

MACS 2023 TRAINING EVENT & TRADE SHOW

Pre-Conference Golf Tournament, February 1, 2023

Training Classes, February 2-4, 2023

Trade Show, February 3, 2023

Gaylord Opryland Resort and Convention Center, Nashville, TN



www.macsmobileairclimate.org

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TRENOR

TRAINING EVENT & TRADE SHOW



The Mobile Air Climate Systems Association (MACS) invites you to come to Nashville, TN for our 43rd annual Training Event and Trade Show at the Gaylord Opryland Resort and Convention Center.

MACS Training Event provides a forum that joins all industry segments and professionals together to foster growth and expand knowledge. By facilitating relationships industry-wide, MACS allows industry professionals to easily attain the information they need to solve their customer's A/C problems.

Over three days, attendees can learn from 31 speakers and participate in 41-hours of mobile A/C training. Presentations will feature service and repair knowledge for automotive, light-duty trucks, heavy-duty and off-road trucks, and electric vehicles. Six social events provide important networking time to create and grow relationships.

MACS holds the only mobile A/C product specific Trade Show in the United States. This is your opportunity to meet the expert industry vendors of parts, tools and equipment, and chemicals.

MACS will also hold complimentary Section 609 classes in English and Spanish.



Wednesday, February 1-MACS Golf Tournament

Sponsored by



MACS annual golf tournament will take place on Wednesday, February 1, 2023, and is always a valuable and enjoyable networking event.

Recruit your foursome now, to get ready for a day of sport and camaraderie on the links at the scenic and historic Hermitage Golf Course in Old Hickory, TN near the one-time home of America's 7th President Andrew Jackson.



SCHEDULE AT A GLANCE



Wednesday, February 1

Annual Golf Tournament

Hermitage Golf Course 9:00am



Thursday, February 2

| | |
|---|-----------------|
| Registration | 7:00am-5:00pm |
| Continental Breakfast | 7:30-8:00am |
| Passenger Car/Light Truck/Marketing Sessions | 8:00-11:15am |
| Heavy Duty & Off-Road Technical Session | 8:00-11:15am |
| Keynote Luncheon | 11:30am-12:45pm |
| Passenger Car/Light Truck/Marketing Sessions | 1:00-4:15pm |
| Heavy Duty & Off-Road Technical Session | 1:00-4:00pm |
| North American Vehicle and Consumer Trends w/ Mark French & Jon Clements, Experian | 3:30-4:00pm |
| Commercial Vehicle Overview: A Market in Motion w/Mark Hazek, IHS Markit | 4:00-4:30pm |
| MACS Member Meeting | 4:35-5:00pm |
| Welcome Reception Wildhorse Saloon | 6:30-8:00pm |

Friday, February 3

| | |
|---|----------------|
| Registration | 7:00am-5:00pm |
| Breakfast | 7:30-8:00am |
| General Session, Kick-off to Trade Show | 8:00-9:45am |
| Trade Show | 10:00am-4:00pm |
| "Grab a Bite" Lite Lunch | 12:00-1:00pm |
| Complimentary Section 609 Certification Class | 1:00-3:00pm |
| SECCIÓN 609 - Agnes Perez | 1:00-3:00pm |
| "A Toast to Myron" After Party | 4:00-5:00pm |

Saturday, February 4

| | |
|--|-----------------|
| Registration | 7:00am-5:00pm |
| Continental Breakfast | 7:30-8:00am |
| Passenger Car/Light Truck/ Marketing Sessions | 8:00-11:15am |
| Heavy Duty & Off-Road Technical Session | 8:00-11:15am |
| Electric Panel Lunch | 11:30am-12:45pm |
| Passenger Car/Light Truck/ Marketing Sessions | 1:00-4:15pm |
| Heavy Duty & Off-Road Technical Session | 1:00-4:00pm |

TRAINING EVENT & TRADE SHOW



Thursday, February 2 - Business Management Training



Rick White, 180BIZ ^(BIZ)

Thursday, February 2, 8:00-9:30am

Making Your Team Un-Poachable

The staffing shortage is real. What's everyone's answer to their employee issues? Steal them?

This class will help you make your team un-poachable and dramatically increase employee retention rates.

