

omniPAGE Maxi and Mini Wide Vertical Electrophoresis Units

Instruction Manual

Catalogue Numbers

VS20WAVESYS

VS20WAVESYS-CU

VS20WAVED

WAVETETRAD

VS10WD

VS10WDSYS

VS10WDSYS-CU

Record the following for your records:

Model _____

Catalogue No. _____

Date of Delivery _____

Warranty Period _____

Serial No. _____

Invoice No. _____

Purchase Order No. _____

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Safety Information



When used correctly, these units pose no health risk. However, these units can deliver dangerous levels of electricity and are to be operated only by qualified personnel following the guidelines laid out in this instruction manual. Anyone intending to use this equipment should read the complete manual thoroughly. The unit must never be used without the safety lid correctly in position. The unit should not be used if there is any sign of damage to the external tank or lid.

These units comply with the following European directives:

**2014/35/EU Low Voltage Directive and 2014/30/UE (official Title 2004/108/EC)
EMC Electromagnetic Compatibility**

By virtue of the following harmonised standards:

BS EN IEC 61010-1: 2010 Safety Testing of Lab Equipment

BS EN IEC 61326-1:2013 EMC Electro Magnetic Compatibility

ROHS DIRECTIVE 2011/65/EU

BS EN 50581:2012 Restriction of Hazardous Substances

Packing List

Each omniPAGE WAVE Maxi unit includes a tank, wired PAGE module, lid, CSL-CAB cables, VS20WAVE-CC Cooling coil and the following items:

SKU	Glass Plates	Combs	Caster
VS20WAVESYS	VS20NG – Notched, Pk/2 VS20PGS1 – Plain with bonded 1mm spacers, Pk/2 VS20-DP – Dummy Plate	2 x VS20-24-1 1mm thick, 24 sample	VS20DCAST -Caster
VS20WAVESYS-CU	As in VS20WAVESYS	As in VS20WAVESYS	VS20DCAST -Caster VS20WAVE-EC – additional casting stand without electrodes
VS20WAVED	As in VS20WAVESYS	As in VS20WAVESYS	None
WAVETETRAD	1 of VS20NG – Notched, Pk/2 2 of VS20PGS1 – Plain with bonded 1mm spacers, Pk/2 1 of VS20NGS1 Notched with 1mm spacer, Pk/2 VS20-DP – Dummy Plate	4 of VS20-24-1 1mm thick, 24 sample	VS20DCAST -Caster VS20WAVE-EC – additional casting stand without electrodes

Each omniPAGE Mini wide unit includes a tank, wired PAGE module, lid, CSL-CAB cables, VS20ICB Cooling pack and the following items:

SKU	Glass Plates	Combs	Caster
VS10WD	VS10WNG - Notched, Pk/2 VS10WPGS1 – Plain with bonded 1mm spacers, Pk/2 VS10W-DP – Dummy Plate	2 of VS20-24-1 1mm thick, 24 sample	None
VS10WDSYS	VS10WNG - Notched, Pk/2 VS10WPGS1 – Plain with bonded 1mm spacers, Pk/2 VS10W-DP – Dummy Plate	2 of VS20-24-1 1mm thick, 24 sample	VS20DCAST
VS10WDSYS-CU	VS10WNG - Notched, Pk/2 VS10WPGS1 – Plain with bonded 1mm spacers, Pk/2 VS10W-DP – Dummy Plate	2 of VS20-24-1 1mm thick, 24 sample	VS20DCAST VS10WEXCASTER – additional casting stand without electrodes

Packing List Checked by: _____

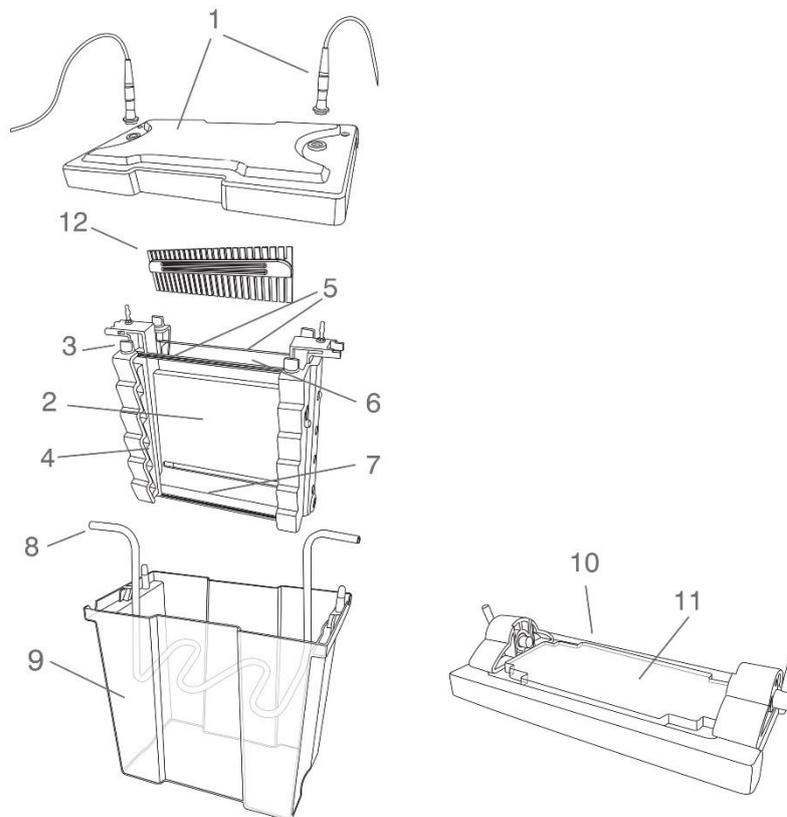
Date: _____

The packing lists should be referred to as soon as the units are received to ensure that all components have been included. The unit should be checked for damage when received.

