



HIGH OUTPUT ON-BOARD AIR KIT
INSTALLATION GUIDE

CKMA12 / 24



Part No. 2102MA12
Revision Date 26/08/2013
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1 Introduction

IMPORTANT :

To assure the highest level of planning and reliability goes into this installation, please read this guide in its entirety before attempting any modifications to the vehicle.

1.1 Pre-Installation Preparation

Although your HF Air Compressor comes complete with all the step by step instructions you will need to install your new air source, HF recommends that you have your HF Air Compressor installed by a trained professional. Many HF distributors around the world have been fully instructed in Air Compressor installations by HF and have gained a wealth of experience and skill from years of performing similar installations.

Make sure your Air Compressor kit is the correct model for your application and that it contains all of the parts listed on back cover of this booklet. Also be sure you have appropriately equipped yourself with all the necessary tools, parts, and materials to complete this installation (see section 1.2 Tool-Kit Recommendations) and minimize vehicle down time.

Please refer to your HF Air Locker Operating & Service Manual for information on operating, servicing, driving technique, or trouble shooting your HF Air Locker(s).

HINT : Place a ✓ mark inside each of the ☐ symbols as you complete each step. It is very important NOT to miss any of the steps!

1.2 Tool-Kit Recommendations

Below is a list of tools and supplies you may need to complete this installation.

1.2.1 Tools

- ☐ Standard automotive sizes (metric and/or imperial) of sockets, wrenches, Allen keys, and drills.
- ☐ A razor knife to cut the nylon tubing.
- ☐ A leak test gauge (i.e., HF # 0770005).
- ☐ A multimeter or test light.
- ☐ A soldering iron.

1.2.2 Supplies

- ☐ Thread lubricant/sealant compound for pressure fittings (e.g., LOCTITE #567 Teflon paste and/or plumbing supply Teflon tape)
- ☐ A soap and water mixture to test for air leaks.
- ☐ Solder and/or automotive crimp fittings for making electrical junctions.
- ☐ Electrical tape and/or heat shrink tubing for insulating electrical junctions.

2 Installing the Compressor

2.1 Identifying the Best Mounting Position

- ☐ Using the following points as guideline, identify a position on the vehicle or inside the cabin where the compressor can be safely and conveniently mounted.

NOTE : The ideal position of the compressor should give consideration to all of the following points:

1. The location should allow for quick and easy access to the compressor for attaching an optional pump-up kit air hose for tire re-filling if desired.
2. Keep away from sources of heat (e.g., too close to exhaust system components or directly behind the radiator, etc.).
3. The position should be safe from damage or abrasion caused by sand or gravel from the road surface.
4. Avoid any extended exposure to direct sunlight.
5. Keep away from excessive moisture (e.g., directly exposed to road spray or rain runoff).
6. Mounting location should be above the highest possible waterline to avoid submerging during water crossings.
7. The position must allow free flow of dry, cool air to the air filter assembly (unless an intake extension tube is to be used, in which case it is the filter assembly and the extension tube which must be located accordingly).
8. The position should allow access to the air filter assembly for filter disassembly and cleaning (unless an intake extension tube is to be used).
9. If an intake extension tube is to be used then consideration should be given to the intake position so that the distance (length of tube) between the compressor mounting location and the actual air intake point can be kept to a minimum.
10. The position must allow the compressor motor mounting bracket to firmly secure the compressor using all 4 bolts.
11. The position must allow access to the opposite side of the mounting location so that the backing plate and locking nuts may be installed.
12. Parts of the compressor may get hot while running for long periods of time, and therefore the compressor should be located away from where it could be touched by children or pets.
13. The position should permit a short (close to the battery), protected and accessible route for the wiring loom to follow.
LONGER POWER WIRES = MORE INLINE RESISTANCE = LESS AIR FLOW RATE
14. The compressor should not be mounted in a position where the running sound might be considered startling or irritating for vehicle occupants.
15. The compressor should not be mounted in close proximity to devices that are sensitive to the electromagnetic fields of DC motors (e.g., compasses, radio/GPS antennas, engine management sensors, etc.).
16. Where possible, the compressor should be mounted close to the location of the Air Locker equipped axle in a single Air Locker system, or halfway between both axles in a dual Air Locker system.
17. Never mount the compressor in a position where it would be considered unsprung mass (e.g., mounted directly to the axle or the engine block).

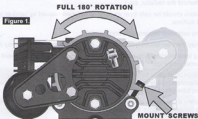
2 Installing the Compressor

2.2 Configuring the Compressor for the Best Fit

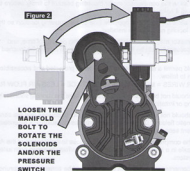
HF's CKMA series compressors are highly configurable to suit the most difficult mounting locations. Once the compressor's ideal location has been determined, the shape of the unit can be configured in several ways to best suit the mounting position, provide best access to the ports, and look the most attractive once installed and wired.

It is highly recommended to spend some time experimenting with different configurations prior to drilling the four mounting holes.

- ☐ Loosen the two motor mount screws (4mm HEX KEY) so that the compressor can be freely rotated in its mount while establishing a good mount position.



- ☐ Loosen the manifold bolt (10mm SOCKET) so that the solenoid(s) and pressure switch (not shown) ports can be freely rotated for best positioning.

