

THE XAD 41 INJECTOR

Description – Installation – Operation

U508735-e – Revision 2 - 09 february 2015



This document consists of **12** pages, including the flyleaf

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THE XAD 41 ADDITIVES INJECTOR

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1. GENERAL

This document describes the information necessary for the reception and for the assembly of XAD 41 additive injectors

The injection mechanism of additives injectors SATAM XAD 41, is designed to be mounted on horizontal meters Z17-80, ZC17-150, ZC17-250 ranges and on vertical metering units ZCE5-80, ZCE5-150, ZCE5-250, to allow the continuous injection of or two different additives (anti-freezing, coloring, etc.). into the measured product stream, exactly at a fixed additive ratio.

ADVANTAGES:

- The additive is regularly and continuously injected in small doses right before the measurement of the main product stream. The result is a complete mixing with the liquid to be measured.
- Separation of additive and liquid by decantation or deterioration of the additive by the ambient air humidity
- The injection mechanism directly driven by the meter shaft does not require any outside power (electric or pneumatic). The rate of flow is always proportional to the rate of the measured liquid, there fore the injection ratio is always constant.
- Different optional accessories allow high application flexibility; injection of one additive at three different ratios, injection of two additives at two different ratios

XAD41 VERSIONS:

- The standard model is designed for one additive and one ratio, and the continuous injection cannot be stopped
- Optionally, a mechanical by-pass or an electric by-pass to stop the injection if desires
- Optionally, injection of 2 additives, each one at same or at different ratio and the injection cannot be stopped
- Optionally, mechanical or electrical by-pass to stop one or both additives on twin additive system.

2. DESCRIPTION AND OPERATION

The mechanism consists in two reciprocating plungers pumps with pistons (figure 1) driven by a same crank shaft actuating on a slide. The crank shaft is fixed on the axle of the meter rotor.

Each of the pumps having their own hydraulic circuit, two different additives can be injected: either alternately, or simultaneously.

A mechanical or electric by-pass, activated directly or remotely, provides the "ON-OFF" control of one or both pumps

- Central element (common to all the versions)

Each revolution of the meter main shaft moves pistons (3) over one full stroke providing two injection doses per revolution. By changing the piston diameter and the piston stroke it is possible to achieve a wide selection of injection ratios.

During a half turn of the crank shaft, the piston (1) moves on the right side. The additive is drawn through valve (5), the valve (6) remaining closed by the combined action of its spring and the pressure in the meter manifold.

During the second half turn of the crank shaft, the piston (1) moves on the left side. The valve (5) closes by its spring and additive is driven into the manifold of the meter through the valve (6). The ball of the valve (6) is raised by the overpressure caused by the movement of the piston.

