



# Voyager™ I Rooftop Units

**Cooling-only TSD/TSH 060-072-090-102-120**

**Heat pump WSD/WSH 060-072-090**

**Gas-fired YSD/YSH 060-072-090-102-120**



**RT-PRC019E-E4**



# Table of Contents

<b>Features and Benefits</b> .....	<b>4</b>
Compressors.....	4
ReliaTel™ Micro Controls .....	4
Progressive Tubular Heat Exchanger.....	4
Top and Cabinet.....	5
Quality And Reliability .....	5
Condenser coil .....	5
Insulation.....	5
Ease Of Installation.....	5
Conversionless Units AND Jobsite Convertible Units.....	5
Improved Airflow.....	5
Single Side Access .....	5
Trane's Idler Arm Assembly.....	5
Serviceability.....	5
Standardized Components .....	5
Easy Access Low Voltage Terminal Board.....	5
Single Point Power .....	5
An Answer to Market Needs.....	5
Flexible applications.....	5
<b>Options and Accessories</b> .....	<b>6</b>
<b>General Data</b> .....	<b>11</b>
<b>Performance Data</b> .....	<b>14</b>
<b>Electrical Data</b> .....	<b>18</b>
<b>Dimensions and Weights</b> .....	<b>19</b>
<b>Controls</b> .....	<b>21</b>
Module Descriptions .....	21
ReliaTel™ Refrigeration Module (RTRM).....	21
ReliaTel™ Options Board (RTOM) .....	22
Economizer Actuator with Module (ECA) .....	22
TCI-R and LCI-R Communication Interface.....	22
PIC.....	22
<b>Mechanical Specifications</b> .....	<b>23</b>
General .....	23
Casing.....	23
Unit Top.....	23
Filters.....	23
Compressors.....	23
Refrigerant Circuits.....	23
Evaporator And Condenser Coils.....	23
Outdoor Fans .....	23
Indoor Fan .....	23
Controls.....	23
Modbus Communication Interface (PIC) .....	24





# Features and Benefits

## Compressors

- Voyager contains the best Scroll compressor technology available, in order to achieve the highest performance possible. **The Trane Voyager™ rooftop has by far the best efficiency in its class.** All performances are Eurovent certified which provides the assurance of accurate performance and common comparison criteria.

## ReliaTel™ Micro Controls

- The Micro provides unit control for heating, cooling and ventilating utilizing input from sensors that measure outdoor and indoor temperature.



- The Micro improves quality and reliability through the use of time-tested microprocessor controls and logic.
  - prevents the unit from short cycling, considerably improving compressor life.
  - ensures that the compressor will run for a specific amount of time which allows oil to return for better lubrication, enhancing the reliability of the compressor.
  - reduces the number of components required to operate the unit, thereby reducing possibilities for component failure.
- The Micro requires no special tools to run the unit through its paces. Simply place a jumper between Test 1 and Test 2 terminals on the Low Voltage Terminal Board and the unit will walk through its operational steps automatically. The unit automatically returns control to the zone sensor after stepping through the test mode a single time, even if the jumper is left on the unit.

- As long as the unit has power and the LED is lit, the Micro is operational. The light indicates that the Micro is functioning properly.
- The Micro features expanded diagnostic capabilities when utilized with Trane's Integrated Comfort™ Systems.
- The Micro in the Voyager units has built-in anti-short-cycle timers, time delay relays and minimum "on" time controls. These controls are functions of the Micro and are factory tested to assure proper operation.
- The Micro softens electrical "spikes" by staging on fans, compressors and heaters.
- The Intelligent Fallback or Adaptive Control is a benefit to the building occupant. If a component goes astray, the unit will continue to operate at predetermined temperature set points.
- Intelligent Anticipation is a standard feature of the Micro. It functions constantly as the Micro and zone sensor work together in harmony to provide tighter comfort control than conventional electro-mechanical thermostats.

## Progressive Tubular Heat Exchanger

- The progressive tubular heat exchanger is designed for increased efficiency and reliability.
- The heat exchanger is manufactured using aluminized steel with stainless steel components for maximum durability. The tube design has been tested and passed over 150,000 cycles.
- The heater has a direct spark ignition system which doubles as a safety device to prove the flame.

## Features and Benefits

### Top and Cabinet

- The compact cabinet with rounded corners takes up less room and is less costly to ship.
- The beveled and ribbed top is designed to prevent water from pooling.
- Easy access panels reduce the number of water entry points. For added water integrity, Voyager has a raised 30 mm lip around the supply and return of the downflow units to prevent water from blowing into the ductwork.

### Quality And Reliability

- The fan and idler arm assembly designs have been tested to over 300,000 cycles each.
- All of Voyager's designs were rigorously rain tested at the factory to ensure water integrity.
- We perform a 100% coil leak test at the factory. The evaporator and condenser coils are leak tested at 1.4 MPa and pressure tested to 3.1MPa.
- Every unit and its options receive a 100% unit run test before leaving the production line to make sure it lives up to Trane requirements.

### Condenser coil

- Coils have a patented design, permanently gapped, for easy cleaning.

### Insulation

- Fire-resistant and washable aluminium foil-faced insulated panels are on the air section.

## Ease Of Installation

Voyager units provide many time and money saving features.

### Conversionless Units AND Jobsite Convertible Units

- The dedicated design units (either downflow or horizontal) require no panel removal or alteration time to convert in the field. Units are also available as convertible on the jobsite.
- Horizontal units come complete with duct flanges so the contractor doesn't have to field fabricate them.

### Improved Airflow

- U-shaped airflow allows for improved static capabilities.

### Single Side Access

- Remove 2 screws to access components and wiring.

### Trane's Idler Arm Assembly

- Our idler pulley provides quick-adjustment for belt or motor sheaves. No longer does one have to adjust the motor to tighten the belt or change the motor sheave setting.

## Serviceability

### Standardized Components

- Components are placed in the same location for all units.

### Easy Access Low Voltage Terminal Board

- The Low Voltage Terminal Board is external to the electrical control cabinet. It is extremely easy to locate and attach the thermostat wire.

### Single Point Power

- A single electrical connection powers the unit.

## An Answer to Market Needs

### Flexible applications

- Only 2 roofcurbs - simplifies selection
- Thanks to its high static pressure capabilities, the Voyager can replace an older machine with old ductwork and, in some cases, improve the comfort through better air distribution.
- Belt or direct drive - standard or oversized supply fan motors meet a wide airflow range.

**Numerous options and accessories are available. See "Options and Accessories".**



# Options and Accessories

Table 1 - Options & accessories – Voyager 1

	TSD	TSH	WSD	WSH	YSD	YSH	Application	Description	Incompatible with
<b>FRESH AIR OPTIONS</b>									
0-50% manual fresh air hood	A	A	A	A	A	A	Fresh air needed in the building, up to 50% of the nominal airflow.	Manually sets a permanent amount of fresh air in the unit, between 0-50% of the nominal airflow.	Economizer, 0-50% motorized fresh air hood, CO <sub>2</sub> sensor, remote potentiometer, barometric relief.
0-50% motorized fresh air hood	O	O	O	O	O	O	Fresh air needed in the building, up to 50% of nominal airflow.	A motorized fresh air damper introduces a permanent amount of fresh air into the unit, between 0-50% of the nominal airflow. The damper position is set by a potentiometer located in the hood. Closes in unoccupied mode when supply fan stops.	0-50% manual fresh air hood, economizer, barometric relief.
Economizer dry bulb or comparative enthalpy control	O	O	O	O	O	O	Fresh air needed in the building, up to 50% of nominal airflow, and intelligent energy saving.	The dry bulb economizer compare outdoor temperature to a set value. The comparative enthalpy economizer is composed of 2 sets of temperature and humidity sensors that measure ambient and room enthalpy, and of a fresh air damper connected to a return air damper. The permanent fresh air function is identical to that of the 0-50% motorized hood. The free-cooling function modulates between the permanent set value (between 0-50%) and 100% of the nominal airflow using the fresh air enthalpy to cool down the building.	0-50% manual fresh air hood, 0-50% motorized fresh air hood.
Remote potentiometer	A	A	A	A	A	A	To remotely set the permanent fresh air intake.	Connected to the potentiometer of the 0-50% motorized hood or of the economizer, can modify remotely the permanent fresh air amount brought into the unit between 0-50% of the nominal airflow.	0-25% manual fresh air hood, not recommended with CO <sub>2</sub> sensor.
CO <sub>2</sub> sensor	O	O	O	O	O	O	Hygienic control of the air.	Works with the 0-50% motorized hood or the economizer and brings fresh air (modulating between the permanent fresh air setpoint and 50% of the nominal airflow) whenever the CO <sub>2</sub> concentration in the room meets or exceeds the adjustable threshold. The sensor itself has to be mounted in a relevant place in the room or in the ductwork.	0-25% manual hood, not recommended with remote potentiometer.
Barometric relief	A	A	A	A	A	A	To minimize overpressure in the building when fresh air intake is around 25% and pressure drop in the return duct is very low.	Damper placed in the return section opens with the overpressurization of the return air. 25% of this return air is blown outside.	0-50% manual fresh air hood, 0-50% motorized fresh air hood.
<b>HEATING DEVICES</b>									
Hot water coil	O	O	O	O	-	-	Need of heating or additional heating on cooling only units or heat pump units. Hot water loop available on site.	Avoids the power consumption of an electric heater by using the hot water loop available to heat the building.	Electric heaters, gas fired units, smoke detector, discharge air sensing.
Electric heaters	O	O	O	O	-	-	Need of heating or additional heating on cooling only units or heat pump units. Very useful with a heat pump unit to keep a good comfort level during the defrost cycle.	On a heat pump unit, in heating mode, turns on when the compressors job does not raise the temperature fast enough. On a heat pump, in heating mode, during the outdoor coil defrost cycle, the electric heater turns on to avoid blowing cold air in the building.	Hot water coil, gas fired units.

