



# *Building Controls*

*Your partner in comfort*



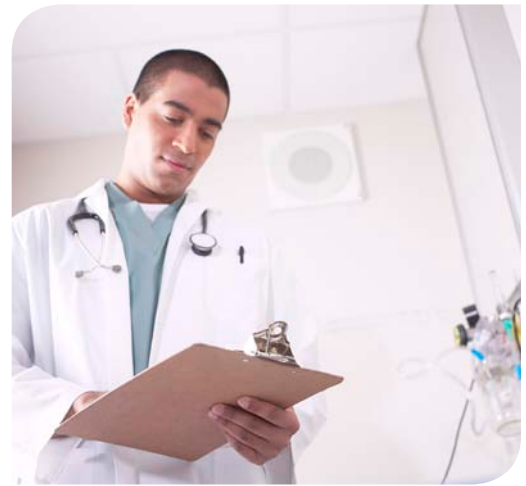
# What are you looking for in a controls company?



A partner, more than a supplier. Local support that you can depend on. A company with a history of quality and a commitment to your future. Knowledgeable people who respond when you need them. Reliable, proven technology.

At Trane, we are committed to offering solutions that support energy efficiency and take a sustainable approach to the environment. We believe in creating high performance buildings.

Trane builds upon 30 years of experience in the controls industry. Trane controls are the keystone to making a building work better for life. They are engineered to be user friendly. Whether you are looking for a web-based, enterprise-wide, integrated control system for flexibility and reduced operating expenses, or a widely-compatible field controller for building renovation, Trane has the controls that can



optimize your system's performance throughout the life of your building. Today Trane controls are installed in tens of thousands of buildings around the world. People are comfortable because they have Trane controls in their buildings and critical process systems can maintain strict temperature and humidity control conditions using a Trane building automation system.

## Total system support

### Local support

Trane sells building control software and equipment through sales offices around the world. Those offices provide system selection advice and building analysis during the design phases of a project.

The Trane sales consultant continues to work with customers through the construction and commissioning phases of a project. When the project is complete, Trane can provide local support through the life of your building:

- Technical service in case of an emergency
- Maintenance to keep your system operating reliably
- A full line of replacement parts in local inventory
- Available extended service warranties for added protection

### Financial options

Trane can help you offset the cost of a new or renovated control system for an existing building. A solutions-based approach, PACT™ (Performance Agreement for Comfort from Trane), is one way for customers to pay for the system without up-front capital. A facility analysis by Trane energy auditors will identify mechanical system improvements and building infrastructure renovations that will yield annual energy savings to help pay for the renovations and improvements. The PACT performance contract brings together a team of experts to work with business owners to develop a program tailored specifically for their facilities. Trane manages the project, monitors results, and delivers savings with no up-front capital expenditure.

### Upgrade/retrofit solutions

The Tracer™ R'newal™ program will help you maximize building performance, improve occupant comfort, and increase operation productivity, while meeting your budget and long-term service needs. This program will assess your building control system as it exists today, and will present a migration path to a more efficient and productive control solution. You'll get reliability and performance, backed by a factory warranty and long-term service agreement.

### Training

To ensure that operators learn about the many functions of their building control systems, Trane offers a comprehensive portfolio of training courses. These range from HVAC fundamentals, system applications, technical services, refrigerant safety, and the operation, installation, and programming of Trane building automation control systems. Practical and results-oriented, these courses are designed and taught by professional instructors using proven best practices gained through decades of experience.



## Integrated comfort

An Integrated Comfort™ system combines Trane HVAC equipment with factory installed unit controls together with a Trane building automation system. The benefits that can result from an Integrated Comfort HVAC system are impressive.

- Higher energy efficiency because the components are optimized for system performance
- Better reliability because the equipment is designed to work together
- Lower installation costs because the HVAC equipment has turnkey factory controls
- Faster occupancy because factory commissioning makes installation and startup faster
- Less system downtime with in-depth diagnostics to identify problems before they become serious
- For new and existing buildings, Trane controls can be field mounted on Trane equipment, non-Trane products and ancillary components

### Single source simplicity

Trane is one of the few companies in the industry that designs, tests and manufactures nearly all products comprising a high-performance HVAC system. And our system and application knowledge is second to none. Our Integrated Comfort Solutions (ICS) meet the most challenging temperature, humidity and ventilation needs by applying our controls, system components, and applications engineering expertise to create the most effective and efficient system.