This class will teach you:

- The two things keeping you at risk
- What your team wants from you now
- The levers you can pull to protect your team
- What's preventing you from moving forward

After attending this class, you'll know exactly what you need to work on to not only safeguard your team but build an environment that attracts quality people.

Thursday, February 2 - Car, Light Truck, EV Training



Al McAvoy, Stellantis ^(PC/LT)

Thursday, February 2, 8:00-9:30am, This class is repeated at 1:00-2:30pm

2023 Jeep Grand Cherokee and Jeep Grand Wagoneer HVAC Systems

The new Jeep Grand Cherokee and Wagoneer now offer Chrysler's first 4-zone automatic temperature control A/C system for first and second-row passengers. It includes personalized temperature settings, fan levels

and modes for each passenger.

Also learn about:

- Updates on Stellantis electrification plans
- New service library replaces TechCONNECT for factory service information
- Scan Tool updates and the new Mopar Diagnostic Pod (MDP) replacing the MicroPOD II's
- R-1234yf service updates



Frank Woodson, Gates ^(PC/LT)

Thursday, February 2, 8:00-9:30am

The Changing Serpentine Belt Drive World

Serpentine belt system diagnostics are important. How do we know if the belt, tensioner or idlers are failing? What are the consequences to the accessories in the system if the belt, tensioner and idlers are past their useful life span? Plus, where is technology taking us in the serpentine belt drive world? Learn the answers to these questions in this session.



Peter Orlando, ^(PC/LT)

Carquest Technical Institute / Advance Auto Parts

Thursday, February 2, 9:45-11:15am, This class is repeated at 2:45-4:15pm

Climate Control System Diagnostics: Using Scan Tool Analytics

Assessing customer complaints with external equipment may not be necessary in all cases to determine diagnostic direction if the answers to a TRUE performance test

are built-in to the vehicle.

Multiple modules are sharing the sense, compare, and correction necessary to impact TRUE engine temperature and total climate control strategies. What would happen if a true performance test required the use of a scan tool initially?

Think about it! There is not one OE manufacturer that prescribes hooking up the RRR machine and taking the vehicle out on a road test! Why not look at the data the modules are seeing to seek the truth in our climate control system analysis?

This seminar will cover:

- Using a scan tool to diagnose climate control complaints
- What climate control parameters are available on my scan tool
- OE vs Aftermarket s tools: What are we missing?
- Season ourselves for the season with REASON!



Dave Hobbs, ^(EV)

Delphi Technology by Borg Warner

Thursday, February 2, 9:45-11:15am, This class is repeated at 2:45-4:15pm

HVAC "Hide & Seek" for Electrified Vehicles: Essentials in PHEV and BEV Thermal Management

Electrified vehicles (HEVs, PHEVs and BEVs) are no longer playing "hide and seek" from the (HEVs) that have been gaining in numbers for over the last 20-years.

The "plug-ins" (PHEVs and BEVs) will be lined-up for service sooner than you think. High voltage/unique HVAC related components used in these vehicles can seem hidden and their technologies can seem hopelessly complicated. Allow Delphi to help you seek the hidden and simplify the complicated! This will help you navigate complex topics like:

- High voltage safety - More than JUST those "Big Orange Cables"
- Electric A/C compressor operation and service
- Heat pumps and high voltage electric heaters (common on PHEVs and BEVs)
- Power electronics and high voltage battery thermal management
- J1772 & EVSE (Electric vehicle supply equipment)

Course Legend

^(BIZ) = Business Management

^(EV) = Electric Vehicle

^(HD) = Heavy-Duty/Off-Road

^(NET) = Networking Event

^(PC/LT) = Passenger Car/Light Truck

^(BUS) = Bus

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Thursday, February 2 - Keynote Luncheon/Pioneer Awards Sponsored by **MAHLE**



Chris Chesney, Repairify ^(NET)

Keynote Luncheon: The Future of Automotive Service
Thursday, February 2, 11:30am-12:45pm

If you watch the news, no matter the channel, electrification of the Fleet is the star of the show, and its co-star self-driving vehicles are on center stage. This keynote presentation will help you sort out the plot and realize what the true facts are so you can be ready to serve your customers and their vehicles. Electrification is coming, but at what pace and in what form? How do you prepare for the next five years and beyond? The answers may surprise you and enable you to prepare to succeed.

