

Lab-Pulse™

Instrument Monitoring and Performance



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INSTRUMENT ANALYSIS SUMMARY

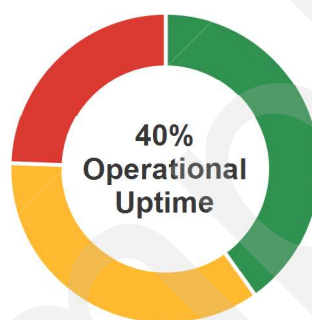
01 DEC 2021 - 31 DEC 2021

CSA / CSA-TeamITR

INSTRUMENT SUMMARY

Instruments Monitored

- **Test Detector 1**
200150001-01
- **Test Detector 2**
200150001-02



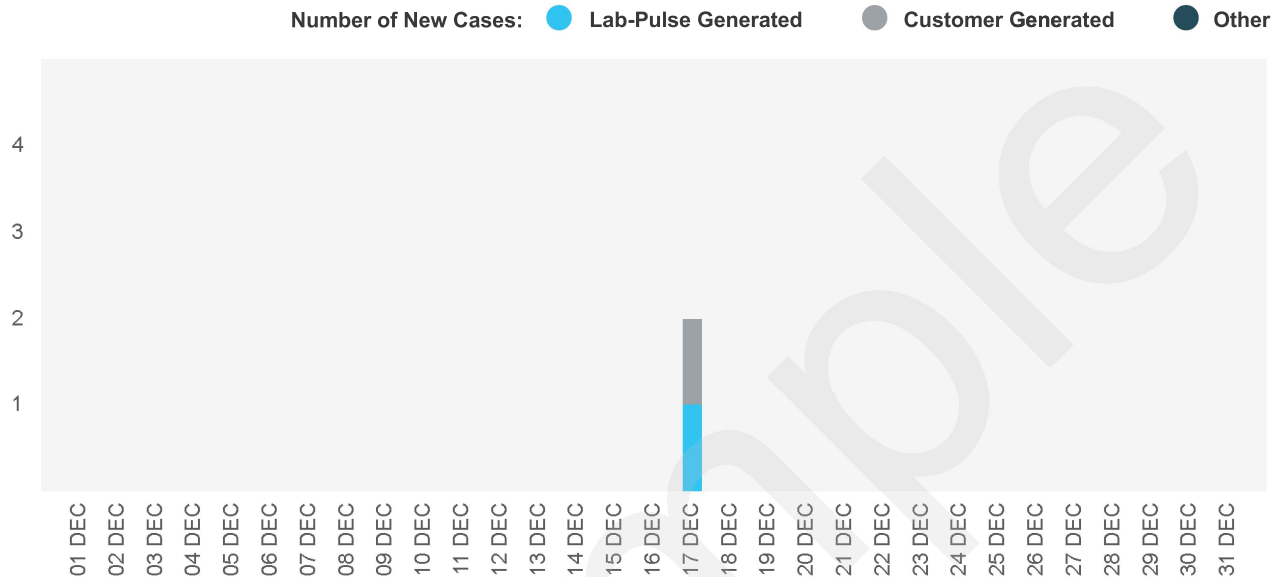
- ✓ Operational
40% of time
- ? Disconnected
35% of time
- ! Alarms
24% of time
- ✗ Out of Service
0% of time

INSTRUMENT	INSTRUMENT STATUS	MIRION RESPONSE	UPTIME
Test Detector 1 Detector SN: LRH1234 Preamp SN: 020221 Cooler SN: 020221		TECH SUPPORT CASE OPEN	
Test Detector 2 Detector SN: LRH5678 Cooler SN: 020221		TECH SUPPORT CASE OPEN	
OPERATIONAL DISCONNECTED ALARM OUT OF SERVICE			



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CASE HISTORY OF COVERED INSTRUMENTS



[Additional Support Case Information](#)

ASSOCIATED TECHNICAL SUPPORT CASES

CASE NUMBER	INSTRUMENT	CASE SUBJECT	DATE OPENED	CASE STATUS
00038472	200150001-01-02	DeviceMetrics:PowerSupplyNeg12V-IPA-P8.020221 at 2021-12-17T13:59:16Z	17 Dec 2021	New
00038475	200150001-01	Detector Resolution	17 Dec 2021	New

Comments:

38475: Tech Support is still working on a resolution



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ASSOCIATED WORK ORDERS

WORK ORDER	INSTRUMENT	TYPE	DESCRIPTION	SCHEDULED DATE	CLOSED DATE
WO-00041796	200150001-02	Emergency Support		28 Dec 2021	

Comments:

41796: Field Support is working on scheduling a visit.

INSTRUMENT STATE OF HEALTH REVIEW

Instrument parameters of each detector system are analyzed over the current monitoring period. This information is used to preemptively identify potential issues and provide information about the overall health of the system. A description of the specific checks are provided in the appendix.