The piston (2) and the lids (4 and 6) work in a identical way

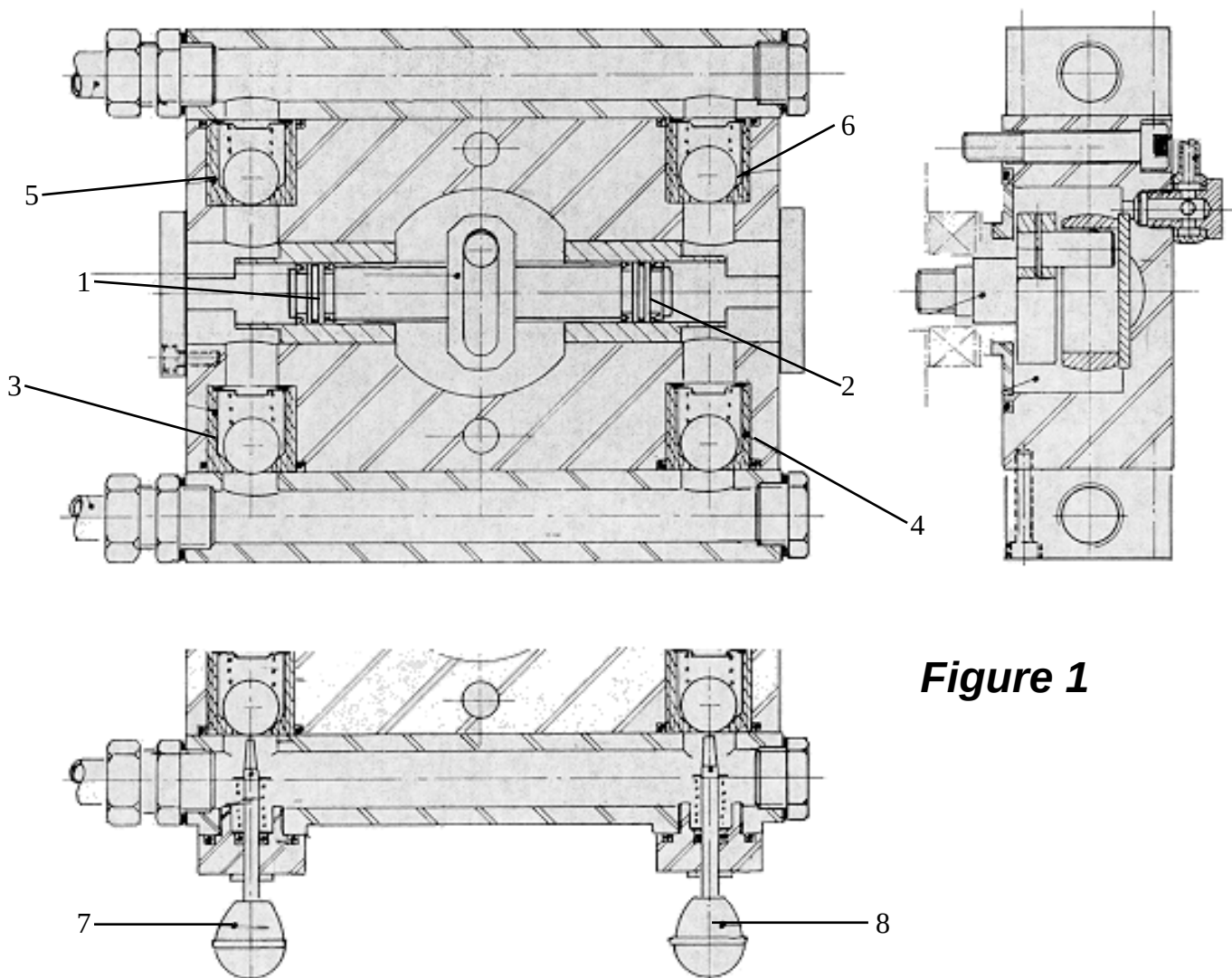


Figure 1

Depending on the main meter flow rate, the additives injection mechanism can be provided with the rate(s) of injection chosen in the following table:

STROKE (mm)	N ^{br} Piston	PISTON Ø17 (Meter capacity)		
		80 m ³ /h	150 m ³ /h	250 m ³ /h
2,75	2 Pistons	1‰	0,5‰	
	1 Piston	0,5‰	0,25‰	
5,5	2 Pistons	2‰	1‰	
	1 Piston	1‰	0,5‰	
8,25	2 Pistons		1,5‰	1‰
	1 Piston		0,75‰	0,5‰
11	2 Pistons		2‰	
	1 Piston		1‰	

- Standard model

The operator has nothing to do; the injection is continuous during the flow of the main product.

OPTIONS :

- Stop by manual command

The lower element is provided in that case with two buttons (7-8) maintained in low position by springs. A device with bayonet allows to lock one (or both) button (s) in high position, which maintains (or both) valve (s) of inhalation corresponding in opened position.

(Or) corresponding piston (s) inhales(sucks up) and repulses the additive in the piping of admittance and the highly-rated of syringe corresponding (or the complete syringe) is then neutralized.

The operator has to make sure that the button corresponding button in the additive which he wishes to add to the liquid to be measured is not pushed. The injection is made for the additive corresponding to the button not pushed button.

- Stop by electric command

Both buttons mentioned here above are replaced by electro pilot command.

The operator has to make sure that switches commanding the starting or the stop of the injection of additive are in the correct position.

