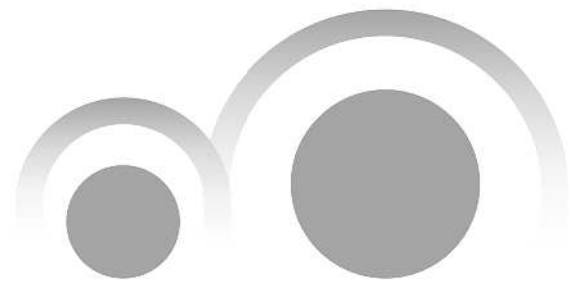
Biomate™

v2PAGE - vertical electrophoresis system

Cat. No. **V2PAGE2G075**	**v2PAGE** - vertical electrophoresis system for ***2 gels, 0.75mm***
Cat. No. **V2PAGE2G100**	**v2PAGE** - vertical electrophoresis system for ***2 gels, 1mm***
Cat. No. **V2PAGE2G150**	**v2PAGE** - vertical electrophoresis system for ***2 gels, 1.5mm***
Cat. No. **V2PAGE4G075**	**v2PAGE** - vertical electrophoresis system for ***4 gels, 0.75mm***
Cat. No. **V2PAGE4G100**	**v2PAGE** - vertical electrophoresis system for ***4 gels, 1mm***
Cat. No. **V2PAGE4G150**	**v2PAGE** - vertical electrophoresis system for ***4 gels, 1.5mm***



Instruction Manual

Contents

⋙ Introduction

v2PAGE - vertical electrophoresis systems are used to run 1 - 2 or 1 - 4 precast and/or hand cast gels, depending on which model applied. **v2PAGE** is compatible with 1D and 2D electrophoresis applications.

⋙ Packing List

v2PAGE - vertical electrophoresis systems for *2 gels* share the same components of:

Item	Quantity	of Cat. No.
vPAGE/v2PAGE/vBLOT2 Lid with Power Cables	1	**VLID**
vPAGE/v2PAGE/vBLOT2 Tank	1	**VTANK**
v2PAGE Electrode Assembly with Banana Plugs	1	**V2PAGE-EBP**
v2PAGE Casting Stand	2	**CAST-STV2**
v2PAGE Casting Frame	2	**CAST-FRV2**
v2PAGE Casting Stand Gasket	3	**CAST-STGV2**
Short Glass Plate, 10 x 7cm	5	**SGP**
Dummy Plate	1	**DUMMY**
Gel Releaser	3	**GEL-REL**
Glass Plate Rack	1	**GPR**
Centrifuge Tube Rack	1	**CTR**

Different models of **v2PAGE - vertical electrophoresis systems for *2 gels*** come with different combs and plain glass plates:

Model	Item
V2PAGE2G075	3 of #**COMB075-10** (Comb of 10-sample, 0.75mm thick) 3 of #**COMB075-15** (Comb of 15-sample, 0.75mm thick) 3 of #**GP075S** (Plain Glass Plate, 10 x 8cm, 0.75mm bonded spacer)
V2PAGE2G100	3 of #**COMB100-10** (Comb of 10-sample, 1mm thick) 3 of #**COMB100-15** (Comb of 15-sample, 1mm thick) 3 of #**GP100S** (Plain Glass Plate, 10 x 8cm, 1mm bonded spacer)

Model	Item
V2PAGE2G150	3 of #**COMB150-10** (Comb of 10-sample, 1.5mm thick) 3 of #**COMB150-15** (Comb of 15-sample, 1.5mm thick) 3 of #**GP150S** (Plain Glass Plate, 10 x 8cm, 1.5mm bonded spacer)