Cleaver Scientific is liable for all missing or damaged parts / accessories within 7 days after customers have received this instrument package. Please contact Cleaver Scientific immediately regarding this issue. If no response within such period is received from the customer, Cleaver Scientific will no longer be liable for replacement/damaged parts.

Please contact your supplier if there are any problems or missing items.

Specifications



1	Lid and Cables	1500V Rated cables, high impact acrylic lid
2	PAGE Insert	Glass filled Nylon and Acetal construction
3	Clamp Screws	Injection moulded to avoid thread wear
4	Plate Clamps	Injection moulded, provide even pressure across glass plates
5	Glass plates	4mm thick float glass
6	Inner Buffer Chamber	Allows use of separate inner running buffer
7	Electrodes	99.99% pure platinum electrodes
8	Cooling Coil	Can be connected to recirculating chiller
9	Out Buffer Chamber	Injection Moulded High Impact Acrylic
10	Casting Base	Injection Moulded Acetal
11	Casting Mat	Ultra-soft silicone for leak free casting
12	Combs	Lapped Acrylic for high thickness uniformity, also available in polycarbonate

Operating Instructions

Further information (including videos) regarding setting up and running the omniPAGE units can be found at www.cleaverscientific.com

Usage Guidance and restrictions

- Maximum altitude 2,000m.
- Temperature range between 4°C and 65°C.
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- Not for outdoor Use.

This apparatus is rated POLLUTION DEGREE 2 in accordance with IEC 664.

POLLUTION DEGREE 2, states that: "Normally only non-conductive pollution occurs.

Occasionally, however, a temporary conductivity caused by condensation must be expected".

Setting up the omniPAGE Gel Tanks

Fitting Electrode cables

- Note the position of the lid on the unit. This shows the correct polarity and the correct orientation of the cables, black is negative and red positive.
- Remove the lid from the unit. Note if the lid is not removed, fitting the cables may result in un-tightening of the gold plug and damage to the electrode.
- Screw the cables into the tapped holes as fully as possible so that there is no gap between the lid and the leading edge of the cable fitting.
- Refit the lid.

The unit is now ready to be used.

Casting Unit Preparation

Cleaning the Glass Plates

Clean a set of glass plates for each gel first with distilled water and then with 70 % ethanol. One set of glass plates constitutes one notched glass plate and one plain glass plate with bonded spacers.

When using a triple glass plate sandwich, two notched glass plates are required, one set of free spacers and a set of plain glass plates with bonded spacers. The plain glass plate is positioned outermost, then a notched glass plate, free spacers and second notched glass plate. Alternatively, accessory notch glass plates with bonded spacers are available.

Note: All glass plates, gel casting modules, casting base and accessories must be completely dry before the set – up. Wet components are more likely to miss-align and cause leaks.

Gel Cassette Assembly

Assemble the glass plates so that the bottom of the glass plates and the spacers are perfectly aligned.

A triple plate sandwich can be used by combining the standard Notched plate and spacer plate, with an additional notched plate with spacers. For triple plate sandwiches, the free spacers need to be perfectly aligned which is best performed using a small spacer or comb to push the spacers apart. Notched glass plates with bonded spacers do not need manual alignment.

NOTE: The glass plates with bonded spacers have an arrow in the top of the spacers which are slightly longer than the glass plate to indicate the top.

Casting Stand Assembly



1. Ensure that the clamps are adequately open for the thickness of spacer used. The clamps can be opened by loosening the screws and sliding the clamps.



2. Position the Slab Gel Insert on a flat surface. Insert the glass plates into the Slab Gel Insert between the clamps and the white gasket. The Slab Gel Insert contains clamps which impart even pressure onto the glass plates and allow even screw pressure transfer onto the sealing edge of the glass plate, ensuring complete sealing.



3. Fully tighten the screws, making sure not to wobble the unit.

4. When only one gel is being run, the dummy plate must be used in the second position and fully tightened.



5. Position the Slab Gel Insert in the casting base such that the Cam pins have handles pointing downwards and are located in the insert holes. The top of the module may need to be pushed down very slightly to locate the cam pins.

NOTE: At this stage, check that the bottom edges of the spacers and glass plates are perfectly aligned.



6. With the cam pin handles facing directly downwards, turn the cam pins fully through 135° or until the insert has tightened onto the silicone mat.

NOTE: It is best to turn the cams in opposite directions to each other. Do not overturn as this will cause the glass plates to push upwards and the assembly will be more likely to leak. The unit is now ready for gel preparation and pouring.



7. Pour in the gel solution, insert the combs and allow the wells to polymerise. Gel pouring is best performed using a 25ml or 50ml pipette. If using a stacking gel, don't insert combs, allow gel to polymerise, pour stacking gel and then insert combs.

