



hvac jess

finance to the field

Ask a Jerk!

HVAC/D?

the ABCs of HVAC

HVAC Moneyball

**Supply Chain
EXPLAINED**

**INSIDE
the HVAC/r
PODCAST
CIRCUIT**





Congratulations!!

Welcome to the summer 2024 episode of HVAC Tactical Magazine.

A voice of the people.

When we rolled out the very first issue of the magazine, we had a vision to bring the voice of the trenches and the movement to the mainstream. A magazine for the trenches, by the trenches.

Our goal is simple.

- Provide valuable, relevant content that our fellow tradesmen and tradeswomen in the trenches can appreciate.
- Build awareness of the movement happening on social media and highlight individuals making an impact in the HVACR community.

Content

If you or someone you know has great content that you'd like to see published in the magazine, feel free to reach out. We're always open to chat!

Email us at magazine@hvactactical.com

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Be sure to follow us on social media and get plugged into the community!

Thank you for your support and welcome to the movement!

Ben Poole • Founder • HVAC Tactical • "It's A Mindset"

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founder of Refrigeration Technologies

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Grow facilities are **big big** business, and they need to be dehumidified.

summer 2024

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Ben Poole
HVAC Tactical Founder

Ben Poole is an entrepreneur and 3rd Generation HVAC professional. He founded HVAC Tactical in 2018, the HVAC Tactical Awards in 2020 and the HVAC Tactical Magazine in 2023.

His goal is to simply elevate the industry, reignite the passion for the trade and motivate others to take on the personal responsibility of mastering their craft.



Giana Brucella
Editor-In-Chief

Giana Brucella is a passionate writer and editor, and has been in the marketing field for the last seven years.

Her keen eye for detail and organization skills help keep the HVAC Tactical magazine looking sharp, clean, and without typos.



Matthew Pryce
Managing Editor

Matthew Pryce is a published author, professional musician, innovative digital marketing maven, and rabbit & traditional husband.

His work has appeared in the Sports Illustrated, The National Review, the NY Daily News, various HVAC publications, and of course, the **HVAC Tactical** magazine.

He sits on the HARDI marketing council, and handles marketing/communications for Centrotherm Eco Systems, a plastics manufacturer located in New York.



10 QUESTIONS

with *John Pastorello*

Founder
Refrigeration Technologies

What's the best piece of advice you've ever received?

Always care. Care about your family and friends. Care about your employees and customers. Care about everyone you meet.

What inspired you to start your company? What's that journey been like?

I was a chemist who turned HVAC contractor/service technician, go figure. At the age of 37, my back told me it was time. I had a product idea. It was a product that I believed would solve a problem. I went all in. The journey was turbulent and I almost lost the house. After 15-20 years of plugging away and barely surviving, my company started to turn the corner. Thirty-five years later, I consider myself very fortunate.

Do you have a favorite memory related to the field?

I am still a service tech at heart. I have a lot of respect for everyone out there doing the work. When I watch a video of a guy out there servicing equipment, it triggers many great memories.

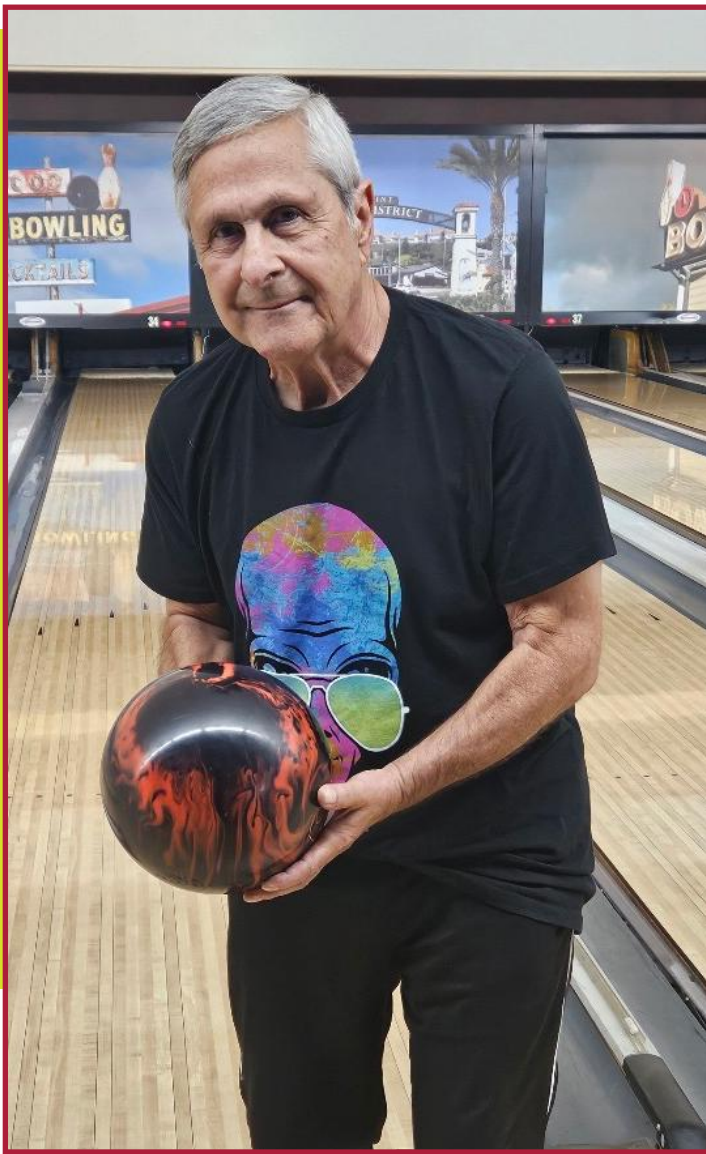
What did you want to be when you were a kid? How is it different from what you're doing now?

I wanted to be a Nuclear Physicist. I wanted to learn everything I could about the atom. When I got to college, physics was all about the math and not much to do about the atom. Chemistry was all about the atom and molecules. Eureka.

What qualities do you look for when adding new members to the team?

Someone who shares the same goals that we all have here. Someone willing to learn from the bottom, take responsibility and work up.





We reward all that they do. Never hire friends or relatives!

What's your favorite podcast? (hvac or not)

I still have a soft spot for the original *HVAC Shop Talk* with Zack and Ralph. I hope that they are reading this and get back together, big fan here. Outside HVAC I enjoy UFO podcasts: *Vetted* and *Lehto Files*.

What's the biggest lesson you've learned in owning a company?

Believe in yourself and believe in the people who are willing to work with you. Become family.

Who's someone you look up to? Why?

I really look up to anyone that dares to be original and not be the copycat. One could point to Willis Carrier. I look up to all the people in this trade that dedicate their lives to educating others.

What's one piece of advice you'd give to someone in the industry?

If you don't love it then don't do it.

What's your favorite thing to do outside of work?

Me and my wife Claire like to bowl in a league twice a week. It's a great outlet. Everyone needs to just blow it out once or twice a week. Golf does not count!



Ask A Jerk #2

Summer 2024

"Hey! Welcome back to "Ask A Jerk"! After our first piece in the previous edition of Ben's magazine, you surely realized that this column should be one of life's required readings, destined to be a pillar of societal evolution. While we agree, apparently there is a lot more work to be done and advice to be given to our devoted readers out there in HVAC-land. So, here's some more:



Q) Dear Jerky bastards,
I was working on a Carrier rooftop the other day, and there were two wires connected to what looked like a plastic donut around another wire. What was that, and is it something that I should be testing?
Chicago Bill, GO BULLS!!!

Dear Bully Bill (really?),
What you were looking at was a current sensing relay. They come in lots of different shapes and sizes, but the little round one you saw is pretty common. These little devices are basically just switches to either turn something on or off, start a sequence of events, or are sometimes used to protect a sensitive device until the provided voltage is within an acceptable range.

They come in a number of different voltage and amp ratings, but one you may see often is a 24v unit used to turn on a solenoid for a humidifier with the "ring" around a high voltage wire of a fan motor. When the fan motor is running and drawing, say, four amps, the relay will then allow voltage to the solenoid. Keep in mind that when testing the resistance of the 24v side, you should see a mega-ohms number on your meter, not "OL" when the 24v is disconnected. However, to test the current sensing relay, the 24v needs to be connected and you need to monitor the high voltage amp draw as well. By the way, is Big Mike still around? Tell him we said "Yo".

Q) Dear HVAC Jerks,
I've been running my own business now for about two years, and I'm trying to grow my company and just make more money. When I talk to anyone whose been doing this for a while and is more successful, or even some of the experts, they all talk about KPIs. "How are your KPIs", "What do your KPIs look like?" What the f%&@ is a KPI?!?!?
Goin' KPI fishin' in OK

Dear KPI fisherman,
KPI stands for Key Performance Indicators, which are used to measure where you are compared to your expectations. Now, there isn't a standard list of what these are, they can be anything that you want to measure, but most service companies need to keep track of the same basic things.





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So, your KPIs might include sales dollars for a month or quarter, gross profit % and/or \$, closing ratio for the techs, billable hours per tech, call-back ratio, cost per lead from advertising, additional sales on PMIs or cleanings, etc. and the same type of thing for your salespeople if you have any. KPIs are whatever performance metrics that are important to your business. Once you know your numbers, you can compare them to the industry standards to see where you need improvement.

Something basic like billable hours for a service tech is critically important. Young business owners are famous for basing their pricing on being able to bill eight hours a day for a technician. Well, when you get your KPIs in order and you realize that your techs are only billing for five and a half hours per day (if you're lucky!), then you will start to see why everyone else is making more than the owner is! There is no sense in being in business if you don't understand your numbers. Good luck!

Q) Dear HVAC Jerks,
I am a single dad, a service technician in the northeast and I don't really date that much. But recently I met this great girl at a friend's party. We hit it off right away, she's beautiful, smart, she works hard, she's into

sports as much as I am and she gets along great with my daughter. What more could I ask for! So, we've been seeing each other for about two months now, and I really think that she could be "the one." That is, until she saw something on Instagram the other day about some states pushing to ban natural gas and going all electric, and started telling me how we have to do that now and get rid of all fossil fuels, like, today!! How can I convince her that the grid's not ready for this, not to mention all the other problems that go with it?! She doesn't want to hear it! What can I do to save our relationship?

