

Service Manual

Elevator Valve EV 100

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GmbH

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



Caution

Only qualified elevator mechanics are permitted to install and adjust elevator control valves and controllers.

Every Blain control valve is subjected to strong quality standards, from production, adjustment and testing, to final shipment.

This manual will provide assistance whenever servicing is required. If necessary, please contact our technical department, stating the valve number, which is engraved into the EV casting above the nameplate, as well as other related technical data.

Technical Servicing

(from USA)

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Elevator Valve - EV 100 3/4'' 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

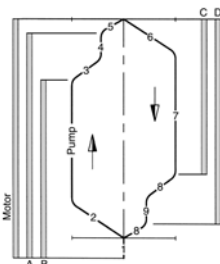


- Éléments de commande**
- A Electro-vanne 'arrêt' (en fin de montée)
 - B Electro-vanne 'ralentissement' (montée)
 - C Electro-vanne 'ralentissement' (descente)
 - D Electro-vanne 'arrêt' (en fin de descente)
 - H Descente de secours (homme mort)
 - S Valve de sécurité
 - U By-pass
 - V Clapet anti-retour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

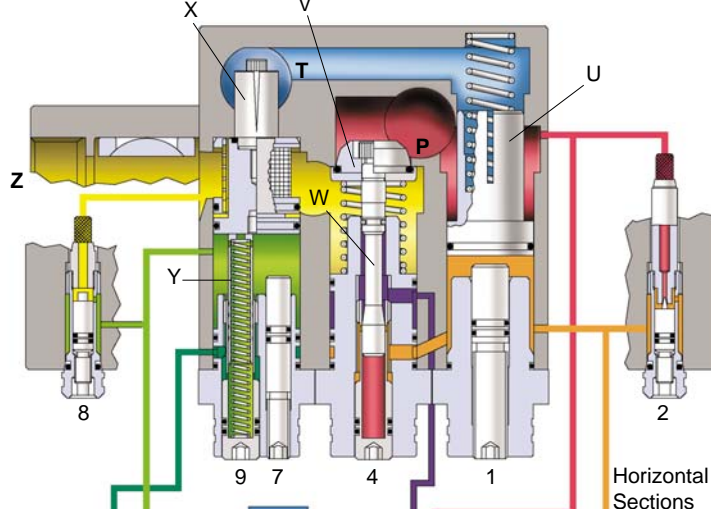
- Réglages MONTÉE**
- 1 By-pass
 - 2 Etrangleur de démarrage
 - 3 Etrangleur de ralentissement
 - 4 Réglage de petite vitesse
 - 5 Etrangleur d'arrêt

- 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



P Pump Port
T Tank Port
Z Cylinder Port



Horizontal Sections



- 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 Schleichfahrventil (auf)
 - X Senkkolben
 - Y Schleichfahrventil (ab)

- Einstellungen AUF**
- 1 Umlaufeinstellung
 - 2 Anfahrrossel
 - 3 Abbremsdrossel
 - 4 Schleichfahreinstellung
 - 5 Haltdrossel

- Einstellungen AB**
- 6 Anfahrrossel
 - 7 Senkfahreinstellung
 - 8 Abbremsdrossel
 - 9 Schleichfahreinstellung

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

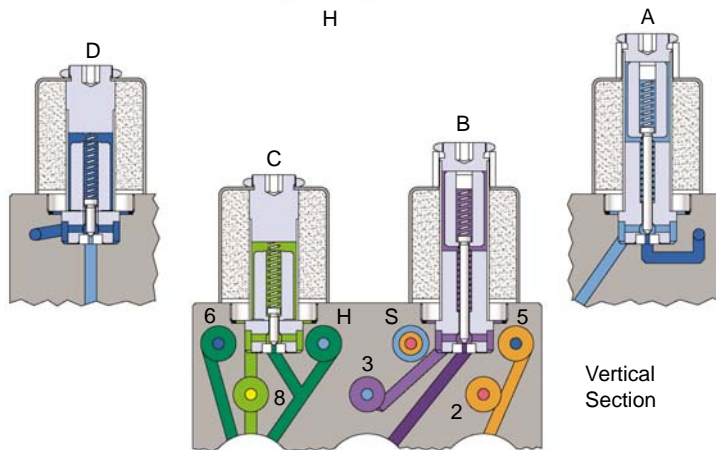


- Elementos de mando**
- A Válv. magnética 'parada' (arriba)
 - B Válv. magnética 'frenado' (subida)
 - C Válv. magnética 'frenado' (bajada)
 - D Válv. magnética 'parada' (abajo)
 - H Válv. parada de urgencia (manual)
 - S Válv. de seguridad
 - U Válv. de desviación
 - V Válv. de retención
 - W Válv.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

