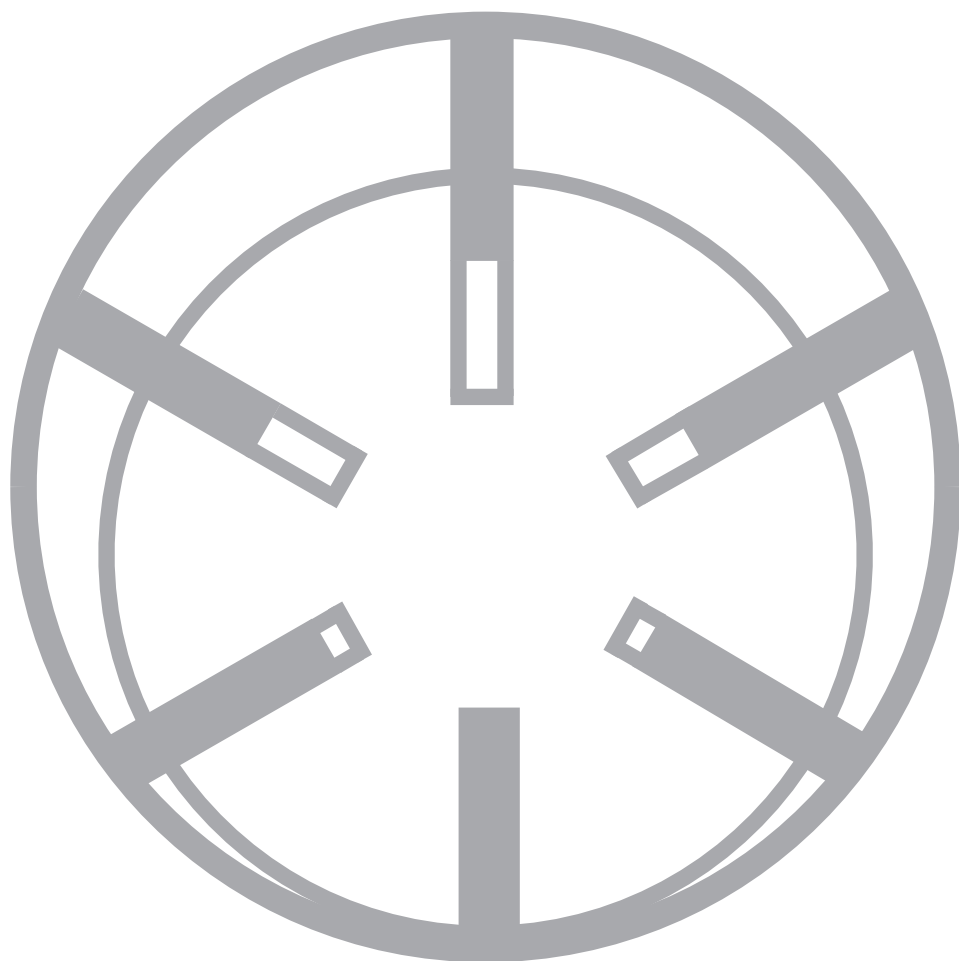


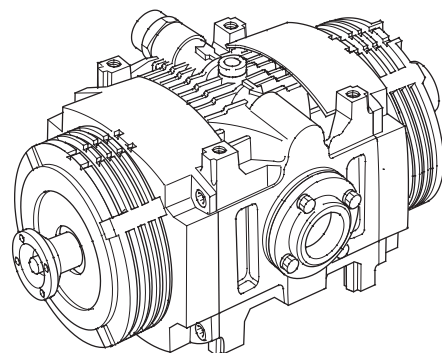
Installation, Operating & Maintenance Manual

(Original Instructions)

DRUM



J200 ROTARY VANE COMPRESSOR



4991310002
September 2013

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1

Health & Safety

READ THE WHOLE MANUAL BEFORE COMMENCING INSTALLATION.



Static electricity

Ensure, that where required, the compressor and ancillaries are earthed in accordance with BS5958 Part 1 1983; 'Control of Undesirable Static Electricity'.

Powder-air combinations are potentially explosive.



Drive line

It is the responsibility of the installer of the equipment to ensure all rotating and moving parts of the installation are adequately guarded to a standard which complies with the prevailing safety legislation.



Compressor

The compressor has internal moving parts some of which may be accessed through the inlet and outlet apertures. Do not place any objects especially fingers into these apertures since personal injury could result.



Installation

A relief valve must be fitted in the appropriate machine port or in the outlet pipe work as close to the compressor as possible. The valve must be positioned so as not to vent air onto any personnel since the air discharged will be hot and can cause severe burns.



Storage/Low Use

Before the machine is installed or when it will not be used for long periods:

- Store in a dry, heated building.
 - Handle with care and keep the suction and delivery ports covered.
 - Rotate the drive shaft of the machine each week, in the direction shown by the arrow between the suction and delivery ports on the machine body.
- Where the compressor is mounted on a vehicle and located outside, it should be operated for at least 15 minutes each week (twice a week in damp/cool conditions)



Fire & Heat.

The compressor includes seals made of fluoroelastomer polymers which degrade if exposed to temperatures above 300°C. If the material has been so exposed then it must not be handled with bare hands.

Surface temperatures can exceed 200°C. Highly combustable materials must not come into contact with the discharge pipework or compressor body.



Relief Valve Check

This procedure should be carried out every month to clear the valve seat and check the valve is functional. (Ear protection is recommended)



Noise

Gardner Denver Drums own tests show maximum noise levels for the J200 should typically not exceed 86/91 dB(A) (1000-1600rpm 2.0bar g).

In accordance with our policy of continuous product improvement, Gardner Denver Drum reserve the right to alter details and specifications without notice.

2 General

2.1 Product General Description

The J200 is a light-weight, compact rotary vane compressor designed for the oil free discharge of bulk liquids from general purpose tankers, e.g. liquid foodstuff, solvents, acids, alkalis, hot bitumen, resins and other chemicals.