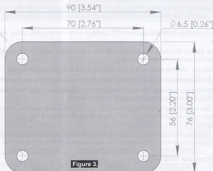


- HINT:** Loosely fitting the solenoid(s) and pressure switch can help you to find the best possible configuration for a tight space.

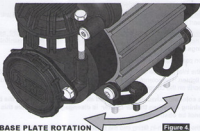
2 Installing the Compressor

2.3 Drilling & Mounting the Compressor

- ☐ Establish the mounting hole locations for the compressor by using the compressor backing plate as a template, or referring to Fig.3. for exact sizes.



- NOTE :** The mounting bracket holes are slotted in a circular pattern allowing the backing plate and bolts to be partially rotated relative to the compressor. This should make finding a place for the four bolt holes an easier task.



- ☐ Drill the four mounting holes at a diameter of 6.5mm [1/4 inch].

- NOTE :** Try to drill mounting holes accurately. Use the backing plate as a drilling template if desired. Holes should never be drilled open to more than 8mm [0.31"] in size to compensate for misalignment.

2 Installing the Compressor

IMPORTANT :

The installation kit includes 4 hex head bolts, 4 dome head carriage bolts and 4 flat washers. The hex head bolts and washers are to be used if the tightening is to be done from the compressor side of the mounting panel. Alternatively, if the nuts are to be tightened from the backing plate side of the mounting panel then the carriage bolts can be used as they will not spin in the mounting bracket slots.

- ☐ Assemble the hex bolts and washers OR carriage bolts into the slots of the mounting bracket.
- ☐ Align the bolts in the mounting bracket with the newly drilled holes in the panel and then sit the compressor assembly in place.
- ☐ Assemble the backing plate onto the protruding bolts from the opposite side.
- ☐ Rotate the compressor on the mounting bolts to the most desirable position (Ref Fig.4).
- ☐ Install the locking nuts with the nylon locking flange facing away from the backing plate and tighten to a torque of approximately 6 Nm [4.4 ft-lb].
- ☐ Rotate the compressor motor in the mount to its most desirable position and tighten the two mount screws (4mm hex key) to a torque of approximately 3 Nm [2.2 ft-lb]. (Ref Fig.1.)
- ☐ Rotate the grey manifold tube and the black manifold cap into the best position and then tighten the manifold bolt (10mm socket) to approximately 9 Nm [6.6 ft-lb] (Ref Fig.2.).

2.4 Installing the Solenoid(s)

This step applies to the 12V solenoid that is packed with each HF Air Locker differential. If the compressor is to be used for an alternate purpose then simply skip this step and plug or terminate the ports as required by the application.

- ☐ Remove one of the $\frac{1}{8}$ " BSPT plugs from its port in the compressor manifold using a 5mm hex key. This plug may be discarded.
- ☐ Apply Teflon paste/tape to one end of the nipple ($\frac{1}{8}$ " X $\frac{1}{8}$ " BSPT supplied with the Air Locker), insert into the port and tighten.

NOTE : Pressure fittings do not require high torque to form an air tight seal.
Do not tighten any more than hand tight or damage to the manifold or fittings may occur.

- ☐ Apply Teflon paste/tape to the free end of the nipple.
- ☐ Assemble the inlet port side of the Air Locker solenoid (marked as port '1') onto the nipple and tighten. The solenoid should be rotated into a position that does not obstruct any other ports on the compressor manifold.

NOTE : The solenoid exhausts compressed air through the center of the black retaining cap when the Air Locker is disengaged. Make sure this orifice cannot be obstructed.

- ☐ Assemble the 5mm push-in fitting into the solenoid outlet port (marked as port '2') and tighten using a wrench/spanner. The O-ring of the fitting will form the seal.

NOTE : Pressure fittings do not require high torque to form an air tight seal.
Do not tighten any more than hand tight or damage to the fitting may occur.

- ☐ If two Air Locker units are being controlled with this air source then repeat Section 2.4 for the second solenoid.

2 Installing the Compressor

2.5 Installing the Pressure Switch

- ☐ Remove the plastic dust plug from the larger 1/4 NPT port in the compressor manifold and discard.
- ☐ Generously apply Teflon paste/tape to the threads of the pressure switch and assemble it into the port and tighten with a wrench/spanner.

NOTE : Pressure fittings do not require high torque to form a good air tight seal.
Do not tighten any more than hand tight or damage to the manifold may occur. Apply an increased amount of Teflon paste/tape if required.

2.6 Assembling / Installing the Air Filter

- ☐ Screw the air filter assembly into the threaded hole in the front of the compressor by hand.

NOTE : If an intake extension tube is to be used to relocate the air intake then the extension tube will be screwed into the front of the compressor and the air filter will be screwed into the extension tube (See section 2.7).

HINT : If extra tightening force is required, the air filter can be tightened by disassembling the cover, removing the filter disk, and using an 8mm [5/16"] hex key on the center of the port.

- ☐ The cover logo may be rotated by hand as desired.

2.7 Using an Air Filter Extension Tube (optional)

The air filter of the CKMA was designed so that it could be relocated to a more suitable location (if required) using an extension tube.

IMPORTANT :

The length and inside diameter of the extension tube can restrict the intake flow and negatively affect the performance of the compressor. In severe cases this could result in overheating and/or damage to compressor components. Use the following chart to make sure that the extension tube will not restrict the intake flow.