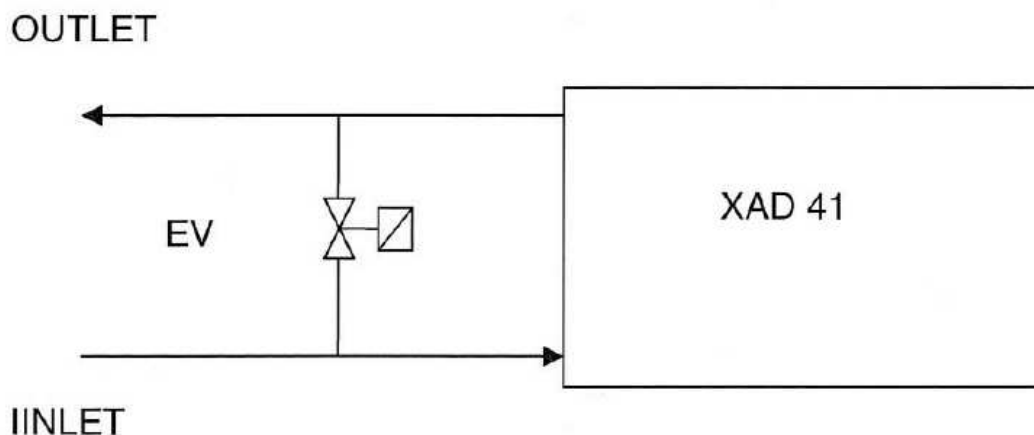
In case the injection is commanded by an automatism, the operator has nothing to do.

2.1. Injection command through by pass valve

This solution has 2 benefits:

- Allows to move the injector command and avoid the constraint of the meter positioning
- To remove leaks risk on the mechanical command axles

The additive injection command (1 rate of injection) is done through a by-pass valve (manual ball valve or solenoid valve) to actuate or stop the additive injection:



3. PERCENTAGE CONFIGURATION (2 different percentages)

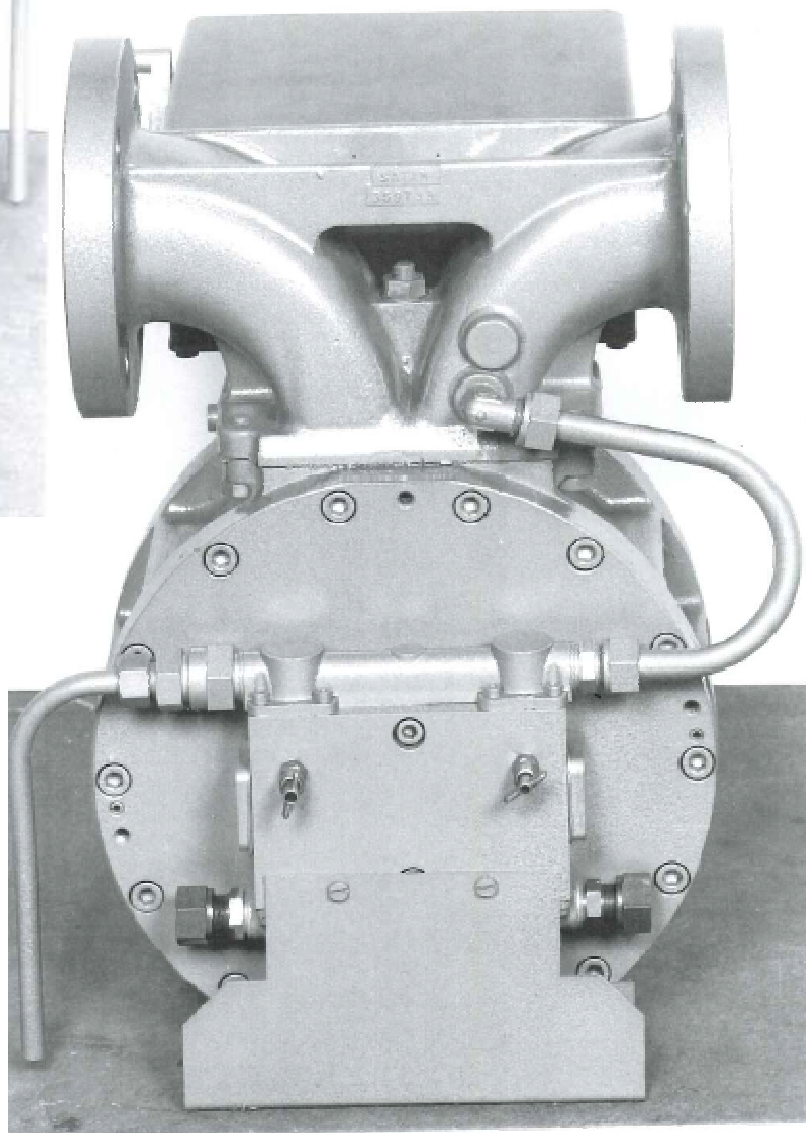
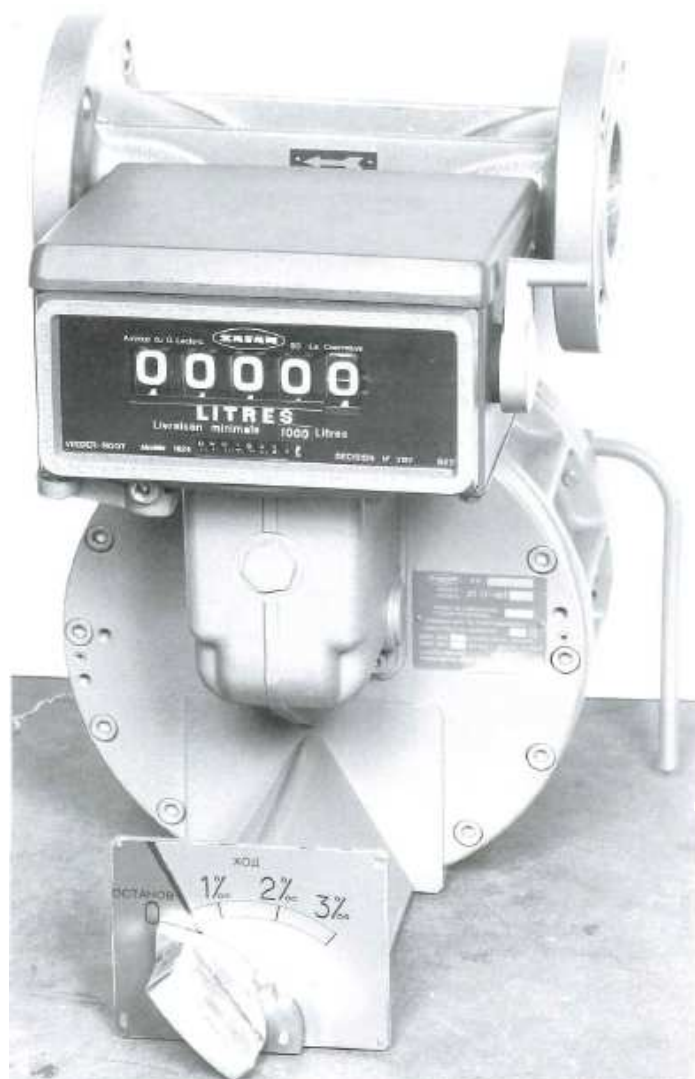
For instance, ZC17 150 can be equipped with XAD41 / 2 additives combining different pistons and "out of round" axle

XAD41 : 2 additives for ZC17-150			
	% Additive1	% Additive2	Out of round
Choice N°1	0,25 ‰ / Piston Ø17	0,25 ‰ / Piston Ø17	2,75
Choice N°2	0,25 ‰ / Piston Ø17	0,5 ‰ / Piston Ø24	2,75
Choice N°3	0,5 ‰ / Piston Ø17	0,5 ‰ / Piston Ø17	5,5
Choice N°4	0,5 ‰ / Piston Ø17	1 ‰ / Piston Ø24	5,5
Choice N°5	0,75 ‰ / Piston Ø17	0,75 ‰ / Piston Ø17	8,25
Choice N°6	0,75 ‰ / Piston Ø17	1,5 ‰ / Piston Ø24	8,25
Choice N°7	1 ‰ / Piston Ø17	1 ‰ / Piston Ø17	11
Choice N°8	1 ‰ / Piston Ø17	2 ‰ / Piston Ø24	11
Choice N°9	1,5 ‰ / Piston Ø24	1,5 ‰ / Piston Ø24	8,25
Choice N°10	2 ‰ / Piston Ø24	2 ‰ / Piston Ø24	11

