runVIEW
Real-Time Horizontal Electrophoresis Systems

Instruction manual

CSL-RVMSCHOICE7, 10, 15 & TRIO

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Version 01C
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Packing list

Included with all models (CSL-RVMSCHOICE7, 10, 15 & TRIO):

- 1x CSL-RVBSBVLID runVIEW base station and bluVIEW lid (including power cord)
- 1x MS15 tank (including electrodes)
- 1x CSL-CAB 4mm power output cables, pack of 2
- 8x 1mm double-sided combs (2x 1-sample / 2-sample preparatory; 2x 4-sample preparatory / 16-sample; 4x 20- / 28-sample multichannel compatible screening); 4x extra thick 3mm preparatory combs with loading guides (2x 4-sample, 2 marker lanes; 2x 6-sample, 2 marker lanes)
- 1x instruction manual

With CSL-RVMSCHOICE7

- 1x MS15-UV7 15x7cm gel tray; 1x MS15-UVDAM casting dams, pk 2

With CSL-RVMSCHOICE10

- 1x MS15-UV10 15x10cm gel tray; 1x MS15-UVDAM casting dams, pk 2

With CSL-RVMSCHOICE15

- 1x MS15-UV15 15x15cm gel tray; 1x MS15-UVDAM casting dams, pk 2

With CSL-RVMSCHOICETRIO

- 3x gel trays
- (MS15-UV7 15x7; MS15-UV10 15x10; MS15-UV15, 15x15cm)
- 1x MS15-UVDAM casting dams, pk 2

Warning

The runVIEW real-time horizontal DNA electrophoresis system has been thoroughly tested and found to comply within the limits of CE regulation. It has been manufactured using the latest technology and does not require maintenance. When used correctly this unit poses no particular health risk, although it can deliver dangerous voltage levels if used incorrectly. Accordingly, this power supply must only be operated by fully qualified personnel adhering to the guidelines laid out within this instruction manual. Although this power supply is equipped with all necessary safety features against abuse and accidental failure, caution should always be exercised when working with high voltage equipment. Any individual intending to use this instrument should read the entire manual thoroughly before operation.

1. Read the instruction manual thoroughly before use.
2. Never touch the power outlets with any conductive object (e.g. naked metal wire) other than properly insulated power supply cables.
3. Do not spill liquid or insert metal objects inside the power supply.
4. Never block the ventilation holes or place the unit in any enclosure unless there is adequate ventilation; never expose the power supply to a direct heat source.
5. Never touch any part of the power supply assembly (i.e. power supply, cables or electrophoresis tank) before switching OFF the power supply.
6. Never manipulate with wet hands.
7. Do not connect to ground any of the power outputs or the buffer within the electrophoresis tank; the power outputs should be only connected to an insulated electrophoresis tank equipped with a safety cover.
8. Do not connect any power supplies in series or in parallel.
9. Never open the back plate nor remove the cover, otherwise an electric shock may result. Repairs should only be made by the manufacturer or a service technician authorised by the manufacturer.
10. Never use this power supply if the safety cover is not in position correctly.
11. Do not use the unit if there is any sign of damage to the external tank or cover. Contact the manufacturer or supplier immediately to replace or repair any damaged parts.
12. Never use the power supply in the presence of flammable or combustible

material as fire or explosion may result.

13. Ensure that the power supply is only connected to an earthed power line. Do not cut and splice the power line. When removing the power cord from the wall, unplug it by holding the plug attachment and not by pulling the cord. Do not hold the plug with wet hands or gloves.

Environmental Conditions

This unit may only be installed and operated only under the following environmental conditions:

1. For indoor use only
2. Relative humidity: ≤95%
3. Atmospheric pressure: 75 kPa – 106 kPa
4. Altitude: ≤2000 metres
5. Operating temperature: ambient to 40°C
6. Pollution degree: 2
7. Mains supply voltage fluctuations up to ±10% of the normal voltage

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”.

Care and Maintenance:-

Cleaning Horizontal 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 buildup of salts but care should be taken not to damage the enclosed electrode and vigorous cleaning is not necessary or advised.
- Air-drying is preferable 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 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 pyrocarbonate) 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.

Symbols

The symbols used on this unit are explained below.

