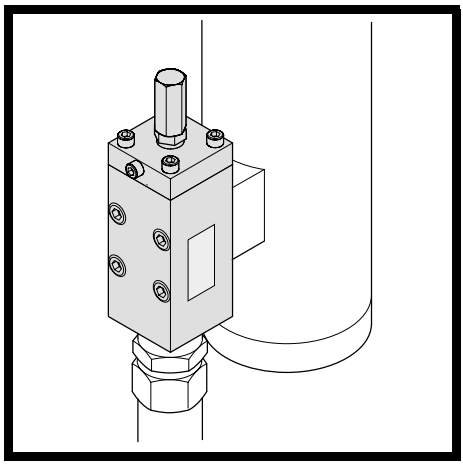
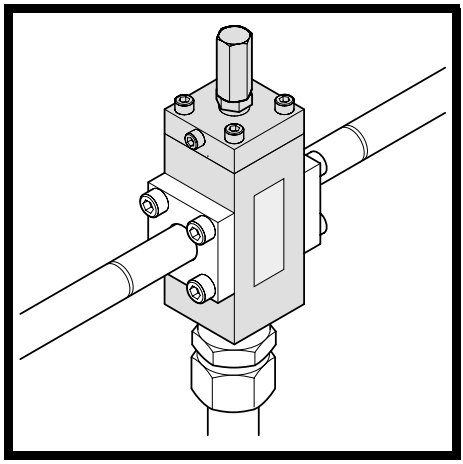
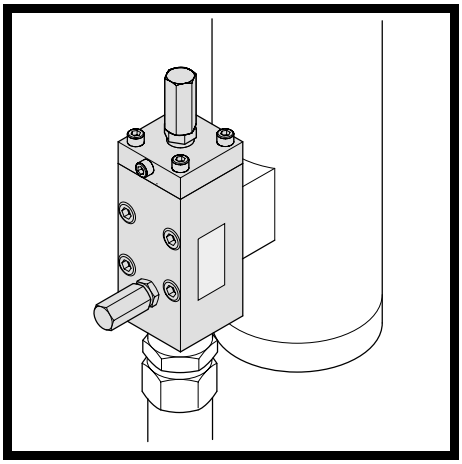
VC 3006 CE







INSTALLATION, SETUP AND MAINTENANCE GUIDE

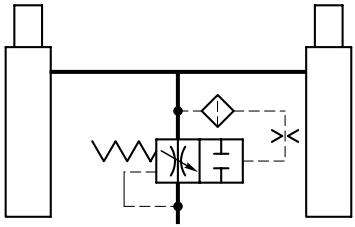
1 0991 001 (15/12/2004)

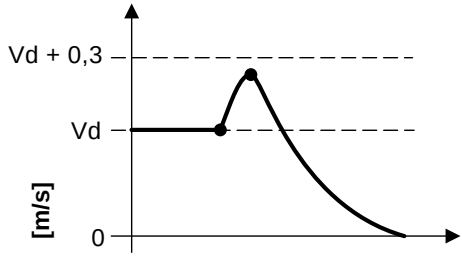
GMV HYDRO LIFT SYSTEM

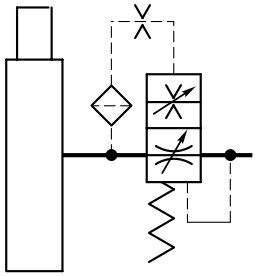
INDEX

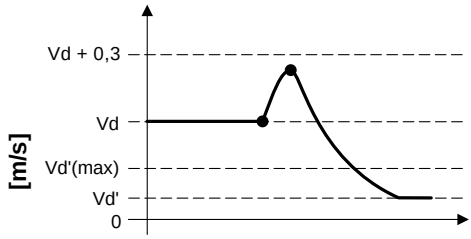
page

1.









		3/4"B	1" B	1"1/4 B-G-R	1"1/2 B-G-R	2"B-G-R	2"1/2 B
	l/min	8 ÷ 150	5 ÷ 275	20 ÷ 350	173 ÷ 525	425 ÷ 700	425 ÷ 1200
	bar	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60
	cSt	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240
	°C	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70

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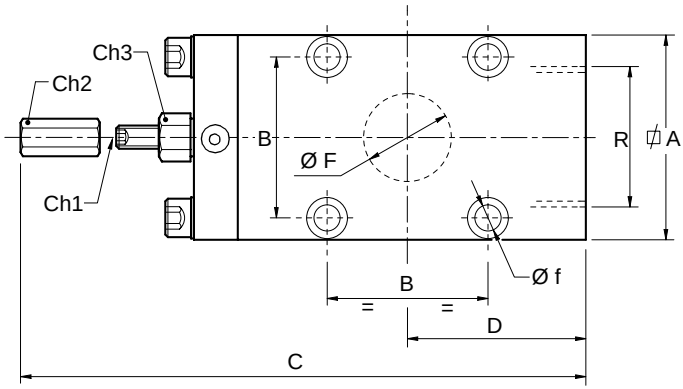
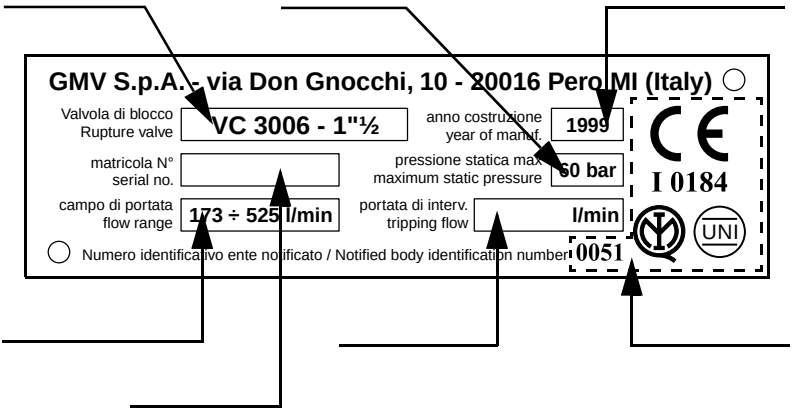


	A	B	C	D	ØF	Øf	Ch1	Ch2	Ch3	R	
	[mm]										[kg]
VC 3006/B - 3/4"B	50	36	135	44	18	8,5	3	10	13	G 3/4"	2
VC 3006/B - 1"B	50	36	160	57	20	8,5	4	13	17	G 1"	3
VC 3006/B - 1"1/4 B-G-R	70	55	166	57	25	9	4	13	17	G 1" 1/4	4
VC 3006/B - 1"1/2 B-G-R	70	55	173	61	30	9	4	13	17	G 1" 1/2	4,5
VC 3006/B - 2" B-G-R	80	65	194	68	40	11	4	13	17	G 2"	6
VC 3006/B - 2"1/2 B	100	80	285	88	53	11	6	17	22	G 2"	10

3.



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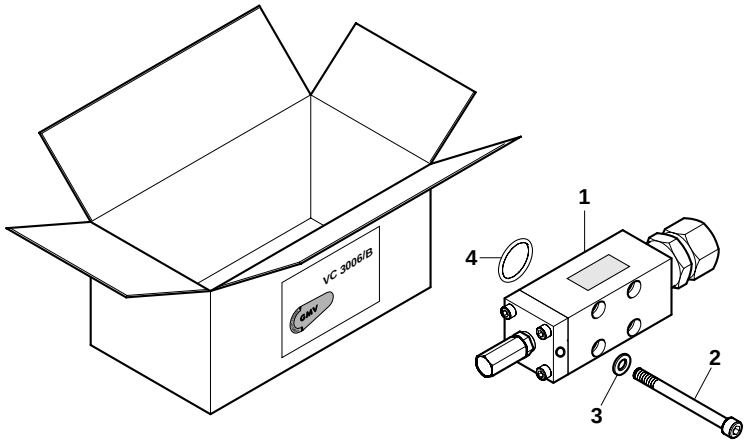

