# EV

## Elevator Control Valves

EN ISO 9001

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

¾" EV

EV 100

1½" & 2" EV

EV 100

2½" EV

EV 100

### Description

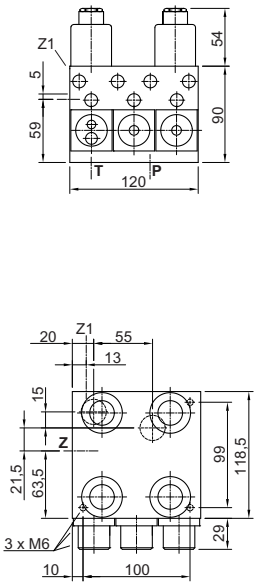
Available port sizes are ¾", 1½", 2" and 2½" pipe threads, depending on flow. EV's start on less than minimum load and can be used for across the line or wye-delta starting. According to customers' information, valves are factory adjusted ready for operation and very simple to readjust if so desired. 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 valves include the following features essential to efficient installation and trouble free service:

- Simple Responsive Adjustment
- Temperature and Pressure Compensation
- Solenoid with 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

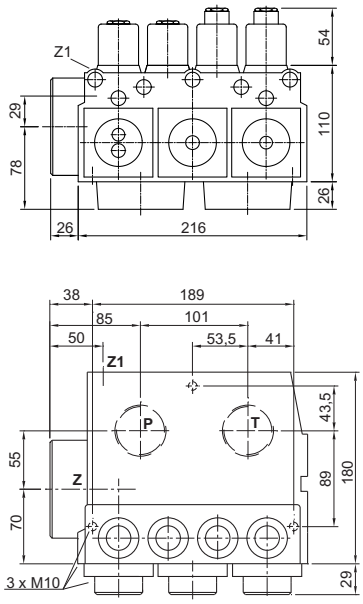
| **Technical Data:** | | ¾" EV | 1½" & 2" EV | 2½" EV |
|---|---|---|---|---|
| **Flow Range:** | l/min | 10-125 (2-33 US gpm) | 30-800 (8-208 US gpm) | 500-1530 (130-400 US gpm) |
| **Pressure Range (valve):** | bar | 5-100 (74-1500 psi) | 3-100 (44-1500 psi) | 3-68 (44-1000 psi) |
| **Press. Range CSA (valve):** | 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 l/min | 4 (58 psi) at 800 l/min | 4 (58 psi) at 1530 l/min |
| **Weight:** | kg | 5 (11 lbs) | 10 (22 lbs) | 14 (31 lbs) |

**Oil Viscosity:** 25-60 cSt. at 40°C (104°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.

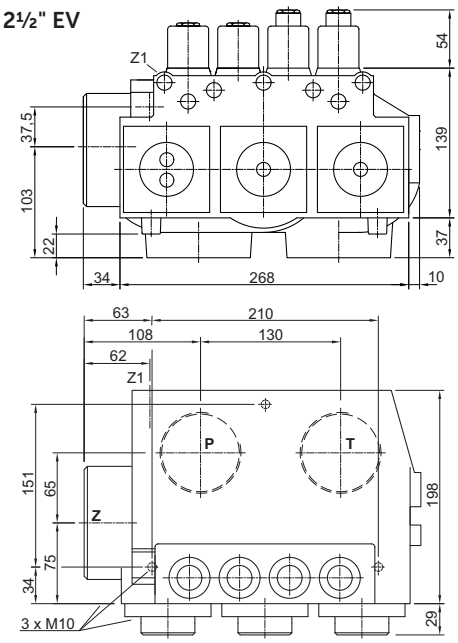
¾" EV




1½" & 2" EV




2½" EV





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Designer and Manufacturer of the highest quality control valves & safety components for hydraulic elevators

## EV Control Valve Types

**Optional Equipment**

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

## EV 0

¾" | 1 ½" & 2" EV | 2 ½"



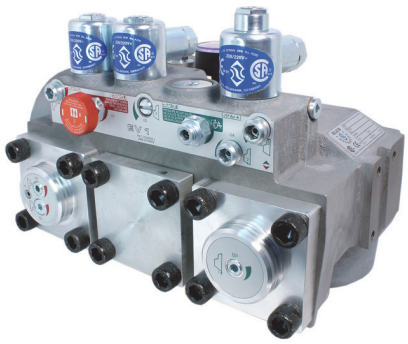
**Up** Up to 0.16 m/s (32 fpm). 1 Up Speed.
Up Start is smooth and adjustable.
Up Stop by de-energising the pump-motor.

