PART 1 GENERAL

1.1 SCOPE: SECTION 20 01 00 - OPERATION AND MAINTENANCE FOR MECHANICAL

A. This Section covers form, content, and submittal of mechanical system Operation and Maintenance Manuals.

PART 2 PRODUCTS

2.1 FORM

A. Arrange operation and maintenance data sequentially by Specification Section.

B. Provide two indexes at the front of the binder that locates individual items by tab number. The first by Specification Section. The second, an alphabetical index of all items without regard to Specification Section.

C. Separate each item with consecutively numbered heavy stock divider sheets with plastic index tab. Type item number on both sides of paper inserts.

D. Precede each item with a completed Item Data Sheet. See required format attached to the end of this Specification Section.

E. Material included shall indicate the specific item(s) utilized for this Project. Delete or cross out all other items.

F. Provide complete operation and maintenance manual submittals. Partial or incomplete submittals required under this Section will be returned without review.

2.2 DATA

A. Include the following data for each item as applicable. Some of these data can be extracted from equipment review submittals and included with the Operation and Maintenance Manuals.

1. Manufacturer's catalog literature and illustrations.

2. Operating characteristics including capacity data, performance curves, flow rates, pressure drops, etc.

3. Electrical characteristics and wiring diagrams.

4. Dimensions and connection sizes.

5. Installation and adjustment instructions, requirements, and recommendations.

6. Parts lists and assembly Drawings.

7. Maintenance, operational, and troubleshooting instructions.

8. Warranty data.

B. Data shall be as provided by the equipment manufacturer or supplier.

C. Data are required for all component items of equipment whether or not the components are products of the equipment manufacturer.

D. All material must be clearly readable. "Faxed" then photocopied information is not acceptable.

E. Include a chart, neatly typed, and arranged by system, summarizing periodic inspections and maintenance recommended by equipment manufacturers and/or required to properly maintain the facility's new mechanical systems. The periodic maintenance summary chart shall include equipment name, identification symbol, location, type of maintenance or inspection required, and recommended time interval.

F. Include an equipment schedule, neatly typed, and arranged by system, listing new equipment with equipment symbol, nomenclature, function and area served, location, manufacturer, nameplate data including model and serial number and motor data including full load amps, horsepower, volts and phase.

2.3 BINDING

A. Bind the Operation and Maintenance Manuals in three ring, D-ring style binders with page lifters and vinyl covers. Expandable catalog type two hole binders with soft board covers and metal prong fasteners will not be accepted.

B. Provide multiple binders as required to limit single binder thickness to three inches. Divide binders at logical points. Do not overfill binders.

C. Label the front cover and end panel. Label to include Project title, Project number, date, and facility name.

PART 3 EXECUTION

3.1 TURNOVER

1. Submit one electronic copy (PDF format) of the Operation and Maintenance Manual for review and acceptance by the Contracting Officer. Electronically Index (Bookmark) each section and item, by item data number and name within the electronic submittal.

2. Submit one bound hard copy of the Operation and Maintenance Manual for review and acceptance by the Contracting Officer.

END OF SECTION

ATTACHMENT: ITEM DATA SHEET

ITEM DATA SHEET

1. Item name/Drawing equipment number:

2. Specification section/Drawing number:

3. Manufacturer/model number:

4. Size/capacity:

5. Use and location: (1)

6. Spare parts source:

7. Providers of warranty service:

8. Other Contractor comments:

(1) This information must be provided for all items. Be specific as possible.

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 00 - COMMON WORK RESULTS

A. This Section covers general mechanical requirements for Work covered under Divisions 20, and 23.

B. All Work and services specifically covered under this Division is supplementary to that covered under other Divisions of these Contract Documents. The requirements of this Division which are more stringent than that covered under other parts of these Contract Documents apply to Work covered under this Division.

C. All incidental Work required but not specified under this Division shall comply with the Division in which it is specified.

D. Review the Drawings and Specifications of all other Divisions for additional Work under Division 20.

1.2 GENERAL REQUIREMENTS

A. Provide the Owner with complete, coordinated, operating, tested, and adjusted mechanical systems.

B. Place all equipment in operation and instruct the Owner's maintenance personnel as to the proper operation, periodic maintenance, and lubrication of new mechanical equipment and systems.

