Vertical Gel Electrophoresis System

Installation and Operation Manual

Version 1.1

Item# 01110

This instrument is intended for laboratory use only

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A. Important Notice

Before setting up and operating the Vertical Gel Electrophoresis System (V-GES), please carefully read these instructions to get familiarized with the installation and operation process. Instructions should be read by experienced individuals before operating the instruments.

Any improper usage of the instrument may cause damage. Please refer to the safety notice included with this equipment.

The instrument shall not be modified or altered in any way. Any modification or alteration will void the warranty, void the regulatory certifications and create potential safety hazard. Wealtec is not responsible for any injury or damage caused by using the instrument for any non-intended purpose or injury as a result of modification of the instrument by any person who is not authorized by Wealtec Corp.

A-1. Warranty

Vertical Gel Electrophoresis System (V-GES) is warranted to be free from defects in materials or workmanship for a period of one year from the original invoice date, under normal usage. Any defects occurring during warranty period, Wealtec Corp. will repair or replace defective products or parts without charge unless the defects arise from conditions outlined below. The defects described below are specially excluded from Wealtec warranty policy.

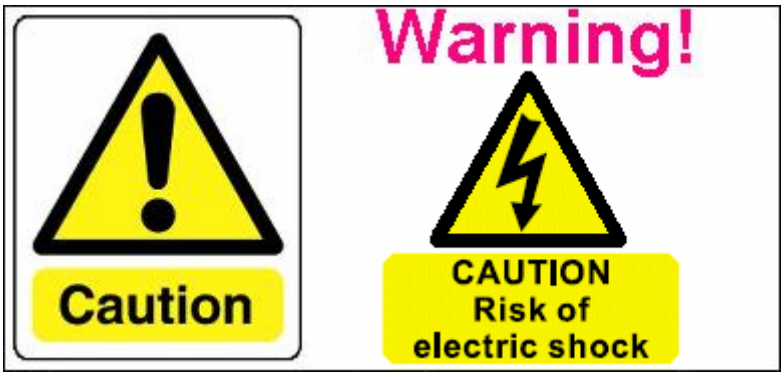
1. Improper operation of the instrument.
2. Repair or modification by any person who is not authorized by Wealtec Corp.
3. Damage caused by any (in)-direct accident, neglect or misuse.
4. Damage caused by disaster.
5. Damage caused by any improper solvents or samples

A-2. Technical and Service Contact

Most of the operation details are described in this instruction manual to assist and guide operator for an appropriate solution. For any other technical/service questions, please contact your local representative or contact Wealtec international technical/service specialist by E-mail: support@wealtec.com.

A-3. Safety Notice

A-3-1. Safety Information



- Do not connect power supply or electricity to V-GES without attaching the cover of the safety-lid. Risk of electric shock to the operator might occur without upper-lid (safety-lid) cover protection.
- Before removing the upper-lid (safety-lid), turn off the power supply and disconnect the black and red electrode-cables.
- Abrasive or high alkaline cleaners may erode the surface protection coating of V-GES. Do not use abrasive or high alkaline cleaners.
- Do not autoclave or boil any parts of vertical electrophoresis system.
- Do not soak / immerse upper-lid (safety-lid) in water or any solvent.
- Exposing the unit to organic solvents like alcohol, chlorinated hydrocarbons and aromatic hydrocarbons will cause damage to the acrylic material of the V-GES.
- The V-GS may be damaged when exposed or operated at temperature over 80℃.
- It is not recommended to remove the wing-releaser, clasp-releaser, clamp-door frequently. This frequent action may cause damage to the parts.
- V-GES should be operated with DC electrophoresis power supply which is isolated from external ground. The maximum electrical limitation of V-GES are:
    - Maximum voltage: 700 V
    - Maximum current: 500 mA
- V-GES is only intended for vertical electrophoresis usage. Do not use V-GES in any other unintended purpose.
- Wear protective gloves, safety glasses and appropriate clothing when operating V-GES.

B. Introduction

V-GES apparatus includes an electrophoresis tank, an electrode module and two casting modules. The system allows casting and running two gels simultaneously. With diverse spacers and combs, casting modules allows casting gels with different thickness and well numbers based on the experiment requirement. V-GES is applicable for SDS-PAGE and native-PAGE. Moreover, it can also be used to purify samples with large quantities. Wealtec ELITE Power Supply Series is compatible and it is recommended to use as a power source to run the V-GES.

