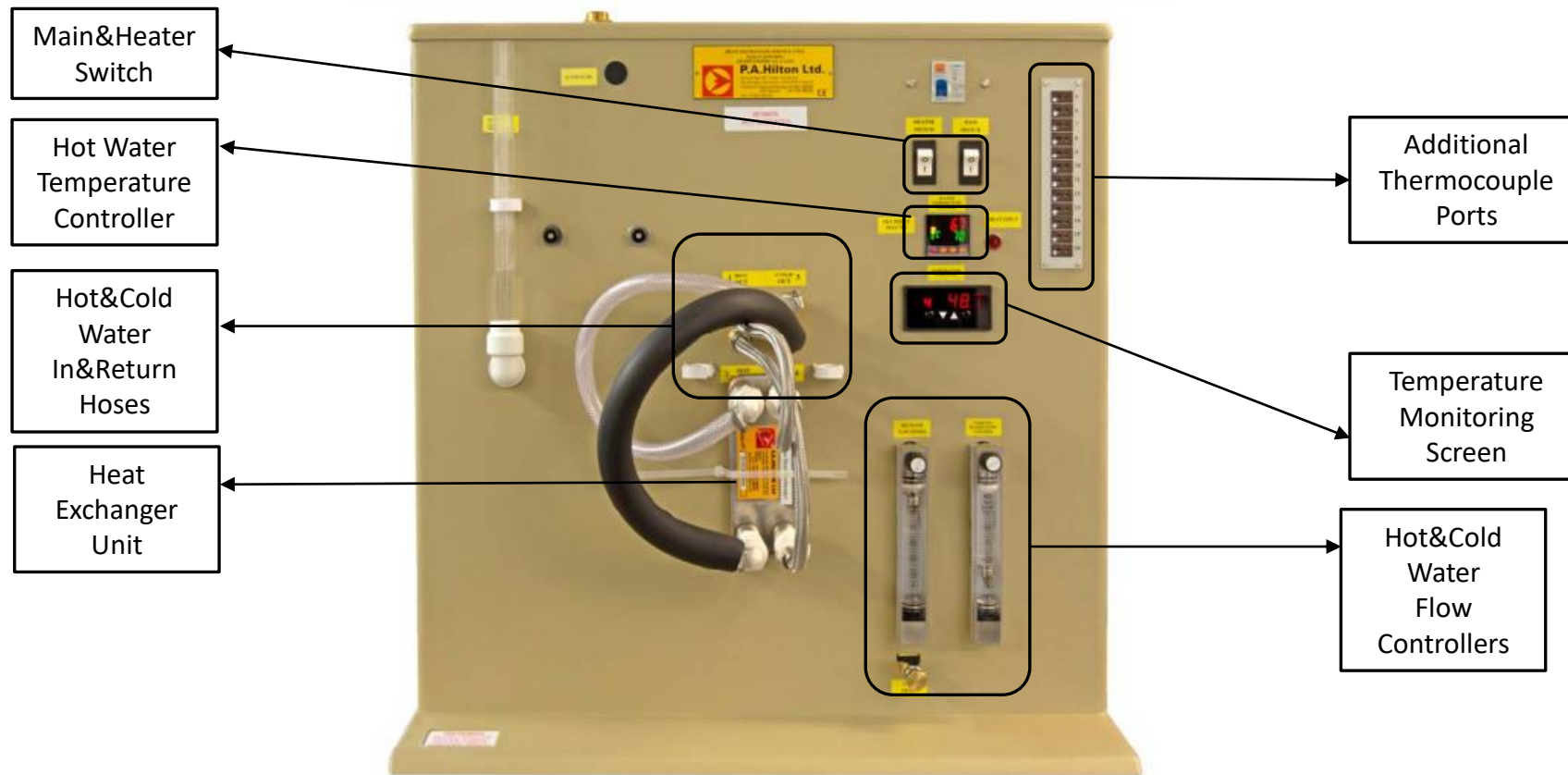


ENE 411
HEAT EXCHANGER
EXPERIMENT

EXPERIMENTAL SETUP



Heat Exchanger Main Unit

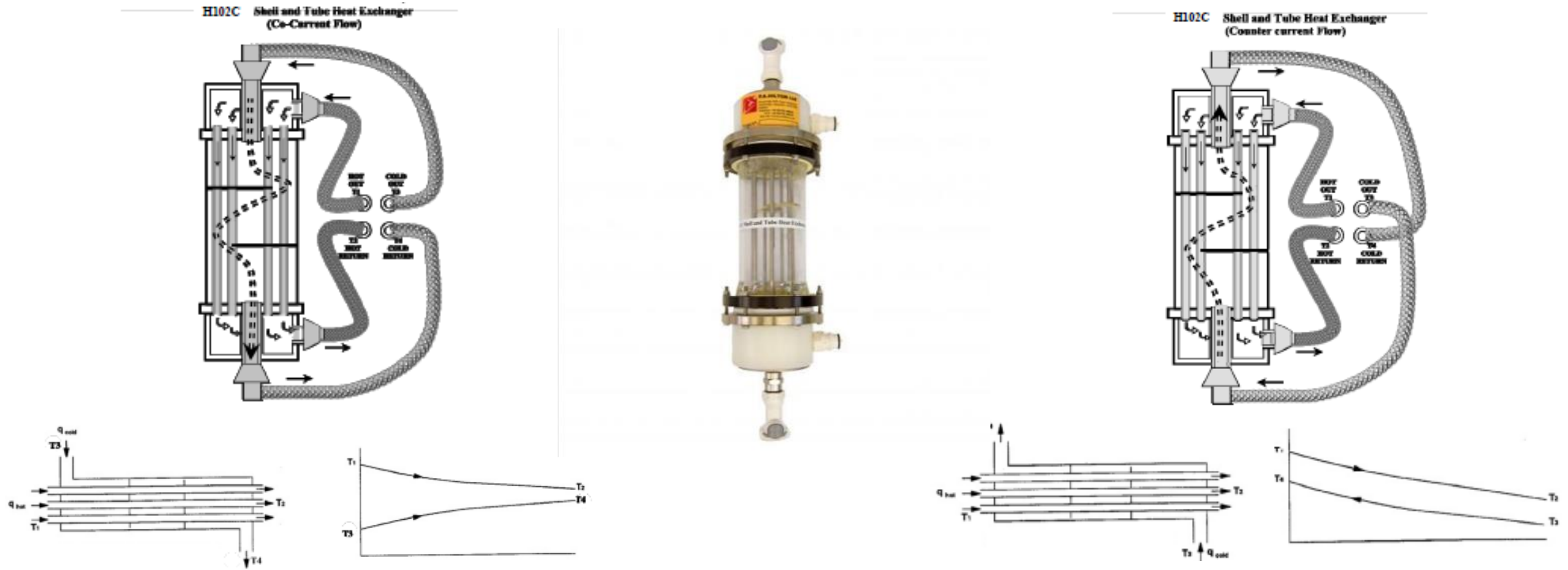