Short circuit love
Springfield, MA

Dear Shorty,
She sounds like a real catch, and a great potential wife! Unfortunately, the electrification thing is a definite game-changer. If a quick dose of shock treatment doesn't fix her, kick her to the curb; there's no hope. Sorry.

Those are all the nuggets of gold we have for this edition. Be sure to send your questions to theboys@thehvacjerks.com or magazine@hvactactical.com.

Peace!



hvac jess paves her own way **from finance** **to the field** ◆ ◆ ◆

By Dan Vastyan





Jess Bannister, or @HVACJess, LOVES her job. But if you follow her on Instagram or her YouTube channel, called The HVAC Diaries, you already know that.

What you may not know is that never in a million years did she guess she'd be in the mechanical business, or the skilled trades in general. Nope. She was an executive assistant in a finance office until her mid-30s.

"I'd been exposed to the HVAC trade my whole life," said Jess. "My dad founded his own refrigeration business in 2002, and my brother grew up working for him. But Dad never offered me a position or insinuated that it could be a career path for me. He didn't for the same reason I hadn't thought of it on my own. We'd never seen women in the trade, or at least not in the field."

Then everything changed. Five years ago,

Jess joined the family business, Cam Cool Refrigeration Inc., located in Coquitlam, British Columbia. She ran the office for nine months and took care of the finances. The bookwork was confusing because Jess didn't have a grasp on refrigeration jargon.

"Capacitor, conductor, condenser, they all sound so similar," said Jess. "Why does one cost 100 times more than the other?"

To learn the lingo, she started riding along with her dad, Neil. There was another factor that played into Jess' decision to venture into the field.

"My dad and brother always came back to the office with stories about the neat places they'd been, interesting people they'd met and the problems they solved," she explained. "That sounded exciting to me!"

Jess began spending more time in the van with her dad or brother, Trevor, and less time in the office. She was shocked by how much she liked the work. Using her mind, hands and tools to solve problems, meeting people

and doing tangible work proved to be super rewarding. Rewarding enough that Jess made the leap.

She's currently a level four apprentice. Canada's HVAC apprenticeship program requires 7,200 in the field. She admits that due to family illnesses and her commitment to handling the company's administrative work, it'll likely take her seven years to complete the four-year program. But that's OK.

The struggle is real, but good

Cam Cool Refrigeration focuses on commercial AC and light industrial refrigeration in the Vancouver, BC metro area. Jess spends a lot of time around big equipment, and she's not what anyone would call a person of large stature. She's found this to be one challenge she can't work around, but rather must work through.

"My physical size causes me some frustration," she said. "I'll struggle and use every ounce of my strength to replace a fan motor in a rooftop unit, for example. Meanwhile, my brother can just walk up and throw it in place."

There's no getting around the difference in physical strength, but I'm taking responsibility for it as best I can. I do a lot of strength training at the gym. Dad and Trevor are always eager to help. I remind them that sometimes I'd prefer to struggle through it. I learn that way and it's more rewarding."

Jess also notes that she doesn't have 15 years of mechanical background, so she's not as familiar with equipment as techs her age typically possess. The fear of heights, too, is often a barrier she must push through.

"I feel a lot of pride when I'm solo, and when I complete anything outside my comfort zone, whether that be overcoming a fear of heights or figuring out a difficult problem," she explained.

"I share so much on social media because I love what I do," Jess continued. "The difficulties are a big part of that, and I want others to understand that they can do it, too. They're capable of doing

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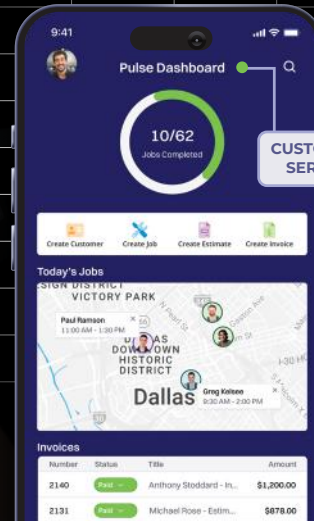
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things they currently believe are beyond their reach. I never shy away from showing the struggle. That's where the reward lies."

HVAC Advocacy

Jess's Instagram account and YouTube channel have seen a lot of growth since she started them a few short years ago. She began posting as much for herself as for anyone else. Eventually she realized the potential it had to help others learn and draw inspiration.

"I'm easily amused, and I wanted to document my journey," she said. "Hopefully other people find the content amusing as well. My work takes me to a lot of interesting places and it's fun to share."

Jess started her Instagram account as soon as she became an apprentice. Right now, she can't offer as much technical advice as other industry influencers, but she certainly has a unique perspective. She's a woman in a male-dominated workspace and this is her second career. Neil and Trevor, like most HVAC professionals, started directly out of high school.

"I really try to maintain a level of authenticity online," said Jess. "It's not all sunshine and rainbows. Show me a career that is! If you're trying to give a good representation of what you do, you need to show everything. At the end of the day, mechanical work is hard. It's awesome, but it's hard."

On the HVAC Diaries YouTube channel, Jess takes viewers through all the jobs she encounters over the course of a week. Viewers who are considering a career in refrigeration can see what's involved. Meanwhile, if people outside the industry happen to find the channel, it might make them think about the effort and struggle that really goes into the work. It adds a human element to the otherwise inanimate metal boxes on the roof.

"Lots of people have messaged me to say that I've inspired them or their daughters,"



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said Jess. "It's super rewarding."

An Awesome Community

Being a source of inspiration for others has been a driving factor for Jess on social media, but she's received lots of inspiration online herself.

"The community I've become a part of and the friends I've made on Instagram are fantastic," she explained. "You correspond with these people online for so long, then you meet them at events like AHR and CMPX. You put faces to names, take selfies, shake hands and give hugs. It's so fun!"

At the 2023 AHR Expo in Atlanta, Jess joined Aaron Bond @bond_aaron, Ben Poole @hvactactical, Chris Stephens @hvacrvideos, Eric Aune @mechanicalhub, Jamie Christensen @northwest_hvac, Jeff DeMassari @jeffjdemhvac, Michael Flynn @flynnstone1, Omar Harris @omartheplumber and Rachel Sylvain @hvacrara onstage for a social media panel to discuss how the online community is strengthening the trade.

In 2022, she joined a women's panel at the CMPX show to discuss opportunities for women in HVAC.

She's appeared in the trade magazines, too. Most recently, The ACHR News named Jess one of the top five newsmakers of the year.

An exciting time to be in the business

"We're living and working in a very exciting time in this industry," said Jess. "Think about all the new technology we're using: new refrigerant, new tools, new controls, new software.

Yes, it has a learning curve, but once that's overcome, our work becomes more efficient and so does the equipment. That's the goal."

Press fittings, Jess used as an example, have turned the tables in her role at Cam Cool. She's been learning from her father from day one, but now, she's introducing something new to him.

"I'm trying to get my dad onboard with press fittings, but he's old school, understandably," she said. "We'll get there!"

Of course, some of the old challenges remain, too. Jess says that if she could change one



thing about the HVAC/R industry, it would be communication among the people in various roles of system design, installation and service.

"I'd like all engineers and installers to work a year in service," said Jess. "Based on the way a piece of equipment was built or installed, servicing it can be all but impossible. Equipment lasts a long time when correctly serviced.

The fact that everything is getting smaller and space is at a premium means that designers



(Left to right): Ben Poole @hvactactical, Jamie Christensen @northwest_hvac, Aaron Bond @bond_aaron, Michael Flynn @flynn-stone1, Jeff DeMassari @jeffdemhvac, Jessica Bannister @hvacjess, Rachel Sylvain @hvacrara, Chris Stephens @hvacrvideos, Eric Aune @mechanicalhub, Omar Harris @omartheplumber.

and installers really need to think about the professionals that follow them.”

Looking Ahead

In the near future, Jess’ goal is to finish her apprenticeship while continuing on the influencer path. She has the energy and desire to spread the word about the trade.

“A trailblazer for women, that’s what I want to be,” she said. “I want to do more speeches and panels and spread awareness that there are rewarding careers waiting for girls in the HVAC/R industry. For example, on Saturday I’m going to a high school career fair to speak with girls and their parents. The parents are key, because sadly there’s still a stigma surrounding the skilled trades.”

Jess is quick to talk about what she’d like to do and a little more hesitant to acknowledge what she’s already accomplished. She used to be the president of Women in HVAC/R Canada, which is loosely affiliated with Women in HVAC/R in the US.

“We started the organization on March 8, 2021, on International Women’s Day,” she explained. “The industry has been very receptive and supportive. There are 11 board members and about 100 members. Despite our size, our fundraising has been successful, and all that money goes toward providing scholarships to young Canadian women looking to join the



industry.”

Today, Jess is a board member and the face of the organization. That’s because she’s the only board member “on the tools.” Other members are company owners, managers, work in finance, etc.

“At some point, I’d love to do some training!” said Jess. “At times I feel like my late start makes that a very difficult goal, and I’m certainly not ready for anything of the sort. That said, I think it’s important to have women in those leadership and teaching roles. Right now, getting my red seal ticket is priority number one.”



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greg crumpton



Most of you reading this are well steeped in HVAC and know the acronym stands for heating, ventilation and air conditioning. To recognize the refrigeration industry, we add the "R", thus making it HVAC/R. Now, with the ever-increasing discussion and actual work being done within the cannabis cultivation space, we add a "D" for dehumidification.

A big part of the growth cycle of the cannabis plant is deeply rooted in the ability of the plant to absorb and rid itself of water vapor. Any time we are dealing with controlling an increased level of relative humidity (RH), dehumidification becomes a very critical point in the overall conversation. One unique aspect in this scenario is that the bulk of the humidification of the plant stems by means of water delivery.

All of the usual components of the typical vapor compression cycle are required (compressor, condenser, metering device, and evaporator) for direct expansion (DX) climate control or a chilled

water coil can be used for the same result. It's vital to remove vast amounts of latent heat in the form of water vapor at the right time.

If you are new to the discipline of cannabis cultivation as it pertains to HVAC, as many of us are, there are a few basic principles to consider regarding the climate and the growing environment. Seed, then sprout, then vegetative to flowering – these are the rudimentary phases of a plant's life. In order for the cycle to be healthy and productive, a few needs must be met: soil, water, sun (light, natural or artificial) and nutrition.