The main advantage of using a compressor to discharge liquids is that the product does not come into contact with the machine. This eliminates any problems of material compatibility with the liquid enabling a much wider variety of products to be discharged.

The machine is an oil free sliding/reciprocating vane design with the main cast iron rotor being supported by bearing arrangements at either end.

All the components in the main bore cavity are manufactured from corrosion resistant materials to avoid any possibility of atmospheric corrosion.

The compact shape and size of the machine make it ideal for mounting inside the chassis to enable direct low-cost prop. shaft driving or via other drive methods more suitable for a particular application.

A through shaft allows CW or ACW input drive rotation and the compressor can be installed on any of the 4 sides.

The standard package consists of:
Basic J200 machine and mounting kit
Induction kit including the inlet filter
Relief valve
Check valve

2.2 Power Options

The J200 can be driven using any of the following drive systems.

Prop. shaft Direct from a gearbox mounted PTO

Hydraulically Several standard drives are available.

Electrically Motor drive packages on base frames/plates

Engine Drive packages on base frames/plates.

2.3 Storage/Low use

Before the machine is installed or when it will not be used for long periods:

- Store the machine in a dry, heated building.
- Handle the machine with care and keep the suction and delivery ports covered.
- Rotate the drive shaft of the machine each week, in the direction shown by the arrow between the suction and delivery ports on the machine body. Where the compressor is mounted on a vehicle and located outside, it should be operated for at least 15 minutes each week (twice a week in damp/cool conditions).

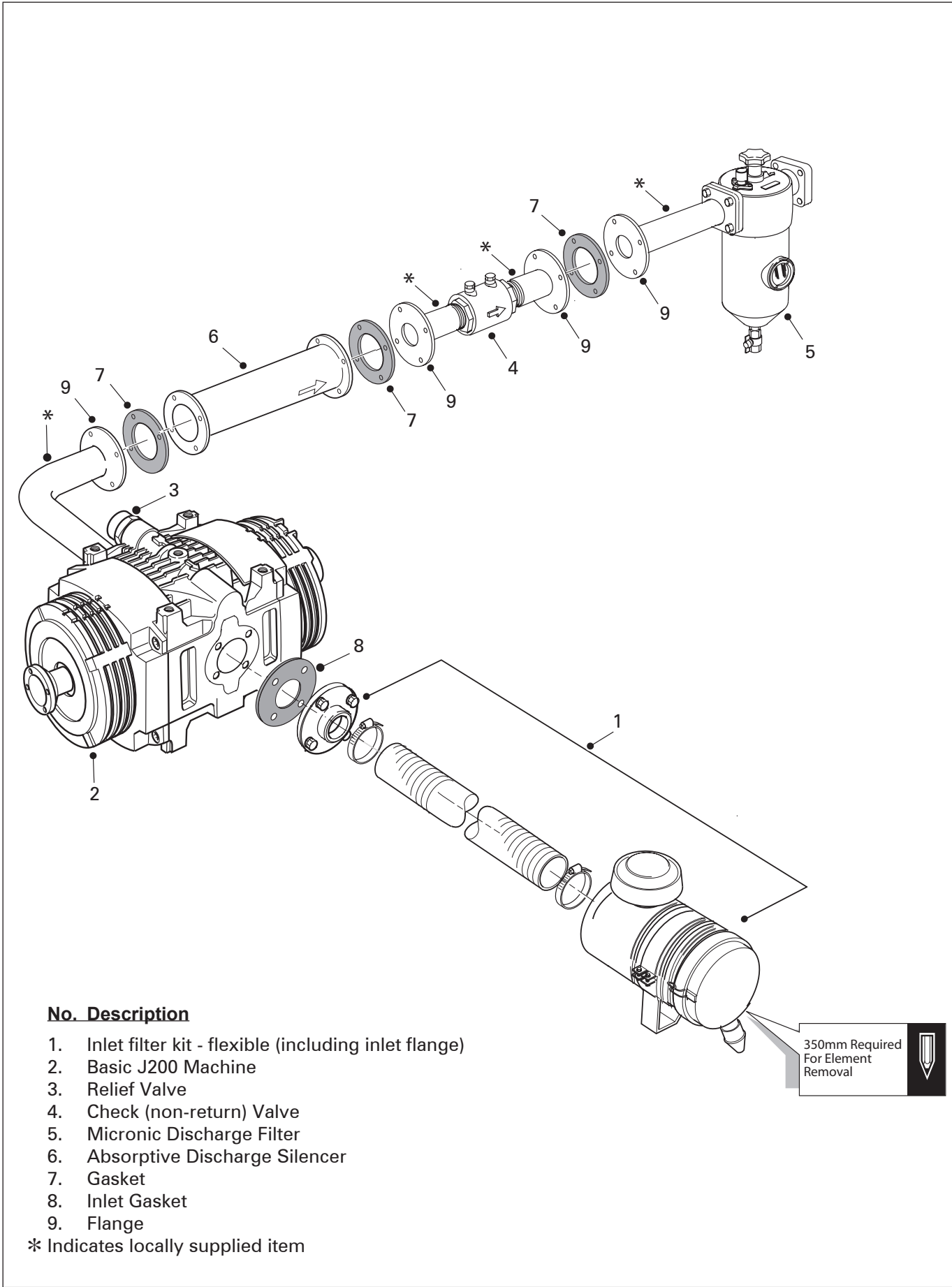
NOTE

The shape and size of the machine make it particularly suitable for PTO/prop. shaft driving inside the vehicle chassis.

NOTE

Do not allow dirt, oil and grease to enter the machine ports as this could cause severe damage.

