

FLOAT CONTROLLED MODULATING VALVE

E 2110-10

OPERATING & MAINTENANCE MANUAL

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

SUMMARY

DESCRIPTION	REF.	PAGE N°
1° page	Q5 10 10 01	1
Summary	Q5 10 10 02	1
Choice of valve	Q5 10 10 03	3
Installation	Q5 10 10 04	6
Maintenance	Q5 10 10 05	1
Hydraulic scheme	Q5 10 10 06	1
Modulating Float Pilot	Q5 10 10 07	2
E 94 hydraulic synchronizer	Q5 10 10 08	1
Main valve Assembly instruction	Q5 10 10 10	3

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		RPRRL21SPD400

VALVE SELECTION

FUNCTIONING see hydraulic scheme

A) RESERVOIR CONTROL FUNCTION (inlet pressure > reservoir max level):

The E2110-10 automatic valve is controlled by a two way pilot 1), activated by a float, transmitting a level variation on a reservoir of about 15 centimeters. That allows the main valve (4) hydraulic synchronizer (7) controlled, to reply with linearity to the drawing from the reservoir. The purpose of the main valve (4) is to maintain the maximum level of the reservoir (it is understood that it must be included within the 15 centimeters float stroke), and to feed the reservoir with the same drawn water quantity in that moment. That permits gradual drawings, not instantaneous and gradual closings.

The lower is drawing, the lower is the main valve (4) flow rate. Decreasing the drawing from reservoir the float starts rising. We change from main valve (4) completely open to stable intermediate positions. When balance between drawing and feeding is reached the float stops and the main valve (4) stalls. Creating a motion of the float by a level variation the main valve (4) replies immediately.

CLOSING OF THE VALVE:

Decreasing the drawing from the reservoir fed by the main valve (4) we obtain a float position variation (upwards), that provokes a diminishing of water quantity through the float pilot (1) and consequent pressure increasing in the control chamber of the main valve (4). That allows a gradual closing of the valve by a decline of the shutter that gradually and linearly reaches the closing position. In this position there is no flow away from float pilot [1 exit (d)]. Even in this action the synchronizer (7) feeds gradually the chamber of the main valve (4). The more shutter falls, the less is the quantity drawn by the float pilot (1), and the less is the quantity supplied by the synchronizer (7) to the control chamber of the main valve (4), in a view to maintain a gradual closing.

OPENING OF THE VALVE:

Increasing the drawing from the reservoir fed by the main valve (4) we obtain an opening degree variation of the float pilot (1) [downwards float] that permits to the water contained into the control chamber of the main valve (4) to flow off [by d on float pilot (1)]. That causes the opening of the main valve (4) by the motion of the shutter that rises into the synchronizer (7) placed on the cover of the main valve (4). The more is the flowed off water quantity from float pilot (1) towards the cover, the more is the quantity of water supplied by the synchronizer (7) to cover with the purpose to maintain balanced the system avoiding a no gradual opening.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

NOTE: Main valve (4) inlet pressure value must be always higher than the downstream one (reservoir max level), so to permit the opening of the valve and the consequent filling up of the reservoir.

RECOMMENDED FLOW RATE RANGE

Differential pressure to be done or available headloss

DN	<= 2 bar		>=2 bars		Max.cont.
	Flow Q mini		Flow Q maxi		
mm	m ³ / h	m ³ / h	advisable		m ³ / h
			m ³ / h	m ³ / h	
50	1,25	3,85	15	25	29
65	1,25	3,85	28	40	50
80	1,25	3,85	43	61	79
100	1,90	5,85	65	97	122
125	3,00	9,20	101	151	191
150	3,00	9,20	148	216	274
200	5,85	18,00	259	385	486
250	9,20	28,25	407	601	760
300	13,50	41,50	583	864	1094
350	13,50	41,50	796	1177	1487
400	19,00	58,50	1040	1537	1944
500	26,50	81,50	1624	2401	3038
600	36,00	110,50	2340	3460	4374
700	60,00	190,00	3186	4710	5957