## Options and Accessories

	TSD	TSH	WSD	WSH	YSD	YSH	Application	Description	Incompatible with
<b>VENTILATION</b>									
EU4 filters	0	0	0	0	0	0	To filter the air.	Washable media, treat the return and fresh air, 90% gravimetric efficiency.	
Clogged filter detector	0	0	0	0	0	0	To facilitate maintenance of the filters.	When the pressure drop of the filter exceeds the selectable value, this differential pressostat report an alarm via a dry contact to the micro-control.	
Textile duct soft starter	0	0	0	0	0	0	To achieve a progressive supply fan start and progressive inflation of textile duct.	Located in the main control panel. Starting time can be adjusted from an actual range of 0 to 40 seconds (factory-set value: 40 s).	
<b>SAFETY</b>									
Fused disconnect switch	0	0	0	0	0	0	To manually disconnect the unit from the power supply line and protect it from internal short circuits	Cuts the 3 phases of the power supply, the fuses blow up in case of short circuit into the unit. Cannot be ordered with electric heaters because in that case the unit is already fused	
Fire thermostat	A	A	A	A	A	A	To stop the unit when temperature of the air stream rises abnormally.	A kit of 2 manual reset thermostats are delivered. The first one, to be placed in the return duct, stops the unit and put the unit in general fault when the airstream rises above 57°C, the second, to be placed in the supply duct, reacts above 115°C. Temperature threshold cannot be changed.	Smoke detector.
Smoke detector	0	0	0	0	0	0	To detect smoke in the building.	Closes the return air damper if an economizer is installed, stops the indoor fan, switches off the electric heater if installed and energized, and put the unit in general fault.	Fire thermostat, hot water coil.
Fan failure switch	0	0	0	0	0	0	To improve security and reliability of the unit (when the indoor fan belt breaks down for instance).	Detects the lack of fan static pressure. If the indoor fan fails, then the unit operation is shut down and the "Service" light LED on the Zone Sensor starts flashing. If no air flow going through the unit is detected within 40 seconds (by differential pressure), the control will shut off all mechanical operations, lock the system, send a diagnostic to the ICS, and the "Service" LED will flash. The system will remain locked until a reset is initiated either manually or through the ICS. The option board is required.	
Three-Phase Monitoring Relay Reverse rotation	S	S	S	S	S	S	This device monitors three-phase power supply in order to protect unit motors. This option is recommended when there are risks of power supply phase reversal.	The relay disables the unit control when one of the following failures occurs on power supply: phase reversal, phase loss.	
<b>ROOFCURBS</b>									
Standard roofcurb	A	-	A	-	A	-	Connection between a flat roof and the rooftop.	Supports the rooftop and ensures watertightness roof/roofcurb/rooftop, and easy connection of the ductwork .	Adjustable roofcurb.
Adjustable roofcurb	A	-	A	-	A	-	Connection between a sloped roof and the rooftop.	Supports the rooftop and ensures watertightness roof/roofcurb/rooftop, and easy connection of the ductwork, correcting slope up to 15%.	Standard roofcurb.



## Options and Accessories

	TSD	TSH	WSD	WSH	YSD	YSH	Application	Description	Incompatible with
Ventilated roofcurb extension (French ERP regulations)	A	A	A	A	A	A	Connection between a roofcurb and a rooftop unit installed on a roof. Used to comply to the French ERP (Etablissement Recevant du Public: Buildings open to the public) regulations.	Avoids contact between the rooftop and the roof. Openings on the sides allow natural ventilation. Protection of the building in case of failure of the rooftop causing overheating / fire.	
<b>CONTROL</b>									
ReliaTel™ Options Module (RTOM)	O	O	O	O	O	O	Required for some optional ReliaTel™ devices (frost, clogged filter switch, fan failure switch, discharge air sensor (DAS) used for supply air tempering and ICS input data, smoke detector, external on/off switch).	Communication interface between the ReliaTel™ Refrigeration Module (RTRM) and some options.	
TCI-R	O	O	O	O	O	O	To communicate with Trane Integrated Comfort Systems, such as the Tracer Summit™, the Tracker™ or a Varitrac™ system (CCP2).	Communication interface between a Trane ICS device and a Voyager™.	THS/P 03, and other communication interfaces
LCI-R	O	O	O	O	O	O	To communicate on a LonTalk® network at the unit level.	Communication interface between a LonTalk® management system and a Voyager™.	THS/P 03, and other communication interfaces
BCI-R	O	O	O	O	O	O	To communicate on a BACnet® MS/TP network at the unit level.	Communication interface between a BACnet management system and a Voyager™.	THS/P 03, and other communication interfaces
PIC	O	O	O	O	O	O	To communicate on a Modbus network at the unit level.	Communication interface between Modbus management system and a Voyager™.	THS/P 03, and other communication interfaces
THS03	A	A	A	A	A	A	Control of 1 cooling-only, heat pump or gas-fired rooftop.	Electronic thermostat, 2 stages cooling, 1 stage compressor heating, 2 stages auxiliary heating. No CTI card needed, communicates in the same language as the rooftop micro-control and uses 100% of its advanced control features	All communication interfaces
THP03	A	A	A	A	A	A	Control of 1 cooling-only, heat pump or gas-fired rooftop.	Electronic programmable thermostat, 2 stages cooling, 1 stage compressor heating, 2 stages auxiliary heating, LCD screen. Communicates in the same language as the rooftop micro-control and uses 100% of its advanced control features.	All communication interfaces
Remote sensor box for THS/THP03	A	A	A	A	A	A	Need of remote or additional sensors with THS/THP03	Senses the temperature and sends the information to the THS/P 03.	THS/P 01-02.



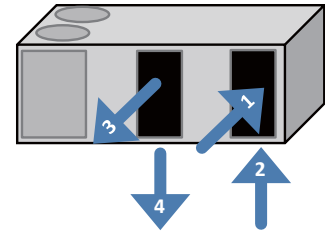
## Options and Accessories

	TSD	TSH	WSD	WSH	YSD	YSH	Application	Description	Incompatible with
Discharge air sensing ("Supply air tempering")	O	O	O	O	O	O	Supply air tempering maintains the supply air temperature above a lower limit during minimum ventilation periods in heating mode. Also used to monitor true discharge air temperature out of the unit.	A sensor is placed in the return air duct.	Hot water coil.
Remote fault relay	O	O	O	O	O	O	To send alarms signals to a local BMS.	Uses the compressor/heating/fan/power supply alarm output signals from the micro-control and reports them into one dry contact.	
TD-5	A	A	A	A	A	A	Plug and play diagnostic touch screen display. Read Only device connected to Reliate! boards.	5 inch touch screen display. Monitor all unit parameters, input, output, graph and record parameter trend. Provide alarm historic reporting and possibility to reset alarms.	
<b>MISCELLANEOUS</b>									
Oversized drive / motor	O	O	O	O	O	O	High static pressure needs.	Increases the fans speed via oversized pulleys/belts and/or oversized motors.	
<b>Legend</b>									
A = Accessory (to be mounted on site)									
O = Option (factory mounted and tested)									
S = Factory mounted standard feature									
Other options or configurations are available. Please contact your local sales office for more information.									
<b>Phase out</b>									
THS01	A	A	-	-	A	A	Control of 1 cooling-only / gas-fired rooftop.	Electronic thermostat, 2 stages cooling, 2 stages auxiliary heating, LCD screen.	TCI-R, LCI-R, remote fault relay.
THS02	-	-	A	A	-	-	Control of 1 heat pump rooftop.	Electronic thermostat, 2 stages cooling, 1 stage compressor heating, 1 stage auxiliary heating, LCD screen.	TCI-R, LCI-R, remote fault relay.
THP01	A	A	-	-	A	A	Control of 1 cooling-only / gas-fired rooftop.	Electronic programmable thermostat, 2 stages cooling, 2 stages auxiliary heating, LCD screen.	TCI-R, LCI-R, remote fault relay.
THP02	-	-	A	A	-	-	Control of 1 heat pump rooftop.	Electronic programmable thermostat, 2 stages cooling, 1 stage compressor heating, 1 stage auxiliary heating, LCD screen.	TCI-R, LCI-R, remote fault relay.
Remote sensor box for THS/THP01-02	-	-	A	A	-	-	Need for remote or additional sensors with THS/P 01-02.	Senses the temperature and sends the information to the THS/P 01-02.	THS/P 03, TCI-R, LCI-R, remote fault relay.
Three-Phase Monitoring Relay Reverse rotation + Unbalance	O	O	O	O	O	O	This device monitors three-phase power supply in order to protect unit motors. This option is recommended when there are risks of power supply imbalance, phase reversal or when power factor correction capacitors are used.	The relay disables the unit control when one of the following failures occurs on power supply: phase reversal, phase loss, phase imbalance (adjustable setting). The recommended setting is as follows: 5% imbalance on 3-phase voltage. Duration of imbalance should be set at 5 seconds.	

