S-TRANS rapid multi-channel semi-dry transfer instrument

Index

1. Product Introduction

Electrical transfer printing is a commonly used technique in many research and diagnostic laboratories. The traditional wet transfer process for preparing reagents and the transfer process takes a considerable amount of time, usually more than one and a half hours.The S-TRANS rapid multi-channel semi-dry transfer instrument launched by ACE significantly reduces the protein transfer time while ensuring performance.With the S-TRANS rapid multi-channel semi-dry transfer instrument, the transfer time can be shortened to 5 minutes at the fastest. The accompanying transfer buffer provides high transfer efficiency and reproducibility.The S-TRANS transfer system consists of a main unit, a semi-dry transfer box, two-stage buffer solution and water-absorbing medium;If one main unit cannot meet the transfer requirements, up to two expansion auxiliary units can be connected to the main unit. The auxiliary units have the same transfer function as the main unit and do not need to provide additional power supply. Their power supply and operation are all provided by the main unit.When in operation, the main unit and the auxiliary unit can be placed in a stacked manner. The main unit is placed on top of the auxiliary unit, and there is a structure for fixation between the main unit and the auxiliary unit. If a second expansion auxiliary unit is used, this auxiliary unit can be placed at the bottom position.

The semi-dry transfer box can hold up to two Mini(7.0x8.5cm) gels at most.When transferring, place the assembled "sandwich" composite structure into the transfer box, close the box lid, insert the transfer instrument (for operation details, see 3.2), select or edit the appropriate transfer program to start the transfer (for operation details, see 3.4).The supporting transfer kit includes: S-TRANS anode buffer, S-TRANS cathode buffer, and S-TRANS high-efficiency transfer gasket (7.0x 9.5cm).

When using nitrocellulose membranes or PVDF membranes, the membranes need to be balanced in the anodic solution for more than 15 minutes. This step is usually carried out simultaneously during the electrophoresis process.The preset, modification and operation of the instrument's transfer program are simple and convenient, and multiple transfers can be carried out continuously.

1.1 Unboxing and Installation Instructions

The S-TRANS system kit includes a main unit (which can be paired with a secondary unit). Besides the main unit, it is also equipped with a semi-dry transfer box (including the base and cover), a transfer roller, a standard power cord, a pair of tweezers, and two plastic boxes.The plastic boxes are respectively used to store S-TRANS anode buffer and S-TRANS cathode buffer to wet the S-TRANS high-efficiency transfer film gasket and transfer membranes.

In addition to the main body, the sub-unit is also equipped with a semi-dry transfer box (including the base and cover) and a standard connection cable to the main unit.When installing, place the instrument on a horizontal working surface with at least a 6 cm gap around it for ventilation. Insert the power cord into the back of the main unit and then connect it to a standard ground socket.If you need to connect the auxiliary unit, place the main unit on top of the auxiliary unit, unscrew the protective covers of the connection ports between the main unit and the auxiliary unit, and connect the main unit and the auxiliary unit with standard connection wires. Remove the protective foam of the instruments and equipment, and turn on the power switch at the back of the main unit to complete the installation.NOTE: Do not place items on top of the S-TRANS system.

1.2 Chemical compatibility

The S-TRANS system and transfer box assembly are incompatible with strong acids or bases,chlorinated hydrocarbons (such as chloroform), aromatic hydrocarbons (such as toluene, benzene), or acetone.

The instrument casing and transfer box can be cleaned with water and mild detergent.Do not use abrasives or organic solvents for cleaning.The cathode stainless steel plate installed inside the box cover can be cleaned with 5% acetic acid and then wiped with water.

1.3 Safety Precautions

When using the S-TRANS system instrument, the following guidelines should be observed and followed.The S-TRANS system instrument should operate under an ambient temperature of 15-31 °C and a relative humidity of 0-95%. It is not recommended to operate this instrument outside of this condition.

