



Heat Pump Commissioning

What can current products do to verify proper operation

9:00 – 10:30 AM

January 26th, 2026



Outline

- Welcome to NEEA Product Council
- Introduction to Connected Commissioning
- Product Presentations and Discussion (25 min each)
 - **Measure Quick**
 - **Dakin Comfort**
 - **Trane Technologies**



Commissioning Definition

A systematic process that ensures all operational components of system function as intended. It involves testing, inspection, and documentation to verify that a facility, system, or component complies with design intent, client requirements, and relevant codes and standards.



The HVAC Problem

- HVAC systems are complex and can vary significantly depending on such things as : Local climate, system sizing, distribution design, control strategy, technology employed, etc. etc
- HVAC Installing technicians view design and testing of systems as underpaid activities and therefore are likely to cut corners or rely on default settings and rules of thumb rather than system specific design and diagnostics.
- HVAC Diagnostic tools are by themselves insufficient to verify proper system operation, the installing technician needs to apply system specific information, especially with variable speed systems to properly verify system operation.



Major market providers of third-party smart diagnostic compatible measurement tools

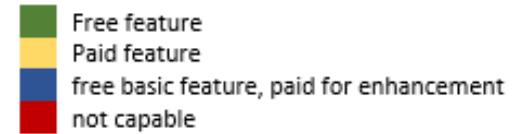
Fault Detection	Smart diagnostic compatible measurement tools	Company										
		Field Piece	Testo	Yellow Jacket	UEI	CPS	JB	iManifold	Navac	Parker Sporlan	Supco-Redfish	TEC
Airflow	Airflow Sensors	X	X	X	X	X	X	X				X
	Hygrometer/Psychrometer	X	X	X	X		X	X	X			
	Temperature Sensors	X	X	X	X	X	X	X	X	X		
Refrigerant Flow	Pressure Gauges	X	X	X	X	X	X	X	X	X		X
	Manifold	X	X	X		X	X	X	X			
	Refrigerant Line Temp Probes	X	X	X	X		X	X	X	X		
	Refrigerant Scale	X		X	X	X						
	Vacuum (micron) Gague	X	X	X		X	X		X			
Electrical	Multimeter	X	X		X						X	
	Clamp Meter	X	X	X	X	X				X	X	
	Data Logger	X	X		X	X		X				

Slide courtesy of Slipstream
jmargolies@slipstreaminc.org



Third-Party Diagnostic Mobile Applications

(Adapted from PNNL, continually updating)



Features	Diagnostic Mobile Application												
	CPS Link	Fieldpiece JobLink	iManifold App	JB Go	MeasureQuick	MyNavac	RefTech	SMART Pro/R Service Tool	Supco TechLink	Testo Smart App	Uei Hub	YJACK View App	TEC TrueFlow App
Low/High Airflow													
Low/High Refrigerant Charge													Red
Calculates Performance													Green
Report Generation			Blue	Red	Blue					Blue			
Export Capabilities						Red							
Brand Neutral	Red	Red	Red			Red							Red
Real-Time Data	Green	Green	Green			Green				Green	Green	Green	Green
Repair Suggestions	Red	Green	Yellow	Red	Blue	Red	Yellow	Yellow	Green	Blue	Yellow	Red	Yellow
Data Logging Capabilities	Green	Yellow	Yellow	Red	Blue	Red	Red	Red	Green	Red	Red	Green	Red
Geolocation	Green	Yellow	Green		Green	Green			Green	Green	Green	Green	Red
Team Connectivity	Red	Yellow	Yellow	Red	Yellow					Yellow	Red	Green	
Invoicing Features	Red	Yellow	Yellow	Red	Red								Red
Photo Logging	Green	Yellow	Green		Green	Green		Green	Green	Green	Green	Green	Red
Built-in Support	Red	Yellow	Yellow	Red	Yellow	Green	Yellow	Red	Green	Yellow	Red	Yellow	
Guided work flow	Red	Yellow	Green	Red	Yellow	Red	Red	Red	Green	Red	Green	Green	Green

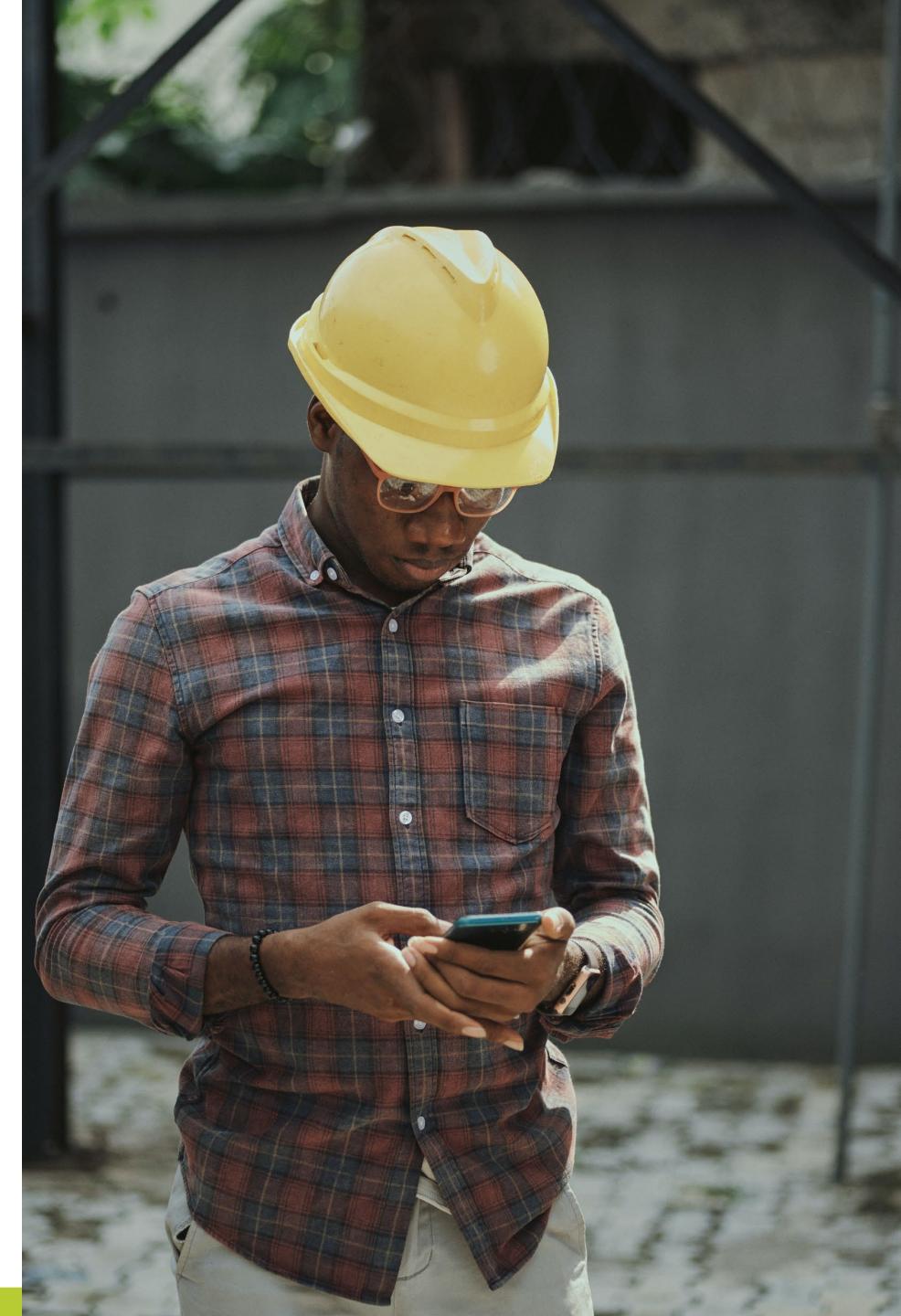
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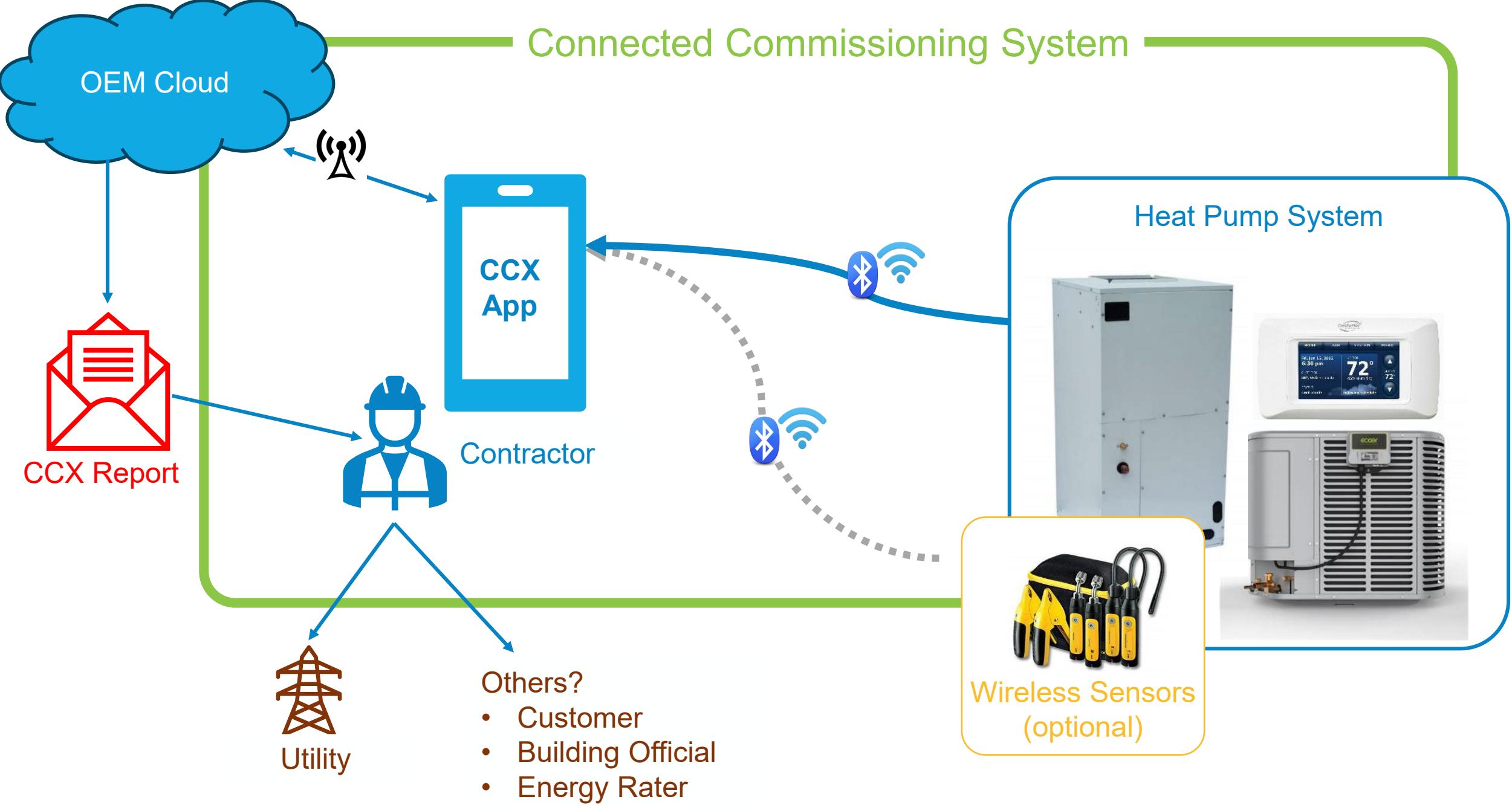
Desired Outcome / Vision