- ☐ Measure the intended length of the extension tube along the path between the compressor mounting location to where the air filter will be mounted.

Maximum Length of Tube		Minimum Inside Diameter of Tube
150mm [5.9"]	=	8mm [0.32"]
400mm [15.7"]	=	10mm [0.39"]
605mm [24.0"]	=	12mm [0.47"]
1715mm [67.5"]	=	14mm [0.55"]
3065mm [120.7"]	=	16mm [0.63"]

NOTE : There is no minimum length or maximum inside diameter for extension tubes.

- ☐ Consult the chart above for the recommended minimum inside diameter of the tube.

2 Installing the Compressor

NOTE : HF does not recommend connecting the compressor intake to the air supply in a 'snorkel' or other part of the air ducting for engine aspiration. However, if an extension tube is used to relocate the compressor intake to the engine intake supply then it must be understood that the negative pressure (vacuum) created by the engine when it is running will adversely affect compressor performance.
IF THE COMPRESSOR INTAKE IS CONNECTED TO THE ENGINE INTAKE THEN DO NOT RUN THE COMPRESSOR FOR APPLICATIONS OTHER THAN ENGAGING AN AIR LOCKER WHILE THE ENGINE IS RUNNING.

NOTE : Do not run the tube through areas where it will be exposed to elevated temperatures while the compressor is running as this will pre-heat the air intake and reduce compressor performance.

- ☐ Assemble an extension tube with a 1/4" NPT male fitting at one end and a 3/4" NPT female end at the other.
- ☐ Install the tube inline with the air filter.

NOTE : If the extension tube is being used due to the possibility of the compressor being exposed to water then Teflon tape or thread sealant should be used on the threads of the extension tube at the compressor end.

- ☐ Secure loose sections of the tube and the air filter.

HINT : The air filter assembly may be easily panel mounted if desired by securing the air filter base using the 2 bosses located on the inside of the filter base for countersunk screws.

ARB

3 Connecting the Air System

3.1 Running & Securing the Air Line to the Axle

IMPORTANT :

The path taken by the air line from the compressor to the Air Locker is unique to each vehicle and the desired position of the compressor. Plan ahead carefully when running the air line and always follow these guidelines:

NOTE : The flexible 5mm air line described here is supplied with each Air Locker kit and NOT with this HF compressor kit. If you require air line to complete this installation then contact your HF Air Locker distributor.

- ☐ Account for axle travel when running the line from the axle to a fixed point on the vehicle. Leave enough slack in the air line to allow for maximum suspension travel in both directions. (Not necessary on IFS installations)
- ☐ Avoid leaving large lengths of air line hanging underneath the vehicle where they may get tangled on rocks, sticks, etc.

HINT : Cable tying the air line to one of the flexible brake lines will account for axle travel and should help keep the air line from getting snagged.

- ☐ Run the air line all the way from the compressor to the differential before trimming either end of the line to length. This will save complications that may arise if the air line has to be removed.
- ☐ Make sure the air line does not contact sharp edges or abrasive surfaces that may damage the tubing over time.
- ☐ Do not run the air line around tight bends which may kink the tubing and restrict or block the air flow.
- ☐ Keep the air line well away from the vehicle's exhaust components. Air lines will melt if subjected to extreme heat.
- ☐ Do not run more air line than necessary. Excess line volume created when coiling the left over hose or using unusually large diameter hose, etc., will increase drain on the compressor resulting in the compressor running more often than needed.
- ☐ Support and secure the air line by tying it back with cable ties wherever possible (e.g., at least every 40cm [15 inches] along the loom).
- ☐ At the solenoid end of the air line, always trim the line to length with a sharp knife to avoid distorting the tube where it plugs into the push-in fitting.
- ☐ To attach the air line to the push-in fitting of the solenoid; insert the line firmly into the fitting, pull outward on the flange of the fitting while holding the line as far into the fitting as possible, and then gently pull outward on the air line to clamp the line in place.

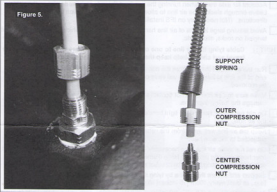
NOTE : To remove the air line from the push-in fitting; while holding the flange of the fitting out, push the air line into the fitting as far as possible, then press the flange inward, then pull the air line free of the fitting.

3 Connecting the Air System

3.2 Connection to the Air Locker Bulkhead Fitting

- ☐ In the case of an IFS axle assembly or in the case that the axle assembly has been completely removed from the vehicle, the assembly will have to be remounted in order to position the bulkhead fitting in its correct location for air line access.
- ☐ Trim the air line to length using a sharp knife.
- ☐ Insert the support spring over the end of the air line - small end first. (Fig.5.)
- ☐ Insert the outer compression nut over the air line.
- ☐ Push the airline onto the barb on the center compression nut, ensuring that it is pushed all the way to the end.

Figure 5.



HINT : If the air line is too difficult to get over the nipple then place the end of the air line into a cup of boiled water to soften the tubing and then try again.

- ☐ Screw on the outer compression nut and tighten, while supporting the center compression nut with a 3/8" spanner. The airline is now attached to the center compression nut.

NOTE : The outer compression nut will tighten against a stop. Over tightening will not create a better seal.

