

# CHALWYN

DIESEL PROTECTION SYSTEMS

## **D-Series Automatic Engine Overspeed Shut Down Valves (Spindle Types)**

## **SELECTION, APPLICATION AND MAINTENANCE**

<p><b>Valve Numbers</b> <b>D75 D92 D102</b> <b>D121 D136</b></p>
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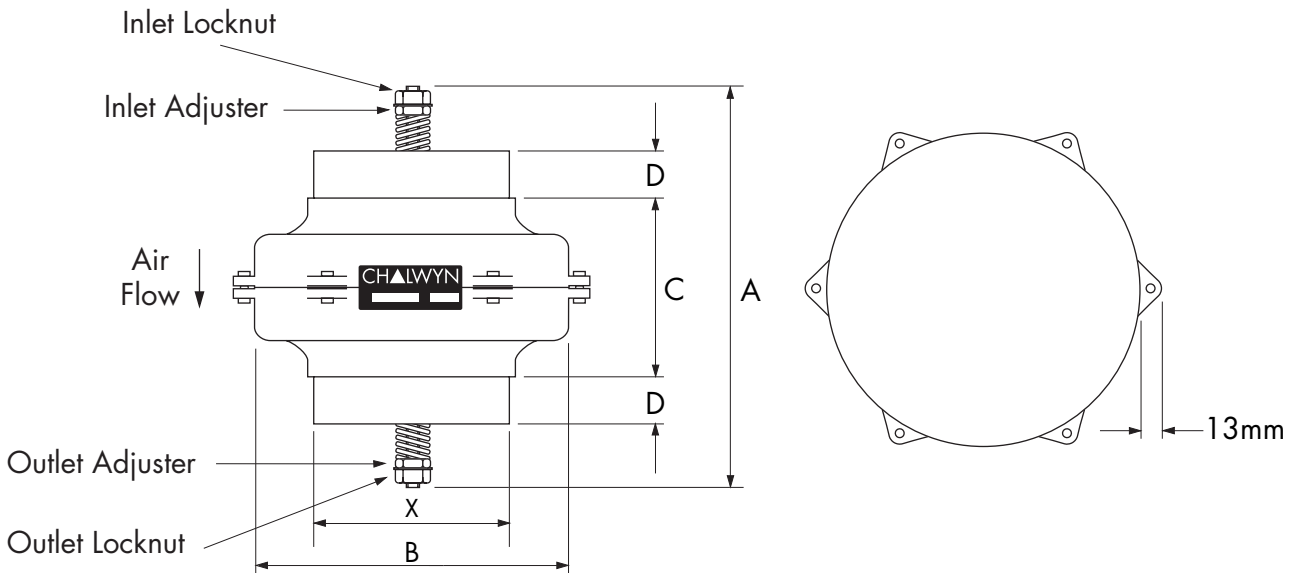
## DESCRIPTION

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 springs force, the pre-load of 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 automatic 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.

The basic dimensions for this family of valves are tabulated below.



Valve Type	A mm	B mm	C mm	D mm	WEIGHT (valve only) kg
<b>D75</b>	203	137	111	28	1.6
<b>D92</b>	252	160	121	28	1.9
<b>D102</b>	252	176	124	28	2.3
<b>D121</b>	308	206	139	28	3.5
<b>D136</b>	308	232	151	28	4.6

Outside diameter 'X' is selected to suit the size of the engine air intake hose - see page 3 "SELECTION"

## SELECTION

Determine the rating of the engine to which the valve is to be fitted. Using the table below identify which valve(s) would be suitable. Finalise the selection by identifying the valve which can also be supplied with end diameters to match the bore of the engine air intake hose at the position the valve is to be fitted. Note, end diameters are manufactured to the nearest 1mm. Generally, where more than one valve meets all requirements, select the larger valve size to minimise engine air intake restriction.

### Valve Selection chart in Metric Units

Valve Type	Engine Power at rated Speed kW	Engine Air Intake Hose Bore mm	
		Minimum	Maximum
<b>D75</b>	60 to 75	70	102
<b>D75S</b>	76 to 149	70	102
<b>D92</b>	80 to 101	76	115
<b>D92S</b>	102 to 190	76	115
<b>D102</b>	100 to 123	89	115
<b>D102</b>	124 to 250	89	115
<b>D121</b>	130 to 158	101	140
<b>D121S</b>	159 to 321	101	140
<b>D136</b>	150 to 188	126	154
<b>D136S</b>	189 to 392	126	154

### Valve Selection chart in Non-metric Units

Valve Type	Engine Power at rated Speed hp	Engine Air Intake Hose Bore inches	
		Minimum	Maximum
<b>D75</b>	80 to 101	2 3/4	4
<b>D75S</b>	102 to 200	2 3/4	4
<b>D92</b>	107 to 135	3	4 1/2
<b>D92S</b>	136 to 255	3	4 1/2
<b>D102</b>	134 to 165	3 1/2	4 1/2
<b>D102S</b>	166 to 335	3 1/2	4 1/2
<b>D121</b>	174 to 212	4	5 1/2
<b>D121S</b>	213 to 430	4	5 1/2
<b>D136</b>	201 to 252	5	6 1/16
<b>D136S</b>	253 to 525	5	6 1/16

#### Notes:

- \* For smaller valve sizes see Chalwyn "Mini Range" and "Bendix Valves," data sheets CE209 and CE204.
- \* For larger valve sizes see "D200" valve data sheet CE231.
- \* For auto/manual versions see Chalwyn data sheet CE210.

## 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 must always be positioned on the upstream (air cleaner) side of the flametrap. These same requirements are generally applicable to both naturally aspirated and turbocharged engines but in the case of turbocharged engine the following may be applicable.
  - a) Insufficient space to fit between the turbocharger and engine. In this case the valve may be fitted upstream of the turbocharger.
  - b) The turbocharger air outlet temperature is exceptionally high (200°C plus). In this case fit the valve downstream of the intercooler or upstream of the turbocharger.
- 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 either horizontally or vertically. 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.

**Note:** Where the valve is fitted immediately upstream of the turbocharger, ensure that the valve spindle does not project into the turbocharger when the valve closes.

# ADJUSTMENT

Once the Chalwyn valve is installed, adjustment of the overspeed trip setting is carried out using the inlet adjuster and locknut (refer to diagram). Basically rotating the inlet 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 its 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:

### Insufficient Adjustment.

Should there be insufficient adjustment available to set the required overspeed trip point, the outlet locknut should be released and the outlet adjuster rotated anticlockwise by four turns. The outlet locknut should then be treated with a thread lock adhesive and securely tightened. Further adjustment to the inlet adjuster as per above instructions is then continued.

### 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.

## 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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