**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





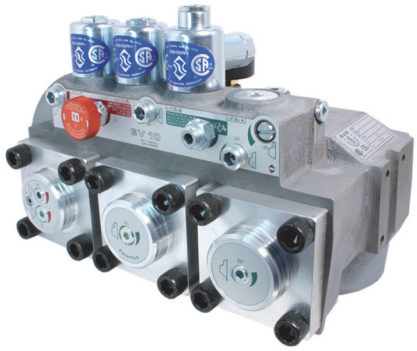
**Up** Up to 0.16 m/s (32 fpm). 1 Up Speed.
Up to 0.4 m/s (80 fpm) by overtravelling and levelling back down.
Up Start is smooth and adjustable.
Up Stop is smooth and exact through valve operation whereby the pump must run approx. 1 sec. longer through a time relay.

**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. 1 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, cylinder line is closed 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 two turns 'out' (c-clockwise). 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, close ball valve gradually.**

### 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. 1 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, close ball valve gradually.**

### 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, close ball valve gradually.**

### 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. 1 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, close ball valve gradually.**

**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, cylinder line is closed 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 slightly 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 1.5 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.**

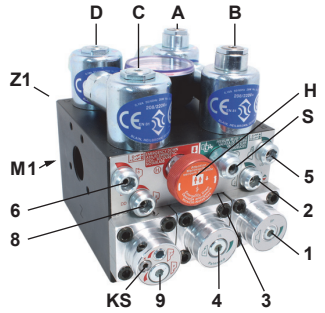
**9. Down Levelling:** With solenoid **C** de-energised and solenoid **D** energised as in 8 above, the car will proceed at its down levelling speed according to the setting of adjustment **9**. 'In' (clockwise) provides a slower, 'out' (c-clockwise) a faster down levelling speed.

**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.

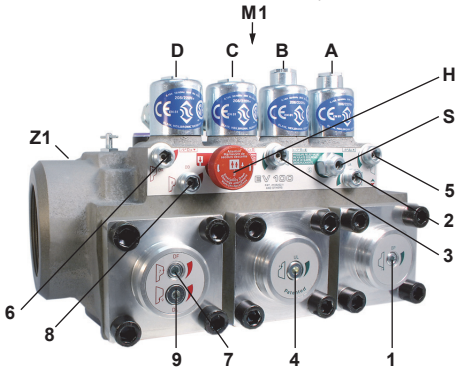
**KS Slack Rope Valve:** Both solenoids **C** and **D** must be de-energized beforehand! Loosen the small grub screw on the top of the **K** on the left hand side. The **KS** is adjusted with a 3 mm Allan Key by turning the screw **K** 'in' for higher pressure and 'out' for lower pressure. With **K** 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

