

**DICE™ Dosing Module**

**Model: ES**

**Installation, Operation and Maintenance Manual**

# DICE™

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## Safety

### General

Carefully read this manual before installing, starting up and servicing the DICE™ dosing module.



Warning notes must be strictly followed in order to avoid injuries and damages.

- The module is internally pressurized and can cause injuries if not handled correctly.
- The fluids\* used in the dosing module or in the cleaning process may be hazardous.
- The following minimum personal protective equipment should be used near the dosing module: protective gloves, glasses and clothing.
- Always refer to the MSDS for all safety instructions related to the fluids\* used.
- Turn off electrical power, depressurize system, release both regulating valves (back pressure valve and pressure relief valve), and vent fluids\* to a safe area before servicing the DICE™ dosing module.
- Always flush all fluids\* prior to module maintenance.

Refer to technical specifications for the maximum operating flow, pressure and operating temperature.

Modifying the DICE™ module, installing non-factory parts or not following the maintenance procedure listed in the present manual may cause injuries, affect product performance, be hazardous and void existing limited warranties.

\*Note: Fluids include: chemicals, polymer solutions, cleaning solutions, water, etc.

## Unpacking and Storage

### *Unpacking*

When unpacking the product, ensure that it is defect-free and according to the purchase order. Please notify Meunier Technologies Inc. or your supplier if there are any irregularities.

Avoid any changes to the back pressure valve and pressure relief valve as they may be factory set. Factory set valves are labelled with the desired pressure at each valve.

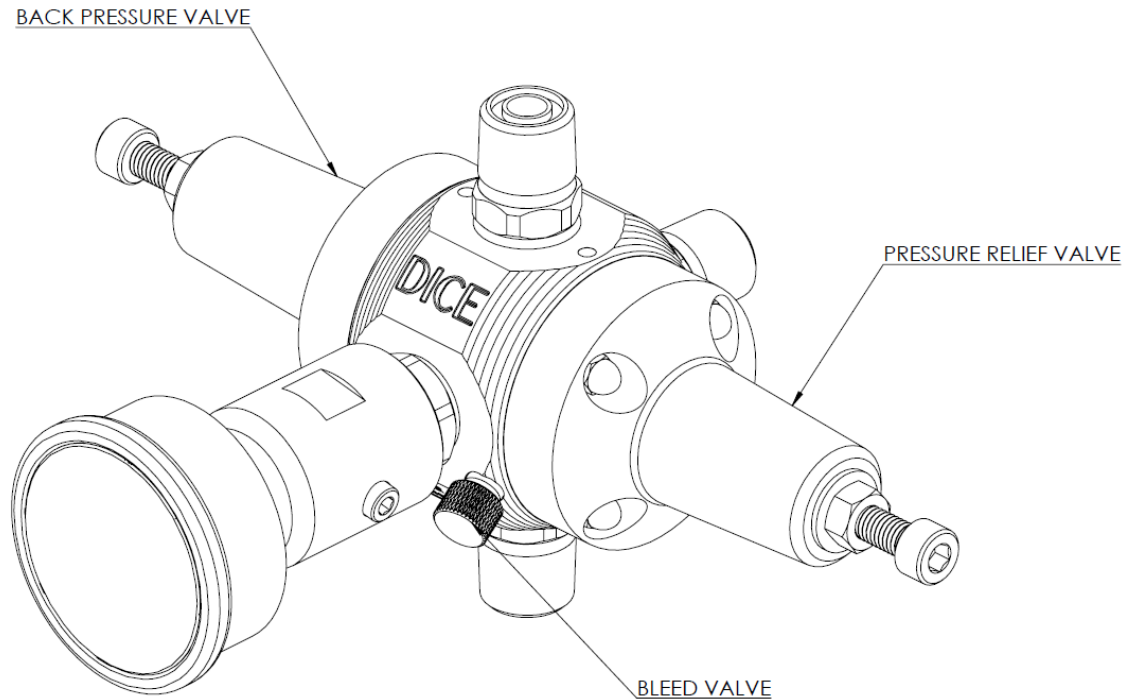
The box should contain one (1) DICE™ dosing module, one (1) IOM (Installation, Operation and Maintenance) manual and the purchased spare parts.

### *Storage and Handling*

- The DICE™ dosing module must be stored indoors, inside its cardboard box, at a temperature of between 5 °C to 40 °C and with a relative humidity level under 80%.
- The DICE™ dosing module must be stored without any pre-set pressure on the back pressure valve and pressure relief valve.
- Excessive stacking of packages may cause damage to the product. Never stack more than five (5) DICE™ dosing modules.
- Do not store the DICE™ dosing module in a corrosive environment or directly exposed to sunlight.
- Handle the DICE™ dosing module with care. Never throw the dosing module, even when it is in its cardboard box. The product is not designed to sustain impact.

# Technical Specifications

## Components

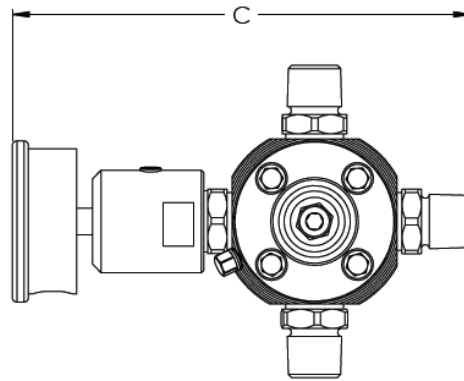
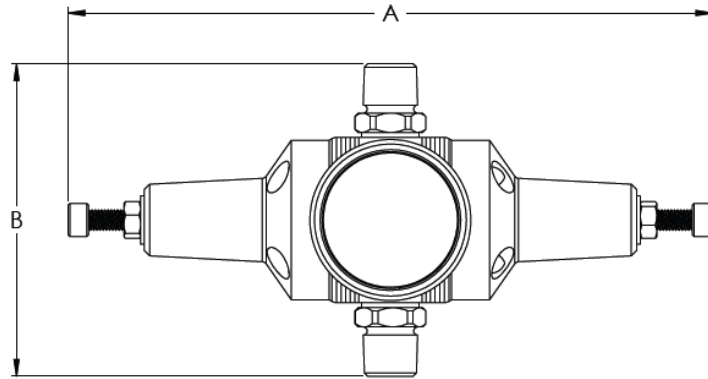


## Technical Specifications

Maximum pressure (psi)	DIXX1	DIXX2
	150	250
Ambient operating temperature (°C)	5 @ 40	
Liquid operating temperature (°C)	5 @ 40	
Storage Temperature (°C)	5 @ 40	

The dosing module should not be used with fluid containing slurry or fluid which could crystallize or which may have already crystallized.

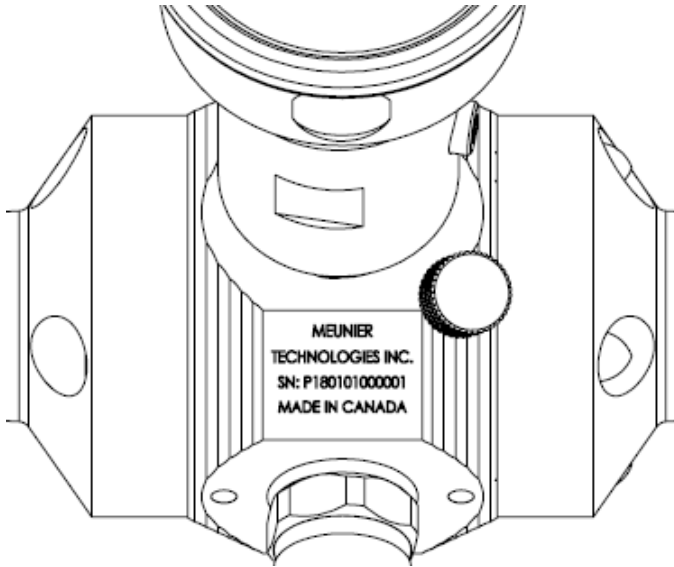
## Dimensions



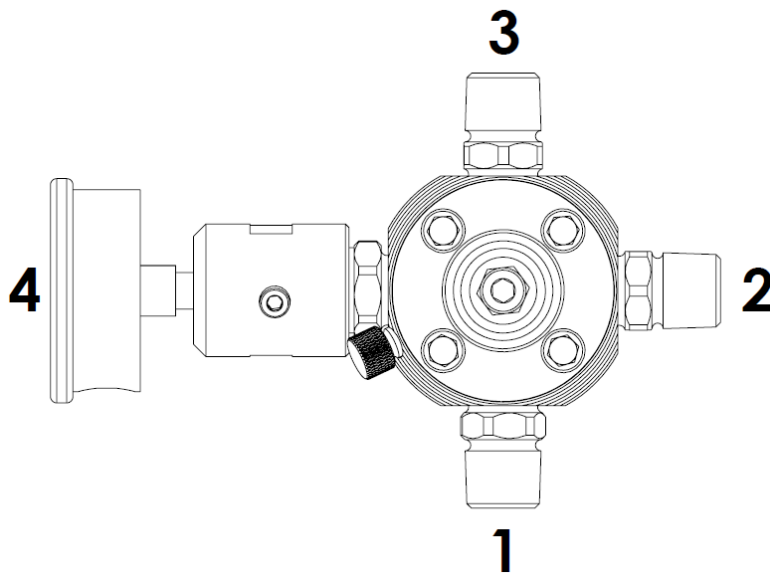
DIMENSIONS mm (in)					
Size			A	B	C
1/4	ES	DIE1X	254,3 (10.01)	123,2 (4.85)	204.1(8.03)

## ***Model Number***

The model number (as purchased) and serial number are engraved on the lower part of the block body.



## **Connection reference numbers**





## Model Number nomenclature

Example:

**DICE™ ES:** DIE21-VVII-111Z (Only available in 1/4")

DI	E	1	1	-	M	V	I	I	-	#1 1	#2 1	#3 1	#4 Z	-	XXX	
<b>Family</b> DICE DI	<b>Configuration</b> ES	<b>Size (in)</b> 1/4														
			<b>Pressure</b> 150 psi 1 250 psi 2		<b>Block Material</b> PVC* V PVDF D	<b>Parts Material</b> PVC* V PVDF D	<b>O-ring Material</b> VITON* I EPDM E	<b>Diaph Material</b> VITON* I EPDM E								
										<b>Connections</b>						
										1/2" MNPT & Hose LMI				1		
										Isolator & pressure Gauge				Z		
										No Connector				W		
															<b>Option</b>	

\*Standard materials

Other standard materials:

- Bolts, nuts, washers, set screws: 18-8 stainless steel

Note:

- Other materials can be supplied upon request.
- Options will be listed at the end of the Model Number in the option section.

## Parts List

PART NO.	DESCRIPTION
1	ES MONO BLOCK
2	BP/PR TOP BODY
3	SPRING TOP SEAT
4	SPRING BOTTOM SEAT
5	DIAPHRAGM
6	SPRING
7	SOCKET HEAD SCREW
8	CAP HEX NUT
9	WASHER
10	SOCKET HEAD SCREW
11	COUNTER LOCK HEX NUT
12	WASHER
13	ISOLATOR AND PRESSURE GAUGE
14	CONNECTOR
15	O-RING - CONNECTOR
16	BLEED VALVE
17	O-RING - BLEED VALVE
18	WALL MOUNT SUPPORT
19	BASE MOUNT SUPPORT
20	MOUNTING TAB
21	SUPPORT SCREW
22	BASE MOUNT SCREW

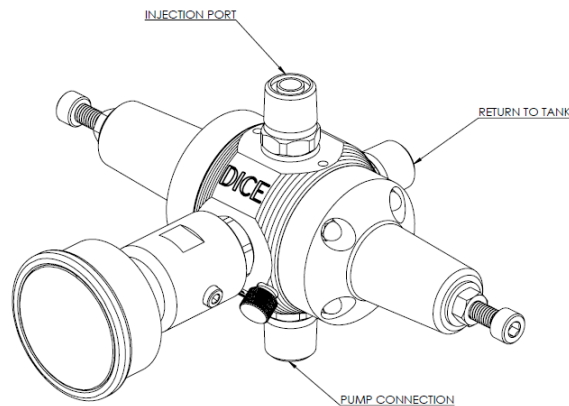
Refer to the figures in the *Installation and Disassembly and Assembly* sections for PART NO.

## Installation

**Warning! Always use the proper tool for each step of the installation.**

### *Mounting*

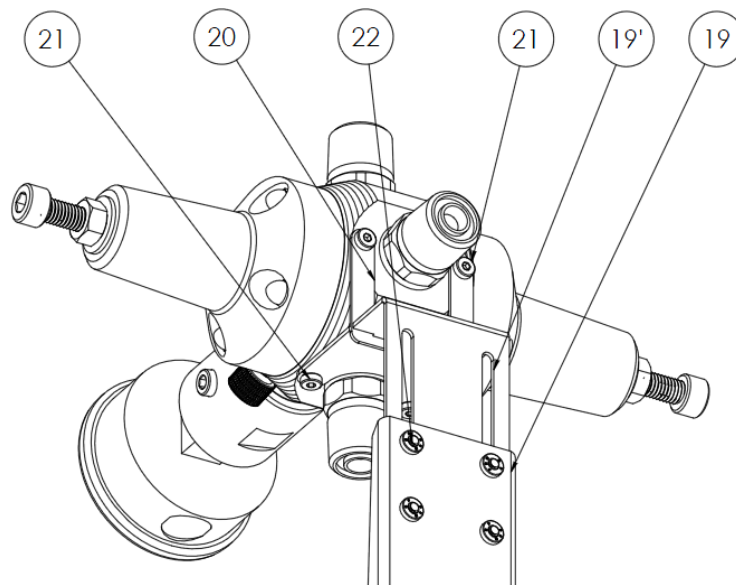
- The DICE™ ES dosing module is designed to be mounted on a pump using the adjustable base mount support.
- The DICE™ should always be mounted so that the injection port is facing upwards as shown in the following figure.
- To avoid accumulation and trapped air, the DICE™ should always be levelled.



### **Upper bracket**

To mount the upper bracket to the DICE™ ES module

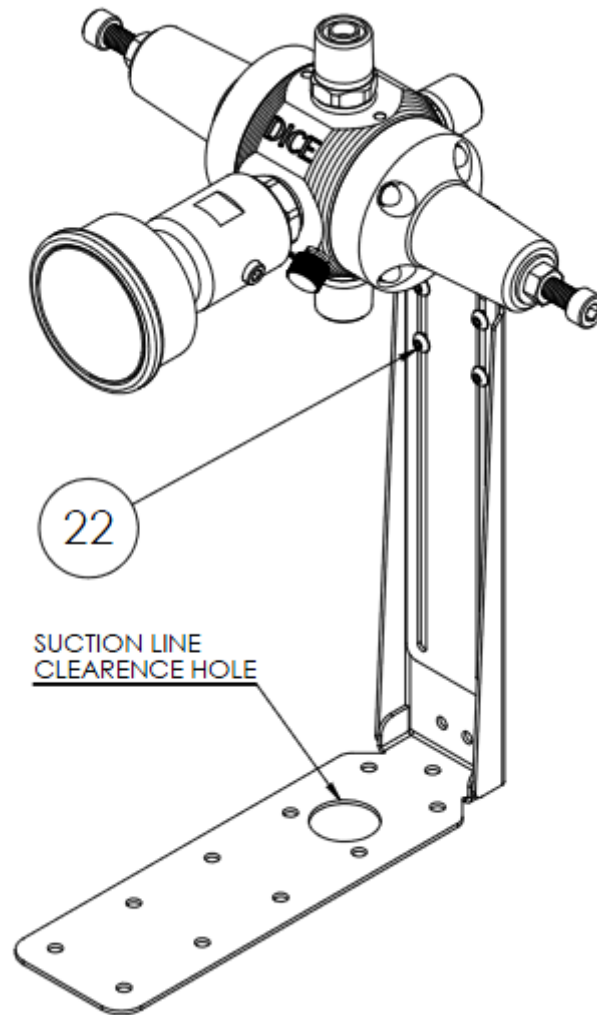
1. Loosen the two screws **(21)** from the back until the mount tabs **(20)** can move freely.
2. Completely unscrew the two bottom screws **(21)**.
3. Align the upper bracket **(19)** with the two mounting holes. Put both screws **(21)** in while leaving the assembly loose.
4. Slide the two tabs **(20)** in the upper bracket **(19')** grooves.
5. Tight all mounting tab screws **(21)** at 60 oz-in.



### Lower bracket

To mount the lower bracket of the DICE™ ES module

1. Fix the bottom part of the bracket (**19**) by using screws in the dedicated holes.
2. Make sure that the suction line clearance hole is not blocked so that the pump suction line can go through.
3. Remove the 4 screws (**22**) from the bracket
4. Attach the DICE™ ES module and upper bracket to the lower bracket using four screws (**22**).



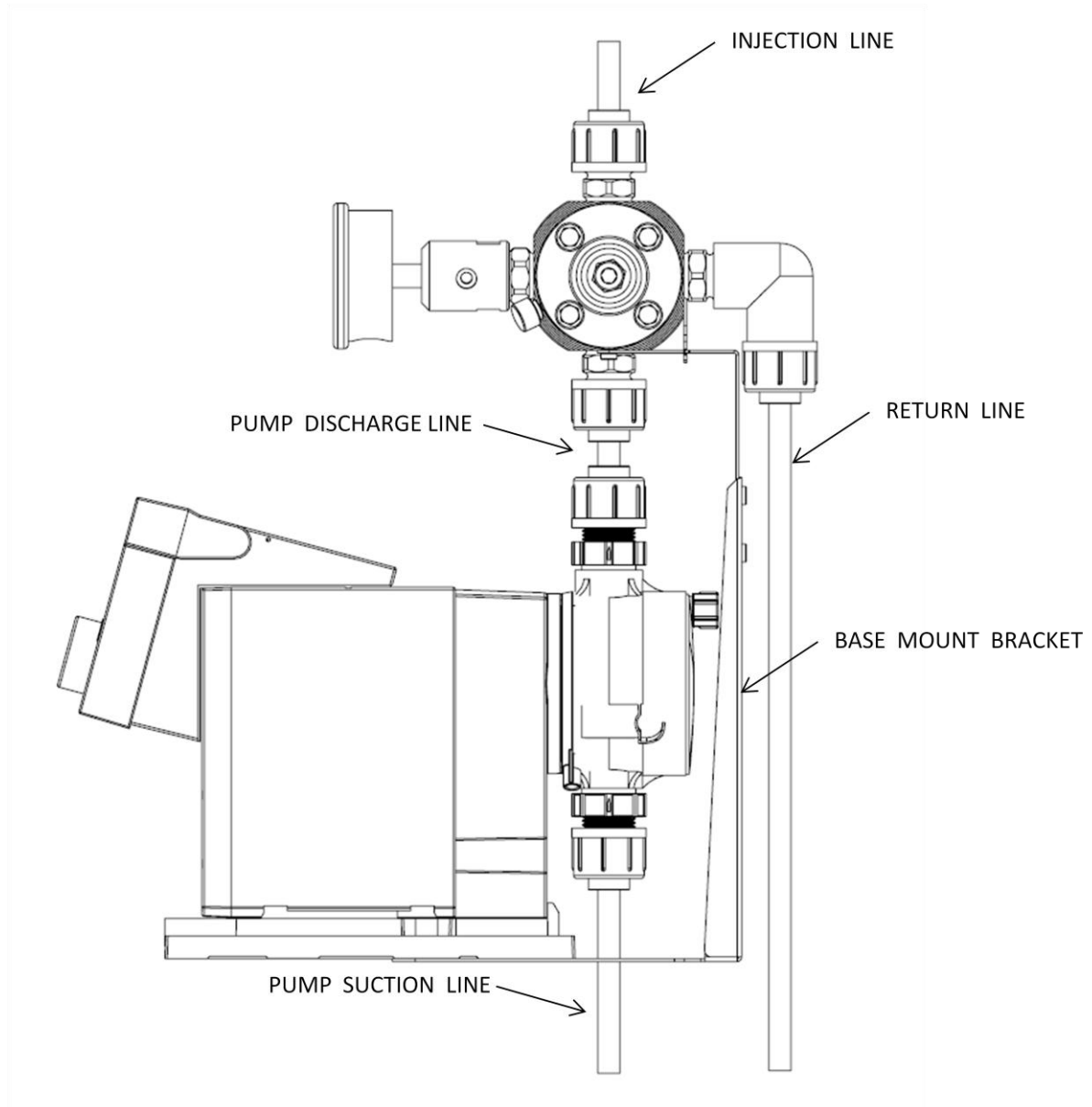
## Pump installation

To mount the DICE™ ES module to the pump

1. Fix the pump on top of the lower bracket bottom part (**19**) by using the pump mounting holes.
2. Make sure that the suction line clearance hole of the lower bracket is aligned with the pump suction port.
3. Adjust the DICE™ ES by loosen the screws (**22**) and sliding the upper bracket. The module and the pump should be separate about 3 inches (75mm) from each other.
4. Tight all mounting screws (**22**) to 100 oz-in.

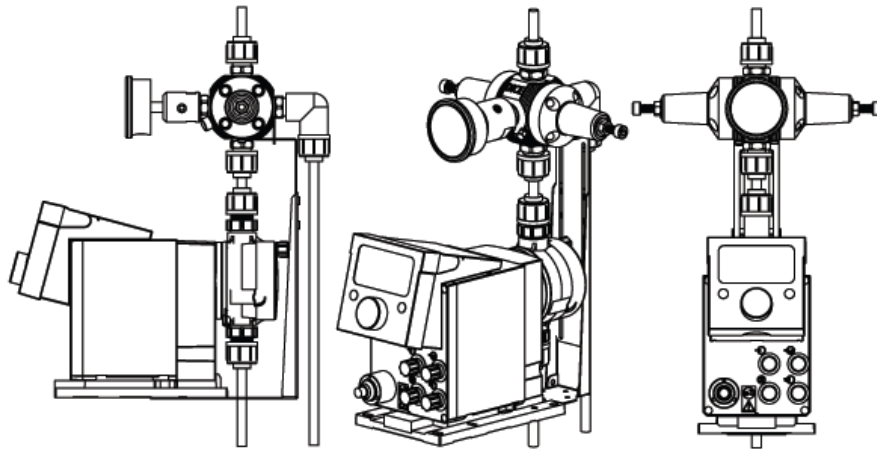
## Typical Installation

The following figure can be used as a typical installation of the DICE™ ES dosing module on a dosing pump.



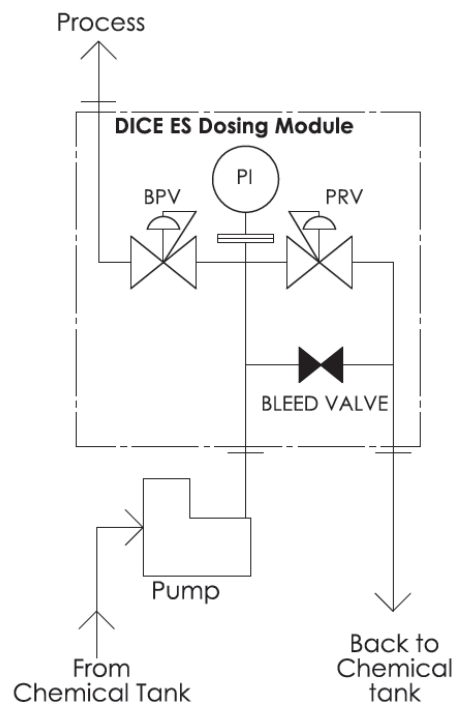
Note:

- Never use a pipe wrench for dosing module installation.



***P&ID***

## P&ID



## Operation

### *Start-up*

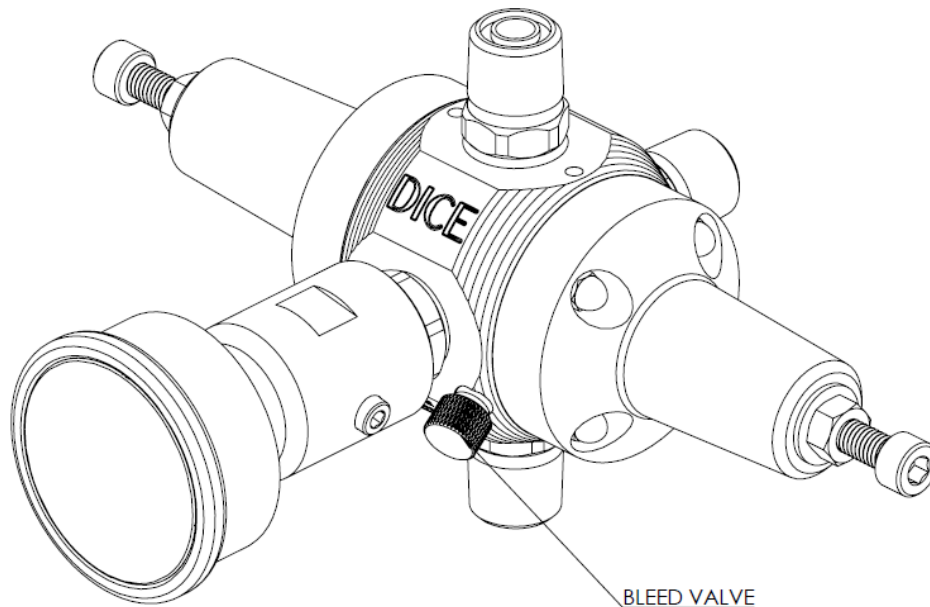
Prior to system start-up, the responsible individuals should be informed of the safety instructions to be followed. This manual and the Installation, Operation and Maintenance Manual should be available at all times.

### **Setup and adjustment**

The pressure relief and back pressure valve needs to be adjusted prior to system operation.

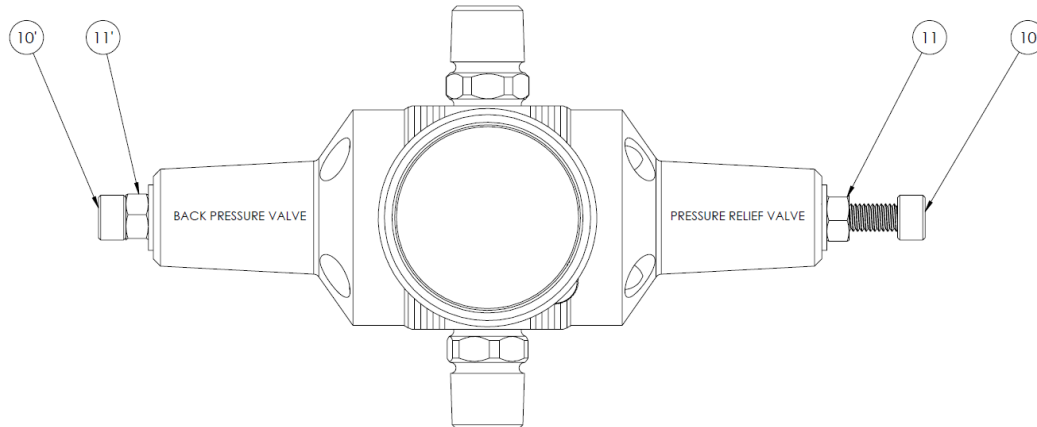
### **Pump priming**

In order to help the pump priming at start-up you can unscrew the Bleed Valve (16) until the fluid start flowing through the evaluation port. Once the pump is primed screw the Bleed Valve (16) back in place (hand tightened); no tools should be used for tightening.





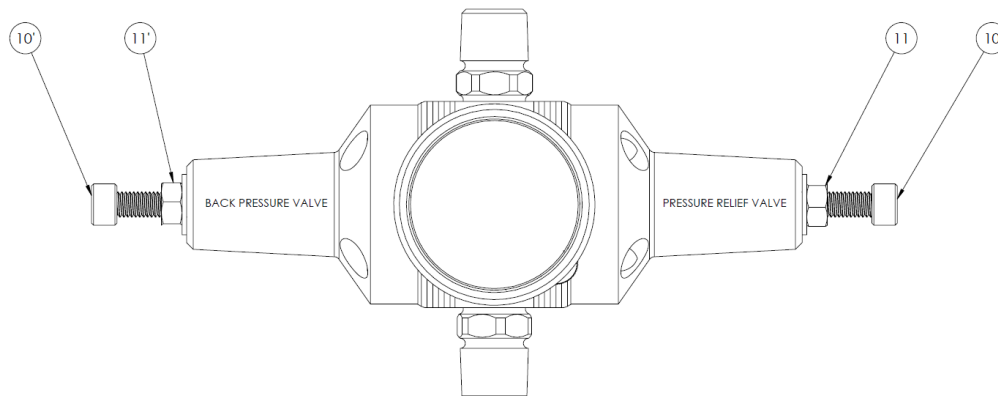
## Pressure relief valve adjustment



1. Start by screwing completely the back pressure adjustment screw (**10'**).
2. Start the pump and wait until fluid passes through the pressure relief valve into the evacuation port. (use the bleed valve to prime the pump if necessary)
3. Use the adjustment screw (**10**) to obtain the desired pressure set point.
4. Once the desired set-pressure is obtained, tighten the counter nut (**11**). See note.
5. Stop the pump and slowly open the bleed valve to release the system pressure.

Proceed with the back pressure valve adjustment.

## Back pressure valve adjustment



1. Start the pump and wait until pressure is build up.
2. Use the adjustment screw (**10'**) to obtain the desired pressure set point by initially unscrewing the back pressure adjustment screw (**10'**).
3. Once the desired set-pressure is obtained, tighten the counter nut (**11'**). See note.

**Important: It is recommended to set the back pressure at 20psi to 30 psi over the process pressure.**

Notes:

- The maximum torque to be applied on the adjustment screws (**10 & 10'**) and counter nut (**11 & 11'**) is **25 in-lb**.

## ***Normal Operation***

In normal operation, the bleed valve should be in the closed position.

In normal operation, the pressure indicator reading should be the value of the pressure set-point of the back pressure valve. If this is not the case, refer to the troubleshooting section of the IOM.

## ***System depressurising***

Stop the dosing pump and unscrew the Bleed Valve (16) until the fluid pressure is released through the evaluation port. The pressure indicator reading should drop all the way to \*0 psi.

The pressure upstream of the back pressure valve should be release and maintenance can now be carried out on the dosing pump.

Once the pump is back in place, proceed with the pump priming.

***\*There can be a residual pressure up to 5-10psi inside the pressure gauge isolator assembly.***

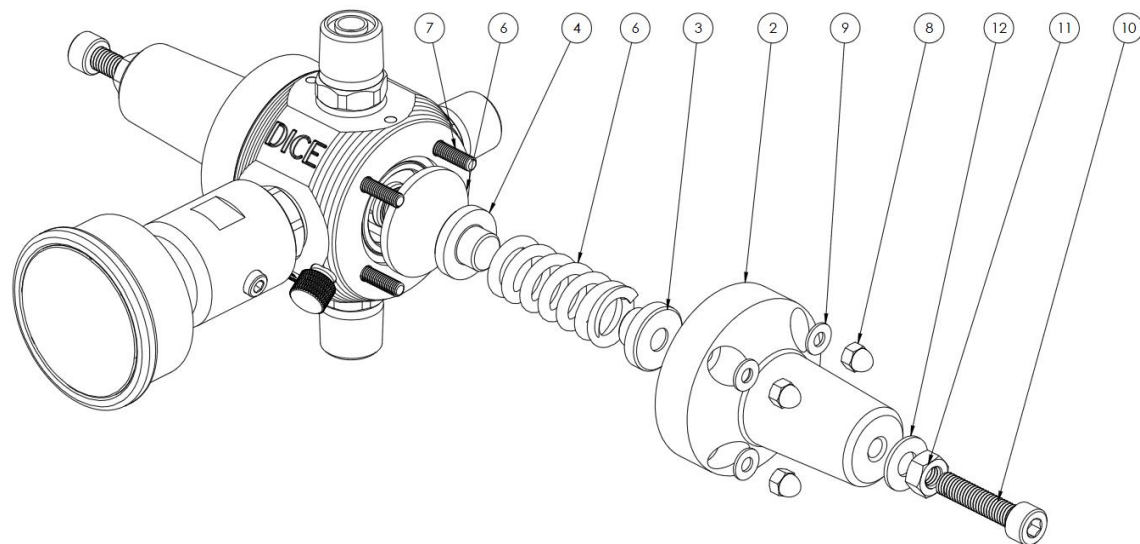
## ***Installation, Operation and Maintenance Manual***

- **Refer to the IOM (Installation, Operation and Maintenance Manual) for all the additional instructions and information.**

## Maintenance

### *Disassembly and Assembly*

**WARNING:** During operation, the module is internally pressurized with fluid such as chemicals, which may cause injuries. Before any disassembly manipulation, make sure that there is no more internal pressure. Follow the steps listed in the first section of the manual for a safe work environment.

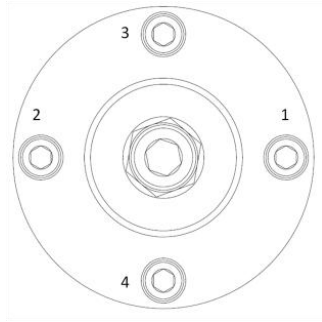


1. Using a 6mm Allen key, loosen and remove the adjustment screw (**10**) along with the counter nut (**11**) and washer (**12**).
2. Loosen and remove the four regulating valve mounting bolts, washers and nuts (**7,8,9**) with a 4-mm Allen key and a 8mm socket wrench.
3. Remove the regulating valve body (**2**).
4. Remove the spring assembly (spring (**6**), top seat (**3**) and bottom seat (**4**)).
5. Remove the diaphragm (**6**) from the block (**1**).

Inspect all parts and replace them if necessary.

To re-install the regulating valve, follow steps 1 through 5 in reverse order.

Gently screw all four bolts following the pattern below.



***Important:***

***Torque the 4 mounting screws to 25 in-lb.***

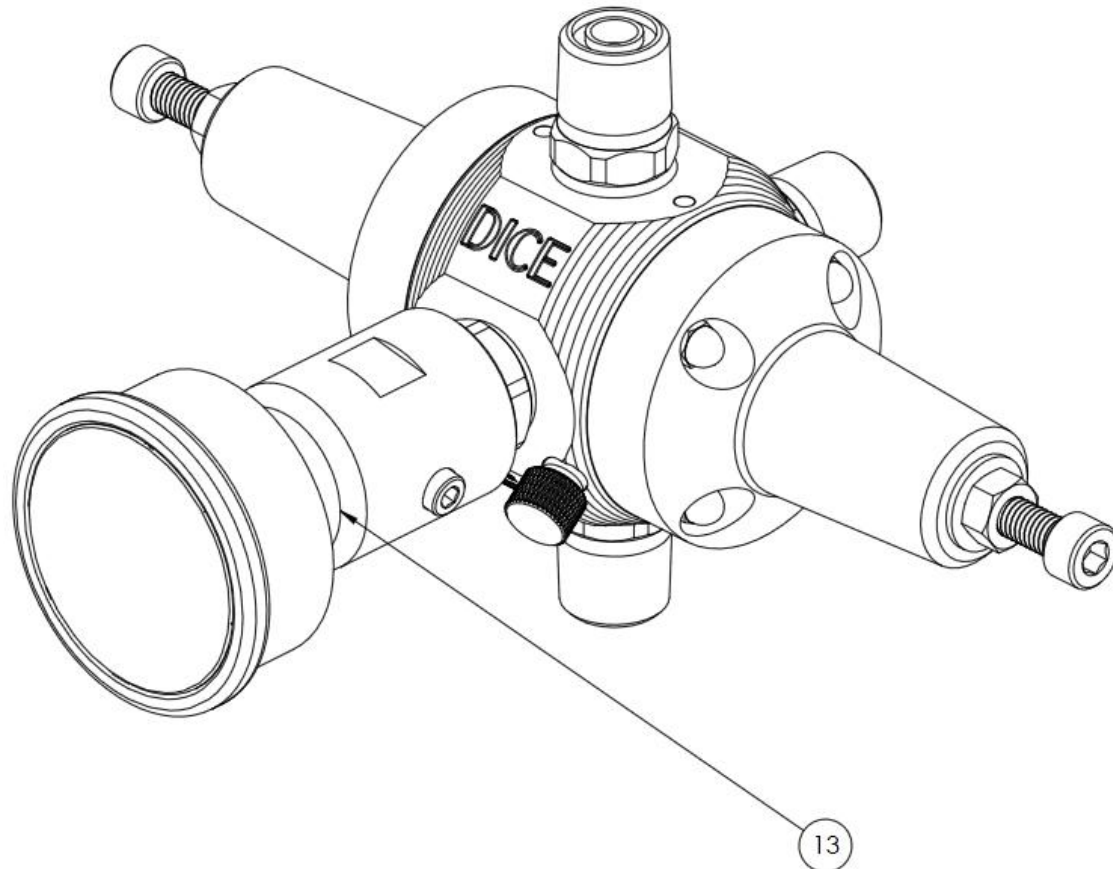
***Make sure the regulating valve body (2) is properly seated on the block (1) by ensuring no gap is present between the two parts, using a filler gauge on four different points.***

The following tools are required:

- Adjustment screw (10): 6-mm hex bit wrench
- Mounting screws (18): 4-mm-hex bit wrench
- Torque wrench

## Pressure indicator and isolator

No periodic maintenance is required on the pressure indicator and its isolator.



If a failure arises related to the pressure indicator or the isolator, the isolator and pressure indicator assembly (**13**) should be disassembled from the block (**1**) and shipped to the supplier with the RMA form.



The re-installation of the isolator should be done manually (hand tightened); no tools should be used for tightening.

Note: The pressure indicator and isolator assembly shall not be disassembled on site. The isolator filling is made by our technician, using specialized tools, prior to shipment.

Note: Never use a pipe wrench for servicing the dosing modules.

## ***Periodic Maintenance***

### **Inspection**

A regular inspection should be made at least once per week. At minimum, this inspection should comprise a visual inspection for leaks and verification of system operating pressure.

### **Cleaning**

The DICE™ needs to be cleaned periodically. The frequency of this cleaning depends on the fluid used as well as operating conditions and environment. Internal cleaning should minimally be done when there is a presence of deposit, scaling or crystals that may obstruct the flow.

**CAUTION:** The fluids used during the cleaning process must be compatible with the dosed chemical and system materials. Refer to your chemical supplier.

### **Pressure relief and back pressure valve**

The DICE™ back pressure and pressure relief valve diaphragms should be fully inspected at least every three (3) years. If the diaphragm shows signs of wear, it should be replaced. Follow the disassembly and assembly procedure indicated in the above section.

**CAUTION:** Strictly follow the warning note in the Disassembly and Assembly section prior to pressure relief and back pressure valve servicing.

### **Pressure indicator and isolator**

Note: No periodic maintenance is required on the pressure indicator and its isolator, other than periodic visual inspection.

## ***Spare Parts***

To request spare parts, please supply the module serial number and PART NO. according to the parts list in the *component list*.

## Troubleshooting

	Trouble	Possible reason	Action
<b>Module</b>			
	Leaking from connector	Insufficient pressure on the connector from the mushroom nut	Hand tight the connector by screwing the mushroom nut
		O-ring failure	Replace the o-ring
	Leaking from Bleed Valve	O-ring failure	Replace the o-ring
<b>Back Pressure and Pressure Relief Valve</b>			
	Leaking from the adjustment screw	Ruptured diaphragm	Replace the diaphragm
	Leaking from the valve block interface	Ruptured diaphragm	Replace the diaphragm
		Insufficient pressure between the diaphragm and the block	Tighten the 4 mounting screws to 35lb-in
Adjustment screw not working	Regulating valve spring failure	Spring replacement	
<b>Pressure Indicator</b>			
	Leaking fluid from the pressure indicator NPT connection	Insufficient tightening of the pressure gauge NPT connection on the isolator	Tighten the pressure gauge NPT connection on the isolator
		Ruptured diaphragm; chemical attacked pressure indicator connection	Ship the isolator and pressure gauge assembly to our facility
	Leaking from the bleeding screw	Bleeding screw o-ring failure Ruptured diaphragm	