

USA *Air* **conditioning** **D I S T R I B U T O R S**

The world's largest privately owned HVAC distributor

1.5 TO 5 TONS YORK HEAT PUMPS CONDENSING UNITS

ERD 13 SEER R-22 Three Phase (2.5 to 5 tons)

have the following available benefits and options

Please, specify the following:

High/Low Pressure switch, Internal Protections

Factory Installed Filter Drier

Isolated Compressor Compartment

Low Sound Operation with Low RPM Fans

5 Years Parts Warranty

10 Years Compressor Warranty

Choice of colors to match building

T2950 365 Days Thermostat

BAS Networkable with free Web Software

ArmorGuard Stainless Steel 316 Corrosion Protection on coils

Please call us !

| | | |
|---------------------------|--------------|--|
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TECHNICAL GUIDE

R-22 SPLIT-SYSTEM HEAT PUMPS

13 SEER – R-22

E*RD036 THRU 060 (2.5 THRU 5 TONS, 3 PHASE)



Due to continuous product improvement, specifications are subject to change without notice.

Visit us on the web at www.york.com for the most up-to-date technical information.

Additional rating information can be found at www.ari.org/aridirectory

DESCRIPTION

The 13 SEER series heat pumps are designed for use with a variety of UPG evaporator sections to suit any application need. A full line of matching Add-On Coils are available for use with upflow, downflow or horizontal furnaces. Matching Air Handlers are also available for upflow, downflow or horizontal installation to provide a complete system. Electric heat may be installed in air handlers. All units are factory charged to assure easy installation.

WARRANTY

Single Phase Units:

5-year limited parts warranty.
5-year limited compressor warranty.

Three Phase Units:

1-year limited parts warranty.
5-year limited compressor warranty.

FEATURES

- **DURABLE CONSTRUCTION** - The outdoor unit is constructed of pre-painted steel that offers tough protection against corrosion and resists fading when exposed to sunlight. Drain holes are incorporated into the base pan to permit free drainage of moisture.
- **QUALITY COILS** - The coil is constructed of enhanced copper tube and aluminum fins.
- **COIL PROTECTION** - Coils are protected from damage by a polymer mesh applied between the coil face, and a PVC coated steel coil guard.
- **PROTECTED COMPRESSOR** - The hermetic compressor is internally protected against high pressure and temperature by the simultaneous operation of a high pressure relief valve and temperature sensors which stop the compressor if operating temperatures go too high. Both protectors reset automatically. A discharge line solid core filter drier further protects the compressor.
- **Complete System Control** – These heat pumps utilize the unique microprocessor defrost control system to provide optimal comfort and to monitor the overall system for reliable operation. The defrost control system continuously monitors the space environment to maintain optimum efficiency. It initiates defrost only when necessary to further reduce heating costs and improve reliability. In the event improper operating conditions occur, the control will automatically shut the system down to extend the life of the heat pump. Rapid cycling is prevented by use of an internal anti-recycle timer.
- **LOW OPERATING SOUND LEVEL** - The compressor is mounted on rubber isolators to reduce operating sounds. The slow moving condenser fan keeps air turbulence and sound to a low level.
- **EASY ACCESS** - Removable panel affords accessibility to the electrical box.
- **FULLY CHARGED AND FACTORY WIRED** - to simply installation and reduce labor costs. Only power supply and control wiring and refrigerant lines must be connected. All models are sweat connect with reusable service valves.
- **Factory tested** - to verify system operation and control functioning before shipment.
- **U.L. and C.U.L. listed** - approved for outdoor application.

Certified in accordance with the Unitary Small Equipment certification program, which is based on ARI Standard 210/240.

FOR DISTRIBUTION USE ONLY - NOT TO BE USED AT POINT OF RETAIL SALE

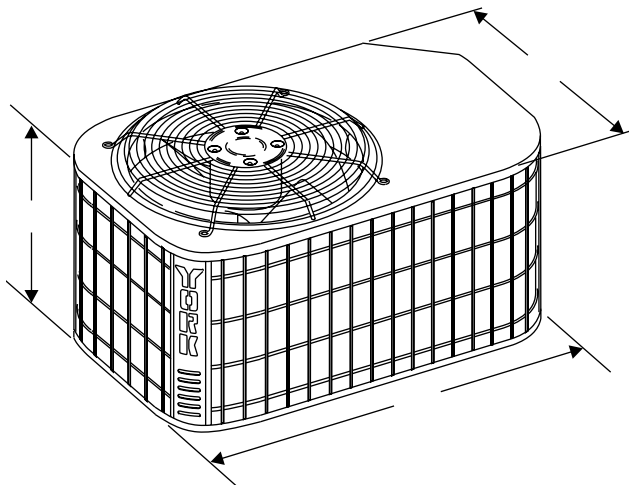
PHYSICAL AND ELECTRICAL DATA - 3 PHASE

| MODEL | E1RD 030S25 | E1RD 036S25 | E1RD 042S25 | E1RD 048S25 | E1RD 060S25 | E1RD 030S46 | E1RD 036S46 | E1RD 042S46 | E1RD 048S46 | E1RD 060S46 | |
|---|---------------------------|----------------|----------------|---------------------|---------------------|-----------------------|----------------|----------------|---------------------|---------------------|----|
| Unit Supply Voltage | 208-230V, 3 ϕ , 60Hz | | | | | 460V, 3 ϕ , 60Hz | | | | | |
| Normal Voltage Range ¹ | 187 to 252 | | | | | 432 to 532 | | | | | |
| Minimum Circuit Ampacity | 12.1 | 14.3 | 14.4 | 20.2 | 23.1 | 5.6 | 6.9 | 7.2 | 9.5 | 11.2 | |
| Max. Overcurrent Device Amps ² | 20 | 20 | 20 | 35 | 40 | 15 | 15 | 15 | 15 | 15 | |
| Min. Overcurrent Device Amps ³ | 15 | 15 | 15 | 25 | 25 | 15 | 15 | 15 | 15 | 15 | |
| Compressor Type ⁴ | Recip | Recip | Recip | Scroll ^D | Scroll ^D | Recip | Recip | Recip | Scroll ^D | Scroll ^D | |
| Compressor Amps | Rated Load | 8.5 | 10.2 | 10.4 | 10.2 | 16 | 3.9 | 4.9 | 6.1 | 6.1 | 8 |
| | Locked Rotor | 62 | 72 | 71 | 95 | 123 | 30 | 45 | 45 | 45 | 70 |
| Crankcase Heater | Yes | Yes | Yes | No | No | Yes | Yes | Yes | No | No | |
| Fan Motor Amps | Rated Load | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 0.7 | 0.7 | 0.7 | 0.7 | |
| Fan Diameter Inches | 22 | 22 | 22 | 24 | 24 | 22 | 22 | 22 | 24 | 24 | |
| Fan Motor | Rated HP | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | 1/4 | |
| | Nominal RPM | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | 850 | |
| | Nominal CFM | 3450 | 3500 | 3500 | 3400 | 3500 | 3450 | 3500 | 3500 | 3400 | |
| Coil | Face Area Sq. Ft. | 20.96 | 23.58 | 23.58 | 24.00 | 27.00 | 20.96 | 23.58 | 23.58 | 24.00 | |
| | Rows Deep | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 2 | |
| | Fin / Inches | 22 | 22 | 22 | 18 | 18 | 22 | 22 | 22 | 18 | |
| Liquid Line Set OD (Field Installed) | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | 3/8 | |
| Vapor Line Set OD (Field Installed) | 7/8 | 7/8 | 7/8 | 7/8 | 1-1/8 | 7/8 | 7/8 | 7/8 | 7/8 | 1-1/8 | |
| Unit Charge (Lbs. - Oz.) ⁵ | 8 - 7 | 8 - 7 | 8 - 7 | 12 - 8 | 16 - 7 | 8 - 7 | 8 - 7 | 8 - 7 | 12 - 8 | 16 - 7 | |
| Charge Per Foot, Oz. | 0.70 | 0.70 | 0.70 | 0.70 | 0.76 | 0.70 | 0.70 | 0.70 | 0.70 | 0.78 | |
| Operating Weight Lbs. | 196 | 208 | 208 | 250 | 294 | 196 | 208 | 208 | 250 | 294 | |

1. Rated in accordance with ARI Standard 110, utilization range "A".
2. Dual element fuses or HACR circuit breaker. Maximum allowable overcurrent protection.
3. Dual element fuses or HACR circuit breaker. Minimum recommended overcurrent protection.
4. All scrolls listed with a superscript "D" are Danfoss scrolls. All scrolls listed with a superscript "C" are Copeland scrolls.
5. The Unit Charge is correct for the outdoor unit, matched indoor coil and 15 feet of refrigerant tubing. For tubing lengths other than 15 feet, add or subtract the amount of refrigerant, using the difference in length multiplied by the per foot value. If line exceeds 25 feet, you may refer to publications software 036-68001-001 for proper line sizing.