Casting 4 gels

The thicker green sliding gel clamps are recommended to secure up to 2 gels (i.e. 1 gel either side of the PAGE insert) for gels up to a maximum thickness of 2mm. For 4 gels (i.e. 2 gels either side of the PAGE insert: made using 1 plain glass plate and 1 notched glass plate, both with bonded spacers, and 1 notched plate without spacers), the thinner YELLOW sliding gel clamps must be used.

To convert the unit from a 2- to 4-gel configuration please adhere to the following instructions. One completed, proceed with casting as above.



1. To replace the green sliding gel clamps, begin by unscrewing the colour-coded vertical screw pins. There should be no glass plates within the PAGE insert, in the side(s) being unscrewed. Once the screw pins are unscrewed sufficiently the green clamp should sit in the resting slot as shown.



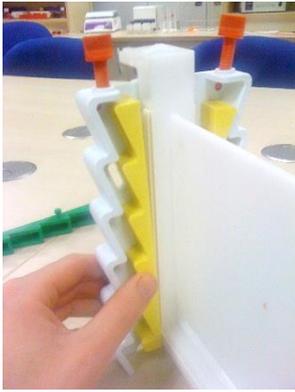
2. Gently push the green sliding clamp horizontally towards the core of PAGE insert until it can move no further.



3. Push the green sliding gel clamp out of the PAGE insert by gently pressing the protruding pin as shown.



4. Once the green sliding gel clamp is removed the PAGE insert is ready to accept the thinner yellow sliding gel clamps for 2-gel sandwiches, either side of the PAGE insert, to convert the WAVE to a 4-gel configuration.



5. Insert the yellow sliding gel clamp into the hole closest to the core of the PAGE insert. Once inserted gently withdraw the sliding clamp outwards away from the core of the PAGE insert as shown.



6. Withdraw the sliding gel clamps so that they sit suspended in the resting slots as shown. Repeat steps 1-6 to replace the remaining green sliding gel clamps. Once complete the PAGE insert is ready for 4-gel assembly.

Gel Preparation

Care should be taken when selecting the pore size of the gel to be used. The pore size or % of gel determines the resolving ability given different sizes of protein.

Gel percentage for various protein sizes are shown below:

Acrylamide Percentage	Separating Resolution
5 %	60 - 220 KD
7.5 %	30 - 120 KD
10 %	20 - 75 KD
12%	17 – 65 KD
15 %	15 -45 KD
17.5%	12 – 30 KD

Gel Volumes

For omniPAGE Maxi

Number of Gels	Volume for 1mm Thick Gel
Single	35 ml
Double	70 ml
4 Gels (2 x Triple plate)	140 ml

For omniPAGE Mini Wide

Number of Gels	Gel Thickness (mm)	Volume (ml)
Single	0.5	8.75
	1	17.5
	1.5	26.3
	2	35
Double	0.5	17.5
	1	35
	1.5	52.5
	2	70
4 Gels (2 x Triple plate)	0.5	35
	1	70
	1.5	105
	2	140

Gel Mixture

Prepare gel solutions as per tables below. These give the volumes of solutions from the standard stock solutions. These should be gently mixed avoiding generation of bubbles which will inhibit polymerization by removing free radicals. The following values are for a 1mm gel for the omniPAGE Maxi, adjust volumes accordingly for other gel sizes.

Resolving Gel:

Solution	5 %	7.5%	10 %	12%	15 %	17.5%
Distilled Water	41ml	35.25ml	29.6ml	24.7ml	17.6ml	11.7ml
30 % Stock Acrylamide Solution	11.7ml	17.6ml	23.5ml	28.2ml	35.25ml	41.1ml
4 X Resolving Tris Solution	17.6ml	17.6ml	17.6ml	17.6ml	17.6ml	17.6ml

Before pouring, add and mix 700 μ l of 10% ammonium persulfate and 70 μ l of TEMED, these are the polymerising agents and will initiate polymerisation of the gel, so must be added only immediately before pouring.

Stacking Gel

Solution	VS20WAVE	VS10W
Distilled Water	16.8ml	8.4ml
30 % Stock Acrylamide Solution	2.6ml	1.3ml
4 X Stacking Gel Tris Solution	6.4ml	3.2ml

Before pouring, add and mix 178 μ l of 10% ammonium persulfate and 17.8 μ l of TEMED for an omniPAGE Maxi gel or 134 μ l of ammonium persulfate and 13.4 μ l of TEMED for an omniPAGE Mini Wide gel. These are the polymerising agents and will initiate polymerisation of the gel, so must be added only immediately before pouring.

Gel Pouring

With Stacking Layer

1. Insert the comb into the glass plates and mark a point on the glass plates 1cm below where the comb teeth finish. This indicates where to add the resolving gel to.
2. Add polymerising agents to the gel solution and mix well but avoid generating air bubbles.

