TRANE®

Installation Operation Maintenance

Voyager™ II Rooftop units
Cooling only TKD/TKH 155 175 200 250
Reversible WKD/WKH 125 155 200
Gas-Fired YKD/YKH 155 175 200 250
R22 - R407C Refrigerant

RT-SVX19A-E4

General information

Foreword

These instructions are given as a guide to good practice in the installation, start-up, operation, and maintenance by the user, of Trane TKD/TKH, WKD/WKH and YKD/YKH units. They do not contain full service procedures necessary for the continued successful operation of this equipment. The services of a qualified technician should be employed through the medium of a maintenance contract with a reputable service company. Read this manual thoroughly before unit start-up.

TKD/TKH units are designed to operate in cooling mode only, with optional auxiliary heat (electric heater or hot water coil).

WKD/WKH can operate in cooling mode or heating mode by reversing the refrigeration cycle with or without auxiliary heat.

YKD/YKH units are designed to operate In cooling mode and equipped with a gas fired heating module.

TKD/TKH, WKD/WKH and YKD/YKH units are assembled, pressure tested, dehydrated, charged and run tested before shipment.

Warnings and cautions

Warnings and Cautions appear at appropriate sections throughout this manual. Your personal safety and the proper operation of this machine require that you follow them carefully. The constructor assumes no liability for installations or servicing performed by unqualified personnel.

WARNING! : Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION! : Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or for equipment or property-damage-only accidents.

Safety recommendations

To avoid death, injury, equipment or property damage, the following recommendations should be observed during maintenance and service visits:

1. The maximum allowable pressures for system leak testing on low and high pressure side are given in the chapter "Installation". Always provide a pressure regulator.
2. Disconnect the main power supply before any servicing on the unit.
3. Service work on the refrigeration system and the electrical system should be carried out only by qualified and experienced personnel.

Reception

On arrival, inspect the unit before signing the delivery note.

In case of visible damage: The consignee (or the site representative) must specify any damage on the delivery note, legibly sign and date the delivery note, and the truck driver must countersign it. The consignee (or the site representative) must notify Trane Epinal Operations - Claims team and send a copy of the delivery note. The customer (or the site representative) should send a registered letter to the last carrier within 3 days of delivery.

Reception in France only:

Concealed damage must be looked for at delivery and immediately treated as visible damage.

Reception in all countries except France:

In case of concealed damage: The consignee (or the site representative) must send a registered letter to the last carrier within 7 days of delivery, claiming for the described damage. A copy of this letter must be sent to Trane Epinal Operations - Claims team.

General information

Warranty

Warranty is based on the general terms and conditions of the manufacturer. The warranty is void if the equipment is repaired or modified without the written approval of the manufacturer, if the operating limits are exceeded or if the control system or the electrical wiring is modified. Damage due to misuse, lack of maintenance or failure to comply with the manufacturer's instructions or recommendations is not covered by the warranty obligation. If the user does not conform to the rules of this manual, it may entail cancellation of warranty and liabilities by the manufacturer.

Refrigerant

The refrigerant provided by the manufacturer meets all the requirements of our units. When using recycled or reprocessed refrigerant, it is advisable to ensure its quality is equivalent to that of a new refrigerant. For this, it is necessary to have a precise analysis made by a specialized laboratory. If this condition is not respected, the manufacturer warranty could be cancelled.

Maintenance contract

It is strongly recommended that you sign a maintenance contract with your local Service Agency. This contract provides regular maintenance of your installation by a specialist in our equipment. Regular maintenance ensures that any malfunction is detected and corrected in good time and minimizes the possibility that serious damage will occur. Finally, regular maintenance ensures the maximum operating life of your equipment. We would remind you that failure to respect these installation and maintenance instructions may result in immediate cancellation of the warranty.

Storage

Take precautions to prevent condensate formation inside the unit's electrical components and motors when:

1. The unit is stored before it is installed; or,
2. The unit is set on the roof curb and temporary auxiliary heat is provided in the building.

Isolate all side panel service entrances and base pan openings (e.g., conduit holes, S/A and R/A openings, and flue openings) to minimize ambient air from entering the unit until it is ready for start-up.

Do not use the unit's heater as temporary heat without completing the start-up procedures detailed under "Unit Start-Up".

The Trane Company will not assume responsibility for equipment damage resulting from accumulation of condensate on the unit electrical components.

Training

To assist you in obtaining the best use of it and maintaining it in perfect operating condition over a long period of time, the manufacturer has at your disposal a refrigeration and air conditioning service school. The principal aim of this is to give operators and technicians a better knowledge of the equipment they are using, or that is under their charge. Emphasis is particularly given to the importance of periodic checks on the unit operating parameters as well as on preventive maintenance, which reduces the cost of owning the unit by avoiding serious and costly breakdown.

Contents

Contents

Installation

General information : The installation must conform to all local standards and regulations.

Reception of units

Rooftop unit

The unit is supplied on a wooden frame. It is recommended to check the machine's condition upon reception.

There are two ways to handle the unit:

1. Use the openings in the wooden frame to handle the machine using a fork lift, in accordance with applicable safety regulations.
2. Use a lifting beam correctly adjusted to fit the unit (Figure 1a).

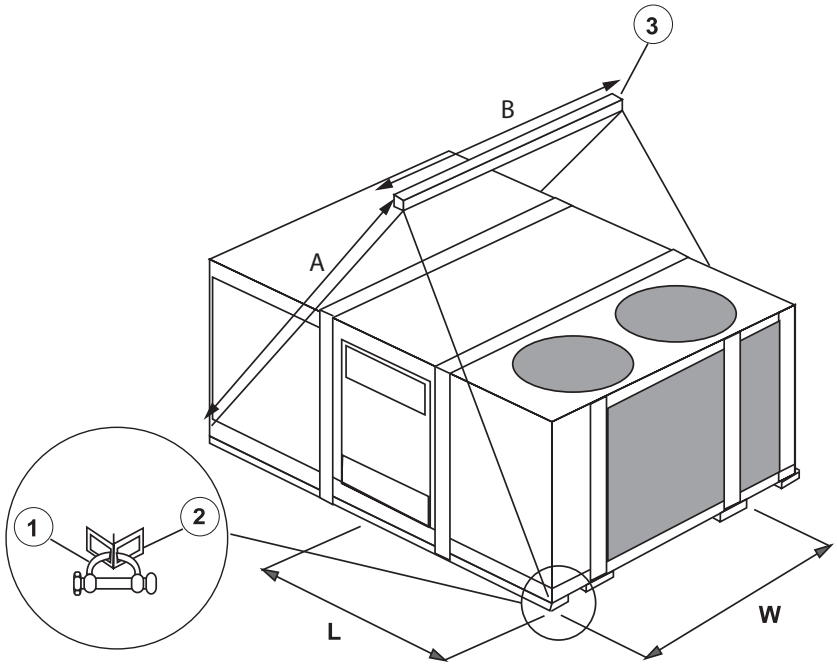
Unit handling

The units are supplied on the truck but are not unloaded. An opening is provided on each corner of the unit base to facilitate handling.
4 shackles and 4 slings are required. Use a lifting beam to prevent the cables pressing too hard on top of the unit during lifting.

Figure 1a indicates the position of the center of gravity and the lifting recommendations.

Important: For unit to fit on the roof curb the fork lift pockets must be removed.

Figure 1a - Unit handling



1 = Clevis
2 = Base Rail
3 = Spreader Bar
L = Length (Center of Gravity)
W = Width (Center of Gravity)

Refer to Table 2 for weights and center of gravity.

Installation

Table 1 - Sling lengths and maximum unit weight

Unit size	A (mm)	B (mm)	Maximm weight kg
125	3000	1900	644
155	3000	1900	773
175	3000	1900	810
400	3500	2200	1001
500	3500	2200	1027

Figure 1b - Maximum slope correction of adjustable roof curb.

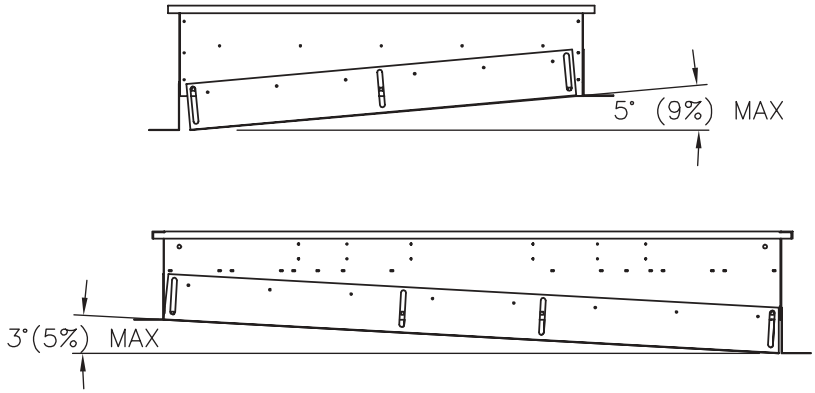
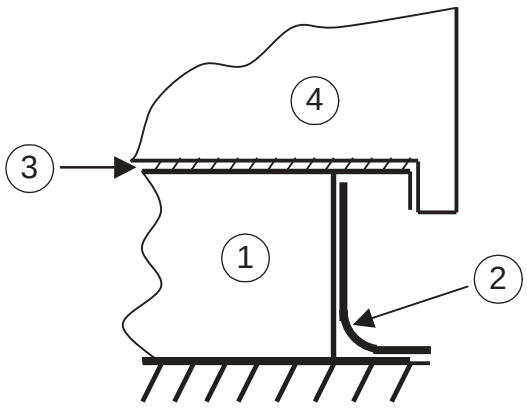


Figure 2 - Waterproofing



1 = Roofcurb
2 = Roof membrane
3 = Seal
4 = Rooftop

Roof curb Installation (TKD-WKD-YKD accessories)

Roof curbs are available as an accessory for "downflow" units to support the unit and ensure the water tightness between the rooftop and the roof. Two types of roof curbs are available: The standard version to allow the installation of the unit on a flat roof and the adjustable version for a sloped roof installation. (See Figure 1b for the maximum slope correction of adjustable roofcurb.)

The adjustable roof curbs are supplied pre-assembled on a skid.

Two types of self-adhesive seals are provided separately. (40 mm wide for the perimeter, 20 mm wide for the cross pieces). Make sure they are properly installed where indicated to assure an adequate curb to unit seal.

Instructions for the roof curb assembly and installation with curb dimensions are provided with each roof curb kit.

Installation

Dimensions/Weights/Clearances

Figure 3 - Minimum clearances

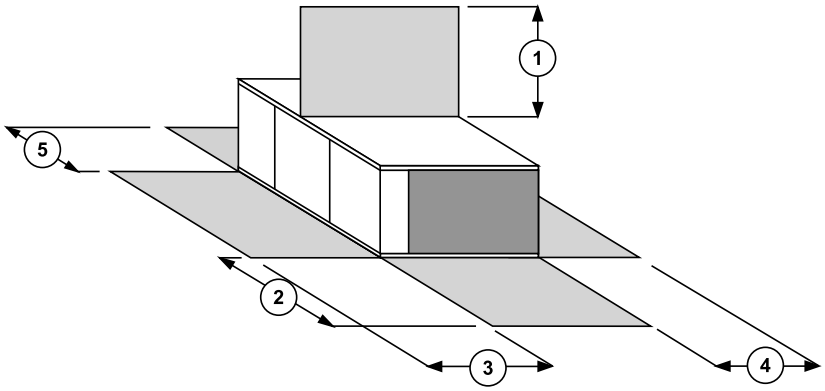


Table 2 - Minimum clearances (mm)

	Minimum clearance				
UNIT	1	2	3	4	5
YKD/YKH 155	1900	1800	1220	1000	1300
YKD/YKH 175	1900	1800	1220	1000	1300
YKD/YKH 200	1900	1800	1220	1000	1300
YKD/YKH 250	1900	1800	1220	1000	1300
TKD/TKH 155	1900	1800	1220	1000	1300
TKD/TKH 175	1900	1800	1220	1000	1300
TKD/TKH 200	1900	1800	1220	1000	1300
TKD/TKH 250	1900	1800	1220	1000	1300
WKD/WKH 125	1900	1800	1220	1000	1300
WKD/WKH 155	1900	1800	1220	1000	1300
WKD/WKH 200	1900	1800	1220	1000	1300

The structure accommodating the unit(s) must be designed to support the equipment in operation, as a minimum. Refer to Table 3a and the space requirement plan.

Installation

Table 3a - Weigths & center of gravity (Figure 1)

	Maximum weight		Corner Weight (1)				Center of Gravity	
	Shipping	Net	A	B	C	D	Length (L)	Width (W)
UNIT	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(mm)	(mm)
YKD/YKH 155	866	698	243	176	118	162	1143	737
YKD/YKH 175	902	735	251	188	127	169	1168	737
YKD/YKH 200	1128	920	324	242	151	203	1321	838
YKD/YKH 250	1154	946	327	251	159	208	1346	838
TKD/TKH 155	790	623	219	159	103	142	1143	711
TKD/TKH 175	827	660	227	172	112	149	1168	711
TKD/TKH 200	1050	841	297	221	138	185	1321	838
TKD/TKH 250	1075	866	300	230	145	206	1346	838
WKD/WKH 125	792	625	218	159	105	144	1143	711
WKD/WKH 155	809	642	228	162	105	147	1143	711
WKD/WKH 200	1080	871	291	226	155	199	1346	889

1. Corner weights are given for information only. All models must be supported continuously by a curb or equivalent frame support.

Table 3b - Weights of Options & accessories

UNIT	Standard Roof Curb	Adjustable Roof Curb	Economizer	Manual Outside Air Damper	Motorized Outside Air Damper	Electric heater	Hot water coil
YKD 155	93	220	30	15	27		
YKD 175	93	220	30	15	27		
YKD 200	107	260	37	15	34		
YKD 250	107	260	37	15	34		
YKH 155			30	15	27		
YKH 175			30	15	27		
YKH 200			37	15	34		
YKH 250			37	15	34		
TKD 155	93	220	30	15	27	14	85
TKD 175	93	220	30	15	27	14	85
TKD 200	107	260	37	15	34	18	110
TKD 250	107	260	37	15	34	18	110
TKH 155			30	15	27	14	
TKH 175			30	15	27	14	
TKH 200			37	15	34	18	
TKH 250			37	15	34	18	
WKD 125	93	180	20	15	27	18	85
WKD 155	93	220	30	15	27	18	85
WKD 200	107	260	37	15	34	18	110
WKH 125			20	15	27	18	
WKH 155			30	15	27	18	
WKH 200			37	15	34	18	

Notes :
Net weight should be added to unit weight when ordering factory installed accessories.
To estimate shipping weight add 2.3 kg to net weight.

Installation

Installing the unit

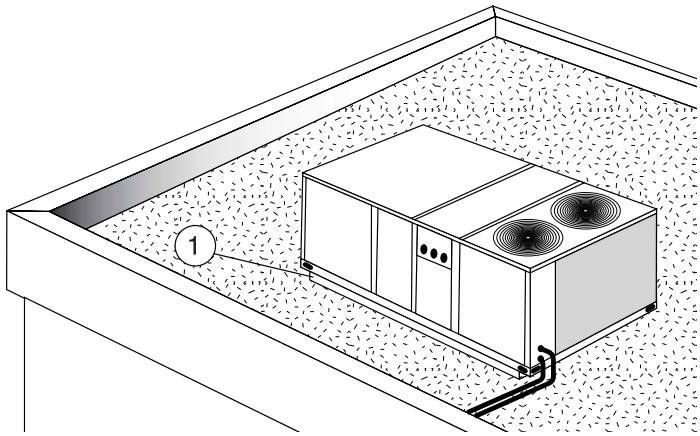
1) Unit mounting on roof

Fix the rooftop curb on the joint beam of the building's structure. Make the rooftop curb's sealing surface level using angle brackets adjusted by screw bolts, located around its perimeter. Place the adhesive seals on the curb's sealing surface (perimeter and cross pieces). Make the rooftop leak-tight around the curbs before installing the unit, in compliance with current construction standards.

Note: The unit must be installed perfectly level to ensure condensates flow from the condensate tray.

