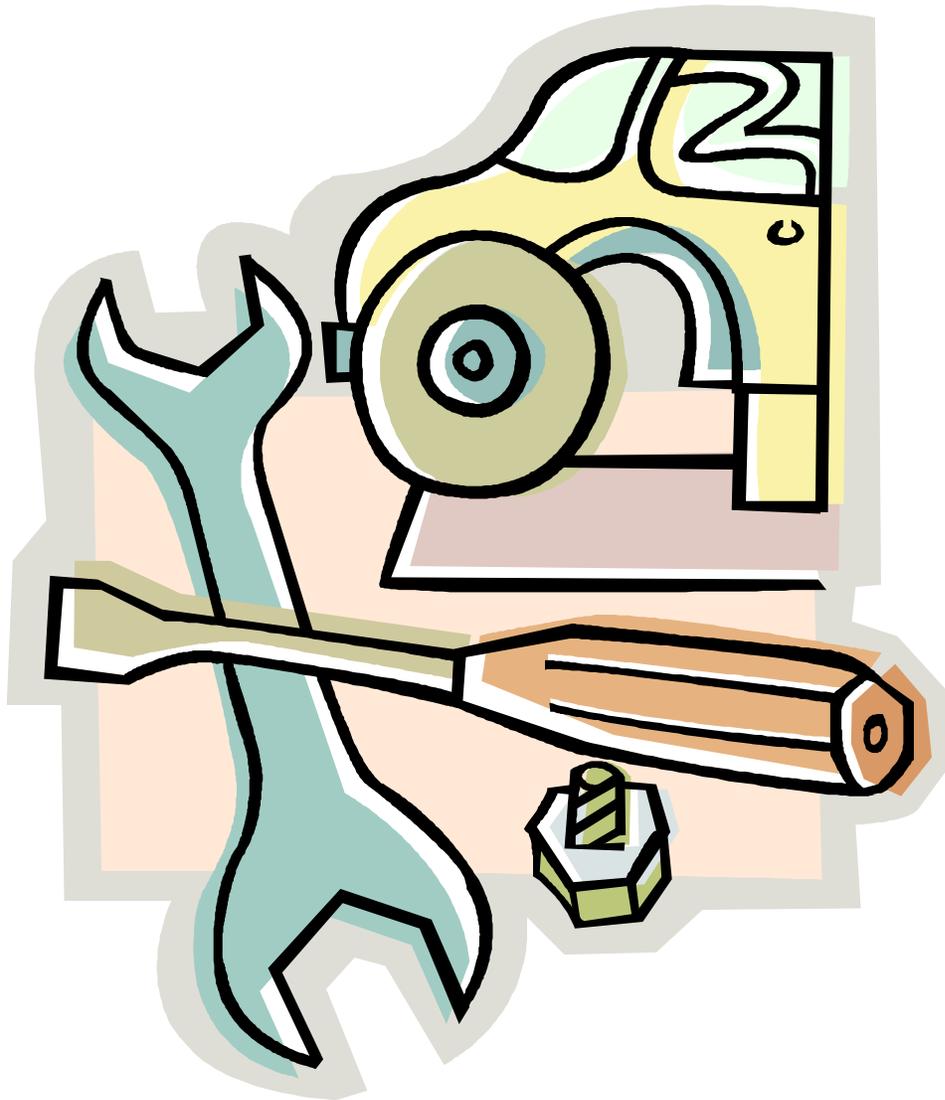


# W123 – OM616 & 617 Diesel Sanden AC Compressor Installation Guide

## Part II



Revision 01

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Draft	03/2015		
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### **Disclaimer;**

Although every effort has been made to ensure the accuracy of the information contained in this document, it is possible small errors will be found. A sincere apology if this is the case. I would ask that you take up contact with me and share what requires updating / correction.

### **IMPORTANT;**

Some of the steps outlined in this document involve potential life threatening activities such as working under the car, making adjustments while the engine is running, etc. PLEASE exercise caution and common sense and take applicable safety precautions.

### **Special Thanks;**

Without the Richard Ingram's (ROLLGUY on Peach Parts MB Forum) help I would not have been able to prepare this document for him and his future customers.

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## Sanden AC Compressor Installation

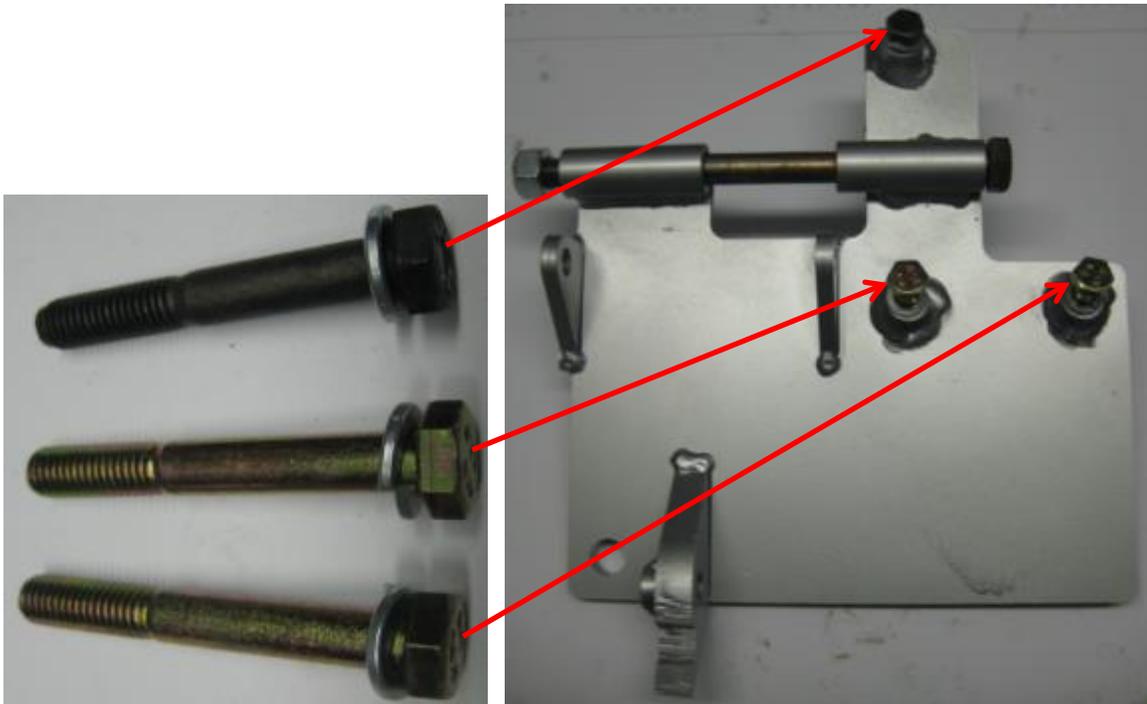
**IMPORTANT** – there are two ways to install the Sanden AC Compressor;

1. Mount the AC Compressor on the Mounting Bracket and install the assembly on the engine. This has the advantage of easy access to the top two mounting bolts (9/16" Allen bolts + flat washer + 9/16" lock nut). But the disadvantage of a heavy assembly to accurately place on the block to allow the long M12 bolt (19 mm tool) to be inserted in the machined hole in the engine block (see picture page 10).