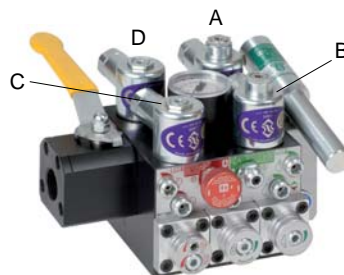
- Ajustes SUBIDA**
- 1 Desviación
 - 2 Arranque
 - 3 Frenado
 - 4 Recorrido lentísimo
 - 5 Parada

- 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



Vertical Section



Elevator Valve

EV 100 1 1/2", 2", 1 1/2"



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 - B Solenoid (UP Deceleration)
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 - 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

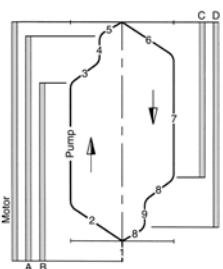


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 - B Electro-vanne 'ralentissement' (montée)
 - C Electro-vanne 'ralentissement' (descente)
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- 6 Anfahrtdrossel
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 - 8 Abbremsdrossel
 - 9 Schleichfahreinstellung

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

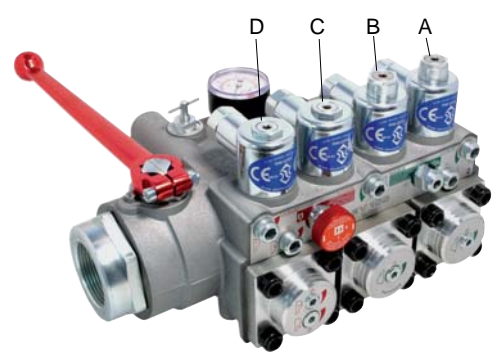
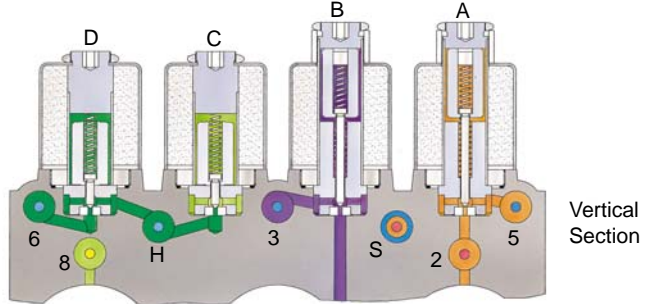
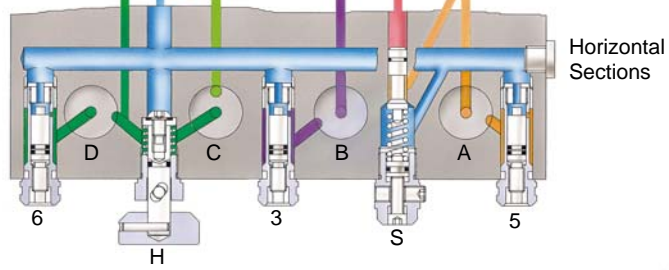
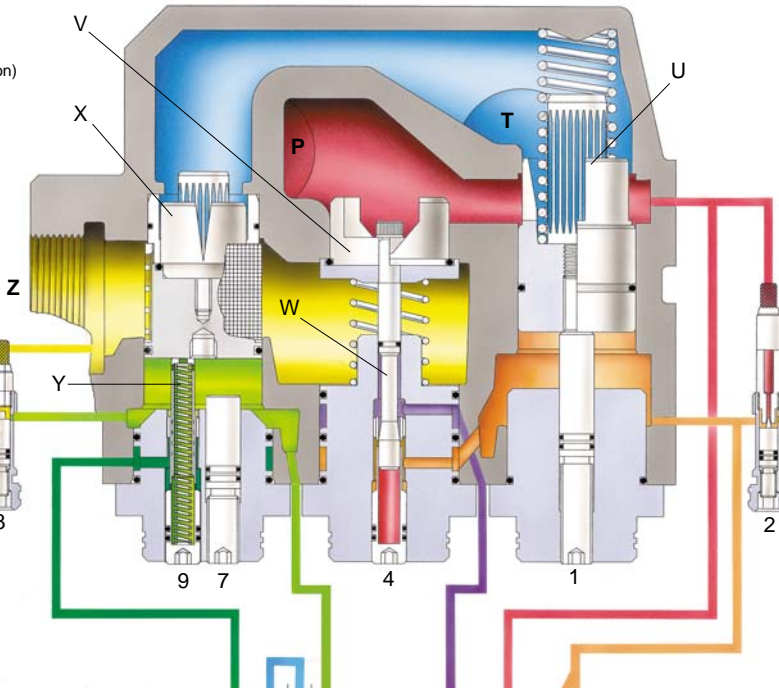


