Instruction Manual

Belt-Driven Reciprocating Air Compressors

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Introduction

Thank-you and congratulations for purchasing a high-quality Puma belt-drive, reciprocating air compressor set. It has been designed and manufactured to provide many years of safe and reliable service if installed, operated and maintained in accordance with these instructions.

Please read and understand this manual before operating the compressor. Failure to do so could result in death, severe injury or substantial property damage.

If after reading this manual you still have any questions or concerns about your compressor, please contact your local authorised Puma dealer or Glenco Air & Power Pty Ltd before operating the unit.

This manual should be considered a permanent part of the compressor and should remain with it if resold.

Disclaimers

All information, illustrations and specifications in this manual are based on the latest information available at the time of publishing. The illustrations are intended as representative reference views only. Due to our policy of continuous product improvement, we may modify information, illustrations or specifications to explain or exemplify a product, service or maintenance improvement.

We reserve the right to make any change at any time without notice. Your compressor may differ slightly from the models pictured, including optional accessories.

Contents

1.0 Safety

The air compressor set should only be operated by authorised persons. All users should follow the instructions and safety warnings as (a) described in this instruction manual, (b) shown on any decals affixed to the unit and (c) described in the Plant Risk Assessment that's also available from the manufacturer.

Read and understand the separate instruction manual for the compressor's petrol or diesel engine, if so equipped, before operating the unit.

You must take reasonable care for the health and safety of both yourself and any others who may be affected by your actions. You should understand and follow all of the safety rules and working instructions described herein. You should also use your own good judgement and common sense.

All users of the compressor and any other workers likely to be in the vicinity thereof should undergo training to achieve the requisite minimum level of operator competence before placing the unit into service.

Do not permit anyone to operate the compressor without proper instruction.

The compressor should be installed or operated in a horizontal position on a firm, level and stationary foundation such as a concrete floor that is strong enough to support its weight. The unit should not impede pedestrian or vehicular traffic.

Do not locate the compressor where chemicals, dust, dirt, fibres, oil, salt, water, or flammable or explosive liquids, gases or dusts may be present. The area should not be wet or damp. The unit should be kept away from other heat sources.

Engines, motors and electrical equipment can cause heat, sparks or flames that may ignite a flammable gas or vapour. Do not operate or repair the compressor in or near a flammable gas or vapour. Do not store flammable liquids or gases in the vicinity of the compressor.

High voltage electricity can cause death or serious injury. All electrical installation, maintenance or repair work should be performed by a licensed electrician.

Electric-powered compressors should be installed in a well-ventilated area preferably indoors. If it has to be located outdoors, the unit should be provided with weather protection against precipitation and direct sunlight.

Electric-powered compressors should be connected to a properly grounded electrical supply of adequate capacity. The electricity supply circuit should comply with the AS/NZS 3000:2018 Wiring Rules. It should include a fixed setting residual current device (RCD) with a rated operating residual current not exceeding 30 mA.

Do not operate an electric-powered compressor in wet conditions. Store it indoors.

Petrol or diesel engine-powered compressors should only be installed or operated outdoors in a well-ventilated area away from building doors, windows and vents.

Petrol and diesel fuels are flammable and poisonous and can cause death or serious injury. Do not smoke or allow flames or sparks close to the engine.

Always refuel an engine-powered compressor outdoors in a well-ventilated area. Do not remove the fuel cap or refuel the compressor while the engine is running. Always turn engine off and allow it to cool down before refuelling. Do not overfill the fuel tank; leave room for the fuel to expand. Check for fuel leaks after refuelling. Do not operate the engine if a fuel leak is discovered. Equip the operating area with a Class ABE or BE portable fire extinguisher.

Petrol or diesel engine exhaust gas contains poisonous carbon monoxide that can cause death or serious injury. Ensure adequate ventilation and do not operate the engine in a closed garage or confined space.

The engine's 12 Volt battery, if so equipped, gives off explosive gases and its electrolyte contains corrosive acid, either of which can cause death or serious injury. Keep sparks, flames and cigarettes away from the battery and provide adequate ventilation when charging. Do not allow the electrolyte to contact body or clothing.

Do not use the unit to compress any gas other than air.

Compressed air can contain carbon monoxide, hydrocarbons or other poisonous contaminants that can cause death or serious injury. The compressor is not designed, intended or approved for breathing air. Do not use compressed air for breathing air applications without proper treatment.

Before operating the compressor, check the safety of any hoses, piping and pneumatic equipment connected to the discharge air outlet coupling or valve. Use only hoses, piping, fittings, air receivers, air tools, etc. connected to the compressor's discharge outlet that are safe for the unit's maximum discharge pressure (as marked on the air receiver tank's nameplate) and temperature (i.e. 100°C).

The compressor should not be operated beyond its specified design parameters, especially the maximum discharge pressure. Do not bypass or disable any of the unit's safety features.

Do not modify the compressor without written permission from the manufacturer.

Do not operate the compressor with any of its components damaged, malfunctioning, or partially or wholly removed.

Monitor the compressor and downstream compressed air system for any excessive noise, vibration, leaks or other abnormalities and repair any faults immediately.

Moving parts can cause serious injury. Keep clear of the compressor during operation. Do not operate with the drive guard removed. The compressor may start automatically. Disconnect the power supply or switch-off engine before servicing.

Hot surfaces can cause serious injury. Do not touch the metal surface of any compressor component (including piping and tank) during or shortly after operation. Allow to cool before servicing.

Do not stand on the compressor or use it as a handhold.

High pressure air can cause death or serious injury. Do not bypass, modify or remove the safety valve. Do not operate the compressor with a faulty safety valve or pressure gauge. Do not direct a compressed air discharge stream onto a person's body. High pressure air can stir up dust and debris that may be harmful. Release air slowly when draining condensate water or depressurising the compressor. Do not connect the compressor to air handling parts that cannot withstand the compressor's maximum design pressure (refer to tank nameplate).

Rusted, cracked or damaged air receiver tanks can explode and cause death or serious injury and must be replaced. Drain tank daily or after each use through valve located at bottom of tank. Release compressed air from the tank before servicing. Do not weld, drill or otherwise modify the air receiver tank.

Drain condensate from the air receiver tank only when it's depressurised. Monitor the drained condensate to check whether it poses a slip hazard, e.g. excessive condensate discharged onto a smooth, non-porous floor.

Keep children, pets and unauthorised persons away from the compressor at all times.

Before attempting to install, maintain, repair, store or transport the compressor, isolate and tag-out the power supply or disconnect the engine's spark plug, carefully release any residual air pressure from the air receiver tank and any connected air hoses or piping, and close the air outlet valve or disconnect the outlet air hose. And, if possible, allow the unit to cool down if it has been running.

During maintenance work, take care to prevent any body parts, clothing or tools from touching any hot or moving components of the compressor.

Carry out preventative maintenance on the compressor in accordance with the recommended schedule using only genuine spare parts.

Clean up any leak or spill of fuel or oil immediately.

Clothing sleeves should be tight fitting, long hair should be tied back, jewellery and other loose articles should be removed, and loose gloves should not be worn when operating or maintaining the compressor.

Wear body protection such as tight-fitting gloves, long sleeves and safety boots and also eye protection such as glasses when performing any maintenance work on the compressor.

Wear eye protection such as glasses if working close to pressurised compressed air plant.

Wear protection such as a filter respirator and goggles when blowing down with compressed air. Minimise the generation of dust by compressed air blowing.

Wear personal protection equipment such as safety glasses, ear muffs and gloves when operating the compressor or using compressed air. Wear a face mask or respirator when spraying, blowing down or otherwise creating airborne mists or dust.

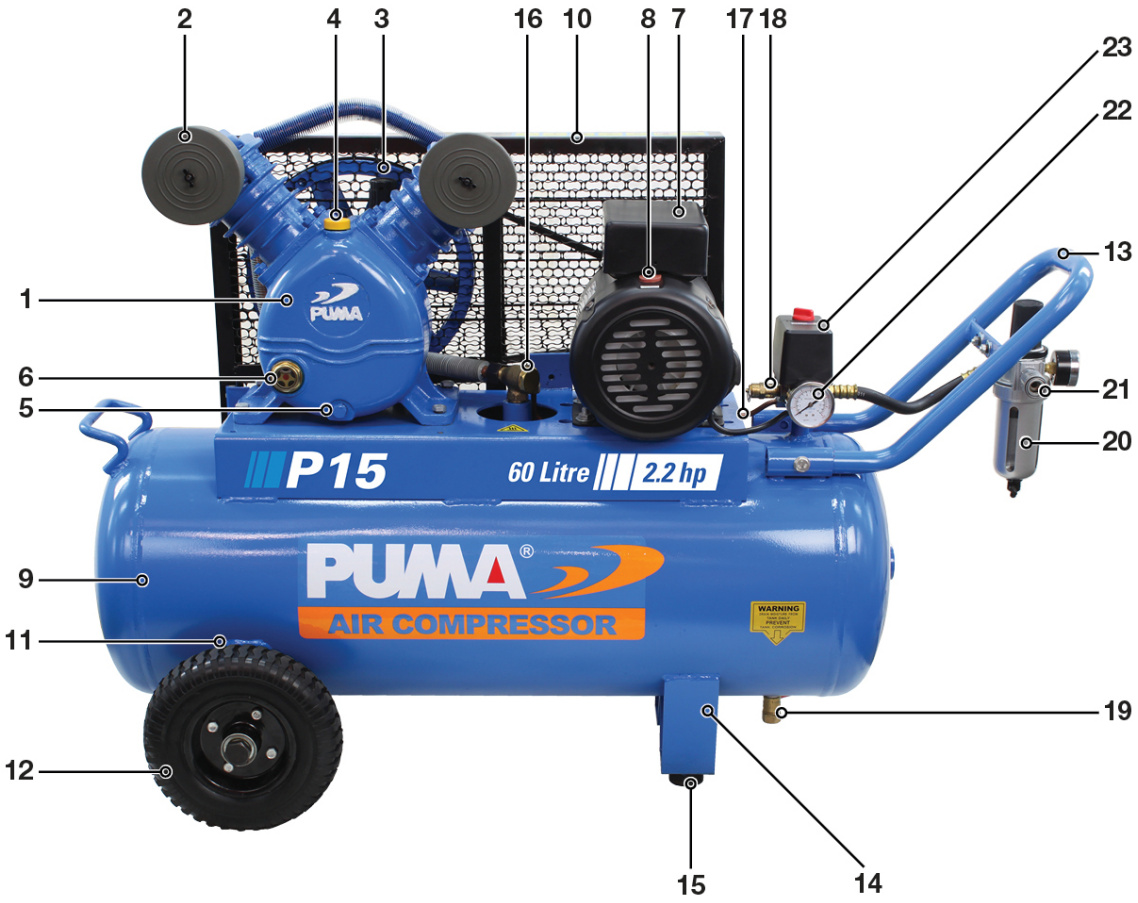
Wear appropriate eye, respiratory and body protection when spraying paint or other chemicals with compressed air. Refer to the chemical's MSDS for specific personal protective equipment (PPE) recommendations.

Do not spray flammable liquids in a confined area. Do not smoke while spraying and do not spray where sparks, flames or other ignition sources (including the compressor) are present.

Do not direct paint or other sprayed material at the compressor. Locate compressor as far away from the spraying area as possible to minimise overspray accumulating on the compressor or clogging its air filter(s).

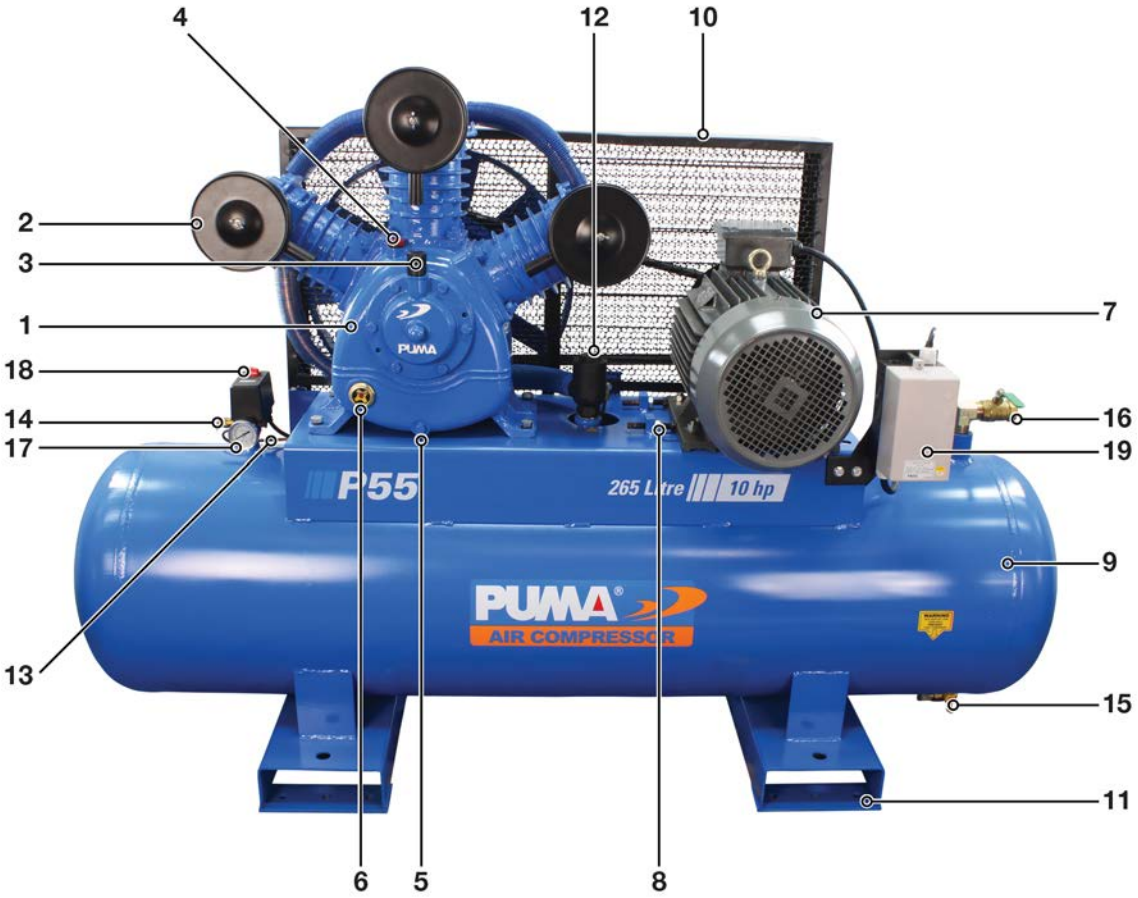
2.0 Product Familiarisation

The major components and primary controls of the various compressor types within the Puma range are identified in Figures 2-1 to 2-5 below. Users should familiarise themselves with their own compressor's features.



