HYDRAULIC SYSTEM SET-UP

VER. 1

4/22/13

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HYDRAULIC SYSTEM SETUP
BLAIN EV10 & EV100 ¾" VALVE

ADJUSTMENTS

- Refer to Blain manual for initial settings and adjuster functions.
- Verify that all coils are connected correctly.
- Verify coil energize / de-energize by pulling up on coil and checking for magnetic pull
- Verify car speeds with a tachometer

PRELIMINARY ADJUSTMENTS - UP

- With B coil energized (A&B on EV100) and pump running, adjust #1 (bypass) so car moves within 1 to 2 seconds.

- With B coil energized (A&B on EV100) and pump running, slowly close ball valve. Set S (pressure relief) to 125%above working pressure.

- With pump running (and A coil energized on EV100), adjust #4 (up leveling) so car moves about 10 FPM FINAL ADJUSTMENTS - UP

- Set up a up direction call. Verify that B coil (A&B on EV100) is energized. Adjust #2 (up acceleration) for a smooth acceleration. The car should be running full speed with 3 seconds of starting to move.

- Verify up full speed, which is determined by the pump output, not the valve. If speed is high, the pump output is too high. If speed is low, the pump output may be low, or the valve may be bypassing or going into pressure relief.

- Verify that the B coil de-energizes at the appropriate slow down point (on TAL controllers, it is when LU turns on; PLC controllers is STU). Adjust #3 (up deceleration) so that car decelerates into leveling speed fast enough so that the car is in leveling speed for at least 1", but not more than 3", before floor level.

- Optional soft stop (EV 100) – verify that pump runs approx. ¾ second after A coil de-energizes. Adjust #5 (up stop) for smooth final stop. If pump stops when A coil de-energizes, the adjustment will not have as much effect. The standard TAL programmable controller does not have a pump stop delay feature.

PRELIMINARY ADJUSTMENTS - DOWN

- With D coil energized, adjust #9 (down level) so car moves about 10 FPM. The manual lowering valve should also cause the car to move at this speed.

FINAL ADJUSTMENTS - DOWN

- Set up a down direction call. Verify that C & D coils are energized. Adjust #6 (down acceleration) for a smooth acceleration. Adjust #7 (down speed) for proper full speed – which should match up full speed. Re-adjust #6 as necessary after setting down speed so the car is running full speed with 3 seconds of starting to move.

- Verify that the C coil de-energizes at the appropriate slow down point (on TAL controllers, it is when LD turns on; PLC controllers is STD). Adjust #8 (down deceleration) so that car decelerates into leveling speed fast enough so that the car is in leveling speed for at least 1", but not more than 3", before floor level.

WHEN CAR IS COMPLETELY ASSEMBLED, PUT FULL LOAD ON THE CAR AND RESET PRESSURE RELIEF.

OPTIONS

On some valves there is a built in additional valve named the “KS” valve. The function of this adjustment is to prevent operation of the manual lowering valve in the event that the safeties have actuated. If this adjuster is not set correctly it can also affect the normal operation of the down direction. If the car will not descend even with the down full speed adjuster fully out. then this is most likely the “KS” adjuster. It must be turned out (counterclockwise) to permit the oil to flow. Turn the adjuster only enough to permit the lift to descend at its normal speed.

After the adjuster has been set, check that the manual lowering valve will not permit the ram to descend when the car is blocked or supported on the safeties. Manually trip the safeties to perform this adjustment, or prop the car to simulate the required condition.

On some valves. the unit is supplied with a negative pressure switch. The function of this switch is to detect negative (or loss of) pressure past the valve. The switch will open the circuit to the down coils. The switch point is preset and cannot be adjusted.

TECHNICAL & TROUBLESHOOTING

Before you start adjusting and repairing a Blain valve, or any valve for that matter, you will find it beneficial to become familiar with the valve by reading as much about it as you can. Read this article from beginning to end. If at all possible, completely dismantle and re-assemble a valve on the bench. Many complete valves are unnecessarily replaced when a simple repair or adjustment would have been sufficient. When trouble-shooting a valve it is of great advantage to have a complete set of bypass and down spools (inserts) on hand so that a suspected spool can be changed. It is rare that any other part has to be replaced

The most common enemy of a hydraulic system is DIRT. Modern valves are designed to precise tolerances, and do not tolerate any foreign material. Dirt in the oil line is the single most common cause of valve contamination. It is extremely important that the oil line be cleaned out prior to assembly. Each section should be flushed with solvent and run through with a lint-free clean rag prior to assembly. Follow the instructions which follow and most valve problems can be site rectified without replacing the valve.

The adjustment procedure is not difficult; however, the mechanic MUST be familiar with the valve and all its functions.The Blain valve is adjustable over a wide range and a knowledgeable mechanic can set up the adjustments so that the lift operates quietly and smoothly.

Sealing joints : A good quality thread sealer must be used and it must be applied sparingly and only in the quantity required to seal the joint. Too many times too much sealer is used and when the threads are tightened the sealer is squeezed into the inside area of the pipe. This excess sealer can find its way into the valve . Tapered hose fittings do not require any sealer.

FLOW GUIDES

The Blain EV10 series valves all use the same valve body but the internal flow guides are changed to provide the different flow characteristics.
For example the EV10-2 is a unit set to operate within a flow rate of 0-20 liters per minute at 20 bar, the EV10-3 operates from 21-40 liters per minute of flow, the EV10-4 from 41-60 liters per minute. It is important to note that the flow rates are based on the empty car traveling in the down direction at rated speed.

If the valve does not seem to perform properly, especially concerning acceleration and deceleration, the flow guidesmay not be the proper size. They can be accessed by removing the bore caps from the front of the valve. Contact us before making any changes to the flow guides

PERFORMANCE FACTORS

There are many factors which act on a hydraulic system. It is impossible to review them all; however these are some of the common that affect operation:

Oil temperature: The hotter the oil the faster the lift will descend and the slower it will ascend. Maximum valve rating is 70 C (158 F).

Oil viscosity: The lower the viscosity of the oil the faster the lift will descend and the slower the lift will ascend. (Valve rating 15-35@ cst at 120 F..)

Feed line size: An undersized oil feed line can affect operation. The pressure in the up direction, will increase and thereby could even affect the required horsepower of the system. The down speed may be slow if the oil line is too small.

Too many 90 degree bends can create additional pressure in the system and affect both the up and down direction. It is good practice to use 45 degree bends or less whenever installing an oil line. If hose is used a minimum bending radius generally of 8 is acceptable depending on hose diameter.

TRAVEL SPEED

The “up speed” is determined by the gallons per minute of the pump and motor combination. This cannot be changed without changing either the pump or motor. The valve itself cannot be adjusted to provide a higher rated speed in the “up” direction. The up speed could theoretically be lowered by throttling the line, but it is not advisable.

If the lift is traveling too slow in the up direction, a low relief valve setting is the most probable cause. Raise the pressure by turning the adjusting screw in clockwise. It is also possible that the up bypass spool is not closing all the way, or has a leak. Remove the spool and check for dirt, bad o-rings, ect.

In rare instances, the motor and pump may not be matched up to provide the proper speed, and if after checking the relief valve the problem persists, call the factory. You must have the motor information (rpm and hp) available plus the pump number. This information can be found on the pump and motor themselves, or on the tags fastened to the valve shelf on submersible pump models.

The “down speed” is adjustable, but there is a relationship between load and speed. A lightly loaded lift will create less pressure in the system, and therefore less flow through the valve. A fully loaded lift will create more pressure and a higher speed.

The setting to contract speed should be done with a fully loaded car as this will cause the maximum flow through the valve. The difference between full and empty should not exceed 5% - 10%. If this does happen then the valve may be undersized. It should be possible to open the “down speed” adjuster and have the lift descend at a rate in excess of the rated speed. It should be necessary to “throttle back” the adjuster for proper operation. If the lift will not run down full speed but will run down at manual lowering speed, full speed is probably set too fast, and/or the overspeed valve on the jack is not adjusted properly – see the overspeed valve (PRV) section for more information.

If you cannot achieve rated down speed, check the following:

1. Check rails & guide shoes for binding
2. If pipe run is long and/or has many bends, 3/4” pipe may be required
3. Check down pilot stem for dirt or binding

4. Check down spool for dirt or binding. If none of these items solve problem, a different down insert may be required. Check no load pressure and contact us for further instructions.

Undersizing of the oil lines can also cause insufficient down speed, but with the low flow requirements of most lifts this is not usually the cause. If the down contract speed (or close to it) cannot be attained after checking the above, then call us.

SEE THE FOLLOW ING INFORMATION FROM BLAIN FOR MORE DETAIL

EV 100

Elevator Control Valves

EN ISO 9001

The BLAIN EV 100 program includes the widest range of options offered to the elevator industry for high performance passenger service. Easy to install, EV 100's are smooth, reliable and precise in operation throughout extreme load and temperature variations.

