CHALWYN
by AMOT

ZMZ Engine Air Intake Shut Down Valves

(Manual closure plus automatic closure on engine overspeed and on loss of an air (or oil) pressure signal input)

Selection, Application and Maintenance

Valve Numbers
ZMZ-303

CE241 (3) ZMZ 0509

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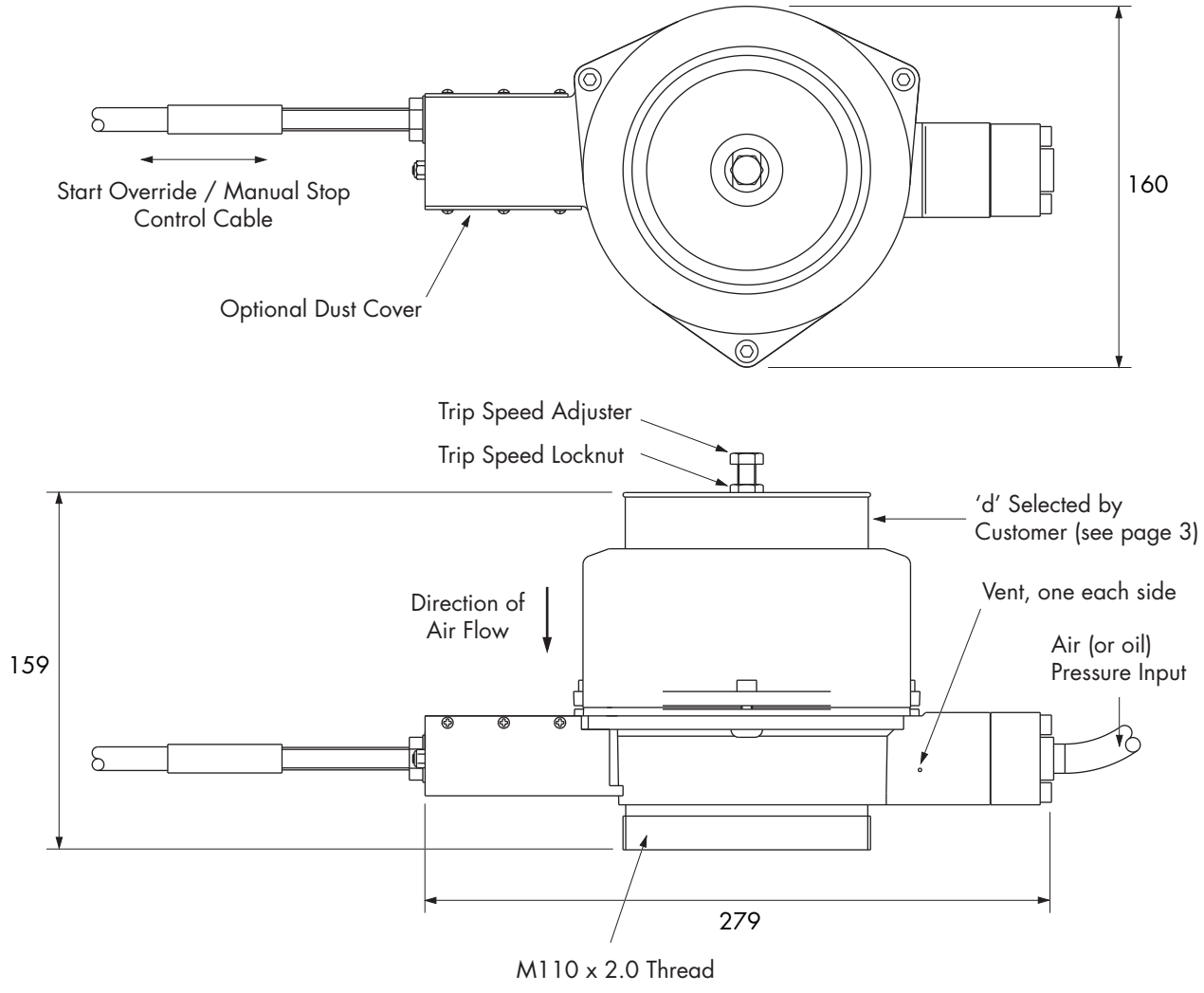
DESCRIPTION

An automatic overspeed air intake shut down valve which can also be automatically closed by loss of an air (or oil) pressure signal. The ZMZ-303 specification also includes manual start override (to enable engine start up prior to the air/oil pressure signal being applied) and manual shut down.

The maximum air (or oil) pressure signal which may be applied should not exceed 10 bar (145psi). Unless manually held open the valve will automatically close when the air (or oil) pressure falls below approximately 1 bar (14.5 psi). Note this value varies slightly with engine speed and overspeed trip setting.

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 basic dimensions for this valve are given below.



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SELECTION

The ZMZ-303 is suitable for fitting to diesel engines rated between 50 and 179 kW (naturally aspirated) or 50 and 149kW (Turbocharged).

The outside diameter of the air inlet pipe (‘d’ on diagram) is designed to push into the bore of the air intake hose. Diameter ‘d’ may be any selected size between 70mm and 108mm.

Select the required length of the manual shutdown cable from the table. Alternative lengths may be available on request.

Cable Part No.	Length (metres)
CHW-150	1.5
CHW-200	2.0
CHW-300	3.0
CHW-400	4.0

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FITTING

1. Valve types ZMZ-303 should generally be fitted as close as possible to the engine intake ports but, in the case of a turbocharged engine, where there is insufficient space to fit the valve between the turbocharger and engine, or where the turbocharger air outlet temperature is exceptionally high (180°C plus), an alternative position is acceptable. Regardless of other considerations, the ZMZ-303 must always be fitted upstream (air cleaner side) of any intake flame trap.

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. Additionally the RLZ-100 start override/ shutdown levers must be arranged to permit simultaneous manual operation.

3. When fitting, ensure the direction of air flow:-

a) Is in compliance with direction indicated on the body.

b) Is between vertically downward and horizontal.

4. Ensure the TMZ valve and RLZ-100 start override/manual shut down lever are positioned to avoid damage to, or sharp bends in, the interconnecting mechanical cable.

5. Where the valve is located between two flexible pipes, ensure that adequate support is provided. If not, a suitable support bracket to the valve must be fitted.

6. 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 atmosphere or to the intake system upstream of the shut down valve. External breather system kits for various engine types are available from Chalwyn.

7. The RLZ-100 start override/shut down lever should be rigidly mounted on a suitable bracket in a convenient position for easy operation.

NOTES

a. Optional Dust Cover (see diagram page 2). Should the dust cover be removed for any reason, ensure it is refitted with a bead of a suitable sealant around the edge to ensure dust tightness.

b. Adjustment of the Start Override/Manual Stop Cable. Should it be necessary to replace this cable for any reason, adjust as follows. With the valve upright (speed trip adjuster at top) and no oil (or air) pressure applied, adjust the cable such that the valve operates fully between its internal stops at the closed and fully open positions as the RLZ-100 lever is moved between its free (engine stop) position and against the resistance of the internal valve springs to the engine run/start override position.

c. The small cable inside the valve is factory set. DO NOT release from its clamp or adjust in any way.

d. In addition to the ZMZ -303, an engine fuel stop must always be retained to enable normal engine shut down. Use the manual shut down lever of the ZMZ-303 valve only for emergency shut down or for system maintenance/checking.

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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

Once the Chalwyn valve is installed, adjustment of the overspeed trip setting is carried out using the adjuster and locknut (refer to diagrams). 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 speed at which automatic shut down occurs, proceed as follows:

1. Start engine. Slowly accelerate. Note speed at which shut down occurs.

2. Remove the 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 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).

8. Restart engine. Run at a mid range speed. Move the start override/emergency stop level firmly to the “stop” position. The engine should stop within a few seconds.

9. Restart engine. Run at a mid range speed. Check engine stops within a few seconds when the air (or oil) pressure signal is removed.

Notes:

Turbocharged Engines.

When setting a valve fitted to a turbocharged engine using the preceding method, it may be found that at high engine 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.

Jammed Valve.

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

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MAINTENANCE

Routine maintenance should be carried out as given below:-

Daily: Run engine at mid-range speed. Check satisfactory shut down occurs when the ZMZ-303 valve manual stop lever is operated.

Three Monthly:

1. Whilst the engine is running, check the small vent holes in the ZMZ-303 (see diagram on page 2) for any sign of air (or oil) leakage. Such leakage is an indicator of a damaged diaphragm. This must be rectified prior to returning the unit to service. (Note. Only suitably qualified personnel familiar with the hazards associated with a running engine should carry out this check.)

2. Stop engine. Disconnect pipework, any support brackets etc. to permit the valve assembly to be removed for inspection.

3. Inspect the valve internally for cleanliness. If necessary clean in paraffin or white spirit taking normal precautions. Dry thoroughly.

4. Check there is no excessive wear and that the valve and internal control rod both move smoothly over their complete operating strokes. Check the internal cable clamp is free from damage and is tightly clamped. **Important** Do not remove the cable clamp or in any way attempt to adjust the internal cable as this is factory set.

5. Do not lubricate valve other than lightly greasing the internal cable.

6. Refit valve. Set valve as per “Adjustment”.

7. Run engine at mid range speed. Check operation of manual emergency shutdown. Check operation when air/oil pressure signal is removed.

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 above routine maintenance schedule should be discussed with your Chalwyn Distributor before any repair work is undertaken.

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