Thursday, February 2 - Car, Light Truck, EV Training



Mike Bailey, ^(EV)

the Auto Prof / EMW Environmental Motorworks
Thursday, February 2, 1:00-2:30pm This class repeats on Saturday, February 4

Electric Compressors, EV System Enhancements and Heat Pumps

EV and hybrid manufacturers are searching for every yard/meter of range they can squeeze out of their vehicles. In the race to get their newest offerings into the driveways of consumers, range is a major factor. HVAC can severely effect vehicle range, and engineers are doing everything possible to reduce the impact of this creature comfort/necessity.

We will explore electric compressor design, 3-phase motor operation, and electronic compressor control. Testing a HIGH VOLTAGE (HV) electric compressor requires PPE, specific equipment, and procedures; both will be discussed and safely demonstrated.

Heat pump system theory, design, components, and operation will be discussed and demonstrated in heating and cooling modes using temperature and pressure analysis. Thermal management systems which usually incorporate an electric compressor and heat pump, will be fully explained.

Thursday, February 2 - Business Management Training



Rick White, 180BIZ ^(BIZ)

Thursday, February 2, 1:00-2:30pm
How to Save a Problem Employee

This sounds completely crazy, right? Here's the truth: Forty-two million people quit their jobs voluntarily in 2021. Unemployment is at 3.6% as of June 2022. Economists consider this to be FULL employment. What does all this mean to you?

- Finding a job is easier now than it's been in years.
- Job openings are at a record high.
- This means more jobs available than people to fill them. It's a "buyers" market.

Automotive repair shops MUST adopt new strategies to keep the employees they have. This class will touch on the current conditions but will focus on turning lackluster problem employees into productive members of high-performing teams. DON'T MISS THIS ONE!



Mark French - Experian ^(BIZ)

Thursday, February 2, 3:30-4:00pm

North American Vehicle and Consumer Trends

A look at the latest population trends for light vehicles in North America. Presenters will provide insight on replacement rates for popular A/C products and talk about the changing trends in engine size, vehicle segments, electrification, and more. The session will also include Experian's ability to add demographic information to vehicles in operation and your ability to target specific vehicle owners for your products!



Mark Hazel, IHS Markit ^(BIZ)

Thursday, February 2, 4:00-4:30pm

Commercial Vehicle Overview: A Market in Motion

Learn about the current and future trends shaping the commercial vehicle market. This session will highlight major trends in commercial vehicle registrations as well as the aftermarket parts outlook for the air climate systems in commercial vehicles. Our automotive team S&P Global Mobility spans the entire automotive ecosystem from light-vehicle and heavy-duty OEs and suppliers.

Thursday, February 2 - Heavy-Duty, Off-Road Training Sponsored by **Danfoss**



John Wagner, Paladin Pathway ^(HD)

Thursday, February 2, 8:00-8:30am

Compliance Issues Impacting the Heavy Equipment Industry

Topics will include but not be limited to:

- PFAS (Long lasting Chemicals found in drinking water)
- TSCA (EPA Toxic Substances Control Act)
- California Prop 65
- Other regulatory issues

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Joe Long, Peak / Old World Industries (HD)

Thursday, February 2, 8:30-9:30am

Heavy Duty Coolants

This presentation will cover the following topics:

- OEM approved coolants
- Coolant colors
- Testing of coolants
- Coolant filtering
- Treating cooling systems



Frank Woodson, Gates (HD)

Thursday, February 2, 1:45-2:30pm

The Changing Serpentine Belt Drive World in HD Vehicles

Serpentine belt system diagnostics are important. How do we know if the belt, tensioner, or idlers are failing? What are the consequences to the accessories in the system if the belt, tensioner, and idlers are past their useful life span? Plus, where is technology taking us in the serpentine belt drive world? Learn the answers to these questions in this session.



Gerald Morris - Caterpillar (HD)

Thursday, February 2, 9:45-10:15am

Caterpillar Update for Off-Highway Equipment

Topics covered include:

- System design and field service updates
- Basic tools for troubleshooting
- Cat electronic technician (Cat ET) update
- Alternative refrigerant for off-highway machines - Update



Eric Weiss, Mobile Climate Control (HD)

Thursday, February 2, 2:45-3:30pm

IOT Diagnostics and Predictive Maintenance

The "Internet of Things" makes connectivity with A/C control units possible, and this technology is proving itself to be a powerful tool, providing engineering and service data not only for field trial units, but also for full scale production systems in all types of machines from skid steers to buses. Data can be pulled LIVE every minute or every 30-seconds, and in some cases, this connection can be maintained 24/7 with the vehicle. With this data, when the customer says they have a fault, you can go back and look at the data, find out when it occurred, and exactly what happened. This presentation explains the technology that not only helps diagnose systems that are currently experiencing issues, but also has the power to help prevent the machine from going down in the first place.