¾" EV

EV 100

1 ½" EV

EV 100

2 ½" EV

EV 100

Description

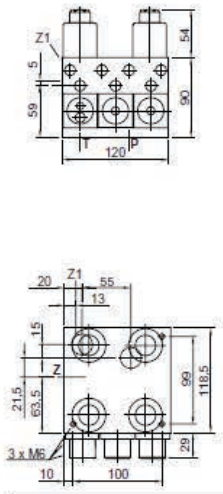
Available port sizes are 3/4", 1 ½", 2" and 2 ½" pipe threads, depending on flow. EV 100's start on less than minimum load and can be used for across the line or wye-delta starting. According to customers' information, valves are factory adjusted ready for operation and very simple to readjust if so desired. The patented up levelling system combined with compensated pilot control ensure stability of elevator operation and accuracy of stopping independent of wide temperature variations.
EV 100 valves include the following features essential to efficient installation and trouble free service:

- Simple Responsive Adjustment
- Temperature and Pressure Compensation
- Solenoid Connecting Cables
- Pressure Gauge and Shut Off Cock
- Self Closing Manual Lowering
- Self Cleaning Pilot Line Filters
- Self Cleaning Main Line Filter (Z-T)
- Built-in Turbulence Suppressors
- 70 HRc Rockwell Hardened Bore Surfaces
- 100% Continuous Duty Solenoids

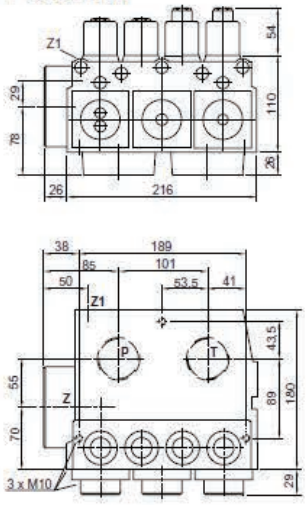
Technical Data:		¾" EV	1 ½" & 2" EV	2 ½" EV
Flow Range:	l/min	10-125 (2-33 USgpm)	30-800 (8-208 USgpm)	500-1530 (130-400 USgpm)
Pressure Range:	bar	5-100 (74-1500 psi)	3-100 (44-1500 psi)	3-68 (44-1000 psi)
Press. Range CSA:	bar	5-100 (74-1500 psi)	3-70 (44-1030 psi)	3-47 (44-690 psi)
Burst Pressure Z:	bar	575 (8450 psi)	505 (7420 psi)	340 (5000 psi)
Pressure Drop P–Z:	bar	6 (88 psi) at 125 lpm	4 (58 psi) at 800 lpm	4 (58 psi) at 1530 lpm
Weight:	kg	5 (11 lbs)	10 (22 lbs)	14 (31 lbs)

Oil Viscosity: 25-60 mm²/sec. at 40°C (15-35 cSt. at 120°F). **Max. Oil Temperature:** 70°C (158°F)
Solenoids AC: 24 V/1.8 A, 42 V/1.0 A, 110 V/0.43 A, 230 V/0.18 A, 50/60 Hz. **Insulation Class, AC and DC:** IP 68
Solenoids DC: 12 V/2.0 A, 24 V/1.1 A, 42 V/0.5 A, 48 V/0.6 A, 80 V/0.3 A, 110 V/0.25 A, 196 V/0.14 A.

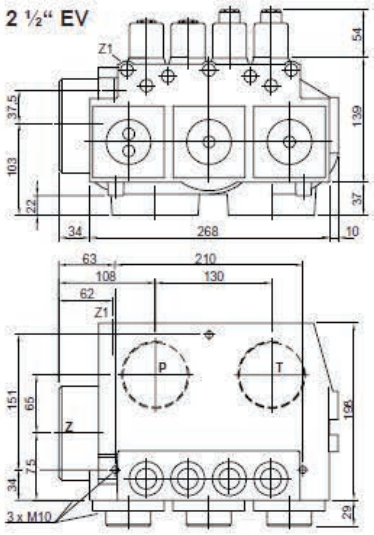
¾" EV



1 ½" & 2" EV



2 ½" EV



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BLAIN HYDRAULICS GmbH

Manufacturer of the Highest Quality:
Control Valves for Elevators
Tank Heaters - Hand Pumps
Pipe Rupture Valves - Ball Valves

EV Control Valve Types

Optional Equipment

EN	Emergency Power Solenoid	RS	Pipe Rupture Valve
CSA	CSA Solenoids	ES	Pipe Rupture Valve End Switch
KS	Slack Rope Valve	DH	High Pressure Switch
BV	Main Shut-Off Valve	DL	Low Pressure Switch
HP	Hand Pump	CX	Pressure Compensated Down
		MX	Auxiliary Down

EV 0

¾" | 1 ½" and 2" EV | 2 ½"



Up Up to 0.16 m/s (32 fpm). 1 Up Speed.
Up Start is smooth and adjustable.
Up Stop is by de-energising the pump-motor.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All down functions are smooth and adjustable.

USA Patent No. 4,601,366
Pats & Pats Pend: France, Germany, Italy, Japan, Switzerland & U.K.

EV 1



Up Up to 0.16 m/s (32 fpm). 1 Up Speed.
Up to 0.4 m/s (80 fpm) by overtravelling and levelling back down.
Up Start is smooth and adjustable.
Up Stop is smooth and exact through valve operation whereby the pump must run approx. ½ sec. longer through a time relay.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All down functions are smooth and adjustable.

USA Patent No. 4,601,366
Pats & Pats Pend: France, Germany, Italy, Japan, Switzerland & U.K.

EV 10



Up Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
Up Start and Slow Down are smooth and adjustable.
Up Levelling speed is adjustable.
Up Stop is by de-energising the pump-motor.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All down functions are smooth and adjustable.

USA Patent No. 4,637,495
Pats & Pats Pend: France, Germany, Italy, Japan, Switzerland & U.K.

EV 100



Up Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All 'up' functions are smooth and adjustable.
Up Levelling speed is adjustable.
Up Stop is smooth and exact through valve operation whereby the pump must run approx. ½ sec. longer through a time relay.

Down Up to 1.0 m/s (200 fpm). 1 Full Speed and 1 Levelling Speed.
All down functions are smooth and adjustable.

USA Patent No. 4,637,495
Pats & Pats Pend: France, Germany, Italy, Japan, Switzerland & U.K.

Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical power is switched off and residual pressure in the valve is reduced to zero.

Adjustments UP

Valves are already adjusted and tested. Check electrical operation before changing valve settings.
Test that the correct solenoid is energised, by removing nut and raising solenoid slighty to feel pull.

Nominal Settings: Adjustments **1 & 4** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **2, 3 & 5** all the way 'in' (clockwise) then **2 & 5** two turns 'out' (c-clockwise), **3** three turns out. A small final adjustment may be necessary.

EV 0

1. **By Pass:** When the pump is started, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
2. **Up Acceleration:** With the pump running, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.

Up Stop: The pump-motor is de-energised. There is no adjustment.

Alternative Up Stop with Over-travel: The motor is de-energised at floor level. Through the flywheelaction of the pump-motor drive the car will travel to just above floor level. In overtravelling the floor, down levelling solenoid **D** is energised, lowering the car smoothly back down to floor level where **D** is de-energised.

S Relief Valve: 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 1

1. **By Pass:** When the pump is started and solenoid **A** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
2. **Up Acceleration:** With the pump running and solenoid **A** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
5. **Up Stop:** At floor level, solenoid **A** is de-energised. Through a time relay the pump should run approx. ½ second longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop.

Alternative Up Stop: At relatively higher speeds, the car will travel to just above floor level. In overtravelling the floor, down levelling solenoid **D** is energised, lowering the car smoothly back down to floor level where **D** is de-energised.

S Relief Valve: 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 10

1. **By Pass:** When the pump is started and solenoid **B** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
2. **Up Acceleration:** With the pump running and solenoid **B** energised as in 1, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
3. **Up Deceleration:** When solenoid **B** is de-energised, the car will decelerate according to the setting of adjustment 3. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration.
4. **Up Levelling:** With solenoid **B** de-energised as in 3, the car will proceed at its levelling speed according to the setting of adjustment **4**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster up levelling.

Up stop: The pump-motor is de-energised. There is no adjustment.

S Relief Valve: 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

EV 100

1. **By Pass:** When the pump is started, and solenoids **A** and **B** energised, the unloaded car should remain stationary at the floor for a period of 1 to 2 seconds before starting upwards. The length of this delay is determined by the setting of adjustment **1**. 'In' (clockwise) shortens the delay, 'out' (c-clockwise) lengthens the delay.
2. **Up Acceleration:** With the pump running and solenoids **A** and **B** energised as in **1**, the car will accelerate according to the setting of adjustment **2**. 'In' (clockwise) provides a softer acceleration, 'out' (c-clockwise) a quicker acceleration.
3. **Up Deceleration:** When solenoid **B** is de-energised, whilst solenoid **A** remains energised, the car will decelerate according to the setting of adjustment 3. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration.
4. **Up Levelling:** With solenoid **A** energised and solenoid **B** de-energised as in 3., the car will proceed at its levelling speed according to the setting of adjustment **4**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster up levelling.
5. **Up Stop:** At floor level, solenoid **A** is de-energised with solenoid **B** remaining de-energised. Through a time relay the pump should run approx. ½ second longer to allow the car to stop smoothly by valve operation according to the setting of adjustment **5**. 'In' (clockwise) provides a softer stop, 'out' (c-clockwise) a quicker stop.