General



No. Description

- 1. Inlet filter kit - flexible (including inlet flange)
- 2. Basic J200 Machine
- 3. Relief Valve
- 4. Check (non-return) Valve
- 5. Micronic Discharge Filter
- 6. Absorptive Discharge Silencer
- 7. Gasket
- 8. Inlet Gasket
- 9. Flange

* Indicates locally supplied item

350mm Required
For Element
Removal



Figure1. Recommended general Layout

General

2.4 Dimensions, Performance Data & Operating Environment

Dimensions

The dimensions of the compressor are shown in figure 2 below.

Performance

The performance details and power requirements of the J200 compressor are shown on the product data sheet.

For additional information, the constant running torque does not exceed:

114 Nm

Speed range 1000 - 1600 rpm

Operating environment

The permissible/foreseen operating environment is as follows:

Ambient temperature range	-40 to +50°C
Resistant to tropical rain (in operation and transit), salt and sun	
Humidity level	Up to 100% RH condensing
Vibration level	0 to 40 Hz; ± 40 mm amplitude tested.
Inlet depression	Not to exceed 37 mbar
Orientation	See fig 4 page 8
Max. outlet temperature	200°C

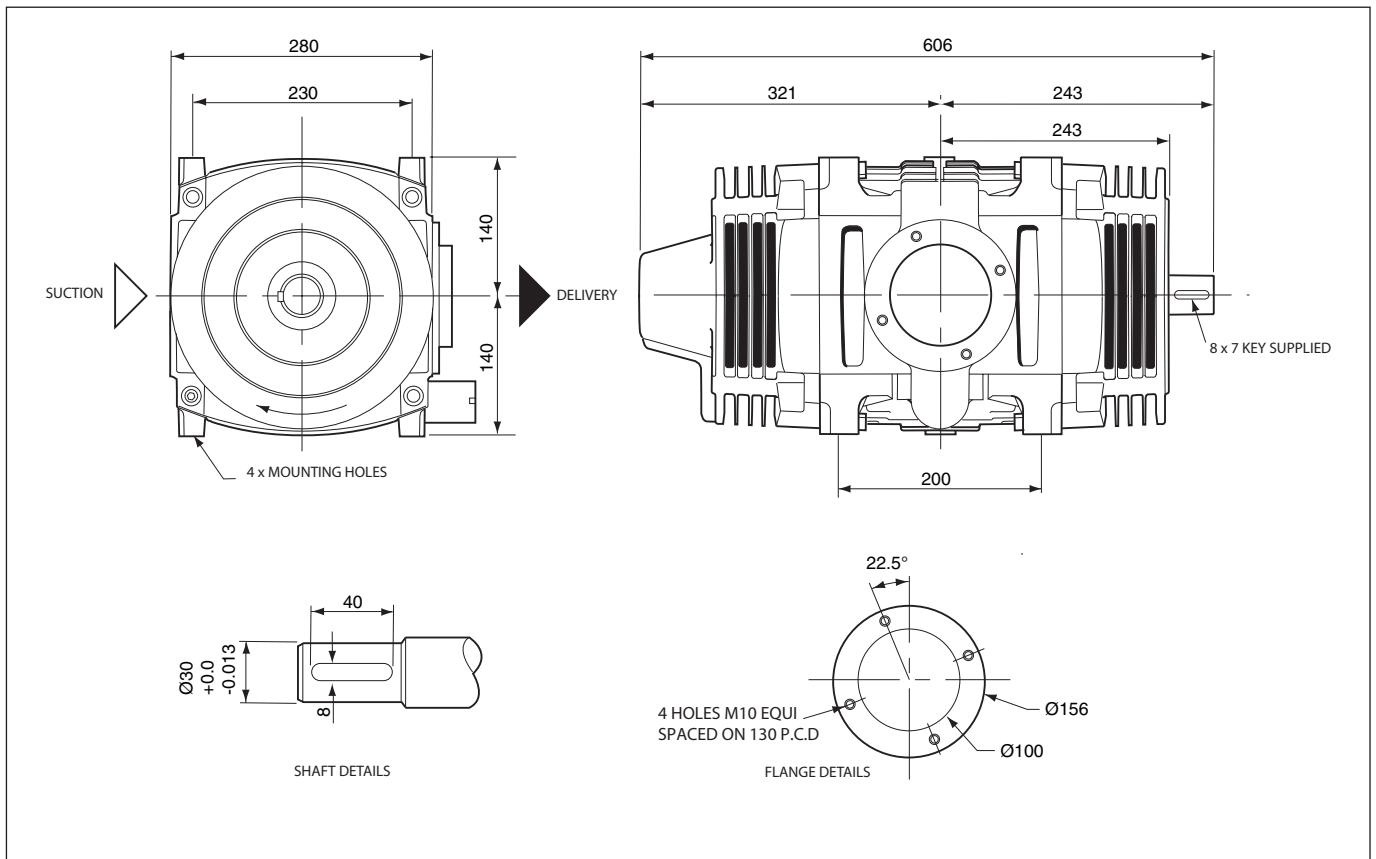


Figure 2. Dimensions

3

Installation

CAUTION



Operating in reverse, even for a short period, can cause severe damage to the machine

3.1 General

For the recommended layout of the machine and ancillaries, see figure 1.

When selecting the machine mounting position, the following points should be considered:

- Direction of input rotation to the machine must be correct and is simple to change by swapping over the cowls (see section 3.5 for how to change the machine input rotation) and driving the shaft at the other end of the machine.
- Install away from sources of heat, e.g. vehicle exhaust air or hot pipes that could effect the compressor temperature in any way.
- Venting relief/control valve air must be unobstructed and direct to the atmosphere.
- Any valves should be positioned to avoid hot air venting onto the operator.
- A cooling fan is fitted at each end of the machine and the cooling air path into the fan must not be obstructed.
- A space of at least 25mm must be allowed around the machine for air circulation. If mounting to a solid plate, the machine should be mounted at least 25mm from the plate or a cooling hole should be cut into the plate.
- Any flexible coupling assembly used with the machine (e.g. on hydraulic drives) must incorporate shaft end clearance (at least 1mm) to avoid interference through temperature expansion during operation.