C. The Drawings are somewhat diagrammatic and do not attempt to show all offsets or fittings required for installation of the mechanical system. Furnish and install pipes and ducts with fittings required for complete and proper installation of mechanical systems specified or required under this Division.

D. Provide piping, equipment, and accessories indicated on the Drawings unless it is specifically indicated that the piping, equipment, or accessory is existing.

E. Install piping, and equipment in accordance with manufacturer's recommendations, with accessories recommended by the manufacturer for service intended, and with accessories indicated. Should recommendations conflict with Contract Documents, contact Contracting Officer for clarification before proceeding.

F. Coordinate the installation of the mechanical systems with the Work of other trades and existing conditions. Route mechanical systems as required to avoid interference with the Work of other trades and existing conditions.

G. Do not scale the Mechanical Drawings. Verify dimensions as construction progresses.

H. Report any errors, discrepancies, or ambiguities to the Contracting Officer, who will answer all questions and interpret intended meaning of these Contract Documents. Accept Contracting Officer's interpretation as final.

I. Perform Work in a neat and workmanlike manner with skilled craftsmen specializing in said Work.

J. Provide new equipment and materials direct from the manufacturer unless specifically indicated otherwise. Remanufactured equipment and materials are specifically not acceptable.

K. Provide the product of only one manufacturer for each item or type of item provided in quantity.

L. Where the selection of materials or methods is left to the discretion of the Contractor, faithfully pursue the use of the best available materials or methods suitable for the purpose intended.

1.3 LOCAL CONDITIONS

A. Bidders shall familiarize themselves with the Contract Documents and existing conditions which affect Work required by the Contract Documents. It will be assumed that bidders have made a personal examination of the jobsite and existing conditions.

B. Failure to visit the jobsite will in no way relieve the successful bidder from the necessity of furnishing any materials or performing any Work that may be required to complete the Work in accordance with the Contract Documents with no additional cost to the Owner.

1.4 PERMITS AND INSPECTIONS

A. Apply, obtain, pay for, and comply with the requirements of all permits, fees and inspections by public authorities required for the Work covered under this Division of the Specifications.

B. Transmit copies of permit applications, permits received, and public authority inspection reports to the Contracting Officer.

1.5 CODES, ORDINANCES, AND STANDARDS

A. Federal, State, and local Codes and Ordinances take precedence over these Specifications and Drawings where conflicts occur unless the Drawings or Specifications call for more stringent requirements. Notify the Contracting Officer in writing of conflicts.

B. Follow latest adopted editions of Code of Federal Regulations, Alaska Administrative Code, International Building Code, International Mechanical Code, International Fuel Gas Code, Uniform Plumbing Code, International Fire Code, National Electrical Code, ADA Accessibility Guidelines, NFPA, ASME, NEMA, ASHRAE, SMACNA, etc. as applicable.

C. Comply with all applicable laws, building and construction codes, OSHA Safety and Health Regulations and applicable requirements of any governmental agency under whose jurisdiction this Work is being performed.

1.6 WARRANTY

A. All manufacturer and supplier standard equipment, item or accessory warranties covered under this Division shall be the Contractor's responsibility under Project warranty period.

B. Equipment, item, or accessory warranties shall commence upon the date of Final Acceptance by the Owner.

C. Transfer all manufacturer and supplier standard equipment, item, or accessory warranties to the Owner upon expiration of Project warranty period.

D. Any warranties, more stringent than manufacturer's standard, specified or indicated under this Division remain the responsibility of the Contractor before and after expiration of Project warranty period.

E. Minimum manufacturer or supplier warranty is that of the manufacturer or supplier used as the basis of design.

1.7 MECHANICAL WORK IN EXISTING FACILITIES

A. Carefully lay out Work in advance.

B. Verify existing conditions affecting Work, including existing sizes and materials indicated, prior to beginning Work or ordering materials that are affected by existing conditions. Beginning of Work means acceptance of existing conditions. Match existing products and Work unless otherwise noted. Notify Contracting Officer of conflicts in writing.

