

/ DPR 3000

Pressure regulation, in the context of irrigation systems, is the process of controlling and maintaining a consistent pressure level throughout the system. Pressure regulation plays a vital role in ensuring optimal performance and efficiency of the irrigation system as different components such as pipes, valves and emitters often require specific pressure levels to function effectively.

Pressure regulation mechanisms are employed to manage pressure fluctuations due to water supply variation, elevation changes, or differences in demand within the system. By stabilizing the pressure, these mechanisms help ensure uniform water distribution to crops or plants, prevent damage to system components from excessive pressure, and promote water conservation by reducing leaks and overspray.

You can regulate pressure in an irrigation system by using pressure regulators, valves, and other control devices installed at strategic points. These devices actively monitor the pressure and adjust it to stay within a set range, which helps to optimize the performance and reliability of the irrigation system.

In our irrigation systems, we mainly rely on one, or in some cases, a combination of the following devices:

Hydraulic Valve Pressure Regulators:

Description: Hydraulic valve pressure regulators use hydraulic pressure generated by the flow of water within the irrigation system to control a regulating valve. This valve adjusts the pressure to maintain a constant pressure and protect the irrigation equipment installed downstream.

Advantages:

- **Wide pressure range:** Hydraulic valve pressure regulators handle a broader range of pressures compared to direct regulators.
- **Automatic adjustment:** Hydraulic valve pressure regulators adjust pressure dynamically based on changes in upstream pressure and/or flow rate, providing precise regulation.

Drawbacks:

- **Complexity:** Hydraulic valve pressure regulators are typically more complex in design, installation, and adjustment which can increase initial setup costs and maintenance requirements.
- **Cost:** Hydraulic valve pressure regulators tend to be more expensive than direct pressure regulators.
- **Dependency on water flow:** Since hydraulic valve pressure regulators rely on the flow of water to function, they may not be suitable for all irrigation systems; this is especially the case for systems with very low downstream pressure and relatively high upstream pressure.

Direct Pressure Regulators:

Description: Direct pressure regulators are mechanical devices installed directly in the irrigation system to regulate pressure. They typically consist of a spring-loaded diaphragm mechanism that adjusts the flow of water to maintain a constant pressure downstream.

Advantages:

- **Simple design:** Direct pressure regulators are straightforward in design and installation, making them easy to maintain.
- **Cost-effective:** Direct pressure regulators tend to be more affordable compared to other pressure regulation methods.
- **Reliability:** Direct pressure regulators provide consistent pressure regulation under varying flow conditions.
- **Compatibility:** Direct pressure regulators can be used in a wide range of irrigation systems, including both low and high pressure systems.

Drawbacks:

- **Limited pressure range:** Some direct pressure regulators may have limitations in the range of pressure they can effectively regulate.
- **Adjustment limitations:** Depending on the model, direct pressure regulators may have limited adjustability, which could be a drawback in systems with specific pressure requirements.

In summary, direct pressure regulators offer simplicity and cost-effectiveness but may have limitations in pressure range. On the other hand, hydraulic valve pressure regulators are more complex, and expensive to install and maintain. The choice between the two depends on factors such as the specific requirements of the irrigation system, budget constraints, and the desired level of control and reliability.

The Netafim™ product portfolio offers pressure regulated hydraulic valves and a wide range of direct pressure regulators.

An example of a Netafim™ hydraulic pressure regulator model:

The valve maintains a preset downstream pressure, regardless of upstream pressure or flow rate fluctuation. The main valve is controlled by either a 3-way or 2-way pilot valve.



Netafim™ direct pressure regulators:



Let's not forget that Netafim™ pioneered the development of direct regulators for use in agriculture towards the end of the 1960's, and this innovation has been serving us efficiently ever since.

Today, we are excited to unveil a new advancement in the market, that will complete the direct pressure regulator product line:

The innovative Netafim™ Plastic Direct Pressure Regulating Valve (DPR 3000) combines the functionalities of two components: a direct pressure regulator and a water flow on-off valve. This quick-reacting valve is designed to provide efficient protection for irrigation systems.

Let's get to know the product, its technical data, and its possibilities.

The following technical information refers to the 4" model, this is the first model of the series we're launching to the market. In the future, we will introduce the 3" and 6" models (when ready for launch we will add their technical data).