- ☐ Assemble the support spring over the outside of the outer compression nut.
- ☐ Secure any loose sections of tube with a cable tie.

4 Mounting & Connecting the Electrical System

4.1 Mounting the Actuator Switch(es)

ARB compressor and Air Locker actuator switch(es) can be easily panel mounted inside the vehicle in a 21mm x 38.5mm [0.83" x 1.44"] rectangular cutout.

NOTE : Air Locker actuator switches described here are supplied with each HF Air Locker kit and NOT with the HF compressor kit. If you require switches to complete the installation then contact your HF Air Locker distributor.

HINT : Only attach the cover plate to the face of the switch once the switch has been mounted and wired correctly as the cover plates are designed to be difficult to remove.

For reasons of safety and for ease of operation, the Air Locker actuator switch(es) should be mounted in a location picked to best suit the operator. Make sure you have taken the following points into consideration:

- ☐ Switch(es) MUST be mounted and should never be allowed to simply dangle from the wiring loom during vehicle use.
- ☐ Switch(es) should be within easy reach of the driver. Ideally, any Air Locker switch should be able to be operated without physical effort or distraction to the driver. (compressor switch location is not critical)
- ☐ Switch(es) should be mounted within the line of sight of the driver so that switch position ('ON' or 'OFF') can be visually determined by the rocker position and the illumination state.
- ☐ The position of the switch(es) should best eliminate any possibility of accidental operation by the driver or one of the passengers.
- ☐ Switch cutout position(s) must be located in an area with a minimum of 50mm [2"] of clearance behind the face of the cutout.
- ☐ Switch(es) should not be mounted where they will be exposed to water (e.g., in the lower section of an inner door panel).
- ☐ HF recommends that you apply the Air Locker Warning Sticker (HF part # 210101 supplied with Air Locker kit) within close visual proximity of the switch location.

NOTE : If no adequate position can be found on existing dashboard panels, a surface mounted bracket (Fig. 6.) may be purchased from your Air Locker distributor to suit 1, 2, or 3 switches.

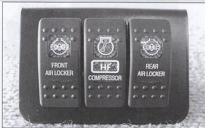


Figure 6

4 Mounting & Connecting the Electrical System

4.2 Wiring the Actuator System

HF AIR COMPRESSOR WIRING LOOM (CKMA12 & CKMA24)

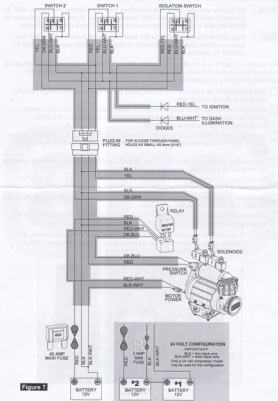


Figure 7

4 Mounting & Connecting the Electrical System

When wiring an HF compressor switch, Air Locker pressure switch, Air Locker actuator switch(es) and Air Locker solenoid(s) to an HF Air Compressor, all connections can easily be set up using only the supplied wiring loom (HF #180409 shown in Figure 7.)

- ☐ Consulting the wiring diagram (Fig.7.) for wire colors, and the switch terminal illustration (Fig.8.), plug each of the female spade terminals onto their appropriate switch terminal.

IMPORTANT :

As a safety precaution, the 'SWITCH 2' position in the wiring loom will not activate unless 'SWITCH 1' is already activated. Therefore, if both front and rear Air Lockers are installed then the rear **MUST** be controlled by 'SWITCH 1', and the front by 'SWITCH 2'. This is a safety feature that serves to reduce the risk of accidental / unintended engagement of the front Air Locker.

If only one Air Locker is installed then it should be wired using the terminals for 'SWITCH 1', regardless of whether the Air Locker is mounted in the front or rear axle.

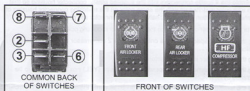


Figure 8.

- NOTE :** FRONT / REAR AIR LOCKER switches are supplied with each Air Locker differential kit, not with this compressor kit.

- ☐ Using a multimeter or an automotive test light, locate an accessory outlet or cigarette lighter port in the vehicle.

- NOTE :** The desired outlet should supply positive 12VDC for a CKMA12 or 24VDC for a CKMA24, be fused at a minimum of 8 amps, and be live only when the vehicle ignition key is in either the 'ACC' position or in the 'ON' position.

- ☐ Using a soldering iron or automotive quality crimp connectors, splice the red wire with a yellow stripe (RED-YEL) found on the separate short section of loom onto the positive (+) wire of the accessory outlet pair.

- NOTE :** If shortening the RED-YEL wire, make sure not to remove the heat shrink inline diode that protects sensitive electronics from current leakage.

- ☐ Insulate the junction area well with electrical tape.

- ☐ Using a multimeter or an automotive test light, locate an active dash light supply wire.

- NOTE :** The desired wire should supply 12VDC for a CKMA12 or 24VDC for a CKMA24 (less if dimmed) and react to the illumination level of the instrumentation / dash light dimmer.