C. When portions of existing mechanical, electrical, structural, etc. conditions are shown, it is not meant to indicate that all of such systems are shown.

D. Where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for the proper installation, support or anchorage of the mechanical equipment, piping, or ductwork, carefully perform this Work and patch to match existing conditions.

E. Repair any damage to building, piping, or equipment with skilled mechanics of the appropriate trade.

F. Cut, move, or remove existing items as necessary for installation of new Work and restore and replace at completion.

G. Remove from site removed materials unless otherwise indicated that the material is to be salvaged for the Owner.

H. Remove, cut, and patch in a manner to minimize damage and to provide means of restoring items to original conditions.

1.8 EXPOSED PIPING, DUCTWORK, EQUIPMENT, AND ACCESSORIES

A. Exposed piping, ductwork, equipment, and accessories have been sized, routed, and coordinated to provide a neat, clean architectural appearance.

B. Fabricate and install exposed piping, ductwork, equipment, and accessories so that finished product exhibits a quality, craftsmanship, and appearance aesthetically acceptable to the Contracting Officer.

1.9 ASBESTOS FREE MECHANICAL SYSTEMS

A. Provide mechanical systems that do not contain asbestos or asbestos-containing materials.

1.10 PROJECT COMPLETION DOCUMENTATION AND MATERIAL TURN OVER

A. See individual specification sections for required project completion documentation, and required maintenance or spare parts to be turned over to the Contracting Officer, including the following:

1. Record documents and reports:

a. Record documents – Section 20 05 00 “Common Work Results.”

b. Conformed O&M manuals – Section 20 01 00 “Operation and Maintenance for Mechanical.”

c. Test performance records for sterilization, cleaning, flushing and refilling of mechanical systems – Section 20 05 00 “Common Work Results.”

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 20 05 11 - COMMON SUBMITTAL REQUIREMENTS FOR MECHANICAL

A. This Section covers required mechanical equipment review submittals of material, equipment, items and accessories covered under this Division for review by the Contracting Officer to determine conformance with the Project design concepts and Contract documents prior to commencement of Work under this Division.

PART 2 PRODUCTS

2.1 FORM

A. Organize submittals by Specification Section. Separate each Section by a heavy stock divider sheet with plastic index tab. Type Specification Section numbers on both sides of paper inserts.

B. Identify each item of the submittal with an item number. Number the first item within a Specification Section "#1", the second item within a Specification Section "#2", and so forth. Restart numbering sequence with each Specification Section. Further separate Sections 21 13 00 “Fire Suppression Sprinkler System” and 23 09 23 “Direct Digital Control System for HVAC” by divider sheets with plastic index tabs between each item. Type item numbers on both sides of paper inserts.

C. Include equipment indicated on the Drawings, but not covered by a Specification Section, with the appropriate volume under a tab marked "Drawings". Rules for item numbering and item data sheets apply.

D. Precede each item with a Submittal Summary Sheet (form provided by the Contracting Officer).

E. Include application data form as indicated in submittal requirements, example format attached.

2.2 FORM

A. Each equipment review submittal or resubmittal shall be indexed, tabbed, and bound copies of data, Drawings, and materials lists. Alphabetize the index by item name and list the Specification Section and item number under which each item is submitted.

B. Submittal information is required for all material and equipment specified or indicated on the Drawings.

C. Organize submittals by Specification Section. Separate each Section by a heavy stock divider sheet with plastic index tab. Type Specification Section numbers on both sides of paper inserts.

D. Include equipment indicated on the Drawings, but not covered by a Specification Section, with the appropriate volume under a tab marked "Drawings." Rules for item numbering and item data sheets apply.

E. Precede each item with a completed Item Data Sheet. See required format attached to the end of this Specification Section.

F. Material submitted shall indicate the specific item(s) proposed for this Project. Delete or cross out all other items.

G. The mechanical equipment review submittal may be divided and submitted in the following volumes. Simultaneous submittal of all volumes is not required. Further division of the submittal into separate volumes is not permitted.

