User Guide
4-Channel Kilobase (S3) Cartridge Kit (C405106)

A. Specifications

Specification	Description
DNA Sizing Range	20-60,000 bp
DNA Detection Range	20-165,000 bp
L.O.D	0.1 ng/µL
Resolution*	10-50 bp
Sample Number	800 runs**
Shelf Life	6 months

* Best resolution is determined by the 15-622 DNA Size Marker (C109200).
** 200 runs/channel x 4 channels = 800 runs

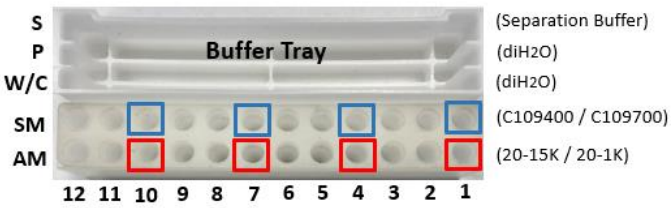
B. Kit Components and Storage Conditions

Item	Storage Condition
4-Channel Kilobase Cartridge (C405106)	4-30˚C (Do Not Freeze)
20-1,000 bp Alignment Marker (C109100-500A, 500 µL)	Short-Term (≤ 3 months): 4-30˚C Long-Term (> 3 months): -20˚C
Separation Buffer (C104409, 100 mL)	4-30˚C
Dilution Buffer (C104408, 30 mL)	4-30˚C
Mineral Oil (C104407, 15 mL)	4-30˚C

C. Cartridge Unpacking Preparation

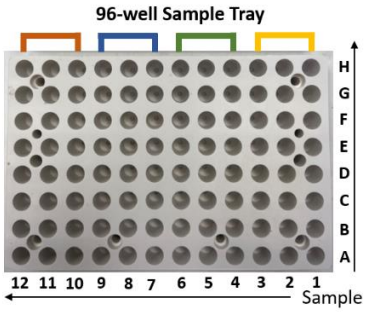
The new cartridge must undergo HV check and calibration. Please place 4 tubes of 20 µL C109100 Alignment Marker at positions AM01, AM04, AM07, and AM10, and follow the instructions provided in the unpacking guide to complete the calibration process.

D. Buffer, Marker, and Sample Preparation



4-Channel position:
(1) Channel 1 : A1-H1/A2-H2/A3-H3
(2) Channel 2 : A4-H4/A5-H5/A6-H6
(3) Channel 3 : A7-H7/A8-H8/A9-H9
(4) Channel 4 : A10-H10/A11-H11/A12-H12

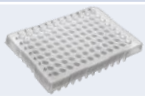
*All 4 channels will be analyzed simultaneously.
***Sample should be in quadruple number. Otherwise, tubes with dilution buffer should be used.**



The 4-channel system can be interpreted as 4 individual cartridges. Thus, the sample number should be quadruple.

For example, if 4 samples are assigned at A1, A4, A7, and A10, then 6 samples can be assigned at A1, A4, A7, A10, B1, and B4, with dilution buffer at B7 and B10.

1. Compatible Sample Tubes

Name	Cat. No.	Volume	Image
Micro Vial	C104250	≥ 2 µL	
0.1 mL PCR Tube	-	≥ 10 µL	
0.2 mL PCR Tube	-	≥ 20 µL	
Semi/Non-skirted 96-well Plate*	-	10-20 µL	

* Recommended 96-well plates: Labcon (3972-520-000), Axygen (PCR-96-FLT-C).

2. Buffer Preparation

Use the droppers to fill the wells. Each well should be 80% full. Overfilling or having droplets left on the dividers will conduct the currents and make it hard to keep track of the changes.

3. Markers Required for Different Size Ranges

- For Sample Size Range from 20 bp to 15,000 bp:
  - 20 bp-15,000 bp Alignment Marker (C109110)
  - 100-10,000 bp Size Marker (C109400)
- For Sample Size Range from 20 bp to 60,000 bp:
  - 20 bp-1,000 bp Alignment Marker (C109100)
  - 500 bp-23,000 bp Size Marker (C109700)

4. Recommended Sample Concentration

Genomic DNA: 2.5-50 ng/µL

- **If the sample concentration exceeds 50 ng/µL, dilute the sample 10X using 1X dilution buffer.**
- **If the sample is eluted in water, add dilution buffer to achieve a sample concentration of either 0.2X or 0.1X dilution buffer condition.**