3.2 Mounting

Each mounting foot is drilled and tapped M10. The machine should be fastened to the mounting channels (or mounting plate) using the four studs supplied (Fig 3, Item 2) and washers (Fig 3, Item 3).

The feet should be fixed to a flat surface to avoid inducing unnecessary stresses on the machine. This can be achieved using shimming if necessary.

NOTE



All fasteners should be tightened to 50 Nm.

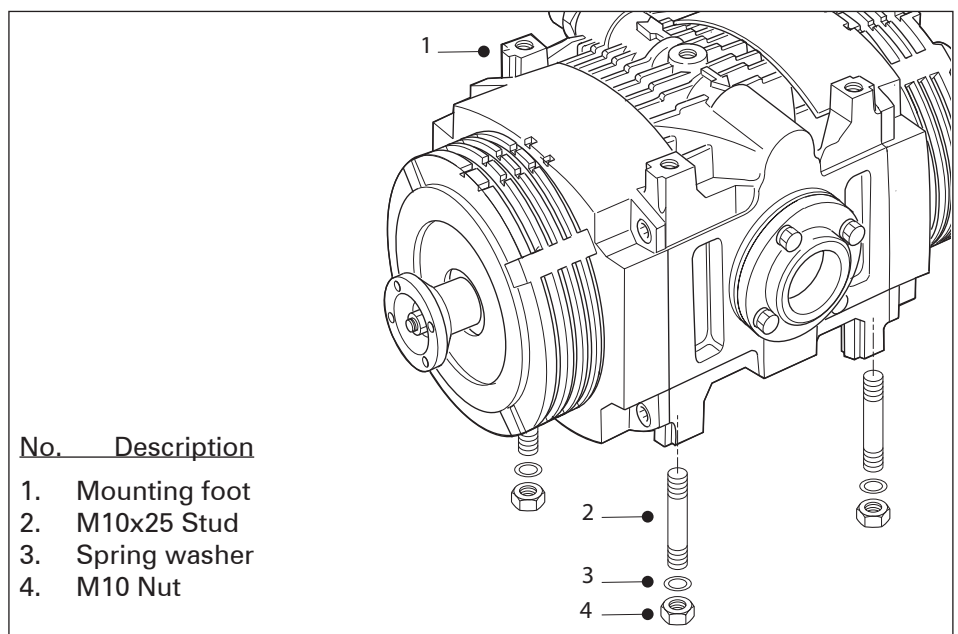


Figure 3. Mounting details

Installation

CAUTION

Only lift/support the machine using an eye bolt, not via the cowls.

3.3 Lifting

The weight of the compressor without ancillaries is 64 kg. We recommend that the machine is lifted via an eye bolt fitted in the M12 tapped hole located on the centre top and centre bottom of the machine body. See fig 3a below. Any equipment used for lifting the machine should be rated accordingly.

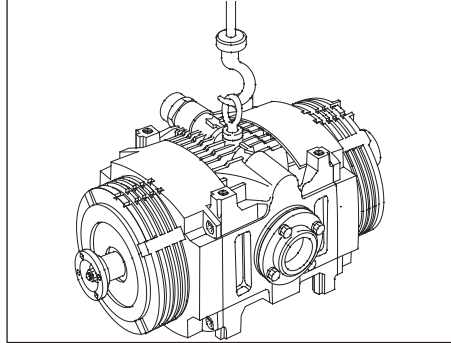


Figure 3a. Lifting

3.4 Mounting orientations

The J200 can be installed in any of the mounting options shown below and can be driven in both rotations by using either end of the input shaft.

The machine can be mounted upright, side mounted or inverted.

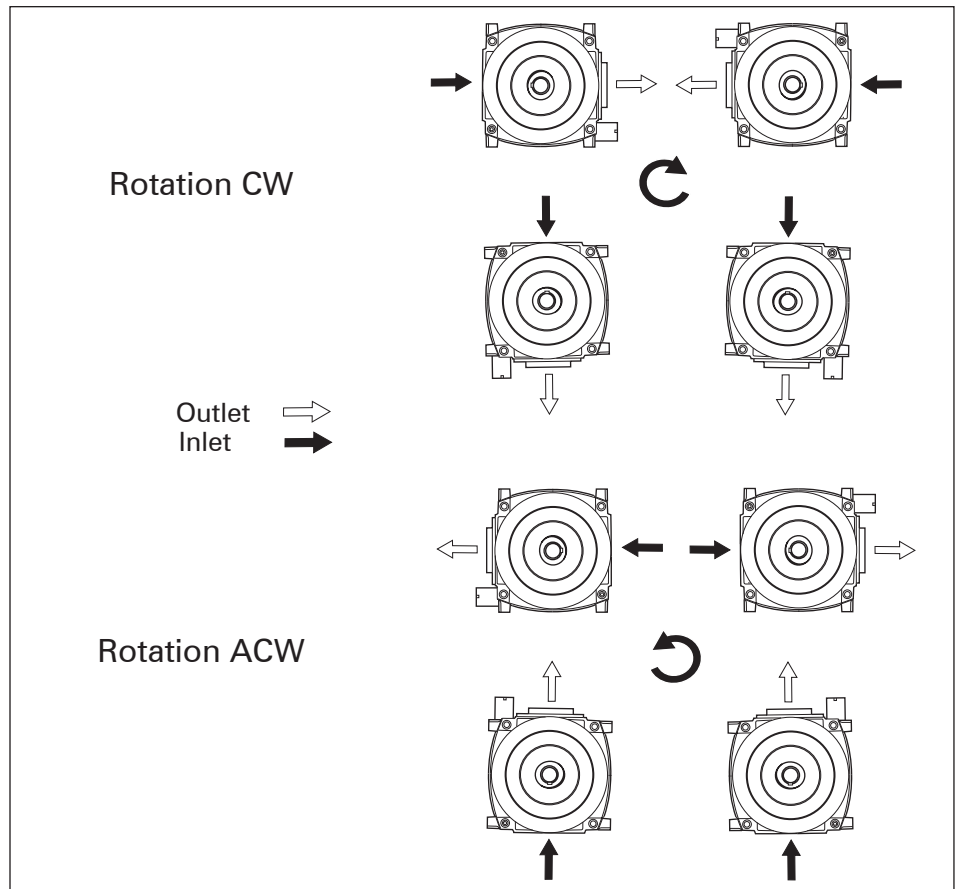


Figure 4. Mounting options

3.5 Lubrication

The J200 is supplied complete with sealed greased bearings which should not need re-lubricating within the normal life of the machine.