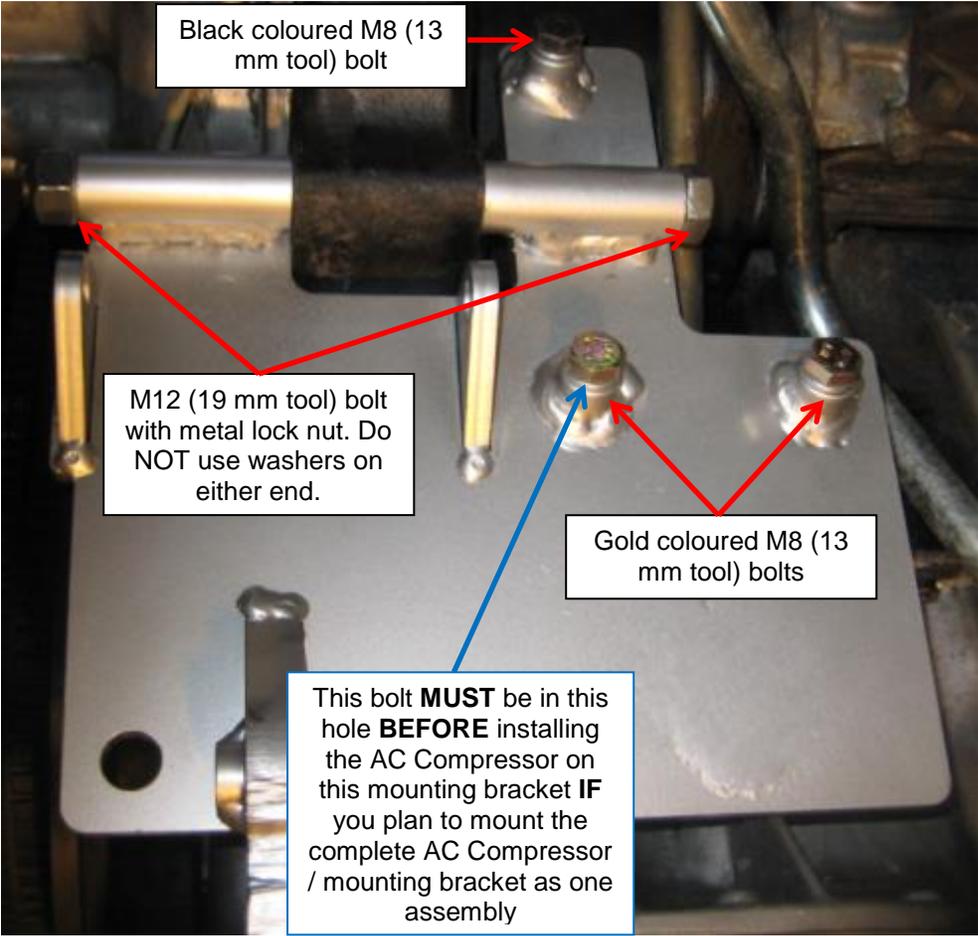
**OR**

2. Mount the Mounting Bracket to the engine block and then attach the compressor. This has the advantage of easy mounting of the Mounting Bracket and less weight to hold up when attaching the AC compressor. The disadvantage is putting the 9/16" Allen bolts through the Mounting Bracket mounting ears and the AC Compressor mounting ears. This becomes a two man job with the use of many expletives. The challenge doesn't stop there, now you need to add a flat washer and lock nut to each bolt. Followed by tightening these – the lock nuts supplied are a VERY tight fit. You need patience, dexterous hands and the right tools. It can be done as I managed to do it, I estimate it cost me 30 – 45 minutes of additional time.

The Gen II Mounting Bracket (silver coloured), requires three M8 bolts (13 mm tool). You will find two are gold coloured and one black plus three lock washers. The black one is slightly shorter and **MUST** be used in the upper mounting hole of the Mounting Bracket. **NOTE** – in the right hand picture the M12 bolt (19 mm tool) is shown in the Mounting Bracket sleeves.



The picture below shows the mounting bracket attached to engine block using the three M8 bolts (13 mm tool) and the M12 bolt (19 mm tool) from the original GM R4 to bracket mounting.

