Tracker™ Light
Commercial Systems

Big building comfort and control...
small building simplicity
sophisticated building management . . . simply
Tracker Light Commercial Systems

Big building comfort and control . . . small building simplicity

Tracker™ Light Commercial Systems provide ideal heating, ventilating, and air-conditioning (HVAC) solutions for restaurants, office buildings, retail stores, medical buildings, and other light commercial properties. Engineered as a complete solution, the controls and associated equipment integral to each Tracker Light Commercial System operate as a seamless single system—a system that provides the comfort and control expected from big building automation systems with the economy and simplicity appropriate for buildings under 100,000 square feet.

Tracker Light Commercial Systems are simple to:
- Specify
- Install
- Commission
- Operate
- Service

Because they are designed as systems, specifying is as easy as choosing from among common HVAC solutions such as changeover bypass zoning or space conditioning using water-source heat pumps. Installation and commissioning tasks become routine by the simple wiring procedures and automatic configuration of the control network. Operating a Tracker Light Commercial System is easy using either an intuitive operator display with a touch screen or associated PC-based software. Additionally, the remote access capabilities that are built into Tracker Light Commercial Systems make performing advanced diagnostics and scheduling preventive maintenance convenient.

Tracker Light Commercial Systems carry the Trane reputation for quality and reliability. Developed to give customers the best in light commercial building management, these impressive products provide sophisticated building management . . . simply.
Tracker Light Commercial Systems

A typical light commercial building has some combination of rooftop units or water-source heat pumps and fans, heaters, zone dampers, sensors, lighting, and other miscellaneous controllers operating a variety of equipment to maintain a comfortable environment. Managing these buildings involves complex tasks such as simultaneously controlling the temperature in hundreds of spaces. As tasks become more complex, the use of a building-wide controller becomes more valuable in the effort to provide simple yet cost effective and efficient building control.

The various Tracker Light Commercial Systems provide pre-engineered solutions to the core tasks within most common HVAC applications and the flexibility to accommodate additional HVAC or miscellaneous tasks.

Lower long-term building operation costs through coordinated building management

- **Common HVAC applications**—Save energy by using zoning to reduce equipment requirements
- **Open communications protocol**—Allows integration of compatible devices
- **Automatic configuration**—Minimizes installation, commissioning, and service costs
- **Building-wide controllers**—Permit centralized scheduling and coordination of complex tasks
- **Simple operator interfaces**—Facilitate monitoring and control by a variety of personnel (highly technical to casually interested)
- **Optional I/O components**—Allow use of existing equipment, implementation of specialized control strategies (such as indoor air quality), and performance of other miscellaneous tasks (such as lighting control)
- **Modem/Ethernet connections**—Facilitate remote monitoring and control of the building using workstation software
- **System-level functions**—Enable scheduling, alarming, data trending, and reports that can be viewed “at a glance”
Tracker system offerings

Tracker Light Commercial Systems are available in four offerings to accommodate most typical light commercial buildings:

**Tracker System CV** ..................................................... page 6
Constant-volume zoning system (multiple constant-volume rooftop units with multiple zones)

**Tracker System CB** .................................................... page 10
Changeover-bypass zoning system (constant-volume rooftop unit with multiple zones)

**Tracker System VAV** ................................................... page 14
Variable-air-volume zoning system (variable-air-volume rooftop unit with multiple zones)

**Tracker System HP** ..................................................... page 18
Water-source heat pump system (water-source heat pumps)
The Tracker™ System CV provides reliable, centralized control of constant-volume HVAC equipment for optimum comfort and efficiency. This system is capable of controlling multiple (up to 24) constant-volume rooftop units and split single-zone systems—those manufactured by Trane as well as most others.

With the Tracker System CV you can—

- Install quickly and easily using daisy-chain communication link (one twisted-pair wire with no polarity) between the Tracker controller and equipment.
- Manage all scheduling and operating functions using a single touch-screen operator display located on the Tracker panel or at a PC workstation. Centralized control is efficient and effective.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
- Save on time and materials: Use less wire and only a thermistor temperature sensor in each space, rather than a full programmable thermostat.
- Increase energy efficiency by economizing (free cooling with outside air).
- Create custom alarms and send them to remote locations with e-mail and pagers.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation, and generate reports.
- Monitor power consumption by using the pulse-meter input and automatically generate a power consumption report.
- Integrate Tracker Systems CB and/or VAV with this system to expand its capabilities.
Tracker System CV—components

Customize Tracker Light Commercial Systems to suit the needs of your facility . . .