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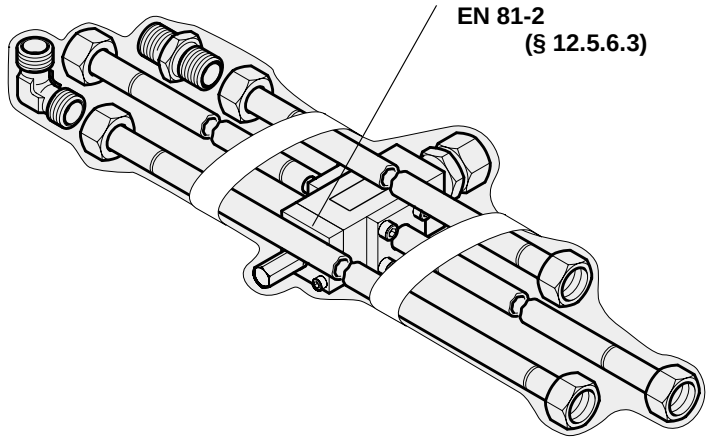
2) n° 4
3) n° 4
4) n° 1
5) n° 1

5.1



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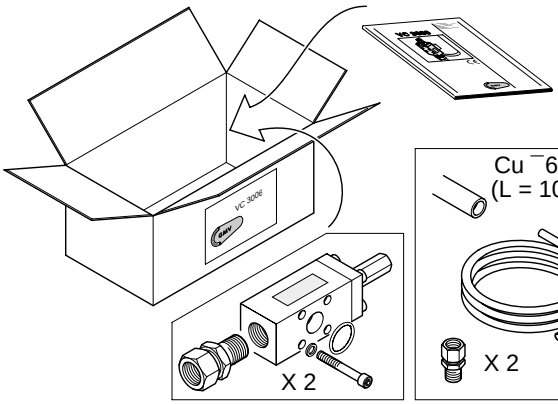

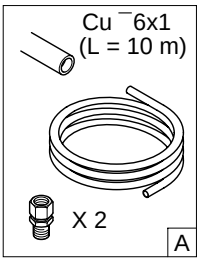

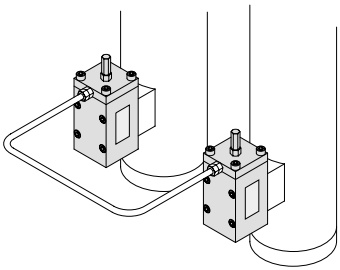

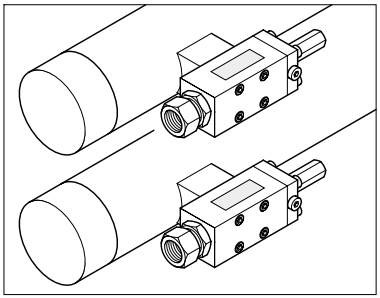

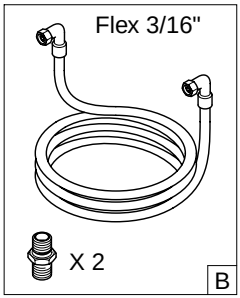

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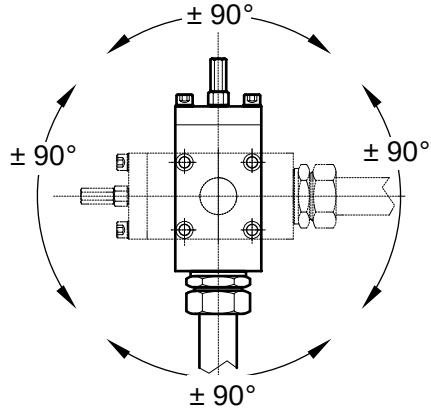

6.2 Montaggio:

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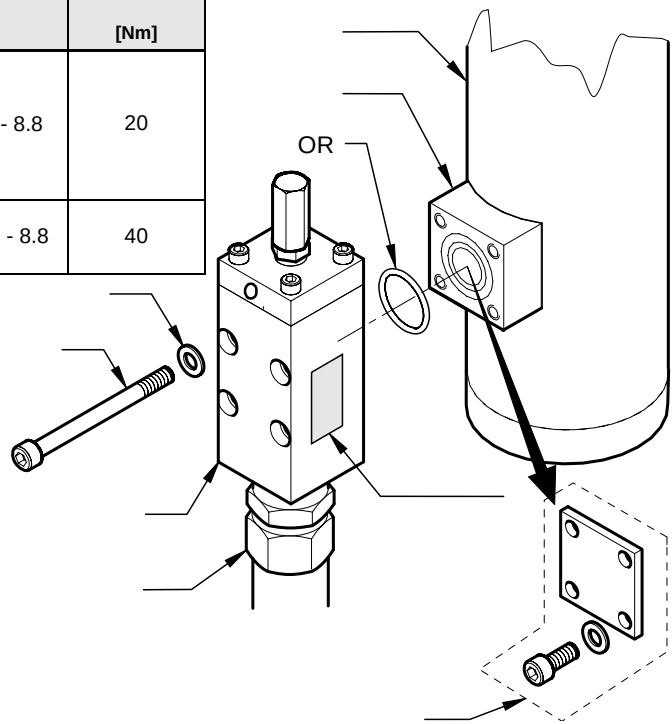
		[Nm]
VC 3006/B - 3/4”	M8 - 8.8	20
VC 3006/B - 1"		
VC 3006/B - 1"1/4		
VC 3006/B - 1"1/2		
VC 3006/B - 2”	M10 - 8.8	40
VC 3006/B - 2"1/2		



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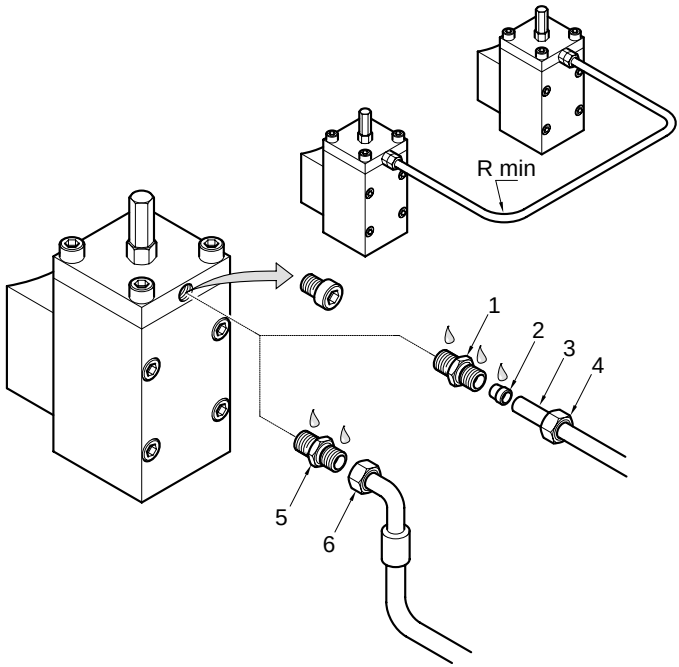