Contractors rely on embedded sensors, diagnostic tools and smart phones as part of their installation and commissioning process

Properly commissioned heat pumps generate additional energy savings, longevity and customer satisfaction



Connected Commissioning System





CCX Report

- Pass/Fail/Warning
 - Protocol established
 - Suitable conditions
 - Charge adequacy
 - Airflow adequacy
 - OEM Warnings
- File Formats
 - XML for utilities, Raters, etc.
 - PDF or equal for customers

CCX Commissioning Report	Pass, Fail
System Information	
Location of Installation	GPS Coordinates
CCX Commissioning Date	Month / Day / Year
AHRI Certification #	Of Matched Pair
Indoor Unit	Make and Model
Outdoor Unit	Make and Model
Thermostat Model	Make and Model
Efficiency Ratings	HSPF2: SEER2: EER2: 5F Capacity Ratio:
CCX Protocol Established	True or False
Suitable Conditions	True or False
Outdoor Temperature	°F
Indoor Temperature	°F
Refrigerant Charge Adequacy	True or False
Liquid Line Temperature	°F
Degrees of Subcooling	°F
Target Subcooling	°F
Airflow Adequacy	True or False
Fan Power	W
Airflow	CFM
External Static Pressure	OK or Energy Warning or OEM Warning
External Static Pressure	in wc
Controller Information	
Auxiliary Heat Lockout	N/A or Off or °F
Compressor Lockout	N/A or Off or °F
Setback Recovery Mode	N/A or Off or On
WiFi Connection	Connected or Not Connected
AHRI 1380 Capable	True or False



CCX Project Timeline

- 2025
 - Complete V1.0 of specification (EOY)
- 2026
 - Demo/Case Studies of current onboard CX systems (Q1-4)
 - NREL certification lab testing complete (Q3?)
 - NEEA Contractor Market Research (Q2)
 - PNNL round robin testing (Q4?)
 - V1.1 of specification update (EOY)
- 2027
 - NEEA Stands up Qualified Product List (Q1)
 - OEMs submit attestation of which hardware meets CCX specification
 - NEEA and Partners pursue program inclusion of CCX
- 2028
 - Field Experience & Impact Research – tbd details



