

AUTOMATIC SASH POSITIONING SYSTEM

Section 15975

PART I – GENERAL

1.1 DESCRIPTION OF WORK

- A. Provide a laboratory fume hood **Automatic Sash Positioning Systems** including but not limited to active hood use sensors, pneumatic sash cable actuators, sash interference sensors, mode switches, push to open switch(es), electronic delay controllers, electronic to pneumatic solenoids, pneumatic tubing and wiring to yield a complete fume hood sash opening and closing system.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Fume hoods
- B. Basic Mechanical Materials and Methods
- C. Tubing (Compressed Air): Pipe and Pipe Fittings
- D. Compressed Air System
- E. Laboratory Airflow Control System
- F. Power Wiring, Electrical Service and Section Connections

1.3 WORK FURNISHED BY OTHERS

- A. The fume hood sash(es) shall be in good working order such that the sashes require less than 7 lbs. of force to overcome static friction in the operation of opening and closing the sash over full range of motion.
- B. A 120 Volt AC duplex receptacle (1 FLA Connected) shall be installed on top of each fume hood.
- C. A ¼” - 25 PSI instrument air (0.5 SCFM) shall be installed on top of each fume hood.

1.4 SUBMITTALS

- A. Shop Drawings - Show complete single line diagrams, schematic diagrams and all other details required to demonstrate that the components selected for the system have been coordinated.
- B. Product Data - Include manufacturer’s descriptive literature, catalog cuts and installation instructions.
- C. Manuals - Submit three (3) copies of bound operation and maintenance manuals including:
 - 1. Installation instructions.
 - 2. Principles of operation and a detailed system description.
 - 3. Start up and operating instructions.
 - 4. Routine preventative maintenance procedures and corrective diagnostic troubleshooting procedures.
 - 5. Field Representative Information – Furnish name, address and telephone number.

1.5 QUALITY ASSURANCE

- A. All materials used shall be suitable for service intended with an expected useful life of at least twenty (20) years.
- B. Reference Codes and Standards - Comply with the following: OSHA part 1910, Title 29, of the Code of Federal Regulation, “Occupations Safety and Health Standards” - 1977 and any amendments to date.
- C. INSTALLER Qualifications:
 - 1. Factory trained employee or representative of manufacturer.
- D. The following Acceptable Supplier/Installer List – recommended for use. No substitutions.
 - 1. New-Tech, a division of Zeigler Enterprises, Inc., (866) 631-8324 or licensed representative.

1.6 DESIGN AND PERFORMANCE CRITERIA

- A. Materials: Where multiple units of the same type are required, the units shall be the products of a single manufacturer. However, the component parts of the system need not be the products of a single manufacturer.

PART II - PRODUCTS

2.1 GENERAL DESCRIPTION

- A. This specification defines an Automatic Sash Positioning System that has been demonstrated to the OWNER and has been judged by him as suitable for the service application.
- B. All equipment power shall be furnished from 120 Volt AC (1 amp), 60 Hz sources, mounted on top of each fume hood by the electrical contractor. All low voltage (12 Volt DC) transformers or power supplies shall be furnished and installed by the automated sash positioning system’s Manufacturer.
- C. All pneumatic equipment shall be furnished with 25 PSI instrument air.
- D. Installation: Install all system components and equipment in accordance with the manufacturer’s recommendations and as shown on Contract Drawings. Provide all necessary interconnections, services, and adjustments required for a complete operable system.