EXPERIMENTAL SETUP



Heat Exchanger Types

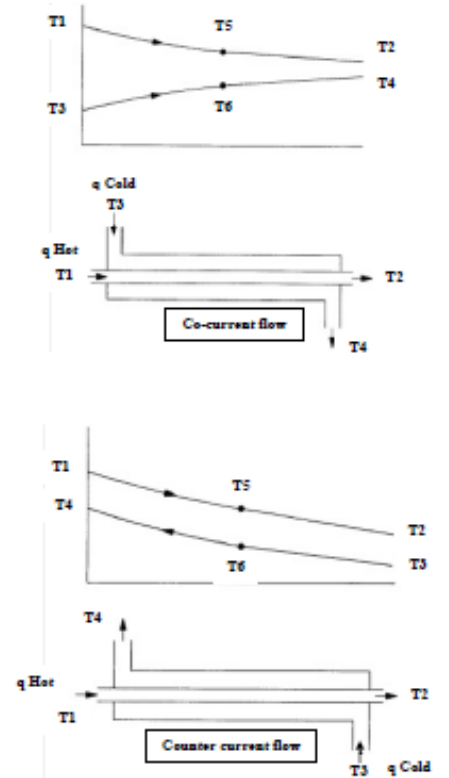
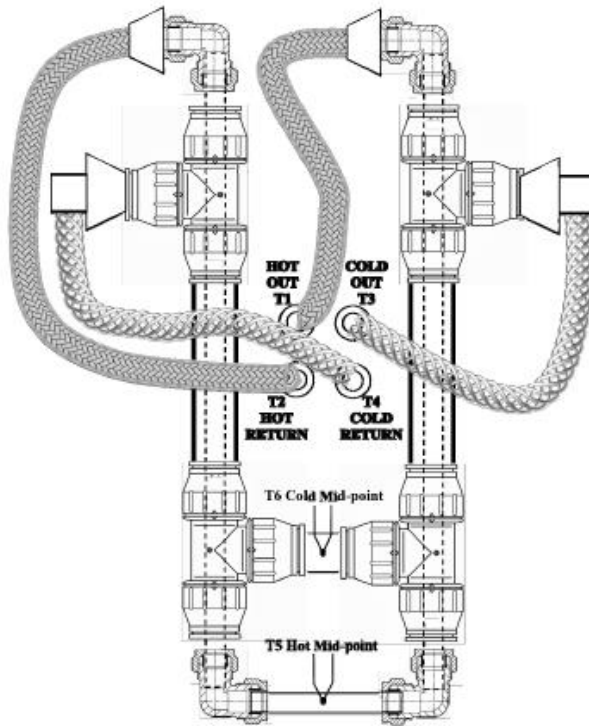
1- Plate 2-Concentric 3-Shell&Tube