Pumping and reservoir

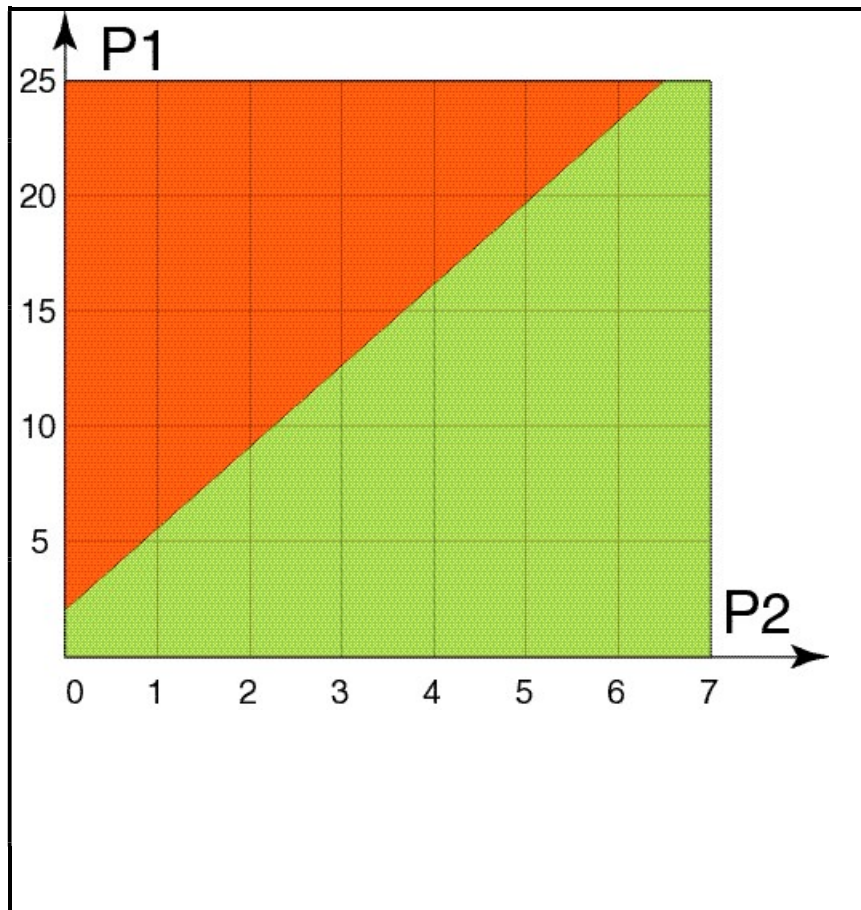
Distribution

Irrigation

Fire protec.

LIMIT CONDITION

Cavitation diagram : it's the admissible differential pressure normally used in the regulating valve.



P1 = MAXIMUM INLET PRESSURE OF THE VALVE

P2 = MINIMUM OUTLET PRESSURE , before danger of cavitation occurs



Green area:
No danger of cavitation
(and therefore no significant wear on the valve)



Red area :
Notable danger of cavitation (with accelerate wear and damage to the valve)

INSTALLATION

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

1) STORAGE

The valves from ND 40 to ND 200 are packed in special cardboard boxes. Outside the carton are clearly pointed out:

- The arrow indicating the position of the valve;
- The name of the customer;
- The code of the valve;
- The number of order confirmation.

The valve is protected by two hardening foam cushions, carefully coated by a thermal plate. This kind of packing if properly stored avoids all the damages originated from transport, unloading, and handling before installation. Avoid to store it under the rain for more than 24 hours!

Open the upper side of the carton and remove the upper cushion. Do not lift the valve by utilizing the pilot, the pilot circuit, or the position indicator. For any kind of handling we recommend to utilize proper eyebolts.

2) INSTALLATION

The mounting principle of a float-controlled modulating valve E2110-10, should be made according to the recommendations given in our scheme Q5 10 10 07. In particular:

- If the feeding pipe is supplying in the bottom of the reservoir, two isolating valves should be installed in the line before and after the float valve. Since the servicing of the main valve is not requesting a long time, a by-pass device is not necessary.
- It is recommended to install the valve as close as possible to the reservoir.
- the float pilot valve (1) must be mounted in the reservoir and fixed to the wall of the reservoir by using the mounting kit designed for this purpose by using the two holes (one with thread G 1/2" and the other one as passing hole).

Should installation require the main valve stem to be horizontal (cover pointed sideways), manufacturer should be consulted concerning valves of ND 200 mm and larger.

NOTE:

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		RPRRL21SPD400




All sizes on request are available with a additional venting cover device (venting cock installed at the top of the cover) to permit a simple escaping of air during the first commissioning.

For a correct operation, it is important to keep the height of the float pilot valve above the main constant level valve always smaller than the dynamic pressure value at the inlet of main valve completely open.