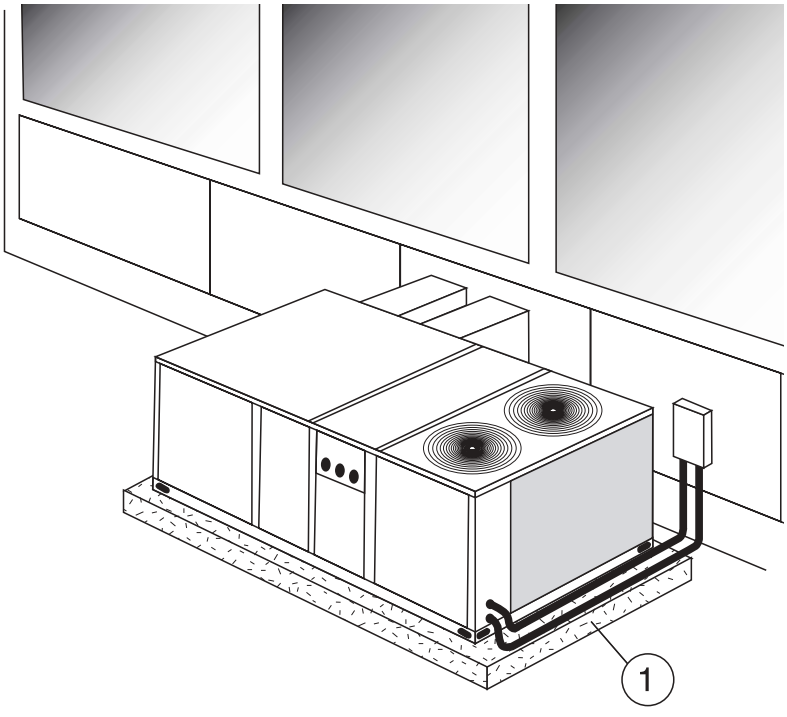
The rooftop unit nests into the curb and is supported by it. Position the unit, taking care to comply with the indicated directions: the unit's discharge and intake openings must match those of the curb.

Figure 4



1 = Frame

Figure 5



1 = Concrete slab

2) Installing the unit on the ground

To install the unit on the ground, its base must be level and supported securely.

For horizontal discharge units, a support is required such as a metal or concrete slab whose height must be determined according to the amount of snow cover, to prevent problems with condensation drainage and obstruction of the external coil. If necessary use an anti-vibration material between the rooftop unit's base and the support.

Note: Unit installation must comply to local codes

Installation

Connection of duct network

1) Downflow discharge units (TKD,WKD,YKD)

Using the rooftop curb

- The rooftop curb must be insulated on the outside walls at the discharge and intake openings to prevent condensation in the ducts.
- The rims around the discharge and intake openings make it possible to attach the flanges on the ends of the ducts. If you are using rigid duct ends recommended on the rooftop curb plan, it is essential to fix these components before installing the unit.
- For the design of the duct network, comply with recommendations currently applicable on the market, in particular:

. Installation of a section of flexible ducts to limit transmission of the unit's vibrations

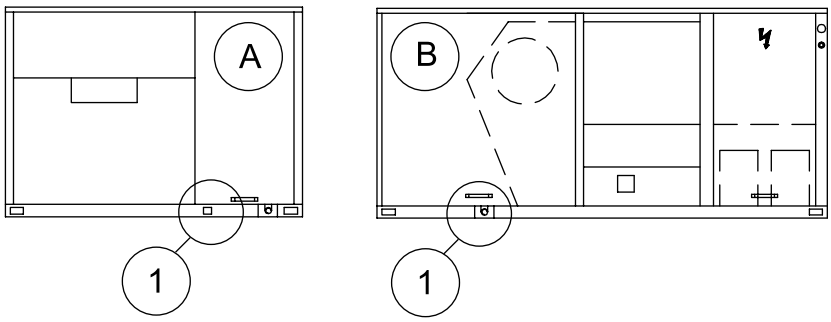
. Use of movable vanes or deflectors to reduce the sound level.

2) Horizontal discharge units (TKH,WKH,YKH)

- The intake and discharge ducts must be insulated (thermal insulation).
- The duct section located outside must be leak-tight.
- Provide a flexible connector to prevent transmission of the unit vibrations. This flexible duct must be installed inside the building.

Note: In case of use of TKH, WKH or YKH units with economizer option, temperature and humidity sensors must be installed in return duct. Economizer linkage is factory mounted but the damper position must be adjusted on site.

Figure 6 - Condensate Drain location



1 = Condensate drain connection
A = TKH/YKH 155, 175, 200, 250 - WKH 125,155, 200
B = TKD/YKD 155, 175, 200, 250 - WKD 125,155,200

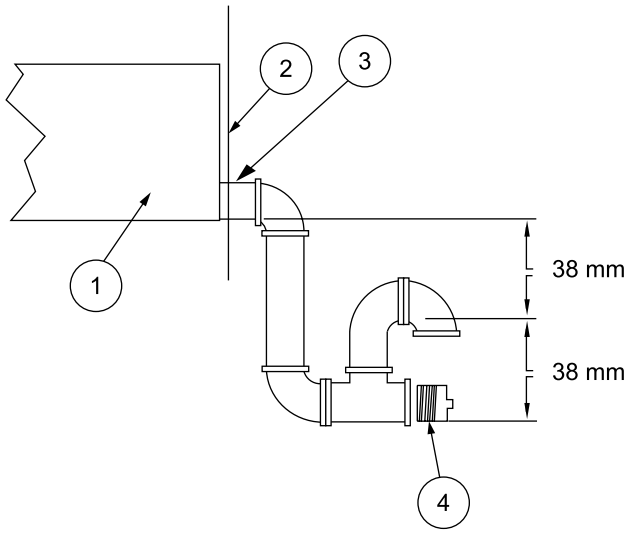
Installation

Condensate drain piping

A 42mm PVC condensate drain connection with P-trap is provided.

Follow local codes and standard piping practices when running the drain line. Install a trap and be sure to fill with water before starting the unit. Pitch the line downward, away from the unit to avoid long, level, horizontal runs. Refer to Figure 7.

Figure 7 - Condensate drain line connection



1 = Static pressure drain pan
2 = Panel enclosure
3 = 42mm PVC drain
4 = Cleanout plug

Installation

Gas pipework installation

The installation must conform to all standards and regulations.

The gas supply pipework and gas stop valve to be installed near the unit must be sized so as to assure the gas pressure is sufficient at the unit inlet when operating at full load.

CAUTION! Should the pressure at the unit valve gas inlet be higher than 0.035 bar, an expansion valve must be installed.

The pipework must be self-supporting and the final connection to the burner must be made by a flexible pipe. Provide a dust protection (filter) upstream the unit connection.

CAUTION! The gas pipework must not exert any stress on the burner gas connection.

Note: Expansion valve must be adapted to the type of gas used:

- G 20 : 20 mb
- G 25 : 25 mb
- G 31 : (Propane): 37 or 50 mb

Table 4 - Gas burner models

Unit		Burner size
YKD/H	155	G350A
YKD/H	175	G350A
YKD/H	200	G350A
YKD/H	250	G350A

See Table 38 for burner performance.

Gas leak check procedure

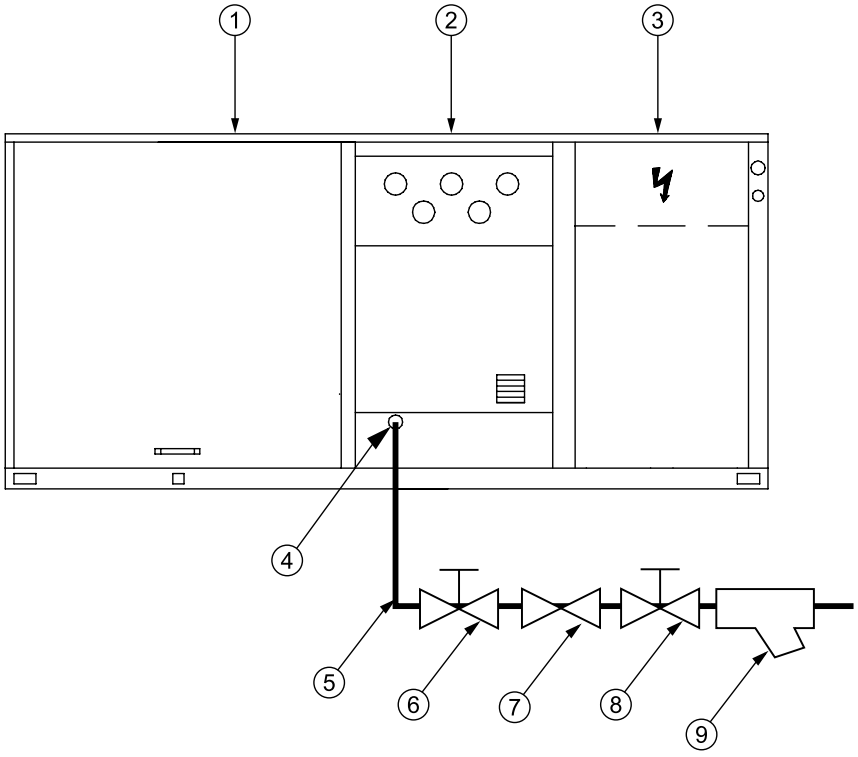
1. Vent the gas line
2. Gas supply line pressure test: close valve 4 and open valve 2
3. Leak-check the gas pipe

Look for gas pipe leaks using "Typol", "1000 bulles" or a similar product. Do not use soapy water.

WARNING! Never use an open flame to check for gas leaks. Required gas pressure at the unit inlet connection are given in Table 37.

Note: To operate with propane gas, the burner is fitted with a pressure limiter (supplied by Trane)

Figure 8 - Typical gas supply Pipework



1 = Evaporator section
2 = Gas burner section
3 = Condenser section
4 = Gas supply connection
5 = Gas supply line
6,8 = Gas stop valve (Field supplied)
7 = Expansion valve (Field supplied)
9 = Filter (Field supplied)

Installation

Filter installation

To gain access to filters, remove the supply fan access panel on downflow units and the filter access panel on the end for horizontal units.

Each unit ships with 40 or 50 mm thick filters. Number and size of filters is determined by size and configuration of the unit.

CAUTION! Do not operate unit without filters in place.

The maximum pressure drops allowable on filters are:

EU2/G2: 120 Pa

EU4/G4: 150 Pa

Table 5 - Filter arrangement

UNIT	EU2/G2		EU4/G4	
	Qty	Size	Qty	Size
YKH/YKD 155	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
YKH/YKD 175	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
YKH 200	8	(508x635x50)	8	(500x625x50)
YKD 200	4	(508x508x50)	4	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
YKH 250	8	(508x635x50)	8	(500x625x50)
YKD 250	4	(508x508x50)	4	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
TKH/TKD 155	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
TKH/TKD 175	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
TKH 200	8	(508x635x50)	8	(500x625x50)
TKD 200	4	(508x508x50)	4	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
TKH 250	8	(508x635x50)	8	(500x625x50)
TKD 250	4	(508x508x50)	4	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
WKH/WKD 125	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
WKH/WKD 155	2	(508x508x50)	2	(498x498x40)
	4	(508x635x50)	4	(500x625x50)
WKH 200	8	(508x635x50)	8	(500x625x50)
WKD 200	4	(508x508x50)	4	(498x498x40)
	4	(508x635x50)	4	(500x625x50)

Installation

Supply fan adjustment

Use the following procedure to determine the proper adjustment of the supply fan for a specific application.

1. Determine total external static pressure about system and accessories.
   a. Obtain the design airflow rate and the design external static pressure drop through the distribution system.
   b. Add static pressure drop of the accessories installed on the unit. (Table 7,8 & 9)
   c. Add the total accessory static pressure drop (from step 1b) to the design external static pressure (from step 1a). The sum of these two values is the total system external static pressure.
2. Using the Tables 10 through 20 to find the external static pressure that most closely approximates total system external static pressure. Then locate the appropriate airflow rate for your unit. The value obtained represents the brake horsepower for the supply fan motor and the fan RPM.
3. Adjust motor sheave according to Table 6.

Table 6 - Motor sheave / Fan speed

	Fan Speed (RPM) Standard Drive						
UNIT	**6 turns Open**	**5 turns Open**	**4 turns Open**	**3 turns Open**	**2 turns Open**	**1 turns Open**	**Closed**
YKD/YKH 155	566	601	637	672	708	743	N/A
YKD/YKH 175	724	769	815	860	906	951	N/A
YKD/YKH 200	513	550	586	623	659	696	N/A
YKD/YKH 250	588	619	650	681	712	743	N/A
TKD/TKH 155	566	601	637	672	708	743	N/A
TKD/TKH 175	724	769	815	860	906	951	N/A
TKD/TKH 200	513	550	586	623	659	696	N/A
TKD/TKH 250	588	619	650	681	712	743	N/A
WKD/WKH 125	533	566	600	633	667	700	N/A
WKD/WKH 155	566	601	637	672	708	743	N/A
WKD/WKH 200	513	550	586	623	659	696	N/A

	Fan Speed (RPM) Oversized Drive						
UNIT	**6 turns Open**	**5 turns Open**	**4 turns Open**	**3 turns Open**	**2 turns Open**	**1 turns Open**	**Closed**
YKD/YKH 155	672	714	756	798	840	882	N/A
YKD/YKH 175	791	840	890	939	989	1038	N/A
YKD/YKH 200	680	711	742	773	804	835	N/A
YKD/YKH 250	690	722	754	786	818	850	N/A
TKD/TKH 155	672	714	756	798	840	882	N/A
TKD/TKH 175	791	840	890	939	989	1038	N/A
TKD/TKH 200	680	711	742	773	804	835	N/A
TKD/TKH 250	690	722	754	786	818	850	N/A
WKD/WKH 125	724	769	815	860	906	951	N/A
WKD/WKH 155	513	550	586	623	659	696	N/A
WKD/WKH 200	588	619	650	681	712	743	N/A

Installation

To increase airflow

Loosen variable sheave set screw and turn sheave clockwise.

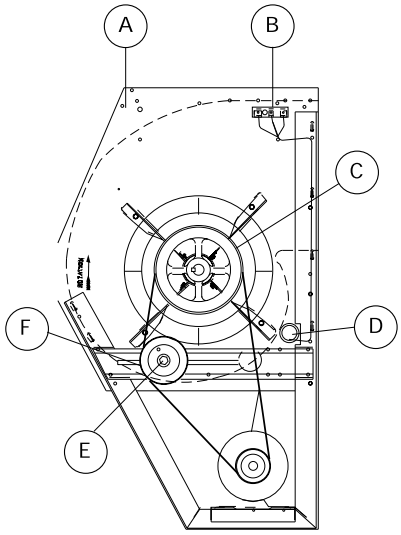
To decrease airflow

Loosen variable sheave set screw and turn sheave counter-clockwise.

To increase belt tension

Loosen the nut (next to the idler sheave) that secures the sheave in place. With a wrench, apply pressure clockwise on the outside nut (round headed one), until tension desired is reached. While holding pressure with the tension nut, retighten the nut next to the idler sheave.