2.2 FIELD EQUIPMENT

A. AUTOMATIC SASH POSITIONING SYSTEM COMPONENTS:

1. SASH INTERFERENCE SENSOR
 - a) Sensor shall have a NEMA rating of 4.
 - b) Sensor shall use a visible polarized red light source, reflecting off a retroreflector.
 - c) Sensor shall have a range up to 9 feet.
 - d) Sensor shall have a -4° to + 158° F operating temperature range with a 1mS Response Time.
2. OPERATOR PRESENCE SENSOR
 - a) Sensor shall have a NEMA rating of 4.
 - b) Sensor shall use a modulated infrared light source.
 - c) Sensor shall have a range up to 9 feet.
 - d) Sensor shall have a + 14° F to +140° F operating temperature range with a 5mS Response Time.
 - e) Provide one presence sensor for fume hood sash up to eight foot wide.
3. PNEUMATIC CABLE CYLINDER
 - a) Cylinder shall be equal or greater length to the sash travel and have ½ inch closing end cushions.
 - b) Cylinder shall have a -5° F to + 160° F operating temperature range.
 - c) Cylinder shall have a 7 – 100 psi operating pressure range.
 - d) Cylinder shall have a life expectancy of 10 million lineal feet of travel.
4. PUSH TO OPEN BUTTON
 - a) Button switches shall be NEMA A600 heavy duty applications and CSA certified.
 - b) Button switches shall be a one inch diameter green cap.
 - c) Button switches shall be labeled with “PUSH TO OPEN”.
 - d) Provide one button switch for fume hood sash up to five foot wide and two for sashes greater than five foot wide.
5. MODE SWITCH (when needed)
 - a) Mode switch shall be NEMA A600 heavy duty applications and CSA certified.
 - b) Mode switch shall be 2 position maintained, with one inch diameter black standard handle.
 - c) Mode switch shall be labeled for the following models with:
 - (1) **ASPS-SS-AP**
 - (a) “AUTO OPEN”
 - (b) “PUSH BUTTON”
 - (2) **ASPS-SS-TH**
 - (a) “HALF OPEN”
 - (b) “FULL OPEN”
 - (3) **ASPS-SS-AM**
 - (a) “AUTO SASH”
 - (b) “MANUAL SASH”
 - (4) **ASPS-WI-SS**
 - (a) “AUTO OPEN”
 - (b) “PUSH BUTTON”
6. CONTROL MODULE
 - a) DIGITAL TIME DELAY RELAY/CONTROLLER
 - (1) Timer shall have a delay range from 0.05 seconds to 300 hours.
 - (2) Timer shall have an expected mechanical life of 10 million operations.
 - (3) Timer shall have a 14° to 130° F operating temperature range with a 0.5 seconds reset time.
 - (4) Timer has a field selected with display window.
 - b) ELECTRIC TO PNEUMATIC SOLENOID
 - (1) Solenoid shall have a maximum safe air pressure of 100 psi.
 - (2) Solenoid shall have a 0° F to 120° F operating temperature range.
 - (3) Solenoid shall have a minimum of 2.0 scfm air discharge to atmosphere capacity at 20 psi.
 - c) PRESSURE REGULATOR
 - (1) Regulator shall have an adjustable discharge pressure range of 0-60 psi.
 - (2) Regulator shall have a 35° F to 150° F operating temperature range.
 - (3) Regulator shall be capable of an inlet pressure of 150 psi.

- (4) Regulator shall include a 0-30 psi discharge pressure gauge.
- 7. **ROCKER SWITCH**
 - a) Switch shall be NEMA 1, 4, 12, triple sealed construction.
 - b) Switch arm shall be at least 1" long with a 7/8" diameter ball bearing roller at the end.
- 8. **POWER SUPPLY**
 - a) Sash positioner shall use an external power supply 1 Amp, 120 Volt AC power plug transformed to 12 Volt, 2 amps.

2.3 APPROVED MANUFACTURERS

- A. All components of the Automatic Sash Positioning System shall be as recommended or distributed by:
 - 1. New-Tech, a division of Zeigler Enterprises, Inc., (866) 631-8324 or licensed representative.

PART III - EXECUTION

3.1 SEQUENCE OF OPERATIONS

- A. Automatic Sash Positioning System for Single Vertically Rising Sash Fume Hoods, **Model # ASPS-SS-AP**
 - 1. With the mode switch in the "AUTO OPEN" position the Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood the hood shall open in less than 3 seconds to a safe working height of 18 inches above countertop ± 1 inch (specify for installation).
 - b) Once the sash has risen, laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood, the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
 - 2. With the mode switch in the "PUSH BUTTON" position the Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood and the "Push to Open" button is activated the fume hood shall open in less than 3 seconds to a safe working height of 18 inches above countertop ± 1 inch (specify for installation).
 - b) Once the sash has risen, laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the "Push to Open" button is activated the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
- B. **PUSH BUTTON** only Automatic Sash Positioning System for Single Vertically Rising Sash Fume Hoods, **Model # ASPS-SS-PB**
 - 1. The Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood and the "Push to Open" button is activated the fume hood shall open in less than 3 seconds to a safe working height of 18 inches above countertop ± 1 inch (specify for installation).
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the "Push to Open" button is activated the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
- C. Automatic Sash Positioning System for Two Heights on a Single Vertically Rising Sash Fume Hoods, **Model # ASPS-SS-TH**