- To ensure sufficient air cooling, please make sure there is at least a 6 cm gap around the instrument and that the fan vents on both sides and at the back of the instrument are not blocked.
- Always connect the unit to a grounded AC socket using the power cord provided in the package.
- Be careful when removing the transfer box from the unit after the transfer is completed,as the transfer box may overheat.
- Do not operate under extreme humidity conditions (>95%),nor when condensation affects the internal circuits of the instrument.
- Operating the S-TRANS system at <15°C is not recommended.
- For your safety and to protect your S-TRANS system instruments,it is recommended that you clean the instruments regularly in accordance with the attached instructions.
- After the transfer is completed, it is recommended that you rinse the base and cover of the transfer box with deionized water to remove the residual buffer salt and prevent salt accumulation.Dry at room temperature or wipe the anode plate and cathode plate with a paper towel.
- Before using the instrument, do not place the buffer solution or the S-TRANS high-efficiency transfer film gasket with buffer solution in the transfer box.
- Install and operate the instrument in a clean and dry location. During operation,keep the inside and around the instrument dry.
- This instrument is for laboratory use only.

2. Overview of Instruments and Reagents

The S-TRANS system instrument and its accompanying reagent kit can complete protein gel transfer within 10 minutes,which is fast and efficient. One transfer box can effectively transfer a single Mini gel (7.0x8.5 cm) or two Mini gels at a time.The kit includes S-TRANS anode and S-TRANS cathode buffer solutions as well as S-TRANS high-efficiency transfer film gasket medium. Users can choose nitrocellulose membrane or PVDF membrane for transfer. Before use,it needs to be balanced in the anodic solution for more than 15 minutes.

The "sandwich" composite in the transfer is sandwiched between the two electrode plates in the transfer box. If the main machine and the two auxiliary machines are running simultaneously,the transfer program can be run independently. The transfer scheme can be stored for retrieval and use.When the transfer program is completed,please discard the S-TRANS high-efficiency transfer film gasket used for this transfer. Membranes and gels (if necessary) can be immediately used for downstream applications or stored for subsequent experimental use.The transfer boxes of the main machine and the auxiliary machine are universal and can be freely interchanged.When the main unit and the secondary unit are connected, one of them can remain idle during operation.

The user interface is the touch screen menu screen of the host.The menu screen offers simple touch access,users can complete a series of transfer program inputs and runs with button prompts.

3. Instrument usage

The default program of the S-TRANS instrument and its accompanying kit can provide efficient transfer for most proteins.However, for individual proteins,different transfer program conditions need to be explored.After optimization,the transfer program can be stored.Please do not use incompatible reagents consumables in this system.

3.1 Suggestions for the use of accompanying reagent kits

- Wear gloves at all times during the transfer process to prevent gel or membrane contamination.
- Immediately transfer the gel after electrophoresis and soak it in deionized water for more than 2 minutes.To achieve a better transfer effect, the gel can be further incubated in the incubation box containing S-TRANS cathode buffer for 2 minutes.
- The nitrocellulose membrane or PVDF membrane used for transfer must be fully balanced (more than 15 minutes);The S-TRANS high-efficiency transfer film gasket must be fully moistened with the buffer solution.It is recommended to use 3 pieces of matching absorbent paper for positive or negative electrode(depending on the type of gel and buffer solution),and do not increase or decrease.The S-TRANS high-efficiency transfer film gasket must be stacked together in 3 pieces and soaked in the buffer solution.Do not soak them separately.
- The S-TRANS high-efficiency transfer film gasket impregnated with S-TRANS anode buffer solution must be used on one side of the anode plate.The S-TRANS high-efficiency transfer film gasket impregnated with S-TRANS cathode buffer solution must be used on one side of the cathode plate.The bottom of the transfer box is the anode plate, and the cover of the transfer box is the cathode plate.
- When transferring multiple membranes simultaneously,please use an appropriate gel combination.
- If you need to move the membrane,plaese use tweezers carefully.

3.1.1 When the S-TRANS system is transferred,the S-TRANS high-efficiency transfer film gasket is soaked in the S-TRANS anode buffer solution and then laid at the bottom of the box,with the bottom of the box being the anode plate.The transfer gasket of the anode plate is in contact with the membrane.On the upper layer of the membrane is gel.Please lay an S-TRANS high-efficiency transfer film gasket soaked in S-TRANS cathode buffer solution on the upper layer of the gel.Finally, cover it with the box cover and lock the pin.The electrode plate on the surface of the box cover is the cathode.At this point, a complete transfer composite structure assembly is completed.After assembling each layer

of the structure,please carefully remove the air bubbles with a transfer roller.

