

Subject: **Beamline Equipment Protection System Test Checklist**

Number: **PS-R-XFP-EPS-CHK-001** Revision: **1** Effective: **8/19/14** Page: **1 of 5**

Beam Line: XFP

Test Date: 7/9/18

EPS Engineer: Garrett Bischof

BL Group Leader: Erik Farquhar

Pre-test setup:

Connect PPS interface test box at beam line EPS/PPS interface connector.

The Beam Line Master Spreadsheet contains a comprehensive list of all EPS related signals. As this test plan is executed note the results in the "test results" column of this spreadsheet.

Test Set 1: Vacuum

Vacuum Section:

Starting conditions: pressure at or below acceptable limits, GVs open.

Simulate pressure rise (toward poor vacuum) by disabling the vacuum gauge controller, ion pump controller channel. Ensure EPICS PVs enter proper alarm states, photon shutter closes¹ and vacuum section is isolated. Two local gate valves and one (or more, if it is required to isolate upstream section, e.g. section branching) upstream gate valve close. Record results for the following:

EPICS PV Alarm

EPS fault

Photon Shutter closes

GVx closes

GVy close:

GVz closes

Attempt to open the front end shutter and gate valves through EPICS.

Photon shutter and gate valves cannot be opened through EPICS (1)

Enable vacuum gauge controller and ensure EPICS alarms clear. Open gate valves and photon shutter through EPICS.

¹ if the intensity of the beam in the section cannot cause damage to its valves, poor vacuum doesn't have to cause shutter close

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Photon shutter and gate valves can be opened through EPICS (2)

With beam pipe installed:

Gauge name:	EPS fault:			(1)	(2)
	Shutter:	d/s GV:	u/s GV:		
XF:17BMA-VA{BPM:1-CCG:1}	FE	Good	Good	Good	Good
XF:17BMA-VA{BPM:1-TCG:1}	-	-	-	Good	Good
XF:17BMA-VA{BPM:1-IP:1}	FE	Good	Good	Good	Good
XF:17BMA-VA{BT:1-CCG:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{BT:1-TCG:1}	-	NA	-	Good	Good
XF:17BMA-VA{BT:1-IP:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{BT:2-CCG:1}	FE	Good	NA	Good	Good
XF:17BMA-VA{BT:2-TCG:1}	-	-	NA	Good	Good
XF:17BMA-VA{BT:2-IP:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{MONO:1-CCG:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{MONO:1-TCG:1}	-	NA	-	Good	Good
XF:17BMA-VA{MONO:1-IP:1}	FE	NA	Good	Good	Good

Without beam pipe installed:

Gauge name:	EPS fault:			(1)	(2)
	Shutter:	d/s GV:	u/s GV:		
XF:17BMA-VA{BPM:1-CCG:1}	FE	Good	Good	Good	Good
XF:17BMA-VA{BPM:1-TCG:1}	-	-	-	Good	Good
XF:17BMA-VA{BPM:1-IP:1}	FE	Good	Good	Good	Good
XF:17BMA-VA{BT:1-CCG:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{BT:1-TCG:1}	-	NA	-	Good	Good
XF:17BMA-VA{BT:1-IP:1}	FE	NA	Good	Good	Good
XF:17BMA-VA{BT:2-CCG:1}	-	Good	NA	Good	Good
XF:17BMA-VA{BT:2-TCG:1}	-	-	NA	Good	Good
XF:17BMA-VA{BT:2-IP:1}	-	NA	Good	Good	Good
XF:17BMA-VA{MONO:1-CCG:1}	-	NA	Good	Good	Good
XF:17BMA-VA{MONO:1-TCG:1}	-	NA	-	Good	Good
XF:17BMA-VA{MONO:1-IP:1}	-	NA	Good	Good	Good

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Test Set 2: Water flow

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Water flow Section:

Record initial flow through section with all valves fully open.

Slowly close supply valve and record the LOW and LOW LOW PV Alarm levels.

If the channel is associated with an EPS action XFD-EPOS, also register the flow at which the EPS fault occurs. Ensure cable disconnection results in EPS action.

Repeat for each water circuit on beam line.

With beam pipe installed:

Sensor name:	Nominal flow:	LOW:	LOLO:	EPS:
XF:17BMA-UT{DI}F:1	.45	.38	.35	Closed FE Shutter
XF:17BMA-UT{DI}F:2	.77	.35	.35	Closed FE Shutter
XF:17BMA-UT{DI}F:3	.39	.32	.3	Closed FE Shutter
XF:17BMA-UT{COMPRESS}F:1	1.79	-	-	No EPS action
XF:17BMA-UT{DI}F:Main	1.77 1.65 <i>gb 7/18</i>	-	-	No EPS action
XF:17BMA-UT{MONO}F:1	ON/OFF signal	-	-	Closed FE Shutter

Without beam pipe installed:

Sensor name:	Nominal flow:	LOW:	LOLO:	EPS:
XF:17BMA-UT{DI}F:1	.45	.38	.35	Closed FE Shutter
XF:17BMA-UT{DI}F:2	.77	.35	.35	Closed FE Shutter
XF:17BMA-UT{DI}F:3	.39	.32	.3	Closed FE Shutter
XF:17BMA-UT{COMPRESS}F:1	1.79	-	-	No EPS action
XF:17BMA-UT{DI}F:Main	1.77 1.65 <i>gb 7/18</i>	-	-	No EPS action
XF:17BMA-UT{MONO}F:1	ON/OFF signal	-	-	No EPS action

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Test Set 3: Thermal

For each temperature transducer ensure the temperature measurement reports expected value.

Attach an appropriate adaptor and transducer simulator to the temperature input of the EPS system (remote IO chassis or Armor Block). Raise the temperature above each of the HI and HIHI PV alarm limits and ensure the alarm is reported. If the transducer is associated with an EPS interlock, continue to raise the temperature until the EPS trip level is exceeded. Ensure the appropriate EPS mitigation process occurs. Ensure channel cable disconnection results in EPS action.

Type K Thermocouples

Sensor name:	Temperature:	HI:	HIHI:	EPS:
FE:C17B-OP{Mir:1}T:1-I	28.9	-	-	No EPS action
FE:C17B-OP{Mir:1}T:2-I	28.6	-	-	No EPS action

RTD (Pt 100)

Sensor name:	Temperature:	HI:	HIHI:	EPS:
XF:17BMA-PU{PCW}T:Return-I	13.0	-	-	No EPS action
XF:17BMA-PU{PCW}T:Supply-I	12.5	-	-	No EPS action
XF:17BMA-UT{DI}T:Return-I	28.4	-	-	No EPS action
XF:17BMA-UT{DI}T:Supply-I	28.1	-	-	No EPS action

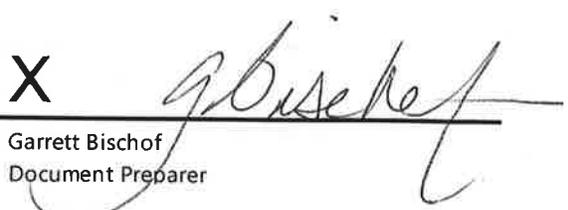
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