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- Ajustes SUBIDA**
- 1 Desviación
 - 2 Arranque
 - 3 Frenado
 - 4 Recorrido lentísimo
 - 5 Parada

- Ajustes BAJADA**
- 6 Arranque
 - 7 Recorrido en bajada
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 - 9 Recorrido lentísimo

- Presión**
- Bomba
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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.

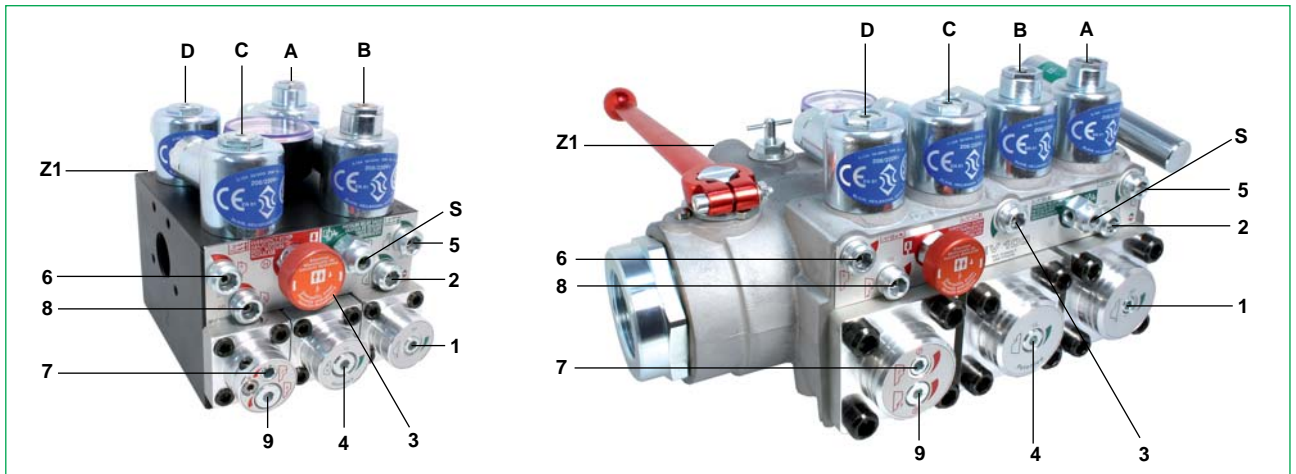
If necessary, to slow the rate of heating, place an 8 or 10 mm socket key or similar steel rod as core thru the coil.

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	EV 100 ¾"	EV 100 1½" - EV 100 2½"
Adjustment No. 1 level with flange face		5 mm Socket key
Adjustment No. 2 all the way 'in'	then 1,5 turns 'out'	then 2 turns 'out'
Adjustment No. 4 level with flange face		5 mm Socket key
Adjustment No. 3 all the way 'in'	then 1,5 turns 'out'	then 2,5 turns 'out'
Adjustment No. 5 all the way 'in'	then 1,5 turns 'out'	then 2,5 turns 'out'
Adjustment No. S all the way 'in'	then 1,5 turns 'out'	then 1,5 turns 'out'

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, levelling 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 Levelling

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 levelling 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.

