



**DETROITAIR**

COMPRESSED AIR INNOVATION THROUGH TECHNOLOGY

# **Belt Drive Air Compressor**

## **OPERATION MANUAL**

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## GENERAL

Thank you for choosing Detroit Air. Detroit Air is a leading manufacturer of consumer and industrial compressed air solutions. Our products dominate markets in Russia, Malaysia, Africa, Australia, Europe, Middle East and South America. Our strengths lie in advanced technology and expert experience in the field of compressed air. We cater for all needs for compressed air from 1HP to 1000HP and pressure from 5 Bar to 300 Bar.

## IMPORTANT NOTE

- Read this manual carefully before operation.
- All machines need to be serviced in order to keep them running. Just like your motor vehicle, an air compressor needs to have good quality oil, air, fuel/power supply to perform properly and not break down.
- Service your machine as required and you will enjoy years of service.
- Never run any machine in an environment you would not run your motor vehicle in.
- If you do, ensure air, oil, engine/electrical motors and any other systems are kept in good working order and are protected from abrasives in the air/oil.
- The system should not be exposed to water or heavy moisture and corrosion must be treated should it appear.

## Safe Operation Specification

Operation regulations must be strictly obeyed.

## Technical Modification

Detroit Air and its subsidiaries reserve the right to modify the air compressor system in any way without prior notice.

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## 1. Check Your New Machine

- 1: When acquiring your new compressor, make sure the specification will meet your requirement for compressed air.
- 2: Check you have received a certificate of approval, maintenance card, as well as all the requested spare parts.
- 3: Make sure the machine is in good condition with no transportation damage or breakage.

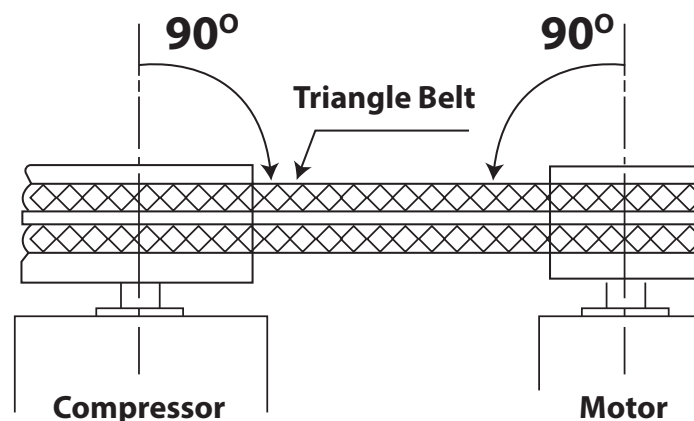
Should you find any problem with the machine before use, we will be glad to assist in resolving the problem.

## 2. Installation Site

In order to ensure long service-life and reduce maintenance costs, a suitable installation site is needed.

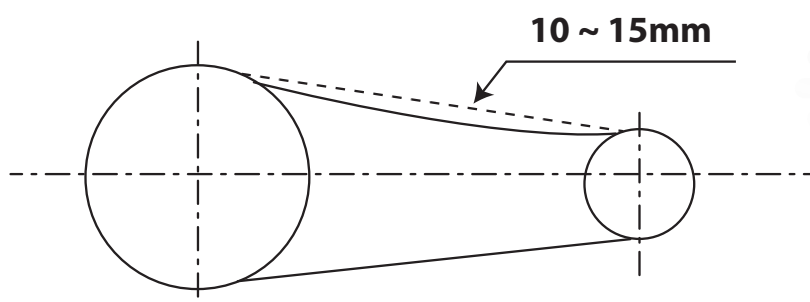
**Follow the guidelines below:**

1. Locate the unit in a place with good ventilation and clean dry air.
2. Choose level surfaces with good light for convenient maintenance and inspection.  
The machine should have, at minimum, between 500mm to 1000mm between it and the closest wall, for ventilation purposes. Machines over 5.5kW need 1000mm or more.
3. Never store flammable and explosive gases/liquids with the unit.
4. Make sure the machine is set up correctly before use. Pay attention to oil levels, oil/air filters/separators, belt tension and inspect all bolts/nuts for correct torque.