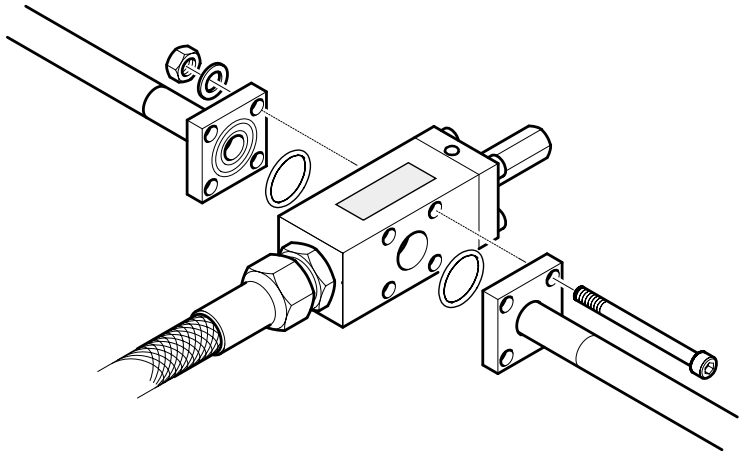

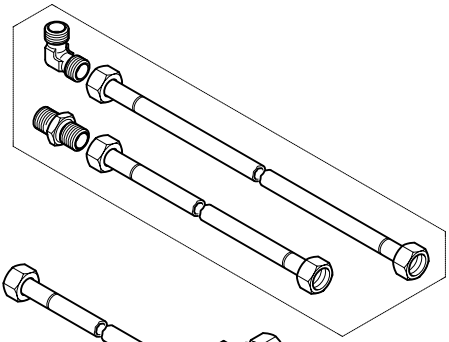

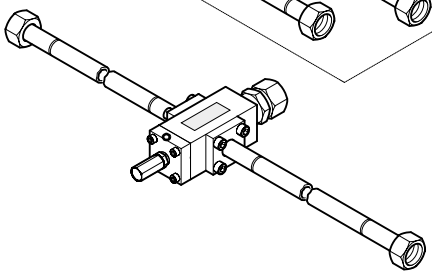

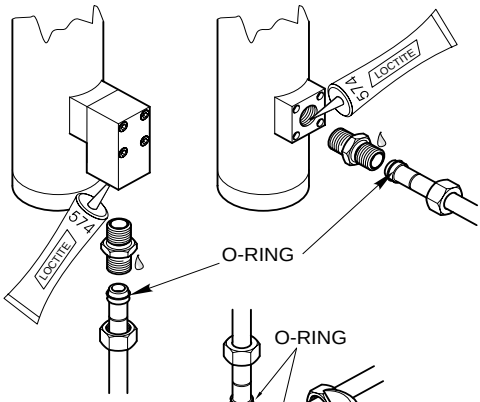
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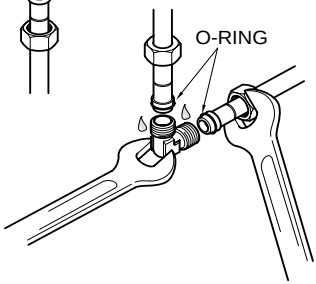
O-RING


O-RING

7.

7.1

$$Q_{i\ max} = \frac{(V_d + 0,3) \cdot 6 \cdot A \cdot N_{VC}}{c_m}$$

$Q_{i\ max}$ =
V_d =
A =
N_{VC} =

c_m =

$$Q_i = \frac{(V_d \cdot 1,3) \cdot 6 \cdot A \cdot N_{VC}}{c_m}$$

	HL45	HL55	HL65										
A [cm^2]	15,90	23,76	33,18										
	50	60	70	80	90	100	110	120	130	150	180	200	238
A [cm^2]	19,63	28,27	38,48	50,27	63,62	78,54	95,03	113,10	132,73	176,71	254,47	314,16	444,88

		T42	T50	T63	T70	T85	T100
C2 (2 stadi)	A [cm^2]	21,14	29,40	44,22	59,59	84,94	117,61
C3 (3 stadi)		33,25	44,04	66,63	88,83	132,27	176,15

		TCS/EC 60	TCS/EC 75	TCS/EC 90	TCS/EC 105	TCS/EC 120
-2N, Y (2 stadi)	A [cm^2]	36,76	54,55	75,87	100,73	129,12
-3Y (3 stadi)		45,95	65,50	88,59	115,22	*****
-4Y (4 stadi)		56,32	77,64	102,50	*****	*****

7.2

	50 Hz			60 Hz		
	[l/min]	[mm]	N°	[l/min]	[mm]	N°
3/4"B	8	3,35	3 1/4	10	3,85	3 3/4
	12	4	4	15	4,5	4 1/2
	15	4,5	4 1/2	18	5	5
	20	5,2	5 1/4	24	5,67	5 3/4
	23	5,5	5 1/2	***	***	***
1"B	25	4,5	3 1/2	***	***	***
	30	5,0	4	30	5,0	4
	35	5,5	4 1/2	36	5,5	4 1/2
	43	6,0	4 3/4	42	6,0	4 3/4
	55	7,0	5 1/2	52	6,5	5 1/4
	75	8,0	6 1/2	66	7,5	6
	100	9,5	7 1/2	90	8,5	6 3/4
1"1/4 B-R-G	55	5,5	4 1/2	52	5,5	4 1/2
	75	7,0	5 1/2	66	6,5	5 1/4
	100	8,0	6 1/2	90	7,5	6
	125	9,0	7 1/4	120	9,0	7 1/4
	150	10,0	8	150	10,0	8
	180	11,0	8 3/4	180	11,0	8 3/4
	210	12,0	9 1/2	216	12,0	9 1/2
1"1/2 B-R-G	180	9,5	7 1/2	180	9,5	7 1/2
	210	10,5	8 1/2	216	10,5	8 1/2
	250	12,0	9 1/2	252	12,0	9 1/2
	300	13,0	10 1/2	300	13,0	10 1/2
	360	14,5	11 1/2	360	14,0	11 1/4
	430	15,5	12 1/2	432	15,5	12 1/2
2" B-R-G	430	14,0	11 1/4	432	14,0	11 1/4
	500	15,5	12 1/2	516	16,0	12 3/4
	600	18,5	14 3/4	600	18,5	14 3/4
2"1/2 B	600	18,5	14 3/4	600	18,5	14 3/4
	720	24,5	16 1/4	720	24,5	16 1/4
	860	26,5	17 3/4	864	26,5	17 3/4
	1000	27,5	18 1/4	1032	27,5	18 1/4

7.3

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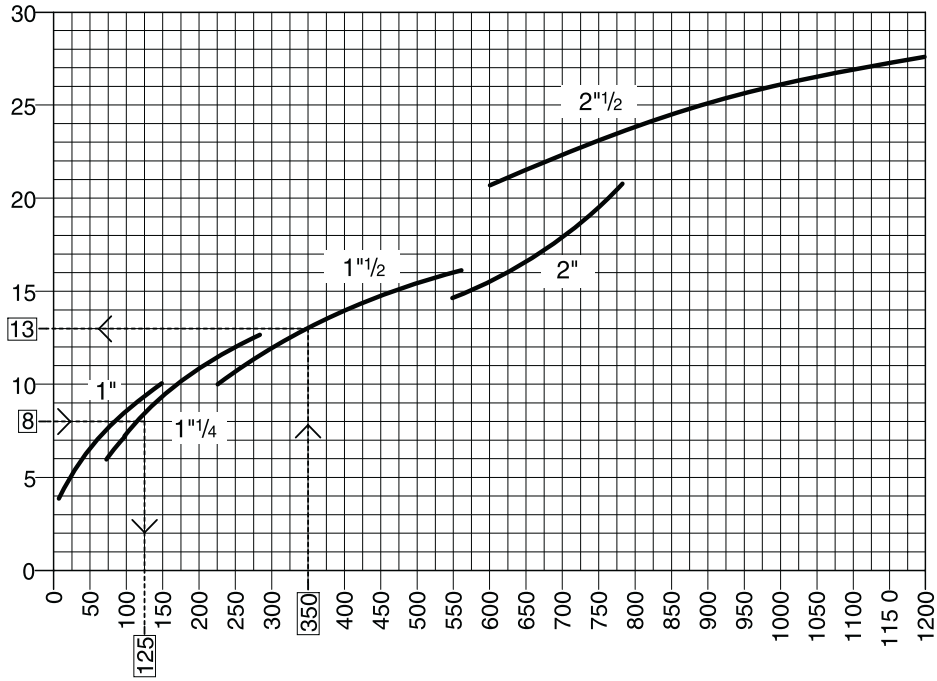
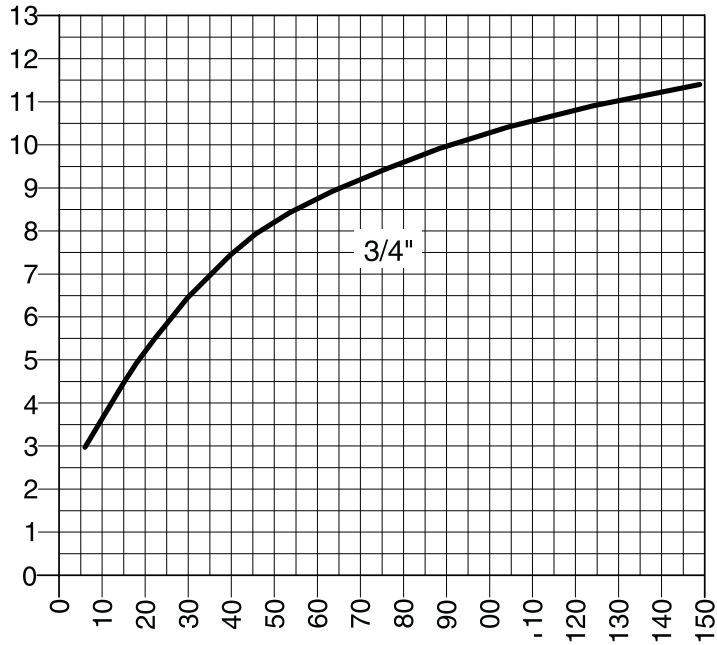


