

Agilent ICP-MS

Interactive Troubleshooting tool for Plasma ignition problem

Rev. B

2017, January, 20

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Preconditions

- 7900, 7800, 7700, 8800, or 8900 ICP-MS is used.
- Sample introduction type is “PeriPump”. If you are using a special configuration such as LC/GC integration or ISIS, setup the instrument with standard configuration.
- You have the “Hardware Maintenance Manual” for your instrument. Some details of the operations are not in this tool. You should refer to the manual.

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Legends

Note

Notes or tips that help troubleshoot.

Reference

You need to refer to another document for detail of the steps.

Good

Good example of situation.

Bad

Bad example of situation.

Did the ion lens test pass?

buttons such as

Yes

or

No

← Questions are displayed in blue you need to click

Based on your answer the tool will navigate you to next step.

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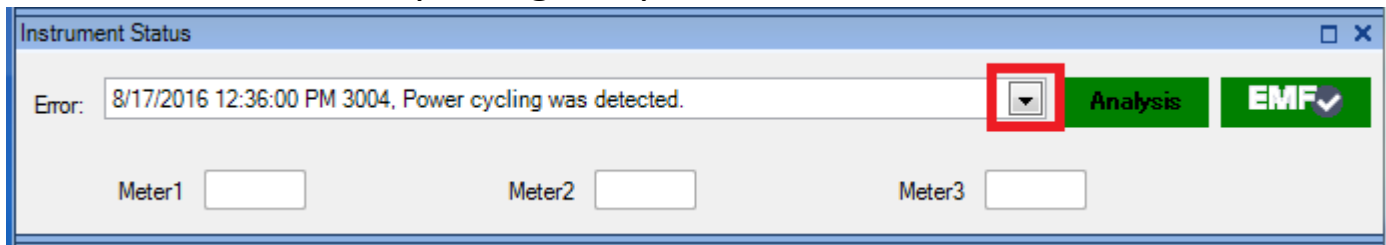
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1.1.1 Check Water flow and Gas flow errors

(1) Select MassHunter Instrument Control Window → Main menu → “View” → “Instrument Status” to display “Instrument Status” Pane

Note If Main menu is not displayed, press F10 key.

(2) Click the dropdown below and check the error number for errors that are generated at the date/time of the attempt to ignite plasma.



(3) Are error numbers 1440, 1445, or 1446 included in the latest errors?

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Yes

No

1.2.1 Check water and argon gas

- (1) If error 1440 has been generated, check if cooling water valve is open and chiller or heat exchanger is working correctly.
- (2) If error 1445 or 1446 have been generated, check if argon gas valve is open and remaining amount is enough.

(3) Did this solve the problem ?

Yes

No

1.3.1 Check timing when Plasma goes out

(1) When did Plasma go out?

Not ignite at all

Several seconds after ignition

One to several minutes after ignition

When "Plasma Correction" is going on

20 minutes or later after ignition

2.1.1 Check condition of argon gas line condition

(1) Are there any situations below?

- Ar cylinder has been replaced recently
- Was there any work on Ar line recently?
- Is the instrument used after a long time (> 1 month).

Yes

No

2.2.1 Check condition of argon gas line

- (1) Purge Ar line.
- (2) Do leak check on Ar line.
- (3) Check specification of Ar gas to have $\geq 99.99\%$ purity (In case cylinder has been replaced).
- (4) Try alternative source of Ar gas (In case cylinder has been replaced and any alternatives are available)

(5) Does this fix the problem?

Yes

No

2.3.1 Isolate the torch and try to ignite

(1) Block end of the torch with plastic film and try to ignite.

(2) Can it ignite?



Yes

No

2.4.1 Check torch box

(1) Open the torch box and observe to check if there are situations below, following instruction from the next page.

- Damaged torch
- Damaged bonnet
- Damaged shield plate
- Damaged shield contact
- Non Agilent torch
- Dirty torch stand
- Wrongly assembled torch

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2.4.2 Check torch box

(2) Check torch

Bad Damaged torch or bonnet (No image)

Bad Non Agilent torch (No image)

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2.4.3 Check torch box

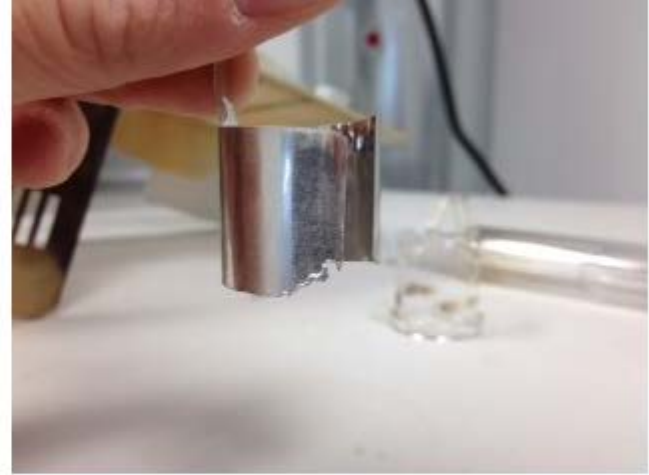
(3) Check if shield plate is damaged.