Installation

3.6 PTO and prop. shaft drive alignment.

NOTE

The machine rotor must always rotate in the same direction, but the opposite input drive rotation can be achieved by driving the rotor shaft from the other end of the machine.

Changing the machine rotation

The current direction of input rotation is indicated by cast arrows on the compressor body. Changing rotation is a simple process of swapping over the cowls, key & drive flange as shown in the diagram below.

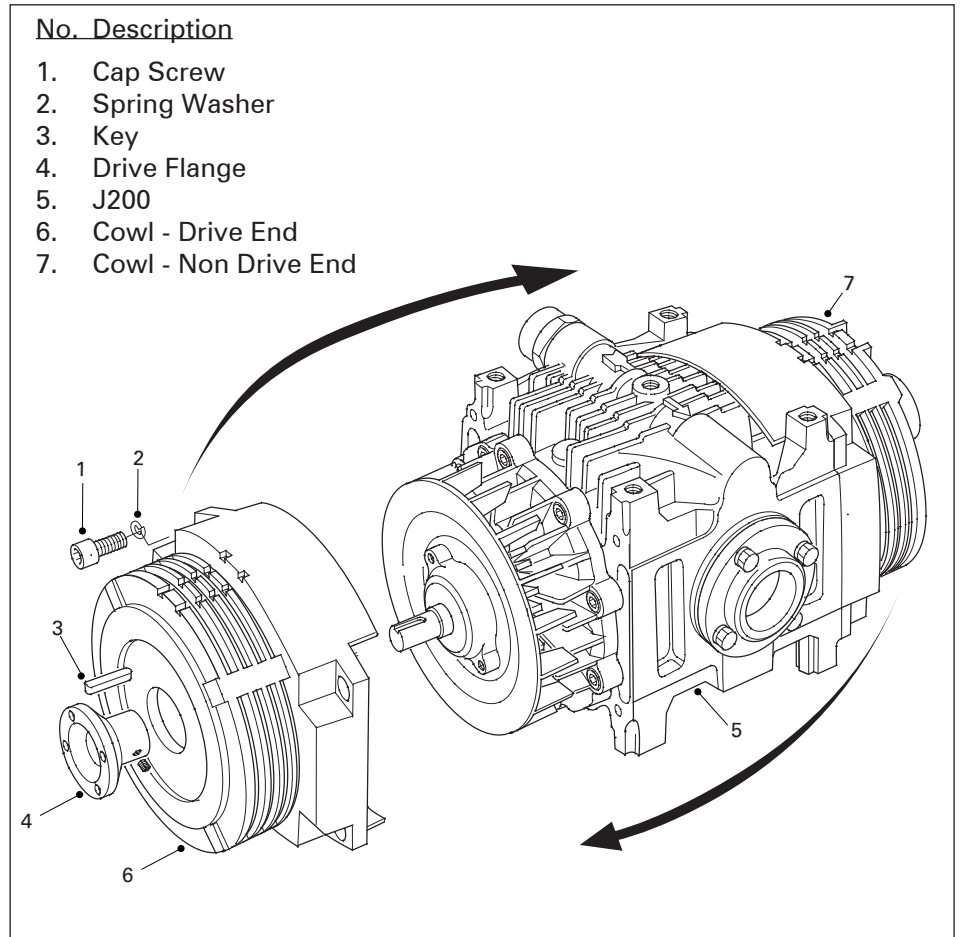


Figure 5. Changing Rotation

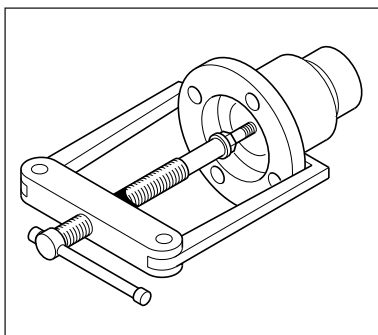


Figure 6. Drive Flange Removal

Fitting the drive flange

Standard drive flanges (and fasteners) are supplied with all new packages to fit either end of the rotor shaft.

Before fitting, the shaft and flange should be clean and damage free to ensure it fits correctly.

Both the shaft and coupling bore should be smeared with a light oil during assembly to aid future separation.

A Hollow Set Screw (Grub Screw) should be used for retaining the drive flange, in position on the shaft.

A puller type device will be required to remove the flange (see Fig. 6) to help avoid damaging the shaft or flange.

Installation

3.7 Machine and PTO Alignment

The drive axis on the majority of PTO's is at 3 - 5° to the horizontal, which reflects the angle of the engine and gearbox.

The compressor should be mounted so that its drive axis is parallel to the PTO's drive axis (within 1 degree) - see fig 7 .

The compressor should also be mounted so that the prop. shaft angle between the PTO and J200 in any plane (including compound angles) is less than or equal to 12°.

Consideration should be given to the prop. shaft length when mounting the machine and the prop. shaft should be sized so that it always has sliding clearance.

NOTE

Also check the prop shaft manufacturers information for the permitted installed angle.

