



Guide Specifications

Voyager III Rooftop Units

TKD/TKH 275-300-350-400-500-600

WKD/WKH 400-500-600

YKD/YKH 275-300-350-400-500-600

DKD/DKH 400-500-600



General

Units shall be dedicated downflow or horizontal airflow. Operating range shall be between 50°C and -18°C cooling as standard for all units. All units shall be factory assembled, internally wired, fully charged with refrigerant, and 100 percent run-tested before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification. The unit shall be available with a main refrigeration circuit in cooling only and reversible versions. Auxiliary heat type shall be selectable: Hot water heat, Gas heater and electrical heater in both refrigeration circuit versions.

Performance

The unit shall be certified and registered on the Eurovent certification under RT program (<http://www.eurovent-certification.com>).

Casing

Unit casing shall be constructed of zinc coated, heavy-gauge, galvanized steel. All exterior components shall be mounted in a weather resistant steel cabinet and painted with a polyester white RAL 9002 powder paint. Where top cover seams exist, they shall be double hemmed and gasket sealed to prevent water leakage. Cabinet construction shall allow access for all maintenance from two sides of the unit. Service panels shall have handles and shall be removable while providing a water and air tight seal. The indoor air section shall be completely insulated with fire resistant, permanent, odorless glass fiber material, aluminum foil faced. The base of the unit shall have provisions for crane lifting.

Hinged Service Access + ¼ locks: Standard

Filter access panel and supply fan access panel shall be hinged for ease of unit service + ¼ turn locks shall be standard. Electrical Control box upper access door shall deliver a protection against rain or snow during commissioning and maintenance operations.

Filters

The unit shall be provided as standard with 50 mm, throwaway EU3 filters. 50 mm EU4, 100 mm EU4 filters shall be optional.

Compressors

All units shall have Trane CSHD/CSHN scroll type compressors. Compressor shall be direct-drive, hermetic with self-lubrication. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage. Internal temperature and current sensitive motor overloads shall be included for maximum protection. Each compressor shall be protected by external discharge temperature thermostat, winding temperature thermostat and reverse rotation/phase loss protection. Each compressor shall have crankcase heaters installed, properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles. All scroll compressors shall be provided with phase monitoring protection.

Refrigerant Circuits

The unit shall be operating with R410A HFC-based refrigerant. Each refrigerant circuit shall have independent thermostatic expansion devices, service pressure ports and refrigerant line filter driers factory-installed as standard. An area shall be provided for replacement suction line driers. Refrigeration circuit shall be protected against refrigerant leak by a low pressure switch. Service valves shall be provided as standard and located on low pressure and high pressure side of the refrigeration piping.

Evaporator and Condenser Coils

Condenser coils shall have 3/8" (10 mm) copper tubes mechanically bonded to lanced aluminum plate fins. Evaporator coils shall be 3/8" (13 mm) internally finned copper tubes mechanically bonded to high performance aluminum plate fins. All coils shall be leak tested at the factory to ensure pressure integrity. All coils shall be leak tested to 2.1 MPa and pressure tested to 4.5 MPa. All evaporator coils shall be of intermingled configuration. Sloped condensate drain pans are standard. Indoor coil shall be protected as standard on all units by an antifrost thermostat.

Outdoor Fans

The outdoor fans shall be direct drive, statically and dynamically balanced, draw-through in the vertical discharge position. The fan motors shall be permanently lubricated and shall have built-in thermal overload protection.

Indoor Fan

Units shall have belt driven, forward curved centrifugal fans with fixed motor sheaves. All motors shall be circuit breaker protected.

Controls

The unit shall be completely factory wired with necessary controls and terminal block for power wiring. Units shall provide an external location for mounting of a fused disconnect device. A unit controller shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point and provides better building comfort. The unit controller shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection. Heat pump units shall manage defrost cycles based on demand defrost logic on the two independent circuits. Electrical components and wiring shall be compliant with EN 60204-1 electrical directive. The unit shall be powered by 400V/3/50Hz supply (without neutral) on a single point of power connection.

Ventilation Override shall allow a binary input from the fire/life safety panel to cause the unit to override standard operation and assume one of two factory preset ventilation sequences, exhaust or pressurization. The two sequences shall be selectable based on a binary select input.

Phase monitoring relay: Standard

The unit shall detect phase loss, phase reversal from main power supply. In case of fault, the unit shall stop.