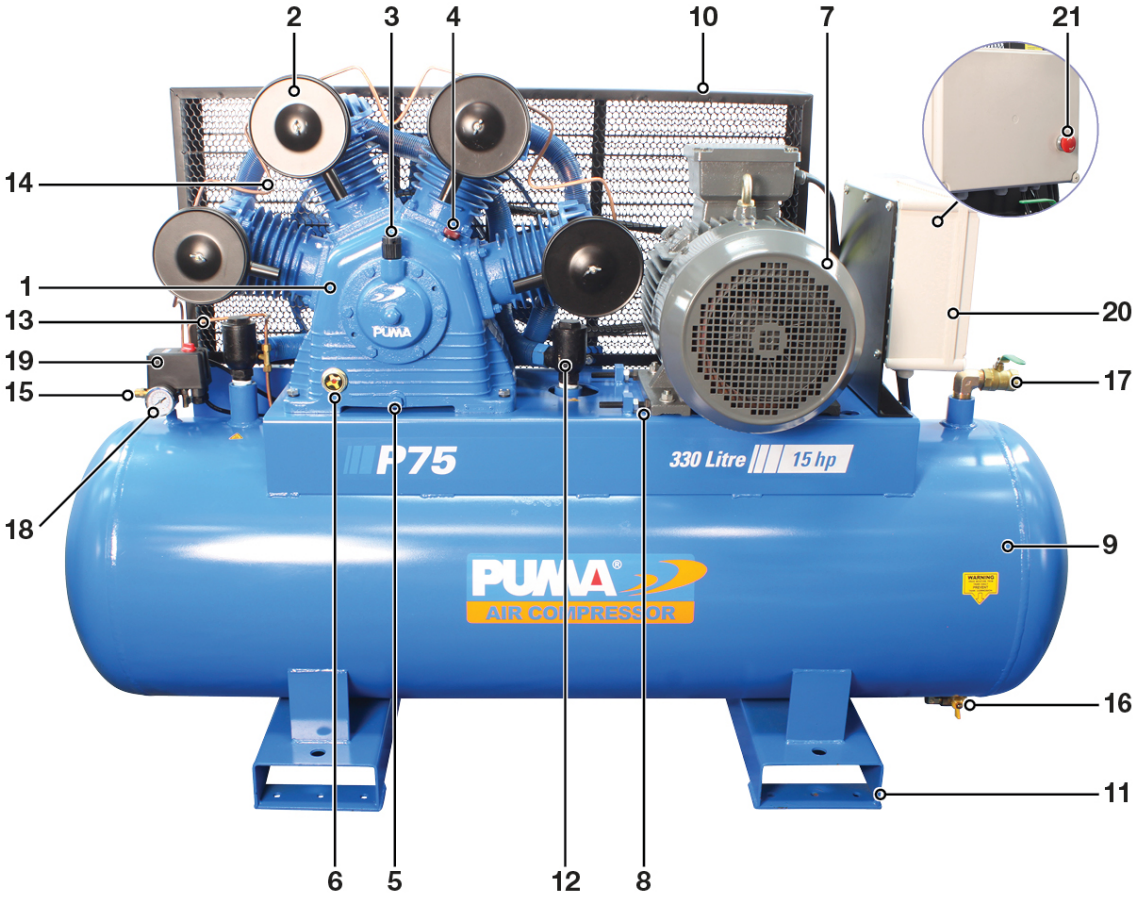
Item	Description	Item	Description
1	Compressor Pump	13	Handle
2	Air Filter	14	Foot Mounting Bracket
3	Crankcase Breather	15	Rubber Foot Mount
4	Oil Fill Cap	16	Non-Return Valve
5	Oil Drain Plug	17	Unloading Line
6	Oil Level Sight Glass	18	Safety Valve
7	Electric Motor	19	Drain Valve
8	Overload Reset Button	20	Filter-Regulator
9	Air Receiver Tank	21	Discharge Outlet Coupling
10	V-Belt Drive Guard	22	Air Receiver Pressure Gauge
11	Wheel Mounting Bracket	23	Pressure Switch
12	Wheel		

Figure 2-1 240 Volt Air Compressor



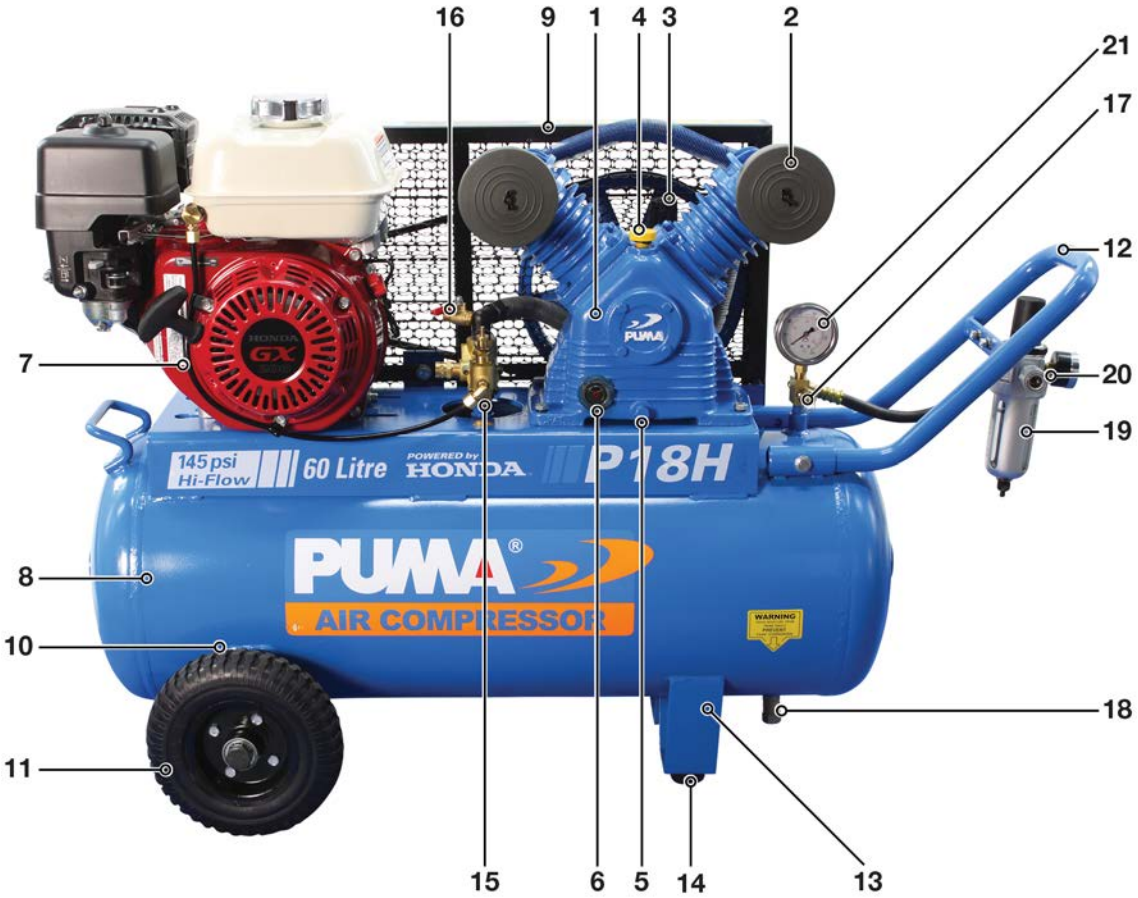
Item	Description	Item	Description
1	Compressor Pump	11	Pallet Foot Mount
2	Air Filter	12	Non-Return Valve
3	Crankcase Breather	13	Unloading Line
4	Oil Fill Cap	14	Safety Valve
5	Oil Drain Plug	15	Drain Valve
6	Oil Level Sight Glass	16	Discharge Outlet Valve
7	Electric Motor	17	Air Receiver Pressure Gauge
8	Motor Position Adjuster	18	Pressure Switch
9	Air Receiver Tank	19	DOL Starter
10	V-Belt Drive Guard		

Figure 2-2 415 Volt Air Compressor ≤ 7.5 kW (10 hp)



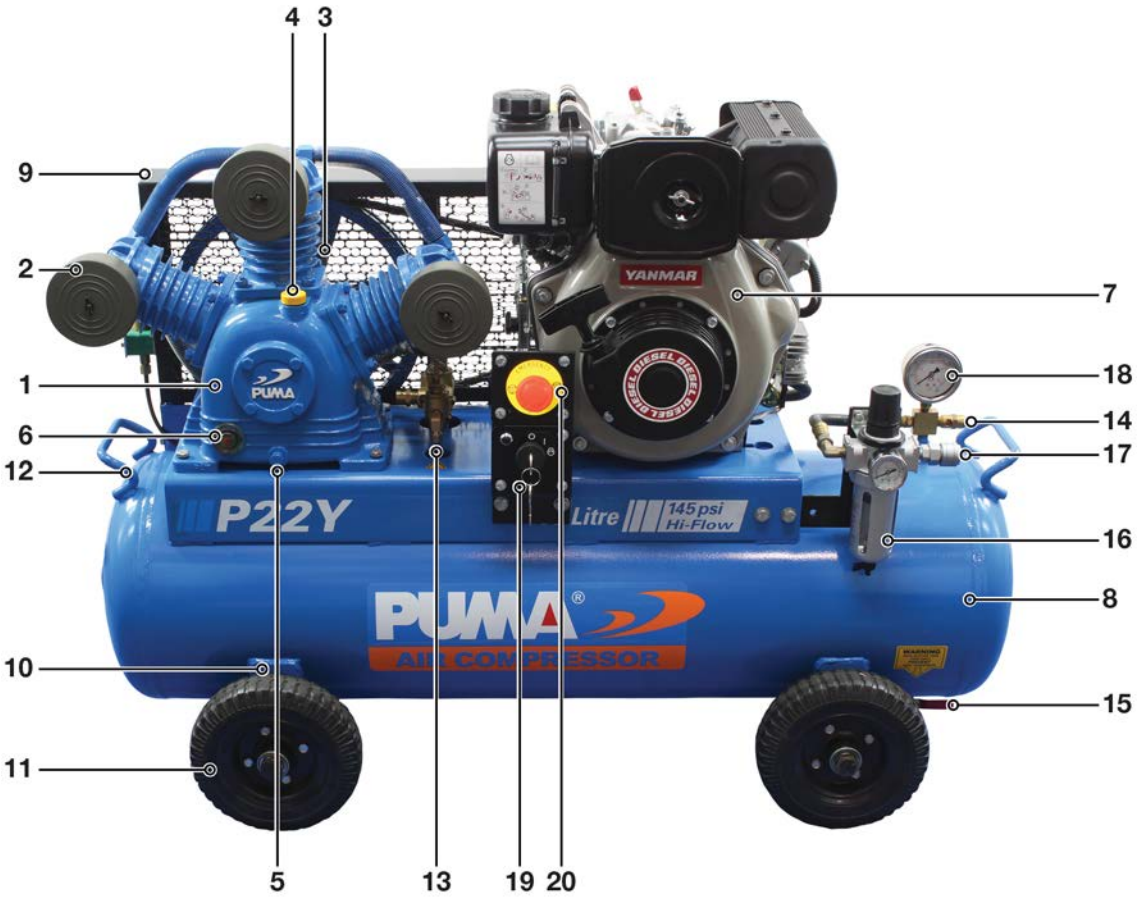
Item	Description	Item	Description
1	Compressor Pump	12	Non-Return Valve
2	Air Filter	13	Non-Return Valve Unloading Line
3	Crankcase Breather	14	Head Unloading Line
4	Oil Fill Cap	15	Safety Valve
5	Oil Drain Plug	16	Drain Valve
6	Oil Level Sight Glass	17	Discharge Outlet Valve
7	Electric Motor	18	Air Receiver Pressure Gauge
8	Motor Position Adjuster	19	Pressure Switch
9	Air Receiver Tank	20	Star-Delta Starter
10	V-Belt Drive Guard	21	Emergency Stop Button
11	Pallet Foot Mount		Solenoid Valve (Behind Item 19)

Figure 2-3 415 Volt Air Compressor 11 kW (15 hp)



Item	Description	Item	Description
1	Compressor Pump	12	Handle
2	Air Filter	13	Foot Mounting Bracket
3	Crankcase Breather	14	Rubber Foot Mount
4	Oil Fill Cap	15	Continuous Run Vent Unloading Valve
5	Oil Drain Plug	16	Easy-Start Valve
6	Oil Level Sight Glass	17	Safety Valve
7	Petrol Engine	18	Drain Valve
8	Air Receiver Tank	19	Filter-Regulator
9	V-Belt Drive Guard	20	Discharge Outlet
10	Wheel Mounting Bracket	21	Air Receiver Pressure Gauge
11	Wheel		

Figure 2-4 Honda Petrol Air Compressor



Item	Description	Item	Description
1	Compressor Pump	12	Handle
2	Air Filter	13	Continuous Run Vent Unloading Valve
3	Crankcase Breather	14	Safety Valve
4	Oil Fill Cap	15	Drain Valve
5	Oil Drain Plug	16	Filter-Regulator
6	Oil Level Sight Glass	17	Discharge Outlet
7	Diesel Engine	18	Air Receiver Pressure Gauge
8	Air Receiver Tank	19	Key Start Panel
9	V-Belt Drive Guard	20	Emergency Stop Button
10	Wheel Mounting Bracket		Easy-Start Valve (Behind Item 13)
11	Wheel		

Figure 2-5 Yanmar Diesel Air Compressor

3.0 Application and Function

Your Puma air compressor is an air cooled, reciprocating type fitted with an oil lubricated, single-stage compressor pump. It is supplied as a compact, self-contained, air receiver tank mounted unit that is automatically regulated and driven by an electric motor or internal combustion engine through V-belts.

The compressor is intended to provide compressed air in a multitude of applications, for example, to power pneumatic tools, operate air dusters and spray guns, inflate tyres, and supply air for pneumatic valves and actuators. It is commonly used as the primary source of compressed air for home garages, workshops, service stations, tyre shops, factories, farms, mobile service vehicles, and so on. Supplementary duties can include furnishing compressed air at an isolated location not serviced by the regular shop air system, and standby service when larger compressors are shut down.

Air discharged from an oil lubricated compressor contains small amounts of oil, water and particulates amongst other contaminants. Virtually all applications require treatment of the compressor's output air to make it suitable for the end use. Air quality treatments such as filtration and drying are the most common requirements together with pressure regulation. The use of compressed air lubricators to protect pneumatic tools is also commonplace nowadays. Failing to install appropriate compressed air treatment equipment will likely result in damage to pneumatic devices or spray-painted finishes.