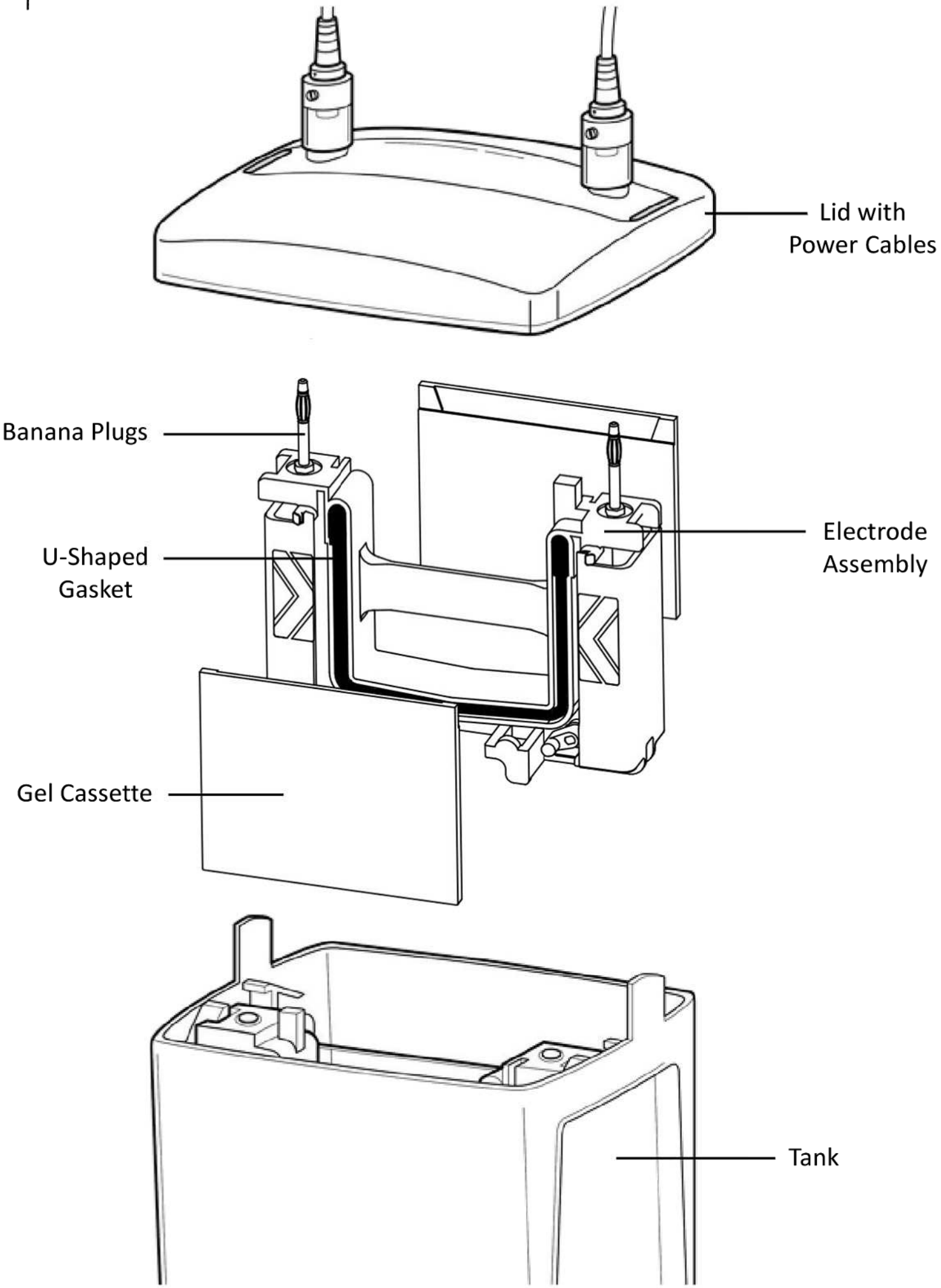
v2PAGE - vertical electrophoresis systems for *4 gels* share the same components of:

Item	Quantity	of Cat. No.
vPAGE/v2PAGE/vBLOT2 Lid with Power Cables	1	**VLID**
vPAGE/v2PAGE/vBLOT2 Tank	1	**VTANK**
v2PAGE Electrode Assembly with Banana Plugs	1	**V2PAGE-EBP**
v2PAGE Electrode Assembly w/o Banana Plugs	1	**V2PAGE-EFP**
v2PAGE Casting Stand	4	**CAST-STV2**
v2PAGE Casting Frame	4	**CAST-FRV2**
v2PAGE Casting Stand Gasket	5	**CAST-STGV2**
Short Glass Plate, 10 x 7cm	10	**SGP**
Dummy Plate	1	**DUMMY**
Gel Releaser	5	**GEL-REL**
Glass Plate Rack	1	**GPR**
Centrifuge Tube Rack	1	**CTR**

Different models of **v2PAGE - vertical electrophoresis systems for *4 gels*** come with different combs and plain glass plates:

Model	Item
V2PAGE4G075	5 of #**COMB075-10** (Comb of 10-sample, 0.75mm thick) 5 of #**COMB075-15** (Comb of 15-sample, 0.75mm thick) 5 of #**GP075S** (Plain Glass Plate, 10 x 8cm, 0.75mm bonded spacer)
V2PAGE4G100	5 of #**COMB100-10** (Comb of 10-sample, 1mm thick) 5 of #**COMB100-15** (Comb of 15-sample, 1mm thick) 5 of #**GP100S** (Plain Glass Plate, 10 x 8cm, 1mm bonded spacer)
V2PAGE4G150	5 of #**COMB150-10** (Comb of 10-sample, 1.5mm thick) 5 of #**COMB150-15** (Comb of 15-sample, 1.5mm thick) 5 of #**GP150S** (Plain Glass Plate, 10 x 8cm, 1.5mm bonded spacer)

⋙ Specifications



⋙ Operating Instructions

⋙ Assembly of Gel Caster

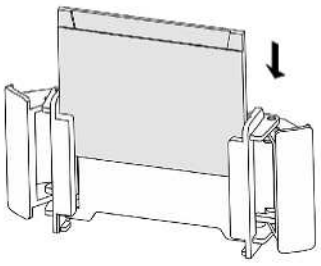
❶ Place the casting frame on the bench in a vertically standing position with clamps open.

❷ Choose the plain glass plate with the bonded spacer of 0.75, 1, or 1.5 mm thick.

❸ Place the short glass plate on it and align the bottom edges of plates.

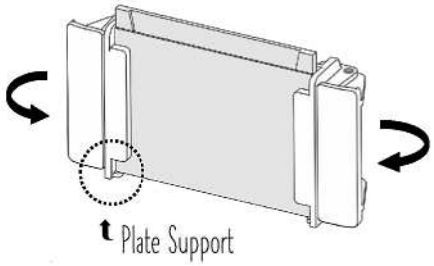
❹ Confirm the the spacer plate at the correct position with the **↑UP↑** mark.

❺ Keep the short glass plate facing front and slide both plates into the casting frame.

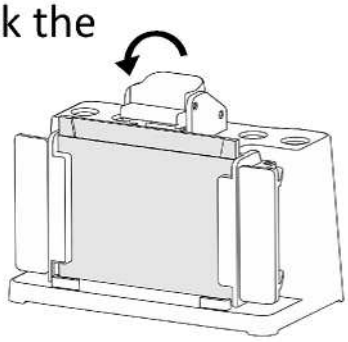


Misalignment or incorrect position may cause leakage.

❻ Ensure both plates stay on plate supports of the casting frame, and then close clamps of the casting frame to seal plates together.



❼ Place the assembled casting frame into the casting stand/onto the gasket while the short glass plate still faces front, and then lock the spacer plate with the clip of the casting stand.



❽ Repeat all steps above to cast another gel.

If needed, pour deionized water into the gel cassette to see if there is any leakage.

⋙ Casting Gel

▸ Prepare the gel or choose the pre-made gel with the appropriate acrylamide percentage to best resolve the protein of interest based on molecular weight:

Protein Size (KDa)	Acrylamide Percentage
4-40	≤20%
12-45	15%
10-70	12.5%
15-100	10%
50-200	8%
>200	4-6%

▸ Volumes per gel of **vPAGE/v2PAGE**:

Gel Thickness	Volume
0.75 mm	4.5 mL
1.0 mm	6 mL
1.5 mm	9 mL

▸ Recipe of 10mL Resolving (lower) Gel:

Gel	6%	8%	10%	12%	15%	17%
30% Acrylamide Solution	2mL	2.7mL	3.3mL	4mL	5mL	5.7mL
Distilled Water	5.4mL	4.7mL	4.1mL	3.4mL	2.4mL	1.7mL
4X Resolving Buffer[1]	2.5 mL					
TEMED[2]	10 µL					
10% APS[2]	100 µL					

[1] #BR300 (1.5M Tris, 0.4% SDS, pH8.8) is recommended.

[2] TEMED and APS (Ammonium Persulphate) would initiate the polymerization, so they shall be added ***just before*** filling the gel cassette.

▸ Recipe of 5mL Stacking (upper) Gel:

Gel	4%
30% Acrylamide Solution	0.67 mL
Distilled Water	3.03 mL
4X Stacking Buffer[3]	1.25 mL
TEMED[2]	5 µL
10% APS[2]	50 µL

[2] TEMED and APS (Ammonium Persulphate) would initiate the polymerization, so they shall be added ***just before*** filling the gel cassette.

