

SECTION 11 06 24
VARIABLE ACOUSTIC BANNERS – STACKING TYPE

PART 1: GENERAL

1.01 SUMMARY

A. Section Includes:

1. Variable Acoustic Banners – Stacking Type – Motorized
2. Variable Acoustic Banner Controls

B. Provision of banner assemblies, equipment and services as specified herein:

1. Verification of site dimensions and conditions
2. Submittals as described herein and in the contract documents
3. Provision and installation of banner assemblies as described herein
4. Provision of control system for installation by Electrical Contractor as described herein
5. Scheduling, sequencing and coordination with other trades
6. Testing and demonstration of banner system and controls
7. Record drawings and Operation and Maintenance manual
8. Instruction to Owner's representatives

1.02 RELATED WORK BY OTHERS

A. Section 05 50 00 – Metal Fabrication:

1. All supplemental steel required to support the acoustic banners.

B. Division 26 – Electrical:

1. All conduit, wiring and terminations for power and control wiring.
2. All devices not listed herein, including external disconnects, as required by AHJ and prevailing code.

C. All modifications to surfaces and provision of access hatches required to provide future access to the banner components.

1.03 REFERENCES

- A. NFPA 70, National Electrical Code
- B. NFPA 79, Electrical Standard for Industrial Machinery
- C. NFPA 701, Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
- D. ASTM C423-08a Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Room Reverberation Method
- E. UL 325, Standard for Door, Drapery, Gate, Louver; Window Operators and Systems
- F. UL 508A, Standard for the Construction of Industrial Control Panels

1.04 QUALITY ASSURANCE

A. Acoustic Testing: The acoustic properties shall be tested and certified by an accredited independent laboratory to insure that the banner fabric and configuration are certified in accordance with ASTM C423-08a Sound Absorption Coefficient by Reverberation Room Method. Systems offered without this certification will not be approved.

Documentation of this must be submitted with the bid.

B. Fire Resistance Rating: Certifications shall be provided evidencing that the fabric has been treated so as to comply with NFPA-701 small scale.

C. Cycle Testing: Banner product shall have been cycle tested for no less than 5000 cycles.

Documentation of this must be submitted with the bid.

D. Manufacturer Qualifications: A company regularly engaged in the manufacture of variable acoustic banner systems with minimum five (5) years experience with systems similar to those specified.

1.05 SUBMITTALS

A. Prepare and Submit in accordance with Section 01 33 00 – Submittal procedures:

1. General Arrangements drawings shall show banners integrated into the facility with specific attention to required clearances. Banners shall be coordinated with other trades and field verified.
2. Shop Drawings detail all materials, fastening and finishes, and indicate all dimensions.
3. Electrical drawings shall indicate controls and required electrical service(s), and all required electrical field interconnections between devices.
4. Submit manufacturer's swatch card for color selection.
5. Custom color wool shall be available at no additional cost. Lab dip samples will be submitted in the fabric to be used to fabricate the banners for approval.

B. No material shall be purchased or fabricated, shipped or installed without prior approval of submitted drawings.

1.06 DELIVERY, STORAGE AND HANDLING

A. Carefully wrap and package banners and controls for shipment to site.

B. Do not deliver materials to site until building is weather tight. Do not subject banners to significant temperature change.

C. Store materials inside under cover and keep them dry and protected against damage from direct sunlight, surface contamination, corrosion, construction traffic and other damage.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirement herein, provide one of the following products:

1. acouStac® 3W11 or 6W11 by acouStaCorp, LLC Bronx, NY (718) 402-2677
2. acouStac® 3W15 or 6W15 by acouStaCorp, LLC Bronx, NY (718) 402-2677

2.02 VARIABLE ACOUSTIC BANNER MACHINES

A. Type: Motorized Line Shaft Devices: Each Variable Acoustic Banner shall be retracted and deployed via a motorized line shaft device. Each device shall consist of a gearmotor and a full length drive shaft supported by self-aligning flange blocks.

1. The machine shall be capable of a nominal fixed lifting speed of 20 fpm. **[OPTION]** Nominal fixed speed between 20 - 100 fpm. **[OPTION]** Machine shall be capable of nominal variable speeds from 0-20 fpm, up to 0-100 fpm.
2. Starter for each machine shall be supplied by this contractor.

B. Mounting Positions: **[OPTION]** **[Wall Mount]** **[Ceiling Mount]** Banners must be rigidly attached to structure. Supply cross bracing if necessary.

C. Frame: A heavy duty frame in standard mill finish aluminum, constructed to mount either from the top or rear, shall support and house the motor assembly and banner. **[OPTION]** Custom powder coating.