4 Mounting & Connecting the Electrical System

- ☐ Using the scotch lock connector (supplied) splice the blue wire with a white stripe (BLU-WHT) found on the separate short section of loom onto the active illumination supply wire.
- NOTE :** If shortening the BLU-WHT wire, make sure not to remove the heat shrinked inline diode that protects sensitive electronics from current leakage.
- ☐ Insulate the junction area well with electrical tape.
- ☐ Route the 4 loose male spade terminals of the long section of loom through any panel work that separates the compressor mount position from the switches (e.g., the firewall separating the cabin from the engine compartment).
- NOTE :** This connection has been supplied disassembled to assist in the routing of the compressor loom through a minimum 8mm [5/16"] drilled hole in panels if necessary (e.g., through the firewall).
- NOTE :** If routing through a drilled hole in steel panels then a rubber insulating grommet should ALWAYS be used to protect the loom.
- ☐ Assemble the 4 spade connectors into the supplied plastic connector housing so that each wire color matches up with the same color on the matching connector housing of the short loom section when the 2 halves of the connector are plugged together.
- ☐ Route the remainder of the loom to the compressor mounting position.
- ☐ Plug the 2 female spade terminals onto any of the 2 compressor pressure switch terminals.
- ☐ Plug the compressor motor connectors together.
- ☐ Plug the female solenoid connector with a yellow wire (YEL) into the solenoid to be controlled by SWITCH 1.
- ☐ Plug the female solenoid connector with a green wire into the solenoid to be controlled by SWITCH 2.
- NOTE :** If no second solenoid is to be used then simply secure the remaining solenoid connector on the loom with a cable tie.
- ☐ Carefully route the 3 remaining wires from the compressor mount position to the battery position using the least possible length of wire along the path.

4 Mounting & Connecting the Electrical System

4.3 Connecting The Power Wires

IMPORTANT :

Although the wiring loom in this kit was designed to work with either a 12 volt or 24 volt system, the DC motor of the compressor has been designed **ONLY** for use on one specific voltage system.

Make sure you have the CKMA12 compressor kit for 12V systems or the CKMA24 for 24V systems.

Connecting a compressor to an incorrect voltage level will cause extensive damage to the compressor's DC motor, so carefully follow the Power Connection instructions below that apply to the vehicle.

IMPORTANT :

Never connect the power to the compressor while the vehicle key is in the ACC position, as this may result in accidental compressor start-up.

4.3.1 Power Connection To A 12V Vehicle / System

- ☐ Trim all 3 wires to the correct length for connection to the battery.

NOTE : If any of the wires require extra length to reach the battery then splice in an extension using **ONLY** wire that is of the same gage or bigger than the wire being lengthened.

NOTE : The inline fuse should be located as close to the battery connection as possible. Never eliminate the fuse when shortening the RED wire, and only ever lengthen the RED wire on the opposite side of the fuse from the battery.

- ☐ Crimp one yellow eye terminal (supplied) onto the heavy gage RED wire.
- ☐ Crimp the remaining yellow eye terminal (supplied) onto the heavy gage black wire that is marked with a white stripe (BLK-WHT).

NOTE : In a 12V system the 2 black wires (BLK and BLK-WHT) will be joined together, so they may be crimped together into the same yellow eye terminal if desired. Refer to wiring diagram in Fig 7.

- ☐ Crimp the blue eye terminal (supplied) onto the lighter gage solid black wire with no stripe (BLK).
- ☐ Connect the RED wire to the positive (+) terminal of the battery by securing the eye terminal under the nut of the clamping bolt.
- ☐ Connect both of the black wires (BLK and BLK-WHT) to the negative (-) terminal of the battery in the same way.
- ☐ Secure all loom wiring with cable ties along its entire path, as vibration could cause wear to the insulation over time which could result in a dangerous electrical short.

4 Mounting & Connecting the Electrical System

4.3.2 Power Connection To A 24V Vehicle / System

NOTE : Vehicles equipped with aftermarket 'dual battery kits' are not classified as 24V systems. They require the 12 volt compressor kit, and connection to the primary battery only according to section 4.3.1.

- ☐ Identify which battery in the system will be used as the 24V negative (-) terminal (i.e., Battery #1 in the wiring diagram Fig. 7.) by connecting a multimeter across the positive (+) terminal of one battery to the negative (-) terminal of the other battery. If you have tested the correct negative (-) terminal then you will read approximately 24 volts on the multimeter, and this battery will be battery #1, and the other battery with the positive (+) terminal you have just tested will be battery #2 (refer to wiring diagram Fig. 7.).

NOTE : If you have tested the wrong negative (-) terminal then you will read approximately 0 volts. Re-test using the opposite batteries.

- ☐ Trim the heavy gage black wire that is marked with a white stripe (BLK-WHT) for connection to battery #1 (identified above).

NOTE : If any of the wires require extra length to reach the battery then splice in an extension using ONLY wire that is of the same gage or bigger than the wire being lengthened.

- ☐ Trim the RED wire and the lighter gage solid black wire with no stripe (BLK) for connection to battery #2.

NOTE : The inline fuses should be located as close to the battery connection as possible. Never eliminate the fuse when shortening the red wire, and only ever lengthen the red wire on the opposite side of the fuse to the battery.

