



HOT AIR

NEWSLETTER

the aftermarket airconditioning and auto electrical specialists of choice

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

OCTOBER 2007

VASA chief is now Chairman of Australian Refrigeration Council in unexpected Board reshuffle

Melbourne, October 17: VASA President Mark Padwick was today elected Chairman of the Australian Refrigeration Council, the Government appointed body which administers the national refrigerant licencing program, following the unexpected departure of foundation chairman Greg Groppenbacher.

Greg had stood down from his board position in a rotational formality, but failed to gain the support of the stationary refrigerant representatives for his expected re-election. The three directors who represent the automotive sector, Mark Padwick (VASA), Mike Bennett (RRA) and Gunther Jurkschat (MTAA) don't vote for the stationary representatives. With the Chairmanship vacant, the members turned to the VASA representative, Mark Padwick who was seen as an independent participant in the refrigerant industry.

"Nobody was more surprised that I was," said Mark. "I'm extremely humbled by the trust placed in me, but everyone needs to know that this election, though unexpected, is a tremendous acknowledgement of the status of VASA in the scheme of things. We may be small, but we fight hard for our members and our industry, and in this respect, I would have to say that most of the groundwork for my election was laid by the foundation VASA board representative, Mark Mitchell, (below) who handed over the reins to me just a year ago.

"There may be some things that the automotive sector might find annoying about the way the licencing program has been implemented, but around the table, we are determined to make it work for the good of the whole industry in Australia. We know that the only way the legislation can achieve its objectives of lowering environmentally damaging emissions, is to ensure that the legislation is explained properly to the community and vigilant compliance programs are maintained.

"I will make these objectives my priority at Council level," said Mark.

VASA pushes for hard-line consumer message to support licencing

...see back page



Mark Padwick took over from Mark Mitchell as the second President of Vehicle Air-conditioning Specialists of Australasia in 2004.

His interest in vehicle design and maintenance began with a school holiday stint on the production line of now defunct automotive air conditioning design and manufacturing company Mark IV in South Sydney.

He achieved a mechanical engineering certificate at the local TAFE and moved swiftly through the ranks as a design, construction and installation engineer.

In the early '80s he was head-hunted by the Australian arm of giant multi-national Sanden where he worked his way through service engineering, sales and then into management. He is now General Manager - Operations.

In 2003 he graduated with an MBA from the Macquarie University School of Management.

Since 2004, Mark Padwick has taken a leading role in the automotive approach to national licensing and has liaised regularly with government and industry authorities.

In 2005 Mark joined with MACS Worldwide and Euro MACS to forge a unique international triad of automotive air conditioning associations, and as a result, VASA members now share MACS outpourings of technical data.

He also heads the Wire & Gas Committee.



The new refrigerant? What new refrigerant?

The global search for a replacement refrigerant for mobile air conditioning units has reached fever pitch as the EU deadline on the banning of R134a draws nearer.

But VASA sources in Europe report that the pendulum is swinging wildly, and it is likely that the car technicians in Europe, in the not too distant future, may face having to work with three different refrigerant systems, or at least two. Considering that Australia now imports more than 50 per cent of its cars from Europe, this dilemma will extend to Australasian workshops soon after.

Speculation reached fever pitch just before the September Frankfurt Auto show, when it was tipped that major announcements would be made. This turned out to be a fizzer, but even so, a BMW spokesperson let slip on 5 September on the internet, that German manufacturers were about to adopt a CO₂-based solution because the competing alternative was a chemical solution which BMW was 'not happy with technically'.

But most reports out of Europe reveal that the pendulum is swinging wildly from replacement fluorocarbons to CO₂, to a US favourite called R152a, to Fluid H from Honeywell. A late report from Europe tells of yet another contender which happens to be one of the two constituents of Fluid H. Depending on the outcome of some remaining testing of flammability properties, the expectation is that this substance can be used in a 'Direct eXpansion' (DX) system. Initial toxicity and performance testing looks quite promising so far.

When the race began several years ago CO₂, which was regarded as a hot favourite among European car makers, began getting bad press because of manufacturing costs. The idea went cold for a while and meanwhile Honeywell and DuPont buried their competitive hatchets and threw their scientists and research into one laboratory to produce a low Global Warming Potential fluorocarbon for the world. The result of this collaboration was expected to be announced this year, but to date, there's been no word.

As the pendulum was going against CO₂ and in favour of the new synthetic refrigerants (now referred to as GARs - Global Alternative Refrigerants) up to about July, the CO₂ lobby came out of their corner fighting and pulling every string possible. It even came to the point where the German environmental minister declared that CO₂ was a mature technology and appeared to be the best environmental choice.

However, at the Phoenix Forum this year, all the chemical companies were forced to admit that there was an issue with each of the GARs that might take time to resolve (one to two years) and no final resolution could be



CO₂ will lead to the biggest mess and debacle in mobile air conditioning history

Hans Fernqvist, Volvo, Sweden

guaranteed.

Popular VASA keynote speaker and a European climate control expert in his own right, Hans Fernqvist, of Volvo, Sweden, has told Hot Air that any attempt to introduce a CO₂ (R744) system to replace today's traditional type of AC system (open, belt driven compressor and screw together connections) will lead to the biggest mess and debacle in mobile air conditioning history.