Indicates the potential for electric shock.
Consult the manual to avoid possible personal injury or instrument damage.

Indicates disposal instruction.
DO NOT throw this unit into a municipal trash bin when this unit has reached the end of its lifetime. To ensure utmost protection of the global environment and to minimise pollution, please recycle this unit.

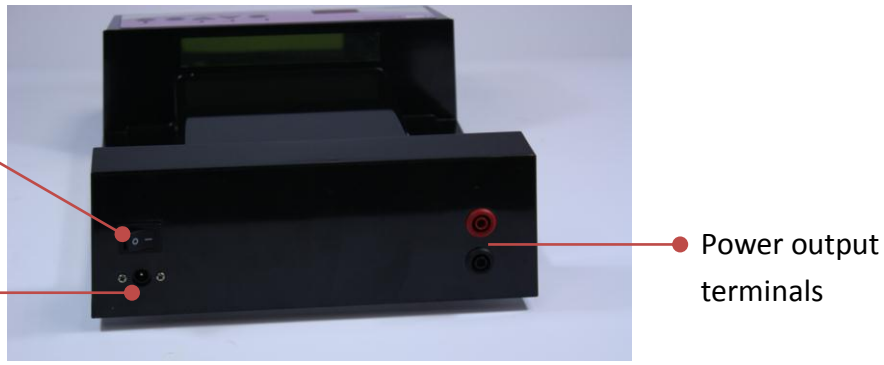
Table of Contents

Section 1 Introduction

1.1 Overview

runVIEW is an innovative new system designed for real-time size fractionation and recovery of nucleic acids. runVIEW can maximise the efficiency of DNA recovery from EtBr and SYBR stained gels by minimising the number of steps involved in post-electrophoretic purification. runVIEW consists of a multiSUB™ MSCHOICE system with bluVIEW lid, containing an orange spectral emission filter and extractor fan within its viewing pane, and a base unit with integrated power supply and blue LED gel illuminator.

Front view



Rear view

1.2 Product Description & Features

The runVIEW real-time horizontal gel electrophoresis system includes everything except chemicals and reagents to run horizontal SYBR- and EtBr-stained gels. This system combines the flexibility and high resolution capability of the MSCHOICE system with the time- and space-saving convenience of a power supply and gel illuminator integrated within one highly compact bench top unit.

FEATURES

- Detachable electrophoresis gel tank and base unit

- bluVIEW lid and built-in extractor fan remove condensation, and maintain visualisation and resolution

- Compatible with 15 x 7, 10 and 15cm gel trays

- The gel tank or UV tray may be placed on the viewing platform for immediate observation of the nucleic acid bands within the gel

- Suitable for SYBR and EtBr stained gels in real-time

- Blue light illuminator provides instant time-saving visualisation of DNA/RNA band migration

- No UV safety equipment required for blue light illlumination

Section 2 Technical Specification

Technical Specification			
runVIEW Viewing Dock			
Blue Light Wavelength	470nm	**Timer**	1-999 minutes with alarm
Voltage/ Resolution	25-150V / 1V	**Safety Device**	No load detection
Current/ Resolution	300mA / 1mA	**Operating Temperature**	Ambient to 40°C
Power	30 W	**Dimensions**	293 x 220 x 80 mm
Operating Mode	Constant Voltage or Current	**Rated Voltage**	100-240V, 50/60Hz
runVIEW Gel System			
Gel Dimensions (W X L)	15 X 7, 15 x 10 & 15 X 15cm	**bluVIEW Lid Design**	Orange spectral emission filter with condensation-free viewing pane
Unit dimensions (W X D X H)	26.5 X 17.5 X 9cm	**Combs**	2x 1-sample, 2x 2-sample and 2x 4-sample preparatory; 4x 28-sample multichannel compatible screening; 2x 4- and 2x 6-sample 3mm preparatory
Buffer volume	500ml	**Comb Thickness**	1mm

Section 3 Installation Instructions

Place the runVIEW on a sturdy and level, dry surface. Plug the power cord into the back of the unit and mains power. The system is now ready for use.

Section 4 Operation Instructions

4.1 Control interface

There are five buttons and four LED indicators on the faceplate.
Each LED indicates the activation status or mode of operation of the unit.

1. 

To select Voltage, Current or Time
2. 