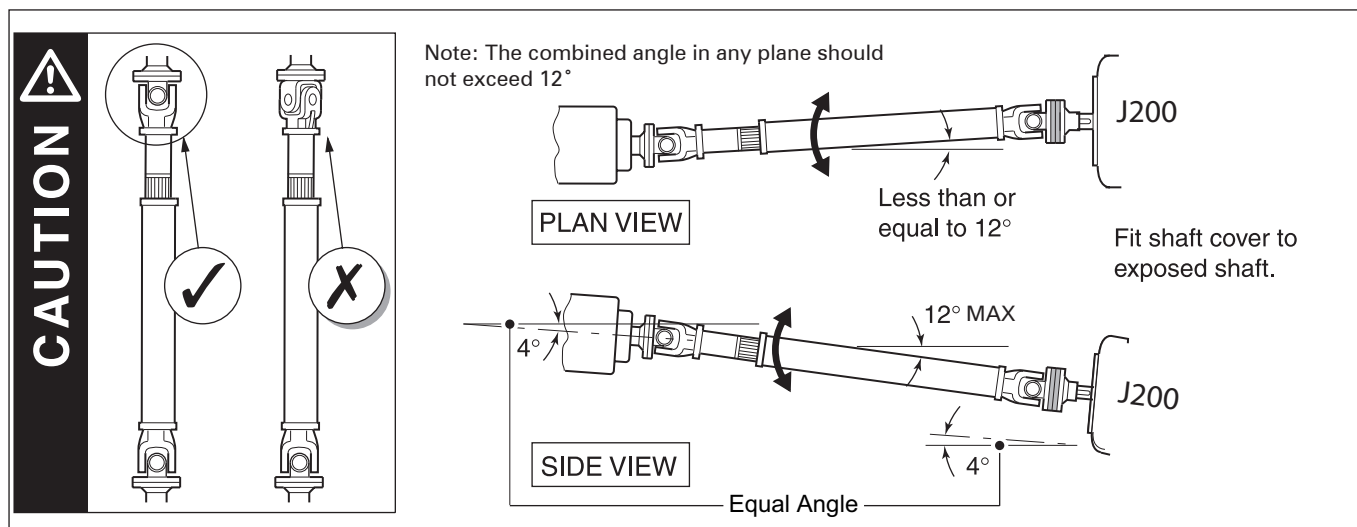


Figure 7. Drive Alignment

3.8 Pipe work - Figure 1 shows a typical layout

Standard inlet

A flexible inlet pipe, inlet filter, machine inlet flange and gasket are all provided.

Fabricated pipework

Where any pipe work is to be fabricated, the following points should be followed/noted to prevent damage to the machine:

- Inlet pipe work should be made in stainless steel or thick wall aluminium to help prevent corroded particles entering the machine.
- Outlet pipe work can be fabricated from any material (including mild steel) to suit the application, although stainless steel is recommended.
- All fabricated pipe work should be carefully de-scaled/cleaned before commissioning the compressor.
- Pipe work should be attached to the vehicle chassis using flexible mountings to prevent unnecessary vibration, expansion stress, noise transfer and avoid distorting the machine body.
- A flexible element is recommended in the discharge pipe work (and inlet pipe work when necessary) to absorb any pipework distortion created through chassis movement and heat expansion.
- All inlet and discharge pipe work should be as free from bends as possible to minimise pressure drops. This allows the machine to work in the best inlet conditions and provide the maximum discharge pressure.

NOTE

Do not mount the machine close to exhausts or other warm air sources and locate in a position clear from vehicle road spray

Installation

3.9 Ancillaries

NOTE

Do not mount the inlet filter close to exhausts or other warm air sources and locate in a position clear from vehicle road spray

CAUTION

Any excess silicone sealant should be removed. Silicone entering the machine can cause damage or failure.

NOTE

The relief valve must be the first ancillary in the discharge line and must be fitted as close as possible to the machine, but must vent away from the machine & operator.

Air Inlet Filter and Flexible Induction Kit

The inlet filter is necessary to clean the air entering the machine to prevent problems through large particle ingress and long term problems by small particles eroding main bore components.

The filter should be located so that the inlet air is cool, dry and as clean as possible to maximise filter and machine life.

The inlet filter should be supported using the mounting band supplied rather than mounting directly to the suction port.

High temperature silicone sealant is recommended to be applied between the flexible inlet pipe and inlet during hose fixing.

Relief Valve

The relief valve (setting stamped on the central brass valve) is provided to protect the machine against pressures of over 2.5 bar g (36 PSI), and should not be adjusted in any way. As such, adjustment of the relief valve will invalidate the J200 and relief valve warranty.

The relief valve is supplied attached to the machine.

Discharge Silencer

If one is fitted, it should be located as close to the machine discharge port as possible.

Check (non-return) Valve

This is to prevent a back-flow of air and product (often encountered when stopping compressors whilst the discharge tank is still pressurised) from entering and damaging the compressor. It should be mounted as the last ancillary in the discharge line.

Expansion Joints

Any pipe work or equipment should incorporate flexible elements where:

- Movement due to thermal expansion is likely
- Pipe work crosses the vehicle chassis.

Discharge Filter

For food or other highly sensitive products, we recommend that a fine gauge discharge filter is used (5 micron nominal rating recommended) and we offer our own unit shown in figure 1.

NOTE

Failure to fit a Ball Valve could cause failure due to high shaft torque or product blow-back.

Ball Valve

A 1" manual ball valve should be fitted on the discharge side of the machine, before the check valve, to prevent starting the compressor against a pressurised tank/line. This allows venting of the compressor discharge air to atmosphere during start-up.