Where installed, compressed air filtration or drying equipment should be located downstream from the air receiver tank and ahead of any pressure regulator. Lubricators, on the other hand, should be installed as the last stage of treatment and located behind or downstream from any pressure regulator.

Please contact your Puma dealer or Glenco Air & Power Pty Ltd for specialist advice about compressed air treatment products.

The basic principle of the compressor's operation is as follows:

- On the downward suction stroke of the compressor pump piston, air at atmospheric pressure enters the cylinder through the inlet air filter and the inlet valve located in the cylinder head.

- On the upward compression stroke, the piston compresses the air to the final discharge pressure and forces it out through the outlet valve in the cylinder head, past the non-return valve and then into the air receiver tank.

The requisite power to drive the compressor pump is provided by the prime mover, i.e. electric motor, petrol engine or diesel engine, through a V-belt drive transmission.

On electric models, the pressure switch turns on the motor when the air receiver tank is at or below the minimum "cut-in" pressure. The compressor then operates continuously until the tank pressure reaches the maximum "cut-out" level whereupon the pressure switch turns off the motor. Air can then be heard leaking out from underneath the pressure switch for a short time while the unloader valve releases air pressure trapped in the discharge line between the compressor pump and the non-return valve. This allows the compressor to re-start more easily without being under load at the outset.

The pressure switch on electric-powered, oil lubricated, single-stage compressors is factory pre-set

with cut-in and cut-out pressures of approximately 600 kPa (87 psi) or 800 kPa (116 psi) and 800 kPa (116 psi) or 1,000 kPa (145 psi), respectively, depending upon the model. These pressure ranges are suitable for the vast majority of compressed air applications supplied by an electric air compressor. Most pneumatic tools are designed for a supply pressure of only 620 kPa (90 psi). Unless absolutely necessary for a special application, compressor operation at higher pressures is not recommended because it increases electricity consumption and compressor pump wear and tear.

Electric models with a standard cut-out pressure of 800 kPa (116 psi) can be adjusted up to a cut-out pressure not exceeding 900 kPa (130 psi), whilst those with a standard cut-out pressure of 1,000 kPa (145 psi) should not be adjusted to a higher cut-out pressure.

On engine-driven models, a continuous run vent unloading valve or a pilot valve regulates the operation of the compressor pump to maintain the air receiver tank pressure between the pre-set cut-in and cut-out levels. Rather than turn off the engine when the cut-out pressure is reached, which would necessitate physically re-starting the engine if more compressed air is required, these control valves switch the compressor to run in “unloading” mode. A continuous run vent unloading valve achieves this by dumping air discharged from the compressor pump to the atmosphere via an exhaust port. A pilot valve actuates a head unloader in each cylinder head to keep the inlet valve open, whereupon air can be felt pulsing in and out of the inlet air filter whilst the compressor pump is in “unloading” mode. When the pressure drops to the cut-in value, the continuous run vent unloading valve or the pilot valve deactivates the unloading function and the compressor returns to “pumping” mode.

An added feature to reduce fuel consumption, noise emission and wear and tear is the automatic throttle control system whereby engine speed is reduced to idle whenever the compressor is in unloading mode and subsequently increased to maximum revolutions when the compressor switches to pumping mode.

On engine-driven, single-stage compressors the continuous run vent unloading valve or pilot valve is factory pre-set with cut-in and cut-out pressures of approximately 800 kPa (116 psi) and 1,000 kPa (145 psi), respectively. This is the optimum range for most applications using an engine-driven air compressor and it should not be adjusted higher.

If the pressure switch or pilot valve does not shut off the compressor pump discharge into the air receiver tank at the cut-off pressure setting, the safety valve will protect the air tank against over pressurising by automatically releasing air when the pressure exceeds a pre-set value.

Puma air receiver tanks are designed and manufactured to comply with the requirements of the ASME Boiler and Pressure Vessel Code and all Australian Workplace Health and Safety Regulations. A copy of the pressure vessel Manufacturer’s Data Report is available from your Puma dealer or Glenco Air & Power Pty Ltd upon request.

The non-return valve is a one-way valve that allows air to enter the tank from the compressor pump, but prevents the reverse of this flow.

The drive guard covers the V-belt(s), engine or motor pulley, and the compressor pump pulley. It is a critical safety device.

A drain valve is fitted to the bottom of the air receiver tank to permit the release of water condensate that would otherwise corrode the tank and damage pneumatic devices.

The pressure within the air receiver tank is indicated on its pressure gauge.

4.0 Receipt and Inspection

Ensure that adequate lifting equipment is available for unloading and moving the air compressor to the installation site. Lifting equipment, slings, etc. must be properly rated for the weight of the compressor.

Lift the compressor from the delivery vehicle by the shipping pallet only. Do not use the electric motor lifting eyebolt to lift the entire compressor. The motor lifting eyebolt is only to be used for removing the motor from the compressor unit.

Do not work or walk under the compressor while it is suspended in the air.

Inspect the compressor upon receipt for any shipping damage or missing parts. If any problems are apparent, make an appropriate note on the delivery receipt before signing and then contact your Puma dealer immediately. Do not operate unit if damaged during shipping, handling or use.

Read the compressor model label to verify it is the correct one as ordered. For electric compressors, check the motor nameplate to verify that it is compatible with the available electricity supply. Make sure that electrical enclosures and components are appropriate for the installation environment.

5.0 Installation

5.1 Handling

Remove the air compressor from its shipping carton and pallet before mounting. Do not use the timber shipping pallet for mounting the compressor.

Portable wheel-mounted compressors should only be lifted manually as a last resort and always as a joint lift by at least two persons. Avoid injury and do not attempt to lift a compressor by yourself. Use a mechanical lifting aid, such as a forklift or crane, whenever possible in conjunction with two rope or web slings wrapped under the air receiver tank.

Stationary foot-mounted compressors should only be lifted with a mechanical aid. The foot mounts are designed for ease of handling with a forklift in preference to lifting with slings as described above.

Compressors have a high centre of gravity due to the elevated position of the compressor pump and engine or motor, which are relatively heavy components compared to the air receiver tank. Take care when attaching slings to ensure that the compressor does not tip over. Also, check that the slings do not damage any components especially including the piping, wiring, pressure switch or pilot valve, safety valve and pressure gauge.

5.2 Electric Air Compressors

Select a clean, dry and well-lit area most preferably indoors with plenty of space for proper ventilation, cooling air flow and accessibility. Locate the compressor at least 300 mm (1 ft) from walls for ventilation or preferably no less than 600 mm (2 ft) to allow for maintenance access. Ensure that the power supply is clearly identified and accessible. Always provide sunshade and shelter from moisture if the compressor has to be located outdoors.

5.2.1 Portable Wheel-Mounted Type

Assemble the supplied axles and wheels onto the compressor. Apply a small amount of lubricant to the axle and wheel rubbing surfaces before tightening the axle bolts. Place the compressor on a firm, level surface that is strong enough to support its weight. Use wheel chocks to prevent movement of the compressor during operation and possible straining of the electricity supply cable or air hose. Do not place on an incline during use as this will interfere with the compressor pump's splash lubrication system.

Some models are equipped with only two – rather than four – wheels and also two rubber foot mounts. Assemble the latter onto the foot mounting bracket with the supplied fasteners. These compressors also require their removeable carry handle to be attached using the supplied fasteners. And depending on the model, some also require the filter-regulator to be attached to this handle.

Portable type compressors may alternatively be installed for fixed stationary or mobile applications by bolting them down loosely through all four of their foot or wheel mounting brackets in a manner that doesn't impart any stress on the air receiver tank. Flexible vibration isolators must be used.

5.2.2 Stationary Foot-Mounted Type

Bolt the compressor loosely to a firm, level foundation such as a concrete floor that is strong enough to support its weight. Do not bolt uneven feet tightly to the foundation as this will cause excessive stress on the air receiver tank. Use metal shims to pack under any "short" feet, if necessary, which is most often due to the floor surface not being perfectly level rather than the mounting feet being uneven. The use of flexible vibration isolators underneath the mounting feet is highly recommended and will reduce noise emissions.

5.3 Petrol and Diesel Air Compressors

Keep the engine at least 1 metre (3 ft) away from building walls and other equipment to prevent a fire hazard and ensure that the exhaust does not blow onto any surface. An exhaust deflector is supplied with the compressor for use, if necessary. Install the compressor in a location with plenty of space for proper ventilation, cooling air flow and accessibility. Do not install or operate the compressor in a confined area. Provide sunshade and shelter from moisture wherever possible.

5.3.1 Portable Wheel-Mounted Type

Assemble the supplied axles and wheels onto the compressor. Apply a small amount of lubricant to the axle and wheel rubbing surfaces before tightening the axle bolts. Use only the supplied rubber wheels or equivalent vibration isolators. Place the compressor on a firm, level surface that is strong enough to support its weight. Use wheel chocks to prevent movement of the compressor during operation and possible straining of the air hose. Do not place on an incline during use as this will interfere with the compressor pump's splash lubrication system.

Some models are equipped with only two – rather than four – wheels and also two rubber foot mounts. Assemble the latter onto the foot mounting bracket with the supplied fasteners. These compressors also require their removeable carry handle to be attached using the supplied fasteners. And depending on the model, some also require the filter-regulator to be attached to this handle.

Portable type compressors may alternatively be installed for fixed stationary or mobile applications by bolting them down loosely through all four of their foot or wheel mounting brackets in a manner that doesn't impart any stress on the air receiver tank. Flexible vibration isolators must be used.

5.3.2 Stationary Foot-Mounted Type

The correct mounting of a stationary engine-driven compressor set is essential for vibration control. Failure to install the compressor set properly will likely result in misuse damage to the unit, which is not covered by warranty.

The compressor can be operated freestanding on a firm and level foundation if mounted on its factory supplied vibration isolators as shown in Figure 5-1. Caution: The unit will move around when the engine is running and may need to be loosely restrained in position.

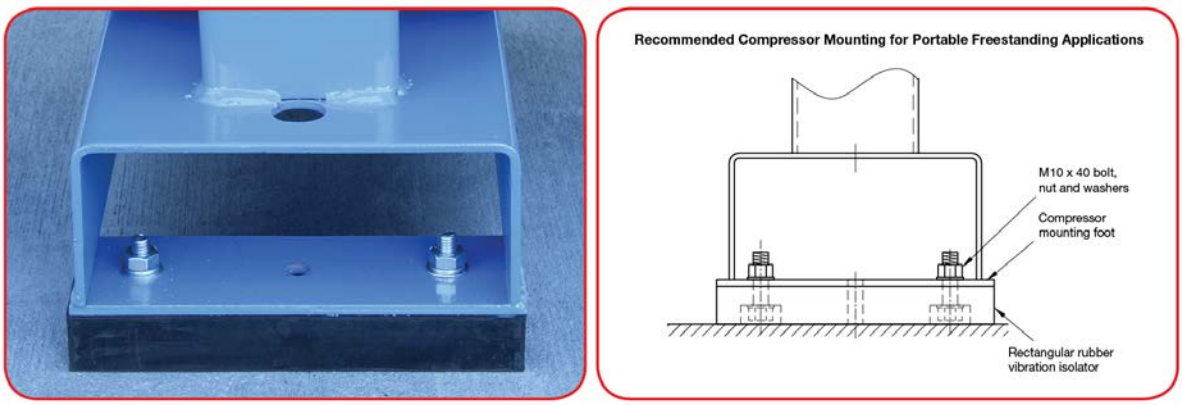


Figure 5-1 Freestanding Foot-Mounting Arrangement

The compressor can be bolted to a firm, level foundation that is strong enough to support its weight such as a concrete floor or alternatively secured to a vehicle chassis or tray for mobile applications. Flexible vibration isolators must be used between the compressor and mounting surface. Do not bolt uneven feet tightly to the foundation as this will cause excessive stress on the air receiver tank. Use metal shims to pack under any “short” feet, if necessary, which is most often due to the floor surface not being perfectly level rather than the mounting feet being uneven. There are three common methods used for such bolted-down, foot-mounting installations:

(a) The basic method as shown in Figure 5-2 has the compressor being bolted-down loosely through the factory supplied vibration isolators with a gap of 1 to 3 mm to allow for vertical movement. One should apply thread lock adhesive such as Loctite® or use a nylon insert lock nut to prevent the central fastener from unscrewing.

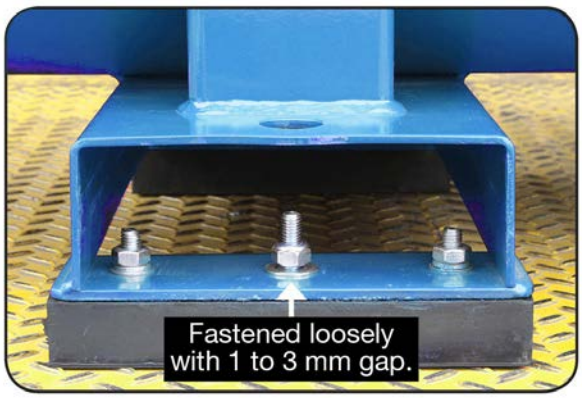


Figure 5-2 Basic Bolted-Down, Foot-Mounting Arrangement

(b) A preferred method as shown in Figure 5-3 is for the compressor set to be bolted-down loosely through the factory supplied compression and rebound vibration isolators with a gap of 1 to 3 mm to allow for vertical movement. One should apply thread lock adhesive such as Loctite® or use a nylon insert lock nut to prevent the central fastener from unscrewing.

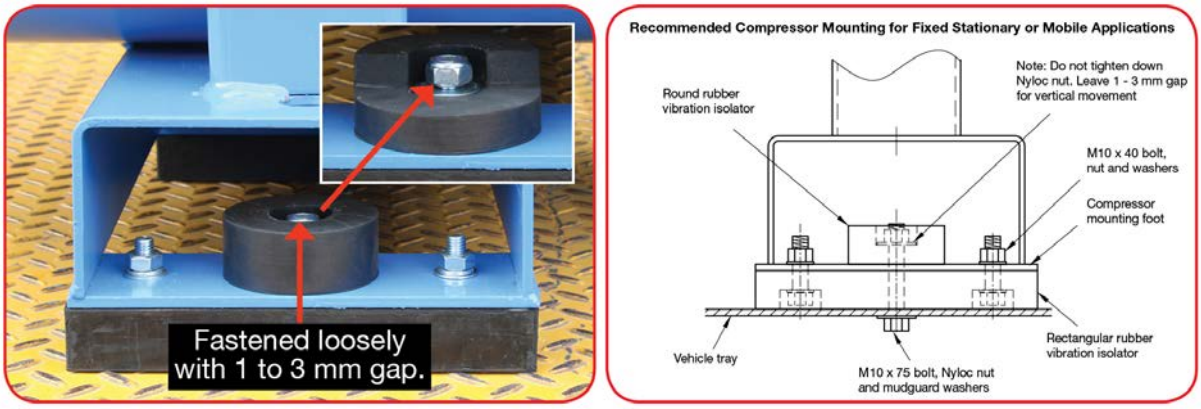


Figure 5-3 Preferred Bolted-Down, Foot-Mounting Arrangement – Option 1

(c) Another preferred method as shown in Figure 5-4 is for the compressor set to be mounted on correctly selected and installed industrial vibration isolators. Specialist providers include Mackay (www.mackayrubber.com.au) and Embelton (www.embelton.com). Caution: It is critically important to specify whether the compressor set will be used in a fixed stationary or mobile application when selecting such industrial vibration isolators.