3. Up Deceleration

With coil **B** still disconnected. Energise motor and coil **A** (normal 'up-level' call). The car will travel upwards at levelling speed. Turn No. **3** 'in' until the car starts to up level faster, then turn No. **3** 'out' until the original levelling 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 levelling 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.

PRE-SETTINGS				
Adjustment No. 8	all the way 'in'	then 1 turns 'out'	then 1,5 turns 'out'	3 mm Socket key
Adjustment No. 6	all the way 'in'	then 1,5 turns 'out'	then 1,5 turns 'out'	3 mm Socket key
Adjustment No. 7	3 mm under the flange face			5 mm Socket key
Adjustment No. 9	level with flange face			5 mm Socket key

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 Levelling Speed

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

H Emergency Lowering

The manually operated emergency down speed and the **D** coil operated down levelling speed are the same.

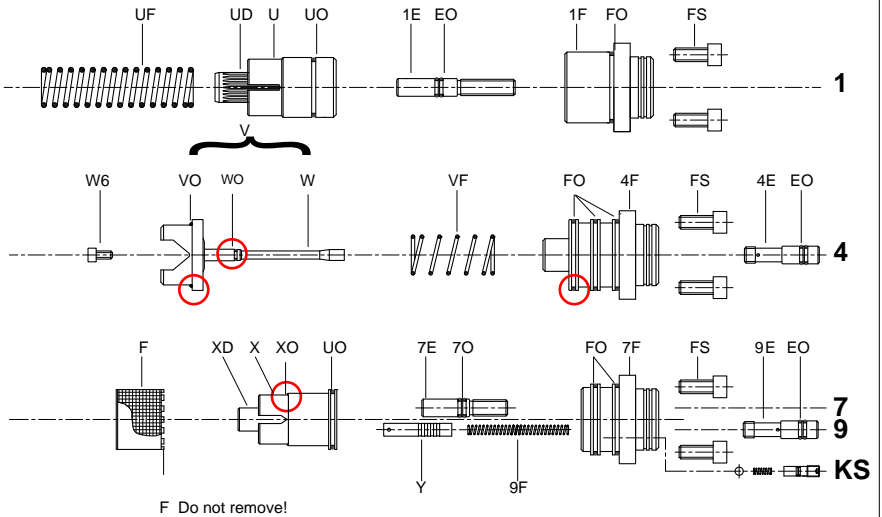
Down Stop

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.

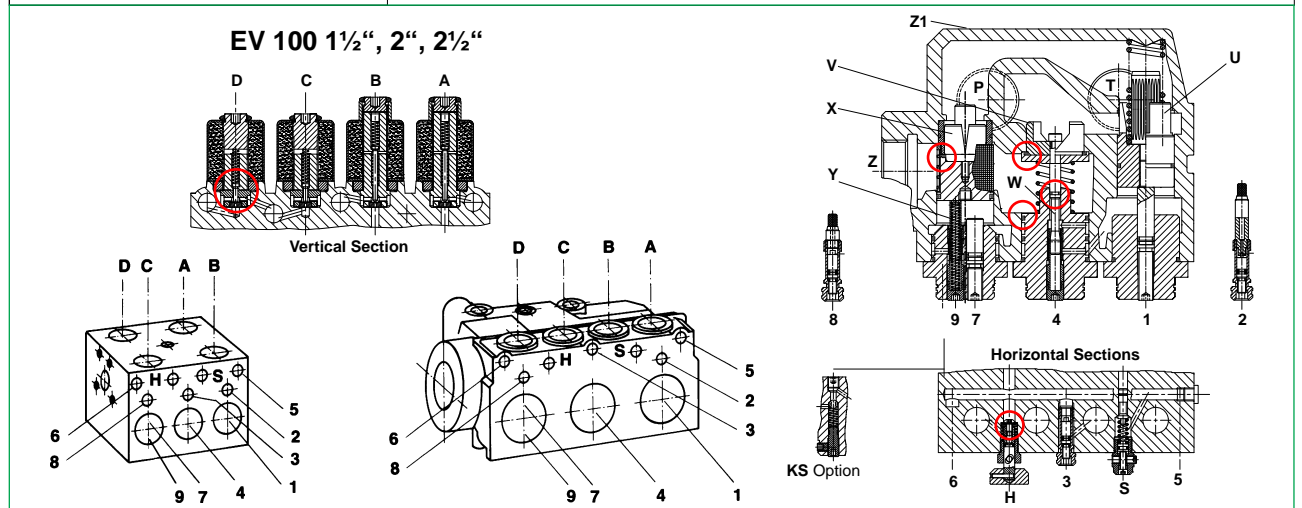
KS Slack Rope Valve

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.