3. Fill the glass plates again avoiding generating any air bubbles. Filling must be performed quickly before the gel becomes too viscous.
4. Overlay the gel carefully with 1 ml of Isobutanol, Isopropanol or distilled water. When using distilled water extra care must be taken to ensure there is no mixing with the gel solution.
5. Let the resolving gel polymerize. Usually this takes around 15 minutes, but this can vary due to the freshness of the reagents used. If polymerization takes a lot longer than this, use fresher stock solutions or add more APS and TEMED.
6. Carefully mix the stacking gel solution, avoiding generating air bubbles.
7. Pour off the overlay liquid from the resolving gel and rinse the gel with distilled water.
8. Add polymerising agents to the stacking gel and pour over the resolving gel.
9. Carefully insert the comb making sure that no air bubbles get trapped under the ends of the comb teeth as these will inhibit sample progression.
10. Allow the stacking gel to polymerize for 30 minutes.

With Stacking Layer

1. Add polymerising agents to the gel solution and mix well but avoid generating air bubbles.
2. Fill the glass plates again avoiding generating any air bubbles. Filling must be performed quickly before the gel becomes too viscous.
3. Carefully insert the comb making sure that no air bubbles get trapped under the ends of the comb teeth as these will inhibit sample progression.
4. Let the resolving gel polymerize. Usually this takes around 15 minutes, but this can vary due to the freshness of the reagents used. If polymerization takes a lot longer than this, use fresher stock solutions or add more APS and TEMED.

Sample preparation and Loading

Denatured sample preparation

The instructions given below are for denatured samples. For Native samples, please consult a laboratory handbook.

1. Prepare the protein samples for loading. The volume of sample depends on the capacity of the wells (See Comb specifications page 28).
2. Using a 0.5 ml micro-centrifuge tube or other convenient receptacle, combine the protein sample and 4 X sample buffer. It is always advisable to use protein markers in one of the end lanes to indicate sizes of bands. These should be prepared according to the manufacturer's instructions.
3. Heat the samples in a water bath or heating block for 2 minutes to denature the samples.
4. Centrifuge the samples in a micro-centrifuge for 20 seconds at 12,000 rpm. The protein samples are now ready to load.

Loading the samples

1. If desired, fit the cooling pack(s) into the end of the tank. These should be pre-frozen and fitted with the longest side positioned sideways with the end(s) of the tank and pressed into the recess. Or these can be fitted down the front of the tank.

NEVER FIT THESE UNDERNEATH THE MODULE IN THE BOTTOM OF THE TANK AS THIS WILL PREVENT THE FLOW OF CURRENT THROUGH THE GEL AND CAUSE SLOW RUNS AND OVER-HEATING.

2. Note one pack is supplied as standard. Additional packs can be purchased.
3. Transfer the Inner gel module containing cast gels into the main tank in the correct orientation as indicated - +ve on the module aligned with +ve on the tank, -ve on the module aligned with -ve on the tank.
4. Fill the outer tank with 1X reservoir buffer.
5. Load the samples into the wells using a pipette tip taking care not to damage the wells or induce any air bubbles.
6. Fill any unused wells with 1X sample buffer.
7. It is a good idea to note the orientation and order the samples were loaded in. This can be done by noting which samples were loaded adjacent to each electrode.

Buffer Volumes

Buffer Volume	VS20WAVE	VS10W
Minimum – Inner tank is filled to above the wells. Outer Tank is filled to just flood the bottom of the glass plates. Cooling potential is at a minimum which may affect resolution.	Total Inner Buffer Chamber: 640ml Outer Tank: 1L	Total Inner Buffer Chamber: 300ml Outer Tank: 500ml
Maximum – Inner tank is filled to above the wells. Outer Tank is filled to the maximum fill line. Cooling is high offering good resolution of samples. This may be further enhanced by using the cooling coil	Total Inner Buffer Chamber: 640ml Outer Tank for 2 gels: 5.4L Outer Tank for 4 gels: 4.8L	Total Inner Buffer Chamber: 300ml Outer Tank for 2 gels: 2.8L Outer Tank for 4 gels: 2.3L

Gel Running

1. Fit the lid and connect to a power supply.
2. Consult the below table for details on recommended power supply voltage settings.
3. Turn the power supply off when the loading dye reaches the bottom of the gel, sooner if your proteins are below 4Kd in size.
4. Remove the gel running module, first emptying the inner buffer into the main tank. Buffer can be re-used but this may affect run quality if continued.
5. Unscrew the glass plates and gently pry apart the glass plates. The gel will usually stick to one of the plates and can be removed by first soaking in buffer and then gently lifting with a spatula.
6. The gel is now ready to be stained with Coomassie or silver stain or the proteins in the gel can be transferred to a membrane by electroblotting for specific band identification and further analysis.

Recommended Voltages for 1mm thick, 12% gels.	VS20WAVE	VS10WD
2-4 gels	Constant Voltage 250V 6 Hours	Constant Voltage 125V 1 Hour

We recommend that for any new sample, a time course experiment is performed to obtain the optimal running conditions.

Connecting a recirculating chiller

Vertical PAGE may sometimes result in high currents. High current may cause the build-up of heat which can affect sample migration and gel resolution as a result. To counteract the adverse effects of heat generation, the manufacturer recommends using an effective chiller unit, such as the CSL-CHILLER, pre-set to 4°C.

1. For active temperature regulation attach two short lengths of hose from the inlet and outlet ports of the chiller unit to the respective outlet and inlet connectors of the cooling coil sitting within the WAVE outer tank.
2. Ensure that the flow rate of the chiller unit is set at an acceptable value by first testing with the cooling coil outside of the electrophoresis tank.