Figure 5-4 Preferred Bolted-Down, Foot-Mounting Arrangement – Option 2

Certain mounting arrangements should never be used because they will likely result in misuse damage to the unit, which is not covered by warranty. These are shown in Figure 5-5.

A vehicle or trailer-mounted compressor must only be operated when in a stationary, horizontal position.

Fill the fuel tank with petrol or diesel as appropriate and check the engine oil level and refill if necessary in accordance with the engine manufacturer's instructions.

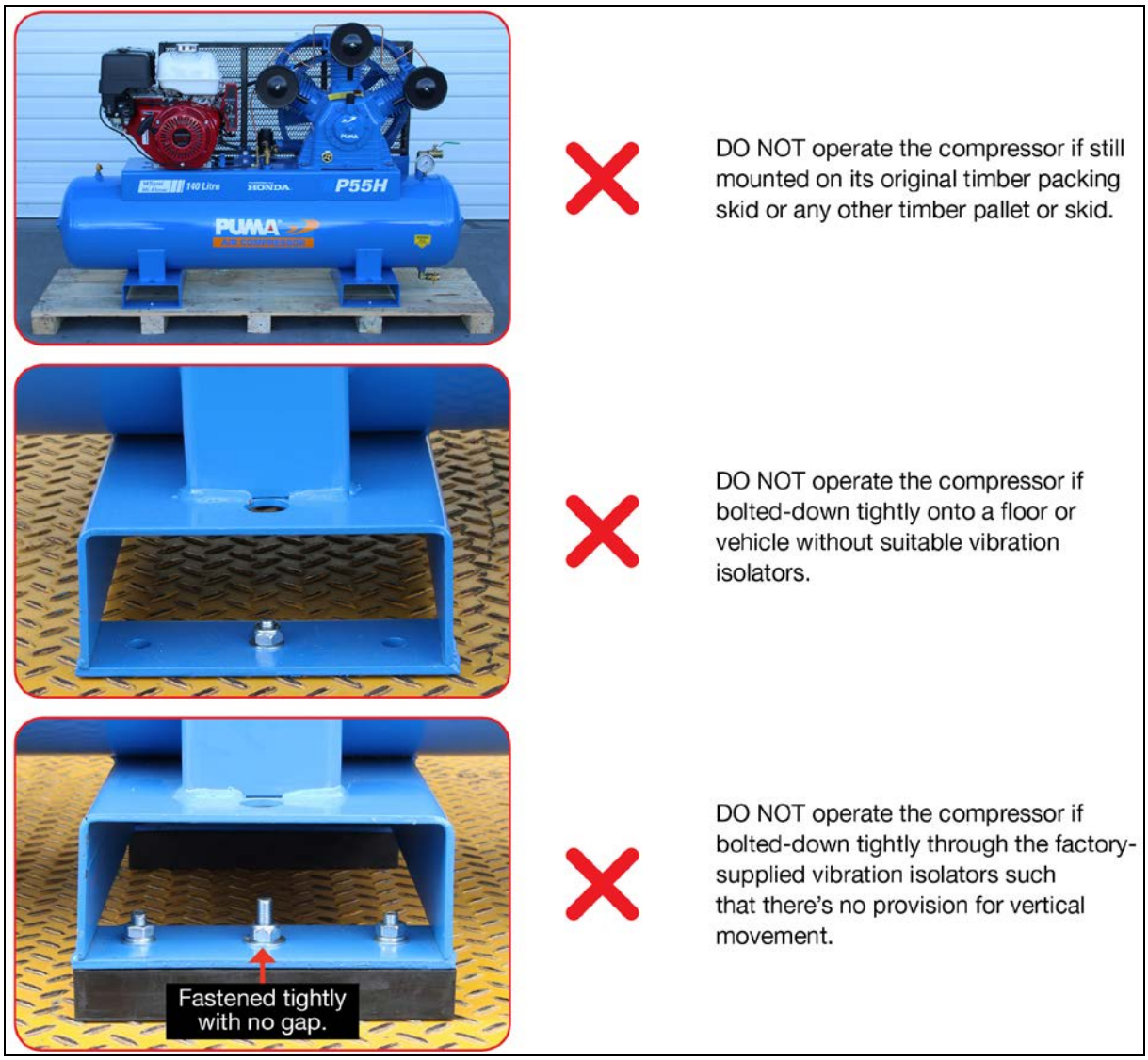


Figure 5-5 Prohibited Bolted-Down, Foot-Mounting Arrangements

5.4 Ambient Temperature

The air compressor is designed for operation in ambient temperatures of between 0°C (32°F) and 40°C (104°F).

Where possible in hot areas, the compressor should be operated in the shade to prevent additional heat load due to solar radiation.

In cold areas subject to sub-zero temperatures, take precautions to prevent water condensate freezing inside the compressor and possibly causing damage. Store the compressor indoors when not in use if possible. Drain the condensate daily from the air receiver tank and filter-regulator, if so equipped, and leave the drain valve(s) open when the compressor is not in use. Also, check that the safety valve is not frozen closed before using the compressor.

5.5 Noise Considerations

Check the State Workplace Health and Safety Regulations or Local Council Regulations regarding

acceptable noise levels. To reduce excessive noise, use vibration isolators, fit intake silencers, install remote air inlets, relocate the compressor, or construct a ventilated enclosure or baffle walls.

5.6 Discharge and Condensate Piping

All piping, fittings, air receiver tanks, and so on connected to the compressor discharge must be certified safe for the unit's discharge pressure and temperature. Do not use PVC plastic in the compressed air discharge line.

Use pipe thread sealant on all threads and assemble joints tightly to prevent air leaks and energy wastage.

Mainline piping used to convey air throughout a system should be sized to accommodate the maximum flow rate of the compressor, which is also referred to as its free air delivery. A basic guide to the selection of minimum pipe size diameter for a given flow rate and pipeline length is given in Table 5-1, or one can refer to the detailed selection guides that are available for the various types of proprietary compressed air piping systems. Branch piping should be sized in a similar manner, but the design flow rate should instead be based on the total air consumption of the tools or appliances running off that branch.

To allow for vibration and to prevent piping stresses being transmitted to the compressor, the connection between the unit's discharge valve and the mainline piping system should be made using a flexible air hose or coupling.

The minimum air hose internal diameter (ID) can be selected in accordance with Table 5-2 or by referring to the hose manufacturer's guidelines, and again with consideration as to whether the hose is a main distribution line or a branch line.

One should always err to the larger size when selecting compressed air pipes or hoses, as a too-small line increases pressure drop and energy loss. A larger air line is more energy efficient, provides additional air storage capacity and reduces the severity of air pressure fluctuations during use.

Table 5-1
Recommended Minimum Pipe Size for Compressed Air Lines
(Schedule 40 Steel Pipe)

	Length of Pipeline (metres)							
Flow (L/m)	**7.5**	**15**	**22.5**	**30**	**45**	**60**	**75**	**90**
142	½"	½"	½"	½"	½"	½"	½"	½"
283	½"	½"	½"	¾"	¾"	¾"	¾"	¾"
425	½"	¾"	¾"	¾"	¾"	¾"	¾"	¾"
566	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"
708	¾"	¾"	¾"	¾"	¾"	1"	1"	1"
849	¾"	¾"	¾"	¾"	1"	1"	1"	1"
991	¾"	¾"	1"	1"	1"	1"	1"	1"
1,132	¾"	1"	1"	1"	1"	1"	1"	1"
1,415	1"	1"	1"	1"	1"	1"	1"	1"
1,670	1"	1"	1"	1"	1-¼"	1-¼"	1-¼"	1-¼"

Table 5-2 Recommended Minimum Hose ID for Compressed Air Lines			
	Length of Hose (metres)		
Flow (L/m)	**10**	**20**	**30**
283	⅜"	⅜"	⅜"
566	⅜"	⅜"	⅜"
1,132	½"	½"	½"
1,698	¾"	¾"	¾"

To convert metres to feet, multiply by 3.281. To convert L/min to cfm, divide by 28.3.

If installing a condensate discharge line from the tank drain valve, the piping must be at least one size larger than the connection, as short and direct as possible, and routed to a suitable drain point or waste container. Condensate contains traces of compressor lubricating oil and other substances that should not be discharged into drains or sewers without pre-treatment.

5.7 Electrical Connection

All electrical installation and service work must be performed by a licensed electrician in accordance with all applicable regulations.

The electric motor rating as shown on the motor nameplate and the power supply must have compatible voltage, phase and frequency characteristics.

The required size of electrical wiring between the power supply and the electric motor varies according to motor power and other factors. Adequately sized wiring must be installed to protect against excessive voltage drop during compressor start-up and running. If connecting other electrical equipment to the same circuit, consider the total electrical load when selecting the proper wire size. Overheating, short circuiting and fire damage may result from undersize wiring.

The compressor must be installed and operated with a power cord or cable that has a properly connected grounding wire of adequate size.

Portable electric generators are not recommended for powering compressors unless they have ample generating capacity to provide the requisite starting and running currents without appreciable voltage or frequency drop.

5.7.1 240 Volt Air Compressors

These models are shipped pre-wired with a compliant flexible electrical supply lead and three-pin plug ready for “plug and play” installation.

The compressor’s electrical supply lead should be plugged directly into a suitable power point. Avoid using extension leads because they can damage the electric motor due to under-voltage supply. This is the most common cause of compressor failure and is not covered by warranty. Always use additional air hose or pipe instead of an electrical extension lead.

Compressors fitted with a standard three-pin 10 Amp electrical plug (on which all three pins have the same cross-section) can be connected to a standard 10 Amp socket provided that there are no other electrical appliances connected to the same branch circuit. They can also be connected to a heavy

duty 15 Amp socket.

Compressors fitted with a heavy duty three-pin 15 Amp plug (on which the earth pin is noticeably larger in cross-section than the other two pins) must only be connected to a heavy duty 15 Amp socket. No other electrical appliances should be connected to the same branch circuit. Under no circumstances should a 15 Amp plug be modified to fit into a 10 Amp socket. This is a dangerous practice and will void warranty on the motor.

The direction of motor rotation has been correctly pre-set at the factory during manufacture. If fitting a replacement motor, check that its direction of rotation is anti-clockwise when viewed looking onto the motor output shaft or compressor pump pulley.

Each 240 Volt motor is fitted with its own manual reset thermal overload protection device. In the event that it is activated due to an overload condition, it is necessary to allow the motor to cool down before the overload switch can be manually reset.

5.7.2 415 Volt Air Compressors

These models are shipped with a pre-wired four-core flexible electrical supply lead that must be either terminated in a suitable four-pin plug or hard-wired for connection to a dedicated electrical supply of adequate capacity fitted with a circuit breaker or fused disconnect switch. The minimum recommended circuit breaker ratings listed in Table 5-3 serve as a general guide only for dedicated supply to the compressor. This electrical installation work must be carried out by a licensed electrician.

Table 5-3
415 Volt Electricity Supply

Air Compressor Model	Main Motor Rating (kW)	Main Motor Starting Method	Maximum Running Current (A)	Minimum Circuit Breaker Rating (A)	Circuit Breaker Tripping Curve
P25	3	Direct On Line	6.4	10	D
P30	4	Direct On Line	8.3	16	D
P40	5.5	Direct On Line	12.2	20	D
P55	7.5	Direct On Line	16.1	25	D
P75	11	Star-Delta	23.0	32	C or D

The maximum running current may exceed the specified value in practice if the electricity supply voltage or power factor are below their rated levels. A four-wire conductor is required for the electricity supply, i.e. three-phase and earth; no neutral is required. For additional protection against electric shock, it is recommended to include a fixed setting residual current device (RCD) with rated operating residual current not exceeding 30 mA.

The direction of motor rotation must be checked and properly adjusted during electrical installation. For correct compressor operation, the motor rotation must be anti-clockwise when viewed looking onto the motor output shaft. This can be readily verified by looking at the compressor pump pulley through the drive guard. When viewed looking onto the pulley side (i.e. looking onto the “rear” of the drive guard), the compressor pump’s direction of rotation must be anti-clockwise.

Each 415 Volt compressor is fitted with an adjustable manual reset thermal overload relay that is

either built into the direct-on-line (DOL) starter (on models ≤ 7.5 kW) or the star-delta starter (on the 11 kW model only). The overload relay settings are listed in Table 5-4.

Table 5-4
415 Volt Overload Relay Settings

Air Compressor Model	Overload Relay Setting (A)
P25	7
P30	9
P40	13.5
P55	17.5
T75	14.5 (= 1 ÷ √3 × 25)

5.7.3 12 Volt Electric Start Petrol and Diesel Air Compressors

Honda electric-start petrol air compressors must be connected to a 12 Volt battery in order to utilise this feature; if no battery is connected, these models can still be pull-started manually and otherwise operate normally.

Yanmar electric-start diesel air compressors will not run unless connected to a 12 Volt battery irrespective of whether they're manually or electrically started. This is because the engine is fitted with a fail-safe energise-to-run fuel solenoid that automatically shuts off the fuel flow if the 12 Volt battery power supply is disconnected or becomes excessively discharged (i.e. the battery voltage is nil or too low).

Use a 12 Volt automotive battery of sufficient capacity and cold cranking performance not less than that specified in Table 5-5. It is essential to use a sealed, maintenance free battery to prevent electrolyte loss due to vibration when the compressor is running or else during handling and transport. Ideally, it is recommended to use a performance matched Puma 12 Volt battery kit that is available from your local authorised Puma dealer; as shown in Figure 5-8, the kit includes a battery, battery mounting bracket, battery clamp, colour-coded battery cables and the requisite fasteners.

For vehicle mounted applications, the compressor can instead be connected to the vehicle's 12 Volt electrical system by a qualified automotive electrician. Take care not to connect a heavy vehicle's 24 Volt power supply to your Puma compressor because it will cause damage to the Honda or Yanmar engine's electrical system that is not covered by warranty.