Figure 9 - Typical fan, motor, and sheave assembly



A = Fan Housing
B = Terminal Block
C = Fan Sheave
D = Plastic Bushing
E = Belt Tension Adjustment Bolt
F = Idler Pulley

Table 6b - Belt tensioning

TK* / YK* / WK*	Motor kW	Fan pulley Type / diam. (mm)	Fan pulley Type / diam. (mm)	Belt type / lengh (mm)	Belt deflexion (mm)	Deflexion effort mini kg	Deflexion effort maxi kg	Belt tension mini N	Belt tension maxi N
125	1,5	BK90 / 222	1VP44 / 105	BX68 / 1727	5,89	2,4	2,9	400	500
155	1,5	BK85 / 210	1VP44 / 105	BX68 / 1727	6	2,4	2,9	400	500
175	3	BK130 / 324	1VP44 / 105	BX75 / 1905	6,05	2,4	2,9	400	500
200	3	BK160 / 400	1VL40 / 95	BX90 / 2286	6,96	2,4	2,9	400	500
250	4,6	BK190 / 476	1VP50 / 121	BX96 / 2438	6,91	2,4	2,9	400	500
125	3	BK130 / 324	1VP44 / 105	BX75 / 1905	5,85	2,4	2,9	400	500
155	3	BK140 / 349	1VP44 / 105	BX77 / 1955	6,17	2,4	2,9	400	500
175	4,6	BK140 / 349	1VP56 / 136	BX75 / 1905	5,45	2,4	2,9	400	500
200	4,6	BK190 / 476	1VP56 / 136	BX96 / 2438	6,87	2,4	2,9	400	500
250	4,6	BK190 / 476	1VP56 / 136	BX96 / 2438	6,32	2,4	2,9	400	500

Installation

Component air pressure drops

Table 7 - YKD/YKH Pressure drop through accessories

	Airflow	Filter EU2/G2	Filter EU4/G4	Economizer 100% outside air	Economizer 100% return air
YKD/YKH 155	6800	13	27	8	6
	7650	16	30	10	7
	8500	19	34	12	8
	9350	22	37	14	9
	10200	26	40	16	10
YKD/YKH 175	7870	17	30	10	7
	8860	21	34	12	8
	9850	25	38	15	9
	10840	30	43	17	11
	11830	35	47	20	12
YKD 200	8970	12	26	29	6
	10090	15	30	37	8
	11210	19	33	45	9
	12330	23	37	55	11
	13450	27	41	65	13
YKH 200	8970	11	23	33	6
	10090	14	26	41	8
	11210	17	29	51	9
	12330	20	33	61	11
	13450	23	36	72	13
YKD 250	11280	18	32	46	10
	12690	24	36	58	12
	14100	29	41	71	14
	15510	36	46	86	17
	16920	43	51	102	19
YKH 250	11280	17	30	52	10
	12690	21	34	65	12
	14100	26	38	80	14
	15510	31	43	96	17
	16920	36	47	114	19

Installation

Table 8 - TKD/TKH Pressure drop through accessories

	Airflow	Filter EU2/G2	Filter EU4/G4	Economizer 100% outside air	Economizer 100% return air	Electric heater	Hot water coil Downflow only
	6800	13	27	8	6	7	33
	7650	16	30	10	7	9	40
TKD/TKH 155	8500	19	34	12	8	11	48
	9350	22	37	14	9	13	56
	10200	26	40	16	10	16	65
	7870	17	30	10	7	10	42
	8860	21	34	12	8	13	51
TKD/TKH 175	9850	25	38	15	9	16	61
	10840	30	43	17	11	19	72
	11830	35	47	20	12	23	83
	8970	12	26	29	6	13	33
	10090	15	30	37	8	17	40
TKD 200	11210	19	33	45	9	21	48
	12330	23	37	55	11	25	56
	13450	27	41	65	13	30	65
	8970	11	23	33	6	13	-
	10090	14	26	41	8	17	-
TKH 200	11210	17	29	51	9	21	-
	12330	20	33	61	11	25	-
	13450	23	36	72	13	30	-
	11280	18	32	46	10	20	49
	12690	24	36	58	12	25	59
TKD 250	14100	29	41	71	14	32	71
	15510	36	46	86	17	38	82
	16920	43	51	102	19	46	95
	11280	17	30	52	10	19	-
	12690	21	34	65	12	24	-
TKH 250	14100	26	38	80	14	29	-
	15510	31	43	96	17	35	-
	16920	36	47	114	19	42	-

Installation

Table 9 - WKD/WKH Pressure drop through accessories

	Airflow	Filter EU2/G2	Filter EU4/G4	Economizer 100% outside air	Economizer 100% return air	Electric heater	Hot water coil Downflow only
	5720	9	21	6	5	4	37
	6430	11	24	7	6	6	45
WKD/WKH 125	7140	14	27	9	6	7	53
	7850	17	30	10	7	9	62
	8560	20	33	12	8	12	72
	6800	13	27	8	6	7	33
	7650	16	30	10	7	9	40
WKD/WKH 155	8500	19	34	12	8	11	48
	9350	22	37	14	9	13	56
	10200	26	40	16	10	16	65
	8970	12	26	29	6	13	33
	10090	15	30	37	8	17	40
WKD 200	11210	19	33	45	9	21	48
	12330	23	37	55	11	25	56
	13450	27	41	65	13	30	65
	8970	11	23	33	6	13	-
	10090	14	26	41	8	17	-
WKH 200	11210	17	29	51	9	21	-
	12330	20	33	61	11	25	-
	13450	23	36	72	13	30	-

Installation

Supply fan performances

Table 10 - YK 155 External static pressure

	External Static Pressure (Pa)																			
	25		**50**		**75**		**100**		**125**		**150**		**175**		**200**		**225**		**250**	
m³/h	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**
6800									564	1	587	1.07	610	1.15	633	1.23	655	1.31	677	1.39
7650					560	1.14	583	1.23	605	1.31	627	1.39	648	1.48	669	1.56	690	1.65	710	1.74
8500	559	1.31	584	1.41	606	1.5	628	1.6	649	1.69	669	1.78	689	1.87	708	1.97	727	2.06	746	2.16
9350	610	1.72	633	1.83	654	1.94	675	2.04	694	2.14	713	2.24	732	2.34	750	2.45	767	2.55	785	2.65
10200	661	2.21	683	2.33	703	2.45	722	2.56												

	External Static Pressure (Pa)																			
	275		**300**		**325**		**350**		**375**		**400**		**425**		**450**		**475**		**500**	
m³/h	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**	**RPM**	**(kW)**
6800	699	1.47	719	1.55	739	1.63	758	1.71	777	1.79	795	1.86	813	1.94	830	2.01	847	2.09	863	2.16
7650	729	1.82	749	1.92	768	2.01	787	2.1	806	2.19	824	2.28	841	2.37	858	2.46	875	2.55		
8500	764	2.25	782	2.35	800	2.45	818	2.55												
9350																				
10200																				

Standard drive

Oversized drive

Installation

Table 11 - YK 175 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
7870									726	1.58	748	1.66	770	1.74	791	1.83	813	1.92	835	2.02
8860					751	1.96	772	2.05	792	2.13	811	2.22	831	2.31	850	2.4	869	2.5	888	2.6
9850	779	2.41	801	2.52	822	2.62	841	2.72	859	2.82	877	2.91	895	3.01	912	3.11	929	3.21	947	3.31
10840	852	3.19	874	3.31	893	3.42	911	3.53	928	3.64	945	3.75	961	3.85	977	3.96	993	4.07	1009	4.18
11830	926	4.12	946	4.25																

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
7870	857	2.12	879	2.22	900	2.33	921	2.44	942	2.55	962	2.65	981	2.75	1000	2.86	1018	2.96	1036	3.06
8860	907	2.7	927	2.81	946	2.92	965	3.03	985	3.15										
9850	964	3.42	981	3.53	998	3.64	1016	3.76	1033	3.88										
10840	1024	4.29																		
11830																				

Standard drive

Oversized drive

Table 12 - YK 200 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970											530	1.5	551	1.61	572	1.74	593	1.87	614	2
10090							529	1.71	548	1.83	567	1.94	586	2.06	604	2.18	623	2.31	641	2.45
11210			530	1.99	551	2.12	570	2.24	588	2.36	606	2.48	623	2.61	640	2.74	657	2.87	673	3.01
12330	548	2.41	573	2.58	594	2.73	613	2.87	630	3	646	3.13	662	3.27	678	3.4	693	3.54	709	3.69
13450	593	3.1	617	3.29	638	3.46	656	3.61	672	3.76	688	3.9	703	4.05	718	4.19				

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970	633	2.14	652	2.27	670	2.4	688	2.54	705	2.67	721	2.8	737	2.93	753	3.06	768	3.19	783	3.31
10090	660	2.6	679	2.75	697	2.91	714	3.06	731	3.21	747	3.35	763	3.5	778	3.65	793	3.8	808	3.95
11210	690	3.16	707	3.31	724	3.47	741	3.64	757	3.81	773	3.98	789	4.14	804	4.31				
12330	724	3.84	739	3.99	754	4.15	770	4.31												
13450																				

Standard drive

Oversized drive

Installation

Table 13 - YK 250 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
9870															606	1.62	625	1.72	643	1.82
11280									603	1.88	620	1.97	637	2.07	653	2.17	670	2.27	686	2.37
12690			602	2.18	622	2.30	640	2.41	657	2.52	673	2.63	688	2.74	704	2.85	719	2.96	733	3.08
14100	639	2.77	660	2.92	679	3.06	696	3.19	712	3.32	727	3.44	742	3.56	756	3.68	770	3.80	784	3.92
15510	699	3.65	719	3.82	736	3.98	753	4.13	768	4.27	782	4.40	796	4.54	810	4.67	823	4.81	836	4.94
16920	758	4.70	777	4.89	794	5.06	810	5.23	824	5.39	838	5.54								

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
9870	662	1.92	681	2.03	699	2.15	717	2.26	735	2.36	752	2.48	768	2.59	784	2.69	800	2.81	815	2.91
11280	702	2.48	718	2.59	734	2.70	750	2.82	767	2.94	783	3.08	800	3.20	815	3.33	831	3.46	846	3.59
12690	748	3.19	762	3.30	776	3.42	791	3.54	805	3.66	819	3.79	834	3.92	848	4.05				
14100	797	4.05	810	4.17	823	4.30	836	4.43	849	4.55										
15510	848	5.08																		
16920																				

Standard drive

Oversized drive

Table 14 - TK 155 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
6800							565	0.7	599	0.77	633	0.85	665	0.93	697	1.02	728	1.1	758	1.19
7650					571	0.82	603	0.9	634	0.99	665	1.07	694	1.16	723	1.25	752	1.34	780	1.44
8500			580	0.97	613	1.07	643	1.16	672	1.25	700	1.34	727	1.43	754	1.53	781	1.63	807	1.73
9350	590	1.13	624	1.24	656	1.35	684	1.46	711	1.55	738	1.65	763	1.75	788	1.86	813	1.96	838	2.07
10200	637	1.44	670	1.57	699	1.69	727	1.81	753	1.92	777	2.02	801	2.13	825	2.24	848	2.35	871	2.46

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
6800	787	1.28	815	1.37	842	1.46	868	1.54												
7650	808	1.53	836	1.63	862	1.74														
8500	833	1.83	858	1.93	883	2.04														
9350	862	2.18	885	2.29	909	2.4														
10200	894	2.58																		

Standard drive

Oversized drive

Installation

Table 15 - TK 175 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
7870			593	0.95	623	1.03	651	1.11	679	1.19	706	1.28	733	1.37	761	1.47	788	1.57	815	1.68
8860	623	1.21	653	1.31	680	1.4	706	1.49	731	1.58	756	1.67	780	1.77	805	1.87	829	1.97	853	2.08
9850	687	1.64	714	1.75	739	1.85	763	1.95	786	2.05	809	2.15	831	2.25	853	2.36	875	2.47	897	2.58
10840	750	2.16	775	2.28	799	2.4	821	2.51	843	2.62	864	2.73	884	2.84	905	2.95	925	3.07	945	3.18
11830	814	2.78	837	2.92	860	3.05	881	3.17	901	3.29	921	3.41	940	3.53	959	3.65	978	3.77	996	3.89

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
7870	842	1.79	869	1.91	896	2.03	921	2.15	946	2.27	970	2.39	994	2.51	1016	2.63	1038	2.75		
8860	877	2.19	901	2.31	925	2.43	949	2.56	973	2.69	997	2.83	1020	2.96	1043	3.1				
9850	919	2.7	941	2.82	962	2.94	984	3.07	1006	3.2	1027	3.33								
10840	965	3.3	985	3.43	1005	3.55	1025	3.68	1044	3.82										
11830	1015	4.02	1033	4.15																

Standard drive

Oversized drive

Table 16 - TK 200 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970							512	0.98	542	1.09	571	1.21	600	1.33	629	1.45	656	1.58	684	1.72
10090					519	1.16	547	1.28	575	1.39	601	1.51	627	1.64	653	1.77	679	1.91	704	2.05
11210			528	1.36	557	1.5	584	1.63	610	1.76	634	1.89	658	2.02	682	2.16	705	2.3	729	2.44
12330	537	1.58	568	1.74	596	1.9	622	2.05	647	2.19	670	2.33	692	2.47	714	2.62	735	2.77	757	2.92
13450	580	2.01	609	2.19	636	2.37	661	2.54	684	2.7	706	2.85	728	3.01	748	3.16	768	3.32	788	3.48

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970	710	1.86	735	2	759	2.14	783	2.27	805	2.41	827	2.55								
10090	729	2.2	753	2.35	777	2.5	800	2.66	823	2.81										
11210	752	2.6	774	2.75	797	2.92	819	3.08	841	3.25										
12330	778	3.08	799	3.24	820	3.4	841	3.57												
13450	808	3.64	828	3.81																

Standard drive

Oversized drive

Installation

Table 17 - TK 250 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
9870									585	1.31	609	1.42	632	1.51	654	1.6	675	1.69	695	1.78
11280							606	1.63	633	1.77	657	1.9	679	2.02	700	2.13	720	2.24	739	2.35
12690			599	1.8	628	1.97	655	2.15	681	2.31	704	2.47	726	2.62	747	2.76	766	2.89	785	3.02
14100	631	2.2	654	2.38	679	2.57	705	2.76	729	2.96	752	3.14	774	3.32	795	3.49	814	3.65	832	3.8
15510	690	2.9	711	3.08	733	3.28	756	3.5	779	3.71	801	3.93	822	4.13	842	4.33				
16920	749	3.73	768	3.92	788	4.14	809	4.36												

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
9870	714	1.86	733	1.94	751	2.02	769	2.1	786	2.17	802	2.25	818	2.32	834	2.39	849	2.46	864	2.53
11280	757	2.45	775	2.55	793	2.65	810	2.74	827	2.84	843	2.93	859	3.02	874	3.11	889	3.19	904	3.28
12690	803	3.14	820	3.26	837	3.38	853	3.49	869	3.61	885	3.72	901	3.83	916	3.93	931	4.04		
14100	850	3.95	866	4.09	883	4.23	898	4.37												
15510																				
16920																				

Standard drive
Oversized drive

Table 18 - WK 125 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970									562	0.55	601	0.63	639	0.71	675	0.8	709	0.89	741	0.98
10090							548	0.6	584	0.68	620	0.76	655	0.84	690	0.93	723	1.03	755	1.13
11210					544	0.68	578	0.75	611	0.83	644	0.91	676	1	708	1.09	739	1.19	770	1.29
12330			542	0.77	577	0.85	609	0.93	640	1.01	670	1.1	700	1.19	730	1.28	759	1.38	788	1.48
13450	541	0.85	578	0.96	612	1.05	643	1.14	671	1.23	699	1.32	727	1.41	755	1.51	782	1.61	809	1.71

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
5720	772	1.06	802	1.15	830	1.24	857	1.33	883	1.41	909	1.5	933	1.59	957	1.68				
6430	786	1.23	815	1.32	843	1.42	871	1.52	897	1.62	922	1.72	947	1.82						
7140	800	1.4	829	1.51	857	1.62	884	1.73	911	1.84	936	1.94	960	2.05						
7850	816	1.59	844	1.7	872	1.82	898	1.94	925	2.06	950	2.18								
8560	835	1.82	862	1.94	888	2.05	913	2.18	939	2.3										

Standard drive
Oversized drive

Installation

Table 19 - WK 155 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
6800							566	0.7	599	0.77	632	0.85	664	0.93	696	1.02	727	1.11	757	1.2
7650					571	0.82	604	0.9	634	0.99	664	1.07	694	1.16	723	1.25	751	1.34	779	1.44
8500			578	0.95	612	1.05	644	1.15	673	1.25	700	1.34	727	1.43	754	1.53	780	1.63	806	1.73
9350	586	1.09	622	1.22	655	1.33	685	1.44	712	1.55	739	1.65	764	1.75	788	1.86	813	1.96	837	2.07
10200	633	1.39	667	1.53	698	1.66	726	1.78	753	1.9	778	2.02	803	2.13	826	2.24	848	2.35	871	2.47

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
6800	787	1.29	816	1.38	843	1.47														
7650	807	1.54	834	1.64	861	1.74														
8500	832	1.83	857	1.94	882	2.04														
9350	861	2.18	884	2.29																
10200	893	2.58																		

Standard drive

Oversized drive

Table 20 - WK 200 External static pressure

	External Static Pressure (Pa)																			
	25		50		75		100		125		150		175		200		225		250	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970							521	1.01	550	1.12	579	1.24	608	1.36	636	1.49	664	1.62	691	1.76
10090					529	1.2	557	1.32	584	1.44	610	1.56	636	1.68	662	1.82	687	1.95	712	2.1
11210			540	1.42	569	1.56	595	1.69	621	1.82	645	1.95	669	2.08	692	2.22	715	2.36	738	2.51
12330	552	1.66	582	1.82	610	1.98	635	2.13	659	2.27	681	2.41	704	2.55	725	2.7	747	2.85	768	3
13450	597	2.11	625	2.3	651	2.47	675	2.64	698	2.8	720	2.95	741	3.11	761	3.26	781	3.42	801	3.58
14570	638	2.59	666	2.8	692	3.01	716	3.2	740	3.39	762	3.58	783	3.75	803	3.92				
15690	677	3.1	707	3.37	735	3.61	761	3.85												
16810	715	3.66	748	3.98																

	External Static Pressure (Pa)																			
	275		300		325		350		375		400		425		450		475		500	
m³/h	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)	RPM	(kW)
8970	717	1.9	742	2.04	766	2.17	789	2.31	811	2.45	833	2.58								
10090	737	2.25	761	2.4	785	2.56	808	2.71	830	2.87										
11210	761	2.66	784	2.82	806	2.98	828	3.15												
12330	789	3.16	810	3.32	831	3.49														
13450	820	3.75	840	3.91																
14570																				
15690																				
16810																				

Standard drive

Oversized drive

Installation

Electrical connection

The electric panel is located in the unit compressor section. Remove the compressor access panel. The unit is designed to run with 400 V +/- 5%/50 Hz/ 3 ph.