So what role does our industry play? Our primary objective as an HVAC/D practitioner is to remove the water from the environment the plant has absorbed through its root system and control the ambient temperature.

The plant will readily emit this water, we just need to have the right ventilation and the cold coil surface to help the process along. Below, you will see the growing life cycle of a plant. Pay attention to the word "transpiration," which is defined as: to emit or give off waste matter, watery vapor, etc., through the surface, as of the body or of leaves (Source: Webster Dictionary).

Cannabis Life Cycle

First, we start with the seed. The seed lies dormant until it is exposed to warmth and moisture. Seeds are planted in a starter mix, covered with plastic and placed on a heat mat. Once the seeds have sprouted, two seedling leaves should appear. Seedlings should be placed under a grow light for 18 hours per day with two inches of space left between the light and the top of the plant.

This will get the process off and running. It's a delicate time during the plant's life cycle, as the seedlings are focusing their energy on growing roots and foliage. Because the roots are so small, proper care must be given to ensure they are not overfed or overwatered.



After a few weeks, the seedlings will really start to grow and demand more food and light. The roots and foliage are growing rapidly during this stage, thereby allowing the plant to take in more nutrients and carbon dioxide. Growth rates of two inches or more per day are not unusual in properly controlled environments.

At this vegetative stage, you will be able to identify whether you are growing an indica or sativa, the two dominant strains of cannabis cultivation. Indicas tend to be short and bushy, while sativas are lanky with less foliage. These strains can be traced back in history 8,000 years or so.

You will also be able to identify the sex of your plants. About four weeks into the vegetative cycle, pre-flowers start to appear. By six weeks, you should be able to determine whether those new buds are male or female. Most growers remove the males from the garden so they don't pollinate the females and cause seeds to form.

Last is the flowering stage. Now, the growing plants need varying levels and amounts of nitrogen, phosphorus and potassium. Silicon is also beneficial at this point because it helps to build strength in the stalk and stems, which is needed to support the buds

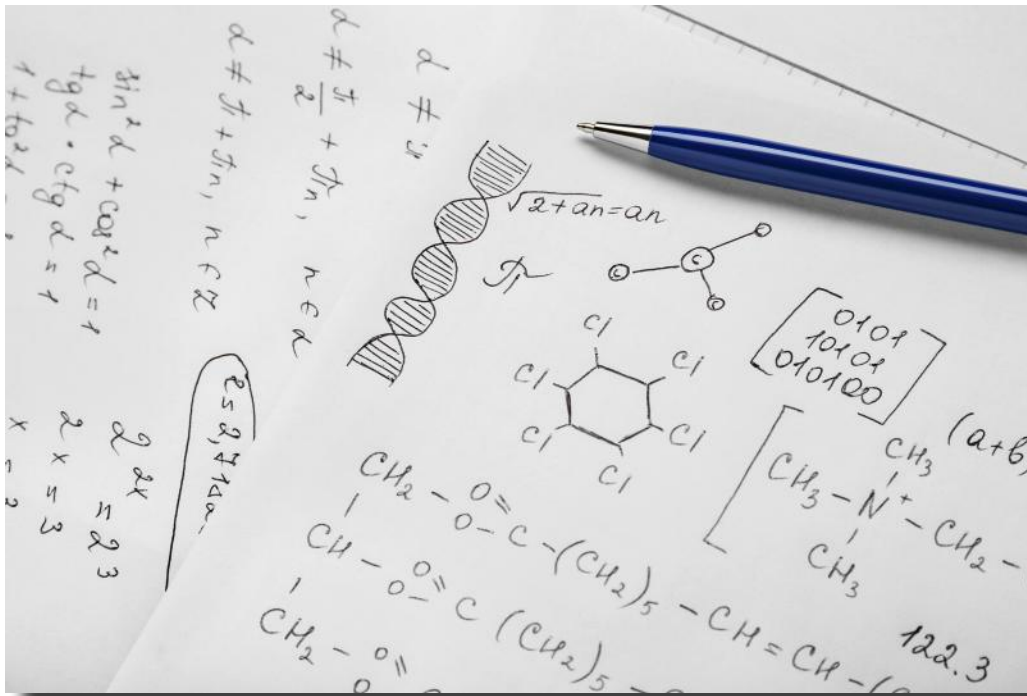
that will soon grow. Different variations of light are needed as well; autumn can be imitated in your garden when you alter artificial light to 12 hours on and 12 hours off. This triggers the cannabis plants to start blooming so they can procreate before they die at the end of the season.

The flowering stage lasts 6 to 10 weeks, depending upon the strain being grown. During this time, dense buds covered in resin will form on the plants. This resin is where the THC and terpenes are found, and growers are trying to get the maximum amount of these two substances as possible.

Following the growth cycle is harvesting, curing, trimming and packaging. Similarly, they each have specific and unique climate considerations.

There are many variables, opinions, techniques and styles to all of these cycle periods and lengths, as well as the chronological order in which the final steps must occur.

The constant is the environmental conditions that are required for each phase of life and process, making HVAC/D key in the success of the cannabis industry.



So now that we have a general idea of the life and growth cycles of the plants, here are some HVAC/D variations needed when it comes to operating different grow rooms.



temperature & humidity by grow room type

room	Temp. (F)	Relative Humidity
Mother Room	75°	60%
<i>Typically used as a genetic 'bank' to preserve cannabis varieties in the case of pest or pathogen contamination in the propagation, vegetative, or flowering rooms.</i>		
Propagation / Clone Room	80°	90%
<i>Typically comprised of cuttings taken from plants in the vegetative room that are in the process of sprouting roots of their own and becoming a genetically identical plant to the plant the cutting was taken from.</i>		
Vegetative Room	80°	70%
<i>Once the cuttings have established a healthy root system, they are moved to the vegetative room to grow to roughly ¾ of their eventual size prior to flowering</i>		
Flowering Room	70-80°	40-60%
<i>Fully established plants are moved from the vegetative room into the flowering room, where the photoperiod is reduced to 12 hours and the plants begin producing flowers – the part of the plant used in recreational and medicinal products. Lighting choices, the desire to fully express plant genetics with low temp/humidity, and budget all play important roles in this decision</i>		
Curing Room	65°	45%
<i>Once the cannabis flowers are fully mature, they are cut down and moved into a drying room. Special care is needed here to preserve terpenes – temperature and light are the most effective oxidizers for the essential chemicals that we are attempting to preserve during this process.</i>		
Trim Room	75°	50%
<i>Depending on the cultivator, trimming can take place before or after drying. The trim room is where fan leaves around and in between the cannabis flower are removed.</i>		
Packaging Room	75°	50%
<i>Packaging rooms are used to individually package dried cannabis flowers for distribution and retail.</i>		

IN THE T



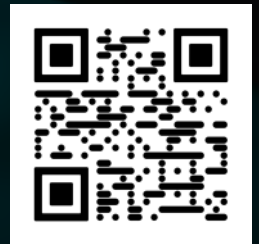
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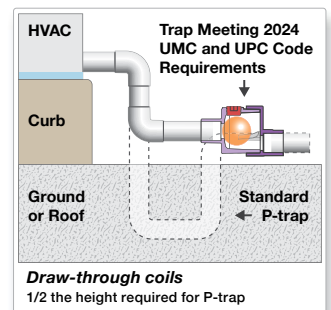
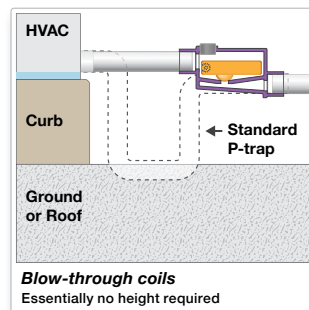
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I knew I was
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hvac moneyball - could it work?

tim de stasio



meet the conventional standards of baseball. He found a cheaper way to “pay” for those wins.

Surprisingly, it worked. The A’s got better and better using the Moneyball model. They broke records and won more games than many other teams with players who had 2-3 times their salary. The lesson to be learned can be summed up in a quote from Chapter 5:

“If you challenge the conventional wisdom, you will find ways to do things much better than they are currently done.”

If it worked in the business of winning baseball games, can it work in HVAC? I’m no mathematician, but I can say that our industry is plagued by an outdated set of traditions that science has long left in the dust, just like traditional baseball. I’d like to explore a few areas where I think it is possible to turn the old ways on their head.

Non-Invasive Testing

The conventional ways of determining cooling involved gauging up and checking superheat and subcooling. Most techs assume if superheat is 10-20 degrees and subcooling is 10-1, the system is performing at its peak.

With diagnosing cooling systems, there is a parallel to Billy Beane’s thought process. What is our end goal? To correctly arrive at a diagnosis or performance level. Is there a way to “pay less” for that information? Time is extremely valuable, so we need to arrive at our conclusions as efficiently as possible without causing other unintended consequences.

Non-invasive testing, like OBP, is one of those hidden gems that even residential and light commercial technicians can use to check system performance. It involves using temperature and humidity air probes, pipe temperature clamps to test a system and placing static pressure probes at the ducts. You’re not “paying a premium” for performance information by gauging up and possibly losing a few ounces of critical charge or cross contaminating a system.

One non-invasive metric is evaporator split, also known as temperature differential or design temperature difference. By subtracting suction line temperature from return temperature and comparing it to a design temperature difference benchmark, we can tell how accurately the unit is charged and even if it has an airflow problem. Then, we can even make a close prediction of what the pressures actually are.

Evaporator Split = Return Dry Bulb – Suction Line Temp

Normal evaporator splits in comfort cooling should fall

Winning takes strategy and the right information. The HVAC business is no different. But what information should we collect, or even pay for, to get better and win?

What if these widely accepted methods that we’ve used for years don’t tell the whole story? What if some of these traditions, while having a connection to the results we want, are not the actual path to these results?

This was explored in the book Moneyball by Michael Lewis, which later became a movie starring Brad Pitt. It recounts the 2002 season of the Oakland Athletics (A’s), a woefully poor baseball team led by their General Manager, Billy Beane. Beane must figure out a way to play winning baseball with a budget that’s a fraction of team’s like the New York Yankees, who year after year would scalp good players away from poor teams because they could afford to pay them more.