In addition, owning a Trane Integrated Comfort HVAC system is easier and more cost effective because the components are manufactured, installed, warranted and serviced by a single source—Trane.

### Interoperability

While offering single-source solutions, Trane stands committed to open standard protocols to meet the needs of building professionals. System designers and building owners today expect that system components from different equipment manufacturers will be able to communicate with each other, that is be interoperable. Trane supports the leading interoperable communications standards; including BACnet™ and LonTalk™.

Thousands of Trane interoperable systems have been installed since the Tracer Summit® building control unit, a native BACnet device, first shipped in 1993. Typical applications for BACnet at the system level include the integration of HVAC, lighting and fire alarm systems. The introduction of Tracer™ SC allows BACnet communication from the unit level up to the system level, with web-enabled building control, providing a total cost-effective solution. LonTalk at the unit level provides a common platform for integrating complementary controllers such as variable speed drives, generators and power monitoring equipment from third party suppliers.



## Delivering systems and controls innovation

Trane Building Automation Systems allow you to sustain the system performance over the building lifetime through alarming, monitoring, commissioning, measurement and verification, and analyzing. Each component is coordinated for optimal performance of the entire HVAC system. Single buildings can have intricate HVAC and energy management needs and a complex of multiple buildings has an even greater diversity of comfort and energy management needs. Trane offers many options in building automation systems, software and controllers. Whether you have a single building in one location or multiple buildings in multiple cities, you can choose the system that meets your specific requirements and budget.

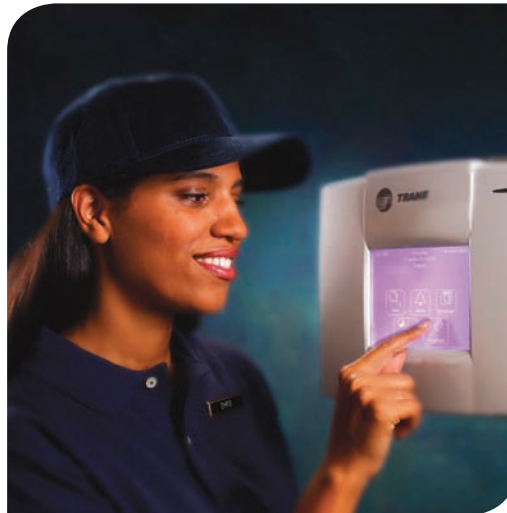
The benefits are many and can include:

- Reduced operating costs through energy management strategies
- Easy to learn and use results in improved operator productivity
- Helps provide consistent occupant comfort
- Flexibility to grow with building expansions or remodeling reducing installation time and costs
- Allows consistent and reliable operation with standard, pre-engineered and pre-tested applications
- Easy troubleshooting and monitoring either on-site or from a remote location

### Spaces – maintain healthy and productive occupant space

#### Sensors

Trane offers a complete family of sensors featuring wired and wireless models dedicated to providing the accurate, reliable sensing that



is critical to keeping HVAC systems running at optimum levels. Trane sensors are compatible with a variety of Trane building systems, general purpose and application specific controllers. As well as unit control modules to provide ready solutions for every application.

**Wireless zone sensors** are compatible with all Trane equipment and controls. Our wireless zone sensors are perfect for new construction, remodels, and retrofits. Simpler faster construction, reduced installation time and flexibility to move the sensors when and where needed, provides improved occupant comfort and reduced costs. Available in three models giving you the zone control capabilities you need for your building.

**Combination temperature and humidity sensors** utilize a polymer capacitive sensing element providing superior performance and longevity. Accurate humidity control is essential to both occupant and facility comfort. Two sensors in one enclosure reduce installation costs and improve building aesthetics.



*Trane Wireless  
Display Sensor*

**Outdoor air temperature sensors** are housed in a weather-resistant enclosure, providing energy efficiency by accurately measuring outdoor air temperature to allow proper ratio of outdoor and indoor air for building comfort levels.