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.

DIMENSIONS



| Unit Model | Dimensions (Inches) | | | Refrigerant Connection Service Valve Size | |
|------------|---------------------|----|----|---|-------|
| | A ¹ | B | C | Liquid | Vapor |
| 030 | 35 | 37 | 27 | 3/8" | 7/8" |
| 036 | 39 | 37 | 27 | | |
| 042 | 39 | 37 | 27 | | |
| 048 | 34 | 43 | 32 | | |
| 060 | 38 | 43 | 32 | | 7/8** |

1. Including Fan Guard.
- * Adapter fitting required for 1-1/8" line set.

| COOLING CAPACITY - With Air Handler AHP | | | | | | | | |
|---|-------------|------------------|----|-----------|---------|-------|-------|-----|
| UNIT MODEL | AIR HANDLER | | | | COOLING | | SEER | EER |
| | MODEL | ELECTRIC HEAT KW | W | RATED CFM | NET MBH | | | |
| | | | | | TOTAL | SENS. | | |
| 3 PHASE | | | | | | | | |
| E1RD030S06 | AHP30 | 5,8,10 | 17 | 1000 | 28.4 | 19.5 | 13 | 11 |
| E1RD030S(25,46) | AHP30 | 5,8,10 | 17 | 1000 | 28 | 19.2 | 13 | 11 |
| | AHP30 | 5,8,10 | 17 | 1000 | 28 | 19.2 | 13 | 11 |
| E1RD036S06 | AHP36 | 5,8,10,15,18 | 21 | 1200 | 34.4 | 25.4 | 13 | 11 |
| | AHP42 | 5,8,10,15,18 | 21 | 1200 | 34.6 | 25.3 | 13 | 11 |
| E1RD036S(25,46) | AHP36 | 5,8,10,15,18 | 21 | 1200 | 33.8 | 24.9 | 13 | 11 |
| | AHP42 | 5,8,10,15,18 | 21 | 1200 | 34 | 24.8 | 13 | 11 |
| E1RD042S06 | AHP48 | 5,8,10,15,20 | 24 | 1400 | 41 | 30.7 | 13 | 11 |
| | AHP48 | 5,8,10,15,20 | 24 | 1400 | 41 | 30.7 | 13 | 11 |
| E1RD042S(25,46) | AHP48 | 5,8,10,15,20 | 24 | 1400 | 40 | 29.9 | 13 | 11 |
| | AHP48 | 5,8,10,15,20 | 24 | 1400 | 40 | 29.9 | 13 | 11 |
| E1RD048S06 | AHP48 | 5,8,10,15,20 | 24 | 1600 | 46 | 35.3 | 13 | 11 |
| | AHP60 | 5,8,10,15,20,25 | 24 | 1600 | 46 | 34.6 | 13.25 | 11 |
| E1RD048S(25,46) | AHP48 | 5,8,10,15,20 | 24 | 1600 | 45 | 34.5 | 13 | 11 |
| | AHP60 | 5,8,10,15,20,25 | 24 | 1600 | 45 | 33.8 | 13.25 | 11 |
| E1RD060S06 | AHP60 | 5,8,10,15,20,25 | 24 | 1800 | 55 | 39.7 | 13 | 11 |
| E1RD060S(25,46) | AHP60 | 5,8,10,15,20,25 | 24 | 1800 | 54.5 | 39.3 | 13 | 11 |

Rated in accordance with DOE test procedures (Federal Register 12-27-79 and 3-18-88) and ARI Standards 210/240. Cooling MBH based on 80°F entering air temperature, 50% RH, and rated air flow. EER (Energy Efficiency Ratio) is the total cooling output in BTU's at a 95°F outdoor ambient divided by the total electric power in watt-hours at those conditions. SEER (Seasonal Energy Efficiency Ratio) is the total cooling output in BTU's during a normal annual usage period for cooling divided by the total electric power input in watt-hours during the same period.

| HEATING CAPACITY - With Air Handler AHP | | | | | | | | |
|---|-------------|-------------|------|------|------|------|------|-------------|
| UNIT MODEL* | AIR HANDLER | ARI HEATING | | | | | | |
| | | 47°F | | | 17°F | | | HSPF STD |
| | | MBH | COP | KW | MBH | COP | KW | |
| 3 PHASE | | | | | | | | |
| E1RD030S(25,46) | AHP30 | 28.6 | 3.66 | 2.28 | 15.6 | 2.5 | 1.32 | 8 |
| E1RD036S(25,46) | AHP36 | 33.6 | 3.44 | 2.91 | 22.4 | 2.5 | 2.37 | 8.5 |
| | AHP42 | 34 | 3.66 | 2.72 | 20.2 | 2.5 | 1.61 | 8 |
| E1RD042S(25,46) | AHP48 | 42 | 3.56 | 3.46 | 25 | 2.52 | 2.93 | 8.4 |
| E1RD048S(25,46) | AHP48 | 47 | 3.66 | 3.76 | 29 | 3.66 | 2.32 | 8 |
| | AHP60 | 47 | 3.66 | 3.76 | 29 | 3.66 | 2.32 | 8 |
| E1RD060S(25,46) | AHP60 | 57 | 3.66 | 4.56 | 34.4 | 3.66 | 2.75 | 8 |

1. Rated CFM same as for cooling.

2. Heating MBH based on ARI standards of 70° DB entering indoor air, 72% RH outdoor air with 25 feet of interconnecting piping and no supplemental electric heat operation.

CP equals MBH output divided by (total KW input x 3.412). HSPF (Heating Seasonal Performance Factor) is the total heating output during a normal annual usage period for heating divided by the total electric power input during the same period.

ACCESSORIES

Refer to Price Manual for specific model numbers.

Start Assist Kit (2SA067*)

Blower Time Delay - Available to increase efficiency when installed. Installs on indoor section and maintains blower for approximately one minute after cooling thermostat has been satisfied.

Hard Start Kits - Provides required starting torque for use with Thermal Expansion Valve Kit.

Low Temperature Cutout (2LT06700224) - Prevents heat pump operation below -10°F ambient temperature.

Compressor Blanket - Designed to further reduce the normal operating sound.

Add-on Fossil Fuel Control - Interface controls for use with gas, oil furnaces and the heat pump system are available.

Thermal Expansion Valve Kit - 1TVM700 Series TXV kit used to improve system performance.

Outdoor Thermostat (2TD06700124) - Provides additional staging of supplemental electric heat.

Room Thermostats - A wide selection of matching thermostats is available to provide features required for any installation.

2H/1C, manual changeover electronic non-programmable thermostat.

3H/2C, non-programmable digital thermostat.

3H/2C, auto/manual changeover, electronic programmable, 7-day, hardwire thermostat.

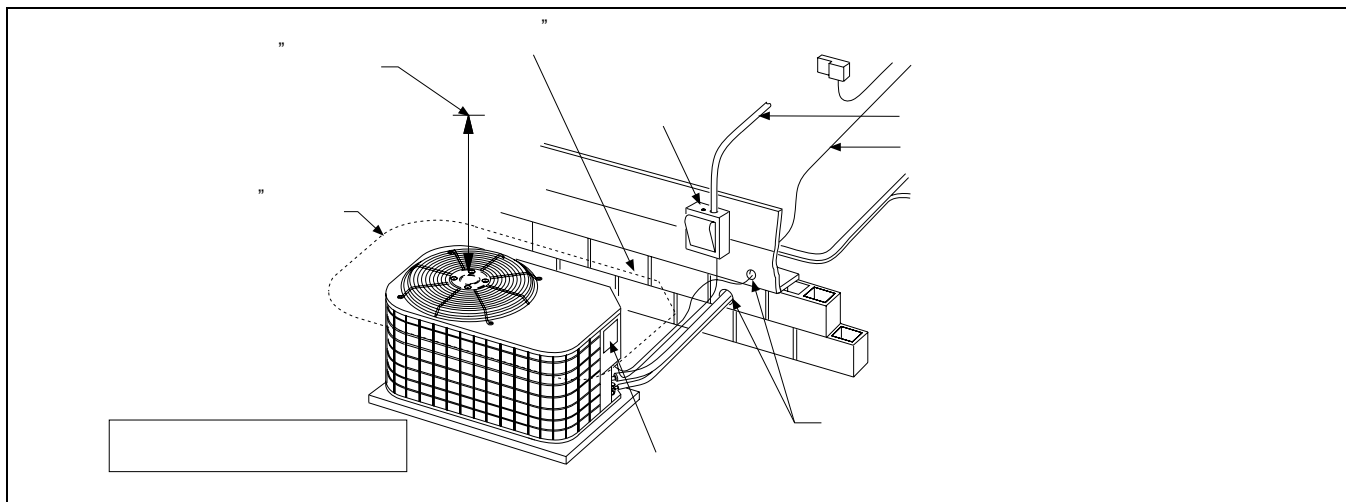
* For the most current accessory information, refer to the price book or consult factory.