B-1. Specifications

B-1-1. V-GES

Maximum gel size (W x H)	10 x 8 (cm)
Gel thickness	0.5 / 0.75 / 1.0 (mm)
Applicable number of samples	10 – 30
Gel capacity	1 or 2 gels
Minimum internal buffer volume	250 ml
Maximum internal buffer volume	300 ml
Minimum external buffer volume	500 ml
Maximum external buffer volume	1400 ml
V-GES tank dimension (L x W x H)	20 x 13 x 16.5 (cm)
Electrode module dimension (L x W x H)	21.5 x 6 x 17.2 (cm)
Casting module dimension (L x W x H)	19.5 x 4 x 14.5 (cm)
Electrode module	1 set (2 gels)
Casting module	2 sets
Selectable comb teeth	10 / 15 (Teeth)
Comb thickness	0.5 / 0.75 / 1.0 (mm)
Weight (Buffer reservoir, lid, electrode module)	800g
Weight (Whole unit, including gel casting modules, glass sets, spacers and package)	3kg
Warranty	1 year
Operating conditions	Temperature : 0-60℃ Humidity: 10% to 90% R.H. Non-condensing
Recommended power supply	ELITE 200, ELITE 300 or 300 PLUS and Mini-ELITE

B-1-2. Upper/Lower Gel Volume Per Gel Thickness

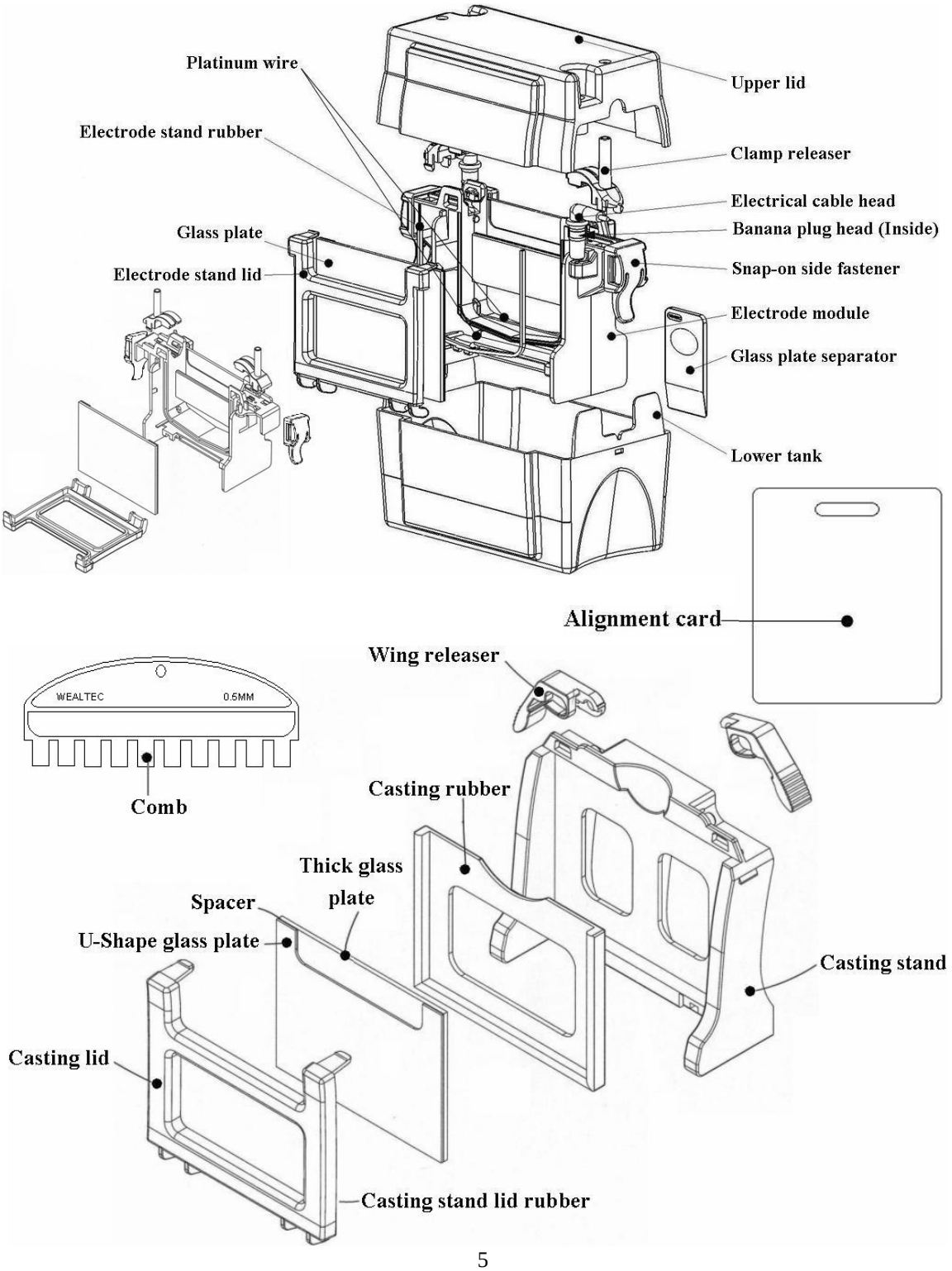
Model		V-GES		
Gel thickness (mm)		0.5	0.75	1.0
Discontinuous gel volume	Upper gel volume (ml)	1	1.4	2
	Lower gel volume (ml)	3.2	5	6.5
Total gel volume		4.2	6.4	8.5