## Installation Site (cont.)

5. Belt tension should be correct to avoid bearing damage or belt slippage; use the diagram as a guideline.



6. Overtight belts will cause bearing wear resulting failure of the main bearings. Belt life will be shortened and load on the motor and motor bearings will be excessive.
7. Loose belts will result in slippage causing damage to the belts or causing the belts to jump off the pulley.

### 3. Correct Power Cable and Oil Selection - for Electric Models

(For engine driven models please refer to the engine operator's manual for correct engine operating procedures and maintenance).

#### 3.1

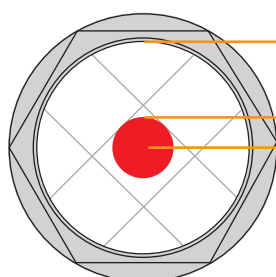
Refer to the below table for correct cable specification. Never use an undersized cable or low-quality oil.

MOTOR (HP)		0.25	0.5	1	2	3	4	5	7.5	10	15	20	30
Single Phase 220/50	Electric Wire mm <sup>2</sup>	2.5	2.5	4	4	6							
	Motor Start Breaker	10	10	15	30	40							
Three Phase 380/50	Electric Wire mm <sup>2</sup>	2.5	2.5	2.5	2.5	2.5	4	4	6	6	10	10	16
	Motor Start Breaker	5	5	5	10	10	15	15	20	30	40	60	75

#### 3.2 Oil Requirements:

#### **NEVER MIX MINERAL AND SYNTHETIC OILS - DAMAGE WILL RESULT**

- 1: Oil should be fully synthetic and have properties of high viscosity and high temperature tolerance.
- 2: High resistance to oxidation.
- 3: Low carbon content, high flash point.
- 4: We recommend international standard compressor oil 68 or 100 grade.
- 5: Keep the oil level close to the top of the oil glass (shown below).



Correct oil level

Minimum oil level must not be lower than the top of the gauge when the machine is in operation

#### **NOTE**

Oil level is to be checked when machine is off

- 6: Too much oil not only wastes the resource, but also causes carbon build-up on the exhaust valves, reducing working life and efficiency. Not enough oil will result in poor lubrication and lead to premature failure or shortened service life.

## 4. Pre-use Inspection

1. Make sure all the technical parameters of the unit are suitable for the application before installation.
2. Check the oil-level in the crankcase.
3. Make sure the caster fulcrum is even and properly set for machines with adjustable belt-tensioning brackets.
4. Check that the pipelines are in good condition.
5. Check the voltage; the reading should be within 5% of the supply requirement.
6. Check that wire terminals are tight to avoid electrical leakage, connect the earth wire correctly.
7. Check belt tension as described previously.
8. Drain the pressure vessel.
9. Exhaust all air before dismantling any parts of the compressor.
10. Shut the air release valve when connecting a pipeline or quick coupler, then re-open it once connected.

## 5. Automatic and Semi-Automatic Operation Instruction

1. Open the exhaust valve to start the unit in an unloaded condition.
2. Turn on the power supply.
3. Make sure operating direction is same as the arrow indicates on top of the pulley cage. If not, change any two wires around for a three-phase motor supply.
4. When starting the unit, let it run unloaded for 5 to 8 minutes to make sure everything is normal.
5. Close the air release valve, check that gauge and cut-out function are working correctly.
6. Check all joints, pressure gauges and pipeline connections for leaks. Check safety-release valves for proper function.
7. Check that the pressure switch system is working correctly and cutting-in and out at the correct pressures automatically.

**SHOULD THE POWER FAIL, TURN THE MACHINE OFF AT THE PRESSURE SWITCH TO UNLOAD THE HEADS AND ENSURE AN UNLOADED START. LOADED STARTS DAMAGE THE ELECTRIC MOTOR AND SWITCHGEAR.**

