

CHALWYN

DIESEL PROTECTION SYSTEMS

D-Series Automatic Engine Overspeed Shut Down Valves (Bendix Types)

SELECTION, APPLICATION AND MAINTENANCE

Valve Numbers
D40B D45B
D51B D57B
D64B D71B

DESCRIPTION

A range of spring loaded poppet valves designed to automatically stop an engine by closing down the air intake should excessive overspeeding occur.

These valves are available with standard springs or strong springs (indicated by the suffix "S" after the valve type number). The spring selection is determined by the rating of the engine to which the valve is to be fitted.

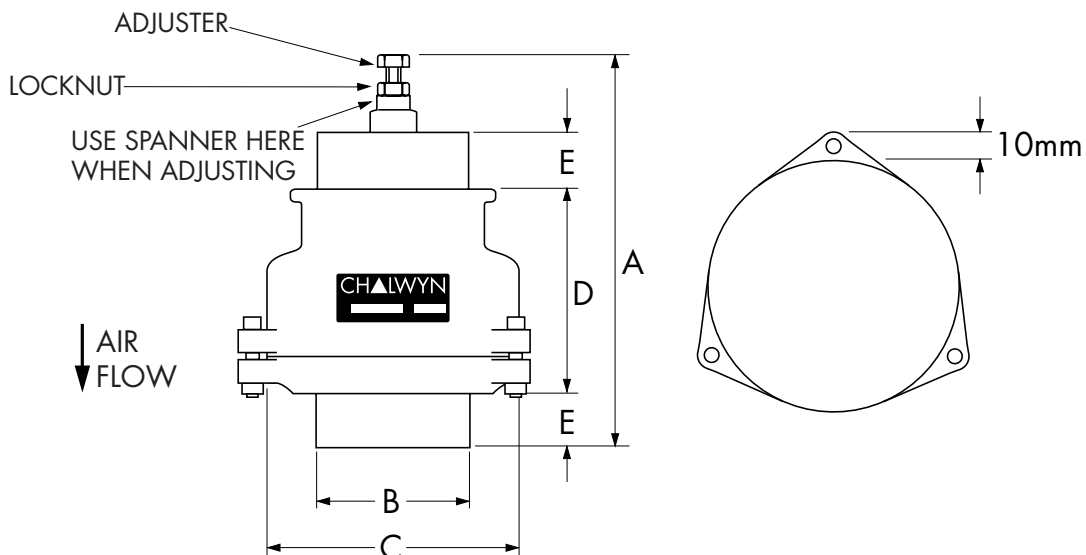
The closing force on the valve is provided by the intake air flow passing through. As the air flow increases, the closing force builds up. This is resisted by the valve spring, the pre-load on which is adjustable such that at a given air flow the resulting force overcomes the spring resistance and causes the valve to close. Once closed the valve will not reset to the open condition until the engine stops.

This type of valve may be fitted to either naturally aspirated or turbocharged engines. It should be noted however that for a given valve setting the repeatability of the actual shut down speed has a greater scatter in the case of a turbocharged engine. However, unless for special reasons a precisely repeatable shut down speed is required, adequate protection from excessive overspeed and potential resulting damage is still achieved.

SELECTION

Bendix Type 'D' valve range is dimensioned as below:

Valve Type	A	MIN	B	MAX	C	D	E	WEIGHT Kg
D40B	135	43		48	86	74	19	0.9
D45B	135	48		70	86	74	19	0.9
D51B	135	54		80	94	77	19	0.9
D57B	135	60		83	104	80	19	1.2
D64B	135	67		96	114	81	19	1.4
D71B	135	76		108	125	81	19	1.6



Notes:

Dimension 'B' is selected within the range given to match the engine air intake pipework.

- * For smaller valve sizes see "Mini Range" valve data sheets.
- * For larger valve sizes see "Spindle" and "D200" valve data sheets.
- * For integral air cleaner and manual shut down options see relevant data sheets.

In order to select the correct valve build the following information is required:

- (a) Engine type.
- (b) Engine rating (power and speed).
- (c) Inside diameter of the engine intake hose into which the Chalwyn valve is to be fitted (see "Fitting").