B-1-3. Well Volume Per Gel Thickness

Gel Thickness (mm)	Teeth No.	Well Width (mm)	Max. Volume / well (µl)
0.5	10	6	15
	15	4	10
0.75	10	6	20
	15	4	15
1.0	10	6	30
	15	4	20

B-2. Product Descriptions

B-2-1. V-GES Hardware Overview



Electrophoresis tank

Electrophoresis tank consists of an acrylic lower-tank, an upper-lid, and a pair of electrode cables (Black and red). The lower-tank can hold sufficient buffer to passively cool down the temperature of the system. The safety-lid prevents users from the risk of electric shock. Furthermore, with fixed black and red electrode cables and uni-direction design, the lid minimizes user mistake with electrode direction or with the right operation orientation.

Electrode module

Electrode module consists of an electrode stand, banana-plugs (Black and red), platinum electrode wire with silicone tubes, electrode stand rubber, clasp-releasers and a clamp-door.
It is designed for easy gel glass sandwich placement and removal without the need for traditional clamping. The design will also assure that the pressure applied to the gel is even. The combination of banana-plugs and platinum electrode wire generates an even electric field distribution. With One-gel gate, V-GES allows running only one gel.

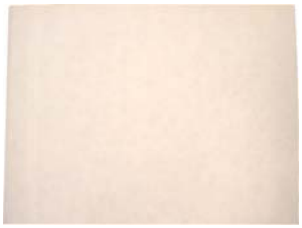
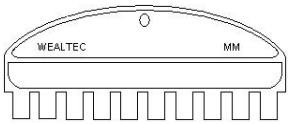
Casting module

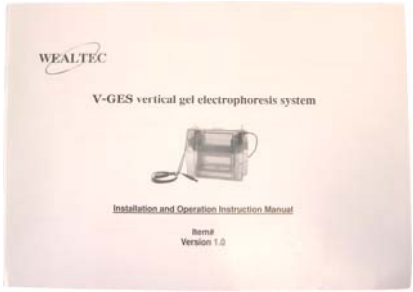
The casting module consists of a casting stand, casting rubber, wing-releasers, a casting lid, spacers, a thick glass plate, a U-shape glass plate, combs, and an alignment card. V-GES casting module allows casting of a 10 x 8 cm of maximum gel size. Selectable spacers (0.5, 0.75 and 1.0mm thickness) and combs (10 or 15-number of teeth) allows user to cast the gels with different thickness and wells. The comb is specifically designed in a way it prevents the comb from sinking into the gel and maintains the teeth at the same position in the gel.

C. Installation of Vertical Gel Electrophoresis System

C-1. Package List

Item	Quantity
Electrophoresis tank 	1
Complete electrode module 	1
Casting module 	2
Thick glass plate 	5

U-Shape glass plate 	5
One-gel gate 	1
Spacer (0.5mm / 0.75mm / 1.0mm)	4
Combs (0.5mm / 0.75mm / 1.0mm – 10 teeth comb) 	2
Alignment card 	1
Gel plate separator 	1

Operation and instruction manual 	1

C-2. Installation of V-GES

1. Unpack the package and remove the V-GES unit out of the box. Remove the plastic protection cover from the unit. Use the packing list to ensure the contents of the box are complete.
2. Use water to wash all the parts **except the safety-lid**, and rinse washed parts with de-ionized water to make sure no ionic material remained. Air-dry all parts before the usage.

D. Operation

D-1. Standard Operation

1. Place the V-GES on an appropriate place and environment for operation.

2. Casting gel

a) Ensure casting module is dry.

b) Release two wing-releasers by lifting them up (Fig.D-1~2). Place the casting module in a flat or horizontal position and place the casting rubber into the casting stand and push firmly to ensure they fit tightly (Fig.D-3).