4

Commissioning

4.1 Pre-operating check list

Tick when completed



Flexible and welded pipe bores etc cleaned after fabrication.	
All flanges, fasteners and mountings secure.	
Vehicle PTO disengaged.	
Engine management system set-up correctly for the application.	
Blow (ball) valve open (if starting against a tank pressure).	
Commissioning/testing 1.5 - 2" gate valve and silencer fitted.	
Discharge pressure gauge fitted (0-3 bar g)	
Ancillaries correctly fitted and sequenced as per instructions	

CAUTION

Gardner Denver Drum's own tests show noise levels fall between 86-91 dB(A) at (1000-1600rpm 2.0bar g).

CAUTION

Never start the compressor against a pressurised tank or discharge line.

Max. Inlet Depression

37mbar under all circumstances.

Max. Discharge Pressure

2,5 bar g (36 psi)

CAUTION

Pipework will become HOT during test/running.

4.2 Test and operating procedure

Tick when completed



1 Check that the gate valve on the discharge pipework is open.	
2 Start the engine, depress the clutch and allow the vehicle gearbox parts to stop rotating (5 seconds should be sufficient).	
3 Engage the PTO and slowly raise the clutch, then set the engine speed to drive the compressor at the operating speed of the application. Note: The compressor input speed range is 1000 - 1600 rpm.	
4 Check that the inlet blockage indicator does not indicate (show red) a blocked filter/inlet pipe work (see inlet filter section)	
5 Whilst the compressor is operating, check the pipe work for leaks. Stop the machine and tighten fasteners if necessary.	
6 Partially close the gate valve to raise the discharge pressure to 0.2 bar below the relief valve full bypass setting (stamped on relief valve). Check the system for leaks. Stop the machine and tighten fasteners if necessary.	
7 If all is well, continue to run the compressor until the total test time reaches 30 minutes. Re-check for air leaks.	
8 Slowly increase the pressure beyond the stamped setting (on valve) to operate the relief valve. The relief valve should crack (begin to lift/open/blow off) within 10% below the set pressure. Slight leakage prior to cracking is permitted at up to 0.5 bar g below the set pressure.	
The relief valve should then fully open (full bypass) at within 5% of the set pressure.	
9 Slowly reduce the pressure until the relief valve re-seats (should be before 0.5 bar g (7 psi) under the full bypass pressure).	
10 Check that all fastenings are still tight and flanges are leak free.	
11 Return the engine speed to tick over, disengage the PTO, and then stop the engine.	
12 Remove any test apparatus, disconnect discharge hose and fit a blanking cap.	

Commissioning

4.3 J200 Driver training

Driver training should be given whenever possible and should include:-

Safety

Instruct the driver regarding:

- Rotating parts
- Hot Pipework
- Safety valves
- Safety couplings

Operation

Instruct the driver regarding:

- Speed range
- Maximum operating pressure
- PTO engagement
- Unloading valve

Routine Maintenance

Instruct the driver regarding:

- Air filter - cleaning
- Pipe connections - checking
- Mounting fasteners - checking
- Relief valve function
- Check valve function

5

Maintenance

NOTE



The compressor can be carefully cleaned with steam or water jets, but only when the machine is cold as serious damage could result.

NOTE



The relief valve should be operated every month to clear the valve seat and check the valve is functional.

(Ear protection is recommended)



NOTE



If the maximum pressure reading is higher than the set pressure by more than 0.2 bar, stop the test and replace the relief valve before running the compressor again.

NOTE



New gaskets may be required when inspecting the check valve.

5.1 Schedule

Daily	<ul style="list-style-type: none">• Monitor the inlet filter blockage indicator.
Weekly	<ul style="list-style-type: none">• Clean the fans, fan covers and body ribs.• Check air filter and pipe work for leaks. <p>Where the compressor is mounted on a vehicle and located outside, it should be operated for at least 15 minutes each week (twice a week in damp/cool conditions)</p>
Monthly	<ul style="list-style-type: none">• Check Function of Relief and Check (non-return) Valve• Check inlet and discharge pipe work for leaks.
3 Monthly	<ul style="list-style-type: none">• Clean filter carcass and element - Air Filter element and carcass - replace if necessary.• Check security of compressor feet fixing bolts to both machine and chassis. Tighten if necessary (M10 bolts - torque to 50 Nm)
6 Monthly	<ul style="list-style-type: none">• Check blade wear
Annually	<ul style="list-style-type: none">• Examine the internals of the check valve• Examine pipes, silencers and pipework fixings for corrosion and replace as required

Tamperproof lead seals have been fitted into several cap screw heads on each of sideplates. Removal of these seals during the warranty period will invalidate the warranty.

5.2 Checking the relief valve operation

Check the relief valve operation as detailed in section 4 and visually check for any sign of obvious defects.

5.3 Inspecting the check (non-return) valve

The check (non-return) valve should be removed and visually checked for signs of wear. If in any doubt, replace the entire valve.

5.4 Silencers / Pipe work

Silencers (if fitted) and pipework should be inspected for signs of damage or corrosion. When paintwork is damaged, clean off any corrosion and treat with rust inhibitor before repainting. Use paints that can withstand temperatures of 200°C.

5.5 Lubrication

The bearings are packed with grease on assembly and need no regular attention.

Any additional greasing of the bearings (see service instructions) should only be undertaken using Aeroshell No.5.

Maintenance

5.6 Air inlet filter

The blockage indicator is designed to show/hold the maximum inlet blockage encountered. It is set to show 100% blockage when the inlet depression reaches 37mbar.

If the indicator valve has entered the red portion of the scale (when the compressor is operating), the filter must be cleaned or replaced by employing one or both of the following processes:

Remove accumulated filter debris (machine not running)

1. Pull back the clips retaining the air inlet filter end cap and remove the end cap.
2. Empty out any dust or dirt and clean out the main filter cavity. Replace the end cap the correct way up and re-clip in position.

Clean the filter element

To clean the filter element (machine not running):

1. Remove the air filter end cap (as described in the previous section).
2. Release the filter retaining nut and withdraw the filter.
3. Clean the filter by blowing through compressed air from the inside.
4. Element replacement is a direct reversal of the above.