S Relief Valve: 'In' (clockwise) produces a higher, 'out' (c-clockwise) a lower maximum pressure setting. After turning 'out', open manual lowering **H** for an instant.
Important: When testing relief valve, do not close ball valve sharply.

Warning: Only qualified personell should adjust or service valves. Unauthorised manipulation may result in injury, loss of life or damage to equipment. Prior to servicing internal parts, ensure that the electrical controller is switched off and residual pressure in the valve is reduced to zero.

Adjustments DOWN

Valves are already adjusted and tested. Check electrical operation before changing valve settings. Test that the correct solenoid is energised, by removing nut and raising solenoid slighty to feel pull.

Nominal Settings: Adjustments **7** & **9** approx. level with flange face. Two turns in either direction may then be necessary. Adjustments **6** & **8** turn all the way 'in' (clockwise), then three turns 'out' (c-clockwise). One final turn in either direction may be necessary.

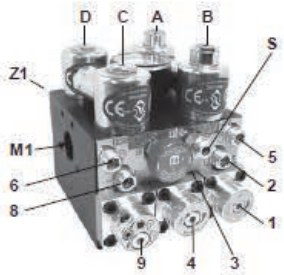
6. **Down Acceleration:** When solenoids C and D are energised, the car will accelerate downwards according to the setting of adjustment 6. 'In' (clockwise) provides a softer down acceleration, 'out' (c-clockwise) a quicker acceleration.
7. **Down Speed:** With solenoids C and D energised as in 6 above, the full down speed of the car is according to the setting of adjustment 7. 'In' (clockwise) provides a slower down speed, 'out' (c-clockwise) a faster down speed.
8. **Down Deceleration:** When solenoid C is de-energised whilst solenoid D remains energised, the car will decelerate according to the setting of adjustment 8. 'In' (clockwise) provides a softer deceleration, 'out' (c-clockwise) a quicker deceleration. **Attention: Do not close all the way in! Closing adjustment 8 completely (clockwise) may cause the car to fall on the buffers.**
9. **Down Levelling:** With solenoid C de-energised and solenoid D energised as in 8 above, the car will proceed at its down levelling speed according to the setting of adjustment 9. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster down levelling speed.

   Down Stop: When solenoid D is de-energised with solenoid C remaining de-energised, the car will stop according to the setting of adjustment 8 and no further adjustment will be required.

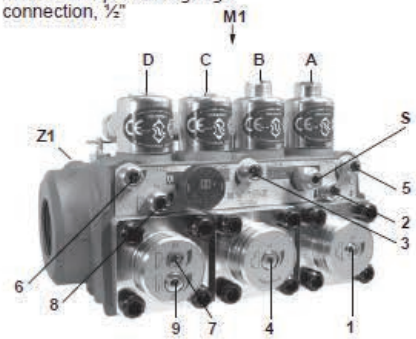
KS Slack Rope Valve: Solenoids C and D must be de-energised! The KS is adjusted with a 3 mm Allan Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when Manual Lowering **H** is opened. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

Positions of Adjustments

Important: Length of ¾" thread on pump connections should not be longer than 17 mm!



M1 Second pressure gauge connection, ½"



Adjustments UP

1 By Pass
2 Up Acceleration
3 Up Deceleration
4 Up Levelling Speed
5 Up Stop

Adjustments DOWN

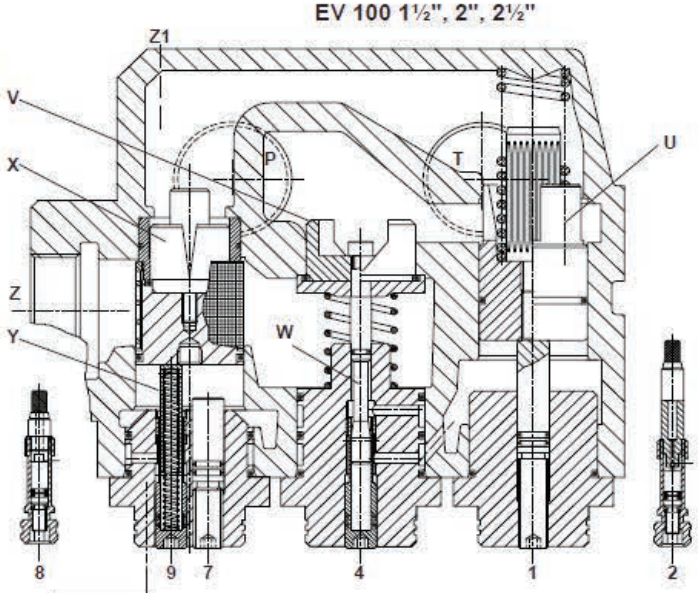
6 Down Acceleration
7 Down Full Speed
8 Down Deceleration
9 Down Levelling Speed

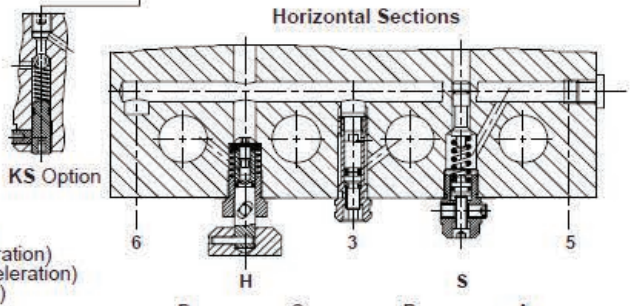
Control Elements

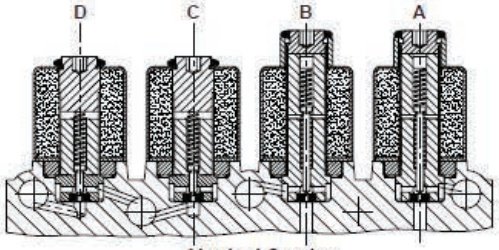
A Solenoid (Up Stop)
B Solenoid (Up Deceleration)
C Solenoid (Down Deceleration)
D Solenoid (Down Stop)
H Manual Lowering
S Relief Valve
U By Pass Valve
V Check Valve
W Levelling Valve (Up)
X Full Speed Valve (Down)
Y Levelling Valve (Down)

Valve Types	Elements Omitted
EV 0	A, B, W, 3, 4 & 5
EV 1	B, W, 3 & 4
EV 10	A & 5
EV 100	as shown

EV 100 1½", 2", 2½"







Vertical Section

EV Elevator Valves

Control Elements

- **A** Solenoid (Up Stop)
- **B** Solenoid (Up Deceleration)
- **C** Solenoid (Down Deceleration)
- **D** Solenoid (Down Stop)
- **H** Manual Lowering
- **S** Relief Valve
- **U** By Pass Valve
- **V** Check Valve
- **W** Levelling Valve (Up)
- **X** Full Speed Valve (Down)
- **Y** Levelling Valve (Down)
- **F** Filter

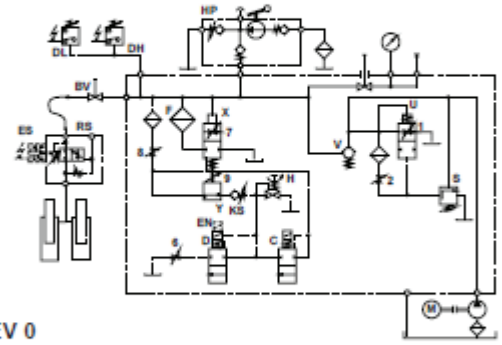
Adjustments UP

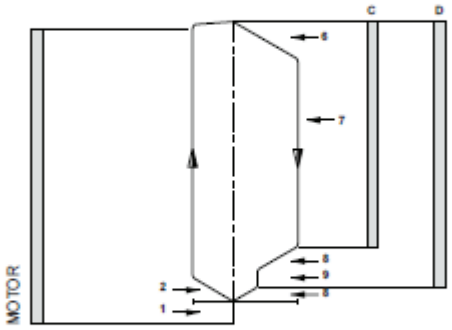
- **1** By Pass
- **2** Up Acceleration
- **3** Up Deceleration
- **4** Up Levelling Speed
- **5** Up Stop

Adjustments DOWN

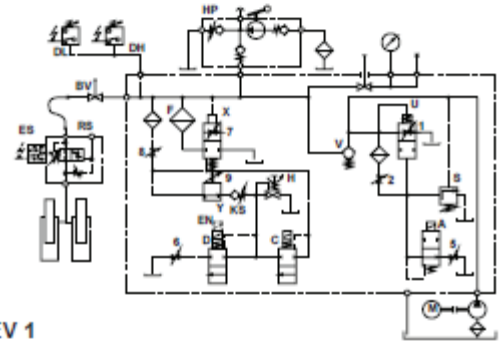
- **6** Down Acceleration
- **7** Down Full Speed
- **8** Down Deceleration
- **9** Down Levelling Speed

