Adjustable Vertical Electrophoresis System

Models ADJ1, ADJ2 and ADJ3

Operating and Maintenance Manual 7217023 Rev. 0

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Owl
Separation Systems

MANUAL NUMBER 7217023

REV	ECR/ECN	DATE	DESCRIPTION	By
0	--	4/30/12	Transfer to Marietta (was The Giraffe 10/2002)	ccs

Important Read this instruction manual. Failure to read, understand and follow the instructions in this manual may result in damage to the unit, injury to operating personnel, and poor equipment performance. ▲

Caution All internal adjustments and maintenance must be performed by qualified service personnel. ▲

Warning To avoid the risk of personal shock, always disconnect the gel box from the power supply. Further, the power supply must be equipped with a shut-down-on-disconnect circuit. Running conditions for this unit should not exceed the name plate readings found on the lower buffer chamber. Do not move the unit unless the power source to the unit has been disconnected.

Statement of Proper Use: Use this product only for its intended purpose as described in this manual. Do not use this product if the power leads are damaged or if any of its surfaces are cracked.

This Owl System is designed to meet IEC 1010-1 safety standards (IEC 1010-1 is an internationally accepted electrical safety standard for laboratory instruments).

Material in this manual is for information purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo be held liable for any damages, direct or incidental, arising out of or related to the use of this manual.

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Important operating and/or maintenance instructions. Read the accompanying text carefully.

Potential electrical hazards. Only qualified persons should perform procedures associated with this symbol.

Equipment being maintained or serviced must be turned off and locked off to prevent possible injury.

Hot surface(s) present which may cause burns to unprotected skin, or to materials which may be damaged by elevated temperatures.

Marking of electrical and electronic equipment, which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005.

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the WEEE symbol. Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State European Country, and this product should be disposed of or recycled through them. Further information on Thermo's compliance with this directive, the recyclers in your country and information on Thermo products will be available at www.thermofisher.com.

- ✔ Always use the proper protective equipment (clothing, gloves, goggles, etc.)
- ✔ Always dissipate extreme cold or heat and wear protective clothing.
- ✔ Always follow good hygiene practices.
- ✔ Each individual is responsible for his or her own safety.

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Our **Sales Support** staff can provide information on pricing and give you quotations. We can take your order and provide delivery information on major equipment items or make arrangements to have your local sales representative contact you. Our products are listed on the Internet and we can be contacted through our Internet home page.

Our **Service Support** staff can supply technical information about proper setup, operation or troubleshooting of your equipment. We can fill your needs for spare or replacement parts or provide you with on-site service. We can also provide you with a quotation on our Extended Warranty for your Thermo Scientific products.

Whatever Thermo Scientific products you need or use, we will be happy to discuss your applications. If you are experiencing technical problems, working together, we will help you locate the problem and, chances are, correct it yourself...over the telephone without a service call.

When more extensive service is necessary, we will assist you with direct factory trained technicians or a qualified service organization for on-the-spot repair. If your service need is covered by the warranty, we will arrange for the unit to be repaired at our expense and to your satisfaction.

Regardless of your needs, our professional telephone technicians are available to assist you Monday through Friday from 8:00 a.m. to 6:00 p.m. Eastern Time. Please contact us by telephone or fax. If you wish to write, our mailing address is:

Thermo Fisher Scientific
401 Millcreek Road, Box 649
Marietta, OH 45750

International customers, please contact your local Thermo Scientific distributor.

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Section 1 General Information

The Adjustable Vertical Electrophoresis Systems are versatile systems that allow a range of gel lengths to be run on a single apparatus. Three systems with fixed widths are available. The height of the upper buffer chamber can be adjusted up or down by sliding it along the two support poles. Accessories such as heat sinks, glass, spacers and combs are available. Custom items can be manufactured for most applications.

Unpack and Inventory Your Order

Before set-up, unpack the unit and inventory your order. If any parts are missing or damaged, contact Technical Services within 48 hours of receipt.

Reference the order or catalog number on your invoice and check the corresponding parts list.