3.1.2 The S-TRANS system host is equipped with two covered plastic boxes for storing two kinds of buffer solutions.Please note that the currently equipped S-TRANS high-efficiency transfer film gasket is only suitable for Mini gel (7.0x8.5 cm).

When impregnating the S-TRANS high-efficiency transfer film gasket, please impregnate all three S-TRANS high-efficiency transfer film gaskets simultaneously.Do not impregnate and lay them separately to avoid unnecessary air bubbles and loss of buffer solution.The buffer in the plastic box can be recycled when it is confirmed that there is no gel contamination.The buffer solution that has been poured into the plastic box should not be left in the box for a long time to avoid water loss and changes in the composition of the buffer solution. It is recommended to replace the buffer with a new one 2 days after pouring it into the incubation box or after using it more than 5 times.

3.2 Put the assembled transfer box into the drawer opening of the main or auxiliary machine

■ The transfer "sandwich" composite structure made by stacking membranes and gels.Once assembled,do not invert the transfer box. When the transfer is completed and the complex is removed,do not invert it either.

■ The assembled "sandwich" composite should be placed in the center of the bottom.If only one piece of gel is assembled, place its center at the center of the bottom of the box and make the long side of the S-TRANS high-efficiency transfer film gasket correspond to the long side of the transfer box.If two gels are transferred simultaneously in the transfer box,please place the two gels along the line connecting the midpoints of the two long sides of the box,and ensure that the long side of the S-TRANS high-efficiency transfer film gasket corresponds to the short side of the transfer box.

■ Please do not move the "sandwich" structure again after the assembly is completed,as this may introduce air between the layers.If the "sandwich" must be moved after placement,it is recommended to reassemble the "sandwich" structure.

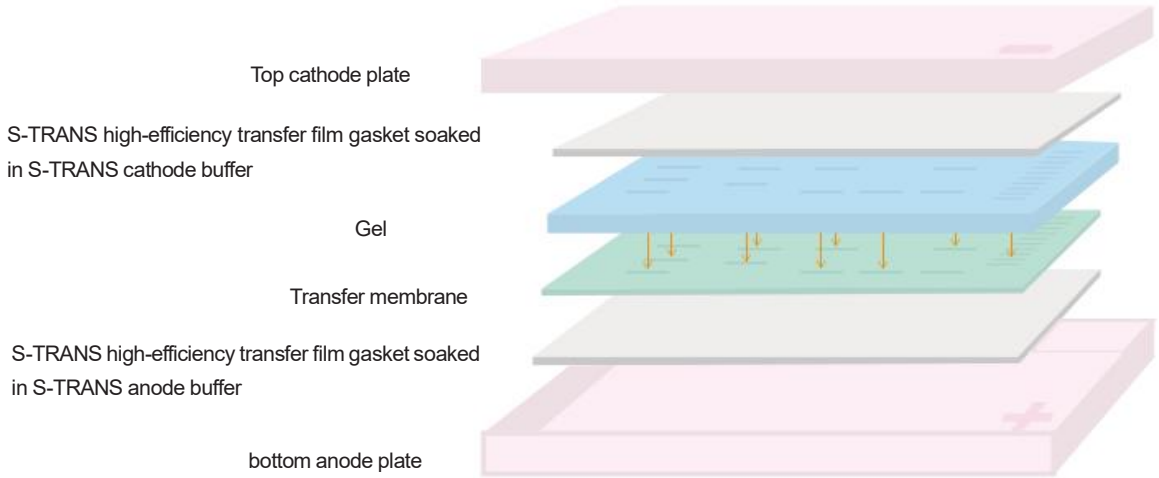
■ Please be sure to use matching S-TRANS high-efficiency transfer film gasket.

■ Avoid adding excessive amounts of membranes,S-TRANS high-efficiency transfer film gaskets,gels and other transfer structures to the transfer box.As shown in the following figure,it illustrates the correct assembly method of the "sandwich" to be transferred in the transfer box.

■ If errors occur during the assembly of the gel and S-TRANS high-efficiency transfer film gaskets,please disassemble the components carefully to avoid damaging the membrane.After reassembly,please carefully remove the air bubbles using a transfer roller.