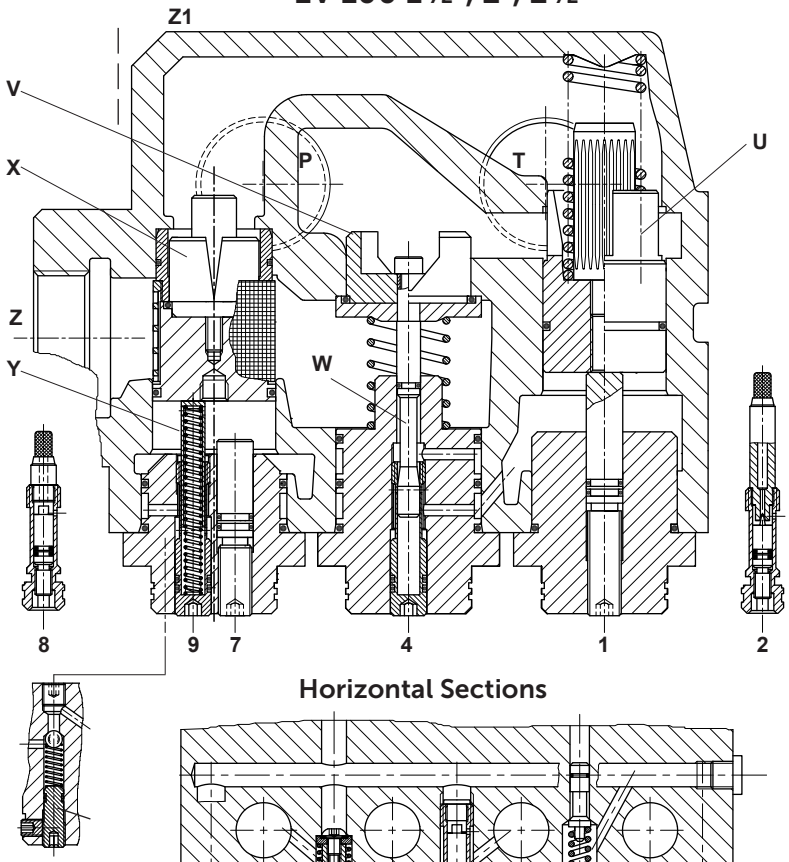
**Important:** Length of ¾" thread on pump connections should not be longer than 14 mm!




**M1** Test pressure gauge connection, ½"
**Z1** Pressure switch connection, ¼"



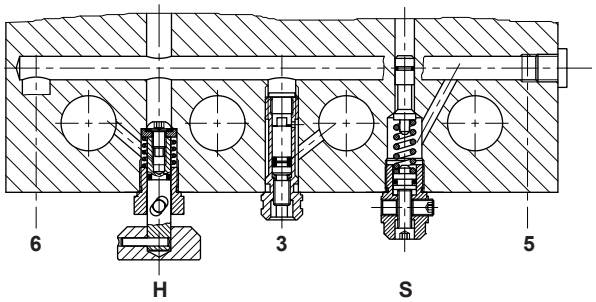

### EV 100 1½", 2", 2½"

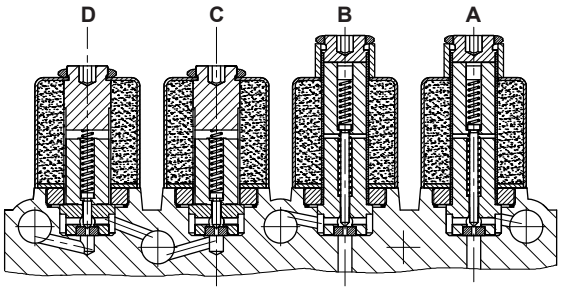





**KS** Option

### Horizontal Sections




### Vertical Section

**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

## 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

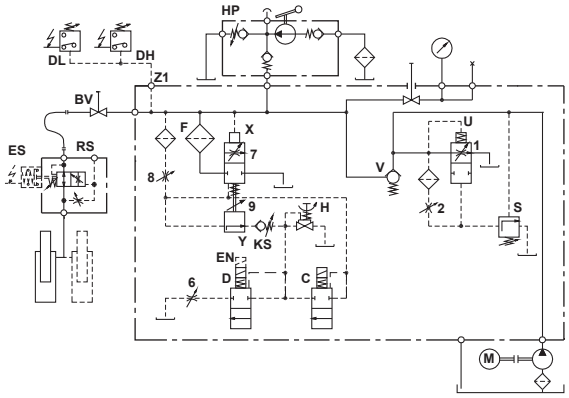
**1** By Pass
**2** Up Acceleration
**3** Up Deceleration
**4** Up Levelling Speed
**5** Up Stop