[3] #BR310 (0.5M Tris, 0.4% SDS, pH6.8) is recommended.

Info. above is for reference. Please adjust depending on your application.

❶ Insert a comb into the gel cassette, and mark on the glass plate 1 cm below the lower endge of the comb as the height of the resolving gel.

❷ Right after mixing with TEMED and APS (initiating the gel polymerization), fill the gel cassette with the prepared resolving gel solution to the mark quickly and gently.

Take care not to generate any bubble while handling gel solutions.

❸ Overlay the gel extremely carefully with water-saturated n-butanol to produce a smooth and completely level surface of the resolving gel. (If applying with distilled water instead, make sure water is not mixed with the gel solution.)

❹ Leave the gel for about 30 minutes until the polymerization is complete. (Time may vary due to the temperature, the freshness of reagents, and the composition.)

❺ Pour out n-butanol, and dry the area above the resolving gel by carefully Inserting a piece of filter paper into the gel cassette (not to touch the resolving gel).

❻ Right after mixing with TEMED and APS (initiating the gel polymerization), fill the gel cassette with the prepared stacking gel solution quickly and gently.

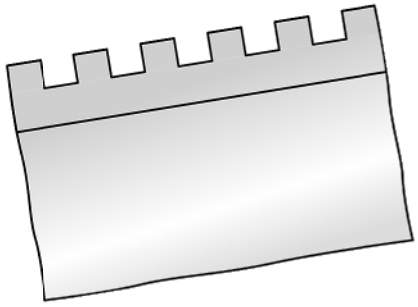
Take care not to generate any bubble while handling gel solutions.

❼ Insert the comb and be careful not to trap any bubble around the comb teeth.

Bubbles around comb teeth would deform wells, and thus affect how samples run. Result Bands may be distorted.

❽ Leave the gel for about 30 minutes until the polymerization is complete.

❾ Release the gel cassette from the casting frame and remove the comb. It is ready for electrophoresis now.



⋙ Sample Preparation

❶ Determine the protein concentration.

❷ Determine how much protein to load (recommended: 10-50 µg/well) with sample buffer[4].

[4] #BR600-25 (5X Protein Sample Buffer: 0.3M Tris-HCl (pH6.8), 50% Glycerol, 10% SDS, 0.5% NaN_3, 5% 2-mercaptoethanol, 0.05% Bromophenol Blue) is recommended.

▸ Capacity of wells:

	Well Width	0.75mm	1mm	1.5mm
10-Well	5.08 mm	33 µL	44 µL	66 µL
15-Well	3.35 mm	20 µL	26 µL	40 µL

❸ Heat the samples in sample buffer at 95-100˚C for 5 minutes for protein reduction and denaturation.

Info. above is for denatured samples and for reference.
Please adjust depending on your applcation.

⋙ Installation of Electrode Assembly

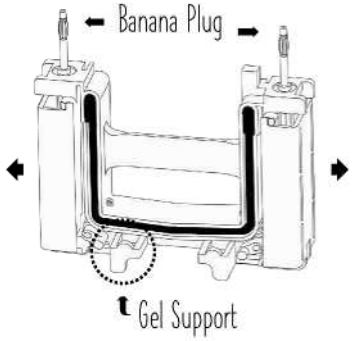
▸ Use **Dummy Plate** if the electrophoresis is proceeded with 1 or 3 gels.

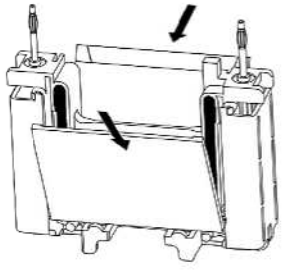
▸ If only 1 or 2 gels are applied, use **vPAGE Electrode Assembly with Banana Plugs** ***only*** and do not leave the electrode assembly w/o banana plugs in the tank. If running with the empty assembly (with no gel cassette), excess heat may be produced and results may be affected.

❶ Place the electrode assembly the bench in a vertically standing position with clamps open.

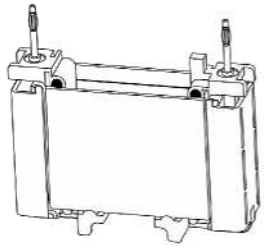
❷ Put the first gel cassette on gel supports while the short glass plate faces inward.