Through-The-Base Electrical Provision: Standard

An electrical service entrance shall be standard for easy access to route all high and low voltage electrical wiring inside the curb, through the bottom (vertically) and through the side (horizontally) of the outdoor section of the unit and into the control box area.

Disconnect Switch: Standard

A factory installed disconnect switch with external handle shall be standard. The disconnect switch shall be mounted inside the unit control box. It should avoid power side access when the switch is set in the ON position.

Options and Accessories

Manual Fresh Air damper

A manually controllable outside air damper shall be adjustable for up to 25 percent outside air. Manual damper is set at the desired position at unit start up.

Economizer

The economizer shall be factory installed. The assembly includes: fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness, and differential enthalpy control.

Barometric Relief

The barometric relief damper shall be optional with the economizer. It shall be available as a factory installed option on all units. Option shall provide a pressure operated damper for the purpose of space pressure equalization and be gravity closing to prohibit entrance of outside air during the equipment "off" cycle.

Power Exhaust Fan

Power exhaust shall be optional with the economizer. It shall be available as a factory installed option on all units. It shall assist the barometric relief damper in maintaining building pressurization.

Remote Potentiometer

A remote potentiometer shall be available to remotely adjust the unit economizer minimum position.

CO₂ Sensor

This accessory shall be compatible with economizer options. It shall measure CO₂ concentration in order to increase or decrease the fresh air amount in the building.

Variable Frequency Drives (VFDs)

VFDs shall be factory installed and tested to provide supply fan motor speed modulation. The VFD shall receive a 2-10 VDC signal from the unit controller based upon supply zone heating/cooling demand and shall cause the drive to accelerate or decelerate as required to maintain the zone temperature setpoint. When subjected to high ambient outdoor conditions the VFD shall reduce its output frequency to maintain operation.

Fan Fail Switch

This option allows checks for supply fan pressure. The fan failure switch will stop all unit functions and report Service alarm on the zone sensor module or Building management system.

Clogged Filter Switch

This option allows for individual dirty filter indication. The switch will light the Service LED on the zone sensor and will allow continued unit operation.

Smoke Detector

This option shall trip off in case of presence of smoke in the supply side of the unit and shall close the return air damper, if any, and stop the unit.

Phase monitoring relay

The phase monitoring relay shall detect phase loss, phase reversal and phase imbalance from main power supply. In case of fault, the unit must stop.

Black Epoxy Fin Coating

An optional coil corrosion resistant coating shall protect indoor and outdoor aluminum fins.

Fire thermostats

Field installed manually resettable high temperature thermostats shall provide input to the unit controls to shut down the system if the temperature sensed is 57°C at the return or 115°C at the discharge.

Roof Curb – Downflow

The roof curb shall be designed to mate with the downflow unit and provide support and watertight installation when installed properly.

The roof curb design shall allow field fabricated rectangular supply/return ductwork to be connected directly to the curb. Curb shall be shipped knocked down for field assembly.

Adjustable Roof Curb

This factory assembled accessory is adjustable on site and allows correction of the slope of the roof up to 5%.

Hot Water Coil

This option shall be factory mounted and placed in the discharge section. It shall be shipped with one 3-way valve, 0 to 100% modulating built-in control and freeze protection. If needed, on reversible unit, hot water coil shall be selected as first source of heat before mechanical heating.

Electric Heaters

Electric heat shall be available for factory installation within the basic unit. Electric heater elements shall be constructed of heavy-duty nickel chromium elements connected for 380 and 415 volt. Staging shall be achieved through the unit controller. Each heater package shall have automatically reset high limit control operating through heating element contactors. All heaters shall be individually fused from factory, where required.

Staged Gas Heater

The heating section shall have a drum and tube heat exchanger(s) design using corrosion resistant steel components. A forced combustion blower shall supply premixed fuel to a single burner ignited by a pilotless hot surface ignition system. In order to provide reliable operation, a negative pressure gas valve that requires blower operation shall be used to initiate gas flow. On an initial call for heat, the combustion blower shall purge the heat exchanger(s) 45 seconds before ignition. After three unsuccessful ignition attempts, the entire heating system shall be locked out until manually reset at the thermostat. Units shall be suitable for use with natural gas or propane (field installed kit). All units shall have two-stage heating. Burners of 48kW and 70kW shall have a no emissions of CO (< 0.001%) and NOx emission below 30ppm (class 5 according to the requirements of Standard EN483)