To switch blue light ON or OFF
3. 
Increase select
4. 
Decrease select

5. 

Start / stop the program

a. Setup Mode (before pressing RUN/Start)

Each LED light indicates each activated parameter. For example, the Voltage LED will be activated when selecting the desired voltage. Use 

to alternate between Voltage, Current and Time. Use  or  to adjust the value to the desired setting.

b. Operation Mode

Press 

to start electrophoresis. The LED light next to the Start/Stop button will light up to indicate the unit is in operation. Use 

to monitor the remaining time and changes in current and voltage.

c. Blue light

There are two modes of blue light illumination for visualisation of nucleic acid bands during electrophoresis.

1. Press the 

once to activate the blue light source for 10 seconds, to monitor the extent of band migration.
2. Press the 

button for 3 seconds for continuous blue light illumination and real-time visualisation of band migration.

4.2 Operating Procedure

Setting up the RVMSCHOICE Gel Tank:-

Instructions for fitting Electrode Cables

1. 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 is positive.
2. Remove the lid from the unit. Note that if the lid is not removed, fitting the cables may result in loosening of the gold plug and damage to the electrode.
3. 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.
4. Refit the lid.

Gel Preparation

1. Table 1 below shows the volume of agarose solution required to make the desired agarose gel for each unit tray size. For a standard 0.7% agarose gel, add 0.7 grammes of agarose to 100 ml of 1x TAE or TBE solution. The same 1 x solution should be used in the tank buffer solution.

Table 1.

Tray Size	15 x 7cm	15 x 10cm	15 x 15cm
Volume of agarose solution for a 5-mm-thick gel	52.5ml	75ml	112.5ml

2. Add the agarose powder to a conical flask.
3. Add the appropriate amount of 1x TAE or TBE solution from the table above. To prevent evaporation during the dissolving steps below, the conical flask should be covered with parafilm.
4. Dissolve the agarose powder by heating the agarose either on a magnetic hot plate with stirring bar or in a microwave oven. If using the microwave method, the microwave should be set at around a 400 watt or medium setting and the flask swirled every minute. The solution should be heated until all crystals are dissolved. This is best viewed against a light background. Crystals appear as translucent crystals. These will interfere with sample migration if not completely dissolved.

The gel must be cooled to between 50°C and 60°C degrees before pouring.

Gel Pouring

Using trays with Casting Dams

1. Fit the casting dams over each end of the tray and place onto a level surface. The dams should be fitted so that there is no gap between the sides of the tray and the groove in the dams. This will ensure that there is no possibility of gel leakage.
2. Place the comb(s) in the comb slots. Each tray has multiple comb slots so that multiple combs can be used. Using multiple combs increases the sample throughput of the gel but decreases run length and care must be taken to ensure that samples from the first wells do not migrate into the lanes of the second comb wells in standard gels (not preparatory gels; see *Using runVIEW for DNA Recovery*).
3. Pour in the agarose carefully so as not to generate bubbles. Any bubbles that do occur can be smoothed to the edge of the gel and dispersed using a pipette tip.
4. Allow the agarose to set, ensuring that the gel remains undisturbed.
5. Carefully remove the gel casting gates and comb and transfer the gel including tray to the main tank.

Performing real-time nucleic acid separation

1. With runVIEW placed on an even bench surface, switch it on using the ON/OFF button located at the rear of the base unit.
2. Slot the electrophoresis tank (MS15TANK) onto the base unit so that it fits comfortably on the blue light illumination platform.
3. Place the gel tray containing an agarose gel (see Table 1) in the middle of the electrophoresis tank in the correct orientation (the wells in which samples are to be loaded should be closer to the black/negative electrode)
4. Pour in enough TAE or TBE buffer so that the gel is just submerged.
5. Load the DNA samples.
6. Select your settings accordingly. To run the system at constant voltage, switch the mode button to the Voltage setting and alter the value to the desired setting as described in **Set Up Mode** (the Volt LED will be illuminated by this stage).
   Use the same principle to run the system at constant current (in this case the Current LED will be illuminated instead).
7. For separations free of condensation, connect the cable from the runVIEW

lid into the rear of the base to activate the extractor fan (IMPORTANT – see Note 2, page 14).