■ If the gel and S-TRANS high-efficiency transfer film gasket need to be reassembled,please use a new S-TRANS high-efficiency transfer film gasket and repeat the soaking process.

■ When extruding bubbles with a transfer roller,please ensure that the extrusion degree of the "sandwich" structure is as low as possible to avoid extruding too much buffer liquid.



Place the transfer "sandwich" structure at the center of the transfer box.If the structure is slightly off the center in the box,there is no need to move it.After placing it in the transfer box,please immediately close the transfer cover to ensure that the electrical contacts fit tightly with the slots of the base.Move the pin lock rod on the box lid towards the center of the box and press down the lid firmly.Then release the rod and insert the pin into the locking slot.After completion,slide the transfer box into the slot of the main unit box,push it to the contact interlock and lock it.At this time, the background color of the touch screen changes from bright white to gray.

If the main unit is mounted with an expansion sub-unit,please give priority to using the main unit for transfer printing.This system requires that both the main and auxiliary machines be inserted into the transfer box simultaneously.When running the program,one of the machines can remain empty.For details of the transfer program using the preset scheme,please refer to the following sections.Note: If an expansion auxiliary unit is mounted, the operation of each unit is independent. You can operate it on the main unit panel.

When the main unit mounts the expansion sub-unit,turn on the power switch, and the main unit can retrieve the sub-unit.Each main unit has only one output interface.Each secondary unit has an input interface and an output interface (for connecting the second secondary unit).The interface on the rear panel that is not in the same vertical line as the main unit is the input interface of the secondary unit.When in use,connect the output interface of the main unit to the input interface of the first secondary unit,and connect the output interface of the first secondary unit to the input interface of the second secondary unit.At most two auxiliary units can be connected to one main unit.After correct connection,the wiring should be in an inclined state.

3.3 Common transfer buffer is not recommended for S-TRANS systems.

There is no need to balance the gel before transfer.However, to eliminate the possible influence of residual gel buffers in different electrophoresis buffer systems on the transfer buffer system,please soak the gel in deionized water for more than 2 minutes before transfer.

3.3.1 Prepare the anode and cathode transfer buffers according to the instructions on the reagent bottle.

3.3.2 The nitrocellulose membrane was immersed in the anode transfer buffer and equilibrated for more than 15 minutes.The PVDF membrane should be rebalanced for more than 15 minutes after activation.

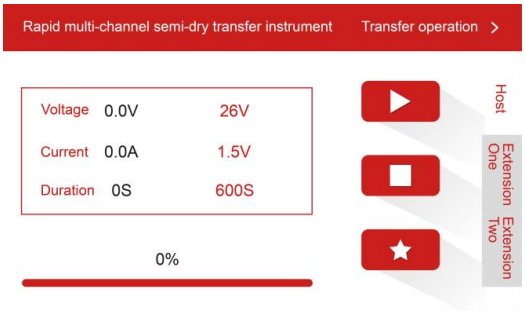
3.3.3 Soak the S-TRANS high-efficiency transfer film gasket.Please note that the S-TRANS high-efficiency transfer film gasket does not need to be soaked for a long time.It only needs to be soaked before assembling the "sandwich" structure.After soaking the S-TRANS high-efficiency transfer film gasket,it is essential not to drain the S-TRANS high-efficiency transfer film gasket.When the S-TRANS high-efficiency transfer film gasket is removed,a small amount of liquid dripping into the transfer box will not affect the transfer.The contact between the S-TRANS high-efficiency transfer film gasket impregnated with the S-TRANS cathode buffer and the S-TRANS anode buffer during the final assembly has no effect on the transfer.

- The PVDF membrane is immersed in 100% methanol or ethanol until the membrane is semi-transparent.Then it is transferred to a plastic box containing S-TRANS anode buffer solution,ensuring the membrane is fully submerged and balanced for more than 15 minutes.
- Membrane equilibrium can be initiated before the electrophoresis is completed.Please note that the membrane should not be soaked in S-TRANS anode buffer for a long time.
- The main unit is equipped with two plastic boxes for balancing or soaking.Before use, 40 mL of buffer solution needs to be poured in.