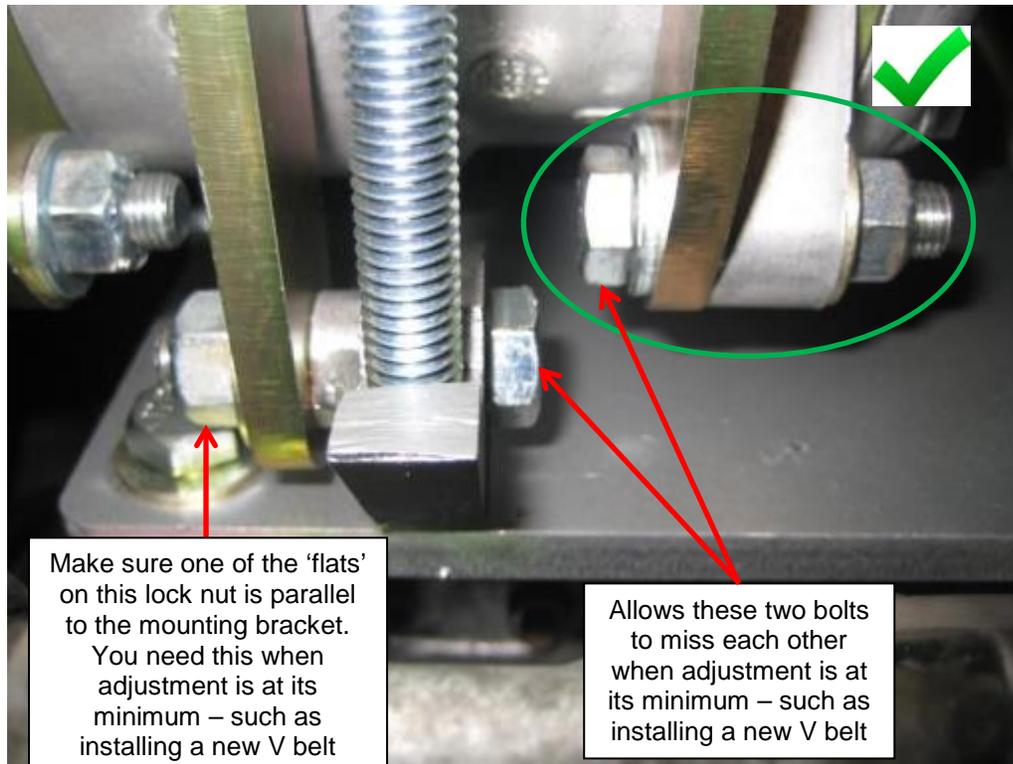
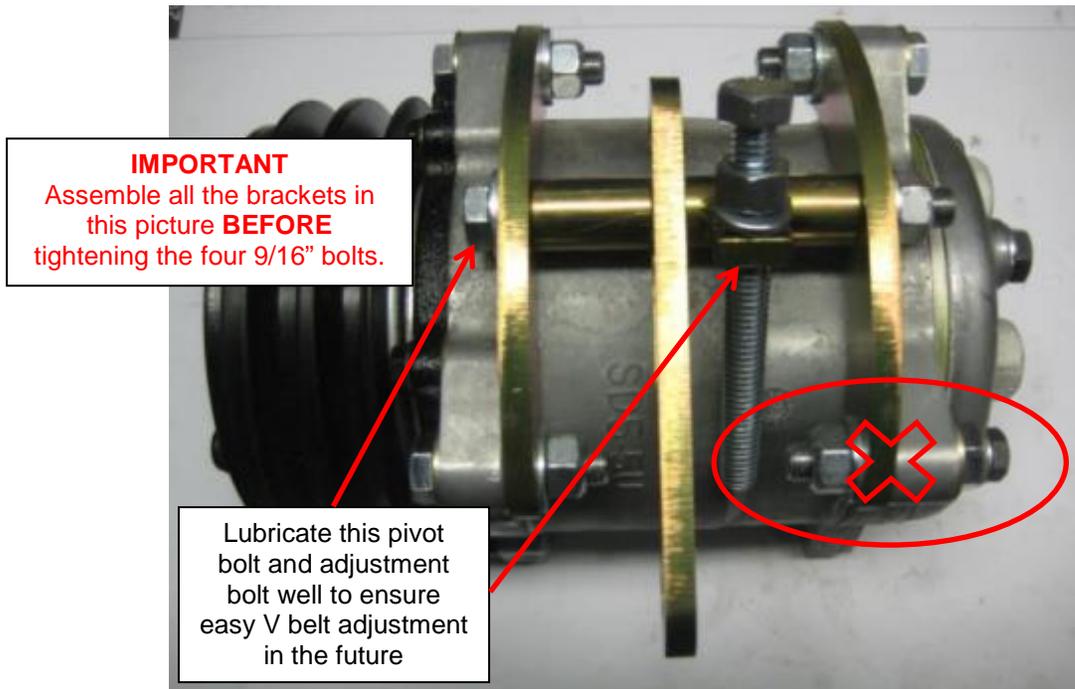


Now the lower brackets on the AC Compressor can be attached;

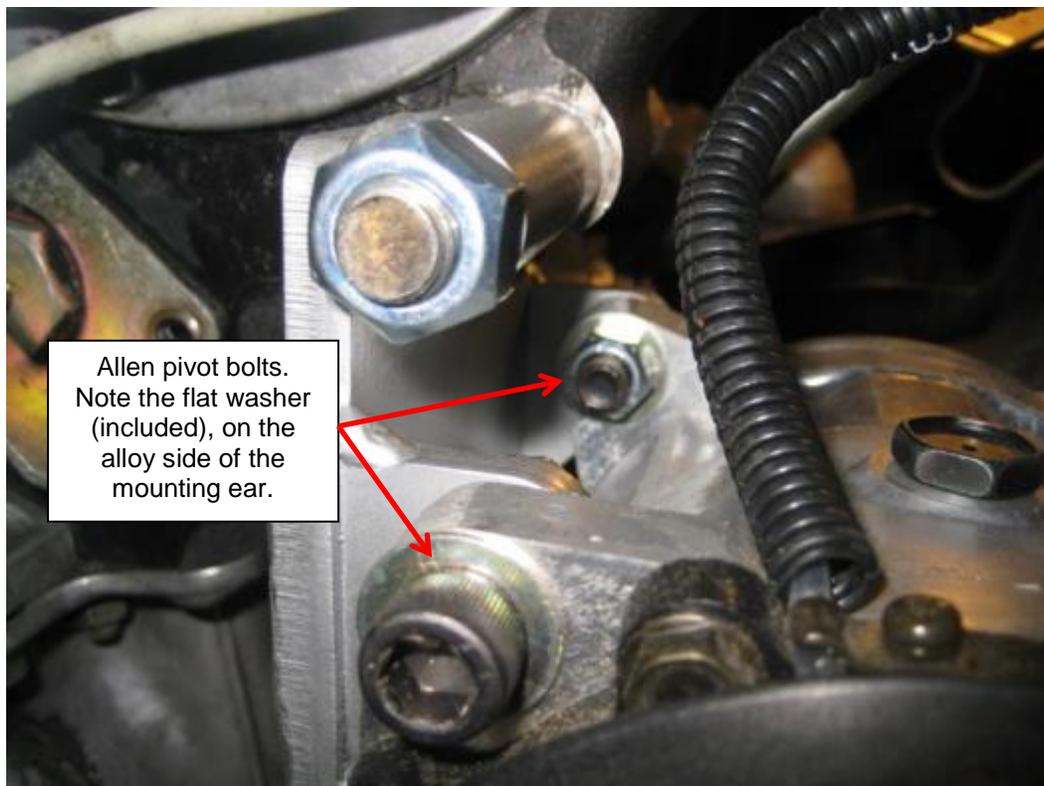


All the components shown on the previous page are to be attached as shown below.  
NOTE – the thin washers included with your kit **MUST** be in contact with the alloy ‘ears’ of the AC Compressor. I added my own washers to the bracket side of each bolt – this is optional. Upon installation I discovered that the lower right bolt should be installed the other way around. You can see why in the second picture.

NOTE – the four bolts with lock nuts are 9/16” so a 14 mm tool will be a tight fit.



If you installed the mounting bracket without the compressor you now get to test your manual dexterity. Before you begin make sure you have a piece of wood of a suitable length to support the AC Compressor from underneath (between the AC Compressor and the ground). If your arm becomes tired holding up the AC Compressor you will have a Plan B. You WILL also need to borrow someone to install the front AC Compressor pivot bolt (Allen head – see picture below) and hopefully the rear one. BOTH are very difficult to get into place. Hence the option suggested on page 18 – install the AC Compressor on the mounting bracket before installing on the engine. Note the comment on the upper picture on page 19 about installing one of the gold coloured M8 (13 mm tool) bolts BEFORE installing the AC Compressor on the mounting bracket. If you forget to do this you will have to remove the AC Compressor to install.