Factory supplied Disconnect switch (Option)

The disconnect switch is factory mounted. It is located on the side of the Electrical panel and equipped with fuses as standard.

Over current protection

The branch circuit feeding the unit must be protected in accordance with national or local codes and max unit amps indicated in Table 21 to 28.

Power wiring

The unit power supply must be provided by 4-wire cable with cross-sectional areas complying with legislation.

The power supply cables must be laid in leak-tight pipes and pass through the bottom of the electric panel. The cables must not be taut.

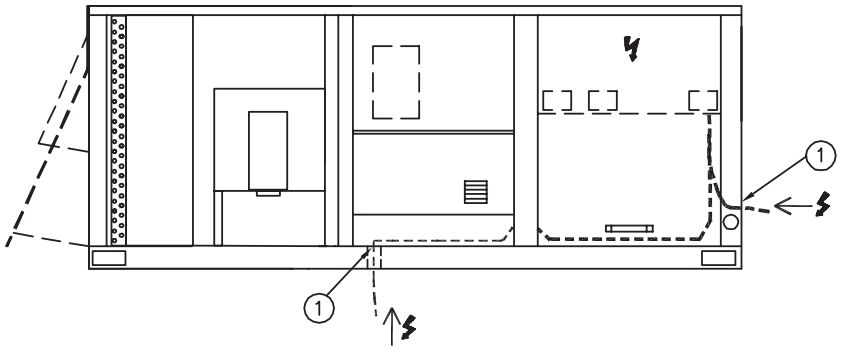
Appropriate connectors must be provided. Flexible pipe supports are required to prevent noise transmission in the building structure. Ensure all the connections are tightened.

Note:

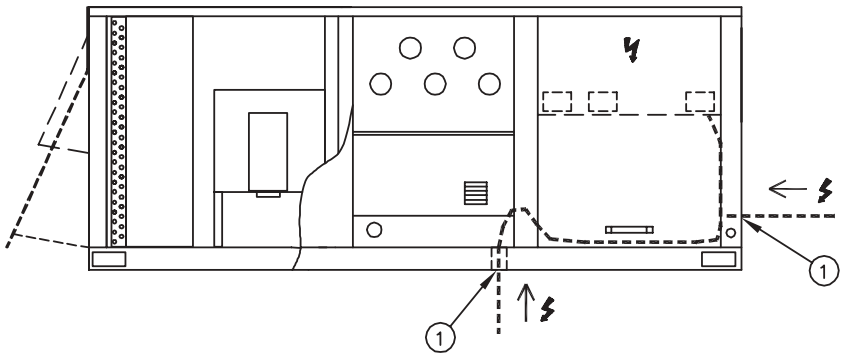
1. earthing must be executed in accordance with local legislation.
2. the machines are designed for a short-circuit current of 10 kA. In the event of a higher application, contact your Trane sales office.

Figure 10 - Power supply

TKD/TKH, WKD/WKH units:



YKD/YKH units:



1 = Power supply from the bottom or from the side.

Installation

Scroll compressors

Compressor electrical phasing

Proper phasing of the electrical power wiring is critical for proper operation and reliability of the scroll compressor and fans.

Proper rotation of the scroll compressor must be established before the unit is started. This is accomplished by confirming that the electrical phase sequence of the power supply is correct. The motor is internally connected for clockwise rotation with the inlet power supply phased A, B, C.

The direction of rotation may be reversed by interchanging any two of the line wires. It is this possible interchange of wiring that makes a phase sequence indicator necessary if the operator is to quickly determine the phase rotation of the compressor motor.

The "ABC" indicator on the face of the phase indicator will glow if phase is ABC for terminals L1, L2, L3.

CAUTION! After completion of wiring, check all electrical connections, and ensure all connections are tight. Replace and secure all electrical box covers and access doors before leaving unit or connecting power to circuit supplying unit.

CAUTION! Units with Scroll compressors are not equipped with crankcase heaters.

WARNING !
Disconnect all power,including remote disconnects, and discharge all capacitors before servicing. Follow proper lockout/tagout procedures to ensure the power cannot be inadvertently energized. After power is removed, allow 4 minutes for capacitors to discharge. Verify with an appropriate voltmeter that all capacitors have discharged. Failure to disconnect power and/or discharge capacitors before servicing could result in death or serious injury. For additional information regarding the safe discharge of capacitors, see Trane Service Bulletin PROD-SVB06A.

Table 21 - Electrical data - YKD/YKH Unit Wiring

Electrical Characteristics Unit amps

UNIT	MPS	Standard Evaporator Fan Motor		Oversized Evaporator Fan Motor	
		Minimum Circuit Ampacity	Maximum Overcurrent Protective Device (Fuse or Circuit Breaker)	Minimum circuit ampacity	Maximum Overcurrent Protective Device (Fuse or Circuit Breaker)
Without Electric heat option					
TKD/H 155	400/3/50	35	50	36.9	50
TKD/H 175	400/3/50	41	50	41.9	50
TKD/H 200	400/3/50	44	63	44.5	63
TKD/H 250	400/3/50	46.4	63	-	-
WKD/H 125	400/3/50	31.9	40	33.8	40
WKD/H 155	400/3/50	35.1	50	37	50
WKD/H 200	400/3/50	50.4	63	50.9	63
YKD/H 155	400/3/50	35.6	50	37.5	50
YKD/H 175	400/3/50	42.3	50	43.2	50
YKD/H 200	400/3/50	44.6	63	45.1	63
YKD/H 250	400/3/50	46.4	63	-	-
With Electric heat					
TKD/H 155	400/3/50	41	63	43	63
TKD/H 175	400/3/50	43	63	43	63
TKD/H 200	400/3/50	61	80	61	80
TKD/H 250	400/3/50	62	80	-	-
WKD/H 125	400/3/50	68	80	69.9	80
WKD/H 155	400/3/50	71.2	80	73.1	80
WKD/H 200	400/3/50	104.5	125	105	125

Installation

Table 22 - Electrical data - TKD/TKH Compressor motor and condenser motor

			YKD/H 155	YKD/H 175	YKD/H 200	YKD/H 250
Compressor						
	Number		2	2	2	2
	Type		Scroll	Scroll	Scroll	Scroll
	Model		9T / 5T	10T / 6.7T	9T / 9T	10T / 10T
	Nominal Amps (1)	(A)	15.0 / 8.5	15.1 / 11.4	14.7 / 14.7	15.3 / 15.3
	Locked rotor Amps (2)	(A)	118 / 65.5	118 / 101	118 / 118	118 / 118
Outdoor Fan						
	Nominal Airflow	(m^3/h)	15350	19750	21000	23500
	Type		Axial	Axial	Axial	Axial
	Diameter	(mm)	660	660	710	710
	Drive type		Direct	Direct	Direct	Direct
	Number / Voltage		2	2	2	2
	Motor HP	(kW)	0.25	0.25	0.56	0.56
	Motor Rated Amps (1)	(A)	1.6	1.6	2.3	2.3
	Motor Locked rotor Amps (2)	(A)	3.8	3.8	5.8	5.8
	Motor RPM	(rpm)	925	925	925	925

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

Table 23 - Electrical data - YKD/YKH Compressor motor and condenser motor

			TKD/H 155	TKD/H 175	TKD/H 200	TKD/H 250
Compressor						
	Number		2	2	2	2
	Type		Scroll	Scroll	Scroll	Scroll
	Model		9T / 5T	10T / 6.7T	9T / 9T	10T / 10T
	Rated Amps (1)	(A)	15.0 / 8.5	15.1 / 11.4	14.7 / 14.7	15.3 / 15.3
	Locked rotor Amps (2)	(A)	118 / 65.5	118 / 101	118 / 118	118 / 118
Outdoor Fan						
	Nominal Airflow	(m^3/h)	15350	19750	21000	23500
	Type		Axial	Axial	Axial	Axial
	Diameter	(mm)	660	660	710	710
	Drive type		Direct	Direct	Direct	Direct
	Number		2	2	2	2
	Motor HP	(kW)	0.25	0.25	0.56	0.56
	Motor Rated Amps (1)	(A)	1.6	1.6	2.3	2.3
	Motor Locked rotor Amps (2)	(A)	3.8	3.8	5.8	5.8
	Motor RPM	(rpm)	925	925	925	925

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

Installation

Table 24 - Electrical data - WKD/WKH Compressor motor and condenser motor

			WKD/H 125	WKD/H 155	WKD/H 200
Compressor					
	Number		2	2	2
	Type		Scroll	Scroll	Scroll
	Model		6T / 6T	7.5T /7.5T	10T / 10T
	Rated Amps (1)	(A)	10.0 / 10.0	12.1 / 12.1	17.5 / 17.5
	Locked rotor Amps (2)	(A)	74 / 74	79 / 79	98 / 98
Outdoor Fan					
	Nominal Airflow	(m^3/h)	15300	15850	23600
	Type		Axial	Axial	Axial
	Diameter	(mm)	660	660	710
	Drive type		Direct	Direct	Direct
	Number		2	2	2
	Motor HP	(kW)	0.25	0.25	0.56
	Motor Rated Amps (1)	(A)	1.6	1.6	2.3
	Motor Locked rotor Amps (2)	(A)	3.8	3.8	5.8
	Motor RPM	(rpm)	925	925	950

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

Table 25 - Electrical data - TKD/TKH Supply fan motor

		YKD/H 155	YKD/H 175	YKD/H 200	YKD/H 250
Indoor Fan					
Nominal Airflow	(m^3/h)	8500	9850	11210	14100
Static pressure available (4)	(Pa)	150	75	175	75
Maximum static pressure available (5)	(Pa)	350	375	450	375
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	15" / 15"	15" / 15"	18" / 18"	18" / 18"
Drive type		Belt	Belt	Belt	Belt
Number	#	1	1	1	1
Motor HP (Standard/Oversized)	(kW)	2.2 / 3.0	3.0 / 4.6	3.0 / 4.6	4.6 / -
Motor Rated Amps (Standard/Oversized)	(A)	4.6 / 6.5	6.5 / 9.0	6.5 / 9.0	9 / -
Motor Locked rotor Amps (Standard/Oversized)	(A)	36.4 / 57	57 / 71.9	57 / 71.9	71.9 / -
Motor RPM (Standard/Oversized)	(rpm)	1450 / 2870	2870 / 2900	2870 / 2900	2900 / -

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

Installation

Table 26 - Electrical data - YKD/YKH Supply fan motor

		TKD/H 155	TKD/H 175	TKD/H 200	TKD/H 250
Indoor Fan					
Nominal Airflow	(m^3/h)	8500	9850	11210	14100
Static pressure available (4)	(Pa)	175	250	200	125
Maximum static pressure available (5)	(Pa)	325	400	375	350
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	15" / 15"	15" / 15"	18" / 18"	18" / 18"
Drive type		Belt	Belt	Belt	Belt
Number	#	1	1	1	1
Motor HP (Standard/Oversized)	(kW)	2.2 / 3.0	3.0 / 4.6	3.0 / 4.6	4.6 / -
Motor Rated Amps (Standard/Oversized)	(A)	4.6 / 6.5	6.5 / 9.0	6.5 / 9.0	9 / -
Motor Locked rotor Amps (Standard/Oversized)	(A)	36.4 / 57	57 / 71.9	57 / 71.9	71.9 / -
Motor RPM (Standard/Oversized)	(rpm)	1450 / 2870	2870 / 2900	2870 / 2900	2900 / -

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

Table 27 - Electrical data - WKD/WKH Supply fan motor

		WKD/H 125	WKD/H 155	WKD/H 200
Indoor Fan				
Nominal Airflow	(m^3/h)	7140	8500	11210
Static pressure available (4)	(Pa)	200	175	200
Maximum static pressure available (5)	(Pa)	425	325	350
Type		FC Centrifugal	FC Centrifugal	FC Centrifugal
Diameter / Width	(in / in)	15" / 15"	15" / 15"	18" / 18"
Drive type		Belt	Belt	Belt
Number	#	1	1	1
Motor HP (Standard/Oversized)	(kW)	2.2 / 3.0	2.2 / 3.0	3.0 / 4.6
Motor Rated Amps (Standard/Oversized)	(A)	4.6 / 6.5	4.6 / 6.5	6.5 / 9.0
Motor Locked rotor Amps (Standard/Oversized)	(A)	36.4 / 57	36.4 / 57	57 / 71.9
Motor RPM (Standard/Oversized)	(rpm)	1450 / 2870	1450 / 2870	2870 / 2900

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

Table 28 - Electrical data - Combustion Blower Motorr

		YKD/H 155	YKD/H 175	YKD/H 200	YKD/H 250
Gas burner					
Heating Models		G350	G350	G350	G350
Heating Input (G20)	(kW)	77	77	77	77
Heating Output	(kW)	69.3	69.3	69.3	69.3
Steady State Efficiency	(%)	90	90	90	90
No. Burners		1	1	1	1
No. Stages		2	2	2	2
Gas Connection Pipe Size		3/4" NPT	3/4" NPT	3/4" NPT	3/4" NPT

Controls

Control wiring

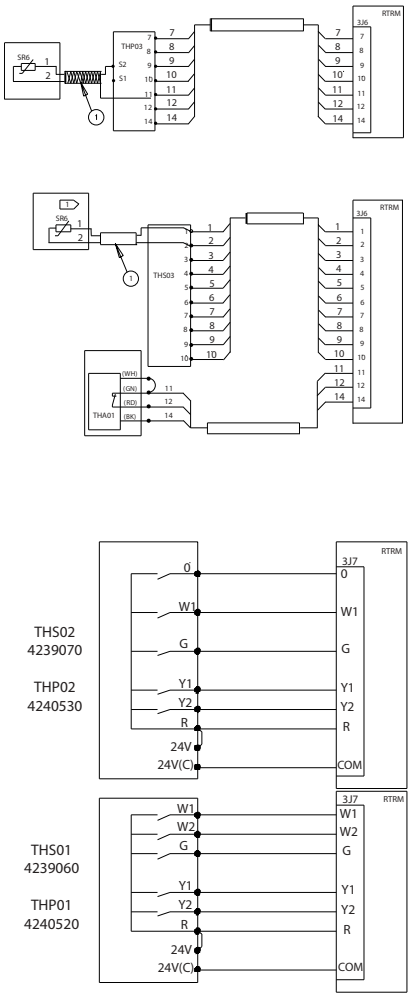
The control circuit is 24 V AC. Unit includes a 400/24 V transformer.

WARNING! The unit disconnect switch must be opened and locked open. Risk of injury and electrocution.

CAUTION! The unit 24 V transformer must not be used to power accessories mounted on site, other than those proposed by Trane.

Unit controlled by thermostat

Figure 11 - Thermostat wiring



Trane THS01, THS02, THP01 and THP02 Thermostats are directly connected to RTRM board (J7 connector). TRANE THS02 and THP03 thermostats are directly connected to RTRM board (J6 connector).

