

## **Z-Range Air Intake Shut Down Valves - Bendix Types**

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

### **Selection, Application and Maintenance**

Valve Numbers

TMZ-121 to TMZ-302

## 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) system to give shut down on loss of engine oil pressure, high coolant or high exhaust gas temperature. TMZ valves also are also supplied with manual start override/manual emergency stop controls.

TMZ valves are available for all popular combinations of air intake pipe sizes and engine ratings up to 149 kW (turbocharged) or 179 kW (naturally aspirated). For higher engine ratings see "Notes" below.

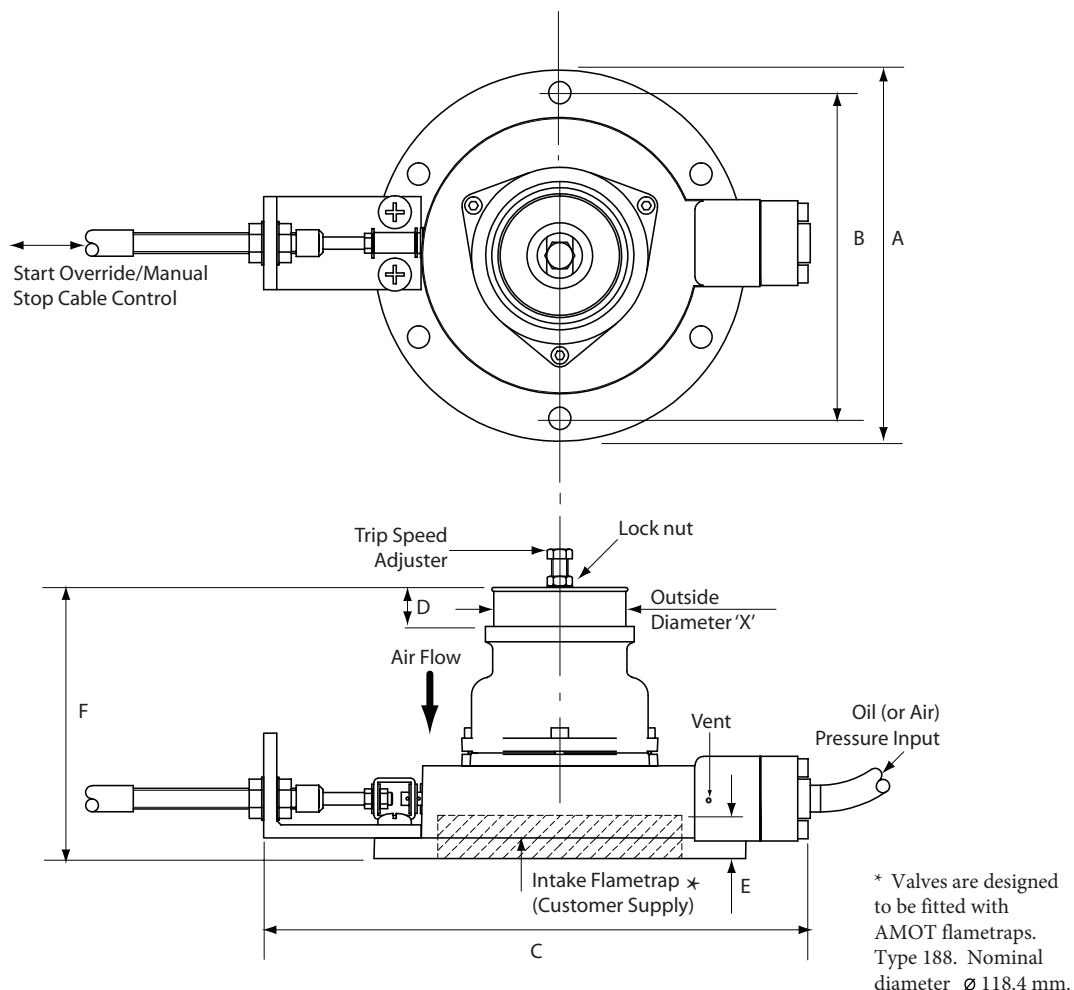
Some smaller TMZ valve sizes are optionally available with an integral intake flame trap housing and/or an integral engine air cleaner.

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 family of valves are tabulated on page 4.

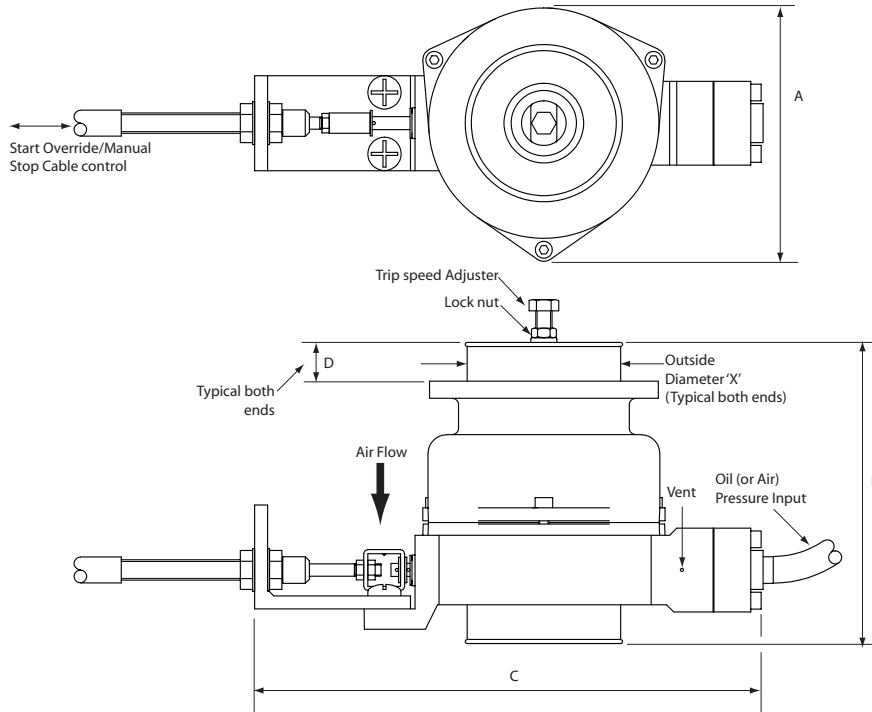
## Typical Arrangement

Valves TMZ-121 to TMZ-128 and TMZ-221 to TMZ-228



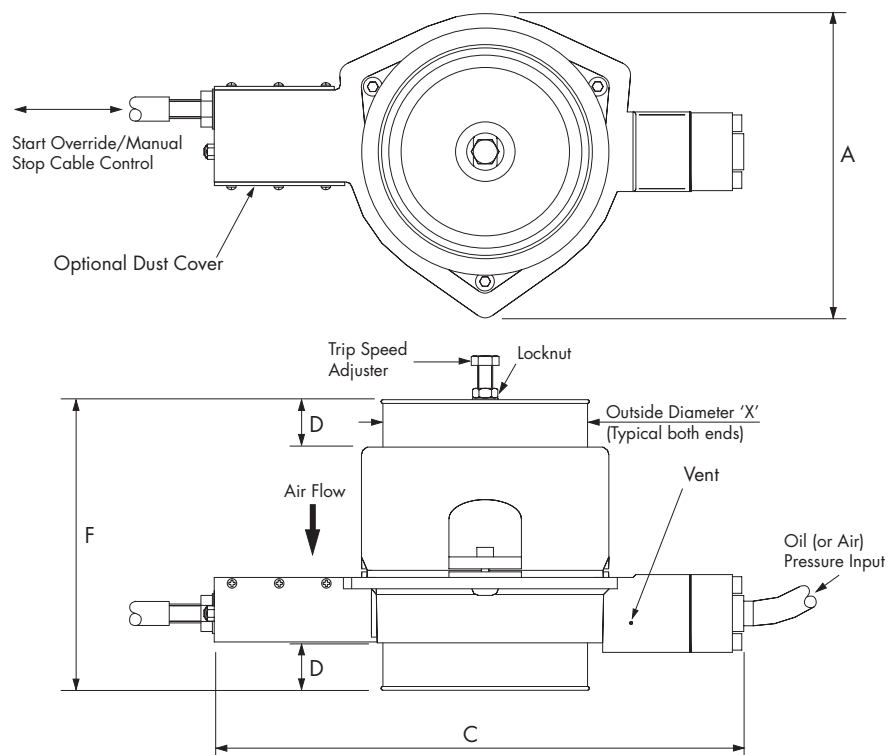
## Typical Arrangement

Valves TMZ-131 to TMZ-134



## Typical Arrangement

Valves TMZ-301 to TMZ-302



| Valve Part No.                               |   | A<br>(mm) | B<br>(mm) | C<br>(mm) | D<br>(mm) | E<br>Flametrapped<br>housing<br>nominal<br>depth (mm) | F<br>(mm) | Overall length with<br>integral air cleaner<br>(fitted) (mm) |
|--|---|-----------|-----------|-----------|-----------|---|-----------|--|
| Without<br>integral<br>engine air<br>cleaner | With<br>integral<br>engine air<br>cleaner |           |           |           |           |   |           |  |
| TMZ-121                                      | TMZ125                                    | 180       | 158       | 265       | 19        | 21  | 132       | 201  |
| TMZ-122                                      | TMZ-126                                   | 180       | 158       | 265       | 19        | 21  | 135       | 204  |
| TMZ-123                                      | TMZ-127                                   | 180       | 158       | 265       | 19        | 21  | 138       | 207  |
| TMZ-124                                      | TMZ-128                                   | 180       | 158       | 265       | 19        | 21  | 139       | 208  |
| TMZ-221                                      | TMZ-225                                   | 180       | 158       | 265       | 19        | 40  | 151       | 220  |
| TMZ-222                                      | TMZ-226                                   | 180       | 158       | 265       | 19        | 40  | 154       | 223  |
| TMZ-223                                      | TMZ-227                                   | 180       | 158       | 265       | 19        | 40  | 157       | 226  |
| TMZ-224                                      | TMZ-228                                   | 180       | 158       | 265       | 19        | 40  | 158       | 227  |
| TMZ-131                                      | n/a                                       | 124       | n/a       | 265       | 19        | n/a   | 139       | n/a  |
| TMZ-132                                      | n/a                                       | 124       | n/a       | 265       | 19        | n/a   | 142       | n/a  |
| TMZ-133                                      | n/a                                       | 124       | n/a       | 265       | 19        | n/a   | 145       | n/a  |
| TMZ-134                                      | n/a                                       | 124       | n/a       | 265       | 19        | n/a   | 147       | n/a  |
| TMZ-301                                      | n/a                                       | 160       | n/a       | 279       | 19*       | n/a   | 147**     | n/a  |
| TMZ-302                                      | n/a                                       | 160       | n/a       | 279       | 19*       | n/a   | 153***    | n/a  |

Outside diameter "X" is selected to match the bore of the engine air intake hose - see page 4 "Selection".  
Dimensions marked \* increased to 25 mm for outside diameter "X" valves of 86 mm or greater.  
Dimensions marked \*\* increased to 153 mm for outside diameter "X" valves of 86 mm or greater.  
Dimensions marked \*\*\* increased to 159 mm for outside diameter "X" valves of 86 mm or greater.

**Important Notes:**

The maximum oil (or air) pressure applied to the TMZ valve should not exceed 10 bar (145 psi). When the engine is running, the TMZ 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.

Where fitted, the integral engine air cleaner used with this range of valves is designed for light/medium duty applications. It should not be used for heavy duty applications as unacceptable short air cleaner service intervals may result. Further advice is available from the Chalwyn Sales Office.

Variants of some TMZ valves can be supplied without the oil pressure and manual control - check with your Chalwyn supplier for details.

For higher engine ratings see AMZ and Z range valves - brochures CE231 and CE243.

## SELECTION

1. Determine the rating of the engine to which the valve is to be fitted and whether or not turbocharged. 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 diameter(s) "X" 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 minimize engine air intake restriction.

### Valve selection chart in metric units

| Valve Part No.    | Engine power at rated speed kW |                      | Engine air intake hose bore mm |         |
|-------------------|--------------------------------|----------------------|--------------------------------|---------|
|                   | Naturally Aspirated Engines    | Turbocharged Engines | Minimum                        | Maximum |
| TMZ-121 & TMZ-125 | 7.5 to 38                      | 7.5 to 32            | 40                             | 70      |
| TMZ-122 & TMZ-126 | 15 to 54                       | 14 to 45             | 51                             | 80      |
| TMZ-123 & TMZ-127 | 22 to 72                       | 22 to 60             | 57                             | 83      |
| TMZ-124 & TMZ-128 | 30 to 93                       | 30 to 78             | 63                             | 96      |
| TMZ-221 & TMZ-225 | 7.5 to 38                      | 7.5 to 32            | 40                             | 70      |
| TMZ-222 & TMZ-226 | 15 to 54                       | 15 to 45             | 51                             | 80      |
| TMZ-223 & TMZ-227 | 22 to 72                       | 22 to 60             | 57                             | 83      |
| TMZ-224 & TMZ-228 | 30 to 93                       | 30 to 78             | 63                             | 96      |
| TMZ-131           | 7.5 to 38                      | 7.5 to 32            | 51                             | 70      |
| TMZ-132           | 15 to 54                       | 15 to 45             | 51                             | 80      |
| TMZ-133           | 22 to 72                       | 22 to 60             | 57                             | 83      |
| TMZ-134           | 30 to 93                       | 30 to 78             | 63                             | 96      |
| TMZ-301           | 40 to 120                      | 40 to 100            | 70                             | 102     |
| TMZ-302           | 50 to 179                      | 50 to 149            | 70                             | 108     |

## Valve selection chart in non-metric units

| Valve Part No.    | Engine power at rated speed \ d' |                      | Engine air intake hose bore in |         |
|-------------------|----------------------------------|----------------------|--------------------------------|---------|
|                   | Naturally Aspirated Engines      | Turbocharged Engines | Minimum                        | Maximum |
| TMZ-121 & TMZ-125 | 10 to 50                         | 10 to 42             | 1 9/16                         | 2 3/4   |
| TMZ-122 & TMZ-126 | 20 to 72                         | 20 to 60             | 2                              | 3 1/8   |
| TMZ-123 & TMZ-127 | 30 to 93                         | 30 to 80             | 2 1/4                          | 3 1/4   |
| TMZ-124 & TMZ-128 | 40 to 125                        | 40 to 104            | 2 1/2                          | 3 3/4   |
| TMZ-221 & TMZ-225 | 10 to 50                         | 10 to 42             | 1 9/16                         | 2 3/4   |
| TMZ-222 & TMZ-226 | 20 to 72                         | 20 to 60             | 2                              | 3 1/8   |
| TMZ-223 & TMZ-227 | 30 to 93                         | 30 to 80             | 2 1/4                          | 3 1/4   |
| TMZ-224 & TMZ-228 | 40 to 125                        | 40 to 104            | 2 1/2                          | 3 3/4   |
| TMZ-131           | 10 to 50                         | 10 to 42             | 2                              | 2 3/4   |
| TMZ-132           | 20 to 72                         | 20 to 60             | 2                              | 2 1/8   |
| TMZ-133           | 30 to 93                         | 30 to 125            | 2 1/4                          | 2 1/4   |
| TMZ-134           | 40 to 125                        | 40 to 104            | 2 1/2                          | 2 3/4   |
| TMZ-301           | 54 to 161                        | 54 to 154            | 2 3/4                          | 4       |
| TMZ-302           | 67 to 240                        | 67 to 200            | 2 3/4                          | 4 1/4   |

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.

4. For TMZ-301 and TMZ-302 valves an optional dust cover is available and is recommended for applications where operation is in dusty conditions (see diagram on page 3).

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

# FITTING

## SAFETY

- 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.

## WARNING

### 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. TMZ valves with integral intake flame traps should be bolted directly to a suitable mating flange secured to the engine air intake as close as possible to the engine intake ports.

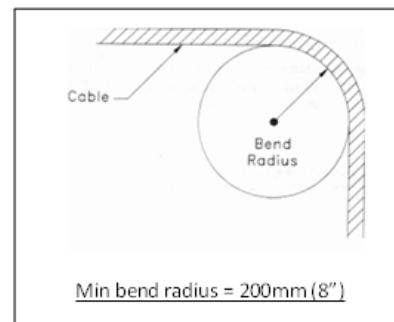
2. TMZ valves without integral intake flame traps should also generally be fitted as close as possible to the engine intake ports, but must always be fitted upstream of any intake flametrap.

Note: Paragraph 1 and 2 are generally applicable to both naturally aspirated and turbocharged engines but, where there is insufficient space to fit the valve between the turbocharger and engine, or where the air outlet temperature from the turbocharger is in excess of 150°C/302°F, alternative fitting arrangements must be considered.

3. 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.

4. 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.

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



6. 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.

7. 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.

8. 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 TMZ valve, an engine fuel stop must always be retained to enable normal engine shutdown. Use the manual shut down lever of the TMZ valve only for emergency shut down or for system maintenance/checking.

# 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 adjuster and locknut (refer to diagrams). Basically rotating the adjuster clockwise will increase 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 (ie 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. Remove oil/air pressure signal. The engine should stop within a few seconds.

#### **Notes:**

##### **Turbocharged Engines**

When fitting 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.

# 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 spill 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. Note that not all model variants include the air intake flametrap and integral air cleaner housing options.

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

### **Three Monthly:**

1. Whilst the engine is running, check the small vent holes in the valve (see diagrams on pages 2 and 3) for any sign of oil (or air) 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. Carefully remove the air intake flame trap where fitted (see flame trap servicing instructions). Do not detach the valve from the flame trap housing.
  4. Inspect the valve internally for cleanliness. If necessary clean in paraffin or white spirit taking normal precautions. Dry thoroughly.
  5. 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.
6. Do not lubricate valve other than lightly greasing the internal cable.
  7. Refit intake flame trap element (where applicable).
  8. Refit valve. Set valve as per 'Adjustment'.
  9. Run engine a mid range speed. Check satisfactory shut down occurs under manual emergency and loss of oil (or air) pressure signal conditions.

**Integral Engine Air Cleaner** (where fitted) Replace air cleaner element at the periods recommended by the engine manufacturer. (Spare elements are available from Chalwyn.)

**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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System is approved by LRQA.

