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# Clarke<sup>TM</sup>



## AIR COMPRESSOR INSTALLATION AND MAINTENANCE INSTRUCTIONS



Essential reading for all users



# Clarke<sup>TM</sup> *air* COMPRESSORS

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

These instructions will help you to obtain many years of reliable service from your air compressor. Do read them carefully and thoroughly before installation/use. If attention is required, ensure that the engineer or electrician is properly qualified to undertake the work. If in doubt about installation or maintenance refer to our service department on 0181-556 4443, spares department on 0181-558 6696 or consult your local dealer.

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### GUARANTEE

Clarke International guarantee this product for 12 months from the date of purchase against faults arising through any defect in manufacture. This does not affect your statutory rights.

However, do please note the following:-

Warranty repairs must only be carried out by Clarke International or their authorised representative.

Any faults must be reported promptly as soon as they occur.

The sales receipt (or similar document) should be retained as proof of purchase.

SYMPTOM	PROBABLE CAUSES	REMEDY
Condensation at outlet points.	Piping installation incorrect. Compressor taking in air which is too warm. Delivery temperature of air from air receiver too high.	Consult your local dealer. Obtain better fresh-air supply for compressor. a) Use a larger air receiver. b) Insert an aftercooler.
Electric Motor too hot: maximum temperature 90 C (194 F).	Operational voltage too low. Faults in electrical installation or electric motor. Cooling fins of electric motor blocked by dirt.	Call an electrician. Call an electrician. Clean cooling fins.
Machine running but not pumping air into receiver (10 HP and above).	Air exhausting from solenoid after starter has changed from star to delta.	Check solenoid valve. Call an electrician to check starter.

**IF IN DOUBT ABOUT INSTALLATION, MAINTENANCE OR SPARES REFER TO OUR SERVICE DEPARTMENT ON 0181-556 4443 OR CONSULT YOUR LOCAL DEALER**

## Parts & Service

*For spare parts and servicing, please contact your nearest dealer, or Clarke International on one of the following telephone numbers:*

CLARKE INTERNATIONAL  
PARTS AND SERVICE DEPT  
TEL 020 8988 7400

### OTHER PRODUCTS WITHIN OUR RANGE

In addition to Air Compressors from 3-80 cfm, we offer a vast range of air tools and airline equipment. Please ask your local dealer for details of our range or a copy of our Power Products Catalogue.

SYMPTOM	PROBABLE CAUSES	REMEDY
Compressor unit starts and stops more frequently than usual.	Large amount of condensation in air receiver. Leaks in control unit or inspection cover. Too little pressure differential.	Drain off condensation AT LEAST once a week. Locate leaks (by means of soapy water) and repair. Adjust pressure switch (see fig.4).
Compressor unit starts when no air is being used.	Leaks in pipework system.	Locate and repair leaks.
Compressor's oil consumption rising.	Too much oil in compressor. Leaks around crank case.  Working temperature of compressor too high because of insufficient cooling. Unit too small in proportion to air consumption. Semi-automatic unit: Load too small. Cylinder worn.  Intake air filter blocked.	Check oil level 2 or 3 minutes after stopping. Change seal and inspect packing surfaces. Repair or replace defective parts. Increase ventilation to air compressor.  Connect supplementary.  Convert to fully automatic operation. Replace worn parts or send compressor pump for an overhaul. Change air filter.
Oil in the air delivered.	Sump over full. Cylinder worn.  Governor controlled unit running off load for too long a period. Intake air filter blocked.	Reduce oil to correct level. Replace worn parts or send compressor pump for an overhaul. Convert to automatic control. Change air filter.
Oil level rises although no oil has been put in.	Condensation in oil pump.	Compressor over-dimensioned.
Condensation in crank case (especially in 2-stage compressors).	Compressor overdimensioned (operational periods too short in relation to resting periods).	a)Frequent oil changes. b)Reduce cooling of crank case (eg. by shielding it from air stream). c)Reduce RPM of pump.