Product Presentations and Discussion

- **Measure Quick**

Jim Bergman President

Manifold Cloud Services measureQuick

- **Dakin Comfort**

Lee Smith Vice President

Strategic Marketing & Environmental Technology Solutions

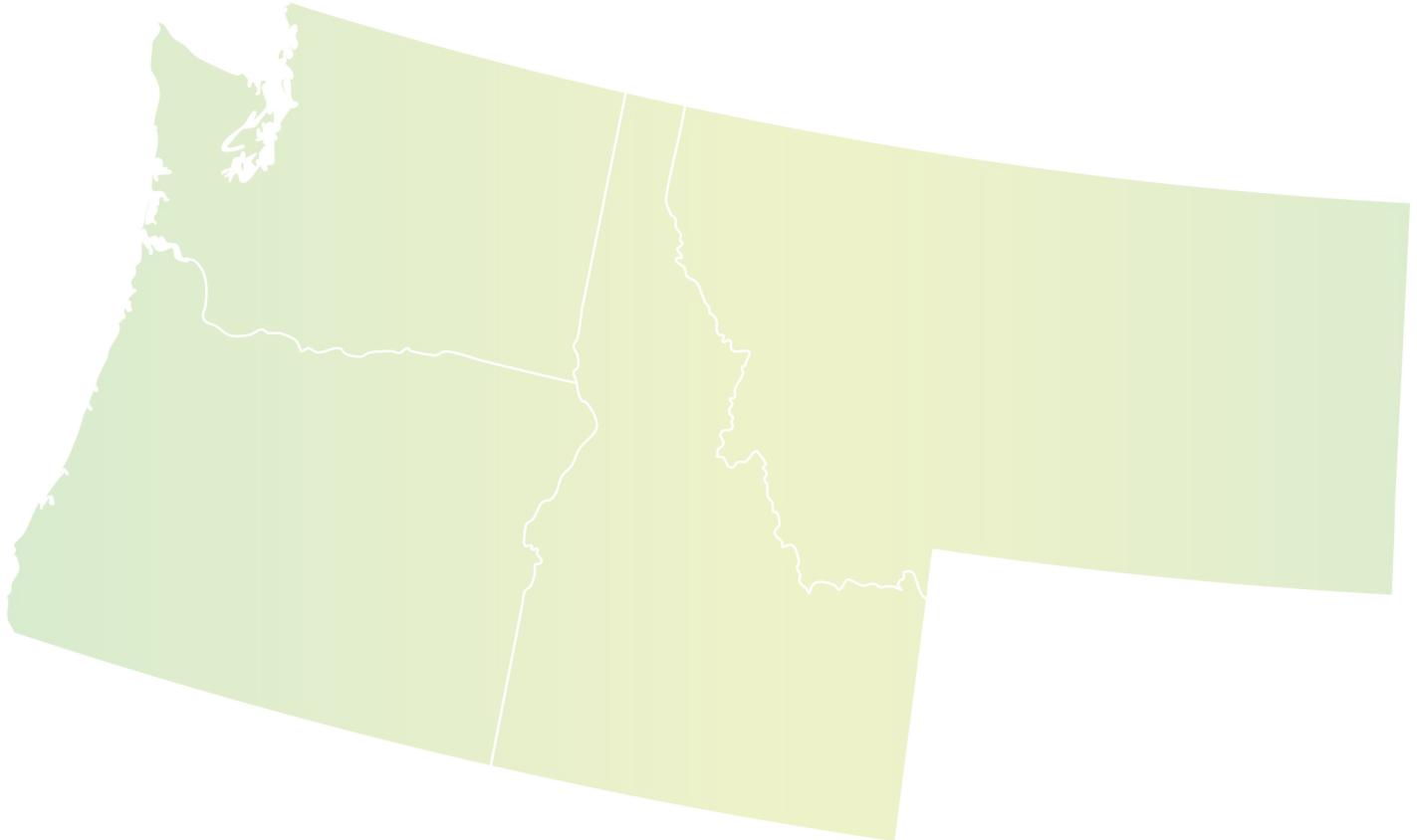
- **Trane Technologies**

Jeff Stewart Refrigeration Chief Engineer

Discussion



Thank You!





Connected Commissioning and Controls Solution

Lee Smith, VP- Strategic Marketing & Environmental Technology Solutions

DAIKIN COMFORT TECHNOLOGIES NORTH AMERICA, INC.

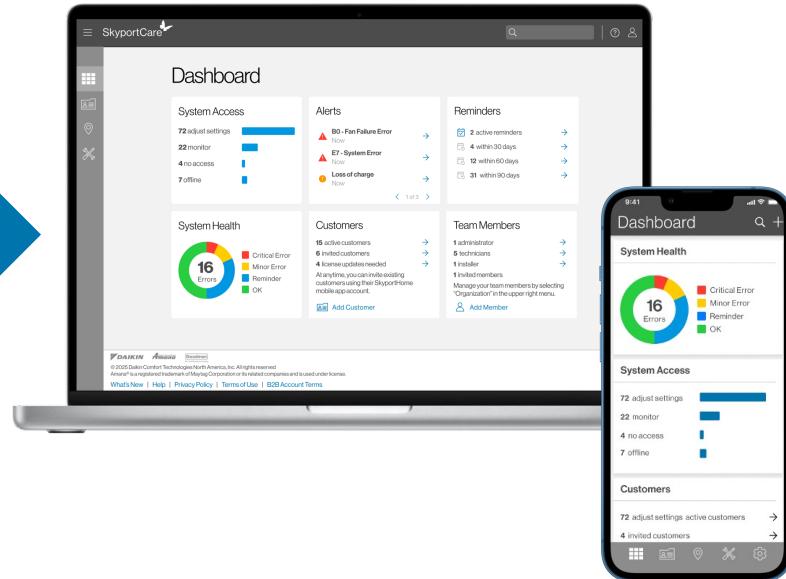


Agenda

- What is SkyportCare?
- Why Connect HVAC Systems?
- Basic System Architecture
- Objectives that may interest utilities
- Quick Demo of SkyportCare
- Alignment to CCX Criteria
- Questions

SkyportCare: A Dealer Support & Enablement Tool

SkyportCare was developed to guide & support dealers throughout the customer experience – from install through the lifecycle of the product.

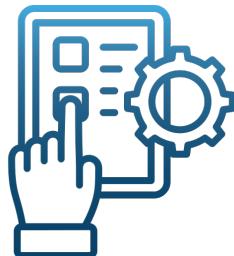


SkyportCare: How can it help with HVAC systems?



Quality Install:

- System Set-up & Commissioning
- Charge Verification and in-situ operational integrity



Digital Reporting:

- Dealer Commissioning Report
- Homeowner Report

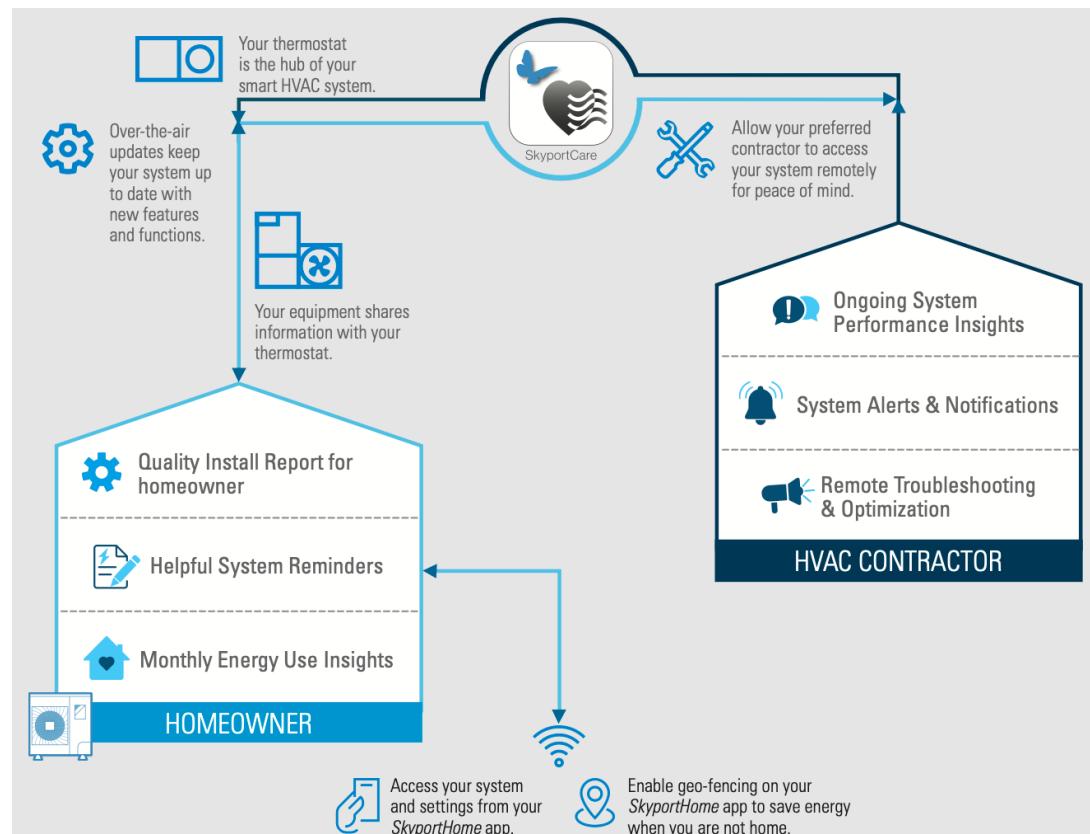


Life Cycle Engagement:

- System Monitoring & Performance Insights
- Remote read and write access

SkyportCare: Basic Architecture

- SkyportCare creates a digital connection between a Daikin heating, ventilation, and air conditioning (HVAC) system and a homeowner's servicing contractor.
- Homeowners can enjoy peace of mind not only from verification of system installation, but also from a 24/7 – 365 connection to Daikin Comfort Technologies cloud.
- With SkyportCare access, Homeowner servicing contractor can have access to system health alerts, performance insights, diagnostics, and even remote access to your system(s) settings – with homeowner approval.