The unit is now ready to be used with active cooling.

Solutions (For SDS-PAGE)

Stock 30% Acrylamide Gel Solution:

30.0 g acrylamide

0.8 g methylene bisacrylamide

Distilled Water to 100ml

Stock 4 X Resolving Gel Tris (1.5 M Tris·HCl pH8.8, 0.4 % SDS)

To 110ml Distilled Water add 36.4 g of Tris base

Add 8ml of 10 % SDS

Adjust pH to 8.8 with 1N HCl

Adjust the final volume to 200ml with Distilled Water.

Stock 4 X Stacking Tris (0.5 M Tris·HCL pH6.8, 0.4 % SDS)

To 110ml Distilled Water add 12.12 g of Tris base

Add 8ml of 10 % SDS

Adjust pH to 6.8 with 1N HCl

Add Distilled Water to a final volume of 200ml

Stock 4 X Tris-glycine tank buffer - SDS

36 g Tris base

172.8 g glycine

Distilled Water to 3 L

1 x Tris-glycine tank buffer - SDS

750ml of 4 X Tris-glycine reservoir buffer - SDS

30ml of 10 % SDS

Distilled Water to 3L

10 % AP (ammonium persulphate solution)

0.1 g ammonium persulphate

1ml Distilled Water

TEMED

Stock 4 X Sample Buffer

4ml glycerol

2ml 2-mercaptoethanol

1.2 g SDS

5ml 4 X Stacking Tris

0.03 g Bromophenol blue

Aliquot into 1.5ml micro centrifuge tubes. Store at -20°C.

References

1. Sambrook, Fritsch, and Maniatis, Molecular Cloning A Laboratory Manual, Second Edition, Cold Spring Harbor Laboratory Press, 1989.
2. Current Protocols in Molecular Biology, Greene Publishing Associates and Wiley-Interscience, 1989.

Troubleshooting

Problem: Sample Preparation	Cause	Solution
Laemmli sample buffer turns yellow	Sample buffer too acidic	Add Tris base until buffer turns blue again.
Sample very viscous	High DNA or carbohydrate content	Fragment DNA with ultrasonic waves during cell lysis and protein solubilization. Add endonucleases (for each benzonases). Precipitate protein with TCA/acetone to diminish carbohydrate content.
Problem: Gel casting and sample loading	Cause	Solution
Poor well formation	Incorrect catalyst used Monomer solution not degassed (oxygen inhibits polymerization)	Prepare Fresh catalyst solution. Increase catalyst concentration of stacking gel to 0.06% APS and 0.12% TEMED. Degas monomer solution immediately prior to casting stacking gel.
Webbing; excess acrylamide behind the comb	Incorrect catalyst concentration	Prepare fresh catalyst solution. Increase catalyst concentration of stacking gel to 0.06% APS and 0.12% TEMED.
Gel does not polymerize	Too little or too much APS or TEMED Failure to degas Temperature too low Poor quality acrylamide or bis Old APS	Use 0.05% APS and 0.05% TEMED. Degas monomer solutions 10-15min. Cast at room temperature, warming glass plates if necessary. Use electrophoresis-grade reagents Prepare fresh APS.
Swirls in the gel	Excess catalysts; polymerization time < 10min Gel inhibition; polymerization time >2hr	Reduce APS and TEMED by 25% each. Increase APS and TEMED by 50%; degas.
Gel feels soft	Low %T Poor quality acrylamide or bis Too little cross-linker	Use different %T. Use electrophoresis-grade reagents. Use correct %C.
Gel turns white	Bis concentration too high	Check solutions or weights.
Gel brittle	Cross-linker too high	Use correct % cross-linker
Sample floats out of the well	Sample is not dense enough Pipetting, loading error	Induce 10% glycerol in sample to make it denser than surrounding buffer. Slowly pipet sample into well. Do not squirt sample quickly into well as it may bounce off bottom or sides and flow into next well. Do not pipet tip from well before last of sample has left the tip.
Problem: Electrophoresis	Cause	Solution
Current zero or less than expected and samples do not migrate into gel	Tape at the bottom of precast gel cassette not removed Insufficient buffer in inner buffer chamber	Remove tape. Fill buffer chamber with running buffer.