Diameter: 4"

Connections Types

- Grooved (VIC) 4"
- Female Solvent Welded (SW) ASTM 3"/ ISO 90 mm

Maximum Fluid Temperature: 60°C (140°F)

Body: Reinforced polyamide

Spring: Stainless steel SS-304

Diaphragm: EPDM

Recommended Flow Rates: Minimum 20m³/h (88.0 gpm); Maximum 80m³/h (352.5 gpm)

Maximum Inlet Pressure: 6.0 bar (87psi) [PN 6]

4 Spring Types (outlet pressures): 0.80, 1.20, 1.70, 2.00 bar (11.60, 17.40, 24.65, 29.0 psi)

Minimum Opening Pressure: 0.20 bar (2.90 psi)

Minimum Closing Pressure: 1.40 bar (20.30 psi) upstream pressure, If this upstream pressure does not exist, the regulator will function according to its characteristics, but the on-off valve cannot be closed.

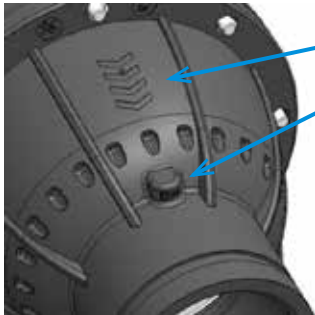
On the body of the regulator, we find the following components:



A 1/4" BSP internal threaded connection marked with the letters UP to connect the upstream micro tube



A 1/4" BSP internal threaded connection marked with the letters COM to connect the 3-way valve or the micro tube from the Aquative™ to activate the valve.



The arrows indicate the direction of flow.

A plastic protrusion where a hole can be drilled, building the internal thread necessary to install a pressure gauge.

This isn't the most suitable place for measuring the outlet pressure because there is still turbulent flow here. It is better to measure or control the outlet pressure a little further from the regulator for more accurate readings. If that's not possible, then installing the pressure gauge here is an option.

As we have already presented, the DPR 3000 can also function as a pressure regulator (without using the internal on-off valve), in which case the two threads presented here must be plugged with a suitable plug.

Although not visible in the drawings presented above, the downstream part of the pressure regulator features a small hole (2 mm diameter) whose function is to allow the air/atmospheric pressure to reach the area housing the spring. Without this hole, the spring, responsible for immediate regulation, could compress the air inside the chamber, interfering with proper operation.

The DPR 3000 can be ordered in one of the following configurations:

- 1) Alone (only as a pressure regulator)
- 2) With 3-way valve installed
- 3) With Aquative™ valve installed
- 4) With 3-way + Aquative™ valves installed

1



2



3

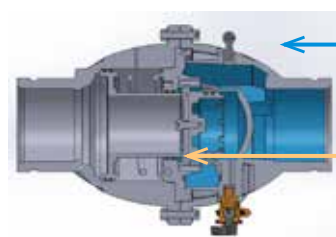


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In the following cross section we can see

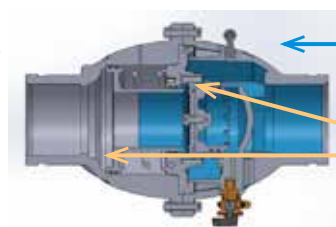
1) how the water flows,



Flow direction

In this cross section we can see that the on-off valve is closed, therefore there is no downstream flow from the regulator.

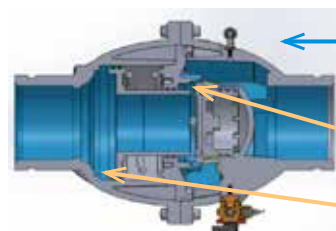
2) the opening/closing system of the internal on-off valve, and



Flow direction

Now we can see that the on-off flow valve is opening, the water begins to flow through the water passage. The regulated water passage is still closed.

3) the area where regulation occurs depending on the compression of the spring.



Flow direction

The shut-off valve is open, the water flows through the regulator, the spring is more compressed and it regulates the outlet pressure.

Technical data:

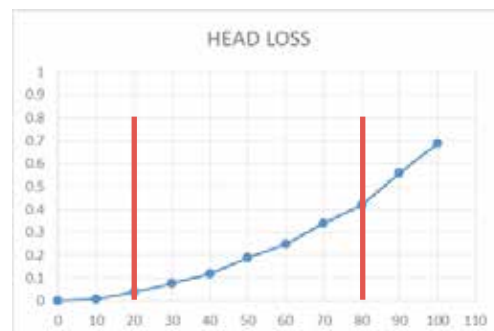
The maximum recommended pressure ratio is 1:3.