Paul Krug, (HD)

Komatsu/Jerry Lemon, Lemco Consulting

Thursday, February 2, 10:15-11:15am

Electric HVAC and No-Idle Control Integration: Examining the benefits of electrification

Jerry and Paul will lead a discussion on the merits of electrification, the impacts of that on mobile air conditioning (and related technology advancements), and what that means to the MACS group. They will discuss the monetization of this emerging technology, how to think about return on investment for upgrades and aftermarket opportunities, and the challenges this brings to the shop owner who might be considering entering this market.



John Finn, Daimler Trucks North America (HD)

Thursday, February 2, 3:30-4:15pm

New Strategies for the Trucking Industry

Technology is progressing at a rapid pace in every segment of business and trucking is no different! Is the Aftermarket transportation industry prepared to compete in the new global ever-changing environment? This session will address how the world, and more importantly trucking is adapting to the new challenges of fast paced technology and innovation. How the current model that has been in place for decades needs to shift and what DTNA and the trucking industry are doing to compete in this new environment. Combining digital tools, logistics, and a premium portfolio of products are what's winning in the today's digital world. Learn how DTNA is investing in this new strategy.



Aaron Clark, Danfoss (HD)

Thursday, February 2, 1:00-1:45pm

Selection of the Proper O-Ring for your MAC Application

O-rings play a key role in mobile air conditioning applications by sealing various surfaces to help contain any liquid or gas being conveyed. Factors that can disrupt this function can include chemical resistance, temperature capability, and multiple formulation specific properties. The objective of this presentation is to examine factors that influence the appropriate application and selection of O-rings for mobile air conditioning equipment and to establish useful selection criteria.



Welcome Reception: Wildhorse Saloon (NET)

Thursday, February 2, 6:30-8:00pm

Thursday evening, jump on the bus and cruise to downtown for the total Nashville experience with your industry friends! Enjoy food, drinks, and genuine country music performances at the Wildhorse Saloon. You can even join the line dances and show-off your country moves.

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Friday, February 3 - General Session

Friday, February 3, 8:00-9:45am

Chenise Farquharson - U.S. - EPA (Environmental Protection Agency)

Chenise Farquharson, coordinator of the Significant New Alternatives Policy (SNAP) Program, will update attendees on the Agency's current SNAP regulations and activities impacting the mobile air conditioning industry for light, medium and heavy-duty vehicles as well as off-road applications.



OEM, Tier 1, and Selected Guests Panel Discussion

SAE Interior Climate Control Chairman, Dwayne Taylor of Denso and Vice Chairman, Angelo Patti of Ford will join Chris Chesney of Repairify, MACS's own Steve Schaeber, and other special guests for a moderated panel discussion with a Q & A session.

Topics will include:

- The current state of the domestic and global A/C system market.
- The future of A/C systems and the role of SAE.
- The transition to EV's and the challenges of developing systems to meet the needs of these next generation vehicles.
- The regulatory landscape for adopting these new, EV specific, systems.
- The service opportunities and challenges for all sectors that are coming with the next generation of consumer motor vehicles.

Friday - MACS Section 609 Certification Classes

Agnes Pérez, Auto Air Parts of Puerto Rico

Friday, February 3, 1:00-3:00pm

SECCIÓN 609 en Español Sponsored by

Todos los técnicos que abren el circuito de refrigeración en el sistema de aire acondicionado de un automóvil deben estar certificados en los procesos de recogida y reciclaje del refrigerante para estar en acuerdo con la sección 609 del "Clean Air Act Amendments" del 1990. Este programa de entrenamiento y

certificación de MACS consiste en una presentación audiovisual aprobada por la EPA para el procedimiento del recogida y reciclaje del refrigerante, además del manual de entrenamiento y certificación de MACS seguido por 25 preguntas a libro cerrado. Esta certificación está actualizada para el R-1234yf. El examen es gratis.