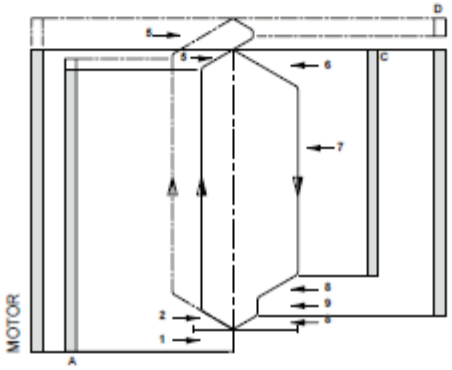
Hydraulic Circuit | **Electrical Sequence**



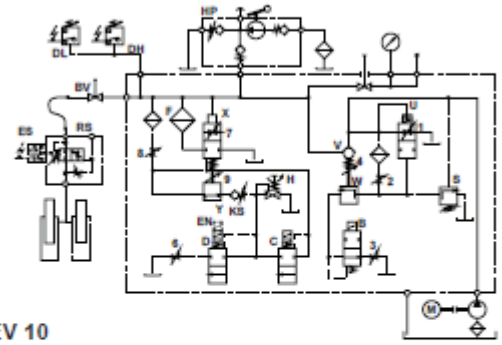


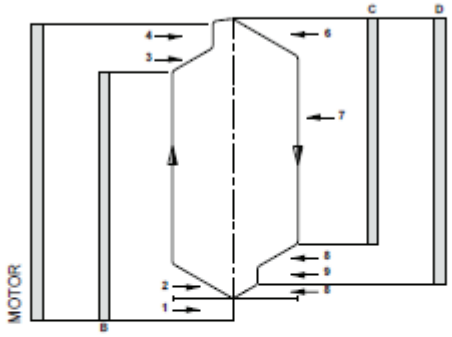
EV 0



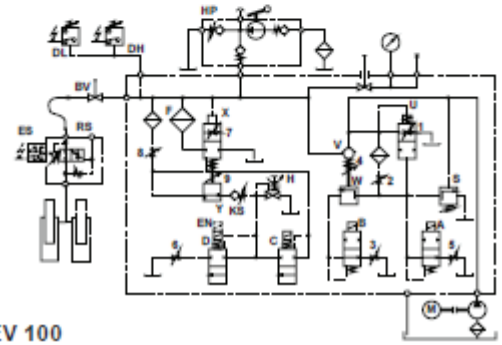


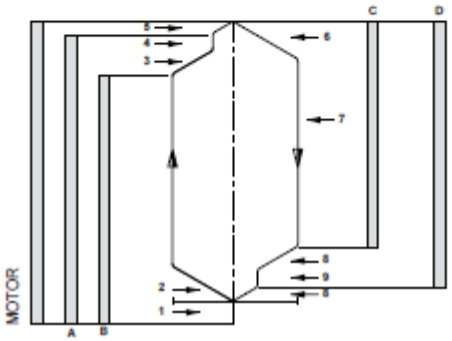
EV 1





EV 10





EV 100

EV Spare Parts List

EV

Pos.	No.	Item
1	FS	Lock Screw - Flange
	FO	O-Ring - Flange
	1F	Flange - By Pass
	EO	O-Ring - Adjustment
	1E	Adjustment - By Pass
	UO	O-Ring - By Pass Valve
	U	By Pass Valve
	UD	Noise Suppressor
	UF	Spring - By Pass
2	2	Adjustment - Up Acceleration
3	3	Adjustment - Up Deceleration
4	EO	O-Ring - Adjustment
	4E	Adjustment - Up Levelling
	4F	Flange - Check Valve
	FO	O-Ring - Flange
	VF	Spring - Check Valve
	W	Up-Levelling Valve
	WO	O-Ring - Up Levelling Valve
	VO	Seal - Check Valve
	V	Check Valve
	W5	Screw - Check Valve
5	3	Adjustment - Up Stop
6	3	Adjustment - Down Acceleration
7	7F	Flange - Down Valve
	FO	O-Ring - Flange
	7O	O-Ring - Adjustment
	7E	Adjustment - Down Valve
	UO	O-Ring - Down Valve
	XO	Seal - Down Valve
	X	Down Valve
	XD	Noise Suppressor
	F	Main Filter
8	8	Adjustment - Down Deceleration
9	EO	O-Ring - Adjustment
	9E	Adjustment - Down Levelling
	9F	Spring - Down Valve
	Y	Down Levelling Valve
H	H	Manual Lowering - Self Closing
	HO	Seal - Manual Lowering
S	SE	Adjustment - Screw
	SM	Hexagonal
	MS	Grub Screw
	SO	O-Ring - Nipple
	SZ	Nipple
	SF	Spring
	SK	Piston
A+B	MM	Nut - Solenoid
	AD	Collar - Solenoid
	M	Coil - Solenoid (Indicate voltage)
	AR	Tube - Solenoid 'Up'
	MO	O-Ring - Solenoid
	AN	Needle - 'Up'
	AF	Spring - Solenoid 'Up'
	AH	Seat Housing - 'Up'
	AS	Seat - Solenoid 'Up'
C+D	MM	Nut - Solenoid
	M	Coil - Solenoid (Indicate voltage)
	DR	Tube - Solenoid 'Down'
	MO	O-Ring - Solenoid
	DF	Spring - Solenoid 'Down'
	DN	Needle - 'Down'
	DK	Core - Solenoid
	DG	Seat Housing with Screen-'Down'
	FD	Filter Solenoid
	DS	Seat - Solenoid 'Down'

Some parts occur more than once in different positions of the valve.

0-Ring-Size

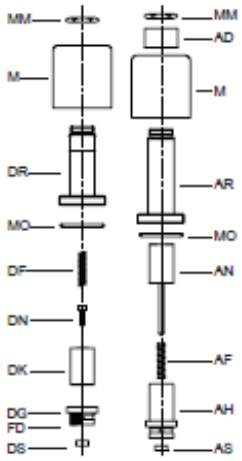
No.	¾"	1 ½"	2½"
FO	26x2P	47x2.5P	58x3P *
EO	9x2P	9x2P	9x2P
UO	26x2V	39.34x2.62V	58x3V
WO	5.28x1.78V	5.28x1.78V	5.28x1.78V
VO	23x2,5V	42x3V	60x3V **
7O	5.28x1.78P	9x2P	9x2P
XO	13x2V	30x3V	47x3V
HO	5.28x1.78V	5.28x1.78V	5.28x1.78V
SO	5.28x1.78P	5.28x1.78P	5.28x1.78P
MO	26x2P	26x2P	26x2P

* FO by 4F 2½" is 67x2.5P

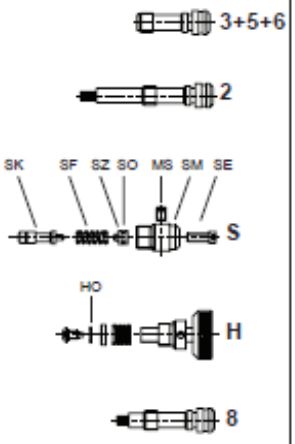
** 90 Shore

O-Ring: V - Viton, P - Perbunan

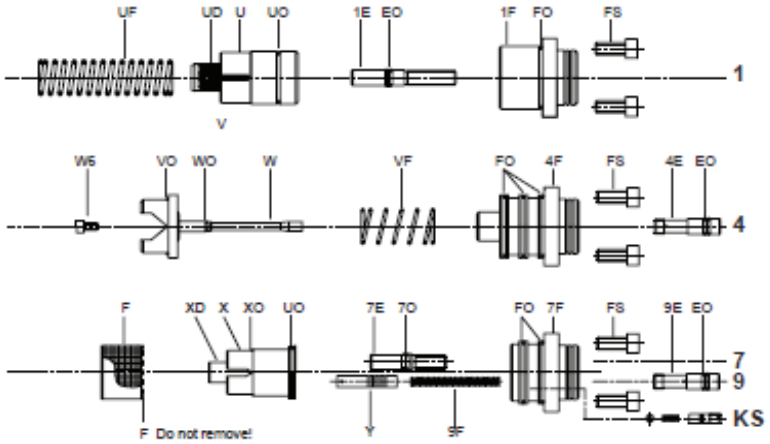
Solenoid Valves



Adjustments

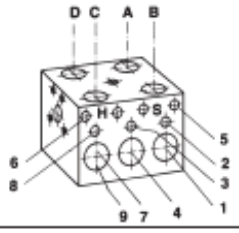


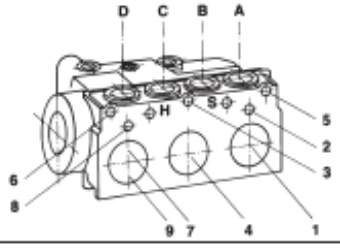
Flow Valves

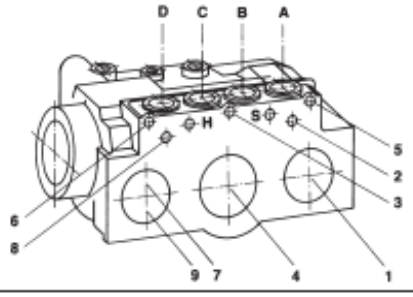


In case of down leakage, replace and test in the following order: DS & DN, XO, VO, WO, FO and HO.