For optimal comfort and efficiency, you can expand the capabilities of the Tracker System CV by integrating it with the Tracker System CB and/or Tracker System VAV. For example, use:

- System CV for the atrium
- System CB for individual office spaces
- System VAV for the manufacturing area

System components

- The Tracker controller, model 12 or 24
- Precedent™ rooftop unit, Voyager™ rooftop unit, or Odyssey™ split systems
- Tracer™ ZN517 unitary controllers, which can be used to control the Odyssey split system as well as most non-Trane brands of rooftop units and split systems
- Tracer MP503 input/output module, which allows additional points to be monitored and controlled

System connection capacities

- The Tracker 12 controller supports up to 12 rooftop units or split systems and 4 Tracer MP503 input/output modules
- The Tracker 24 controller supports up to 24 rooftop units or split systems and 4 Tracer MP503 input/output modules
The Tracker controller

The Tracker controller provides central operation and control for the Tracker System CV. The Tracker controller includes a complete, factory-run-tested, three-piece assembly, which can be snapped together without tools:

- The termination module, which houses and provides access to the termination board and mounting holes. The termination module fits on most standard Asian, European, and US electrical boxes.
- The main module, which houses the main circuit board, PC port, modem, and LAN port.
- The display module, which houses a liquid crystal display (LCD) touch screen.

With the Tracker controller you can—

- Monitor and control the system from one central location.
- Install system using one simple communication link (single twisted pair) to all zones and the rooftop or split unit.
- Create up to 10 different schedules for individual devices, groups zone controllers, or individual binary outputs (useful for lighting control).
- Control after-hours timed override functions.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation.
- Create custom alarms to monitor critical parameters.
- Send alarms and messages to pagers with the built-in standard modem.
- Send alarms and messages to an e-mail address using the optional Ethernet card and the LAN/WAN.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
- Specify a password to provide system security.
- Monitor power consumption by using the pulse-meter input and automatically generate a power consumption report.
- Control zone temperature setpoints from the Tracker controller or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the Tracker controller).
- Maintain weekly schedules as well as holiday and exception schedules.
- Use the priority shutdown input for an orderly system-wide shutdown.

Precedent rooftop unit, Voyager rooftop unit, and Odyssey split system with ReliaTel control

Trane offers a full range of sizes of Precedent and Voyager rooftop units (from 3 – 25 tons) and Odyssey split systems. A reliable, intelligent factory-installed electronic controller called the ReliaTel™ control is available on all of these rooftop units and split systems. The ReliaTel control is a communicating interface that permits full integration of the rooftop unit or split system into the Tracker system.

ReliaTel control has the following features and benefits—

- Eliminates the need for field-installed components, such as anti-short-cycle timers, time delay relays, and minimum on/off timers, saving on time and materials.
- Its built-in unit testing sequence is simple and convenient—no special tools are required.
- The LEDs indicate proper operation.
- The built-in soft start feature lessens electrical spikes by staging on fans, compressors, and heaters.
- If communication to the Tracker controller fails, the intelligent fallback feature keeps the rooftop unit operating at predetermined temperature setpoints.
- Intelligent economizer damper control enables economizing (free cooling with outside air).
Tracker System CV—components

The Tracer ZN517 unitary controller

The Tracer ZN517 unitary controller can be configured to control Odyssey split systems and most non-Trane rooftop units and split systems.

The Tracer ZN517 has the following features and benefits—

- Provides a communicating interface that permits full integration of the rooftop unit or split system into the Tracker system.
- Automatic heat/cool determination.
- Saves energy by controlling the temperature with an optional motion (occupancy) sensor or a time clock.
- Saves energy by economizing (free cooling with outside air).
- Equipment protection is ensured with features such as minimum on/off timer, fan status inputs, fan off delay, and filter maintenance timer.
- Equipment protection for heat pumps. The controllers include inputs that allow for refrigerant high- and low-pressure protection that prevents operation with high/low refrigeration pressure levels.
- A set of factory-programmed occupied, occupied standby, and unoccupied setpoints can be used for energy-savings strategies such as night set-back. During unoccupied conditions, when larger space temperatures swings can be tolerated, controllers significantly reduce unit run-time and save operating expenses.

The fan can run continuously at a given speed or cycle on and off automatically.

- The timed override function for after-hours operation can be activated simply by pressing the on button located on the zone sensor.
- Built-in manual output test. This feature allows you to temporarily override normal unit operation and manually exercise each of the controller outputs.

The Tracer MP503 input/output module

Tracer MP503 input/output (I/O) module is a multi-purpose device used to provide data monitoring and binary control as part of the Tracker System CV. It can monitor a wide variety of sensed conditions and provide equipment start/stop or other switched states. Each Tracker system has the capacity to control four Tracer MP503 modules along with its four universal inputs and four binary outputs, giving a total of sixteen universal inputs and sixteen binary outputs.