Pos.	No.	Item	O-Ring-Size			Solenoid Valves	Adjustments	
			No.	3/4"	1 1/2"	2 1/2"		
1	FS	Lock Screw - Flange	FO 26x2P	47x2.5P	58x3P *	C+D 	A+B 	 +5 +6
	FO	O-Ring - Flange	EO 9x2P	9x2P	9x2P			
	1F	Flange - By Pass	UO 26x2V	39.34x2.62V	58x3V			
	EO	O-Ring - Adjustment	WO 5.28x1.78V	5.28x1.78V	5.28x1.78V			
	1E	Adjustment - By Pass	VO 23x2.5V	42x3V	60x3V **			
	UO	O-Ring - By Pass Valve	7O 5.28x1.78P	9x2P	9x2P			
	U	By Pass Valve	XO 13x2V	30x3V	47x3V			
2	UD	Noise Suppressor	HO 5.28x1.78V	5.28x1.78V	5.28x1.78V	 2		
	UF	Spring - By Pass	SO 5.28x1.78P	5.28x1.78P	5.28x1.78P			
3	2	Adjustment - Up Acceleration	MO 26x2P	26x2P	26x2P	 2		
3	3	Adjustment - Up Deceleration	* FO by 4F 2 1/2" is 67x2.5P ** 90 Shore O-Ring: V - Viton P - Perbunan					
4	EO	O-Ring - Adjustment						 2
	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						
5	VO	Seal - Check Valve				 2		
	V	Check Valve						
6	W6	Screw - Check Valve				 2		
	3	Adjustment - Up Stop						
7	7F	Flange - Down Valve						 2
	FO	O-Ring - Flange						
	7O	O-Ring - Adjustment						
	7E	Adjustment - Down Valve						
	UO	O-Ring - Down Valve						
	XO	Seal - Down Valve						
	X	Down Valve						
8	XD	Noise Suppressor				 2		
	F	Main Filter						
9	9E	Adjustment - Down Levelling						 2
	9F	Spring - Down Valve						
	Y	Down Levelling Valve						
H	H	Manual Lowering - Self Closing						 2
	HO	Seal - Manual Lowering						
S	SE	Adjustment - Screw						 2
	SM	Hexagonal						
	MS	Grub Screw						
	SO	O-Ring - Nipple						
	SZ	Nipple						
A+B	MM	Nut - Solenoid						 2
	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'						



Down Leakage (Relevelling)
 In case of down leakage, replace and test in the following order: **DS & DN, XO, VO, WO, FO + HO.**



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.
Levelling 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 ¼"**: 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.

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.