SkyportCare: Objectives that may interest utilities



Affordability:

- Energy Efficiency & Cost Savings

Flexibility:

- Grid & Demand Management

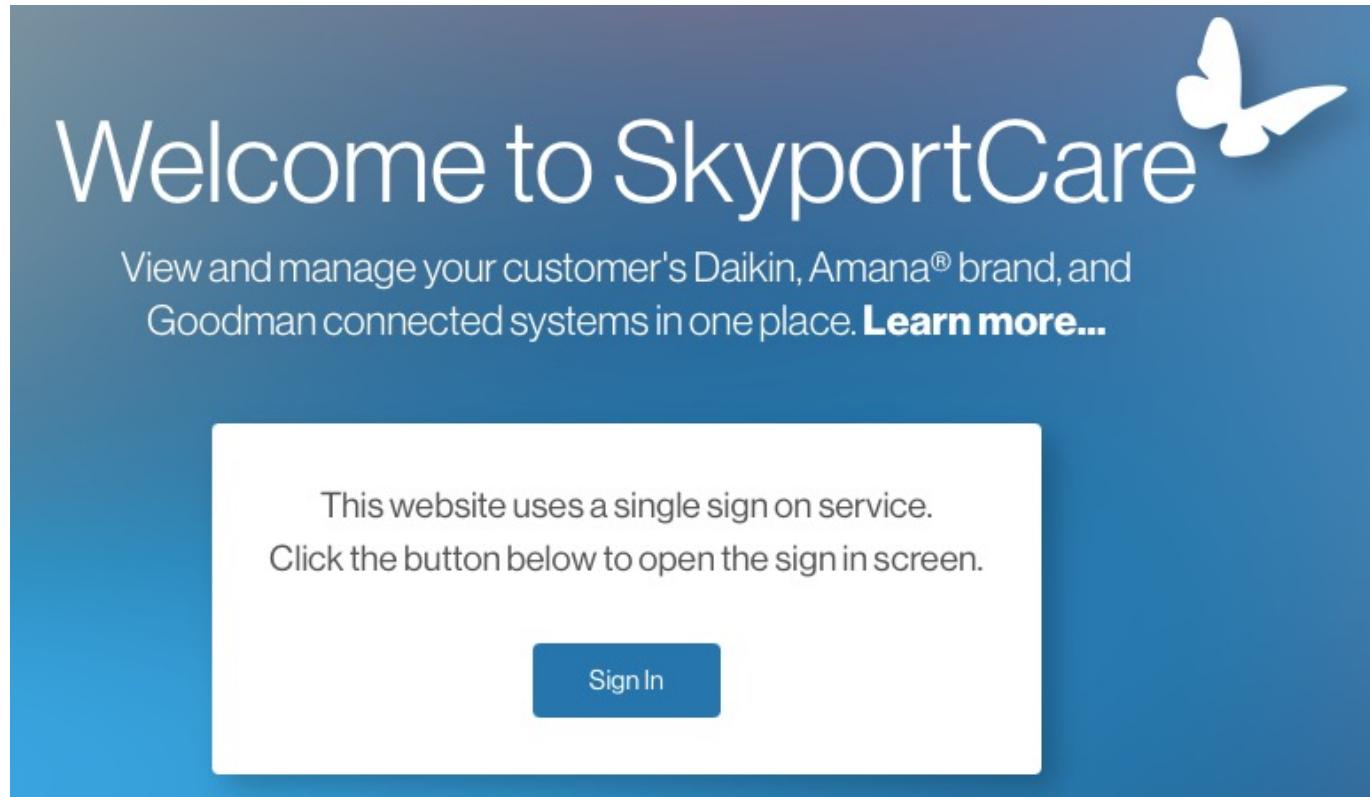
Connection:

- Aggregated Electrification & Renewable Integration

Retention:

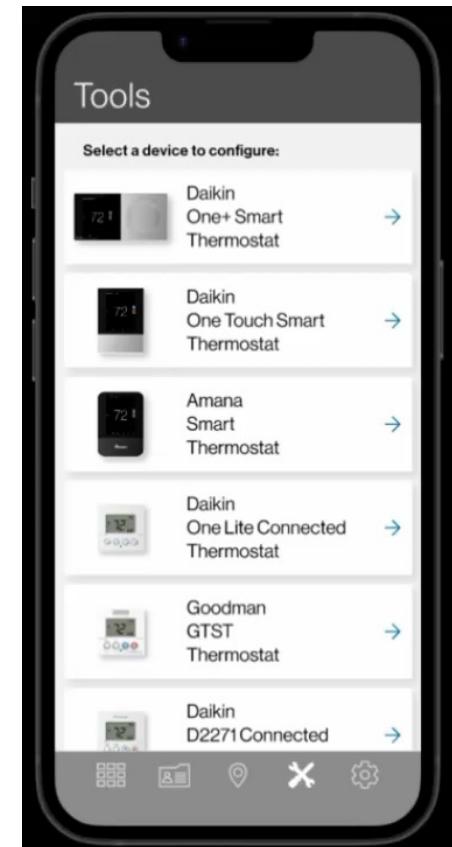
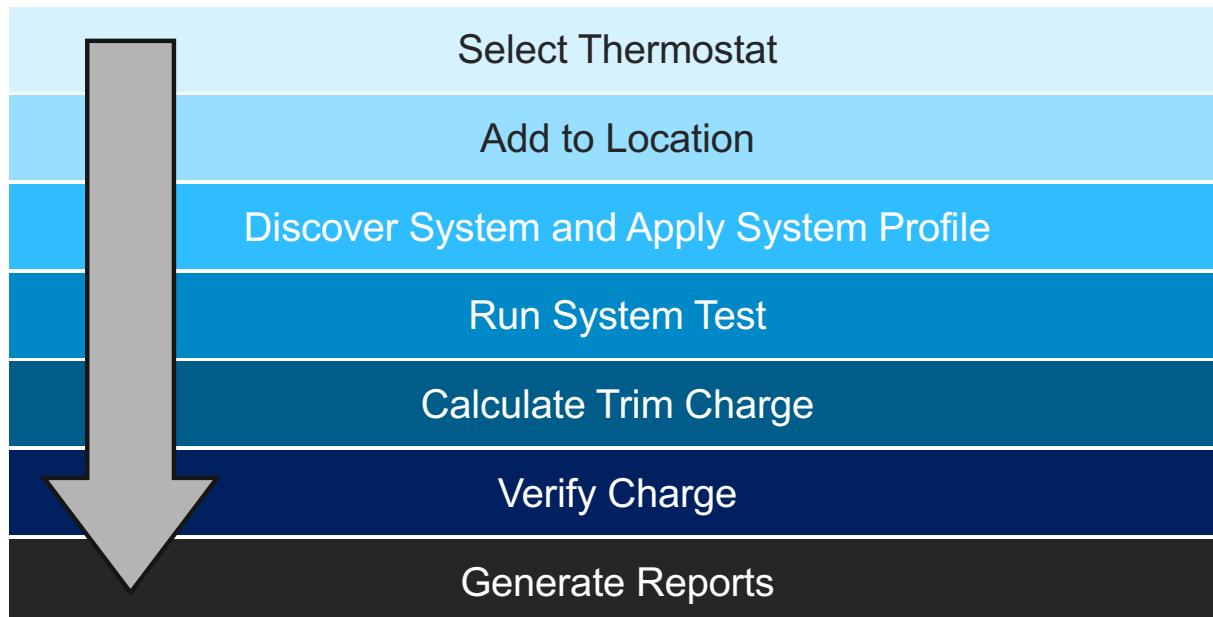
- Customer Comfort & Market Transformation

SkyportCare: Demo



The image shows a screenshot of the SkyportCare demo landing page. The background is a gradient of blue shades. At the top right, there is a white butterfly icon. The main title "Welcome to SkyportCare" is displayed in large white font. Below the title, a subtext reads: "View and manage your customer's Daikin, Amana® brand, and Goodman connected systems in one place. [Learn more...](#)". In the center, a white rectangular box contains the text: "This website uses a single sign on service. Click the button below to open the sign in screen." At the bottom of this box is a blue "Sign In" button. The overall design is clean and professional.

SkyportCare: Demo Video



SkyportCare: Alignment to CCX Criteria

System Information	SkyportCare	Refrigerant Charge Adequacy	SkyportCare
Location of installation	Yes	Liquid Line Temperature	Yes
CCX Commission Date	Yes	Degrees of Subcooling	Yes
AHRI Certification #	No	Target Subcooling	Yes
Indoor Unit (make, model)	Yes		
Outdoor Unit (make, model)	Yes		
Thermostat Model (make, model)	Yes		
Efficiency Ratings	Yes		
CCX Protocol Established	Yes	Controller Information	
Suitable Conditions		Auxiliary Heat Lockout	Yes
Outdoor Temperature	Yes	Compressor Lockout	Yes
Indoor Temperature	Yes	Setback Recovery Mode	No*
Air Flow Adequacy		Wi-Fi Connection	Yes
Fan Power	Partial	AHRI 1380 Capable	Yes
Airflow	Partial		

- **Yes:** Matches CCX criteria
- **Yellow:** CCX requirement met but not reported
- **Partial:** CCX requirement can be met with minor updating
- **No:** CCX requirement not yet satisfied.
- **No*:** Purpose of this versus inherent operation of VSHP unclear.