Hans believes the level of customer complaints and rate of complete vehicle buy-back cases will just rocket.

It is estimated it will take anywhere from six months to two years after start of production for the CO₂ mess to unravel.

"The main factors for this failure scenario are related to the circumstances of actual mass production and can therefore not be tested or evaluated properly in advance," warns Hans.

"The immense problem of finding small and medium size leaks on CO₂ systems, both in production and for the aftermarket, is another major factor in this failure scenario."

He went on to tell Hot Air, "Since mid-July 07, the status of the so-called Global Alternative Refrigerants (GAR) has changed dramatically.

"From either medical/toxicity or technical and environmental reasons there are, for the moment, no viable alternatives to the standard R134a, the only refrigerant currently recommended by car makers around the world, but destined for extinction because of its Global Warming Potential (GWP) of 1410. Currently, any replacement refrigerant must have a GWP of 150 or less.

"Re-testing of long term toxicity effects are estimated to take another six to eight months," Hans said.

"In all, considering the first phase-out date for new platform vehicles (1 January 2011), the world is left, in my opinion, with only one alternative that will work when applied to a mass produced vehicle.

"That is R152a (HFC152a) in a so-called 'Secondary Loop' (SL) system (= indirect system).

"There are still people who believe that trans-critical, high pressure CO₂/R744 systems are the only possible choice, but as I claimed at the VASA Convention in 2006 and further explained at the JRAIA Symposium in Kobe, Japan in December 2006, any attempt to introduce such a system to replace today's traditional AC system will lead to a complete debacle.

"The concept of secondary loop, really independent of refrigerant, with the exception of CO₂/R744, has been demonstrated to work very well both from a performance as well as from a reliability standpoint.

"The problem today is that some companies or personnel claim that CO₂/R744 is the only choice, while others make the same claim for R152a/SL.

"Even within the same company there can be totally deviating opinions on this issue. It is a fully possible scenario that one group of European OEMs will go for CO₂/R744 and the other group will go for R152a/SL," added Hans.

VASA SEARCHES FOR A YOUNG ACHIEVER

VASA has thrown its weight behind the first comprehensive awards program to honour those who have contributed to the development of environmentally aware products and services, by sponsoring an award for the best young mobile air conditioning technician in Australia.

The awards are the brainchild of the Climate Control News magazine (CCN), and they are called the CCN CoolWorld Industry Awards.

Major players in the air conditioning and refrigeration industry are contributing to the extensive program, which culminates in a glittering awards presentation in Melbourne next April.

Nominations for the awards opened on 1 October and will close on 25 January 2008.

MORE DETAIL AT
www.vasa.org.au



DAVE TOWNLEY EXITS AIR INTERNATIONAL, JOINS ADAIR

One of the best known and respected names in A/C in Australasia, Dave Townley, has joined ADAIR, ending a 20-year-stint as Air International's customer support front-man for Holden and Ford dealerships around the nation.

Dave was better known to VASA members as a regular Wire & Gas Convention trainer, and he has attended and spoken at almost every major convention since VASA started having conventions in the early '90's.

In an interview on the eve of his departure from the familiar surroundings of Air International, Dave explained his need for new challenges, which at ADAIR will still involve him in conducting training courses and he will be the company's A/C customer product technical support person.

Dave's intimate grasp of A/C technology was an accidental by-product of a life around motor cars.

It began at Lane's Motors Mercedes dealership in Melbourne where, as a young lad, he had visions of becoming a top spare parts manager.

But he soon moved on to John Ould Motors, a Renault, Peugeot and BMW dealer, where he took up an interest in the mechanics of motoring. Later, he was to hone his mechanical skills at Middle Brighton Motors, a Datsun and Mercedes dealership. As European cars were fitted with A/C in the '60s and early '70s, this was the perfect time to specialise and learn about automotive A/C theory, repairs and servicing.

RAC Licence holders get an easy nod to do auto work

VASA's appeal to the Government to make the full automotive competency assessment mandatory for RAC licence holders who want to do auto work may have fallen on deaf ears, but the result may not be as devastating as some might have thought.

A number of full RAC licence holders believed they should automatically receive endorsements to work on auto systems, where they already have some experience in this area, mostly in remote locations.

VASA said that any watering down of the requirement to prove competencies flies in the face of the licencing concept.

When Mercedes Benz Australia advertised for a Mechanical Training Instructor for passenger cars, Dave was on the doorstep, application in hand. In his eight years there, he self-developed his training skills, and forged a relationship with OEM supplier, Air International, which was to become his ultimate career work place.

In 1987, Air International Port Melbourne advertised for a Field Service and Training Supervisor, while he was doing a short stint as Service Manager with a Honda dealership. He applied for, and got the job.

Dave has looked after the dealerships of Holden and Ford through the OEM network of Air International, and became so respected for his knowledge of a variety of systems, that he was often called on to give advice on other manufacturers' component problems.

He wrote technical bulletins, workshop manuals, dealer A/C training, product problem solving and was certainly regarded by VASA directors as one of the very small number of top drawer A/C trainers in this country.

