

OPERATIONAL PROCEDURE FOR USING PTFE MEMBRANE DAMPENERS IN CIRCUITS WITH A WIDE RANGE OF WORKING PRESSURES

(For instance, between 10 bar and 100 bar)

PTFE membrane dampeners can only accept a reduced value of the “K” ratio, equal or inferior to 2 in the case of the **HIDRACAR** dampeners.

$$K = \text{max. circuit pressure} / \text{dampener gas pre-charge pressure}$$

To avoid damaging the membrane in those applications where the circuit pressure changes, beyond the allowed K ratio, between lower values and higher ones, we propose two solutions that consist in varying the pressure in consecutive steps, in either a manual or a semi-automatic operation:

MANUAL OPERATION PROCEDURE (See **Scheme 1**)

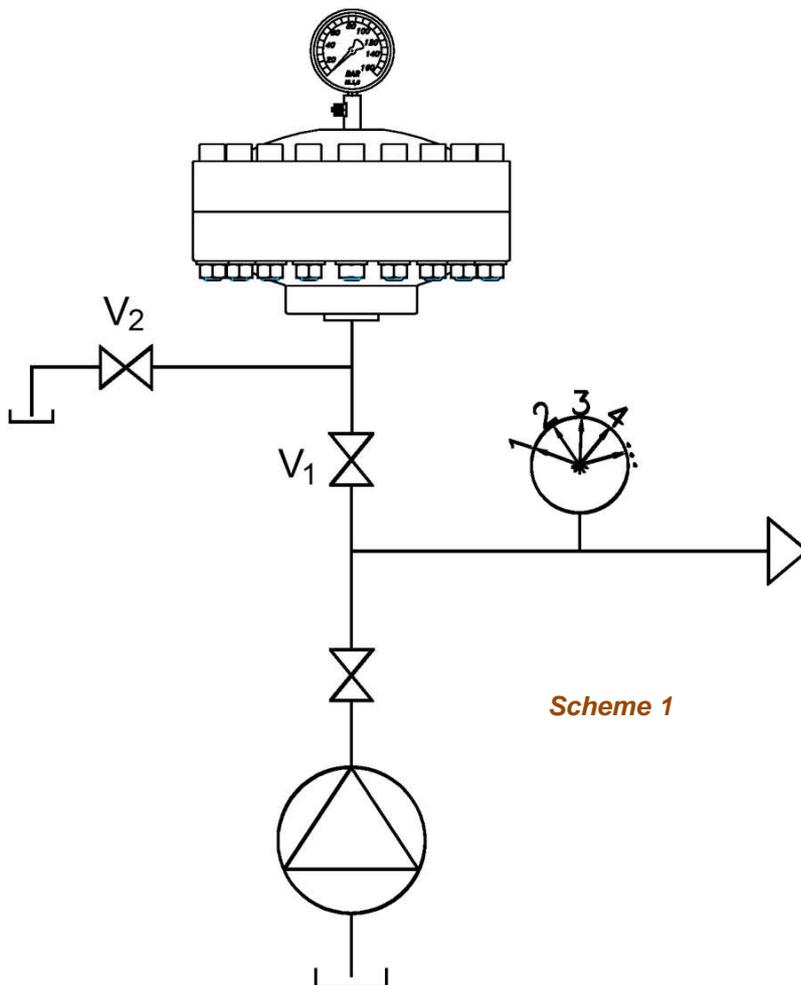
In our example we will start with a working pressure of 10 bar and a corresponding pre-charge pressure (P_0) of 8 bar.

Now, following the data in **chart A**, and without stopping the pump, close valve V_1 , open valve V_2 , inflate the dampener at 16 bar and then close V_2 and open V_1 . Repeat the process following the values of each consecutive step until the final working pressure is reached.

If the installation can't work for several seconds without the dampener, then two dampeners should be used instead, and the semi-automatic operation applied.

chart A

working pressure	pre-charge pressure (P_0)	step
10	8	1
20	16	2
30	24	3
40	32	4
50	40	5
60	48	6
70	56	7
80	64	8
90	72	9
100	80	10



Scheme 1

SEMI-AUTOMATIC OPERATION PROCEDURE (KEEPING A CONTINUOUS DAMPENING EFFECT FROM THE DAMPENERS UNLIKE WITH THE ONE DAMPENER MANUAL OPERATION) (See **Scheme 2**)

Here we start (again, follow the data in **chart A**) with the dampener **D1** charged at step 1 P_0 and the dampener **D2** at step 2 P_0 . Valves **V_{1c}** and **V_{2d}** are open, while valves **V_{1d}** and **V_{2c}** are closed.

A gas pressure regulator will be installed in connection to our filling device mounted in the top of each dampener to increase the different filling pressure steps.

The pressure in the circuit starts to rise. When the pressure switch **PS₁** detects the step 2 P_0 , it closes valves **V_{1c}** and **V_{2d}** opens valve **V_{1d}** and **V_{2c}**. This way, now the dampener that is working in the circuit is **D2**, which is charged at step 2 P_0 , and everything keeps working smoothly. The P_0 is then increased in dampener **D1** from step 1 P_0 to step 3 P_0 .

The active pressure switch is now **PS₂**. The circuit pressure keeps increasing and when pressure switch **PS₂** detects the step 3 P_0 , it closes valves **V_{1d}** and **V_{2c}** and opens valves **V_{1c}** and **V_{2d}**. The P_0 is then increased in dampener **D2** from step 2 P_0 to step 4 P_0 .

The whole process repeats step by step until the step 10 is reached.