Table 5-5
12 Volt Battery Requirements

Engine Make & Model	Capacity (Ah)	Cold Cranking Performance (CCA)
Honda GX200	12	Not Specified
Honda GX270	14	Not Specified
Honda GX390	18	Not Specified
Yanmar L48	18	100
Yanmar L70	24	135
Yanmar L100	35	200

Observe the following procedure for connecting the battery to your compressor:

(a) Connect the battery positive (+) cable to the starter solenoid terminal as shown in Figure 5-6.

(b) Connect the battery negative (−) cable to an engine mounting bolt, frame bolt, or other good engine ground connection as shown in Figure 5-7.

(c) Connect the battery positive (+) cable to the battery positive (+) terminal.

(d) Connect the battery negative (−) cable to the battery negative (−) terminal.

Take care not to connect the battery in reverse polarity as this may damage the battery charging system.

Check the battery cable connections to be sure the cables are tight and free of corrosion. Remove any corrosion, and coat the terminals and cable ends with corrosion-preventing grease.

Check that the battery cables cannot rub or chafe against any surface due to vibration from operation, handling or transport. Otherwise the battery cable insulation may wear through and allow the conductor to short circuit and cause damage.

Remove the cable from the battery negative (−) terminal before carrying out any maintenance.

The procedure for safely disconnecting the battery from your compressor is the reverse of the connecting procedure, i.e. proceed in the sequence of (d) → (c) → (b) → (a) per the above.

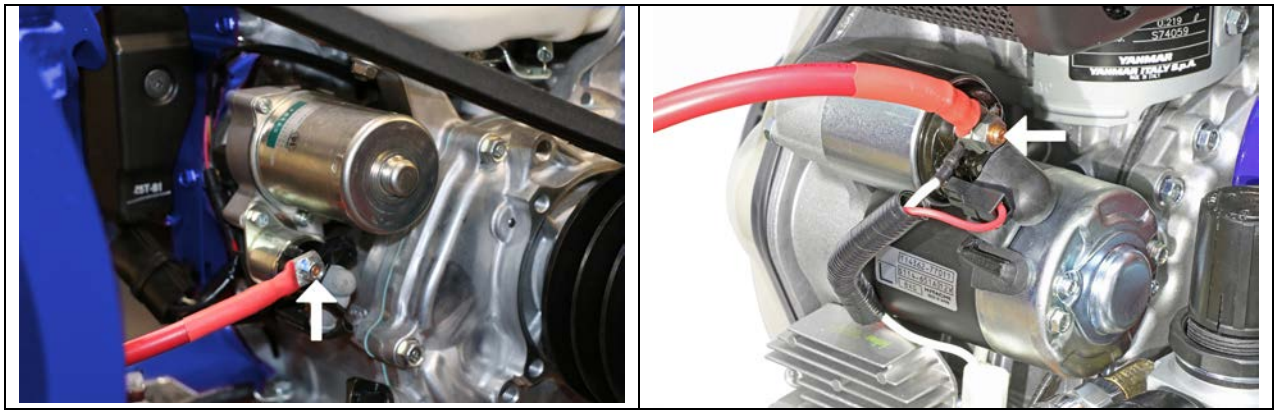


Figure 5-6 Battery Positive (+) Cable Connection to Starter Solenoid

Figure 5-7 Battery Negative (-) Cable Connection to Engine Mounting Bolt

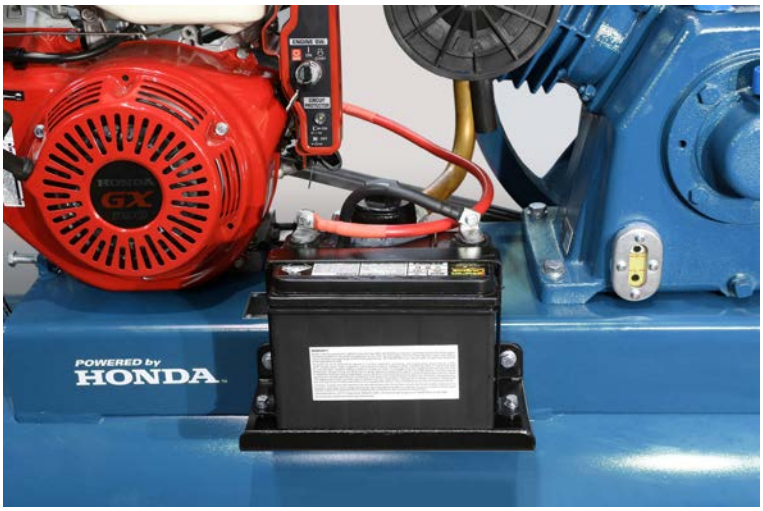


Figure 5-8 Puma 12 Volt Battery Kit Installed

6.0 Operation

6.1 Precautions

Before operating the air compressor, always check first to ensure that it has been received, inspected and installed in accordance with the instructions herein. Rectify any discrepancies before proceeding further.

Check the compressor pump's oil level by looking at the sight glass. The oil level should be at the top of the red circle on the oil sight glass as shown in Figure 6-1. Add oil, if required, through the oil fill cap and only when the unit is not operating. Do not overfill with oil. Refer to the Maintenance and Repair section for recommended oil specifications.

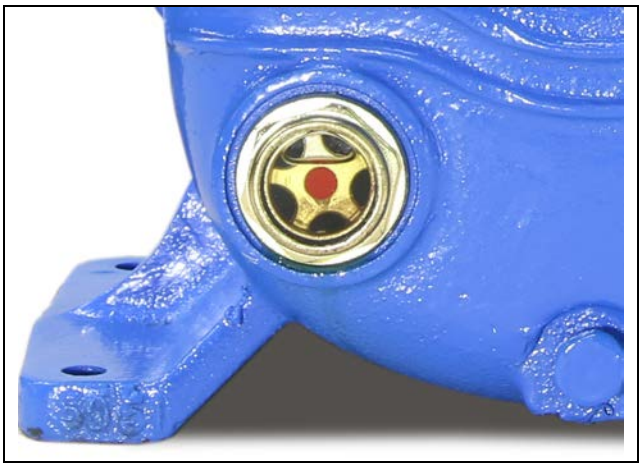


Figure 6-1 Compressor Pump Full Oil Level

Check that the outlet valve, if fitted, is closed. Any connected air hose(s) or distribution pipe(s) should not be open to the atmosphere; this is to prevent any injuries from "hose whip" or high-pressure air discharge and also to avoid unattended compressed air discharge to the atmosphere. In the event that an air line is cut or broken, the air supply must be immediately closed off at the compressor either by shutting the discharge outlet valve or switching off the compressor. Do not attempt to "catch" the loose end of a discharging air hose.

Check that the tank drain valve is closed.

If equipped with a filter-regulator, check that its drain valve is in the closed / semi-automatic position with the arrow symbol on its handle pointing vertically upwards (▲) as shown in Figure 6-2.

Take care when discharging air from the tank, i.e. from the safety valve, the drain valve or the air outlet, to ensure that it does not cause dirt, stones, metal swarf or other particles to be blown around.

Any unusual noise or vibration likely indicates a problem with the compressor. Do not continue to operate the unit until the source of the problem has been identified and corrected.

Figure 6-2 Filter-Regulator Condensate Drain Valve in the Semi-Automatic Position

6.2 240 Volt Air Compressors

Check that the electricity supply is turned off.

Check that the compressor's pressure switch is turned to the "OFF" position.

Connect an air hose to the compressor's discharge outlet coupling by pulling back the locking collar on the socket, inserting a compatible Nitto-style male plug (fitted to one end of the air hose) into the socket, and then releasing the locking collar. Check that the connection is secure by ensuring that the locking collar is fully engaged and also by trying to pull the air hose away from the coupling.

Plug in the compressor's electrical supply lead.

Switch on the electricity supply.

Turn the compressor's pressure switch to "ON" position. The compressor will now start automatically whenever the air receiver pressure drops to or below the pre-set cut-in pressure of approximately 600 kPa (87 psi) or 800 kPa (116 psi) depending on the model. It will also stop automatically whenever the air receiver pressure reaches the pre-set cut-out pressure of approximately 800 kPa (116 psi) or 1,000 kPa (145 psi), respectively, depending on the model.

To adjust the output air pressure from a compressor fitted with a filter-regulator, lift the black knob on top of the filter-regulator to unlock it and then turn it to the desired setting by referring to its pressure gauge. Then push the knob back down to lock it.

When compressor operation is no longer required, always turn the pressure switch to the "OFF" position before switching off the electricity supply or unplugging the supply lead. Always use the pressure switch to turn the compressor on and off otherwise the electric motor may be damaged.

6.3 415 Volt Air Compressors

Check that the electricity supply is turned off.

If fitted with a star-delta starter, check that the compressor's emergency stop button is released (which can be verified by turning the stop button head clockwise one-quarter of a turn).

Check that the compressor's pressure switch is turned to the "OFF" position.

Connect an air hose or flexible pipe to the compressor's discharge outlet valve using a compatible threaded male air line fitting. Check that the threaded connection is secure by ensuring that it has been properly tightened and also by trying to pull the air hose or pipe away from the outlet valve. Check that the outlet valve is closed.

Plug in the compressor's electrical supply lead if it is fitted with a plug. Otherwise, check that the supply lead is permanently connected (or "hard-wired") to the electricity supply.

Switch on the electricity supply.

Turn the compressor's pressure switch to the "ON" position. The compressor will now start automatically whenever the air receiver pressure drops to or below the pre-set cut-in pressure of approximately 600 kPa (87 psi). It will also stop automatically whenever the air receiver pressure reaches the pre-set cut-out pressure of approximately 800 kPa (116 psi).

Slowly open the outlet valve, but only if it is connected to a suitable compressed air hose(s) or distribution pipe(s) not open to the atmosphere.

When compressor operation is no longer required, always turn the pressure switch to the "OFF" position before switching off the electricity supply or unplugging the supply lead. Always use the pressure switch to turn the compressor on and off otherwise the electric motor may be damaged.

The compressor's emergency stop button, if fitted, should only be used in the case of a genuine emergency and not for routine operation. Press firmly on its red button to stop the compressor in an emergency and then switch off the electricity supply or unplug the supply lead if safe to do so.

6.4 Petrol Air Compressors

Connect an air hose to the compressor's discharge outlet coupling, if fitted, by pulling back the locking collar on the socket, inserting a compatible Nitto-style male plug (fitted to one end of the air hose) into the socket, and then releasing the locking collar. Check that the connection is secure by ensuring that the locking collar is fully engaged and also by trying to pull the air hose away from the coupling.

Alternatively, connect an air hose or flexible pipe to the compressor's discharge outlet valve, if fitted, using a compatible threaded male air line fitting. Check that the threaded connection is secure by ensuring that it has been properly tightened and also by trying to pull the air hose or pipe away from the outlet valve. Check that the outlet valve is closed.

Open the compressor's easy-start valve.

Move the engine fuel valve lever rightwards to the "ON" position. If you're unsure of its location, refer to the separate instruction manual for the petrol engine.

Move the engine choke lever leftwards to the closed position. This may not be necessary if the engine is already warm or the ambient temperature is high.

Do not touch the engine's throttle control lever; it will operate automatically.

To start using the engine's recoil (or "rope") starter:

(a) Turn on the engine control switch clockwise to the “ON” position.

(b) Pull the starter handle slowly until resistance is felt and then pull it briskly. Do not allow the starter handle to snap back against the engine, but instead return it gently to prevent starter damage.

(c) If the engine doesn’t start, repeat the previous step.

To start using the engine’s electric starter, if fitted:

(a) Turn the engine control switch clockwise to the “START” position using the ignition key and hold it there until the engine starts. Release the key as soon as the engine starts. Do not engage the electric starter for more than five seconds at a time.

(b) If the engine doesn’t start, release the key and wait 10 seconds before repeating the previous step.

As the engine warms up, gradually move the choke lever rightwards to the open position.

Close the easy-start valve.

The compressor will now operate automatically. Whenever the air receiver pressure drops to or below the pre-set cut-in pressure of approximately 800 kPa (116 psi), the engine will accelerate to full speed and the compressor will operate in normal “pumping” mode. Then, whenever the air receiver pressure reaches the pre-set cut-out pressure of approximately 1,000 kPa (145 psi), the engine will decelerate to idle speed and the compressor will operate in “unloading” mode. When operating in unloading mode, it is normal for air to discharge from the compressor’s continuous run vent unloading valve muffler or the compressor pump’s air filter inlets depending on the model.

To minimise mechanical wear and tear, fuel consumption, and exhaust and noise emissions, do not operate the compressor unnecessarily for extended periods in unloading mode. Switch off the engine instead.

To adjust the output air pressure from a compressor fitted with a filter-regulator, lift the black knob on top of the filter-regulator to unlock it and then turn it to the desired setting by referring to its pressure gauge. Then push the knob back down to lock it.

Slowly open the outlet valve, if fitted, but only if it is connected to a suitable compressed air hose(s) or distribution pipe(s) not open to the atmosphere.

When compressor operation is no longer required, turn off the engine control switch before turning off the engine fuel supply valve.

6.5 Diesel Air Compressors

Connect an air hose to the compressor’s discharge outlet coupling, if fitted, by pulling back the locking collar on the socket, inserting a compatible Nitto-style male plug (fitted to one end of the air hose) into the socket, and then releasing the locking collar. Check that the connection is secure by ensuring that the locking collar is fully engaged and also by trying to pull the air hose away from the coupling.

Alternatively, connect an air hose or flexible pipe to the compressor’s discharge outlet valve, if fitted,

using a compatible threaded male air line fitting. Check that the threaded connection is secure by ensuring that it has been properly tightened and also by trying to pull the air hose or pipe away from the outlet valve. Check that the outlet valve is closed.

Check that the emergency stop button, if fitted, is released; this can be verified by turning the stop button head clockwise one-quarter of a turn.

Open the compressor's easy-start valve.

Turn the engine fuel cock to the "ON" position. If you're unsure of its location, refer to the separate instruction manual for the diesel engine.

Do not touch the engine throttle control lever; it will operate automatically.

To start using the engine's recoil (or "rope") starter:

(a) Turn the engine control switch clockwise to the "ON" position using the ignition key, if fitted.

(b) Pull the starter handle slowly until strong resistance is felt and then return it slowly.

(c) Push the engine decompression lever down and release it. The decompression lever will automatically return to its original position when the engine starts.

(d) Pull the starter handle briskly with both hands. Do not allow the starter handle to snap back against the engine, but instead return it gently to prevent starter damage.

(e) If the engine doesn't start, repeat the previous three steps.