Install the electrical link between the thermostat (thermostat terminal strip) and the unit (J6 or J7 connector) in compliance with the interconnection diagram. The low voltage wiring must not be laid in the same pipes as the power cables.

The sizes and lengths of the thermostat connection wires are given in Table 29. The total resistance of these control cables must not exceed 5 ohms. If the resistance exceeds this value the thermostat may not operate with the same precision.

Table 29 - Zone sensor wire size and maximum length

Maximum length		
Zone sensor wire size		
	Wire size (mm^2)	Maximum wire lengh (m)
THS/THP 03	0.33	45
	0.5	76
	0.75	115
	1.3	185
	2	300
Conventionnal thermostat THS/THP 01-02	0.33	10
	0.5	15
	0.75	23
	1.3	37
	2	60

Controls

Unit controlled by BAS

Each unit must be equipped with a TCI-R board. A communication bus (twisted shielded pair) must link each TCI-R to the Trane Roof Top Manager (RTM) or to the communication gateway (in the case of an external BAS). Connect one temperature sensor to each unit. LonTalk® communication interface LTCI-R board allows ICS communication between a ReliaTel™ unit and LonTalk® communication applications.

Unit controlled by Tracker™ supervisor

The units must also be equipped with the TCI-R communication board. One remote sensor is required on each unit for a constant flow volume. In the case of a variable flow installation (VariTrac™) these sensors must not be installed. A twisted shielded pair must be used for the communication link. The main functions of the Tracker™ supervisor are control of setpoints, timetable management (Programming) and display of faults. For more details refer to the supervisor documentation.

Controls

CO_2 sensors

Wall-mounted and duct-mounted CO_2 sensors

Table 30 - Specifications

	Wall-mounted	Duct-mounted
Measuring range CO_2	0-200 ppm	
Accuracy at 25°C	<+/- [40 ppm CO_2 + 3% of reading] (included repeatability and calibration uncertainty)	<+/- [30 ppm CO_2 + 2% of reading] (included repeatability and caiibration uncertainty)
Non-linearity	<1.0% full scale	
Ternperature dependence of output	0.3% full scale/°C	
Long-term stability	<5.0% full scale / 5 years	
Recomrnended calibration interval	5 years	
Response time	1 minute (0-63%)	
Operating temperature	15-35°C	- 5-45°C
Storage temperature	-20-70°C	
Humidity range	0-85% relative humidity	
Airflow range		0-10 m/s)
Output signals (jumper selectable)	0-10Vdc	
Resolution of analog outputs	10 ppm CO2	
Recomrnended external load	Current output: max 500	
	Voltage output: min. 1000	
Power supply	Nominal 24Vac	
Power consumption	<5 VA	
Warm-up time	<15 minutes	
Dimensions (mm)	108 x 80 x 36	80 x 80 x 200

Controls

Power supply requirements

CAUTION! Make sure that you connect the power wire only to the 24V terminal. Connecting the power wire to the output terminal may result in equipment damage.

The CO_2 sensor is designed to operate with a nominal 24 Vac supply. The power supply should maintain the voltage between 20 to 26 Vac.

Table 31 - CO_2 sensor wire size

Cross section (mm2)	Maximum wire length (mn)
0.25	50
0.5	100
1	200

Wiring the wall-mounted CO_2 sensor

DVC setpoint potentiometer on economizer module can be adjusted as follows:

0% - 500ppm, 50% - 1000 ppm,

100% - 1500ppm

The outside air damper will modulate from minimum position setting to up to 100% while attempting to maintain the CO_2 setpoint.

To connect the wall mounted CO_2 sensor, Refer to t**he wiring diagram provided in the unit.**

Wiring the duct-mounted CO_2 sensor

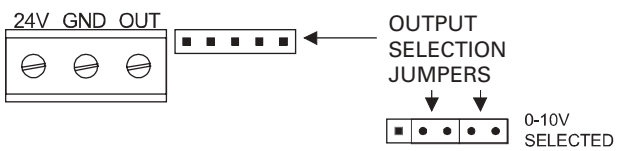
1. Connect the DCV signal lwire to the connector DCV of the ECA
2. Connect the power according to the guidelines in Power supply requirements.

To connect the wall mounted CO_2 sensor, Refer to the wiring diagram provided in the unit.

Mounting the wall-mounted sensor

1. Select a proper location in the room to mount the CO_2 sensor. Look for an interior wall with good air circulation, approximately 1.4 m from the floor.
2. Remove the back plate from the sensor and thread the power wires and output signal wire through the hole in the back plate.
   For surface wiring, make cut-outs with pliers to the thinner section of the upper or lower edge of the back plate and to thread the wires through.
3. Mount the back plate to the wall with screws. Note that the arrow on the back plate shows the mounting direction.

Figure 12 - Jumper settings



Controls

Mounting the duct-mounted CO_2 sensor

1. Select a proper location on the duct to mount the CO_2 sensor.
2. Drill a 22-25 mm hole in the mounting surface for sensor insertion (Figure 13).
3. Attach the mounting plate to the duct wall with four screws.
4. Insert the sensor through the mounting plate, adjusting the depth for optimal air sensing.

CO_2 sensor maintenance

This CO_2 sensor has excellent stability and requires no maintenance. In most environments the recommended calibration interval is five years. A trained service technician can use a portable CO_2 meter to certify sensor calibration. If, when checking the sensor, the reading differs too much from the reference value, the sensor can be recalibrated in the field. A calibration kit, software, and calibration gases are required. If certified accuracy is required, the sensor must be calibrated against accurate and traceable calibration gases in a laboratory. Consult Trane BAS for further details.

Figure 13 - Duct-mounted CO_2 sensor

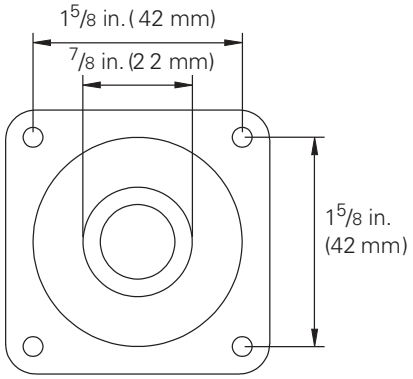
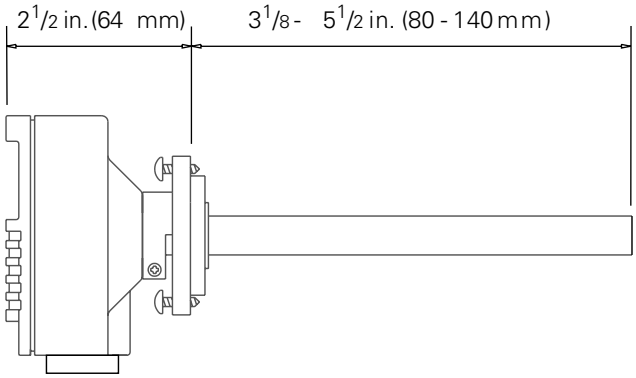


Figure 14 - Duct-mounted CO_2 insertion depth



Controls

Remote potentiometer

To install the remote potentiometer, cut the jumper WL on the economizer ECA board, and connect the wires to P and P1.

Note: This potentiometer allows to adjust the permanent fresh air intake from 0 to 50%.

0 W corresponds to closed fresh air damper.

270 W corresponds to 50% open fresh air damper.

Note: This potentiometer allows to adjust the permanent fresh air intake from 0 to 50%.

0 W corresponds to closed fresh air damper.

270 W corresponds to 50% open fresh air damper.

Figure 15 - Remote potentiometer dimensions

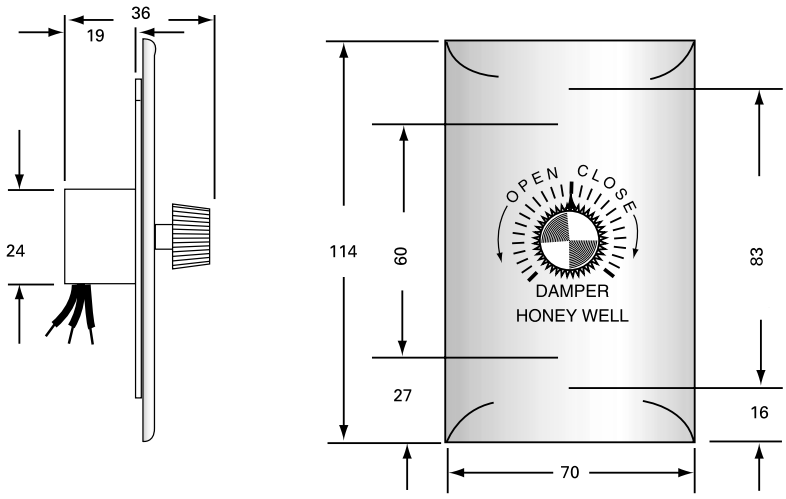
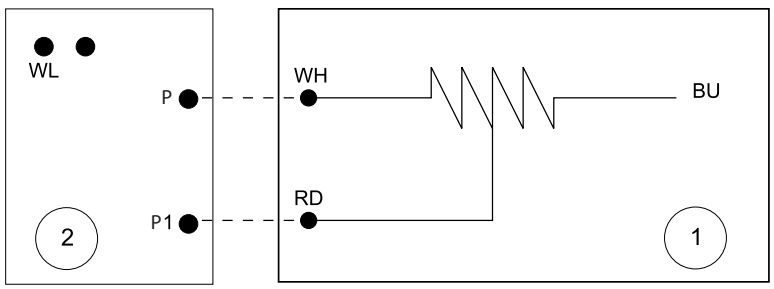


Figure 16 - Remote potentiometer wiring



1 = Remote potentiometer
2 = ECA Board
WH = White wire
RD = Red Wire
BU = Blue wire
_____ Factory wiring
-------- Field wiring

Controls

Fire thermostat

There are two sensors in the fire thermostat Kit: Sensor X13100040-01 is factory-set to open at 57°C. Sensor X13100040-02 is set to open at 115°C.

Sensors are mounted directly in the ductwork. They should be installed where elements can respond quickly to air temperature changes. If not possible, the sensor may be installed on a suitable bracket so the air is drawn across the element. Sensor X13100040-01 has to be mounted in the return air duct. Sensor X13100040-02 has to be mounted in the supply air duct.

Note: Do not permit element guard to touch internal parts. Do not locate sensor where the air circulation is restricted by baffles.

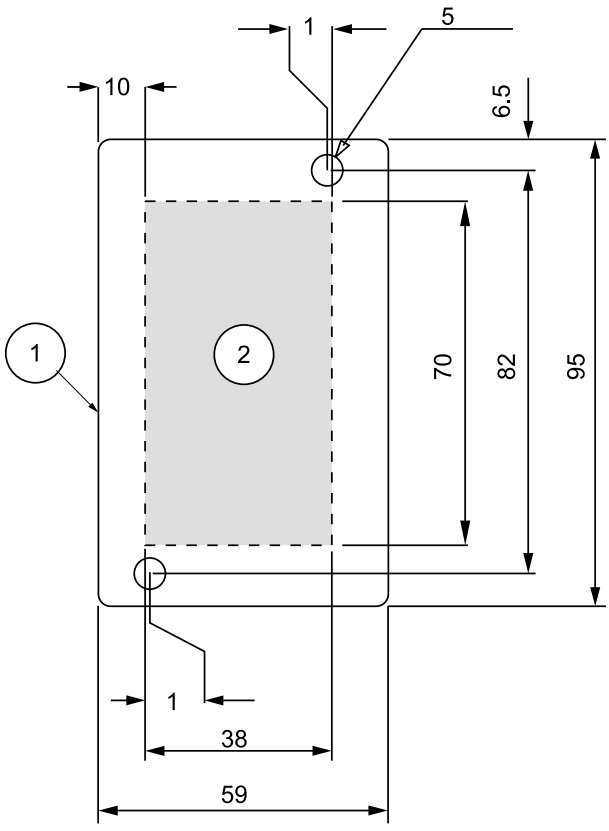
Connection of the fire thermostat with TCI board : Refer to the wiring diagram provided in the unit.

Connection without TCI board

Connect according to the standard wiring diagram provided on the unit.

Remove sensor cover and fasten control securely with screws. Loads connected must not exceed 2 amps, 30V Ac.

Figure 17 - Duct mounting of fire thermostat



1 = Fire thermostat
2 = Hole in the duct

Controls

Clogged filter detector

This device is mounted in the filter section. The sensor measures the difference in pressure before and after the filter section. The information is sent to the THP03 thermostat, to a Tracker™ or to a BMS.

Smoke detector

This device is used to detect smoke in the air stream. It includes a factory mounted detector connected to a central panel, both fitted in the fan section.

When smoke is detected, it shuts off the unit. A dry contact is available on the control panel for a remote default.

High temperature safety thermostat

This additional safety device is a manual reset thermostat for gas fired units (YKD/YKH), required mainly by the French ERP regulation. It is located in the gas burner section. It stops the gas burner and the supply air fan when the supply air temperature rises to 120°C.

Remote fault relay

This is a factory mounted relay used to send alarm signals (dry contact) to a local BMS or a local control panel. With this relay, the compressor, heating, fan and power supply alarm output signals from the controller are reported to a single dry contact.

Thermostats

6 thermostats are available:

THS01/THP01, THS02/THP02 and THS03/THP03.

"THS" are non programmable thermostats, "THP" are programmable.

01 and 02 series are conventional thermostat, 03 series are dedicated to the controller.

Table 32 - Thermostats features

	THS01	THP01	THS02	THP02	THS03	THP03
non-programmable	X	-	X	-	X	-
programmable	-	X	-	X	-	X
electronic	X	X	X	X	X	X
unit control type design	electromech.	electromech.	electromech.	electromech.	Reliatel	Reliatel
interface card needed	CTI*	CTI*	CTI*	CTI*	none	none
for Cooling Only units	X	X	-	-	X	X
for Heat Pump units	-	-	X	X	X	X
for Gas Fired units	X	X	-	-	X	X
Cooling stages	2	2	2	2	2	2
auxiliary heating stages (elec. heater, HWC)	2	2	1	1	2	2
heating stages (heat pump mode)	none	none	1	1	1	1
liquid crystal display	X	X	X	X	-	X

*some important features are lost while using the CTI card.
Note: thermostats are powered up by the rooftop control (24V)

Controls

Other accessories available

Remote temperature sensor to be used with THS/THP 01-02

TZS01: Remote room temperature sensor to be used with THS/THP 03, Tracker or Varitrac systems.

DTS: Duct temperature sensor to be used with THS/THP 03

TZS02: Remote room temperature sensor with adjustable thumwheel setpoint to be used with Tracker or Varitrac systems

TZS04: Room temperature sensor with adjustable thumbwheel and override button, to be used with Tracker or Varitrac systems

Refer to separate documentation for more information.

Communication Interfaces

TRANE Communication Interface (TCI-R) board

This is an electronic board, factory-mounted in the main control panel, needed to allow communication between a TRANE Integrated Comfort system (TRACKER or Varitrac CCP2) and the unit. (COM3-COM4)

LON Communication Interface (LCI-R) board

This is an electronic board, factory-mounted in the main control panel, needed to allow communication on a LonTalk® Network at the unit level.

LonTalk®. Communication Interface (LCI-R) board

This interface board allows Voyager units to communicate on a LonTalk® Network at the unit level. Network variables are based on the LonMark®. Space Comfort Controller Functional Profile Template. The LCI-V uses a Free Topology transceiver FTT-10A. The FTT-10A transceiver supports non-polarity sensitive, free topology wiring, allowing the system installer to use star, bus, and loop architecture. The LCI-V can also be connected to an optional High Temperature Limit Switch if installed with the rooftop unit. For more information, see attached manual LTCI-IN-1.

Unit Options

Hot water coil

(Down flow units only)

In order to prevent water to freeze up in the coil during unoccupied period or shutdown limited period, a thermostat opens when there is a risk of freeze-up. The services of a water treatment specialist are recommended if water used can cause scaling deposits or erosion. Insulate all the water piping likely to be exposed to freezing temperatures in order to avoid freeze up of the coil and heat losses. The water distribution network must be fitted with vents in places where air is likely to be trapped.