- ☐ Crimp one yellow eye terminal (supplied) onto the RED wire.
- ☐ Crimp the remaining yellow eye terminal (supplied) onto the heavy gage BLK-WHT wire.
- ☐ Crimp the red eye terminal (supplied) onto one end of the mini-blade fuse holder (supplied). Then crimp the red insulated cable joiner (supplied) onto the other end.
- ☐ Now join the mini-blade fuse holder onto the lighter gage black wire (BLK) by crimping the other end of the insulated cable joiner.
- ☐ Connect the BLK-WHT wire to the negative (-) terminal of battery #1 by securing the eye terminal under the nut of the clamping bolt.
- ☐ Connect the mini-blade fuse holder to the negative (-) terminal of the battery #2 in the same way.
- ☐ Connect the RED wire to the positive (+) terminal of the battery #2 in the same way.

NOTE : Double check that the connections match the wiring diagram (Fig 7.). Accidentally reversing the 2 black wires will cause damage to the compressor kit.

- ☐ Secure all loom wiring with cable ties along its entire path, as vibration could cause wear to the insulation over time which could result in a dangerous electrical short.

5 Testing & Troubleshooting

5.1 Leak Testing

- ☐ With the vehicle parked and the engine off, turn the compressor on and wait until the air system is fully charged.

NOTE : With the Air Locker(s) disengaged, the compressor should not have to recharge over time. Intermittent recharging without Air Locker use usually indicates a leak at the solenoid or pressure switch fittings.

- ☐ Actuate the Air Locker(s).
- ☐ The compressor should not come on again for a period of at least 15min. Air system recharging within that time period would indicate that a leak is present in the system.
- ☐ If a leak is found to be present, spray a soap and water mixture onto all air fittings in the system while the compressor is fully charged. Bubbles should appear at any leak points.
- ☐ Check that leaky fittings have been adequately tightened.

If leaking persists then disassemble fittings, clean threads, and reapply thread sealant / tape.

5.2 Testing the Air Locker Actuation

To test that the air system, electrical system, and the Air Locker differential is functioning correctly:

- ☐ Support the vehicle such that the wheels are free to rotate (e.g., on axle stands, a chassis hoist, etc.)
- ☐ Leave the parking brake off, the transmission in neutral, and the Air Locker switch 'OFF'.
- ☐ Turn the ignition to the 'ON' position (leaving the motor off). The large symbol on the Air Locker switch cover should not be illuminated.
- ☐ Turn the compressor on to charge the air supply to maximum pressure.
- ☐ While supporting the drive shaft flange, rotate one wheel by hand.
- ☐ The wheel should rotate freely and the opposite wheel should be turning in the opposite direction without any resistance or mechanical noise from within the differential.
- ☐ Turn the Air Locker switch to the 'ON' position. The symbol on the switch cover should light up.
- ☐ Rotate the same wheel again and check that both wheel rotate together.
- ☐ Turn the switch off again.
- ☐ Rotate the same wheel again.
- ☐ The wheels should again rotate in opposite directions.

5 Testing & Troubleshooting

5.3 Electrical Fault Diagnosis

The following describes an effective procedure for tracing an electrical fault in a CKMA12 or CKMA24 compressor which has been wired using a genuine HF wiring loom (refer to the diagram in Figure 7.). All steps must be performed in the order listed here for an accurate assessment.

NOTE : Before attempting to troubleshoot a malfunctioning compressor, always make sure that the compressor manifold has been de-pressurized, all connections have been made according to the wiring diagram, the vehicle's ignition is in the ACC power position, and that the ISOLATING SWITCH has been turned 'ON'.

NOTE : The 'MOTOR VOLTAGE' referred to below should be approximately 12V in the case of the CKMA12 and 24V in the case of the CKMA24. Otherwise '12V' refers to approximately 12V regardless of compressor model as the 24V compressor runs on a 12V control circuit.

NOTE : Battery number references (e.g., [B1]) are for 24V system wiring purposes.

STEP

1 Using a multimeter, check the voltage at the battery terminals to make sure the battery is working and is fully charged. Check each individual 12V battery in a 24V system.
Did each battery measure at least 12.5 volts?

YES Proceed to STEP 2.

NO Insufficient battery voltage. Recharge or replace the battery.

2 Disconnect the compressor motor from the wiring loom at the connector plug. Run a new wire directly from the negative (-) terminal of the battery [B1] to the BLK-WHT wire of the compressor motor. Momentarily connect a wire from the positive terminal of the battery [B2] to the RED wire of the compressor motor.
Did the compressor activate when the wires were connected?

YES Remove the extra wires and reconnect the compressor motor plug. Proceed to STEP 3.

NO Internal compressor motor problem. Contact HF for assistance.

3 Remove the fuse(s) from the fuse holder(s) in the compressor wiring loom. Using a multimeter, check the continuity (resistance) across the 2 contacts of the fuse.
Did the resistance measure less than 1 Ohm?

YES Proceed to STEP 4.

NO Blown fuse. Replace with a new fuse of same type. Insert new fuse with caution in case a wiring short was responsible for the fuse blowing.

4 Using a multimeter, check for MOTOR VOLTAGE between a chassis ground and each of the two contacts in the Maxi-blade fuse holder.
Was MOTOR VOLTAGE detected at one of the two contacts?

YES Reconnect the fuse into the fuse holder. Proceed to STEP 5.

NO Wiring fault between the positive (+) battery terminal and the fuse holder. Check the wire connection at the battery terminal and/or replace the wiring and/or fuse holder.

5 Testing & Troubleshooting

STEP

5 [24V COMPRESSOR AND WIRING ONLY] Using a multimeter, check for 12V between a chassis ground and each of the two contacts in the mini-blade fuse holder.
Was 12V detected at one of the two contacts?