Note 1: To operate under constant voltage or constant current modes, adjust the other parameter to the maximum value. For example, to operate under constant voltage, adjust the current to the maximum output of 400mA before running the power supply with the voltage set at the desired output setting.

To Start the Run

8. Press the 

button to commence electrophoresis. Press the 

button again to pause or stop electrophoresis at any time.

9. Press the 

button to switch on the blue light source in order to view real-time DNA migration.

10. Once electrophoresis is completed ‘End’ will show in the display accompanied by an alarm. Press the 

button again to cancel this.

Note 2: By its very nature during electrophoresis the application of current through a gel leads to a buildup of heat resulting in the accumulation of condensation within the blueVIEW lid viewing pane. Excessive levels of condensation impair visualisation of the nucleic acid bands within the gel. Condensation may be cleared by using the fan extractor in bluVIEW lid.

Using runVIEW as a blue light illuminator

1. With runVIEW placed on an even bench surface, switch it on using the ON/OFF button located at the rear of the base unit.
2. Using gloved hands, place the gel tray containing the gel onto the illumination platform within the base unit
3. Switch on the blue light by pressing the 

button located on the front panel.

4. Any runSAFE-, SYBR- or EtBR-stained DNA present in solution or as fractionated bands should be immediately visible beneath the bluVIEW lid.
5. Protective glasses are not necessary when viewing the blue light illuminator.

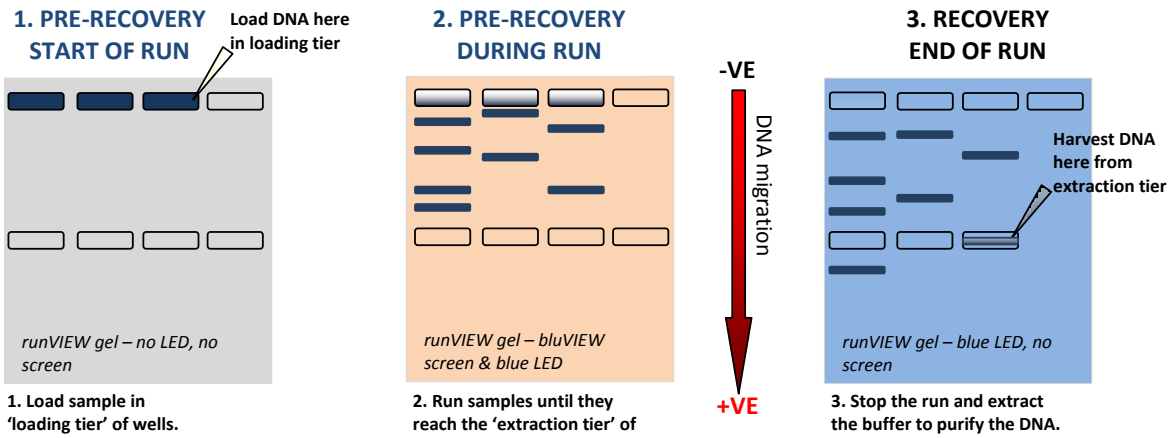
Using runVIEW for DNA recovery

1. Cast a gel featuring two rows of wells with one matching pair of the preparatory combs supplied, before transferring the blue-light transparent gel tray to the MSCHOICE tank located on the base unit. CSL recommends the extra thick 3mm preparatory combs – see Packing Lists.
2. Add sufficient buffer just to cover the gel, and remove the combs to load the DNA samples into the upper row of wells ('Loading' tier).
3. Replace the lid to connect the MSCHOICE tank to the integrated power supply before applying the voltage as described in SETUP MODE. Press the 

button to start the run.
4. Press the 

to switch on the blue LED illuminator.
5. Watch through the bluVIEW lid's viewing pane as the samples migrate in real-time to the second row of wells ('extraction' tier).
6. Once the DNA bands of interest enter the 'extraction' tier, simply stop the power supply, remove the lid and harvest the DNA by pipette.

Using runVIEW



Upon harvesting, measure the volume obtained from the extraction well by pipette before performing ethanol precipitation using 1/10th volume of 3M Sodium Acetate and 2x volumes of ice-cold 100% ethanol. Spin using a microcentrifuge (e.g. CSL-microFUGE) for 10' at maximum rpm.