There had always been a widely accepted set of metrics to evaluate a baseball hitter’s worth, namely home runs and runs batted in. Scouts would even throw around other highly subjective attributes when speculating a young player’s potential, such as his jaw line or even how pretty his girlfriend was. But Beane was committed to a mathematical approach based on less appreciated statistics, like on-base percentage (OBP). His approach? Sabermetrics. More affectionately called “Moneyball.”

He realized that the end goal was to win games. He used statistics to determine how many runs his team needed to score to win those games. Then, he figured out how to get those runs with an aggregate of cheaper players that had been discarded by other teams because they didn’t

around 35°F no matter what the current heat load is. If the split is higher, you may be undercharged or have too much airflow. If it's lower, you may be overcharged or have an airflow problem.

On the condenser side, a similar test can be done to measure approach temperature. On air cooled condensers, it can be very useful in determining how efficient the condenser is at rejecting heat and even if a system is properly charged.

Approach Temperature = Liquid Line Temp – Outdoor Air Temp Entering Condenser

Approach temperatures are typically between 3-17 degrees. Comparing approach temperature with other temperatures can help pinpoint the problem without having to connect gauges.

Coupling non-invasive system testing with airflow testing gives a fuller picture of the system's delivered capacity. Total airflow is one of the most important measurements a tech should be able to take and has traditionally been one of the hardest to take accurately and efficiently. But new tools like the TrueFlow Grid from The Energy Conservatory now make that test a lot easier.

Moneyball leads you to believe that 2002 was the first year any team put this new method of playing baseball into practice. In reality, Billy Beane had followed this strategy 10 years prior and did not even invent it. Other statisticians had written books about it, and Beane was simply progressive enough to try it out since he had nothing to lose. Similarly, non-invasive testing is not new, but it's surprising how many technicians and companies forgo using it.

Power Factor

Conventional service procedures would call for every motor in a system to get an amperage check and for all capacitors to be unwired and bench tested during a maintenance visit. Some companies even perform resistance checks or use a megger on small motors. I'm not saying those tasks have no value, but what is our goal? It's to predict a future failure. Is there a more effective way so we don't pay a steep price in time or risk?

Most of the time, when a motor is over-amping, it's overheating. But amps don't tell the whole story. Just because a motor is not over-amping does not mean it is operating efficiently.

Checking winding resistance can be time consuming. The system has to be shut down, the motors unwired one by one, then checked and rewired. There is a lot of potential for miswiring it back. What is an appropriate winding resistance? 2 Ohms? 10 Ohms? It leaves a lot of room for error.

Bench testing capacitors has been a time-tested maintenance task. This too is time consuming, requires

the unit to be shut down, unwired and rewired back. Plus, bench testing doesn't detail how that capacitor works under load.

On the other hand, power quality multimeters are now very affordable. These meters can read power factor, which is another term for electrical efficiency of a motor. Normal power factor on PSC motors is 0.94 or higher. A technician can quickly detect a capacitor that is failing and even find an inefficient motor without ever shutting down or unwiring any equipment.

Power quality tests along with non-invasive testing and total airflow give you the system's running energy efficiency ratio (EER) and coefficient of performance (COP). These can help a technician make ethical replacement and upgrade sales that are backed by science and math.

Technician Role Players

Similar to baseball, the HVAC industry, especially the residential sector, has an abundance of key performance indicators (KPIs) that paint a very clear picture of a technician's actual contribution to the company's financial bottom line. If you're not using a field management software that gives you those insights, then you are literally flying with your eyes closed. Some of these KPIs are yearly revenue, revenue per call and revenue per hours worked. These metrics will reveal your high performing technicians—the Aaron Judges and Bryce Harpers of your company.

It's important for your business to have heavy hitters like that. Moneyball would have the casual viewer think that the 2002 Oakland A's were composed of nothing but undervalued players that didn't hit many home runs. But the book reveals that while Billy Beane did manage to assemble an "island of misfit toys," the team also had conventional talent like Miguel Tejada and Eric Chavez who hit a combined 68 home runs in 2002. Their ace pitcher, Barry Zito, led the league with 23 wins and also won the Cy Young award.

But there were unconventional role players too. The A's had a lead-off hitter in Jeremy Giambi. Traditionally, the leadoff hitter (who hits first in the batting order) is the fastest runner on the team so he can beat out ground balls for infield hits. Giambi was anything but that; he was thick around the waist and slow. But he got on base better than most players who were faster runners because he drew a lot of walks. Because of his plate discipline the results were the same.

Business owners would love to have an all-star team of technicians and installers. The reality is the HVAC industry is already facing a skilled labor shortage. We cannot continue to fill our rosters the old way—hiring from tech schools and community colleges that fail to prepare job-ready students and are taught with outdated methods that don't even include technology. Small contractors that

take a loss for years bringing up apprentices only to have them leave when they're finally profitable.

There are many skilled men and women in other sectors who already have the skills to use technology. They are already being recruited from electronics repair, IT, auto repair, communications, etc. to switch to the HVAC industry. Developing a repeatable process using software like measureQuick allows someone to specialize in maintenance with just a few weeks of targeted training for that role. Within a short time, that same maintenance technician can advance their skills and be able to perform further diagnostics and even new system commissioning.

There will always be a need for craftsman installers and master technicians. Forward-thinking employers recognize that asking an install crew to also perform a full system commissioning after a long day in a hot attic is simply not realistic. Decoupling installation from commissioning allows a team to play the position that suits them. It also allows you to make a new employee profitable quicker and give them a path to further advancement.

Choose the Game You Want to Compete In

The A's ended the regular 2002 season in first place and tied the Yankees with 103 wins, and also set a Major League record of 20 consecutive wins all with a third of the Yankees payroll. But the A's lost in the first round of the postseason, as did the Yankees.

So was Billy Beane really successful? Can we truly say that Moneyball worked if they didn't win the World Series? It depends on what you say the goal was. Of course, every Major League team wants to win the World Series, but to win 103 games out of 162 in the regular season says a lot more about a team than the small sample size of the postseason where anything can happen. Billy Beane studied the game, recognized what he could and could not do and played it his way.

It's tempting to want to build an empire. But there are other ways to succeed in our industry as a small

company too. Recognizing your pockets aren't as deep as the bigger players will prevent you from trying to compete with them in aspects like advertising. Focus on quality, customer service, technical excellence and profitability. Maybe your investment will pay off in a different way, like building small businesses that are sellable after a few years in different markets.

The success of the A's made believers out of other teams and Beane was hired by the Boston Red Sox for the 2003 season. He backed out so they hired 30-year-old Harvard graduate, Theo Epstein, as their GM. Epstein was a student of Sabermetrics. In 2004, the Red Sox won the World Series using Moneyball. Instead of buying expensive talent who demanded exorbitant compensation, their talent was homegrown and trained in their system that rewarded plate discipline, OBP and defensive ability.

The Moneyball mentality is to understand the game better than your opponent, choose the part to compete in and set realistic expectations. It's a strategy for the underdog who has the cards stacked against him, but allows him to stay competitive.

In the same way, you should find unconventional methods to arrive at a winning result; embrace new technology and data.

"If you challenge the conventional wisdom, you will find ways to do things much better than they are currently done."

Just like the 2004 Boston Red Sox, you might just peak at the right time and win it all.



Tim De Stasio

Tim De Stasio is an HVAC contractor in North Carolina. With over 25 years of experience in residential, commercial and industrial HVAC, he now specializes in residential design and home performance. He also is an educator and trainer and is willing to share his experience in the classroom and on many social media platforms as @timdestasiohvac .

He has worked as a brand ambassador and technical consultant for Haven IAQ, Retrotec, Santa Fe Dehumidifiers, measureQuick, The Energy Conservatory, Conduit Tech, the #betterHVAC movement and many others.

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“ whatever you do, work at it with all your heart, **as working for the lord, not for human masters** ”

Colossians 3:23



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Starting off in the field-side of HVAC can be intimidating – not only for the sheer amount of learning involved, but also overcoming feelings of isolation. Deciding to share their chaotic field adventures online, three rising stars, Ashley, Rachel, and Rachelle give the world an inside look of what’s behind the vents. More than just exposing newcomers to HVAC, they use their platforms to spur enthusiasm for the trade, acknowledging that it’s okay to get dirty and make mistakes – so long as there’s room to learn and laugh.

To gain a better perspective on their passion for HVAC and their work in the social media sphere, I listened to podcasts and also sat down with them to ask some questions of my own. I inquired of their path to HVAC, social media influencing, and what makes HVAC exciting but also uniquely challenging. As public figures and women in a male-dominated trade, I also asked for words of advice for thriving in unwelcoming spaces.

transitioned into her current role as a Commercial HVACR Maintenance Operator for a government contractor, one of her greatest accomplishments in HVAC thus far.

Replying to what makes HVAC fun, Ashley enjoys the ability to get her hands dirty, doing work on her own time, and – now that she’s on the commercial-side – experiencing all sizes of behind-the-scenes machinery. While Ashley does recommend HVAC to anyone looking for a new, more fulfilling career, she said it is not for everyone. “You have to understand that this trade is gross, tiring, and demanding.” Commenting on how the industry is constantly changing, she recommends having a fluid mindset and being open to changing your ways of doing things.

ASHLEY [@ashxkillz] ♦ Southern California commercial hvac/r maintenance operator

In her former life, Ashley was a project manager for an airplane dismantling company, which, as she shared in an interview with Adrian Garcia of Reliable HVACR, is how she rose to fame on social media, sharing videos about taking apart and smashing planes. “I thought the process was super cool, and I figured others might too,” she recalled. Ashley began her HVAC career already mechanically inclined, no college necessary, thanks to her father, a general contractor, who encouraged her to master all the basic construction skills.

Ashley appreciated how her past five-plus years of working for her father-in-law’s residential HVAC company has helped her troubleshoot and diagnose larger equipment in commercial settings as she

One thing, according to Ashley, which makes HVAC uniquely challenging is finding electrical shorts. Balancing fieldwork and posting interesting content is something Ashley makes look easy. She said she spends most of her spare time editing videos but does admit she’s often late to the trends. Never letting the comment section tear her down, she counsels, “as much as it sucks, I remember they did watch my video, so I’m making money and having it pushed out that much more. The negativity actually helps a lot.”

Ashley shared that her area is notorious for shying away from hiring people without experience and thus considers herself lucky. However, for anyone looking to get their foot in the door in HVAC, Ashley





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welcomes reaching out and running service calls with her.

