OPERATING INSTRUCTIONS
FOR
MODEL SPR-40
Semi-Automatic
Screen/Stencil Printer
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I. SPECIFICATIONS

Air ................................................................. 60 TO 100 psi

Overall dimensions ........................................... 30” W x 35” L x 16” H
(762 x 900 x 406mm)

Dimensions with stand ....................................... 30” W x 35” L x 47” H
(762 x 900 x 1194mm)

Maximum print area ............................................ 16” x 18” (406 x 457 mm)

Theta adjustment .............................................. counter rotating dual knobs
± 5° range

X & Y adjustment ............................................... ± 0.500” (12.7 mm)

Z axis adjustment ............................................... 0 to 5/8” (16 mm)
single knob (self leveling)

Approximate weight SPR-40 ............................... .150 lbs (68kg)
Approximate weight SPR-45 ............................... .160 lbs (73kg)
Stand option weight ............................................ .47 lbs (21kg)

WARNING: READ AND FOLLOW SAFETY INSTRUCTIONS BEFORE OPERATING
II. SAFETY INSTRUCTIONS:

1. **CAUTION** should be used when handling metal blade/squeegee.

2. Ensure that gas struts are properly positioned in adjustment slot to hold Frame/Squeegee Assembly in up position. **Note:** different frames have different weights.
III. INSTALLATION

The model SPR-40 is a semi-automatic stencil or screen printer requiring electricity and shop air for operation. The SPR-40 should be placed on a sturdy work table (or bolted to its optional stand) approximately 28" from the floor to provide a comfortable area for the operator. Use leveling feet to eliminate movement on the bench (or floor) during printing and to level screen/stencil to Printing Plate.

The SPR-40 is packed in its carton with the frame attached. Unbolt 4 screws from under carton. These holes in the base of the printer will be used to insert the 4 leveling feet. Remove from carton by lifting base plate assembly. DO NOT REMOVE FROM CARTON BY LIFTING SCREEN FRAME. DO NOT LIFT FROM REAR PANEL.

Remove all items from the packing crate:

1. One SPR-40-stencil printer
2. One tubular frame
3. One dual squeegee assembly (attached)
4. Four (4) leveling feet
5. Lexan™ print alignment fixture
6. Six Board Stops for registration (in slots)
7. One 3/32” hex key
8. One operator manual
IV. SET-UP

A. Air Hook-up

1. Attach air to 1/4” NPT female fitting provided in the rear of the machine (60 to 100 psig).

B. Installing Screen/Stencil Frame  (refer to Illustrations 1 & 2)

1. It is recommended to lift squeegee assembly to “up” position before attaching frame/stencil to system (loosen 2 knurled thumb screws at front of assembly)
2. Loosen the front and back Universal Frame Holders via locking thumbscrews.
3. Move frame holders from front to back (and from back to front) so that the frame will be centered in the printer.
4. Place frame/stencil onto frame holders and secure frame/stencil by tightening Frame Clamps.

   NOTE: Frame holders/clamps will adjust to frames between 1-1/8” and 1-1/2” thick and to any frame smaller than 23” x 23” O.D.
5. Tighten 4 locking knobs on both sides to secure Universal Frame Holders.
6. Position left & right squeegee limit stops on rear guide rail so that squeegee stops short of frame. (Refer to Illustration 1.)
7. Ensure that gas struts are properly positioned in adjustment slot to hold Frame/ Squeegee Assembly in up position. (When changing to frame of different weight)

C. Registering Board:

1. Lift stencil frame to up position by using squeegee handle.
   
   NOTE: See section V - E. through I. for pneumatic adjustment and initial set-up procedure.
2. Position clear Lexan™ sheet provided using the two brackets at rear of Print Deck.
3. Lower stencil frame to "down" position.
4. Swipe squeegee to apply paste through stencil to clear Lexan™ sheet.
5. Raise stencil frame to up position again.
6. Lift clear sheet enough to "roughly" place circuit board on Print Deck (match up pads on board to paste on clear sheet). Now remove clear sheet without moving PC board.
7. Position Board Stops around PCB and tighten for precise registration*. (Figs. 1, 2 & 3)
8. Adjust height of print deck beneath frame with Z axis knob. The tensioned* stencil can be flush on the board or slightly above the board surface.
9. Using the X,Y and Ø -axis adjustment knobs on the front and sides of the machine, register the pattern of the stencil apertures to the pads on the board. Final registration can be done most accurately by looking directly down on the stencil while moving the plate. (Refer to X, Y and Ø adjustments in sections IV. & V.)