Purpose

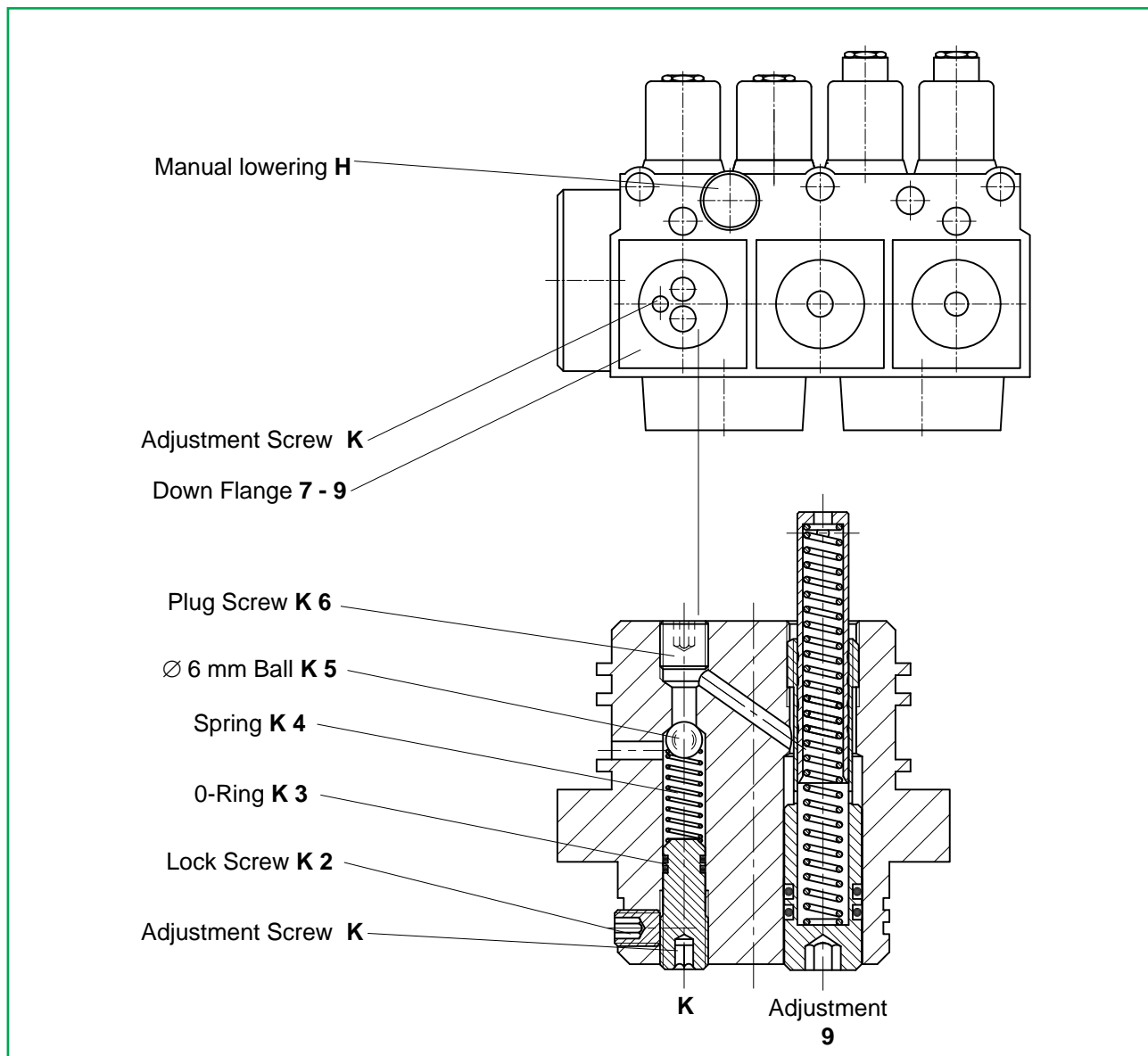
In the case of the operation of the safeties in a 1:2 hydraulic lift system when the weight of the car is no longer carried by the ropes, the electrical supply to the elevator must automatically be switched off. The **K** Slack Rope Valve avoids the ram being lowered by the opening of the manual lowering 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

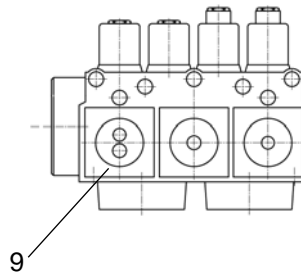
The **K** valve is adjusted to a pressure just above the pressure produced by the weight of the ram. When under normal operating conditions, the weight of the car acts upon the ram through the 1:2 roping, the resulting pressure is sufficient to open the poppet of the **K** valve when the manual lowering **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.