To start using the engine's electric starter, if fitted:

(a) Turn the engine control switch clockwise to the "START" position using the ignition key and hold it there until the engine starts. Release the key back to the "ON" position as soon as the engine starts. Do not use the electric starter for more than 10 seconds at a time.

(b) If the engine doesn't start, release the key and wait 15 seconds before repeating the previous step.

Allow the engine to warm up and then close the easy-start valve.

The compressor will now operate automatically. Whenever the air receiver pressure drops to or below the pre-set cut-in pressure of approximately 800 kPa (116 psi), the engine will accelerate to full speed and the compressor will operate in normal "pumping" mode. Then, whenever the air receiver pressure reaches the pre-set cut-out pressure of approximately 1,000 kPa (145 psi), the engine will decelerate to lower speed and the compressor will operate in "unloading" mode. When operating in unloading mode, it is normal for air to discharge from the compressor's continuous run vent unloading valve muffler.

To minimise mechanical wear and tear, fuel consumption, and exhaust and noise emissions, do not operate the compressor unnecessarily for extended periods in unloading mode. Switch off the engine instead.

To adjust the output air pressure from a compressor fitted with a filter-regulator, lift the black knob

on top of the filter-regulator to unlock it and then turn it to the desired setting by referring to its pressure gauge. Then push the knob back down to lock it.

Slowly open the outlet valve, if fitted, but only if it is connected to a suitable compressed air hose(s) or distribution pipe(s) not open to the atmosphere.

When compressor operation is no longer required:

(a) For engines with a recoil starter only: Locate the fuel stop lever mounted on the lower left-hand side of the engine behind the oil filler cap / dipstick and pull it forwards. Hold firmly until the engine stops. Refer to Figure 6-3.

(b) For engines with an electric starter: Turn the ignition key anticlockwise to the “OFF” position.

(c) Turn the engine fuel cock to the “OFF” position.

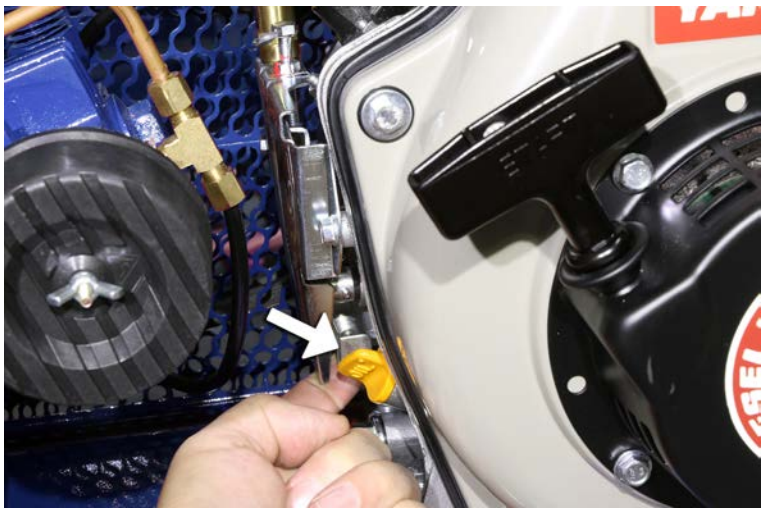


Figure 6-3 Yanmar Diesel Engine Fuel Stop Lever

6.6 Duty Cycle

To maximise service life, the air compressor should be adequately sized for its given application.

It should ideally operate in a repeating run-stop or pump-unload cycle, with total compressor “pumping” time not exceeding 75% or 45 minutes in every hour on average.

The elapsed time between the start and finish of any given pumping cycle (i.e. the continuous duration that the electric motor operates or the continuous duration that the petrol or diesel engine runs at full speed) should not exceed 10 minutes.

If the unit cannot supply the compressed air demand without exceeding the above duty cycle limits, then either the demand should be reduced or the compressor should be replaced with a unit having a larger free air delivery.

The duty cycle limit is intended to protect the compressor pump valves and heads against stabilised high operating temperatures that can cause premature pump failure.

In applications where multiple compressors are required to satisfy the total air demand, it is

recommended that the compressed air distribution system be split into separate circuits each supplied by a single compressor operating within its recommended duty cycle limits. The parallel operation of individual compressors supplying a common air system can often result in very unbalanced duty cycles amongst the units unless they share a single controller.

7.0 Maintenance and Repair

7.1 Precautions

Before performing any maintenance or repair work on the compressor, isolate and tag-out the power supply or disconnect the petrol engine's spark plug, turn off the fuel supply (if engine-driven), carefully release any residual air pressure from the air receiver tank and any connected air hoses or piping, and close the air outlet valve or disconnect the outlet air hose. And, if possible, allow the unit to cool down if it has been running.

Refer to the separate instruction manual for maintenance and repair of the petrol or diesel engine, if fitted.

Use only genuine spare parts for maintenance and repair of the compressor to ensure its safe and reliable operation.

The maintenance tasks recommended herein can generally be undertaken by anyone with proficient mechanical ability and access to proper tools. Alternatively, your Puma dealer can carry out this work.

For best results, the following repair procedures should always be observed:

(a) Use new gaskets, seals and O-rings during reassembly.

(b) Use PTFE thread tape or Loctite® sealant on threaded joints subject to pressure.

(c) Use Loctite® retaining compound when fitting engine or motor pulleys onto their drive shafts.

7.2 Maintenance Schedule

The maintenance schedule shown in Table 7-1 has been developed for typical industrial applications in clean indoor environments. The service intervals should be shortened in harsher working conditions. Regular preventative maintenance is essential for the safety, reliability and performance of the compressor and will add years to its useful life.

Table 7-1 Recommended Maintenance Schedule for Oil Lubricated Compressors						
	Elapsed Time or Operating Hours (whichever occurs first)					
Activity	1 Day	1 Week	1 Month	3 Mths or 500 h	1 Year or 2,000 h	2 Years or 4,000 h
Check Oil Level	●					
Inspect for Oil Leaks	●					
Drain Air Tank and Filter-Regulator	●					
Check or Clean Air Filter(s)		●				
Test Safety Valve		●				
Inspect for Air Leaks		●				
Check V-Belt(s)			●			
Tighten Joints and Fasteners			●			
Clean Unit			●			
Replace Oil				●		
Replace Air Filter(s)					●	
Replace Filter-Regulator						●
Replace V-Belt(s)						●

7.3 Lubricating Oil

Maintain the oil level at the top of the red circle on the oil sight glass fitted to the compressor pump as shown in Figure 6-1.

Remove the oil fill cap to add oil only when the compressor is switched off.

Use premium quality engine oil of monograde or multigrade viscosity that is appropriate for the ambient temperature range in which the compressor will be operating. The compressor pump has been filled at the factory with SAE 30 mineral based engine oil that is suitable for ambient temperatures from 5°C (41°F) to 40°C (104°F). Mineral based, semi-synthetic or fully synthetic oils may be used, but different types of oils should not be mixed together.

Regular oil changes in accordance with the recommended maintenance schedule are crucial to the service life of the compressor pump.

To change the oil, remove the oil fill cap and then remove the oil drain plug. An alternative to draining is to evacuate the oil through the oil fill hole by inserting a suction probe. Oil flows easier if the pump is warm, but do not touch the oil in case it is hot. Reinstall the oil drain plug tightly before adding the new oil and then finally screw the oil fill cap back in place.

If the oil changes to a white colour, this indicates water contamination. If it changes to a dark colour, this can indicate compressor overheating or that the oil is contaminated with wear and tear debris. Change the oil immediately in either case of discolouration.

Do not pollute the environment by improper or illegal disposal of waste oil.

New or rebuilt compressor pumps will discharge higher than normal amounts of oil until the piston rings are seated in, which can take approximately 100 operating hours. Some oil may also concurrently accumulate at the crankcase breather openings and this too will diminish with run time.

7.4 Air Receiver Tank

To drain condensate from the air receiver tank, slowly open the drain valve and allow the condensate to discharge. Do not pollute the environment by improper or illegal disposal of condensate that may contain lubricating oil or other contaminants.

Use extreme caution when opening the drain valve if the air receiver tank is pressurised. Thumbscrew drain cocks should not be opened more than one full turn. Lever operated drain valves can be fully opened with one quarter of a turn.

Certified external and internal inspections of the air receiver tank should be carried out by a licensed in-service inspector at intervals of no less than two and four years, respectively, in accordance with Australian and New Zealand Standard AS/NZS 3788:2006 or as otherwise specified by the Workplace Health and Safety Regulations in your jurisdiction.

Do not attempt to repair or modify an air receiver tank. Welding, drilling or any other modification will weaken the tank and may result in damage from rupture or explosion.

Always replace worn, cracked, corroded or damaged air receiver tanks immediately.

7.5 Filter-Regulator

The compressor's filter-regulator, if so equipped, is fitted with a semi-automatic drain valve underneath its condensate bowl.

With reference to Figure 6-2, the drain valve handle should normally be kept in the semi-automatic position with the arrow symbol pointing vertically upwards (▲); when there is no air pressure in the system, any condensate water will automatically discharge out through the bottom of the valve. And when the system is pressurised, the valve will automatically close internally.

If there's an excessive accumulation of condensate during compressor operation or the system is not depressurised after use, the condensate should be evacuated manually by turning the drain valve handle until the arrow symbol is pointing vertically downwards (▼).

Should it become necessary to clean out the condensate drain bowl, always depressurise the system before removing the bowl's outer guard.

The internal filter element will become clogged and contaminated after extended use and also the condensate bowl and various O-rings / seals will undergo some degradation. For optimal performance and safety, it is recommended to replace the entire filter-regulator periodically.

7.6 Air Filters

Do not operate the compressor without its air filter(s) installed or if the filter element(s) is clogged or damaged.

Each air filter element can be accessed by unscrewing the wing nut on the air filter casing and pulling off the front cover. On B-Series pumps, it is necessary to release the toggle clamps on either side of the air filter cover to gain access to the air filter element. Refer to Figure 7-1.

Remove the filter element away from the unit and use compressed air to gently blow it clean from the inside out, but do not wash or oil the element. If it cannot be blown clean or is otherwise torn or

damaged, the filter element must be replaced. Wear eye and ear protection when blowing out the filter element.

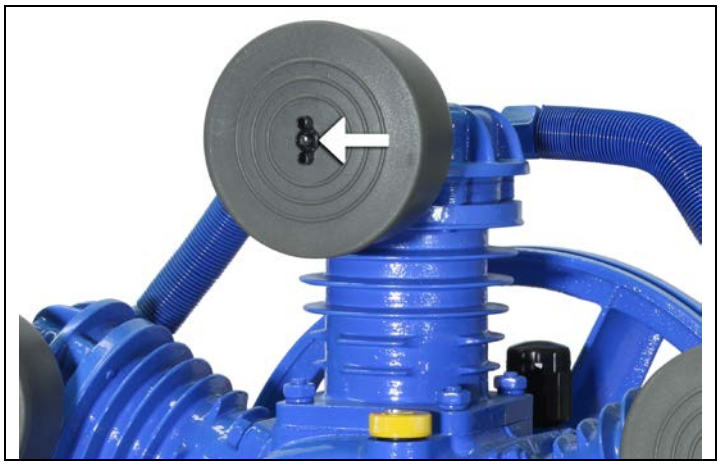


Figure 7-1 Air Filter Element Cover Removal

7.7 Safety Valve

Regularly check the safety valve to verify that it's operating freely. While the air receiver tank is pressurised to at least 650 kPa (94 psi), pull the ring on the safety valve and allow it to snap back to its normal position. If air leaks out after the ring has been released, or the valve is stuck and cannot be actuated by pulling the ring, the safety valve is faulty and must be replaced before operating the compressor.

Take care when testing the safety valve as compressed air will discharge from the valve with high velocity and loud noise; wear eye and ear protection.

Do not tamper with the safety valve. It is designed to automatically release air if the tank pressure exceeds a pre-set maximum.

7.8 Air Tightness

While the air receiver tank is pressurised to at least 650 kPa (94 psi) and the compressor is switched off, listen for any audible air leaks. Squirt soapy water around any suspect joint and watch for bubbles indicating a leak.

De-pressurise the air receiver tank and all connected air hoses or air piping fully before commencing any repairs.

Disassemble the leaking joint and clean off all traces of thread tape or sealant using a wire brush. Apply PTFE thread tape or Loctite® 243 liquid sealant to the male threaded connection before reassembling and tightening the joint. Allow at least 30 minutes for the liquid sealant to cure, if used.

Re-pressurise the air receiver tank and check that the air leak has been rectified before putting the unit back into normal operation.

7.9 V-Belt(s)

V-belts will stretch in normal use and more particularly so on petrol and diesel engine-driven models.

When properly tensioned, a 2.25 kg (5 lb) force applied to each V-belt midway between the engine / motor and pump pulleys will cause a deflection of about 9.5 mm (3/8”) to 12.7 mm (1/2”).

The drive guard must first be removed before V-belt tension can be checked or adjusted. If tension adjustment is necessary, loosen the four fasteners holding the engine or motor to the baseplate. Then either move the engine or motor away from or closer to the pump to increase or decrease V-belt tension, respectively, and retighten the hold-down fasteners. Always use a straight edge to check that the engine / motor and pump pulleys are properly aligned and the V-belt(s) runs straight. Do not over-tension the V-belt(s).

V-belts of the same nominal size can vary in length from one make to another. Thus, for compressors with two or more V-belts, it is essential to replace the entire complement of them when necessary with a full set of the same size and make.

Always refit the drive guard before operating the compressor.

Note: The engine or motor pulley has been installed onto its shaft with a high strength Loctite® retaining compound and may need to be heated prior to removal. It may also be necessary to use a puller tool to remove the pulley.

7.10 Cleaning

Switch off the air compressor and use compressed air to blow dust and foreign matter off the compressor pump, motor or engine, piping and air receiver tank. Wear eye and ear protection while undertaking this task.

Oil and grease marks should be cleaned off using mild household surface cleaner and a soft rag. Do not use abrasive cleaners or strong solvents that can damage the compressor’s paint finish.

7.11 12 Volt Battery

If the compressor is equipped with a genuine Puma 12 Volt battery kit, the battery is a sealed-for-life type that requires no regular maintenance. It is automatically charged whenever the compressor is running.

The battery will self-discharge slowly when not in use and after some time it may have insufficient charge to start the compressor. To prevent this inconvenience, one can either run the compressor periodically to keep the battery charged sufficiently or otherwise charge it (when the compressor is not operating) using a mains-powered 12 Volt battery charger.

Ensure correct polarity whenever charging or re-connecting the battery as described in the Installation section.

7.12 Oil Fill Quantities

Please note that the values listed in Table 7-2 are approximate only. Always check the compressor pump’s oil level using the crankcase sight glass as described earlier in this section.

