

## Displacement Sensor 1021534

### Instruction sheet

07/19 GH



#### 1. Description

Displacement sensor inside a sensor box and featuring a built-in precision potentiometer plus a rotating pulley onto which a string can be wound in order to measure displacement. Suitable for recording periodic and oscillatory movements which can be traced by the turning of the string on the pulley without putting too much strain on the precision potentiometer when it reaches the limits of rotation.

Automatic sensor recognition through CMA interfaces distributed by 3B.

#### 2. Operation

- Set up the experiment with the displacement sensor included.
- If possible, select a zero point in such a way that the limits of rotation of the pulley are never reached.
- Turn on the interface or connect it to the computer and start the Coach software. Connect the displacement sensor with the sensor cable to one of the analog inputs of the interface.
- Wait for the unit to automatically detect the sensor

#### 3. Technical data

Internal diameter of pulley:	22 mm
Max. displacement:	61 mm
Resolution:	0.3 mm
Sensor:	Precision potentiometer using a wire
Max. angle of rotation for sensor pulley:	320°
Resistance range:	10 kΩ/44 mm
Max. permitted speed of rotation for long-term use:	1 turn/second
Max. permitted torque at end limits	100 Ncm

#### 4. Apparatus supplied

- 1 Displacement sensor
- 1 Stand rod with thread, 120 mm
- 1 Nylon thread, 1 m, 1 mm diam.
- 1 Instruction manual

#### Additionally required

- 1 Sensor cable 1021514

## 5. Example experiment

### Recording a pV diagram for a G-model Stirling motor using WiLab and Coach 7

Required equipment:

1 Stirling Engine G	1002594
1 WiLab	1022284
1 Displacement Sensor FW	1021534
1 Relative Pressure Sensor FW $\pm 1000$ hPa	1021533
2 Sensor Cable	1021514
1 Sensor Holder for Stirling Engine G	1008500
1 DC Power Supply 0 – 20 V, 0 – 5 A @ 115 V	1003311
or	
1 DC Power Supply 0 – 20 V, 0 – 5 A @ 230 V	1003312
1 set of experiment leads	1002843
1 Coach 7 License	

Set up the experiment as in Fig. 1.

- Wrap the thread around the displacement sensor's pulley as in Fig. 2.
- Connect WiLab to the computer, start the Coach 7 software and load an activity suitable for the Stirling engine G.
- Connect the Stirling engine's DC motor to the DC power supply and set an output voltage of 6 V so that the Stirling engine operates at medium speed.
- Only allow the Stirling motor to operate at high-speed for short periods so as not to overstress the displacement sensor.

## 6. Disposal

- The packaging should be disposed of at local recycling points.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. Local regulations for the disposal of electrical equipment will apply.

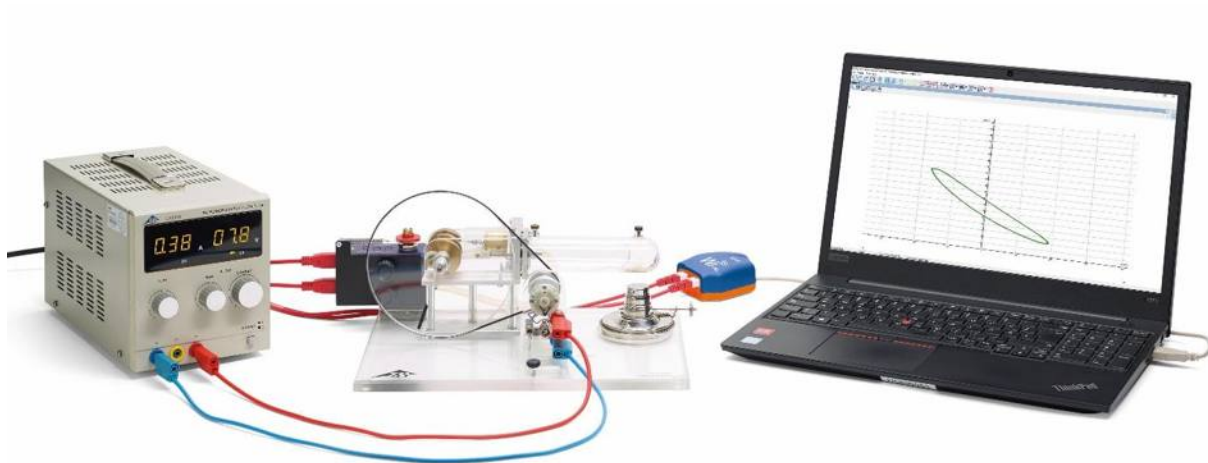
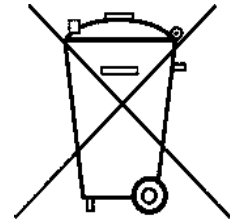


Fig. 1 Experiment set-up for recording the pV diagram of a G-model Stirling engine



Fig. 2 Attachment of the thread to displacement sensor pulley

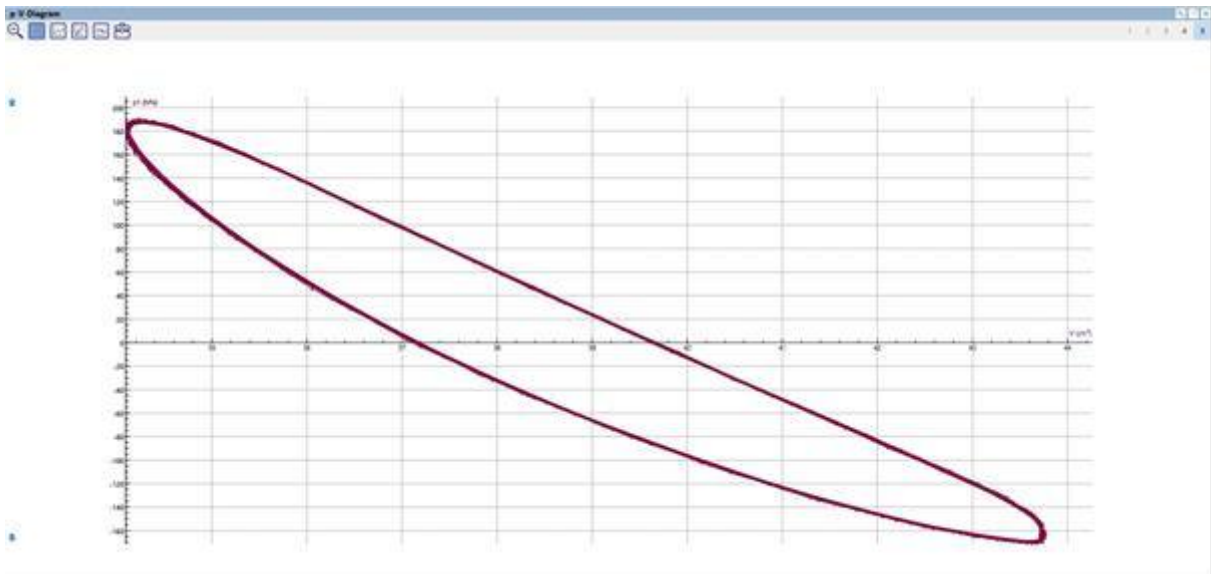


Fig. 3 Graph of pV diagram for Stirling engine G using WiLab and Coach 7.