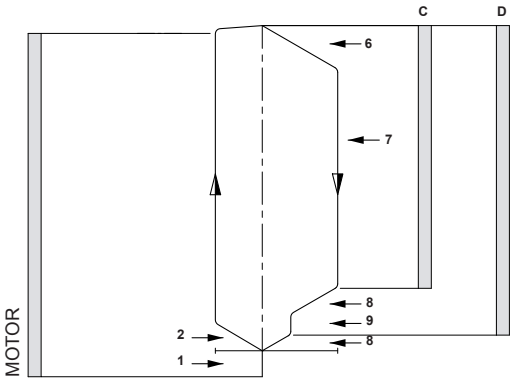
### Adjustments DOWN

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

**Hydraulic Circuit** | **Electrical Sequence**

## EV 0

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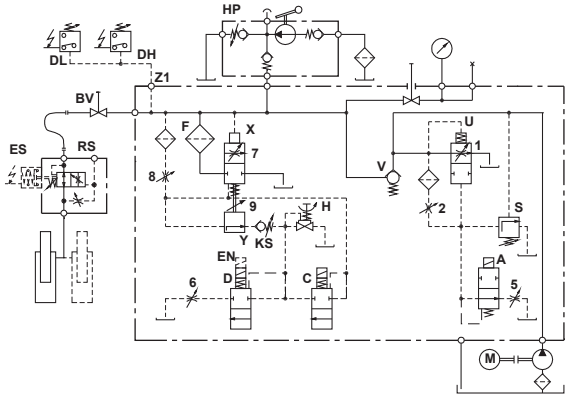


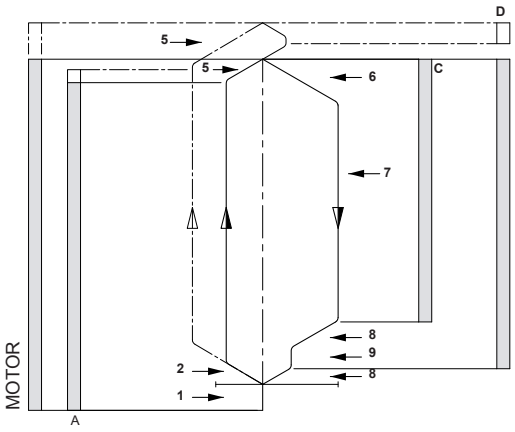


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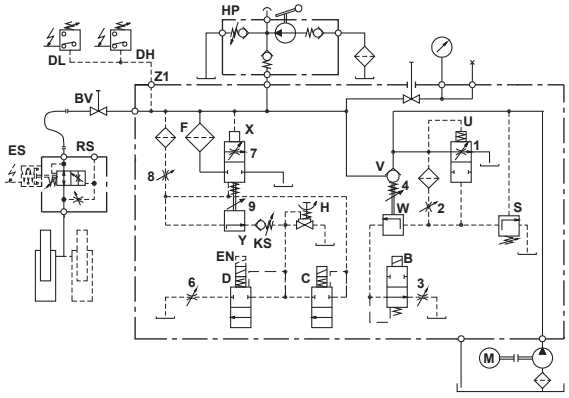