Good Good shield plate.



Bad Damaged shield plate.



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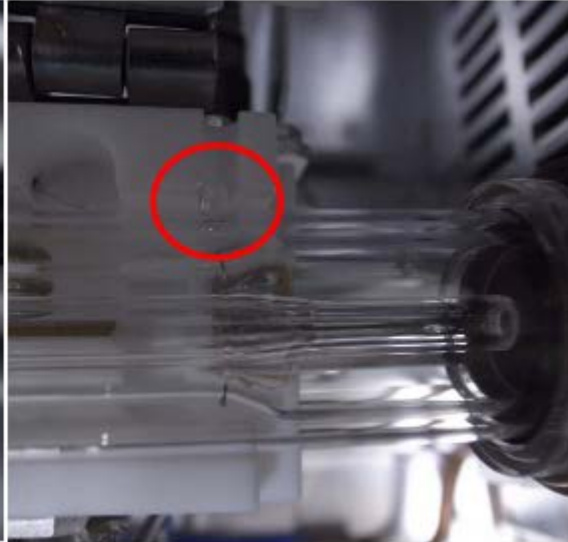
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2.4.4 Check torch box

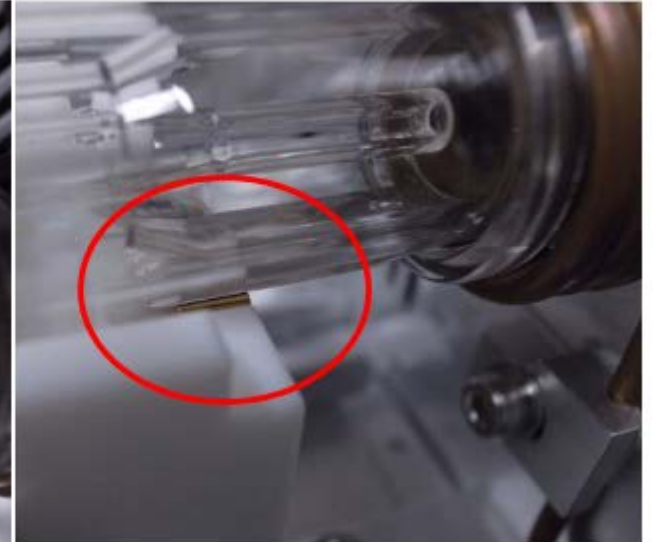
(4) Check if shield/torch is correctly assembled.



Good Set the projection on torch in the hole of the shield plate .



Good Set the projection on torch in the notch of the holder.



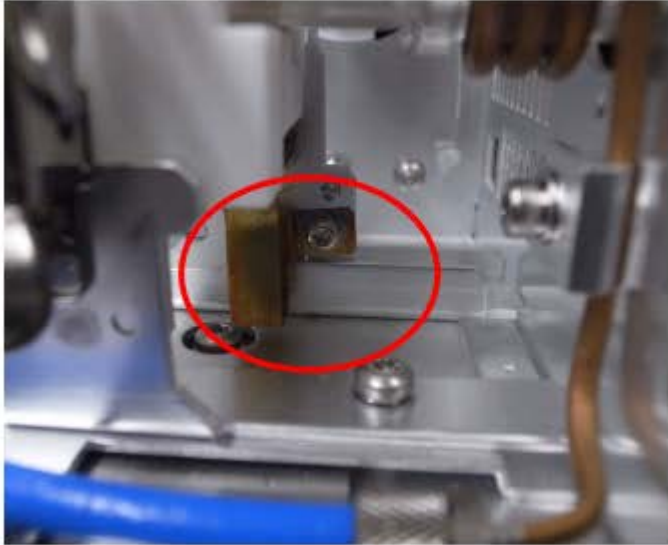
Good Good contact between shield plate and shield contact.

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2.4.5 Check torch box

(5) Check shield contact.



Good Shield contact in good condition.



Bad Damaged shield contact.