The Tracer MP503 has the following features and benefits—

- The four universal inputs of the modules provide very precise sensing of measured variables through the use of high-resolution analog-to-digital converters.
- The modules have a built-in 80 mA, 24 Vdc power supply capable of powering 4–20 mA transmitting sensors. Use any of the four inputs with 4–20 mA sensors.
- The four universal inputs can be configured for use with a Trane 10 kW thermistor temperature sensor, a 0–20 mA relative humidity sensor, or 0–10 Vdc CO2 sensor, or a binary device (for monitoring status of fan or pump operation).
- Each of the four binary outputs can be controlled independently from the Tracker system for on/off functions, including fan control, pump control, lighting control, and staging of heating or cooling equipment.
- Four LEDs on the module indicate the status of an output. An LED illuminates when the associated binary output is energized. With only a glance, you can tell if the associated controlled device is powered on or off.
- A default state in each binary output ensures fail-safe operation of controlled equipment in the event of a system-level communication loss. Configure the output default to on or off, or to maintain its current state.
- The modules have an extended operating temperature range from -40°F to 158°F (-40°C to 70°C). This extended range allows placement of modules in locations not suitable for other building control modules.
The Tracker™ System CB is a changeover-bypass variable-air-volume (VAV) system developed for light commercial applications. It combines the comfort benefits of VAV with the economy and simplicity of packaged, constant-volume unitary equipment. This system responds to changing cooling or heating requirements by varying the quantity or volume of air delivered to each zone. Each zone has its own thermostat for individual comfort control.

A central (unitary) air-conditioning unit delivers a constant volume of air to the system. As the volume of air required by the zones changes, excess supply air is directed to the return duct by a bypass duct and damper.

With the Tracker System CB you can—

- Install quickly and easily using daisy-chain communication link (one twisted-pair wire).
- Perform automatic configuration and start-up.
- Manage all scheduling and operating functions using a single touch-screen operator display or a PC workstation. Centralized control is efficient and effective.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
- Increase energy efficiency by economizing (free cooling with outside air) and using occupancy sensors in zones.
- Create custom alarms and send them to remote locations with e-mail and pagers.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation, and generate reports.
- Monitor power consumption by using the pulse-meter input and automatically generate a power consumption report.
- Add an easy snap-in relay board to the CCP to provide control for a non-Trane rooftop unit or split system.
**Tracker System CB**

**Tracker System CB—components**

**Customize Tracker Light Commercial Systems to suit the needs of your facility . . .**

For optimal comfort and efficiency, you can expand the capabilities of the Tracker System CB by integrating it with the Tracker System CV and/or Tracker System VAV. For example, use:

- System CV for the atrium
- System CB for individual office spaces
- System VAV for the manufacturing area

**System components**

- The Central Control Panel (CCP) with optional operator display
- The Tracker controller (optional), model 12 or 24
- Precedent™ rooftop unit, Voyager™ rooftop unit, or Odyssey™ split system
- Communicating bypass controller
- VariTrac™ zone dampers with electronic controls
- Tracer™ MP503 input/output module, which allows additional points to be monitored and controlled

**System connection capacities**

- Each CCP can control up to 24 VariTrac zone dampers and 1 rooftop unit or split system.
  - Expand the system with the Tracker 12 controller by integrating up to 5 CCPs (with up to 24 VariTrac zone dampers per CCP). This expanded Tracker system can also support 4 Tracer MP503 input/output modules and up to 12 additional rooftop units or split systems (Tracker System CV).
  - Expand the system with the Tracker 24 controller by integrating up to 10 CCPs (with up to 24 VariTrac zone dampers per CCP). This expanded Tracker system can also support 4 Tracer MP503 input/output modules and up to 24 additional rooftop units or split systems (Tracker System CV).
Tracker System CB—components

Central Control Panel (CCP) with optional operator display

The heart of the system is the Central Control Panel (CCP). The CCP acts as the communications hub of the system. It is responsible for coordinating the actions of the rooftop unit with the actions of the VariTrac zone dampers to meet the comfort requirements of the zones. The CCP arbitrates system heating and cooling decisions to optimize system supply air temperature and static pressure. The optional relay board enables control of non-Trane HVAC equipment.

The optional operator display is a back-lit, liquid crystal display with touch-screen programming capability. Using the operator display, the operator can monitor system and zone status, perform basic setup of the VariTrane VAV units, and configure CCP and rooftop unit or split system operating parameters. The operator display is designed to allow an installer to commission a CCP without using a PC.

The CCP allows you to—
- View the status of HVAC equipment and all zones from one central location.
- Perform automatic configuration and start-up.
- Install system using one simple communication link (single twisted pair) to all zones and the rooftop unit or split system.
- Implement CO₂-based demand control ventilation to maintain air quality.
- Save energy by using occupancy sensors in individual zones.
- Maintain simple weekly scheduling (must have the operator display for this function).
- Configure maximum and minimum airflow parameters.
- Control zone temperature setpoints from the CCP or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the CCP).
- Use the priority shutdown input for an orderly system-wide shutdown.
- Control a non-Trane rooftop unit or split system by adding a quick snap-in relay board to the CCP.
- Specify a password to provide system security.