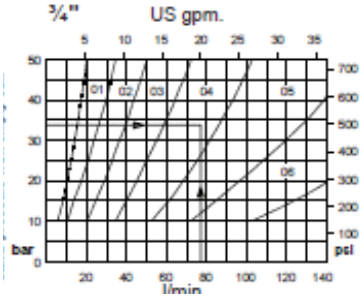
Taper threads: Do not exceed 8 turns of piping into the valve connections.

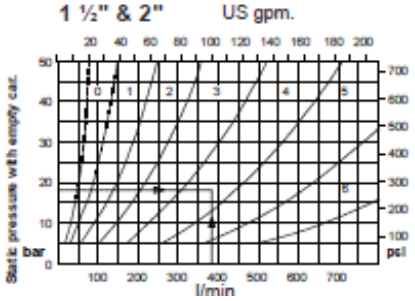


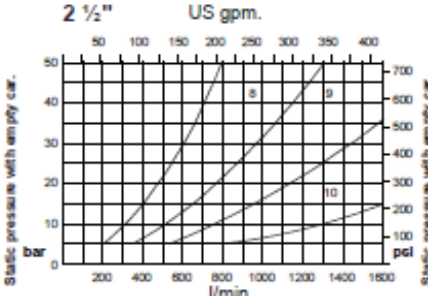




Flow Guide Selection Charts







EV 100 Service Manual

Elevator Valve - EV 100 ¾" for Home Lifts

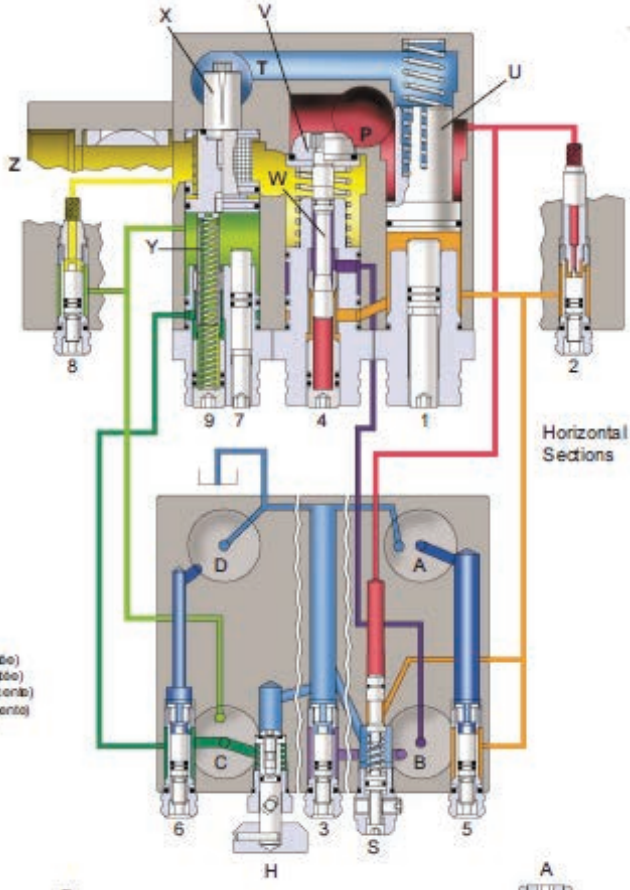
Control Elements
A Solenoid (UP Stop)
B Solenoid (UP Deceleration)
C Solenoid (Down Deceleration)
D Solenoid (Down Stop)
H Manual Lowering
S Relief Valve
U By Pass Valve
V Check Valve
W Leveling Valve (Up)
X Full Speed Valve (Down)
Y Leveling Valve (Down)

Adjustments UP
1 By Pass
2 Up Acceleration
3 Up Deceleration
4 Up Leveling Speed
5 Up Stop

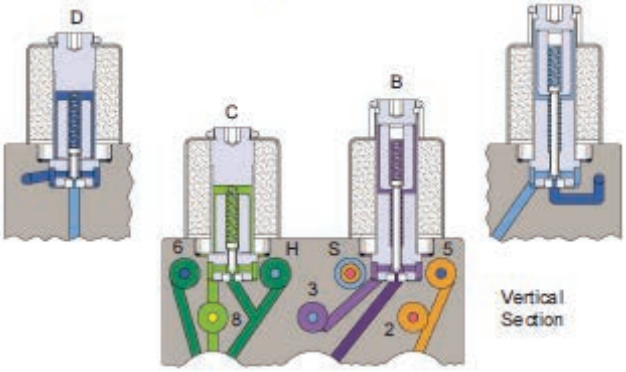
Adjustments DOWN
6 Down Acceleration
7 Down Full Speed
8 Down Deceleration
9 Down Leveling Speed

Pressure
Pumpe
Bypass Valve
Up Leveling
Tank
Cylinder
Down Valve
Down Leveling

P Pump Port
T Tank Port
Z Cylinder Port



Horizontal Sections



Vertical Section

Steuerelemente
A Magnetventil (Halt oben)
B Magnetventil (Abbremsen auf)
C Magnetventil (Abbremsen unten)
D Magnetventil (Halt unten)
H Notablassventil
S Überdruckventil
U Umlaufkolben
V Rückschlagventil
W Schleichfahrtventil (auf)
X Senkkolben
Y Schleichfahrtventil (ab)

Einstellungen AUF
1 Umlaufeinstellung
2 Anfahrdrossel
3 Abbremsdrossel
4 Schleichfahrteinstellung
5 Haltedrossel

Einstellungen AB
6 Anfahrdrossel
7 Senkfahrteinstellung
8 Abbremsdrossel
9 Schleichfahrteinstellung

Druck
Pumpe
Umlaufkolben
Schleichfahrt (Auf)
Tank
Zylinder
Senkkolben
Schleichfahrt (Ab)

Eléments de commande
A Electro-vanne 'arrêt' (en fin de montée)
B Electro-vanne 'ralentissement' (montée)
C Electro-vanne 'ralentissement' (descente)
D Electro-vanne 'arrêt' (en fin de descente)
H Descente de secour (homme mort)
S Valve de sécurité
U By-pass
V Clapet anti-retour
W Soupape montée petite vitesse
X Soupape descente
Y Soupape descente petite vitesse

Réglages MONTÉE
1 By-pass
2 Etrangleur de démarrage
3 Etrangleur de ralentissement
4 Réglage de petite vitesse
5 Etrangleur d'arrêt

Réglages DESCENTE
6 Etrangleur de démarrage
7 Réglage de grande vitesse
8 Etrangleur de ralentissement
9 Réglage de petite vitesse

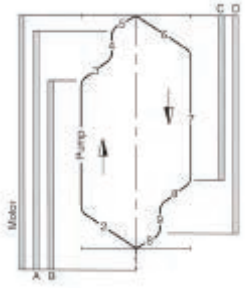
Pression
Pompe
By-pass
Montée petit vitesse
Cuve
Vérin
Soupape descente
Descente petite vitesse

Elementos de mando
A Válv. magnética 'parada' (arriba)
B Válv. magnética 'frenado' (subida)
C Válv. magnética 'frenado' (bajada)
D Válv. magnética 'parada' (abajo)
H Válv. parada de urgencia (manual)
S Válv. de seguridad
U Válv. de desviación
V Válv. de retención
W Válv. de subida lentísima
X Válv. de bajada
Y Válv. de bajada lentísima

Ajustes SUBIDA
1 Desviación
2 Arranque
3 Frenado
4 Recorrido lentísimo
5 Parada

Ajustes BAJADA
6 Arranque
7 Recorrido en bajada
8 Frenado
9 Recorrido lentísimo

Presión
Bomba
Válvula de desviación
Subida lentísima
Tanque
Cilindro
Válvula de bajada
Bajada lentísima



ISO 9001

EV 100 Service Manual

Quick adjustment procedure

Solenoid Coils

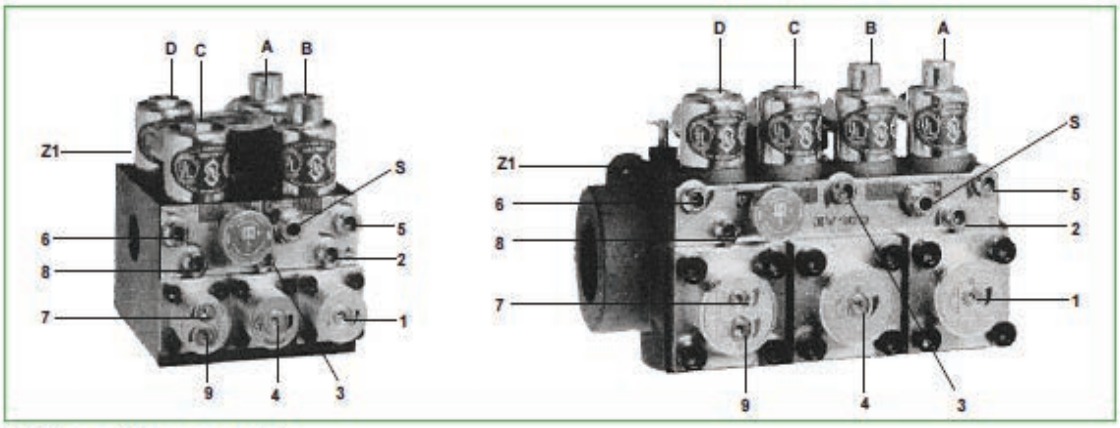
During adjustment of the EV 100 valve, instead of making a full floor to floor travel to check operation, much time can be saved by removing the securing nuts of the coil and switching to deceleration or to acceleration by lifting or replacing the appropriate coil by hand, allowing several adjustment corrections during one car travel between floors.