1. There shall be an integral mounting system built into the frame for mounting to the building structure.

- D. Infill Panels: The frame shall have infill panels made of low VO Sintra, removable for maintenance. Color Selection: White, Black, Grey, Silver, Beige, Blue and Red. **[OPTION]** Custom enclosures available per project design at additional cost.
- E. Motor: The motor shall be UL approved, 3 phase gear motor, selected to suit the voltage.
1. The gear motor shall be equipped with an electrically released fail-safe brake, rated for 200% of the machine's capacity that is engaged, unless the controller disengages it for raising or lowering the load.
 2. The gear motor capacity shall include a minimum 1.25 safety factor.
 3. The gear motor and drive system shall be sized to accommodate the size and weight of the specified banner.
- F. Limit Switches: Each machine shall be equipped with a 4-element rotary limit switch for normal up and down travel stops and over-travel protection in both directions.
1. Normal limit stops shall be used by the control system to limit travel. When a normal limit is tripped, the system shall prevent continued movement in that direction. Movement away from the limit shall be possible.
 2. Over-travel limit stops shall be used to protect against damage or injury in case of normal limit failure or mis-adjustment. When an over-travel limit is tripped, the system shall prevent motion, and remove power from motor. Movement is only possible with the use of a maintenance procedure.
 3. The limit switch shall have a direct drive connection to the drive shaft or be equipped with a keyed sprocket on the drive shaft and a pinned sprocket on the limit switch and the roller chain assembly.
 4. A chain guard assembly shall be supplied if the roller chain is exposed outside of a machine frame.
 5. Each switch contact is to be clearly labeled, along with electrical field connections.
 6. **[OPTION]** A flying lead cable shall be supplied to allow for simplified connection to field wiring in adjacent junction boxes. Provide multi conductor cable [_____] feet long.
- G. Positioning Sensor: The machine shall incorporate a separate solid state encoder as a positioning sensor to provide feedback information to the controls.
1. Encoder shall be incorporated within the gear motor and coupled to the motor shaft.
 2. Encoder shall provide an HTL or TTL quadrature output signal as required to interface with specified controller.
 3. Encoder output shall provide connections for the complementary output signals.
- H. Controls: Banners shall be controlled by the Variable Acoustic Controls.

2.03 ACOUSTIC BANNER FABRIC PANELS

- A. Fabric: 29oz per linear yard, 100% Wool, Durably Flame Retardant.
- B. Colors may be manufacturer's standard colors. **[OPTION]** Custom color match with lab dip at no additional cost.
- C. Fabric shall meet NFPA 701 testing standards.
- D. The banner consists of two parallel fabric panels made up of individual horizontal segments each connected by aluminum rail assemblies or 'stackers'. The 'stackers' separate the fabric panels at a constant dimension (depth) over the full height and width of the banner.
- E. The paired fabric panels are available with 11" or 15" segment heights and of 3" or 6" inner chamber depth.
- F. Each individual fabric segment shall be removable for cleaning and repair without removing the entire banner.

- G. The fabric panels are flat with 0% fullness. Selvage shall not be incorporated in the width of the banner.
- H. Fabric edges shall be cut straight, plumb and true. Banners shall travel vertically and plumb.
- I. The banner shall retract by means of stainless steel lifting bands. The lifting bands shall wind onto drums positioned along the width of the banner and shall connect to the lifting plate at the bottom of the banner. The lifting band capacity shall include a design factor of no less than 8:1.
- J. The banner fabric shall be kept taut by means of an internal bottom tube weight. This bottom weight shall be securely attached to the lifting mechanism at no fewer than two points.

2.04 VARIABLE ACOUSTIC CONTROLS

- A. Control Source: Subject to compliance with requirement herein, provide products of one of the following:
 - 1. acouTroL® Symphony by acouStaCorp, LLC
 - 2. Alternate: ETC rigging control with ETC FSMS or MCI (See Rigging Control Specification).
 - a. Optional third party interface CRESTRON (see G below).
- B. The Control System: Shall be specifically designed for the control of motorized equipment environments such as theatrical, corporate, arenas, convention centers, etc. It shall provide a high level of reliability, accuracy, and stability appropriate for systems operating equipment in places of public assembly or work environments.
 - 1. The control system shall be capable of controlling over 50 axis and maintaining sixteen (16) presets for each axis. An additional eight (8) global presets shall be provided.
 - 2. Grouping functions shall also be included to allow for up to sixteen (16) groups.
 - 3. To provide additional security, system shall allow for individual user logins.
- C. User Interface: A controller shall be provided that includes a touch screen and discrete pushbuttons, switches and indicators to allow for easy and simple control of the banner system.
 - 1. Controller shall be: **[OPTION] [Wall mount] [Rack mount] [Handheld]** Touch screen pendant with associated wall plate.
 - a. System has the ability to operate from the front panel. Pendant is only required where line of sight to equipment is obstructed at controller.
 - 2. Controller faceplate marking shall be engraved and filled, or polycarbonate type with printing on the reverse. Silkscreen text is susceptible to wear and is not acceptable.
 - 3. Touch screen display shall be of rugged industrial design, rated IP65 and 6" class minimum.
 - 4. Buttons/switches shall be 22mm industrial type.
 - a. An Emergency Stop Button shall be part of the Emergency Stop Circuit and shall conform to NFPA 79 requirements. Resetting of this circuit shall not initiate motion.
 - b. A key switch shall prevent unauthorized usage and provide system security. It shall control power to the control system, starters, and drives. Turning the system off shall remove all power from the motors, starters, and drives. The control system shall retain all position data, presets, and soft limits when the system is turned off.
 - c. Illuminated Operation buttons shall be included on the face of the controller, and shall illuminate only when the associated function is available
 - d. Operators that control motion shall be configured to require constant pressure- Hold to Run.
 - 5. Indicators LED shall be multicolor and 8mm in size.
 - 6. **[OPTION] [Wall mount] [Rack mount]** Controllers: Provide Hand-held Pushbutton pendant to give the operator with line of sight control. Pendant shall be provided with a 25ft nominal cable. **OR,** **[Handheld Touch Screen Pendant Controller]:** Provides the operator with flexible control options while maintaining line of sight control. Pendant shall be provided with a 25ft nominal cable.