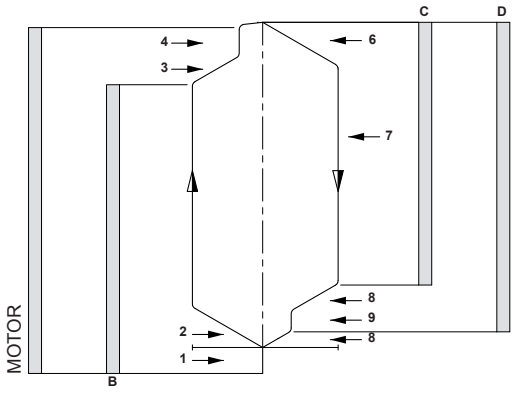


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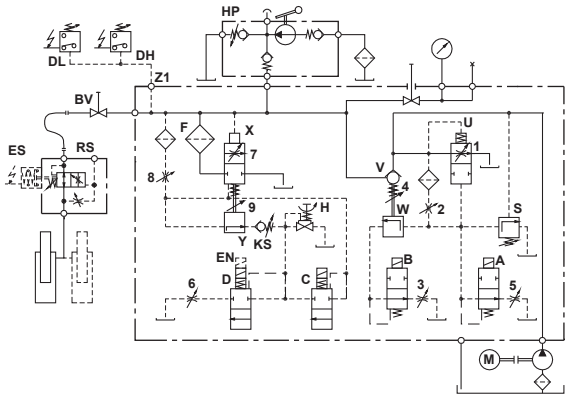
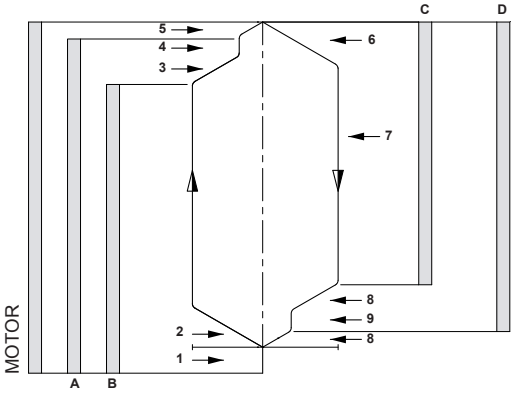


# EV Spare Parts List

| Pos. | No. | Item |
|---|---|---|
| 1 | FS | Lock Screw - Flange |
| | FO | O-Ring - Flange |
| | 1F | Flange - By Pass |
| | EO | 0-Ring - Adjustment |
| | 1E | Adjustment - By Pass |
| | UO | 0-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 | 0-Ring - Adjustment |
| | 4E | Adjustment - Up Levelling |
| | 4F | Flange - Check Valve |
| | FO | 0-Ring - Flange |
| | VF | Spring - Check Valve |
| | W | Up-Levelling Valve |
| | WO | 0-Ring - Up Levelling Valve |
| | VO | Seal - Check Valve |
| | V | Check Valve |
| | W6 | Screw - Check Valve |
| 5 | 3 | Adjustment - Up Stop |
| 6 | 3 | Adjustment - Down Acceleration |
| 7 | 7F | Flange - Down Valve |
| | FO | 0-Ring - Flange |
| | 7O | 0-Ring - Adjustment |
| | 7E | Adjustment - Down Valve |
| | UO | 0-Ring - Down Valve |
| | XO | Seal - Down Valve |
| | X | Down Valve |
| | XD | Noise Suppressor |
| | F | Main Filter |
| 8 | 8 | Adjustment - Down Deceleration |
| 9 | 9E | Adjustment - Down Levelling |
| | EO | 0-Ring - Adjustment |
| | 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 | 0-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 | 0-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 | 0-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.

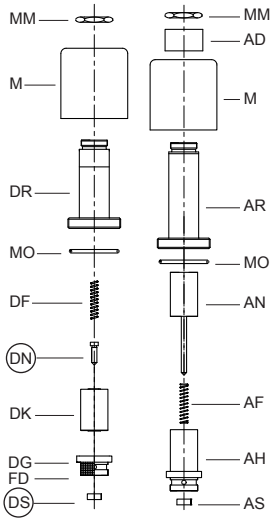
**O-Ring-Size**

| No. | ¾" | 1 ½" | 2 ½" |
|---|---|---|---|
| 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 |