1. Section 20.

2. Section 23.

H. Each submittal or resubmittal of each volume shall be complete and shall contain all previously submitted material except that being replaced by new or revised material which shall be removed. Partial or improperly indexed or tabbed submittals or resubmittals shall be rejected without review or comment.

I. With each resubmittal include a complete summary of all changes and additions made to the equipment review submittal since the previous submittal. Only those items included in the summary will be reviewed with the resubmitted package.

J. Do not submit "updates" for previous submittal packages with resubmittals. Previous submittals will not be updated.

2.3 DATA

A. Include the following data for each item as applicable:

1. Manufacturer and model number.

2. Drawing equipment number.

3. Catalog literature.

4. Operating characteristics including capacity data, performance curves, flow rates, pressure drops, etc.

5. Electrical characteristics and wiring diagrams.

6. Dimensions and connection sizes.

7. Installation and adjustment instructions, requirements and recommendations.

8. Color samples.

9. Warranty data.

B. A list of minimum submittals required is provided in each Section. These lists are not necessarily complete or all-inclusive and the Contractor is responsible for complete submittal.

PART 3 EXECUTION

3.1 REQUIRED COPIES AND TIMING

A. Submit one electronic copy (PDF format) of the Mechanical Equipment Review Submittal or resubmittal for review and acceptance by the Contracting Officer. Electronically Index (Bookmark) each section and item within the electronic submittal.

B. Materials submitted shall be reviewed and accepted by the Contracting Officer before Contractor releases material for fabrication or shipment.

END OF SECTION

ATTACHMENT: ITEM DATA SHEET

ITEM DATA SHEET

1. Item number:

2. Item name/Drawing equipment number:

3. Specification section/Drawing number:

4. Manufacturer/model number:

6. Spare parts source:

7. Providers of warranty service:

8. Proposed deviations from the Contract Documents: (2)

9. Other Contractor comments:

10. Contractor Certification: (3)

The undersigned Contractor Representative certifies that he has reviewed the attached information and has determined that the proposed material complies with the requirements of the Contract Documents; he has coordinated installation of the material with the work of other trades and existing conditions; he has determined and verified field measurements, field construction criteria, manufacturer's installation requirements affecting the proposed material; and has notified the Contracting Officer of conflicts.

_____
Contractor Representative's Signature

(2) If this section is left blank it will be assumed that proposed equipment is exactly as specified and indicated on the Drawings.

(3) The Contractor referenced here is the General Contractor for the project. The signature of a subcontractor representative is not acceptable.

Contractor Comments:

PART 1 GENERAL

1.1 SCOPE: SECTION 20 07 00 - INSULATION FOR MECHANICAL

A. This Section covers selection and installation of insulation used in the mechanical systems.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selections of insulation products and accessory items.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide interior insulation having UL listed composite fire and smoke hazard rating not exceeding:

1. Flame Spread: 25.

2. Smoke Developed: 50.

B. Provide accessories such as adhesives, mastics, cement, tapes, and jackets having the same component rating as listed above.

C. Lagging fabric: 100 percent textured silica yarn or 100 percent cotton fabric, eight ounce per square yard, with or without pre-applied re-wettable adhesive finish. Fattal's Thermocanvas, Zetex 300, Newtex, or equal.

D. Thermal Insulation Coatings: Washable, abrasion resistant coating for thermal insulation. Minimum continuous service rating of 180 degrees F. Maximum dry basis VOC level of 80 grams per liter. Used to adhere lagging fabric without pre-applied re-wettable adhesive finish to pipe and duct insulation. Foster #30-36 Sealfas, MEI, Fiberlock, or equal.

E. Insulating cements: Mineral fiber base with maximum 0.90 (BTU-inch)/ (square foot-hour-Fahrenheit) conductivity at 200 degrees F mean temperature.

F. Vapor barrier coatings: Water based; fire resistive, flexible, maximum 0.08 perm water vapor permeability. Foster #30-80, MEI, Fiberlock, or equal.