Table 1-1. Specifications

Unit	ADJ-1	ADJ-2	ADJ-3
Glass size	16cm W x 14-40cm L	20cm W x 20-70 cm L	35cm W x 20-80cm L
Overall dimensions	48cm H x 23cm W x 25cm D	78cm H x 28cm W x 25cm D	86cm H x 41cm W x 25cm D
Buffer volume	500ml	900ml	1800ml

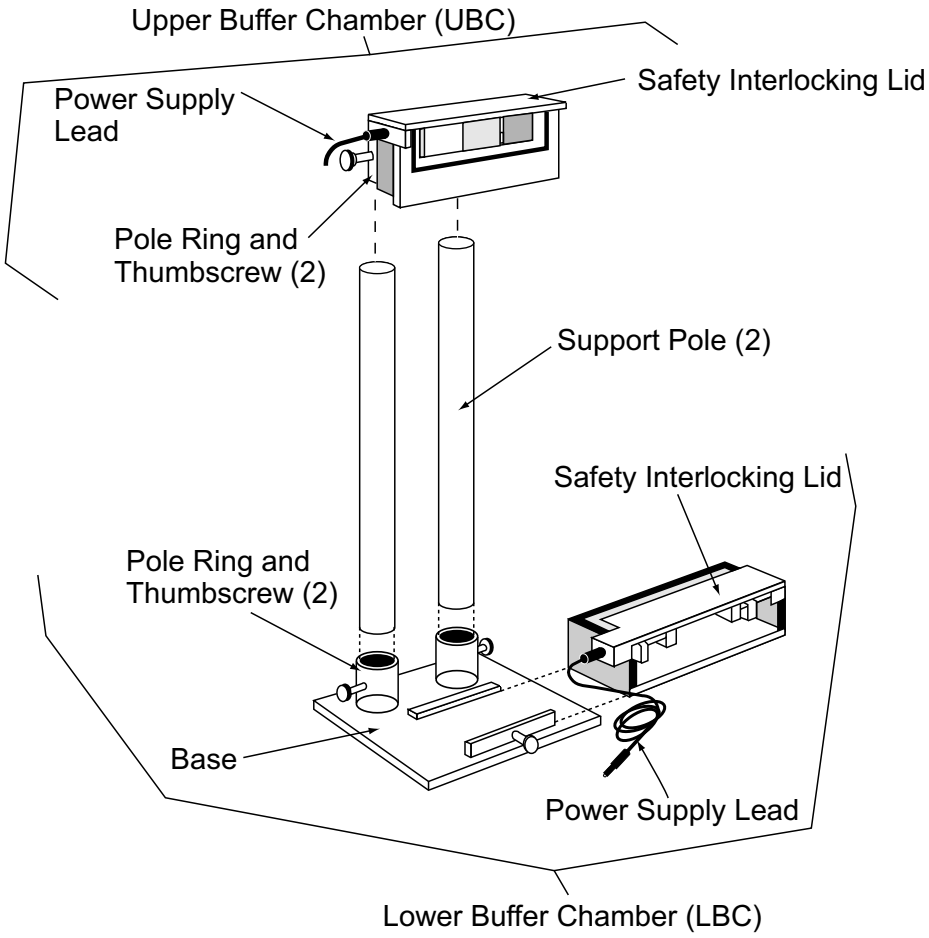

Figure 1-1. Exploded Parts Diagram

Parts List

Base with Attached Pole Rings

Heavy-Duty Support Poles (2)

Removable Lower Buffer Chamber with Safety Interlocking Lid and Attached Power Supply Lead

Removable Upper Buffer Chamber with Safety Interlocking Lid and Attached Power Supply Lead

Section 2 Setting Up

1. Place the two support poles in the rings on the base and secure the pole using the thumbscrews located on the pole ring.

2. Slide the upper buffer chamber down onto the support poles through the attached pole rings on the back of the upper buffer chamber. Adjust to desired height and secure by tightening thumbscrews.

