# Trouble shooting
SEV-05 Control Valve

## General

I Valves are already adjusted and tested. Check electrical operation before changing valve settings. II Test that the correct solenoid is energized, by removing the nut and raising the solenoid slightly to feel pull III Make sure that flow guides (inserts) are correctly located after maintenance

| Problem | Cause | Solution |
|---|---|---|
| It is not possible to adjust the solenoids to 2100 PWM. | 1. Location of the orifice for the solenoid needle is not correct.<br>2. Incorrect dimension of seat housing.<br>3. No spring.<br>4. Wrong solenoid needle (A or C) | 1. Readjust needle (21.29 mm UP(A) – 33.11 mm DOWN (C))<br>2. Change seat housing.<br>3. Insert spring.<br>4. Insert correct solenoid needle. |
| Adjustment screws of 1, 7 and 9 are too much out/in from the flange faces | 5. Flow guide (insert) size is too small/big – travel of the internal flow guide is too long/short [(a)]. | 5. If pressure difference (p min – p max.) is greater than 20bar, take next larger/smaller flow guide (insert) size. |
| Car is not moving in UP direction, and very slow in DOWN direction | 6. Error message on the SEV card; 'Sensor defect'<br>7. Signals for UP and DOWN are sent to the SEV card at the same time.<br>8. No input signals into the SEV card [(c)]. | 6. Correct the error by pressing ESCAPE button<br>7. Check the input signal and apply only in one direction at a time<br>8. Check the main controller signaling. |
| Car always over/under travels the stop | 9. Ex-center not correctly adjusted therefore, the actual leveling speed is much higher/lower than the target speed [(b)]. | 9. Adjust the Ex-center correctly (Refer to the SEV Handbook). |
| Sensor needs frequent adjustments (overflow) or it is difficult to adjust the sensor to its initial setting | 10. Defected sensor<br>11. Spring in the flow meter is broken | 10. Change the sensor<br>11. Change the flow meter |