2.2 SPRAY APPLIED FOAM URETHANE - INTERIOR

A. Fluid Applied Air, Water & Vapor Barrier Membrane. Air-Bloc 32MR, W.R. Meadows, Prosoco, or equal.

1. Water Vapor Permeance: 0.08 perms maximum.

2. VOC Content: 100 g/L maximum.

3. Service Temp: 150 degrees F.

2.3 OUTSIDE, RELIEF, EXHAUST, AND COMBUSTION AIR DUCT INSULATION

A. Insulation:

1. Rectangular ductwork: Two inches thick, minimum three-pound density, semi-rigid or rigid fiberglass insulation. Johns-Manville 800-Series Spin-Glas/AP, Owens/Corning 700-Series/ASJ, Knauf Insulation Board/ASJ, or equal.

2. Round ductwork: Two inches thick, semi-rigid fiberglass insulation with end grain perpendicular to jacket. Johns-Manville Pipe and Tank Insulation with AP Jacket, Owens-Corning Pipe and Tank Insulation/ASJ or equal.

B. Provide with vapor barrier jacket with a maximum water vapor permeability of 0.02 perms, a minimum beach puncture resistance rating of 50, and a white kraft paper facing.

C. Conductivity: 0.30 (BTU-inch)/ (square foot-hour-Fahrenheit) maximum at 100 degrees F mean temperature.

D. Continuous service rating: 250 degrees F minimum.

E. Provide pressure sensitive tape, used to seal seams and penetrations, constructed from same material as the vapor barrier jacket.

PART 3 EXECUTION

3.1 GENERAL

A. Surface Preparation: Prior to insulation installation, clean and dry exterior surfaces of ductwork.

B. Do not cover or obscure manufacturer or field applied identification tags, nameplates, information labels, etc.

C. Seal exposed ends and face of cuts in fiberglass insulation with thermal insulation coating.

3.2 OUTSIDE AIR DUCT INSULATION

A. Insulate outside air intake ductwork from exterior wall to duct termination.

B. Adhere insulation to ducts with noncombustible adhesive in accordance with manufacturer's recommendations for 50 percent coverage.

C. Seal and secure seams, joints, and penetrations in order to provide a neat and evenly rounded finished surface and complete vapor barrier envelope.

D. Where ducts are insulated with two layers, stagger the insulation joints.

E. On rectangular ducts, additionally secure insulation to bottoms and sides over 24 inches across with mechanical fasteners spaced at 12 inches on center and within 3 inches of all edges and corners.

F. Clip pins on mechanical fasteners flush at the washer and cover pin and washer with vapor proof pressure sensitive tape.

G. Apply insulation with joints tightly butted and sealed with vapor proof pressure sensitive tape.

H. Seal penetrations with pressure sensitive tape.

I. Seal insulation ends to adjoining exterior air inlets and outlets, roofs, walls, floors, ceilings, ducts, equipment, and building vapor retarder or membrane with vapor retarder pressure sensitive tape and lagging fabric to provide a complete vapor barrier envelope.

J. Provide metal corner beads, USG or equal, at all corners and hold in place with vapor proof pressure sensitive tape.

K. After insulation, corner beads, and vapor barrier have been installed cover all work with a lagging fabric, which has been dipped in a thermal insulation coating. In areas exposed to public view, install lagging fabric neatly, with cut rather than torn edges, to give a clean architectural appearance.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 09 33 - STANDALONE CONTROL SYSTEM FOR HVAC

A. This Section covers the selection and installation of standalone control systems.

1.2 GENERAL SUBMITTAL REQUIREMENTS

A. Coordinate submittal items with the submittal register as indicated or as revised by the Contractor.

B. If an item indicated on the submittal register is not used submit an item data sheet correlating to the appropriate item number, specification paragraph and indicate as “Not Used”. If a device or component is used that is not indicated on the submittal register or added after the original submittal provide a new submittal register item number appended to the end of the list within the appropriate section.