One of Ashley's most viral videos on Instagram was a video originally intended to be about brazing techniques, but she ended up collaborating a blooper scene into a skit with other HVAC guys sarcastically demonstrating the worst advice for brazing.

RACHEL [@missminisplit] **San Diego, California**

owner

As "San Diego's favorite mini-split/VRF specialist," Rachel enjoys the flexible work schedule her persistent work ethic has afforded her and the ability to concentrate her skills in an emerging technology. In an interview on Commercial Kitchen Chronicles, hosts Pat Finley, Rich Ortega, and Jason Latimer asked Rachel about her inspiration for starting her own residential and light commercial HVAC business. College-educated in geology, after unsuccessful stints in waitressing and teaching pre-school, she wittily realized, "I was always a very difficult employee." But she was always handy, recalling times where she would borrow an ex-boyfriend's tools to fix things around the school.

She began as a refrigeration technician in 2016 and, after five years of working in residential and light commercial, received her contractor's license to start her own business specializing in new construction, luxury homes, and – her Instagram handle's namesake – mini-splits. She reflects on how the entrepreneurship opportunity gave her a new mindset of being fully liable for her jobs and motivated her to be a better technician.

Rachel credited several influential people in her life, including her first employer, Morrison HVAC, the retired Tom Davies of Sunspot Solar and San Diego Community College, and others on Instagram whose work she's very impressed by – including @flynnstone1, @jeffjdemhvac,



@rich.in.kitchens, and Pat Finley (@commercial_kitchen_chronicles). As a business owner, Rachel enjoys the freedom to choose her own schedule, be a mother, post sarcastic videos from the field, and educate herself on the latest developments in the industry.

On what makes HVAC fun, Rachel appreciates the diversity of skills one can gain with HVAC and that it's not the same thing every day. She contrasts this with the sober realization that HVAC requires grit to climb the ranks. One aspect Rachel shared that makes this trade uniquely challenging is hauling tools to the top of commercial buildings. Her advice to women interested in a career in HVAC is to "keep

your head low, learn as much as you can, and don't date HVAC guys." When asked how she deals with negative comments online, she said she responds, on par with her comedic personality type, with humor.

One of Rachel's most viral videos on Instagram was a picture of an install she did a long time ago, with the caption, "Walking up to my install from 10 years ago not knowing it's mine," edited with the meme of Vinny Gambini taking off his sunglasses, turning around and saying, "WTF is this POS?"

RACHELLE [[@hvac_install_her](#)] **Raliegh, NC** hvac installer



A college-educated social worker, specifically in healthcare and discharge planning, Rachelle's passion has always been helping people. Feeling burned out and disappointed with the straining COVID regulations, Rachelle decided to change careers to installer for a larger residential HVAC and plumbing company. She found one aspect that makes HVAC installation uniquely rewarding is the ability to set the pace of the day. However, a significant factor for disliking HVAC, Rachelle laments, is working in the rain. "I can tolerate hot and cold temperatures," she said, "but working with wet hands, clothing, and tools is especially miserable." In a recent interview on HVAC Uncensored, host Gil Cavey Jr. asked how she knew so much after only three years of experience, to which she credited her husband Ighor – whom she met through her father who owned an HVAC company – for being her role model, mentor, and someone who invested significant efforts honing her skills needed to be a detail-oriented installer.

She began posting on social media to show how fulfilling skilled trades can be for other women feeling unsatisfied by their office jobs or traditional work roles. Always one to "give 'em hell," Rachelle's advice for those interested in HVAC is that "for every nay-sayer, there will be ten other people rooting for you – find

your people and keep your eye on your own unique 'why.'" She affirms that HVAC is for anyone with drive, professionalism, and a healthy amount of grit.

When asked about obstacles, Rachelle responded that one of the greatest barriers she faced didn't come from other people or organizations; rather, "it was the high and unrealistic expectations I held for myself." She recounts in the beginning feeling embarrassed not knowing everything and not able to answer every question.

Rachelle's approach towards balancing fieldwork and posting interesting content is to not overthink it – "I just try and share my life in a way that is honest, relatable, and would inspire others to either join the trade or keep pushing through the difficulties." Rachelle said her way of dealing with negativity online is heavy sarcasm and witty come backs.

One of Rachelle's most viral posts was an 8-second video demonstrating how to slide heavy tools such as oxy-acetylene torches and equipment across a crawlspace using a two-inch PVC pipe. In the background, a voice says, "you will never be criticized by someone who is doing more than you – you will only be criticized by someone doing less."

About the Author:

Liana Schwalenberg

Lianna Schwalenberg is an HVAC Service Technician at the K Company in Akron, OH. She specializes in residential service and commercial maintenance. With a B.A. in Communications from the University of Wisconsin – Madison.


She's an avid writer and spends the majority of her free time reading books.

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Humility.

Being humble. These are words and phrases we can often hear in our trade, especially from those in our wonderful online community. What does humility mean though, and what does being genuinely humble look like?

Merriam Webster online defines humility as "freedom from pride or arrogance : the quality or state of being humble," and "humble" is defined in multiple ways:

1. not proud or haughty : not arrogant or assertive,
2. reflecting, expressing, or offered in a spirit of deference or submission, a humble apology,
3. A) ranking low in a hierarchy or scale, insignificant, unpretentious
B) not costly or luxurious

humility.

Now, one could go down all sorts of rabbit holes defining all the words used within each definition.

Suffice to say, humility, to put it in our terms, is not being an asshole. Yet again, though, what does that realistically look like? How do we demonstrate humility?

I'll use myself as an example, at least when it comes to posting content on social media, specifically IG, as it's the only platform I actively participate in. For me, I try to post items that are educational or might be useful to the HVAC community overall.

Some things are basic, others more advanced, especially with now working in a strictly commercial



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and industrial setting, but I try to demonstrate ideas and concepts that some may hear, but not grasp immediately because it's abstract. Push/pull recovery is one such concept, for example, that I made a small video on so others could visually see how it works.

Interacting with others is another instance to practice humility. Most, if not all, of you reading this already demonstrate this aspect.

A humble person asks questions, not sarcastically or with an air of arrogance, but from a place of wanting to know more or from a place of genuine curiosity. At times, humility dictates we say nothing, which can be difficult, especially with the many trolls and naysayers out there.

Outside of social media, humility is a virtue that shapes us personally. It requires patience and discretion to know when and how to speak or act.

Truthfully, it is not an easy or simple virtue to master. Our impulses want us to be recognized and awarded: we want to be "the" guy, we want the followers, the viral content, the likes, but is it truly fulfilling?

In our jobs, we want the boss to see and recognize the hard work we put out daily, we want to brag about the problem that was puzzling everyone else, but you solved.

Again, there's nothing inherently wrong with these desires, but what is the motivation behind it? What's the "why" behind our actions and words?

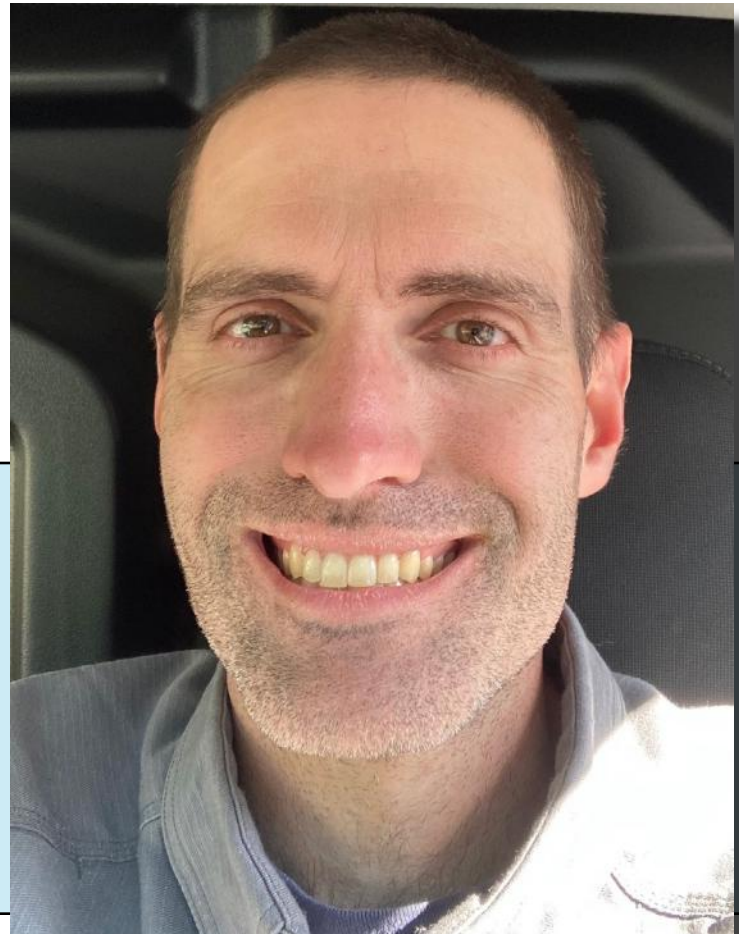
Matt Showers

Matthew Showers is a commercial service tech for an equipment manufacturer and host of the Trade Therapy podcast, which highlights mental health stories of tradespeople

Follow him on IG: @hvac_grammarian

For me, as a Catholic Christian, there is a prayer, called the Litany of Humility, that specifically focuses on this. Any time I ponder the words of it, there are always a few lines that are like a punch to the gut. Essentially, it is a prayer asking that others may receive the praise and the recognition we may want, and to not fear being disliked, unnoticed, not praised, etc.

It's a hard look at ourselves, especially in this world with social media and "influencers", along with all the other things that are vying for our attention. Ultimately, humility keeps us grounded and keeps our attention focused on the most important things of life, like family, friends, and those in our "real" lives.



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strength in supply chain partnerships

how manufacturers & their partners should support mechanical contractors

michael sokaris

The success of any business, including HVAC contractors, heavily relies on efficient distribution strategies and strong partnerships. When it comes to mechanical contractors, the importance of a robust distribution strategy is even more pronounced. Here, we will be exploring the significance of an HVAC manufacturer having a well-structured distribution strategy in order to best support mechanical contractors.

By ensuring timely delivery, strong technical support, comprehensive product availability and strong partnerships (value chain), an effective distribution strategy can foster mutually beneficial relationships, enhance productivity and contribute to the overall success of all participants in the value chain.