**Temperature sensors** feature a full line offering that provides flexibility for building occupants to choose various temperature and operating mode setpoints to meet their comfort levels.

**Pressure sensors** monitor building static pressure, differential water pressure and duct static pressure for cost effective operation.

**Carbon dioxide (CO<sub>2</sub>) sensors** high accuracy provides effective control of CO<sub>2</sub> levels for optimized energy efficiency, reduced energy costs and improved air quality providing improved occupant comfort and safety.

## Equipment—optimize equipment operating efficiency

### HVAC controls

Offering a wide range of field controllers to suit virtually any application, these units are compatible with a variety of building types and can be used for new construction or renovation. Through extensive usability testing internally and with building operators, we design our controls for real world ease of use.

When used with a Tracer™ SC or Tracer Summit® building management system, the unit controllers provide diagnostic and troubleshooting information that helps maintain the reliable operation of the comfort system through the life of a building.

Unit-mounted controllers are wired, commissioned and tested in the factory. Installation and startup of equipment with factory mounted controls is faster and less expensive compared to unit controls requiring field labor to wire and mount. Whether your needs are specific to application, multi-purpose, or programmable, Trane has the unit controller to meet your needs.

Many of our control units feature an easy-to-use touch screen and display. The interface has a unified look and feel across the entire Tracer product line which simplifies training and enhances operator efficiency.

### Airside HVAC

**Tracer™ multi-purpose controllers (UC400)** use a common repeatable, consistent platform providing greater flexibility on VAV boxes. Ideal when special sequences are required. Standard software applications come pre-loaded at the factory simplifying field-installation. They support factory and field mount, graphical programming and BACnet™ protocol.

**Tracer™ air-handler controllers (AH540 and 541)** are available either factory or field-installed, with or without an operator display, on constant-volume and variable-air-volume air handlers.

**Tracer™ variable air volume controllers (VV550 and 551)** provide single-duct digital control for VAV boxes with three operating modes and ventilation flexibility and support LonTalk™ protocol.

**Tracer™ loop controller**, used in either new or existing buildings, is a configurable direct digital controller that provides control and monitoring for water-source heat pump systems.

**Tracer™ zone controllers (ZN511 and 521)** are field mounted to provide digital control for water source heat pump equipment, as well as other HVAC equipment, i.e. cabinet heaters, fan coils, unit ventilators, and blower coils.

**Tracer™ unitary controller (ZN517)** provides digital control similar to a wall thermostat and can operate as part of a Trane Integrated Comfort™ system or as a stand-alone device.

### General purpose controllers

Tracer modules provide flexible control and data monitoring for heating, ventilation, and air conditioning equipment, as well as a part of a building automation system (BAS). Our modules are configurable, multi-purpose devices that utilize a LonTalk™ or BACnet™ link to communicate with a BAS. They are durable, easy to install and suitable for mounting in a variety of locations.

**Tracer™ multi-purpose programmable controllers (UC400)** use a common repeatable, consistent platform providing greater flexibility on terminal products. Standard software applications come pre-loaded at the factory simplifying field-installation. They support

factory and field mount, graphical programming and BACnet™ protocol.

### Chiller controls - Tracer AdaptiView™

**Tracer AdaptiView chiller control** lets your building operating staff take command of the chiller plant in a way never before possible by giving a better view into a chiller's inner workings. With a full color touch-screen display and interactive animated graphics, they'll be able to view, access and control complex chiller operations and functions; gain insights into the operating patterns, energy use and system performance. This advanced level of control translates into enhanced building performance that can help keep building occupants cool, critical processes operational, and sustain superior energy efficiency.

Optimal chiller operation delivers more hours at peak efficiency, particularly in variable-primary flow applications.

Industry-leading, time-tested *Adaptive Control™ Algorithms* embedded within the *Tracer™ UC800* controller works with the unique capabilities of the Trane CenTraVac™ Chiller to keep your building operational even during the most challenging conditions when other chillers would shut down.