- be sure that no foreign material or slag remains in the pipe (it should have been properly flushed before the installation of the automatic control valve !!!!).
- Before installation of the regulating valve (and respective strainer), it is recommended to flush the upstream line, in order to clear it of slags and other debris.

An efficient flushing should be made with a fluid velocity of at least 1,5 m/s during several hours!

- leave around the valve free space to make eventual maintenance operation.
- Install the valve so that the flow arrow marked on the valve body corresponds to the flow into the reservoir (filling cycle).

UPSTREAM    DOWNSTREAM

- The float pilot valve, already equipped with counterweight, stainless steel cable and float, must be fixed against the wall of the reservoir (see scheme Q5 10 10 07) .
- Adjust the prescribed height of the stop with the back clamp [**Lmin**] on the cable, by fixing the blocking counterweight put at the extremity of the float arm, so that the float is at the requested minimum level.

ATTENTION: pay attention, when screwing the fixing screws (blocking counterweight or stop [**Lmax**]), not damage the cable, in order to allow any future setting modification.

- Installing a stilling well (pipe of diameter of 250 mm with a length 200 mm. longer than the distance [**Lmax**]- [**Lmin**]) using the fixing kit designed for this purpose (see enclosed drawing) or directly to the upper wall of the reservoir.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

NOTE: For the correct operation of the float pilot valve (1), it is absolutely necessary to provide such stilling well, to avoid that the waves created by the water feeding the reservoir are disturbing its proper operation.

- The float pilot valve ((see scheme Q5 10 10 06 rep1) must be mounted as near as possible of the maximum level of the reservoir and if below the high point of the feeding line (see Q5 10 10 06 rep6). If this is not possible (feeding at the bottom of the reservoir, for example), it must be paid attention that its mounting height (measured in meter) is always smaller than the dynamic pressure value existing at the inlet of the completely open valve (given in mWh). Therefore, the sizing of the valve is extremely important to insure the correct operation of any float pilot valve.
- The main regulating pilot system (see Q5 10 10 06 rep1) must be connected to the float pilot valve with a pipe (see Q5 10 10 06 rep6) of size G 1/2" from the isolating cock (3b) up to the inlet of the float pilot valve (S), located on the side of the float pilot body, G1/2". This pipe should be as close as possible of the maximum level of the reservoir and not present any high point which is higher than the highest point of the feeding line or at least be lower than the dynamic pressure value existing at the inlet of the completely open main valve.
- Open all ball cocks (3a) of the pilot circuit. **The cock of the sensing line (3b) is closed.**

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		RPRRL21SPD400

3) INITIAL SET UP

The isolating valves (before the Y strainer and after the VALVE see Q5 10 10 10 rep3) **are in closed position.**

1. Open upstream valve to feed main valve (4). In this way main valve (4) is closed and the upper chamber is under pressure.
2. Vent air inside main valve (4) control chamber by the device placed on the position indicator (5). Then close the air valve.
3. Carry the lever of the float pilot (1) in upper position. Open isolating ball valve (3b). The valve is forced in closed position.
4. Carry the lever of the float pilot (1) slowly to open position by pushing it downwards. Test the gradual operation of the main valve (4) by carrying manually the lever of float pilot (1) along its stroke by little movements. Control also the main valve (4) opening degree compared to the corresponding stroke on the shutter. During this operation is helpful to observe carefully the movements of the stem inside the position indicator (5).

Verify also that each stop of float pilot (1) stroke corresponds to a fix flow rate value with proper inertia.

5. Now the valve is able to modulate. Through the clamp of the float pilot (1), behind the counterweight, set the chosen float position in correspondence with maximum et minimum level fixed in the space of the 15 centimeters float working stroke.

6. The intermediate body of the synchronizer (7) must be in the middle of its 12 mm. stroke.

On synchronizer (7) it is possible to realize a fine tuning so to make main valve (4) sensitive in controlling small openings and small flow rates.

The recommended position corresponds to the center line of its stroke.

Screwing completely the intermediate body we obtain a higher sensibility but an opening degree of main valve (4) lower than the one reachable with the synchronizer (7) in the middle. In this way we can control a very flow rates of 1-2-3 l/s (for valves from ND 50 to ND 200).