Caution: Once removed from the solenoid tube, the energised coil will begin to overheat after about 20 secs. If necessary, to slow the rate of heating, place an 8 or 10 mm socket key or similar steel rod as core thru the coil. Do not lay an energised coil to one side, otherwise it may overheat unnoticed.

If the coil becomes too hot to hold, it must be replaced, back over the solenoid tube and any further adjustment carried out with the elevator making normal floor to floor runs.

Car not visible from Machineroom

If the car cannot be seen during adjustment of the valve, the acceleration and deceleration times can be heard from the change of the turbulent noise within the valve as the speed of the car changes. With no load in the car, the duration of the speed changes should be about 2,5 seconds. This applies to adjustments 2, 3, 6 and 8.



Up Travel (empty car)

PRE-SETTINGS

Adjustment No. **1**	level with flange face.	5 mm Socket key
Adjustment No. **2**	all the way 'in' then 2 turns 'out'.	3 mm " "
Adjustment No. **3**	" " " " " 4 " " .	3 mm " "
Adjustment No. **4**	level with flange face.	5 mm " "
Adjustment No. **5**	all the way 'in' then 4 turns 'out'.	3 mm " "
Adjustment No. **S**	" " " " " 2 " " .	3 mm " "

1. Pilot Pressure Setting

Disconnect coil **A**. Energise Motor (pump).
If the car does not move, turn No. **1** 'in' until the car begins to move, turn No. **1** 'out' until the car stops, then back out again 1/2 turn. The car remains standing still.
DO NOT UP-LEVEL WITH THIS ADJUSTMENT! Between full and empty car, leveling speed differences would be extreme.

2. Up Acceleration

Reconnect coil **A**. Start Motor and energise coil **A** and **B** (normal 'up' call).
Observe the up acceleration. If it is too quick, turn No. **2** 'in' ½ turn. If it is too long, turn No. **2** 'out' ½ turn. Repeat until acceleration is satisfactory. Acceleration time should be about 2,5 secs.

4. Up Leveling

Disconnect coil **B**. Energise Motor and coil **A** (normal 'up-level' call).
With adjustment No. **4** level with the face of the flange the car will up level. If the leveling speed is too fast, turn No. **4** 'in' until the speed is as required. If the speed is too slow, turn No. **4** 'out'. Recommended speed 6 cm/sec.

EV 100 Service Manual

Quick adjustment procedure

3. Up Deceleration
With coil **B** still disconnected. Energise motor and coil **A** (normal 'up-level' call).
The car will travel upwards at leveling speed. Turn No. **3** 'in' until the car starts to up level faster, then turn No. **3** 'out' until the original leveling speed is observed. Reconnect coil **B** and place a normal up call.
Observe the deceleration of the car. If it is too long, turn No. **3** 'out' ¼ turn; if it is too short, turn No. **3** 'in' ¼ turn.
Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

5. Up Soft Stop
Disconnect coil **A**. Energise Motor.
The car should not move. Turn No. **5** 'in' until the car starts upwards then turn No. **5** 'out' until the car stops.
Reconnect coil **A**. Energise Pump-Motor and **A**. The car will travel upwards at leveling speed.
Lift **A** coil by hand briefly and observe the stopping of the car. If the stop is too hard turn No. **5** 'in' ¼ turn.
If the stop is too soft, turn No. **5** 'out', ¼ turn. Repeat until the stop is satisfactory.

S Pressure Relief Valve
Turn **S** screw 'out' until about 2 mm of the screw head is showing. Close the ball valve in the cylinder line and open the manual lowering **H** to lower valve pressure down to zero. Place an up call, energising motor and coils **A** and **B**. The relief pressure will show on the pressure gauge.
To increase the relief valve setting, turn **S** 'in'.
To decrease the relief valve setting, turn **S** 'out', then open the manual lowering for ½ second with the pump still running to release locked-in pressure, before observing the pressure gauge reading.

Down Travel (empty car)

PRE-SETTINGS

Adjustment No. **6**	all the way 'in' then 4 turns 'out'.	3 mm Socket key
Adjustment No. **7**	3 mm under the flange face.	5 mm " "
Adjustment No. **8**	all the way 'in' then 2 turns 'out'.	3 mm " "
Adjustment No. **9**	level with flange face.	5 mm " "

8. Down Deceleration
Place down call (coils **C** and **D** energised).
As the car approaches full speed, remove coil **D** by hand briefly from the solenoid and observe the deceleration of the car. If the deceleration is too long, turn No. **8** 'out' ¼ turn; if it is too short, turn No. **8** 'in' ¼ turn.
Repeat until deceleration is satisfactory. Deceleration time should be about 2,5 secs.

6. Down Acceleration
Turn No. **6** all the way 'in'. Place down call (coils **C** and **D** energised).
The car will not move. Turn No. **6** 'out' slowly until the car accelerates downwards.
If the acceleration is too long, turn No. **6** 'out' ¼ turn. If it is too short, turn No. **6** 'in' ¼ turn.
Acceleration time should be about 2,5 secs.

7. Down Full Speed
Place down call (coils **C** and **D** energised).
Observe full down speed. Turn No. **7** 'in' for slower, 'out' for faster speed.

9. Down Leveling Speed
Disconnect coil **C**. Place down call (**D** energised).
Observe down leveling speed. Turn No. **9** 'in' for slower, 'out' for a fast down leveling speed.
Recommended speed 6 cm/sec.

H Emergency Lowering
The manually operated emergency down speed and the **D** coil operated down leveling speed are the same.

Down Stop
When solenoid **D** is de-energised with solenoid **C** remaining de-energised, the car will stop according to the setting of adjustment 8 and no further adjustment will be required.

KS Slack Rope Valve
The KS is adjusted with a 3 mm Socket Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** turned all the way 'in', then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.

EV 100 Trouble Shooting (2007)

UP Travel

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Up-Start (Elevator remains at floor)	Test: Turn adjustment **5** all the way in. If the elevator now starts upwards the problem is at solenoid **A**.	
	Solenoid **A** not energised or voltage too low.	See Ⓐ below.
	Solenoid **A** tube not screwed down tight.	Tighten Solenoid **A** tube.
	Solenoid valve A: Dirt or damage between needle **AN** and seat **AS**.	Clean or change needle and seat.
	Adjustment **2** not far enough open.	Turn out adjustment **2**.
	Adjustment **1** too far back (open). Not enough pilot pressure.	Turn in adjustment **1** with the pump running.
	Pressure relief **S** valve is set too low.	Set relief valve higher.
	Adjustment **8** turned in too far (car sits on the buffer).	Turn out adjustment **8**.
	Bypass flow guide **U** is too large.	Insert smaller bypass flow guide (see flow guide charts at EV catalogue).
	Pump running in the wrong direction.	Install the pump correctly.
	The pump connection flange is leaking excessively.	Seal the pump connection.
	The pump is undersize or worn.	Select bigger pump or replace pump.
	Test: If by turning adjustment **1** with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
Up-Start, but no Full Speed	Test: Turn adjustment **3** all the way in. If the elevator now travels upwards at full speed the problem is at solenoid **B**.	
	Solenoid **B** not energised or voltage too low.	See Ⓐ below.
	Solenoid **B** tube not screwed down tight.	Tighten Solenoid **B** tube.
	Solenoid valve **B**: Dirt or damage between needle **AN** and seat **AS**.	Clean or change needle and seat.
	The pump connection flange is leaking excessively.	Seal the pump connection.
	The pump is undersize or worn.	Select bigger pump or replace pump.
	Test: If by turning adjustment **1** with the pump running the pressure does not rise above 5 bar, even with a smaller bypass valve inserted, the problem should be sought at the pump.	
Up-Start too hard	Adjustment **1** turned in too far.	Turn out adjustment **1**.
	Adjustment **2** turned out too far.	Turn in adjustment **2**.
	Bypass flow guide U too small (slots too narrow).	Change to flow guide with wider slots.
	O-Ring **UO** on Bypass Valve **U** is leaking.	Change O-Ring → see EV Spare Parts List.
	Star to Delta motor switch period is too long.	0.2-0.3 sec. is sufficient.
	Excessive friction on the guide rails or in the cylinder head.	Can not be eliminated thru valve adjustment.
No deceleration into leveling speed	Solenoid **B** does not de-energise.	Lift coil to check magnetic pull. See Ⓐ below. Slow down switch possibly set to high (late).
	Adjustment **3** turned in too far.	Turn out adjustment **3**. Turn in adjustment **2**.
	O-Ring **UO** on Bypass Valve **U** is leaking.	Change O-Ring → see EV Spare Parts List.
Leveling too fast	Adjustment 4 too far screwed out.	Turn in adjustment **4** to about 0.05 m/s leveling speed.
Deceleration into leveling speed but overtravel of floor level	Solenoid **A** is de-energised too late.	Lift coil to check pull. See Ⓐ below.
	Adjustment **5** turned in too far.	Turn out adjustment **5**.
	Adjustment **1** turned in too far.	Turn out adjustment **1**.
	Up leveling speed too high.	Turn in adjustment **4** to about 0.05 m/s leveling speed.
Bypass-pressure not adjustable	Restriction on the return line.	Remove restriction; enlarge return line.
	Bypass flow guide **U** too small (slots too narrow).	Change to flow guide with wider slots.
Elevator stops before reaching the floor (no leveling)	Solenoid **A** and **B** reversed.	Swap solenoid A and B. See Ⓐ below.
	Up leveling speed too slow.	Turn out adjustment **4**.
	Middle O-Ring **FO** of flange **4F** is leaking.	Change O-Ring → see EV Spare Parts List.
	Relief valve is set too low.	Set relief valve higher.