Hot Air asked Dave what had really started his career in the niche direction of climate control. "I know this will date me, but I used to install complete A/C systems in Datsun 180Bs in the '70s at a dealership, so a lot of it I had to learn myself, without textbooks."

VASA and Hot Air readers will wish Dave good luck in his new career.

Holders of Certificate III qualifications say they hold all the competencies necessary to do automotive work.

The government conceded there are peculiarities of the automotive environment that a technician needs to be aware of in order to safely carry out RAC work on automotive systems.

The Australian Refrigeration Council has agreed that holders of the Full RAC Refrigerant Handling Licence will have their licences endorsed to undertake automotive air conditioning work where they can produce a letter from their employer, or a statutory declaration, that they have two years experience working on automotive systems.

VASA President Mark Padwick said the

Hi and welcome aboard

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

Former AAAE President Deyan Barrie sent his



former members a firm recommendation to stay connected to a professional association, and many heeded the call and as we go to press, they are still enlisting. AAAE voted in August to wind up its company and transfer operations to VASA. The move provides great economies of scale, and has pointed VASA in a new

direction of expansion to cover more than just A/C technicians.

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.

- Redcliffe Car Electrics - Redcliffe Qld
- Osborne Auto Electrics - Chinchilla Qld
- Auto Electrical Services - Maryborough Qld
- Tony's Mobile Auto Electrics - Moonah Tas
- Sparks Auto Electrical - Coburg Vic
- North Shore Auto Electrical Services - Chatswood NSW
- Supreme Auto Electrical - Manly Vale NSW
- Heavylec Pty Limited - Regency Park SA
- Sarina Auto Electrics - Sarina Qld
- Yass Electrical Service - Yass NSW
- South Coast Auto Repairs - Dapto NSW
- Epping Keilco - Wandong VIC
- Scorpion Auto Electrics - Alice Springs NT
- Malvern Auto Electrical - East Malvern VIC
- Kavney's Auto Air & Electrics - Dalby Qld
- Woods Auto Electrical - Tolga Qld
- Phillips Auto Electrics Pty Limited - Bendigo VIC
- Murwillumbah Auto Electrics - Murwillumbah NSW
- Barden Ridge Auto Electrics - Menai MSW
- McQueens Auto Electrical - Batemans Bay NSW
- Sunnyside Auto Electrics - Hamilton NSW
- Berwick Auto Electrics - Berwick VIC
- Mittagong Auto Electrics - Mittagong NSW
- Active Car & Truck Electrics - Coffs Harbour NSW
- G & J Tonkin Auto Electrical Service - Charlton VIC

AND...there's been a great rush of new members to join VASA. A big welcome to the following:

- French's Auto Electrics - Burnie Tas
- Mike King Airconditioning - St Agnes SA
- CJ Graham Auto Electrics and Air Conditioning - Cobram VIC
- City North Autolec - Joondalup WA
- Maleny Autoelectrics & Airconditioning - Maleny Qld

auto aftermarket should not get too stressed about any impact this might make into their customer base.

"Those with Cert III qualifications, already working mostly in remote areas on vehicles as well, are not exactly in the same category as the unqualified back yarders which VASA has been trying to eliminate.

Don't ignore the problem solving capabilities of VASA's famous RTP

It's amazing how often a member asks a technical question, only to be told 'Look up your RTP'.

Don't discount these gems of aftermarket wisdom.

This great catalogue of information, built up over seven years, is as relevant today as it ever was. The series was developed by the VASA technical committee and written expertly by Grant Hand, arguably Australasia's best known climate control trainer.