The hot water coil is factory mounted in the discharge section. Two holes are provided to connect the hot water coil. They are located at the base of the unit. Remove the central panel to access the coil, using an 8 mm wrench (the bolts are located on the bottom part of the panels). The tubes for entering and leaving water are equipped with a threaded female connector.

Water connection inlet/outlet: 1 ¼" ISO R7.

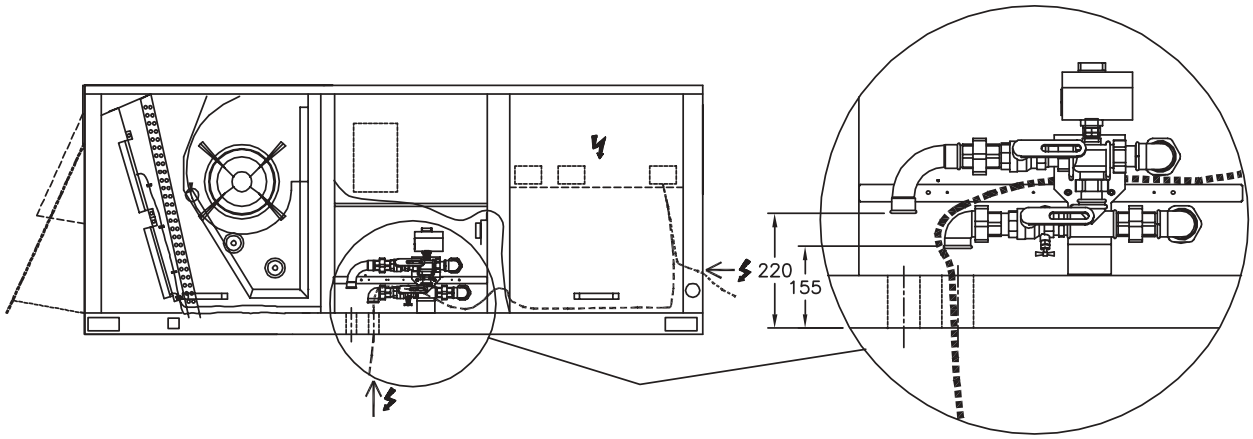
Hot water coil: Installation and connection

In order to prevent water to freeze up in the coil during unoccupied period or shutdown limited period, it is recommended to use ethylene glycol. The services of a water treatment specialist are recommended if water used can cause scaling deposits or erosion. Insulate all the water piping likely to be exposed to freezing temperatures in order to avoid freeze up of the coil and heat losses. The water distribution network must be fitted with vents in places where air is likely to be trapped.

Table 33 - Ethylene glycol percentage

Ethylene glycol percentage	Freezing point
(%)	(°C)
10	-4
20	-10

Figure 18 - Hot water coil connections



Unit Options

Electric Heater

Electric heaters are fitted on the fan discharge.

Heaters have two heating stages and provided with two types of overheat thermostats:

- Automatic reset thermostats which stop the electric heater when the air temperature rises to 76°C. Automatic reset at 60°C. No alarm output available.
- The manual reset thermostat which stop the unit when the air temperature rises to 120°C. No alarm output available.

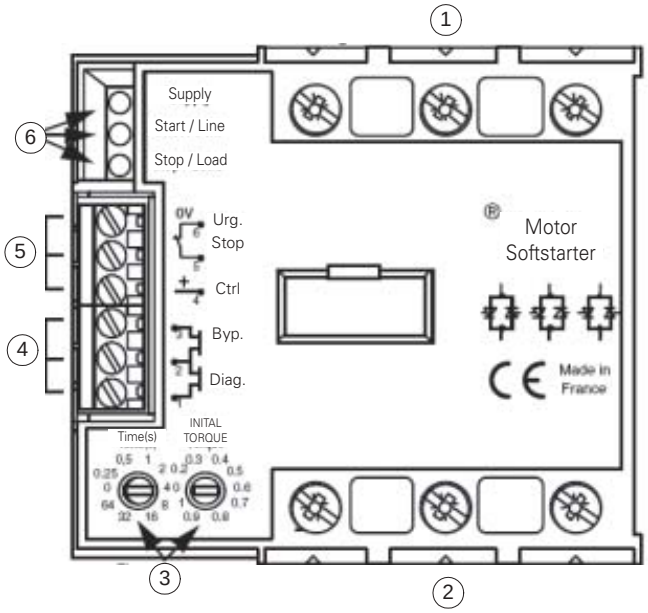
Soft Starter

The soft starter is used to achieve a progressive supply fan start and a reduced starting current as well as the motor starting torque. This option is well adapted for textile duct applications. It is factory installed in the main control panel.

The soft starter gradually increases the voltage of the supply fan motor until it reaches full line voltage.

The starting time can be adjusted from 0 to 64 seconds but the soft starter is factory set to the maximum starting time value, 64 seconds.

Figure 19 - Soft starter



1 = Three phase mains connections
2 = Motor connections
3 = Settings
4 = Status outputs
5 = Controls
6 = LEDs

Unit Options

0 - 25% fresh air hood

The 0-25% fresh air hood allows to introduce fresh air into the unit.

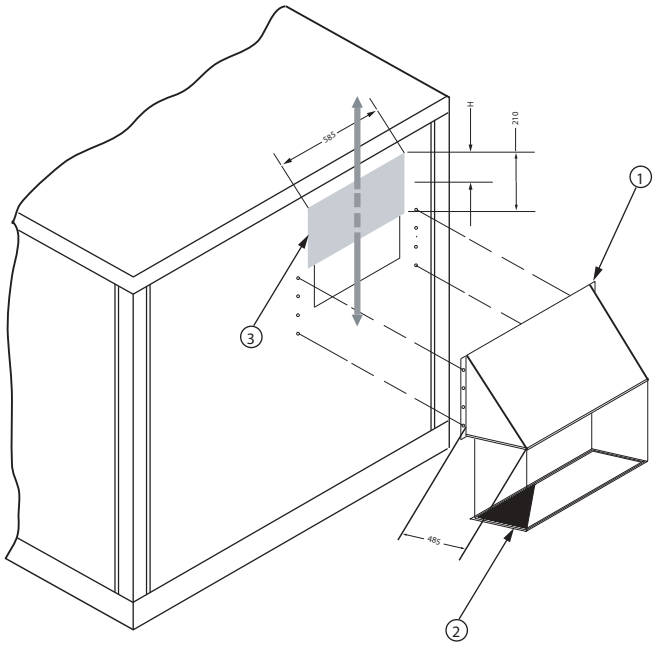
This is a manual device fitted on the back of the unit, sized for a maximum of 25% of the nominal rooftop air flow.

This option includes for the hood itself, a wire mesh and a slidable damper.

The slidable damper has to be adjusted manually by removing the screws and sliding it off up or down (Figure 20).

The amount of fresh air introduced is then permanently fixed.

Figure 20 - 0-25% manual fresh air hood



1 = Intake hood
2 = Wire mesh
3 = Slidable damper

Unit Options

Barometric relief

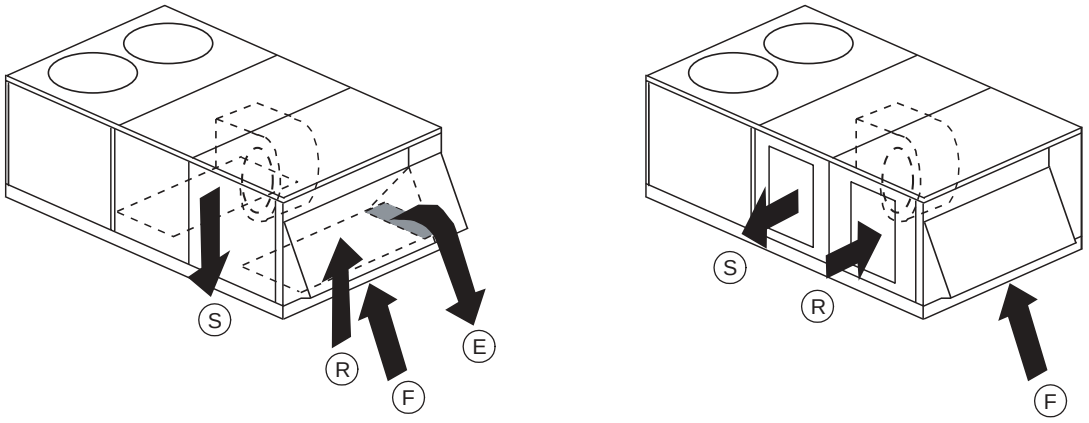
The barometric relief allows to minimize overpressure in the building caused by the introduction of fresh air. This option is typically installed when fresh air intake is below 25% of the nominal air flow and when the return air pressure drop is below 25Pa.

This option includes exhaust hoods and gravity dampers located in the return air section (Figure 22). When the pressure of the building increase, the gravity dampers open and relieve air to the outside.

If the return air duct pressure drop is higher than the building overpressure, the gravity dampers will not open.

If the return air duct pressure drop is lower than the building overpressure, the gravity dampers will open and releive air outside of the building.

Figure 21 - Economizer flow chart with barometric relief



Downflow version **Horizontal flow version**

R = return
S = supply
F = fresh air
E = exhaust

Operation

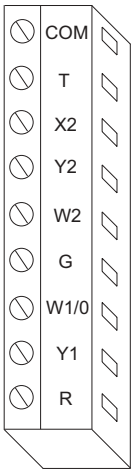
Operation with a conventional thermostat

The ReliaTel module has conventional thermostat connections as well as Zone Sensor Module connections. When a conventional thermostat is controlling the unit, operation differs as follows.

- Supply Air Tempering feature is not available. If outdoor air is being introduced through the equipment, discharge air temperature may be cold when not actively heating.
- Proportional Integral (PI) control is not available.
- Zone Sensor Diagnostics are only available on the RTRM module on the J6 terminals, instead of at the Zone Sensor in the space.
- Intelligent Fall-Back is not available. If a failure occurs in the device controlling the equipment, operation will cease.
- Heat Pump Smart Recovery and Smart Staging is not available. Heat Pump operation becomes more costly unless the generic control being applied can accomplish this.
- Remote Sensing Capabilities are not available on most mechanical thermostats.
- Space Temperature Averaging capabilities are not available on most mechanical thermostats.
- 27½ to 50 VAV – Conventional thermostat input terminals are inactive.
- Built in Night Set Back and Unoccupied Functions function differently with a conventional mechanical thermostat.
- A built-in algorithm which allows for automatic reset of the discharge air temperature while economizing is not available.

The terminal strip for attaching the thermostat wires is located on the RTRM module in the control compartment.

The purpose of each terminal is discussed in the next section.



Customers occasionally require operation with a conventional thermostat rather than a zone sensor. In some cases there is a preference for a specific thermostat model, and in others there is reluctance to adopt newer technology that may not be as well understood as conventional thermostats. In addition, non-Trane Building Controllers typically provide an interface to HVAC equipment based on a conventional thermostat interface. Units applied with this type of controller need to accept conventional thermostat inputs.

Conventional thermostat signals represent direct calls for unit functions. In their simplest applications, thermostat contacts directly control contactors or other load switching devices. This function provides inputs for the thermostat signals and processing to enhance reliability and performance. Compressor protection and reliability enhancement functions (HPC, LPC, Minimum On/Off timers, etc.). All operate the same whether applied with zone sensors or a conventional thermostat.

Logic is also provided to cause appropriate unit functions when inappropriate thermostat signals are provided. Simultaneous calls for heating and cooling will be ignored, and the fan will be turned on with a call for heating or cooling even if the fan request is not detected.

If the thermostat is immediately changed from a heating to a cooling call, or vice versa, there will be a five minute delay before the new call will initiate.

Operation

Thermostat signals are as follows:

R 24VAC power to thermostat

Y1 Call for compressor 1 or first stage cooling

Y2 Call for compressor 2 or 2nd stage cooling

G Call for supply fan

W1 Call for heat 1

W2 Call for heat 2

Heat pump only:

X2 Call for emergency heat

O Switchover valve On = cooling, Off = heating

T Bias for heat anticipation for those mechanical thermostats that use this function

Conventional thermostat – Gas/ Electric, Electric Heat:

Input/connection	Function when energized :
G (fan)	Fan runs continuously except during unoccupied mode (see next page)
Y1 (compressor 1 or economizer)	Compressor #1 runs or economizer operates
Y2 (compressor 2 or compressor 1 while economizing)	Compressor #2 also runs, or #1 compressor runs while economizing
W1 (gas / electric heat first stage)	1st stage heat
W2 (gas / electric heat 2nd stage)	2nd stage heat (if available)

Conventional thermostat – Heat Pump

Input/connection	Function when energized
Cooling mode:	
G (fan)	Fan runs continuously except during unoccupied mode (see next page)
O (reversing valve during cooling)	Reversing valve in cool mode
Y1 + O (first stage cooling)	Compressor #1 runs or economizer operates
Y1 + Y2 + O (2nd stage cool)	Compressor #2 also runs, or #1 compressor runs while economizing.
Heating mode:	
G (fan)	Fan runs continuously except during unoccupied mode (see below)
Y1 (both compressors 1st stage heat)	Both compressors run
Y2 (during heating – nothing happens)	No change
W2 (electric heat 2nd stage)	2nd stage (electric) heat
X2 (electric heat only)	Electric heat only – no compressors

T (provides heat anticipation signal for those mechanical thermostats that use this feature. If the thermostat used does not have a "T" terminal, disregard this terminal.

Operation

Unoccupied mode:

If the thermostat being used is programmable, it will have its own strategy for unoccupied mode and will control the unit directly. If a mechanical thermostat is being used, a field applied time clock with relay contacts connected to J6-11 and J6-12 can initiate an unoccupied mode as follows:

- Contacts open: Normal occupied operation.
- Contacts closed: Unoccupied operation as follows - Fan in auto mode regardless of fan switch position. Economizer closes except while economizing regardless of minimum position setting.

Cooling/Economizer Operation:

If unit does not have an economizer, the Cool/Econ Stage 1 and Stage 2 will call directly for mechanical cooling (compressor) stages. If the unit has an economizer, the Cool/Econ stages will function as follows.

Table 34 - Cooling/Economizer Operation with Thermostat1,2

OK to Economize?	Thermostat Y1	Thermostat Y2	Call for Economizer Cooling	Compressor Staging Request
No	On	Off	Inactive	Compressor Output 1
No	Off	On	Inactive	Compressor Output 2
No	On	On	Inactive	Compressor Outputs 1 & 2
Yes	On	Off	Active	Off
Yes	Off	On	Active	Compressor off
Yes	On	On	Active	Compessor

Operation

Setting the economizer or 0-50% motorized hood (option)

The ECA board is mounted on the damper actuator. To access the ECA board on economizers:

- Remove the access panel located on the economizer section.
- The electrical power must be disconnected to set the minimum position and check the economizer.
- Disconnect the power supply, put the thermostat fan selector to "ON" and the "HEAT/COOL" selector to "OFF". This puts the damper in the minimum ventilation position.
- To set the required minimum ventilation air position, turn the dial on the ECA clockwise to increase ventilation, or anti-clockwise to decrease ventilation. The damper will open at this setting whenever the fan circuit is powered up.
- When the arrow on the dial adjustment screw is pointing to 8 o'clock, the minimum position is roughly 0%. When the dial is pointing to 12 o'clock it is roughly 25%, and when the dial is pointing to 4 o'clock it is roughly 50%

To check the damper is functioning correctly, the ECA is equipped with an indicator light in the middle of the board. This light operates as in Table 35.