Section 609 Certification Prep Class Test

Friday, February 3, 1:00-3:00pm

Complimentary Section 609 Tech Training & Certification!
Sponsored by

Here's the perfect opportunity for mobile A/C technicians to check out the leading suppliers to the mobile A/C industry at MACS Trade Show and then attend the U.S. EPA-required training and Section 609 certification - ALL IN ONE PLACE!

MACS Trade Show



"Grab a Bite" Sponsored by

Friday, February 3, 10:00am-4:00pm

Visit mobile A/C industry product experts and find out what's new in service and repair, parts, tools and equipment and chemicals. Enjoy a bite to eat and network with the best in the business.



Afterparty: A Toast to Myron Stein

Sponsored by

Friday, February 3, 4:00-5:00pm

Stop by after the MACS Trade Show to network with friends and colleagues and share a toast to Myron Stein, a legend in our industry. Aaron Becker, president of AirSept, invites all to stop in for a cocktail and a shared tribute to honor the company's founder, a former recipient of the MACS Career Achievement Award and the MACS Industry Pioneer Award.

Saturday - Car, Light Truck, EV Training



Gene Dianetti, (PC/LT)

Retired - Parker Hannifin Corp.

Saturday, February 4, 8:00-9:30am, This class will be repeated at 1:00-2:30pm

TXVs, Superheat, MOP and More!

Come to this class to learn everything you ever wanted to know about expansion valves - how they work, what superheat is, what does MOP stand for? Different styles and designs of TXVs will be discussed. You've always wondered - now, you'll know!



Paul Pelly, (EV)

Collaborative Partner - FutureTech Auto

Saturday, February 4, 8:00-9:30am, This class will be repeated at 1:00-2:30pm

Building an EV Training Program That's Best for Your Business and Service Team.

Selecting training courses that provide both value and practical application is as important as partnering with an experienced training supplier.

In this session, Paul Pelly, associate professor of automotive technologies, will share best practices in building your customized EV Training Pathway that will support the needs of your technicians, service writers and advisers, marketing, management, and other members of your service team.

Many training delivery and course options exist. These can be in the form of virtual, on-demand, adaptive learning, hands-on workshops, bootcamps, blended learning, and others. Electrified transportation technologies training

topics such as high voltage vehicle safety systems, 3-phase systems, trans and drive units, charging systems, diagnostic workshops, and more. This presentation will explore these options to assist you with selecting the best delivery method and course content for your organization.



Dr. Mark Quarto, FutureTech Auto (EV)

Saturday, February 4, 8:00-11:15am

A/C Compressor Diagnostics for Electrified Vehicle Systems (Workshop 1)

High Voltage (HV) electric A/C compressors in hybrid and electric vehicles have an extensive role in vehicle systems operation. The A/C compressor not only cools the vehicle cabin but, it can also be the primary component for cooling the electric vehicle battery pack.

Using live vehicles, this mini hands-on workshop is designed to cover A/C compressor specifications, high and low voltage circuits, 3-phase power Inverter operation, and HV electric compressor controls (which are significantly different than electric propulsion systems). Additionally, this session will cover how to utilize oscilloscopes, current clamps (AC and DC), current meters, scan tools, and compressor manufacturer information as resources to determine compressor state-of-health and identify various failure modes on live vehicles.



"G" Jerry Truglia, (PC/IT)

ATTS / Dorman Products

Saturday, February 4, 8:00-9:30am This class will be repeated at 1:00-2:30pm

Understanding and Diagnosing Air Conditioning

This class goes beyond minimum requirements for recovery, evacuating, recharging, and recycling by offering real world examples in diagnosing and repairing

A/C electrical, computer / BCMs, climate control and electronic components. Most of today's vehicles come equipped with electronically controlled A/C systems. Auto A/C systems have become more difficult to diagnose using the repair strategies learned from years of servicing R-12 and R-134a systems. This class will cover operation and service of today's and tomorrow's air conditioning systems including R-1234yf.



Agnes Pérez, (PC/IT)

Auto Air Parts of Puerto Rico

Saturday, February 4, Part I 8:00-9:30am & Part II 9:45-11:15am

Mejores practicas: Teoría, diagnósticos y procedimientos del sistema de aire acondicionado automotriz

Este curso describe los procedimientos de servicio y reparación de aires acondicionados relacionados a los

sistemas móviles. Los procedimientos descritos en este programa deberán ayudarte a garantizar un diagnóstico más preciso, realizar reparaciones de

alta calidad ayudando en la reducción de las reparaciones y logrando una mayor satisfacción con el cliente.