All RTPs are available as printable downloads on the members' pages of the

VASA website

www.vasa.org.au

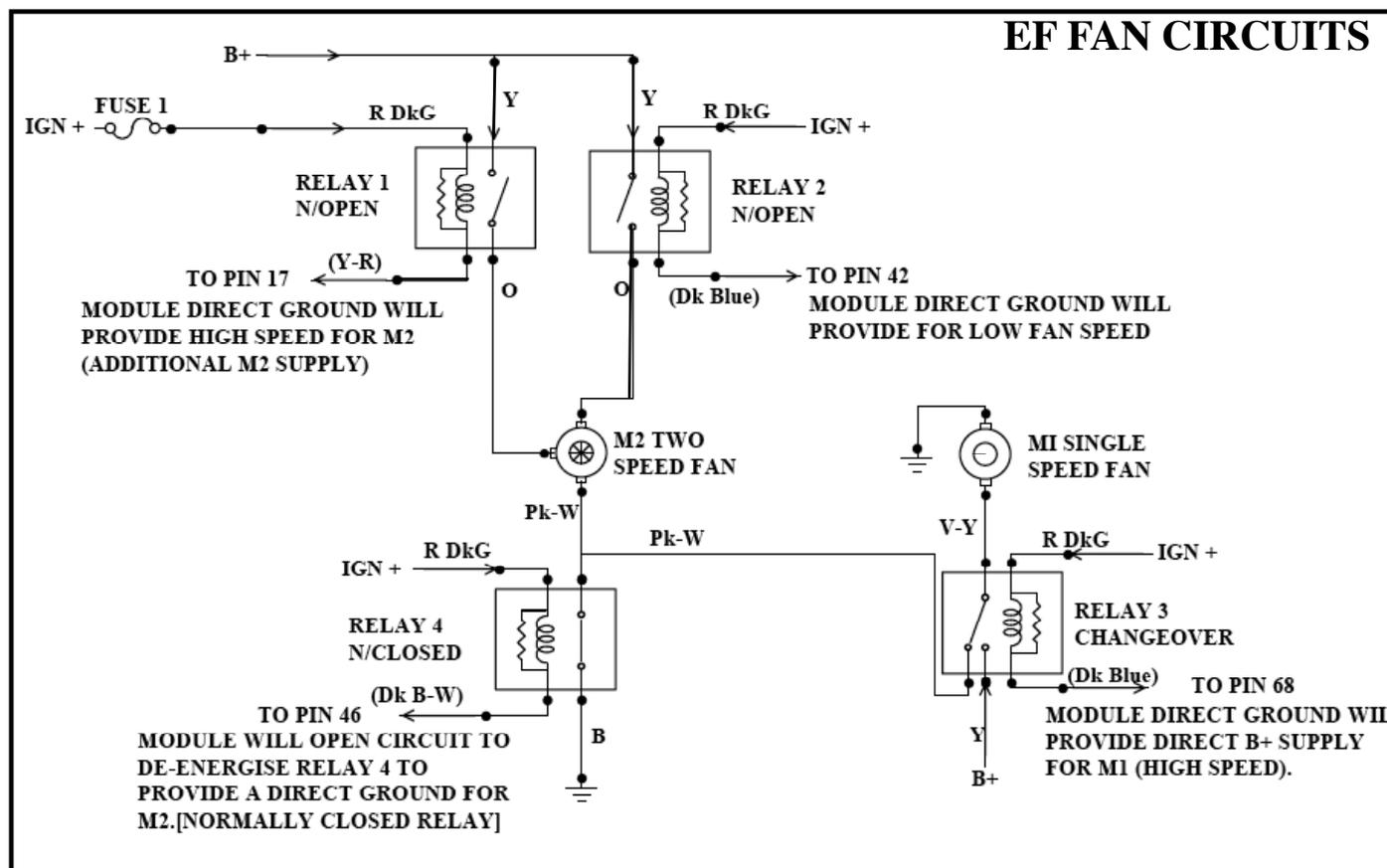
Here's a typical case in point - a member asked 'Could anyone please provide me with the wiring diagram for the modification to the cooling fans wiring to get the fans to run on high speed all the time the A/C is turned on, on an EF Ford Falcon.'

Bill Penfold of Sanden responded 'Go to Electrical bulletin No 4 Vol 1 - EF/EL FALCON FAN WIRING.'

We reproduce the main points here.

A warning:
All vehicle manufacturers are extremely reluctant to allow or endorse modifications to their systems - and understandably so. On viewing some wiring circuit modifications being circulated Australia wide they 'take out of circuit' the normal fan switching strategies which protect against engine overheat and which automatically engage the fans in adaptive strategies (limp home) mode.

When modifying modern electronically controlled systems extreme caution must be exercised to guard against any loss of 'normal switching', damage to sensitive electronics and inadvertent setting of fault codes (through tripping of watch dog circuits).



SUMMARY - EF Falcon

2 SPEED ON FAN 1 (M1) (via series parallel switching)
3 SPEED ON FAN 2 (M2) (via series parallel switching plus dual speed motor)

4 Fan Relays
No. 1 = N/open
No. 2 = N/open
No. 3 = changeover
No. 4 = N/Closed

To get high fan speed:

No. 1 Relay

- ▣ Closed - Y/R into control unit must be grounded.
- ▣ This is only essential if it is necessary to give 2300 + 2300 r/min - if Y/R is not energised we get 2300 + 1900.
- ▣ This is normally enough.

No. 2 Relay

- ▣ Closed. This is done by control unit in all modes anyway.
- ▣ Air conditioner function of ECU
- ▣ Do not change.

No. 3 Relay

- ▣ Must be energised to C/O position (87a to 87) to give M1 direct supply - ground dark blue at ECU (careful there are two dark blue wires) (C228) (Grounding via relay A/C activated).

No. 4 Relay

- ▣ Must not energise
- ▣ Open circuit at relay or ECU
- ▣ (Dark blue/white trace).

Recommendations for Modification at Technicians Discretion

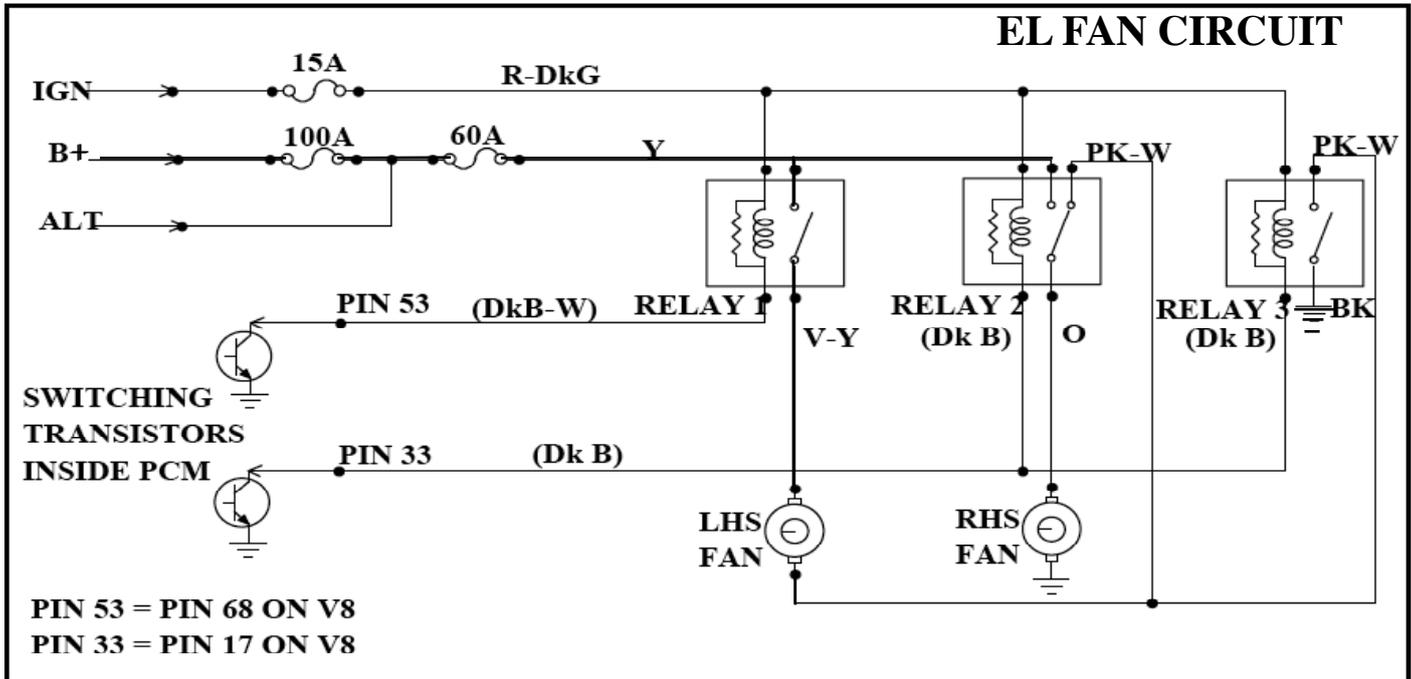
- ▣ Open circuit dark blue/white trace via A/C activated relay or trinary switch
- ▣ Ground circuit 228 (Pin No unknown) via A/C activated relay or trinary switch. (Dark blue at ECU/relay via A/C activated relay or trinary switch).
- ▣ Optional ground of Y/Red (circuit 752) (Not essential modification.)

EL FALCON SWITCHING

The EL switching is much simplest using 2 single speed fans and series/parallel switching of them. Normal PCM control in case of engine overheat etc is the same, therefore modifications to circuits must once again be done to ensure normal switching is maintained.

PCM Control

Pin 33 and Pin 53 (17 and 68 V8) are grounded by the PCM when required. In fact switching control is via Pin 33 above. Pin 53 (68) is switched with A/C activated under normal operation. When Pin 33 is grounded Relays 2 and 3 are energised. Relay 2 provides a direct supply to the RHS motor. Relay 3 provides a direct supply for the LHS motor.



Modifying the Circuit

Simple!

Ground Pin 33 (Dark blue at Relay 2 or 3 via an A/C or Trinary switch activated relay).

Trinary (Medium)

Pressure Switching

When modifying the EL fan switching, particularly when the vehicle is being used predominantly in highway mode,

consideration should be given to switching the fans via a trinary switch.

This is simply a matter of placing the switch in the relay coil control circuit to ensure the additional relay only energises when the trinary switch is closed.

With EF models Pin 46 requires open circuiting (ie using a normally closed relay), thereby making the incorporation of trinary switch difficult unless a normally closed trinary switch (medium pressure switch) is sourced ie some Kenworth truck types.

HOW MANY AWARDS CAN YOU HAVE ON THE WALL?

If you've ever visited former AAAE president Deyan Barrie's workshop in Sydney, you would quickly reach the conclusion that there's no limit - even if you run out of wall.



Branka Barrie and Barrie Auto Electrics Manager Perry Robinson collect the latest award for the wall

Their latest award was to honour top performing local businesses, run by the Advocate newspaper.

Barrie Auto Electrics was the winner of the Motoring Services division, Upper North Shore True Local 2007.

Customer surveys have found a strong relationship between customer loyalty and trade and community certificates on the wall.

Awards cost nothing but a bit of time, which is usually well spent writing about your own business and networking at presentation functions - all part of a good business.

When any VASA member next wins an award, send a picture to Hot Air.

Big names in new company

Air International Transit, previously owned by the Futuris Corporation has been acquired by a group of private owners.

It will now trade as Sigma Coachair Group. Sigma is well known in the mining, rail, industrial and defence markets worldwide, and Coachair in the bus market in the Asia Pacific region.

The new owners include Mark Parow, best known as part owner and CEO of Natra Group, existing AIT execs Joe Schembri, Geoff Rule and John Walsh, and former MD and part owner of Fans Direct, Andrew Israel.

The team is aiming to take Sigma Coachair Group to the major European and North American markets.



Hot Air is the only official journal of VASA and AAAE and will be published every two months and mailed to members. All inquiries should be directed to the CEO, Ken Newton at info@vasa.org.au, or Ph 07 5591 6274 or fax 07 5591 8172. Website address is www.vasa.org.au



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Repeat compressor failures

By Paul Weissler – MACS Technical Correspondent

It's one of the most debated questions in every A/C workshop - why do compressors fail. The reasons are many and varied, and most are related to workshop practices.

This is Part 2 of a detailed look at repeat compressor failures - and it's a must-keep article for every workshop.

Flushing with refrigerant

Using liquid refrigerant to flush the system, and finishing up with an in-liquid-line filter, is a General Motors-recommended alternative to the terpene and petrochemical solvents.

It does a good job of removing oil and minor debris (such as desiccant particles), but is time-consuming. Further, recovering liquid refrigerant that fills the system is not some quick operation, and it requires a recovery machine designed for refrigerant flushing, including a special port.

GM requires its dealers to get permission to perform it under warranty.

Substantially too much oil in the system, however, is not something you can ignore. If you want to refrigerant-flush, be aware of the full GM procedure, which is described later in this report.

Debris and filtration - and oil balancing

When debris is an issue, you need filtration. Sure, there are accessible screens that can be replaced or cleaned (orifice tube, perhaps expansion valve and/or receiver-dryer). Inspecting them usually indicates how much debris got through the condenser.

Suction side "thimble" screens don't look very big, but their shape gives them a surprising amount of surface area and they save a lot of compressors from debris that had blown back into the suction side.

A nasty problem with debris: it often doesn't stay put unless it's trapped in a filter or screen. So a technician changes some parts, but not the condenser, runs the system and soon encounters a failure from an apparent restriction.

This time he replaces the condenser, but debris already came out and plugged an

orifice tube or expansion valve, which previously was replaced.

So the parts all may be new, but because of the sequence of replacement, there's still debris in the system.

Moral: the more complete the repair the first time around after catastrophic failure, the better, and if a suction screen and liquid-line filter go with it, you've got some backup protection.

Flushing (if done correctly for the full system) should remove all the oil, so you have to make a suitable adjustment when you replace the compressor, condenser, etc.

There isn't a 'standard' procedure. A replacement compressor may come with no oil, a full charge or some amount in between. Because one compressor goes into systems with different oil capacities, the best bet:

- remove as much oil as possible from the new compressor (it takes time. Turn the shaft slowly until you are at the point of very diminished returns)
- then add oil to each component according to the manufacturer's recommendations for new parts. There's surely some oil left in the compressor and what you add may result in an ounce or two extra in the system, but it beats an ounce or two short.

A far greater problem is from just bolting on a compressor with a full oil charge when there may be more than a full charge remaining in the system from the OE charge and any additions during previous service.

If it's the first compressor failure, no indication of much debris, and the technician decides not to flush components, he should remember to adjust the oil level in the new compressor, referring to what he could drain from the failed one.

However, if that compressor has lasted a long time, he should remember that one of the reasons that compressors repeat-fail is because the system is loaded with oil.

Perhaps previous shops kept topping up a leaking system and added a few ounces of oil each time. Then the technician installs a new compressor with a full charge of oil and combined with debris left in the system, encounters a repeat failure.

He replaces that compressor, maybe changes the accumulator or receiver-dryer and a couple of hoses too, but the new compressor contains still another full charge of oil.

One of the reasons that compressors repeat-fail is because the system is loaded with oil.

Yes, even if the compressor doesn't hydro-lock, there's so much oil in the system that cooling is bad. Perhaps the technician tries adding more refrigerant to improve cooling, and the head pressures go up. Well, you can see where this is leading.

But before putting back all those trim pieces that he had to take off to gain access, the technician also should leak check with a premium electronic detector.

Loss of refrigerant causes a performance drop, and if a technician has been focused on the compressor and sees pressures that are in the low-normal range, he concludes the compressor failed again.

Loss of refrigerant that leads to poor cooling may not produce big changes in system pressures, but it reduces oil circulation (the refrigerant carries the oil, of course).

So when the compressor fails once more - although perhaps not until next season - the technician is complaining to his parts supplier about compressor quality.

Factory fixes are 'special'

Factory fixes for compressor failure raise special issues, even if they resemble 'standard issue' repair.

Many technicians think a complete factory fix procedure can be interpreted.

That leads both to shortcuts and alternatives that don't work. Believe that a factory procedure is a safe minimum, because anything extra raises warranty costs.

Factory service engineers can't try every possible combination to validate a fix, but they do develop a feel for what's necessary - probably better than you could when you face the problem on a customer's car.

If the 'what's available now' fix is expensive and the problem is not going away altogether, someone will work on a lower-cost approach to be released later - after it's also been validated.

Leave the experiments to the service engineers.

(Continued next page...)



THE MOBILE AIR CONDITIONING SOCIETY WORLDWIDE

MACS SERVICE REPORTS

Repeat compressor failures

VASA and MACS Worldwide signed an affiliation agreement in 2005. The two organisations collaborate on major industry issues, and VASA is grateful for access to top technical information from MACS experts.

An important issue at factory service engineering departments also is the repair's practicality.

It can't be so sensitive to individual technique that a high percentage of technicians could get unsatisfactory results.

That said, we don't claim the factory fixes are always absolutely perfect. We add a caution: with some low-volume problems, the factories often are 'pushed' into accepting superceding parts that are physically different but seem technically calibrated for the job.

The parts seem to work, and there are higher-volume, bigger problems out there that need solving. The 'technically correct part' turns out to be not so good a choice, and doesn't always work.

The aftermarket soon learns about these and the word gets out, perhaps even before the factory finds out and hustles to release still another part. So listening to the aftermarket grapevine can often produce 'enhanced' data.

But that's a lot different from just going ahead with any 'I think you oughtta try this'.

Now let's look at some original equipment specifics when there's a catastrophic compressor failure.

Classic case

The compressor on the 2004 Crown Vic failed and the technician saw contamination, so (he said) he "replaced every component" with the OE parts (supposedly including condenser, evaporator and every line and accumulator).

And during assembly, he added oil to each, and finally charged the system (accurately of course). He ran the A/C and the gauge readings started oscillating. He found the orifice tube loaded with metallic debris, after just seconds of operation.

He replaced the compressor twice more, along with accumulators and orifice tubes, and sadly got the same problem each time. With a fourth compressor and assorted other new parts, the failures seemed to have stopped.

We weren't there, standing by the technician's side, to document everything he claimed was done. If the gauge readings were jumping, the problem recurred in minutes, and the orifice tube was found to be loaded, debris still was in the system.

As we pointed out, when all replacements aren't done in one job, debris may move, and create a blockage.

Ford has long advocated flushing the evaporator, hoses and lines, and as we said earlier, also accepted the idea that

a late-model condenser has such small passages that it probably can't be flushed very well if there is catastrophic failure of the compressor. But let's review exactly what Ford recommends:

- After recovering the refrigerant, disconnect the refrigerant hoses or lines from the heat exchanger(s) to be flushed. Remove the accumulator or receiver-dryer, expansion valve or orifice tube and hoses with mufflers. Yes, after you find a failed compressor, you take off all these parts before you go further.

- Attach the Ford-approved flushing machine or one you know does an equivalent job, following the instructions and



Ford approved Flushing machine, with specific terpene solvent, is used in closed loop circuits through hoses, lines, heat exchangers, followed by a shop air purge so virtually no solvent remains in any component.

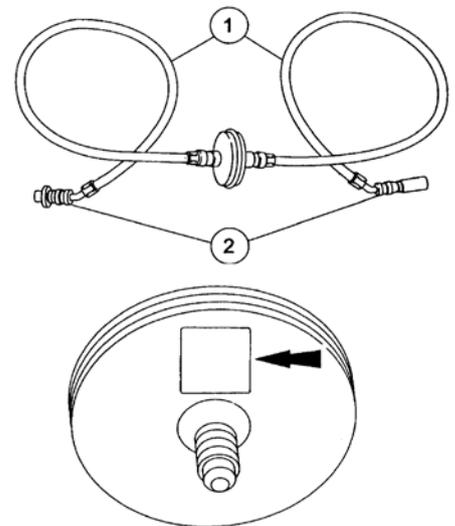
using one fresh gallon of the approved solvent (or a reputable terpene solvent with similar vapour and other characteristics). Ford prescribes a back-flushing procedure, and points out that you're not necessarily trying to get out just particulate debris, but oil that sludged from overheat.

- Run the flushing solvent through the heat exchanger for at least 15 minutes, more if there's likely to be a lot of debris. Then air purge for at least 30 minutes. Ford warns: "Failure to successfully remove all residual solvent within the component can result in system damage

when reconnected and (the system is) operated." Never shorten the air purge, ever on any machine.

- If the problem was a failed compressor or desiccant, replace the accumulator or receiver-dryer, the orifice tube or thermal expansion valve (or clean or replace the TXV screen) and hoses or lines with mufflers.

- "If A/C system contamination is extensive," Ford recommends using a pancake filter kit, installed with auxiliary hoses in series with the condenser and its outlet line fitting.



Following a Ford flush, as in the top illustration, pancake filter with auxiliary hoses attaches in series with condenser outlet and its refrigerant line. The bottom illustration shows label for side with auxiliary hose that connects to the condenser (hose on the other side of pancake connects to refrigerant line). After the system is run to trap additional debris, filter setup is removed.

Run the A/C; engine idling several minutes at 800 rpm, then for several minutes at 1000 rpm and finally (for an hour) at 1200 rpm. Then discard the filter.

The appeal of this filter is that it doesn't require cutting into a line for a permanent installation, but remember it's been validated only to follow the Ford flushing procedure on Ford vehicles.

Adding a suction side screen and a permanent in-liquid-line filter is not required by Ford, but there's no objection to the extra protection.

The Ford flush removes virtually all oil from components, so remember to add the specified amounts, as noted earlier in this report.

Finishing this series in the next issue with a range of repeat failure cases on various vehicles.

Licensing:

CONSUMER CAMPAIGN BEGINS WARM AND FUZZY - BUT HARD-HITTING IS WHAT THE WORKPLACE DESPERATELY NEEDS

The long awaited ARCTICK consumer education campaign, aimed at informing the motoring public that new legislation exists, and that new work practices dictate how a vehicle's air conditioning system is managed in the repair shop, has hit the streets.

But don't wait for the accolades from the technicians and workshop owners who have to deal daily with a sceptical and cynical public who accuse technicians of 'ripping them off' when they insist that any leaks must be fixed and a 'top up' is no longer legal.

VASA president Mark Padwick, who is now Chairman of ARCTICK has rushed to assure the automotive repair trade that the first wave of posters and brochures will be followed up within a short time by more hard-hitting material.

The first wave is obviously aimed at conditioning the public to look for the ARCTICK symbol as an indicator that the tradesmen inside have the necessary skills to properly service air conditioning systems. The environmental message is strong, as it should be.

However, members have complained that the real message is yet to be seen, and are hoping that future campaigns to follow will spell out clearly that Australia has legislation and penalties if workshops don't do the right thing by the environment.

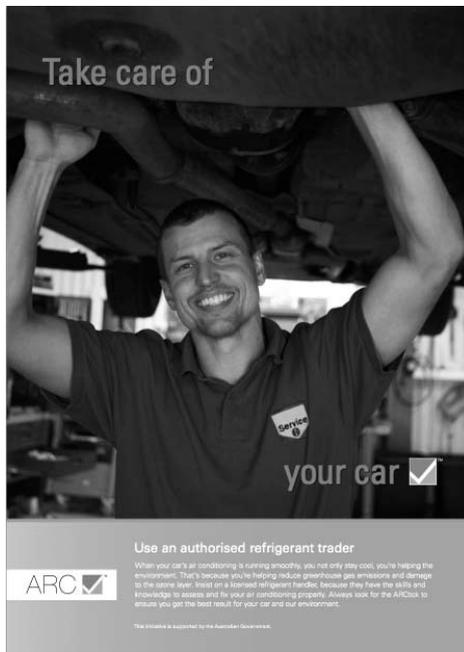
Some members complain that while so many workshops are still happy to 'top up', instead of insisting that leaks have to be fixed, the public will continue to make repair decisions through their wallet.

"Nobody believes there is such a law, because nobody in the government or ARCTICK has told them about it. They remain blissfully ignorant of the requirements that we in the workshops have to meet, but when we try to inform the customer, all they see is a money-grubbing repairer trying to upsell the service," said a member.

This email came from a member in Queensland "We are still expected to do their work for them and hand out these brochures to our customers and explain what they mean. I don't class that as government doing much to let the public know their obligations under the new regulations. I still have public not believing we're not just after more money from them. It's hard enough to survive as it is without not knowing what's going on."

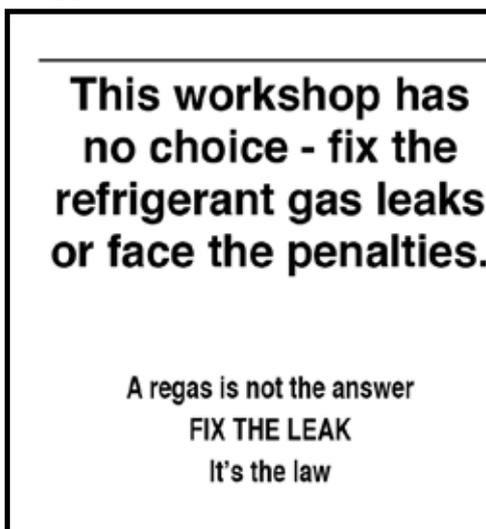
Another took one look at the poster he was expected to put in his waiting room and

commented,"It's a good ad for under-arm deodorant, but what's it really got to do with what we are supposed to be telling our customers. It's an insult to our industry."



Above: The first wave of ARCTICK posters

Below: The posters VASA has presented for consideration, based on the simple campaign against under-age drinking in every pub and club in the land.



"A second wave of more hard-hitting material will be released to the trade quite soon," said Mark Padwick. "On top of that, I will be working hard to get our simple message through, so I ask the trade to be patient for a little longer until the impact of the total campaign can be assessed."

VASA recommends all technicians spend a little time on the ARCTICK website, to find answers to many questions. <http://arctick.org>

BATTERIES - IT'S HARD TO BE POSITIVE WHEN THE PRICES ARE SO NEGATIVE

Be prepared for higher battery prices in Australia and New Zealand as the world price of lead goes through the roof.

Century Yuasa report that since 2006, the world market price for lead has increased a staggering 300%. At last report, the price was still climbing and no relief was in sight.

Century Yuasa, and presumably other manufacturers, have been forced to increase their battery prices.

The reason for the price hikes comes back to the insatiable demands of the emerging economies like China and India. The growing car markets in both countries is partly to blame, but on top of this, speculative buying by fund managers across the globe of a metal which many thought to be under-valued has done nothing to improve the situation.

Battery making is the main use of lead around the world.

Century Yuasa has hastened to assure auto technicians that the price slug is not 'price gouging', but a global problem which will affect all makers.