One of the fundamental pillars of a successful distribution strategy is ensuring the timely delivery of HVAC equipment and supplies to mechanical contractors. Mechanical contractors operate within strict project schedules and deadlines, where any delay can disrupt the entire construction process.

A manufacturer with a reliable distribution strategy can make certain that mechanical contractors receive their orders promptly, minimizing project delays and maximizing end user satisfaction. Timely delivery not only enhances the contractor's ability to meet project milestones but also improves their reputation for delivering projects on time, ultimately attracting more clients and driving future business.

A good distribution strategy includes providing comprehensive technical support to mechanical contractors.

HVAC systems are complex, and contractors often require expert guidance regarding product selection, system sizing, pricing, installation and troubleshooting. By offering extensive support, manufacturers can assist distributors and contractors in making informed decisions, ensuring that the right equipment is chosen for each project. Timely access to technical

resources and knowledgeable support staff allows mechanical contractors to overcome challenges more efficiently, resulting in better project outcomes and reduced downtime. Moreover, ongoing technical training programs organized by manufacturers can empower contractors to stay updated with the latest industry advancements, codes, standards and installation techniques to further enhance the end results.

A well-designed distribution strategy ensures that mechanical contractors have access to a comprehensive range of HVAC products and components. Every project has unique requirements, and contractors rely on their partners to provide a wide selection of equipment options. Having a diverse inventory readily available enables contractors to meet the varying needs of their clients effectively.

It also eliminates the need for contractors to source products from multiple suppliers, simplifying procurement processes and reducing administrative burdens, while simultaneously reducing the cost of the installed project. Additionally, partner commitment to consistently stocking and replenishing inventory reflects their dedication to support the contractor's business needs and foster long-term relationships.

Many (but not all) manufacturers utilize sales reps/agents to better support HVAC contractors. Manufacturers reps possess extensive industry knowledge and expertise, allowing them to understand the specific needs and challenges faced by contractors. This enables them to effectively communicate the benefits of a contractor's products or services to potential customers, addressing their pain points and positioning the contractor as a valuable solution provider. Sales agents also provide a cost-effective solution for contractors, represent several complementary brands and often package products together to provide full solutions.

The last and most important link in the value chain is the wholesaler. Distributors serve as a one-stop shop for mechanical contractors, as they source a wide range of products from multiple manufacturers. This makes it convenient for contractors to find the specific items they need for their projects. Distributors typically maintain large inventories of products, ensuring that contractors

can quickly access needed materials without having to wait for manufacturers to produce or ship them. Having a reliable distributor with a well-stocked inventory helps contractors meet project timelines and avoid delays. Wholesalers often have a team of knowledgeable staff who can provide technical support and guidance to mechanical contractors.

They can assist with product selection, offer recommendations based on project requirements and help troubleshoot any issues that may arise during installation or operation. Distributors handle the logistics of getting products from manufacturers to contractors efficiently. They have established distribution networks and delivery systems to ensure timely and reliable delivery of materials to project sites. Lastly, distributors often provide after-sales support services such as warranty assistance, product returns or exchanges and repair services.

This support can be valuable for mechanical contractors who need ongoing assistance or face issues with the products they have purchased.

A well designed value chain strategy holds immense importance for an HVAC manufacturer aiming to support the success of mechanical contractors. Timely delivery, technical support, comprehensive product availability, and strong partnerships all contribute to the seamless execution of projects, customer satisfaction, and long-term business growth.

By recognizing the specific needs and challenges faced by mechanical contractors, manufacturers should design distribution strategies that not only meet those needs but also create a competitive advantage for all their partners in the marketplace.

Ultimately, a mutually beneficial relationship between an HVAC manufacturer, manufacturer's reps, distributors, and mechanical contractors leads to a win-win-win-win situation, benefiting all parties and enhancing the overall efficiency and effectiveness of the HVAC industry as a whole.

How is the support from your primary manufacturers regarding your requirements and business expansion?

If they are performing well, inform them about it. If they are not meeting your needs, communicate your concerns and hold them accountable to improve.

If they step up and improve, excellent! If not, assess your needs and consider switching to partners that meet your requirements.

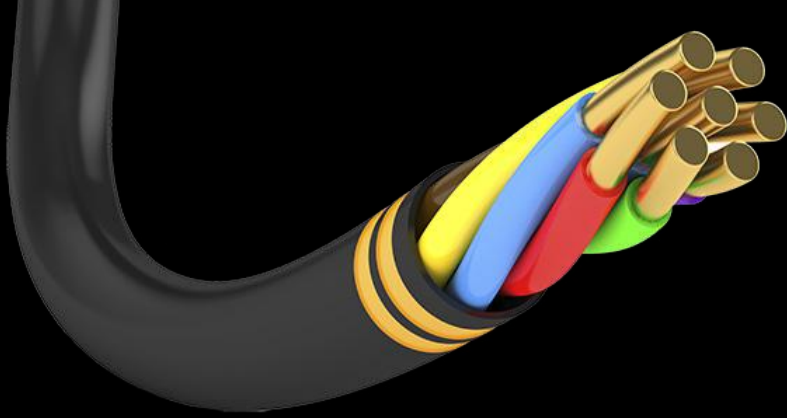


AUTHOR BIO

Michael Sokaris serves as the Director of Sales & Marketing - North America for Centrotherm Eco Systems. Michael and his team support the needs of HVAC, Plumbing, and Hydronic Engineers, Manufacturers Reps, Mechanical Contractors, Plumbing Contractors, Original Equipment Manufacturers and Wholesale Distributors across North America. Michael also sits on the HARDI Residential Committee and the AIM/R Supplier Advisory Committee.

wiring extenders

ken wiklund



As an HVAC tech, being able to problem solve quickly and efficiently matters. You can quote jobs more accurately, schedule appropriately and provide quality service to customers. Each job comes with some guesswork, and the more tools you have in your proverbial toolkit, the more you'll be able to pivot and find the best solution.

That's where an HVAC wiring extender comes in. The wiring extender is typically a two-part kit that includes a sender and a receiver, and is helpful with upgrading HVAC equipment without installing new cables. By easily adding a common wire, you can get the job done more efficiently. This makes even more of an impact in tighter spaces like apartments, condos or busy commercial buildings.

An installation example where a wiring extender is used would be converting an air conditioner to a heat pump. On the AC unit, you may only have two conductors on a low voltage cable going outside. With a wiring extender, you can get a full heat pump multi-stage system running off of just two wires. Wiring extenders can also be used between an indoor unit and an outdoor unit.

Another example would be putting in a thermostat that doesn't have a common wire. When adding functions between a thermostat and indoor unit, the sender is connected to the existing thermostat cable and the new thermostat. The receiver is connected to the other end of the existing cable and the indoor unit. The sender and receiver communicate over the existing cable, providing a reliable hard-wired (not wireless) connection.

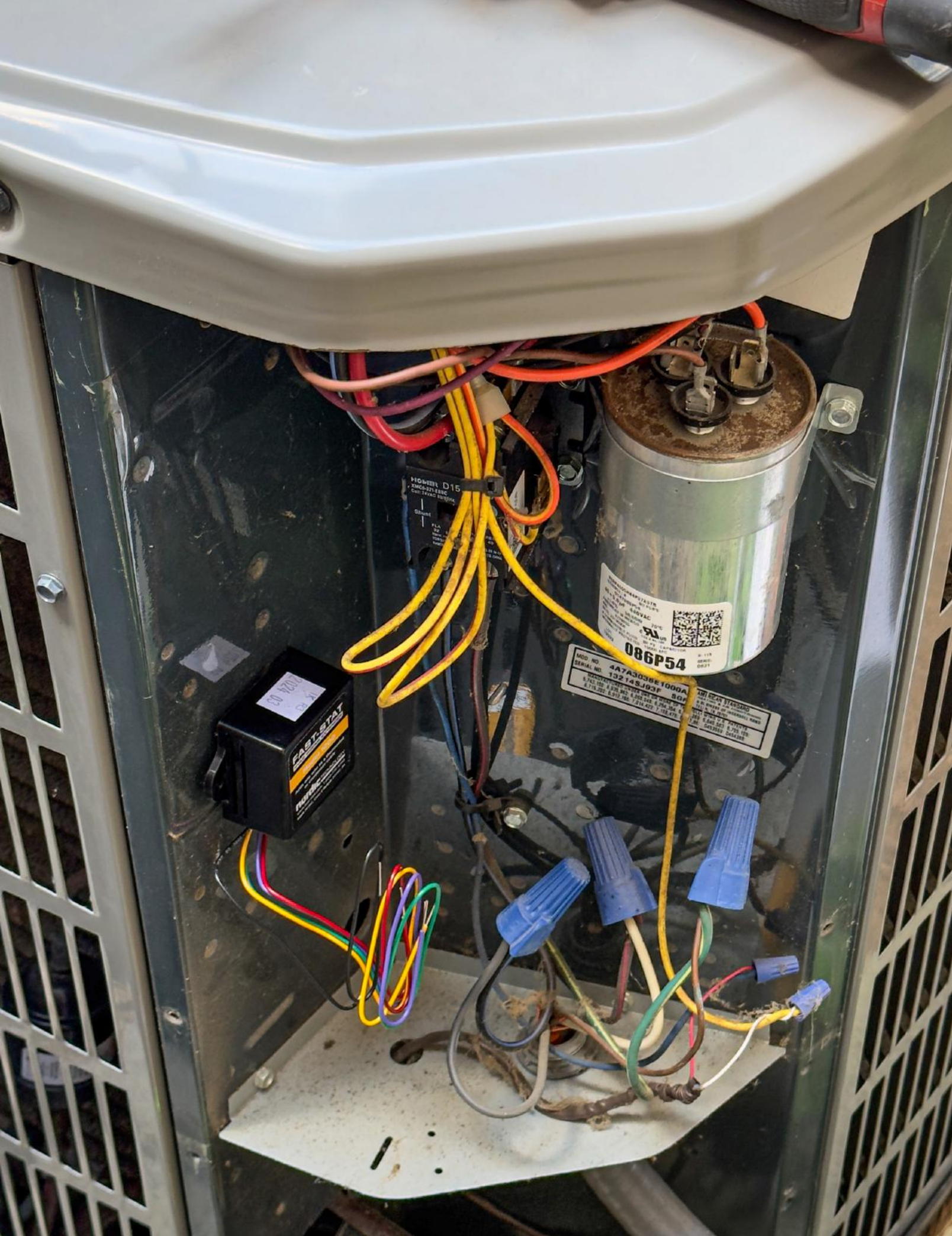
There is no limit to the number of wiring extenders that can be used in the same building as the units do not affect other wiring extenders or other electronic devices. Wiring extenders don't require batteries or any maintenance once installed.