*NOTE: For pin positioning of circuit boards contact factory for recommended methods.
Board Stop Slides (6)

Print Deck (pressure plate)

Fig. 1

Slide Board Stops up to board on all edges

Fig. 2

Tighten all Board Stop Slides around board using 3/32” hex key

Fig. 3
V. SYSTEM OPERATION  (refer to Illustrations 1 & 2)

A. Once you have the board-to-stencil registration set, lift frame by squeegee handle.

B. Place PC board in registration frame (within Board Stops) on Print Deck.

C. Lower the frame using squeegee handle.

E. Set squeegee pressure to approx. 20 to 30. Clockwise increases the pressure shown on gauge (use approx. 1.5 psi for each linear inch of squeegee).

H. Lift squeegee assembly (loosen 2 knurled thumb screws at front of assembly) and apply a row of (room temperature) solder paste on stencil between two squeegee blades. Replace squeegee assembly and tighten 2 knurled thumb screws.

I. Using the squeegee handle, make a single or double pass with the squeegee.

J. Inspect paste on board carefully and make speed and pressure adjustments to insure complete coverage of pads. It may take several trial runs to get the quality expected.

K. After lifting frame, remove board and insert new board.

L. Repeat steps, taking note of when more solder paste might have to be added.
Print Deck (Pressure Plate) shown without Lexan Pre-print sheet

Board Stop Slides

Squeegee transfer and lift handle

Knurled Thumb Screws

Slide Rail

Squeegee Limit Stop

Gas strut and adjustment slot

X Axis Adjustment

Squeegee Pressure Regulator

Squeegee Pressure Gauge (in psi)

Illustration No. 2.
VI. Z-AXIS ADJUSTMENT
A. Z-Axis, or the height of the stencil above the board, is referred to as the stand-off height.
B. Z-Axis leveling is factory preset. Insure that stencil printer leveling feet are set properly to level printer (use level). If the stencil plane to print deck plane is not parallel, consult factory.
C. To adjust the stand-off height, turn the Z Axis Adjustor knob (front at right) clockwise to raise the print deck and counter-clockwise to lower the print deck.

VII. X, Y AND THETA ADJUSTMENTS
A. To align the circuit board to the hole pattern on the stencil, the SPR-40 is equipped with registration control knobs that provide ±0.5" of movement in the X axis and Y axis and ±5° diagonally (theta rotation).
B. On the front of the unit, the 2 adjustment knobs (left and center) control the Y-axis (front and back) and the theta (skew) for board-to-stencil fine registration.
C. Turning the Y knobs simultaneously clockwise will move the pressure plate towards the front of the machine. Turning the Y knobs simultaneously counter-clockwise will move the pressure plate towards the rear of the machine.
D. Turning the left Y knob counter-clockwise while turning the right Y knob clockwise will cause the pressure plate to rotate clockwise. Turning the right Y knob counter-clockwise while turning the left Y knob clockwise will cause the pressure plate to rotate counter-clockwise.
E. The adjustment knob on the right side of the unit controls the X-axis (side to side) movement of the Print Deck. Turning the X axis knob clockwise moves the print deck from left-to-right, and turning counter-clockwise moves the print deck right-to-left.
F. Align the stencil with the pads on the substrate by looking through the screen or stencil openings while turning the appropriate axis control knob(s). Several test prints are recommended to verify fine registration.

VIII. DUAL SQUEEGEE ANGLE ADJUSTMENT
A. Squeegee angle is factory set and normally doesn’t need to be changed; however, to do so:
B. Loosen set screws of both collars at top of squeegee assembly (9/64” allen key provided)
C. Lift squeegee to give squeegee a steeper angle.
D. Lower both collars and tighten collar set screws.
IX. MAINTENANCE

1. Clean the unit thoroughly after each use. Use solvent, such as isopropyl alcohol, to remove any ink or paste deposits.

2. Lubricate squeegee guide rails with light oil every 40 hours of use.

3. The unit will give you years of reliable service.

4. If any problems arise please contact APS at 215-938-1000 custserv@apsgold.com
X. SPR-40 VACUUM PLATE ATTACHMENT OPTION

A. Position plate so that manifold is towards the rear, and 4 corner holes line up.
B. Attach vacuum plate to Print Deck using four (4) screws provided at each corner into pre-tapped holes.
C. Attach a shop-vac or other source of vacuum to 1" hose fitting.
D. Cover vacuum air holes around board to maximize the available vacuum.