❸ Place the second gel cassette on gel supports of the other side of the electrode assembly, while the short glass plate faces inward. (If applying the dummy plate instead, please read the words on the plate and place accordingly.)

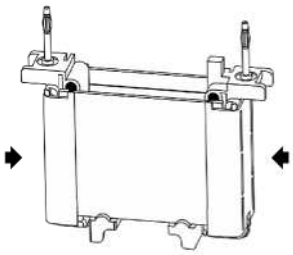




❹ Gently move cassettes (or one cassette and one dummy plate) close to each other, and make sure the top edge of the short plate fits snugly into notches of the U-shaped gasket.



❺ Close clamps of the electrode assembly.



❻ Transfer the assembled electrode assembly into the tank, and place in the correct orientation (the plug with the red circle aligned with ⊕ labeled on the tank, and the plug with the black circle aligned with ⊖ labeled on the tank).

❼ Fill the space between cassettes and the tank with running buffer[5].

[5] #BR150 (0.25M Tris-Base, 1.92M Glycine, 1% SDS, pH 8.3) is recommended.

▸ Volume of Running Buffer:

1-2 Gels	700 mL
3-4 Gels	1000 mL

⋙ Loading and Running Gel

❶ Slowly load samples prepared in sample buffer (as described in Sample Preparation), and the protein marker[6] into wells.

[6] #BR0671 (Prestained Protein Marker, 9-180kD) or #BR1811 (Prestained Protein Marker, 9-245kD) is recommended.

❷ Fill unused wells with 1X sample buffer.

Take care not to damage the gel wells or induce any bubble while loading.

❸ Put the lid with power cables on, and connect to the power supply.

❹ Depending on research needs, run the gel at constant voltage of 100-150 volts for 1-2 hours.

Please adjust depending on your applcation.

≫ Gel Removal

❶ Turn off the power supply when the front of loading dye reaches the bottom of the gel.

❷ Remove the lid and take the electrode assembly out of the tank.

❸ Release the gel cassette from the electrode assembly.

❹ Gently insert the thinner edge of **Gel Releaser** between the short and the plain glass plates, and twist to separate plates.

❺ The gel usually would stay with one of the glass plates, and could be removed by soaking into buffer or deionized water.

❻ Now the gel is ready for coomassie stain, silver stain, electroblotting, and further analysis.

≫ Troubleshooting

Problem	Possible Cause	Soultion
Leakage during Gel Casting	Damged glass plate	Check the integrity of glass plates.
	Misalignment of the short plate and the plain plate	Ensure feet of the casting frame and bottom edges of plates flush on the bench surface.
	Gasket of the casting stand is dirty or damaged	Check the integrity of the gasket.
Difficulty of Closing Casting Frame Clamps	Hinge of the casting frame gets dirty	Clean the casting frame carefully before and after use.
Poorly Formed Gel Wells	Incorrect catalyst used	> Check the composition of APS and TEMED. > Use freshly prepared APS and TEMED.
	Imcomplete polymerization	Try degassing gel solutions.
Longer Time for Running Gel	Concentrated running buffer	> Dilute the buffer. > Use fresh running buffer.
	Excess salt in samples	Desalt samples by dialysis or centrifuge desalting columns.

Problem	Possible Cause	Soultion
Gel Running Unusually Fast	Diluted running buffer	> Concentrate the buffer. > Check the recipe of running buffer.
	High voltage	Lower the voltage.
Bands form a "Smile" across the gel	Temperature on both sides is lower	> Make sure buffers are well mixed while preparing and diluting. > Use fresh buffers.
	High voltage	Lower the voltage.
Bands Smeared Vertically	Too much protein loaded	Load less protein.
	Protein precipitated	Membrane-associated proteins tend to precipate. Remove such proteins from samples, or add more SDS to ensure proteins are well bound.
Wavy Bands	Uneven surface of resolving gel	Cast and overlay the gels carefully.
	Excess salt in samples	Desalt samples by dialysis or centrifuge desalting columns.
Too Many Bands	Protein degradation	> Use fresh lysates. > Keep samples on ice until just before sample buffer addition and boiling. > Include protease inhibitors and phosphatase inhibitors if detecting phosphorylated target.
	Protein isoforms	Check references for further information about samples applied.
	Protein with post-translational modifications	
Too Few Bands	Too few protein loaded	> Load more protein. > Include protease inhibitors in the lysis buffer.
	Proteins have run off the gel	> Decrease the running time. > Lower the voltage. > Increase the acrylamide percentage of the gel.
	Protein degradation	> Use fresh lysates. > Keep samples on ice until just before sample buffer addition and boiling. > Include protease inhibitors in lysis buffer.