SOUND POWER RATINGS

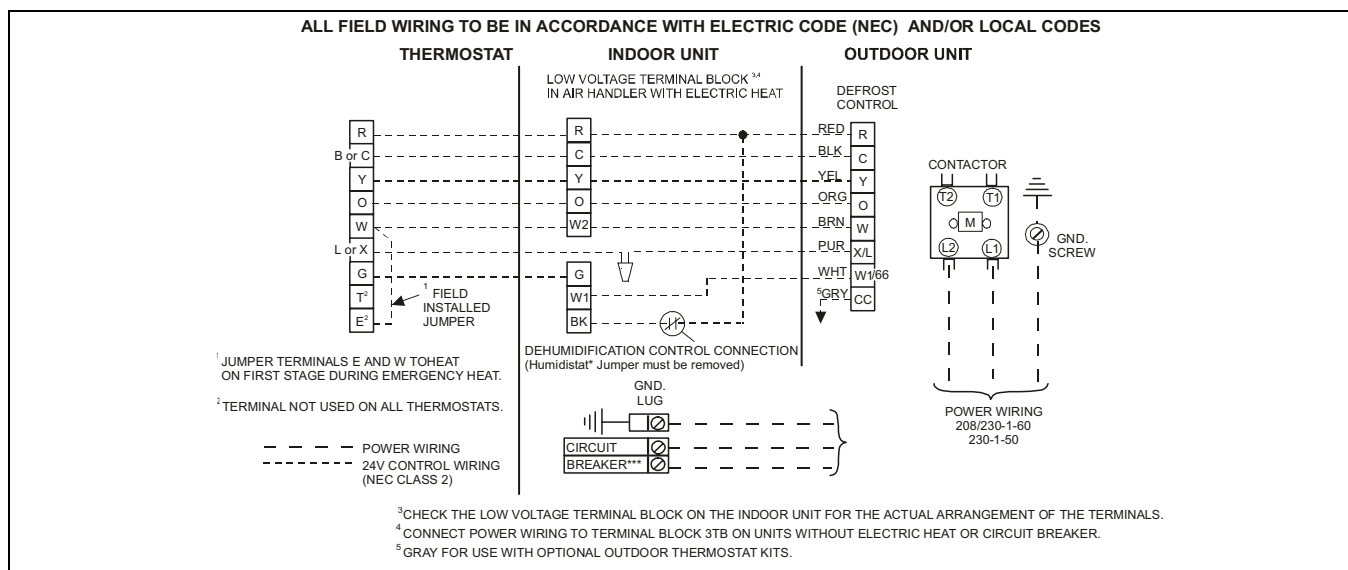
| UNIT MODEL | (dBA)* | |
|------------|---------|---------|
| | Cooling | Heating |
| 018 | 70 | 70 |
| 024 | 74 | 75 |
| 030 | 76 | 77 |
| 036 | 76 | 77 |
| 042 | 77 | 78 |
| 048 | 78 | 78 |
| 060 | 79 | 79 |

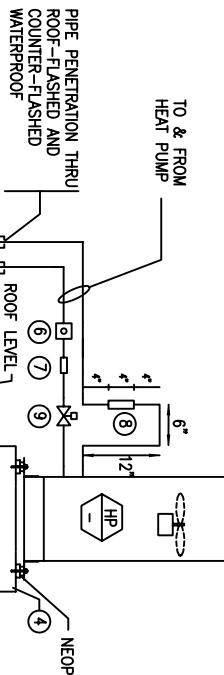
* Rated in accordance with ARI 270-95 Standards.

INSTALLATION CLEARANCES



TYPICAL FIELD WIRING

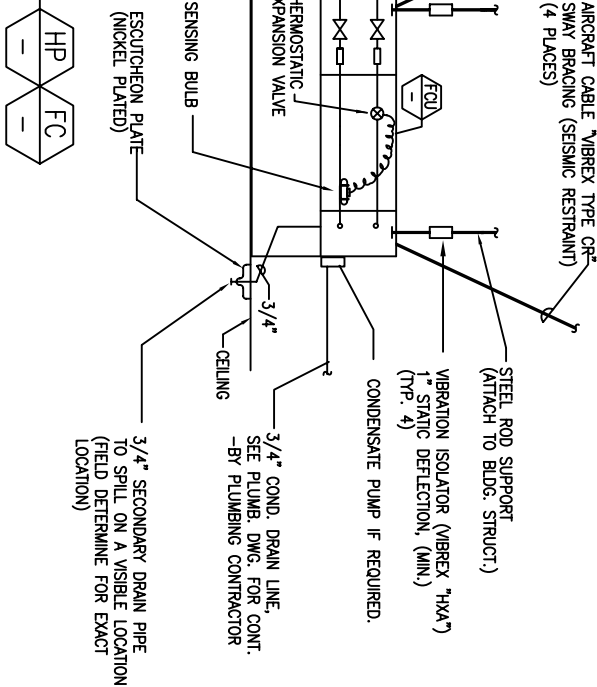




- NOTES:
1. FAN COIL UNITS SHALL BE LOCATED SUCH THAT UNIT CAN BE SERVICED AND REMOVED WITHOUT REMOVAL OF PERMANENT CONSTRUCTION.
 2. INSULATE REFRIGERANT SUCTION LINES.
 3. INSTALL PIPES IN STUD WALL WITH VIBRATION ISOLATION PIPE SUPPORT.
 4. 6" HIGH EQUIPMENT PLATFORM
 5. INSTALL REFRIGERANT PIPING PER MANUFACTURER'S INSTALLATION RECOMMENDATION
 6. FIELD INSTALLED SIGHT GLASS
 7. FIELD INSTALLED FILTER DRIER
 8. FIELD INSTALLED MUFFLER (LOCATED IN A VERTICAL POSITION)
 9. FIELD INSTALLED SOLENOID VALVE

SPLIT DX HP REFRIGERANT PIPING DIAGRAM

SCALE: NOT TO SCALE



VENSTAR®

COMMERCIAL THERMOSTAT

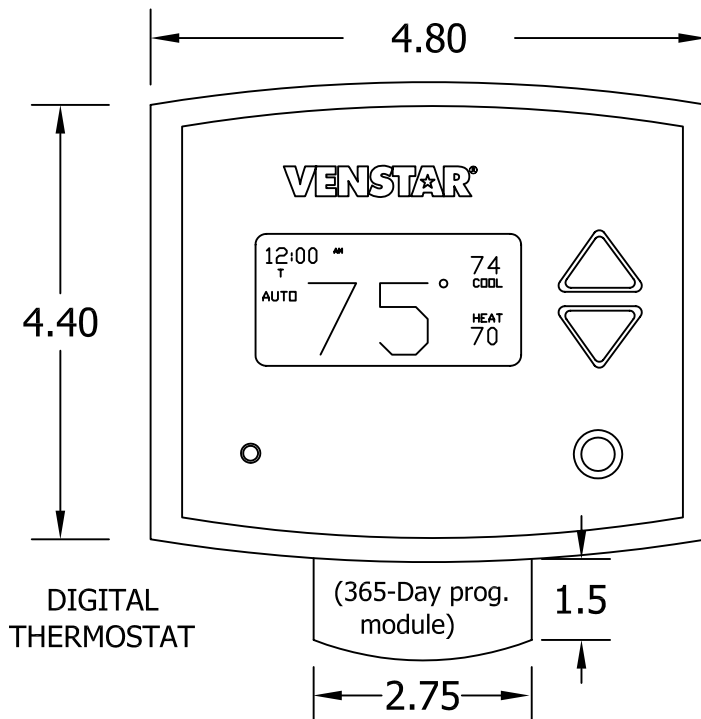
MODEL NO. T2950

365-DAY PROGRAMMABLE

UP TO 3-HEAT
& 2-COOL

HEAT
COOL & HEAT
PUMP

TITLE-24 COMPLIANT



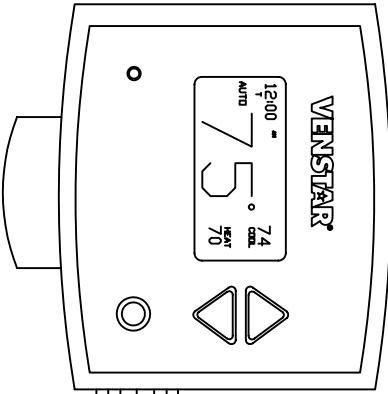
STANDARD FEATURES:

- **365-day programmable (up to 10 years, includes full calendar with preprogrammed holidays)**
- Up to 3-Occupied, 1-Unoccupied periods per day, with copy command for easy programming
- **Light Activated occupied period (defeatable)**
- **Auto changeover, 3-stage heat, 2-stage cool for use with gas/electric, heat pump, split systems, electric & hydronic heat**
- Configurable for manual changeover, also configurable programmable or non-programmable
- Adjustable deadbands and timers
- 2 configurable outputs for maximum flexibility. Can be used for humidification, dehumidification, 3rd stage heating or programmable output for lighting, exhaust fans, remote sensor etc.
- Energy Watch keeps track of energy use by tracking heating and cooling hours
- Smart Fan (keeps the fan from running during unoccupied periods)
- Smart recovery (reaches selected comfort temperature at exact time is scheduled for energy savings)
- **Pre-occupancy fan purge**
- Display shows both heating and cooling setpoints and room temperature simultaneously
- All programming and setpoints stored in non-volatile memory, and are never lost in power failure
- Service filter and service UV lamp indicators
- Red/Green LED shows whether thermostat is calling for heating or cooling
- **5-minute compressor time guard and adjustable cycle limit, both defeatable for servicing equipment**
- Thermoglow backlit electro-luminous display and backlit color coded keys and legends

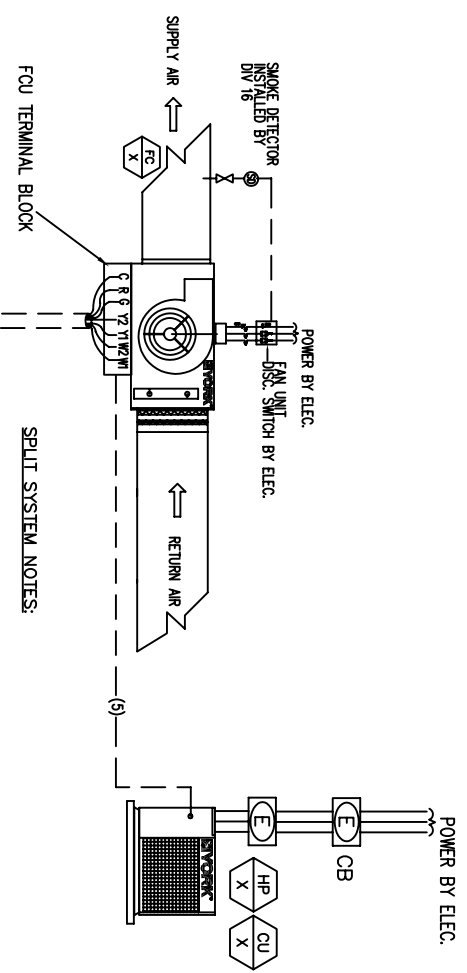
ACCESORY FEATURES:

- **Accepts humidification/dehumidification control module (Venstar part number ACC0430)**
- **Control to, or monitor a second remote sensor. Can average up to 8 (wired or wireless) remote sensors (Venstar part number ACC0401)**
- Outdoor sensor ready with high and low temperature of the day (Venstar part number ACC0400)
- Accepts accessory IR remote control system (Venstar part number ACC0431)
- Accepts accessory EZ Programmer- programmed via USB through computer (Venstar part number ACC0)
- **For accessory locking cover use (Venstar part number ACC0620)**

MODEL NUMBER: VENSTAR T2950



365-DAY PROGRAMMABLE



SPLIT SYSTEM NOTES:

1. SEE MANUFACTURER INSTALLATION MANUAL FOR SENSOR INSTALLATION AND REQUIREMENTS.
2. ALL CONTROLS AND EQUIPMENT PROVIDED BY USACD.
3. EACH ROOFTOP UNIT WILL HAVE NECESSARY SAFETIES.
4. THE SYSTEM IS ENABLED AND DISABLED AS PROGRAMMED BY THE PROGRAMMABLE THERMOSTAT (MODEL NO: VENSTAR T2950). TSTAT SHALL BE TITLE-24 APPROVED AND 365-DAY PROGRAMMABLE.

(7) WIRES IN RIGID CONDUIT SEPARATE FROM PWR LINE

WIRING LEGEND

- 24VAC COMMON — C
- 24VAC POWER — R
- FAN RELAY — G
- 1ST STAGE COOLING — Y1
- 2ND STAGE COOLING — Y2
- 1ST STAGE HEATING — W1
- 2ND STAGE HEATING — W2

TYPICAL STAND ALONE SPLIT SYSTEM CONTROL DIAGRAM

SCALE: NONE

COMMERCIAL ZONING PACKAGE

FACILITY EXPLORER

BY JOHNSON CONTROLS

The Facility Explorer Commercial Zoning Package is a complete, turnkey control system used to improve occupant comfort in a building (or section of a building) that is conditioned with a packaged rooftop HVAC unit. It accomplishes this by varying the amount of conditioned air delivered to individual zones and by intelligently cycling the rooftop unit's heating and cooling stages to best satisfy all the zone demands.

Manufacturer Independent

The Facility Explorer Commercial Zoning Package is designed to work with any standard, packaged HVAC equipment, regardless of manufacturer. This allows you to apply this control package to equipment provided by a variety of suppliers or to equipment that has already been installed. This flexibility makes the Facility Explorer Commercial Zoning Package perfectly suited for both new and retrofit installations.

Affordable Intelligence

The Facility Explorer Commercial Zoning Package utilizes the distributed application architecture of the FX16 Master Controller. This feature allows direct communications to occur between the FX16 and all the zone controllers. This means that there is no need for a traditional supervisory class controller to manage the data sharing. This direct communication flow allows the FX16 to monitor each zone's status to intelligently determine the proper mode of operation for the rooftop unit.