SkyportCare: Example Reports



Dealer Commissioning Report

Created by: Lee Smith

Run On November 1, 2024

DAIKIN
AIR INTELLIGENCE™

Homeowner:
Lee Smith
3308 Pecan Park Dr
Flower Mound, TX 75022

The attached report captures system settings and configurations for the selected Daikin equipment at the time the report was run. System settings impact performance and efficiency of installed equipment and should always be configured by qualified and trained HVAC professionals. Daikin recommends running a Dealer Commissioning Report at the completion of every system installation. Descriptions are provided for reference but should NOT be used in place of installation instructions. For technical start-up and/or troubleshooting questions contact your local Daikin distributor.

Setup	Equipment Type	Unitary
	WiFi Status	connected to Daikin One Cloud
	Large Font	no
	Language	English
	Device Name	Ground
	Degree Units	fahrenheit



Homeowner Report

Created by: Lee Smith

Run On November 1, 2024

DAIKIN

For:
Lee Smith
3308 Pecan Park Dr
Flower Mound, TX 75022

Thank you for choosing Daikin Internal Testing and Daikin for your home HVAC system. This report is a snapshot of the configuration of your system at the time this report was run. It details the equipment installed and some of the key settings used to optimize your system for peak and efficient operation.

Daikin Internal Testing	
19001 Kermier Rd	+1-855-324-5461
Waller, TX 77484	contact@daikinone.com
October 25, 2024	www.daikinone.com
	● System connected to Cloud Services

Ground

Tests Run	
● System	Standard tests were run. Details from these tests are used by your dealer to optimize your system set-up.
● Cooling	
● Heat Pump Heat	

**Thank You for Your Attention
Any Questions?**

DAIKIN COMFORT TECHNOLOGIES NORTH AMERICA, INC.



Trane® Link and Technician App Features

Jeff Stewart, Refrigeration Chief Engineer

January 26, 2026



It's Hard To Stop A Trane.®



WHAT IS TRANE® LINK?

Trane Link provides innovative new features designed to revolutionize the way installation, commissioning, and remote monitoring are conducted on variable speed systems. Expect a higher degree of installation accuracy, faster commissioning, and reduced callbacks.



It's Hard To Stop A Trane.®

INSTALLATION EASE.

Trane® Link systems are built to be “plug and play.” Once the technician has connected the outdoor unit, indoor unit, system controller and smart thermostat, they simply need to turn on the system. The equipment will communicate and configure the system automatically to default settings.



The Trane® Technician app enables **fast, convenient system setup**.



Bluetooth offers **multiple points of connection**, enabling the technician to connect to all pieces of equipment from almost anywhere in or around the home.



Four color coded wires enable easy wiring with **simple, consistent connections on all pieces of equipment**.



Equipment automatically **self-identifies and auto-configures** according to model or serial number.



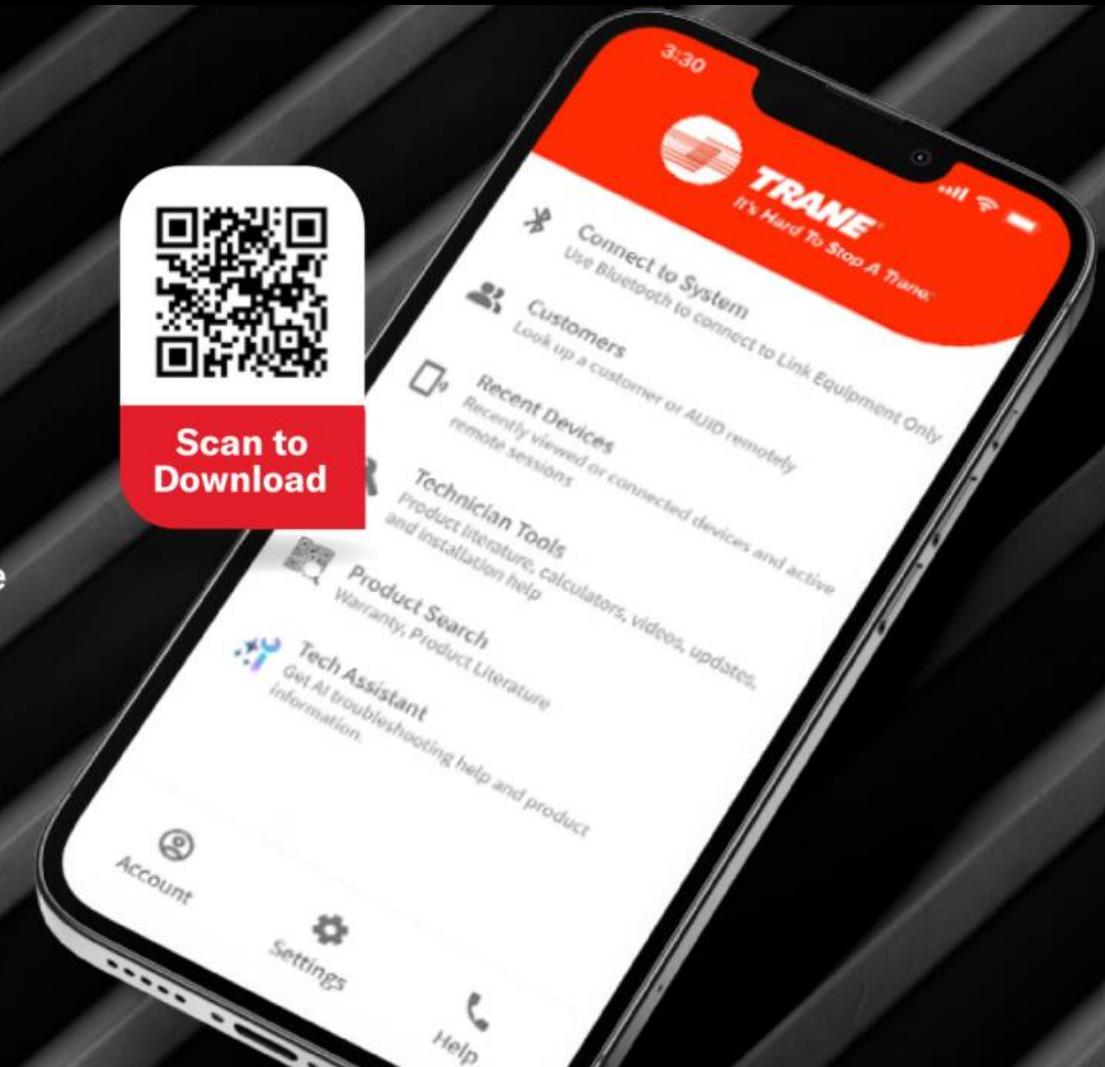
The SmartCharge™ feature **automatically charges** to the subcooling target using the factory-installed sensors.

Installation – Changing the Game

What is the Trane Technician App?

The Trane Technician App is a tool that empowers technicians to streamline installation, commissioning, servicing and troubleshooting of HVAC equipment – all from a mobile device.

Offering a robust solution on the go, the Trane Technician App goes far beyond diagnostics; it empowers technicians with all the digital tools needed for seamless HVAC installations, repair and service.