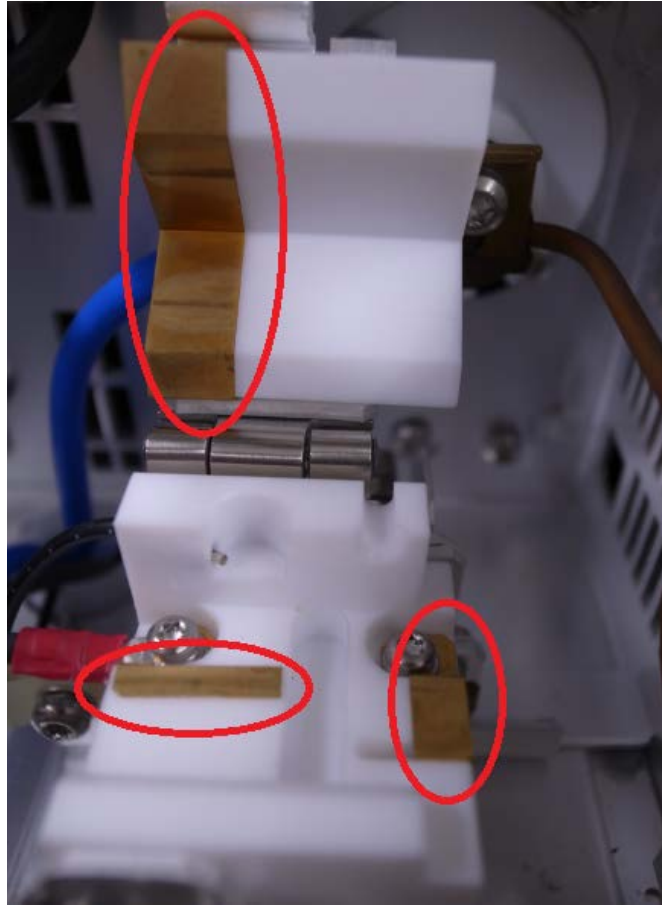
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2.4.6 Check torch box

(6) Check torch stand

Good Torch stand with clean contact



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2.4.7 Check torch box

(7) Is there any failure of torch, shield plate, shield contact, and torch stand?

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Yes

No

2.5.1 Torch box issues cannot be fixed by customers

(1) Are there any situations below?

- Damaged torch
- Damaged shield contact

Yes

No

2.6.1 Torch box issues can be fixed by customers

(1) Are there any situations below?

- Damaged bonnet
- Damaged shield plate
- Non Agilent torch
- Dirty torch stand
- Wrongly assembled torch

Yes

2.7.1 Fix torch box issues

(1) Replace or maintain the parts.

(2) Did this fix the problem?

Yes

No

2.8.1 Check work coil shape

(1) Check work coil shape.

Reference Hardware Maintenance Manual → "Maintenance" → "Torch area" → "RF Coil"

(2) Any problem found?

Yes

No

2.9.1 Fix work coil shape

(1) Fix work coil shape.

Reference Hardware Maintenance Manual → "Maintenance" → "Torch area" → "RF Coil"

(2) Did this fix the problem?

Yes

No

2.10.1 Check cooling water

(1) Does the cooling water have any additive substance, such as antifreeze or antiseptic ?

Yes

No

2.11.1 Check cooling water

(1) Replace water with pure water.

(2) Did this fix the problem?

Yes

No

3.1.1 Check photo sensor cable

(1) Open torch box and remove torch.

Reference Hardware Maintenance Manual → "Maintenance" → "Torch area" → "Torch" → "Removal"

(2) Are there any situation below?

- Cable for photo sensor is not correctly installed (not inserted into the hole on torch stand).
- Cable for photo sensor is damaged.

Bad Photo sensor cable installed not correctly.



Yes

No

3.2.1 Check if photo sensor cable is damaged

(1) Is the Cable for photo sensor damaged?

Yes

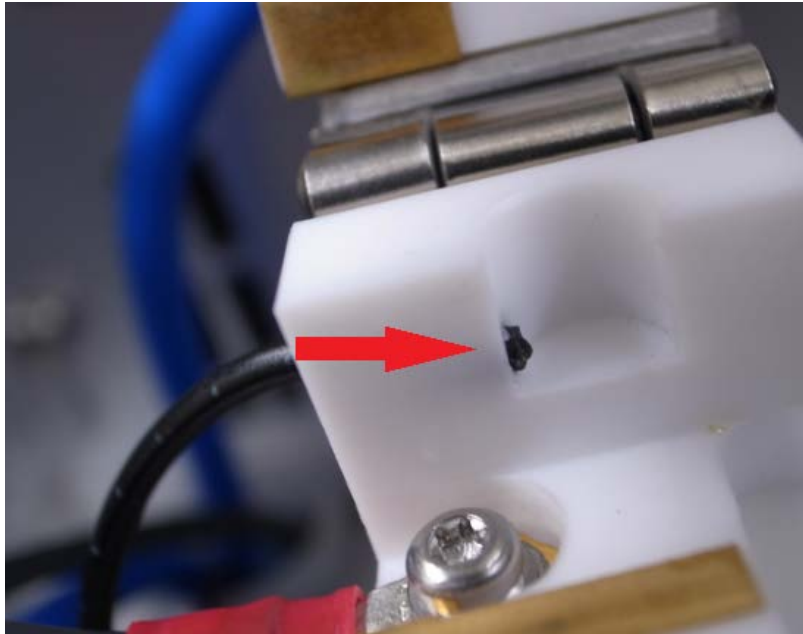
No

3.3.1 Check if photo sensor cable is damaged

(1) Insert the cable to the hole.

