

INSTRUMENT TROUBLESHOOTING

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OVERVIEW



Basic Preventative Measures



Troubleshooting Hardware and Software Issues



Troubleshooting Bias Issues



Inconsistent Results

GOOD
TROUBLESHOOTING
STARTS BEFORE THE
ISSUE ARISES

Prepare

Keep up with regular preventative maintenance

- Default to the manufacturer's recommendations
- Create your own preventative maintenance plans and schedules
 - Keep records of when consumables wear out and try to change them before they become an issue

Keep logs

Keep Logs of what "Normal" looks like

- Identify key components of the method:
 - Pressures
 - Intensities
 - Retention Times
- Set expectations and limits

Don't ignore

Don't ignore obvious signs of trouble

- Don't ignore unusual noises
- Don't ignore sudden changes with the instrument

TAKE STEPS TO AVOID BIAS ISSUES WITH DATA



Check your Calibration Curve standards and reagents before putting them into use



Stick to a calibration schedule

Decide in advance how often you will calibrate your instrument, and then calibrate more often if needed



Run Calibration Verification Standards routinely to check for Curve drift

BASIC TROUBLESHOOTING – WHERE TO START?

Don't get intimidated

What changed?

- Did you just make a change? Replaced a part? Opened a new reagent? Start there

Check for obvious problems

- Broken consumables/parts?
- Crimped lines?
- Lights that should be on that are off and vice versa?
- Is it making weird noises?
- Leaks?

Identify the type of problem you are having

- Hardware issues where the instrument is not running at all
- Software Issue
- Bias issue – results are higher or lower than expected
- Inconsistent Results

HARDWARE ISSUES

1

Start with the easiest things first

- Confirm they are working and then move on from there

2

Only Change/Check one thing at a time

3

Use your resources

- Call Technical Support
- Develop a good relationship with your Service Engineers
- Have a list of the questions they ask
 - They generally have a list of things that you need to confirm are working, check those things before the call



HARDWARE ISSUES – TIPS

- TRY TO KEEP BACKUPS OF COMMONLY REPLACED PARTS TO REDUCE DOWNTIME
- IF YOU HAVE A PART THAT GETS CLEANED AND REUSED, HAVE A BRAND NEW BACK UP ON HAND
- CHECK FOR BUILDUPS AND CLOGS IN SAMPLE TUBING
 - ROUTINELY CLEAN AND/OR CHANGE OUT SAMPLE INTRODUCTION PARTS AND TUBING
 - WATCH FOR BACTERIA BUILDUP AND GROWTH IN SAMPLE LINES AND IN REAGENTS

SOFTWARE ISSUES

- IS THE PROGRAM FROZEN/CRASHED
- HAS THE COMPUTER RESTARTED?
 - SIMPLE RESTARTS CAN SOLVE MANY ISSUES
- DOES THE SOFTWARE LOOK LIKE IT IS STILL RUNNING
- CHECK THE DATA FILE SIZE
 - IF THE DATA FILES ARE TOO BIG IT CAN CAUSE PROBLEMS

BIAS ISSUES

- IF YOU SEE YOUR RESULTS ARE BIASED HIGH OR LOW
 - IF BIASED HIGH
 - RUN A REAGENT BLANK TO CHECK FOR CONTAMINATION
 - CHECK YOUR CALIBRATION CURVE
 - RUN A FRESH CURVE, OR MAKE FRESH CALIBRATION STANDARDS
 - CHECK YOUR CALIBRATION BLANK
 - MAKE SURE YOUR BLANK IS THE SAME MATRIX AS YOUR CALIBRATION CURVE AND SAMPLES
 - IF BIASED LOW
 - CHECK YOUR CALIBRATION BLANK
 - CHECK YOUR CALIBRATION CURVE
 - RUN A FRESH CURVE, OR MAKE FRESH CALIBRATION STANDARDS
 - CHECK SAMPLE FLOW TO ENSURE YOU ARE GETTING THE SAMPLE INTO THE INSTRUMENT
- CHECK EACH COMPONENT INDEPENDENTLY

BIAS ISSUES

- MAKE SURE YOU ARE VIEWING AND MONITORING YOUR SAMPLE IMAGING
 - CHROMATOGRAMS, WAVELENGTH SPECTRA, SAMPLE CHARTS
 - CHECK FOR ISSUES:
 - BASELINE ISSUES
 - INTEGRATION ISSUES
 - FRONTING OR TAILING PEAKS
 - INTERFERENCE PEAKS

INCONSISTENT RESULTS

- CHECK YOUR SAMPLE INTRODUCTION SYSTEM
 - CHECK SAMPLE TUBING, NEEDLES, VALVES FOR PINCHES OR PLUGS
- CHECK CONSUMABLE PARTS AND REPLACE ANYTHING THAT APPEARS WORN
- RUN MULTIPLE REPLICATES OF THE SAME SAMPLE OR STANDARD
 - THIS WILL HELP IDENTIFY IF IT IS AN INSTRUMENT ISSUE OR A PROCESS ISSUE
- MAKE SURE YOUR PROCESS IS CONSISTENT
 - START WITH SAMPLE PREP AND WORK YOUR WAY THROUGH THE PROCESS TO REDUCE VARIABILITY

MISCELLANEOUS TIPS



Technical Support is your friend

If you have never seen an issue, it is usually quicker to diagnose over the phone than to figure out yourself

Utilize service engineers when they are on-site and learn from them



Know how to utilize service plans

Service plans are expensive, but so are instrument parts

Depending on the equipment, one service call can pay for a service agreement

Vendors often can get parts quicker if you have a service plan



Know when a fix is beyond your capability



QUESTIONS





CONTACT US

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