# Options and Accessories

**Table 2 - Mandatory informations to select a rooftop**

System type	Cooling Only <input type="checkbox"/>	Heat pump <input type="checkbox"/>	
<b>Airflow information</b>			
Configuration of return duct	1 - Horizontal flow <input type="checkbox"/>	2 - Downflow <input type="checkbox"/>	Other _____
Configuration of supply duct	3 - Horizontal flow <input type="checkbox"/>	4 - Downflow <input type="checkbox"/>	Other _____
Unit airflow	_____ m <sup>3</sup> /h		
Fresh air rate	_____ m <sup>3</sup> /h	_____ % of nominal airflow	
External static pressure on return duct	_____ Pa		
External static pressure on supply duct	_____ Pa		
<b>Cooling mode design conditions</b>			
Unit cooling capacity	_____ kW		
Indoor air Dry Bulb	_____ °C		
Indoor air wet Bulb / Relative Humidity	_____ °C	_____ %	
Outdoor air Dry Bulb	_____ °C		
<b>Heating mode design conditions</b>			
Heating capacity	_____ kW		
Auxiliary heat type	Electric Heat <input type="checkbox"/>	Gas Heat <input type="checkbox"/>	Hot Water coil <input type="checkbox"/>
Gas type	Natural gas G20 <input type="checkbox"/>	Natural gas G25 <input type="checkbox"/>	Propane gas G31 <input type="checkbox"/>
Auxiliary heating capacity	_____ kW		
Indoor air Dry Bulb	_____ °C		
Outdoor air Dry Bulb	_____ °C		
Outdoor air wet Bulb / Relative Humidity	_____ °C	_____ % (only for Heat pump)	
<b>Options</b>			
Air filter class	_____		
Variable speed drive	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Economizer type	Without <input type="checkbox"/>	Manual fresh air <input type="checkbox"/>	Comparative enthalpy economizer <input type="checkbox"/>
Fresh air control	Constant <input type="checkbox"/>	Remote reference <input type="checkbox"/>	CO <sub>2</sub> sensor controlled <input type="checkbox"/>
Unit control	Local control without scheduling <input type="checkbox"/>	Local control with scheduling <input type="checkbox"/>	Multi-unit centralized control <input type="checkbox"/> Remote relay interface control <input type="checkbox"/>
Remote control communication interface	LON <input type="checkbox"/>	Modbus <input type="checkbox"/>	Bacnet <input type="checkbox"/> Trane <input type="checkbox"/>
Smoke detector	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Low ambient cooling operation	Down to 0°C <input type="checkbox"/>	Down to -18°C <input type="checkbox"/>	
Fire detector	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Disconnect switch	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Dirty filter switch	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Fan fail switch	With <input type="checkbox"/>	Without <input type="checkbox"/>	
Outdoor coil corrosion protection	Without <input type="checkbox"/>	Epoxy coating <input type="checkbox"/>	
Indoor coil corrosion protection	Without <input type="checkbox"/>	Epoxy coating <input type="checkbox"/>	
Roofcurb	None <input type="checkbox"/>	Flat <input type="checkbox"/>	Adjustable pitch <input type="checkbox"/>



# General Data

**Table 3 - General data – TS**

		TSD/TSH 060 Standard R410A	TSD/TSH 072 Standard R410A	TSD/TSH 090 Standard R410A	TSD/TSH 102 Standard R410A	TSD/TSH 120 Standard R410A
<b>Eurovent Performances (1)</b>						
Net Cooling Capacity	(kW)	17.2	21.8	24.9	28.7	31.7
Total Power input in cooling	(kW)	5.6	7.18	8.64	9.99	11.84
EER		3.07	3.04	2.88	2.87	2.68
Eurovent Efficiency class Cooling		<b>A</b>	<b>A</b>	<b>B</b>	<b>B</b>	<b>C</b>
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Outdoor sound power level env.	(dBA)	79	82	82	83	83
Indoor sound power level in duct	(dBA)	71	68	70	78	80
Outdoor sound pressure level env. (6)	(dBA)	48	51	51	51	51
Unit max amps (3)	(A)	18.1	22.8	26.0	28.4	29.9
Unit start-up amps (3)	(A)	78	103	120	88	93
Short circuit current	(kA)	10	10	10	10	10
<b>Electric Heater</b>						
Heating Capacity	(kW)	12	18	18	25	25
Capacity steps	#	2	2	2	2	2
Heating Capacity Step	(kW)	0 / 6 / 12	0 / 6 / 18	0 / 6 / 18	0 / 12.5 / 25	0 / 12.5 / 25
Rated Amps	(A)	17.3	26.0	26.0	36.1	36.1
<b>Compressor</b>						
Number	#	1	1	1	2	2
Type		Scroll	Scroll	Scroll	Scroll	Scroll
Model		Climatuff	Climatuff	Climatuff	Climatuff	Climatuff
Motor HP	(kW)	6.7	8.9	10.1	6.7 / 5.1	7.2 / 5.5
Max Amps(2)	(A)	11.3	15.2	17.4	11.3 / 8.5	12.2 / 9.1
Locked rotor Amps (2)	(A)	71	95	111	71 / 51	75 / 52
<b>Outdoor Coil</b>						
Type		Lanced	Lanced	Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94	7.94	7.94
Face Area	(m <sup>2</sup> )	1.02	1.58	1.58	1.84	1.84
Rows / Fin series	# / FPF	3 / 192	3 / 192	3 / 192	3 / 192	3 / 192
<b>Indoor Coil</b>						
Type		Lanced	Lanced	Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94	7.94	7.94
Face Area	(m <sup>2</sup> )	0.62	0.92	0.92	1.15	1.15
Rows / Fin series	# / FPF	3 / 192	3 / 192	3 / 192	3 / 192	4 / 192
Refrigerant Control		Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection No./Size	(mm)	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT
<b>Outdoor Fan</b>						
Nominal Airflow	(m <sup>3</sup> /h)	4930	8660	8830	9340	9850
Type		Axial	Axial	Axial	Axial	Axial
Diameter	(mm)	560	660	660	660	660
Drive type		Direct	Direct	Direct	Direct	Direct
Number	#	1	1	1	1	1
Motor HP	(kW)	0.4	0.75	0.75	0.75	0.75
Motor Max Amps(1)	(A)	1.0	3.0	3.0	3.0	3.0
Motor Locked rotor Amps (2)	(A)	2.8	7.1	7.1	7.1	7.1
Motor RPM	(rpm)	950	950	950	950	950
<b>Indoor Fan</b>						
Minimum Airflow	(m <sup>3</sup> /h)	2720	3260	4080	4620	5440
Nominal Airflow	(m <sup>3</sup> /h)	3400	4080	5100	5780	6800
Maximum Airflow	(m <sup>3</sup> /h)	4080	4900	6120	6940	8160
Static pressure available (TSD / TSH) (4)	(Pa)	325 / 225	275 / 225	250 / 175	275 / 200	325 / 225
Maximum static pressure available (TSD / TSH) (5)	(Pa)	375 / 325	375 / 375	375 / 375	500 / 500	500 / 450
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	11 / 11	12 / 12	12 / 12	15 / 15	15 / 15
Drive type		Belt Drive	Belt Drive	Belt Drive	Belt Drive	Belt Drive
Number	#	1	1	1	1	1
Motor HP (Standard/Oversized)	(kW)	1.1 / -	1.1 / 1.5	1.5 / 2.2	1.5 / 2.2	2.2 / -
Motor Max Amps(Standard/Oversized)	(A)	3.2 / -	3.2 / 4.3	4.3 / 5.3	4.3 / 5.3	5.3 / -
Motor Locked rotor Amps (Standard/Oversized)	(A)	25.3 / -	25.3 / 36.4	36.4 / 57.0	36.4 / 57.0	57.0 / -
Motor RPM (Standard/Oversized)	(rpm)	1450 / -	1450 / 1450	1450 / 2850	1450 / 2850	2850 / -
<b>Filters</b>						
Type Furnished		1" Throwaway	2" Throwaway	2" Throwaway	2" Throwaway	2" Throwaway
(No.) Size Recommended	#	2x(508x762x25)	4x(406x635x50)	4x(406x635x50)	4x(508x635x50)	4x(508x635x50)
<b>Operating limits</b>						
Minimum operating outdoor air temp.	°C	-18	-18	-18	-18	-18
Maximum operating outdoor air temp.	°C	46	46	46	46	46
Minimum intake air temp. on the indoor coil	°C	18	18	18	18	18
<b>Dimensions (3)</b>						
Height	(mm)	921	1038	1038	1190	1190
Length	(mm)	1775	2251	2251	2251	2251
Width	(mm)	1124	1353	1353	1353	1353
Operating Weight	(kg)	240	355	374	415	426
Shipping Weight	(kg)	288	415	434	478	489
<b>Unit construction</b>						
Sheet metal / Thickness	Type / mm	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1
Insulation / Thickness	Type / mm	M0 / 12.5	M0 / 12.5	M0 / 12.5	M0 / 12.5	M0 / 12.5
<b>System Data</b>						
Refrigerant circuit	#	1	1	1	2	2
Capacity steps / % per step	#	1 / 0%-100%	1 / 0%-100%	1 / 0%-100%	2 / 0%-40%-100%	2 / 0%-45%-100%
<b>Refrigerant Charge (3)</b>						
Circuit A (TSD / TSH)	(kg)	3.49	5.35	5.44	3.49	3.63
Circuit B (TSD / TSH)	(kg)	-	-	-	2.63	2.86