3. Slide the lower buffer chamber into position between the attached positioning bar and thumbscrew on the positioning bar, assembly on the base, and tighten thumbscrew to secure.

Section 3 Using the System

1. After casting the appropriate size gel, slide open the lids of the upper and lower buffer chambers. Place the bottom of the gel assembly in the lower buffer chamber.

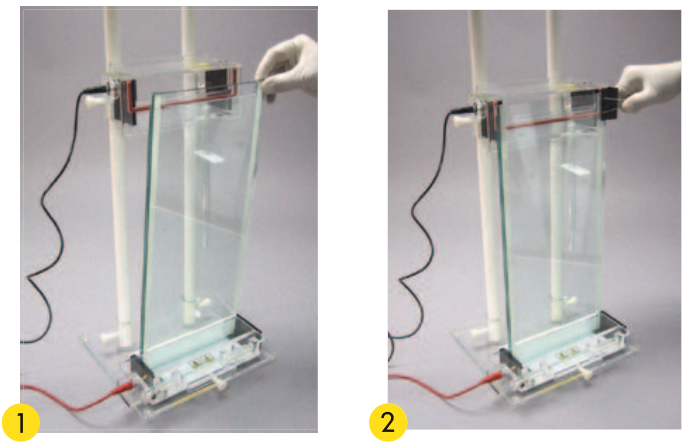

Figure 3-1. System in Use

2. Press the gel assembly against the silicone gasket on the upper buffer chamber. The notched or offset glass should be facing the upper buffer chamber and the long blank plate should be facing outwards. The top of the plates should be even with the top of the upper buffer chamber where the lid and chamber come in contact with each other. If the upper buffer chamber is not at the correct height, readjust this by moving it up or down the poles and tightening thumbscrews on the back of the upper buffer chamber to secure it in place.

3. Secure plates to the upper buffer chamber with binder clamps or heavy-duty pony clamps. A leak-proof seal will form between the glass and the gasket. The upper buffer chamber gasket will appear slightly flat against the plates when assembled correctly. If the seal does not appear, tighter binder clamps may be needed or the gasket may have become unseated. In this case, remove the upper buffer chamber gasket, wash and inspect it, and then carefully reseat it in its groove. Do not stretch the gasket as it is seated in the groove. If using an aluminum heatsink, attach to the notched or offset side of the cassette with clamps.

(continued)

4. Fill the upper and lower buffer chambers with running buffer and slide the safety lids closed.

5. Load samples, pre-running beforehand, if necessary. To connect the unit to the power supply, use the power supply leads attached to the UBC lid and LBC lid.

Section 4 Finishing Up

1. When finished, turn off the power supply and disconnect the unit.

2. Clean the unit by rinsing thoroughly with distilled water to remove all buffer. See Care and Cleaning section for additional cleaning information.

Notes:

The required voltage is dependent upon the selected method of electrophoresis being used. Refer to your specific protocol to determine the voltage or current required.

An aluminum heat sink may be used when running sequencing gels on this apparatus. This is an aluminum plate clamped to the back of the notched or offset plates. It is used to evenly distribute the heat generated during electrophoresis across the gel. Even heat distribution yields superior results and flatter banding patterns.

Section 5 Technical Tips

Glass

BLANK

The plate which faces you during electrophoresis. All gel assemblies require one piece of blank glass.

NOTCHED

The plate which faces the chamber during electrophoresis. Spacers are placed over the "ears" of the plate when casting vertical gels. Buffer accesses the gel between the ears.

OFFSET

Offset plates may be used in place of notched plates. They require sponge tips mounted on the spacers. Sponge tips take the place of the "ears", and prevent buffer from running out of the upper buffer chamber from the sides.

FROSTED

Frosted plates are used for vertical agarose electrophoresis. One side of the plate has a rough surface to prevent agarose from sliding down.