PART 2 PRODUCTS

2.1 GENERAL

A. Select miscellaneous components to meet the specific functional requirements of each application.

2.2 THERMOSTATS

A. Space Line Voltage Thermostats:

1. Adjustable setpoint, room temperature indication, setpoint index.

2. Switching through SPDT contacts rated 16 amp inductive current at 120V.

3. Setpoint range: 50 degrees F to 80 degrees F minimum setpoint adjustment range.

4. Removable setpoint adjustment knob.

5. Covers: Removable and without temperature or setpoint indication unless specifically indicated otherwise.

6. Mount covers to bases with tamper proof fasteners.

7. Similar to Honeywell T6051A.

2.3 DAMPER ACTUATORS

A. Where exposed to outdoor air or air temperatures lower than 50 degrees F use provide completely weatherproof actuators with internal heaters to allow normal operation at minus 50 degrees F.

B. Provide spring return to normal position type actuators

C. Provide actuators of the following signal type:

1. Two Position Electric Actuator. Direct mounting actuator to open or close depending on contact closure state. Similar to Belimo.

2.4 WIRING AND RACEWAYS

A. Provide wiring and raceway complying with the National Electrical Code, Division 26, and State and Local Codes and Ordinances.

B. Raceways:

1. EMT, IMC, rigid conduit, surface metal raceways, or totally enclosed metal trough with flexible metal tubing.

C. Wiring:

1. Provide wire with copper stranded conductors. Provide color or number coded jackets.

2. Low voltage wiring: 18 gauge minimum foil-shielded cable rated 100 VDC at 80 degrees C.

2.5 CONNECTORS

A. Provide with voltage and current ratings matching ratings of associated wire. Thomas & Betts Sta-Kon terminals or equal.

PART 3 EXECUTION

3.1 GENERAL

A. Work is to be performed by trained mechanics and installed in a first-class, neat and orderly manner.

B. Control devices shall not be used in locations where they are subject to damage or malfunction due to normally encountered ambient temperatures.

C. Damper operators mounted on insulated ductwork shall be mounted on secure brackets such that the device is external of the insulation.

3.2 WIRING

A. General:

1. Permanently label wiring at each end in each of the following ways. This applies to junction boxes and terminal strips in addition to devices where each wire terminates. 3M Scotch Code Write On Marker System or equal.

   a. Matching numerical designations.

   b. Indicating terminal to which wire/tube is connected.

2. Install wiring in a neat and orderly manner generally running wiring parallel to and along building lines.

B. Wiring:

1. Wire all electrical controls and switches furnished under this Section of the Specifications.

2. Make wire connections using factory fabricated jack assemblies, terminal strips, or solder connections. Use crimp connectors on stranded wire unless connecting to terminal strips approved for direct stranded wire connection. Insulate solder connections with heat shrink tubing. Field connections in control power wiring circuits may be made using wire nuts.

3. Install wiring in conduit.

4. Conceal wiring in finished areas. Unless otherwise noted, install wiring inside conduit or fully enclosed metallic raceway.

5. Install all wiring in accordance with National Electrical Code, Division 26, and State and Local Codes and Ordinances.

3.3 THERMOSTATS AND SWITCHES

A. Mount room thermostats so the operable portion is no higher than 48 inches, unless otherwise indicated. Where adjacent to light switches mount at same height as switches to provide a clean horizontal appearance.

B. Install thermostats on exterior surfaces with insulated bases such that actual room temperature, not wall surface temperature, is sensed.

3.4 CONTROL POWER SUPPLY

A. Provide electric power to control devices from device or equipment being controlled.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 13 - DAMPERS

A. This Section covers selection and installation of dampers.

1.2 SUBMITTALS

A. Manufacture Data:

1. Catalog selection for equipment and accessory items.

PART 2 PRODUCTS

2.1 GENERAL

A. Construct accessories installed in galvanized ductwork as indicated in the following paragraphs.

B. Construct accessories installed in stainless steel ductwork from stainless steel with features indicated in the following paragraphs.

2.2 MOTORIZED CONTROL DAMPERS

A. Motorized Control Dampers:

1. General: Provide insulated motorized control dampers where damper is exposed to outside air such as intake, exhaust, or relief dampers.