Allen pivot bolts.  
Note the flat washer  
(included), on the  
alloy side of the  
mounting ear.

Make sure the two Allen bolts are snug. You want to ensure there is no play in the mounting but the bolts should be just loose enough to allow the AC Compressor to pivot for drive belt adjustment.

Double check that all four mounting bracket to engine bolts are tight (3 x M8 - 13 mm tool and 1 x M12 - 19 mm tool)).

The 'mounting bracket brace' can now be installed. This is an upgrade that is now part of the Gen II version of the mounting bracket (silver coloured one). It consists of the pieces in picture below.



OR



OR

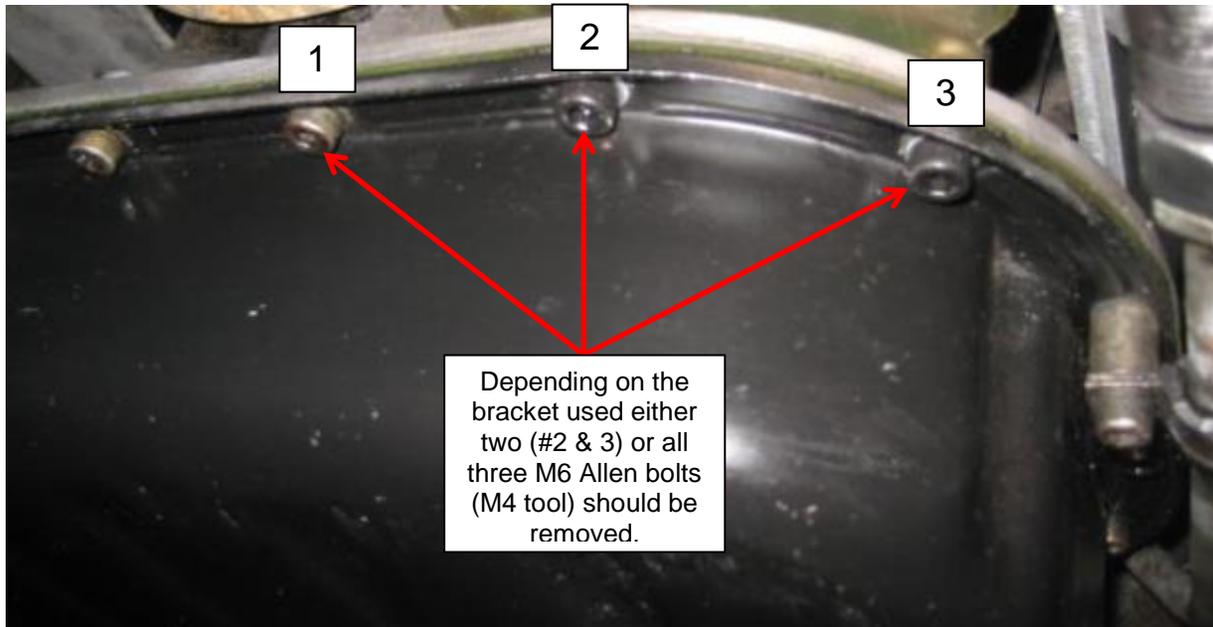


This mounting bracket brace acts as additional support for the mounting bracket and takes advantage of the threaded bosses for the oil pan bolts.

Remove these M6 Allen head (m4 tool) oil pan bolts (see picture below), lay the plate on top of the oil pan casting and install the black M6 Allen head bolts included with the conversion kit. Tighten to 8 Nm (6 ft.lb), and no more. Remember these are steel bolts going into an alloy casting, very easy to strip. If you have it, lightly coat the threads with anti-seize compound. These bolts are much longer than the originals and will stick out some 15 mm (5/8") above the alloy casting. Go slowly when installing these bolts as the top few threads in the alloy casting are not used by the original bolts and will be filled with dirt. If you have a metric thread chaser (6 mm) I would recommend cleaning the threads up before installing the bolts.

Install the lock nuts and snug up but do not fully tighten. You want some movement available in the bracket. Now install the 9/16" bolt assembly through the mounting bracket hole and the one in the support bracket. Tighten this one fully (up to 70 Nm or 50 ft.lb.) remember the lock nut is a very tight fit. Just before the final tightening, back off the black lock nuts so you can check that the spacing between the mounting bracket brace hole and each black bolt is relatively even or at a minimum not touching one. If this is the case move the mounting bracket brace accordingly while making sure it remains flat against the alloy casting.

Why go to all this effort? You want to make sure that the mounting bracket brace is not putting any side load on the oil pan bolts. If you are satisfied that everything is orientated correctly the final tightening of all the fittings can be done.



## O-Ring Tutorial;

Before connecting any of these to their respective fittings make sure you have new O-Rings. Over the past 15 or 20 years, O-Rings used in sealing hoses and components of mobile AC systems have routinely been one of three colours: black, blue, or green. Black O-Rings can be Nitrile or Neoprene however, it is impossible to look at a black O-Ring and tell if it is Nitrile (R-12) or Neoprene (R-134a). That is the reason colours have been adopted. Blue and green have become the standard colours for those applications. The blue O-Rings that are available today are Neoprene. They are coloured blue with an external coating to distinguish them from black Nitrile O-Rings that are identical in appearance yet not recommended for use with R-134a. The green O-Rings are Highly Saturated Nitrile (also known as Hydrogenated Nitrile) and are commonly referred to as HNBR or, in some cases, HSN. In either case, the green colour is moulded into the rubber. The blue Neoprene and green HNBR O-Rings are interchangeable in their applications with R-134a, blended refrigerants and R-12 as well.



Insert the new O-Ring on the fitting and tighten firmly. Do not over tighten as you will crush the O-Ring and it will lose its sealing capabilities. When tightening any connection please use a second open end wrench to support the 'fixed' side (i.e. the welded / soldered on connection on the condenser core). This will prevent flexing of any welded / soldered joint and potential cracks resulting in leaks. It also allows you to more accurately judge the torque being applied to the connection and the pressure on the O-Ring.