## SAFETY PRECAUTIONS

Before using your compressor it is in your own interest to read and pay attention to the following safety rules:

- 1) COMPRESSED AIR IS DANGEROUS - Never direct a jet of air at people or animals.
- 2) Do not operate your air compressor with any guards removed.
- 3) Electrical or mechanical repairs should only be carried out by a qualified electrician/engineer. If you have a problem, contact your local dealer, or our Service Department on 0181-556 4443.
- 4) Before attempting any repair ensure pressure is expelled from the air receiver and disconnect from electrical supply.
- 5) Do not leave pressure in air receiver overnight or when transporting.
- 6) Do not adjust or tamper with any safety valves. The maximum working pressure of the compressor is clearly stated on the machine.
- 7) Exercise caution when transporting the machine to avoid tipping the machine over.
- 8) Do not operate in a wet/damp environment.
- 9) Locate your air compressor on a firm flat surface and ensure an adequate supply of clean air is available to the pump unit.
- 10) Do not exert any strain on electrical cables and ensure that air hoses are not tangled or wrapped around machinery etc.
- 11) The cylinder head and delivery pipes of your compressor become quite hot during operation. Do not touch. After switching off remember to leave an adequate cool-down period before touching.
- 12) Ensure that any equipment/tool used in conjunction with your compressor has a safe working pressure exceeding the output pressure of the machine.
- 13) When disconnecting air hoses or other equipment from your compressor ensure that the air supply is turned off at the machine outlet and expel all pressurised air from within the air hose and other equipment attached to it.
- 14) If using your compressor for paint spraying:
  - a) Never spray close to any source of flame or heat.
  - b) Always ensure that the spraying area has adequate fresh air ventilation.
  - c) Hazardous paints require special apparatus (see paint manufacturers recommendations).
- 15) Never let anyone operate the compressor unless they have had the necessary instructions.
- 16) Permanently installed pipework systems should be designed and installed by a competent engineer.

## NOISE LEVELS

These machines produce noise levels in excess of 70dB(A). Persons working in the vicinity of the machine must be provided with suitable ear protection.

## INSTALLATION

Before installing your machine, check that its air output is sufficient for the equipment to be used. The air output from the compressor must be more than the volume of air required.

We recommend the following:

- 1) Firm and level site, and the use of floor mountings for stationary compressors. (Do not bolt machines directly to the floor).
- 2) Dust and damp free environment.
- 3) Adequate ventilation for:-
  - a) Air intake to compressor pump (in order to draw in clean air).
  - b) Cooling to compressor pump, engine or electric motor.
  - c) Engine exhaust gases.
- 4) Do not operate compressor in the vicinity of combustible materials.
- 5) To allow sufficient access for servicing, a minimum clearance of 500mm must be allowed round the machine.
- 6) The power cable from the main supply must be large enough to carry the starting and running load of the electric motor. This is particularly relevant if the compressor is some distance from the source of supply.
- 7) Electrical installations should be completed by a qualified electrician.
- 8) Electrical connection to the mains supply must be via a suitably fused (see table below) approved plug or isolator (allowing sufficient capacity for motor starting). If using a circuit breaker in place of fuses, ensure it is Motor Rated and of sufficient size to allow for motor starting.
- 9) Compressors should be connected to mains electricity supply via an earth leakage protection device (RCD), particularly if used outdoors.

## SUGGESTED FUSE RATINGS

MOTOR SIZE		SINGLE PHASE MOTOR D.O.L. 240V	THREE PHASE MOTORS 415V	
KW	HP		D.O.L.	STAR DELTA
0.75	1.0	13 amp	10 amp	
1.1	1.5	13/15 amp	10 amp	
1.5	2.0	20 amp	10 amp	
1.9	2.5	20 amp		
2.2	3.0	30 amp	16 amp	
3.0	4.0	40 amp	20 amp	
4.0	5.5	50 amp	25 amp	
5.5	7.5		30 amp	
7.5	10.0			25 amp
11.0	15.0			30 amp
15.0	20.0			35 amp