Los principales temas que se cubren el curso incluyen:

- Sistemas de aire acondicionado: qué hacen y cómo lo hacen
- Componentes del sistema de aire acondicionado: descripción y funcionamiento
- Refrigerantes y aceites del sistema de aire acondicionado
- Precauciones y prácticas esenciales de servicio del sistema de aire acondicionado



Jerry Mungle, ACDelco (EV)

Saturday, February 4, 9:45-11:15am This class is repeated at 2:45-4:15pm

Hybrid and Electric Vehicle Operation, Diagnosis, and Repair

This training seminar provides an overview of hybrid and electric vehicle designs, operation, and servicing. Diagnosing and servicing Hybrid Electric Vehicles (HEV) and Battery Electric Vehicles (BEV) requires an in-depth understanding of their design and operation. This course covers the operation of HEV and BEV propulsion systems, driveline configurations, high voltage batteries, drive motors / generators, and charging systems. The course also covers HEV and BEV servicing procedures including high voltage safety, high voltage disabling / enabling, loss of isolation diagnosis, and range related conditions.



Russ Hutton, (EV)

Collaborative Partner - FutureTech Auto

Saturday, February 4, 9:45-11:15am This class is repeated at 2:45-4:15pm

How to Prepare your Shop to be Profitable When Adding EV Service and Repair

Adding services that will support the over 8-million hybrid and electric VIO can significantly add to business profitability. Knowing which services is a helpful starting point to any shop or technician.

In this session, Russ Hutton will outline, and provide a step-by-step roadmap to the services that can easily be added and how to incorporate these services into your daily shop schedule sheet. Services such as pre-purchase inspections, hybrid "tune" up, high voltage (HV), HVAC service, state-of-health testing on high voltage (HV) systems (propulsion, battery pack, dc-dc converter, etc.), cooling systems, HV charging system, brake systems, and more will be highlighted to help you get started or add to your existing service menu.

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Dr. Mark Quarto, FutureTech Auto (EV)

Saturday, February 4, 1:00-4:15pm

What Can Be Inspected and Serviced on Electrified Vehicles Now (Workshop 2)

Hybrid and electric vehicles have been in the U.S. automotive market for close to 25 years. However, field testing and diagnostic techniques for confirming failed high voltage (HV) components or, determining component/systems state-of-health (SOH) have not progressed beyond the scan tool (DTCs) or limited off-board testing. High voltage systems are highly integrated and aging or failure of one system can significantly impact all other HV systems.

This hands-on session with live vehicles will concentrate on SOH testing (non-DTC testing or predictive/prognostic) for the core high voltage systems, including the air conditioning systems for LD, MD, and HD vehicles. These systems will include the battery pack, electric machines, power inverter, dc-dc converter, HVAC, and HV charging systems.



Steve Schaeber, MACS (PCAT)

Saturday, February 4, 1:00-2:30pm

Mobile A/C Best Practices

This course describes "Best Practices" service and repair methods pertaining to mobile A/C systems. The procedures outlined in this program should help assure more accurate diagnoses, high-quality long-lasting repairs, reduction of comebacks and increased

customer satisfaction.

Major topics in the course include:

- A/C systems: What they do and how they do it
- A/C system components: Description and operation
- Refrigerants and oils
- Essential service practices and precautions



Mike Bailey, the Auto Prof / EMW Environmental Motorworks (EV)

Saturday, February 4, 2:45-4:15pm

Electric Compressors, EV System Enhancements and Heat Pumps

EV and hybrid manufacturers are searching for every yard/meter of range they can squeeze out of their vehicles. In the race to get their newest offerings into the driveways of consumers, range is a major factor. HVAC can severely effect vehicle range, and engineers are doing everything possible to reduce the impact of this creature comfort and necessity.

We will explore electric compressor design, 3-phase motor operation, and electronic compressor control. Testing a HIGH VOLTAGE (HV) electric com-

pressor requires PPE, specific equipment, and procedures; both will be discussed and safely demonstrated.

