VASA
VEHICLE AIRCONDITIONING SPECIALISTS OF AUSTRALASIA
incorporating the Australian Association of Automotive Electricians

HOT AIR NEWSLETTER

FEBRUARY 2008

the aftermarket airconditioning and auto electrical specialists of choice

National Secretariat: PO Box 1160 Paradise Point Qld 4216 ACN 063969782

Biggest convention incentives ever

When a VASA inc AAAE member buys ONE full registration

Apprentices from the same workshop are

FREE (no limit)

Technical staff from the same workshop are

HALF PRICE

(no limit)

No tricks. Full convention benefits, training, entertaining and trade show are all included in every delegate registration.

This is the biggest incentive yet to encourage VASA workshop owners to introduce their staff and apprentices to the best collection of speakers, trade exhibits and training ever assembled in one place for the vehicle air conditioning and auto electrical technicians of Australia and New Zealand.

FOR THE BEST DEAL - REGISTER BEFORE 25 APRIL

REGISTRATION FORMS ARE NOW AVAILABLE
If you haven't received one, go to www.wireandgas.com.au
OR send an email to wireandgas2008@ozaccom.com.au
OR Phone 07 3854 1611

WIRE & GAS 2008
surf, sand & training

Gold Coast Convention & Exhibition Centre
Broadbeach Queensland

Begins 6pm Friday
27 June 2008
Ends late Sunday 29 June 2008

Full Registrations:
VASA members $410
(early bird before 25 April)
$445 standard rate

Non-members $460
(early bird before 25 April)
$495 standard rate

Additional technicians from same workshop $230
(early bird before 25 April)
$247.50 standard rate

Apprentices:
Complimentary when attending with a full paying VASA member.

INSIDE THIS ISSUE:

WIRE & GAS 2008

surf, sand & training

Australia's nine top trainers in a/c and electrics

Train on cars and trucks under cover in the big convention centre

Hear international and national speakers

See the biggest trade show with the latest tools and equipment in the southern hemisphere

Be amazed by an Australian designed and made army machine (unconfirmed)

Meet people who can help you in your business

Have a good time

Enjoy the Gold Coast

The excitement is building as the next big Wire & Gas Training Convention and Trade Show begins locking down its star performers, and engaging speakers, trainers, bands, comedians and special attractions for the delegates who will enjoy a full weekend of fun and inspiration.

The full program is contained in the Registration form which is being posted to all members, and distributed through wholesaler outlets. It is also at www.wireandgas.com.au

Delegates are assured of a great time, in the company of a hand picked team of speakers, trainers and entertainers.

Wayne Gardner, World 500cc motorcycle racing champion and Australian V8 Supercar Champion is a keynote speaker. He will inspire you with his story of how he built a successful business after retiring from racing.

Conrad Norris, senior design engineer at Sanden International in Germany, who was so popular at the 2004 convention will be back to bring Australia up to date with the European car making industry.

The very entertaining Jack Stepanian of Amazing Visions Pty Ltd will deliver the fundamentals of electrical/electronic testing

Australia's roving trainer, Grant Hand of Automotive Training Solutions, will cover advanced a/c diagnostics on late model vehicles. Grant has been VASA's key technical adviser since its formation in the early 1990s and currently spends most of his time at WA minesites.

WIRE & GAS 2008
surf, sand & training

VASA convention regular Dave Townley, formerly head trainer for OEM Air International and now working with ADAIR, will cover common faults and solutions on Holden a/c systems.

Another convention regular is Robert Burns from Denso Australia, who will bring conventioneers up to speed with common faults and solutions on Toyota a/c systems.

After years of attending every training session he could find, Sydney auto electrician and businessman Jeff Smit from The Automotive Technician Pty Ltd becomes a trainer himself, and will talk about ABS and traction control systems.

Voted excellent value at the 2007 AGM training sessions for VASA in Adelaide, instrument trainer Nigel Muggridge from CPS Australia will cover basic electrical diagnostics on modern a/c technical tools.

Long time mentor to Australian auto electricians, Allan Hill, head of the Electrical Rebuilders Group will teach conventioneers how to use new technologies to rebuild electrical units in a cost effective and environmentally friendly way.

This day is FREE for fully registered convention delegates.