## 6. Adjustment Options

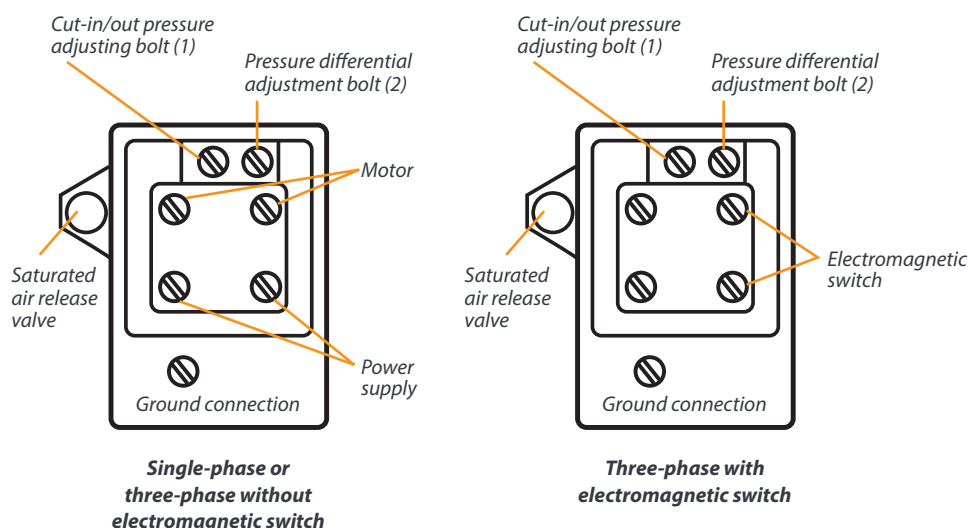
### 6.1 Adjustment method of the automatic pressure switch - Diagram A.

- Setting pressure:**  
The cut-in/out pressure will increase when turning right (1) and will decrease when turning left.
- Pressure differential adjustment:**  
The pressure difference range will increase when turning the differential adjusting bolt to the right (2). Turn to the left to decrease.
- (1) and (2) are connected, adjust with caution and attention. In general, the normal pressure will not exceed  $8 \text{ kg/cm}^2$  (8 Bar), while high pressure setting should not be above  $12.5 \text{ kg/cm}^2$  (12.5 Bar) for safe use.

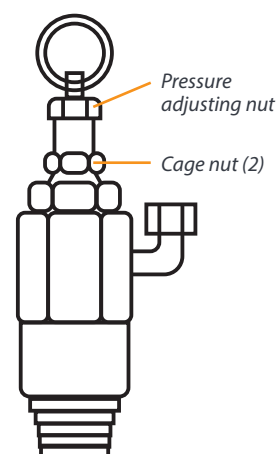
### 6.2 Adjusting the semi-automatic safety-valve (unloading valve) – Diagram B.

- Turn left and loosen the unloading valve cage nut (2), then turn the pressure adjusting nut right to increase the blow-off pressure and turn left to decrease blow-off pressure. Lock the cage nut after adjustment.

**DIAGRAM A**



**DIAGRAM B**





## Adjustment Options (cont.)

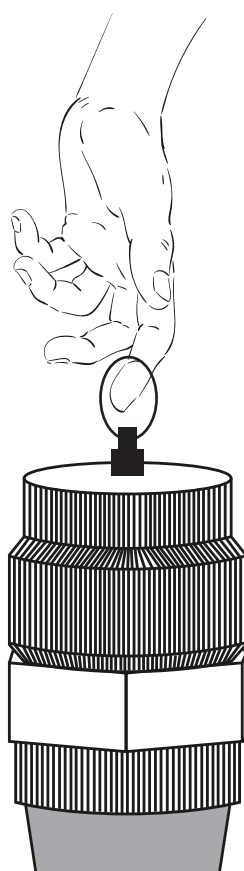
### 6.3 Safety Valve

All compressor units are supplied with a safety valve protection device to prevent excessive pressure in the tank.

**Please note:** All safety valves are adjusted according to pressure vessel regulation during manufacture and testing; do not make changes unless required. Should adjustment be required, please ensure that the valve is set correctly and safely by qualified personnel. Remember to test the air release valve at least 5 times a week to make sure it works according to specification.

See diagram C.

**DIAGRAM C**



## 7. Maintenance

### 7.1 Daily maintenance

1. Every day before use, ensure oil level is within the stated limit in the crankcase.
2. Every day after use, open the water drain valve to remove the remaining water from the tank.
3. Check if there are any abnormal sounds or high temperature during operation.

### 7.2 Weekly maintenance

1. Change the oil after first 50 hours of operation.  
**NOTE: The machine is supplied with mineral oil. It is recommended to change to fully synthetic oil after the first 50 hours of use.**
2. Clean the intake air filter every week. Change when dirty. Dusty environments will necessitate more frequent filter service and maintenance.
3. Check the safety valve for correct function.
4. Check the pressure switch and air release valves.

