

## **‘Z’ Range Intake Shut Down Valves Spindle Types**

**(Manual closure plus automatic closure on engine over-speed, low engine oil pressure, high coolant or high exhaust temperature)**

### **Installation, Operation and Maintenance**

**Valve Numbers**

D92 - AMZ    D102 - AMZ

D121 - AMZ    D136 - AMZ

## DESCRIPTION

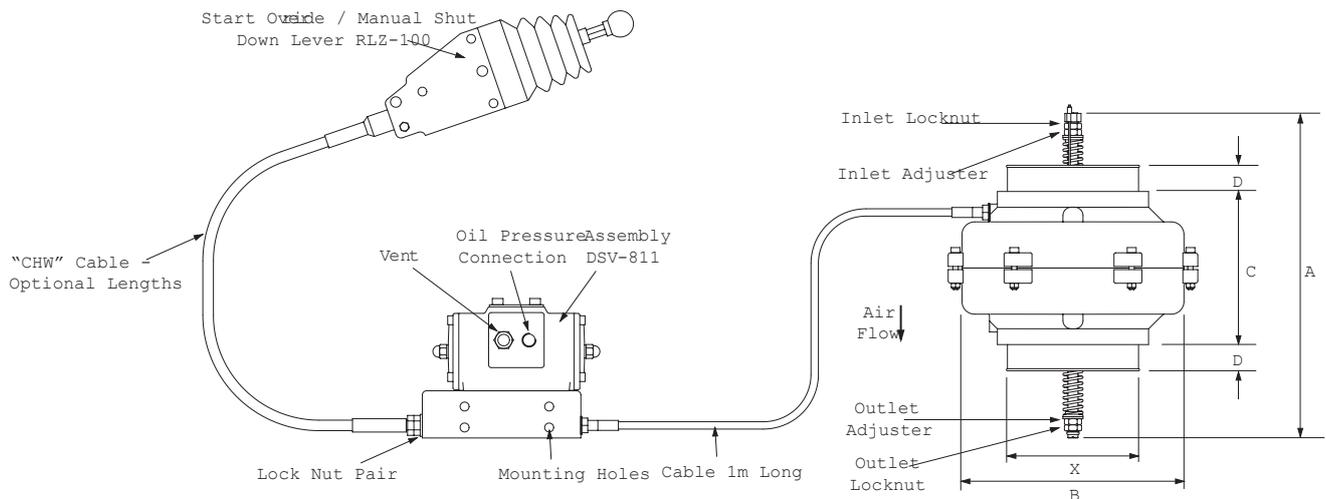
A range of automatic overspeed air intake shut down valves which can also be automatically closed by an engine lubricating oil pressure (or air pressure) operated system to give shut down on loss of engine oil pressure, high coolant or high exhaust gas temperature. A manual start override/manual emergency stop control feature is also included.

These valves are available for all popular combinations of air intake pipe sizes and engine ratings between 80kW and 392Kw. For lower and higher engine ratings see "Notes" below.

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.

The maximum oil (or air) pressure applied to the valve should not exceed 8 bar (116 psi). When the engine is running, the valve will close when the oil (or air) pressure falls below approximately 1 bar (14.5 psi). Note, this value varies slightly with engine speed and specific valve build.

### Dimensions and Typical Arrangement:



Valve Type	A	B	C	D	WEIGHT (Valve only) Kg
D92-AMZ & D92S-AMZ	253	162	136	25	2.1
D102-AMZ & D102S-AMZ	253	177	132	25	2.5
D121-AMZ & D121S-AMZ	310	210	150	25	3.7
D136-AMZ & D136S-AMZ	310	240	160	25	4.8

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

**Notes:**

- \* For smaller 'Z' valve sizes see TMZ valve data Sheet CE 208.
- \* For larger 'Z' valve sizes see D200 valve data Sheet CE 231.

## SELECTION

1. 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 "x" 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
D92-AMZ	80 to 101	76	115
D92S-AMZ	102 to 190	76	115
D102-AMZ	100 to 123	89	115
D102S-AMZ	124 to 250	89	115
D121-AMZ	130 to 158	101	140
D121S-AMZ	159 to 321	101	140
D136-AMZ	150 to 188	126	154
D136S-AMZ	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
D92-AMZ	107 to 135	3	4 <sup>1</sup> / <sub>2</sub>
D92S-AMZ	136 to 255	3	4 <sup>1</sup> / <sub>2</sub>
D102-AMZ	134 to 165	3 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>
D102S-AMZ	166 to 335	3 <sup>1</sup> / <sub>2</sub>	4 <sup>1</sup> / <sub>2</sub>
D121-AMZ	174 to 212	4	5 <sup>1</sup> / <sub>2</sub>
D121S-AMZ	213 to 430	4	5 <sup>1</sup> / <sub>2</sub>
D136-AMZ	201 to 252	5	6 <sup>1</sup> / <sub>16</sub>
D136S-AMZ	253 to 525	5	6 <sup>1</sup> / <sub>16</sub>

2. Select the required length of the manual shut-down cable from the table. Alternative lengths may be available on request.
3. Order "Start override/manual shut down lever" RLZ-100 with valve and cable.

CABLE PART NO	LENGTH (Metres)
CHW-150	1.5
CHW-200	2.0
CHW-300	3.0
CHW-400	4.0

# FITTING

## SAFETY

## WARNING

- Care should be taken when unpacking to prevent injury.
- Exhaust gases may cause permanent respiratory problems, suffocation or death. Any exhaust systems should be piped out of enclosed areas.
- Ensure that a hot engine has sufficiently cooled before commencing any work.
- Ensure that the engine is prevented from being started before commencing work.
- Isolate any air or oil supply being connected to the valve before commencing work.
- The D Valve should be located in a safe and easily accessible position to prevent injury to the operator due to moving parts or contact with hot surfaces while setting the valve.
- Parts of the machinery on which workers are likely to move about or stand to set the Valve, should be designed and constructed in such a way as to prevent workers from slipping, tripping or falling on or off these parts.
- A risk assessment should be conducted before commencing work, to ensure that all hazards such as exhaust fumes, risks due to moving parts, noise and hot surfaces have been eliminated or minimised.

## NOTES

- No special handling requirements apply to the D Valve.
- Carefully read and fully understand the installation instructions before commencing work.
- Only competent personnel should install the D valve.
- Wear appropriate Personal Protective Equipment including safety footwear, safety glasses, thermal and oil resistant gloves and ear plugs.
- Any spilt oil should be collected in an appropriate container and disposed of in accordance with COSHH and local regulations.

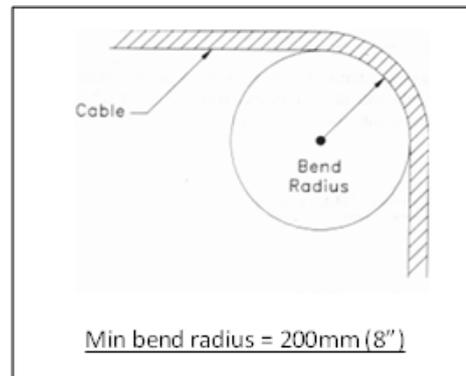
1. These valves are supplied with the shut down air cylinder assembled (via a cable) to the valve and the start override/manual shut down lever and cable fitted and fully adjusted. It is recommended that these assemblies are not separated during fitting.
2. The Chalwyn valve is designed for fitting as 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 a 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 (150° C plus). In this case fit the valve downstream of the intercooler or upstream of the turbocharger.

**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.

3. Where more than one Chalwyn valve is fitted to 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. Additionally the RLZ-100 start override/shut down levers must be arranged to permit simultaneous manual operation.

## FITTING Continued

- When fitting ensure the direction of air flow is in compliance with direction shown on the body. The valve may be installed either horizontally or vertically. Ensure that the mechanical cables are installed without tight bends and are positioned to avoid mechanical damage or damage from hot surfaces.



- Securely locate the shut down cylinder assembly DSV-811 using the four mounting holes provided. The RLZ-100 start override/manual shutdown lever should be rigidly mounted on a suitable bracket in a convenient position for operation.
- The flexible cuffs at the inlet and outlet of the valve should be of a reinforced type, provide adequate support for the valve and prevent excessive vibration. If necessary, additional support brackets mounted from the engine should be considered.
- 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 reinforced hose. The possibility of a hose collapse on closure of the shut down valve should be avoided.
- 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.

### Important Notes:

In addition to the air intake shut down valve, an engine fuel stop must always be retained to enable normal engine shut down. ie. DO NOT use the manual lever RLZ-100 as the normal way to stop the engine in a non emergency situation.

## OPERATION

### Engine Start

The start override/emergency stop lever must be held in the "start override" position prior to starting the engine. Continue to hold this lever in the start override (engine run) position after starting the engine until it latches in this position (may take up to about 30 seconds if engine oil pressure is the operating fluid). Release lever.

### Engine Stop

Use normal engine fuel stop.

### Emergency Manual Stop

Move the start override/emergency stop lever firmly to the stop position.

**Note:** The start override/emergency stop lever always returns to the "stop" position when the engine is not running.

# ADJUSTMENT

## SAFETY

### WARNING

- When adjusting the D Valve, take care to ensure that contact with hot surfaces or entanglement in adjacent equipment is avoided

### NOTE

- If a manual shut down cable assembly is fitted, ensure that excessive effort is not required to operate the manual override.

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 below the engine high idle speed. To increase the shut down speed to the required setting, proceed as follows:-

1. Start engine as given under "Operation". 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:
  - 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).
8. After completing the valve adjustment, check the functioning of the oil (or air) pressure shut down system and the manual shut down, by operating each in turn with the engine running at medium speed. The engine should stop within a few seconds in each case.

### **Important Notes:**

#### **Adjustment of Shut Down Cylinder Assembly.**

The cable between the shut down cylinder and the valve is adjusted such that with the engine static and zero oil (air) pressure applied to the shut down cylinder, the valve is held between 0mm and 1mm open. This will give satisfactory operation when an engine shut down is required. DO NOT adjust such that with zero oil pressure the shut down cylinder return spring is pulling the valve hard onto its seat.

#### **Insufficient Overspeed Adjustment.**

Should there be insufficient adjustment available to set the required overspeed trip point, the valves 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

## SAFETY

## WARNING

- When externally cleaning the valve ensure the engine is sufficiently cooled before commencing work, if cleaning a hot valve take extra care to avoid touching hot surfaces and to avoid entanglement in adjacent equipment.
- Take care not to trap fingers when making adjustments to the valve setting.
- When maintaining the valve, isolate pressure sources and ensure that there is no trapped pressure before dismantling.
- Equipment contains springs, during dismantling ensure that spring forces are safely removed.
- When internally cleaning components with chemical agents avoid contact with skin, inhalation and ingestion of the cleaning agents and dirt / debris removed. Appropriate PPE should be worn.

## NOTES

- No special handling requirements apply to the D Valve.
- Carefully read and fully understand the maintenance instructions before commencing work.
- Only competent personnel should maintain the D valve.
- Wear appropriate Personal Protective Equipment including safety footwear, safety glasses, thermal and oil resistant gloves and ear plugs.
- Any spilt oil should be collected in an appropriate container and disposed of in accordance with COSHH and local regulations.

Routine maintenance should be undertaken as below:-

**Daily:** Run engine at a mid range speed. Check satisfactory shut down occurs when the manual emergency stop lever is operated.

### **Three Monthly:**

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| <ol style="list-style-type: none"> <li>1. Check the oil shut down cylinder assembly for freedom from leakage. Any significant leakage to be rectified prior to returning the unit to service.</li> <li>2. Disconnect pipework and remove valve complete with cables, shut down cylinder assembly and start override/manual shut down lever.</li> <li>3. Inspect the valve internally for cleanliness. If necessary, clean in paraffin or white spirit taking normal precautions. Dry the valve thoroughly.</li> <li>4. Check there is no excessive wear and that the valve moves smoothly over its complete operating stroke. <b>DO NOT LUBRICATE.</b></li> <li>5. Check that operation of the start override/manual shut down lever releases valve to spring back from its seat to its operating condition. On release of the lever the valve should move back to a position within 0mm and 1mm of its seat.</li> <li>6. Apply air pressure of about 3 bar to the shut down cylinder connection. Again this should</li> </ol> | <p>cause the valve to spring to its open position and, on release of the pressure move back to a position within 0mm to 1mm of its seat.</p> <ol style="list-style-type: none"> <li>7. Refit valve. Check valve overspeed setting based on the "Adjustment" instructions given herein.</li> <li>8. Exhaust oil pressure from the shut down system whilst the engine is running at medium speed. The engine should stop within a few seconds.</li> <li>9. Operate the manual shut down control with the engine running at medium speed. The engine should stop within a few seconds.</li> <li>10. Check over pipework for security and freedom from leakage.</li> </ol> |
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**Note:** If the valve fails to function correctly, or if there is any doubt about the operation of the valve, it should be withdrawn from service until corrective action has been completed.

**Important Notes:**

The three monthly routine maintenance period requirement is dependent on the operating conditions to which the equipment is exposed and, by experience, may need to be varied.

Any maintenance problems not covered by the routine maintenance schedule should be discussed with your Chalwyn Distributor before any repair work is undertaken.



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Chalwyn's Quality Management  
System is approved by LRQA.