Table 7-2 Puma Compressor Pump Oil Fill Quantities	
Pump Model	**Oil Capacity (Litres)**
PG15	0.50
PG20	1.00
PG29	1.00
PG30	1.00
PG31	0.46
PG40	1.00
PG41	0.80
PG55	1.40
PG56	1.00
PG75	1.35
PG76	1.00
PG100	3.00
PG101	1.50
PG151	3.00

7.13 Engine Speed

The maximum engine speed on both petrol and diesel-powered models has been pre-set at approximately 3,600 rpm with the compressor in “loading” mode at 900 kPa. Do not adjust the engine speed higher as this may cause damage due to increased vibration, which is not covered by warranty.

Should it ever be necessary to re-set the maximum engine speed in accordance with the above specification, it is recommended to apply Loctite® threat sealant onto the engine’s high idle set screw to prevent it from vibrating out of adjustment.

7.14 Fastener Torques

Table 7-3 Recommended Assembly Torques				
Item	**Thread Size (mm)**	**Hex Key or Spanner Size (mm)**	**Torque (Nm)**	**Torque (lbf-ft)**
Puma PG15 Cylinder Head Socket Screw	M6	5	14	10
Puma PG20 Cylinder Head Socket Screw	M6	5	14	10
Puma PG29 Cylinder Head Socket Screw	M6	5	14	10
Puma PG30 Cylinder Head Socket Screw	M6	5	14	10
Puma PG31 Cylinder Head Socket Screw	M6	5	14	10
Puma PG40 Cylinder Head Socket Screw	M10	8	48	35
Puma PG40 Cylinder Head Socket Screw	M6	5	14	10
Puma PG41 Cylinder Head Socket Screw	M6	5	14	10
Puma PG55 Cylinder Head Socket Screw	M10	8	48	35
Puma PG55 Cylinder Head Socket Screw	M6	5	14	10
Puma PG56 Cylinder Head Socket Screw	M10	8	48	35
Puma PG56 Cylinder Head Socket Screw	M6	5	14	10

Table 7-3 Recommended Assembly Torques				
Item	**Thread Size (mm)**	**Hex Key or Spanner Size (mm)**	**Torque (Nm)**	**Torque (lbf-ft)**
Puma PG75 Cylinder Head Socket Screw	M12	10	61	45
Puma PG75 Cylinder Head Socket Screw	M8	6	34	25
Puma PG76 Cylinder Head Socket Screw	M12	10	61	45
Puma PG76 Cylinder Head Bolt	M8	13	34	25
Puma PG100 Cylinder Head Socket Screw	M12	10	61	45
Puma PG100 Cylinder Head Socket Screw	M8	6	34	25
Puma PG101 Cylinder Head Socket Screw	M12	10	61	45
Puma PG101 Cylinder Head Bolt	M8	13	34	25
Puma PG151 Cylinder Head Socket Screw	M12	10	61	45
Puma PG151 Cylinder Head Bolt	M8	13	34	25

8.0 Troubleshooting

8.1 Procedure

Before performing any inspection, test or repair work on the compressor, isolate and tag-out the power supply or disconnect the petrol engine's spark plug, turn off the fuel supply (if engine-driven), carefully release any residual air pressure from the air receiver tank and any connected air hoses or piping, and close the air outlet valve or disconnect the outlet air hose. And, if possible, allow the unit to cool down if it has been running.

Please refer to the troubleshooting guide shown in Table 8-1 for assistance with diagnosing and repairing any problem that might occur with your air compressor. Whilst many of the tasks can be undertaken by a mechanically proficient person with access to proper tools, all electrical work must by undertaken by a licensed electrician.

It is recommended for your convenience that this troubleshooting guide be consulted prior to contacting a Puma dealer or Glenco Air & Power Pty Ltd for advice. Additional technical information is available online for download at www.glencoairpower.com.au.

Please refer also to the separate instruction manual for troubleshooting of the petrol or diesel engine, if fitted.

Table 8.1
Troubleshooting Chart

Symptom	Possible Cause	Corrective Action
Motor will not start, runs slowly or repeatedly trips out overload protection.	1. Pressure switch not turned on.	1. Turn on pressure switch.
	2. Air receiver tank pressure above cut-in pressure.	2. Nil (no fault).
	3. No voltage at the pressure switch, DOL starter or star-delta starter.	3. Check electricity supply including all fuses, circuit breakers, switches and wiring.
	4. No voltage at the electric motor (faulty pressure switch, DOL starter or star-delta starter).	4. Repair or replace pressure switch, DOL starter or star-delta starter.
	5. No voltage on one or two phases of 415 V supply.	5. Check voltage on all three phases of 415 V supply.
	6. Low supply voltage.	6. Check no load and full load supply voltage. Upgrade power supply circuit if required. Disconnect any other electrical devices on the same supply circuit.
	7. Use of extension lead.	7. Do not use extension lead. Use longer air hose with larger diameter.
	8. 240 V: Thermal overload switch on motor tripped.	8. 240 V: Allow motor to cool down and manually reset overload switch.

Table 8.1 Troubleshooting Chart		
Symptom	**Possible Cause**	**Corrective Action**
	9. 415 V, < 11 kW: Thermal overload relay in DOL starter tripped.	9. 415 V, < 11 kW: Manually reset overload relay (located inside the DOL starter enclosure).
	10. 415 V, 11 kW: Emergency stop button activated (pushed in).	10. 415 V, 11 kW: Release emergency stop button by a ¼ turn clockwise.
	11. 415 V, 11 kW: Thermal overload relay in star-delta starter tripped.	11. 415 V, 11 kW: Manually reset overload relay (located inside the star-delta starter enclosure).
	12. Faulty pressure switch unloader valve (nil or restricted unloading air flow).	12. Replace unloader valve or complete pressure switch.
	13. Nil or restricted discharge air flow through non-return valve.	13. Repair or replace non-return valve.
	14. 240 V: Blown start or run capacitors. Damaged motor cowl or fan. Other motor faults.	14. 240 V: Check both capacitors and replace as required. Replace motor cowl or fan. Replace motor.
	15. 415 V: Damaged motor cowl or fan. Other motor faults.	15. 415 V: Replace cowl or fan. Replace motor.
	16. V-belts too tight or misaligned.	16. Adjust belts to proper tension and alignment.
	17. Compressor pump partially or totally seized.	17. Repair or replace compressor pump.
Engine will not start or cranks slowly.	1. No fuel in tank.	1. Add fuel.
	2. Fuel supply valve closed.	2. Open fuel supply valve.
	3. Engine control switch off.	3. Turn on control switch.
	4. Low oil level.	4. Add oil.
	5. 12 Volt battery not connected (to electric start diesel engine).	5. Connect 12 Volt battery to engine.
	6. Emergency stop button activated (pushed in).	6. Release emergency stop button by a quarter turn clockwise.
	7. Engine not grounded properly.	7. Ground battery to engine as recommended.
	8. Old fuel or water in fuel.	8. Replace fuel and add fuel stabiliser.
	9. Easy-start valve closed.	9. Open easy-start valve.
	10. V-belts too tight or misaligned.	10. Adjust belts to proper tension and alignment.
	11. Compressor pump partially	11. Repair or replace

Table 8.1 Troubleshooting Chart		
Symptom	**Possible Cause**	**Corrective Action**
	or totally seized. 12. Engine fault.	compressor pump. 12. See engine manual.
Compressor pump does not come up to speed.	1. Loose engine or motor pulley, loose compressor pump pulley, or loose / worn V-belts. 2. Low supply voltage. 3. Use of extension lead. 4. Engine throttle control not opening fully or engine fault. 5. Damaged or worn compressor pump valves or blown cylinder head gaskets. 6. Compressor pump partially seized.	1. Tighten or replace pulleys as required, check alignment and adjust V-belt tension. 2. Check no load and full load supply voltage. Upgrade power supply circuit if required. Disconnect any other electrical devices on the same supply circuit. 3. Do not use extension lead. Use longer air hose with larger diameter. 4. Adjust or replace throttle control. See engine manual for other action. 5. Replace compressor pump valves or cylinder head gaskets. 6. Repair or replace compressor pump.
Excessive noise (including knocking and rattling) or vibration.	1. Loose engine or motor or loose compressor pump pulleys. V-belts not tensioned correctly or misaligned. 2. Low oil level. 3. Pistons hitting the cylinder heads. 4. Damaged or worn crankshaft bearings, crankpin bearings, crankshaft, connecting rods, piston pin bearings, piston pins, pistons, cylinders or valves. 5. Faulty non-return valve. 6. Loose fasteners. 7. Engine fault.	1. Tighten or replace pulleys as required, check alignment and adjust V-belt tension. 2. Add oil. 3. Remove cylinder heads and check for carbon deposits or other foreign matter on top of pistons. 4. Replace components or entire compressor pump. 5. Repair or replace non-return valve. 6. Check and tighten fasteners (including foot mounts). 7. See engine manual.
Slow pressure build-up or	1. Air demand exceeds	1. Reduce air demand or use

Table 8.1 Troubleshooting Chart		
Symptom	**Possible Cause**	**Corrective Action**
unable to reach cut-out pressure.	compressor pump capacity. 2. Air leaks. 3. Blocked or dirty inlet air filters. 4. Loose engine or motor pulley, loose compressor pump pulley, or loose / worn V-belts. 5. Head unloaders not fully retracting (usually indicated by air blowing out from air filter inlets). 6. Damaged or worn compressor pump valves or blown cylinder head gaskets. 7. Damaged or worn piston rings, pistons or cylinders. 8. Faulty non-return valve.	larger or additional compressor(s). 2. Tighten, refit or replace leaking connections or components. 3. Clean or replace air filter elements. 4. Tighten or replace pulleys as required, check alignment and adjust V-belt tension. 5. Repair or replace head unloaders. 6. Replace compressor pump valves or cylinder head gaskets. 7. Replace components or entire compressor pump. 8. Repair or replace non-return valve.
Compressor pump runs excessively hot (and possibly melts air filter enclosures).	1. Incorrect direction of rotation. 2. Ambient temperature too high or insufficient ventilation. 3. Low oil level. 4. Excessive duty cycle. 5. Damaged or worn compressor pump valves or blown cylinder head gaskets.	1. Check compressor pulley turns anti-clockwise (looking onto pulley). Change electric motor connections if incorrect. 2. Reduce ambient temperature or improve ventilation (e.g. move further away from walls or other equipment). 3. Add oil. 4. Reduce air demand or use larger or additional compressor(s). 5. Replace compressor pump valves or cylinder head gaskets.
Excessive duty cycle (> 75% loading ratio or continuous loading times > 10 minutes).	1. Air demand is too high. 2. Air leaks.	1. Reduce air demand or use larger or additional compressor(s). 2. Tighten, refit or replace leaking connections or components.
Excessive cycling between	1. Maximum cycling occurs	1. Nil (no fault). Cycling will

Table 8.1 Troubleshooting Chart		
Symptom	**Possible Cause**	**Corrective Action**
pumping mode and unloading or off mode.	when air demand is at 50% of compressor output. 2. Air leaks. 3. Excessive condensate in air receiver tank.	reduce with either decreased or increased compressed air demand. 2. Tighten, refit or replace leaking connections or components. 3. Drain air receiver tank.
Excessive oil in discharge air.	1. Blocked or dirty inlet air filters. 2. Overfilled with oil. 3. Low oil viscosity. 4. Excessive duty cycle. 5. Blocked or damaged crankcase breather. 6. Damaged or worn intake valves, piston rings, pistons or cylinders.	1. Clean or replace air filter elements. 2. Drain oil down to high level mark. 3. Replace with correct oil. 4. Reduce air demand or use larger or additional compressor(s). 5. Clean or replace crankcase breather. 6. Replace components or entire compressor pump.
Water in discharge air.	1. No fault. This is normal operation. Condensate quantity will increase with duty cycle and humidity.	1. Install dryer or filter in discharge line. Install automatic tank drain valve or manually drain air tank more often. Revise distribution piping system to ensure proper condensate drainage.
Compressor does not switch off and safety valve discharges.	1. Faulty or incorrectly set pressure switch, continuous run vent unloading valve or pilot valve. 2. Faulty safety valve. 3. Note: Use tank pressure gauge to help diagnose fault.	1. Adjust or replace pressure switch, continuous run vent unloading valve or pilot valve. 2. Replace safety valve.
Low suction or air blowing out at air filter inlets during pumping mode.	1. Damaged or worn compressor pump inlet valves or blown cylinder head gaskets. 2. Head unloaders not fully retracting (usually indicated by air blowing out from air filter inlets).	1. Replace compressor pump inlet valves or cylinder head gaskets. 2. Repair or replace head unloaders.
No short discharge of air from the pressure switch after	1. Faulty pressure switch unloader valve.	1. Replace unloader valve or complete pressure switch.

Table 8.1 Troubleshooting Chart		
Symptom	**Possible Cause**	**Corrective Action**
reaching cut-out pressure or being manually switched off.	2. Blocked or damaged unloading line. 3. Blocked or faulty non-return valve.	2. Clean or replace unloading line. 3. Clean, repair or replace non-return valve.
Short initial discharge of air from the 240 Volt pressure switch during pumping mode after starting with nil or low pressure in the air receiver tank.	1. Correct function of the “soft start” pressure switch unloading valve to reduce motor starting current.	1. Nil (no fault).
Continuous discharge of air from the pressure switch after reaching cut-out pressure or being manually switched off.	1. Faulty non-return valve.	1. Repair or replace non-return valve.
Continuous discharge of air from pressure switch during pumping mode.	1. Faulty pressure switch unloader valve.	1. Replace unloader valve or complete pressure switch.
Air receiver tank does not hold pressure when compressor is off and discharge outlet valve is closed.	1. Faulty non-return valve or continuous run vent unloading valve. 2. Faulty head unloaders. 3. Air leaks.	1. Repair or replace non-return valve or continuous run vent unloading valve. 2. Repair or replace head unloaders. 3. Tighten, refit or replace leaking connections or components.
Engine stalls when compressor changes from unloading mode to pumping mode.	1. Engine idle speed too low. 2. Engine throttle control not opening fully. 3. Other engine fault.	1. Increase engine idle speed. 2. Adjust or replace throttle control. 3. See engine manual.
Engine stalls when compressor changes from pumping mode to unloading mode.	1. Engine idle speed too low. 2. Head unloaders not fully actuating. 3. Other engine fault.	1. Increase engine idle speed. 2. Repair or replace head unloaders. 3. See engine manual.
External oil discharge from compressor pump.	1. Oil leaks.	1. Tighten, refit or replace leaking connections or components.
Oil appears “milky” in sight glass.	1. Water contamination in oil.	1. Replace oil and move compressor to less damp or humid location.
Oil appears black in sight glass.	1. Graphite carry-over from cast iron material (initial oil fill only). 2. Oil dirty or overheated (initial or subsequent oil fill).	1. Replace oil. 2. Replace oil and check for compressor pump overheating.

