

# Microprocessor Controller (TRNSYS Type 40) for Heatpump Applications

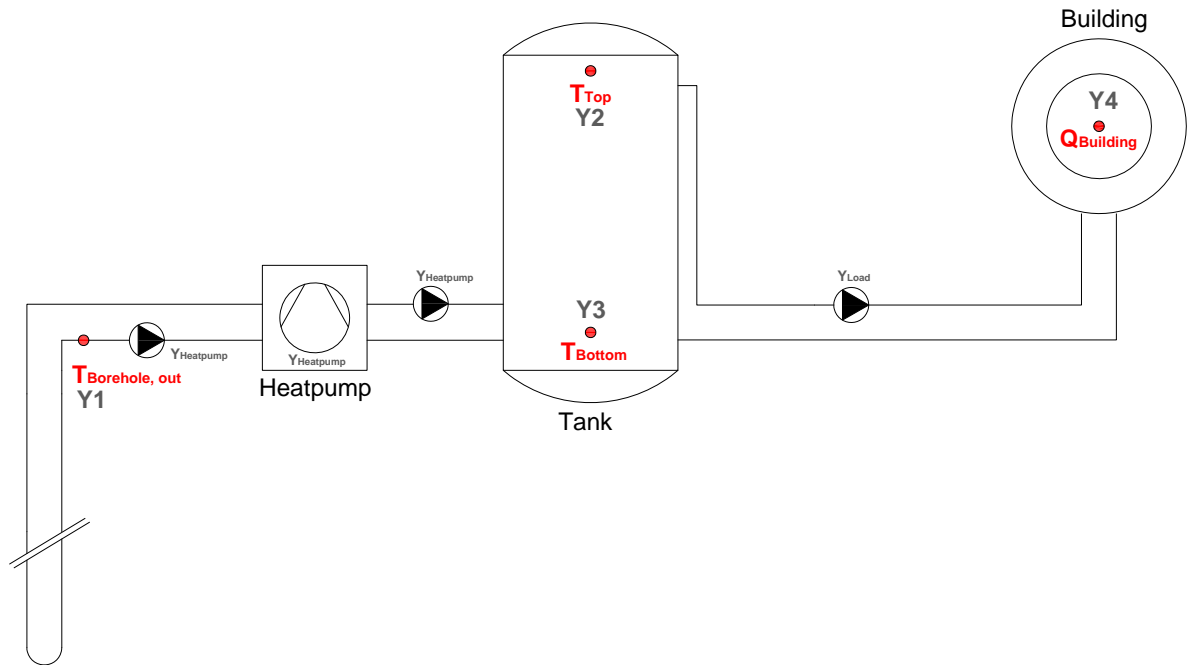


Figure 1: Generic diagram for the borehole, heatpump, tank and building

$$C_{i,t} = \begin{cases} \text{ON} & \text{if } (IN_{hi} - IN_{low}) > \Delta T_{on} \text{ and } C_{i,t-1} = \text{OFF} \\ \text{OFF} & \text{if } (IN_{hi} - IN_{low}) \leq \Delta T_{off} \text{ and } C_{i,t-1} = \text{ON} \end{cases}$$

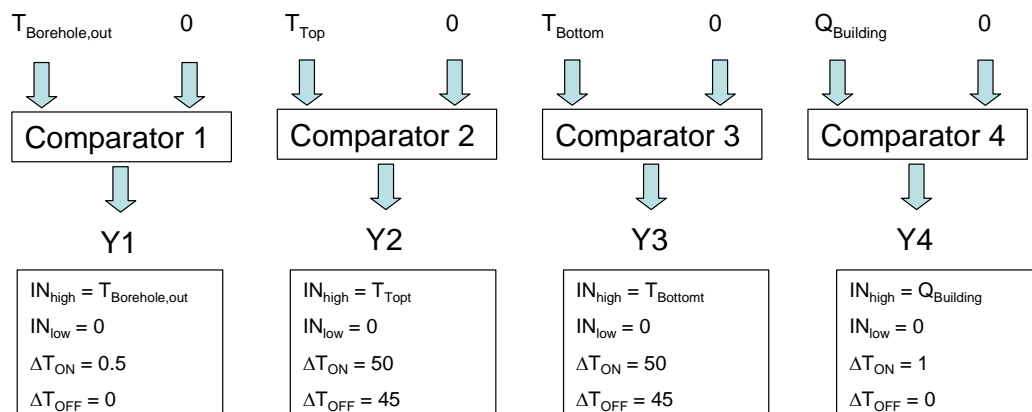
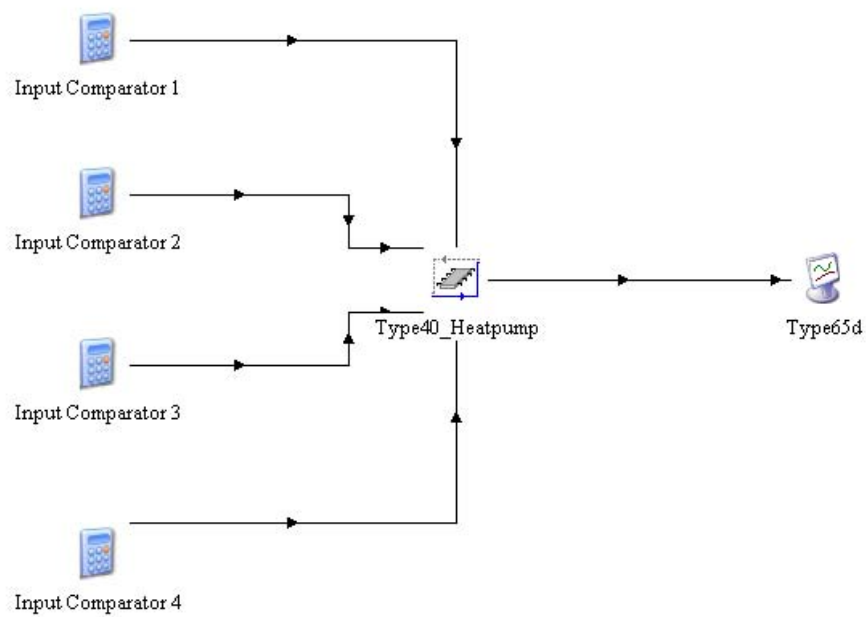


Figure 2: Comparator logic and configuration

**Table 1: Possible output states of the comparators and the corresponding Type 40 outputs**

Comparator Outputs					Type 40 Outputs	
NMMODE	Y1 BH <sub>min</sub>	Y2 T <sub>Top</sub>	Y3 T <sub>Bottom</sub>	Y4 Q <sub>Building</sub>	I Y <sub>Heatpump</sub>	II Y <sub>Load</sub>
1	1	1	1	1	0	1
2	1	1	0	1	0	1
3	1	0	1	1	0	1
4	1	1	1	0	0	0
5	1	1	0	0	0	0
6	1	0	1	0	0	0
7	1	0	0	0	0	0
8	1	0	0	1	1	1
9	0	(0 or 1)	(0 or 1)	(0 or 1)	0	1



**Figure 3: TRNSYS Studio example file**