FITTING

- 1.** The Chalwyn valve is designed for fitting as close to the engine air intake manifold as possible. Where an engine air intake flametrap is also fitted, the Chalwyn valve should be positioned immediately on the upstream (air cleaner) side of the flametrap. These same requirements are applicable to both naturally aspirated and turbocharged engines albeit in the latter case there is sometimes insufficient space to fit the Chalwyn valve between the turbocharger and intake manifold. Under this circumstance, the shut down valve may be fitted on the upstream (air cleaner) side of the turbocharger but should otherwise still be in compliance with the preceding requirements.
- 2.** Where more than one Chalwyn valve is fitted to an engine as in the case of an engine with multiple intake pipes, a balance pipe arrangement must be installed to connect the various intake pipes together downstream (engine side) of the shut down valves. Typically balance pipe diameters should be about 30% of the diameter of the intake pipes.
- 3.** When fitting, the direction of the air flow arrow on the Chalwyn valve must be observed. The valve may be installed with the direction of air flow anywhere between vertically down and horizontal. The cuffs at the inlet and outlet of the valve should be of a re-inforced type, provide adequate support for the valve and prevent excessive vibration. If necessary, additional support brackets mounted from the engine should be considered.
- 4.** Particular care must be taken to ensure the integrity of the intake pipework between the Chalwyn valve and intake manifold. Ideally metal pipework should be used and any gaps kept as short as possible, taking into account any relative movement, and closed by re-inforced hose. The possibility of a hose collapse on closure of the shut down valve should be avoided.
- 5.** Any engine crankcase breather connections into the intake system between the Chalwyn valve and engine or any internal crankcase breather arrangement venting directly into the engine intake ports must be sealed and replaced by an external breather system venting either to atmosphere or to the intake system upstream of the shut down valve. External breather system kits for various engine types are available from Chalwyn.

ADJUSTMENT

Once the Chalwyn valve is installed, adjustment of the overspeed trip setting is carried out using the adjuster and locknut (refer to diagram). Basically rotating the adjuster clockwise will increase the engine speed at which automatic shut down occurs.

As supplied, the valve will be adjusted such that shut down will generally occur well below the engine high idle speed. To increase the shut down speed to the required setting proceed as follows:-

1. Start engine. Slowly accelerate. Note speed at which shut down occurs.
2. Remove hose at air inlet to Chalwyn valve to expose the adjuster and locknut (see diagram).
3. Release locknut. Turn adjuster clockwise one turn. Tighten locknut.
4. Refit inlet hose to Chalwyn valve.
5. Start engine. Slowly accelerate. Note speed at which shut down occurs.
6. Repeat the above steps '2' to '5' until the first setting at which the engine does not shut down at high idle speed (i.e. maximum throttle, no load). Then either:
 - a) *Use the results of shut down speed versus adjuster setting as a calibration check to make a final adjustment to give the required setting (typically 10% to 15% over high idle).*
 - or**
 - b) *If a very precise setting is not required, turn the adjuster a further one turn clockwise to take the shut down above high idle speed by a suitable margin. When using this setting procedure it may be found that the engine occasionally shuts down during the normal operation. If so, turn the adjuster clockwise by a further one half turn.*
7. Ensure the adjuster locknut is fully tightened. (Use a thread lock adhesive on the locknut threads).

Notes:

Turbocharged Engines.

When setting up a valve on a turbocharged engine using the preceding method, it may be found that at high power outputs, the engine will shut down at a lower speed than required. If this occurs, further small adjustments in steps of one half turn clockwise should be made until the problem is eliminated.

Insufficient Adjustment.

Should there be insufficient adjustment to set the shut down speed at the required level contact your Chalwyn agent for supply of a stronger valve spring.

Jammed Valve.

If in the course of adjusting the valve it jams on its seat, release by turning **CLOCKWISE** viewed from adjuster end of valve.

MAINTENANCE

The recommended routine maintenance period is three months. This period is dependent on the operating conditions of the engine and, by experience, may need to be varied.

Routine Maintenance

1. Disconnect intake pipework and release the valve from any support brackets etc. to allow it to be removed.
2. Inspect the valve internally for cleanliness. If necessary, clean in paraffin or white spirit taking normal precautions. Dry the valve thoroughly.
3. Check there is no excessive wear and that the valve moves smoothly over its complete operating stroke. **DO NOT LUBRICATE.**
4. Refit valve. Check valve setting based on the "Adjustment" instructions given herein.

Valve Reconditioning

When excessive wear is noted or the valve damaged it should be returned to Chalwyn Limited for appraisal and reconditioning.
(All such work is dealt with on an urgent basis.)

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