3.4 Transfer Program Operation

3.4.1 Main interface description and basic operations

Connect the power supply and turn on the machine.The initial screen starts up and the system automatically enters the main screen.On the main screen interface,you can directly perform the transfer operation.



The voltage,current and time parameters are displayed on the left side of the interface.

The upper limit of voltage is 26V,the upper limit of current is 2.6A, and the upper limit of duration is 30000 seconds.The default startup values are 26V voltage, 1.5A current and 600 seconds.Click the corresponding parameter name, and a numeric keypad will pop up for setting the parameter value (for details of the operation, see 3.5).

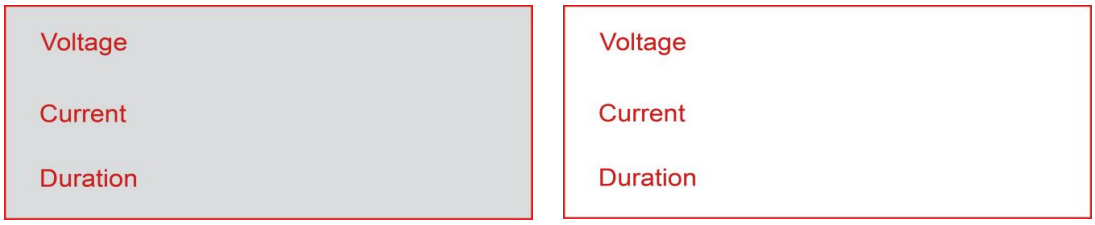
Among them,the voltage parameter range is 0-26 V, with a minimum increment of 1 V.The current parameter range is 0- 2.6A, with a minimum

increment of 0.1A.The time parameter range is 0 to 30000 seconds,with a minimum increment of 1 second.

■ The S-TRANS system has preset a relatively wide range of parameters.Please use the parameters recommended in this manual during actual operation.

On the right side of the interface,the main unit and the connected auxiliary units are displayed.By pressing the buttons,you can switch to the main and auxiliary unit instruments that need to be operated.The switch can only be made 5 seconds after the main machine starts up.If the secondary machine is not online, clicking will not switch the page.The instrument will self-check the insertion status of the transfer box.If the transfer box is in the inserted state,the instrument will display a dark background.

If the transfer box is empty,the instrument will display a bright white background.

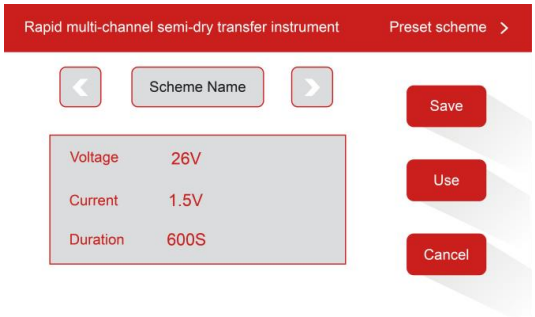


After the parameters are set, press the button ▶ on the interface and the program will run automatically.The screen will display the real-time parameters of the transfer and the transfer progress bar.Note: During operation, it can be paused by pressing the corresponding button to stop ■ or pause ⏸ the operation.Users can choose to resume from the paused time point,restart the operation or terminate the operation.After the transfer is completed,the screen will display that the operation is finished and emit a buzzing alarm.

■ The main unit can be connected to up to two expansion sub-units through the standard wiring at its rear.Please turn off the power of the main unit before assembling or removing any sub-unit.

3.4.2 Transfer using the preset scheme

On the main page, click ★ to enter the preset scheme interface.



On this interface,you can use the left and right arrow keys to select the scheme you need to adjust.There are a total of 10 preset scheme positions available for use.

To modify the scheme name,please click on the position where "Scheme Name" is located.After the 51-key English keyboard pops up,you can re-write the scheme name.After completion, press the "OK" key to confirm.

To modify the parameter Settings,please click on the parameters and use the keyboard to make the changes.

After the modification is completed,please press the "Save" button on the right side of the interface to save.

When invoking a scheme on the main interface,you will enter the interface of that scheme.Press the "Use" key, and the instrument will invoke this scheme and directly return to the main interface.At this time, the parameter setting line on the main interface will display the parameters set for the scheme,and then it can be run.