### 7.3 Monthly maintenance

1. Make sure there is no leakage in any pipeline.
2. Fasten all spare parts like screws and nuts; do not let them become loose.
3. Clean the machine and check for problems.

### 7.4 Seasonal maintenance

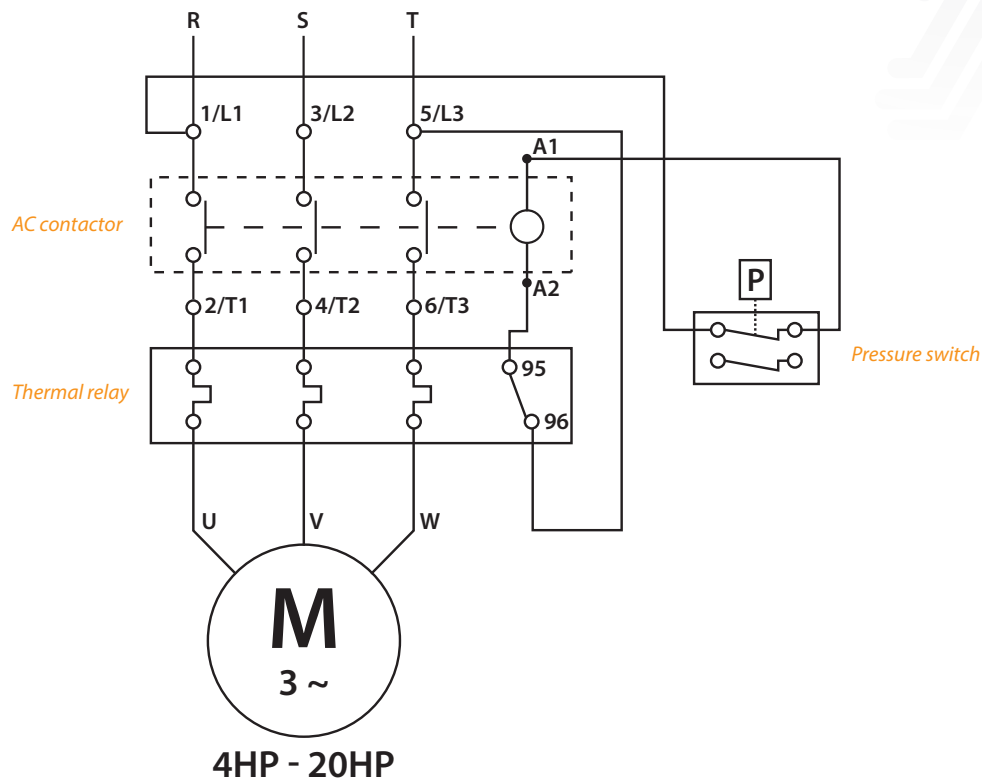
1. Change oil every 500 hours (sooner if required).
2. Change the air intake filter element.
3. Check the tension of V-belt(s).
4. Inspect the valve seats and clean out the carbon deposits. Mineral oil usage speeds up carbon build-up significantly.
5. Check the cylinder and rings for damage. Proper oil and air filter maintenance will prevent premature cylinder failure or damage.

