Thermal Response Test Equipment Data

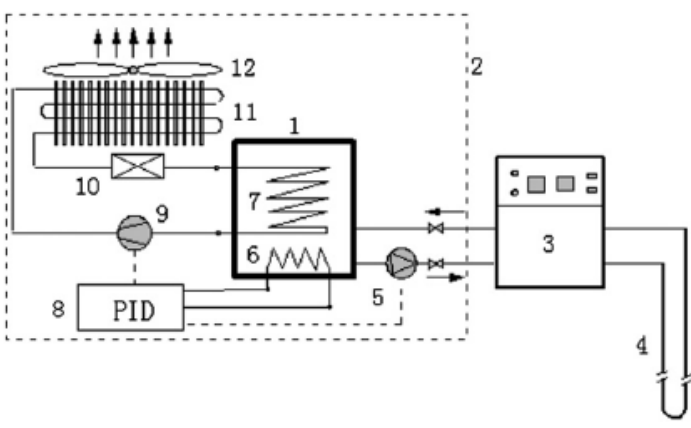|	
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General TRT data

Type: *Heat injection and heat extraction*	**No TRTs:** *6*	**Size, weight:** *85cm+85cm+105cm, 125kg*
Aim: *Research, development, and commercial*		**Pump:** *Wiley-RS25 (2.5m^3/h and 90W)*
Powered by: *Electricity (380V/50Hz)*		**Heater:** *PID heater (12kW,$\pm0.5^oC$ accuracy)*
Built on/in: *Container(movable)*		**HP/Cooler:** *R22 refrigeration cycle (9kW)*

Fig. 1. Principle diagram of the improved TRT equipment. (1: insulated water tank; 2: heat/cold source system; 3: measuring system; 4: borehole heat exchanger; 5: circulating pump; 6: water heater; 7: evaporator; 8: PID controller; 9: compressor; 10: expansion valve; 11: condenser 12: axial cooling fan.).

<u>Principle outline</u>

Temperature measurements: *Pt1000 sensors ($\pm0.1^oC$ accuracy)*

Flow rate measurements: *Ultrasonic flow meter ($\pm0.001\ m^3$/h accuracy)*

Voltage stabilization: *Yes (220 V/50Hz)*

Electricity measurement: *Yes (±0.1 kWh)*

GPS: *No*

Remote Control: *No*

Remote Data Collection: *No*

Logger: *Automatic logger (custom)*

TRT Experience

Years of operation: *3 years*

Number of performed measurements: *over 60 boreholes (Research and commercial)*

Typical borehole depths: *50m, 100m and 120m*

Applications: *BHE and energy piles*

Typical collector type: *1U and 2U with different types of filling*

Typical fluid type: *Water*

Typical groundwater temperature: *12-16^oC*

Geographical area: *Beijing, Tianjin, Hebei, Anhui, et al.*

Analysis Method: *Numerical method based on cylindrical source model (own software)*