**IMPORTANT** – always lubricate the O-rings and fitting threads with PAG100 BEFORE installation and tightening.

## AC Hose Connections

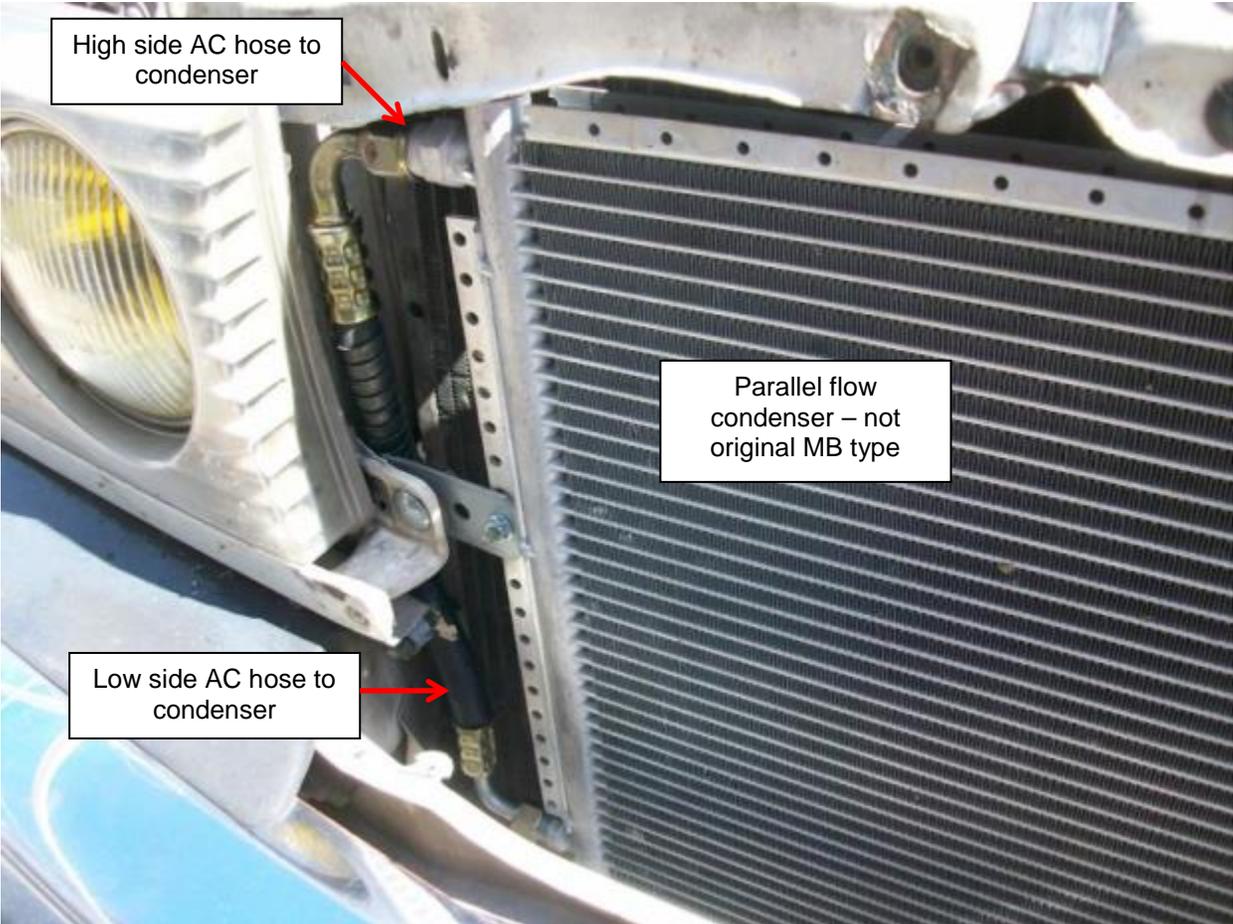
The low side hose (larger diameter) is the one with the blue cap on the Schrader Valve. This is to be connected between the 'SUC' (suction) side on the Sanden AC Compressor manifold and the firewall connection to the Evaporator. If you are not familiar with the term Evaporator is a component similar to you heater core that sits under the dashboard in your Heating, Ventilation and Air Conditioning system (HVAC). It looks after providing the cold that your ventilation fan sends to the interior.

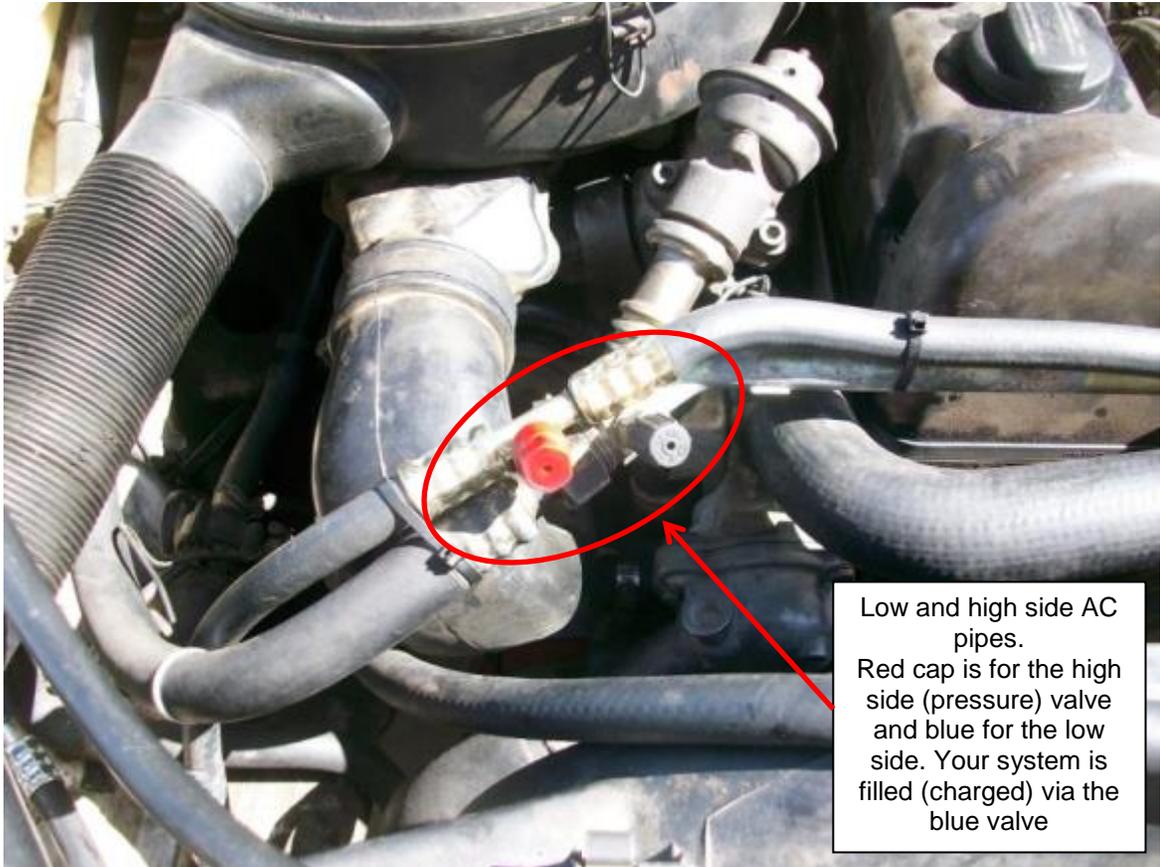
The high side hose (smaller diameter) with the red cap on the Schrader Valve connects between the 'DIS' (discharge) side of the Sanden AC Compressor manifold and the Condenser core in front of the radiator.