: Q_i = 350 l/min - VC 3006 - 1"1/2
X = 13 mm.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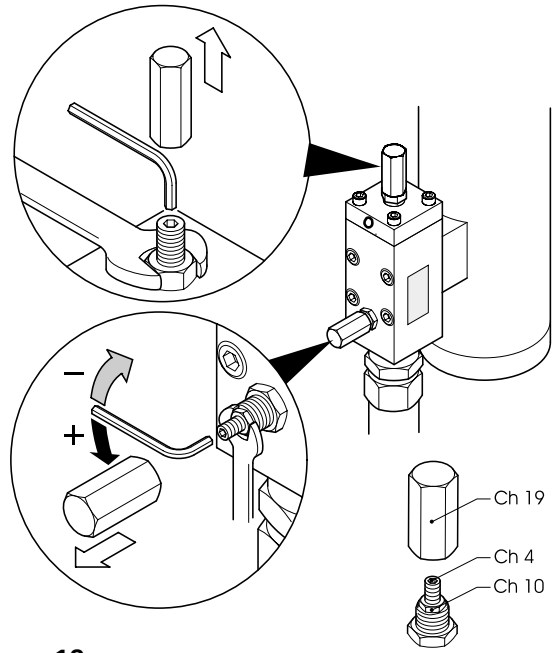
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Ch 19
Ch 4
Ch 10

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8.3

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(Es: **X** = 8 mm / VC3006 - 1” 1/4 ➜ $\mathbf{Q_i}$ = 125 l/min).

3.

4.
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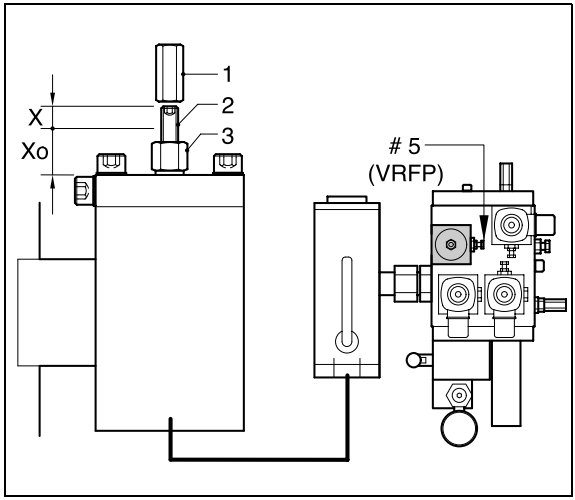

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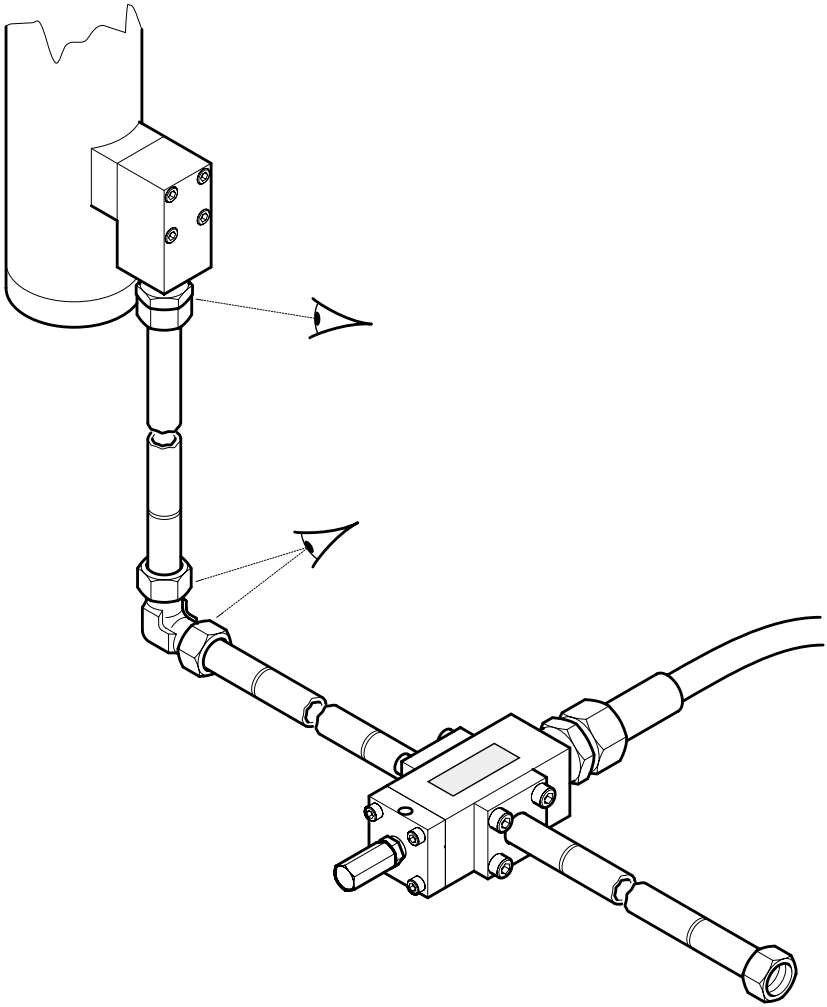
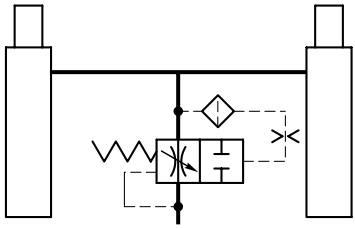


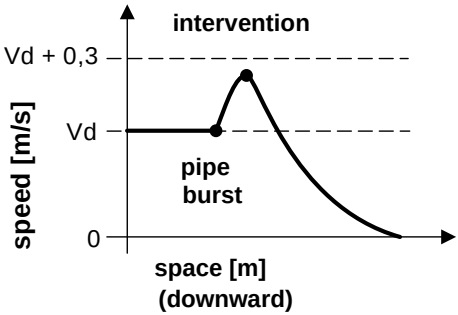
1. DESCRIPTION

Type VC 3006 rupture valve is a safety device designed to be used with elevators in line with directive 95/16/CE.
It interrupts the flow of fluid from the cylinder in case of excessive down speed.
The valve is designned and manufactured to withstand without deformation 5 times the maximum static pressure 60 bar x 5= 300 bar (653 psi x 5 = 3260 psi).

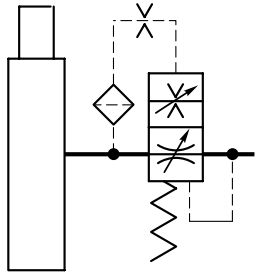
HYDRAULIC CIRCUIT "B-G"



FUNCTION CURVE "B-G"



HYDRAULIC CIRCUIT "R"



FUNCTION CURVE "R"

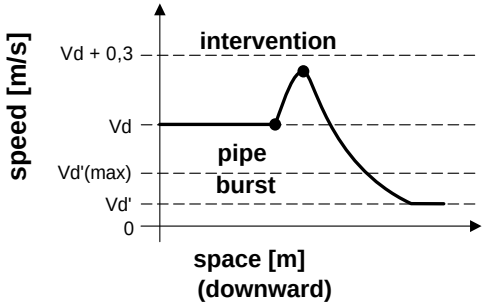


Table 1 - Valve selection

		3/4"B	1" B	1"1/4 B-G-R	1"1/2 B-G-R	2"B-G-R	2"1/2 B
Flow rate	l/min	8 ÷ 150	5 ÷ 275	20 ÷ 350	173 ÷ 525	425 ÷ 700	425 ÷ 1200
Static pressure	bar	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60	12 ÷ 60
Fluid viscosity	cSt	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240	16 ÷ 240
Fluid working temperature	°C	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70	5 ÷ 70