The Tracker controller

The optional Tracker controller can be used with the Tracker System CB for two purposes:
- To provide centralized operation and control for multiple Tracker System CBs that are connected together to form a single system. The CCPs on this system do not need operator displays, since the Tracker controller provides one for the entire system.
- To provide more sophisticated control than a CCP, including full-year scheduling, trends, custom alarms, remote access, and optimal start-up.

The Tracker controller includes a complete, factory-run-tested, three-piece assembly, which can be snapped together without tools:
- The termination module, which houses and provides access to the termination board and mounting holes. The termination module fits on most standard Asian, European, and US electrical boxes.
- The main module, which houses the main circuit board, PC port, modem, and LAN port.
- The display module, which houses a liquid crystal display (LCD) touch screen.

With the Tracker controller you can—
- Monitor and control the system from one central location.
- Install system using one simple communication link (single twisted pair) to all zones and the rooftop unit or split system.
- Create up to 10 different schedules for individual devices, groups of zone controllers, or individual binary outputs (useful for lighting control).
- Control after-hours timed override functions.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation.
- Create custom alarms to monitor critical parameters.
- Send alarms and messages to pagers with the built-in standard modem.
- Send alarms and messages to an e-mail address using the optional Ethernet card.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
- Specify a password to provide system security.
- Monitor power consumption by using the pulse-meter input. (This feature includes an automatic power consumption report.)
- Control zone temperature setpoints from the Tracker controller or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the Tracker controller).
- Maintain weekly schedules as well as holiday and exception schedules.
- Use the priority shutdown input for an orderly system-wide shutdown.
- Maintain air quality by monitoring and controlling CO₂ levels in your facility.
Trane offers a full range of sizes of Precedent and Voyager rooftop units (from 3–25 tons) and Odyssey split systems. A reliable, intelligent factory-installed electronic controller called the ReliaTel™ control is available on all of these rooftop units and split systems. The ReliaTel control is a communicating interface that permits full integration of the rooftop unit or split system into the Tracker system.

ReliaTel control has the following features and benefits—

- Eliminates the need for field-installed components, such as anti-short-cycle timers, time delay relays, and minimum on/off timers, saving on time and materials.
- Its built-in unit testing sequence is simple and convenient—no special tools are required.
- The LEDs indicate proper operation.
- The built-in soft start feature lessens electrical spikes by staging on fans, compressors, and heaters.
- Intelligent economizer damper control enables economizing (free cooling with outside air).

Communicating bypass controller

The communicating bypass controller is composed of an integrated control circuit board, static pressure sensor, and discharge air temperature sensor. The controller uses the static pressure sensor to measure duct static pressure and positions the bypass damper(s) to maintain the static pressure setpoint.

VariTrac zone damper

A VariTrac zone damper is a fully modulating, pressure-dependent VAV device. A VariTrac zone damper controls zone temperature by varying the volume of air flowing into a space and, optionally, controlling local heat. Each damper has an attached control box with a VAV control board and actuator enclosed.

The Tracer MP503 input/output module

The Tracer MP503 input/output module is a multi-purpose device that provides data monitoring and binary control on a Tracker System CB that uses a Tracker controller. It can monitor a wide variety of sensed conditions and provide equipment start/stop or other switched states. Each Tracker system has the capacity to control four Tracer MP503 modules along with its four universal inputs and four binary outputs, giving a total of sixteen universal inputs and sixteen binary outputs.

- The Tracer MP503 has the following features and benefits—
- The four universal inputs of the modules provide very precise sensing of measured variables through the use of high-resolution analog-to-digital converters.
- The modules have a built-in 80 mA, 24 Vdc power supply capable of powering 4–20 mA transmitting sensors. Use any of the four inputs with 4–20 mA sensors.
- The four universal inputs can be configured for use with a Trane 10 kW thermistor temperature sensor, a 0–20 mA absolute humidity sensor, or 0‒10 Vdc CO₂ sensor, or a binary device (for monitoring status of fan or pump operation).
- Each of the four binary outputs can be controlled independently from the Tracker system for on/off functions, including fan control, pump control, lighting control, and staging of heating or cooling equipment.
- Four LEDs on the module indicate the status of an output. An LED illuminates when the associated binary output is energized. With only a glance, you can tell if the associated controlled device is powered on or off.
- A default state in each binary output ensures fail-safe operation of controlled equipment in the event of a system-level communication loss. Configure the output default to on or off, or to maintain its current state.
- The modules have an extended operating temperature range from -40°F to 158°F (-40°C to 70°C). This extended range allows placement of modules in locations not suitable for other building control modules.
The Tracker™ System VAV provides all the efficiency and control of a true VAV system—normally found only on very large buildings—in an economical package suitable for medium-sized buildings. This system controls discharge air temperature and static pressure for optimum space comfort with minimum energy consumption.

