**Price Linear Fan Terminal**

#  Division 23 – Heating, Ventilating, and Air Conditioning Section

#  23 36 16 – Variable Air Volume Units

The following specification is for a defined application. Price would be pleased to assist in developing a specification for your specific need.

**PART 1 – GENERAL**

* 1. **Summary**
1. This section includes the following:
2. Linear Fan Terminal

**1.02 Related Documents**

1. Section 01 30 00 – Administrative Requirements
2. Section 01 40 00 – Quality Requirements
3. Section 01 60 00 – Product Requirements
4. Section 01 74 19 – Construction/Demolition Waste Management and Disposal
5. Section 01 78 00 – Closeout Submittals
6. Section 01 79 00 – Demonstration and Training
7. Section 23 30 00 – HVAC Air Distribution
8. Section 23 32 00 – Air Plenums and Chases
	1. **Reference Standards**
9. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
10. ASHRAE Standard 62.1 – Standards for Ventilation and Indoor Air Quality
11. ASHRAE Standard 70 – Method of Testing the Performance of Air Outlets and Air Inlets
12. IEC 60335 – International Standard for Household and Similar Electrical Appliances - Safety
13. NFPA Standard 70A, Article 100 – National Electrical Code
14. RoHS 3 – Restriction of Hazardous Substances in Electrical and Electronic Equipment
15. UL 900 – Standard for Air Filter Units
16. UL 1995 – UL Standard for Heating and Cooling Equipment

**1.04 Administrative Requirements**

A. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

**1.05 Submittals**

1. Product Data:
	1. Provide data indicating configuration, general assembly, materials used in fabrication, rated capacities, and furnished specialties and accessories.
	2. Include drawings indicating size, profiles and dimensional requirements of the linear floor grilles that are based on the specific system indicated.
	3. Include catalog performance ratings that indicate airflow volume, initial pressure drops, sound performance, and throw, as tested in accordance with ASHRAE 70.
2. Shop Drawings: For each type of product indicated, include the following:

1. Equipment assemblies and indicated dimensions.

2. Required clearances.

3. Method of field assembly.

4. Revit models.

1. Coordination Drawings: Include floor plans, and other details, drawn to scale, one which the following items are shown and coordinated with each other, based on input from installers of the items involved:
	1. Floor or underfloor-mounted items including;
		1. Floor structure (floor tiles, concrete, etc.)
		2. Floor finishing (carpet, tile, etc.)
		3. Access panels
		4. Electrical components
		5. Plumbing
		6. Networking components
		7. Terminal Units and other HVAC components
2. Operation and Maintenance Data: Include manufacturer’s descriptive literature, operating instructions, maintenance schedules and repair data, and parts lists.

**1.06 Quality Assurance**

1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.
2. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
3. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

**1.07 Warranty**

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 18 month manufacturer warranty from date of shipment for grilles and registers.