(2) Did this fix the problem?

Good Photo sensor
cable installed
correctly.



Yes

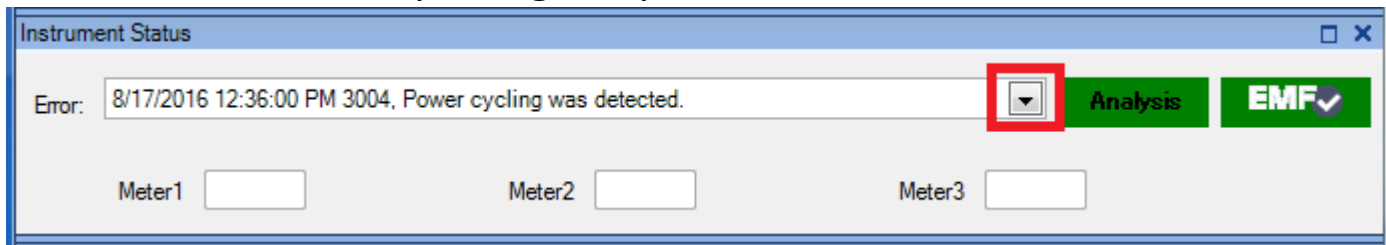
No

4.1.1 Check IF/BK vacuum pressure errors

(1) Select MassHunter Instrument Control Window → Main menu → “View” → “Instrument Status” to display “Instrument Status” Pane

Note If Main menu is not displayed, press F10 key.

(2) Click the dropdown below and check the error number for errors that are generated at the date/time of the attempt to ignite plasma.



(3) Are error numbers 1118, or 1119 included in the latest errors?

Yes

No

4.2.1 Check sampling cone

(1) Check if sampling cone has a distorted or expanded orifice.

(2) Any trouble found?



Good Sampling cone in good condition.

Note Distortions of cones are subtle. If it is not clear, regard it as “Yes”.

Yes or not clear

No

4.3.1 Change sampling cone

(1) Exchange sampling cone.

Reference Hardware Maintenance Manual → "Maintenance" → "Interface"

(2) Does this fix the problem?

Yes

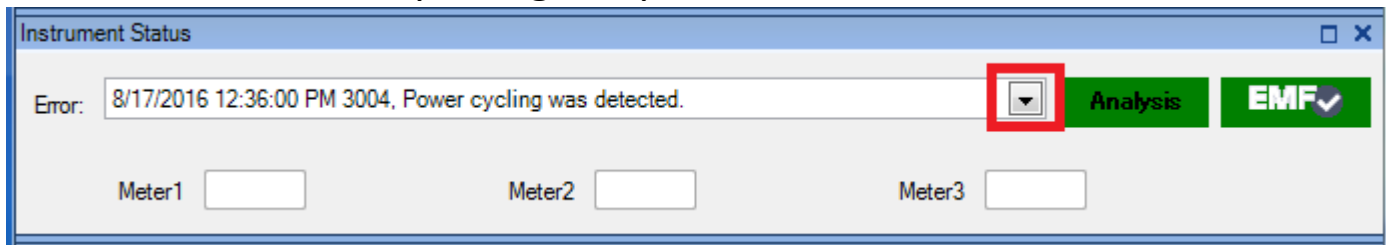
No

4.4.1 Check Analyzer vacuum pressure errors

(1) Select MassHunter Instrument Control Window → Main menu → “View” → “Instrument Status” to display “Instrument Status” Pane

Note If Main menu is not displayed, press F10 key.

(2) Click the dropdown below and check the error number for errors that are generated at the date/time of the attempt to ignite plasma.



(3) Are error numbers 1124, or 1129 included in the latest errors?

Yes

No

4.5.1 Check skimmer cone

(1) Check if skimmer cone has a distorted or expanded orifice.

(2) Any trouble found?



Good Skimmer cone in good condition.

Note Distortions of cones are subtle. If it is not clear, regard it as “Yes”.

Yes or not clear

No

4.6.1 Change skimmer cone

(1) Exchange skimmer cone.

