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Operating instructions

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Fig. 1: 04372-10 Stirling Engine Datalogging Module

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The unit complies with the applicable EC-guidelines

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1 SAFETY PRECAUTIONS



- Carefully read these operating instructions completely before operating this instrument. This is necessary to avoid damage to it, as well as for user-safety.
- Only use the instrument for the purpose for which it was designed.
- Only use the instrument in dry rooms in which there is no risk of explosion.
- Protect the instrument from dust, moisture and vapours. Use a slightly moist lint-free cloth to clean the instrument. Do not use aggressive cleaning agents or solvents.
- Take care that no liquid penetrates in through the housing openings, as such penetration would result in damage to Sensor.
- Do not open the unit.

2 PURPOSE AND CHARACTERISTICS

The data logging module was developed especially for the transparent Stirling engine 04372-00. It serves to record all thermodynamic state variables of the Stirling engine and transfer the measured data to the software via USB.

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3 INSTALLATION OF THE MODULE

To measure pressure, temperature, volume and speed of the Stirling engine, the data logging module and the Stirling engine must be connected together.



Fig. 2: Individual parts of the scope of delivery

The Stirling engine is detached from the blue base plate. Then the mounting plate is removed from its underside using a screwdriver. Now the Stirling engine is attached to the mounting plate of the Datalogging Module (3).



Fig. 3: Stirling engine mounted on the mounting plate

Remove the protective foil of the adhesive strip from the magnetic signal module (4) and stick the module into the opening of the transparent crankshaft housing. Ensure that the two driving pins are coupled to the mushroom-shaped flywheel mass.

For pressure measurement, the compressed air hose (5) must be connected to the connector (6) on the base plate (3) and connected to the data logging module (1).



Fig. 4: Connected data logging module

The data logging module can now be docked to the mounting plate using the centering pin (7) and magnets.



Fig. 5: Fully assembled data logging module

Finally, the Stirling engine is mounted again on the blue base plate using the knurled screws (2) supplied.



Fig. 6: Fully assembled Stirling engine

4 NOTES ON OPERATION

This device fulfils all of the technical requirements that are compiled in current EC guidelines. The characteristics of this product qualify it for the CE mark.

The individual connecting leads are each not to be longer than 2 m.

The instrument can be so influenced by electrostatic charges and other electromagnetic phenomena (HF, bursts, indirect lightning discharges) that it no longer works within the given specifications. Carry out the following measures to reduce or eliminate the effect of such disturbance: Ensure potential equalization at the PC (especially with Laptops). Use screening. Do not operate high frequency emitters (e.g. radio equipment or mobile radiotelephones) in the immediate vicinity. When a total failure of the instrument occurs, unplug it and plug it back in again for a reset.

5 HANDLING

This section describes how to commission the module. Please read this section carefully in order to avoid failures or operating errors.

5.1 Start-up

Connect the data logging module to the computer using the USB connection cable included in the scope of delivery. The operational readiness is indicated by a green LED.



Now connect the two supplied thermocouples (NiCrNi) to the measuring points T1 and T2 on the module. Insert the sensor ends (9) into the corresponding measuring points on the Stirling engine. Attention: The sensor ends are protected with a metal sleeve (8), which must be unscrewed beforehand.



Fig. 7: Thermocouples

Start the measureLAB data acquisition software. Select the desired measurement mode (P-V mode or measurement mode). Then start the measurement acquisition software.

6 TECHNICAL DATA

Operating temperature range: 5 - 40°C Rel. humidity < 80%

Temperature T1	
Range	-10 +400 °C
Resolution	0.4 °C
Temperature 12	
Range	-10 +400 °C
Resolution	0.4 °C
Speed v	
Range	0 2000 U/min
An edge of	
	0 200 %
Range	0360
Resolution	0,1 °
Volume V	
Range	32 cm ³ 44 cm ³
Resolution	0.02 cm ³
Pressure p	
Range	0…200 kPa
Resolution	0.1 kPa
May data rata	2 64-7
Dimonsions (longth x width x hoight)	2 NI IZ
Maight (incl. Mounting plate)	159 a
weight (incl. wounting plate)	156 <u>y</u>
7 SCOPE OF DELIVERY	
The extent of delivery is as follows	
Stirling Engine Datalogging Module	04372-10
2v Type-K Thermocouple	0-072-10
	07025 00
Mounting plate	07935-00

Mounting plate Magnetic signal mod

- Magnetic signal moduleCompressed air supply line
- 4x Knurled screw (M3*10)
- Operating instructions

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8 ACCESSORIES

- Stirling engine, transparent
- Software measureLAB

9 DISPOSAL

The packaging mainly consists of environmentally-friendly materials that should be returned to the local recycling stations.



Do not dispose of this product with normal household waste. If this unit needs to be disposed of, please return it to the address that is stated below for proper disposal

04372-00

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