SYMPTOM	PROBABLE CAUSES	REMEDY
Unusual noise from compressor.	Bolts loose. V-Belt flywheel or cooling coil touching belt guard. Flywheel loose. Unit installed on an unsuitable base. Bearings, piston rings or cylinder worn. Valve broken. Bearings of electric motor worn.	Tighten Bolts. Find place of contact and remedy fault. Tighten flywheel. Move unit to a more solid base. Replace worn parts or change compressor pump. Change valve parts. Have motor bearing replaced.
Compressor becomes too hot.	Insufficient ventilation.  Oil level too low (check 2 or 3 times after stopping). Wrong direction of rotation.  Fault in valves (machine not stopping). Blown head gasket (machine not stopping). Dirt on cooling fins or suction filter. Unit working at too high a pressure. Not fully unloading (Governor control machines only). Non-return valve partly blocked. Compressor being overworked and running continuously.	See that sufficient air is supplied to flywheel or fan of compressor and that hot air is properly vented.  Fill with oil - see Page 3.  Cooling air from flywheel fan must blow against compressor. Check, clean/replace. Check and replace gasket.  Clean cooling fins and suction filter. Reset to correct working pressure detailed on unit. Check pressure unloading genie, adjust if necessary, check valve(s) Clean or thaw out non-return valve. Connect to a supplementary compressor or install a larger model.

SYMPTOM	PROBABLE CAUSES	REMEDY
Compressor unit will not stop automatically.	Pressure switch defective.  Pressure switch set at a pressure higher than the safety valve's opening pressure.	Have pressure switch changed by an electrician. Adjust pressure switch or safety valve. <b>WARNING: DO NOT ADJUST SAFETY VALVE ABOVE MAXIMUM WORKING PRESSURE DETAILED.</b>
Bleed valve under pressure switch blows whilst compressor is not running.	Non-return valve leaking.	Clean non-return valve or replace.
Bleed valve under pressure switch blows whilst machine is running.	Relief valve leaking.	Clean relief valve or change pressure switch.
Compressor runs continuously and cannot attain the working pressure required.	Suction filter blocked. V-belt too slack (not applicable to direct drive machines). Leak between compressor block and air receiver/ leaks in or near air receiver. RPM too low because of incorrectly connected electric motor. Valves blocked by dirt, paint, dust or coked up. Inspection cover or plug leaking. Suction rendered difficult or impossible at suction intake, or the air being taken in is too warm. Pressure gauge defective. Unit too small in relation to air consumption.  Compressor worn.	Change filter. Tighten V-Belt.  Tighten connection and repair leak.  Call an electrician.  Clean or change valves.  Empty air receiver and change seal. Larger fresh-air inlet.  Change pressure gauge. Connect a supplementary compressor or install a larger model. Have compressor overhauled or replace it.

## ELECTRICAL CONNECTIONS

### IMPORTANT - SINGLE PHASE MACHINES ONLY

The wires in the mains lead of this machine are coloured in accordance with the following code:

Green and Yellow	-Earth
Blue	-Neutral
Brown	-Live

As the colours of the wires in the lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured green and yellow must be connected to the terminal which is marked with the letter E or by the earth Symbol ( $\perp$ ) or coloured green or green and yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

**WARNING: This machine must be earthed.**

### LUBRICATION:-

Pump: Use Clarke compressor oil, as indicated on machine plate.  
Engine: (Petrol or diesel) refer to maker's handbook.

### BEFORE STARTING COMPRESSOR CHECK:-

- Compressor Pump Oil Level by - (a) Dipstick (to level marked) or - (b) Sight glass (see fig. 1)

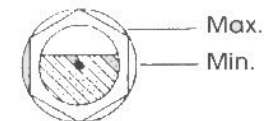


Fig.1

Engine oil and fuel levels (where applicable) see manufacturers handbook for details.

- (a) Automatic Control:- Pressure switch is off with button in depressed position (Fig.2, item 22).  
(b) Genie Control:- Ensure bleed valve is open. (See Fig.5, item 2).

### WARNING

- Before starting compressor, open all outlet valves.
- The following start and stop instructions must be followed in the correct sequence to avoid serious damage to the compressor/motor.

