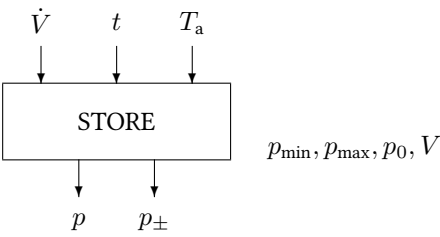


Block STORE

The STORE block simulates a pressure storage with a safety valve.



Name	STORE
Function	se0015
Inputs	3
Outputs	2
Parameters	4
Strings	0
Group	S

- Inputs
- 1 Volume flow $\dot{V} / \text{m}_n^3 \text{ s}^{-1}$
 - 2 Time t / s
 - 3 Ambient temperature $T_a / ^\circ\text{C}$

- Outputs
- 1 Tank pressure p / bar
 - 2 Difference pressure $p_{\pm} / \text{bar}$

- Parameters
- 1 Minimum tank pressure $p_{\min} / \text{bar}$
 - 2 Maximum tank pressure $p_{\max} / \text{bar}$
 - 3 Initial tank pressure p_0 / bar
 - 4 Tank volume V / m^3

Strings

None

Description It is assumed that the gas is an ideal gas and the tank volume V is a constant. Hence, the volume flow $\dot{V}$ for a time interval Δt , which is calculated from the time input, causes a change in the actual tank pressure

$$p_{\text{new}} = p + \frac{(T_a + T_n) p_n}{T_n V} \dot{V} \Delta t \quad (1)$$

where

T_n Standard temperature 273.15 K

p_n Standard pressure 1.013 bar

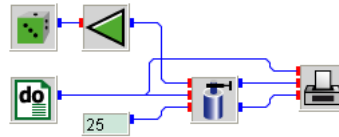
The outputs are set to

$$p = \begin{cases} p_{\min} & \text{if } p_{\text{new}} < p_{\min} \\ p_{\text{new}} & \text{if } p_{\min} \leq p_{\text{new}} \leq p_{\max} \\ p_{\max} & \text{if } p_{\text{new}} > p_{\max} \end{cases}$$

and

$$p_{\pm} = \begin{cases} p_{\text{new}} - p_{\min} & \text{if } p_{\text{new}} < p_{\min} \\ 0 & \text{if } p_{\min} \leq p_{\text{new}} \leq p_{\max} \\ p_{\text{new}} - p_{\max} & \text{if } p_{\text{new}} > p_{\max} \end{cases}$$

store.vseit

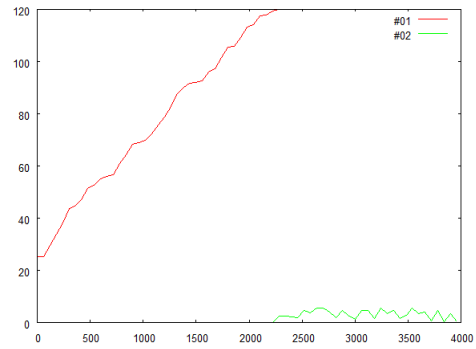


A **RAN1** block generates uniform random numbers diluted by a factor of 10 by an **ATT** block, finally fed into a **STORE** block as volume flow in m^3/s . The storage tank is set to an initial pressure of 25 bar, with a tank volume of 1.2 m^3 .

A **DO** block runs the simulation for 4000 seconds with a time step of 60 seconds. The time signal is connected to the **STORE** block.

The temperature of the high pressure storage is set to $25 \text{ }^\circ\text{C}$ by a **CONST** block.

The [PLOT](#) block displays tank pressure and the difference pressure which has to be dumped via the safety valve.



See also [Block BALON](#).