2. Uninsulated Motorized Control Dampers:

a. Provide dampers with EPDM blade edge seals and stainless steel jamb seals to guarantee maximum leakage rate of 15 cfm per square feet at four inches water gauge pressure differential. Ruskin CD36, Greenheck, Canarm, or equal.

b. Blades of 16 gauge formed galvanized steel or two 22 gauge galvanized steel sheets spot welded together, not over 8 inches wide or 48 inches long, secured to 1/2-inch diameter zinc plated rod axles with zinc plated bolts and thrust bearings at each blade.

c. Bar or channel frames of 16 gauge formed galvanized steel with holes for duct mounting.

d. Suitable for operation in airstreams at temperatures from minus 50 degrees F and 200 degrees F.

e. Bearings: Molded synthetic.

f. Linkage: Zinc plated steel and brass.

g. Provide external bearing on removable socket type drive shafts.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION

A. All duct accessories shall provide intended function without rattles, sags, vibration, or whistles.

B. Install in accordance with manufacturer's or SMACNA recommendations.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 33 56 - HVAC LOUVERS

A. This Section covers selection and installation of exterior air inlet and outlet louvers.

1.2 SUBMITTALS

A. Manufacturer’s Data:

1. Catalog selection for equipment and accessory items.

2. Dimensional Drawings showing construction and dimensions, CFM's, Face Velocities, and Pressure Drops.

3. Opening sizes required for penthouse or louver opening framing.

PART 2 PRODUCTS

2.1 LOUVERS

A. Six inches deep, extruded aluminum frame, 0.08-inch wall thickness, integral caulking slots. Ruskin ELF6375DX, Pottorff EFD-637, Arrow, or equal.

B. Extruded aluminum blades, 0.08-inch wall thickness, drainable.

C. Continuous appearing stationary blades with concealed intermediate mullions in lengths up to ten feet and unlimited heights.

D. 3/4-inch by 0.05-inch aluminum bird screen.

E. Factory applied baked acrylic enamel finish.

F. AMCA Standard 511 rated capacity, water infiltration less than 0.01 ounce per square foot: 7500 CFM through 48 inches by 48 inches louver.

G. Maximum intake and exhaust resistance to airflow at 7500 CFM through 48 inches by 48 inches louver: 0.15-inch w.g.

H. Provide with integral flange frame construction.

I. Match existing siding color as closely as possible with factory standard color.

2.2 SHOP FABRICATED ITEMS

A. Provide exterior surfaces suitable for painting.

B. Protect raw metal edges on galvanized steel with ZRC zinc coating after fabrication.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install exterior air inlets and outlets as required to prevent exterior water infiltration past exterior wall surface.

B. Seal exterior air inlets and outlets to wall vapor retarder as required to maintain continuous vapor barrier envelope.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 34 43 - ROOM EXHAUST FANS

A. This Section covers selection and installation of room exhaust fans.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Catalog cuts and selection for equipment and accessory items.

2. Fan motor operating characteristics, including capacity, brake horsepower and efficiency.

3. Selection with drawings and details indicating equipment dimensions.

4. Materials of construction for casing, fan wheel, and accessory equipment.

5. Fan curves.

6. Acoustical data.

7. Wiring Diagrams.

1.3 QUALITY ASSURANCE

A. Fans licensed to bear the AMCA seal for air performance.

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish factory fabricated sidewall propeller fans, complete with housing, motor, and indicated accessories. Greenheck SE, Loren Cook, Penn or equal.

B. AMCA certified performance ratings.

2.2 CASING

A. Galvanized steel

2.3 FAN AND MOTOR

A. Aluminum impeller.

B. Motor: Direct drive.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install as indicated and per manufacturer's recommendations.

B. Provide indicated accessories of same manufacturer as fans.

END OF SECTION

PART 1 GENERAL

1.1 SCOPE: SECTION 23 62 16 - SPLIT SYSTEM REFRIGERATION UNITS - RESIDENTIAL

A. This Section covers selection and installation of split system refrigeration units.

1.2 SUBMITTALS

A. Manufacturer's Data:

1. Provide a separate complete submittal for each equipment package even though some accessory items may be repeated in several packages.