## TO START COMPRESSOR – ELECTRIC MACHINES

1. Switch on isolator (mains supply)
2. Press green or black button (direct on line starters only).
3. Switch on pressure switch (lift knob). (Fig.2, item 22)
4. Check rotation (Flywheel/Fan blows air over pump)
5. Run compressor for 10 minutes with outlet valves open (first time of operation only).
6. Close valves and check that pressure does not exceed maximum working pressure (stamped on machine plate), adjust if required (see 'Pressure Adjustments' later in this manual).

## TO START COMPRESSOR – ENGINE DRIVEN MACHINES

1. Open bleed valve (fig.5, item 2). N.B. since the CFP9BH does not have a bleed valve (only a small bleed hole) ensure no equipment is connected to the air compressor outlet, and that the pressure adjusting knob (fig.6, item 1) is set to minimum.
2. Start engine in accordance with engine manufacturers instructions.
3. Close bleed valve and allow compressor to run for 10 minutes (first time of operation only).
4. Close valves and check that pressure does not exceed maximum working pressure (stamped on machine plate), adjust if required (See 'Pressure Adjustments' later in this manual).

## TO STOP COMPRESSOR – ELECTRIC MACHINES

1. Switch off pressure switch (Push knob down). (Fig.2, item 22)
2. Switch off starter (Press red button - Direct on line starter only).
3. Switch off isolator (Mains Supply).
4. Drain air receiver (release drain tap).

## TO STOP COMPRESSOR – ENGINE DRIVEN

1. Allow machine to run for 2 minutes off load (with outlet valves open).
2. Switch off engine (see manufacturers handbook).
3. Drain air receiver (release drain tap).

**WARNING:** Compressor pumps, delivery pipes etc., and engines will remain hot for some time after use.

## MAINTENANCE CHART

CHECK LIST	DAILY	WEEKLY	6 MONTHLY	
Oil Level	Check		Change	
Air receiver	Drain			
Intake filter		Check/Clean		Replace if necessary
Oil breather		Check/Clean		
Fan and Cooling Fins		Clean		
Inlet and Outlet valves			Check	Replace if worn
Non-return valve			Clean	Replace if worn
Belt tension			Check/Adjust	Does not apply to direct drive
Big end bearings			Check	Replace if worn
Main bearings			Check	Replace if worn
Piston rings			Check	Replace if worn

## TROUBLE SHOOTING CHART

### IMPORTANT!

1. Any remedial work that may be required must be carried out by a qualified electrician/engineer.
2. Switch off current before removing any parts from the compressor.
3. Empty Air Receiver of Air before dismantling any part of the compressor unit's pressure system.
4. If your compressor develops a fault do not use until the fault has been rectified.

SYMPTOM	PROBABLE CAUSES	REMEDY
Compressor will not start automatically.	Fault in electrical installation. a) current supply failure. b) voltage drop. c) motor starter faulty. d) motor incorrectly connected or faulty. e) starter overload has tripped out. f) Pressure switch defective.  Fuse blown.	Let an electrician check electrical installation.       Reset by depressing button. Have pressure switch changed by an electrician. Check fuse rating - replace.
Fuses keep blowing.	Inadequate size fuse installed. Fault in motor.	Replace with reference to chart on page 2. Consult an electrician.
Compressor unit starts, but stops again after only a few revolutions.	Non-return valve leaking (compressor unit is on load during start).  Non-return valve blocked, possibly frozen up.  Solenoid valve leaking or defective (only applies to 10 hp machines and above).	Switch off current and empty air receiver. Clean or replace non-return valve.  Thaw non-return valve out (Unit must be installed in frost-free place). Let an electrician inspect electrical installation in accordance with diagram supplied with starter (10 hp and above).

## OUTLET PRESSURE ADJUSTMENTS CFP9BH

1. Pressure Adjusting Knob
2. Lock Nut
3. Air Outlet
4. Bleed Hole

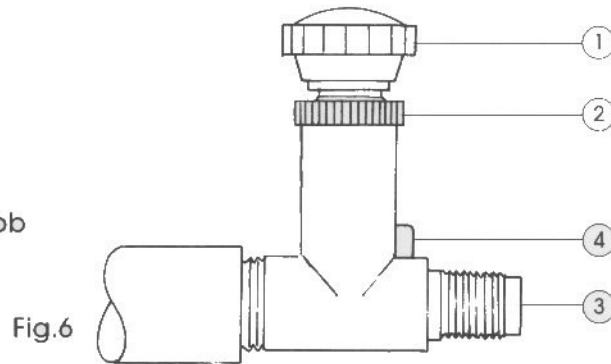


Fig.6

To adjust outlet pressure slacken lock nut (2). Turn Pressure Adjusting Knob (1) clockwise to increase outlet pressure, anti-clockwise to decrease, tighten lock nut (2) when correct pressure is obtained.