Ⓐ For checking the operation of the solenoids, remove the top nuts. By lifting the coils a few millimeters, the magnetic pull of the coil can be felt. For testing, the operation of the elevator car can also be controlled by lifting and replacing the coil. If the coil gets too hot, the coil has to be mounted onto the solenoid and the following adjustments have to be carried out on normal travels from floor to floor.

Standard settings: Adjustments **1 & 4** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **2, 3 & 5** all the way in (clockwise) then for EV ¾": **all adjustments** 1.5 turns out (c-clockwise), for EV **1 1/2 " – 2 ½"**: **adjustments 3 & 5** two and half turns out (c-clockwise), **adjustment 2** two turns out. Small final adjustments may be necessary.

EV 100 Trouble Shooting (2007)

DOWN Travel

Valves are fully adjusted and tested in the factory. Check electrical operation before changing valve setting.

Problem	Possible cause	Recommended
No Down Start	Solenoid **D** not energised or voltage too low.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **6** turned in too far.	Turn out adjustment **6**.
	Adjustment **8** turned out too far.	Turn in adjustment **8** cautiously. **Attention:** Danger of traveling through
	O-Ring **UO** on Down Valve **X** is leaking.	Change O-Ring → see EV Spare Parts List.
No full speed	Solenoid **C** not energised or voltage too low.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **7** turned in too far.	Turn out adjustment **7**.
	Down Valve flow guide **X** too small.	Check insert size (see flow guide charts page 6)
No down leveling. Elevator stops before floor level	Solenoid **C** and **D** reversed.	Lift coil to check magnetic pull. See Ⓐ below.
	Adjustment **9** turned in too far.	Turn out adjustment **9** to about 0.05 m/s leveling speed.
	Spring **9F** in adjustment **9** is broken.	Replace adjustment **9** complete.
No down leveling. Elevator travels though floor level	Adjustment **8** turned in too far. Filter of adjustment 8 blocked or adjustment 8 is damaged.	Turn out adjustment **8** about ½ turn.
	Adjustment **9** turned out too far.	Turn in adjustment **9** to about 0.05 m/s leveling speed.
	Solenoid valve **C**: Dirt or damage between needle **DN** and seat **DS**.	Clean or change needle and seat.
	Inner O-Ring **FO** on flange **7F** is leaking.	Change O-Ring → see EV Spare Parts List.
Elevator sinks quickly	Solenoid **D** tube not screwed down tight.	Tighten Solenoid **D** tube.
	Adjustment **8** turned in too far.	Turn out adjustment **8** about ½ turn.
Elevator sinks slowly due to inner leakage (Relevelling)	For possible down leakage points, see „Technical Dokumentation System Lenkage".	Replace one seal at a time and test before proceeding to the next point of possible leakage, if still necessary.
	Solenoid valve **D**: Dirt or damage between needle **DN** and seat **DS**.	Clean or change needle and seat.
	O-Ring **XO** of Down Valve **X** is leaking.	Change O-Ring → see EV Spare Parts List. When Down Valve is compensated, replace Down Valve.
	O-Ring **VO** of Check Valve **V** is leaking.	Change Check Valve → see EV Spare Parts List.
	O-Ring **WO** of Leveling Valve **W** is leaking.	Change O-Ring → see EV Spare Parts List.
	Inner O-Ring **FO** on flange **4F** is leaking.	Change O-Ring → see EV Spare Parts List.
	O-Ring **HO** of Manual Lowering **H** is leaking.	Replace Manual Lowering.
Elevator sinks due to inner leakage of auxiliary equipment	HP: Handpump is leaking.	Remove suction tube and observe if handpump leaks. Replace complete hand pump.
	HX/MX : Adjustment **8M** turned in too far.	Turn out adjustment **8M**.
	HX/MX: Down valve **9M** is leaking. Dirt or damage between the needle **DN** and seat **DS**.	Clean or change needle and seat.
	HX/MX: O-Ring **XO** of Down Valve **YM** is leaking.	Change O-Ring → see EV Spare Parts List.
	HX/MX: Manual Lowering is leaking (HX/MX).	Replace Manual Lowering.
	Contraction of oil during cooling especially from 35°C or above.	Consider oil cooler if hot oil is a problem.

Ⓐ For checking the operation of the solenoids, remove the top nuts. By lifting the coils a few millimeters, the magnetic pull of the coil can be felt.
For testing, the operation of the elevator car can also be controlled by lifting and replacing the coil. If the coil gets too hot, the coil has to be mounted onto the solenoid and the following adjustments have to be carried out on normal travels from floor to floor.

Standard settings: Adjustments **7 & 9** approx. level with flange faces. Up to two turns in either direction may then be necessary. Adjustments **6 & 8** all the way in (clockwise) then for EV ¾", **adjustment 6**,1 ½ turn and **adjustment 8**, 1 turn out (c-clockwise), for EV **1 1/2 " – 2 ½"**, **adjustments 6 & 8**, 1 ½ turns out (c-clockwise). Small final adjustments may be necessary.

mar 07

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BLAIN HYDRAULICS GmbH

Manufacturer of the Highest Quality:
Control Valves for Elevators
Tank Heaters - Hand Pumps
Pipe Rupture Valves - Ball Valves

EV 100 Service Manual

Slack Rope Valve `K´

Purpose

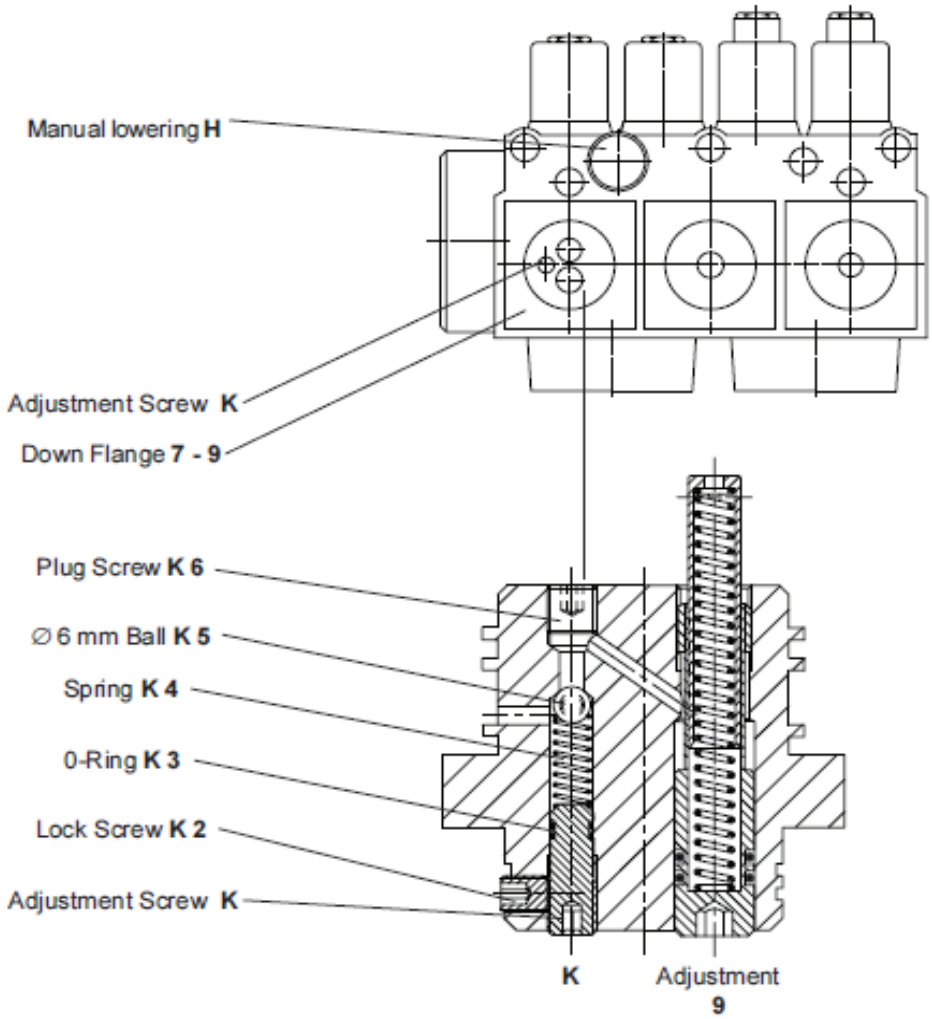
In the case of the operation of the safeties in a 1:2 hydraulic lift system when the weight of the car is no longer carried by the ropes, the electrical supply to the elevator must automatically be switched off. The **K** Slack Rope Valve avoids the ram being lowered by the opening of the manual lowering valve which could otherwise cause a tangled rope condition. The **K** Slack Rope Valve prevents the pressure holding up the ram from being evacuated through the manual lowering valve.