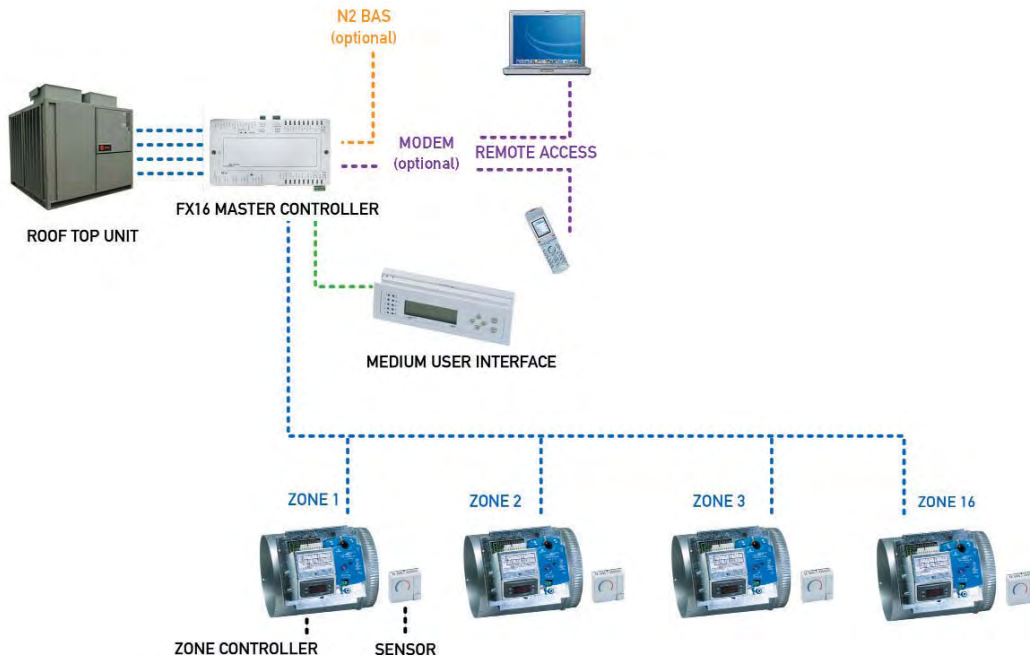


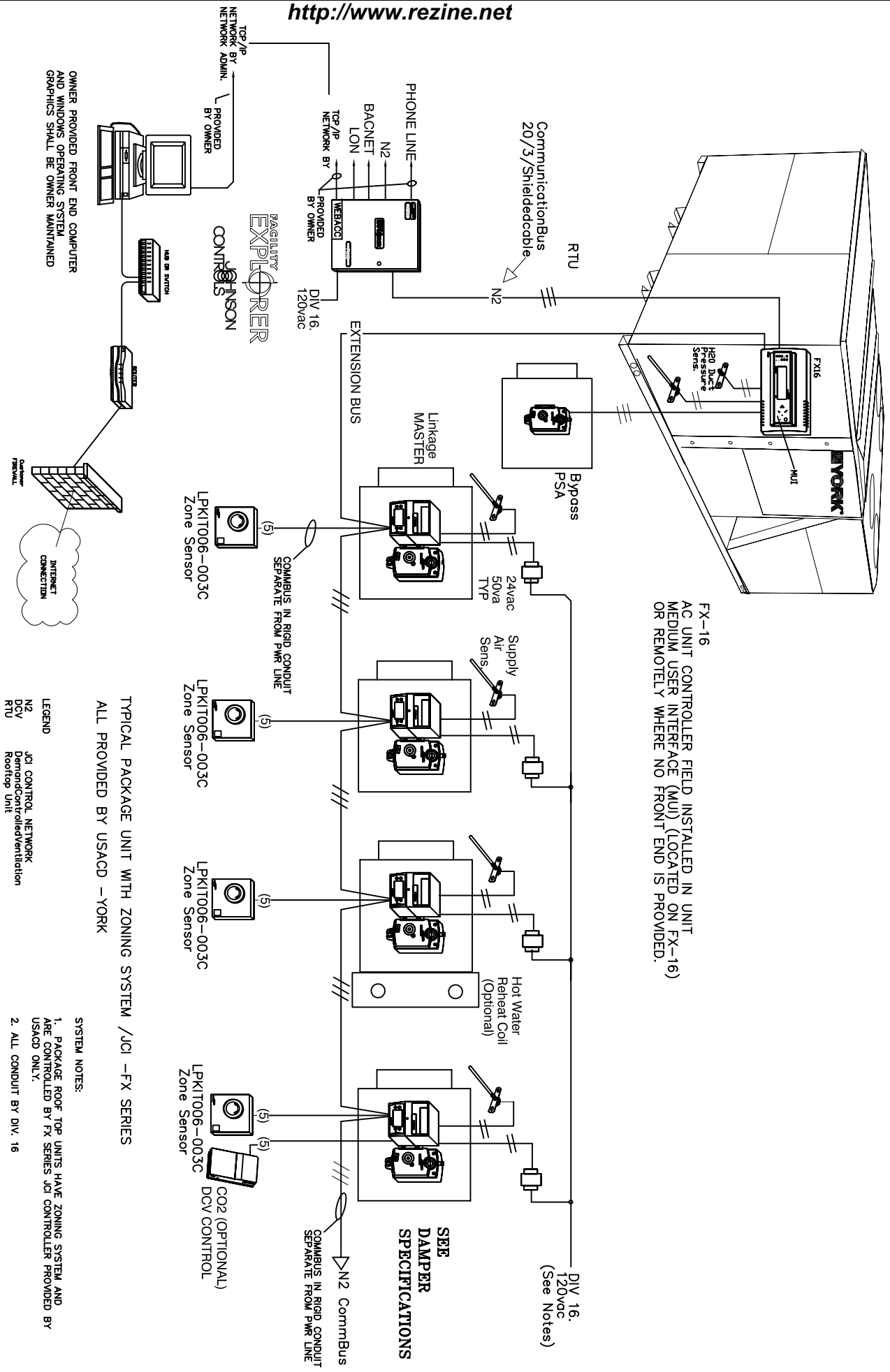
Easy Installation

Several pieces of the Facility Explorer Commercial Zoning Package can be ordered pre-assembled from the factory to simplify installation:

- Zone Controller and Actuator Assembly (FXZAN)
 - The FX05 Field Controller is combined with an M9104AGA non-spring return actuator and an electrical termination wiring block, all in one packaged assembly
 - Perfect for retrofit installations where the zone damper is already installed
- Zone Controller, Actuator, and Damper Assembly
 - FXZAN Zone Controller and Actuator Assembly is combined with a round or rectangular zone damper
 - Perfect for new installations or for retrofit installations where the zone damper has not yet been installed

- Bypass Damper and Actuator Assembly
 - A round or rectangular bypass damper is combined with an M910xHGA non-spring return actuator
- FX16 Master Controller with Pre-Downloaded Zoning Application
 - FX16 Master Controller can be ordered with the commercial zoning application pre-downloaded
 - Once installed, the FX16 takes care of downloading the corresponding parts of the zoning application to each of the zone controllers
 - Eliminates the downloading steps from the field installation and startup
 - This provides the possibility (with an onsite Medium User Interface) to download, configure and commission the entire system, including the rooftop, bypass, and all zone controllers without any software tool





FX-16
AC UNIT CONTROLLER FIELD INSTALLED IN UNIT
MEDIUM USER INTERFACE (MUI) (LOCATED ON FX-16)
OR REMOTELY WHERE NO FRONT END IS PROVIDED.

TYPICAL PACKAGE UNIT WITH ZONING SYSTEM / JCI - FX SERIES
ALL PROVIDED BY USACD - YORK

LEGEND
N2 DCV JCI CONTROL NETWORK
RTU DemandControlledVentilation Rooftop Unit

SYSTEM NOTES:
1. PACKAGE ROOF TOP UNITS HAVE ZONING SYSTEM AND ARE CONTROLLED BY FX SERIES JCI CONTROLLER PROVIDED BY USACD ONLY.
2. ALL CONDUIT BY DIV. 16
3. ALL LOW VOLTAGE WIRING BY CONTROL CONTRACTOR.
4. ALL 120V TO ZONE DAMPERS AND CONTROL DEVICES SHALL BE BY DIV.16
5. ALL SENSORS AND TRANSFORMERS PROVIDED BY CONTROL CONTRACTOR.

TYPICAL ZONING SYSTEM-FX CONTROLS

SCALE: NONE

OWNER PROVIDED FRONT END COMPUTER AND WINDOWS OPERATING SYSTEM GRAPHICS SHALL BE OWNER MAINTAINED

FACILITY EXPLORER
JCI
CONTROLS

SEE DAMPER SPECIFICATIONS

TSS – Single Duct Variable Air Volume Terminal



- An integrated VAV box with direct digital controls eliminates the coordination and difficulties associated with factory mounting
- Downloading of software, setting of parameters, addressing and testing at the factory reduces startup time and lowers risk
- Superior flow measuring provides for lower minimum cubic feet per minute (CFM) values, which reduces energy costs and noise while maintaining comforts in the zone
- Installation time can be reduced with the low profile compact design and standard metal hanging straps
- Units wired in compliance with all applicable National Electrical Code (NEC) requirements and tested in accordance with Air Conditioning and Refrigeration Institute (ARI) standard 880
- Offers damper stall detection, starved box detection, actuator motor duty cycle, VAV box flow test, and other diagnostics on most models (VMA Series)

TSS Terminals provide Variable Air Volume (VAV) control beyond the typical single duct box. They are specifically designed for precise air delivery throughout the entire operating range, regardless of the installed inlet conditions. These units can be ordered with or without a Direct Digital Controller (DDC), which can operate as a stand-alone unit, on a Johnson Controls N2 trunk, or on a LON® trunk.

TSS Terminals take advantage of typical benefits provided by single duct units, while performing at extremely low sound levels. This is critical in today's buildings where occupants are placing more emphasis on indoor acoustics. The TSS Terminal is manufactured and assembled with a multi-point, center-averaging airflow sensor, which provides a signal to the controller enabling it to quietly and precisely measure airflow.

Bundled with the TSS Terminal is a digital controller from the VAV Modular Assembly (VMA) Series or the LN Series. Each model in the VMA1400 Series and the LN Series combines a controller, pressure sensor, and actuator housed in one pre-assembled unit.