**NOTE:** When Compressor reaches pressure air will bleed from bleed hole (4).

**NOTE:** Item (3) quick fit nut can be removed if required and hose can be fitted using 1/4 BSP nut.

## PORTABLE COMPRESSORS

1. Pressure Adjusting Knob
2. Outlet Taps
3. Quick Fit Nuts
4. Pressure Gauge

To adjust outlet pressure:

To increase pressure turn knob (1) clockwise. To decrease pressure turn knob (1) anti-clockwise.

Outlet taps, slide knurled section away from body to open, push towards body to close.

**NOTE:** Pressure Gauge (4). Pressure shown will differ by approximately 1 bar depending on whether the outlets are open/closed.

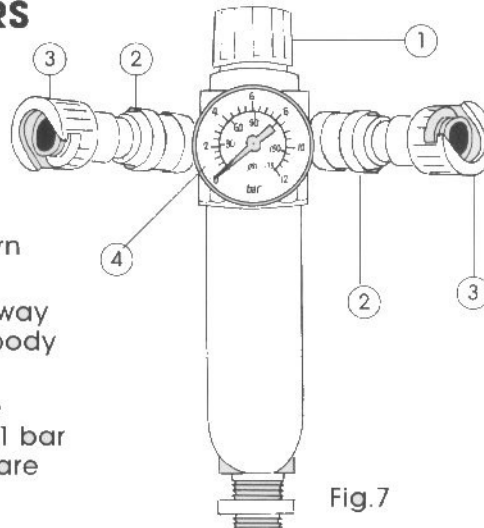


Fig.7

## STATIONARY COMPRESSORS

These machines are not supplied with the facility to adjust outlet pressure. A comprehensive range of airline accessories is available from your local CLARKE stockist.