Note

(1) At Eurovent rating conditions : Indoor return Air (27°C DB / 19°C WB) - Ambient 35°C

(2) per motor at 400V/3/50

(3) For standard unit, without options

(4) At the nominal airflow with standard drive

(5) At the nominal airflow with oversized drive when available

(6) At 10m from the unit in a free field

Electrical & refrigerant charge Data are subject to change without notice. Please refer to unit nameplate data.



# General Data

Table 3 - General data – WS

		WSD/WSH 060 Standard R410A	WSD/WSH 072 Standard R410A	WSD/WSH 090 Standard R410A
<b>Eurovent Performances (1)</b>				
Net Cooling Capacity	(kW)	16.7	22.32	26.34
Total Power input in cooling	(kW)	5.46	6.64	8.66
EER		3.06	3.36	3.04
Eurovent Efficiency class Cooling		<b>A</b>	<b>A</b>	<b>A</b>
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50
Outdoor sound power level env.	(dBA)	79	82	82
Indoor sound power level in duct	(dBA)	71	68	70
Net Heating Capacity	(kW)	15.3	20.57	25.68
Total Power input in Heating	(kW)	4.37	5.78	6.7
COP		3.50	3.56	3.83
Eurovent Efficiency class Heating		<b>A</b>	<b>A</b>	<b>A</b>
Outdoor sound pressure level env. (6)	(dBA)	48	51	51
Unit max amps (3)	(A)	17.9	22.7	26.0
Unit start-up amps (3)	(A)	78	84	120
Short circuit current	(kA)	10	10	10
<b>Electric Heater</b>				
Heating Capacity	(kW)	12	18	18
Capacity steps	#	2	2	2
Heating Capacity Step	(kW)	0 / 6 / 12	0 / 6 / 18	0 / 6 / 18
Max Amps(2)	(A)	17.3	26.0	26.0
<b>Compressor</b>				
Number	#	1	1	1
Type		Scroll	Scroll	Scroll
Model		Climatuff	Climatuff	Trane 3D
Motor HP	(kW)	6.7	8.2	10.1
Max Amps(2)	(A)	11.3	14.1	17.4
Locked rotor Amps (2)	(A)	71	75	111
<b>Outdoor Coil</b>				
Type		Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94
Face Area	(m <sup>2</sup> )	1.02	1.58	1.58
Rows / Fin series	# / FPF	3 / 192	3 / 192	3 / 192
Refrigerant Control		Expansion Valve	Expansion Valve	Expansion Valve
<b>Indoor Coil</b>				
Type		Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94
Face Area (WKD / WKH)	(m <sup>2</sup> )	0.72	0.92	0.92
Rows / Fin series	# / FPF	3 / 192	3 / 192	4 / 192
Refrigerant Control		Fixed Orifice	Fixed Orifice	Fixed Orifice
Drain Connection No./Size	(mm)	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT
<b>Outdoor Fan</b>				
Nominal Airflow	(m <sup>3</sup> /h)	4930	8660	8830
Type		Axial	Axial	Axial
Diameter	(mm)	560	660	660
Drive type		Direct	Direct	Direct
Number	#	1	1	1
Motor HP	(kW)	0.3	0.56	0.56
Motor Max Amps(2)	(A)	1	3	3
Motor Locked rotor Amps (2)	(A)	2.8	7.1	7.1
Motor RPM	(rpm)	950	950	950
<b>Indoor Fan</b>				
Minimum Airflow	(m <sup>3</sup> /h)	2720	3260	4080
Nominal Airflow	(m <sup>3</sup> /h)	3400	4080	5100
Maximum Airflow	(m <sup>3</sup> /h)	4080	4900	6120
Static pressure available (WSD / WSH) (4)	(Pa)	325 / 225	250 / 200	225 / 175
Maximum static pressure available (WSD / WSH) (5)	(Pa)	375 / 325	375 / 375	375 / 375
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	11 / 11	12 / 12	12 / 12
Drive type		Belt Drive	Belt Drive	Belt Drive
Number	#	1	1	1
Motor HP (Standard/Oversized)	(kW)	1.1 / -	1.1 / 1.5	1.5 / 2.2
Motor Max Amps(Standard/Oversized)	(A)	3.2 / -	3.2 / 4.3	4.3 / 5.3
Motor Locked rotor Amps (Standard/Oversized)	(A)	25.3 / -	25.3 / 36.4	36.4 / 57.0
Motor RPM (Standard/Oversized)	(rpm)	1450 / -	1450 / 1450	1450 / 2850
<b>Filters</b>				
Type Furnished		1" Throwaway	2" Throwaway	2" Throwaway
(No.) Size Recommended	#	2x(508x762x25)	4x(406x635x50)	4x(406x635x50)
<b>Operating limits</b>				
Minimum operating outdoor air temp. (Cooling)	°C	-18	-18	-18
Minimum operating outdoor air temp. (Heating)	°C	-15	-15	-15
Maximum operating outdoor air temp. (Cooling)	°C	46	46	46
Maximum operating outdoor air temp. (Heating)	°C	18	18	18
Minimum intake air temp. on the indoor coil (Cooling)	°C	18	18	18
Minimum intake air temp. on the indoor coil (Heating)	°C	5	5	5
<b>Dimensions (3)</b>				
Height	(mm)	921	1038	1038
Length	(mm)	2251	2251	2251
Width	(mm)	1124	1353	1353
Operating Weight	(kg)	256	337	379
Shipping Weight	(kg)	304	397	439
<b>Unit construction</b>				
Sheet metal / Thickness	Type / mm	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1
Insulation / Thickness	Type / mm	M0 / 12.5	M0 / 12.5	M0 / 12.5
<b>System Data</b>				
Refrigerant circuit	#	1	1	1
Capacity steps / % per step (Cooling)		1 / 0%-100%	1 / 0%-100%	1 / 0%-100%
Capacity steps / % per step (Heating)	#	1 / 0%-100%	1 / 0%-100%	1 / 0%-100%
<b>Refrigerant Charge (3)</b>				
Circuit A (WSD / WSH)	(kg)	3.86	5.53	6.17
Circuit B (WSD / WSH)	(kg)	-	-	-

Note  
 (1) At Eurovent rating conditions : Indoor return Air (27°C DB / 19°C WB) - Ambient 35°C / Heating mode Indoor return Air (19°C) - Ambient (7°C DB / 6°C WB)  
 (2) per motor at 400V/3/50  
 (3) For standard unit, without options  
 (4) At the nominal airflow  
 (5) At the nominal airflow with oversized drive when available  
 (6) At 10m from the unit in a free field  
 Electrical & refrigerant charge Data are subject to change without notice. Please refer to unit nameplate data.