## 8. Troubleshooting and Problem Solving

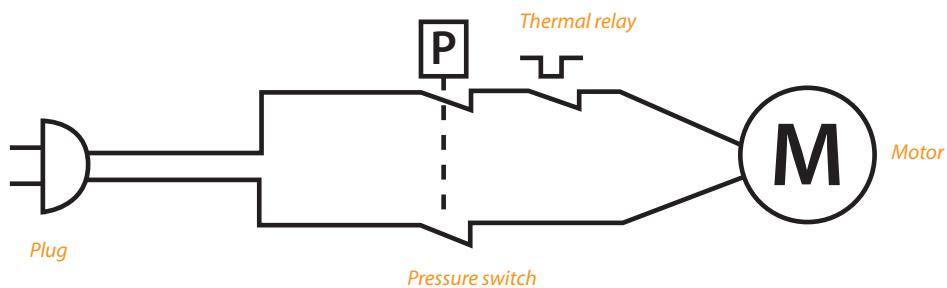
PROBLEM	REASON	SOLUTION
Decreased air volume output or drop of pressure	Air volume demand is greater than rated output	Get the correct machine for the job
	Intake filter is blocked	Clean or change the filter element
	Valves dirty	Dismantle and clean
	Valve seated incorrectly	Repair or replace
	Valve sets worn or spring broken	Replace
	Piston ring or cylinder wall damaged	Replace
	Low rotation speed	Adjust the belt tension
	Leakage on the exhaust pipeline or connection	Check the pipeline with soap water or tighten up connection
Pressure too high or safety valve blow-off	Set pressure is higher than rated pressure	Adjust the pressure setting
	Pressure switch or air release valve is broken	Replace
	The set pressure of safety valve is too low, broken	Adjust the pressure or replace
Air contains oil or using oil	Overfilled oil	Check oil level
	Use the wrong oil ring, or broken ring	Replace
	Oil viscosity not matching (specification)	Use matching lubricant oil
	Broken piston ring or cylinder wall damage	Replace
	Air vent is blocked	Get rid of blockage
Too much vibration	Pressure is too high	Lower the pressure
	Belt pulley is not properly set	Adjust it
	The ground base is not even	Fix and make it even
Too much noise during operation	Valve seat is loose	Tighten it up
	The cylinder head is hit by piston	Thicken the gasket, check big/small-ends
	Something is wrong with the connecting rod bearing	Replace
	Bearing bush broken	Replace
Excessive heat generated	Incorrect running direction causes excess heat	Change wire connection
	Pressure too high	Lower it
	Not enough lubricant oil	Fill it up
	Ambient temperature too high or bad ventilation	Move to a suitable location
Discharge valve leakage	Discharge valve broken	Replace
	Non-return valve is blocked or broken	Dismantle it and repair/replace
No sound when power on	Bad wiring or circuit breaker/isolator failure	Check the wiring or replace damaged breaker/isolator
	Overload protection trips	Reset the protection
	Motor problem	Send for repairs
Motor keeps buzzing but not working	Voltage drop due to use of extension cord	Remove extension cord or increase wire gauge
	Under voltage	Check cable and supply
	Motor overloaded	Release pressure to lessen load
	Dropped phase/lack of voltage	Check electrical supply
	Starting capacitor faulty - for single-phase motors	Replace
	Centrifugal switch is loose - for single-phase motors	Tighten/adjust it