Figure D-1

Figure D-2

Figure D-3

c) Place the thick glass plate on the casting rubber (Fig.D-4) and line two spacers on both sides (Fig.D-5). Place U-shape glass plate over the spacers (Fig.D-6).

Figure D-4

Figure D-5

Figure D-6

d) Close the casting lid. Hold the glass plate sandwich and place the casting module upright or vertical position and ensure the glass plate sandwich is not moved. Press and lock wing-releaser on both sides and gently close and push the casting lid until you hear the click sound [Insert it just enough to secure the gel assembly] (Fig.D-7). Insert the alignment card in between the glass plate sandwich to the bottom. (Fig.D-8).

Figure D-7

Figure D-8

e) Remove the alignment card that placed in between the glass plate sandwich carefully. (Fig.D-9).

Figure D-9

f) Load the lower/resolving gel solution mixture into an intervening space in between the glass plate sandwich (Fig.D-10). The height of the gel solution should reach the lower line beneath the frame of the casting lid. (Fig.D-11).

Figure D-10

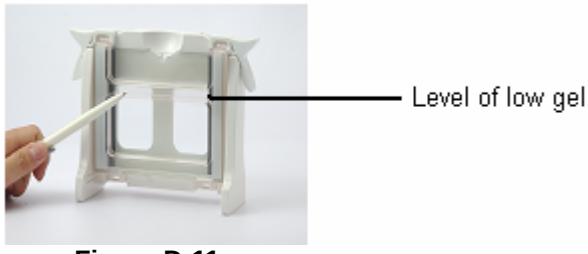


Figure D-11

g) Carefully load de-ionized water into an intervening space in between the glass plate sandwich to level the gel (Fig.D-12) and leave it for one hour for polymerization. After polymerization is complete, remove any remaining de-ionized water with the edge of a paper towel.

Figure D-12

h) Load upper/stacking gel solution onto the polymerized resolving gel (Fig.D-13). Ensure the flat surface of the comb facing and attaching the back of the glass plate with the right orientation gently insert the comb into the gel solution without trapping any bubbles. Insert the comb all the way till it reaches limit of maximum allowable insertion (Fig.D-14).

Figure D-13

Figure D-14

i) Leave the gel at least 30 minutes ~ 1 hour to ensure the gel fully solidifies then remove the comb (Fig.D-15).

Figure D-15

j) Release the wing-releaser on both sides by lifting them up and the casting lid will open and fall out (Fig. D-16~17). Gently push out the gel glass plate sandwich through the two large holes from the back of the casting module with fingers by holding the casting module gel glass plate sandwich (Fig. D-18).


Figure D-16


Figure D-17


Figure D-18

3. Press clasp-releasers at both sides of electrode module to open the electrode stand lid (Fig.D-19). Place the gel glass plate sandwich into the electrode module with U-shape glass plate facing or attaching to the electrode module. Slide gel-glass-sandwich into electrode module's side edges to the bottom (Fig.D-20). Gently close and push the electrode stand lid until you hear the click sound [Insert it just enough to secure the gel assembly] (Fig.D-21). If the users require running only one gel at a time, ensure to place the one gel gate in the opposite/other side. Please be noted both sides of the electrode module must be occupied with gel glass plate sandwich or one gel gate before operating or starting electrophoresis experiment (Fig.D-22).

Note: While placing the gel glass plate sandwich into the electrode module with U-shape glass plate facing or attaching to the electrode module, do not push or remove the electrode stand rubber with bottom edges of the gel glass plate sandwich during insertion. (Electrode stand rubber placed on the electrode stand along in term of U-shape) on the electrode modules.


Figure D-19


Figure D-20


Figure D-21


Figure D-22

4. Place the electrode module into the lower-tank (Fig.D-23). The snap-on side fastener on both side of the electrode module should be placed in the centre of the tank so as it will snap and fit to the tank (Fig.D-24).

Figure D-23

Figure D-24

5. Fill the running buffer into the lower tank and electrode module. Ensure the wells are fully immersed in the buffer.

Note: When pouring running buffer into the lower and electrode module, avoid the bubbles.

6. Sample loading: Load the sample dye mixtures into the wells with a micropipette.

7. Gently close the lower tank and the electrode module with the safety-lid (upper-lid) (Fig.D-23). Ensure the safety-lid is closed properly to the tank as the electrical cable on the safety lid is attached to the banana electrodes on the electrode module.