2. DIMENSIONS

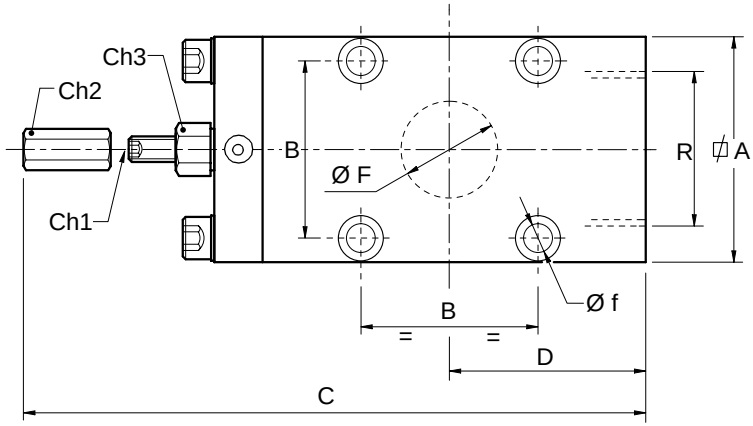
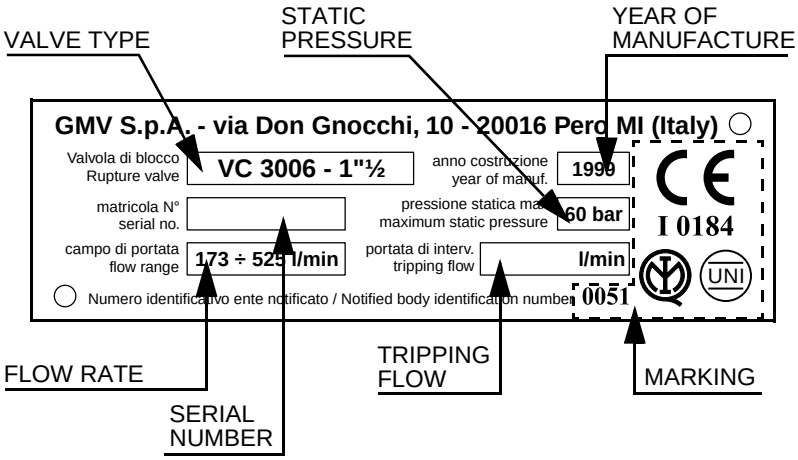


Table 2 - Overall dimension

VALVE TYPE	A	B	C	D	ØF	Øf	Ch1	Ch2	Ch3	R	weight
	[mm]										[kg]
VC 3006/B - 3/4"B	50	36	135	44	18	8,5	3	10	13	G 3/4"	2
VC 3006/B - 1"B	50	36	160	57	20	8,5	4	13	17	G 1"	3
VC 3006/B - 1"1/4 B-G-R	70	55	166	57	25	9	4	13	17	G 1" 1/4	4
VC 3006/B - 1"1/2 B-G-R	70	55	173	61	30	9	4	13	17	G 1" 1/2	4,5
VC 3006/B - 2" B-G-R	80	65	194	68	40	11	4	13	17	G 2"	6
VC 3006/B - 2"1/2 B	100	80	285	88	53	11	6	17	22	G 2"	10

3. DATA PLATE



4. SAFETY MEASURES

4.1 Technician

The technician performing the installation and adjustment of the valve should be properly trained, and has to be fully aware of the dangers involved while working on hydraulic equipment under pressure.
Furthermore he must wear all individual protection items required.

4.2 Operations

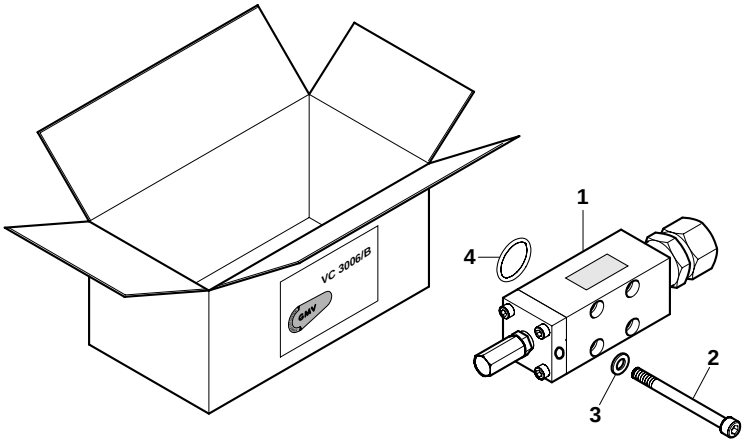
- The interventions allowed are only those described in this manual.
- In case of damage or break down request replacement from GMV.

Never open the valve!!!

4.3 Warning for connection tubing

- The connection tube is a fundamental component of the rupture valves system. It can be produced with copper tube Ø 6x1 (max length 10 m) or with flexible tube 3/16" (on request).
- In case of wearing or loss, require original spare parts only.
- With a copper tube, the bents must have a minimum curving ray of 30 mm.
- Using a flexible tube, it is advisable to use the minimum curving ray declared by the manufacturer.
- Please always foresee space enough to inspection the tube all along its length and to replace it if necessary.

5. PACKING

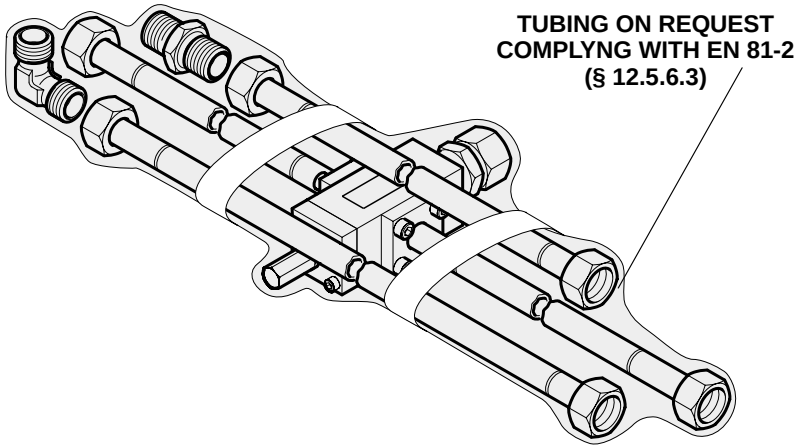


The valve is packed in a card box containing:
1) n° 1 VC 3006 valve with (1",1"¼,1"½) terminal connector of with (2"and 2"½) plastic cap
2) n° 4 Screws
3) n° 4 "Schnorr" washer
4) n° 1 O-Ring
5) n° 1 Installation manual

The box is labelled with the type of valve, purchase order number, and valve serial number.

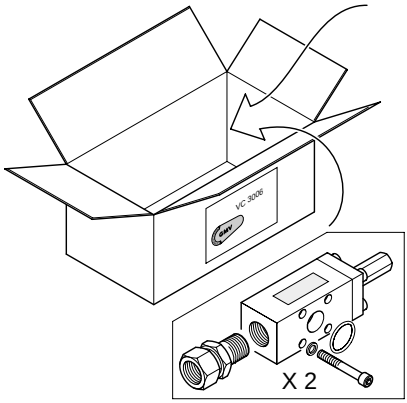
5.1 PACKING

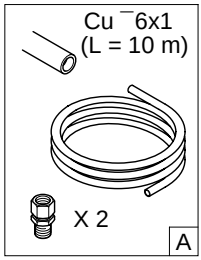
Valves type VC3006/G are supplied together with the connection tubing.

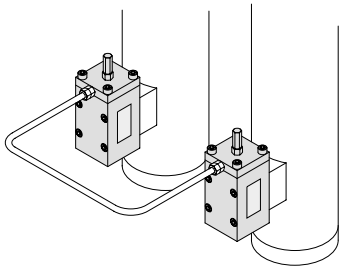


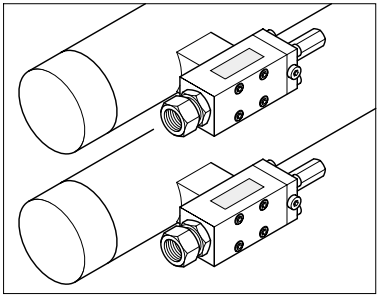
5.2 PACKING 2 VC

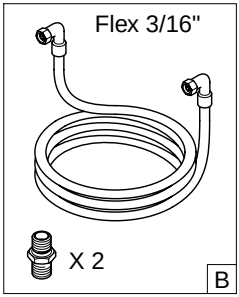
Valves type VC3006 are supplied together with the connection tubing.











6. INSTALLATION GUIDE

6.1 Before mounting:

1. Check the integrity of the package.
2. Make sure the valve is as per order.

6.2 Mounting:

1. Remove cap from the valve inlet.
2. Remove the protection cover from the cylinder.
3. Replace existing “OR” seal with the new seal supplied.
4. Mount the valve with four screws and the corresponding washer provided.
   Position the valve to align it with the feed line.
5. The tightening torque for mounting screws is indicated on Table 3.
6. Connect oil feed line.