Unit-level open protocol flexibility, including BACnet™, Modbus RTU, or LonTalk™ with no gateways, reduces the complexity and cost of integration with other building control systems.

The ergonomic arm enables easy operator viewing from virtually any height or angle, regardless of where the chiller is installed.



*Tracer AdaptiView™ chiller controls*

**Tracer™ programmable controllers (MP580 and 581)** are fully programmable, and available both factory and field-installed on Trane air handlers, boilers, cooling towers, etc. They are available with or without operator display, provide a link into a Trane Integrated Comfort™ system and are ideal for new construction or renovations.

**Tracer™ controllers (MP501 and 503)** can operate as a stand-alone device or as part of a building automation system. It is a configurable, multi-purpose controller used to provide direct-digital control for a wide range of HVAC equipment.

**Other general controllers** include the universal programmable control module, the Tracer™ programmable control module and terminal unit controller all providing digital control and monitoring for a wide range of HVAC equipment.

### **Variable frequency drives**

Variable frequency drives play an important role in a system to reduce energy usage, extend motor life, optimize AC motor speed control, maximize occupant comfort and reduce costs. They are available factory-mounted and commissioned on Trane IntelliPak™, Voyager III™ and M-Series™ and T-Series™ Climate Changers. In addition, TR200 Series drives support open standard protocols—making them compatible with virtually all HVAC equipment and building automation systems. They can also be ordered specifically for a project and easily installed on-site for new and retrofit applications. With a complete range available from 1½ to 1350 HP, the features and flexibility of TR200 Series drives make them ideal for stand-alone control of cooling towers, exhaust fans, pumps and a variety of air handlers.

### **Tracker™ light commercial system controls**

An affordable choice for small- to medium-sized buildings is the Tracker™ building controller which provides control and monitoring of packaged HVAC equipment and room controllers. Other components, such as lighting and exhaust fans, can also be integrated into a Tracker system. Tracker is available in three models to match the unit capacity and features that are required by a range of buildings.

### **Tracer™ building management controls**

Whether you manage multiple facilities across various locations, or a single on-site HVAC unit, Trane can put together a building automation system (BAS) that is scaled to your needs.

### **Tracer™ SC controller: BAS with Web-based interface**

Tracer™ SC controller allows you to streamline facility management without reinventing the entire system. Adding Tracer SC to your system provides a flexible, cost-effective solution for programming and managing facility climate that can extend to lighting and energy consumption.

Accessible from any PC with an Internet connection, Tracer SC eliminates the need for a dedicated computer and monitor, so you can manage system performance whenever, wherever it is convenient. Tracer SC controller's simplified, Web-based management tool reduces scheduling, reporting and applications programming chores to simple "point and click" tasks. The intuitive online tools produce improved efficiencies, increased tenant comfort, reduced energy costs—adding up to a better bottom line.



*Tracer™ SC delivers open, web-based management to Trane Rooftop Systems*

Tracer SC is scalable for most buildings—small, medium or large – and can grow with your building and adapt to your changing needs. With expandable communications from 30 to 60 to 120 unit controllers, it is a flexible and cost-effective choice.

Tracer SC now supports BACnet™ top to bottom, as well as existing LonWorks™ controllers.

- Web-enabled for easy access from any location, from any computer
- Energy-saving programs for building operations
- Scalable for building size and budget flexibility
- Proven pre-programmed system applications provide consistent comfort and deliver optimized indoor air quality to help eliminate or reduce comfort issues.

### **Tracer Summit® controller: BAS with PC workstation interface**

The Tracer Summit® building automation system (BAS) provides integrated building control through a dedicated PC workstation. Climate, lighting, energy consumption, scheduling and other controllable features can all be programmed and managed by Tracer Summit building control units (BCUs).

A BCU, PC workstation with Tracer Summit software and unit controllers comprise the legacy Tracer Summit building automation system. Using Tracer Summit systems, a building operator can perform daily tasks, such as responding to alarms, viewing reports and trends, changing area and equipment controls and custom programming.

### **Tracer ES™ control software: manage multiple facilities online**

Managing multiple facilities as a single enterprise couldn't be easier. Tracer ES™ building automation control software gives you an online, enterprise-wide view and control over all of your buildings and systems – from any PC on your network.