Figure D-25

Figure D-26

Figure D-27

Note: The safety-lid is designed to be uni direction therefore it needed to be placed on a right orientation in order to close properly (Fig.D-25~26). The safety-lid will not be able to close properly if it is closed or placed in a wrong orientation. (Fig.D-27)

8. Start operation – Running the gel: Plug the electrical cable into Elite Power Supply [Red to anode/＋, Black to cathode/－] (Fig.D-28~29). Switch on the power supply and setup the desired parameter and the values (Voltage or current) for gel electrophoresis. When

electrophoresis starts, bubbles will be generated at the bottom of the electrode module from the electrode platinum wires. The movements of tracking dyes also can be observed.

Figure D-28

Figure D-29

9. Stop operation: When electrophoresis is completed, turn off the power supply and remove the electrical cables from the output of the power supply for safety reason. Hold the safety lid and by resting the thumbs on the protruding pegs on both sides, lift up the safety-lid with other fingers vertically towards upward (Fig.D-30~31).

Figure D-30

Figure D-31

10. Keep the electrode module in the tank. Press the clasp-releasers to open the electrode stand lid and release the inner buffer into the tank (Fig.D-32). Remove the gel glass plate sandwich from the module for further gel staining and documentation (Fig.D-33).

Figure D-32

Figure D-33

11. Removing the electrode module from the lower tank: Gently by lifting the snap-on side fastener horizontally lift up the whole electrode module vertically upward. (Fig.D-34~36)

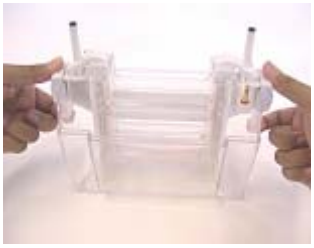


Figure D-34

Figure D-35

Figure D-36

E. Electrophoresis Protocol

E-1. SDS PAGE for Protein Analysis

1. Follow the instructions above on standard operation procedure D-1 ~ D-2(e) and assemble the gel glass plate sandwich.
2. Determine the gel formulation required by referring to Table 1 below to cast the resolving gels. Add APS and TEMED in gel solution **ONLY** when the glass plates are assembled and ready to load the gel solution.

Gel size	Resolving Gel (%)	H_2O (ml)	Acrylamide/Bis 30% 29:1(ml)	1.5M Gel Buffer pH8.8 (ml)	10% SDS (ul)	10% APS (ul)	TEMED (ul)
Two gel for 0.5 spacer (12ml)	6%	6.36	2.40	3	120	120	9.6
	8%	5.52	3.24	3	120	120	7.2
	10%	4.80	3.96	3	120	120	4.8
	12%	3.96	4.80	3	120	120	4.8
	15%	2.76	6.00	3	120	120	4.8
Two gel for 0.75 spacer (14ml)	6%	7.42	2.80	3.5	140	140	11.2
	8%	6.44	3.78	3.5	140	140	8.4
	10%	5.60	4.62	3.5	140	140	5.6
	12%	4.62	5.60	3.5	140	140	5.6
	15%	3.22	7.00	3.5	140	140	5.6
Two gel for 1.0 spacer (16ml)	6%	8.48	3.20	4	160	160	12.8
	8%	7.36	4.32	4	160	160	9.6
	10%	6.40	5.28	4	160	160	6.4
	12%	5.28	6.40	4	160	160	6.4
	15%	3.68	8.00	4	160	160	6.4

Table1. Recommended Resolving Gel Formulation for SDS PAGE

3. Follow the instructions above on standard operation procedure D-2(f) ~ D-2(g).
4. When the gel is completely polymerized, remove the water and add stacking gel (Refer to Table 2) on the resolving gel. Gently place and insert the comb in the stacking gel

and avoid trapping any air bubbles. (Refer to the instructions above on standard operation procedure D-2(h))

Note: Do not insert the comb too fast else the gel solution might splash out.