POSSIBLE MOUNTING POSITION

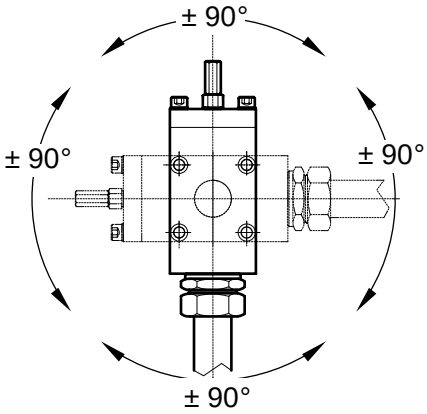
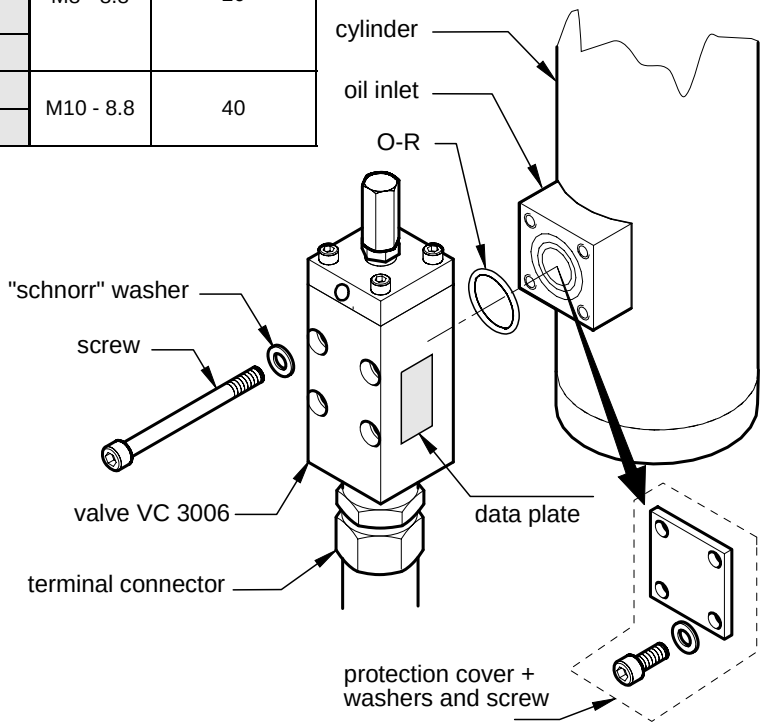


table 3 - Screw tightening torque

VALVE TYPE	Screw	Torque [Nm]
VC 3006/B - 3/4”	M8 - 8.8	20
VC 3006/B - 1"		
VC 3006/B - 1"1/4		
VC 3006/B - 1"1/2		
VC 3006/B - 2”	M10 - 8.8	40
VC 3006/B - 2”1/2		

MOUNTING DIAGRAM



6.3 Mounting of tubing joints/connections

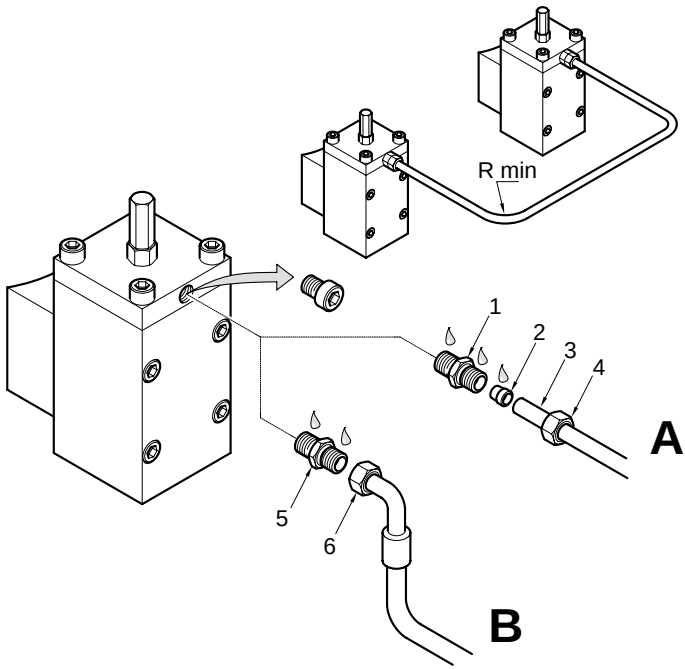
A - Mounting of the copper tube

1. Screw the end connection in its fit hole.
2. Cut the tube at the desired length and check that the cut is perpendicular with the tube.
3. Slightly deburr the tube inside and outside.
4. Oil the connections threading.
5. Screw the blocking gear until it stops.
6. Fix for ¼ rev. spanner and fox-wedge.
7. Loose and check that the cutting ring has engraved the tube all around.
8. Repeat operations 5 and 6.

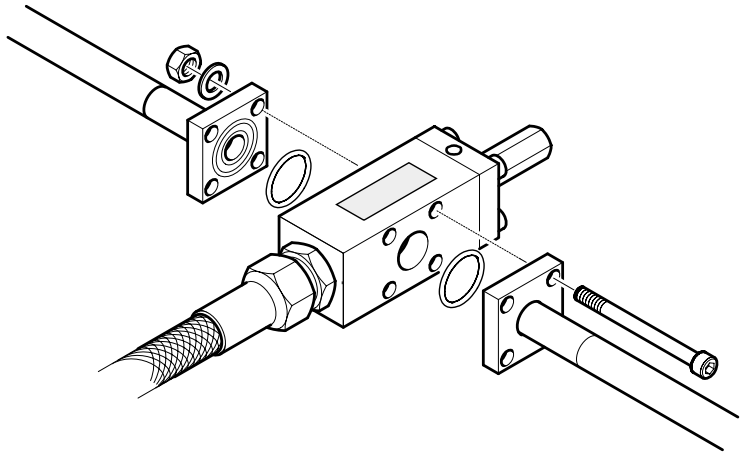
B - Mounting the flexible tube

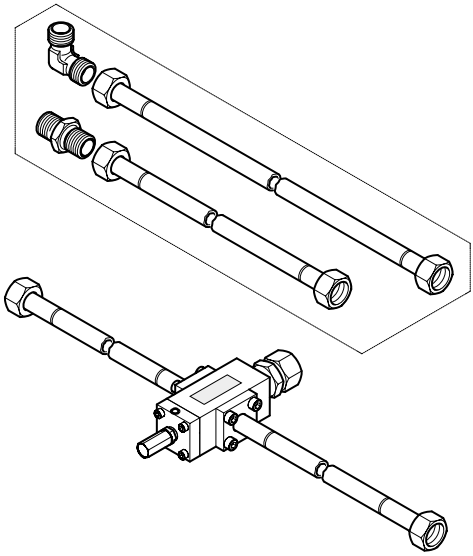
1. Screw nipple 1/8” in its hole.
2. Screw the female rotating component on the nipple until it blocks and fix for 1/4 rev.

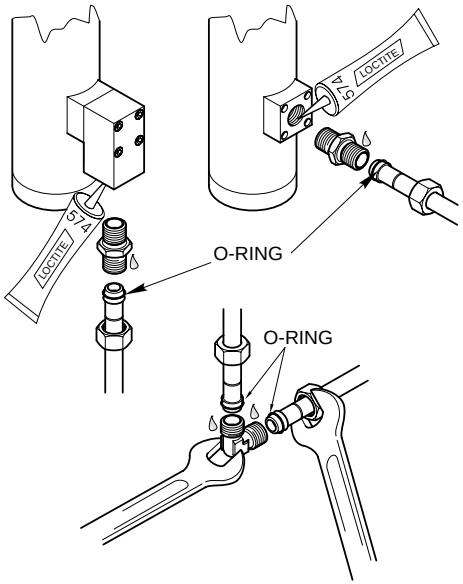
1. Terminal straight connection G 1/8”
2. Cutting ring
3. Copper tube Ø 6x1
4. Blocking gear
5. Nipple1/8”
6. Nipple 6/16”



SCHEMA DI MONTAGGIO PER VALVOLE FORNITE SEPARATAMENTE TIPO “G”







7. VALVE ADJUSTMENT

Adjustment and testing are always necessary in the installation phase.
The valve should be adjusted to intervene before the down speed of the cabin reaches V_d + 0,3 m/s.