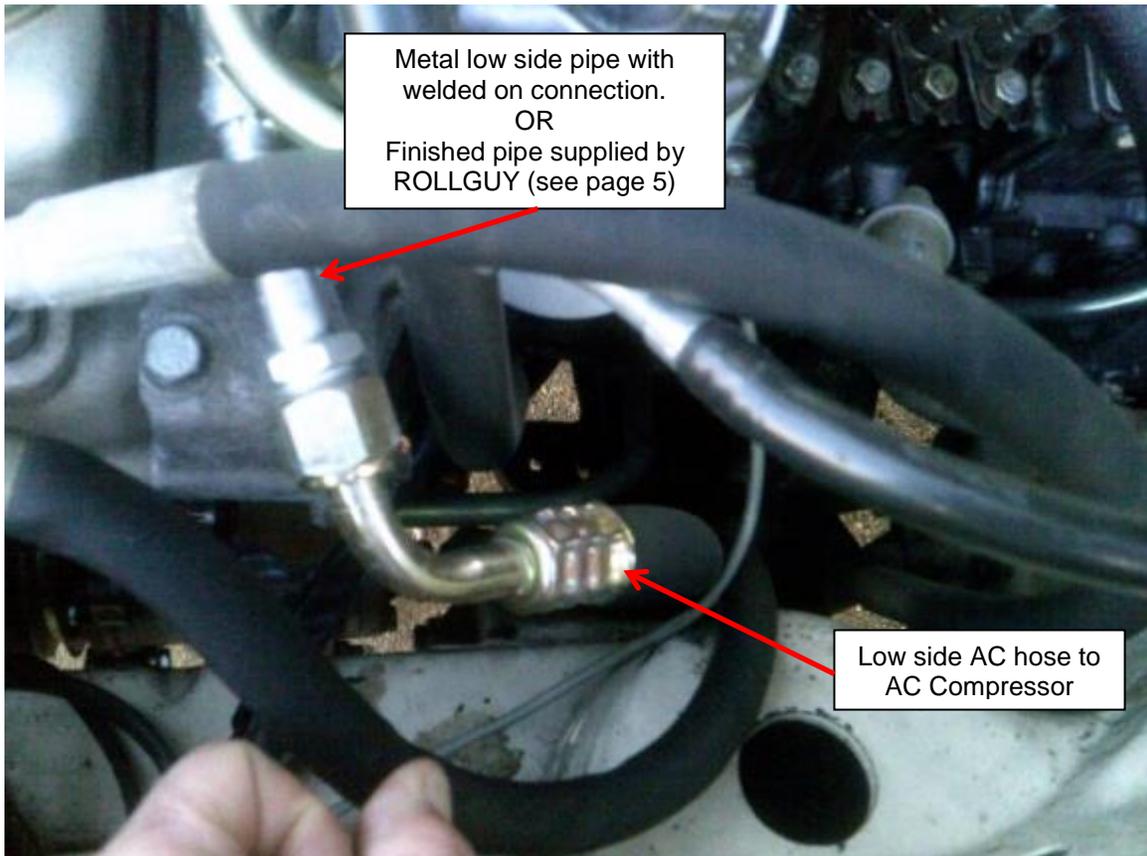
Double check the routing of the hoses and all connections to ensure they are properly secured, won't rub on anything, subjected to excessive heat (exhaust manifold in W123 applications) and the connections are secure.

The connections that use O-rings should have the O-ring as well as the compression nut or threaded fitting lubricated with PAG100 oil before tightening. The oil is important to protect the O-ring as well as ease threading the compression nut. These compression nuts should not be tightened to more than ~20 Nm (~15 ft.lb.) of torque.





Low and high side AC pipes.  
Red cap is for the high side (pressure) valve and blue for the low side. Your system is filled (charged) via the blue valve



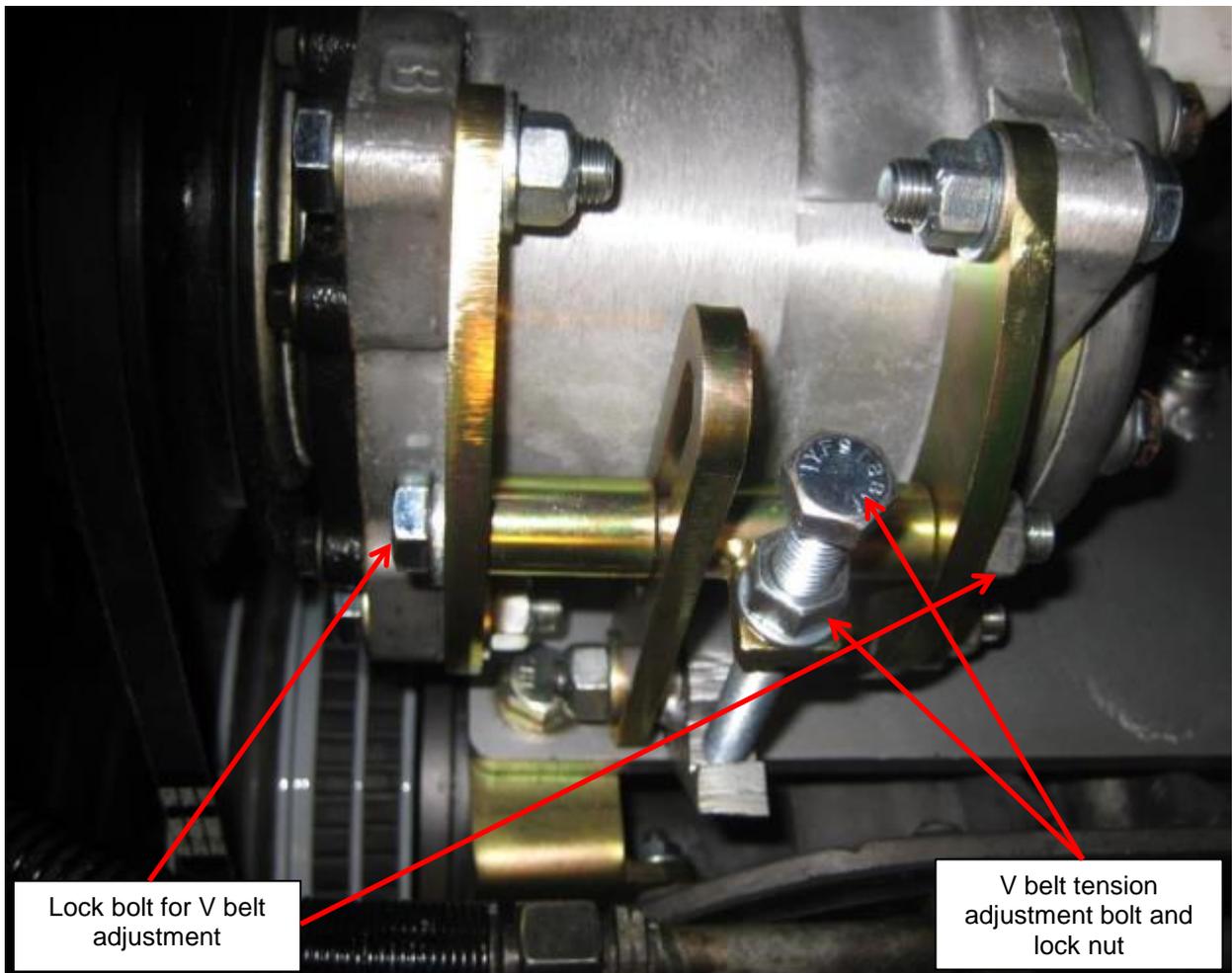
Metal low side pipe with welded on connection.  
OR  
Finished pipe supplied by ROLLGUY (see page 5)