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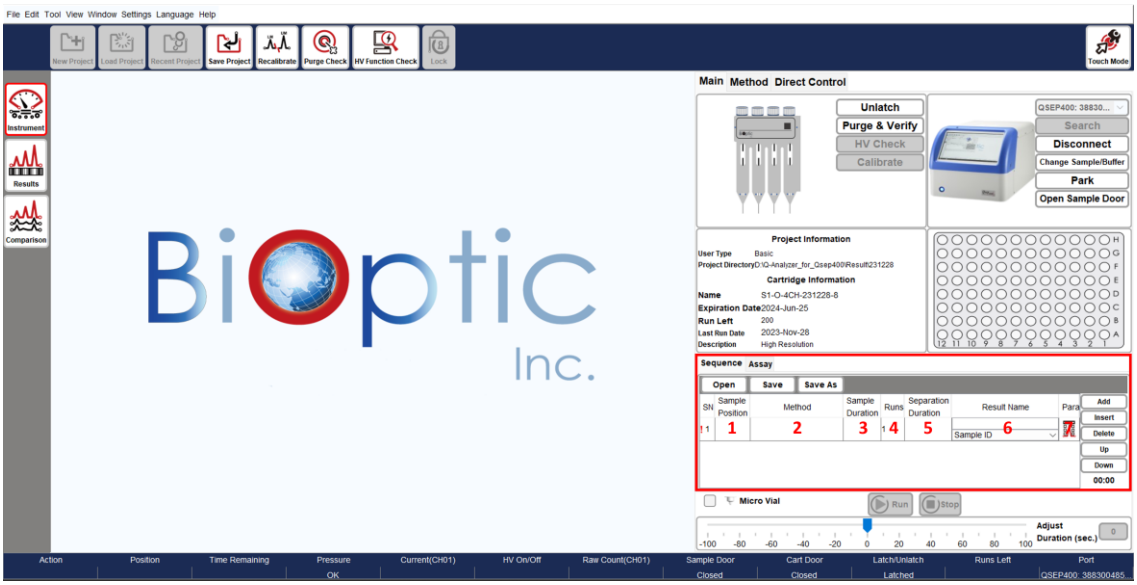
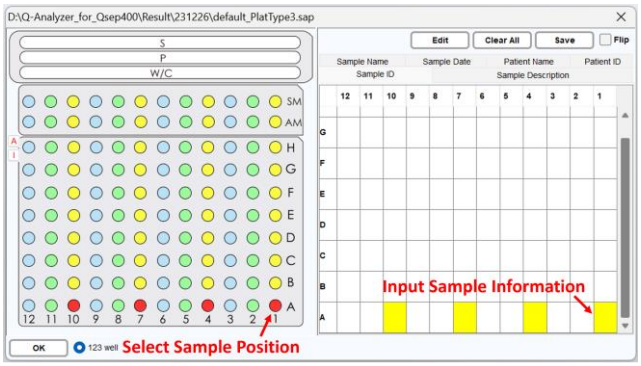
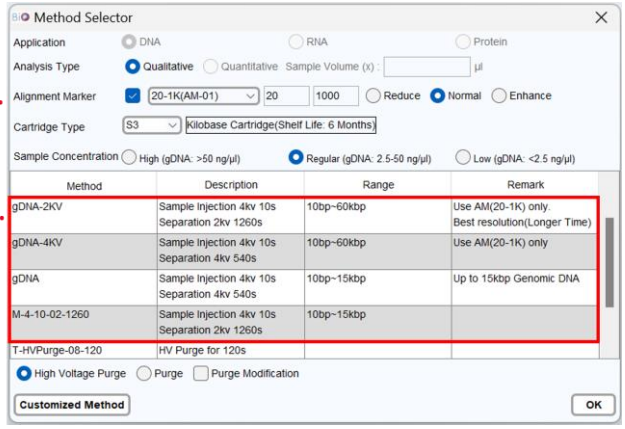
E. Software Operation Guide



1. Sample Position: Place the sample and select the corresponding position. Input sample information if necessary.



2. Method: Select (a) Alignment Marker and (b) Analytic Method in the Method Selector.



- **Adjust injection conditions based on sample concentration.**

Sample Concentration	High (2kV, 10s)	Regular (4kV, 10s)	Low (8kV, 10s)
Genomic DNA	> 50 ng/μL	2.5-50 ng/μL	0.5-2.5 ng/μL

3. Sample Duration: Adjust the sample injection time to increase/decrease injection amount.

- **Modify injection conditions based on sample concentration.**

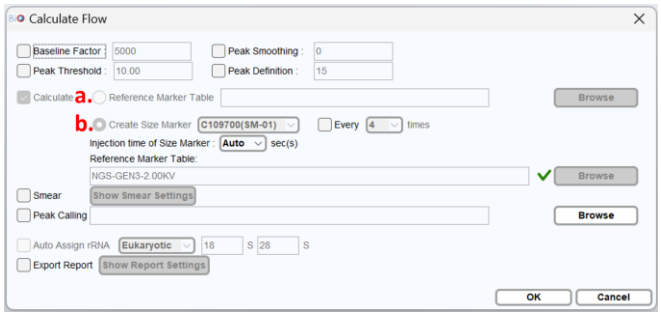
4. Runs: Set the repetition time.