Standard Features

Construction

- ARI 880 certified and labeled
- 22-gauge galvanized steel casing and valve
- G90 galvanized steel
- 1/2", 4lb/ft³ skin, dual density fiberglass insulation, glued and clinch-pinned in place

Hot Water Coils

- ARI 410 certified and labeled
- 1-, 2-, 3-, 4-row coils
- Tested at a minimum of 350 psig under water
- Mechanically expanded copper tubes leak tested to 350 psig air pressure
- Male sweat type water connections

Primary Air Valve

- Embossed rigidity rings
- Low-thermal conducting damper shaft with position indicator
- Mechanical stops for open and closed position
- Multi-point center-averaging airflow sensor
- Brass balancing tees
- Plenum-rated sensor tubing

Electrical Components

- cETL listed for safety compliance
- National Electrical Manufacturers Association (NEMA) Type 1 wiring enclosure

Electric Heat

- ETL listed as an assembly for safety compliance
- Integral electric heat assembly
- Automatic reset primary and back-up secondary thermal limits
- Single-point power connection
- Hinged electrical enclosure
- Fusing per NEC
- Airflow switch
- Ni-chrome elements
- Primary/Secondary power terminations
- Wiring diagram

Optional Features

Construction

- 20-gauge galvanized steel construction
- 3/4" or 1" fiberglass insulation
- Scrim-reinforced, foil-faced insulation meeting American Society for Testing and Materials (ASTM) C1136 for mold, mildew, and humidity resistance
- 1/2" Elastomeric closed-cell foam insulation
- Double wall construction with 22-gauge liner
- Mounting brackets to accept all-thread hanging rods or wire hangers
- Low temperature construction for use in thermal storage applications, including a thermally isolated primary air inlet and a composite damper shaft

Hot Water Coils

- Low pressure steam coils
- Multi-circuit coils for reduced water pressure drop
- Opposite hand water connections
- Bottom and top access plates for cleaning

Electrical Components

- Full unit toggle disconnect and inline motor fusing
- Primary and secondary transformer fusing

Electric Heat

- Proportional solid state relay (SSR) heater control
- Mercury contactors
- Door interlocking disconnect switches
- Disconnect (toggle or door interlocking)
- Pneumatic Electric (PE) switches
- Mercury and magnetic contactors
- Manual reset secondary limit
- 24 volt control transformer
- Special watt densities
- Finned tubular elements

Controls

- Factory-provided controls
- Direct digital controls (DDC) for N2 or LON® networks
- Pneumatic controls

TSL – Single Duct Low Height Variable Air Volume Terminal



- An integrated VAV box with direct digital controls eliminates the coordination and difficulties associated with factory mounting
- Downloading of software, setting of parameters, addressing and testing at the factory reduces startup time and lowers risk
- Superior flow measuring provides for lower minimum cubic feet per minute (CFM) values, which reduces energy costs and noise while maintaining comforts in the zone
- Installation time can be reduced with the low profile compact design and standard metal hanging straps
- Units wired in compliance with all applicable National Electrical Code (NEC) requirements and tested in accordance with Air Conditioning and Refrigeration Institute (ARI) standard 880

TSL Terminals provide variable air volume (VAV) control beyond the typical single duct box. They are specifically designed for precise air delivery throughout the entire operating range and are only 10" in height, making them ideal for shallow or congested ceiling plenum applications. These units can be ordered with or without a Direct Digital Controller (DDC), which can operate as a stand-alone unit, on a Johnson Controls N2 trunk, or on a LON® trunk.

TSL Terminals take advantage of typical benefits provided by single duct units, while performing at extremely low sound levels. This is critical in today's buildings where occupants are placing more emphasis on indoor acoustics. The TSS Terminal is manufactured and assembled with a multi-point, center-averaging airflow sensor, which provides a signal to the controller enabling it to quietly and precisely measure airflow.

Bundled with the TSL Terminal is a digital controller from the VAV Modular Assembly (VMA) Series or the LN Series. Each model in the VMA1400 Series and the LN Series combines a controller, pressure sensor, and actuator housed in one pre-assembled unit.

Standard Features

Construction

- ARI 880 certified and labeled
- 20-gauge, galvanized steel casing and valve
- G90 galvanized steel construction
- 1/2", 4 lb/ft³ skin, dual density fiberglass insulation glued and clinch pinned
- Invertible unit facilitates control installation on the left- or right-hand side

Hot Water Coils

- ARI 410 certified and labeled
- 1-, 2-, 3-, 4-row coils
- Left- or right-hand connections
- Tested at a minimum of 450 psig under water and rated at 300 psig working pressure at 200°F
- Aluminum fin construction with die-formed spacer collars for uniform spacing
- Mechanically expanded copper tubes leak tested to 450 psig air pressure and rated at 300 psig working pressure at 200°F
- Male sweat type water connections

Primary Air Valve

- 18-gauge, G90 galvanized steel construction
- Low thermal conductance damper shaft
- Position indicator on external end of damper shaft
- Mechanical stops for open and closed position
- Multi-point center-averaging airflow sensor
- Brass balancing tees
- Plenum-rated sensor tubing

Electrical Components

- cETL listed for safety compliance with Underwriters Laboratories Inc.® (UL) 1995
- National Electrical Manufacturers Association (NEMA) Type 1 wiring enclosure

Electric Heat

- Invertible unit facilitates control installation on the left- or right-hand side (not applicable if equipped with a mercury contactor)
- cETL listed as an assembly for safety compliance
- Automatic reset primary and back-up secondary thermal limits
- Primary auto-reset high limit

- Secondary high limit
- Airflow switch
- Single-point power connection
- Hinged electrical enclosure door
- Fusing per NEC

Optional Features

Construction

- Scrim-reinforced, foil-faced insulation meeting American Society for Testing and Materials (ASTM) C1136 for mold, mildew, and humidity resistance
- 1/2" Elastomeric closed-cell foam insulation
- Double wall construction with a 22-gauge liner
- Mounting brackets to accept all thread hanging rods or wire hangers
- Discharge sound attenuator (Model TSL-SA)

Hot Water Coil

- Coil access plate for cleaning coil
- Coil circuiting options for reduced water pressure drop
- Right- or left-hand water connections
- Bottom and top access plates for cleaning
- Steam coils

Electrical Components

- Toggle disconnect switch
- Primary and secondary transformer fusing

Electric Heat

- Proportional solid state relay (SSR) heater control
- Mercury contactors (if equipped with a mercury contactor, the unit cannot be inverted)
- Door interlocking disconnect switches
- Disconnect (toggle or door interlocking)
- Pneumatic Electric (PE) switches
- Mercury and magnetic contactors
- Manual reset secondary limit

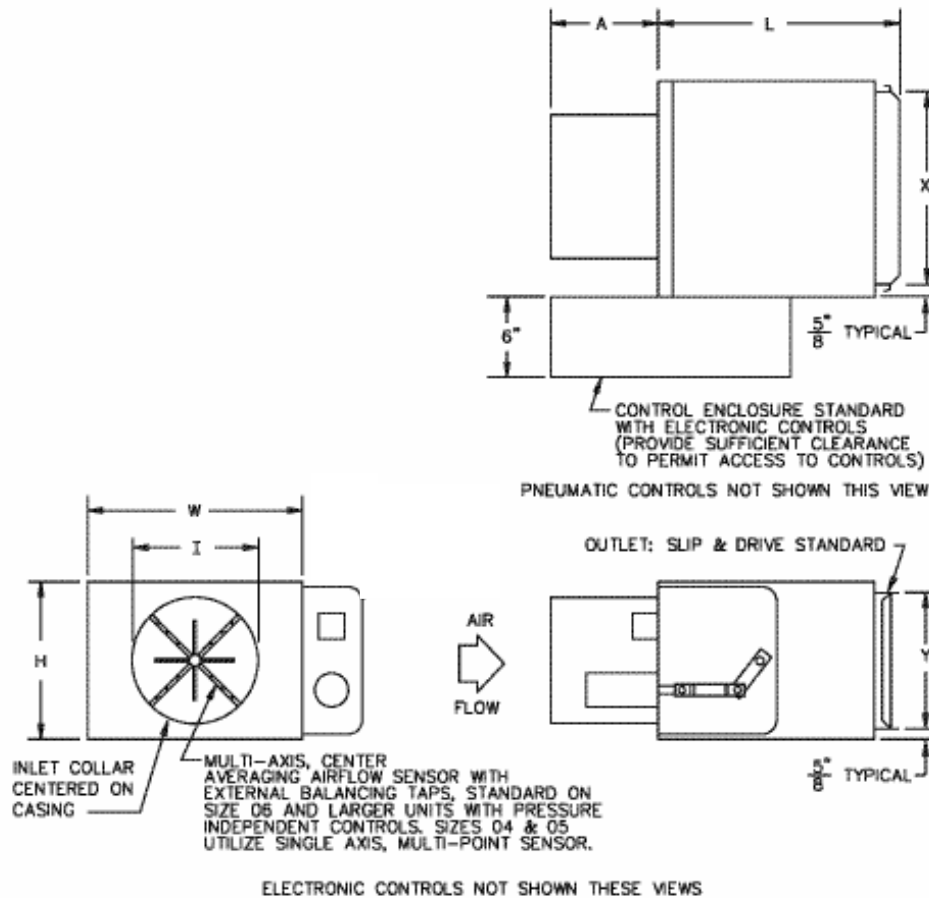
Controls

- Factory-provided controls
- Direct Digital Controls (DDC), for N2 or LON® networks
- Pneumatic controls