	Insufficient buffer in outer buffer chamber Electrical disconnection	Fill inner and outer buffer chambers to ensure wells are completely covered. Check electrodes and connections.
Gels run faster than expected	Running buffer too concentrated and gel temperature too high; incorrect running buffer concentration or type used Running or reservoir buffer too dilute Voltage too high	Check buffer composition and type. Check buffer protocol and concentrate if necessary. Decrease voltage by 25-50%.
Gels run slower than expected	Incorrect running buffer composition or type Excessive salt in sample	Check buffer composition and type. Desalt sample.
Problem: Total Protein Staining	Cause	Solution
Bands not visible	No protein in gel Imaging system malfunctioning Incorrect imaging parameters were used	Stain with another method to confirm there is protein. Check instrument manual for troubleshooting or contact imaging instrument manufacturer. Check Instrument manual.
Poor staining sensitivity	Dirty staining trays Insufficient stain volume Insufficient staining time Reuse of staining solution	Clean staining trays and other equipment with laboratory glassware cleaner. Follow recommendations for stain volume (appropriate to gel size). Increase staining time. Repeat staining protocol with fresh staining solution.
High or uneven background staining	Staining trays or equipment dirty Too much time in staining solution Reagent impurities	Clean staining trays and other equipment with laboratory glassware cleaner. Restrict duration of incubation in staining solutions as recommended in protocol. Wash gel in water or retrospective destaining solution for >30min. Use high-purity water and reagents for staining.
Speckles or blotches in gel image	Particulate material from reagents, staining tray, dust or gloves	Clean staining trays thoroughly. Decrease time that gels and staining solution are exposed to open air. Use dust-free gloves and handle gels only by edges.
Uneven staining	Insufficient shaking during staining	Agitate gel during staining.
Gel shrinkage	Gel dehydrated	Transfer gel to water for rehydration.
Problem: Evaluation of Separation	Cause	Solution
Diffuse or broad bands	Poor quality acrylamide or bis-acrylamide incomplete polymerization Old SDS or sample buffer Gel temperature too high	Use electrophoresis-grade reagents. Check polymerization conditions. Prepare fresh solutions. Use external cooling during run or run out a lower voltage.
Bands 'smile' across gel, band pattern curves upward at both sides of gel	Excess heating of gel; centre of gel runs hotter than either end	Check buffer composition; buffer not mixed well, or buffer in upper chamber too concentrated.

	<p>Power conditions excessive</p> <p>Insufficient buffer</p>	<p>Prepare new buffer, ensuring thoroughly mixing, especially when diluting 5x or 10x stock. Do not exceed recommended running conditions. Decrease power setting from 200V to 150V or fill lower chamber to within 1 cm of top of short plate.</p> <p>Fill inner and outer buffer chambers to ensure that wells are completely covered.</p>
Smiling or frowning bands with gel lane	<p>Overloaded proteins Sample preparation/ buffer issues</p> <p>Incorrect running conditions</p>	<p>Load less protein.</p> <p>Minimize salts, detergents and solvents in sample preparation and sample buffers.</p> <p>Use correct voltage.</p>
Skewed or distorted bands, lateral band spreading	<p>Excess salt in samples</p> <p>Ionic strength of sample lower than that of gel Insufficient sample buffer or wrong formulation Diffusion prior to turning on current</p> <p>Diffusion during migration through stacking gel Uneven gel interface</p>	<p>Remove salts, from sample by dialysis or desalting column prior to sample preparation. Use same buffer in samples as in gel.</p> <p>Check buffer composition and dilution instructions.</p> <p>Minimize time between sample application and power start-up.</p> <p>Increase %T of stacking gel to 4.5% or 5%T.</p> <p>Increase current by 25% during stacking.</p> <p>Decrease polymerization rate.</p> <p>Overlay gels carefully.</p> <p>Rinse wells after removing comb to remove residual acrylamide.</p>
Vertical streaking	<p>Overloaded samples</p> <p>Sample precipitation</p>	<p>Dilute sample.</p> <p>Selectively remove predominant protein in sample (fractionate).</p> <p>Reduce voltage by 25% to minimize streaking.</p> <p>Centrifuge samples to remove particulate prior to sample loading.</p> <p>Dilute sample in sample buffer.</p>
Fuzzy or spurious artefactual bands	Concentration of reducing agent too low	Use 5% BME or 1% DTT.
Protein bands do not migrate down as expected	Bands of interest may be neutral or positively charged in buffer used; pH of bands must be -2pH units more negative than pH of running buffer	Use SDS-PAGE or a different buffer system in native PAGE or IEF.

Care and Maintenance

Cleaning Vertical Units

Units are best cleaned using warm water and a mild detergent. **Water at temperatures above 60°C can cause damage to the unit and components.**

The tank should be thoroughly rinsed with warm water or distilled water to prevent build-up of salts, but care should be taken not to damage the enclosed electrode and vigorous cleaning is not necessary or advised.

Air drying is preferably before use.

The units should only be cleaned with the following:

Warm water with a mild concentration of soap or other mild detergent.

Compatible detergents include dishwashing liquid, Hexane and Aliphatic hydrocarbons

The units should not be left to in detergents for more than 30 minutes.

The units should never come into contact with the following cleaning agents, these will cause irreversible and accumulative damage:

Acetone, Phenol, Chloroform, Carbon tetrachloride, Methanol, Ethanol, Isopropyl alcohol, Alkalis.

RNase Decontamination

This can be performed using the following protocol:

Clean the units with a mild detergent as described above.

Wash with 3% hydrogen peroxide (H₂O₂) for 10 minutes.

Rinsed with 0.1% DEPC-(diethyl pyro carbonate) treated distilled water,

Caution: DEPC is a suspected carcinogen. Always take the necessary precautions when using.

RNaseZAP™ (Ambion) can also be used. Please consult the instructions for use with acrylic gel tanks.