7.1 Trigger flow rate calculation

The maximum trigger flow rate must be calculated in the elevator design phase. If the value is not determined at design phase, it should be calculated at the installation phase.
The maximum trigger flow rate of the Rupture Valve is calculated using the following formula:

$$Q_{i\ max} = \frac{(V_d + 0,3) \cdot 6 \cdot A \cdot N_{VC}}{c_m}$$

where:

$Q_{i\ max}$ = Maximum flow rate at which the valve actuates [l/min]
V_d = Nominal down speed [m/s]
A = Equivalent cross-sectional area or of telescopic pistons [cm^2]
N_{VC} = Number of pistons connected to rupture valve (If there are more than one)
c_m = Coefficient (1 for direct acting 1:1, 2 for indirect acting 2:1)

Therefore the maximum flow rate Q_i should be set between the flow rate at nominal down speed, and the maximum flow rate $Q_{i\ max}$ corresponding to Vd + 0,3 m/s.
For Vd < = 1,00 m/s it is recommended to use the following formula:

$$Q_i = \frac{(V_d \cdot 1,3) \cdot 6 \cdot A \cdot N_{VC}}{c_m}$$

Table 4 - Single stage piston effective area

ram	HL45	HL55	HL65										
A [cm^2]	15,90	23,76	33,18										
ram	**50**	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**150**	**180**	**200**	**238**
A [cm^2]	19,63	28,27	38,48	50,27	63,62	78,54	95,03	113,10	132,73	176,71	254,47	314,16	444,88

Table 5 - Hydraulically synchronised telescopic piston equivalent effective area

piston type		T42	T50	T63	T70	T85	T100
C2 (2 stages)	A [cm^2]	21,14	29,40	44,22	59,59	84,94	117,61
C3 (3 stages)		33,25	44,04	66,63	88,83	132,27	176,15

Table 6 - Mechanically synchronised telescopic piston effective equivalent area

piston type		TCS/EC 60	TCS/EC 75	TCS/EC 90	TCS/EC 105	TCS/EC 120
-2N, Y (2 stages)	A [cm^2]	36,76	54,55	75,87	100,73	129,12
-3Y (3 stages)		45,95	65,50	88,59	115,22	*******
-4Y (4 stages)		56,32	77,64	102,50	*******	*******

7.2 Approximate value of distance X, as a function of pump flow rate.

	50 Hz			60 Hz		
valve size	**pump flow rate [l/min]**	**Distance X [mm]**	**N° of turn on screw**	**pump flow rate [l/min]**	**Distance X [mm]**	**N° of turn on screw**
3/4"B	8	3,35	3 1/4	10	3,85	3 3/4
	12	4	4	15	4,5	4 1/2
	15	4,5	4 1/2	18	5	5
	20	5,2	5 1/4	24	5,67	5 3/4
	23	5,5	5 1/2	***	***	***
1"B	25	4,5	3 1/2	***	***	***
	30	5,0	4	30	5,0	4
	35	5,5	4 1/2	36	5,5	4 1/2
	43	6,0	4 3/4	42	6,0	4 3/4
	55	7,0	5 1/2	52	6,5	5 1/4
	75	8,0	6 1/2	66	7,5	6
	100	9,5	7 1/2	90	8,5	6 3/4
1"1/4 B-R-G	55	5,5	4 1/2	52	5,5	4 1/2
	75	7,0	5 1/2	66	6,5	5 1/4
	100	8,0	6 1/2	90	7,5	6
	125	9,0	7 1/4	120	9,0	7 1/4
	150	10,0	8	150	10,0	8
	180	11,0	8 3/4	180	11,0	8 3/4
	210	12,0	9 1/2	216	12,0	9 1/2
1"1/2 B-R-G	180	9,5	7 1/2	180	9,5	7 1/2
	210	10,5	8 1/2	216	10,5	8 1/2
	250	12,0	9 1/2	252	12,0	9 1/2
	300	13,0	10 1/2	300	13,0	10 1/2
	360	14,5	11 1/2	360	14,0	11 1/4
	430	15,5	12 1/2	432	15,5	12 1/2
2" B-R-G	430	14,0	11 1/4	432	14,0	11 1/4
	500	15,5	12 1/2	516	16,0	12 3/4
	600	18,5	14 3/4	600	18,5	14 3/4
2"1/2 B	600	18,5	14 3/4	600	18,5	14 3/4
	720	24,5	16 1/4	720	24,5	16 1/4
	860	26,5	17 3/4	864	26,5	17 3/4
	1000	27,5	18 1/4	1032	27,5	18 1/4

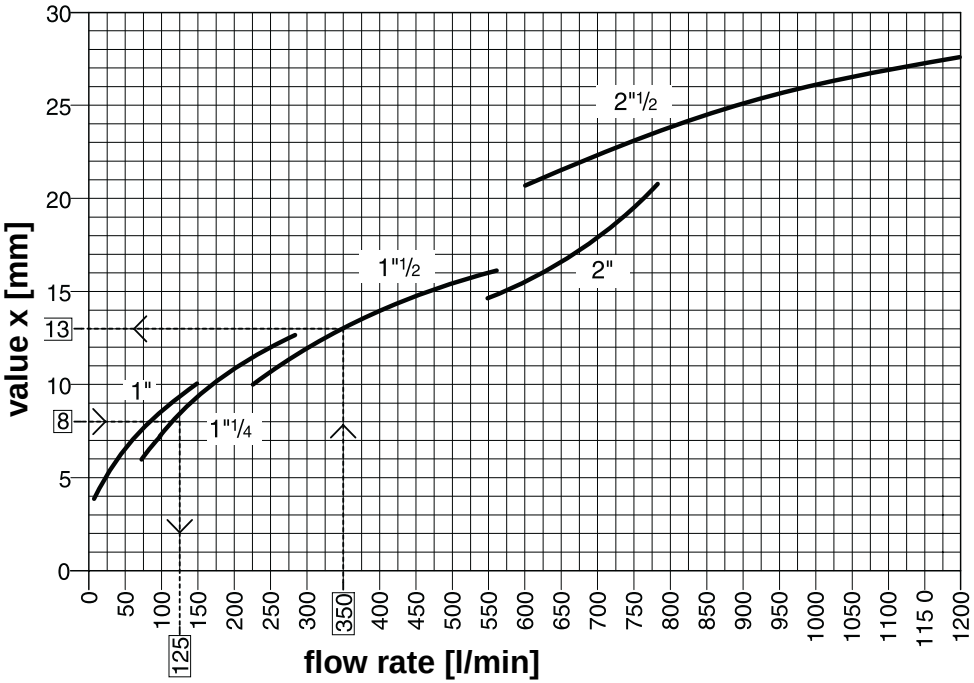
NOTE:

- **Down travel flow rate is assumed to be equal to up travel flow rate.**
- **Besides using this table, the installing technician should make sure that the valve is triggered within the limits required by code regulations.**

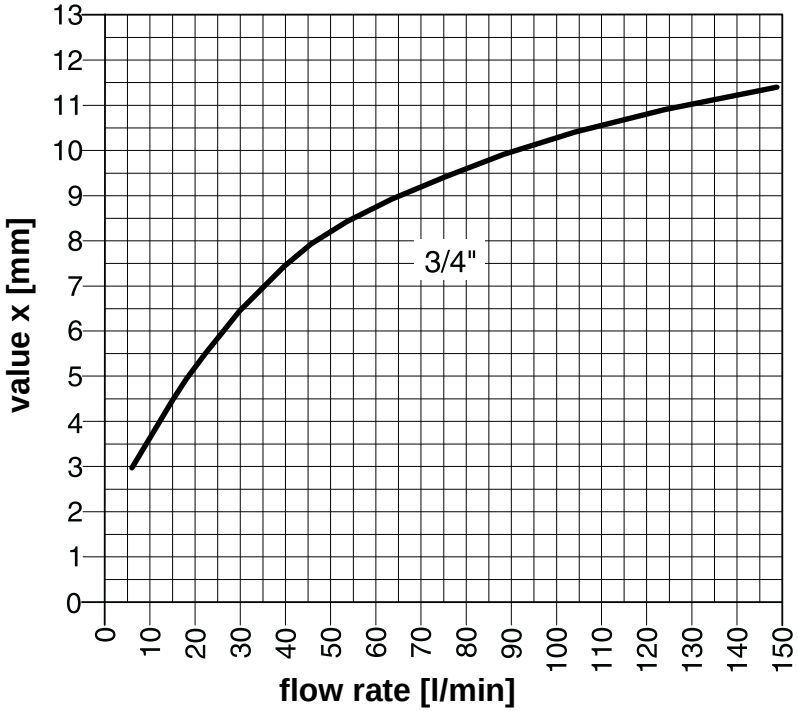
7.3 Rupture valve adjustment

For a correct adjustment of the valve follow these steps:

1. From the adjustment curve read the value of **X** at the required flow rate.
2. Remove the protection cup (1) and loosen the lock nut (3).
3. Tighten the valve adjustment screw fully (valve completely closed value **Xo**).
4. While holding in place the lock nut (3), loosen the adjustment screw until you obtain desired value of **X**.
5. While holding in place the adjusting screw (2), tighten the lock nut (3).
6. Check the functionality of the valve as described in the section. 8.