Single Duct Variable Air Volume Terminal (Model TSS)

| Unit Size | CFM | Bypass CFM | Weight | Dimensions | | | | |
|-----------|------|------------|--------|---------------------|--------|-------------------|---------|---------|
| | | | | W x H x L | A | I | X | Y |
| 6 | 200 | 300 | 18 | 10" x 10" x 11" | 6 1/2" | 5 7/8" | 8 3/4" | 8 3/4" |
| 8 | 400 | 600 | 20 | 12" x 10" x 11" | 6 1/2" | 7 7/8" | 10 3/4" | 8 3/4" |
| 10 | 600 | 900 | 25 | 14" x 12.5" x 13" | 6 1/2" | 9 7/8" | 12 3/4" | 11 1/4" |
| 12 | 800 | 1200 | 30 | 16" x 15" x 13" | 6 1/2" | 11 7/8" | 14 3/4" | 13 3/4" |
| 14 | 1100 | 1800 | 38 | 20" x 17.5" x 17.5" | 6 1/2" | 13 7/8" | 18 3/4" | 16 1/4" |
| 16 | 1500 | 2200 | 42 | 24" x 17.5" x 17.5" | 6 1/2" | 15 7/8" | 22 3/4" | 16 1/4" |
| 22 | 3000 | 5400 | 72 | 34" x 17.5" x 11" | 8" | 32 1/4" x 15 7/8" | 32 3/4" | 16 1/4" |

Note: All dimensions are in inches with a tolerance of +1/8". Size 22 has a rectangular inlet collar. CFM based on 1000 FPM (Bypass 1500 FPM) for low to medium pressure applications.



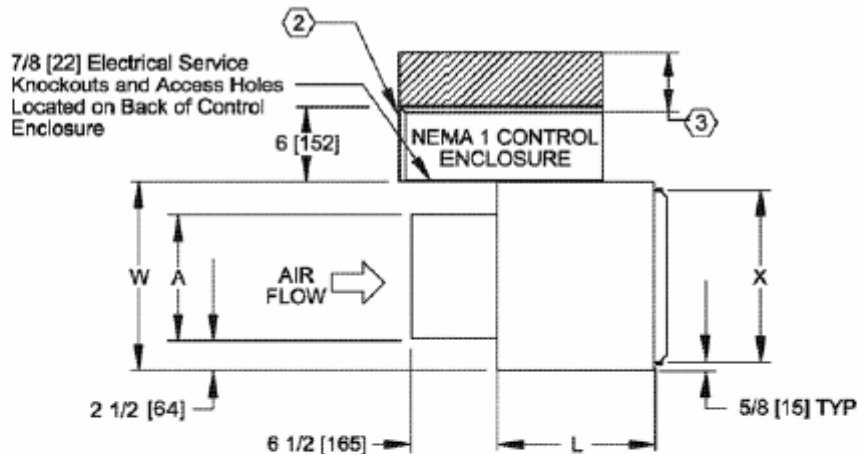
Clearance 24"

Dimensions – Model TSS

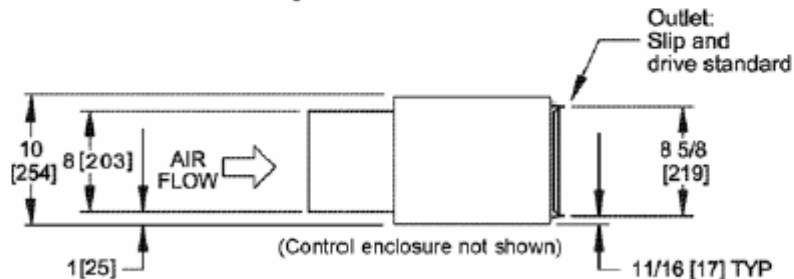
Single Duct Variable Air Volume Terminal - Rectangular (Model TSL)

| Unit Size | CFM | Bypass CFM | Dimensions | | | | Weight |
|-----------|------|------------|------------|-----|---------|---------|--------|
| | | | A | W | L | X | |
| 10 | 600 | 1200 | 10" | 15" | 12 1/2" | 13 3/4" | 26 |
| 12 | 800 | 1600 | 14" | 19" | 12 1/2" | 17 3/4" | 28 |
| 14 | 1200 | 2200 | 20" | 25" | 16 1/2" | 23 3/4" | 39 |
| 16 | 1500 | 3000 | 26" | 31" | 16 1/2" | 29 3/4" | 45 |

Notes: 1. For dimensional data for unit sizes 6 and 8, refer to the Single Duct Variable Air Volume Terminal (Model TSS). All dimensions are in inches with a tolerance of +1/8". Weights are in pounds. Weights are for the basic unit with the indicated option and control enclosure. Actual weight varies based on project-specific requirements for unit options, appurtenances, and controls. 2. Control enclosure is standard with factory-mounted electronic controls. 3. Check all national and local codes for required clearances.

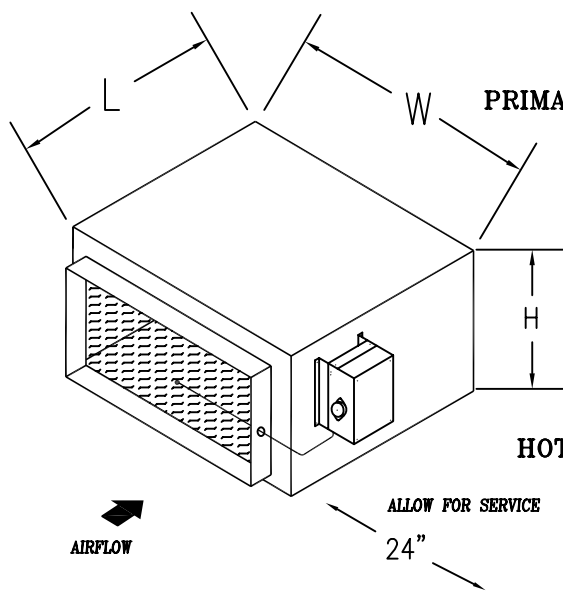


Top View



Side View

Dimensions – Model TSL



CASING: Minimum 22 gauge galvanized steel reinforced for maximum rigidity and minimum leakage. Units complete with a minimum of 1 inch to 1 1/2 inch density insulation in accordance with NFPR-90

PRIMARY AIR VALVE: Constructed of welded steel channel frame with 18 gauge galvanized steel blades, die formed stiffeners are full blade stop. Stainless steel side seals standard along with blade seals to minimize leakage. All hardware is zinc plated with brass pivot points and bronze oilite bearings.

ACTUATOR: Electronic, manufactured by JCI (FX SERIES),

HOT WATER COIL: Add 4 1/2 inches to airway length for 1 or 2 rows, 1/2 inch SW connection.

NOTES: 1. Dampers may be mounted in any position.
2. Bypass dampers are sized for 100% bypass relief. (see bypass damper selection chart)

| 35PSA ZONE/BYPASS DAMPER | | | | | | | |
|--------------------------|----------|------------|--------------|----|----|----|-------|
| MODEL NUMBER | ZONE CFM | BYPASS CFM | INLET + 1/4" | H | W | L | (lbs) |
| PSA-06-006 | 600 | 1000 | 10 X 9 | 12 | 11 | 13 | 17 |
| PSA-08-010 | 1000 | 2000 | 16 X 10 | 12 | 18 | 13 | 23 |
| PSA-10-016 | 1000 | 2000 | 16 X 10 | 12 | 18 | 13 | 23 |
| PSA-12-022 | 1500 | 2500 | 16 X 10 | 12 | 18 | 13 | 23 |
| PSA-14-028 | 2000 | 4000 | 29 X 10 | 12 | 31 | 13 | 38 |
| PSA-16-035 | 2000 | 4000 | 29 X 10 | 12 | 31 | 13 | 38 |
| PSA-18-050 | 3000 | 6000 | 26 X 16 | 18 | 28 | 22 | 45 |
| PSA-20-065 | 4000 | 8000 | 32 X 16 | 18 | 34 | 22 | 51 |
| PSA-24-100 | 5000 | 10000 | 40 X 16 | 18 | 42 | 22 | 63 |

*ZONE CFM BASED ON 1000 FPM

*BYPASS CFM BASED ON 2000 FPM

SIZE TO 100% OF UNIT AIRFLOW (MANF. RECOMMENDED)

*PROVIDED BY USACD-YORK

ADDITIONAL DAMPER
SPECIFICATIONS – 35PSA (RECTANGULAR)

SCALE: NONE

STERIL-AIRE®

UVC for HVAC™

Model SE Series UVC Emitters™

Single-Ended, Very High
Output Germicidal Light
Source for HVAC Systems

needed to maintain microbial control. The UVC Emitter, by contrast, has a 12-month service life – and even after a full year, it has 2-1/2 times greater output than competitive devices deliver on Day 1! As a result, only Steril-Aire can ensure the germicidal performance you need, with no return of microbial growth, for 3-4 times longer than the competition.



