Tape plasma discharger

Georg Kislinger, Martina Schifferer

plans adapted from Mark Terasaki, Richard Schalek
Setup and run

- Glue tape to empty reel with sticky tape as shown
- The ‘outside’ uncoated side has to be taped as ‘inside’ on the empty reel
- Flip the empty reel in way that the full reel inside is pointing upwards
Setup and run

• Insert to the chamber as seen in the video
• Fitting a single finger into the reel seems to be the easiest way to hold them
• Place plastic dish or any other fitting plastic below the tape reel to keep it in place
Setup and run: Spool insertion
Setup and run

• Wiggle tape over discharge unit
• Make sure everything is airtight
• Start a protocol you previously prepared
How to set-up easiGlow

- The options 'Ultimate Pressure' and 'Stable Pressure' were not used.
- Instead, 'Hold Pressure' at 0.39 mbar was used most vacuum steps, since it has been the most reliable.

To set the desired values:
1. Press 'Main' and then 'Protocols'
2. Select the protocol you want to modify.
3. Click on 'Program Screen' to change the protocols parameters (use 'Run Screen' to run a protocol).

To modify a step:
1. Use the up and down arrows to select the desired step.
2. Press 'Next' to choose the step type (options include Ultimate Pressure, Hold Pressure, etc.).
3. Enter the desired values.
4. Press 'Next' to proceed to the next window.

To save the settings for a step:
- Click 'Save Program settings' to save the settings for an individual step.
- This appears after 'next'-ing through all previous windows.
- One final 'Next' brings you back to step selection (Step 1)

To start a program:
1. Press 'Main' and 'Protocols'.
2. Select the desired program.
3. Open the 'Run Screen'.
4. Start the program using 'Auto Run'.

Hold Pressure at 0.33 mBar for 1s
Hold Pressure at 0.39 mBar for 1s
Hold Pressure at 0.39 mBar for 10s
Glow Discharge with negative charge/15 mA/1440 s
Vent
PROTOCOL 2

1  HOLD PRESSURE
    NEGATIVE seconds
    0 mA
    0.33 mBar
    GAS 1

2  HOLD PRESSURE
    NEGATIVE seconds
    0 mA
    0.39 mBar
    GAS 1

3  HOLD PRESSURE
    NEGATIVE seconds
    0 mA
    0.39 mBar
    GAS 1

4  GLOW DISCHARGE
    NEGATIVE seconds
    15 mA
    0.39 mBar
    GAS 1

5  VENT W/ PUMP OFF
    NEGATIVE seconds
    0 mA
    10.97 mBar
    GAS 1
During the run

• Make sure the plasma looks OK
• Once the plasma is OK start the tape motor
• Fine adjust its speed
• Use no speed higher than 20 rpm
After the run

- Check discharge quality by putting a drop of water onto tape
- If water spreads like on left stripe discharging is good
Technical details

- Box size outside [in]: 12x6x5
- Wall thickness [in]: ½
- Ø big hole [in]: 4 ⅛
- Distance small holes to edges [in]: 2 ¼, 2 ⅛
- Ø small holes [in]: ¼
Technical details

We use ¼ inch shaft size
Technical details: Spool holder

plastic burls to prevent spool slip off (fit into spool indentations)

tightening turning rod
Technical details: Motor coupling
Technical details: Pump
Technical details: Pump
Parts (Motor)

EITHER from McMaster-Carr

- Mini Gearmotor 12 V DC, 25 rpm @ 47 in/oz
  PartNo: 6331K32
  Price: 109.50 $
- Enclosed AC to DC Motor Speed Control
  PartNo: 7793k51
  Price: 295 $
- Replacement Bearing & Seal Package, 1/4" Shaft Drive 1/4"
  PartNo: FMH-25BK
  Price: €26.60

OR from Pololu ordered from EXP-Tech

- 1x Pololu Jrk G2 21v3 USB Motor Controller with Feedback
  PartNo: EXP-R25-1198
  Price: 42,30€
- Enclosed AC to DC Motor Speed Control
  PartNo: 7793k51
  Price: 295 $
- 1x Pololu 150:1 Metal Gearmotor 37Dx73L mm with Encoder
  PartNo: EXP-R25-1413
  Price: 44,10€

- This option is preferred if you have someone to setup the motor
Moving parts (Kurt J. Lesker Company)

EITHER

• Dynamic O-ring shaft seal 1/4" Aluminum
  PartNo: FMH-25A
  Price: €179.00

OR

• Dynamic O-ring shaft seal 1/4" Stainless
  PartNo: FMH-25SS
  Price: €317.00

• Replacement Bearing & Seal Package, 1/4“ Shaft Drive 1/4"
  PartNo: FMH-25BK
  Price: €26.60

• O-ring: Feedthru, Aluminium 1/4" shaft rotary o-ring sealed 1
Parts (Plexiglass)

For example:
• Plexi Glass 2x(12x6), 2x(4x6), 2x(4x11).
  (Chemcast GP Acrylic Sheet, 0.500 clear, Tap Plastics, San Leandro, CA).
• Plexiglas adhesive
  (Weld-On 4 Cement, 4oz, Tap Plastics, San Leandro, CA).
• Plexiglas adhesive applicator
  (SY20-65, Syringe Hypodermic Applicator,18 gage, Tap Plastics, San Leandro, CA).
Supplementary files

• Supplementary files can be found at
https://drive.google.com/drive/folders/1_6dVm971XVx_WnZGPuem7iYIQ3TwWxFj?usp=drive_link