

Study of a Vortex tube

DESCRIPTION

- The Vortex or whirling tube is an original system which was invented by the French physicist Georges Ranques, and patented in France. It does not include any moving parts and it can separate, with variable proportions, one compressed gas stream (T_E) temperature in two gas streams one with the $T_C > T_E$ temperature (hot stream) and the other with the $T_F < T_E$ temperature (cold stream).



SUGGESTED APPLICATIONS

Theoretical examination of the Vortex tube operating principle

Qualitative study

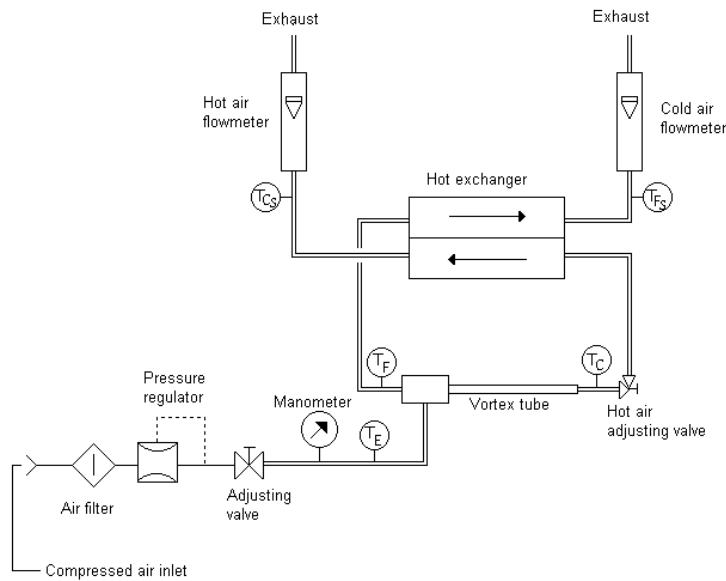
Qualitative study – performance curves

- Temperature deviation between the hot side ΔT_E^C and the cold part of the flow (σ)
- Temperature deviation between the cold side ΔT_E^F and the cold part of the flow (σ)
- $\Delta T_E^C = f(\text{pressure})$ With a constant cold air flow, with a constant hot air flow, with a constant σ

Use of the Ranques tube as a refrigerator

- Determination of : powers, coefficient of performance
- Enthalpic balance

SCHEMATIC DIAGRAM



SPECIFICATIONS

- Measurement of temperatures by means of Pt 100 Ω probes
- Measurement of air flow by means of class 1,25 float flow meters
- Measurement of inlet air pressure by means a Bourdon tube manometer : \varnothing 100 mm, class 1.6
- Digital temperature indicator, probe selection by means of a fast connecting system

UTILITIES

Electricity : 230 V single phase 50/60 Hz – 3 kW
Water : 100 L/h

DIMENSIONS

Length : 450 mm
Width : 400 mm
Height : 620 mm
Weight : 30 kg