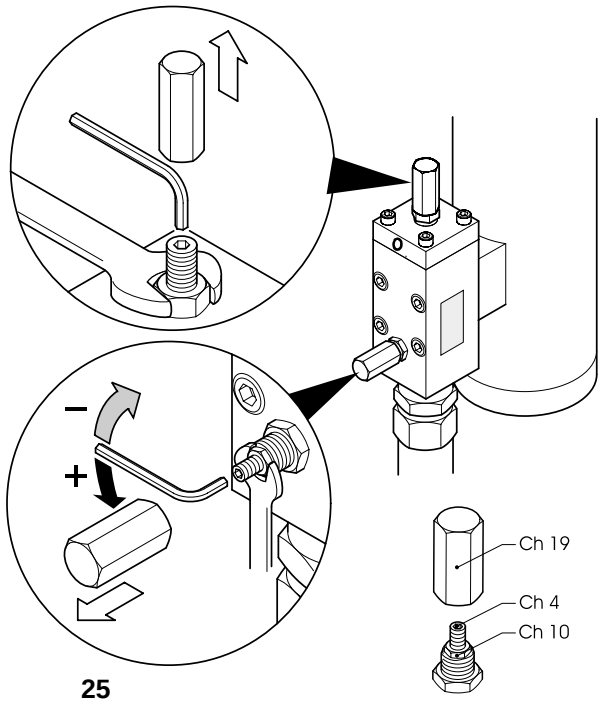
Example: Q_i = 350 l/min - VC 3006 - 1"1/2
X = 13 mm.



7.4 Down-speed adjustment after intervention

Adjust the by-pass after an intervention included between 0,02 and 0,05 m/s.

1. Completely close the modulating valve screwing the main adjustment screw thoroughly.
2. Remove the protection cap for by pass adjustment and loose the counter-nut.
3. Operate on the adjustment screw of the by-pass so that the down speed is included between 0,02 and 0,05 m/s. The speed increases screwing and decreases loosing the screw.



8. RUPTURE VALVE TEST

The following instructions are valid for GMV 3010 series control valves. For other types, refer to instructions provided from manufacturers.

8.1 rupture valve functionality test

1. Move the elevator (cab) to the highest landing at nominal load.
2. Tighten screw #5 fully, and call the elevator to lowest landing.
3. When the cab reaches a speed corresponding to the flow rate of the valve, the valve closes and the elevator stops.

8.2 valve failure

If the valve does not intervene, perform the following operations:

1. Loosen the lock nut (3) and tighten the adjusting screw (2), one turn, holding it in place.
2. Repeat steps 1, 2, and 3 of section 8.1, until the rupture valve intervenes.

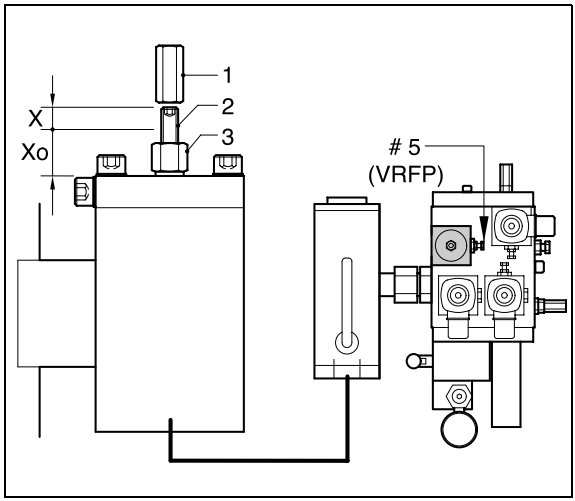
8.3 final check-up

Once the above test is performed:

1. Fully open screw #5 and verify that the valve does not intervene at normal down speed.
2. Measure the real distance **X** after adjustment. Read the trigger flow rate on the graph, for the corresponding valve.
   (E.g.: **X** = 8 mm / VC3006 - 1" 1/4 ➜ $\mathbf{Q_i}$ = 125 l/min).
3. Mount the protective cap (1).

NOTE: The trigger flow rate acquired from the diagram should however be lower than or equal to the maximum flow rate $\mathbf{Q_{i\ max}}$.

4. Record the trigger flow rate permanently, on the valve data plate.
5. It is recommended to seal the valve protection cap to prevent tampering.



9. PREVENTIVE MAINTENANCE

Every12 months:
1. Check the proper functionality of the valve as described in section 8.1.
2. When the test is complete, perform the final check as described in section 8.3.

Check possible blow-by in gears.
In case of blow-bys, tighten the connections.
If blow-by persists replace O-R.
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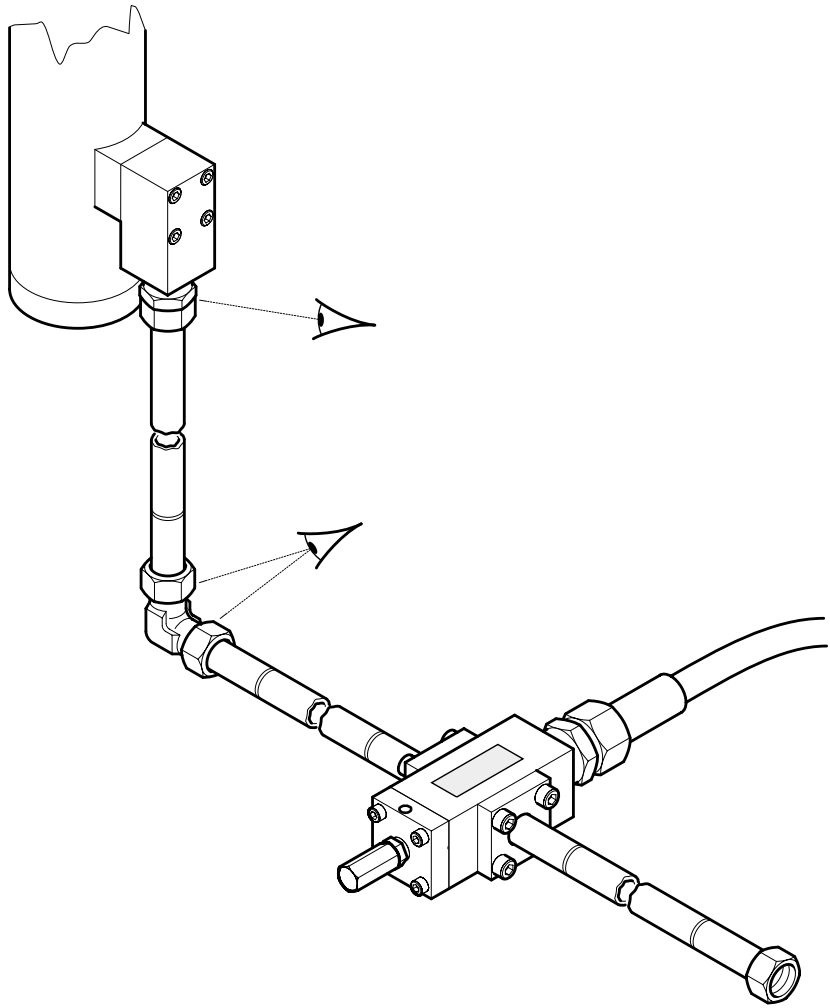

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