TYPE 682: LOAD IMPOSED ON A LIQUID STREAM

General Description

Often in simulating an HVAC system, the heating and cooling loads on the building have already been determined, either by measurement or through the use of another simulation program and yet the simulation task at hand is to simulate the effect of these loads upon the system. This component allows for there to be an interaction between such pre-calculated loads and the HVAC system by imposing the load upon a liquid flowing through a device.

Nomenclature

$\dot{Q}$	-	[kJ/h]	the rate at which energy is added to or removed from the liquid stream.
$\dot{m}$	-	[kg/h]	the rate at which fluid flows past the load
C_p	-	[kJ/kg.K]	the specific heat of the liquid
T_{in}	-	[ºC]	the temperature of liquid arriving at the load.
T_{out}	-	[ºC]	the temperature of the liquid leaving the load.

Detailed Description

Type682 can be thought of as an interaction point between a building load and the liquid working fluid in an HVAC system. If the interaction point is between the building and an air stream, Type693 may be used instead.

Mathematically, this model is very simple, the user provides the flow rate, specific heat, and temperature of liquid at a point in the system loop. The building loads are added to, or subtracted from that liquid, resulting in an outlet temperature just past the interaction point.

$$T_{out} = T_{in} + \frac{\dot{Q}}{\dot{m}C_p} \qquad \text{(Eq. 682.1)}$$

According to the sign convention, a positive load will result in an outlet temperature higher than the inlet temperature and vice versa; a negative load results in an outlet temperature lower than the inlet temperature.

Example

Type682 is used in an example that can be found in:
" ..\trnsys16\TESS Models\Studio Projects\Loads and Structures Library\Synthetic Building.tpf"