Purpose: To determine the Polyarc (PA) System and Polyarc Reactor configuration required for a customer with an Agilent 7890 or 8890 GC.

> *Note: It is important to select the correct system and reactor configuration to ensure compatibility with a specific GC.*

The Polyarc System may include the Polyarc Reactor, an Electronic Flow Controller (EFC), Temperature Controller, and a Spare Polyarc Reactor (a replacement reactor for the shelf to reduce downtime). **The system configuration determines what additional equipment is needed to supply the reactor with air, hydrogen, and power for the heater. The Polyarc Reactor configuration is the physical enclosure required for the reactor. This includes where it will be installed on the GC, the column connection type, and the resistance temperature detector (RTD) type.**

> *Note: There are two versions of the Polyarc Reactor, the standard version and the Polyarc Ultra. The Polyarc Ultra has an enhanced flow path with ultra-inert coating and optimized internal geometry to allow for minimal peak broadening. The standard Polyarc does not broaden peaks more than 5-10%. A Polyarc Ultra would be used if a customer has an analyte closely eluting to their solvent peak. This becomes more important if the solvent has significant tailing, such as toluene. (See "PA vs. PA Ultra Overview.pdf" in the Partner Portal for more information.)*

Instructions: To follow you will find two configuration steps. Step 1 for the Polyarc System and Step 2 for the Polyarc Reactor.   Each step has specific questions that will guide you to the appropriate configuration setup. Read the questions in order. Then select from the "if" statements, located below the question, the appropriate response and go to the instructed question. Stop once a Polyarc System configuration is determined.

Call the ARC team at 612-444-3626 with any questions on compatibility.

Question 1.

Question 2. Question 3.
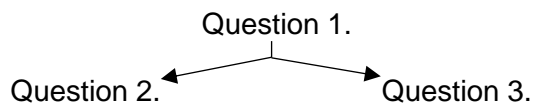
Step 1. Polyarc System Configuration

> *Question 1 determines if an ARC Temperature Controller should be included with the Polyarc System. It would be needed if the GC does not have an available heater zone to control the temperature of the Polyarc reactor. Commonly it is preferred to use the GC heater zone for temperature control.*

Question 1. Is there an available heater zone on the GC?

If a heater zone is <u>not</u> available on the GC, go to *Question 2*.

If a heater zone is available on the GC, go to *Question 3*.

Questions 2 and 3 are to determine if the Polyarc System will include an ARC Electronic Flow Control Module (ARC EFC). The ARC EFC is a set of mass flow controllers that provides precise flow rates of hydrogen and air to the Polyarc reactor. Mass flow controllers work independently of the upstream gas pressure, so upstream pressure changes do not impact the flow rates. The ARC EFC is the preferred flow control option. The other flow control option is to connect directly to the GC Electronic Pressure Controller module (EPC). Two EPC channels, commonly the auxiliary channels, would need to be present on the GC. The flow rates with the EPC can drift overtime and can fluctuate with downstream pressure changes. To automate the Polyarc shutdown, an EPC would need to be used. However, it is not recommended to frequently (weekly) power cycle the Polyarc.

Question 2. Does the customer have two available auxiliary EPC channels and does not want to use the ARC Electronic Flow Controller (EFC)?

If the customer prefers to have the benefits of mass flow control provided by the ARC EFC, the Polyarc System configuration is a PA-SYS-ETC and the Polyarc Ultra System configuration PA-SYS-UET.

If there are two available EPC channels and the customer accepts using pressure flow control over mass flow control, the Polyarc System configuration is a PA-SYS-NTC and the Polyarc Ultra System configuration is PA-SYS-UNT.

Question 3. Does the customer have two available auxiliary EPC channels and does not want to use the ARC Electronic Flow Controller (EFC)?

If the customer prefers to have the benefits of mass flow control provided by the ARC EFC, the Polyarc System configuration is a PA-SYS-EFC and the Polyarc Ultra System configuration PA-SYS-UEF.

If there are two available EPC channels and the customer accepts using pressure flow control over mass flow control, the Polyarc System configuration is a PA-SYS-NFC and the Polyarc Ultra System configuration is PA-SYS-UNF.

Polyarc and Polyarc Ultra System Configuration Scenarios

	Include ARC EFC?			Include ARC EFC?