## UP Direction

| Problem | Cause | Solution |
|---|---|---|
| Car does not start to travel or it is not possible to adjust by-pass pressure | 1. Solenoid 'A' not energized or insufficient power [(c)]<br>2. Incorrect spring pretension of solenoid 'A'<br>3. Solenoid tube 'A' has not been fastened enough<br>4. Dirt between needle and seat housing of Solenoid 'A' or one of them has been damaged.<br>5. Adjustment '1' has been opened too far, therefore pressure is too low (min. 5bar) or the by-pass flow guide (insert) is too big<br>6. Setting for pressure relive valve is too low<br>7. Pressure relief valve is leaking<br>8. Adjustment '2' closed too far (over compensation)<br>9. Solenoid 'A' energized but car doesn't move, when solenoid 'A' de-energized car starts to move rapidly<br>10. Pump turns in the wrong direction<br>11. Pump capacity is too small, or pump is worn out<br>12. Leakage at the pump-valve assembly. | 1. Check the connector to solenoid 'A'<br>2. Start the car in leveling speed in UP direction then turn the adjustment c-clockwise on solenoid 'A' until car is travelling<br>3. Fasten Solenoid tube 'A'<br>4. Disassemble the solenoid 'A' clean all the parts, or replace damaged parts if needed<br>5. Turn adjustment '1' clockwise, or use a smaller by-pass flow guide (insert)<br>6. Close pressure relive valve completely, then apply 1 ½ turns c-clockwise out<br>7. Change the piston or the spring of the pressure relief valve<br>8. Turn out (c-clockwise) adjustment '2', if sealed exchange adjustment '2' completely<br>9. Wrong solenoid needle in solenoid 'A', replace with the correct one<br>10. If the pressure is not rising above 5 bar while adjusting adjustment '1' (turning clockwise) or through changing the by-pass valve insert to the next smaller size, please check 10), 11) or 12) |
| Car starts with a sudden pull | 13. Adjustment '1' has been turned in too far<br>14. Short delay valve is not closing<br>15. Under high pressure the Adjustment '2' cannot compensate enough, or it has been turned in too far.<br>16. For the pump, switching from "Star" to "Delta" kick is too late (i.e. the pump switches during acceleration).<br>17. O-ring (UO) at the by-pass valve is leaking.<br>18. Front O-ring (FO) at the check valve flange, (4F) is leaking<br>19. Extreme high friction in the rails or at the cylinder head. | 13. Turn Adjustment '1' further out (c-clockwise).<br>14. Change Short delay valve flange<br>15. Replace adjustment '2' or turn it further out (c-clockwise).<br>16. Switching time of 0.2 to 0.3 s will be sufficient<br>17. Change O-ring (UO) at the by-pass valve<br>18. Change O-ring (FO) at the flange (4F)<br>19. This problem can't be solved through the SEV control block |
| Car does not decelerate properly from full speed | 20. O-ring (UO) at the by-pass valve is leaking<br>21. Setting for the deceleration time is too high | 20. Change O-ring (UO) at the by-pass valve (SEV 1½" + 2": 39,3x2,6 ; SEV 2½': 58,0x3,0)<br>21. Use lower setting for the deceleration time |
| Car decelerates, but over travels the stop or has a sudden stop | 22. Deceleration signal is set too late<br>23. Setting for deceleration time is too high<br>24. Dirt in Plug '5'<br>25. Setting for leveling speed too high<br>26. The adjustment '1' is not set properly therefore, by-pass valve cannot open wide enough.<br>27. The car stops suddenly and too hard, because the soft stop is set too soft<br>28. Because of too low static pressure, dynamic pressure drops too far [(d)]. | 22. Move the switch to the right position<br>23. Lower setting for deceleration time (Standard: 2,5s)<br>24. Clean Plug '5'<br>25. Lower the setting for leveling speed<br>26. Turn adjustment '1' two turns (c-clockwise) out and check the effect.<br>27. Increase setting for soft stop (Standard setting: 60%)<br>28. Use next lager insert -> or/and<br>Increase pressure / weight -> or/and<br>Reduce friction between car and rails -> or/and<br>Decrease up speed -> or/and<br>Adjust the deceleration time to a higher setting and if necessary, change the position of the deceleration switch |
| Vibration during the entire travel | 29. Location of the orifice for the solenoid needle is incorrect (distance is too long).<br>30. Flow guide (insert) size too big [(a)]<br>31. Gain setting too high | 29. Place a 1.4mm drill tip in the needle orifice and adjust the distance between drill tip and the solenoid core to 21.29mm or a tiny bit less -> 21,23mm<br>30. In case the gain is < 7 use the next smaller flow guide(insert)<br>31. Lower gain setting (should not be smaller than 5) |

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## SEV-05 Control Valve

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|---|---|---|
| Vibration while travelling through some sections. | 32. Control parameters are not optimal | 32. Lower gain setting or change setting of the slope variable P- and D- (call for service) |
| Valve reacts too slow (Waves at the travel graph) | 33. Location of the orifice for the solenoid needle is incorrect (distance is too small).<br>34. Flow guide (insert) size is too small [(a)]<br>35. Gain setting is too small | 33. Place a 1.4mm drill tip in the needle orifice and adjust the distance between drill tip and the solenoid core to 21.29mm or a tiny bit longer->21.34mm<br>34. In case the gain is > 11 use the next bigger flow guide(insert)<br>35. Increase gain setting |

