Operating Instructions for the P-541.T0L Open-Loop Stage

The P-541.T0L stage is an open-loop stage for tip/tilt motion. It is to be operated by the E-663 three-channel piezo driver.

This Technical Note contains the following information:

- Safety precautions
- General requirement for tilt motion
- Performing tilt motion around the X axis
- Performing tilt motion around the Y axis
- Dimensional drawings

Safety precautions

**NOTICE**

Possible damage of flexure joints

If the output voltages of the piezo driver are not set as listed below the flexure joints of the stage can be damaged.

- To prevent damage from the stage use output voltages for Channel 1, Channel 2 and Channel 3 as follows:

**With tilt motion around the X axis:**

- The output voltage of Channel 1 must be 50 V DC.
- The voltages on Channel 2 and 3 must be changed in an opposing way.
- The voltages on Channel 2 and 3 must be changed by the same amount, see example in instructions below.

**With tilt motion around the Y axis:**

- Channel 2 and 3 must have an equal output voltage.
- The output voltages of Channel 2 and 3 must be changed in an opposing way to the output voltage of Channel 1.
- The changed amount of output voltage of Channels 2 and 3 must be half of the changed amount of Channel 1’s output voltage, see example in instructions below.
General requirement for tilt motion
To make tip/tilt motion possible, the three piezo actuators have to expand to half of their possible travel.
To do so proceed as follows:
1. Connect Channel 1 of the E-663 amplifier to the PZT1 cable of the P-541.T0L stage.
2. Connect the amplifier’s Channel 2 to the stage’s PZT2 cable.
3. Connect the amplifier’s Channel 3 to the stage’s PZT3 cable.
4. Put an output voltage of 50 V DC to Channel 1, Channel 2 and Channel 3.

Performing tilt motion around the X axis
To perform a tilt motion around the X axis proceed as follows:
1. Keep the output voltage of Channel 1 at 50 V DC.
2. Change the output voltages of Channel 2 and of Channel 3 in an opposing way to each other and about the same amount:
   For example:
   If you set Channel 2 to 70 V DC, you have to set Channel 3 to 30 V DC simultaneously.

Performing tilt motion around the Y axis
To perform a tilt motion around the Y axis proceed as follows:
1. Set Channel 2 and Channel 3 to identical output voltages.
2. Change the output voltage of Channel 2 and 3 in an opposing way to the output voltage of Channel 1.
   NOTE: The changed amount of output voltage of Channels 2 and 3 must be half of the changed amount of Channel 1’s output voltage
   For example:
   If you set the output voltage of Channel 2 and Channel 3 to 70 V DC, you have to set the output voltage of Channel 1 to 40 V DC simultaneously.
Dimensional drawings

Decimal places are separated by commas.

Figure 1: Top view on P-541.T0L
Figure 2: View on P-541.T0L from position A of previous figure