■ Please pay attention to the main and secondary machine interfaces when using this function.If you enter this function by pressing a key on a certain secondary machine interface,the instrument will default to calling the preset scheme from this secondary machine. After the scheme is preset,it will also default to returning to this secondary machine interface.Please ensure that your secondary machine is selected correctly when using this function.If only the host is running, there is no need to pay attention to this.

3.4.3 If the transfer "sandwich" has a large or small resistance,it is possible that the assembly is incorrect.The screen will display an icon, meaning the program will not run.At this time, the specific structure in the transfer box needs to be checked.

3.4.4 Operation after transfer:Please be careful when removing the transfer box from the unit after the transfer is running,as the transfer box may overheat.
3.4.4.1 Take the transfer box directly out of the instrument.The LCD menu screen will automatically return to the program interface just completed.
3.4.4.2 By sliding the slider towards the middle of the box cover,the latch will unlock, and at this point,the transfer box can be opened.
3.4.4.3 When disassembling the "transfer sandwich",place the film in an appropriate container.
3.4.4.4 After the transfer is completed,be sure to discard the S-TRANS high-efficiency film gasket and do not attempt to reuse it.
3.4.4.5 After the transfer is completed,the remaining liquid in the box should be drained.If the next transfer is not carried out immediately,the base and lid of the transfer box should be cleaned with deionized water,wiped with a paper towel and then dried.If transfer is no longer needed,please turn off the power switch.

3.5 When performing transfer printing with the S-TRANS system, please use the recommended transfer conditions.If there is a special need to change the transfer conditions,please do so within the limits of the safe transfer conditions listed in the table below. Otherwise, it may cause excessive heat generation power, thereby affecting your transfer results.

Use Current	Suggested time	Time Limit
2.0 A	350s	600s
1.5 A	600s	900s
1.0 A	1200s	1800s

3.6 Optimize transfer conditions:The use of the following technologies alone or in combination will enhance transfer efficiency

■ Use low-concentration gel or gradient gel.High concentrations of gel can impede the transfer of proteins, especially in large proteins.

■ High-molecular-weight proteins may require increased transfer time or power conditions,especially when using thick gels.

■ Under conditions of longer transfer times or high power transfer,some extremely low-molecular-weight proteins may be transferred through the membrane to the transfer gasket on the anode surface.For effective transfer, shorter transfer times or reduced power conditions should be used.

■ When assembling the transfer "sandwich", use the transfer roller to remove any possible bubbles.The bubbles between the assembled sandwich layers will prevent protein transfer and create white spots on the membrane.

■ When using two complete mini gel-sized membranes,the current can be raised to 1.8A.

4. Maintenance and cleaning

Maintenance of S-TRANS rapid multi-channel semi-dry transfer instrument.

■ After using the semi-dry transfer machine, rinse the base and cover of each transfer box with deionized water to remove residual salt and prevent salt accumulation.After cleaning,air dry the transfer box or wipe it dry with a paper towel.Each transfer box has two contact points for contact with the base cavity of the instrument body.Over time,buffer or other contaminants may be exposed to these contact points,causing stains to adhere to the recessed areas.Use isopropyl alcohol to wipe and clean these contact points.

■ Clean up the spilled buffer with a dry towel or wiping paper.

■ The surface of the transfer box and the instrument housing can be cleaned with water or a mild detergent.Do not use abrasives or organic solvents during cleaning.

■ Regularly unplug the instrument,wipe the instrument casing with a damp cloth or tissue,and ensure that the electrode contacts of the transfer box are clean.The electrode plates should be occasionally cleaned with deionized water or a mild detergent to reduce salt accumulation. If there is excessive salt accumulation on the cathode plate,7% acetic acid can be used to remove the residue.

■ Occasionally check the air vents of the cooling fan and the air outlets on both sides to ensure there are no debris or dust.

■ Clean the instrument after each use and check whether the instrument and the transfer box are damaged.If there is any damage, please contact our ACE technical support.

5. Related Products

Product	Cat.No.
S-TRANS fast multi-channel semi-dry transfer printer (host)	FW606
S-TRANS fast multi-channel semi-dry transfer printer (auxiliary machine I)	FW607
S-TRANS fast multi-channel semi-dry transfer printer (auxiliary machine II)	FW608