



P4NODE2 - pneumatic junction 4 ports (temperature and pressure fixed by port 2)

Description

P4NODE2 is a 4-port pneumatic junction with temperature and pressure fixed by port 2.

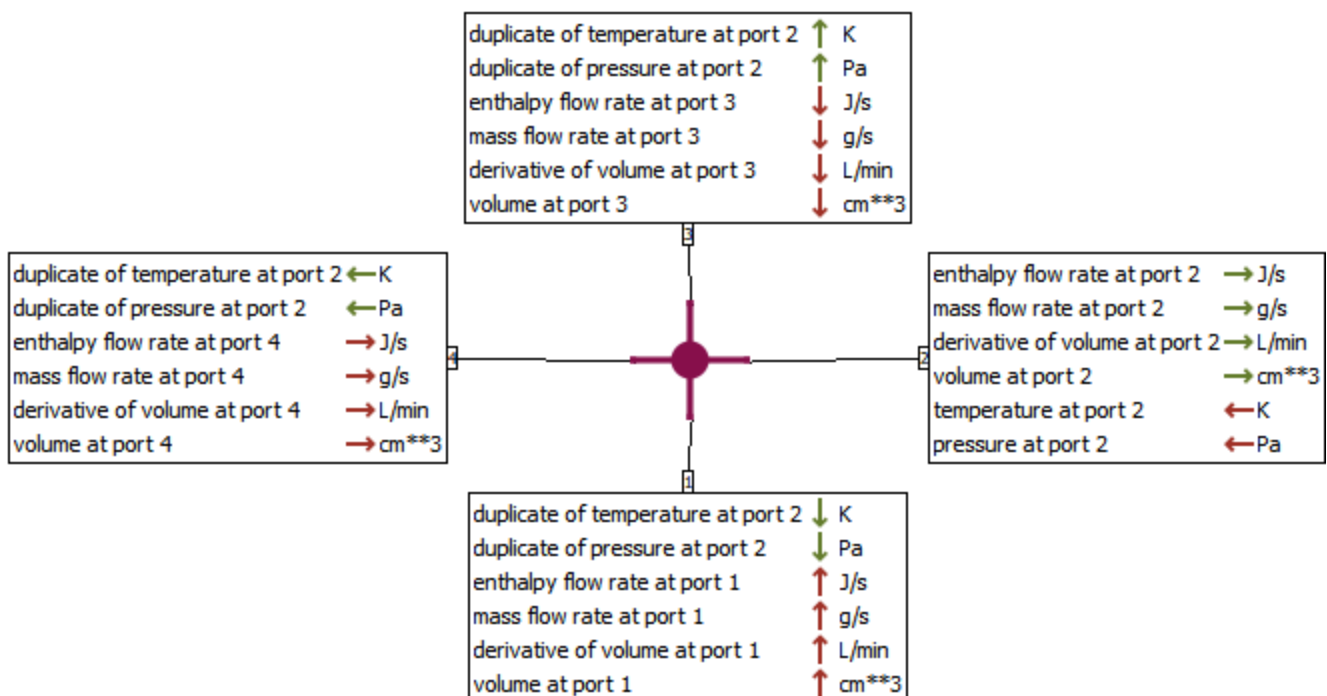
The derivatives of volume in L/min and chamber volumes in cm^3 are required as inputs on ports 1, 3 and 4 in addition to the enthalpy in J/s and mass flows in g/s. The pressure in Pa and temperature in K are fixed by the port 2 and passed without modifications to the other ports.

The bold line indicates from which port pressure and temperature are imposed to the submodel.

The enthalpy flows and mass flows, the derivatives of volume and chamber volumes, are summed and passed as outputs to port 2.

The derivative of volume and volume are used in the PCD components to transfer these data from a piston or a valve to a PCD chamber.

Icon with external variables



Usage

This submodel is suitable as a general purpose pneumatic 4-port node.

Only direct connections should be used between PCD submodels if you want to transfer the derivative of volume and chamber volume to the pneumatic chamber.

Physics and equations

Enthalpy and mass flows at port 2 are :

$$dh2 = dh1 + dh3 + dh4 \quad \text{and} \quad dm2 = dm1 + dm3 + dm4$$

Derivative of volume and chamber volume at port 2 :

$$dvol2 = dvol1 + dvol3 + dvol4 \quad \text{and} \quad vol2 = vol1 + vol3 + vol4$$

Detailed submodel view

External variables

	Title	Variable name	Unit	Type	In/Out	Default value
Port 1						
1	duplicate of temp2	temp1	K	duplicate [hidden]	output	-
2	duplicate of press2	press1	Pa	duplicate [hidden]	output	-
3	enthalpy flow rate at port 1	dh1	J/s	basic variable	input	-
4	mass flow rate at port 1	dm1	g/s	basic variable	input	-
5	derivative of volume at port 1	dvol1	L/min	basic variable	input with default	0
6	volume at port 1	vol1	cm**3	basic variable	input with default	0
Port 2						
1	enthalpy flow rate at port 2	dh2	J/s	one line macro	output	dh1+dh3+dh4
2	mass flow rate at port 2	dm2	g/s	one line macro	output	dm1+dm3+dm4
3	derivative of volume at port 2	dvol2	L/min	one line macro	output	dvol1+dvol3+dvol4

4	volume at port 2	vol2	cm**3	one line macro	output	<i>vol1+vol3+vol4</i>
5	temperature at port 2	temp2	K	basic variable	input	-
6	pressure at port 2	press2	Pa	basic variable	input	-
Port 3						
1	duplicate of temp2	temp3	K	duplicate [hidden]	output	-
2	duplicate of press2	press3	Pa	duplicate [hidden]	output	-
3	enthalpy flow rate at port 3	dh3	J/s	basic variable	input	-
4	mass flow rate at port 3	dm3	g/s	basic variable	input	-
5 3	derivative of volume at port 3	dvol3	L/min	basic variable	input with default	0
6	volume at port 3	vol3	cm**3	basic variable	input with default	0
Port 4						
1	duplicate of temp2	temp4	K	duplicate [hidden]	output	-
2	duplicate of press2	press4	Pa	duplicate [hidden]	output	-
3	enthalpy flow rate at port 4	dh4	J/s	basic variable	input	-
4	mass flow rate at port 4	dm4	g/s	basic variable	input	-
5 4	derivative of volume at port 4	dvol4	L/min	basic variable	input with default	0
6	volume at port 4	vol4	cm**3	basic variable	input with default	0

[Contents of the Pneumatic library](#)