With the Tracker System VAV you can—

- Install quickly and easily using daisy-chain communication link (one twisted-pair wire).
- Perform automatic configuration and start-up.
- Manage all scheduling and operating functions using a single touch-screen operator display or a PC workstation. Centralized control is efficient and effective.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
- Increase energy efficiency by economizing (free cooling with outside air), using occupancy sensors in zones, optimizing fan speed, and using discharge-air-temperature reset.
- Create custom alarms and send them to remote locations with e-mail and pagers.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation, and generate reports.
- Monitor power consumption by using the pulse-meter input and automatically generate a power consumption report.
- Integrate the Tracker Systems CV and/or CB to this system to expand its capabilities.
Tracker System VAV—components

Customize Tracker Light Commercial Systems to suit the needs of your facility . . .

For optimal comfort and efficiency, you can expand the capabilities of the Tracker System VAV by integrating it with the Tracker System CV and/or Tracker System CB. For example, use:
- System CV for the atrium
- System CB for individual office spaces
- System VAV for the manufacturing area

System components

The Tracker VAV system requires the following combination of Trane products:
- Central Control Panel (CCP) with operator display
- The Tracker controller (optional), model 12 or 24
- Voyager™ Commercial 27 ½ to 50-ton VAV packaged rooftop unit with factory-installed inlet guide vanes or variable frequency drive, electronic controls, and Trane communications interface
- VariTrane™ VAV units
- Tracer™ MP503 input/output module (optional), which allows additional points to be monitored and controlled

System connection capacities

- Each CCP can control up to 32 VariTrane VAV units) and 1 rooftop unit.
  - Expand the system with the Tracker 12 controller by integrating up to 5 CCPs (with up to 32 VariTrane VAV units per CCP). This expanded Tracker system can also support 4 Tracer MP503 input/output modules and up to 12 additional rooftop units (Tracker System CV).
  - Expand the system with the Tracker 24 controller by integrating up to 10 CCPs (with up to 32 VariTrane VAV units per CCP). This expanded Tracker system can also support 4 Tracer MP503 input/output modules and up to 24 additional rooftop units (Tracker System CV).
Central Control Panel (CCP) with operator display

The heart of the system is the Central Control Panel (CCP) with operator display. The CCP acts as the communications hub of the system. It is responsible for coordinating the actions of the VAV rooftop unit with the actions of the VariTrane VAV units to meet the comfort requirements of the zones. The operator display is a back-lit, liquid crystal display with touch-screen programming capability. Using the operator display, the operator can monitor system and zone status, perform basic setup of the VariTrane VAV units, and configure CCP and rooftop unit operating parameters. The operator display is designed to allow an installer to commission the CCP without using a PC (except for air-balancing function).

The CCP allows you to—
- View the status of HVAC equipment and all zones from one central location.
- Perform automatic configuration and start-up.
- Install system using one simple communication link (single twisted pair) to all zones and the rooftop unit.
- Implement CO2-based demand control ventilation to maintain air quality.
- Maintain simple weekly scheduling.
- Configure maximum and minimum airflow parameters.
- Control zone temperature setpoints from the CCP or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the CCP).
- Save energy by using occupancy sensors in individual zones.
- Save energy by economizing (free cooling with outside air).
- Use discharge-air-temperature reset to increase efficiency. The discharge-air-temperature setpoint may be reset from a zone temperature, return air temperature, or outdoor air temperature input.
- Optimize fan speed to maintain lowest possible static pressure that will still maintain comfort in the zones.
- Use the system balance mode option to enable accurate calibration of airflow.
- Use the morning warm-up function to provide an efficient transition from unoccupied to occupied modes to increase comfort.
- Optimize efficiency by operating the rooftop unit as a constant-volume unit during unoccupied hours.
- Use the priority shutdown input for an orderly system-wide shutdown.
- Specify a password to provide system security.

The Tracker controller

The Tracker controller can be used with the Tracker System VAV for two purposes:
- To provide centralized operation and control for multiple Tracker System VAVs that are connected together to form a single system.
- To provide more sophisticated control than a CCP, including full-year scheduling, trends, custom alarms, remote access, and optimal start-up.

The Tracker controller includes a complete, factory-run-tested, three-piece assembly, which can be snapped together without tools:
- The termination module, which houses and provides access to the termination board and mounting holes. The termination module fits on most standard Asian, European, and US electrical boxes.
- The main module, which houses the main circuit board, PC port, modem, and optional LAN port.
- The display module, which houses a liquid crystal display (LCD) touch screen.