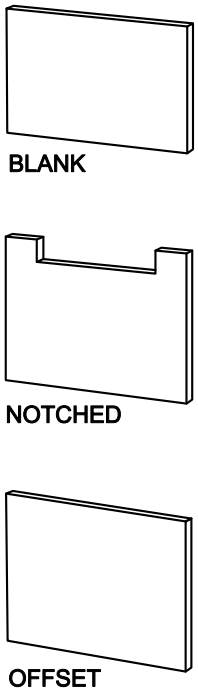

Figure 5-1. Glass

Spacers

STANDARD

Protein spacer sets include two side spacers and one bottom spacer. Spacers and combs must be of identical thickness to be used together.

WEDGE

Linear wedge spacers (0.4 - 0.8mm) provide a current gradient allowing a single percent gel to separate disparate sized DNA fragments.

Reagent Information

Running Buffer - Tris Glycine with SDS (TGS Buffer)
Tris - 3.0285g/L
Glycine - 14.4g/L
SDS - 1.0g/L
pH 8.3 (Laemmli, 1970)
q.s. to 1L
Note For Native Protein Electrophoresis, omit SDS.

Table 5-1. Sample Buffer

2X Concentration Stock		/L	/10 mL	Final Concentration With Sample*
2%	SDS	20g	0.2	1%
10%	BME	10mL	0.1	5%
250mM	Tris	6.057g	.0606g	125mM
30%	Glycerol	300 mL	3 mL	15%
0.002%	Bromo Phenol Blue	.02g	.0002g	0.001%

** add sample buffer 1:1 with sample solution.*

Caution 2X Sample Buffer containing 2-mercaptoethanol should be prepared in a fume hood. 0.2M (final concentration) Dithiothreitol (DTT) may be used in place of 2-mercaptoethanol. ▲

Acrylamide

Table 5-2. Gel Preparation (Polyacrylamide DNA Sequencing)

Description . . . . . .Amount
Acrylamide . . . . . .5 g
Bisacrylamide . . . . . .0.2 g
Urea . . . . . .50 g
5x TBE buffer 20ml
Adjust to final 100ml volume. Add 0.2ml 10% (w/v) APS and 0.07 ml TEMED.

Section 6 Troubleshooting

Problems with Sequencing Gels

Problem	The comb feels loose
Solution	Try clamping across the top of the plates while the gel polymerizes. This will allow the gel to polymerize more tightly around the comb.
	These problems are usually caused by glass variability. Owl uses the highest quality glass available but these variations still exist. Glass can also be warp over time.
Problem	The bands are frowning
Solution	This may be caused by imperfections in the flatness of the glass plate. Because of the way glass plates are made, one side of the glass is usually flatter than the other. Mark one side of the glass with a lab marker, and try running the gel with the other side of the plate facing the acrylamide. If this doesn't solve the problem, the entire plate may be defective. Try using a different plate.
	An aluminum heat sink may be used to prevent this.
	Check the current (watts) to ensure that this is not too high and turn down accordingly.
Problem	The gel seems to be dissolving slightly at the top, making it difficult to reload
Solution	This phenomenon is probably caused by a pH imbalance. Try adding fresh, preheated buffer to the upper buffer chamber a few times during the run to prevent this.
Problem	Buffer is leaking from between the UBC and the glass plates
Solution	Check the red silicone gasket to make sure it is firmly seated. Grease the gaskets if necessary. If a gasket is old, it may need to be replaced. Call Technical Services.
Problem	Sparks and smoke are coming from the unit
Solution	Turn off the power to the apparatus! This is usually caused by a slow leak from the upper chamber. Do not run the apparatus under these conditions. Call Technical Services if this occurs.

Problems with Sequencing Gels (cont.)