Trane Technician App

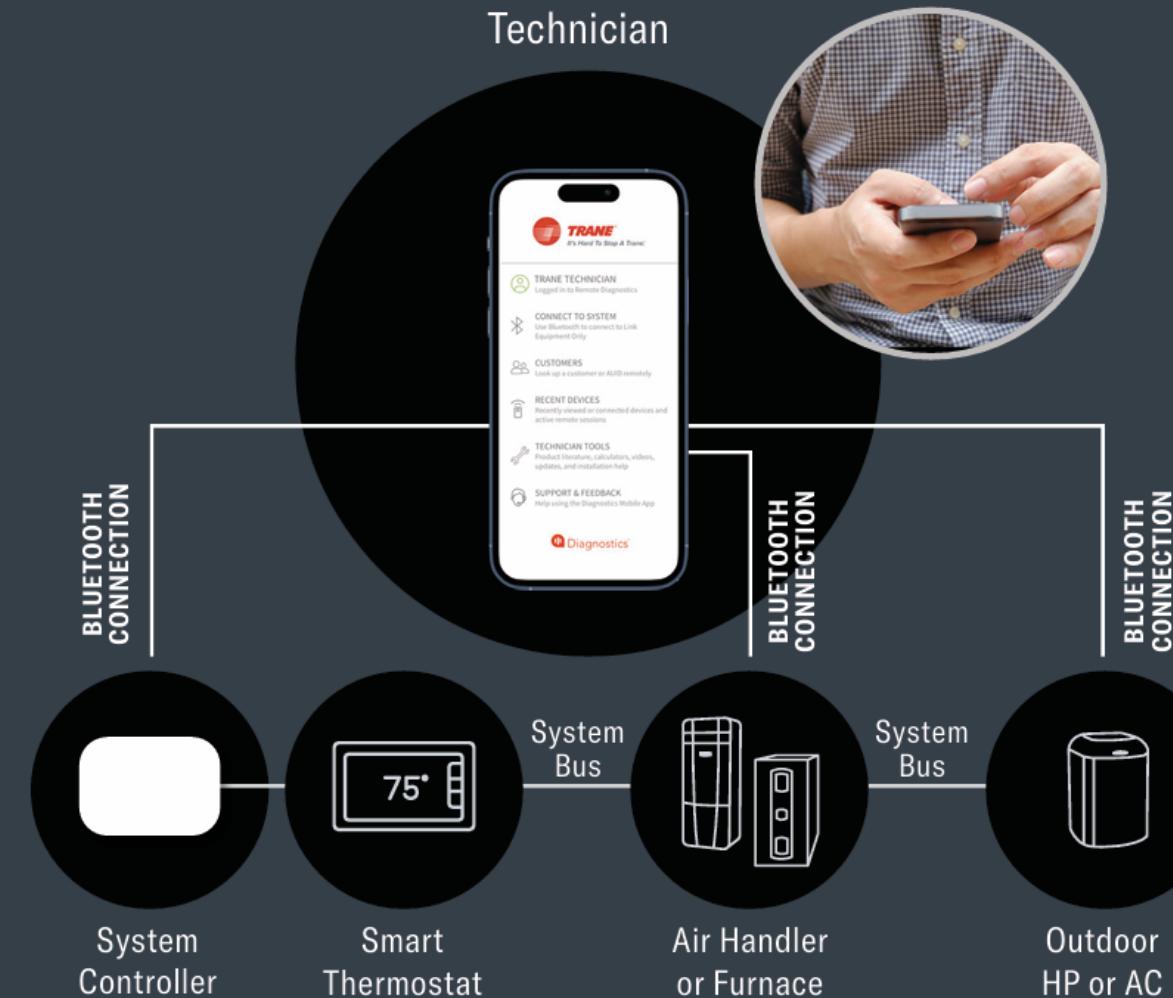
 **TRANE**[®]
It's Hard To Stop A Trane.[®]

TRANE TECHNICIAN APP

CONNECTING TO THE EQUIPMENT FOR INSTALLATION AND SERVICE

The mobile device connects directly to the equipment, leveraging Bluetooth connectivity between the outdoor unit, indoor unit, and system controller.

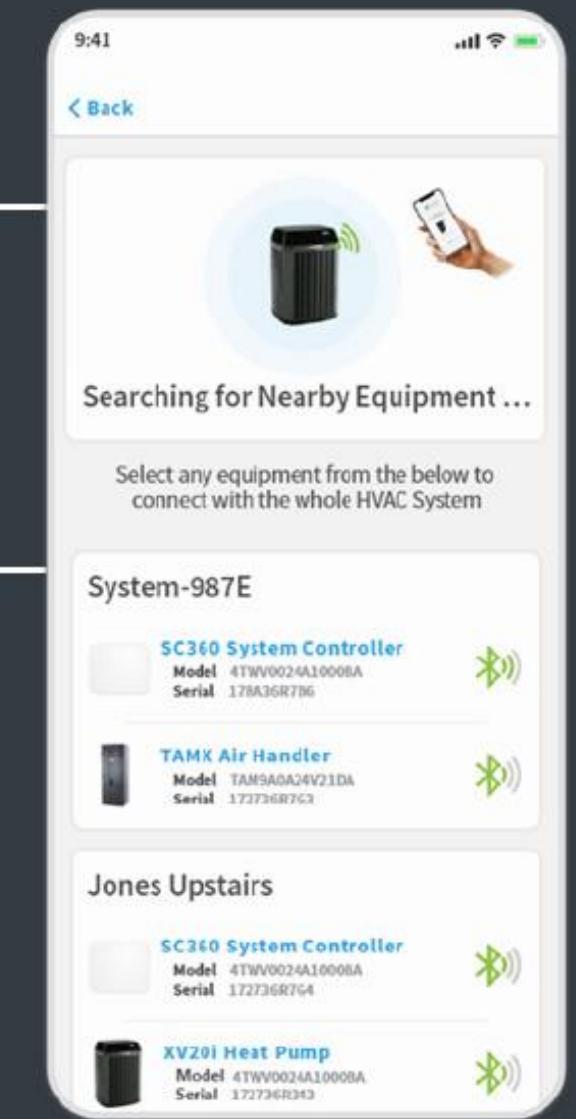
Then, the mobile app automatically switches connection between system components as a dealer moves around the home site—always maintaining a connection with the strongest signal.



"Being able to control all pieces of equipment from outside using the app is really nice."
- Airmax Heating & Cooling PILOT PROGRAM

Technician App – a next gen experience!

When first connecting, the app searches for nearby equipment and displays each system and its components. Then, the technician selects which one to connect to.



Connection Ease

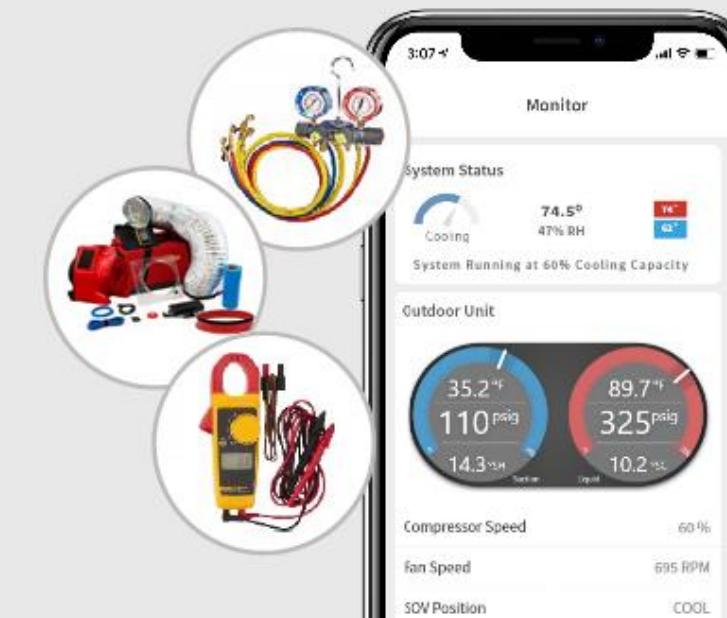


SYSTEM IDENTIFICATION

- View a summary of all communicating equipment and accessories
- Find and share model and serial numbers
- Identify and view the installation date
- See software versions

LIVE SENSOR READINGS TO MONITOR:

- Refrigerant pressures and temperatures
- Real-time subcool/superheat calculations
- Power usage metrics
- Airflow delivery
- Return and supply static pressure (with optional kit coming soon)
- Airflow total static pressure



Dashboard and System Monitor

NEW SYSTEM SETUP

- › Notifications to verify system set up
- › Reduced complexity of initial install
- › Complete system configuration in just minutes
- › Automatic Zone Sizing

HOLISTIC SYSTEM CONFIGURATION

- › Modern, simple to use interface
- › Reorganized categories on smart thermostat
- › Real-time system configuration
- › All settings available on Trane Technician app and smart thermostat
(no need to go to equipment)