There are various wiring extenders on the market that are compatible with major thermostat brands like Nest and Ecobee. Check out your local supply house to learn about more different wiring tools!

ken wiklund

Ken Wiklund began his career as an electrician, working alongside HVAC technicians. Today he leads Nordic Technology, and continues to be committed to finding new solutions to everyday problems.

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time is money.

*Pure mathematics is, in its way,
the poetry of logical ideas.*

– Albert Einstein
German theoretical physicist.



If you've been reading my column for the last few episodes, then you'd know that I enjoy starting off my cheeky and insightful plumbing & hvac/r articles with a quote from someone outside of the industry.

This edition is no exception.

Though Einstein could have probably figured out how to do some basic plumbing stuff, that's not for what he's best known.

He was a noted physicist, quantum mechanist, humanitarian, scholar and mathematician, among other things.

You don't have to hold degrees in any of these fields to run a successful contracting firm, but you must know your numbers.

Let's throw out a few phrases and terms: margin, total installed cost, labor savings, return on investment, tax deductions, gross vs. net, operating expenses – these are just a few things that you should be regularly evaluating in your own business.

Do you know the margin on the products you install? Have you run calculations on time savings vs cost of goods (COG)?

There are so many teensy equations that could make all the difference in your profitability. Tying it back to the initial quote – basic math could influence logical ideas and create positive outcomes. For example, Product X costs a little bit more than Product Y, but Product X requires about half the time to install.

Thus, you can do twice the amount of work using the more expensive product than had you chosen materials by the price alone. This is the type of mathematical consideration that should be on a near constant loop of reevaluation.

Return on investment is another easy example to see. If you're spending too much time handling administrative and clerical tasks – so much that it is compromising the ability to contract and complete new business, perhaps it's time to grow the company with a new hire.

Where do you need the most help? If it's bookkeeping, perhaps an accountant is the right fit. Do you need help with administrative tasks like scheduling, human resources or even marketing?

Adding staff is an upfront cost, but finding the right person and plugging the right hole in the company could lead to a significant return on that investment.

It's all in the numbers, and it's imperative that time is deemed an important metric in all these equations.

We've all heard the phrase time is money – but this famous idiom, originally attributed to Ben Franklin (you know, the \$100 bill guy), doesn't fully capture the importance of time.



Time is the only commodity that you can't replenish.

Other resources can be replaced, but wasted time is just lost forever.

Therefore, time is one of the most important factors in all decisions.

Maybe there is a prospective job that requires two hours driving each way. Don't necessarily reject this opportunity outright but perhaps factor it into the estimate. Another opportunity could be down the street but there is a strange or limited window of available work time to complete the job.

Factor it in.

Do you need special permits or equipment for a specific job? Obviously, this must be considered when figuring out a price, and I am sure you're already doing this. But are you really delving, analyzing and using the data to influence decisions?

There is no doubt that all this bean counting is tedious. The dividends, however, that a sharp analysis will deliver, could be immediate.

Shall we conclude with two more colorful metaphors?

Time waits for no man.

Start thinking about these little mathematical equations today. All that will happen is that you'll start making little decisions that put more money in your pocket.

There's no doubt that a ton of you are already working at least some of these things out, but for those who aren't:

better late than never.



Matthew Pryce

Marketing & Communications Manager for Centrotherm Eco Systems in New York. Matthew is a frequent contributor to various HVAC publications and one of the editors of this one!

What other little spare time he's got is spent traveling with his wife Gabrielle and mastering new and exotic instruments.

@matthewfuntime



hvac school: molding a generation

Jennifer Manzo

@hvacchicksjennifer

Misfits of HVAC Podcast



INSIDE the HVAC/R PODCAST CIRCUIT

The Beginning:

For most of us, our journey into the trades is one laden with confusion, fear, and imposter syndrome. I remember fumbling through my first few weeks, beaten and broken as the job humbled me. So, you can imagine the hope that surged when in desperation I stumbled upon the wealth of knowledge and community that is HVAC School.

The podcast really drew me in, mainly because it's not just technical. There is such a wide array of different people and topics ranging anywhere from interviews to advanced airflow. Sponsored by some of the biggest brands in our industry, there's no shortage of information to be gained from listening.

In 2016, HVAC School founder Bryan Orr was already well known in the online HVAC space. Providing free training, consultation, and advice to thousands of technicians across

the globe; as well as owning and operating Kalos, the HVACR business he started with his dad in 1999 at just 17 years old! The father of 10 had a love for radio and if you've ever heard his voice over a speaker, you understand why. So many people were already benefiting from his appearances on other podcasts that it was a no brainer to start his own gig.

Episode one (of a whopping 710) blew up online garnering praise and excitement from not only technicians but manufacturers, company owners and everyone in between. This firestorm of listeners was the beginning of what we know today as the number one HVAC/R podcast in the country, and possibly the world.

Be Our Guest:

Being a guest on the *HVAC School Podcast* feels a lot like catching up with an old friend. Bryan's old soul shines as he asks questions that are far from generic with the sense

that he truly and personally wants to know the answers. I've been featured on several podcasts in my career and right away I knew this would be a different experience. The conversation would ebb and flow as Bryan added anecdotes, and tribulations from a life well lived.

Revelations he'd had that mirrored my own, and his genuine thoughts on my passion for helping others left me feeling so much hope for this industry we love. The most beautiful thing about the guests on this show is that although they are all in the HVAC business in some capacity, their individuality is the star of the show making each episode so different from the last and keeping listeners engaged week after week.

Furthering Education With HVAC School:

The podcast is also a great way to further your education. Whether you choose to listen on the road or at home the podcast is available on all podcast platforms. There are many different educational episodes to help you become the best technician you can be. A few of my favorites are :

- The Chemistry of Combustion with Rachel Kaiser
- The Humility of Thought Leadership
- Wiring Refrigerated Cases with Nathan and Phil
- Becoming a Complete Tech

I encourage all of our readers to look into what HVAC School has to offer. As a complete trade we have an astonishing number of technicians who



HVAC SCHOOL

FOR TECHS BY TECHS

are furthering their education and honing their skills in their own time to better themselves and their careers. HVAC School is one of the few free resources to help you do just that.

On top of the online training, podcast, tech tips blog and more, each year Kalos Services hosts a massive training event, The HVAC School Symposium. A place where people from all walks of their HVAC career can come together in learning, and fellowship to "recharge" and recover from burnout before the next busy season.

The symposium features 2-3 days worth of panels, live trainings, live podcasting, social gatherings and valuable workshops giving attendees all the educational tools they need to work better, faster and smarter in the year to come.

To learn more about HVAC School, listen to the podcast, buy tickets to the Symposium or just explore what's available, visit HVACRSchool.com

Want to help out at or even work at HVAC School? Visit the "Jobs" tab on the website to find open positions, and even apply!



HVAC School
For Techs by Techs

Eduardo Felix Diaz

37 ♦ miami FL

years in the trade

18 years

favorite brands

wiha ♦ fluke ♦ navac

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“

the only thing I know is nothing –

and I'm quite sure I know that”

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SMACKDOWN

digital manifolds vs. wireless probes

By Tony Gonzalez

To truly appreciate the measurement and diagnostic technology we have in our industry today, we should look at how it has evolved over the years. For many decades, analog refrigerant manifold gauges were on top - designed for the HVACR equipment of their time. Older equipment had much looser tolerances, refrigerant charge and airflow requirements. But as equipment advances in technology, so should the test tools we use to properly commission and/or diagnose performance. The good news is that what we need to measure as far as pressures and temperatures go hasn't changed all that much. What has changed are the tolerances and specifications required to properly set up modern HVACR equipment for a long life of efficiency and comfort.

To properly set up an HVACR system, we need to verify three factors: airflow, refrigerant charge and electrical. Airflow is measured by verifying that the delta T across the evaporator coil and the total external static pressure are within equipment specifications. Once the airflow is confirmed, the next step is to check the refrigerant charge by calculating superheat and subcooling. Lastly, all electrical wiring and components must be verified as correct and operating within equipment specifications. With antiquated test tool technology, an HVACR technician would have to make a choice: spend the extra time taking all these measurements serially OR take only the measurements required to get the system to blow cold "enough" air. Unfortunately, many technicians have had to choose the latter due to time constraints or lack of proper tools.

In the past, system pressures were measured with analog gauges and a hose set, and temperatures were measured with a Type K thermocouple with a velcro strap. System pressures were read



from gauge needles and saturation temperatures were analyzed on a P-T chart. Finally, paper and pen were used to do some math with the system and saturation temperatures to get to the superheat and subcooling values. These methods weren't super reliable. Using analog gauges and a thermocouple and velcro strap had inherent inaccuracies; superheat and subcooling could easily be 4-6 degrees off using older technology. But, the measuring process became more simple and faster when digital refrigerant manifold gauges were introduced to the industry about 20 years ago.

What are the benefits of using a digital tool over an analog tool?

Higher accuracy, better resolution and automatic math calculation. System pressures are measured with digital gauges and hose sets, temperatures are measured with specially designed temperature pipe clamps, refrigerant type can be selected on the digital manifold, and saturation temperatures and superheat and subcooling calculations are displayed instantly. Done, easy! Not only does digital technology speed up the process, but it greatly reduces inaccuracies from the tools being used and math mistakes by the tech.

In addition to the refrigerant charge side, digital technology brought us the same benefits for airflow when measuring delta T and static pressures.

While time saving is great, digital technology alone did not allow the technician to check the airflow at the same time. An HVACR system is dynamic and the airflow and the refrigerant charge are interrelated; one affects the other. To test system performance more accurately, both airflow and refrigerant charge need to be measured at the same time. I think you know where we're going with this... wireless technology.

