



# Guide Specifications

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## Voyager II Rooftop Units

TKD/TKH 155-175-200-250-265-290-340

WKD/WKH 125-155-200-265-290-340

YKD/YKH 155-175-200-250

DKD/DKH 125-155-200-265-290-340



## **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. Unit shall be available with a main refrigeration circuit in cooling only and reversible version. Auxiliary heat type shall be selectable: Hot water heat, Gas heater and electrical heater in both refrigeration circuit versions.

## **Performance**

Units shall be certified and registered on the Eurovent certification under RT program (<http://www.eurovent-certification.com>). Units net EER shall be class B (>2.80) or higher in cooling mode except for reversible units of 79kW and 88kW Eurovent cooling capacity. Reversible units net COP shall be class B (>3.20) or higher in heating mode.

## **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 on 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.

## **Service Access ¼ locks: Standard**

Electrical control box access panel, filter access panel and supply fan access panel shall be locked by ¼ turn locks as standard for ease of unit service.

## **Filters**

Units shall be provided in standard with 50 mm, throwaway EU3 filters. 50 mm EU4 filters shall be optional.

## **Compressors**

All units shall have scroll type compressors. Compressors shall be direct-drive, hermetic with self-lubrication. The 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 protected with phase monitoring protection.

## **Refrigerant circuits**

Units shall operate 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 circuits shall be protected against refrigerant leak by a low pressure switch. Service valves shall be provided as standard and located on the low pressure and high pressure side of the refrigeration piping.

## **Evaporator and condenser coils**

Condenser coils shall have 3/8" (9.52 mm) copper tubes mechanically bonded to lanced aluminum plate fins. Evaporator coils shall be 3/8" (9.52 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 coils shall be protected in option with 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 fans**

Units shall have belt driven, forward curved centrifugal fans with variable diameter motor sheaves. All motors shall be protected from overload.

## **Controls**

Units shall be completely factory wired with necessary controls and terminal block for power wiring. Units shall provide an external location for mounting a fused disconnect device. The 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.

Unit shall be powered by 400V/3/50Hz supply (no neutral) on a single point of power connection.

**Ventilation override**

This function 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**

Units 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 which allows 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: Optional**

A factory installed disconnect switch with an external handle shall be mounted inside the unit control box.

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## 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 desired position at unit start up.

**Motorized fresh air damper**

This option shall be factory mounted. Outdoor air rate shall be adjustable from 0 to 50 percent. Once set, outdoor air dampers shall open to the set position when the indoor fan starts. The damper shall close to the full closed position when the indoor fan shuts down.

**Economizer - Downflow**

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. It shall be provided with barometric relief damper. The barometric relief damper shall deliver space pressure equalization and be gravity closing to prohibit entrance of outside air during the equipment "off" cycle.

**Economizer – Horizontal flow**

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.

**Power exhaust fan**

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

**Remote potentiometer**

A remote potentiometer shall be available to remotely adjust the unit fresh air damper minimum position.

**CO<sub>2</sub> sensor**

This accessory shall be compatible with the motorized fresh air damper and economizer options. It shall measure CO<sub>2</sub> concentration in order to increase or decrease the fresh air amount in the building.

**Clogged filter switch**

This option allows for individual dirty filter indication. The switch shall light the Service LED on the zone sensor and 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 shall 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. The 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 basic units. 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.

### **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 no emissions of CO (< 0.001%) and NOx emissions below 30ppm (Class 5 according to the requirements of EN483 standards). Burners of 77kW shall have no emissions of CO (< 0.001%) and NOx emissions below 50ppm (Class 4 according to the requirements of EN483 standards)

### **Energy recovery module – General**

Heat recovery shall include direct driven exhaust fans. The fan speed shall be adjusted by a separate frequency drive according to the 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 shall be bypassed to avoid heat exchange on the fresh flow entering the building.

### **Energy recovery module - Plate heat exchanger version**

The energy recovery module shall have a total efficiency of 51% 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**

The energy recovery shall have a total efficiency of 64% 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-R shall allow control and monitoring of the rooftop unit via a two-wire communication link.

### **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-installed. The PIC shall allow control and monitoring of the rooftop unit via a two-wire communication link and Modbus protocol.

### **LonTalk® Communication Interface (LCI-R)**

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