For example: If we require an outlet pressure of 1.70 bar (24.6 psi), the inlet pressure should not exceed 5.1 bar (73.97 psi); (1.7×3) or (24.6×3) .

What would happen if the relationship is greater?

For example: If we require an outlet pressure of 0.80 bar and have an inlet pressure of 3.0 bar? In this case, the DPR 3000 would maintain the required outlet pressure but the regulator will emit a high-pitched sound and, in certain cases, it might start to vibrate.

What if the inlet pressure was lower than the required downstream pressure? In this case, the internal spring will not begin to compress, so it will not influence the pressure. In this case, however, it is important to take into account that the regulator will have a pressure loss (like any other accessory installed in the system) according to the following pressure curve.

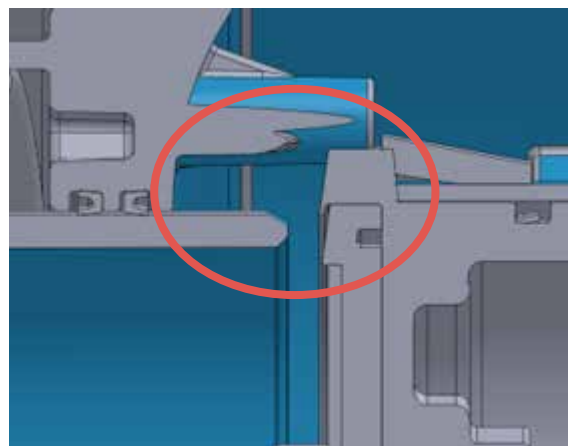


As presented above, the recommended flow range is 20 to 80 m³/h. What happens if the flow rate is lower?

If the flow rate is less than 20 m³/h, the distance between the parts that produce pressure losses (in order to reach the desired pressure at the outlet) will be very small, and in these cases it is very difficult to maintain correct regulation. If lower flow rates are required, we recommend using smaller diameter pressure regulators.

What if the flow is greater than 80 m³/h?

In this case, the regulator may begin to vibrate and depending on the flow it could vibrate very strongly. This is not recommended as it may cause damage to itself or other system components.



Will the outlet pressure always be exactly the same for each spring model?

Not exactly the same, since the inlet pressure has a small influence. In the following table, we can see the average results of numerous operating tests and the possible differences. In the field, these variations have a very negligible influence.

	INLET PRESSURE (bar)							
SPRING	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.7	0.68	0.75	0.81					
1.2	0.95	1.02	1.10	1.17	1.21			
1.7				1.62	1.65	1.67	1.70	1.86
2.0				1.81	1.85	1.89	2.00	2.09

Maintenance

Care must be taken not to damage the external micro tubes (with water leaks), and not to bend them. If the tubes have been bent ("knack") this may impede the passage of water through them, preventing the internal valves from being activated.

The internal parts of the regulator cannot be replaced in the field. The DPR 3000 can be opened by pulling away the two main parts of the body (note: this should be done with caution since the internal spring is still compressed). However, since reassembling the pressure regulator requires a mechanical press and special tools, performing this manually in the field is almost impossible.

***Attention: The DPR 3000 should not be opened/disassembled in the field/grower warehouse. Only a specialized technician with the correct tools should be allowed to inspect the interior parts of the product.**

In areas where temperatures may drop below 4 °C in winter, the irrigation systems should not be used, and we must ensure water is drained from the control area – as we recommend doing with all hydraulic valves in the field. Remember, the DPR 3000 also contains a hydraulic valve.

Commercial

Without a doubt, the DPR 3000 is a game-changer, combining the functionalities of two separate products into one, while offering instant regulation capable of adapting to the needs of the farmer.

The DPR 3000 is particularly effective at protecting thin driplines, which are unable to withstand high pressures. In comparison to existing hydraulic products (which are relatively slow in responding to unexpected pressure changes), DPR 3000 stands out in its ability to offer instant regulation. Unlike the DPR 3000, hydraulic pressure regulators need to fill the regulation chamber, which can take minutes based on the valve's size and design. This delay in sensing downstream pressure means the valve is initially fully open, allowing high pressure to potentially damage the irrigation system. Only once the pipe line is full do they start to regulate pressure. In contrast, the DPR 3000 provides immediate protection against sudden pressure spikes, keeping the irrigation system components safe.

The DPR 3000 is a game-changer in pressure regulation, based on years of professional experience and profound expertise in designing solutions for efficient and protected irrigation.