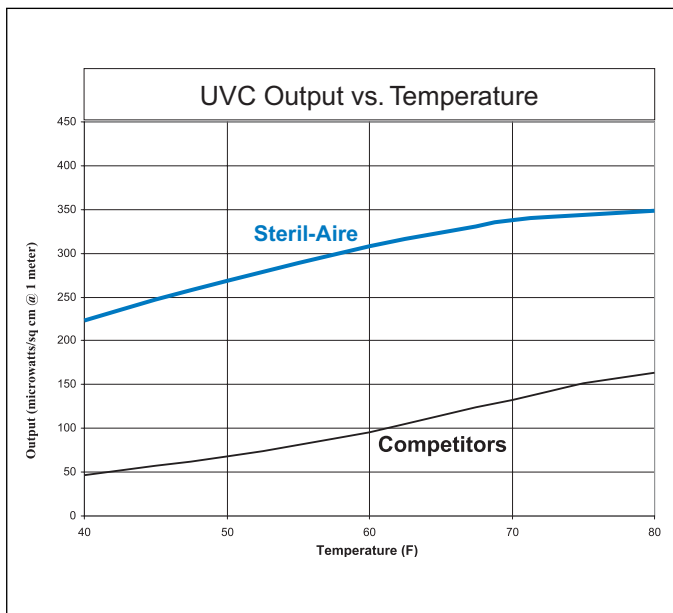
Applications

Steril-Aire Single-Ended (SE Series) fixtures install from the exterior of HVAC equipment, making them ideal for germicidal sites that are difficult to access. They are easily installed by making a one-inch hole in the equipment wall and/or duct, and then simply mounting the fixture to the unit exterior. Only the lamp or tube penetrates into the system, while the power supply remains external. Choose from six tube lengths (16", 20", 24", 30", 36" and 42") and four voltage options (115, 208, 230 or 277 Vac) to fit most applications, including:

- Fan coils, heat pumps, unit ventilators, terminal units and ductwork.

Benefits

- Kills or inactivates surface and airborne microorganisms that contribute to poor IAQ and/or the spread of infectious disease, including: mold and mold spores, bacteria (*including TB, Legionella, E. coli, Listeria, salmonella and whooping cough*); and viruses (*including colds, flu, measles*).
- Delivers an average of 5 times the output of competitive UVC products at HVAC operating temperatures, for 3-4 times longer life and more reliable germicidal control.
- Uses patented state-of-the-art solid-state electronic power supply for enhanced reliability and performance.
- Continuously cleans coils, drain pans, plenums and ducts, eliminating costly cleaning programs and the use of harmful chemicals and disinfectants.
- Lowers HVAC energy costs by restoring heat transfer and net cooling capacity.
- Produces no ozone or other secondary contaminants – will not harm building occupants, equipment or furnishings.
- Offers lowest life-cycle cost of any UVC product. Return on investment is often less than one year.
- Installs quickly and easily, with no need to open equipment – ideal for small systems and/or ducts.



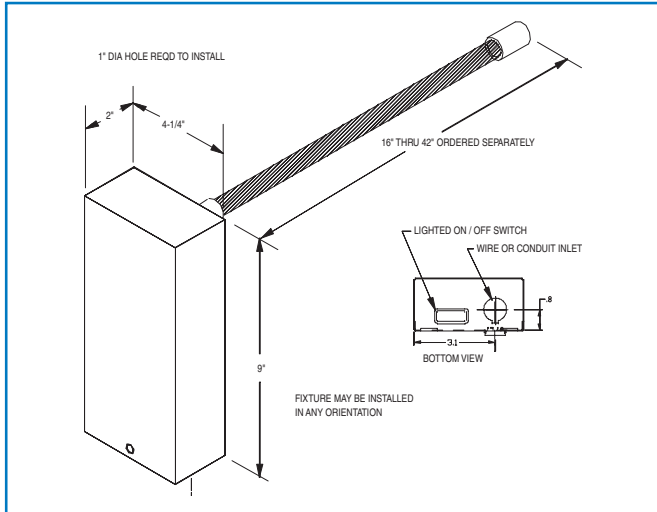
Steril-Aire's multi-patented UVC Emitter™ provides the best and longest-lasting UVC performance available. As shown in the comparison graph (*above*), it has been independently tested to deliver an average of 5 times the output of other ultraviolet devices under HVAC operating conditions (45° F @ 550 fpm air velocity).

Competitive UVC lights must be changed every 3-4 months because they quickly lose the output or "killing power"

Model SE Specifications

The UVC Emitter™ and fixture shall be factory assembled and tested. They shall consist of a housing, power source, Emitter socket and Emitter.

The housing shall be constructed of 304 stainless steel to withstand HVAC environments and shall be equipped with a 1/2" electrical conduit opening to facilitate wiring. All components shall be



This product may be covered by one or more of the following patents, others pending: 5,334,347/ 5,866,076/ 5,817,276/ 6,372,186/ 6,313,470/ 6,245,293/ 6,267,924/ 6,280,686/ 6,423,882.

incorporated into one integral assembly that maximizes serviceability. It shall be designed for mounting from outside the airstream with only the Emitter in the conditioned air. Emitter shall be held in place and supported in the airstream by a patented integral collar, o-ring and heavy-duty spring wire fastener. The housing shall include an on-off switch and an indicator light to verify unit function.

The power supply shall be a Class P2, electronic rapid start type with a power factor of >0.95 and a power conversion of >75%. It shall be available in 115-208/230 or 277 Vac, 50/60 Hertz, and single phase. It shall be designed to maximize photon production, irradiance and reliability in cold or moving airstreams of 35-170° F, 100% RH and up to 2000 fpm. The design shall include RF and EMI suppression.

The socket shall be a Circline® 4 pin type with sufficient wire length to facilitate service.

The Emitter shall be a very high output, hot cathode, T5 diameter, Circline® cell-base type that produces a UVC band of 250-260 nm. Each tube shall be capable of producing the specified output at up to 2000 fpm velocity and temperatures of 35-170° F. It shall produce no ozone or other secondary contaminants.

Independent testing: The unit shall be tested by an independent test laboratory in accordance with the general provisions of IES Lighting Handbook, 1981 Applications Volume, and shall be verified through independent testing to provide output per 1" arc length of not less than 10 µW/cm² at 1 meter in a 400 fpm airstream of 45° F.

Unit shall comply with UL Standard 1995 for use in HVAC equipment and shall carry the "UL" and "ULC" labels.

Ordering Information

| Model No. | Part No. | Description | Length | Electrical | Weight |
|-----------|----------|----------------------|--------|-----------------------------|----------|
| SE 1 VO | 11001900 | Single-Ended Fixture | N/A | 115, 208, 230V: 70-85 watts | 3.0 lb. |
| SE 1 VO | 11002100 | Single-Ended Fixture | N/A | 277V: 70-85 watts | 3.0 lb. |
| GTS 16 VO | 21000100 | UVC Emitter | 16" | N/A | 0.15 lb. |
| GTS 20 VO | 21000200 | UVC Emitter | 20" | N/A | 0.15 lb. |
| GTS 24 VO | 21000300 | UVC Emitter | 24" | N/A | 0.20 lb. |
| GTS 30 VO | 21000400 | UVC Emitter | 30" | N/A | 0.20 lb. |
| GTS 36 VO | 21000500 | UVC Emitter | 36" | N/A | 0.25 lb. |
| GTS 42 VO | 21000600 | UVC Emitter | 42" | N/A | 0.25 lb. |

STERIL-AIRE®

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 Email: sales@steril-aire.com



Complies with current U.S. and Canadian UL Standards for use in HVAC equipment.

Represented By: