

**INTRODUCTION**

The Cla-Val Model CDS6 Altitude Control is a spring loaded, 3-way, diaphragm-actuated control that provides high-level shut-off for Cla-Val Altitude Control Valves. It remotely senses pressure in the reservoir or tank. There are five altitude ranges available, 5 to 40 feet, 30 to 80 feet, 70 to 120 feet, 110 to 160 feet and 150 to 200 feet. The spring adjusting nut can be set to stop flow into the reservoir within these ranges.

INSTALLATION

The CDS6 Altitude Pilot Control is normally supplied mounted on a Cla-Val 210 Series Altitude Valve which should be installed in a horizontal run of pipe with the main valve cover up. Two line block valves are recommended for valve servicing. If the CDS6 is mounted from the main valve by a few feet, then it must be installed with adjustment springs up for ease of adjustment and servicing. Consult factory for recommendations.

After the Cla-Val 210 Series Altitude Valve is installed in the pipeline close to the reservoir, install the required remote sensing line from the CDS6 to the reservoir or tank. The sensing line allows the CDS6 to sense the static pressure head of the reservoir. The sensing line should not be installed in the flowing line between the valve and the reservoir or into turbulent flow area. These locations do not reflect the true static head of the reservoir.

The remote sensing line should be 3/4" or larger copper tubing or Schedule 40 PVC pipe. Galvanized pipe is not recommended. The sensing line should slope (minimum 2 degrees) upward from the CDS6 toward the reservoir to self-purge air out of the line. The sensing line should have no high points to entrap air. A shutoff valve at the reservoir connection is recommended. For above ground reservoirs, the connecting point for the sensing line should be a minimum of 12" to 18" above reservoir bottom (if filling from bottom) or at fill pipe connection (if filling from side). Minimum high-level set-point adjustment is approximately five feet above the remote sensing point of connection.

CDS6 STOCK NUMBER 2" SIZE	CDS6 STOCK NUMBER 2 1/2" SIZE & LARGER	ALTITUDE RANGE (FT H.O)	NUMBER OF SPRINGS	PSI CHANGE PER TURN	ALTITUDE CHANGE PER TURN
29330-06F	29330-01E	5 - 40	1	0.32	0.75
29330-07H	29330-02G	30 - 80	2	0.64	1.50
29330-08K	29330-03J	70 - 120	3	0.96	2.20
29330-09B	29330-04A	110 - 160	4	1.28	3.00
29330-10D	29330-05D	150 - 200	5	1.60	3.70

OPERATION, START-UP AND ADJUSTMENT

When the reservoir pressure (head) is lower than the setpoint of the spring on the CDS6 Altitude Control ports "1" and "D" are interconnected. This relieves the main valve cover pressure to atmosphere. Line pressure then opens the main valve to start filling the reservoir.

Reservoir sensing pressure increases as the liquid level rises in the reservoir. When the sensing pressure increases to the set point of the CDS6 control spring, the control shifts interconnecting port "S" and port "1". This pressurizes the main valve cover chamber and the main valve closes.

By turning the adjusting nut the liquid level shutoff point will be changed. Turn the adjusting nut clockwise to raise the liquid level shutoff point; counterclockwise to lower the liquid level shutoff point. Follow the general operation and start-up instructions regarding purging air from the valve control system.

MAINTENANCE AND INSPECTION

Under normal operating conditions the CDS6 Altitude Control will be trouble free. There is a visual check possible to determine if there is damage to the diaphragm in the control. The Lower Cover/Pilot (a) is vented to atmosphere by means of a small hole in the wall of the casting. If water is discharging out of this opening, the diaphragm should be inspected for damage.

One other visual check and indication of a problem is continuous discharge from the drain port ("D") at the bottom of the CDS6.



The volume of drained water will vary according to the valve size. Continuous draining after main valve has fully opened will indicate a problem. Refer to the service suggestions to check for probable causes and remedies.

DISASSEMBLY

During preventive maintenance or service to the CDS6 Altitude Control, all pressure to the control must be shutoff. The CK2 shutoff cocks in the main valve control lines should be closed before starting disassembly. Main valves 4" and larger have CK2 cocks installed, however main valves smaller than 4" normally do not, therefore requiring closure of shutoff valves in the main line at the valve inlet and outlet. The shutoff cock or valve in the sensing line to the reservoir must also be closed.

WARNING: Failure to shutoff and release pressure prior to any disassembly can result in serious damage to equipment or injury to personnel.

1. Disconnect tubing at the CDS6 Altitude Control.
2. Remove two mounting caps screws and two lock washers.
3. Remove CDS6 Altitude Control from main valve to work bench or clean area. Parts must be kept clean.

DISASSEMBLY OF UPPER SPRING SECTION

1. Unscrew adjusting nut (4) from upper stem (5).
NOTE: Count the number of turns required to remove the nut (4), record this information for reference when reassembling. The CDS6 Altitude Control can then be approximately reset for the same reservoir liquid level shut-off point.
2. Remove the thrust washer (3), swivel retainer (2) and spring retainers if applicable.
3. Remove Spring(s) (6), bellows (7) and set-screw (8)
4. Remove twelve hex nuts (33), and twelve bolts (32), and set mounting bracket (29) aside.

Note: Assembly contains two (of twelve) longer bolts which are used for the mounting bracket.

5. Remove upper cover (13) from lower assembly, and push stem assembly through.
6. Remove diaphragm washer nut (12), diaphragm nut washer (16) and diaphragm (14)
7. Separate upper stem from diaphragm washer by removing stem retaining pin. (11)
8. Inspect all parts for damage, wear and mineral deposits. Check O-ring (10) for wear, inspect and remove any deposit in O-ring area. Also inspect diaphragm for wear or cracks. Clean parts thoroughly and replace damaged parts as necessary. If, upon disassembly, sand and silt are found in the CDS6 Altitude Control, every effort must be made to eliminate this problem. Filters, or relocating the reservoir sensing line may be required if deposits are found in the sensing chamber of the control.

REASSEMBLY OF UPPER SPRING ASSEMBLY

1. Reassembly is in general, the reverse of disassembly. NOTE: A light coating of Dow Corning 33 grease, or equivalent, should be applied to CDS6 Altitude Control stems (5), before reassembly.
2. When replacing adjusting nut (4) tighten the same number of turns as referred to in **note** in paragraph (1) of "Disassembly Of Upper Spring Section".

DISASSEMBLY OF LOWER PILOT VALVE SECTION

1. Disassemble control per steps 1 through 5 in "Disassembly of upper section", to work on lower (pilot) cover (17)
2. Remove lower stem (21) spring (19) and retaining ring (18) as an assembly, inspect stem for damage.
3. Remove Poppet guide (28) and o-ring (27) from lower cover (17).
4. Remove Poppet (22-1) and poppet spring (26) and inspect poppet and disc for damage.
5. Remove Strainer screen (25)
6. Remove seat (24), **Note:** be sure not to nick or ding exposed sealing surface. To prevent binding and damage, use a wood dowel to evenly tap out the seat from TOP of lower cover (area from which lower stem was removed).
7. Inspect all parts for damage, wear and mineral deposits. If there has been discharge from vent hole, remove o-ring (20) from lower cover (17) and poppet guide (28). Inspect o-rings for wear or damage and o-ring groove for material build-up. Clean and/or replace as necessary. Inspect seat (24) and disc poppet assembly (22) for wear or damage. If poppet and/or disc are damaged they must be replaced as an assembly (item 22). Otherwise clean and polish surfaces of moving parts with 600 wet/dry sandpaper. Also clean strainer screen (25) of any deposits

REASSEMBLY OF LOWER PILOT VALVE SECTION

1. Reassembly is in general, the reversal of disassembly. **Note:** A light coating of Dow Corning 33 grease, or equivalent should be applied to all o-rings and moving part surfaces (20,21,22-1 23 and 27).
2. Lay lower cover (17) on its top (do not damage serrated surface), insert the seat (24) with o-ring (23) in lower (pilot) cover with finger. Use a wood dowel to push the seat in fully with hand pressure ONLY. **Note:** damage to the seat can compromise the sealing ability of the control, and careful efforts must be applied on reassembly of this component.
3. Insert strainer (25).
4. Install poppet guide, o-ring, spring and poppet assembly. (See Note #1 for greasing)

5. Thread and securely fasten poppet guide assembly into lower cover (recommended 200-250 in/lbs.)
6. Turnover lower cover, and assemble as an assembly lower stem (21) retainer (18) and spring (19) into lower cover, being careful not damage o-ring (20).

COMPLETING ASSEMBLY

1. Reassembly of twelve nuts (33) and bolts (32) should be torqued to 200-250 in/lbs. **Note:** assembly contains two longer bolts (item 32) for the support bracket. These two bolts are to be assembled with bracket (29) on the two larger support flats located on the lower cover located 90 degrees from common/supply ports.
3. Install CDS6 Altitude Control assembly on main valve.
4. Replace tube lines and fittings exactly as removed.

SERVICE SUGGESTIONS

UPPER (SPRING) SECTION

SYMPTOM	PROBABLE CAUSE	REMEDY
Vent leaks in lower cover (17)	Diaphragm (14) damaged Diaphragm nut (12) loose O-ring (20) damaged	Replace diaphragm Tighten nut (12) Replace O-ring (20)
Leakage past stem stem (5)	O-ring (10) damaged	Replace O-ring
Stem (5) movement restricted or erratic	*Sand or silt in sensing chamber above diaphragm Sensing line clogged Sensing line valve closed Sensing line sagging or bent collecting sediment	Remove foreign matter from sensing chamber Clean line Open valve fully Straighten and support sensing line to reservoir
	Sensing line has high point trapping air in the line	Straighten sensing line. Must slope upward from altitude control to the reservoir

*NOTE: if this problem occurs, a sand trap should be installed in the sensing line, or the line moved to a point on the reservoir where sand or silt cannot enter this line.

SERVICE SUGGESTIONS

LOWER (PILOT VALVE) SECTION

SYMPTOM	PROBABLE CAUSE	REMEDY
Vent in lower cover (17) leaks	O-ring (20) worn or damaged. See Upper Spring Section service suggestion	Replace O-ring (20)
Flow from supply port to valve cover port restricted	Clogged strainer screen(25) Silt packed in seat (24) and lower stem (21)	Remove screen and clean Clear area of blockage
Continuous drain leak. Main valve closed	Seat (24) damaged Disc in poppet assembly (22) damaged Foreign object between disc and seat (24) O-ring (20) in poppet guide (28) damaged	Inspect and replace Inspect and replace poppet assembly (22) Remove object Replace O-ring
Continuous drain leak. Main valve open	Main valve diaphragm worn or stem nut loose	Service main valve. Replace diaphragm or tighten stem nut