Function

The **K** valve is adjusted to a pressure just above the pressure produced by the weight of the ram. When under normal operating conditions, the weight of the car acts upon the ram through the 1:2 roping, the resulting pressure is sufficient to open the poppet of the **K** valve when the manual lowering **H** is opened, allowing the car to descend as required. When however the `safeties´ have operated and only the weight of the ram and sheave block are acting upon the hydraulic system, the resulting pressure is too low to open the **K** valve. The ram and sheave block can not be lowered.

Adjustment

The **K** is adjusted with a 3 mm Socket Key by turning the screw **K** `in´ for higher pressure and `out´ for lower pressure. With **K** turned all the way `in´, then half a turn back out, the unloaded car should descend when the **D** solenoid alone is energised. Should the car not descend, **K** must be backed off until the car just begins to descend, then backed off a further half turn to ensure that with cold oil, the car can be lowered as required.



EV 100 Service Manual

Overheating of Power Units - System Leakage

Oil temperatures above 55 °C (130° F) should be avoided, otherwise the efficiency of the pump drops considerably and its life is reduced. Aging of the oil is also accelerated.

Possible causes of overheating:

1. Up leveling too long due to the leveling speed being too slow or the slow down switch being set too low.
2. Machine room ventilation inadequate.
3. The frequency of operation is too high for the normal rate of heat dissipation.

Temporary solution:

As a temporary measure to avoid overheating of the oil resulting in the shut down of the elevator, the down speed can be slowed to reduce frequency of operation until a permanent solution is installed.

Cooling systems

a. If the degree of overheating is not excessive and it takes for example two to three hours for the oil temperature to rise from 20° to 55°C (70° to 130° F), it may be sufficient to improve air circulation around the power unit, for example through the installation of a 0.05 to 0.10 kW ventilator extracting air out of the machine room or through a fan of similar power, blowing air over the power unit.

b. Should the above be inadequate, depending on the size of the elevator, it will be necessary to install a 10-50 l/min (3 - 13 gpm) pump to circulate the hot oil through an air cooled radiator of about 0.1 to 0.2 fan kW. It is also essential that there is sufficient extraction of warm air out of the machine room or that the cooler is out side of the machine
room, for example in the elevator shaft. The effective cooling power of an air cooled radiator should not to be confused with the power of the fan drive which normally need only be 0.1 or 0.2 kW. Normally, the effective cooling power of a cooler need only be approximately ¼ of the main hydraulic elevator motor, in the case of submersible drives.

Cooling systems for the above purpose should be switched into operation when the oil reaches 30° - 35°C (85° - 95° F).

System leakage (re-leveling)

The aim of manufacturers of hydraulic elevator control valves is to produce valves with zero leakage. Due to fine contamination in the oil perfect sealing between valve parts may not always be achieved, leading to a slow down leak of the elevator car.

It would become unnecessarily expensive to strive for perfect sealing in every valve in operation. Therefore, because code requirements assure a safe releveling system whether descent of the car is caused by valve leakage or through the cooling of the oil in the cylinder pressure system, a minor leakage of the control valve can be tolerated.

1. The European Code EN 81-2 require: that the loaded elevator does not leak downwards by more than 10 mm (3/8") in 10 minutes. This is the standard used to determine if a valve should be serviced for leakage.
2. For practical reasons, a quicker method for judging valve leakage is to close the ball valve in the cylinder line and observe the gauge showing pressure in the cylinder chamber of the valve. If this pressure falls to zero in less than 20 secs, it may be necessary to service the valve, depending on the diameter of the main ram and sensitivity of the customer.
3. Down sinking giving the impression of leakage can be due to cooling of the oil.

   When the elevator is at rest and the temperature of the oil falls, contraction of the oil in the cylinder and piping causes the car to sink. This sinking is very slow but overnight without releveling could amount to as much as half a meter, depending on the temperature drop of the oil and the volume of oil in the cylinder system. The elevator releveling system, operating normally however, keeps the car at floor level.
4. In the case of Blain EV valves, see page 6 indicating where valve down leakage can occur.

EV 100 Service Manual

Switch Distances

Recommended distances between leveling and stop switches

Elevator Speed mtrs/sec.	Switch Distance approx. cm	Elevator Speed ft/min.	Switch Distance approx. inches
0,10	5	20	2
0,15	10	30	4
0,20	15	40	6
0,25	18	50	7
0,30	25	60	9
0,35	30	70	12
0,40	40	80	16
0,45	46	90	18
0,50	50	100	20
0,55	58	110	23
0,60	70	120	28
0,70	80	140	31
0,80	95	160	36
0,90	105	180	41
1,00	120	200	48

With no load in the car, the deceleration time should be 2 to 2,5 secs. from full speed to leveling speed. The leveling time should be 1 to 2 secs.

Accurate landing can be affected by different factors as follows:

a. If the leveling speed is fast i.e. 0,1 m/sec (20 ft/min), landing will not be as accurate as when the leveling speed is slower i.e. 0,05 m/sec (10 ft/min).

b. If the soft stop adjustment '5' is set too soft, stopping will be less accurate as when '5' is set for a quicker stop.

c. Particularly when the mechanic can not see the operation of the elevator car, it is possible that the elevator has not finished decelerating from fast speed before reaching the floor. In other words, the elevator has not slowed down to its correct leveling speed before the stop switch is actuated.
Usually, the leveling operation can be observed through the crack in the car doors. Alternatively, in the machine room, the turbulant noise within the valve during leveling can be heard and should last 1 to 2 secs. following 2 to 2,5 secs. deceleration time with no load in the car.

d. A difference in landing accuracy between the elevator being loaded and unloaded, can be due to the car under load, leaning to one side by several millimeters causing an alteration in the operating position of the stop switch by some centimetres.

RUPTURE VALVE VC 3006 - types A*,B,R,G,E*

This device consists of a valve which stops (completely or partially) the oil flow when downward speed exceeds the preset value. This device ensures a deceleration lower than g_n (9,81 m/s^2).
These valves are designed and manufactured to a safety factor greater than 1,7 with respect to the proof stress (non-proportional elongation) calculated on a pressure 2,3 times the maximum static one (45 bar).

SETTING OF THE RUPTURE VALVE :

- Calculate the tripping flow with the following formula:

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

where:
Q_i = maximum tripping flow of the valve [l/min]
V_d = rated downward speed of the car [m/s]
A = ram area [cm^2]
N_{vc} = number of jack connected to the rupture valve
c_m = reeving ratio (1 for direct installation 1:1,2 for indirect installation 2:1)

Table 1 - area for single ram jacks

ram	HL 45	HL 55	HL 65											
A [cm^2]	15,90	23,76	33,18											
ram	50	60	70	80	90	100	110	120	130	140	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	153,94	176,71	254,47	314,16	444,88

Table 2 - equivalent area for telescopic jacks with hydraulic synchronization

jack 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 3 - equivalent area for telescopic jacks with mechanical synchronization (by chains)

jack 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	*****	*****

- Remove the cap from the adjusting screw and untight the locking nut.
- Screw the adjustment screw in to stop and measure the quote Xo (valve completely closed).
- Read on the diagram for valve setting the quote X with respect to the tripping flow and to the valve dimension (es: VC 3006/B 1"1/4; Qi = 150 l/min; X = 9mm)
- Screw out the adjustment screw to obtain the requested quote X + Xo.

CHECKING OF THE RUPTURE VALVE:

- Reduce the down speed to approx. 20 FPM.Call the lift with full load to the top landing.
- Call the lift back to the bottom floor and increase the down speed while it is running.
- When the lift reaches the downward speed according the tripping flow (125% of rated speed), the PRV closes and the car stops

If the valve does not close , or closes too early it is necessary to readjust:

- Untight the locking nut and screw in the adjustment screw one turn if closing speed too high, turn out if too low.
- Call the lift to the top floor and then back to the bottom floor.
- Repeat this operation until the valve closes.
- Reset down speed to rated speed and be sure the valve does not trip during a normal down travel.

IMPORTANT!!!

Once the check is done re-assemble the cap on the adjusting screw.

DIAGRAM FOR VC3006 3/4" ADJUSTMENT