Carrying upwards the synchronizer (7) position (unscrew counterclockwise the central body, we obtain a higher opening degree of the valve [float pilot (1) completely down, shutter of main valve (4) completely open] but with feeble control in case of lower flow rate.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

ATTENTION :

before changing the regulation of the synchronizer (7) close the ball valve (3a), open the venting device of the position indicator (5) so to take away the pressure inside the cover that prevents from moving the intermediate body of the synchronizer (7).

Please contact us for any problem concerning regulation of the synchronizer (4).

THE START-UP OF AN AUTOMATIC CONTROL VALVE REQUIRES THAT PROPER PROCEDURES BE FOLLOWED. TIME MUST BE ALLOWED AFTER EACH SETTING, FOR THE VALVE TO REACT TO ADJUSTMENT AND THE SYSTEM TO STABILIZE. THE OBJECTIVE IS TO BRING THE VALVE INTO SERVICE IN A CONTROLLED MANNER.

4) CHOICE OF PILOT CONNECTING PIPE

4-1 The connecting pipe between valve chamber and pilot may be made of whatever material (steel, stainless steel, copper, polyethylene) provided that it does not pollute drinking water.

4-2 Avoid the use of rubber or other yielding material pipes because in case of bending the pipes can create high pressure drops.

4-3 It is necessary that the **pipe complies** with the following requirements:

UTILIZATION ON WATERWORKS

The pipe must be suitable for drinking water so to avoid the release into water of substances over the maximum level allowed by the law.

TUBE MECHANICAL FEATURES

When pilot closes, into the valve chamber the pressure is equal to the static one measured with zero flow rate on main line (closed valve).

So the pipe must be able to resist this pressure without any danger.

Follow our instructions carefully considering a reference pressure value equal to 1.5 times the valve inlet pressure, with valve in closed position.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		RPRRL21SPD400

RECOMMENDED MINIMUM DIAMETER

When the float is totally lowered it is necessary to have the maximum release of the pressure within the valve chamber as to assure the maximum opening degree of main valve.

The utilisation of a tube having a too small diameter prevents the release of the pressure. In this way the valve is not able to open completely, to the detriment of the maximum flow rate that the valve is able to reach.

This in particular for plants where, with valve in fully open position, the inlet pressure reaches reduced values. That is to say in plants where ΔH tank water level is few meters higher than valve axis.

4-4 Utilise pipes having a diameter higher or equal to the minimum recommended as per following table according to required pipe length (L) and constructive material.

Pipe material tube	Pipe length (meters)						
	4	6	10	15	20	40	60
	Pipe diameter(mm)						
steel	17	18	20	22	23	26	28
Copper	15	16	18	19	20	22	24
Polyethylene	14	15	17	18	19	22	23

4-5 Important

Utilise new and duly cleaned pipes.

On connections do not utilise vegetable fibres as sealing agent. Give your preference to Teflon tape.

The presence of foreign matters on the pipe before installation or resulting from assembly can obstruct the pilot circuit. That harms the correct working of the whole valve.

For any further information contact our Customer Service, indicating all data as per plastic label on main valve body. Give full detailed information's about working conditions, the type of problem.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		EARAVACVSTDLA00

MAINTENANCE

RECOMMENDED SPARE PARTS:

Full set of gaskets for E2001;

Full set of gaskets for PV20C.

MAINTENANCE

This control should then allow to determine the cycle of the requested maintenance, since it is taking into consideration the true service conditions of the valve.

The quality of the material used in the manufacture of our valves should produce no wear of the internal components. However we are recommending:

AFTER 6 MONTHS OF SERVICE:

- Control and clean eventually the screen on the Y strainer pos. 2 (see scheme Q5 10 10 06).

Note:

A plugged screen will prevent any flow of control fluid into the pilot circuit, which will put the main valve progressively out of control!

AFTER 12/18 MONTHS OF SERVICE:

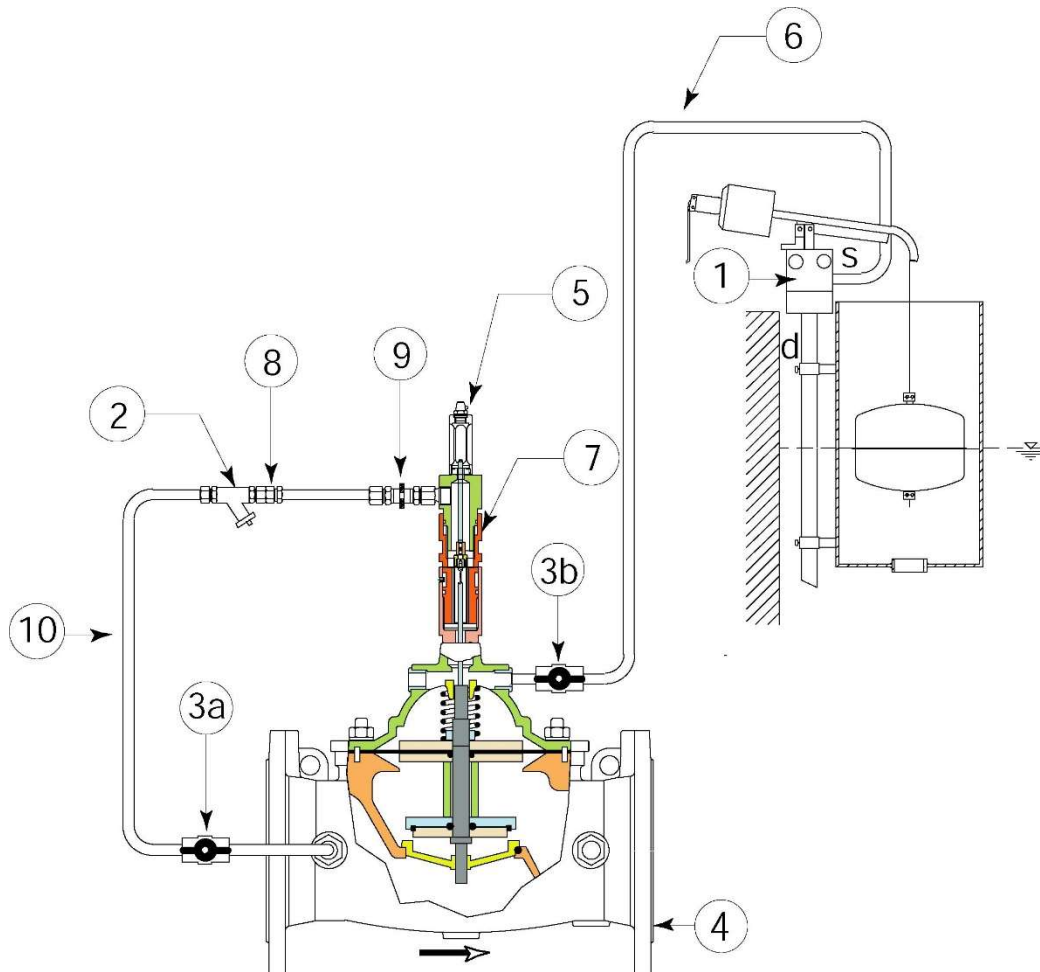
- Control and clean eventually the screen on the Y strainer pos. 2 (see scheme Q5 10 10 06).
- After one year of service, control the screen of the main strainer installed in front of the regulating valve (see scheme Q5 10 10 10 rep 4).
- Take the main valve apart, by removing first the complete pilot circuit.
- Then unscrew the stud nuts and remove the cover and internal diaphragm assembly.
- Check for any eventual damage of the QUAD-RING and the diaphragm.

PIPELINE PROTECTION VALVES DN 50 to 700		08/31/2022
		RPRRL21SPD400

- Clean thoroughly the internal part of the valve, grease slightly the stem at both guided locations (water grease, non toxic !!).
- Assemble the main valve and the pilot circuit.
- Put the valve back into service.

This control should then allow to determine the cycle of the requested maintenance, since it is taking into consideration the true service conditions of the valve.

HYDRAULIC SCHEME		
Ref.	Description	Material
1	Modulating	F35 Aisi 304
2	Y-strainer	Brass
3a-3b	Ball valve	Brass Ni-plated
4	Main valve	E2001
5	Position indicator with manual venting cock	E50
6	Tube (not included)	Aisi 304
7	Hydraulic synchronizer	
8	Tube Union "Serto"	Brass Ni-plated
9	Calibrated orifice	Delrin
10	Tube	Aisi 304



PILOT F35 PS

Ref.	Description	Material
01	Body	AISI 304
02	Base	AISI 304
03	Obturator	AISI 304
04	Pilot lever	AISI 304
05	Support lever	Bronze
06	Float	AISI 304
07	Cable	AISI 316
08	Cable stretcher	Bronze
09	Counterweight	Bronze

