N.A.	N.A.	N.A.	EF	EF	EF	EF
N.A.	N.A.	N.A.	N.A.	2018-07-31	2018-07-31	2018-07-31	2018-07-31
N.A.	N.A.	N.A.	N.A.	EF	EF	EF	EF
N.A.	N.A.	N.A.	N.A.	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-02	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-02	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
In Progress (EF)	N.A.	N.A.	N.A.	EF	EF	EF	EF
2018-08-02	N.A.	N.A.	N.A.	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-01	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-01	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	N.A.	N.A.	N.A.	EF	EF	EF	EF
2018-08-02	N.A.	N.A.	N.A.	2018-07-31	2018-07-31	2018-07-31	2018-07-31
In Progress	Ready	Ready	Ready	Ready	Ready	Ready	Ready
Functioned on bench, issue with reliable movement found in checkout. <i>Not required for first light.</i>	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Functional. Travel range to be refined during commissioning.	Functional. Travel range to be refined during commissioning.	Fully functional.	incr. rotary encoder avail., not implemented on this axis