Low side AC hose to AC Compressor

## AC Belt Installation / Adjustment

Make sure the AC Compressor can move as close to the mounting bracket as possible (see page 19). You will need every millimetre of slack possible to get the belt over the pulleys. With the bolt head and nut flats alignment you can easily install the belt on both pulleys (belt size is 15375). I recommend you place the belt around the crank pulley and then slide it over the smaller AC Compressor pulley, the front one in this picture.

Place the adjustment bolt against the stop and begin tightening. The adjustment is very fine so you will require about 3/4 of the bolt to be threaded through the adjustment block. Adjust the belt on the tight side, less than 12 mm (1/2") of slack, the belt will stretch as it is in operation. Tighten the adjusting bolt lock nut as well as the through bolt for the adjustment block.



## Receiver / Dryer Information

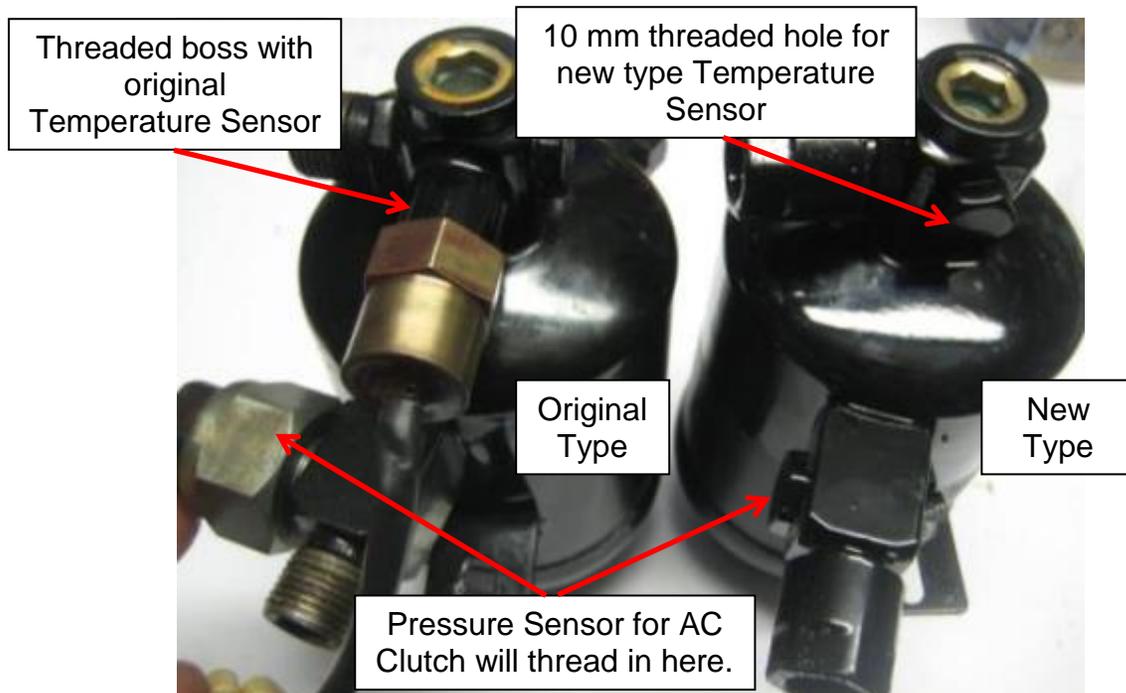
If your W123 still has the original Receiver / Dryer (P/N 123 830 06 83), the design will be slightly different from the one you received from ROLLGUY or purchased separately. This is probably due to the move in the early 1990s from R12 to R134a.

The difference lies in the Temperature Sensor for the condenser fan. In the original design it used a copper/brass coloured sensor that used a M6 threaded boss on the sight glass housing. This is a blind hole so the sensor is not in direct contact with the Freon but relies on housing temperature. Since it is a blind hole it did not require an O-ring or any form of sealant. These sensors were typically set for 52C (~125F).

The new style Receiver / Dryer may not have this threaded boss but a 10 mm hole with an O-ring. The original Receiver / Dryer also had this bolt. The new style Receiver / Dryer will allow you to use the new type of Temperature Sensor. The new type sensor uses a 10 mm thread and O-ring as the opening in the sight glass housing is open to the Freon in the system.

There are two types of Temperature Sensor – the 'red' one (part number 004 820 68 10) and the 'green' one (part number 004 820 67 10). The green one is recommended for R134a applications as it triggers at a lower temperature. (See pictures next page)

**IMPORTANT** – it is highly recommended that you wait until just before evacuating and/or charging the AC system to install the Receiver / Dryer - 'the last minute' if you will. This will ensure that the desiccant (drying agent), in the housing is exposed to as little outside air as possible not to mention contaminants. The refrigerant oil should also be added at this time.



**NOTE** – This shows a W126 Receiver / Dryer, the W123 is similar



004 820 67 10



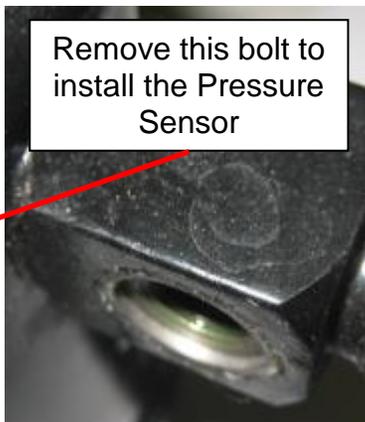
004 820 68 10

The Temperature Sensor (green or red one shown above), should be screwed into the 10 mm threaded hole in the sight glass housing. Use a 14 mm tool to remove the black bolt. NOTE – new Receiver / Dryers always contain compressed air don't be surprised when air suddenly rushes out as you remove the first bolt. Don't forget to install a new O-ring.