Agilent 7890/8890 with Polyarc		Yes	No
Include Temp. Controller?	Yes	PA-SYS-ETC	PA-SYS-NTC
	No	PA-SYS-EFC	PA-SYS-NFC

Agilent 7890/8890 with Polyarc Ultra		Yes	No
Include Temp. Controller?	Yes	PA-SYS-UET	PA-SYS-UNT
	No	PA-SYS-UEF	PA-SYS-UNF

Step 2. Polyarc Reactor Configuration

Instructions: Start at Question 1. Then select from the "if" statements, located below the question, the appropriate response and go to the instructed question. Stop once a Polyarc Reactor configuration is determined. Call the ARC team with any questions on compatibility.

There are two different RTD types for the Polyarc Reactor, PT100 and ARC RTD. The Polyarc reactor is operated at 450 °C. The PT100 RTD is always used with the ARC Temperature Controller or when directly connecting to the heater zone of an Agilent 7890 or 8890 GC. The PT100 RTD will read the temperature is at 450 °C. The ARC RTD is used when directly connecting to the heater zone of an Agilent 6890 GC, the temperature read out will be 293 °C even though the reactor operates at 450 °C.

Shown below is a table with the applicable options for the Polyarc reactors. Go to Question 1, to be walked through the selection process.

Polyarc Reactor Configuration - Agilent 7890 / 8890

Column Type	Capillary			
RTD Type	PT100 (PA-SYS-ETC or PA-SYS-NTC)		ARC RTD (PA-SYS-EFC or PA-SYS-NFC)	
Installation Position	Detector, Valve Box, Aux. Detector	Inlet	Detector, Valve Box, Aux. Detector	Inlet
Polyarc Reactor Configuration	PA-SUB-42D	PA-SUB-42Z	PA-RRC-A02	PA-RRC-A09

Column Type	Packed			
RTD Type	PT100 (PA-SYS-ETC or PA-SYS-NTC)		ARC RTD (PA-SYS-EFC or PA-SYS-NFC)	
Installation Position	Detector, Valve Box, Aux. Detector	Inlet	Detector, Valve Box, Aux. Detector	Inlet
Polyarc Reactor Configuration	PA-RRT-PT1	PA-RRT-PT2	PA-RRT-A10	PA-RRT-A15

Polyarc Ultra Reactor Configuration - Agilent 7890 / 8890

Column Type	Capillary			
RTD Type	PT100 (PA-SYS-ETC or PA-SYS-NTC)		ARC RTD (PA-SYS-EFC or PA-SYS-NFC)	
Installation Position	Detector, Valve Box, Aux. Detector	Inlet	Detector, Valve Box, Aux. Detector	Inlet
Polyarc Reactor Configuration	PA-RRC-A1U	PA-RRC-A2U	PA-RRC-A5U	PA-RRC-A4U

Question 1. Will the Polyarc System be connected to a capillary or packed column?

If a capillary column, go to *Question 2*.

If a packed column, go to *Question 5.*

Question 2. Does the Polyarc System include an ARC Temperature Controller?

If an ARC Temp. Controller is included, go to *Question 3*.

If an ARC Temp. Controller is <u>not</u> included, go to *Question 4*.

Question 3. What is the location that the Polyarc will be installed in?

If installed in the detector, valve box, and aux. detector location, then use the Polyarc reactor configuration PA-SUB-42D or the Polyarc Ultra reactor configuration PA-RRC-A1U.

If installed in the inlet location, then use the Polyarc reactor configuration PA-SUB-42Z or the Polyarc Ultra reactor configuration PA-RRC-A2U.

Question 4. What is the location that the Polyarc will be installed in?

If installed in the detector, valve box, and aux. detector location, then use the Polyarc reactor configuration PA-RRC-A02 or the Polyarc Ultra reactor configuration PA-RRC-A5U.

If installed in the inlet location, then use the Polyarc reactor configuration PA-RRC-A09 or the Polyarc Ultra reactor configuration PA-RRC-A4U.

Question 5. Does the Polyarc System include an ARC Temperature Controller?

If an ARC Temp. Controller is included, go to *Question 6.*

If an ARC Temp. Controller is <u>not</u> included, go to *Question 7*.

Question 6. What is the location that the Polyarc will be installed in?

If installed in the detector, valve box, and aux. detector location, then use the Polyarc reactor configuration PA-RRT-PT1.

If installed in the inlet location, then use the Polyarc reactor configuration PA-RRT-PT2.

Question 7. What is the location that the Polyarc will be installed in?

If installed in the detector, valve box, and aux. detector location, then use the Polyarc reactor configuration PA-RRT-A10.

If installed in the inlet location, then use the Polyarc reactor configuration PA-RRT-A15.

Congratulations on your Polyarc Configuration Selection.