## DOWN Direction

| Problem | Cause | Solution |
|---|---|---|
| No down travel | 1. Solenoid 'D' is not energized or insufficient power [(c)]<br>2. O-ring at the down valve (UO) is leaking | 1 See Note II on the first page<br>2. Change O-ring (UO) at the down valve (SEV 1½" + 2": 39.3x2.6 ; SEV 2½': 58.0x3.0) |
| Cannot reach full speed | 3. Adjustment '7' is not opened enough<br>4. No input signal to the SEV card for full down speed [(c)] | 3. Open adjustment '7' (turn out '7' c-clockwise)<br>4. Check input signal at the SEV card (for full down speed the two small red LED should be illuminated) |
| Full down speed, but no leveling speed | 5. Adjustment '9' not opened enough or/and ex-center adjustment is not correct [(b)]<br>6. Broken spring (9F) on the adjustment '9' ´ | 5. Adjust the No 9 approximately to the flange level or/and correct the ex-center<br>6. Check the spring and if needed change the spring. |
| Car does not decelerate from full speed and over travels the stop | 7. Leveling speed '9' is set too high<br>8. The solenoid 'C' is not closing completely<br>9. The first O-ring (FO) of the flange (7F) is leaking | 7. Turn in adjustment '9' (clockwise) to adjust leveling speed (Standard: 0.03m/s); There are two ways: 1) Open manual lowering valve or 2) Energize only solenoid D.<br>8. Clean Solenoid 'C', or change needle and seat housing<br>9. Change O-ring (FO) at the down flange (EV 1½" + 2" 47.0x2.5; EV 2½" 58.0x3,0) |
| Leakage, Car is sinking | 10. Solenoid tube 'D' has not been fastened enough<br>11. Leakage at DN, DS, XO, VO, WO, FO, or HO<br>12. Short delay valve is not closing<br>13. Leakage of a hand pump or other valves if attached<br>14. Contraction through cooling down of the hot oil, especially oil temperature above 40°C | 10. Fasten Solenoid tube 'D'<br>11. Check the components and if needed replace them in the listed sequence<br>12. Replace flange 'E'<br>13. Detach return pipe and check for leakage; if needed change hand pump or other attached components.<br>14. Install oil cooler if needed |
| Valve reacts too slow (Waves at the travel graph) | 15. Location of the orifice for the solenoid needle is incorrect (distance is too small).<br>16. Inside dimension of the seat housing are not correct.<br>17. Dimension of the fix drilled hole Ø 0.7 mm of adjustment '8' is too small<br>18. Size of the flow guide (insert) is too small [(a)]<br>19. Gain is too small | 15. Place a 1.4mm drill tip in the needle orifice and adjust the distance between drill tip and the solenoid core to 33.11mm or a tiny bit longer-> 33.16mm<br>16. Change seat housing<br>17. Replace adjustment '8'<br>18. In case the gain is > 11 use the next bigger flow guide<br>19. Increase gain setting |
| Vibration during the entire travel | 20. Location of the orifice for the solenoid needle is incorrect (distance is too long).<br>21. Flow guide (insert) size too big [(a)]<br>22. Gain setting too high | 20. Place a 1.4mm drill tip in the needle orifice and adjust the distance between drill tip and the solenoid core to 33.11mm or a tiny bit smaller-> 33.06mm<br>21. In case the gain is < 6 use the next smaller flow guide<br>22. Decrease gain setting (should not be smaller than 5) |
| Opening manual lowering valve under high pressure, but car is not lowering | 23. The nozzle hole in down leveling valve '9' is too small or is not there.<br>24. 'KS' adjustment is set too high | 23. Replace Down leveling valve<br>24. Readjust 'KS' |
| Lowering speed is too high when opening manual lowering | 26. Solenoid tube 'C' not fastened<br>27. Adjustment '9' is set too high | 26. Fasten Solenoid tube 'C'<br>27. Readjust '9' |

Additions:

(a) i- When the flow guide (insert) size is too small, travel of the flow guide (insert) is longer. At low pressures, oil pressure behind the by-pass valve cannot build up fast enough therefore, waves during the travel may occur.
ii- When the flow guide (insert) size is too big, travel of the flow guide (insert) is shorter. At high pressures, flow is more difficult to control therefore, vibration during the travel may occur.

(b) Ex-center is factory adjusted. Unless its adjustment is spoiled, the adjustment is not necessary. When the leveling speed is too high/low, the car over/under travels. Even though the leveling speed is lowered/increased, the actual leveling speed could still be higher/lower than the setting. This situation occurs due to incorrect ex-center adjustment (Refer to the SEV Handbook).

(c) Small Led's on the card (green for up direction, red for down direction and yellow for inspection) show input signals, big Led's (green for up direction, red for down direction) show output signals to the solenoids. If they are not illuminated during the operation then the card is not receiving and outputting signals.

(d) Pressure behind the by-pass flow guide (insert) cannot build-up quick enough therefore; reaction of the by-pass flow guide (insert) is slowly. This situation occurs at extremely low working pressures (below 12bar). One of the remedies is to use a bigger size by-pass flow guide (insert).

(e) When the gain value is changed, fine-tuning of the solenoid may be re-done.

(f) A factory-adjusted valve may only require fine-tuning for the solenoids of maximum ±45°. However, if the valve input values have been changed then one may require more degrees of turns than that.