## General Data

**Table 3 - General data – YS**

	YSD/YSH 060 Standard R410A	YSD/YSH 072 Standard R410A	YSD/YSH 090 Standard R410A	YSD/YSH 102 Standard R410A	YSD/YSH 120 Standard R410A	
<b>Eurovent Performances (1)</b>						
Net Cooling Capacity	(kW)	17.2	21.8	24.9	28.7	31.7
Total Power input in cooling	(kW)	5.6	7.18	8.64	9.99	11.84
EER		3.07	3.04	2.88	2.87	2.68
Eurovent Efficiency class Cooling		<b>A</b>	<b>A</b>	<b>B</b>	<b>B</b>	<b>C</b>
Main Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Outdoor sound power level env.	(dBA)	79	82	82	83	83
Indoor sound power level in duct	(dBA)	71	68	70	78	80
Outdoor sound pressure level env. (6)	(dBA)	48	51	51	51	51
Unit max amps (3)	(A)	18.1	22.8	26.0	28.4	29.9
Unit start-up amps (3)	(A)	78	103	120	88	93
Short circuit current	(kA)	10	10	10	10	10
<b>Gas burner</b>						
Heating Models		G120	G200	G200	G250	G250
Heating Input (G20)	(kW)	26.5	44.4	44.4	55.8	55.8
Heating Output	(kW)	24.6	41.3	41.3	51.9	51.9
Steady State Efficiency	(%)	93	93	93	93	93
No. Burners	#	3	4	4	5	5
No. Stages	#	1	2	2	2	2
Heating Capacity Step	(%)	0 / 100	0 / 70 / 100	0 / 70 / 100	0 / 70 / 100	0 / 70 / 100
Inducer Motor HP	(W)	21	50	50	50	50
Inducer motor RPM	(RPM)	2525	2800 / 2550	2800 / 2550	2800 / 2550	2800 / 2550
Inducer motor Voltage	(V/ph/Hz)	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
Gas Connection Pipe Size		1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT
<b>Compressor</b>						
Number	#	1	1	1	2	2
Type		Scroll	Scroll	Scroll	Scroll	Scroll
Model		Climatuff	Climatuff	Climatuff	Climatuff	Climatuff
Motor HP	(kW)	6.7	8.9	10.1	6.7 / 5.1	7.2 / 5.5
Max Amps(2)	(A)	11.3	15.2	17.4	11.3 / 8.5	12.2 / 9.1
Locked rotor Amps (2)	(A)	71	95	111	71 / 51	75 / 52
<b>Outdoor Coil</b>						
Type		Lanced	Lanced	Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94	7.94	7.94
Face Area	(m <sup>2</sup> )	1.02	1.58	1.58	1.84	1.84
Rows / Fin series	# / FPF	3 / 192	3 / 192	3 / 192	3 / 192	3 / 192
<b>Indoor Coil</b>						
Type		Lanced	Lanced	Lanced	Lanced	Lanced
Tube Size OD	(mm)	7.94	7.94	7.94	7.94	7.94
Face Area	(m <sup>2</sup> )	0.62	0.92	0.92	1.15	1.15
Rows / Fin series	# / FPF	3 / 192	3 / 192	3 / 192	3 / 192	4 / 192
Refrigerant Control		Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve	Expansion Valve
Drain Connection No./Size	(mm)	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT	1 / 3/4" NPT
<b>Outdoor Fan</b>						
Nominal Airflow	(m <sup>3</sup> /h)	4930	8660	8830	9340	9850
Type		Axial	Axial	Axial	Axial	Axial
Diameter	(mm)	560	660	660	660	660
Drive type		Direct	Direct	Direct	Direct	Direct
Number / Voltage	#	1	1	1	1	1
Motor HP	(kW)	0.4	0.75	0.75	0.75	0.75
Motor Max Amps(1)	(A)	1	3	3	3	3
Motor Locked rotor Amps (2)	(A)	2.8	7.1	7.1	7.1	7.1
Motor RPM	(rpm)	950	950	950	950	950
<b>Indoor Fan</b>						
Minimum Airflow	(m <sup>3</sup> /h)	2720	3260	4080	4620	5440
Nominal Airflow	(m <sup>3</sup> /h)	3400	4080	5100	5780	6800
Maximum Airflow	(m <sup>3</sup> /h)	4080	4900	6120	6940	8160
Static pressure available (YSD / YSH) (4)	(Pa)	350 / 250	300 / 250	250 / 200	275 / 175	375 / 200
Maximum static pressure available (YSD / YSH) (5)	(Pa)	350 / 250	375 / 375	375 / 375	500 / 500	450 / 325
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	11 / 11	12 / 12	12 / 12	15 / 15	15 / 15
Drive type		Belt Drive	Belt Drive	Belt Drive	Belt Drive	Belt Drive
Number	#	1	1	1	1	1
Motor HP (Standard/Oversized)	(kW)	1.1 / -	1.1 / 1.5	1.5 / 2.2	1.5 / 2.2	2.2 / -
Motor Max Amps(Standard/Oversized)	(A)	3.2 / -	3.2 / 4.3	4.3 / 5.3	4.3 / 5.3	5.3 / -
Motor Locked rotor Amps (Standard/Oversized)	(A)	25.3 / -	25.3 / 36.4	36.4 / 57.0	36.4 / 57.0	57.0 / -
Motor RPM (Standard/Oversized)	(rpm)	1450 / -	1450 / 1450	1450 / 2850	1450 / 2850	2850 / -
<b>Filters</b>						
Type Furnished	#	1" Throwaway	2" Throwaway	2" Throwaway	2" Throwaway	2" Throwaway
(No.) Size Recommended	+	2x(508x762x25)	4x(406x635x50)	4x(406x635x50)	4x(508x635x50)	4x(508x635x50)
<b>Operating limits</b>						
Minimum operating outdoor air temp.	°C	-18	-18	-18	-18	-18
Maximum operating outdoor air temp.	°C	46	46	46	46	46
Minimum intake air temp. on the indoor coil (Cooling)	°C	18	18	18	18	18
Minimum intake air temp. on the indoor coil (Heating)	°C	4	4	4	4	4
<b>Dimensions (3)</b>						
Height	(mm)	921	1038	1038	1190	1190
Length	(mm)	1775	2251	2251	2251	2251
Width	(mm)	1124	1353	1353	1353	1353
Operating Weight	(kg)	264	383	401	447	459
Shipping Weight	(kg)	312	443	461	510	522
<b>Unit construction</b>						
Sheet metal / Thickness	Type / mm	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1	Prepainted Steel / 1.1
Insulation / Thickness	Type / mm	M0 / 12.5	M0 / 12.5	M0 / 12.5	M0 / 12.5	M0 / 12.5
<b>System Data</b>						
Refrigerant circuit	#	1	1	1	2	2
Capacity steps / % per step	#	1 / 0%-100%	1 / 0%-100%	1 / 0%-100%	2 / 0%-40%-100%	2 / 0%-45%-100%
<b>Refrigerant Charge (3)</b>						
Circuit A (YSD / YSH)	(kg)	3.49	5.35	5.44	3.49	3.63
Circuit B (YSD / YSH)	(kg)	-	-	-	2.63	2.86

Note

(1) At Eurovent rating conditions : Indoor return Air (27°C DB / 19°C WB) - Ambient 35°C

(2) per motor at 400V/3/50

(3) For standard unit, without options

(4) At the nominal airflow

(5) At the nominal airflow with oversized drive when available

(6) At 10m from the unit in a free field

Electrical & refrigerant charge Data are subject to change without notice. Please refer to unit nameplate data.



# Performance Data

## Hot Water Coil Performance

Table 4 - TSD/TSH-WSD/WSH 072

Indoor return air temperature: 20°C					
Indoor Airflow (m <sup>3</sup> /h)	Entering / Leaving Water Temperature (°C)	Heating Capacity (kW)	Water Flow (l/s)	Leaving air Temperature (°C)	Pressure drop* (kPa)
3670	60 / 40	3.6	0.04	23	0.0
	70 / 50	9.1	0.11	27	1.2
	80 / 60	13.2	0.16	31	3.3
	90 / 70	16.9	0.20	34	4.5
4080	60 / 40	3.7	0.04	23	0.0
	70 / 50	9.6	0.11	27	2.2
	80 / 60	13.8	0.16	30	3.4
4490	60 / 40	3.7	0.04	22	0.0
	70 / 50	10.0	0.12	27	2.2
	80 / 60	14.3	0.17	29	3.4
4900	60 / 40	3.8	0.05	22	0.0
	70 / 50	10.4	0.12	26	2.2
	80 / 60	14.8	0.18	29	3.4
	90 / 70	19.1	0.23	32	5.7

(\*) Coil + Valve only

Table 5-TSD/TSH 102

Indoor return air temperature: 20°C					
Indoor Airflow (m <sup>3</sup> /h)	Entering / Leaving Water Temperature (°C)	Heating Capacity (kW)	Water Flow (l/s)	Leaving air Temperature (°C)	Pressure drop* (kPa)
5200	60 / 40	4.3	0.05	22	0.0
	70 / 50	11.5	0.14	27	2.2
	80 / 60	16.5	0.20	29	3.5
	90 / 70	21.2	0.25	32	4.8
5780	60 / 40	4.4	0.05	22	0.0
	70 / 50	12.0	0.14	26	2.3
	80 / 60	17.2	0.21	29	3.5
	90 / 70	22.2	0.26	31	5.9
6360	60 / 40	4.4	0.05	22	0.0
	70 / 50	12.4	0.15	26	2.3
	80 / 60	17.8	0.21	28	3.6
	90 / 70	23.0	0.27	31	6.0
6940	60 / 40	4.5	0.05	22	0.0
	70 / 50	12.9	0.15	25	2.3
	80 / 60	18.4	0.22	28	4.6
	90 / 70	23.8	0.28	30	6.0

(\*) Coil + Valve only

## Gas Burner Performance

**Table 6 - Gas burner correspondence table**

Unit	Furnace Model
YS* 060	G120
YS* 072	G200
YS* 090	G200
YS* 102	G250
YS* 120	G250