Burners of 77kW shall have a no emissions of CO (< 0.001%) and NOx emission below 50ppm (class 4 according to the requirements of Standard EN483)

Modulating Gas Heater

The gas burner should be modulating from 30% to 100%. Control of the burner should be delivered according to the heating demand and supply air temperature. The burner should be condensing below 60% heating output. Efficiency of the burner should be below 94% at full load and 105% at reduced load. Gas heat exchanger should be drum and tube type, built in stainless steel. A forced combustion blower shall supply premixed fuel to a single burner ignited by pilot burner integrated with spark ignition system. Premix burner shall have a no emissions of CO (0%) and NOx emission below 35ppm (class 5 according to the requirements of Standard EN483)

Energy Recovery Module – General

Heat recovery should include a direct driven exhaust fan. Fan speed should be adjusted by a separate frequency drive according to fresh air flow in order to maintain building pressurization.

Fresh air flow shall be filtered before entering the heat exchanger in order to prevent clogging on the fresh air side.

When free cooling is needed, energy recovery should be by-passed to avoid heat exchange on the fresh flow entering the building.

Energy Recovery Module - Plate heat exchanger version

The energy recovery module should have a total efficiency of 58% or higher at -5°C outdoor, 19°C indoor and 30% fresh air rate. The module shall be equipped with a freeze monitoring pressure switch that initiates defrost cycle when the exchanger is clogged by frost in winter application.

Energy Recovery Module - Heat wheel version

Energy recovery should have a total efficiency of 70% or higher at -5°C outdoor, 19°C indoor and 30% fresh air rate. Fresh air and exhaust air flow shall be filtered before entering the heat exchanger in order to prevent exchanger clogging.

Thermostats and Zone Sensors

The thermostats and zone sensors shall be provided to interface with the ReliaTel® unit controls and shall be available in either manual, automatic programmable with night setback, with system malfunction lights or remote sensor options.

Communication Interface (TCI-R)

ReliaTel® Trane Communication Interface (TCI) shall be provided to interface with the Trane Integrated Comfort™ System and shall be available as a field or factory-installed option. The TCI shall allow control and monitoring of the rooftop unit via a two-wire communication link. The following alarm and diagnostic information shall be available:

Trane Modbus Communication Interface (PIC)

Modbus Communication Interface (PIC) shall be provided to interface with the Trane Integrated Comfort™ System and shall be available field or factory-installed. The PIC shall allow control and monitoring of the rooftop unit via a two-wire communication link and Modbus protocol. The following alarm and diagnostic information shall be available:

LonTalk® Communication Interface (LCI-R)

The field or factory-installed ReliaTel® LonTalk Communication Interface (LCI-R) will be provided to interface with the Trane Integrated Comfort™ System or LonTalk® capable third party building management networks. The LCI-R will allow control and monitoring of the rooftop unit via a two wires communication link.

Reliatel® Unit Controller Originated Data

- Unit operating mode
- Unit failure status
 - Cooling failure
 - Heating failure
 - Emergency service stop indication
 - Supply fan proving
 - Timed override activation
 - High temperature thermostat status
- Zone temperature
- Supply air temperature
- Cooling status (all stages)
- Stage activated or not
- Stage locked out by Reliatel
- HPC status for that stage
- Compressor disable inputs
- Heating status
- Number of stages activated
- High temperature limit status
- Economizer status
- Requested minimum position
- Damper position
- Dry bulb/enthalpy input status
- Outside air temperature
- Outside relative humidity
- Sensor Failure
 - Humidity sensor
 - Outdoor air temperature sensor
 - Supply air temperature sensor
 - Return air temperature sensor
 - Zone temperature sensor
 - Mode input
 - Cooling/heating setpoint from sensors
 - Unit mounted potentiometer
- Unit configuration data
 - Gas or electric heat
 - Economizer present
- Local setpoint
- Local mode setting
- Clogged filter service indicator
- CO₂ setpoint
- CO₂ value

Building Management System Communication Originated Data

- Command operating mode
- Host controllable functions:
 - Supply fan
 - Economizer
 - Cooling stages enabled
 - Heating stages enabled
 - Emergency shutdown
- Minimum damper position
- Heating setpoint
- Cooling setpoint
- Supply air tempering enable/disable
- Slave mode (CV only)
- Tracer/Local operation
- Daytime warm-up enable/disable
- Power exhaust setpoint



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