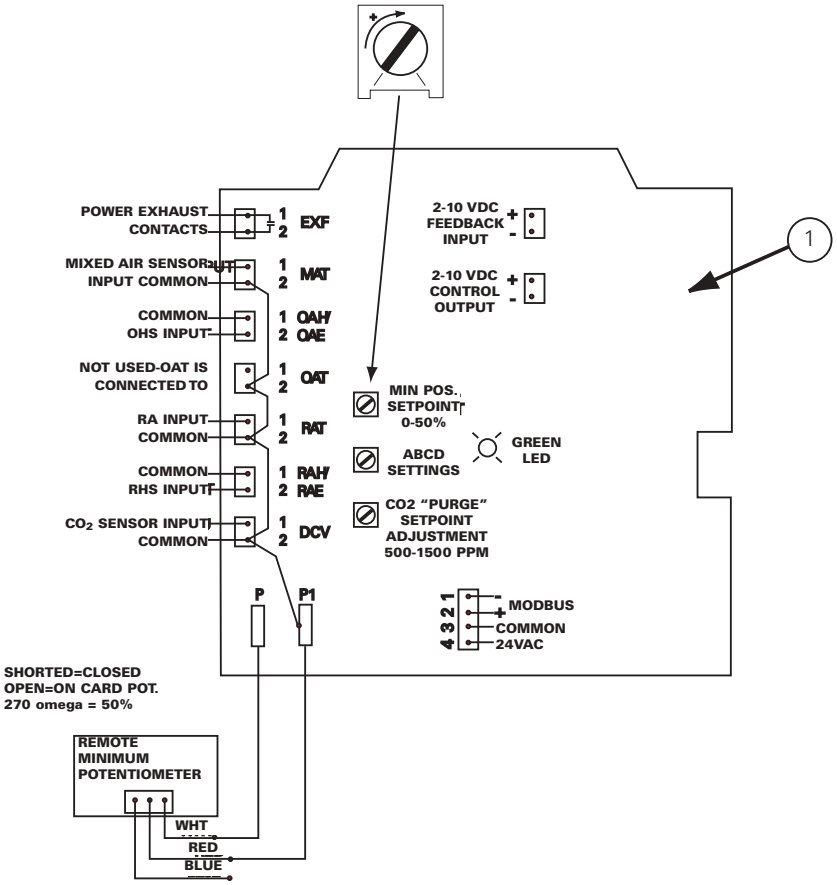
Table 35 - ECA board LED

OFF:	No Power or Failure
ON:	Normal, OK to Economize
Slow Flash:	Normal, Not OK to Economize
Fast Flash:	Communications Failure
Pulse Flash:	Error Code:
1 Flash:	Actuator Fault
2 Flashes:	$C0_2$ Sensor
3 Flashes:	RA Humidity Sensor
4 Flashes	RATemp Sensor
5 Flashes:	OA Quality Sensor
6 Flashes:	OA Humidity Sensor
7 Flashes:	OATernp Sensor
8 Flashes:	MATemp Sensor
9 Flashes:	RAM Fault
10 Flashes:	ROM Fault
11 Flashes:	EEPROM Fault

While setting the minimum position the damper may move toward the new setting in several small steps. Once the damper has remained in the same position for 10 to 15 seconds it can be assumed it is in the new position.

Operation

Figure 22 - Minimum fresh air adjustment



1 = ECA board

Operation

Test procedures

Operating checklist before start-up

- Unit is level, with sufficient clearance all round
- Duct network is correctly sized according to the unit configuration, insulated, and water-tight
- Condensate drainage line is correctly sized, equipped with a trap, and sloped
- Filters are in position, of correct size and quantity and clean
- Wiring is correctly sized and connected in accordance with wiring diagrams
- Power supply lines are protected by recommended fuses and correctly earthed
- Thermostat is correctly wired and positioned
- Unit is checked for refrigerant charge and leaks
- Indoor and outdoor fans rotate freely and are fixed on shafts
- Supply fan rotation speed is set
- Access panels and doors are replaced to prevent air entering and risks of injury
- Checking of the gas heating section, in accordance with above procedure

WARNING! If any operating checks must be performed with the unit operating, it is the technician's responsibility to recognize any possible hazards and proceed in a safe manner. Failure to do so could result in severe personal injury or death due to electrical shock or contact with moving parts.

Power-up initialization

CAUTION! Before proceeding with any test procedure or operation, make sure that crankcase heaters have been energized for at least 8 hours.

Units equipped with Scroll compressors do not have crankcase heaters.

Note:

Upon power initialization, the RTRM performs self-diagnostic checks to insure that all internal controls are functional. It also checks the configuration parameters against the components connected to the system. The Liteport LED located on the RTRM module is turned "On" within 1 second of power-up if internal operation is okay.

Test mode procedure at the ReliaTel™ control board

Operating the unit from the roof using the test mode at the ReliaTel™ control board.

CAUTION! Before proceeding with the following test procedures, make sure that thermostat or zone sensor is off.

CAUTION! Use one of the following "Test" procedures to bypass some time delays and to start the unit at the control panel.

Each step of unit operation can be activated individually by temporarily shorting across the "Test" terminals for two to three seconds. The Liteport LED located on the RTRM module will blink when the test mode has been initiated. The unit can be left in any "Test" step for up to one hour before it will automatically terminate, or it can be terminated by opening the main power disconnect switch. Once the test mode has been terminated, the Liteport LED will glow continuously and the unit will revert to the "System" control.

Operation

Test modes

There are 2 methods in which the "Test" mode can be cycled with the test button:

1. Step Test Mode
This method initiates the different components of the unit, one at a time, by temporarily shorting across the two test terminals for two to three seconds. For the initial start-up of the unit, this method allows the technician to cycle a component "On" and have up to 1 hour to complete the check.

2. Auto Test Mode
This method is not recommended for start-up due to the short timing between individual component steps. This method initiates the different components of the unit, one at a time, when a jumper is installed across the test terminals. The unit will start the first test step and change to the next step every 30 seconds. At the end of the test mode, control of the unit will automatically revert to the applied "System" control method.
For unit test steps and test modes, values to cycle the various components, refer to Table 36.

Table 36 - Service Test Guide for Component Operation on gas-fired units

Step	Mode	Indoor Fan	Economizer	Compressor 1	Compressor 2	Heat 1	Heat 2	Outdoor 1	Outdoor 2
1	Fan On	On	Min	Off	Off	Off	Off	Off	Off
2*	Econ.	On	Open	Off	Off	Off	Off	Off	Off
3	Cool1	On	Min	On	Off	Off	Off	On	**
4	Cool2	On	Min	On	On	Off	Off	On	**
5	Heat1	On	Min	Off	Off	On	Off	Off	Off
6	Heat2	On	Min	Off	Off	On	On	Off	Off

* With Optional Accessory
** **"Off"** If temperature falls below 16° (±1°)°C, **"On"** if temperature rises above 18°(±1°)°C.
Note: Steps for optional accessories and modes not present in unit will be skipped.

Operation

Unit start-up

Verification of gas valve settings - (Reserved for the qualified gas technician)

WARNING! Improper gas valve setting may lead to burner destruction and people injury.

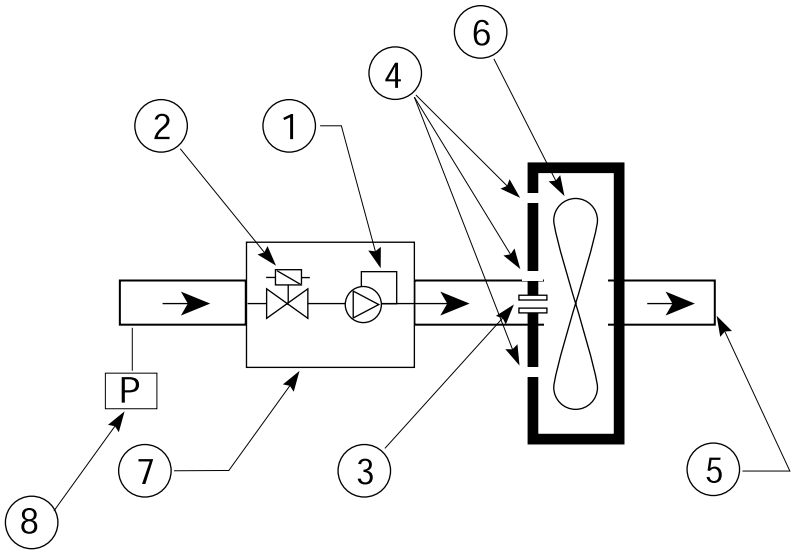
Note: Unit factory-set for G20.

Note: Unit to be installed outside only.

Note: Expansion valve must be adapted to the type of gas used:

- G 20: 20 mb
- G 25: 25 mb
- G 31 (Propane): 37 or 50 mb

Figure 23 - Gas valve



1 = Negative pressure controller
2 = Safety solenoid valve
3 = Gas injector
4 = Air inlets
5 = To the burner
6 = Fan
7 = Gas unit
8 = Minimum gas pressure cut-out

Operation

Table 37 - Marking category of the gas section in different countries

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						
G20	20	20	20	-	20	20	20
G25	25	-	-	25	25	20	-
G31	37	37	37	30	37	50	-

Table 38 - Gas burner data

			G350
YK* 155-175-200-225			1
Burner			**G350**
Natural Gas G20 (20mbar) 34.02 MJ/m³ (15°C-1013)			
Gas Flow (15 C-1013 mbar)	(m^3/h)	**Nominal rate**	**8.1**
		Reduced rate	8.13
Heating Capacity	(kW)	**Nominal rate**	**69.3**
		Reduced rate	69.1
Heating Rate	(kW)	**Nominal rate**	**77**
		Reduced rate	76.8
Efficiency	%	**Nominal rate**	**90**
		Reduced rate	90
Smoke analysis	G20 - 20mbar @ 400V-3-50Hz	CO %	< 0.001%
		Nox ppm	9 ppm
		CO_2 %	9.7%
Burner			**G350**
Natural Gas G25 (20 ou 25 mbar) 29.30 MJ/m³ (15°C-1013)			
Gas Flow (15 C-1013 mbar)	(m^3/h)	**Nominal rate**	**8.8**
		Reduced rate	8.21
Heating Capacity	(kW)	**Nominal rate**	**62.9**
		Reduced rate	59.5
Heating Rate	(kW)	**Nominal rate**	**71.5**
		Reduced rate	66.8
Efficiency	%	**Nominal rate**	**88**
		Reduced rate	89
Smoke analysis	G25 - 25mbar @ 400V-3-50Hz	CO %	< 0.001%
		Nox ppm	-
		CO_2 %	7.4%
Burner			**G350**
Propane Gas G31 (30, 37ou 50 mbar) 88.00 MJ/m³ (15 C-1013)			
Gas Flow (15 C-1013 mbar)	(m^3/h)	**Nominal rate**	**2.7**
		Reduced rate	2.56
Gas Flow (15 C-1013 mbar)	(kg/h)	**Nominal rate**	**5.1**
		Reduced rate	4.9
Heating Capacity	(kW)	**Nominal rate**	**57.5**
		Reduced rate	55.3
Heating Rate	(kW)	**Nominal rate**	**65.3**
		Reduced rate	62.6
Efficiency	%	**Nominal rate**	88
		Reduced rate	88.3
Combustion Air Flow (Avec E=25%)	(m^3/h)	**Nominal rate**	98
		Reduced rate	93
Smoke analysis	G31 - 37mbar @ 400V-3-50Hz	CO %	< 0.001%
		Nox ppm	-
		CO_2 %	8.9%

Operation

Starting the unit in cooling mode

Before start-up, ensure that all power cables are tightened.

Verify that the unit airflow rate is adjusted according to the information provided in the "Supply fan adjustment" section of this manual.

To start the unit in cooling mode:

- Place the zone sensor system switch in the "COOL" position.
- Position the cooling setpoint approximately 10° below room temperature and place the fan switch in the "AUTO" or "ON" position.
- Turn on unit main power supply.

The condenser fan motor, compressor and supply fan motor should operate automatically.

There will be a delay of up to 5 minutes before the unit starts in cooling mode.

Operating pressures

After the unit has operated in cooling mode for a short period of time, install pressure gauges on the gauge ports of the discharge and suction line valves.

Note: To bypass time delays and verify the operation of this unit from the roof, use the "Test procedure" section in this manual. Check the suction and discharge pressures.

Note: Always route refrigerant hoses through the port hole provided and ensure that the compressor access panel is in place.

Cooling shutdown

To exit the test mode, disconnect unit power for 3-5 seconds and reapply. When running the unit using the zone sensor as the control, position the selector switch to "OFF".

There may be a delay of up to 3 minutes before compressors shut down and an additional one minute before the fan shuts down in this setting.

Do not de-energize main power disconnect except when unit is to be serviced. Power is required to keep the compressor crankcase warm and boil off refrigerant in the oil (except on units with Scroll compressors).

Final installation checklist

- Are all power cables tightened?
  Check torque of power cables contact !
- Is the condenser fan and indoor blower operating correctly, i.e. correct rotation and without undue noise?
- Are the compressors operating correctly and has the system been checked for leaks?
- Have the voltage and running currents been checked to determine if they are within limits?
- Have the air discharge grilles been adjusted to balance the system?
- Has the ductwork been checked for air leaks and any condensation?
- Has the air temperature rise been checked?
- Has the indoor airflow been checked and adjusted if necessary?
- Has the unit been checked for tubing and sheet metal rattles or any unusual noises?
- Are all covers and panels in place and properly fastened?

Operation

ReliaTel™ is a microelectronic control feature, which provides operating functions that are significantly different from conventional electro-mechanical units. The master module is the ReliaTel™ Refrigeration Module (RTRM).

The RTRM provides compressor antishort cycle timing functions through minimum "Off" and "On" timing to increase reliability, performance and to maximize unit efficiency.

Upon power initialization, the RTRM performs self-diagnostic checks to insure that all internal controls are functioning. It checks the configuration parameters against the components connected to the system.

The LED located on the RTRM module is turned "On" within one second after power-up if all internal operations are okay.

Cooling without an Economizer

When the system switch is set to the "Cool" position and the zone temperature rises above the cooling setpoint controlband, the RTRM energizes the (K9) relay coil located on the RTRM. When the K9 relay contacts close, the compressor contactor (CC1) coil is energized provided the low pressure control (LPC1) and high pressure control (HPC1) are closed. When the CC1 contacts close, compressor (CPR1) and the outdoor fan motor (ODM) start to maintain the zone temperature to within ± 2 F of the sensor setpoint at the sensed location.

If the first stage of cooling can not satisfy the cooling requirement, the RTRM energizes the (K10) relay coil located on the RTRM. When the (K10) relay contacts close, the compressor contactor (CC2) coil is energized provided the low pressure control (LPC2) and high pressure control (HPC2) are closed. When the CC2 contacts close, compressor (CPR2) starts to maintain the zone temperature to within ± 2 F of the sensor setpoint at the sensed location.

Evaporator Fan Operation

When the fan selection switch is set to the "Auto" position, the RTRM energizes the (K6) relay coil approximately one second after energizing the compressor contactor coil (CC1) in the cooling mode. In heating mode, the RTRM energizes the (K6) relay coil approximately 45 seconds after gas ignition. Closing the K6 contacts on the RTRM energizes the supply fan relay (F) coil to start the supply fan motor (IDM).

The RTRM de-energizes the fan relay (F) approximately 60 seconds after the cooling requirement has be satisfied to enhance unit efficiency.

When the heating cycle is terminated, the supply fan relay (F) coil is de-energized approximately 90 seconds after the heating requirement.

When the fan selection switch is set to the "On" position, the RTRM keeps the supply fan relay coil (F) energized for continuous fan motor operation.

When the unit is equipped with the optional clogged filter switch, wired between terminals J7-3 and J7-4 on the ReliaTel™ Options Module (RTOM), the RTRM produces an analog output if the clogged filter switch (CFS) closes for two minutes after a request for fan operation. When the system is connected to a remote panel, the "SERVICE" LED will be turned on when this failure occurs.

Operation

Low Ambient Operation

During low ambient operation, outside air temperature below 13ºC, the RTRM will cycle the compressor and outdoor fan motor "Off" for approximately three minutes after every 10 minutes of accumulated compressor run time. The supply fan motor (IDM) will continue to operate during this evaporator defrost cycle (EDC) and the compressor and outdoor fan will return to normal operation once the defrost cycle has terminated and the compressor "Off" time delay has been satisfied.

Cooling with an Economizer

The economizer is utilized to control the zone temperature providing the outside air conditions are suitable.

Outside air is drawn into the unit through modulating dampers. When cooling is required and economizing is possible, the RTRM sends the cooling request to the unit economizer actuator (ECA) to open the economizer damper. The RTRM tries to cool the zone utilizing the economizer to slightly below the zone temperature setpoint. If the mixed air sensor (MAS) senses that the mixed air temperature is below 53ºF, the damper modulates toward the closed position. If the zone temperature continues to rise above the zone temperature setpoint controlband and the economizer damper is full open, the RTRM energizes the compressor contactor (CC1). If the zone temperature continues to rise above the zone temperature setpoint controlband and the economizer damper is fully open, the RTRM energizes the compressor contactor (CC2).