Gel size	Resolving Gel (%)	H_2O (ml)	Acrylamide/Bis 30% 29:1(ml)	1.5M Gel Buffer pH6.8 (ml)	10% SDS (ul)	10% APS (ul)	TEMED (ul)
Two gel for 1.0 spacer (6ml)	5%	4.1	1.0	0.75	60	60	6
Two gel for 0.75 spacer (5ml)	5%	3.4	0.83	0.63	50	50	5
Two gel for 0.5 spacer (4ml)	5%	2.7	0.67	0.5	40	40	4

Table 2. Recommended Stacking Gel Formulation (4ml) for SDS PAGE

	Resolving Gel Buffer (1.5M Tris -HCL pH 8.8)	Stacking Gel Buffer (1.5M Tris-HCL pH 6.8)
Tris base (g)	18.15	18.15
HCl	Adjust to pH 8.8	Adjust to pH 6.8
ddH_2O	To 400ml	To 400ml

Table 3. Composition of Gel Buffer for SDS PAGE (Store at 4℃)

5. Follow the instructions above on standard operation procedure D-2(i) ~ D-4.
6. Fill a maximum of 1 liter running buffer in the lower tank and make sure the electrode module has sufficient buffer. Fill in the electrode module with running buffer up to at least 0.5cm above the wells. (Refer to the instructions above on standard operation procedure D-5)

7. Sample preparation: Mix protein samples with loading buffer (Refer to table 4 & 5) in a 1:1 ratio. Heat the mixture up to 100℃ for 5 minutes in order to denature the protein samples.

Components	Final Concentration	Amount
1.5M Tris-HCl (pH 6.8)	**50mM**	**200µl**
2M Dithiothreitol (DTT)	**100mM**	**3ml**
SDS	**2%**	**1.2ml(10%SDS)**
Bromophenol Blue	**0.1%**	**A small amount**
Glycerol	**10%**	**690µl (87% glycerol)**
ddH_2O	**---**	**To 6ml**

Store at 4℃ or -20℃

Table 4. SDS Sample loading buffer

Components	Amount
Dithiothreitol	**3.09g**
0.01M Sodium acetate	**To 10ml**

Store at -20℃

Table 5. 2M DTT solution prepare

8. Sample loading: Carefully use a micropipette to add samples into the wells. Well capacities are given above in section B1 of this manual. Do not exceed the maximum limit of the volumes stated in section B1.

Note: Fill the electrode module and wells with buffer (Refer to Table 6) before sample loading.

Components	Final concentration	Amount
Tris base	12mM	3.0275g
Glycine	192mM	14.413g
SDS	0.1% (w/v)	1g
ddH2O	---	To 1000ml

Store at room temperature

Table 6. Electrophoresis running buffer for SDS PAGE

9. Close the upper lid and connect to the power supply. (Refer to the instructions above on standard operation procedure D-7 ~ D(8))

	Voltage	Time
Pre run	40V	20min
Run	120V	80min

Table 7. Recommended voltage and time for SDS PAGE

10. Run the electrophoresis until the lower tracking dyes migrates close to the bottom of the gel.

11. Disconnect the system from the power supply. (Refer to the instructions above on standard operation procedure D-9 ~ D-11)

12. Disasssemble the glass plates with the aid of the glass plate separator.

13. Place the gel in a container box and wash the gel for 5 min with de-ionized water.

14. Use coomassie blue staining buffer to stain the gel for 10 – 20 min.

15. Remove coomassie blue staining buffer and fill in the destaining buffer and allow 30mins for destaining for several times (~ 5 or 6 times until the gel background is clear and clean).

16. The gel is ready for image capturing and analysis.

E-2. PAGE for DNA analysis

1. Follow the instructions above D-1 ~ D-2(e) and assemble the gel glass plate sandwich.
2. Determine the gel formulation required by referring to Table 8 below to cast the resolving gels. Add APS and TEMED in gel solution **ONLY** when the glass plates are assembled and ready to load the gel solution.

Gel size	Resolving Gel Percentage	H_2O (ml)	Acrylamide/Bis 30% 29:1(ml)	5 TBE (ml)	10% APS (ul)	TEMED (ul)
Two gel for 0.5 spacer (14ml)	3.0%	9.48	2.52	2.8	140	7
	5.0%	8.78	2.32	2.8	140	7
	8.0%	7.38	3.72	2.8	140	7
	12%	5.50	5.6	2.8	140	7
	20%	1.78	9.32	2.8	140	7
Two gel for 0.75 spacer (16ml)	3.0%	10.83	2.88	3.2	160	8
	5.0%	10.03	2.66	3.2	160	8
	8.0%	8.43	4.26	3.2	160	8
	12%	6.28	6.4	3.2	160	8
	20%	2.03	10.66	3.2	160	8
Two gel for 1.0 spacer (18ml)	3.0%	12.19	2.09	3.6	180	9
	5.0%	11.29	2.99	3.6	180	9
	8.0%	9.49	4.79	3.6	180	9
	12%	7.07	7.2	3.6	180	9
	20%	2.29	11.99	3.6	180	9

Table 8. Recommended Polyacrylamide gel formulation of DNA separation

Gel concentration (%)	Effective range of separation (bp)
3.5	1000-2000
5.0	80-500
8.0	60-400
12.0	40-200
15.0	25-150
20.0	6-100

Table 9. Gel concentrations for effective range of DNA separation.

