



### STANDARD EQUIPMENT

No	Description	Qty	Type
1	MAIN VALVE HY-CHECK AE/GE/NGE	1	100-04
2	ISOLATION BALL VALVE	7	RB-117
3	STRAINER	2	X43
4	CHECK VALVE	4	CDC-1 (#)
5	3-WAY SOLENOID VALVE (NO)	1	311-D
6	AUXILIARY 3-WAY VALVE	1	102C-3H/KH
7	DIFFERENTIAL PRESSURE CONTROL	1	CDHS-2BP
9	RATE OF FLOW CONTROLLER	2	VRE
10	SWITCH ASSEMBLY	1	X105-M
11	UNION WITH INCORPORATED RESTRICTION	1	X52-VR

### OPTIONAL FEATURES

No	Description	Qty	Type

### NOTES

AE/GE : DN 150 - DN 400 / NGE : DN 200 - DN 600  
(# ) = According to valve size this feature type could change

OPTIONAL FEATURES : \_\_\_\_\_  
NOT FURNISHED BY CLA-VAL : \_\_\_\_\_

### ► Operating data

#### 1.1 ► SOLENOID CONTROL FEATURE

Solenoid valve 311-D (5) is a direct-acting, 3-way solenoid control, equipped with a manual actuator, which changes position when its coil is energized or de-energized. This applies or relieves pressure in the upper chamber of auxiliary valve (6), which is switching accordingly from hydraulic selection "NC" - "COM" into the other selection "COM" - "NO" or backwards, providing the operation shown in the following table:

60-31/72			
Solenoid 311-D (5)		Auxiliary valve 3-way (6)	Main valve (1)
State	Ports connected	Position	Position
De-energized	0 - 1	"NC" - "COM"	Closed
Energized	1 - 2	"COM" - "NO"	Open

#### 1.2 ► CHECK VALVE FEATURE

The main valve (1) has an integral check feature (main valve model Hy-Check), which closes automatically when outlet pressure exceeds inlet pressure, regardless the position of the diaphragm assembly of main valve. Then the main valve (1) is hydraulically locked into its closed position, by outlet pressure flowing into its control chamber through (3B), (4D), (6) and (7). The check valve (4C) prevents any control pressure backflow towards the inlet of main valve (1).

#### 1.3 ► SLOW CLOSING SPEED CONTROL

The flow regulator (9A), which is not adjustable, but at any time fully interchangeable, controls exclusively the slow closing speed of the main valve (1), regardless of the slow opening speed adjustment.

The flow regulator (9A), which is mounted in the pilot circuit of the pump control valve, is providing from the moment the high closing speed is put out of operation by the closing of pilot (7), a time of slow closure corresponding approximately (rule of the thumb) to 20% of the main valve size SERIE GE\* or to 15% of the main valve size SERIE NGE\*.

Example SERIE GE\*: [DN 150 > 30 s], [DN 300 > 60 s], etc.

If however the slow closing time has to be modified in order to secure a faster closing, however without generating a surge, the flow regulator (9A), which is mounted in an union-fitting, can be easily exchanged with a higher capacity one, to get the prescribed speed.

#### 1.4 ► SLOW OPENING SPEED CONTROL

The flow regulator (9B), which is not adjustable, but at any time fully interchangeable, controls exclusively the slow opening speed of the main valve (1), regardless of the slow closing speed adjustment.

The flow regulator (9B), which is mounted in the pilot circuit of the pump control valve, is providing from the opening of the main valve (1) up to the moment the high opening speed is put into operation by the opening of pilot (7), a time of slow opening corresponding approximately (rule of the thumb) to 20% of the main valve size SERIE GE\* or to 15% of the main valve size SERIE NGE\*.

Example SERIE GE\*: See chapter 1.3 above.

If however the slow opening time has to be modified in order to secure a faster opening, however without generating a surge, the flow regulator (9B), which is mounted in an union-fitting, can be easily exchanged with a higher capacity one, to get the prescribed speed.

### 1.5 ► HIGH OPERATING OPENING/CLOSING SPEED

As long as the differential pressure "HP" - "BP" between inlet and outlet of main valve (1) is higher than the value set on pilot valve (7), this last one is tightly closed. The slow opening speed, respectively slow closing speed are exclusively under the control of the flow regulator (9B), respectively (9A), as indicated in chapters 1.4 / 1.3.

When the differential pressure "HP" - "BP" between inlet and outlet of main valve (1) is lower than the preset value of pilot valve (7), this last one opens and accelerates the opening or closing speeds automatically. The importance of the speed acceleration is controlled by an orifice mounted in the union-fitting (11).

**Note:** When the proper slow opening, slow closing and high opening/closing speeds have been set, they cannot be anymore modified accidentally which is securing a safe operation of the pump control valve.

In case of power failure during operation of the pump control valve, the differential pressure "HP" - "BP" is becoming negative and forces the total opening of pilot valve (7). This allows control pressure to flow at maximum rate of flow, under control of orifice (11), during the total lift of the valve (1) into the control chamber of main valve (1), which is then locked hydraulically in its closed position. The switch assembly (10) is then closing, permitting the new start of the pump.

### 1.6 ► SWITCH ASSEMBLY FEATURE

Switch assembly (10) is actuated magnetically by a permanent magnet attached to the main valve stem extension. The magnetical contact can be adjusted on the PVC support.

The switch assembly is adjusted to turn off when the main valve (1) is in the closing cycle (approximately 3% of the opening lift). When the main valve (1) starts to close and reaches a lift lower than 3% of the opening, the switch (10) turned off and shut down the pump.

**Note:** The switch (10) must be electrically connected to a relay; the use of a time-delayed relay (0-20 s) allows further to get a drip tight closure of main valve (1), before the pump motor is switched off.

### 1.7 ► (E\*) EUROPEAN STANDARDS

ITEM (2) - Isolation ball valve:

Isolation ball valves RB-117 (2) are used to isolate the pilot system from main line pressure and to test the operation of the main valve (1). These valves must be open during normal operation.

ITEM (3) - Y-Strainer:

Two strainers X43 (3) are installed in the pilot supply lines to protect the pilot system from foreign particles. The strainer screens must be cleaned periodically.

### 1.8 ► CHECK LIST FOR PROPER OPERATION

- ☐ System valve open downstream.
- ☐ Air removed from the main valve cover.
- ☐ Isolation ball valves (2) open.
- ☐ Periodic cleaning of strainers (3).
- ☐ Correct voltage to solenoid valve (5) - manual solenoid valve override in neutral position.
- ☐ Switch (10) assembly correctly positioned and connected.