2 different configurations are possible for XAD41 operation: manual selection or remote selection

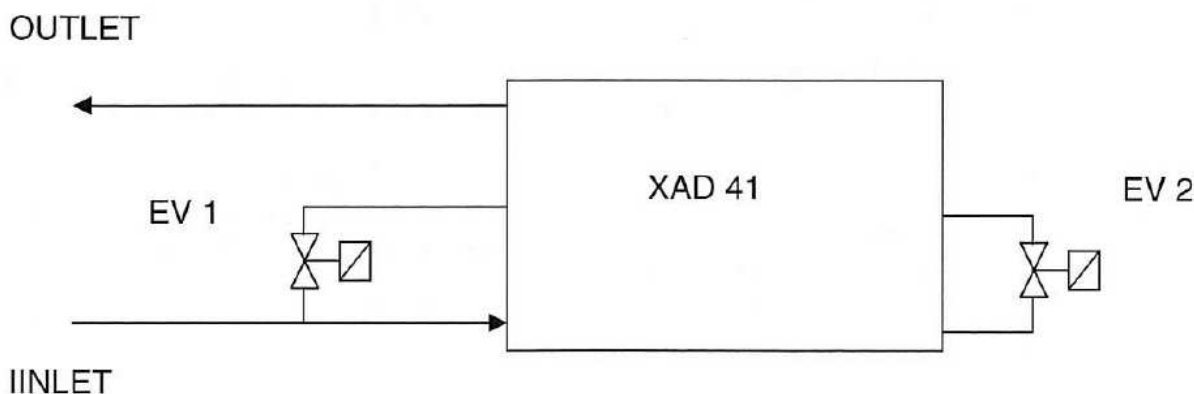
3.1. Mechanical selection

The mechanical selection is done with a manual selector dial depending of the percentages chosen:



3.2. Injection selection through 2 by-pass valves (ball valve or solenoid valve)

The selection of the injection is obtained through 2 by-pass valves which open or close manually (manual ball valves) or remotely (solenoid valves) the additive(s) chosen.



With this solution, the additive injection can either be variable (depending of the pistons size):

0 ‰ :	EV1 open	EV2 open
1 ‰ :	EV1 closed	EV2 open
2 ‰ :	EV1 open	EV2 closed
3 ‰ :	EV1 closed	EV2 closed

Or 2 chosen fix rates of injection (see chapter 3 here above) can be actuated manually or remotely (valves 1 and 2 opened or closed)

4. UTILISATION

The person in charge of the installation must control that there is always enough additive in the additive tank feeding the XAD41.