1. With the mode switch in the "HALF OPEN" position the Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood and the "Push to Open" button is activated the fume hood shall open in less than 3 seconds to a safe working height of 18 inches above countertop ± 1 inch (specify for installation).
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the "Push to Open" button is activated the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
 2. With the mode switch in the "FULL OPEN" position the Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood and the "Push to Open" button is activated the fume hood shall open in less than 5 seconds to the full sash opening positioning.
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 15 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the "Push to Open" button is activated the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
- D. AUTO/MANUAL mode for Automatic Sash Positioning System for Single Vertically Rising Sash Fume Hoods, **Model # ASPS-SS-AM**
1. With the mode switch in the "AUTO SASH" position the Automatic Sash Positioning System shall operate as follows:
 - a) When a laboratory technician is sensed in front of the fume hood and the "Push to Open" button is activated the fume hood shall open in less than 3 seconds to a safe working height of 18 inches above countertop ± 1 inch (specify for installation).
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the "Push to Open" button is activated the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the sash shall be manually movable.
 2. With the mode switch in the "MANUAL SASH" position the Automatic Sash Positioning System shall operate as follows:
 - a) The laboratory technician must manually raise the sash.
 - b) The laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. This allows the laboratory technician to remove the object, then after the "Push to Open" button is activated to reset the latch and the 60 second delay the sash will continue to close.
 - e) Upon power or instrument air failure the sash shall be manually movable.
- E. Automatic Sash Positioning System for upper sash of Walk-In Fume Hoods, **Model # ASPS-WI-SS**

1. With the mode switch in the “AUTO OPEN” position the Automatic Sash Positioning System shall operate as follows on the upper sash:
 - a) With the lower sash closed to floor and when a laboratory technician is sensed in front of the fume hood, the upper sash shall open in less than 3 seconds to a working height of 18 inches \pm 1 inch (specify for installation).
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood, the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the upper sash shall be manually movable.
 - f) During equipment change out with the lower sash is raised, a red light is illuminated and the Automatic Sash Positioning System is disengaged allowing the upper sash is able to be manually movable.
2. With the mode switch in the “PUSH BUTTON” position the Automatic Sash Positioning System shall operate as follows on the upper sash:
 - a) With the lower sash closed to floor and when a laboratory technician is sensed in front of the fume hood and the “Push to Open” button is activated, the upper sash shall open in less than 3 seconds to a working height of 18 inches \pm 1 inch (specify for installation).
 - b) Once the sash has risen, the laboratory technician shall be able to manually move the sash to a higher or lower position without releasing any type of sash locks.
 - c) Once NO moving objects are sensed in front of the fume hood, the control module shall delay 60 seconds (adjustable), then slowly close the sash in less than 10 seconds.
 - d) During sash closure, if an object is sensed in the path of the sash, the amber light illuminates and the sash stops without making contact with the object. When a laboratory technician is sensed in front of the hood and the “Push to Open” button is activated, the sash will re-open allowing the removal of the object.
 - e) Upon power or instrument air failure the upper sash shall be manually movable.
 - f) During equipment change out with the lower sash is raised, a red light is illuminated and the Automatic Sash Positioning System is disengaged allowing the upper sash is able to be manually movable.

F. Add options for any Automatic Sash Position System

1. Object Alarm: while the amber light is illuminated an audible alarm sounds.
2. Sash Interference Dry Contact: while the amber light is illuminated a dry contact closes for remote monitoring by building systems.
3. Automatic Fume Hood Light: when a laboratory technician is sensed in front of the fume hood a 10Amp SPST dry contact will close allowing the fume hood light to be illuminated. *Wiring of fume hood light to dry contact by OTHERS.*

3.2 MAINTENANCE AND SERVICE

- A. Provide all services, materials and equipment necessary for the successful operation of the Automatic Sash Positioning System, furnished per this section, for a period of eighteen months after shipping.
- B. Advise the Owner in writing of the names of the designated service representative(s) and of service personnel.
- C. Provide a two (2) year service contract proposal, which may be accepted by the Owner up to the end of the first year warranty period.

3.3 TESTING AND COMMISSIONING

- A. Prior to system commissioning, perform point-to-point checkout of all wiring and pneumatic connections.
- B. Provide System Commissioning to meet operational specifications.
- C. Demonstrate proper functioning of the Automatic Sash Positioning System to OWNER before final acceptance.

END OF SECTION