EXPERIMENTAL SETUP



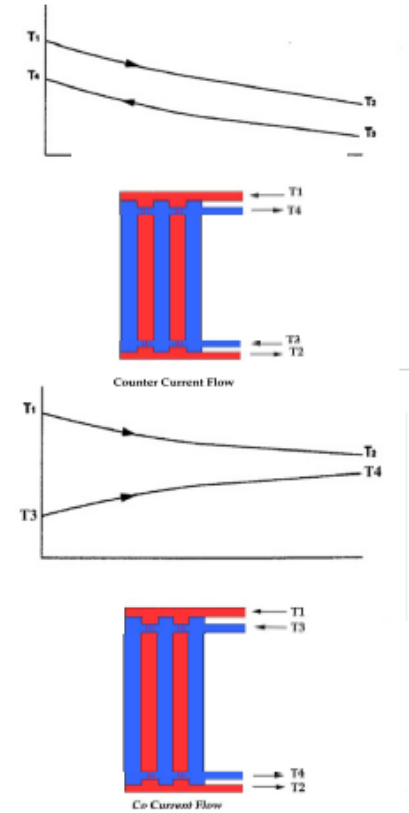
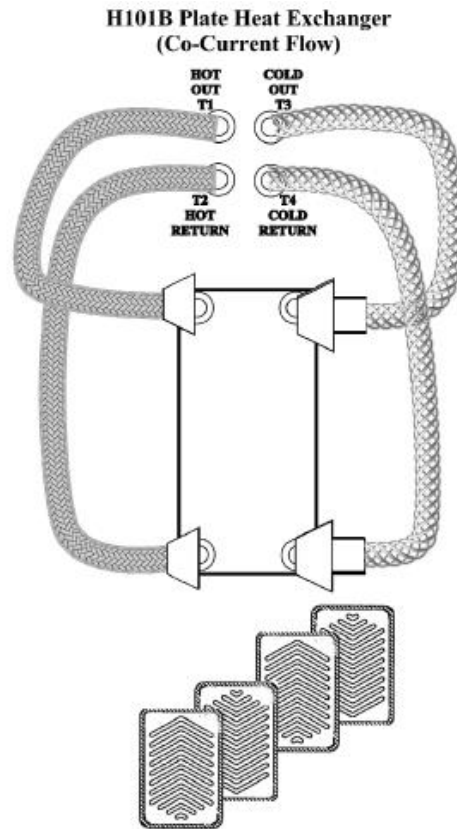
EXPERIMENTAL SETUP

H102A Concentric Tube Heat Exchanger
(Co-Current Flow)



Parallel (Co-Current) Flow Configuration of Concentric Heat Exchanger

EXPERIMENTAL SETUP



Parallel (Co-Current) Flow Configuration of Plate Heat Exchanger

EXPERIMENTAL PROCEDURE

1. Adjust the flow configuration of heat exchanger. (Parallel or Counter)
2. Press the Main Switch for starting water circulation.
3. Press the Heater Switch to give heat input to the hot water side of heat exchanger.
4. Adjust the hot water inlet temperature.
5. Adjust the flow rates of hot and cold water streams.
6. Take temperature datas when the system reach steady regime.

REPORT DETAILS

1. You should start with giving information about heat exchangers like types and usages etc.
2. In your reports you should calculate the temperature difference both hot and cold side, thermal efficiencies of each side and mean thermal efficiency of HEx, heat transfer rate of both sides, logarithmic mean temperature difference of HEx and overall heat transfer coefficient.
3. You should show temperature profile basicly in a graph. (Inlet and outlet values of both sides)

REPORT DETAILS

4. Energy balance: compare the heat given by the hot stream (Q_{hot}) with the heat taken by the cold stream (Q_{cold}) and report the loss $Q_{loss} = Q_{hot} - Q_{cold}$. If $Q_{cold} > Q_{hot}$, or the loss is more than a few percent of Q_{hot} , explain which measurement (thermocouple offset, flowmeter reading, steady state not reached) can produce this.
5. Compare the co-current and counter-current runs at the same flow rates (efficiencies and U). If counter-current flow shows no clear advantage, discuss why (small exchanger / low NTU, measurement uncertainty).
6. Discuss how U changes with the hot water inlet temperature and with the flow rates, and whether your data follow the expected trend. Point out and explain any outlier.