Filter elements should be replaced every 12 months or sooner if cleaning does not return the blockage indicator to the unblocked condition.



Figure 10. Blockage Indicator

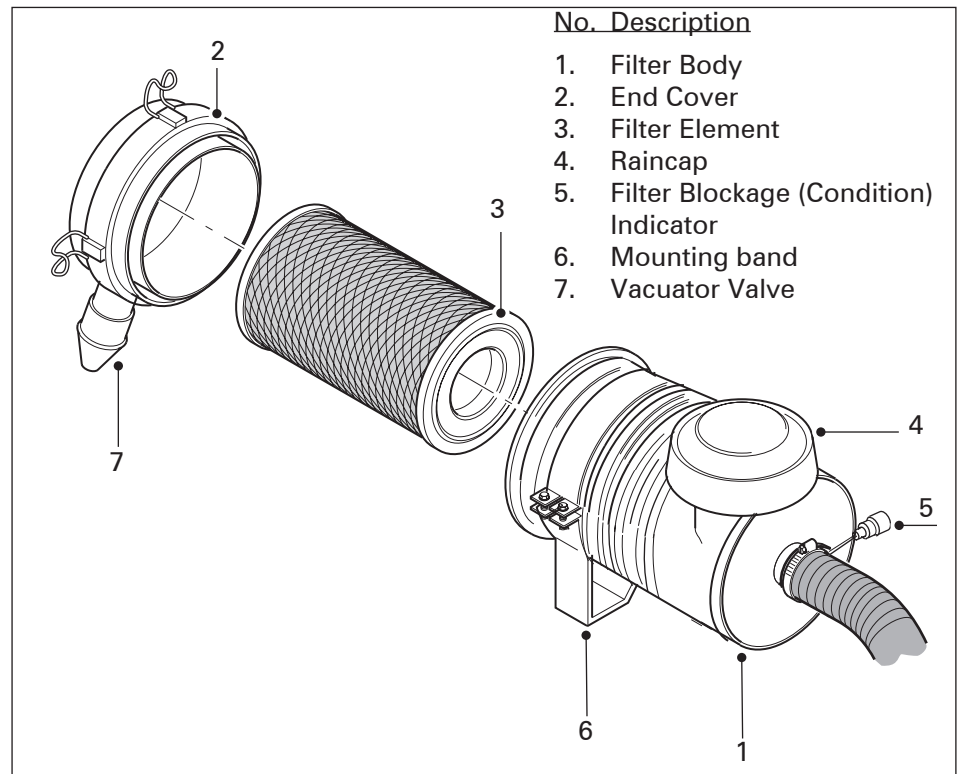


Figure 9. Replacing Air Filter

Maintenance

5.7 Checking the blade wear

Under normal working conditions, the blades should last for a considerable period (see 5.8).

NOTE



Failure to replace the blades will eventually result in machine failure. Late blade change can permanently damage the machine so that future blade life is reduced.

Using the drawing (fig 10) below, check the blade wear as follows:

1. Remove the pipework from the most convenient port.
2. Measure the distance from the face of the port to the outside diameter of the rotor.
3. Turn the rotor until one of the blade slots lies perpendicularly opposite the port (it will not be central).
4. Push the blade down to the bottom of the slot and measure the distance from blade to the top of the slot (dimension 'A' shown below).
5. The performance of the machine will begin to deteriorate when this measurement reaches 20mm (25/32").

Replace the blades before this level of wear is reached.

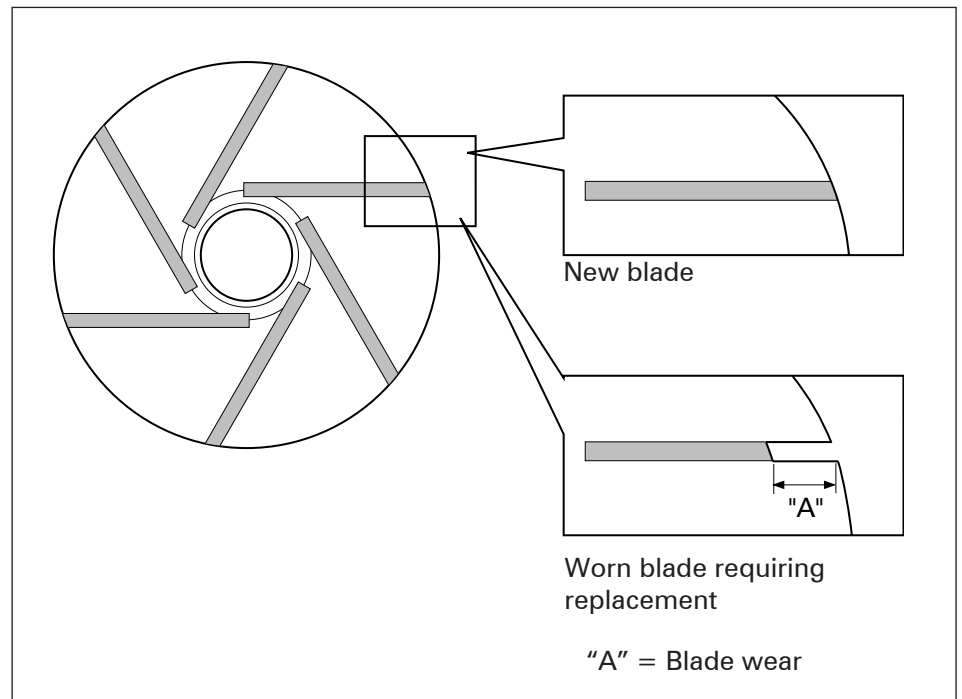


Figure 10. Blade change.

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The logo for Gardner Denver, featuring the word "Gardner" in a large, bold, black sans-serif font, with a thick red horizontal line underneath it. Below the line, the word "Denver" is written in a smaller, bold, black sans-serif font.

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