Problem	Bands are smearing
Solution	Smearing of bands may be caused by template DNA that is not pure. Try repurifying the template. An old gel or the use of old gel components may also give poor quality results. Try making up new gel solutions. DNA samples that were not heat denatured prior to gel loading will not run as flat, smooth bands. Always remember to heat denature samples 5 minutes at 95°C before loading.
Problem	Blurring of bands
Solution	Poor contact between the gel and X-ray film during autoradiography will cause the bands to appear blurred, and reading the data will be difficult. This can be eliminated by adding weight to the film cassette during exposure.
	If the urea is not completely rinsed from the gel before X-ray film exposure, sometimes the bands will not be as sharp as is desired. A 15 minute soak in 5% methanol and 5% acetic acid is recommended before film exposure.
	Gel run temperature that is too high can cause bands to run at different speeds, causing bands to smear and drag through the gel unevenly. Turning down the voltage can help eliminate this.
Problem	Curving of bands or lanes
Solution	Curving may be caused by the uneven heating of the gel plates prior to sample loading. Always preheat the gel at least 30 minutes. A 50-60°C gel surface temperature should eliminate smiling and smearing. For best results, it is always best to avoid using the outermost lanes on the gel to eliminate any curving.
Problem	Cracking of glass
Solution	Cracking of gel plates can be caused by overheating. Check to make sure you are running the unit within the voltages recommended. If there is any sparking occurring, turn the power off immediately! Call Technical Services if this occurs.
Problem	Poor resolution
Solution	Loading too much sample, as well as using samples of poor quality, may give poor gel resolution. An excess of glycerol in loaded samples can produce a "bulge" effect to bands and appear as smiles or frowns in sample lanes.

Problems with Protein Gels

Problem	Longer run time than expected
Solution	Buffer is too diluted. Check buffer recipe; remake buffer and try again. See if voltage produced by the current you are running at is the same. If it differs significantly, your buffer may not have been made up correctly.
Problem	Upper buffer chamber is leaking
Solution	Make sure that the gel assembly is seated firmly against the gasket. Remove gasket, wash in warm water to remove excess salts, and place the gasket back in the groove. If the clamps have been overtightened in the past, the gasket can be pushed too far into the gasket groove and will not make a seal.
Problem	Running at too low of a current
Solution	Make sure you are running using the suggested running conditions for this unit. When running at constant current, the current value is per gel.
Problem	Running too fast
Solution	Buffers are too concentrated. Check buffer recipe; remake and try again. If voltage is lower than usual when running at constant current, the buffer is probably too diluted.
Problem	Voltage or current set too high
Solution	Turn down current setting
Problem	Smiling of dye front
Solution	Run under cold conditions
Problem	Center of gel is running hotter than the ends
Solution	Turn down current setting
Problem	Bands spreading outward
Solution	Diffusion of sample when loading. Make sure that the samples are loaded quickly and the power is applied as soon as possible after loading.
	Increase % of stacking gel or increase current by 25% when stacking
	Match the ionic strength of the sample with that of the gel.

Problems with Protein Gels (continued)

Problem	Bands are narrower than sample wells
Solution	Ionic strength of sample is higher than of the gel. Desalt the sample or use sample buffer of the same strength as the gel
Problem	Broad lanes at bottom of gel
Solution	Will occur when adjoining lanes are loaded with dissimilar samples. Normal in gradient gels.
Problem	Skewed bands
Solution	Gel has not polymerized properly at wells. Degas gel solution before casting and increase APS and TEMED concentrations. The comb can be wiped with TEMED just prior to casting to improve polymerization.
	Salt concentration is too high in sample. Dialyze sample or use desalting column.
	Resolving gel is uneven at top. Overlay gel carefully using water saturated n-butanol and make sure gel is cast on a level surface.
	The upper buffer chamber is leaking either through the gel or along the sides. Check gel to make sure that it is a solid slab inside the glass and check the setup of the apparatus to ensure a seal with the gasket.
Problem	Streaked bands
Solution	Overloading of sample. Use less protein or sample when next loading.
Problem	Frowning of outside lanes
Solution	Sample has precipitated. Centrifuge sample before adding sample buffer or use a lower % acrylamide gel.
	Leakage of buffer along sides or along spacers inside the gel assembly. Do not move spacers after polymerization and make sure that gasket is seated firmly against the glass. Always load your samples with an empty lower buffer chamber so that buffer leaks are caught before you begin the run.
Problem	Double bands (“doublets”)
Solution	Due to re oxidation or insufficient reduction of the sample. If using a reducing agent, prepare fresh sample buffer every 30 days. Increase the concentration of 2-mercaptoethanol or dithiothreitol in the sample.
Problem	Glass cracks when putting gel assembly in unit
Solution	Gel is too thin for clamping system. Use glass appropriate for the unit. If this is not possible, use an extra piece of blank glass to take up the space. If the clamps are used with their flat side against the glass, thinner glass may often be used.
	Gasket is old or flattened making it impossible to make a good seal. Wash gasket after each use to remove salts. If gasket is old and has lost its flexibility, it may need to be replaced. If unit has been previously overtightened, the gasket may need to be removed and re seated.