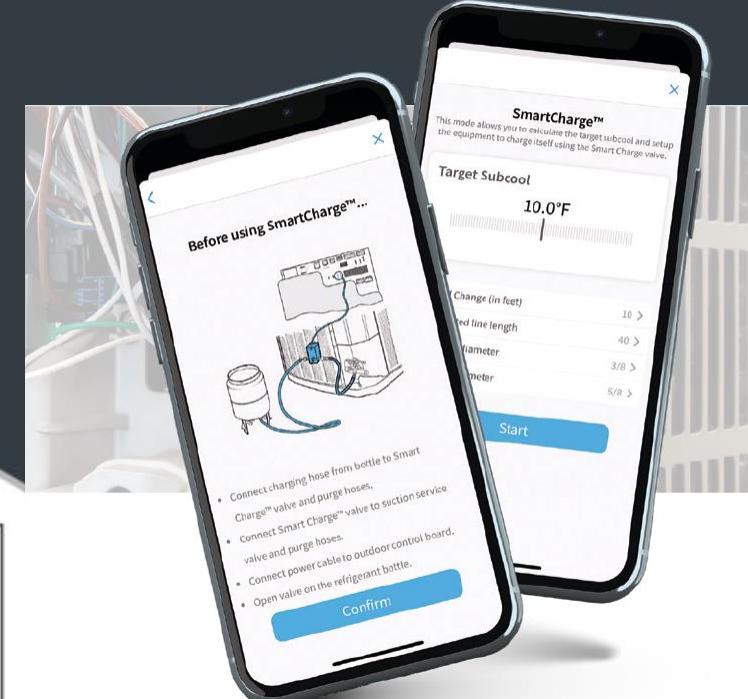
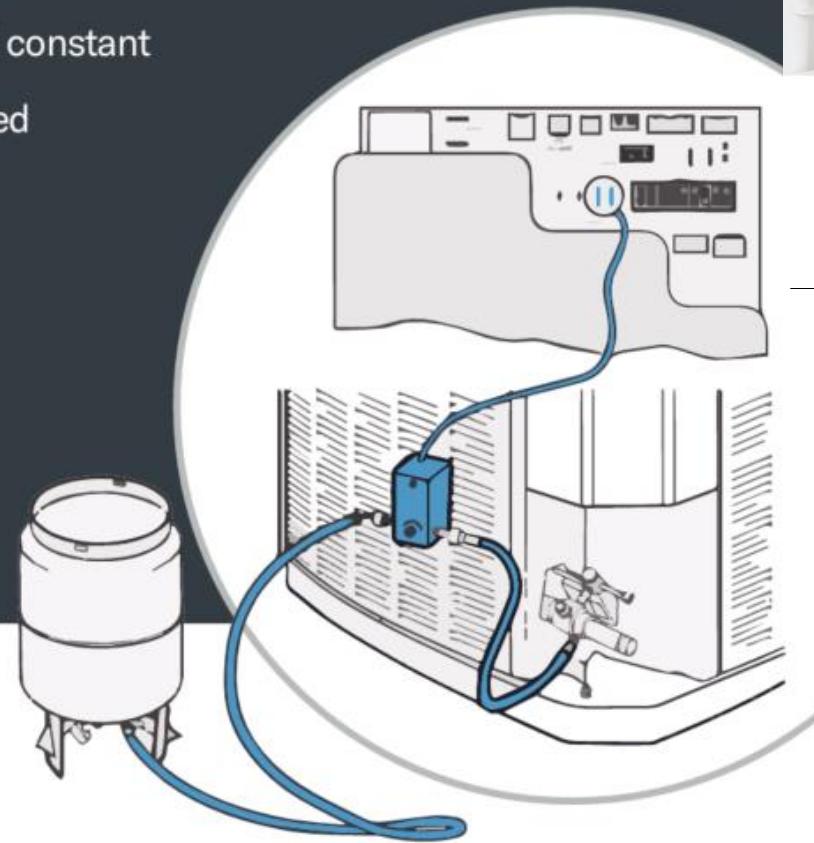
Setup and Configuration

SMARTCHARGE™

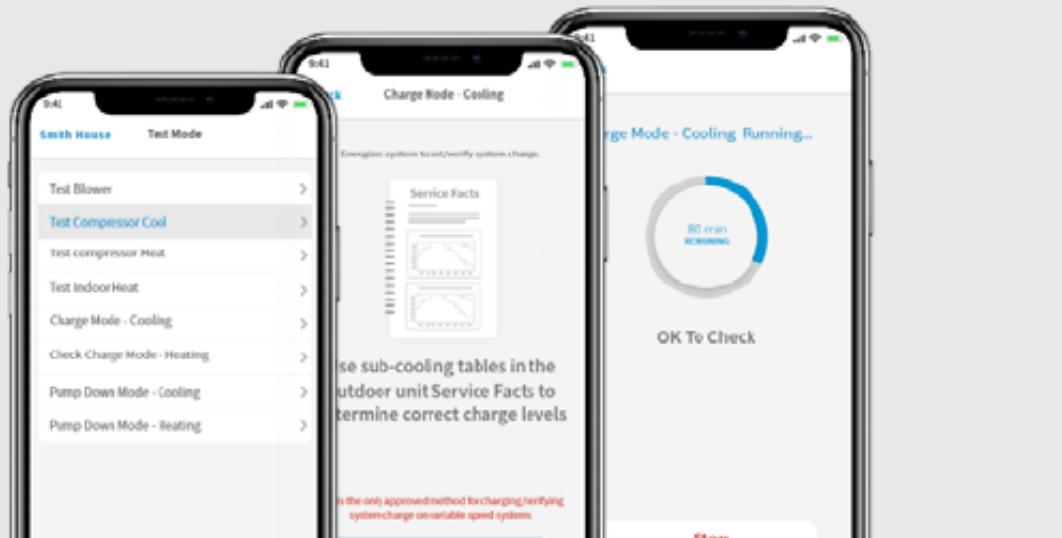
AUTOMATIC VARIABLE SPEED SYSTEM CHARGING

SmartCharge is an all-new, automatic charging feature built into every variable speed system with Trane® Link. Coupled with a charging solenoid (BAYCAKT002 sold separately), the Trane Technician app works with the charging solenoid and built-in system sensors to automatically charge the equipment without constant technician engagement. Technicians can take the time they used to spend charging a system to do other work. Once charging is complete, the Trane Technician app will alert the technician, and they can view the results. This innovative new solution is built around four key principles:

1. User-Friendly Interface
2. Fast, Accurate Charging
3. Full Transparency
4. Automatic Verification
(no gauges, scale, or calculations req'd.)



Automated Charging



FLEXIBLE TEST MODES

- SmartCharge™
- Automated System Verification allows the entire system to be managed from one place
- Charge Management and Manual Equipment Testing
Test modes listed below