TEST DETECTOR 1

BIF-Detector with IPA-P8 and CP5-PLUS

Detector SN: LRH1234

Preamp SN: 020221

Cooler SN: 020221

Leakage Current Check	✓
Vacuum Health	✓
Detector Temperature Check	✓
iPA Power Supply Check	✓
CP5-Plus Detector Temperature	✓
CP5-Plus Power Consumption	✓

TEST DETECTOR 2

BIF-Detector with ICC-HI and LP-VIB-SENSOR

Detector SN: LRH5678





Cooler SN: 020221

Leakage Current Check	✓
Vacuum Health	✓
Detector Temperature Check	✓
iPA Power Supply Check	✓
iCC LN ₂ Consumption Check	✓
iCC Dewer Pressure Check	✓
iCC Cooler Power Check	✓
iCC Fans Check	✓



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INSTRUMENT FIRMWARE STATUS

INSTRUMENT	LATEST RELEASE	INSTALLED VERSION	STATUS
Test Detector 1 (LRH1234)			
CP5-Plus (020221)			
FirmwareVersion	9501 836 04205	2.02	
iPA (020221)			
AEMFirmwareVersion	395	395	
DEM FirmwareVersion	0.1.06.07.16.0	0.1.06.07.16.0	
Test Detector 2 (LRH5678)			
ICC (020221)			
FirmwareVersion	2.02	2.02	

Comments:

None



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AMBIENT ENVIRONMENTAL CONDITIONS REVIEW

This review evaluates the observed room temperature and humidity against the recommended conditions for each supported Mirion Instrument, providing feedback to maximize the lifetime of your instrument. If environmental excursions beyond the recommended operating conditions are observed during the monitoring period, these will be flagged in the evaluation below.

Ambient Temperature



Ambient Humidity



Observations:

The daily cycle at the Lab sets the temp back to far at night.

CONCLUSIONS AND RECOMMENDATIONS

Analyst Summary:

Detectors are operating fine. Recommend setting the temp at night up a few degrees.

Action Plan:

Schedule next onsite visit

Mirion Analyst:

Luke Hovestadt

IT Manager, Service

Signed:

A handwritten signature in black ink, appearing to read "Luke Hovestadt", written over a light blue horizontal line.



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DEFINITION OF LAB-PULSE TERMS

Operational Uptime: The Lab-Pulse report provides an uptime calculation of instruments specifically covered by the Lab-Pulse Services contract. This includes Mirion's iPA, CP5-Plus, iCC, and CCII-Plus. A system is considered operational when all Lab-Pulse monitored instruments for a given HPGe system are in normal operation mode. If any instrument is in alarm mode, set to "out of service" (for example, when the instrument is in the factory for repair), or the Lab-Pulse system is not receiving data from the instrument, then the system is not considered to be operational. The operational uptime percentage is an aggregate summary of the uptime for all monitored Lab-Pulse systems during the reporting period. Devices used to support the Lab-Pulse Service are excluded from the uptime calculation, such as the Lab-Pulse gateway, the ambient environmental conditions sensor, and the vibration sensor.

State of Health Instrument Checks

Leakage Current Check: During this check, the current baseline leakage current is verified to be consistent with the recorded leakage current when the detector was last at the factory. Change in the baseline leakage current is often an early indicator to detector resolution degradation.

Vacuum Health Check: This is a measure of two sensors located along the cold path of the detector. The temperature difference of these two sensors is expected to be constant. If this value drifts over time, this could be an indication of vacuum degradation of your detector. There may also be changes observed if there are large external temperature changes.

Detector Temperature Check: The detector temperature check compares operational temperature of the detector crystal and cold source against expected temperature for your unique detector. Large increases in detector temperature will result in shutdown of the detector high voltage to prevent damage to the internal electronic components.

iPA Power Supply Check: This metric looks at the total performance of the power supply voltages and currents on the iPA. If any of these are not within tolerance, this will be flagged for further review.

CP5-Plus Power Consumption Check: The CP5-Plus power consumption is a measure of how hard the compressors are working to keep the detector cold. This is an early indicator which can be used to predict when maintenance on your detector may be required. The Mirion analyst will evaluate the power consumption over time and determine if any changes in wattage are related to a degradation of detector health. Corrective actions may be recommended.

CP5-Plus Detector Temperature Check: The CP5-Plus detector temperature reports on the cold tip temperature reported by the CP5-Plus unit. This is held constant at all times to a factory setting. Deviation from the factory setting is a serious fault and will affect detector operation.

iCC LN₂ Consumption Check: The iCC is expected to be able to hold LN₂ for 1 to 2 years. If the consumption rate is greater than expected, a corrective action may be recommended to improve detector LN₂ holding time. In addition, if the current LN₂ level is below 35%, an action plan to refill the detector will be provided.

iCC Dewar Pressure Check: The iCC is designed to hold pressure to 1 PSIG during normal operations. Deviations from this state may be a sign of insufficient cooler lift or a severe leak in the system.

iCC Cooler Power Check: The power consumption of the cooler will be reviewed against expected behavior. If the power consumption is greater than expected, this may indicate there is difficulty in keeping the detector cold. This could be due to either environmental conditions or a possible issue with the detector.

iCC Fans Check: This check reviews the speed of each of the four fans. If they are running faster than standard, the analyst may recommend ensuring there are no blockages to air flow. If the fan speeds are slower than standard, preventative maintenance may be required.