YES Reconnect the fuse into the fuse holder. Proceed to STEP 6.

NO Wiring fault between the negative (-) terminal of the battery (#2) and the fuse holder. Check the wire connection at the battery terminal and/or replace the wiring and /or fuse holder.

6 Using a multimeter, check for MOTOR VOLTAGE between a chassis ground and the RED wire at the relay block. (I.e., the wire leading directly from the fuse).
Was MOTOR VOLTAGE detected?

YES Proceed to STEP 7.

NO Wiring fault between the fuse and the relay. Replace wiring and/or fuse holder.

7 Using a multimeter, check for approximately 12V between the negative (-) terminal of the battery (#2) and the RED-YEL wire connected to terminal #2 of the compressor isolating switch. (I.e., the wire leading from the vehicle's ACC power.)
Was 12V detected?

YES Proceed to STEP 8.

NO Wire has not been connected correctly or accessory power has not been turned on. Attach RED-YEL wire to live ACC power.

8 Using a multimeter, check for approximately 12V between the negative (-) terminal of the battery (#2) and the RED wire connected to terminal #3 of the compressor isolating switch. Test while spade terminals are still connected.
Was 12V detected?

YES Proceed to STEP 9.

NO Switch fault or switch not turned 'ON'. Replace switch or toggle switch to 'ON' position.

9 Using a multimeter, check for approximately 12V between the negative (-) terminal of the battery (#2) and the RED wire connected to the pressure switch attached to the compressor tank. Test while spade terminals are still connected.
Was 12V detected?

YES Proceed to STEP 10.

NO Wiring fault between the isolating switch and the pressure switch. Replace wiring.

10 Using a multimeter, check for approximately 12V between the negative (-) terminal of the battery (#2) and the DK-BLU wire connected to the pressure switch attached to the compressor tank. Test while spade terminals are still connected.
Was 12V detected?

YES Proceed to STEP 11.

NO Pressure switch fault or tank not de-pressurized. Replace pressure switch or drain tank.

5 Testing & Troubleshooting

STEP

11

Using a multimeter, check for approximately 12V between the negative (-) terminal of the battery [#2] and the DK-BLU wire at the relay block. (i.e., the wire leading directly from the pressure switch)

Was 12V detected?

YES Proceed to STEP 12.

NO Wiring fault between pressure switch and relay block. Replace wiring.

12

Disconnect the relay from the relay block. Using a multimeter, check the continuity between the BLK wire at the relay block and the negative (-) terminal of the battery [#2].

Did the resistance measure less than 1 Ohm?

YES Reconnect the relay to the relay block. Proceed to STEP 13.

NO Wiring fault in the ground wire between the battery and the relay block.
Replace wiring.

13

Using a multimeter, check for **MOTOR VOLTAGE** between the negative (-) terminal of the battery [#1] and the RED-WHT wire connected to the relay block and while the relay is still connected. Pierce the RED-WHT wire with the multimeter probe to make connection if necessary.

Was MOTOR VOLTAGE detected?

YES Proceed to STEP 14.

NO Relay fault. Replace with a new 12V - 40A relay of the same type.

14

Disconnect the compressor motor from the wiring loom at the connector plug. Using a multimeter, check for **MOTOR VOLTAGE** between the negative (-) terminal of the battery [#1] and the RED-WHT wire on the loom side of the plug.

Was MOTOR VOLTAGE detected?

YES Proceed to STEP 15.

NO Wiring fault between the relay and the compressor motor connector. Replace wiring.

15

Using a multimeter, check the continuity (resistance) between the BLK-WHT wire on the loom side of the plug (not on the compressor side) and the negative (-) terminal of the battery [#1].

Did the resistance measure less than 1 Ohm?

YES Intermittent wiring fault or internal compressor problem. Contact HF.

NO Wiring fault in the ground wire between the battery [#1] and the compressor motor.
Replace wiring.

5 Testing & Troubleshooting

5.4 Post-Installation Check List

Now that the compressor installation has been completed, HF recommends that you take the time to complete the following check list just to insure that you haven't missed any of the vital steps.

- ☐ The air system has been leak tested.
- ☐ The air filter position will not be exposed to moisture, dust or dirt.
- ☐ All air lines and wiring have been securely cable tied to resist snagging.
- ☐ Switch(es) have been securely mounted within operator reach, yet well away from danger of accidental engagement.
- ☐ Switch(es) function properly and illuminate to indicate activation.

For warranty and service purposes, please fill in the following fields and supply a copy to the customer (if applicable).