**PIPELINE PROTECTION
VALVES**

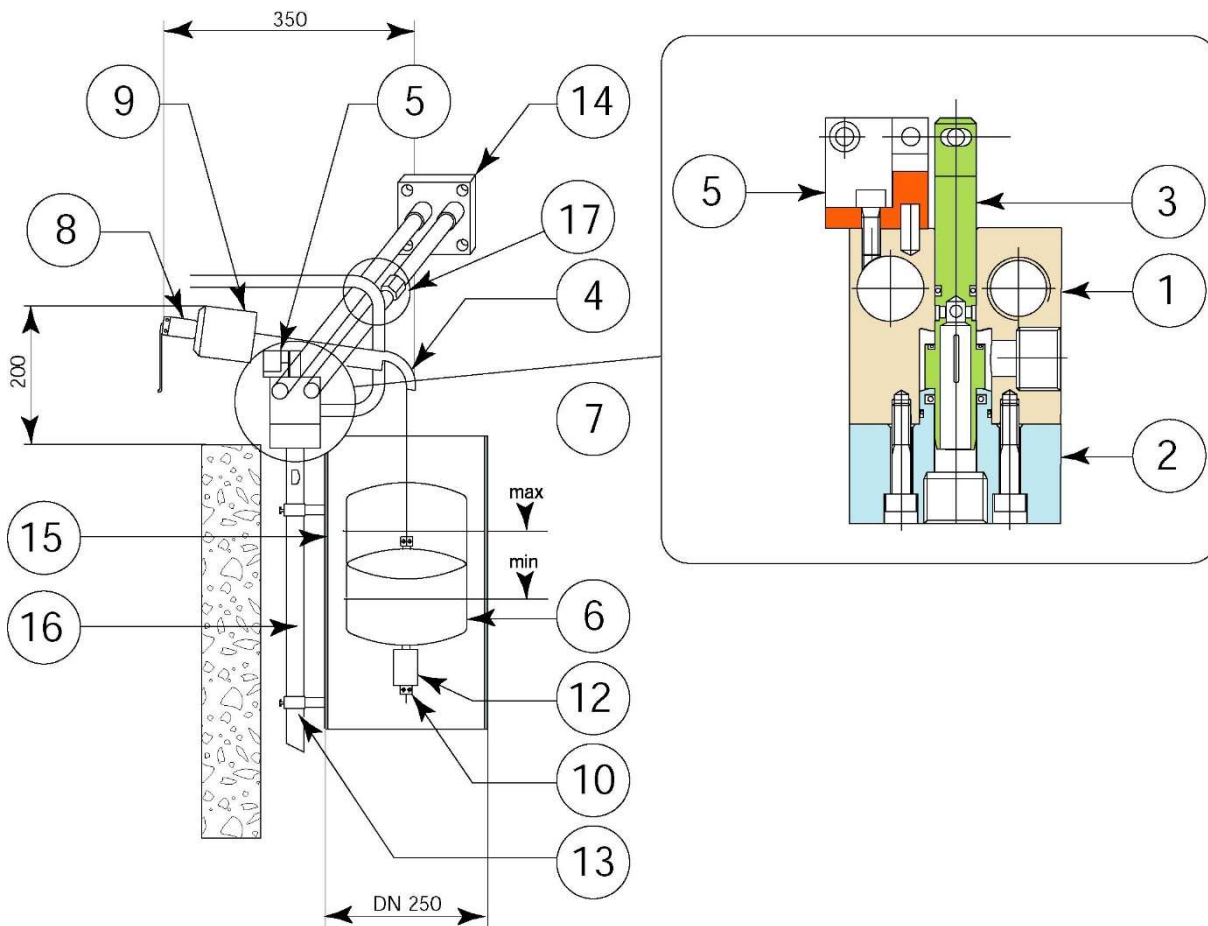
DN 50 to 700



08/31/2022

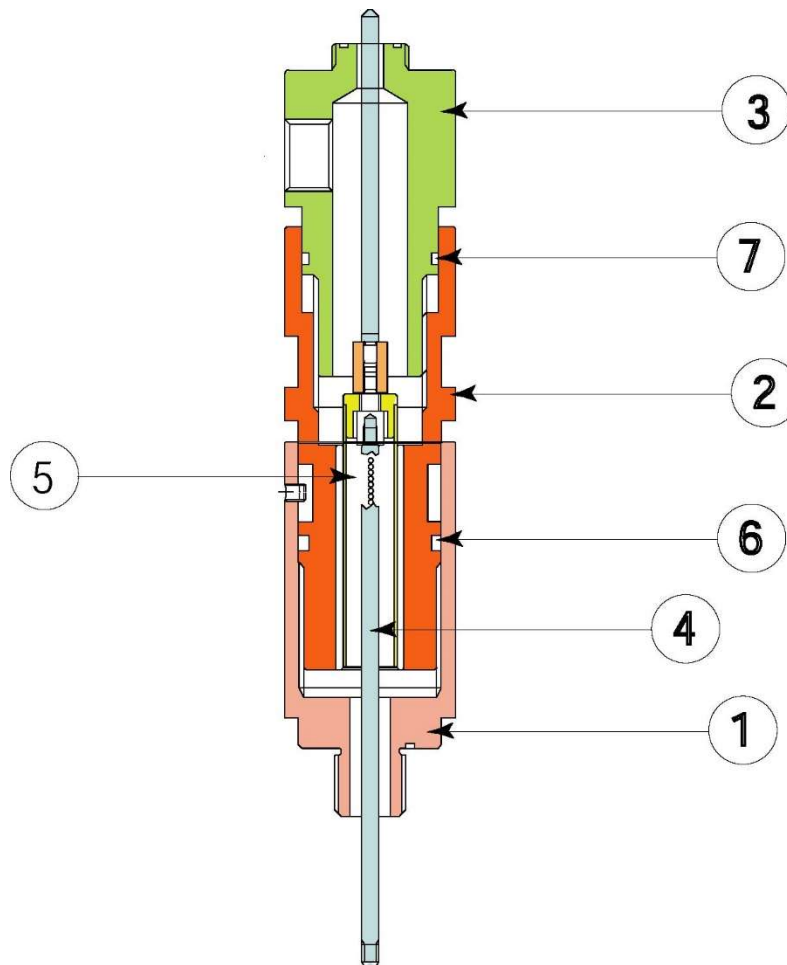
RPRRL21SPD400

10	Clamp	Brass + inox
12	Counterweight	Bronze
13	Kit support (included)	Aisi 303
14	Tie plate (included)	Aisi 303
15	Plastic tube Ø 250 (not included)	
16	Tube ½" (not included)	
17	Assembly kit (included)	



HYDRAULIC SYNCHRONIZER E 94

Ref.	Description	Material
1	Bottom Body	Brass Ni-Plated
2	Body / Adjustable Seat	Stainless Steel Aisi304
3	Top Body	Brass Ni-Plated
4	Shutter Stem	Stainless Steel Aisi304
5	Main Shutter	Stainless Steel Aisi304
6-7	O-Ring	NBR 70



MAIN VALVE E2001

Ref.	N°.	Description	Material (type)
01	01	Body	FGS 400-15
02	01	Cover	FGS 400-15
03	01	Cover bearing	Bronze
04	01	Seat	AISI 316
05	01	Quad-ring retainer plate	AISI 316
06	01	Quad-ring retainer size 50 up to 200	AISI 316