With the Tracker controller you can—
- Monitor and control the system from one central location.
- Install the system using one simple communication link (single twisted pair) to all zones and the rooftop unit.
- Create up to 10 different schedules for individual devices, groups of zone controllers, or individual binary outputs (useful for lighting control).
- Control after-hours timed override functions.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation.
- Create custom alarms to monitor critical parameters.
- Send alarms and messages to pagers with the built-in standard modem.
- Send alarms and messages to an e-mail address using the optional Ethernet card and the LAN/WAN.
- Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.
Specify a password to provide system security.

Monitor power consumption by using the pulse-meter input. (This feature includes an automatic power consumption report.)

Control zone temperature setpoints from the Tracker controller or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the Tracker controller).

Maintain weekly schedules as well as holiday and exception schedules.

Use the priority shutdown input for an orderly system-wide shutdown.

Maintain air quality by monitoring and controlling CO₂ levels in your facility.

**Voyager Commercial VAV packaged rooftop unit with Voyager Micro control**

Trane offers a line of Voyager Commercial VAV packaged rooftop units ranging from 27½ to 50 tons. A reliable, intelligent factory-installed electronic controller called the Voyager Micro control is installed on all of these HVAC units. The Voyager Micro is a communicating interface that permits full integration of the HVAC unit into the Tracker system.

Voyager Micro control has the following features and benefits—

- Eliminates the need for field-installed components, such as anti-short-cycle timers, time delay relays, and minimum on/off timers, saving on time and materials.
- Stages on fans, compressors, and heaters to soften electrical spikes.

**VariTrane VAV units**

Each zone in your building is served by a VariTrane VAV unit, which controls the zone temperature by modulating the air valve of the unit. All VariTrane VAV units have been tested in accordance with industry-accepted standards for ventilation and indoor air quality, pressure drop, flow performance, and acoustical performance.

The three most commonly used types of VariTrane VAV units are:

- **VCCF:** Single-duct units provide an economical energy savings system solution. This is the most common type of VAV unit (pictured here).
- **VPCF:** Fan-powered parallel units offer energy savings due to intermittent fan control. They are an excellent choice when minimal zone heating is needed.
- **VSCF:** Series fan-powered units have fans which are always energized. They are common in premium VAV systems and in applications such as conference rooms and cafeterias.

**The Tracer MP503 input/output module**

The Tracer MP503 input/output module is a multi-purpose device that provides data monitoring and binary control on a Tracker System VAV that uses a Tracker controller. It can monitor a wide variety of sensed conditions and provide equipment start/stop or other switched states. Each Tracker system has the capacity to control four Tracer MP503 modules along with its four universal inputs and four binary outputs, giving a total of sixteen universal inputs and sixteen binary outputs.

The Tracer MP503 has the following features and benefits—

- The four universal inputs of the modules provide very precise sensing of measured variables through the use of high-resolution analog-to-digital converters.
- The modules have a built-in 80 mA, 24 Vdc power supply capable of powering 4–20 mA transmitting sensors. Use any of the four inputs with 4–20 mA sensors.
- The four universal inputs can be configured for use with a Trane 10 kW thermistor temperature sensor, a 0–20 mA relative humidity sensor, or 0–10 Vdc CO₂ sensor, or a binary device (for monitoring status of fan or pump operation).
- Each of the four binary outputs can be controlled independently from the Tracker system for on/off functions, including fan control, pump control, lighting control, and staging of heating or cooling equipment.
- Four LEDs on the module indicate the status of an output. An LED illuminates when the associated binary output is energized. With only a glance, you can tell if the associated controlled device is powered on or off.
- A default state in each binary output ensures fail-safe operation of controlled equipment in the event of a system-level communication loss. Configure the output default to on or off, or to maintain its current state.
- The modules have an extended operating temperature range from -40°F to 158°F (-40°C to 70°C). This extended range allows placement of modules in locations not suitable for other building control modules.
The Tracker™ System HP integrates the inherent energy efficiency of heat pump systems with the sophistication of electronic controls to optimize Trane heat pump systems for maximum comfort and energy savings. The Tracker System HP uses energy-efficient boilers, cooling towers, and even the ground (geothermal energy) to collect and reject heat in system-wide water loops. Only when necessary, the system adds local-space mechanical heat/cool to provide adequate occupant comfort.

The Tracker controller communicates with one Tracer™ Loop Controller by using a standard communications link to provide automated control for the entire building from a single location. The Tracker controller works in tandem with the Tracer Loop Controller to communicate with the heat pump controllers. Each system is capable of controlling a mixing valve, enabling a boiler, sequencing four stages of cooling tower, coordinating a supply pump, and controlling up to 100 water-source heat pumps.