**Table 7 - Gas type per country**

Country	FR	CH-ES-GB-IE-PT	IT	NL	BE	LU-DE	AT-DK-FI-SE
Category	II2E+3P	II2H3P	II2H3+	II2L3P	I2E+ & I3P	I2E & I3P	I2H
Type of gas	Pressure in mbar						
<b>G20</b>	20	20	20	-	20	20	20
<b>G25</b>	25	-	-	25	25	20	-
<b>G31</b>	37	37	37	30	37	50	-

**Table 8 - Gas burner performance**

Burner	G120			G200			G250		
Gas Type	G20	G25	G31	G20	G25	G31	G20	G25	G31
Heating Input (kW)	26,5	26,9	27,0	44,4	44,8	45,1	55,8	56,2	56,6
Heating Output (kW)	24,6	25	25,1	41,3	41,7	41,9	51,9	52,3	52,6
Efficiency	93%	93%	93%	93%	93%	93%	93%	93%	93%
Gas Flow rate (Nm <sup>3</sup> /h)	2,8	3,3	2,1	4,7	5,5	3,5	5,9	6,9	4,4
Heating Output per stage (1st/2nd) (%)	0%-100%	0%-100%	0%-100%	0%-70%-100%	0%-70%-100%	0%-70%-100%	0%-70%-100%	0%-70%-100%	0%-70%-100%
Inlet pressure Min/Nominal/Max (mbar)	17 / 20 / 25	20 / 25 / 30	25 / 37 / 45	17 / 20 / 25	20 / 25 / 30	25 / 37 / 45	17 / 20 / 25	20 / 25 / 30	25 / 37 / 45
Low pressure switch setting (mbar)	15	15	20	15	15	20	15	15	20
Manifold pressure (mbar)	7,5	10,5	24,9	7,5	10,5	24,9	7,5	10,5	24,9
No of injectors	3	3	3	4	4	4	5	5	5
Injector size (Drill / mm)	(33) / 2.87mm	(33) / 2.87mm	(51) / 1.70mm	(1/8") / 3.175mm	(1/8") / 3.175mm	(49) / 1.85mm	(1/8") / 3.175mm	(1/8") / 3.175mm	(49) / 1.85mm
Smoke analysis									
Gas / Voltage	G20 - 20mbar 400/3/50	G25 - 25mbar 400/3/50	G31 - 37mbar 400/3/50	G20 - 20mbar 400/3/50	G25 - 25mbar 400/3/50	G31 - 37mbar 400/3/50	G20 - 20mbar 400/3/50	G25 - 25mbar 400/3/50	G31 - 37mbar 400/3/50
CO %	0.0012%	0.0017%	0.0003%	0.0020%	0.0015%	0.0011%	0.0020%	0.0015%	0.0011%
Nox ppm	59 ppm	44 ppm	8.7 ppm	10 ppm	10 ppm	11 ppm	10 ppm	10 ppm	11 ppm
CO <sub>2</sub> %	8,29%	9,20%	8,90%	7,10%	7,10%	8,28%	7,10%	7,10%	8,28%

**Notes:**

 (1) G20 heating output given for 34,02 MJ/m<sup>3</sup> (15°C-1013)

 (2) G25 heating output given for 29,30 MJ/m<sup>3</sup> (15°C-1013)

(3) G31 heating output given for 46.34 MJ/kg



## Performance Data

### Sound Levels

Voyager 1 Sound Power Levels - R410A

Data given at 250Pa & 35°C ambient for nominal airflow rate

Sound Power Référence = 10E-12 Watt

**Table 9 - Overall Outdoor Sound Power level (Env.)**

		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
TSC	060	66.2 dBA	66.7 dBA	70.1 dBA	73.2 dBA	74.1 dBA	70.6 dBA	68.0 dBA	60.2 dBA	79 dBA
TSC	072	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.7 dBA	62.1 dBA	82 dBA
TSC	090	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.6 dBA	62.0 dBA	82 dBA
TSC	102	65.9 dBA	69.9 dBA	73.5 dBA	76.5 dBA	77.6 dBA	74.1 dBA	71.6 dBA	63.1 dBA	83 dBA
TSC	120	65.9 dBA	69.9 dBA	73.5 dBA	76.5 dBA	77.7 dBA	74.2 dBA	71.8 dBA	63.3 dBA	83 dBA
YSC	060	66.2 dBA	66.7 dBA	70.1 dBA	73.2 dBA	74.1 dBA	70.6 dBA	68.0 dBA	60.2 dBA	79 dBA
YSC	072	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.7 dBA	62.1 dBA	82 dBA
YSC	090	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.6 dBA	62.0 dBA	82 dBA
YSC	102	65.9 dBA	69.9 dBA	73.5 dBA	76.5 dBA	77.6 dBA	74.1 dBA	71.6 dBA	63.1 dBA	83 dBA
YSC	120	65.9 dBA	69.9 dBA	73.5 dBA	76.5 dBA	77.7 dBA	74.2 dBA	71.8 dBA	63.3 dBA	83 dBA
WSC	060	66.2 dBA	66.7 dBA	70.1 dBA	73.2 dBA	74.1 dBA	70.6 dBA	68.0 dBA	60.2 dBA	79 dBA
WSC	072	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.7 dBA	62.1 dBA	82 dBA
WSC	090	65.9 dBA	69.9 dBA	73.5 dBA	76.4 dBA	77.3 dBA	73.7 dBA	70.6 dBA	62.0 dBA	82 dBA

**Table 10 - SUPPLY Indoor Sound Power level (In duct)**

		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
TSC	060	53.6 dBA	52.0 dBA	59.0 dBA	64.7 dBA	62.0 dBA	61.2 dBA	60.0 dBA	50.9 dBA	69 dBA
TSC	072	50.6 dBA	49.0 dBA	56.0 dBA	61.7 dBA	59.0 dBA	58.2 dBA	57.0 dBA	47.9 dBA	66 dBA
TSC	090	52.6 dBA	51.0 dBA	58.0 dBA	64.7 dBA	63.0 dBA	62.2 dBA	61.0 dBA	52.9 dBA	70 dBA
TSC	102	59.6 dBA	63.0 dBA	69.0 dBA	72.7 dBA	69.0 dBA	68.2 dBA	65.0 dBA	55.9 dBA	77 dBA
TSC	120	60.6 dBA	65.0 dBA	71.0 dBA	74.7 dBA	72.0 dBA	72.2 dBA	69.0 dBA	59.9 dBA	79 dBA
YSC	060	50.6 dBA	55.0 dBA	64.0 dBA	63.7 dBA	64.0 dBA	59.2 dBA	58.0 dBA	48.9 dBA	70 dBA
YSC	072	47.6 dBA	52.0 dBA	61.0 dBA	60.7 dBA	61.0 dBA	56.2 dBA	55.0 dBA	45.9 dBA	67 dBA
YSC	090	47.6 dBA	54.0 dBA	62.0 dBA	62.7 dBA	63.0 dBA	59.2 dBA	57.0 dBA	49.9 dBA	69 dBA
YSC	102	59.6 dBA	64.0 dBA	72.0 dBA	71.7 dBA	69.0 dBA	67.2 dBA	63.0 dBA	53.9 dBA	77 dBA
YSC	120	60.6 dBA	65.0 dBA	74.0 dBA	73.7 dBA	72.0 dBA	70.2 dBA	66.0 dBA	56.9 dBA	79 dBA
WSC	060	49.6 dBA	55.0 dBA	64.0 dBA	63.7 dBA	63.0 dBA	59.2 dBA	58.0 dBA	48.9 dBA	69 dBA
WSC	072	46.6 dBA	52.0 dBA	61.0 dBA	60.7 dBA	60.0 dBA	56.2 dBA	55.0 dBA	45.9 dBA	66 dBA
WSC	090	47.6 dBA	53.0 dBA	62.0 dBA	63.7 dBA	63.0 dBA	59.2 dBA	58.0 dBA	49.9 dBA	69 dBA