9.0 Transport

Always switch off the air compressor and de-pressurise the air receiver tank before transporting the unit. Turn the engine fuel valve off, if fitted, and always keep the compressor upright to prevent oil or fuel spillage.

Ensure that adequate lifting equipment is available for moving and loading the compressor. Lifting equipment, slings, etc. must be properly rated for the weight of the compressor.

Take care when attaching load restraining devices to ensure that the compressor does not tip over during transport, especially because of its high centre of gravity.

Check with the carrier whether lubricating oil or engine fuel must be drained out prior to transport. If so, ensure that the party receiving the compressor is notified accordingly.

Keep the compressor covered during transport to prevent the ingress of dust and debris.

10.0 Storage

Always switch off the air compressor and then de-pressurise and drain the air receiver tank before storing the unit.

Turn the engine fuel valve off, if fitted, and always keep the compressor upright to prevent oil or fuel spillage.

Store the compressor in a cool, dry and shaded place and keep it covered to prevent the ingress of dust and debris.

If storing the compressor for a long period, the following additional preparations should be made:

- Change the compressor pump lubricating oil and clean the entire unit in accordance with the maintenance instructions.

- Petrol air compressors: Check that the engine control switch is turned off and drain all petrol from the fuel tank and piping. Remove the spark plug and pour a tablespoon of clean engine oil into the cylinder. Crank the engine several revolutions to distribute the oil and then reinstall the spark plug. Remove the 12 Volt battery, if fitted, and recharge it once a month.

- Diesel air compressors: Check that the engine control switch is turned off and drain all diesel from the fuel tank and piping. Pull the starter handle slowly until strong resistance is felt and then return it slowly. At this point, the engine's inlet and exhaust valves should be closed during the compression stroke and this should help to prevent rust forming inside the cylinder while the engine is not is use. Remove the 12 Volt battery, if fitted, and recharge it once a month.

11.0 Dismantling and Disposal

There is no requirement for the air compressor to be dismantled during normal operation other than for major repair / overhaul or prior to final disposal at the end of its service life.

Dismantling should only be carried out by a mechanically proficient person with access to proper tools or alternatively by your Puma dealer.

Before dismantling the compressor, switch off the unit, disconnect the power supply, turn off the fuel supply valve, carefully de-pressurise and drain the air receiver tank, drain out the fuel tank and piping, and drain the lubricating oil from the compressor pump and engine.

Do not pollute the environment by improper or illegal disposal of the waste oil, fuel and condensate.

Air receiver tanks should be rendered unusable for pressure service prior to disposal, for example by cutting or massive deformation. This is to prevent their unauthorised and unsafe use by others.

Do not pollute the environment by improper or illegal disposal of the compressor either as a whole or dismantled. Take the unwanted unit or components to your local recycling centre instead. The compressor is made almost entirely of metal that can usually be sold to scrap metal recyclers.

12.0 Specifications

12.1 240 Volt Electric Air Compressors

Puma Model	Puma Pump Model	Displ. (L/min)	FAD (L/min)	Cut-Out Pressure (kPa)	Max. Pressure (kPa)	Electric Motor (kW)	Tank Vol. (L)	Outlet Size BSP	Weight (kg)
P13	PG15	255	170	1,000	1,000	1.65	60	1/4"	83
P15	PG20	270	200	800	900	1.65	60	1/4"	85
P17	PG29	400	280	1,000	1,000	2.2	60	1/4"	89
P20	PG30	420	320	800	900	2.4	75	1/4"	103

12.2 415 Volt Electric Air Compressors

Puma Model	Puma Pump Model	Displ. (L/min)	FAD (L/min)	Cut-Out Pressure (kPa)	Max. Pressure (kPa)	Electric Motor (kW)	Tank Volume (L)	Outlet Size BSP	Weight (kg)
P25	PG40	545	390	800	900	3	125	3/4"	178
P30	PG55	735	520	800	900	4	140	3/4"	205
P40	PG75	1,020	760	800	900	5.5	215	1"	316
P55	PG100	1,415	1,055	800	900	7.5	265	1"	368
P75	PG151	1,965	1, 520	800	900	11	330	1"	477

12.3 Honda Petrol Air Compressors

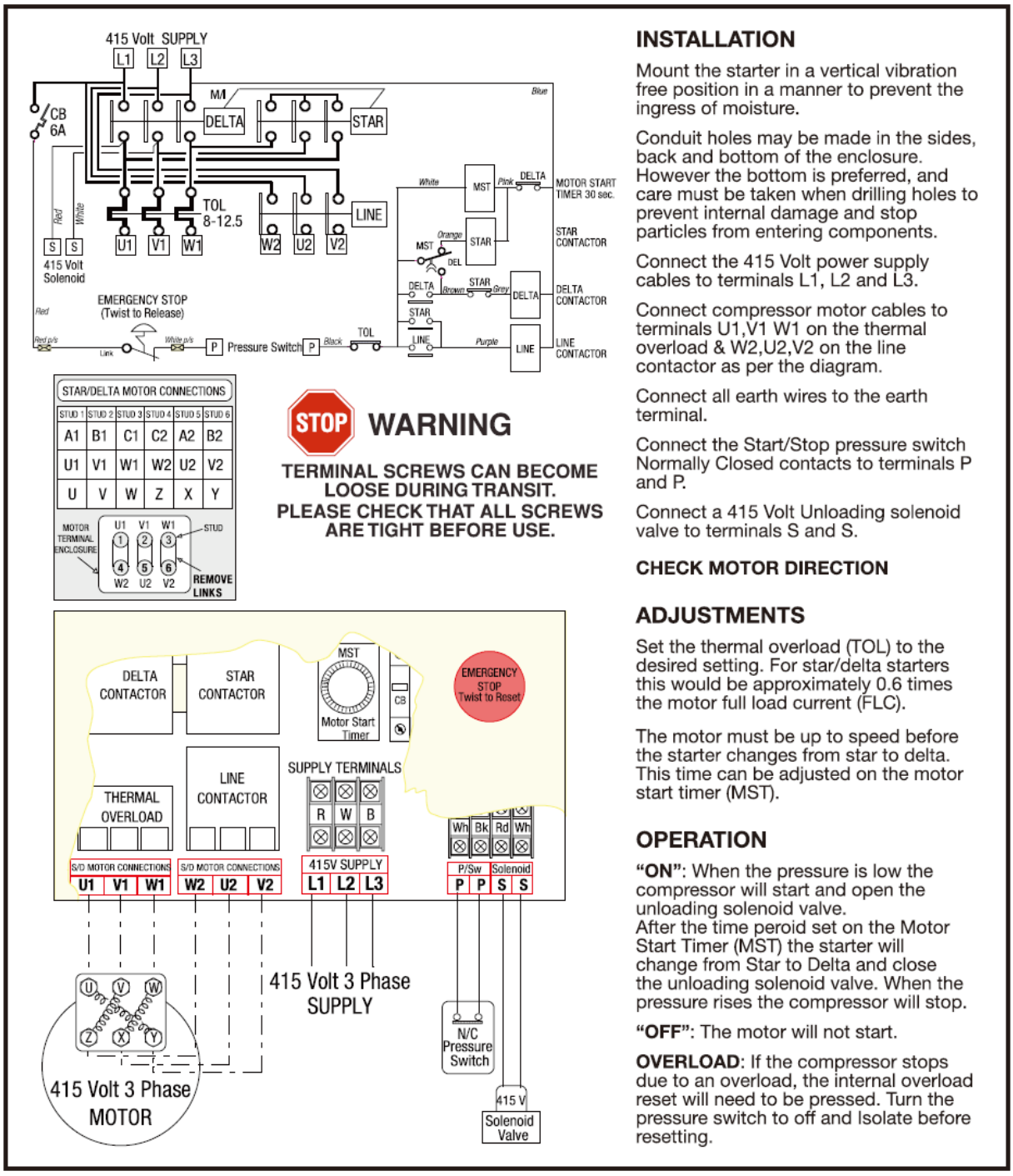
Puma Model	Puma Pump Model	Displ. (L/min)	FAD (L/min)	Max. Press. (kPa)	Honda Engine Model	Honda Engine Starter	Tank Vol. (L)	Outlet Size BSP	Weight (kg)
P18H	PG31	430	350	1,000	GX200	Rope	60	1/4"	90
P22H	PG41	540	440	1,000	GX200	Rope	75	1/4"	112
P22H ES	PG41	540	440	1,000	GX200	Electric	75	1/4"	115
P30H	PG56	805	690	1,000	GX270	Rope	125	1/2"	189
P30H ES	PG56	805	690	1,000	GX270	Electric	125	1/2"	192
P55H ES	PG101	1,340	1,015	1,000	GX390	Electric	140	3/4"	257

12.4 Yanmar Diesel Air Compressors

Puma Model	Puma Pump Model	Displ. (L/min)	FAD (L/min)	Max. Press. (kPa)	Yanmar Engine Model	Yanmar Engine Starter	Tank Vol. (L)	Outlet Size BSP	Wt. (kg)
P18Y	PG31	430	350	1,000	L48	Rope	60	1/4"	100
P18Y ES	PG31	430	350	1,000	L48	Electric	60	1/4"	105
P22Y	PG41	540	440	1,000	L48	Rope	75	1/4"	119
P22Y ES	PG41	540	440	1,000	L48	Electric	75	1/4"	124
P30Y ES	PG56	805	690	1,000	L70	Electric	125	1/2"	204
P40Y ES	PG76	1,085	805	1,000	L100	Electric	140	3/4"	240

13.0 Wiring Diagrams

13.1 11 kW Star-Delta Starter Wiring Diagram



INSTALLATION

Mount the starter in a vertical vibration free position in a manner to prevent the ingress of moisture.

Conduit holes may be made in the sides, back and bottom of the enclosure. However the bottom is preferred, and care must be taken when drilling holes to prevent internal damage and stop particles from entering components.

Connect the 415 Volt power supply cables to terminals L1, L2 and L3.

Connect compressor motor cables to terminals U1,V1 W1 on the thermal overload & W2,U2,V2 on the line contactor as per the diagram.

Connect all earth wires to the earth terminal.

Connect the Start/Stop pressure switch Normally Closed contacts to terminals P and P.

Connect a 415 Volt Unloading solenoid valve to terminals S and S.

CHECK MOTOR DIRECTION

ADJUSTMENTS

Set the thermal overload (TOL) to the desired setting. For star/delta starters this would be approximately 0.6 times the motor full load current (FLC).

The motor must be up to speed before the starter changes from star to delta. This time can be adjusted on the motor start timer (MST).

OPERATION

"ON": When the pressure is low the compressor will start and open the unloading solenoid valve.
After the time peroid set on the Motor Start Timer (MST) the starter will change from Star to Delta and close the unloading solenoid valve. When the pressure rises the compressor will stop.

"OFF": The motor will not start.

OVERLOAD: If the compressor stops due to an overload, the internal overload reset will need to be pressed. Turn the pressure switch to off and Isolate before resetting.

14.0 Warranty Against Defects

14.1 Record of Ownership

Please complete the following details about your air compressor for future reference concerning warranty, spare parts and service.

Date of Purchase: .....

Purchased From: .....

Tax Invoice Number: .....

Air Compressor Model Number: .....

Air Receiver Tank Serial Number: .....

Compressor Pump Model Number: .....

Compressor Pump Serial Number: .....

Engine or Motor Type / Make / Size: .....

It is recommended that you keep a copy of the original tax invoice together with this manual.

14.2 Warrantor

Name: Glenco Air & Power Pty Ltd (ABN 21101370085)
Address: 21 Resource Street, Parkinson, 4115, Australia
Phone: (07) 3386 9999
Fax: (07) 3386 9988
Email: sales@glencomfg.com.au
Web: www.glencoairpower.com.au

14.3 Warranty Conditions

Glenco Air & Power Pty Ltd (the "Company") warrants that its Puma air compressors (the "Goods") shall be free from defects in material and workmanship for a period of twelve (12) months from the date of original sale (hereinafter the "Warranty Period").

Accessories or components furnished by the Company, but manufactured by others – including, but not limited to electric motors, petrol engines and diesel engines – shall carry whatever warranty the manufacturer conveyed to the Company and which can be passed onto the Consumer.

The Warranty Period is continuous from the date of original sale and does not restart upon the repair or replacement of the Goods or any part thereof.

Upon return – transportation charges prepaid by the Consumer – to the Company's or its nominated dealer's premises within the Warranty Period, the Company shall repair or replace, at its option, any Goods which it determines to contain defective material or workmanship, and shall return said Goods to the Consumer free-on-board (FOB) at the Company's or agent's premises. The repair or replacement work will be scheduled and performed according to the Company's normal work flow

and availability of replacement parts.

The Company shall not be obligated, however, to repair or replace Goods which have been: repaired by others; abused; improperly installed, operated, maintained, repaired, transported or stored; not serviced to schedule using genuine spare parts; altered or otherwise misused or damaged in any way.

The Company shall not be responsible for any diagnosis, communication, dismantling, packing, handling, freight, and reassembly or reinstallation charges.

Freight damage, pre-delivery service, normal operating adjustments, preventative maintenance service, consumable items, cosmetic damage, corrosion, erosion, normal wear and tear, performance, merchantability, and fitness for a particular purpose are not covered under this Warranty. Consumable items include batteries, filters, lubricants and V-belts.

The Company shall not be liable for any repairs, replacements, or adjustments to the Goods or any costs of labour performed by the Consumer or others without the Company's prior written approval.

To the extent permissible by law and notwithstanding any other clause in these Warranty Conditions, the Company excludes all liability whatsoever to the Consumer arising out of or in any way connected with a contract for any consequential or indirect losses of any kind howsoever arising and whether caused by breach of statute, breach of contract, negligence or other tort.

The Company's liability will be limited to, in the case of products, the replacement of the products, the supply of equivalent products or the payment of the cost of replacing the products or of acquiring equivalent products or, in the case of services, the supply of the services again or the payment of the cost of having the services supplied again. The choice of remedy will be at the discretion of the Company and the Consumer acknowledges that this limitation of liability is fair and reasonable.

This Warranty is available only to the original Consumer bearing the original tax invoice from the Company or one of its authorised dealers as proof of purchase. Goods purchased from any other party such as a private seller, auction house, eBay seller, etc. are not covered by this Warranty.

Our Goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the Goods repaired or replaced if the Goods fail to be of acceptable quality and the failure does not amount to a major failure.

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