Heat pump system theory, design, components, and operation will be discussed and demonstrated in heating and cooling modes using temperature and pressure analysis. Thermal management systems which usually incorporate an electric compressor and heat pump, will be fully explained.

Saturday - Heavy-Duty, Off-Road Vehicle Training

Sponsored by



Yevgeniy Beygel, Bergstrom (HD)

Saturday, February 4, 8:00-8:30am

Ventilation in high efficiency HVAC systems as related to cabin CO₂ levels

Evaluation of the effect of the reduced outside air flow rates on the ventilation of the vehicle and machine cabins. With the introduction of the high efficiency HVAC systems, the amount of the outside air flow is reduced to improve efficiency and lower required capacity and power consumption, which can cause poor air quality and increased CO₂ levels. We will discuss CO₂ level limits, ways to mitigate poor air quality in design and service.



Rachel Dill, Schrader Pacific (HD)

Saturday, February 4, 8:30-9:00am

A/C Service Ports: Small Product, Big Value

Every A/C system has service ports, but not all systems are created equal! Service port products come in a variety of sizes and types, and each combination works a little differently. This presentation will discuss product distinction, selection, application, and proper usage to achieve the best system performance and user satisfaction.



Matt Farel, INFICON (HD)

Saturday, February 4, 9:00-9:30am

Why it's Important Now to Improve Your A/C Skills

With the rising cost of refrigerant, improving your method of leak detection is now more important than ever before. If you're relying on your RRR machine to leak check, you could be missing large leaks that result in comebacks and rack up warranty costs. EV climate control systems can also be problematic if you aren't checking for leaks using an electronic leak detector. Join Matt Farel, sales manager for the automotive Aftermarket, as he dives into the misconception of "passing the leak test" with your currently required equipment, and how using an electronic leak detector can eliminate repeated customer repair visits.

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Saturday - Heavy-Duty, Off-Road Vehicle Training

Sponsored by



Kermit Walden, ^(BUS)

Trans/Air Manufacturing

Saturday, February 4, 9:45-10:15am

Proper Charging Procedures for School and Transit Buses

Charging a mobile A/C system with the correct amount of refrigerant is key for proper system operation. School and transit buses can pose special challenges for technicians.

Saturday Electric Panel Discussion Lunch



EV NET

February 4, 11:30am-12:45pm

Join us for lunch on Saturday for an electrified discussion on battery electric and hybrid vehicles. Topics will range from electric vehicle development and future architectures to service procedures and tools. Panelists will include some of your favorite instructors, including Mike Bailey, Jerry Mungle, Mark Quarto and "G" Truglia.



Sherwood Wheeler, AGCO Corporation ^(HD)

Saturday, February 4, 10:15-11:15am

AGCO equipment HVAC Service and Repair

The program will feature product updates on AGCO-built products including TSB information, product improvements, and more information on specific HVAC systems. The program will also include A/C system diagnostics and refrigerant capacity update for new models and approved revisions to previously published refrigerant capacity.



Jerry Lemon, Lemco Consulting ^(HD)

Saturday, February 4, 1:00-4:15pm

Heavy-duty Truck and Agricultural Machinery Mobile A/C Best Practices

Servicing heavy duty A/C systems has become more complicated in recent years as vehicle and equipment OEMs continue to build more modern and complex systems. Presented by MACS, the worldwide leader in

mobile A/C information and training, this clinic will help service technicians to better understand component design and integration, testing, and replacement, along with recommended best service practices to get the job done right the first time. The

following topics will be covered during the program:

- Mobile A/C system types, components, and operation
- Condensers, Evaporators, Compressors, Lines & Hoses
- Receiver/Driers & TXVs - Accumulators & OTs
- Control Devices: What they are and how they work
- Diagnosing, testing & servicing mobile A/C systems
- Refrigerant recovery & recycling
- Compressor diagnosis and replacement
- Proper oil balancing & accurate charging
- A/C system troubleshooting and performance testing
- Best Practices repair methods



REGISTRATION & HOTEL



MACS Host Hotel - Gaylord Opryland Resort - February 2-4, 2023

MACS has made every effort to secure the best group room rate for you at the 2023 Training Event and Trade Show at the Gaylord Opryland Resort. The MACS negotiated rate for a single/double occupancy room is \$217 plus tax and resort fee, per night.