HF PRODUCT MODEL NUMBER: _____

SERIAL No: _____

POINT OF SALE (NAME/LOCATION): _____

DATE OF PURCHASE: _____

INSTALLATION PERFORMED BY: _____

DATE OF INSTALLATION: _____

VEHICLE MAKE: _____

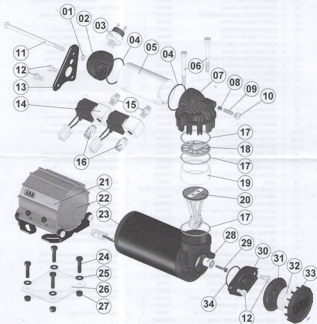
VEHICLE MODEL: _____

VEHICLE YEAR OF MANUFACTURE: _____



6 Parts List

CKMA12 & CKMA24 Air Compressor – Exploded Parts Diagram



6 Parts List

CKMA12 & CKMA24 Air Compressor

PART #	QTY	DESCRIPTION	PART #	NOTES
01	1	O-RING (85010V75)	160242	5
02	1	MANFOLD CAP (1/4" NPT)	325214	
03	1	PRESSURE SWITCH (1/4" NPT)	CO35	
04	2	O-RING (85031N70)	160241	5
05	1	MANFOLD TUBE	325215	
06	2	HEX BOLT (M6 x 50mm)	200763	
07	1	COMPRESSOR HEAD ASSEMBLY	320162	
08	1	SAFETY VALVE POPPET	325255	1
09	1	SAFETY VALVE SPRING	160115	1
10	1	SAFETY VALVE FITTING	325254	1
11	1	MANFOLD BOLT (M6 x 125mm)	200717	
12	4	HEX BOLT (M6 x 12mm)	200762	
13	1	MANFOLD SUPPORT BRACKET	325267	
14	#	AIR LOCKER CONTROL SOLENOID (12V)	160163	
15	#	NIPPLE (1/8" to 1/8" BSPT)	175561	
16	#	PUSH-IN FITTING (5mm to 1/8" BSPP)	175261	
17	3	O-RING (85032S70)	160247	5
18	1	VALVE PLATE ASSEMBLY	320165	
19	1	BARREL	325261	
20	1	PISTON ASSEMBLY (SERVICE KIT)	325352	6
21	1	STICKER, CKM COMPRESSOR	210122	
22	1	MOUNT ASSEMBLY	320161	
23(a)	1	MOTOR ASSEMBLY (12V)	320164	2
23(b)	1	MOTOR ASSEMBLY (24V)	320166	2
24	4	HEX BOLT (M6 x 25mm)	200405	
*	4	CARRIAGE BOLT (M6 x 25mm)	615162	
25	4	FLAT WASHER (M6)	200769	
26	1	BACKING PLATE	200663	
27	4	NYLON LOCK-NUT (M6)	615123	
28	1	AXLE	325293	
29	1	CAP SCREW (M5 x 20mm)	200711	6, 7, 8
30	1	AIR FILTER FLANGE (1/4" NPT)	325212	
31	1	AIR FILTER BASE	325501B	3
32	1	AIR FILTER ELEMENT (OIL TYPE)	200503	3
33	1	AIR FILTER COVER	325501A	3
34	1	O-RING (85029N70)	160256	5, 8
*	1	WIRING LOOM (CKMA12 & CKMA24)	160409	4
*	1	RELAY (12V/40A)	CO42	
*	1	SWITCH (12V)	160269	
*	1	SWITCH COVER (COMPRESSOR)	160212	
*	1	SCOTCH LOCK ELEC. CONNECTOR (56A)	CO45	
*	2	PLUG (1/8" BSPT)	175602	
*	2	EYE TERMINAL, 16MM (YELLOW)	160762	
*	1	EYE TERMINAL, 16MM (BLUE)	CO44	
*	1	FUSE, 48A, MAXI BLADETYPE	160703	
*	1	MINI BLADE FUSE HOLDER, 5A FUSE	160416	9
*	1	EYE TERMINAL, 8MM (RED)	160767	9
*	1	CABLE JOINER, INSULATED (RED)	160708	9
*	1	INSTALLATION GUIDE, CKMA	2102MA12	

Specs:

Voltage	12 Volts (CKMA12), 24 Volts (CKMA24)
Current Draw	No Load: 13A (CKMA12 only) Load: 23A (CKMA12 only)
Air Flow	61.2 L/min @ 80kPa (1.00 CFM @ 10psi) 61.8 L/min @ 200kPa (1.34 CFM @ 20psi)
Total Weight	4.8kg (10.6lb)
Size	145mm x 195mm x 95mm (5.7" x 7.7" x 3.7")
Manifold Port	1/4" NPT (Pressure Switch) x 1 1/2" BSPT (Solenoid/Nipple) x 2
Pressure Switch	Open: 690kPa (100psi) Closed: 490kPa (70psi)
Safety Valve	OPEN @ > 1200kPa (180 PSI)

Notes:

- Comes pre-assembled with HEAD KIT (35).
- Water leakage is the only difference between The CKMA12 and CKMA24 compressors. Water is compatible with replacement brushes. Available as 4202111.
- AIR FILTER BASE (31) & COVER (33) available only in AIR FILTER ASSY 420501 which also includes the element.
- Wiring loom 160409 suits 12 & 24 volt systems. See full wiring diagram attached.
- Complete set of Driving seals is also available as O-ring Service Kit 420505.
- PISTON ASSEMBLY (30) comes only as a service kit also containing the BARREL (19), AXLE (28), and CAP SCREW (29).
- Thread lock must be applied to threads of CAP SCREW (29) and then torqued to 10 Nm (7.45 lb-ft). CAP SCREW (29) should never be re-used once it has been fully torqued once.
- Pre-June 2009 CKMA's used O-RING 160241 and CAP SCREW 200168 (M6 x 25mm torque to 5Nm (4.45 lb-ft).
- Only included in the CKMA24.

Available separately or included with Air Locker kits.

* Not illustrated in exploded view.