## 9. Electric Wiring Diagram

### 9.1 Three-phase wiring diagram

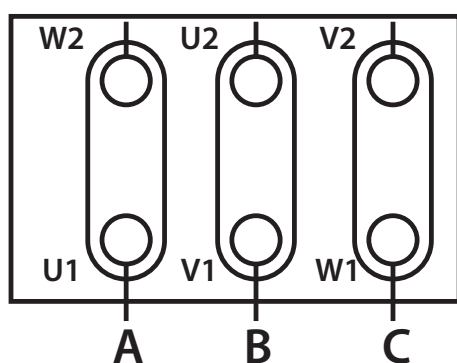


### 9.2 Single-phase wiring diagram

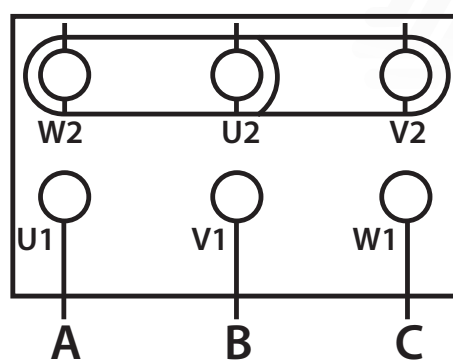


## Electric Wiring Diagram (cont.)

### 9.3 Three-phase wiring terminal

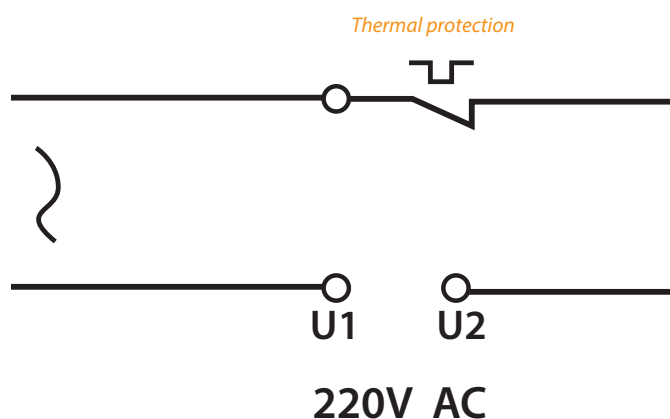


Power supply  
△ Connecting method

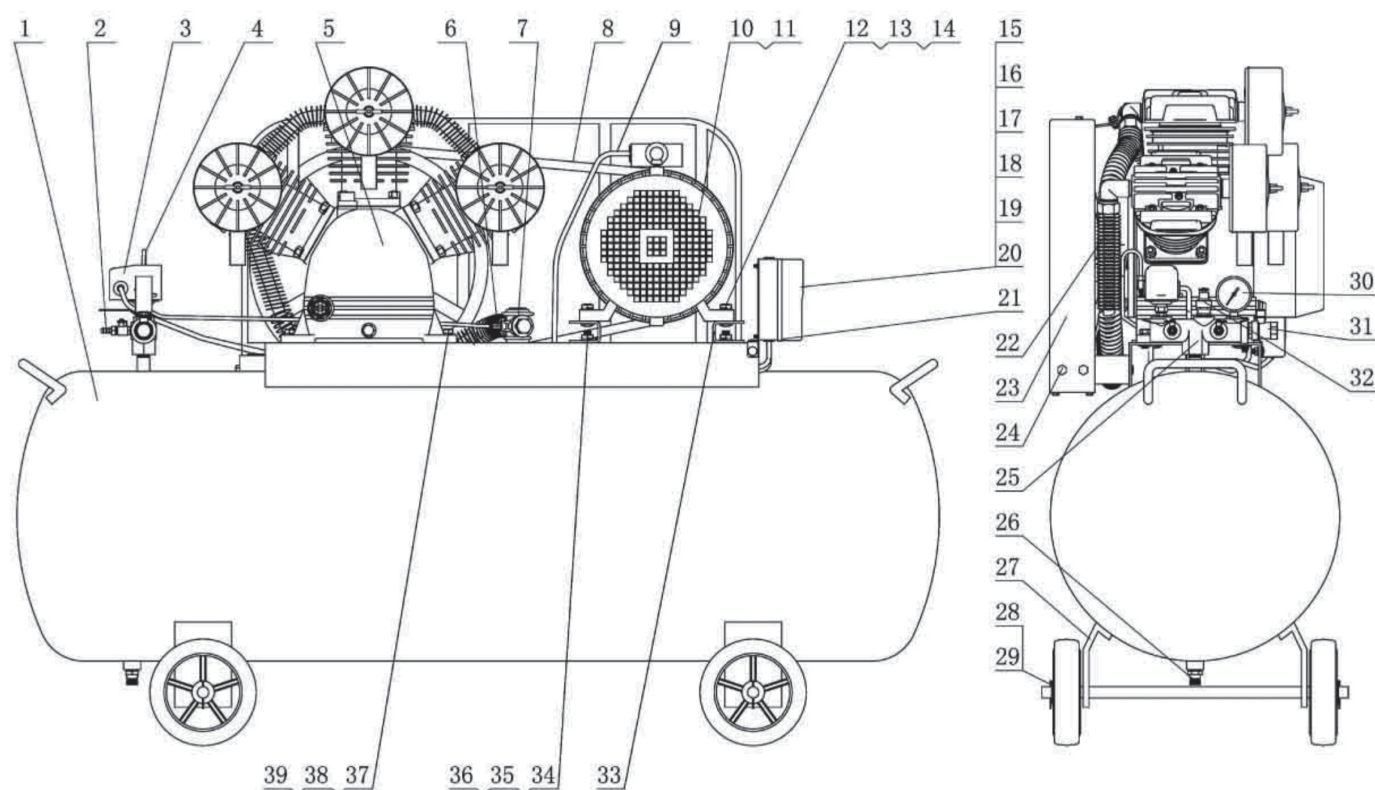


Power supply  
Y Connecting method

### 9.4 Single-phase wiring terminal

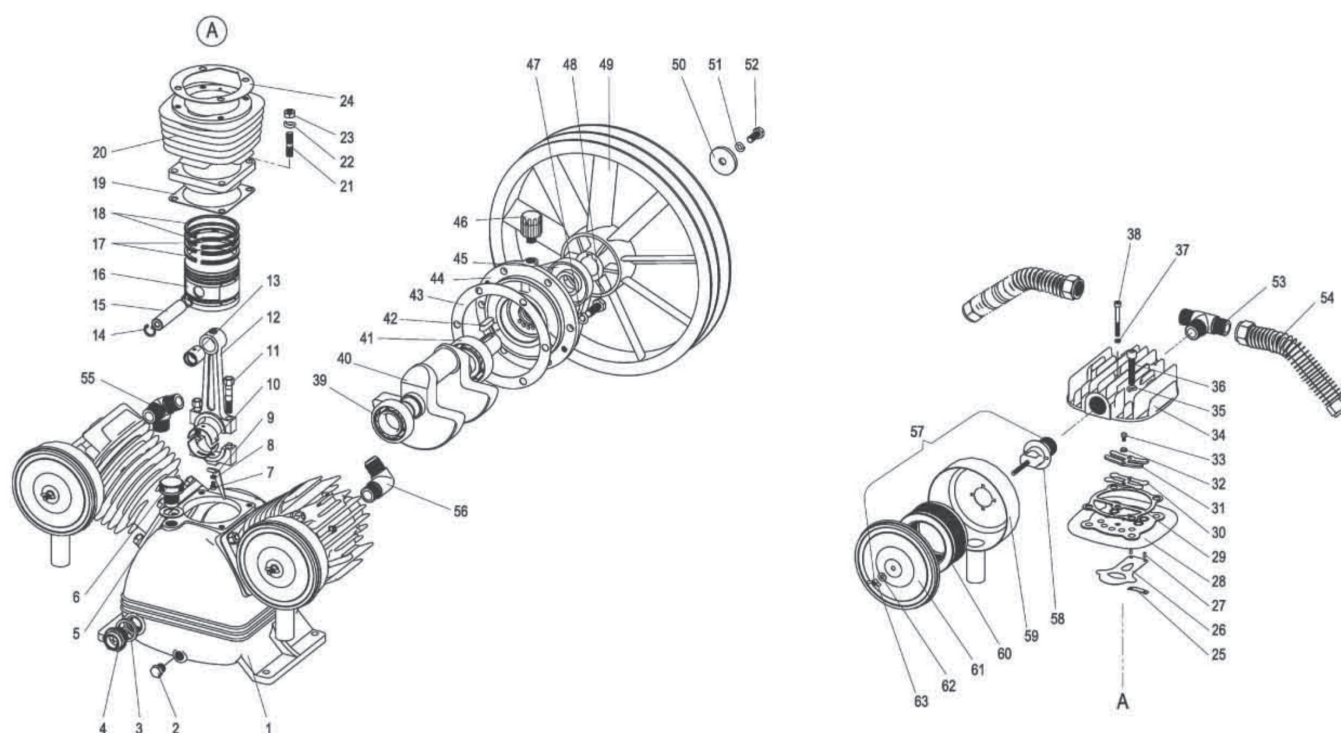


## 10. Parts List for the Compressor



- |                            |                                   |                        |
|----------------------------|-----------------------------------|------------------------|
| 1. Tank                    | 14. Nut                           | 27. Wheel              |
| 2. Small air release valve | 15. Switch box support            | 28. Washer             |
| 3. Pressure switch         | 16. Switch box                    | 29. Cotter pin         |
| 4. Pressure relief pipe    | 17. Screw                         | 30. Pressure gauge     |
| 5. Bare pump               | 18. Magnetic switch               | 31. Ball valve         |
| 6. Elbow                   | 19. AC contactor                  | 32. Safety valve       |
| 7. Safety valve            | 20. Thermal relay                 | 33. Motor channel iron |
| 8. Belt                    | 21. Pressure switch electric wire | 34. Base-plate bolt    |
| 9. Motor electric wire     | 22. Delivery pipe assembly        | 35. Spring washer      |
| 10. Motor                  | 23. Belt guard                    | 36. Nut                |
| 11. Motor pulley           | 24. Bolt and nut                  | 37. Pump foot-bolt     |
| 12. Motor foot bolt        | 25. Five-way manifold             | 38. Spring washer      |
| 13. Spring washer          | 26. Water drain valve             | 39. Nut                |