Reference Hardware Maintenance Manual → "Maintenance" → "Interface"

(2) Does this fix the problem?

Yes

No

4.7.1 Isolate the torch and try to ignite

(1) Block end of the torch with plastic film and try to ignite.

(2) Can it ignite?

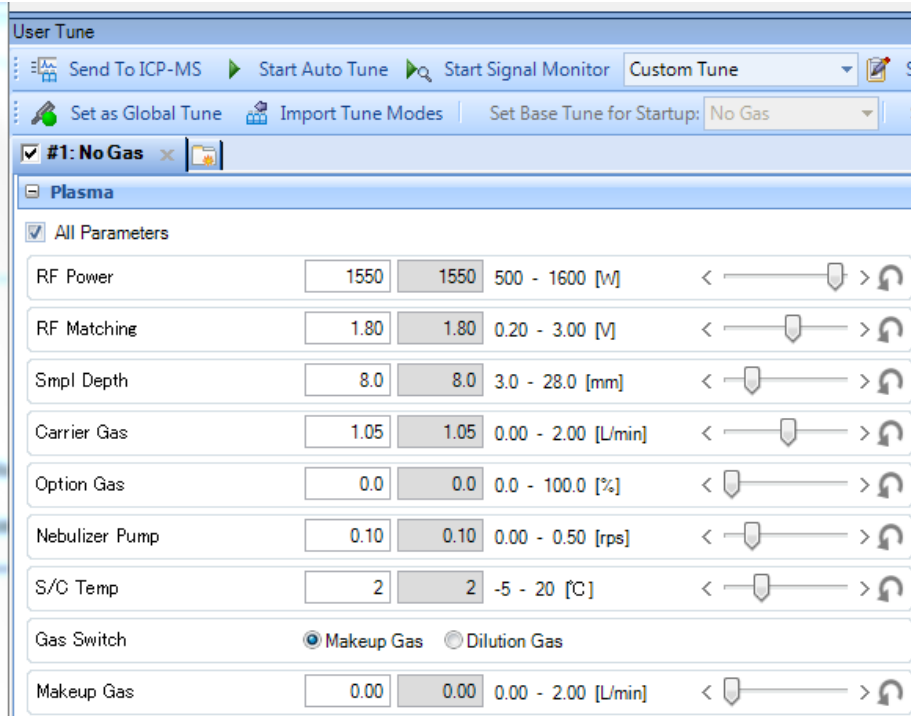
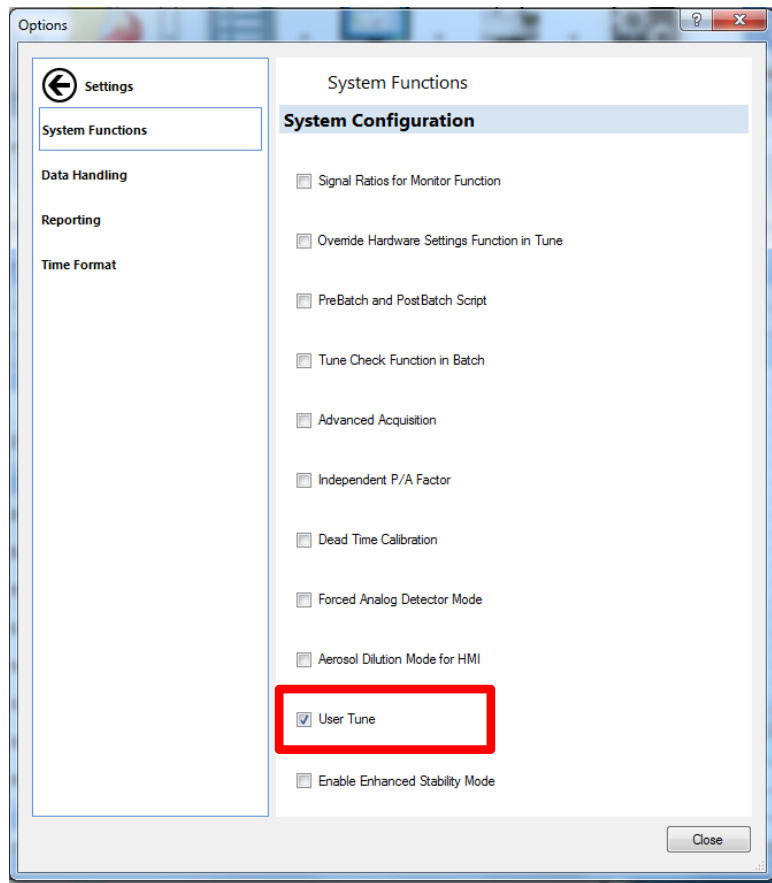


Yes

No

4.8.1 Check usage of “User Tune”

(1) Is “User Tune” function in use?