Automatic Verification Tests

Blower Test

Compressor Heating Test

Compressor Cooling Test

Charge Management

Charge Mode - Cooling

Check Charge Mode - Heating

Pump Down Mode - Cooling

Pump Down Mode - Heating

Manual Testing

Test Blower

Test Compressor Cool

Test Compressor Heat

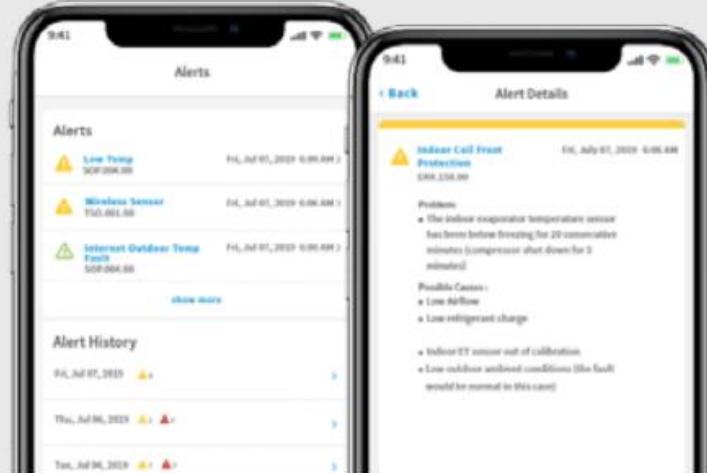
Furnace Simple Run Test

Test Indoor Heat

Open Indoor EEV

Close Indoor EEV

Test Modes for Installation and Service



SYSTEM ALERTS - REAL-TIME & HISTORY

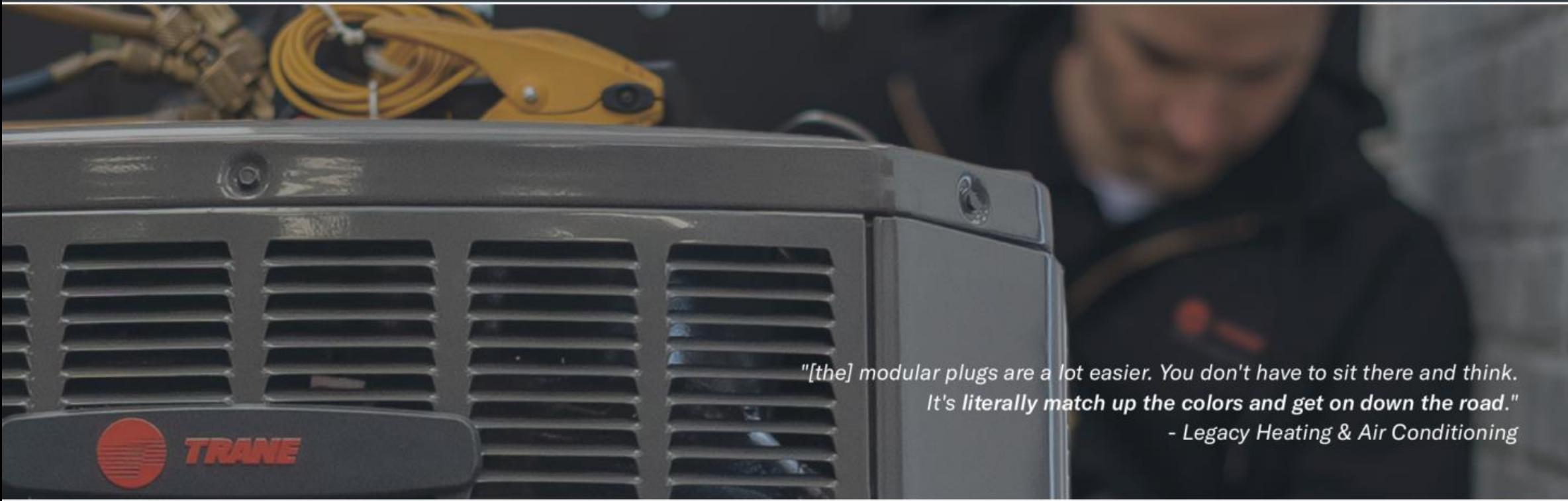
- Problem description
- Possible causes
- Alert history provided by equipment (no internet connection required)

SYSTEM SELF VERIFICATION

- Verify all modes of operation
- Automatically capture steady-state data
- Compare against Trane recommendations
- Free up technician for other end-of-day activities
- Export data to a Dealer Verification Report (PDF)
- Generate Homeowner System Report



Alerts & Automated Commissioning



*"[the] modular plugs are a lot easier. You don't have to sit there and think.
It's literally match up the colors and get on down the road."*

- Legacy Heating & Air Conditioning

ACCURACY VERIFICATION.

Trane Link can run and verify each mode of operation as well as verify the overall system is functioning properly. This automatic verification provides two reports—a detailed Dealer Verification Report and a summarized Homeowner System Report, providing peace of mind to the customer.

Automated Commissioning



A VALUABLE EXPERIENCE FOR THE HOMEOWNER

LESS WORRY, MORE COMFORT.



Trane® Link ensures a precise installation, giving both the technician and homeowner peace of mind.

After an install is completed, technicians can provide the homeowner with a Homeowner System Report that captures the successful completion of automated system tests. Post installation, the homeowner can opt in to have their system's data remotely monitored for even the slightest system changes, staying ahead of any problems. Thanks to the installation benefits, monitoring and diagnostics of Trane Link, homeowners can relax and enjoy the exceptional comfort their variable speed system provides.

How Link Benefits the Homeowner



NEVER STOPPING.

NEVER SETTLING.



It's Hard To Stop A Trane.®

Live demo



It's Hard To Stop A Trane®

Addendum



OUTDOOR UNITS

WITH TRANE® LINK

PRODUCT	MODEL NUMBER	CAPACITY (TONS)	DIMENSIONS (IN.)		
			H	W	D
18 TruComfort™ Variable Speed Air Conditioner	5TTV8X24A1000A	2	46	30	33
	5TTV8X36A1000A	3	46	30	33
	5TTV8X48A1000A	4	46	35	38
	5TTV8X60A1000A	5	46	35	38
18 TruComfort™ Variable Speed Heat Pump	5TWV8X24A1000A	2	46	30	33
	5TWV8X36A1000A	3	46	30	33
	5TWV8X48A1000A	4	46	35	38
	5TWV8X60A1000A	5	46	35	38
20 TruComfort™ Variable Speed Air Conditioner with WeatherGuard™	5TTV0X24A1000A	2	50	30	33
	5TTV0X25A1000A	2	55	35	38
	5TTV0X36A1000A	3	55	35	38
	5TTV0X48A1000A	4	55	35	38
	5TTV0X60A1000A	5	55	35	38
20 TruComfort™ Variable Speed Heat Pump with WeatherGuard™	5TWV0X24A1000A	2	50	30	33
	5TWV0X36A1000A	3	55	35	38
	5TWV0X48A1000A	4	55	35	38
	5TWV0X60A1000A	5	55	35	38



AIR HANDLERS

WITH TRANE® LINK

PRODUCT	MODEL NUMBER	CAPACITY (BTUH)	CRATED DIMENSIONS (IN)			MOTOR TYPE	FILTER SIZE (IN.)
			H	W	D		
TruComfort™ Variable Speed Air Handler	5TEMCB02AV21DA	18-24k	46.77	18.5	21.13	ECM	16 x 20 x 1
	5TEMCB03AV31DA	18-30k	46.77	18.5	21.13		20 x 20 x 1
	5TEMCD04AV31DA	24-42k	51.27	23.5	21.13		22 x 20 x 1
	5TEMCD05AV41DA	36-48k	51.27	23.5	21.13		22 x 20 x 1
	5TEMCD06AV41DA	36-60k	57.4	23.5	21.13		22 x 20 x 1
	5TEMCD07AV51DA	42-60k	57.4	23.5	21.13		22 x 20 x 1
Hyperion™ Variable Speed Air Handler	5TAMXB02AV21DA	18-24k	49.9	17.5	21.8	ECM	16 x 20 x 1
	5TAMXC03AV31DA	18-30k	55.7	21.3	21.8		20 x 20 x 1
	5TAMXD04AV31DA	24-42k	56.9	23.5	21.8		22 x 20 x 1
	5TAMXD05AV41DA	36-48k	56.9	23.5	21.8		22 x 20 x 1
	5TAMXD06AV41DA	36-60k	61.7	23.5	21.8		22 x 20 x 1
	5TAMXD07AV51DA	42-60k	61.7	23.5	21.8		22 x 20 x 1



GAS FURNACES

WITH TRANE® LINK

PRODUCT	MODEL NUMBER	NOMINAL TONS	H	W	D	MOTOR TYPE	AFUE
80 Two-Stage Variable Speed Gas Furnace	S8V2A040M3PCA*	3	34	14.5	28.75	Variable Speed	80%
	S8V2B060M4PCA*	4	34	17.5	28.75		
	S8V2B080M4PCA*	4	34	17.5	28.75		
	S8V2C080M5PCA*	5	34	21.0	28.75		
	S8V2C100M5PCA*	5	34	21.0	28.75		
	S8V2D120M5PCA*	5	34	24.5	28.75		

The 97 Two-Stage Variable Speed Gas Furnace (S9V2-VS) can be upgraded to a communicating furnace with the S9V2-VC Link Kit which also enables zoning capability with the Link Zoning Kit, sold separately.

97 Two-Stage Variable Speed Gas Furnace	S9V2B040U3VSB*	3	34	17.5	28.8	Variable Speed	97%
	S9V2B060U4VSB*	4	34	17.5	28.8		
	S9V2B080U4VSB*	4	34	17.5	28.8		
	S9V2C080U5VSB*	5	34	17.5	28.8		
	S9V2C100U5VSB*	5	34	21.0	28.8		
	S9V2D120U5VSB*	5	34	24.5	28.8		
	S9V2B040D3VSB*	3	34	17.5	28.8		
	S9V2B060D3VSB*	3	34	17.5	28.8		
	S9V2B080D4VSB*	4	34	17.5	28.8		
	S9V2C100D5VSB*	5	34	24.5	28.8		
	S9V2D120D5VSB*	5	34	24.5	28.8		

The SC360 system controller can be installed in both conditioned and non-conditioned spaces. It is designed to be placed in a location that can receive the best WiFi signal to ensure the optimal connectivity to the Trane Home app.

- ▶ The system supports one UX360 smart thermostat and up to three additional relative humidity and indoor temperature (RHT) sensors in a non-zoned system for averaging, including ZSENS930AWOOMA.
- ▶ For a zoned system, it supports up to two zone panels for a total of six zones per system.