5. INSTALLATION

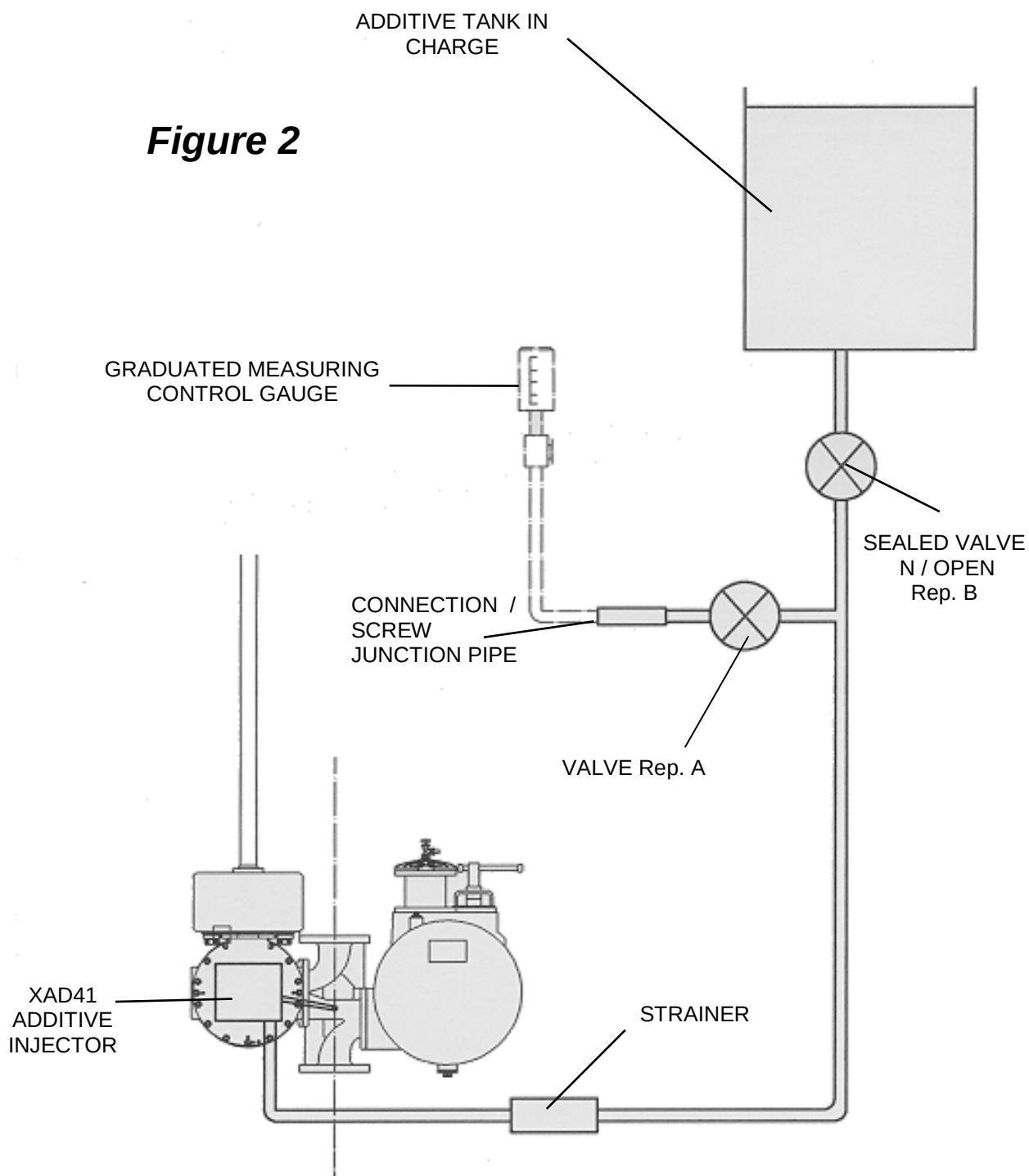
A typical installation is shown on the figure 2 here under (all equipments provided by the Customer) .

The height of the additive supply tank should be fixed in such a way that the additive pressure at the inlet of the injection mechanism remain between 0 and 0,3 bar

The diameter of the inlet piping much be as large as possible (if the additive is viscous).

This must be realized as well when the reservoir is full and the syringe out of order (Loss of load useless in the channeling of food), when the tank is almost empty with a functioning of it syringe in its maximum debit and a low temperature additive (maximal viscosity). A T of connecting must be foreseen on the piping of food to allow the assembly of a gradual capacity allowing verifying the rate of injection.