Ordering information

Catalogue No.	Product Description
VS10WD	omniPAGE Mini Wide, 20 x 10cm Dual, 2 sets of Glass Plates with 1mm thick bonded Spacers, 2 x 24 sample, 1mm thick combs, cooling pack
VS10WDSYS	omniPAGE Mini Wide, 20 x 10cm Dual, 2 sets of Glass Plates with 1mm thick bonded Spacers, 2 x 24 sample, 1mm thick combs, cooling pack including caster
VS10WDSYS-CU	omniPAGE Mini Wide, 20 x 10cm Dual, 2 sets of Glass Plates, 1mm thick bonded Spacers, 2 x 24 sample, 1mm thick combs including caster, External casting upstand
VS10WEXCASTER	VS10W External Casting Stand - No Casting Base
VS20CAST	20 x 10cm Casting Base
VS20DCASTM	Replacement Silicone Mat for 20 x 10cm Casting Base
VS10WDIRM	Inner Running Module
VS20-x -LG	Loading guides for omniPAGE mini combs, x = comb well number
VS10WNG	20 x 10cm Notched Glass Plates 4mm thick (pk/2)
VS10WPG	20 x 10cm Plain Glass Plates 4mm thick (pk/2)
VS10WNGS0.75	20 x 10cm Notched Glass Plates with 0.75mm Bonded Spacers (pk/2)
VS10WPGS0.75	20 x 10cm Plain Glass Plates with 0.75mm Bonded Spacers (pk/2)
VS10WNGS1	20 x 10cm Notched Glass Plates with 1mm Bonded Spacers (pk/2)
VS10WPGS1	20 x 10cm Plain Glass Plates with 1mm Bonded Spacers (pk/2)
VS10WPGS1.5	20 x 10cm Plain Glass Plates with 1.5mm Bonded Spacers (pk/2)
VS10WPGS2	20 x 10cm Plain Glass Plates with 2mm Bonded Spacers (pk/2)
VS10WDP	Dummy Plate, 20 x 10cm
RPW-0.2	Replacement Platinum Wire - 0.2mm, 50cm
VS20ICB	Maxi Cooling Pack
VS20WAVESYS	VS20WAVE Maxi, 20 x 20cm Dual with Glass Plates with bonded 1mm thick spacers, 2x 24 sample combs, cooling coil, dummy plate and Casting Base
VS20WAVESYS-CU	VS20WAVE Maxi, 20 x 20cm Dual, 2 sets of Glass Plates, 1mm thick bonded Spacers, 2 x 24 sample, 1mm thick combs, cooling coil, dummy plate; includes caster and External casting upstand
VS20WAVE-EC	VS20WAVE External Casting Stand - No Casting Base
VS20DCAST	20 x 20cm Dual Casting Base
VS20DCASTM	Replacement Silicone Mat for 20 x 20cm Casting Base
VS20WAVEDIRM	PAGE insert
VS20WAVE-CC	Detachable Cooling Coil
VS20-x -LG	Loading guides for omniPAGE maxi combs, x = comb well number

VS20NG	20 x 20cm Notched Glass Plates 4mm thick (pk/2)
VS20PG	20 x 20cm Plain Glass Plates 4mm thick (pk/2)
VS20NGS0.75	20 x 20cm Notched Glass Plates with 0.75mm Bonded Spacers (pk/2)
VS20PGS0.75	20 x 20cm Plain Glass Plates with 0.75mm Bonded Spacers (pk/2)
VS20NGS1	20 x 20cm Notched Glass Plates with 1mm Bonded Spacers (pk/2)
VS20PGS1	20 x 20cm Plain Glass Plates with 1mm Bonded Spacers (pk/2)
VS20PGS1.5	20 x 20cm Plain Glass Plates with 1.5mm Bonded Spacers (pk/2)
VS20PGS2	20 x 20cm Plain Glass Plates with 2mm Bonded Spacers (pk/2)
VS20DP	Dummy Plate, 20 x 20cm
VS20S0.75	20cm Spacers - 0.75mm (pk/2)
VS20S1	20cm Spacers - 1mm thick (pk/2)
VS20S1.5	20cm Spacers - 1.5mm thick (pk/2)
VS20S2	20cm Spacers - 2mm thick (pk/2)
VS20WAVE-IEFKIT	IEF Conversion for 18cm IPG strips and tube gels, includes: 1 set of plain glass plates with bonded spacers, 0.6x20cm (WxH); and 2x 2-D combs with one 3.5mm marker lane and one 18cm preparatory well
RPW-0.2100	Replacement Platinum Wire - 0.2mm, 100cm

Comb options

Catalogue No.	Thickness	Sample Number	Sample Volume μ l per well
VS20-1-0.75	0.75	1	1100
VS20-5-0.75	0.75	5	160
VS20-10-0.75	0.75	10	80
VS20-18MC-0.75	0.75	18	40
VS20-24-0.75	0.75	24	30
VS20-30-0.75	0.75	30	25
VS20-36-0.75	0.75	36	20
VS20-48-0.75	0.75	48	15
VS20-1-1	1	1	1500
VS20-5-1	1	5	200
VS20-10-1	1	10	100
VS20-18MC-1	1	18	50
VS20-24-1	1	24	40
VS20-30-1	1	30	35

VS20-36-1	1	36	25
VS20-48-1	1	48	20
VS20-1-1.5	1.5	1	2200
VS20-5-1.5	1.5	5	320
VS20-10-1.5	1.5	10	160
VS20-18MC-1.5	1.5	18	80
VS20-24-1.5	1.5	24	60
VS20-30-1.5	1.5	30	50
VS20-36-1.5	1.5	36	40
VS20-48-1.5	1.5	48	30
VS20-1-2	2	1	3000
VS20-5-2	2	5	400
VS20-10-2	2	10	200
VS20-18MC-2	2	18	100
VS20-24-2	2	24	80
VS20-30-2	2	30	70
VS20-36-2	2	36	50
VS20-48-2	2	48	40