Remove this bolt to install the Temperature Sensor

The Pressure Sensor is also threaded into a 10 mm threaded hole. Don't forget to install a new O-ring.

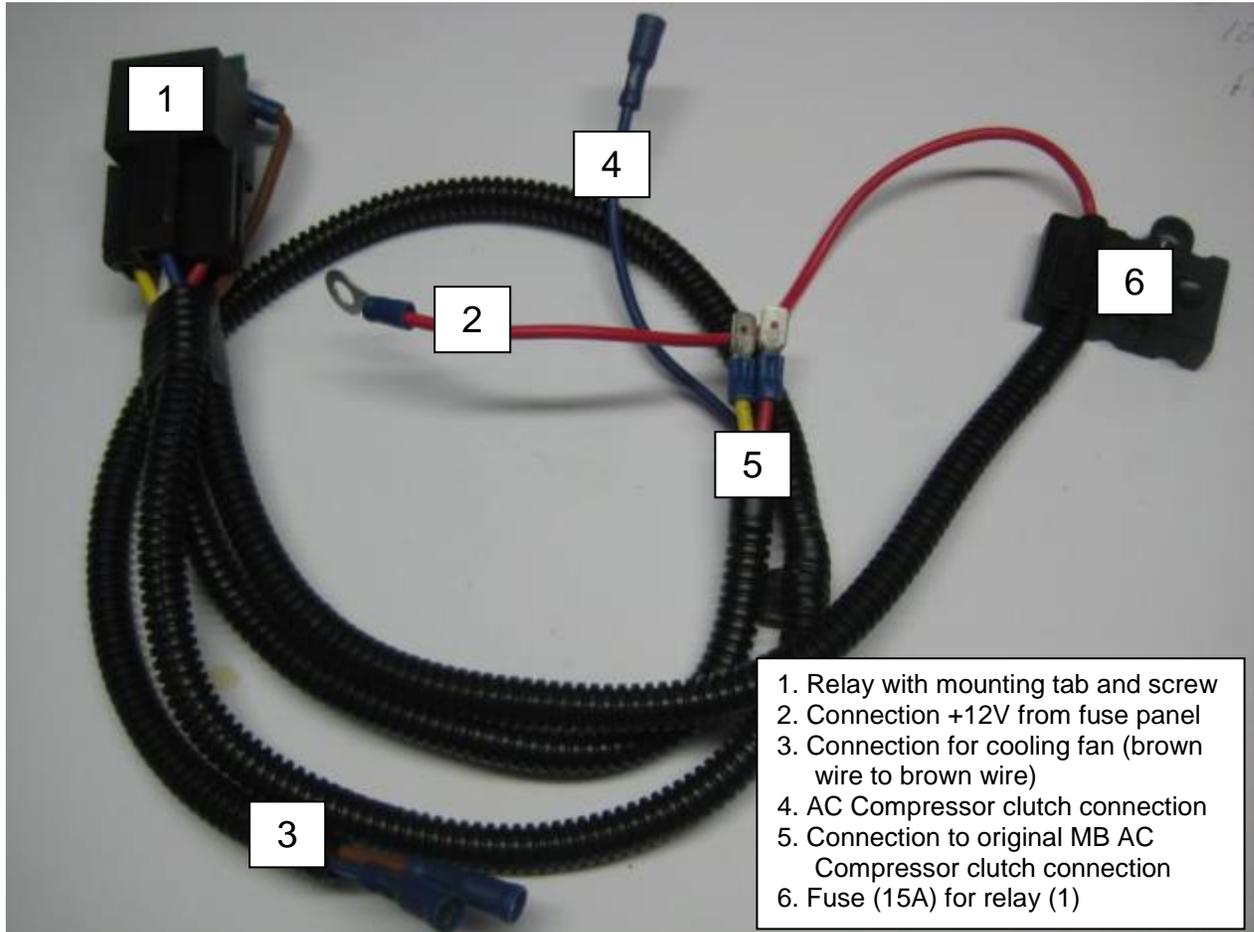


Remove this bolt to install the Pressure Sensor



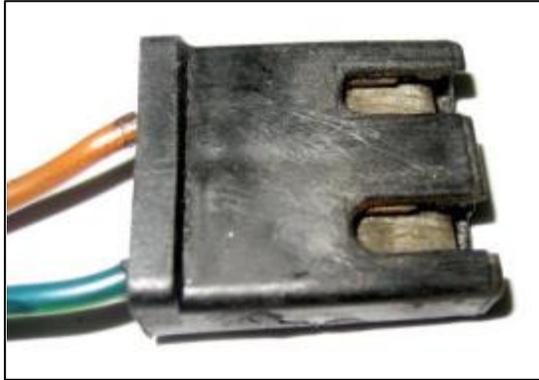
## Condenser Cooling Fan Modification

This optional kit contains a wiring harness and relay that uses the original 2 pin MB connector for the AC Compressor to operate the Sanden AC Compressor and simultaneously switch on the electric cooling fan for the condenser. This will improve the AC cooling efficiency as well as assisting engine coolant temperature in city traffic during hot weather.



On the W123 use the Glow Plug Relay as the +12V source for the ring connection on the red wire (item 2 above). The relay (item 1 above), has a self-tapping screw on the mounting tab. Find a suitable location on the inner fender to mount this. The brown wire connected to this screw is the ground for the relay. Ensure the connector is on the bottom to prevent moisture from collecting on the terminals.

Plug the red and yellow spade connectors into the original MB AC clutch connector. Colour code matching is not critical.



Next connect the brown and blue wires to the two pin connector for the condenser cooling fan. Polarity is important if you connect it incorrectly the fan will turn in the opposite direction. It is simply a matter of swapping the connections. If wired correctly the fan blows air through the condenser into the engine compartment.

Double check all your electrical connections as well as everything related to the AC Compressor.

Do **NOT** plug the electrical connection for the AC Compressor clutch into the remaining blue wire. This must wait until your AC system has had the air drawn out (vacuum), checked to ensure it loses no vacuum over a period of time and in many cases is pressurised with Nitrogen. The latter is to check for leaks as well as ensuring no moisture is in the system. After all these steps have been performed, the AC clutch wire can be plugged into the harness and the system charged with R-134a.

Now, enjoy the ice cold air coming from your dash vents. Followed by a trip to the refrigerator to grab a drink of your favourite beverage.

Thank you and take care,

Richard (aka ROLLGUY).