A Tracer ES system offers both flexibility and precision. Each system is customized by Trane to reflect the customer's unique requirements. Tracer ES is easy to install, and it enables users to perform daily building operations tasks remotely – including troubleshooting, scheduling, alarm management and data analysis. It provides a single window into multiple Trane or qualified BACnet systems (including Tracer SC) for easier integration, providing simplified facilities and energy management.

### **Tracer ES™ express software: cost-effective online accessibility on a smaller scale**

Smaller companies can gain the same benefits that are delivered through Tracer ES™ such as daily operations management, scheduling and troubleshooting.

This Web-based building automation control software supports up to five controllers, including Tracer Summit, Tracer SC and other qualified BACnet systems. Whether you have an existing Tracer Summit controller and want the convenience of Internet accessibility, or you are purchasing new Tracer SC controls and need a first point-of-entry into control software – Tracer ES Express offers a fully functional yet affordable solution.



# Tracer™ SC System Applications



*Tracer™ SC systems feature “built-in” applications – pre-programmed features that will quickly become integral to your day-to-day building management.*

## Chiller plant management

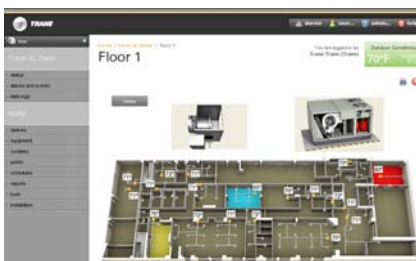
Tracer Chiller Plant Control is a standard, pre-tested application program that controls up to 25 chillers of multiple types and sizes. The program is well suited to ice storage systems and dual fuel chiller plants, as well as comfort and industrial applications. Chiller sequencing routines can optimize the overall chiller plant energy efficiency by rotating individual chiller operation to equalize runtime, and by matching capacity to the building cooling load.

Pumps and cooling towers are coordinated with

the chiller operation for even greater energy efficiency and reduced costs. The status screens display both current operating conditions and upcoming automated control actions to add or subtract a chiller. Alarms and diagnostic messages provide easier monitoring and troubleshooting. And snapshot reports showing the status of critical operating parameters prior to a shutdown help an operator determine the cause of a problem.

## Rooftop/VAV systems management

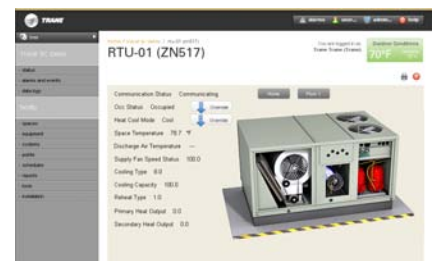
The Trane large variable air volume (VAV) rooftops, building management equipment and VAV units form a system typically used in offices, healthcare facilities, schools, theaters and retail stores. The RTU/VAV system within the Tracer SC web-enabled building control system allows you to streamline facility management and provides a flexible, efficient and cost effective solution for maintaining facility climate. With its Web-based online management tool, you can reduce energy costs and installation time and improve tenant comfort. Support of open standard protocols adds more flexibility.



*Tracer™ SC controller provides an easy-use interface via the Web to monitor and control a building from virtually anywhere.*



*Tracer SC™ chiller plant dashboard uses an easy-to-interpret, graphical display to report current operating conditions and energy usage.*