Yes

No

4.9.1 Check User Tune parameters

(1) Modify tune parameters in user tune like below.

Sampling Depth 8mm

Carrier Gas flow

MicroMist: 1.0L/min

MicroFlow: 0.6L/min

Make Up Gas flow

MicroMist: 0L/min

MicroFlow: 0.3L/min

(2) Does this fix the problem?

Yes

No

4.10.1 Re-adjust User Tune parameters

(1) Check if the new tune parameters give good sensitivity. If not, adjust tune parameters so that it gives enough sensitivity.

A blue rectangular button with rounded corners and a slight 3D effect, containing the white text "OK".

OK

5.1.1 Check dilution gas connection

(1) Check dilution gas connection



Push dilution gas line into connector.



Confirm line is inserted into the bottom of connector.

Bad loose nut.



Confirm nut has been tightened.

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5.2.1 Check dilution gas connection



(2) Did this fix the problem?

With the other end of the connector, confirm connection in the same way

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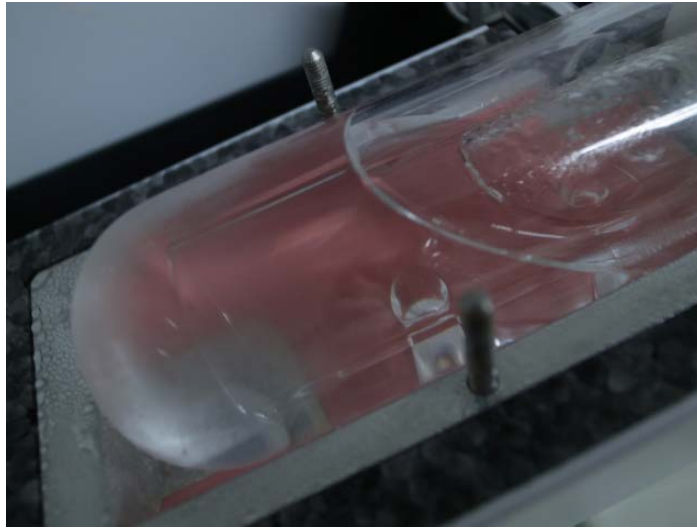
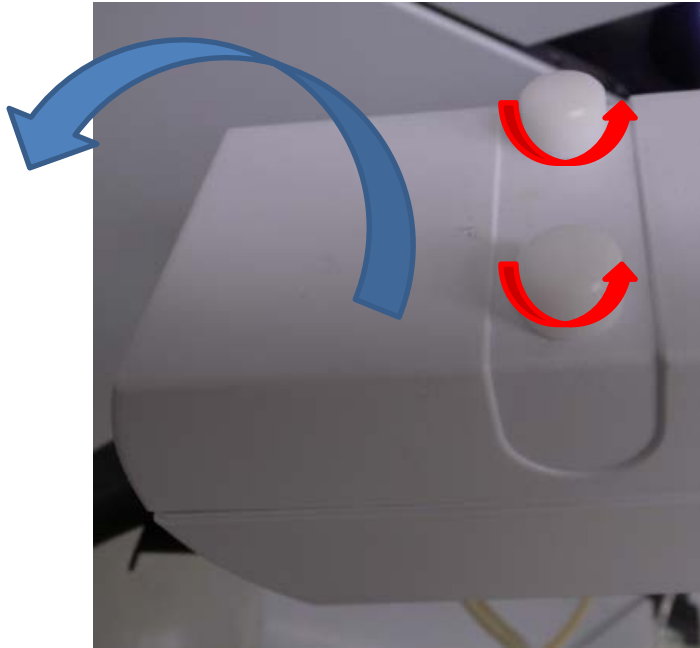
Yes

No

6.1.1 Check spray chamber

(1) Remove top cover of spray chamber chiller.

(2) Is the spray chamber filled with liquid?