		Quad-ring retainer 250 up to 700	FGS 500-15 + Epoxy
07	01	Stem	AISI 303
08	02	Stem nuts	AISI 303
09	01	Spacer	AISI 303
10	02	Diaphragm washers epoxy coated	Steel
11	01	Spring	AISI 302
12	*	Stud	AISI 303
13	*	Nuts	AISI 303
14	*	Washer	AISI 303
15	01	Quad-ring	NBR (Ktw-WrC)
16	01	Seat O-ring	Viton
17	01	Diaphragm	NBR nylon reinforced (Ktw WrC)
18	01	O-ring	NBR
19	02	Centring taper pin	AISI 303
20	01	Base position indicator	Brass Ni-plated
21	01	Position indicator housing	Brass Ni-plated
22	01	Positionn indicator stem	AISI 303
23	01	Position indicator	Glass
24	02	O-ring	NBR
25	01	Manual venting cock	Brass Ni-plated
26	01	O-ring	NBR
27	07	Reduction	AISI 304

MOUNTING INSTRUCTIONS

Ref.	N°.	Description
01	2	Attachment flange
02	2	Flanged taper
03	3	Isolating valve
04	1	Strainer with drain cock
05	1	Automatic control valve E2001
06	1	Dismantling joint
07	1	Pilot F 35 PS