The ECA continues to modulate the economizer damper open/closed to keep the mixed air temperature that is calculated by the RTRM.

If economizing is not possible, the ECA drives the damper to the minimum position setpoint when the supply fan relay (F) is energized and allows mechanical cooling operation. When the unit is equipped with the optional fan failure switch, wired between terminals J7-5 and J7-6 on the RTOM, the RTRM will stop all cooling functions and produce an analog output if the fan failure switch (FFS) does not open within 40 seconds after a request for fan operation. When the system is connected to a remote panel, the "SERVICE" LED will flash when this failure occurs.

Operation

Economizer Set-Up

Adjusting the minimum position potentiometer located on the unit economizer Actuator (ECA) sets the required amount of ventilation air.

Two of the three methods for determining the suitability of the outside air can be selected utilizing the enthalpy potentiometer on the ECA, as described below:

1. Ambient Temperature - controlling the economizing cycle by sensing the outside air dry bulb temperature. The Table below lists the selectable dry bulb values by potentiometer setting.
2. Reference Enthalpy - controlling the economizer cycle by sensing the outdoor air humidity. The Table below lists the selectable enthalpy values by potentiometer setting.
   If the outside air enthalpy value is less than the selected value, the economizer is allowed to operate.
3. Comparative Enthalpy - By utilizing a humidity sensor and a temperature sensor in both the return air stream and the outdoor air stream, the unit control processor (RTRM) will be able to establish which conditions are best suited for maintaining the zone temperature, i.e. indoor conditions or outdoor conditions. The potentiometer located on the ECA is non-functional when both the temperature and humidity sensors are installed.

Table 39 - Potentiometer Setting

Potentiometer Setting	Dry Bulb (°C)	Enthalpy (KJ/kg)
A	23*	63
B	21	58
C	19	53
D	17	51

*Factory Setting

ReliaTel™ Control Heating Operation

When the system switch is set to the "Heat" position and the zone temperature falls below the heating setpoint controlband, a heat cycle is initiated when the RTRM communicates ignition information to the Ignition module (IGN).

Ignition Module

Two Stage (IGN) runs self-check (including verification that the gas valve is de-energized). (IGN) checks the high-limit switches (TC01 & TC02) for normally closed contacts. With 115 VAC power supplied to the ignition module (IGN), the hot surface ignition probe (IP) is preheated for approximately 45 seconds. The gas valve (GV) is energized for approximately 7 seconds for trial for ignition, to ignite the burner.

Once the burner is ignited, the hot surface ignition probe (IP) is de-energized by the ignition module (IGN) and functions as the flame sensing device.

If the burner fails to ignite, the ignition module will make two more attempts before locking out. The green LED will indicate a lock out by two fast flashes. An ignition lockout can be reset by:

1. Opening for 3 seconds and closing the main power disconnect switch
2. By switching the "Mode" switch on the zone sensor to "OFF" and then to the desired position
3. Allowing the ignition control module to reset automatically after one hour.

Operation

Refer to the ignition control module diagnostics section for the LED diagnostic definitions.

When the fan selection switch is set to the "Auto" position, the RTRM energizes the supply fan relay (F) coil approximately 30 second after initiating the heating cycle to start the supply fan motor (IDM).

The automatic reset high limit (TCO1), located in the bottom right corner of the burner compartment, protects against abnormally high leaving air temperatures.

The automatic reset fan fail limit (TCO2), located in the upper middle section of the supply fan board, protects against abnormally high heat buildup which could occur because of extended cycling of the high limit (TCO1) or if the supply fan motor (IDM) fails to operate. Should TCO2 open, the RTRM will energize the supply fan relay (F) in an attempt to start the fan motor. The RTRM signals that a heat failure has occurred by flashing the "Heat" LED on the zone sensor.

There is a Green LED located in the Ignition Control Module. The table below lists the diagnostics and the status of the LED during the various operating states.

Final installation checklist

- Is the condenser fan and indoor blower operating correctly, i.e.: correct rotation and without undue noise?
- Are the compressors operating correctly and has the system charge been checked?
- Has the gas module been installed as per the procedure in this manual?
- Have the voltage and running currents been checked to determine if they are with in limits?
- Have the air discharge grilles been adjusted to balance the system?
- Has the ductwork been checked for air leaks and any condensation?
- Has the heating air temperature rise been checked?
- Has the indoor airflow been checked and adjusted if necessary?
- Has the unit been checked for tubing and sheet metal rattles orany unusual noises?
- Are all covers and panels in placeand properly fastened?

To keep the unit operating safely and efficiently, the manufacturer recommends that a qualified service technician check the entire system at least once each year, or more frequently if conditions warrant.

Table 40 -LED status

Diagnostics	Green LED	Red LED
1. Powered but no heat dernand	Off	Off
2. Heat demand without fault	Flash ing	Off
3. No flame detection on ignition - or signal detected and then lost	Off	Flashing
4. Gas unit incorrectly wired or flame signal detected on a heat demand	Steady	Flashing
5. Internal fault	Off	Steady

Maintenance

To keep the unit operating safely and efficiently, the manufacturer recommends that a qualified service technician check the entire system at least once each year, or more frequently if conditions warrant it.

End user routine maintenance

Some of the periodic maintenance functions for the unit can be undertaken by the end user. This includes replacing (disposable) or cleaning (permanent) air filters, cleaning unit cabinet, cleaning the condenser coil, and carrying out a general unit inspection on a regular basis.

WARNING! Disconnect the power supply before removing access panels to service the unit. Failure to disconnect power before attempting any servicing can result in severe injury or death.

Air filters

It is very important for the central duct system air filters to be kept clean.

These should be inspected at least once a month when the system is in constant operation (in new buildings, the filters should be checked every week for the first four weeks). If disposable-type filters are used, they should only be replaced with ones of the same type and size.

Table 41 - Refrigerant charge

Unit model and size	Number of circuits	Refrigerant charge (kg) (R22/R407C)
YSD/YSH 060	1	3.5
YSD/YSH 072	1	3.7
YSD/YSH 090	1	4.5
YSD/YSH 102	2	3.7/2.1
YSD/YSH 120	2	3.5/3.0

Note: Refrigerant charges are given for information only. Check unit nameplate for exact values.

Maintenance

Note: Do not attempt to clean disposable filters. Permanent filters can be cleaned by washing with a mild detergent and water. Ensure that the filters are thoroughly dry before reinstalling them in the unit (or duct system).

Note: Replace permanent filters annually if washing fails to clean them, or they show signs of deterioration. Be sure to use the same type and size as were originally installed.

Condenser coil

Unfiltered air circulates through the unit's condenser coil and can cause the coil's surface to become clogged with dust, dirt, etc. To clean the coil, brush the coil surface in the direction of the fins with a soft bristled brush.

Keep all vegetation away from the condenser coil area.

Hot water coil (option)

Stop the unit. Do not disconnect the main supply to the unit. This will permit the anti-frost protection to continue to operate, and avoid water to freeze-up in the coil.

Service technician maintenance

Before the cooling season, your service technician may examine the following areas of your unit:

- Filters, for cleaning or replacement
- Motors and drives system components
- Economizer gaskets, for replacement if necessary
- Condenser coils, for cleaning
- Safety controls, for mechanical cleaning
- Electrical components and wiring, for replacement and tightening of connections as necessary
- Condensate drain, for cleaning
- Unit duct connections, to ensure they are physically sound and sealed to the unit casing
- Unit mounting support, to ensure that it is sound
- The unit, to ensure there is no obvious deterioration

Before the heating season, your service technician may examine the following areas of your unit:

- The unit, to ensure that the condenser coil can receive the required airflow (that the condenser fan grille is not obstructed)
- The control panel wiring, to verify that all electrical connections are tight, and that wire insulation is intact
- Clean burner area, verify the gas heat system operates properly.

Maintenance

Troubleshooting

The RTRM has the ability to provide the service personnel with some unit diagnostics and system status information. Before turning the main power disconnect switch "Off", follow the steps below to check the ReliaTel™

Refrigeration Module (RTRM). All diagnostics & system status information stored in the RTRM will be lost when the main power is turned "Off".

1. Verify that the Liteport LED on the RTRM is burning continuously. If the LED is lit, go to Step 3.
2. If the LED is not lit, verify that 24 VAC is present between J1-1 and J1-2. If 24 VAC is present, proceed to Step 3. If 24 VAC is not present, check the unit main power supply, check transformer (TNS1). Proceed to Step 3 if necessary.
3. Utilizing "Method 1" or "Method 2" in the system status diagnostic section, check the following: System status, Heating status, Cooling status. If a System failure is indicated, proceed to Step 4. If no failures are indicated, proceed to Step 5.
4. If a System failure is indicated, recheck Steps 1 and 2. If the LED is not lit in Step 1, and 24 VAC is present in Step 2, the RTRM has failed. Replace the RTRM.
5. If no failures are indicated, use one of the TEST mode procedures described in the unit "Start-Up" section to start the unit. This procedure will allow you to check all of the RTRM outputs, and all of the external controls (relays, contactors, etc.) that the RTRM outputs energize, for each respective mode. Proceed to Step 6.
6. Step the system through all of the available modes, and verify operation of all outputs, controls, and modes. If a problem in operation is noted in any mode, you may leave the system in that mode for up to one hour while troubleshooting. Refer to the sequence of operations for each mode, to assist in verifying proper operation. Make the necessary repairs and proceed to Steps 7 and 8.
7. If no abnormal operating conditions appear in the test mode, exit the test mode by turning the power "Off" at the main power disconnect switch.
8. Refer to the individual component test procedures if other microelectronic components are suspect.

System Status Checkout Procedure

"System Status" is checked by using one of the following two methods:

Method 1

If the Zone Sensor Module (ZSM) is equipped with a remote panel with LED status indication, you can check the unit within the space. If the ZSM does not have LED's, use Method 2.

THS/P03 have the remote panel indication feature. The LED descriptions are listed below:

LED 1 (System) "On" during normal operation. "Off" if a system failure occurs or the LED fails. "Flashing" indicates test mode.

LED 2 (Heat) "On" when the heat cycle is operating. "Off" when the heat cycle terminates or the LED fails. "Flashing" indicates a heating failure.

LED 3 (Cool) "On" when the cooling cycle is operating. "Off" when the cooling cycle terminates or the LED fails. "Flashing" indicates a cooling failure.

LED 4 (Service) "On" indicates a clogged filter. "Off" during normal operation. "Flashing" indicates an supply fan failure.

Maintenance

Below is the complete listing of failure indication causes:

System failure

Check the voltage between terminals 6 and 9 on J6, it should read approximately 32 VDC. If no voltage is present, a system failure has occurred. Refer to Step 4 in the previous section for the recommended troubleshooting procedure.

Heating Failure

Verify Heat Failure by Ignition Module (IGN) LED indicator:

OFF: No Power or Failure

ON: Normal

Slow Flash: Normal, Heat Call

Fast Flash: Error Code:

1 Flash: Communication Failure
2 Flashes: System Lockout
3 Flashes: Pressure Switch Fail
4 Flashes TC01 or TC02 Open
5 Flashes: Flame w/o Gas Valve
6 Flashes: Flame Rollout Open

Cooling Failure

1. Cooling and heating set point (slide pot) on the zone sensor has failed. Refer to the "Zone Sensor Test Procedure" section.
2. Zone temperature thermistor ZTEMP on ZTS failed. Refer to the "Zone Sensor Test Procedure" section.
3. CC1 or CC2 24 VAC control circuit has opened, check CC1 & CC2 coils, and any of the controls below that apply to the unit (HPC1, HPC2).
4. LPC1 has opened during the 3 minute minimum "on time" during 4 consecutive compressor starts, check LPC1 or LPC2 by testing voltage between the J1-8 & J3-2 terminals on the RTRM and ground. If 24 VAC is present, the LPC's has not tripped. If no voltage is present, LPC's has tripped.

Service Failure

1. If the supply fan proving switch has closed, the unit will not operate (when connected to RTOM), check the fan motor, belts, and proving switch.
2. Clogged filter switch has closed, check the filters.

Simultaneous Heat and Cool Failure

1. Emergency Stop is activated

Method 2

The second method for determining system status is done by checking voltage readings at the RTRM (J6).

The system indication descriptions and the approximate voltages are listed below.

System Failure

Measure the voltage between terminals J6-9 & J6-6.

Normal Operation = approximately 32 VDC

System Failure = less than 1 VDC, approximately 0.75 VDC

Test Mode = voltage alternates between 32 VDC & 0.75 VDC

Heat Failure

Measure the voltage between terminals J6-7 & J6-6.

Heat Operating = approximately 32 VDC

Heat Off = less than 1 VDC, approximately 0.75 VDC

Heating Failure = voltage alternates between 32 VDC & 0.75 VDC

Cool Failure

Measure the voltage between terminals J6-8 & J6-6.

Cool Operating = approximately 32 VDC

Cool Off = less than 1 VDC, approximately 0.75 VDC

Cooling Failure = voltage alternates between 32 VDC & 0.75 VDC

Maintenance

Service Failure

Measure the voltage between terminals J6-10 & J6-6.

Clogged Filter = Approximately 32 VDC.

Normal = Less than 1 VDC, approximately 0.75 VDC

Fan Failure = voltage alternates between 32 VDC & 0.75 VDC.

To use LED's for quick status information at the unit, purchase a ZSM and connect wires with alligator clamps to terminals 6 through 10.

Connect each respective terminal wire (6 through 10) from the Zone Sensor to the unit J6 terminals 6 through 10.

Note: If the system is equipped with a programmable zone sensor THS03, the LED indicators will not function while the ZSM is connected.

Resetting Cooling and Ignition Lockouts

Cooling Failures and Ignition

Lockouts are reset in an identical manner. Method 1 explains resetting the system from the space, Method 2 explains resetting the system at the unit.

Note: Before resetting Cooling Failures and Ignition Lockouts, check the Failure Status Diagnostics by the methods previously explained.

Diagnostics will be lost when the power to the unit is disconnected.

Method 1

To reset the system from the zone, turn the "Mode" selection switch at the zone sensor to the "Off" position.

After approximately 30 seconds, turn the "Mode" selection switch to the desired mode, i.e. Heat, Cool or Auto.

Method 2

To reset the system at the unit, cycle the unit power by turning the disconnect switch "Off" and then "On".

Lockouts can be cleared through the building management system. Refer to the building management system instructions for more information.

Zone Temperature Sensor (ZTS) Service Indicator

The ZSM SERVICE LED is a generic indicator that will signal the closing of a Normally Open switch at any time, providing the Indoor Motor (IDM) is operating. This indicator is usually used to indicate a clogged filter, or an air side fan failure.

The RTRM will ignore the closing of this Normally Open switch for 2 (±1) minutes. This helps prevent nuisance SERVICE LED indications. The exception is the LED will flash 40 seconds after the fan is turned "On" if the Fan Proving Switch is not made.

Clogged Filter Switch

This LED will remain lit the entire time that the Normally Open switch is closed. The LED will be turned off immediately after resetting the switch (to the Normally Open position), or any time that the IDM is turned "Off".

If the switch remains closed, and the IDM is turned "On", the SERVICE LED will be turned "On" again after the 2 (±1) minute ignore delay.

This LED being turned "On", will have no other affect on unit operation. It is an indicator only.

Fan Failure Switch

When the "Fan Failure" switch is wired to the RTOM, the LED will remain flashing the entire time the fan proving switch is closed, indicating a fan failure, and it will shut the unit operations down.

Maintenance

Zone Temperature Sensor (ZTS) Test

Note:These procedures are not for programmable or digital models and are conducted with the Zone Sensor

Module electrically removed from the system.

Test 1

Zone Temperature Thermistor (ZTEMP)

This component is tested by measuring the resistance between terminals 1 and 2 on the Zone Temperature Sensor.

Table 42 - Thermistor Resistance / Temperature Chart

Temperature/resistance coefficient is negative.

Temperature (°C)	Resistance (kOhms)
-21	103
-15	74.65
-9	54.66
-7	46.94
-4	40.4
-1	34.85
2	30.18
4	26.22
7	22.85
10	19.96
13	17.47
16	15.33
18	13.49
21	11.89
24	10.5
27	9.297
29	8.247
32	7.33
35	6.528
38	5.824

Quality Management System Approval

CE

TRANE®

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For more information, contact your local Trane sales office or e-mail us at comfort@trane.com

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