Section 7 Care and Cleaning

A few tips for the care of your system follow.

Caution Organic solvents cause acrylic to "craze" or crack. Clean all acrylic systems with warm water and a mild detergent. Do not use ethanol or other organic solvents to clean these products. Do not autoclave, bake, or microwave your unit. Temperatures over 50°C can damage the acrylic. ▲

Note If an RNase free electrophoresis system is desired, there are various methods to rid the system of RNA contamination. For fast and easy decontamination, use RNase AWAY®*. Spray, wipe or soak labware with RNase Away, then wipe or rinse the surface clean; it instantly eliminates RNase. RNase Away® eliminates the old methods that include treatment with 0.1% Diethyl Pyrocarbonate (DEPC) treated water and soaking in diluted bleach. This electrophoresis system should never be autoclaved, baked, or placed in a microwave. ▲

Warning DEPC is suspected to be a carcinogen and should be handled with care. ▲

To order RNase AWAY, contact Technical Services:

Part Number	**Description**
7000	250ml bottle
7002	475ml spray bottle
7003	1 liter bottle
7005	4 liter bottle

**Rnase AWAY® is a registered trademark of Molecular BioProducts, Inc.*

Care Of Acrylic

This list does not include all possible chemical incompatibilities and safe compounds. Thermo's acrylic products should be cleaned with warm water, a mild detergent such as Alconox™, and can also be exposed to a mild bleach solution (10:1). In addition, RNAse removal products are also safe for acrylic. Contact Technical Services with any questions.

The following chemical compatibility chart is supplied for the convenience of our customers.

Although acrylic is compatible with most solvents and solutions found in the biochemical laboratory, some solvents can cause substantial damage. Keep this chart handy to avoid harm to your apparatus by the use of an inappropriate solvent.

Codes:

S - Safe (No effect, except possibly some staining)

A - Attacked (slight attack by, or absorption of, the liquid)
(slight crazing or swelling, but acrylic has retained most of its strength)

U - Unsatisfactory (softened, swollen, slowly dissolved)

D - Dissolved (in seven days, or less)

Table 7-1. Chemical Compatibility for Acrylic-Based Products

Chemical	Code	Chemical	Code	Chemical	Code
Acetic acid (5%)	S	Ethyl alcohol (50%)	A	Naptha	S
Acetic acid (Glacial)	D	Ethyl alcohol (95%)	U	Nitric acid (10%)	S
Acetic Anhydride	A	Ethylene dichloride	D	Nitric acid (40%)	A
Acetone	D	Ethylene glycol	S	Nitric acid concentrate	U
Ammonia	S	2-Ethylhexyl Sebacate	S	Oleic acid	S
Ammonium Chloride (saturated)	S	Formaldehyde (40%)	S	Olive oil	S
Ammonium Hydroxide (10%)	S	Gasoline, regular, leaded	S	Phenol 5% solution	U
Hydroxide (10%)	S	Glycerine Heptane (commercial grade)	S	Soap solution (Ivory)	S
Ammonium Hydroxide concentrate	S	Hexane	S	Sodium carbonate (2%)	S
Aniline	D	Hydrochloric acid (10%)	S	Sodium carbonate (20%)	S
Benzene	D	Hydrochloric acid concentrate	S	Sodium chloride (10%)	S
Butyl Acetate	D	Hydro uoric acid (40%)	U	Sodium hydroxide (1%)	S
Calcium chloride (saturated)	S	Hydrogen peroxide (3% solution)	S	Sodium hydroxide (10%)	S
Carbon tetrachloride	U	Hydrogen peroxide (28% solution)	U	Sodium hydroxide (60%)	S
Chloroform	D	Isooctane	S	Sodium hydrochlorite (5%)	S
Chromic acid (40%)	U	Isopropyl alcohol (100%)	A	Sulfuric acid (3%)	S
Citric acid (10%)	S	Kerosene (no. 2 fuel oil)	S	Sulfuric acid (30%)	S
Cottonseed oil (edible)	S	Lacquer thinner	D	Sulfuric acid concentrate	U
Detergent Solution (Heavy Duty)	S	Methyl alcohol (50%)	A	Toluene	D
Diesel oil	S	Methyl alcohol (100%)	U	Trichloroethylene	D
Diethyl ether	U	Methyl Ethyl Ketone	U	Turpentine	S
Dimethyl formamide	U	Methylene chloride	D	Water (distilled)	S
Dioctyl phthalate	A	Mineral oil (white)	S	Xylene	D
Ethyl acetate	D				