7. Decant supernatant and perform a second centrifugation for 10' with ice-cold 70% ethanol.
8. Decant supernatant and dry the DNA pellet for 10' using a Speedyvac on a low heat setting.
9. Once dry, resuspend the pellet in a small volume of distilled water or TE (Tris-Ethylenediaminetetracetic acid), and store or use accordingly.

N.B. For extractions performed with samples at low concentration, a small piece of DEAE cellulose paper or dialysis membrane may be inserted into the extraction wells ahead of elution. The paper may be washed by changing the salt concentration to release the DNA, whereas for the membrane, reversal of the power output cables in the base unit (i.e. red cable to the black outlet and the black cable to the red outlet) and application of the voltage for 15-60 seconds, should release the DNA from the dialysis membrane. For both techniques, the solution should be then removed from the extraction tier and ethanol precipitation performed as described steps 7-10.

Again, it is recommended that the extractor fan is connected to the base unit just before or at the beginning of the run to maintain resolution and condensation-free viewing of electrophoresis.

Section 5 Troubleshooting and Maintenance

Many operating problems may be solved by reading and following the instructions in this manual accordingly. Some suggestions for troubleshooting are given below. If these suggestions fail to resolve the problem, contact our SERVICE DEPARTMENT or the Cleaver Scientific distributor in your region for assistance. If troubleshooting service is required, please include a full description of the problem.

Problem	Cause	Solution
No Display / lights	No AC power.	Check if the power supply is unplugged, or if the AC power source is a problem.
	AC power cord is not connected.	Check AC power cord connections at both ends. Use the correct cords.
	The fuse has blown.	Replace the fuse
Operation stops	Electrophoresis leads are not connected to the power supply or the electrophoresis unit; or the circuit is broken in the electrophoresis system.	Check the connections to the power supply and within electrophoresis system to make sure the connection is intact; check the electrodes to make sure they are intact. Close the circuit by reconnecting the cables. Press **START/STOP** to restart the run.
	High resistance due to tape left on a pre-cast gel, incorrect buffer concentration, or insufficient buffer volumes in the electrophoresis system.	Make sure that the tape is removed from the pre-cast gel, that the buffers are prepared correctly, and the recommended volume of buffer is added to the electrophoresis unit and is covering the gel.
 Error message	Over voltage (170V safety limit reached or exceeded).	Press **START/STOP** button to clear the error message. Contact Cleaver Scientific's service department if the problem persists.

 Message	No load is detected.	(1) Check the connections. (2) Check the buffer condition / buffer Level.
 Alarm message	Maximum power output reached (30 W).	Warning message for reference.

Encountering Problems

1. Check the troubleshooting section.
2. Call Technical Service or e-mail to info@cleaverscientific.com
3. If it is necessary to return unit for repair, please contact Cleaver Scientific or the distributor for a Return Authorisation Number and shipping instructions. The unit will be repaired and returned to you as quickly as possible.

Maintenance

Each runVIEW system uses all solid-state components and should require no maintenance or recalibration under normal use. If the unit is to be returned for repair, contact our **SERVICE DEPARTMENT** or your local authorised Cleaver Scientific distributor.

info@cleaverscientific.com
www.cleaverscientific.com

Section 6 Ordering Information

Ordering Information	
CSL-RVMSCHOICE7	runVIEW system complete with 15 x 7cm gel tray.
CSL-RVMSCHOICE10	runVIEW system complete with 15 x 10cm gel tray.
CSL-RVMSCHOICE15	runVIEW system complete with 15 x 15cm gel tray.
CSL-RVMSCHOICETRIO	runVIEW system complete with 15 x 7, 15 x 10 and 15 x 15cm gel trays.
CSL-RVBSBVLID	runVIEW base station & bluVIEW lid.

Section 7 Warranty

Cleaver Scientific Ltd. (CSL) products have a warranty against manufacturing and material faults of twelve months from the date of customer receipt.
If any defects arise during this warranty period, CSL will repair or replace the defective parts free of charge.
This warranty does not cover defects resulting from 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.
Warranty is rendered invalid for those units which contain accessories or repaired parts not supplied by CSL or its associated distributors.
CSL cannot repair or replace free of charge units where improper solutions or chemicals have been used.
If a problem does occur then please contact your supplier or CSL on: -

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