3. Follow the instructions above on standard operation procedure D-2(f) ~ D-2(g).

4. Gently place and insert the comb in the gel and avoid trapping any air bubbles. Ensure the flat surface of the comb facing and attaching the back of the glass plate with the right orientation. Insert the comb all the way till it reaches limit of maximum allowable insertion. Allow 30 ~ 60 min for gel to polymerize.

Note: Do not insert the comb too fast else the gel solution might splash out.

5. Use a 1*TBE soaked paper towels and cover the comb (top of the casting module) attached in the gel in the casting module. Then wrap the entire casting module with cling film (In order to avoid the top of the gel from drying) and store at 4℃ for 1~2 days before it is used.

6. Remove the cling film, paper towel and comb from casting module. Follow the instructions above on standard operation procedure D-2(i) ~ D-4.

7. Fill a maximum of 1 liter running buffer (1*TBE) in the lower tank and make sure the electrode module has sufficient buffer. Fill in the electrode module with running buffer up to at least 0.5cm above the wells. (Refer to the instructions above on standard operation procedure D-5)

8. Sample preparation: Mix DNA samples with loading buffer (Refer to table 10) in a 1:5 ratio.

Components	Final Concentration	Amount
Bromophenol Blue	**0.25%**	**0.25g**
Xylene CyanolFz	**0.25%**	**0.25g**
Glycerol in H_2O	**30%**	**3ml**
ddH_2O	**---**	**~ 10ml**

Store at 4℃

Table 10. DNA Sample loading buffer

9. Sample loading: Carefully use a micropipette to add samples into the wells. Well capacities are given above in section B1 of this manual. Do not exceed the maximum limit of the volumes stated in section B1.

Note: Fill the electrode module and wells with buffer before sample loading.

10. Close the upper lid and connect to the power supply. Set voltage at 100V. (Refer to the instructions above on standard operation procedure D-7 ~ D(8))

11. Run the electrophoresis until the lower tracking dyes migrates close to the bottom of the gel.

12. Disconnect the system from the power supply. (Refer to the instructions above on standard operation procedure D-9 ~ D-11)

13. Disassemble the glass plates with the aid of the glass plate separator.

14. Place the gel in a container box filled with the staining buffer (Refer to Table 11) and stain the gel for 30 min

Components	Amount
Ethidium bromide(EtBr)(0.5ug/ml)	**10ul**
TBE*1	**100ml**
Wrap the container in aluminum foil or transfer the solution to a dark bottle and store at room temperature	

Table 11. Stain buffer of DNA separation.

15. Remove the gel from the staining solution and wash the gel with de-ionized water.

16. Place the gel on Wealtec MD-20 or MD-25 UV transilluminator.

17. The gel is ready for image capturing and analysis.

F. Care and Maintenance

- All V-GES parts **except the upper lid** should be washed with clean water to avoid all possible contaminations and damages to the instruments. Organic solvents or strong detergents may damage the instrument and should not be used.

- Soft sponge is recommended to clean the lower tank and the glass plates. Do not use hard tissues to wipe the surface of the V-GES.

- Rinse the tank and plates with de-ionized water to ensure no ionic material remains or presents.

- Avoid washing or immersing the upper lid in water because this will damage the electrode terminals and cables. The electrodes should be protected from all possible moisture, organic solvents and detergents. Clean the upper lid with pre-moistened soft tissue soaked with clean water if necessary.

- Air-dry all the V-GES parts before the usage.

G. References

1. Laemmli 1970, Cleavage of Structural Proteins during the Assembly of the Head of Bacteriophage T4, U.K., Nature, 227, 680-685.

2. J. Sambrook and D. Russell, Molecular Cloning A Laboratory Manual, 3rd Edition, 2001.

3. Hunkapiller M.W,Lujan E, Ostrander F, and Hood L.E 1983 .Methods Enzymol .91:227-236

H. Order Information

V-GES System

Item #	Description
1031101	V-GES (0.5mm) complete system, system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate sets/5pcs, 0.5mm spacer/4pcs, 0.5mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator and an instruction manual.
1031102	V-GES (0.75mm) complete system, system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate sets/5pcs, 0.75mm spacer/4pcs, 0.75mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator and an instruction manual.
1031103	V-GES (1.0mm) complete system, system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate sets/5pcs, 1.0mm spacer/4pcs, 1.0mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator and an instruction manual.

