

(NOTE: OPTIONS IN RED with SELECTION REQUIREMENTS)

**Part 1 – General**

**1.1 Related Documents**

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 Summary**

1. This Section includes four-fold metal doors with surface mounted tube frames and customizable fully glazed panels.
2. Operation of four-fold metal doors includes overhead mounted electro-mechanical operators.

**1.3 Submittals**

1. Submit each item for review, in accordance with Division 1 Specifications.
2. Shop drawings clearly reflecting door assemblies, hardware, operating components including adjacent construction. Drawings to show elevation, sections, details, and clearances required for the door assemblies.
3. Shop drawings shall be of best quality craftsmanship, specifically prepared on standard size drawing sheet.
4. Complete installation instructions for doors and hardware.
5. Manufacturer's technical product data on each product type being utilized.
6. Letter of conformance indicating that the doors are installed in accordance to the drawings and the specifications.
7. Reference list including five (5) successful installations of this type of door within the past two (2) years.

**1.4 Quality Assurance:**

1. Doors shall be designed to withstand external or internal horizontal wind loads as specified or in accordance with ASCE. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 lbs psi. Sections structural frames shall be designed in accordance with the AISC "Steel Construction Manual".
2. Door manufacturer shall have at least 10 years experience in manufacturing door type specified for applications of similar type.

**1.5 Delivery, Storage & Handling**

1. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water; in such way as to permit access for inspection and handling.
2. Handle materials carefully to prevent damage.

**1.6 Warranty**

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1. Door manufacturer shall provide a written standard limited warranty certificate for material and workmanship.

### PART 2 - PRODUCTS

#### 2.1 Manufacturer

1. Manufacturer: Four-Fold Industrial Metal Door manufactured by JUS Doors, Inc., 3714 Alliance Dr, Ste. 305 PO Box 16639; Greensboro, NC 27416 (888.510.5331 / www.jusdoors.us).
2. Product: M87(93) **Electrically Operated** Four-Fold Door. Model: (Select One: M87SGE or M93SGE / Standard Glazing, M87FGE or M93FGE / Full Glazing, M87SE or M93SE / Solid)
3. Product: M87(93) **Manual Operated** Four-Fold Door. Model: (Select One: M87SGM or M93SGM / Standard Glazing, M87FGM or M93SGM / Full Glazing, M87SM or M93 SM)

#### 2.2 Materials

1. Steel Tube: ASTM A513 and ASTM A500/A500M
2. Steel Sheets: Steel sheets of commercial quality, complying with ASTM A1011/A1011M hot-rolled steel sheet.
3. Hardware: Manufacturer's standard components.
4. Fasteners: Zinc-coated steel.

#### 2.3 Four-Fold Doors

1. Sections: The door section frames shall be constructed from 3-inch thick tubular steel of minimum 11 ga thick wall, the frames shall be covered on both faces with 14 gauge thick formed steel sheets. Sections shall be true to dimensions and square in both planes. All exposed welds shall be ground smooth and flush and no section shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Sections shall be pre-drilled for assembling the hardware in the field
2. Insulation (Option for M87SGE, M87SE, M93SGE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane closed cell foam.
3. Surrounding Frame: The surrounding frame shall include jambs and lintel fabricated from 6" x 3" structural tubular steel. The frames shall be factory prepared to receive the jamb hinges and hardware

#### 2.4 Glazing/Paneling

1. Raised Panels (Option for M87FGE or M93FGE): Raised panels shall be installed with silicone base gaskets retained on the interior with extruded clear anodized aluminum retainers snapped over concealed retained clips. Visible fasteners on the door face are not acceptable.
2. Solid Panels (Option for M87SE or M93SE): Internal chambers of solid sections shall be pressure injected with CFC-free polyurethane foam.
3. Vision Panels (Option for M87SGE or M93SGE): Sections shall receive vision panels in shape and location indicated on the architectural drawings. The vision panels shall be made from of two (2) 1/4" clear-tempered glass with 1/2" air space providing 1" over all thickness.

## 2.5 Hardware:

1. Hardware: Hardware shall include guides, brackets, trolleys, end and center hinges, and necessary fasteners for complete installation and operation. All brackets shall be manufactured from steel not less than 1/4" thick and shall be bolted to the wall structure with minimum 3/8" fasteners.
2. Door Track/Guides: The top guides shall be manufactured from heavy-gauge steel designed to support the leading sections for full travel.
3. Guide Trolleys: Heavy-duty made from aluminum and have three wheels complete with ball bearings.
4. Jamb Hinges: Heavy-duty type, incorporating the radial and thrust bearings designed to transmit the forces to the opening frame. The hinges shall be adjustable and to have removable pins for servicing.
5. Intermediate Hinges: Black powder coated, made from aluminum, have dual shear pin complete with radial and thrust bearings. The hinges shall be of adjustable design to allow uniform gap and effective seal between sections.
6. Weather seal: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weather seal at center shall be 1/16" cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weather seal at sill shall include two 1/16" cloth inserted neoprene sweeps with an aluminum retainer.