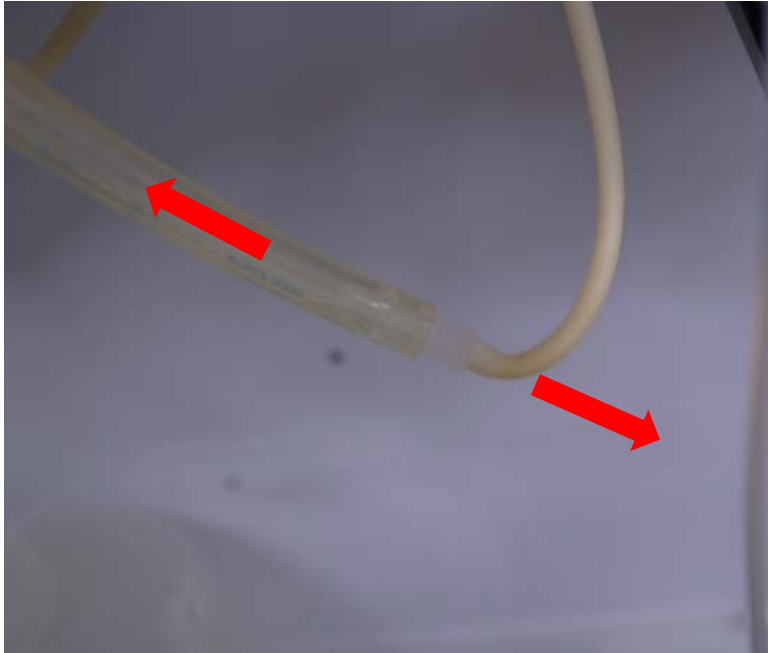
Bad Spray chamber filled with liquid.

Yes

No

6.2.1 Drain spray chamber

(1) Pull out drain tube and drain liquid from the spray chamber



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6.2.2 Drain spray chamber

(2) Remove torch. Then clean it with pure water and dry it.

Reference Hardware Maintenance Manual → "Maintenance" → "Torch area" → "Torch" → "Removal"

(3) Attach the torch again.

Reference Hardware Maintenance Manual → "Maintenance" → "Torch area" → "Torch" → "Installation"

(4) Check and fix drain tube

Reference Hardware Maintenance Manual → "Maintenance" → "Peristaltic Pump Area" → "Peristaltic Pump Tubing" → "Installation"

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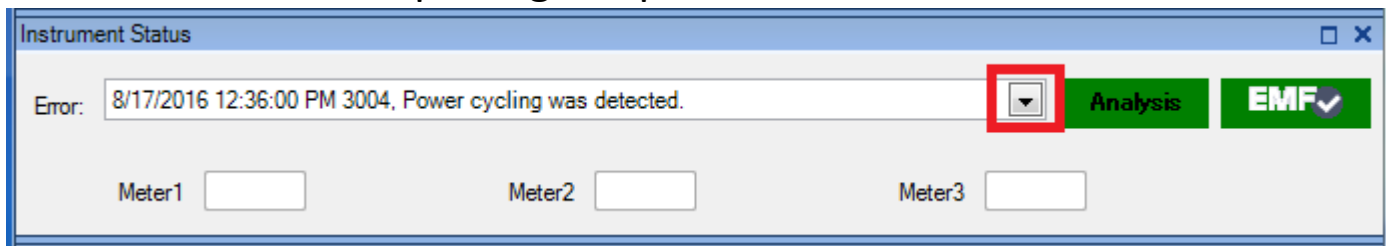
OK

6.3.1 Check Water flow and Gas flow errors

(1) Select MassHunter Instrument Control Window → Main menu → “View” → “Instrument Status” to display “Instrument Status” Pane

Note If Main menu is not displayed, press F10 key.

(2) Click the dropdown below and the check error number for errors that are generated at the date/time of the attempt to ignite plasma.



(3) Are error numbers 1440, 1445, or 1446 included in the latest errors?

Yes

No

6.4.1 Check water and argon gas

- (1) If error 1440 has been generated, check if cooling water valve is open and chiller or heat exchanger is working correctly.
- (2) If error 1445 or 1446 has been generated, check if argon gas valve is open and remaining amount is enough.

(3) Did this solve the problem ?

Yes

No

7.1.1 Air leak check

(1) Check carrier gas connection.



Push carrier gas line into connector.



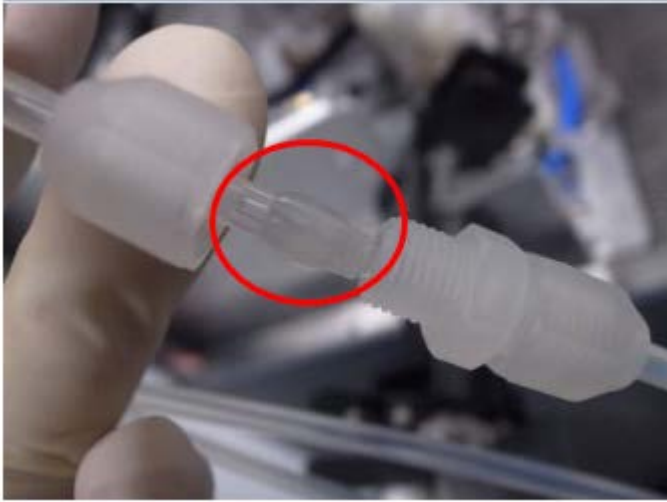
Push carrier gas line into connector (In case of glass nebulizer).