This list does not include all possible chemical incompatibilities and safe compounds. Acrylic products should be cleaned with warm water, a mild detergent such as Alconox™, and can also be exposed to a mild bleach solution (10:1). In addition, RNAse removal products are also safe for acrylic. Contact Technical Services with any questions.

Section 8 Optional Equipment

Adjustable units are sold without accessories to allow for maximum flexibility. All accessories need to be purchased separately. In addition to the stock items listed below, custom glass, heat sinks, spacers and combs can be made for these units. Call Technical Services for details.

Model ADJ-1

Item Description		Catalog Number
Complete System		ADJ-1
Replacement Gaskets (1 pair)		ADJ1-GK
Spacers	1.0cm W x 14cm L x 0.8mm T	P1-SC
	1.0cm W x 14cm L x 1.5mm T	P1-SD
	1.0cm W x 25cm L x 0.8mm T	ADJ1-C25
	1.0cm W x 25cm L x 1.5mm T	ADJ1-D25
	1.0cm W x 40cm L x 0.8mm T	ADJ1-C40
	1.0cm W x 40cm L x 1.5mm T	ADJ1-D40
Glass Plates		
Notched	16cm W x 14cm L x 1/8" T	P1-14R
Blank		P1-14G
Offset	16cm W x 12cm L x 1/8" T	P1-12G
Notched	16cm W x 16cm L x 1/8" T	P1-14FR
Blank		P1-14FG
Notched	16cm W x 25cm L x 3/16" T	ADJ1-25R
Blank		ADJ1-25G
Offset	16cm W x 23cm L x 3/16" T	ADJ1-23G
Notched	16cm W x40cm L x 3/16" T	ADJ1-40R
Blank		ADJ1-40G
Offset	16cm W x 38cm L x 1/8" T	ADJ1-38G
Aluminum Heat Sink		ADJ1-40LM

Optional Combs for Model ADJ-1

Type	# of Teeth	Tooth Width	Thickness (mm)	Catalog No.
Standard	10	10.4	0.8	P1-10C
	10	10.4	1.5	P1-10D
	15	6.1	0.8	P1-15C
	15	6.1	1.5	P1-15D
	20	3.9	0.8	P1-20C
	20	3.9	1.5	P1-20D
	24	2.9	0.8	P1-24C
	24	2.9	1.5	P1-24D
Prep	2	-	1.5	P1-PDC

Model ADJ-2

Item Description		Catalog Number
Complete System		ADJ-2
Replacement Gaskets (1 pair)		ADJ2-GK
Protein Spacers	1.0cm W x 20cm L x 0.8mm T	P2-SC
	1.0cm W x 20cm L x 1.5mm T	P2-SD
	1.0cm W x 45cm L x 0.2mm T	S2S-SA2
	1.0cm W x 45cm L x 0.4mm T	S2S-SA4
Glass Plates		
Notched	20cm W x 20cm L x 3/16" T	P2-20R
Blank		P2-20G
Offset	20cm W x 18cm L x 3/16" T	P2-18G
Notched	20cm W x 45cm L x 3/16" T	S1S-45R
Blank		S1S-45G
Offset	20cm W x 43cm L x 1/8" T	S1S-43G
Aluminum Heat Sink (fits glass S1S-45G)		ADJ2-45LM