**Table 11 - RETURN Indoor Sound Power level (In duct)**

		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
TSC	060	59.6 dBA	58.0 dBA	56.0 dBA	56.7 dBA	55.0 dBA	54.2 dBA	52.0 dBA	42.9 dBA	65 dBA
TSC	072	56.6 dBA	55.0 dBA	53.0 dBA	53.7 dBA	52.0 dBA	51.2 dBA	49.0 dBA	39.9 dBA	62 dBA
TSC	090	57.6 dBA	55.0 dBA	55.0 dBA	53.7 dBA	54.0 dBA	55.2 dBA	53.0 dBA	43.9 dBA	64 dBA
TSC	102	63.6 dBA	64.0 dBA	62.0 dBA	57.7 dBA	60.0 dBA	61.2 dBA	56.0 dBA	46.9 dBA	70 dBA
TSC	120	64.6 dBA	65.0 dBA	64.0 dBA	58.7 dBA	61.0 dBA	63.2 dBA	59.0 dBA	48.9 dBA	71 dBA
YSC	060	57.6 dBA	56.0 dBA	56.0 dBA	56.7 dBA	61.0 dBA	58.2 dBA	55.0 dBA	44.9 dBA	66 dBA
YSC	072	54.6 dBA	53.0 dBA	53.0 dBA	53.7 dBA	58.0 dBA	55.2 dBA	52.0 dBA	41.9 dBA	63 dBA
YSC	090	54.6 dBA	52.0 dBA	53.0 dBA	53.7 dBA	59.0 dBA	57.2 dBA	54.0 dBA	44.9 dBA	64 dBA
YSC	102	60.6 dBA	64.0 dBA	62.0 dBA	58.7 dBA	64.0 dBA	63.2 dBA	58.0 dBA	48.9 dBA	71 dBA
YSC	120	60.6 dBA	66.0 dBA	65.0 dBA	61.7 dBA	65.0 dBA	66.2 dBA	61.0 dBA	50.9 dBA	73 dBA
WSC	060	58.6 dBA	57.0 dBA	56.0 dBA	56.7 dBA	61.0 dBA	58.2 dBA	55.0 dBA	44.9 dBA	66 dBA
WSC	072	55.6 dBA	54.0 dBA	53.0 dBA	53.7 dBA	58.0 dBA	55.2 dBA	52.0 dBA	41.9 dBA	63 dBA
WSC	090	55.6 dBA	53.0 dBA	53.0 dBA	53.7 dBA	59.0 dBA	57.2 dBA	54.0 dBA	44.9 dBA	64 dBA



# Electrical Data

**Table 12 - Electrical characteristics**

Unit	Indoor Fan							Electric Heat
	Control	Compressor 1 / 2		Standard drive	Oversized drive	Outdoor Fan		
	Max Amps	Max Amps	Start Amps	Max Amps		Quantity	Max Amps	
YSD/YSH/TSD/TSH 060	0.3	11.3	71	3.2		1	1.0	17.3
YSD/YSH/TSD/TSH 072	0.3	15.2	95	3.2	4.3	1	3.0	26
YSD/YSH/TSD/TSH 090	0.3	17.4	111	4.3	5.3	1	3.0	26
YSD/YSH/TSD/TSH 102	0.3	11.3 / 8.5	71 / 51	4.3	5.3	1	3.0	36.1
YSD/YSH/TSD/TSH 120	0.3	12.2 / 9.1	75 / 52	5.3		1	3.0	36.1
WSD/WSH 060	0.3	11.3	71	3.2		1	1.0	17.3
WSD/WSH 072	0.3	14.1	75	3.2	4.3	1	3.0	26
WSD/WSH 090	0.3	17.4	111	4.3	5.3	1	3.0	26

**Table 13 - Wire sizes and maximum wire lengths**

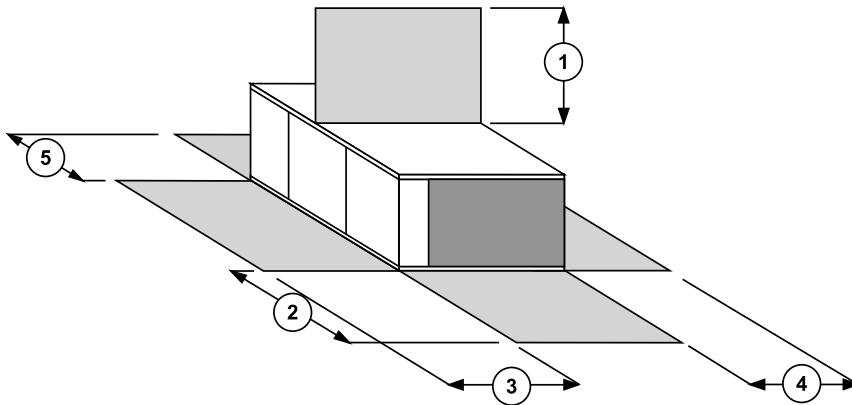
	Recommended wire size (mm <sup>2</sup> )	Maximum wire length (m)
<b>Zone sensor</b>	0.33	45
	0.5	76
	0.75	115
	1.3	185
	2	300
<b>CO<sub>2</sub> sensor</b>	0.25	50
	0.5	100
	1	200
<b>Electromechanical Thermostat 24V AC Conductors</b>		<b>Distance from unit to control (m)</b>
	0.75	000 - 140
	1.5	141 - 220

# Dimensions and Weights

## Unit Dimensions, Weights and Clearances

Overall unit dimensions, shipping weights and operating weights are given in the General Data tables.

**Figure 1 - Minimum recommended clearances**



**Table 14 - Minimum recommended clearances**

Model and size	Minimum recommended clearances (mm)				
	1	2	3	4	5
TSD/TSH 060	1829	1219	914	914	914
TSD/TSH 072	1829	1219	914	914	914
TSD/TSH 090	1829	1219	914	914	914
TSD/TSH 102	1829	1219	914	914	914
TSD/TSH 120	1829	1219	914	914	914
WSD/WSH 060	1829	1219	914	914	914
WSD/WSH 072	1829	1219	914	914	914
WSD/WSH 090	1829	1219	914	914	914
YSD/YSH 060	1829	1219	914	914	914
YSD/YSH 072	1829	1219	914	914	914
YSD/YSH 090	1829	1219	914	914	914
YSD/YSH 102	1829	1219	914	914	914
YSD/YSH 120	1829	1219	914	914	914

## Dimensions and Weights

### Weights of Factory-installed Options

Net weight should be added to unit weight when ordering factory-installed options. To estimate shipping weight, add 2.3 kg to net weight. Weights for options not listed are less than 3 kg.

**Table 15 - Factory-installed Options Net Weights (kg)**

Model and size	Economizer	Barometric Relief	Motorized Outside Air Damper	Manual Outside Air Damper	Roof Curb	Oversized Motor	Electric Heaters	Hot Water Coil
TSD/TSH 060	11.8	3.2	9.1	7.3	31.8	-	6.8	14.0
TSD/TSH 072	16.3	4.5	13.6	11.8	52.2	3.6	13.6	17.0
TSD/TSH 090	16.3	4.5	13.6	11.8	52.2	3.6	13.6	17.0
TSD/TSH 102	16.3	4.5	13.6	11.8	52.2	3.6	13.6	19.0
TSS/TSH 120	16.3	4.5	13.6	11.8	52.2	3.6	13.6	19.0
WSD/WSH 060	11.8	3.2	9.1	7.3	31.8	-	6.8	14.0
WSD/WSH 072	16.3	4.5	13.6	11.8	52.2	3.6	13.6	17.0
WSD/WSH 090	16.3	4.5	13.6	11.8	52.2	3.6	13.6	17.0
YSD/YSH 060	11.8	3.2	9.1	7.3	31.8	-	6.8	
YSD/YSH 072	16.3	4.5	13.6	11.8	52.2	3.6	13.6	
YSD/YSH 090	16.3	4.5	13.6	11.8	52.2	3.6	13.6	
YSD/YSH 102	16.3	4.5	13.6	11.8	52.2	3.6	13.6	
YSD/YSH 120	16.3	4.5	13.6	11.8	52.2	3.6	13.6	

Note:  
 (1) Weights for options not listed are < 3 kg.  
 (2) Net weight should be added to unit weight when ordering factory-installed accessories.  
 (3) Some accessories not available on all units.

### Filters

**Table 16 - Filter arrangement**

Unit size	Number	G2/EU2 Dimensions (mm)	Number	G4/EU4 Dimensions (mm)
060	2	(508x762x25)	2	(500x750x25)
072	4	(406x635x50)	4	(395x625x50)
090	4	(406x635x50)	4	(395x625x50)
102	4	(508x635x50)	4	(500x625x50)
120	4	(508x635x50)	4	(500x625x50)

# Controls

## Module Descriptions

### ReliaTel™ Refrigeration Module (RTRM)

Every ReliaTel™ unit uses an RTRM. The RTRM provides primary unit control for heating and cooling. In addition, it has built-in logic that controls heating and cooling staging, minimum run times, diagnostics, heat pump defrost control, short cycle timing and more. It can be controlled directly by any of the following:

*Figure 2 - TZS004 zone sensor*



- **Zone Sensor**

TZS001: Sensor only, used when connected to CCP2 or Tracker™

TZS002: Sensor and setpoint adjustment thumbwheel

TZS004: Sensor, override button, and setpoint adjustment thumbwheel (Figure 2)

Zone sensor module (ZSM)

THP03 (Programmable)

THS 03 Non programmable

- **Conventional Thermostat**

Fan, Cooling and heating stages can be wired directly to the RTRM and does not require any interface.

In addition, the unit can be controlled using Trane ICS systems by applying the appropriate interface. The RTRM is configured through the unit wiring harness. The same module is used on cooling-only, heat pump, and gas-fired units. The following additional inputs are connected to the RTRM:

- Outdoor air sensor (OAS)
- Coil Temperature Detector (CTS) on heat pump units
- Smoke detector (unless factory-mounted) or other shutdown device

### TD5 service and diagnostic user display

The TD-5 display allows you to view data and make operational changes on Voyager rooftop equipped with Reliatel control v3.4 or above.