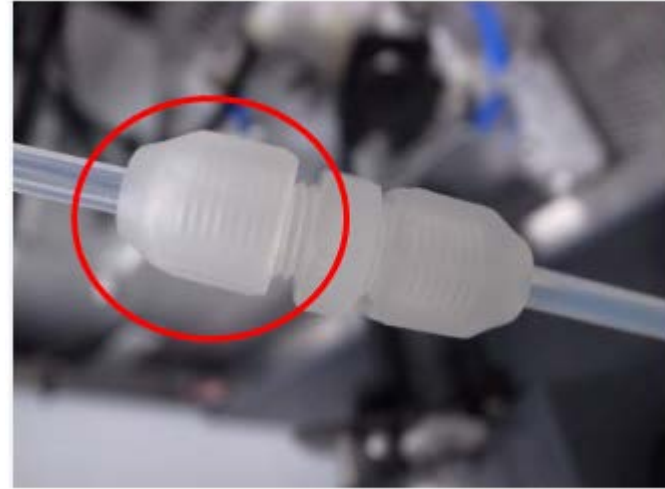
Push connector toward nebulizer (In case of glass nebulizer).

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7.1.2 Air leak check



Check if ferrule is correctly installed
(In case of PFA nebulizer).



Bad loose nut.

Tighten the nut, if it is loose.
(In case of PFA nebulizer).

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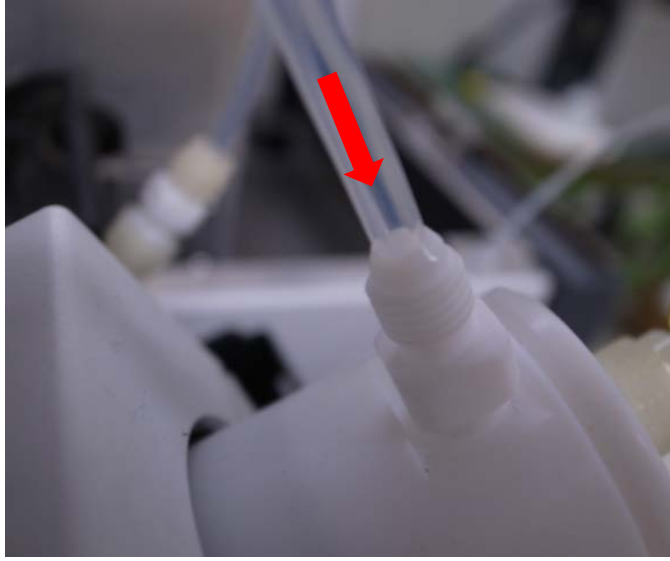
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7.1.3 Air leak check

(2) Check makeup gas connection.



Push makeup gas line into connector.



Confirm line is inserted into the bottom of connector.

Bad loose nut.



Confirm nut has been tightened.

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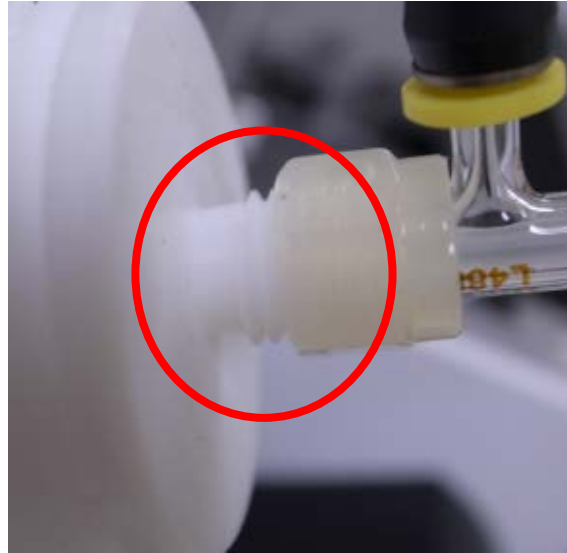
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7.1.4 Air leak check

(3) Check loose nebulizer.



Good Correctly installed
nebulizer



Bad loose nut.



Bad Not inserted to the end.

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7.1.5 Air leak check

(4) Check loose spray chamber cap.



Check that the cap is not loose.

(5) Did this fix the problem?

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Yes

No

8.1.1 Check rotary pump

(1) Check and Maintain rotary pump.

Reference Hardware Maintenance manual → "Maintenance" → "Maintaining Other Parts"

Yes

No

9.1 End of procedure

Close this window.

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9.2 End of procedure

To solve the problem an engineer from Agilent is needed. Please contact Agilent using the link below.

<http://www.agilent.com/en-us/contact-us/page>

Close this window.

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