Fieldpiece introduced wireless testing technology over 15 years ago, which has since advanced to reaching up to 1000 ft. wireless connection from the tools. This allows simultaneous measurement of the airflow at the indoor unit and the refrigerant charge at the outdoor unit. Taking these measurements at the same time not only speeds up the process, but provides a more accurate look into overall system performance.

Now, moving on to our current set of wireless test tools, there are two different options to measure system pressures and temperatures. Again, let's stay on the refrigerant side. One of the most common questions I'm asked is whether to use a digital manifold or wireless test probes. At the end of the day there is no right or wrong answer, just personal preference. In fact, there are even benefits of using both of them together. Let's look at the

SMAN® Digital Manifold and the Job Link® System probes as an example.

Both the SMAN and the Job Link probes measure system pressures and temperatures. The SMAN screen displays both saturation temperatures and superheat/subcooling, while the Job Link app displays the same information on a mobile device. Both tools work with the Job Link app to generate commissioning reports and to monitor airflow, refrigerant charge and electrical measurements at the same time. Also, a temperature compensated nitrogen system pressure test can be performed to check for leaks with both the SMAN and the Job Link probes.

The SMAN and Job Link probes differ when it comes to hoses. The SMAN requires a refrigerant hose, whereas the Job Link probes do not. The latter connects directly to the service ports or to a valve core removal tool to measure system pressures. This is a pretty big deal for critically charged systems. Using a refrigerant hose negatively impacts refrigerant charge - when disconnected the refrigerant trapped in the hoses is taken from the system. While performing a refrigerant recovery or a system evacuation,



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Accuracy

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using wireless probes creates better flow than a manifold. During recovery or evacuation, a manifold acts as a restriction to the flow and increases the number of potential leak points in the setup. To achieve the fastest recovery and evacuation times, it's wise to remove a manifold from the setup. A set of wireless probes are more compact and lighter than a digital manifold with hoses connected, making them easier to carry to and from the job site. However, digital manifolds have the benefit of displaying measurements on its own screen without having to use a mobile device. So, if you are in hotter climates this may cause overheating of the mobile device or drain the battery very quickly. Using a digital manifold avoids those issues.

In summary, there are key benefits of using Job Link probes instead of a digital manifold. Chief among them are not having to use refrigerant hoses and

reducing the number of flow restrictions and leak point connections. However, if you prefer not to use your mobile device, then using a digital manifold would be the better choice. At the end of the day, both options provide superior measurement accuracy, calculations and system performance diagnostics by incorporating both digital and wireless technology that monitor airflow, refrigerant charge and electrical parameters at the same time.

So digital manifolds or wireless probes? To that I say, why not both? They are complementary technologies that can increase customer satisfaction and maximize company revenue. As I said earlier, there is no right or wrong here.

When it comes to your profession, select the tools that help do the job easier, faster and better.



Tony Gonzalez

Tony Gonzalez has over 20 years of HVAC experience with Fieldpiece Instruments, and has been leading Fieldpiece training since 2020. Tony presents courses nationally at conferences, partners with leading industry organizations and is recognized everywhere for his how-to videos. Tony is committed to sharing the best practices that make HVACR technician's job easier, faster and better





financial instability isn't a skill problem.

it's a motivation problem"



Nicola Rosetti

33 • atlanta GA

years in the trade

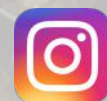
15 years

favorite brands

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chiropractic care: the cool solution for hvac workers

Dr. Jimmy

dr. jimmy allgood

doctor and friend to hvac tactical

Working in the HVAC industry isn't a breeze. From crawling into tight spaces and lifting heavy equipment, to managing the extreme Texas heat, technicians face physical challenges that can take a toll on their bodies. Fortunately, chiropractic care offers a cool solution to keep them in top shape.

Back in Action

HVAC workers often find themselves in contorted positions, like human pretzels trying to reach that elusive duct. It's no wonder their backs can get hurt! Fortunately, chiropractic adjustments can help realign the spine, alleviating back pain and improving flexibility. With a well-adjusted back, techs can twist and turn without feeling like they're starring in the nightmare version of Cirque du Soleil.

Shoulder the Load

While lugging around heavy tools and parts is in the job description, it can cause shoulder pain. Chiropractic care can help by addressing misalignments and muscle imbalances, making those shoulders as reliable as a top-of-the-line HVAC system. Techs can say goodbye to carrying that extra weight on their shoulders!

Wristy Business

All that twisting, turning and wrenching can lead to wrist and hand pain, particularly conditions like carpal tunnel syndrome. Techs need their hands in top form to handle the intricate work of installations and repairs. Chiropractic adjustments and ergonomic advice can help keep those wrists in working order; satisfied



ALLGOOD
CHIROPRACTIC

Neck of the Woods

Let's face it, staring up at ceiling units all day is a literal pain in the neck. The strain from constantly looking up can lead to neck pain and tension headaches, turning techs into grumpy weathervanes. Chiropractors can help by adjusting the cervical spine and offering exercises to strengthen neck muscles. Techs can look up, down and all around without feeling the need to ice their neck every night.

customers can get high fives and handshakes without techs wincing in pain.

Hip Hip Hooray

Whether it's crouching low or stretching high, the demands of the HVAC job can wreak havoc on the hips. Misaligned hips can lead to discomfort and affect overall balance. Chiropractors can help realign the hips and offer stretches to keep you moving smoothly,

making sure the hips are as reliable as the tools!

Cool Tips for Hot Pros

Chiropractic care isn't just about adjustments. It also includes advice on posture, lifting techniques and ergonomic tools that can make a huge difference. With the right guidance, techs can learn how to use their bodies more efficiently, reducing the risk of injury and keeping them cool.

Cracking Up with Chiropractic

Chiropractic care for techs isn't just beneficial; it can also be a fun and refreshing experience. Techs can imagine getting an adjustment and leaving the office feeling like they've just been upgraded from an old, rattling unit to the latest model with all the bells and whistles. Plus, there's something oddly satisfying about feeling the spine move, signifying everything

is back in place and the body is running in for optimal performance – like the sweet sound of an HVAC system kicking in on a hot day and running great, not just good. Good isn't good enough!

The Chill Factor

In conclusion, chiropractic care is an amazing solution for HVAC workers dealing with the physical demands of their job. By addressing pain, improving mobility and offering practical advice, chiropractors can help HVAC pros stay in peak condition.

So, the next time YOUR back feels like it's been through a heatwave, or your neck is as stiff as a frozen pipe, remember that chiropractic care can keep you in cool, working order, ready to tackle whatever the job throws your way.



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In 2018, an idea was brought to life.

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An idea that the brand itself would stand for something more than just a cool looking shirt or hat.

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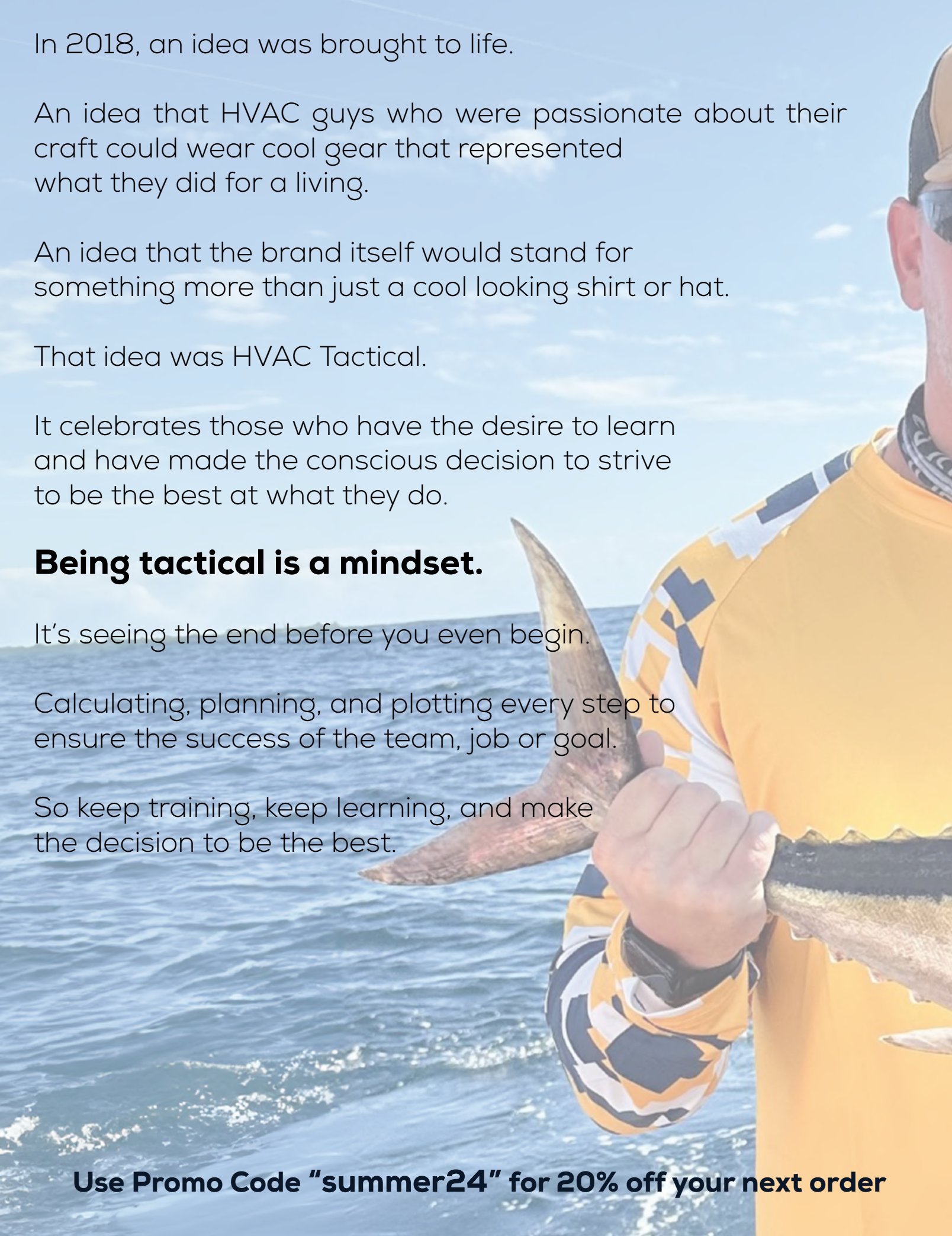
Being tactical is a mindset.

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