**PART 2 – PRODUCTS**

**2.01 General**

1. Basis of Design: Price Industries, Inc.
2. Linear Fan Terminal [Price Model LFT]
3. General Product Information:
4. Furnish and install Price model LFT of the sizes and capacities indicated on the drawings or outlet schedule.
5. Unit sizes shall be selected in accordance with ASHRAE guidelines and manufacturer’s literature.
6. Manufacturers shall demonstrate that they have successfully supplied and installed underfloor HVAC products, as well as the computer modeling thereof for a minimum of 10 years.
7. Manufacturers must be pre-qualified to bid based on the completion of a minimum of [xx] jobs in similar climates.
8. Manufacturers shall provide a list of completed jobs and references.
9. Underfloor Air System Controls:
	1. Air Grilles and diffusers specified for underfloor service shall incorporate the following requirements:
		1. Airflow and throw heights shall decrease in response to lower space demands with flow-modulation of constant temperature plenum air. The flow-modulation technique shall be implemented to maximize stratification, leading to energy savings and increased thermal comfort.
	2. CFLEX cable:
		1. Plug-and-play purple plenum rated cables with RJ45 connectors shall be used between devices.
		2. The cable shall be constructed of eight (8) individually insulated wires wrapped in an insulated jacket.
		3. The cables shall carry the fan speed and valve modulation control signals to each LFT.
		4. Cable types shall be limited to no more than one type and connector per device to reduce complexity in wiring and future modifications
		5. The cable shall be 15, 25, or 35 feet in length.
	3. **Linear Fan Terminal**
10. Description:
	1. Furnish and install Price model LFT (L x W x H) with the sizes, configurations and capacities indicated on the plans and air outlet schedule.
11. Performance:
	1. The manufacturer of the linear fan terminal shall provide performance data for air volume, initial pressure drop, and heating and cooling element performance.
	2. Performance data published should be collected from testing completed for in floor applications that represent the intended application. Bare heating element data not tested within the convective trough should not be considered.
	3. Air shall be delivered to the space without the use of nozzles.
	4. All data must be tested in accordance with the most recent publication of ASHRAE 70.
12. Construction:
	1. The plenum shall be constructed of minimum 18 gauge steel.
	2. The LFT shall be ETL certified.
	3. The plenum style shall be [select one]:
		1. [F] – Flanged – order with 1000 style LFG
		2. [NF] – Non-flanged – order with 125/187 style LFG
		3. [FL] – Flared – order with RFG
	4. The LFT shall be supplied complete with two modular jacks for system connections and modular CFLEX cable.
	5. The plenum shall be [floor tile] or [pedestal] supported or supported by [leveling feet].
	6. Removable end caps for continuous LFG and RFG integration.
	7. Plenum to be provided with a plenum extrusion for the [FL] type selection.
	8. The LFT shall be equipped with side knockouts.
	9. The LFT shall be equipped with a drain or drip pan.
	10. The LFT can be controlled by either Price supplied T-stats or BACnet.
13. Controls:
	1. The LFT controls shall be supplied by [select one]:
		1. [EHP] – Controls by Price
			1. [INT] - All Controls Components Internal of Plenum
			2. [EXT] - Controls in External Remote Enclosure (Daisy Chain drone LFTs to single remote controls enclosure)
				1. Number of daisy chained drone LFT is determined based on power supply size within the remote enclosure
				2. Power connection is hardwired through terminal block connection between remote enclosure and drone LFTs with appropriately sized cable (cable is provided by others).
		2. [FLD] – Field mounted controls by others
			1. [INT] - All Controls Components Internal of Plenum
			2. [EXT]- Controls in External Remote Enclosure (Daisy Chain drone LFTs to single remote controls enclosure)
				1. Number of daisy chained drone LFT is determined based on power supply size within the remote enclosure
				2. Power connection is hardwired through terminal block connection between remote enclosure and drone LFTs with appropriately sized cable (cable is provided by others).
		3. [FAC] – Controls supplied by others – factory mounted by Price
			1. [INT] - All Controls Components Internal of Plenum
			2. [EXT]- Controls in External Remote Enclosure (Daisy Chain drone LFTs to single remote controls enclosure)
				1. Number of daisy chained drone LFT is determined based on power supply size within the remote enclosure
				2. Power connection is hardwired through terminal block connection between remote enclosure and drone LFTs with appropriately sized cable (cable is provided by others).
14. Thermostat for [EHP] only [select one]:
	1. [SENS] – Blank Face Thermostat
	2. [DIAL] – Dial Set-Point Thermostat