Down Levelling Adjustment 9 Replacement



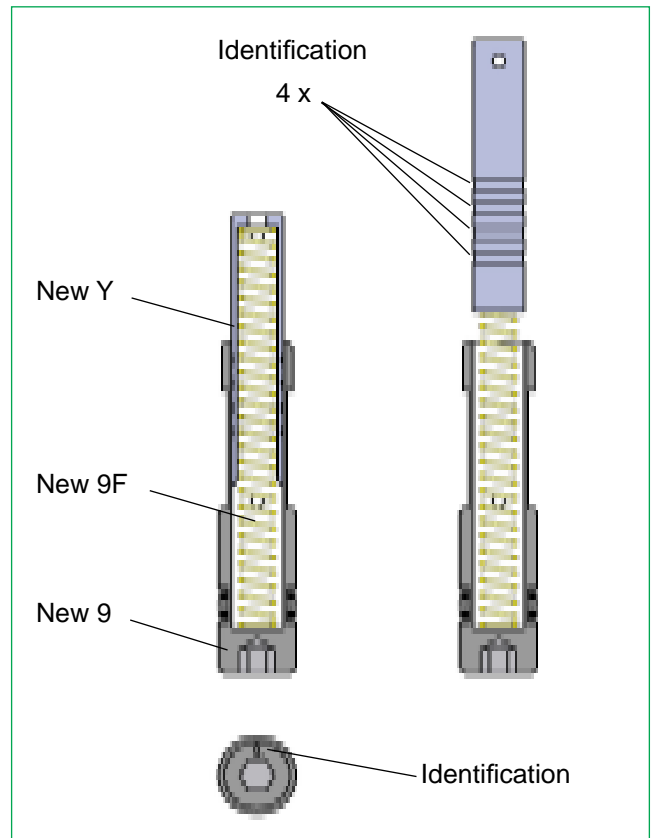
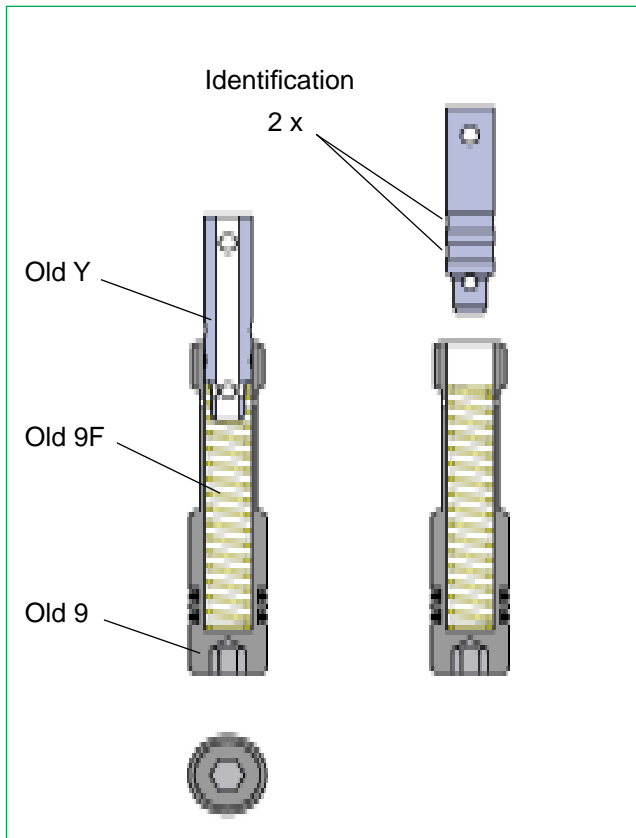
Old Type

1971 - 1999

Replacement not necessary
if operation is normal

New Type

from Jan. 2000



Advantages of new type

- Smoother deceleration
- Higher mechanical closing force
- Longer spring life
- Easier assembly

In the past, a small number of the original springs No. 9F have broken. Beginning January 2000, the design of the down levelling adjustment was modified to take a stronger spring.

The complete new adjustment is interchangeable with the original adjustment 9.

A broken spring 9 would cause the down levelling speed to be slower. No danger to passengers would arise as a consequence.

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 levelling too long due to the levelling 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-levelling)

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 relevelling 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 relevelling 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 relevelling 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.

Recommended distances between leveling and stop switches

Elevator Speed	Switch Distance	Elevator Speed	Switch Distance
mtrs/sec.	approx. cm	ft/min.	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 levelling speed. The levelling time should be 1 to 2 secs.

Accurate landing can be affected by different factors as follows:

- If the levelling speed is fast i.e. 0,1 m/sec (20 ft/min), landing will not be as accurate as when the levelling speed is slower i.e. 0,05 m/sec (10 ft/min).
- If the soft stop adjustment '5' is set too soft, stopping will be less accurate as when '5' is set for a quicker stop.
- 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 levelling speed before the stop switch is actuated.
Usually, the levelling operation can be observed through the crack in the car doors. Alternatively, in the machine room, the turbulent noise within the valve during levelling can be heard and should last 1 to 2 secs. following 2 to 2,5 secs. deceleration time with no load in the car.
- 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.