Optional Combs for Model ADJ-2 Protein

Type	# of Teeth	Tooth Width	Thickness (mm)	Catalog No.
Standard	10	13.6	0.8	P2-10C
	10	13.6	1.5	P2-10D
	15	8.2	0.8	P2-15C
	15	8.2	1.5	P2-15D
	20	5.5	0.8	P2-20C
	20	5.5	1.5	P2-20D
	25	3.9	0.8	P2-25C
	25	3.9	1.5	P2-25D
Prep	2	-	1.5	P2-PD

Optional Combs for Model ADJ-2 Sequencing

Well	20	6.8	0.4	S1S-20A
	30	4.1	0.4	S1S-30A
Sharktooth	39	--	0.4	S1S-SHARK4
	39	--	0.2	S1S-SHARK2
Sharktooth-Multichannel Pipette	36	--	0.4	S1S-MT2
	55	--	0.4	S1S-MT3
	73	--	0.4	S1S-MT44
	73	--	0.2	S1S-MT42

Model ADJ-3

Item Description		**Catalog Number**
Complete System		ADJ-3
Replacement Gaskets (1 pair)		ADJ3-GK
Protein Spacers	1.0cm W x 45cm L x 0.4mm T	S2S-SA4
	1.0cm W x 45cm L x 0.2mm T	S2S-SA2
	1.0cm W x 65cm L x 0.4mm T	S2SL-SA4
	1.0cm W x 65cm L x 0.2mm T	S2SL-SA2
Glass Plates		
Notched	35cm W x 45cm L x 3/16" T	S2S-45R
Blank		S2S-45G
Offset	35cm W x 43cm L x 3/16" T	S2S-43G
Notched	35cm W x 45cm L x 3/16" T	S2S-65R
Blank		S2S-65G
Offset	35cm W x 63cm L x 3/16" T	S2S-63G
Aluminum Heat Sink		ADJ3-45LM
Aluminum Heat Sink		ADJ3-65LM

Optional Combs for Model ADJ-3 Sequencing

Well	40	6.8	0.4	S2S-40A
	60	4.1	0.4	S2S-60A
Sharktooth	78	--	0.4	S2S-SHARK4
	78	--	0.2	S2S-SHARK2
Sharktooth-Multichannel Pipette	72 (2x)	--	0.4	S2S-MT2
	110 (2x)	--	0.4	S2S-MT3
	146 (2x)	--	0.4	S2S-MT44
	146 (2x)	--	0.2	S2S-MT42

Optional Accessories for the ADJ-1, ADJ-2, and ADJ-3

Accessories	Cat. No.
Power Supply Leads	PSL-5
Binder Clamps (pkg.12)	CL-12
Stainless Steel Binder Clamps (pkg.12)	CL-12S
Heavy Duty Pony Clamps (1 pair)	CL-2
Casting Tape, 72 yards x 1-1/2" W (1 roll)	TAPE
Sponge Tips (pkg.10)	ST-10

THERMO FISHER SCIENTIFIC OWL PRODUCTS WARRANTY USA

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner.

During the first thirty-six (36) months, component parts proven to be non-conforming in material or workmanship will be replaced at Thermo's expense, including labor. Installation, calibration and certification is not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of component parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any component or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo postage paid and replacement parts are shipped FOB destination.

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Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-800-438-4851 (USA and Canada) or 1-740-373-4763. We're ready to answer your questions on equipment warranty, operation, maintenance, service, and special applications. Outside the USA, contract your local distributor for warranty information.

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THERMO FISHER SCIENTIFIC OWL PRODUCTS WARRANTY INTERNATIONAL

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