MC denotes multichannel pipette spacing

Related Products

Catalogue No.	Product description
CSL-PPL	CSL Pink Plus Prestained Protein Ladder, 10-175kDa, with 10, 40 & 90kDa reference bands, 1x 500µL vial.
CSL-BBL	CSL BLUE Wide Range Prestained Protein Ladder, 10-245kDa, with 25 & 75kDa reference bands, 1x 500µL vial.
CSL-TGSDSP	Powdered Tris-Glycine-SDS Running buffer - 10 Pouches(10 litres/pk)
CSL-TGP	Powdered Tris-Glycine Running buffer - 10 Pouches(10 litres/pk)
CSL-TTSDSP	Powdered Tris-TRICINE-SDS Running buffer - 10 Pouches(10 litres/pk)
CSL-MSDSP	Powdered MOPS-SDS buffer Running buffer - 10 Pouches(10 litres/pk)
TG10X1L	Cleaver Buffer Tris-Glycine 10 x 1litre
TG10x5L	Cleaver Buffer Tris-Glycine 10 x 5litre
TG-SDS10X1L	Cleaver Buffer Tris-Glycine SDS 10 x 1litre
TG-SDS10X5L	Cleaver Buffer Tris-Glycine SDS 10 x 5litre

CSL-GELX4	4mm x 1mm, Gel Cutting Tips, 250/ bag
CSL-GELX4RACK	4mm x 1mm, Gel Cutting Tips, 5 racks of 48
CSL-GELX6.5	6.5mm x 1mm, Gel Cutting Tips, 250/ bag
CSL-GELX6.5RACK	6.5mm x 1mm, Gel Cutting Tips, 5 racks of 48
POWERPRO300	Power Supply MIDI 300V 700mA 150W - 110/230V
POWERPRO500	Power Supply MAXI 500V 800mA 200W - 110/230V
VS10BI	omniBlot Mini Insert - including 4 cassettes, 16 foam pads
VS10DCI	omniPAGE Mini Tube Gel Insert - including 10 glass tubes
OMNIDOCIPROSAFE	OMNIDOC-i plus Blue LED Epi-illumination Module (OMNIDOC-BL), and 520, 560 & 580nm filters (OMNIDOC-SYBR, -AF560 & -AF580); and White Light Table (OMNIDOC-WLT)
CVS10CBS	Complete system for Mini Vertical Electrophoresis & Blotting including: Vertical unit, Blotting insert & accessories. CLAMP VERSION.
SB10	OmniBlot Mini, 10 x 10cm Blotting System, including 4 cassettes
SB20	OmniBlot Maxi, 20 x 20cm Blotting System, including 4 cassettes
CV20	Cleaver Pipette - Volume; 2 - 20ul
CSLVORTEX	Cleaver Vortex Mixer with general purpose head, 230V
CSLQSPIN	Mini Centrifuge complete with 1.5/2.0 ml rotor, strip tube rotor, 0.5 and 0.4 ml adapters, 230V, Purple lid
TCDB-01	The Cube Dry Bath Incubator (one block unit); without block 220V
CSL-UVCAB	UV sterilisation cabinet with timer, four UV lights and white light, no Tray - 230V
SD20	Semi Dry Maxi, 20 x 20cm System
CVS10D	omniPAGE Mini, 10 x 10cm Dual, 2 sets of Glass Plates, 1mm thick bonded Spacers, 2 x 12 sample, 1mm thick combs. CLAMP VERSION
CVS10DSYS	omniPAGE Mini, 10 x 10cm Dual, 2 sets of Glass Plates, 1mm thick bonded Spacers, 2 x 12 sample, 1mm thick combs including caster. CLAMP VERSION
CVS10PRE	omniPAGE Mini, 10 x 10cm Dual. No accessories. CLAMP VERSION
CVS10DSYS-CU	omniPAGE Mini, 10 x 10cm Dual, 2 sets of Glass Plates, 1mm thick bonded Spacers, 2 x 12 sample, 1mm thick combs including caster. CLAMP VERSION, External casting upstand

Warranty

The Cleaver Scientific Ltd. (CSL) omniPAGE Horizontal Electrophoresis units have a warranty against manufacturing and material faults of twelve months from date of customer receipt.

If any defects occur during this warranty period, CSL will repair or replace the defective parts free of charge.

This warranty does not cover defects occurring by accident or misuse or defects caused by improper operation.

Units where repair or modification has been performed by anyone other than CSL or an appointed distributor or representative are no longer under warranty from the time the unit was modified.

Units which have accessories or repaired parts not supplied by CSL or its associated distributors have invalidated warranty.

CSL cannot repair or replace free of charge units where improper solutions or chemicals have been used. For a list of these please see the Care and Maintenance subsection.

If a problem does occur, then please contact your supplier or Cleaver Scientific Ltd:

Cleaver Scientific Ltd.

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Rugby, Warwickshire, CV22 7DH

Tel: +44 (0)1788 565300

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