With the Tracker System HP you can—

- Install quickly and easily using daisy-chain communication link (one twisted-pair wire).
- Perform automatic configuration and start-up.
- Manage all scheduling and operating functions using the Tracker controller touch-screen operator display or a PC workstation for centralized control.
- Monitor and control the system remotely from almost anywhere using the Tracker PC software and a phone line or the LAN/WAN.
- Minimize energy consumption with loop temperature optimization and by using occupancy sensors in zones.
- Protect the water loop and building from dangerously cold temperatures with built-in safety features.
- Create custom alarms and send them to remote locations with e-mail and pagers.
- Program simple routines to control binary outputs for more flexibility.
- Create custom trends to track various aspects of building operation, and generate reports.
- Monitor power consumption by using the pulse-meter input and automatically generate a power consumption report.
System components

- The Tracer Loop Controller
- The Tracker WSHP controller (optional)
- Trane water-source heat pumps and non-Trane water-source heat pumps equipped with one of the following unit controllers
- Any of the following water-source heat pump unit controllers:
  - Tracer ZN510/511 zone controller
  - Tracer ZN517 unitary controller
  - Tracer ZN524 water-source heat pump unit controller
- Tracer MP503 input/output module, which allows additional points to be monitored and controlled

System connection capacities

The Tracker WHSP controller supports up to:
- 100 water-source heat pumps
- 1 Tracer Loop Controller
- 4 Tracer MP503 input/output modules
The heart of the system is the Tracer Loop Controller, which acts as the communications hub of the system. It is responsible for coordinating the actions of the individual heat pumps and the system components—the boiler, cooling tower, supply pump, and mixing valve. This coordination maintains an optimum water temperature in the loop to maximize the efficiency of the units.

**The Tracer Loop Controller**
- Sequences supply pumps for lead/lag operation.
- Protects heat pump compressors by disabling them on a loss of flow.
- Enables the boiler.
- Modulates a mixing valve to temper the water in the main loop.
- Monitors boiler loop temperature for additional safety.
- Supports open and closed towers, as well as geothermal systems.
- Controls four stages of cooling tower.
- Supports different fan schemes including individual fan cells, two-speed motors, and pony-motors.

If the optional Tracker controller is used in a Tracker System HP, the Tracker controller and the Tracer Loop Controller work in tandem to coordinate the water-source heat pumps, to control the sequences and general operation of the system, and to optimize the cooling tower, boiler valves, and heat pumps. A Tracker controller provides more sophisticated control than a Tracer Loop Controller, including full-year scheduling, trending and reporting, custom alarms, remote access, and optimal start-up.

The Tracker controller includes a complete, factory-run-tested, three-piece assembly, which can be snapped together without tools:
- The termination module, which houses and provides access to the termination board and mounting holes. The termination module fits on most standard Asian, European, and US electrical boxes.
- The main module, which houses the main circuit board, PC port, modem, and optional LAN port.
- The display module, which houses a liquid crystal display (LCD) touch screen.

**With the Tracker controller you can**
- Monitor and control the system from one central location.
- Install system using one simple communication link (single twisted pair) to all water-source heat pumps.

**Create up to 10 different schedules for equipment or individual binary outputs (useful for lighting control).**
- **Control after-hours timed override functions.**
- **Program simple routines to control binary outputs for more flexibility.**
- **Create custom trends to track various aspects of building operation.**
- **Create custom alarms to monitor critical parameters.**
- **Send alarms and messages to pagers with the built-in standard modem.**
- **Send alarms and messages to an e-mail address using the optional Ethernet card and the LAN/WAN.**
- **Monitor and control the system remotely from almost anywhere using the PC software and a phone line or the LAN/WAN.**
- **Specify a password to provide system security.**
- **Monitor power consumption by using the pulse-meter input. (This feature includes an automatic power consumption report.)**
- **Control zone temperature setpoints from the Tracker controller or the local zone sensor thumbwheel (zone sensor setpoints can also be limited from the Tracker controller).**
- **Maintain weekly schedules as well as holiday and exception schedules.**
- **Use the priority shutdown input for an orderly system-wide shutdown.**
- **Maintain air quality by monitoring and controlling CO2 levels in your facility.**

**Tracer ZN510/ZN511 zone controller**

The Tracer ZN510 is factory installed on Trane heat pumps, and the Tracer ZN511 is the field-installed equivalent. They can be configured to control water-source heat pumps.
Tracker System HP—components

The Tracer ZN510/511 has the following features and benefits—

- Provides a communicating interface that permits full integration of the water-source heat pump into the Tracker system.
- **Automatic heat/cool determination.**
- Random start feature. Staggers multiple unit start-up to reduce electrical demand spikes.
- **Equipment protection for heat pumps:** Refrigerant high- and low-pressure protection prevents operation with high/low refrigeration pressure levels.
- **Compressor minimum on and off timers** prevent short cycling and extend compressor life.
- **Low-temperature detection inputs** that provide freeze protection.
- **Built-in manual output test.** This feature allows you to temporarily override normal unit operation and manually exercise each of the controller outputs.
- **A set of factory-programmed occupied, occupied standby, and unoccupied setpoints** that can be used for energy-savings strategies such as night set-back. During unoccupied conditions, when larger space temperatures swings can be tolerated, controllers significantly reduce unit run-time and save operating expenses.
- The fan can run continuously at a given speed, cycle on and off automatically, or determine optimum speed automatically.
- **Built-in refrigerant high- and low-pressure protection capabilities** prevent the unit from operating with high/low refrigeration pressure levels that may occur under abnormal system conditions.

