# Acutherm Pressure Independence Module

# Division 23 – Heating, Ventilating, and Air Conditioning

# Section 23 36 00 – Air Terminal Units

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

# PART 1 – GENERAL

## 1.01 Section Includes

* + 1. Pressure Independent Module.

## 1.02 Related Requirements

1. Section 23 09 93 - Sequence of Operations for HVAC Controls.
2. Section 23 31 00 - HVAC Ducts and Casings.
3. Section 23 33 00 - Air Duct Accessories.
4. Section 23 37 00 - Air Outlets and Inlets.

## 1.03 Reference Standards

1. All referenced standards and recommended practices in this section pertain to the most recent publication thereof, including all addenda and errata.
2. NFPA 70 - National Electrical Code.
3. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.
4. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.
5. UL 94 – Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

## 1.04 Administrative Requirements

1. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section, and require attendance by all affected installers.
2. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

## 1.05 Submittals

1. See Section 01 30 00 - Administrative Requirements for submittal procedures.
2. Product data shall be provided with data indicating configuration, general assembly, and materials used in fabrication, including catalog performance ratings that indicate airflow, static pressure, NC designation, electrical characteristics, and connection requirements.
3. Shop drawings shall indicate configuration, general assembly, and materials used in fabrication, and electrical characteristics and connection requirements. The manufacturer shall include schedules listing discharge and radiated sound power level for each of second through seventh octave bands at inlet static pressures from 1 to 3 inch water gauge (**round only**).
4. Manufacturer's Installation Instructions shall indicate support and hanging details, installation instructions, recommendations, and service clearances required.
5. Project record documents shall record actual locations of units and controls components and locations of access doors.
6. Provide complete service and installation manual.
7. Manufacturer’s warranty shall be submitted and ensure forms have been completed in Owner's name and registered with manufacturer.
8. Maintenance materials shall be furnished for the Owner's use in maintenance of the project.

## 1.06 Quality Assurance

1. Manufacturer qualifications shall be specified in this section, with minimum ten years of documented experience.

## 1.07 Warranty

1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Provide 24 month manufacturer warranty from date of shipment for pressure independent modules.

## PART 2 – PRODUCTS

## 2.01 Pressure Independence Modules

1. Basis of Design: Acutherm
	* + 1. Pressure Independence Modules (PIM) with digital controls.
2. Construction:
	* + 1. The unit shall be constructed from:
				1. [Round PIM]: a minimum 22 gauge zinc-coated steel.
				2. [Square/Rectangular PIM]: a minimum 20 gauge zinc-coated steel.
			2. The damper shall be constructed from:
				1. [Round PIM]: a minimum 22 gauge, zinc-coated steel with polyethylene damper shaft bearings and damper gasket.
				2. [Square/Rectangular PIM]: a minimum 16 gauge, zinc-coated steel with bronze Oilite damper shaft bearings.
			3. The damper shaft shall be zinc-plated CRS.
			4. The controls enclosure shall be constructed from minimum 22 gauge, zinc-coated steel.
			5. The controls enclosure mounting bracket shall be zinc-coated steel.
			6. Air Leakage: The PIM air leakage rate with the damper in the full-closed position shall not exceed two percent of the nominal catalog rating at three inches water gauge inlet static pressure when tested in accordance with ASHRAE 130. (**applies to round PIM only**)
		1. Options:
			1. Transformer: (Optional)
				1. The PIM shall be supplied with a factory mounted [50 VA step-down] or [40 VA isolation] transformer.
			2. BACnet Interface: (Optional)
				1. The PIM shall be supplied with a native BACnet MS/TP interface.
		2. Electrical Requirements:
3. Pressure Independence Modules shall be provided with single-point power connection, and the equipment wiring shall comply with the requirements of NFPA 70.
	* 1. Controls:
			1. The Pressure Independence Modules shall be supplied with direct digital controls (DDC) with the following control sequence (**select one**):
				1. Bypass Control: The pressure independent module shall bypass the main air supply to a plenum or air handler return. The bypass shall open in response to rising static pressure to maintain constant supply air duct static pressure.
				2. Zone Control: The pressure independent module shall be supplied with a static pressure sensor for field mounting downstream of the PIM. The zone shall close in response to rising static pressure measured by the downstream pressure sensor to maintain constant pressure to the diffusers.

## PART 3 – EXECUTION

## 3.01 Examination

* + 1. Verify that conditions are suitable for installation.
		2. Verify that field measurements are as shown on the drawings.

## 3.02 Installation

* + 1. PIM with damper:
		2. Install in accordance with manufacturer's instructions.
		3. Install the inlets of the pressure independent modules and airflow sensors a minimum of three duct diameters from elbows, transitions, and duct takeoffs.
		4. See drawings for the size(s) and duct location(s) of the pressure independent modules.
		5. Provide ceiling access doors or locate units above easily removable ceiling components.
		6. Support units individually from the structure.
		7. Embed anchors in concrete in accordance with ASTM E488/E488M.
		8. Do not support from ductwork.
		9. Connect to ductwork in accordance with Section 23 31 00.
		10. Verify that electric power is available and of the correct characteristics.
		11. PIM - PIC Controller only:
		12. Install in accordance with manufacturer's instructions.
		13. Mount the controller on the duct with the damper shaft going through the controller actuator, and tighten the screws on the actuator.
		14. Secure the back end of the controller using the supplied anti-rotational bracket. Do not mount the anti-rotation bracket tightly to the controller casing – the intent is to allow the controller to move slightly to allow for variations on the damper shaft.
		15. Connect any of the controller’s outputs as required.
		16. When the output loads require a switched HOT or COMMON 24VAC signal, use the jumper near the FAN output to select HOT or COMMON inputs.
		17. Power the controller using 24VAC. The secondary 24VAC common of the transformer must be earth grounded.

## 3.03 Adjusting

* + 1. Ensure damper operator attached to the assembly allows full modulation of flow range from close to open.

## 3.04 Field Quality Control

* + 1. See Section 01 40 00 - Quality Requirements, for additional requirements.

## 3.05 Cleaning

1. 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.