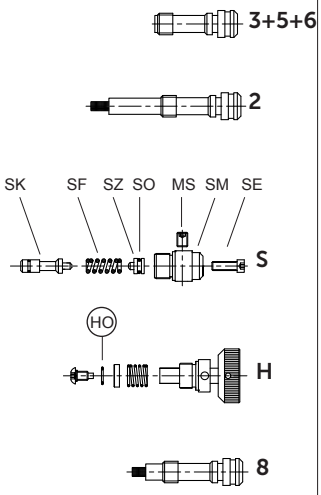
* FO by 4F 2½" is 67x2.5P
** 90 Shore

O-ring: V = FKM - Viton
P = NBR - Perbunan

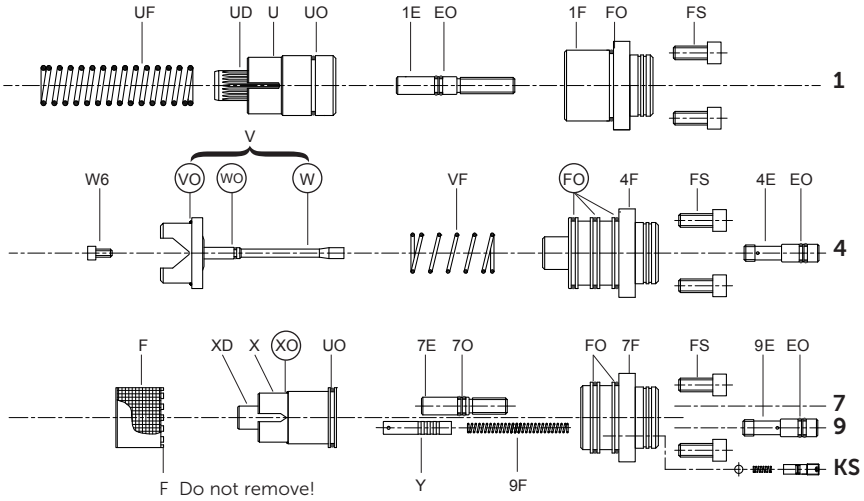
## Solenoid Valves




## Adjustments

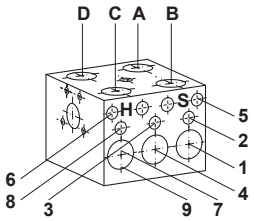


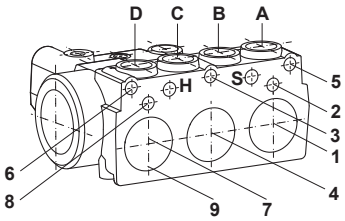

## Flow Valves

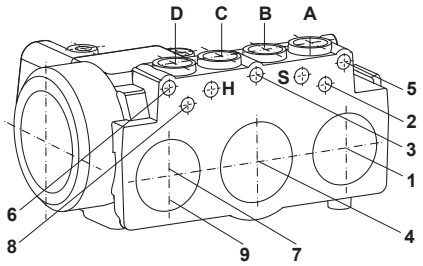



In case of down leakage, replace and test in the following order: (DS) & (DN), (XO), (VO), (WO), (FO) + (HO).

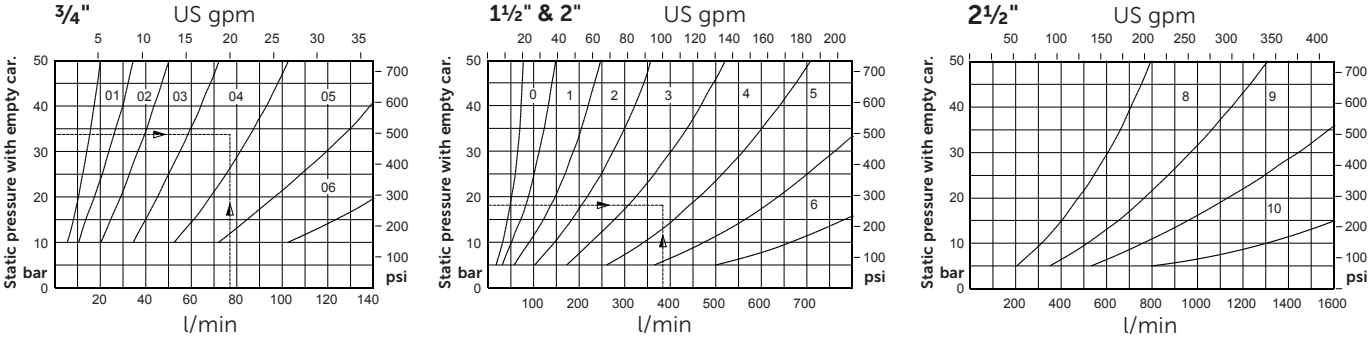
**Taper threads:** Do not exceed 8 turns of piping into the valve connections.




## Flow Guide Selection Charts for Down Direction




To order EV: Size (inch), valve type, state pump flow, empty car pressure (or flow guide size) and solenoid voltage.
**Example order:** 2"EV100, 380l/min, 18bar (empty), 110 AC or 2"EV100/4/110AC