**Tracer ZN517 unitary controller**

The Tracer ZN517 unitary controller can be configured to control water-source heat pumps.

**The Tracer ZN517 has the following features and benefits—**

- Provides a communicating interface that permits full integration of the water-source heat pump into the Tracker system.
- **Automatic heat/cool determination.**
- Saves energy by controlling the temperature with an optional motion (occupancy) sensor or a time clock.
- Equipment protection is ensured with features such as minimum on/off timer, fan status inputs, fan off delay, and filter maintenance timer.
- **Equipment protection for heat pumps:** The controllers include inputs that allow for refrigerant high- and low-pressure protection that prevents operation with high/low refrigeration pressure levels.
- Saves energy by economizing (free cooling with outside air).
- **A set of factory-programmed occupied, occupied standby, and unoccupied setpoints** can be used for energy-savings strategies such as night set-back. During unoccupied conditions, when larger space temperatures swings can be tolerated, controllers significantly reduce unit run-time and save operating expenses.
- The fan can run continuously at a given speed or cycle on and off automatically.
- The timed override function for after-hours operation can be activated simply by pressing the **ON** button located on the zone sensor.
- **Built-in manual output test.** This feature allows you to temporarily override normal unit operation and manually exercise each of the controller outputs.

**Tracer ZN524 water-source heat pump unit controller**

Tracer ZN524 water-source heat pump unit controller controls a wide range of water-source heat pump equipment.

**The Tracer ZN524 has the following features and benefits—**

- Provides a communicating interface that permits full integration of the HVAC unit into the Tracker system.
- **Automatic heat/cool determination.**
- Random start feature. Staggers multiple unit start-up to reduce electrical demand spikes.
- **A set of factory-programmed occupied, occupied standby, and unoccupied setpoints** can be used for energy-savings strategies such as night set-back. During unoccupied conditions, when larger space temperatures swings can be tolerated, controllers significantly reduce unit run-time and save operating expenses.
- Performs dehumidification to maintain relative humidity levels for occupant comfort and minimize the risk of microbial growth and damage to the building and its furnishings.
- **Supports a two-position waterside economizer** through the use of an economizer coil that also saves energy when conditions are appropriate.
- **Compressor minimum on and off timers** prevent short cycling and extend compressor life.
- **Timed override feature for after-hours operation** allows users to request unit operation by the touch of a button on the unit space.
temperature sensor. Users can press the CANCEL button at any time to return the unit back to unoccupied mode.

- Fan status monitoring for proof of airflow. This cost-effective feature is commonly used on direct-drive fan applications.
- The fan can run continuously at a given speed or cycle on and off automatically.
- Built-in manual output test. This feature allows you to temporarily override normal unit operation and manually exercise each of the controller outputs.
- Built-in refrigerant high- and low-pressure protection capabilities prevent the unit from operating with high/low refrigeration pressure levels that may occur under abnormal system conditions.
- A condensate overflow switch to prevent water damage.
- Can be configured for compressor heat, electrical heat, or both.

The Tracer MP503 input/output module

The Tracer MP503 input/output module is a multi-purpose device that provides data monitoring and binary control on a Tracker System HP that uses a Tracker controller. It can monitor a wide variety of sensed conditions and provide equipment start/stop or other switched states. Each Tracker system has the capacity to control four Tracer MP503 modules along with its four universal inputs and four binary outputs, giving a total of sixteen universal inputs and sixteen binary outputs.

The Tracer MP503 has the following features and benefits—

- The four universal inputs can be configured for use with a Trane 10 kW thermistor temperature sensor, a 0–20 mA relative humidity sensor, or 0–10 Vdc CO₂ sensor, or a binary device (for monitoring status of fan or pump operation).
- Each of the four binary outputs can be controlled independently from the Tracker system for on/off functions, including fan control, pump control, lighting control, and staging of heating or cooling equipment.
- Four LEDs on the module indicate the status of an output. An LED illuminates when the associated binary output is energized. With only a glance, you can tell if the associated controlled device is powered on or off.
- A default state in each binary output ensures fail-safe operation of controlled equipment in the event of a system-level communication loss. Configure the output default to on or off, or to maintain its current state.
- The modules have an extended operating temperature range from -40°F to 158°F (-40°C to 70°C). This extended range allows placement of modules in locations not suitable for other building control modules.