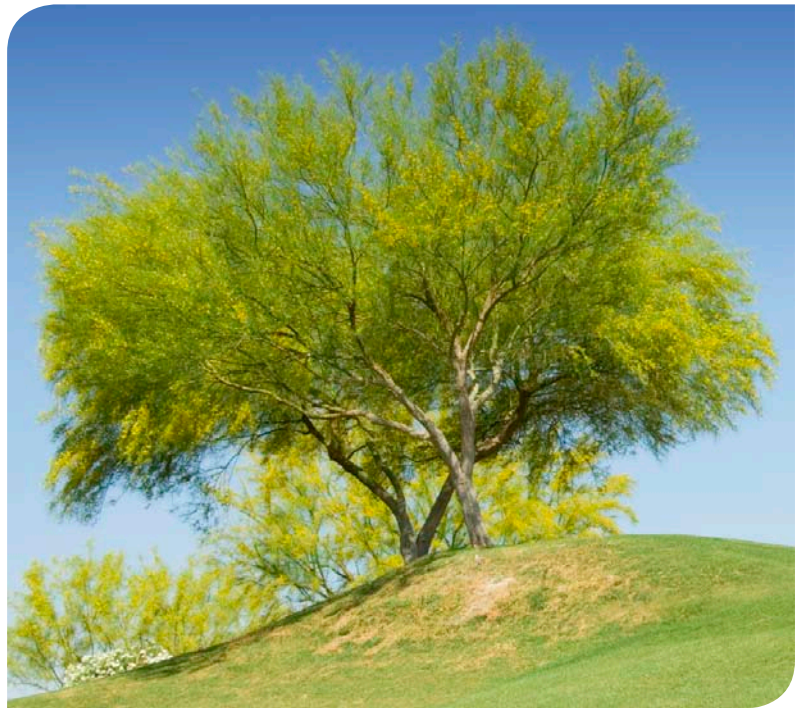
*Applications within Tracer™ SC simplify facilities management for buildings with rooftop or VAV systems.*

## Energy and the environment

At Trane, our philosophy about creating the right comfort and critical control environment is deeply rooted in our commitment to offering systems, solutions and services that support energy efficiency, maximize indoor air quality, and take a sustainable approach to the environment. We believe in creating high performance buildings. These buildings, by creating a healthy and comfortable indoor environment for the occupants, can increase their productivity and lower your total cost of ownership by effectively minimizing energy requirements and reducing the environment impact.

### Indoor air quality

Today's building owners are concerned about maintaining and documenting indoor air quality, not only to avoid problems with condensation, building sickness or noise issues, but to provide a clean and healthy working environment in the building. Trane believes that good HVAC system selection and design and specification of equipment, along with proper building operation and maintenance, are the foundations of high quality indoor air. Trane can monitor and control various variables that contribute to indoor air quality. Any of these criteria require effective management, both at the equipment and the building control levels, and Trane has a number of solutions. We have the expertise to ensure that all essential aspects of your system support your indoor air quality requirements.



### LEED® and green buildings: sustainable, efficient, profitable, comfortable

An increasing number of building owners are recognizing the value of achieving LEED certification. Our company believes that sustainable construction and reduced environment impact are intelligent ways to reduce the impact we have on the Earth. We have become an HVAC industry leader on green (LEED certified) buildings because a green building is a high performance building. We are proud to have over 800 LEED accredited professionals—more than any other company in the industry. We partner with a variety of industry and construction organizations sharing information and resources on the importance of sustainable green building practices along with the energy and financial efficiencies associated with them.



## Committed to quality

Trust Trane for the right advice, the right tools, the right systems and the right services to help make your building environmentally friendly.

Around the world, our environmental commitment is to provide state-of-the-art HVAC systems, solutions and services that are good for our customers, good for our businesses and environmentally responsible.

Integrated comfort and critical control solutions for high performance buildings—building owners who depend on quality systems, controls and services depend on Trane.

## Beyond HVAC and forward to the future

Making Buildings Better is our commitment. All building systems should be economical, safe and secure, comfortable, energy efficient and integrated. This commitment, combined with the strength of Ingersoll Rand, is a reality. Utilizing a single web-based command center, from a single-source supplier, you can control security access to your building, monitor and record building activity, manage HVAC systems, lighting, and alarm systems.

You'll benefit from a world leader in creating and sustaining safe, comfortable and efficient environments.



Ingersoll Rand (NYSE:IR) is a world leader in creating and sustaining safe, comfortable and efficient environments in commercial, residential and industrial markets. Our people and our family of brands—including Club Car®, Hussmann®, Ingersoll Rand®, Schlage®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings, transport and protect food and perishables, secure homes and commercial properties, and increase industrial productivity and efficiency. We are a \$13 billion global business committed to sustainable business practices within our company and for our customers.

