

Study on High-efficiency for Co-generation System

Study on Performance Evaluation and Optimization of 200kW Gas Engine Co-generation System

➡ Energetic analysis of co-generation system by using heat quantity and exergy

Energy flow diagram (Fig.1) ... Evaluation of effective use of energy
Operation simulation ... Energy conservation evaluation

Construction of High-efficiency Heat Recovery Generation System for Co-generation (Fig.2)

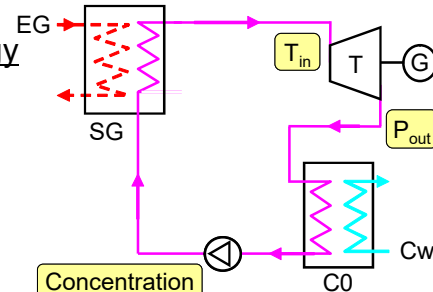
➡ Selection of steam cycle and working fluid by using cycle simulation

Steam cycle ... Rankine cycle, Kalina cycle
Working fluid ... Steam, Ammonia, Ammonia/water mixtures, etc.

➡ Elucidation of performance characteristic of scroll expander (Fig.3)

Performance test ... Comparison between compressed air and steam
Analytical model ... Quantitative evaluation of various losses (expansion loss, mechanical loss) in expander

Rankine Cycle



G : Generator EG : Exhaust gas
Jw : Jacket water
Se : Separator Mx : Mixer Cw : Cooling water
C0, C1, C2 : Condenser SG : Steam generator
T_{in} : Turbine inlet temperature
P_{out} : Turbine outlet pressure

Kalina Cycle

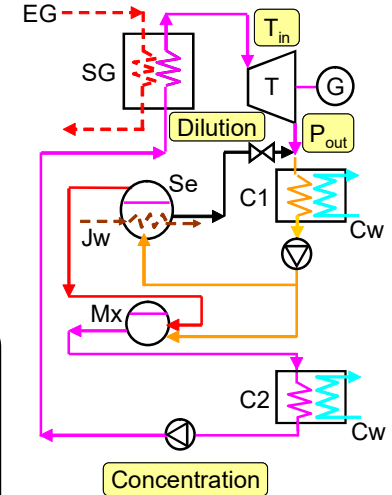


Fig.2 Rankine cycle and Kalina cycle

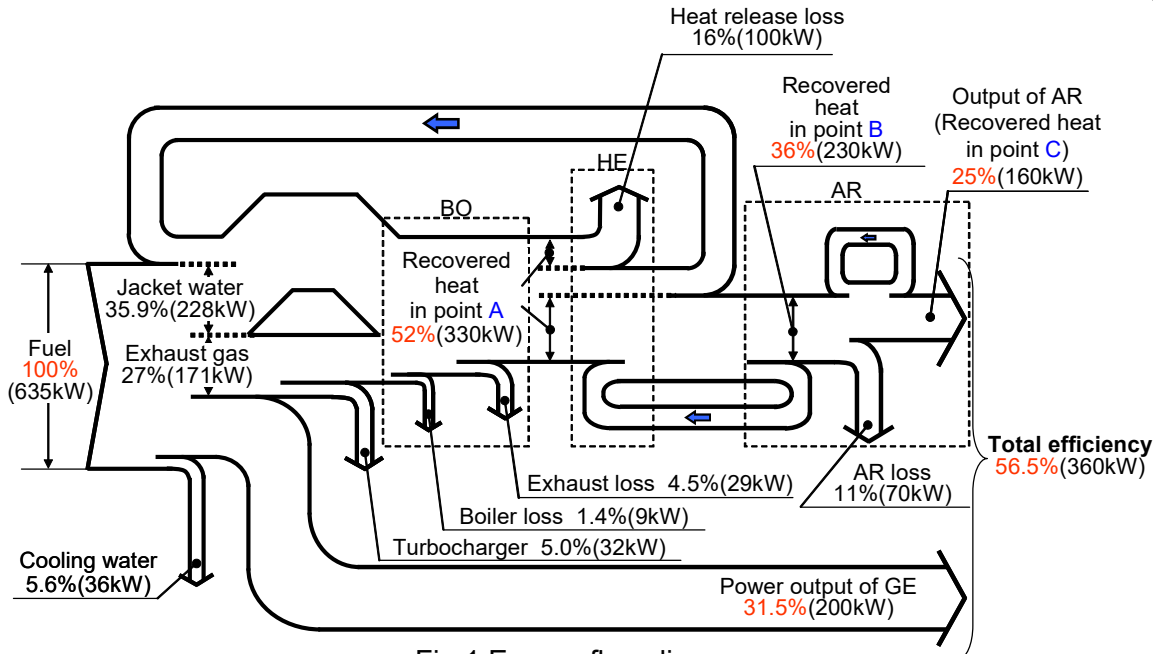


Fig.1 Energy flow diagram

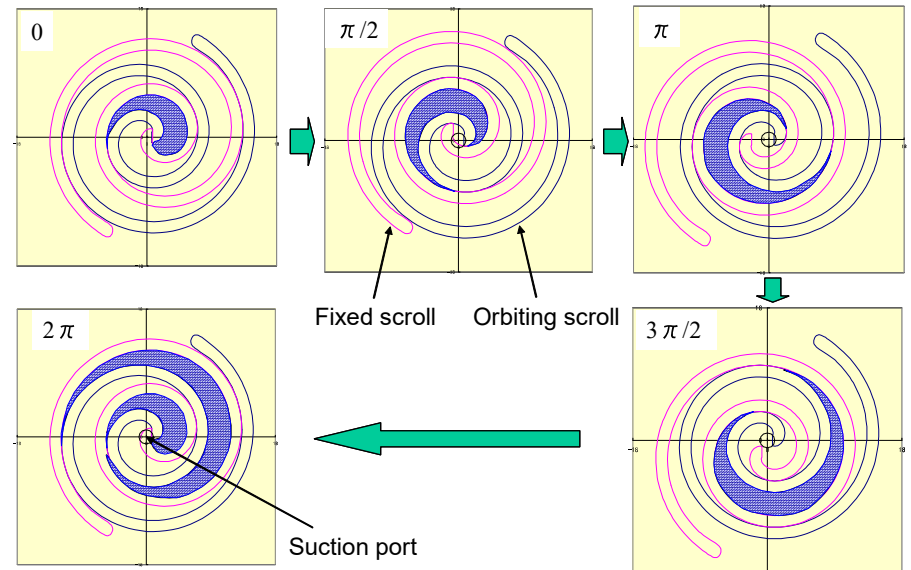


Fig.3 Principle of scroll expander