TD-5 is an 5" (127mm diagonal) high resolution color touch screen display

TD-5 provides in 26 languages:

- 15 different reports (3 custom, 12 standard),
- 12 different graphs (4 custom, 8 standard)
- View and reset Historic of last 100 detailed alarms.

Graph data can be exported to an excel file through USB memory stick.

*Figure 3 - TD5 user display*



## Controls

**Table 17 - Characteristics of Programmable and Conventional Thermostats**



	Conventional Thermostat	THS03	THP03
Programmable	- / •	-	•
Electronic	•	-	•
Control type design	Electro-mechanical	Reliatel	
For cooling-only units (TS*/TK*)	•	•	•
For heat pump units (WS*/WK*)	•	•	•
For gas-fired units (YS*/YK*)	•	•	•
Number of cooling stages	2	3	3
Auxiliary heating stages (electric heater, hot water coil)	2	2 / 1 Modulating	
Liquid crystal display	•	-	•

### ReliaTel™ Options Board (RTOM)

The Options Board gets power from and communicates with the RTRM. Any of the following optional devices require the use of the Options Board:

- Froststat
- Clogged filter switch
- Fan failure switch
- Discharge air sensor used for supply air tempering and ICS input data
- Factory-mounted smoke detector

### Economizer Actuator with Module (ECA)

The economizer can be used with or without the Options Board. The actuator has a detachable communicating module, which can be replaced separately. The outdoor air sensor connected to the RTRM provides outdoor temperature information for the changeover decision. This module accepts the following inputs:

- Mixed air sensor
- Return air sensor for comparative enthalpy or ICS input data
- Outdoor humidity sensor for comparative enthalpy
- Return air humidity sensor for comparative enthalpy
- CO<sub>2</sub> sensor
- Remote minimum potentiometer
- Power exhaust relay

### TCI-R and LCI-R Communication Interface

Allows ICS communication between a ReliaTel™ unit and the following systems:

- Tracer Summit™
- Tracker™
- VariTrac™
- LonTalk® BMS

### PIC

Modbus Communication Interface.

Allows ICS communication between a ReliaTel™ unit and open modbus BMS.



# Mechanical Specifications

## General

Units shall be dedicated downflow or horizontal airflow. Operating range shall be between 46°C and -18°C cooling as standard from the factory for all units. All units shall be factory assembled, internally wired, fully charged with refrigerant, and 100% run-tested before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification.

## Casing

Unit casing shall be constructed of heavy gauge galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished weather-resistant RAL 7032 baked enamel finish. Unit's surface shall be tested 1000 hours in a salt spray test in compliance with NFX 41.002. Cabinet construction shall allow for all maintenance on one side of the unit. Service panels shall have lifting handles and be removed and reinstalled by removing not more than 1 fastener while providing a water and air tight seal. All exposed vertical panels, top covers and the base in the indoor air section shall be insulated with cleanable foil faced, fire-retardant permanent, odorless glass fiber material. The aluminium foil shall be 0.030 mm thick. The downflow unit's base pan shall have no penetrations within the perimeter of the curb other than the raised 29 mm high supply/ return openings to provide an added water integrity precaution, if the condensate drain backs up. The base of the unit shall have provisions for forklift and crane lifting. The horizontal flow units should not require any extra plenum or roofcurb to comply with an «horizontal return and discharge» requirement.

## Unit Top

The top cover shall be one piece or where seams exist, it shall be double hemmed and gasket sealed to prevent water leakage. The ribbed top adds extra strength and prevents water from pooling on unit top.

## Filters

Fifty mm filters shall be factory supplied.

## Compressors

All units shall have direct-drive, hermetic, scroll type compressors 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. All scroll compressors shall be provided with internal overloads.

## Refrigerant Circuits

Each refrigerant circuit shall have independent fixed orifice expansion devices, service pressure ports, and refrigerant line filter driers factory-installed as standard. On the reverse cycle of the heat pump unit, each circuit shall have an independent fixed thermal expansion valve.

## Evaporator And Condenser Coils

Internally finned 8 mm (5/16 inch, in diameter) copper tubes mechanically bonded to configured aluminum plate fin shall be standard. Coils shall be leak tested at the factory to ensure pressure integrity. The evaporator coil and condenser coil shall be pressure tested to 4.5 MPA and leak tested to 2.9 MPA. Unit condensate drain pan shall be constructed of a non-corrosive material. Drain pan shall be reversible for side opposite service connections. Drain pan shall be removable to gain access for cleaning. Drain pan shall be double sloped to ensure proper draining of condensate.

## 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

All units shall have belt driven, with forward-curved blades and adjustable motor sheaves. All units shall have an adjustable idler-arm assembly for quick-adjustment to fan belts and motor sheaves. All motors shall be thermally protected. Oversized motors shall be available for high static operations.

## Controls

Unit shall be completely factory wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Units shall provide an external location for mounting a fused disconnect device. Microprocessor controls shall be available. Microprocessor controls provide for all 24 volt control functions. With the microprocessor controls, 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. A centralized microprocessor shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

24-volt electromechanical control circuit shall include control transformer and contactor pressure lugs for power wiring. Unit shall have single point power entry as standard.

## Operation and diagnostic display

The unit shall be equipped with a 5" high resolution color touch screen LCD display. The display allows you to view data and make operational changes on the rooftop.

Display shall provide in 26 languages:

- 15 different reports (3 custom, 12 standard),
- 12 different graphs (4 custom, 8 standard)
- View and reset historic of last 100 detailed alarms.

Graph data shall be exported to an excel file through USB memory stick.

## Mechanical Specifications

### Options and Accessories

**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 and shall include wood nailer strips.

**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 and a field adjustable 2-step control and frost protection.

**Electric Heater** - Electric heater elements shall be constructed of heavy duty nickel chromium elements internally wire connected. Each heater package shall have automatically reset high limit operating through heating element contactors. Electric heaters shall be protected with fuses. Power supply shall come from the main unit power supply. All electric heaters shall be supplied with overheat thermostat protection.

**Economizer - Downflow** - This assembly includes fully modulating 0-100% motor and dampers, barometric relief, minimum position setting, preset linkage, wiring harness and differential enthalpy control.

**Economizer - Horizontal** - This accessory shall be factory-installed only. The horizontal economizer shall contain the same features as the downflow economizer with the exception of barometric relief.

**Remote Potentiometer** - Field-installed, the minimum position setting of economizer shall be adjusted with this accessory.

**Motorized Outside Air Dampers** - Factory or field-installed manually set outdoor air dampers shall provide up to 50 percent outside air. Once set, outdoor air dampers shall open to set position when indoor fan starts. The damper shall close to the full closed position when indoor fan shuts down.

**Manual Outside Air Damper** - Factory or field-installed rain hood and screen shall provide up to 50 percent outside air.

**Oversized Motors** - Factory or field-installed direct drive oversized motors shall be available for high static applications.

**Discharge Air Sensing** - This factory or field option provides true discharge air sensing in heating models. This sensor is a status indicator readable through Tracer® or Tracker®. This option is available for microprocessor controlled units.

**Through the Base Electrical with Fuse Disconnect Switch** - Factory-installed 3-pole, molded case disconnect switch with provisions for through the base electrical connections are available. The disconnect switch will be installed in the unit in a watertight enclosure with access through a swinging door. Factory wiring will be provided from the switch to the unit high voltage terminal block. The switch will be CE recognized.

**Fan Failure/Clogged Filter Switches** - These factory or field-installed options allow for individual fan failure and dirty filter indication in microprocessor controlled units. The fan failure switch will disable all unit functions and "flash" the Service LED on the zone sensor. The dirty filter switch will light the Service LED on the zone sensor and will allow continued unit operation.

**High Pressure Cutout** - All 3-phase models with scroll compressors include High Pressure Cutout as standard.

**Supply Air Smoke Detector** - With this option installed, if smoke is detected, all unit operation will be shut down. Reset will be manual at the unit.

### Control Options

**TCI-R Comm-3/4 Trane Communication Interface** - This factory or field-installed option shall be provided to interface microprocessor controlled units with the Trane Integrated Comfort™ systems.

**LCI-R Comm-5 LonTalk Communication Interface** - This factory or field-installed option shall be provided to allow the unit to communicate as a Trane Comm-5 device or directly with generic LonTalk Network Building Automation System Controls.

**Zone Sensor** - Field-installed, this accessory shall be provided to interface with the Micro equipped units and shall be available in either manual, automatic programmable with night setback, with system malfunction lights or remote sensor options.

**Thermostats** - Two stage heating and cooling operation or one stage heating and cooling shall be available, for field installation, in either manual or automatic changeover. Automatic programmable electronic with night set back shall also be available.

**Comparative Enthalpy** - Replaces the standard dry bulb control with two enthalpy sensors that compare total heat content of the indoor air and outdoor air to determine the most efficient air source. This control option offers the highest level of comfort control, plus energy efficiency, available. This option shall be available for microprocessor controlled units. It can be field-installed or factory-installed with the factory-installed economizer.

#### 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.



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