## 11. Compressor Spare Parts Exploded View



- |                           |                          |                              |
|---------------------------|--------------------------|------------------------------|
| 1. Crankcase              | 22. Spring washer        | 43. End cover gasket         |
| 2. Oil plug               | 23. Nut                  | 44. End cover                |
| 3. Oil glass O-ring       | 24. Valve seat gasket    | 45. Oil seal                 |
| 4. Oil glass              | 25. Spring               | 46. Breather cap             |
| 5. Oil filling cap O-ring | 26. Air intake valve     | 47. Spring washer            |
| 6. Oil filling cap        | 27. Locating pin         | 48. Flywheel bolt            |
| 7. Bolt                   | 28. Valve seat           | 49. Pump belt pulley         |
| 8. Oil agitator           | 29. Cylinder head gasket | 50. Washer                   |
| 9. Oil dialing needle     | 30. Air release valve    | 51. Spring washer            |
| 10. Bearing bush          | 31. Limiting stopper     | 52. Bolt                     |
| 11. Connecting rod bolt   | 32. Spring washer        | 53. 180° three-way connector |
| 12. Connecting rod        | 33. Screw                | 54. Air release valve        |
| 13. Brass bush            | 34. Cylinder head        | 55. 120° three-way connector |
| 14. Snap ring             | 35. Spring washer        | 56. 90° two-way connector    |
| 15. Piston pin            | 36. Cap-screw            | 57. Air filter               |
| 16. Piston                | 37. Spring washer        | 58. Air filter connector     |
| 17. Oil ring              | 38. Bolt                 | 59. Air filter case          |
| 18. Gas ring              | 39. Main bearing one     | 60. Air filter element       |
| 19. Cylinder gasket       | 40. Crankshaft           | 61. Air filter cover         |
| 20. Cylinder              | 41. Main bearing two     | 62. Washer                   |
| 21. Double-threaded bolt  | 42. Key                  | 63. Wing-nut                 |

## 12. Piston Type Air Compressor Specification List

MODEL	Motor		Piston Dia. X No.	Travel Tank	Air Delivery	Pressure	Tank	Packing	N.W
	kW	HP	MM	MM	CFM	BAR	L	L x W x H CM	KG
<b>SINGLE-STAGE</b>									
V-0.17/8	1.5	2.0	51 x 2	46	6.0/0.17	8/0.8	90	99 x 46 x 76	83
V-0.25/8	2.2	3.0	65 x 2	46	8.8/0.25	8/0.8	100/150/200	115 x 48 x 86	108
W-0.36/8	3.0	4.0	65 x 3	48	12.7/0.36	8/0.8	200	120 x 48 x 85	123
V-0.48/8	4.0	5.5	90 x 2	60	17.0/0.48	8/0.8	200	142 x 54 x 93	183
W-0.67/8	5.5	7.5	80 x 3	70	23.7/0.67	8/0.8	270	151 x 58 x 96	214
W-1.25/8	7.5	10	100 x 3	80	44.2/1.25	8/0.8	360	168 x 76 x 122	370
W-1.5/8	11	15	100 x 3	100	53.0/1.5	8/0.8	400	178 x 76 x 122	430
W-2.0/8	15	20	120 x 3	100	70.7/2.0	8/0.8	400	188 x 82 x 139	430
W-3.0/10	22	30	150 x 3	100	106.0/3.0	10/1.0	500	192 x 80 x 150	950

MODEL	Motor		Piston Dia. X No.	Travel Tank	Air Delivery	Pressure	Tank	Packing	N.W
	kW	HP	MM	MM	CFM	BAR	L	L x W x H CM	KG
<b>TWO-STAGE</b>									
W-0.30/12.5	3.0	4.0	65 x 2/51 x 1	48	10.6/0.3	12.5/1.25	200	120 x 48 x 85	134
V-0.40/12.5	4.0	5.5	90 x 1/65 x 1	60	14.1/0.4	12.5/1.25	200	142 x 54 x 94	189
W-0.6/12.5	5.5	7.5	80 x 2/65 x 1	70	21.2/0.6	12.5/1.25	270	151 x 58 x 96	222
W-0.80/12.5	7.5	10	90 x 2/80 x 1	70	28.3/0.8	12.5/1.25	270	160 x 69 x 100	262
W-1.1/12.5	11	15	100 x 2/90 x 1	100	38.9/1.1	12.5/1.25	400	178 x 76 x 123	430
W-1.5/12.5	15	20	120 x 2/100 x 1	100	53.0/1.5	12.5/1.25	400	188 x 82 x 126	560