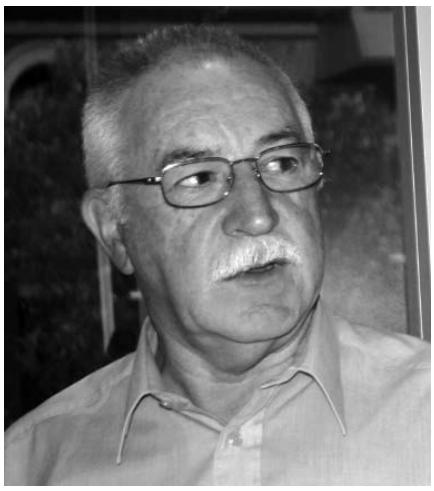
As Hot Air goes to press, Wire & Gas awaits confirmation that the 2004 big truck trainers,Terry Stevens - Western Star Trucks and Glen Lithgow - MAN Trucks will be attending with their big rigs, to provide an update on the technologies of the latest transports.

A new and detailed DVD training program for distribution to technicians in remote parts of Australia and trainees anywhere, is in final stages of production at VASA headquarters on the Gold Coast. The program was devised by VASA in conjunction with Automotive Training Solutions (Grant Hand), and part one was sponsored by Refrigerants Australia.

The three-part training documentary series covers service procedures in accordance with the new Code of Practice and provides tips on how to sell the new legislative requirements to customers. The program is expected to be on sale through wholesalers by April.

PROUD SPONSOR OF COOLWORLD INDUSTRY AWARDS 2008

HUGE CONVENTION BONUS



FREE accreditation assessment for a National Refrigerant Handling Licence

Trainer Rick Goodwin will conduct a full day training and licence assessment package on the Sunday of the convention for those who are working in the trade but have not yet achieved their Refrigerant Handling Licence.

This service is generously sponsored by CoolDrive Distribution and Automotive Training Solutions, whose head trainer, Grant Hand, devised the assessment course and is approved by the Government to assess technicians against Certificate II standards.

Kieran's MOVING story...

VASA's newest recruit, Kieran Lawrence, literally moved heaven and earth to re-locate his mobile air conditioning service to Brisbane.

He moved (with his partner Maggie Davison), his whole workshop and air conditioning tools, his mobile service van (a Merc Vito), a Land Rover, and their four pet German Shepherd dogs, from Leeds, Yorkshire, England to Brisbane, Australia.

All this came to Australia. Above - on location at the American motor show in UK. Below - Kieran and his beloved Shepherds.

Anyone who has ever moved from one suburb to another understands the logistics involved, but to negotiate your way through customs and immigration with Keiran and Maggie's list of possessions takes more than a bit of stiff British upper lip.

Kieran managed his Australian visa on the strength of his mechanical and air conditioning credentials, but he happens to pack a few other handy skills as well.

Apart from his knowledge of European vehicles, he's pretty handy with modern, vintage and classic American vehicles. This was the result of a decision he made, when he started his own aircon service and repair business in 2000, to turn up with his mobile workshop at the massive Northampton UK AAC American motor show twice a year for seven years.

This decision provided Kieran with a permanent flow of customers, not to mention work he got from the public, dealerships and other mechanical workshops which were not well up on air conditioning.

He had also spent a few years living in Louisiana in the USA after he'd qualified as a mechanic, and that's where he fell in love with American cars and their aircon systems.

His affinity with car repairs first began when he realised that being a motorcycle despatch rider in England had a life expectancy of about six months.

He joined a garage which specialised in Ford Grenadas, a popular English car of the '70s and '80s, and It was here he became a qualified mechanic, but then went further to earn qualifications to become a vehicle inspector, a role held in some awe in the UK.

When he returned to England after his US visit, Kieran achieved his air conditioning service and repair qualifications and also completed a refrigerant safe handling certificate.

He has also appeared on a UK television motor show, demonstrating aircon service.

Oh...he also brought his business name with him, which he managed to register in Queensland - Antarctic Vehicle Air Conditioning.

Handling refrigerant without a licence is illegal

The Australian Refrigeration Council (ARC) has identified significant numbers of tradespeople and businesses that have not renewed their Refrigerant Handling Licence or Refrigerant Trading Authorisation.

The Department of the Environment, Water, Heritage and the Arts (DEWHA) has advised the ARC that people operating without a licence or authorisation are to be referred to DEWHA as it is illegal and is subject to prosecution.

The ARC will now apply the resources of its auditors to identify those people operating without licences or trading authorisations and will report these cases directly to DEWHA.

As the national licensing system for the industry is now well into its third year, more stringent adherence to the conditions of an authorisation and licence is expected by both the ARC and DEWHA under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995.

For further information on licensing contact the ARC on 1300 88 44 83 or go to www.arctick.org

The end of a brilliant era

The Brisbane manufacturing plant of Cooltemp is one of the success stories of the Australian vehicle air conditioning industry.

After June 2008, Cooltemp, or at least its incredible expertise and all of its specialised equipment for making complex evaporators and heat exchangers, will disappear from Australian shores.

Cooltemp is not going to the wall, but its directors saw the writing on the wall before becoming yet another victim of the globalisation of products and the cold hard fact that the only way to meet budgets is to send manufacturing to Asia.

There are two really sad elements to the story. The first is the loss of so many talented men and women, many of whom were specially trained by Cooltemp, and the second is that the design and manufacturing know-how, built up by the enterprising duo of Bevan Carrick and Steve Whitelock and their key staff, will be packed into boxes along with all their equipment when it's shipped to Thailand with its new owner at the end of June.

Cooltemp had become one of Australia's largest and most modern designers, manufacturers and assemblers of transport refrigeration and vehicle air conditioning products.

In its hay day, Cooltemp could design and produce an aftermarket kit for a new vehicle and have it on the market before the paint was dry on the car. This side of the plant produced 60,000 kits a year, and the range had grown to around 200 different kits to suit many models of cars. They were not only the dominant player on the Australian market, but they exported to South Africa, Greece, the UK and Asia. Last year, Cooltemp made 2,000 kits and when the last one was shipped out in November 2007, the plant closed down.

The kit business was fired up in 1985, soon after Bevan Carrick and Steve Whitelock joined forces to establish Cooltemp Pty Ltd as a private, Australian owned company.

In 1977, Bevan had established Summercool, an air-conditioning installation firm and it was from these humble premises in Castlemaine Street in Milton that the story of Cooltemp began.

Eight years later the company was divided into manufacturing and installation, and the first of four buildings was built at Darra. Now well recognised for their design capability, the business was booming. This meant expansion for the manufacturing operation, and so in 1991 a second building, their aluminium brazing plant, was built.

By 1995 Cooltemp was building their own Head Office, bringing the undercover area of their Brisbane based facilities to 13,000 square metres.

Over the years Cooltemp gained a reputation as a leader in design, manufacture and supply of high quality products both locally and internationally.

This reputation was maintained through Cooltemp's in-house expertise in the tooling, design and manufacture of its own components including aluminium serpentine heat exchangers, sheet metal components, refrigeration hose and pipes, electrical harnesses, plastic injection products, and aluminium brazing.

The heat exchanger plant covered 4,500 square metres on its own and many of the machines were an amalgam of Japanese and their own in-house design.

The OEM contracts began to flow in 1998, with the plant producing evaporator cores for the Falcon and Commodore. A laminated plate evaporator is today being made for the current Falcon along with 38 mm twin tube evaporators for the Commodore.

"When we were faced with spending another million dollars or so on a new production line to meet the next wave of twin tube technology for Ford, we decided the time had come to make a bold decision about the future," recalls Bevan.

"You didn't need to be smart to see how locally manufactured vehicle sales were plummeting, and how manufacturing margins were being plundered by competition from the low-wage countries, not to mention the world fuel prices and environmental pressures.

"We told our client, Air International, that we did not want to continue on this path of diminishing returns, and so they agreed to purchase the entire plant and move it to Thailand, where no doubt it will begin a new life and be much more competitive," Bevan added.

This leaves only one other serious heat exchanger manufacturer in Australia, Nippon Denso, but they belong to the Toyota empire, so their future seems assured as a result of Toyota's world popularity.

After June 2008, the Summercool nameplate will be polished up and the team that's left will concentrate on building up their already profitable business of refrigerated truck body, insulated panel and associated manufacturing processes.

They currently turn out up to 10 large refrigerated trucks a month for rigid body vehicles, and that includes designing and manufacturing all the insulated panels.

Although much smaller than the old plant, it's a business which has a future and will keep some of their old design and manufacturing skills alive. Surplus building space will be rented out.

(...continued on back page)

Revisiting the VASA Registered Technicians Program

Refrigerant charge rates charts can only ever be a guide - in fact, you don't need them at all

A spate of requests for charge rate charts means that the air conditioning technician needs to be reminded once again that these charts are really not the answer and that, if used, they can only ever be a rough guide.

VASA's technical coordinator Grant Hand, of Automotive Training Solutions, stopped producing these charts in the mid 1990s, preferring to direct the technician to the more reliable means of ensuring any vehicle is charged with the correct amount of refrigerant.

As VASA vice-president Mark Mitchell constantly explains,"While ever we still have R134a, the Registered Technicians Program is relevant." The RTP was developed over a period of seven years, and today remains the only true a/c bible for Australian and New Zealand technicians.

So, from Volume 1, Bulletin 1 (Retrofitting), we offer this refresher course.

The 90% Charge Rule.
When a system is charged with refrigerant we have characteristically used the "weight charging" method. This has led us to the belief that it is the weight of refrigerant that enters the system that is important. In fact it is the LIQUID VOLUME that is the critical factor.

When comparing R134a and R12 there is approximately a 10% weight differential to liquid volume (density differential).

In simple terms 1kg of R134a will occupy a 10% larger volume than did 1kg of R12. Now ask yourself the question - where is the 10% extra liquid going to fit in the system? The answer is nowhere - you will be in the overcharge band with excessive head pressures and liquid flood back a distinct possibility.

The answer is to reduce the weight charge by 10%. This will ensure the liquid volume in the system is equal to what it was designed for.

The system should operate correctly if component compatibility is acceptable. If, however, problems start to arise before the 90% charge ratio is achieved then there is either a limitation in a component design/size with respect to its ability to handle R134a or there is a component malfunction which is limiting its ability. These limitations are usually related to condensing capability.

R134a - Sight Glass Charging

Most technicians by now realise the limitations of sight glass observation of R134a systems. It must be identified however, that the sight glass (if fitted) may still, in many systems, be an indicator of charge rates.

It is just that it cannot be used as an absolute indicator - because in many cases it will bubble or even foam severely. Our role is to identify charge rates by all of the indicators that the system under test show.

Why does the sight glass foam/bubble on R134a where it didn't on R12?

Basically there are four reasons for a bubbling/foaming sight glass:

1 Oil foaming
2 Turbidity of R134a
3 Lack of Condensing
4 Undercharge

Oil Foaming

Basically a problem of retrofitting.

If mineral oil is left in the system excessive foaming and agitation with the R134a compatible synthetic oils may occur. This renders the sight glass useless.

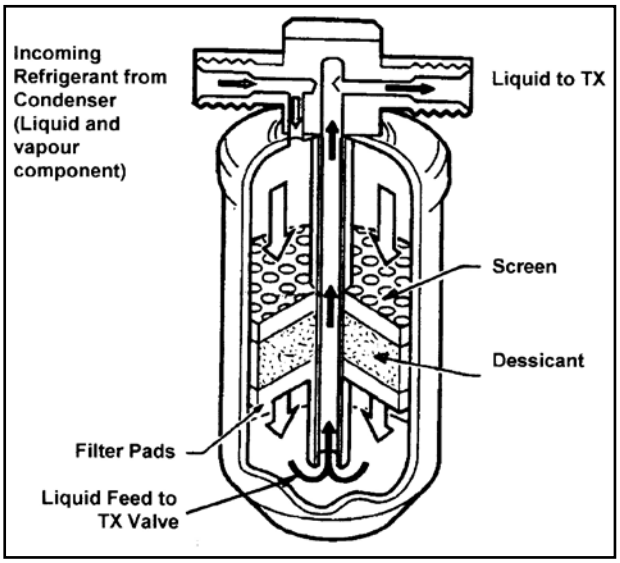
Low charge rates are undesirable in retrofit for 4 reasons

1. Inadequate performance under high heat loads
2. Excessive superheating under high heat loads
3. Reduced oil circulation
4. No safety margin when minor leakage occurs

It is imperative that the technician identifies the cause of a foaming sight glass.

It must be proved it is not an undercharge or lack of condensing in retrofitted systems.

Lack of performance under high heat loads will result from both conditions.



Refrigerant charging

Charging Options

There are four options of charging:

1 Weight charging
2 Sight glass charging
3 Pressure charging
4 Monitoring of condenser subcooling

None of the above methods of charging should be used in isolation.

In all cases pressures must be analysed and in retrofitted systems subcooling checks are recommended to verify correct charge rates and/or satisfactory condenser performance.

WEIGHT CHARGING

The simplest of all methods of charging is to weigh in a specified quantity of refrigerant as specified by the manufacturer.

Before weight charging a system ensure the following factors are taken into account.

A thorough inspection must be carried out to ensure the system is unaltered from manufacture.

To accurately weight charge a system the hoses must be 'pulled dry' or an allowance made for the quantity of the refrigerant that is retained in the hoses at the completion of charging.

Note: A 2 metre set of service hoses will contain approximately 100 grams of refrigerant unless they are pulled dry.

When weight charging retrofitted systems DO NOT pull the hoses dry or balance off the gauges unless some pre-testing has been done on an identical system to ensure that the extra quantity pulled into the system will not drive head pressures up to an unacceptable level.

When pulling hoses dry once the high side valve depressor is backed off, the high side pressure can no longer be assessed.

The extra quantity (up to 100 grams) can be a massive overcharge to a retrofitted or small capacity system. It is for this reason it is strongly recommended the hoses are left full on completion of charging UNLESS prior verification testing is performed.

SIGHT GLASS CHARGING

Contrary to popular opinion the sight glass may still clear at correct charge rates in a correctly operating system.

While weight charging or pressure/ subcooling charging keep an eye on the sight glass. If it happens to clear then it still remains a valid indicator.

The important thing to realise is it may not clear and this is where the other indicators are critical.

PRESSURE CHARGING

In reality pressure charging should never be done in isolation. It should be "married" with weight charging, sight glass indication and liquid line subcooling as required.

Pressure dynamics will vary significantly dependent on the heat loads placed on the system. However there are some rules that can be used for basic pressure analysis of both genuine and retrofitted R134a systems.

In a correctly operating, correctly charged system the evaporator and the condenser will 'Balance Off'.

In simple terms this means the condenser will dissipate the heat that the evaporator absorbs - in fact it has to also dissipate suction line superheat and compressor superheat.

For this reason the condenser's heat radiation capacity is above that of an evaporator.

Critically, an evaporator will absorb approximately 25º to 30ºC out of the cabin air. On humid days this temperature absorption factor will drop because it has the dehumidification heat loads to contend with.

If the evaporator is absorbing 30ºC out of the cabin then it stands to reason the condenser will need to 'dump off' heat at a differential of 30ºC.

Due to the frontal surface area of a condenser being considerably larger than an evaporator, its efficiency as a heat exchanger is higher. Given this, well designed systems will 'balance off' when the refrigerant in the condenser is approximately 25ºC hotter than the air surrounding the condenser.

Using this +25ºC rule will arm the technician with a basic guideline for establishing what the condensing pressure should be for normal heat loads of 20 to 35ºC (moderate to low humidities).

Most technicians are familiar with monitoring high side pressures - but in both retrofit and genuine 134a systems there are significant advantages in using condensing temperatures as the benchmark for system analysis.

Example:

Sample the air temperature the condenser is working with ie the temperature of the air 50mm in front of the condenser with no air flow.

Let's use the example of 28ºC.

Condenser air on	=	28ºC
Air to refrigerant differential required for adequate condensing	=	25ºC
= Ideal condensing temperature		53º C

= (Refer to P/T chart)
Approximately 1320kPa (190PSI)

Therefore this system operating and charged correctly will operate with a head pressure of 1320 kPa (190PSI) to give a condensing temperature of 53ºC. Of course this is in an ideal world with everything working perfectly - but the reality is we must make an allowance to the condensing temperature of +10% for low humidities and +20% for high humidities (above 60% Relative Humidity)

In the real world a condensing temperature of 60ºC (1580 kPa) (230PSI) would be acceptable for low humidities and up to 66ºC (1800 kPa) (265PSI) for high humidity conditions.

Using these guidelines establishes a basic pressure/temperature rule for ascertaining head pressures but there are limitations to this clinical approach.

Low Ambient Conditions

Under low ambient conditions (below 25ºC) especially when humidities are also low the +25ºC rule is limited.

Going back to the basic system operation why would the condenser establish a 25º differential when the evaporator is only absorbing 18ºof heat

Going back to the basic system operation, why would the condenser establish a 25º differential when the evaporator is only absorbing 18º of heat (18º day)?

The answer is it wouldn't.

It would only establish a differential to balance off the system which will only be 18ºC (possibly only 15º to 16º given the efficiency ratio condenser to evaporator).

For low ambient conditions it is therefore recommended the 'doubling rule' be used. The doubling rule is simply - sample the ambient temperature and double it.

For example: 18ºC day + 18ºC differential
= 36º condensing temperature
= 810 kPa (118 PSI)

Once again an allowance of 10% must be made for low to moderate humidities and 20% for high humidities (above 60%).

High Ambient Conditions

At above 35ºC, especially with high humidities, the evaporator is working at peak capability. The TX valve will be open for a considerable percentage of time causing high flow rates and dense suction vapours to the compressor and the flow rate through the condenser to be higher.

These factors 'load' the condenser to a point where it will need to operate at approximately 30ºC higher above its sourcing air (air on) in order for it to dump heat effectively.

NEXT ISSUE OF HOT AIR:

DETERMINING CHARGE RATES BY PRESSURES

Members can read the entire technical bulletin now by logging on to www.vasa.org.au
then click on the members library and follow the links to RTP Bulletins. Choose Year 1, Retrofitting Bulletin 1

(...the Cooltemp story continued)

Many of the Cooltemp employees will find immediate work elsewhere because of their skills, and a small crew will go to Thailand with the brazing plant.

The high ideals set by Bevan and Steve have been an inspiration to VASA members. They are highly regarded for their perfectionism and their toolroom (18 staff now reduced to three) was the envy of many Australian companies.

Hot Air is the only official journal of VASA inc AAAE and is published every two months and mailed to members.

All inquiries should be directed to the CEO, Ken Newton at info@vasa.org.au
Website address:www.vasa.org.au

The Automotive Technician

This issue of Hot Air comes with the first edition of a bright new technical magazine devoted to helping the technicians of Australia and New Zealand to 'problem solve' at every workbench.

The Automotive Technician concept was spawned from the corridors of VASA and AAAE, and its directors are all leading lights within these organisations.

The Automotive Technician will support any industry association, but because of its origins, TaT has an obligation to support VASA (inc AAAE) and its ideals.

There are huge bonuses for VASA (inc AAAE) members, making membership of the association not only desirable, but very cost effective.

The main benefit for members is that the magazine, to be published every two months, will be posted free to all members, and included in the post will be the current issue of Hot Air newsletter. Hot Air will contain news specificially for members' eyes only, and will obviously concentrate on a/c and auto electrical.

The TaT picture is much wider, covering all manner of technical problems relating to the motor vehicle.

So what's in it for you?

- **The TaT magazine delivered to you free with your Hot Air**
- **When the TaT on-line problem solving services opens in the next month or so, members will be granted free access via a password**
- **Members will, for the first time, have access to a fax/email hotline for problem solving, an extension of the existing VASA Brains Trust, currently used by a small number of members**

The total retail value of these services is $115 per year - all FREE to VASA (inc AAAE) members.

However, for reasons of workshop efficiency and for members to make the most of the TaT services, VASA is encouraging members to consider signing up each technician in the workshop as a subscriber. (Read the article 'Empower every techician to help them through their day' in the TaT magazine)

So if you want to empower your technicians to improve your workshop efficiency and train your people at the same time, you are encouraged to take advantage of this first edition special offer from TaT, to sign up your additional technicians for a one-off reduced annual subscription of $90 + GST. This annual rate will remain as long as the technician stays employed with a VASA member.

Hi and welcome aboard

VASA (inc AAAE) extends a hearty welcome to the auto electricians listed below who have climbed aboard our band-wagon of technician and workshop members.

If existing VASA members know any of these workshops in your locality, do the right thing and drop around with a six-pack and shake them by the hand - then promise to work together to keep all customers in the VASA network. The move will do you both good.

Werribee Auto Electricians Pty Ltd
WERRIBEE VIC
Powers Road Auto Electrical Services SEVEN HILLS NSW

AND...there's been a steady flow of new members joining VASA. A big welcome to the following:

Deering Autronics Centre
BELMONT WA
Antarctic Vehicle Air Conditioning,
DREWVALE QLD
Australian Mobile AutoAir
TORONTO NSW