5. Separation Duration: Adjust the duration to extend/reduce the separation time.

(Optional)

6. Result Name: Input the result name for the result file.

7. Para: Choose between (a) Reference Marker Table and (b) Create Size Marker for calculation.



- **C109700 size marker must be run every 24 hours when using the "gDNA-2KV" and "gDNA-4kV" methods to obtain sizing results up to 60 kb. If a size marker is created within this timeframe, you have the option to choose "Reference Marker Table" for calculation.**

8. Click “Run” to start the sequence analysis.

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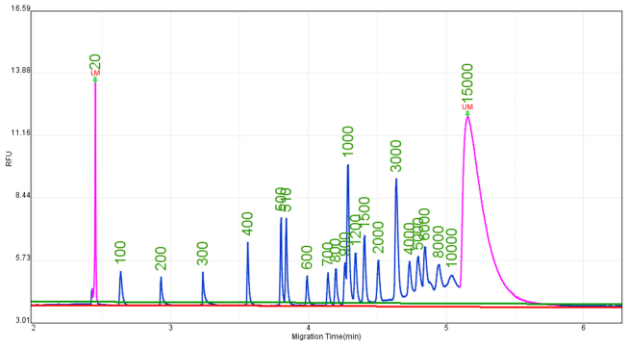
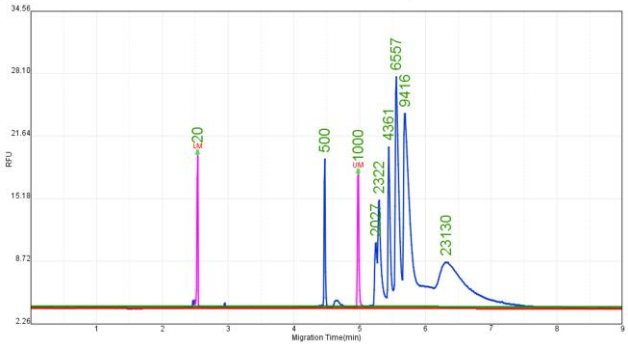
F. Result & Application

- **Alignment Marker & Size Marker Result**

20-15K & C109400 100-10000 bp Size Marker



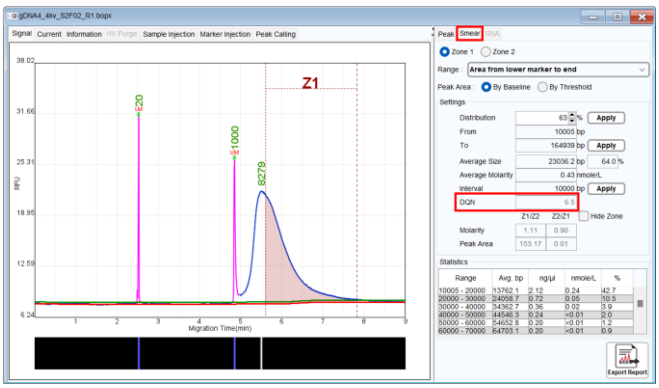
20-1K & C109700 500-23000 bp Size Marker



- **The 4-channel system can be interpreted as 4 individual cartridges. Therefore, there should be 30-50% individual differences between each of them.**

- **Genomic DNA Validation**

Use the smear function to set up a user-defined threshold for DNA Quality Number (DQN) calculation. The DQN, ranging from 1 to 10, can be used as a reference to assess the integrity of genomic DNA.

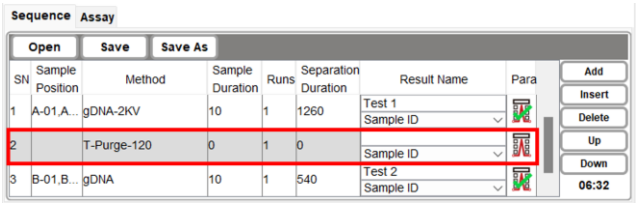


G. Troubleshooting

Before attempting any troubleshooting, ensure that the system is functioning properly and that all operations are following the instructions.

If encountering unstable current during sample injection or separation steps, which may be caused by residues left in the DNA sample after extraction, consider the following solutions:

1. Dilute the sample using dilution buffer.
2. Centrifuge the sample for a period to allow residues to accumulate at the bottom of the tube.
3. Insert a "T-purge-120" method between several sample runs. For example, insert one run of "T-Purge-120" every 5-10 sample runs.



H. Cartridge Disposal

Please wear gloves before discarding the cartridge.

1. Bend the cartridge tip.
2. Open the caps on the gel reservoirs and remove the inner caps.
3. Pour the gel into the chemical waste container.
4. Dispose of the cartridge in the trash bin.

Contact Information:
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