	3. [LCD] – LCD Thermostat
	4. [MOT] – LCD with Motion Sensor Thermostat
	5. [CO2H] – LCD with CO2 and Humidity Monitoring Thermostat
15. Heating and Cooling coils:
	1. The unit shall be supplied with a hydronic coil of the configurations described below [select one]:
		1. 2 pipe coils
			1. The coils shall be offered in [2] or [4] rows
		2. 4 pipe coils
			1. The coils shall be offered in [3] rows
		3. The heaters comes with the option of [MPT] – Threaded connection or [SWT] - Sweat connection styles
	2. All standard coils are 12 FPI.
	3. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin.
	4. All coils shall be hydrostatically tested at 390 pounds per square inch minimum air pressure and rated for a maximum of 300 pounds per square inch working pressure at 200 degrees Fahrenheit.
16. Drain pans:
	1. All 6.125” – 7.625” tall LFT units with cooling coils shall be supplied with a primary drain pan with single wall, stainless steel for corrosion resistance.
	2. The drain pan shall extend under the entire length and width of the coil.
	3. Drain pans shall be of ¾” tall, one-piece construction and shall be connected with a 3/8” drain pipe.
	4. The drain pans shall be positively sloped for condensate removal as per ASHRAE 62.1.
17. Drip pan
	1. All 4.000” – 5.500” tall LFT units with cooling coils shall be supplied with a primary drip pan with single wall, stainless steel for corrosion resistance.
	2. The drip pan shall extend under the entire length and width of the coil.
	3. Drip pans shall be of ¼” tall, one-piece construction and shall not have a drain pipe.
	4. The drip pans shall not be sloped.
18. EC Fan:
	1. The LFT shall be equipped one (1), two (2) or three (3) fans based on the length selection.
	2. The fan motor and motor shaft shall be directly connected to the fan.
	3. The fan motor shall be low voltage 24VDC.
	4. The fan motor will accept a 0-10V control signal.
	5. Fans shall be provided with a protective fan grate.
19. Mounting/Fastening:
	1. Floor tile supported units shall be supplied with a 1/2-inch flange on all sides.
	2. Pedestal supported units shall be supplied with 16 GA pedestal support brackets attached to the units.
	3. Leveling feet could be used in trench applications for flat placement of the unit. Increases unit height by minimum ½”, maximum 1 ½”.
	4. Support pedestals shall be positioned without the use of tools.
	5. Pedestal and pedestal heads shall be provided by others.
20. Electrical Requirements:
	1. The unit equipment wiring shall comply with the requirements of NFPA 70.
	2. The units shall be ETL listed and compliant with IEC 60335, UL1995, and CSA C22.2#236.
	3. All high voltage electrical components shall be enclosed in a single control box.
21. Finish:
	1. The plenum shall be finished in black powder coat.
	2. Mill finish stainless steel drip and drain pan.
	3. [FL] Flared plenum comes with a plenum extrusion with the extrusion finish to match the RFG finish selected (RFG ordered separate).
22. Options [select all that apply]:
	1. Unit Voltage
		1. 120V-1
		2. 208V-1
		3. 240V-1
		4. 277V-1
	2. Water Valve:
		1. 24 VAC binary and analog water valve actuator options available.
	3. Safety disconnect switch:
		1. Manually control the power supply to the unit.
	4. Overflow Protection [OFS]
		1. LFT can be equipped with an optional overflow safety flow switch mounted on the drain pan.
	5. Fan Filter:
		1. 30 PPI foam air filter.
		2. Shall comply with UL 900 and RoHS 3.
		3. Washable.
		4. Shall be securely attached to the fan grate.

# PART 3 - EXECUTION

##  Examination

## Verify that conditions are suitable for installation.

## Verify that field measurements are as shown on the drawings.

##  Installation

## Install the units in accordance with the manufacturer's instructions.

## Install underfloor fan powered units level and plumb. Maintain sufficient clearance for normal services, maintenance, or in accordance with construction drawings.

## Complete installation and startup checks according to manufacturer’s instructions and perform the following:

## Verify that inlet duct connections are as recommended by the manufacturer to achieve proper performance.

## Verify that any identification tags are visible.

## Verify locations of thermostats, humidistats, and other exposed control sensors with drawings and room details before installation.

## Adjusting

1. Ensure the damper operator attached to the assembly allows full modulation of flow range from 100 percent of design flow to zero.
	1. **Field Quality Control**
2. See Section 01 40 00 - Quality Requirements, for additional quality requirements.
	1. **Cleaning**
3. See Section 01 74 19 - Construction Waste Management and Disposal for additional cleaning requirements.

## 3.06 Closeout Activities

1. See Section 01 78 00 - Closeout Submittals for closeout submittals.
2. See Section 01 79 00 - Demonstration and Training for additional closeout requirements.