## GENERAL ARRANGEMENT

### STATIONARY

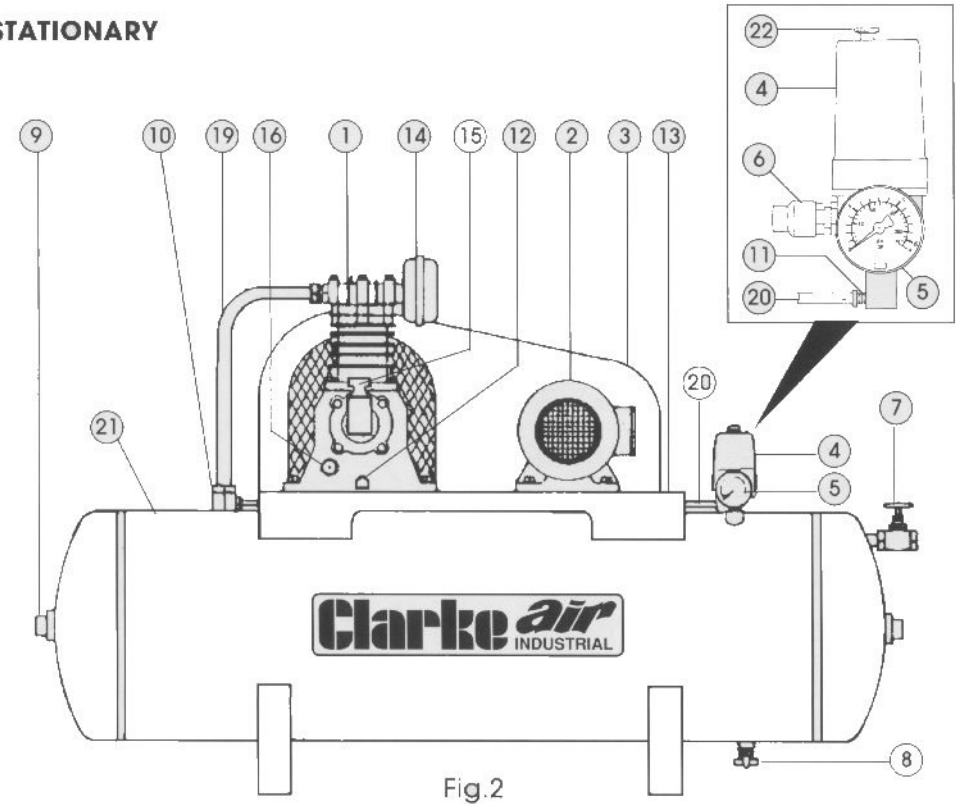


Fig.2

- |                           |                         |                           |
|---------------------------|-------------------------|---------------------------|
| 1. Air Compressor Pump    | 8. Drain Tap            | 16. Oil Level Sight Glass |
| 2. Electric Motor         | 9. Inspection Plug      | 17. -                     |
| (or petrol/diesel engine) | 10. Non-Return Valve    | 18. -                     |
| 3. Belt & Pulley Guard    | 11. Air Bleed Valve     | 19. Air Delivery Pipe     |
| 4. Pressure Switch        | 12. Oil Drain Plug      | 20. Air Bleed Pipe        |
| 5. Pressure Gauge         | 13. Saddle              | 21. Air Receiver          |
| 6. Safety Valve           | 14. Air Intake Filter   | 22. On/Off Button         |
| 7. Air Outlet Valve       | 15. Oil Filler/Breather |                           |

N.B. 1) On some electric driven and all petrol/diesel models, item 10 is replaced by a pressure unloading genie for constant run operation. In this case items (4), (11) and (20) are deleted.

2) On automatic machines 10 H.P. & above a solenoid valve is fitted to the delivery pipe.