Provide jamb and head weather seal of 1/16" cloth-inserted neoprene bulb (or closed cell neoprene

## 2.6 Finish:

1. Factory Applied Polyurethane Industrial Finish: After fabrication, all exposed steel shall be finished with manufacturers standard factory applied epoxy primer and polyurethane finish coat. Color as selected by Architect from manufacturers range including but not limited to the RALK7 Index or Sherwin Williams Indexes. All hardware to be standard black finish.
2. Factory Applied Powder Coat (Option): After fabrication, all exposed steel shall be powder-coated to match color from RALK7 Index standard solid color chart. All hardware to be standard black finish.

## 2.7 Operator

1. Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation consisting of an electric motor with built-on frequency inverter coupled to worm gear reducer with integrated slipping clutch driving second stage worm gear reducer coupled to the torque arm, release mechanism for manual operation and limit switches.
2. Electro-mechanical drive complete shall be located in the middle above the opening. Power

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from the torque arm to the jamb sections shall be transmitted through linkage and heavy-duty push rods, all pivot joints shall have permanently lubricated thrust and radial bushings. Mechanism for manual operation shall be designed so that both sides to move simultaneously and the electric operation can be engaged or disengaged at any position and that limits shall remain synchronized with door position. Mechanism with two manual disconnects, without electrical interlock and that requires each side to move separately or does not allow manual/electrical operation from any position is not acceptable. Pulley and belt type drive mechanism is not acceptable.

3. The drive mechanism shall be capable of operating each side at a speed of 12" per second, for a combined speed of 24" per second. The operator shall have electrically interlocked emergency disconnect lever designed to disconnect both sides from floor level.
4. The controls shall be of inverter type with variable frequency drive and shall be housed in a NEMA 4 type control panel with disconnect switch. The electric operator and controls shall be UL listed. The operators shall be prewired and tested at the factory. Momentary type OPEN-CLOSE-STOP push buttons shall be located on the control panel.
5. Electric operator shall be sized to operate doors at 75 percent capacity under normal operating conditions.

### 2.8 Controls & Safety Devices

1. Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/outputs.
2. Motor shall be controlled by frequency converter with overload and under voltage protection. Motor shall have integrated brake system. All control components shall be enclosed in motor housing unit with wiring diagram placed on inside panel.
3. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, built in accordance with the latest NEMA standards. **Incoming electrical shall be (Choose One): 120VAC single phase, 208VAC single phase, 208/230VAC 3-phase, 480VAC 3-phase.**
4. Control Panel: Enclosure shall be NEMA 4 with disconnect switch.
5. Push buttons: Momentary pressure type three push buttons to OPEN, CLOSE and STOP the door shall be mounted on the control panel cover.
6. Remote Push Button Station: **(Option)** Wall mountable NEMA 4, 3 buttons bush button station to OPEN, CLOSE and STOP the door.
7. Keypad Entry: **(Option)** Single-Entry Multi-Function Access Controller with Integrated Keypad And Card Reader in Vandal-Resistant Metal Enclosure with a Sealed, Weatherproof Keypad.
8. Limit switches shall be provided to stop the travel of the door in its full open and full closed position.

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9. Safety edges: Provide electric safety edges on the leading edges designed to reverse the door closing in case it detects an obstruction.
10. Exterior Photo eyes: Provide a jamb mounted, thru-beam type photo eyes, NEMA 4 rated. The photo eyes shall be wired to reverse the door to open position in case it detects an obstruction during the door closing.
11. Interior Photo eyes: **(Option)** Pedestal or Bollard mountable photo eyes can be wired as secondary opening or safety device.
12. Interior Presence Sensor: Provide an overhead mounted BEA LZR-Widescan presence sensor with pre-open and pre-close safety fields.
13. Exterior Presence Sensor: **(Option)** Provide an overhead mounted BEA LZR-Widescan presence sensor.
14. Radio controls: **(Option)** Provide a radio receiver and **SELECT ONE: (X) single button remotes per door or (X) three button remotes per door**. Remotes to open and close doors with single button.
15. Timer Activation Loop Detectors: **(Option)** Provide “pulse on exit type” loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to pouring the concrete.
16. Warning Horn/Strobe: **(Option)** Provide warning light and strobe. Include outputs PLC to allow for activation while door is in motion both opening and closing, along with activation prior to closing. **Include programmable “delay-to-close” timer which activates the warning horn for a set time, prior to the door closing.**
17. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

### PART 3 - EXECUTION

#### 3.1 Installation

1. Four-fold door shall be installed in strict accordance with approved drawings by certified installer. Door rough opening shall be prepared by General Contractor prior to installation of door. Rough-in electrical shall be brought to door prior to installation as to avoid installation delays.
2. Slab shall be poured cured and in place prior to installation.
3. Door shall be set plumb, leveled and square with all parts properly fastened and mounted. Door shall be tested and left in good operational order.

#### 3.2 Turnover

1. Door shall be inspected and operated by installer in presence of General Contractor and / or Architect upon completion of installation. Any noted defects shall be corrected and door turned over to General Contractor. Any damage following

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turnover to General Contractor prior to final turnover to owner, is the responsibility of the General Contractor.

2. Complete Operation and Maintenance Manual & Warranty Certificate shall be provided by manufacturer at turnover of door.

**END OF SECTION**