⋙ Care and Maintenance

Major components of **v2PAGE** - **vertical electrophoresis systems** are made from polycarbonate, which is not compatible with **acetone**, **ketones**, **ethers**, and **aromatic/chlorinated hydrocarbons**.

In addition, combs are not compatible with **100% TEMED**.

Defects caused by organic reagents are not covered by warranty.

Please contact us for concern of using reagents unmentioned.

⋙ Safety Information

- Please do not try to run without the lid.
- Power shall be off when the lid is opened.

⋙ Ordering Information

Cat. No.	Product Description	Packing
VLID	**vPAGE/v2PAGE/vBLOT2** Lid with Power Cables	1/pk
VPC	Power Cables	1/pk
VTANK	**vPAGE/v2PAGE/vBLOT2** Tank	1/pk
V2PAGE-EBP	**v2PAGE** Electrode Assembly with Banana Plugs	1/pk
V2PAGE-EFP	**v2PAGE** Electrode Assembly w/o Banana Plugs	1/pk
V2PAGE-BP	Banana Plug of **v2PAGE** Electrode Assembly	1/pk
V2PAGE-EC	Clamp of **v2PAGE** Electrode Assembly	2/pk
VPAGE-EU	U-Shaped Gasket of **vPAGE/v2PAGE** Electrode Assembly	2/pk
CAST-STV2	**v2PAGE** Casting Stand	1/pk
CAST-CLIP	Clip of **v2PAGE** Casting Stand	1/pk
CAST-FRV2	**v2PAGE** Casting Frame	1/pk
CAST-STGV2	**v2PAGE** Casting Stand Gasket	5/pk
COMB075-10	Comb of 10-sample, 0.75mm thick	5/pk
COMB075-15	Comb of 15-sample, 0.75mm thick	5/pk

Cat. No.	Product Description	Packing
COMB100-10	Comb of 10-sample, 1mm thick	5/pk
COMB100-15	Comb of 15-sample, 1mm thick	5/pk
COMB150-10	Comb of 10-sample, 1.5mm thick	5/pk
COMB150-15	Comb of 15-sample, 1.5mm thick	5/pk
GP075S	Plain Glass Plate, 10 x 8cm, 0.75mm bonded spacer	5/pk
GP100S	Plain Glass Plate, 10 x 8cm, 1mm bonded spacer	5/pk
GP150S	Plain Glass Plate, 10 x 8cm, 1.5mm bonded spacer	5/pk
SGP	Short Glass Plate, 10 x 7cm	10/pk
DUMMY	Dummy Plate	1/pk
GEL-REL	Gel Releaser	1/pk
GEL-LG	Sample Loading Guide, 10-well	1/pk
GPR	Glass Plate Rack	1/pk
CTR	Centrifuge Tube Rack	1/pk

▸ Related Products:

Cat. No.	Product Description
VPAGE2G075	**vPAGE** - vertical electrophoresis system for ***2 gels, 0.75mm***
VPAGE2G100	**vPAGE** - vertical electrophoresis system for ***2 gels, 1mm***
VPAGE2G150	**vPAGE** - vertical electrophoresis system for ***2 gels, 1.5mm***
VPAGE4G075	**vPAGE** - vertical electrophoresis system for ***4 gels, 0.75mm***
VPAGE4G100	**vPAGE** - vertical electrophoresis system for ***4 gels, 1mm***
VPAGE4G150	**vPAGE** - vertical electrophoresis system for ***4 gels, 1.5mm***
VBLOT2G	**vBLOT$_2$** electroblotting system for ***2 gels***
VBLOT4G	**vBLOT$_4$** electroblotting system for ***4 gels***

⋙ Guarantee and Warranty

***Biomate™* V2PAGE - vertical electrophoresis systems** are for research use only and guaranteed for twelve months from date of receipt.

The warranty does not cover defects caused by:

1) improper use,
2) organic reagents (check Care and Maintenance for further information), or
3) maintenance or repair by non-*Biomate™/ Rainbow Biotech.* Staff.

Please contact the salesperson whom this product is purchased from for any question or concern.

⋙ Contact Information

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