## GENERAL ARRANGEMENT

### PORTABLE

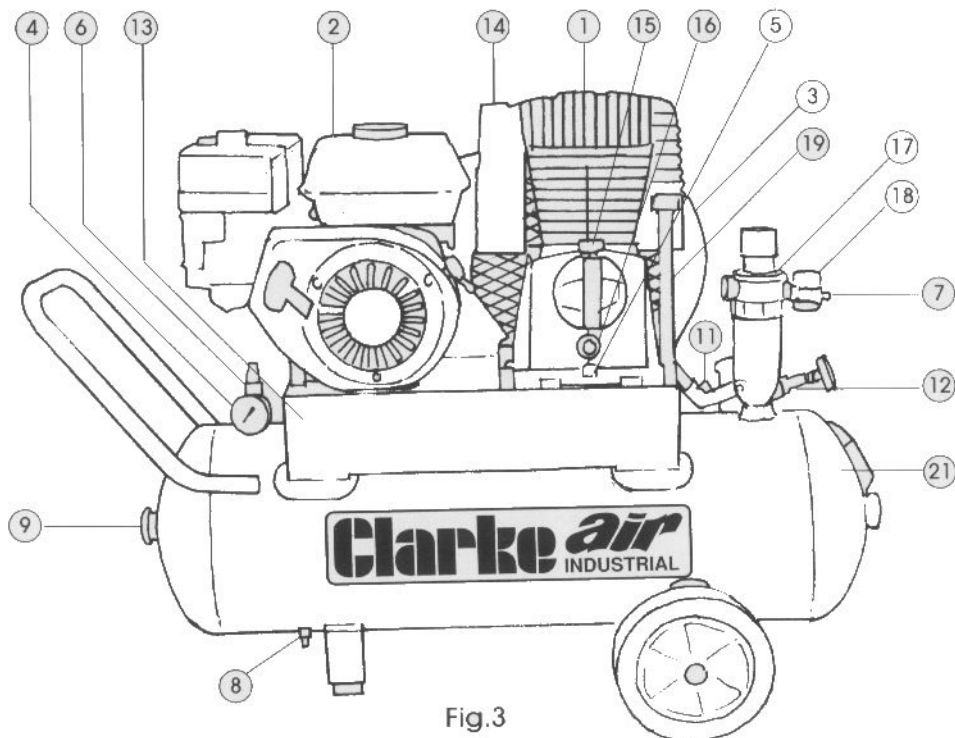


Fig.3

- |  |                              |   |
|--|------------------------------|---|
| 1. Air Compressor Pump                         | 8. Drain Tap                 | 16. Oil Level Sight Glass               |
| 2. Petrol/Diesel Engine<br>(or electric motor) | 9. Inspection Plug           | 17. Air Filter/Regulator<br>(see Fig.7) |
| 3. Belt & Pulley Guard                         | 10. -                        | 18. Outlet Air Pressure<br>Gauge        |
| 4. Pressure Gauge                              | 11. Air Bleed Valve          | 19. Air Delivery Pipe                   |
| 5. Oil Drain Plug                              | 12. Air Governor (see Fig.5) | 20. -                                   |
| 6. Safety Valve                                | 13. Saddle                   | 21. Air Receiver                        |
| 7. Air Outlet Valve                            | 14. Air Intake Filter        |   |
|  | 15. Oil Filler Breather      |   |

N.B. On Electric Portable Machines items 11 and 12 are replaced with a Non-Return Valve and a Pressure Switch, as shown on page 7.

## AIR RECEIVER PRESSURE ADJUSTMENTS

**WARNING:** THE SAFETY VALVE (ITEM 6, FIG. 2 & 3) FITTED TO THIS COMPRESSOR IS FACTORY SET AND MUST NOT BE ADJUSTED.

If it is necessary to alter the pressure settings on the compressor please remember that increasing the pressure will NOT increase the volume of air supplied.

Any adjustments must be made with the compressor at working pressure.

### ELECTRIC MACHINES (See the illustration below).

**WARNING:** DISCONNECT FROM ELECTRICITY SUPPLY BEFORE REMOVING ANY COVER.

#### NEMA Pressure Switch (shown with cover removed).

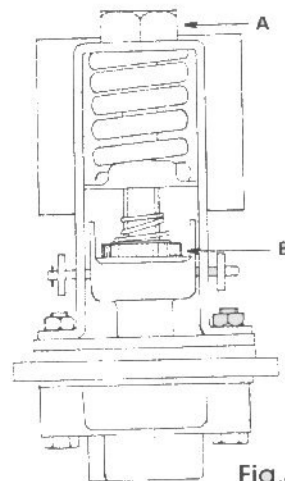


Fig.4

**PRESSURE ADJUSTMENT:** To increase the cut out pressure, turn the hexagon (A) on top of the pressure switch clockwise. To reduce the cut out pressure, turn it anti-clockwise.

**RANGE ADJUSTMENT:** To increase the pressure differential between cut in and cut out, turn the toothed wheel (B) situated under the large spring anti-clockwise, using a screwdriver. In its present position, the PRESSURE SWITCH is set to the minimum range.

**NOTE:** These operations must always be performed with the PRESSURE SWITCH under pressure.

### ENGINE DRIVEN MACHINES (Except CFP9BH - see page 10)

Air Governor - Pressure unloading genie

1. Air Delivery Pipe from Compressor Pump.
2. Bleed Valve
3. Exhaust Filter
4. Pressure Adjustment Knob
5. Lock Nut.

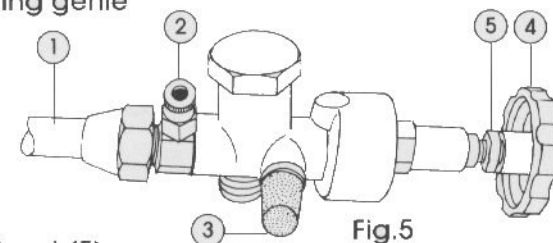


Fig.5

To adjust pressure slacken lock nut (5). Turn pressure adjusting knob (4) clockwise to increase pressure, anti-clockwise to decrease. Tighten lock nut (5) when correct pressure is obtained.

**WARNING:** Do not exceed the maximum working pressure of the machine, as marked on the CLARKE AIR specification plate.