Figure 2

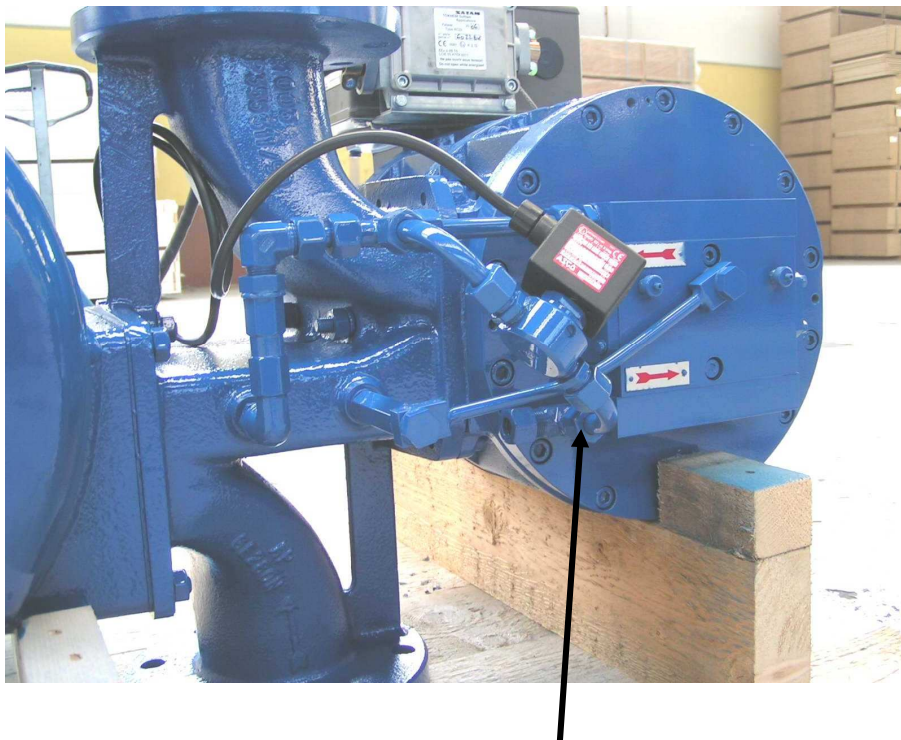


6. PRECAUTIONS TO BE TAKEN BEFORE OPERATING

FEEDING OF XAD41 INJECTOR

It is recommended to install a filter upstream to the syringe

It is compulsory that additives are suitably filtered (Y type strainer) with a low pressure loss filtering unit upstream the pump and downstream XAD41.



Inlet of XAD41 injector: smooth tube Ø 12 x 14

The XAD41 feeding pipe must be as short as possible and the diameter as big as possible, as it has to generate the minimum pressure loss and should not have to contain of lid anti-return.

The injection chamber must always be full of liquid. When it is required to stop the injection, it is necessary to put the button in stop position (push and turn of $\frac{1}{4}$ of tour the button), Injection is stopped by lifting balls (5) off their seats but never stop the flow of additive. Avoid a dry operation of the mechanism as this would indeed risk to work dry and to jam, entailing the destruction of it syringe and can be even of the measuring apparatus.

Never incorporate a gate valve between the injection mechanism and the pipe (manifold) of the meter having a risk of provoking an immediate deterioration of the injector.

N.B: Recommended filtration for Gasoline/premium/Jet: 200microns
Recommended filtration for Gas oil, Diesel Oil, Fuel Oil: 450 microns

7. STARTING AND OPERATING XAD41

To start operating XAD451 device in good conditions, it is necessary:

- to have a clean product, totally exempt of metallic particles
- that all the upstream pipe must be totally cleaned, rinsed and exempt of water.

Important remark:

- The product being of use to the operations of rinsing must not pass through the syringe.
- Rinsing operations have to correspond at least to three times the capacity of the line.

These recommendations being respected, the XAD41 can be operated.

Open the gate of isolation (this one will be filled opened after starting) and make the purge of the syringe by both faucets of purge situated on the face before by the body of the syringe under the stake in functioning of this one.

Verify that the installation is fully drained (by both faucets) and then proceed to the control of the rate of injection percentage here under.

8. CONTROL OF THE RATE OF INJECTION

Installation of the gauge of control (Figure 2 above), to open the valve locates (A) allowing the filling of this one and to close the valve locates (B).

It is recommended to make tests in 1000 liters units to facilitate the calculation of the results.

After control of functioning of this one, put back in normal condition of functioning by closing the gate (A) and opening of her (B) and filled the gate in opened position.

9. SERVICING

9.1. General

Periodic maintenance is required at least once a year.

Service operations must be carried out by a Company approved by Weights & Measures.

9.2. Periodical controls

Several controls must be done periodically by the User (at least quarterly) :

- to control the state of the pipe connections, no leak should be detected.
- to control the state of the filtering basket gone up upstream to the syringe.

Every year control

- Control of functioning of the syringe and its rates of injections.
- Verify the state of the brace and the stroke.

10. VERY IMPORTANT REMARK

We strongly advise against the use of a high pressure water jet to clean the measuring unit, as this could seriously damage the metering unit.

11. RECEPTION

The meters are packed in cardboard packing designed for and adapted to protect the meters during transport.

However if, on equipment reception, the packaging appears to be damaged, the customer should notify the carrier of the damage and inform SATAM.