D. Motor Controllers: Shall be furnished to accommodate all banners in the system. Provide [#] of group Motor Control Panels (MCPs) as indicated on the drawings. MCP shall contain motor controllers for each device. Motor Controllers shall include all short-circuit and over current protection required for system operation.

1. For fire and electrical safety, MCPs shall conform to the NEC (NFPA 70), be built in accordance with UL Standard 508A.
2. MCPs shall also meet “touch safe” requirements per IEC 204-1 “Protection against direct contact” rules.
3. Each MCP shall be equipped with disconnecting means, accessible from the front face of the enclosure.
4. MCP enclosures shall be NEMA 12 rated to protect components.
5. Each Motor Controller shall be sized to match the motor horsepower. Overload and over current protection shall conform to UL and NEC requirements.
6. Field terminals shall be provided for each banner connected. All terminals shall be labeled.
7. All internal wiring shall be numbered and labeled matching the schematics to aid service and maintenance.

E. Operation: Primary user control of the system shall be through the touch screen display. This shall be used in conjunction with the physical operator buttons, which initiate motion.

1. System shall provide for sixteen (16) Flex presets for each banner.
2. System shall provide for eight (8) Global presets for the system as a whole.
3. System shall provide for sixteen (16) Groups for easy selection and control of banners in the system. Individual banners may be members of multiple groups.
4. System shall provide user adjustable labels for each of the Flex Presets, Global Presets, and Groups.
5. System shall be provided with multiple levels of password.
 - a. User Level – allowing recall of presets, and adjusting banners limited Jog functionality.
 - b. Advanced Level – allowing for the functions of User Level, and adding the ability to record presets, adjust labels and various banner parameter adjustments.
 - c. Administrator Level – allows for the creation, adjustment, and deletion of individual user logins.
 - d. Factory Level – used to configure banners and hardware settings for the system.
6. System shall indicate on the touch screen when and which E-stop in the system has been triggered.
7. Soft limits may be set or adjusted inside of the banners physical limits.
8. A graphical “map” shall be incorporated in all screens of the complete system to help the user easily identify each banner.
9. System shall indicate graphically the position in real time of all the banners in the system.
10. System shall indicate graphically with color, the status of each banner in the system. An online key shall be included to assist with determining the status based on color.
11. System shall provide means to backup all user adjustable info onto USB or SD card.

F. Service Indicator: An indicator will illuminate and a notice on the touch screen shall be provided to alert the user when regular system service and inspections are required.

G. **[OPTION]** Third party A/V interface to Crestron series 2 and 3 processors:

1. Provide means to recall presets, and indicate status for the system and individual banners via a set of strings sent from the Crestron device to the controller.
2. A minimum of (3) IP addresses on the A/V network shall be reserved for use by the controller system.
3. At a minimum, any commanded movement must be repeated every 500ms to insure that the communication link is still valid.
 - a. Alternately, a hard wired hold-to-run type enable switch may be utilized. This shall be connected directly to this control system and shall not be wired in the A/V controller.

H. **[OPTION]** Industrial Network Connection Firewall: Allows for secure and easy remote connection for program updates and system troubleshooting through a powerful, flexible, and fast firewall. Device will allow for VPN connection with minimal IT intervention for improved customer service and maintenance from the factory without requiring a site visit.

PART 3: EXECUTION

3.01 EXAMINATION

- A. Installing contractor is responsible for examination of structure to which banners shall be attached for compliance with requirements for installation tolerances and other conditions affecting performance with the banners.
- B. Installing contractor is responsible for field verification of all banner dimensions prior to release for fabrication.
- C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION OF MOTORIZED BANNERS

- A. Install Variable Acoustic Banners in the locations as indicated on the drawings.
- B. Banner mounting to be coordinated with Manufacturer.
- C. Installing contractor is responsible for thoroughly reviewing technical product information.
- D. Installing contractor to coordinate installation with other trades.
- E. All installation shall be level and plumb.
- F. All hardware shall have minimum rating of Grade 5; all bolted fastenings shall use locking nuts and washers.

3.03 TRAINING AND DOCUMENTATION

- A. After completion of electrical power and control system installation, by others, train the client in the proper operation and maintenance of the banners.
- B. Provide digital files of As-built Drawings and Operations and Maintenance Manual.
- C. Provide a minimum one year warranty upon acceptance by owner.

END OF SECTION