For reservations, please go to the MACS 2023 Training Event page on our website www.macsmobileairclimate.org for the reservation link, or call (877) 351-5021.

Please remember to mention you are part of the MACS Training Event and Trade Show. Room reservations must be made by Monday, January 9, 2023, after which reservations and substitution request will be accepted only if hotel space is available.

Please remember to keep your confirmation number. Please advise the hotel regarding any disabilities or special requirements. Check-in time is 4:00 pm and check-out time is 11:00 am. In room Wi-Fi is complimentary as part of the daily resort fee. Overnight guests will receive a \$5 discount on self-parking.

NOTE: Beware of bogus hotel reservation companies: MACS and the Gaylord Opryland Resort are NOT affiliated with any third party for booking hotel rooms. Should you be contacted to book your hotel room through a third party, please know this is a scam. Please report any suspect activity to MACS.

Another thing to watch out for: Brokers offering the full MACS 2023 registration list available for purchase through their organization. Please be aware that MACS never sells conference registration and contact lists to any brokers or third-party entities.



Pick up your collectible
T-shirt at
TSI Supercool Booth



TRAINING EVENT & TRADE SHOW



Save \$\$\$ by pre-registering now!

Register: Email info@macsmobileairclimate.org; Call (215) 631-7020; Online www.macsmobileairclimate.org

ARE YOU A MACS MEMBER? (check one) ☐ Service/Installer ☐ Distributor ☐ Manufacturer/Supplier ☐ Educational/Training Facility ☐ Individual

Name _____ Company/Shop _____

Address _____

City _____ State/Province _____ Zip/Postal Code _____ Country _____

Email _____ Onsite cell number _____

Emergency contact _____ Emergency contact cell _____

Full Registration

Thursday, Feb. 2 - Saturday, Feb. 4, 2023

☐ Member \$435 ☐ Non-Member \$635

Includes:

- * All Training sessions from Thursday thru Saturday
- * Keynote Lunch
- * Welcoming Reception at the World Famous Wildhorse Saloon
- * Friday AM General Session
- * Trade Show Exhibits & "Grab-A-Bite" lunch
- * Complimentary EPA Section 609 Certification course & test
- * "A Toast to Myron" post Trade Show After Party
- * Saturday Electric Panel lunch

Annual Golf Tournament (optional)

Wednesday, Feb. 1, 2023

☐ \$130

TOTAL: _____

Prices above valid only until January 20, 2023

The health and safety of our attendees, exhibitors, guests, and staff are of utmost importance. By accepting your event registration, attendees, exhibitors, guests, and staff agree to abide by all local, state, and federal laws, regulations, declarations, and rules put in place for the benefit of your health and safety.

Any personal data (e.g., your name, company affiliation, address, phone number and email) provided to MACS is used to process your requested registration and for contact purposes. Information on persons registered to attend the forum are provided to the host hotel to ensure that each reservation related to the MACS event is acknowledged and counted by the host hotel. The list of convention attendees is also provided to exhibitors, who may want to follow up with attendees to offer information regarding their products or services. By submitting this registration form to MACS, you are consenting to usage of your personal data in the manners described above. View our privacy policy at www.macsmobileairclimate.org for what is personal data and about our use and storage of your personal data.

PHOTO RELEASE:

By submitting this registration to MACS, you give your permission to the Mobile Air Climate Systems Association (MACS) to use your company/staff image for MACS publications that do not endorse any specific commercial product.

Residents of any of the countries which are part of the EU, and the EEA will receive a separate form from our office concerning photo release and Personal Data.

Cancellation Policy: Cancellations must be received on or before January 20, 2023, to receive a refund. There is a \$50 cancellation fee. Cancellations after January 20, 2023, and "no-shows" will forfeit the full registration amount. Your badge and function tickets will be waiting for you on-site.

Signature _____ Date _____

☐ Enclosed is my check for \$ _____ NAME ON CARD _____ DATE _____

☐ Please charge to (check one) _____ / /

☐ Mastercard ☐ Visa ☐ Discover ☐ American Express CARD NO. _____ EXPIRATION _____ SECURITY CODE _____

Contributions or gifts to MACS are not deductible as charitable contributions for Federal Income Tax purposes. Dues payment may be deductible by members as an ordinary and necessary business expense. Pre-registration will save you money: Prices at the Training Event will be 10% higher than those above.