V-GES Modules

Item #	Description
1031002	V-GES casting module, system includes V-GES casting module without tank and glass plate set.
1031003	V-GES electrode module, system includes V-GES electrode module without tank and glass plate set.

V-GES with E-Blotter System

Item #	Description
1030001	V-GES with E-Blotter complete system, system includes V-GES (0.5mm) complete system and E-Blotter module.
1030002	V-GES with E-Blotter complete system, system includes V-GES (0.75mm) complete system and E-Blotter module.
1030003	V-GES with E-Blotter complete system, system includes V-GES (1.0mm) complete system and E-Blotter module.

V-GES / E-Blotter Electrophoresis Tank

Item #	Description
1031001	V-GES / E-Blotter electrophoresis tank
1035001	V-GES / E-Blotter lower tank with four rubber feet
1035002	V-GES / E-Blotter upper lid with electrical cable

V-GES System with Power Supply

Item #	Description
1031111	V-GES(0.5mm) complete system with power supply (120V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 0.5mm spacer/4pcs, 0.5mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply, (120V – 50/60Hz).
1031112	V-GES(0.5mm) complete system with power supply (230V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 0.5mm spacer/4pcs, 0.5mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply (230V – 50/60Hz).
1031113	V-GES(0.75mm) complete system with power supply (120V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 0.75mm spacer/4pcs, 0.75mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply (120V – 50/60Hz).
1031114	V-GES(0.75mm) complete system with power supply (230V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 0.75mm spacer/4pcs, 0.75mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply (230V – 50/60Hz).
1031115	V-GES(1.0mm) complete system with power supply (120V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 1.0mm spacer/4pcs, 1.0mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply (120V – 50/60Hz).

1031116	V-GES(1.0mm) complete system with power supply (230V), system includes electrode module, electrophoresis tank, casting module/2pcs, glass plate/5pcs, 1.0mm spacer/4pcs, 1.0mm – 10 teeth comb/2pcs, one-gel gate, alignment card, glass plate separator, an instruction manual and ELITE 300 plus power supply (230V – 50/60Hz).

V-GES with E-Blotter System and Power Supply

Item #	Description
1030011	V-GES with E-Blotter complete system, system includes V-GES (0.5mm) complete system, E-Blotter module and ELITE 300 Plus power supply (120V – 50/60Hz).
1030012	V-GES with E-Blotter complete system, system includes V-GES (0.5mm) complete system, E-Blotter module and ELITE 300 Plus power supply (230V – 50/60Hz).
1030013	V-GES with E-Blotter complete system, system includes V-GES (0.75mm) complete system, E-Blotter module and ELITE 300 Plus power supply (120V – 50/60Hz).
1030014	V-GES with E-Blotter complete system, system includes V-GES (0.75mm) complete system, E-Blotter module and ELITE 300 Plus power supply (230V – 50/60Hz).
1030015	V-GES with E-Blotter complete system, system includes V-GES (1.0mm) complete system, E-Blotter module and ELITE 300 Plus power supply (120V – 50/60Hz).
1030016	V-GES with E-Blotter complete system, system includes V-GES (1.0mm) complete system, E-Blotter module and ELITE 300 Plus power supply (230V – 50/60Hz).

V-GES Accessories – Glass Plate

Item #	Description
1031005	V-GES glass plate set, set includes thick glass plate/5pcs and U-shape glass plate/5pcs.
1035401	Thick glass plate 130 x 100 mm, 5pcs.
1035402	U-shape glass plate 130 x 100 mm, 5pcs.

V-GES Accessories – Comb and Spacer

Item #	Description
1032001	0.5mm spacer 15 x 100 mm, 2pcs.
1032002	0.75mm spacer 15 x 100 mm, 2pcs.

1032003	1.0mm spacer 15 x 100 mm, 2pcs.
1032101	0.5mm 10 – Teeth comb, 1pcs.
1032111	0.5mm 15 – Teeth comb, 1pcs.
1032102	0.75mm 10 – Teeth comb, 1pcs.
1032112	0.75mm 15 – Teeth comb, 1pcs.
1032103	1.0mm 10 – Teeth comb, 1pcs.
1032113	1.0mm 15 – Teeth comb, 1pcs.

V-GES Accessories – Others

Item #	Description
1035302	Casting rubber, 1pcs.
1035501	One-gel gate, 1pcs.
1035502	Glass plate separator, 1pcs.
1035503	Alignment card, 1pcs.

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