2. Catalog cuts and selections for equipment and accessory items:

a. Materials of Construction.

b. Dimensional drawings and details:

1) Dimensions of all components.

2) Connection sizes and locations.

3) Equipment clearances.

4) Piping diagrams.

5) Accessory details.

c. Electrical data.

d. Wiring diagrams.

e. Control interface diagram.

3. Performance and capacity data:

a. Condenser performance data.

b. Evaporator performance data.

c. Acoustical data.

PART 2 PRODUCTS

2.1 GENERAL

A. Manufacturer's standard catalog product pre-packaged complete with casing, support legs, compressor, fans, and motors, condensing coil, evaporator coil, wiring, panels and capacity and head pressure controls. Trane/Mitsubishi, McQuay, RUUD, or equal.

B. Complete with two separate and independent refrigeration circuits. Provide each refrigeration circuit complete with liquid accumulator and pressure gauges. Provide each refrigeration circuit complete with compressor suction and discharge service valves and a liquid line service valve.

C. Complete with starter panel containing fan and compressor motor contactors, motor overloads for each fan motor, and control circuit transformer. All panels WP rated.

D. UL approved.

E. Units shall be capable of extended exposure to minus 50 degrees F ambient temperatures without damage.

F. Refrigerant: R-410A, blend of Difluoromethane (HFC-32) and Pentafluoroethane (HFC-125)

2.2 CASING

A. 14 gauge welded galvanized steel frame. Minimum 14 gauge and 16 gauge galvanized steel panels and access doors.

B. Exterior surfaces cleaned, phosphatized, and coated with an epoxy resin primer and finished with an enamel finish.

C. Decorative louvered intake grills.

D. Fan compartments separated by full width and height partitions.

2.3 COMPRESSORS

A. 3600 RPM scroll or 1750 RPM hermetic or semi-hermetic reciprocating compressors with vibration isolation.

2.4 CONDENSING COILS

A. Constructed of aluminum fins mechanically bonded to copper tubes.

B. Constructed and rated in accordance with AHRI standards. Designed for 300 PSIG working pressure.

C. Factory cleaned, dehydrated, and charged with refrigerant.

D. Provide coil guards to protect coil exterior surface.

2.5 FANS AND MOTORS

A. Fans: Direct drive with aluminum blades and zinc-plated steel hubs. Statically and dynamically balanced.

B. Motors: Permanently lubricated ball bearings, built in current and thermal overload protection, and weathertight slingers over bearings.

2.6 CONTROLS

A. Factory mounted and wired to starter panel.

B. Provide with wired controller and sensor from same manufacturer. Provide control interface from same manufacturer and accessories as required for complete control system.

1. Controller operations and features:

a. On/off.

b. Room temperature setpoint.

c. Fan speed.

d. Operation mode selection.

e. Backlit LCD display.

f. Integral space temperature sensor.

2.7 PIPING

A. Annealed ACR copper tube (ASTM B 280) and fittings with brazed or silver soldered joints. Individually insulated in twin-tube, flexible, closed-cell, elastomeric material for the insulation of refrigerant pipes and tubes with thermal conductivity equal to or better than 0.27 BTU-inch/hour per Sq Ft / °F, a water vapor transmission equal to or better than 0.08 Perm-inch, up to 1” thick insulation, shall have a Flame-Spread Index of less than 25 and a Smoke-development Index of less than 50.

B. Dehydrated and sealed at the factory.

C. Refrigerant line sizing shall be in accordance with manufacturer specifications.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install as indicated and in accordance with manufacturer's recommendations.

B. All piping connections shall have unions and isolation valves to allow for maintenance or replacement.

END OF SECTION

Cut Sheets

M-SERIES

SUBMITTAL DATA: MSZ-JP12WA & MUZ-JP12WA
12,000 BTU/H 115V WALL-MOUNTED HEAT PUMP SYSTEM

MITSUBISHI ELECTRIC
HEATING & AIR CONDITIONING

Job Name:	
System Reference:	Date:

Indoor Unit: MSZ-JP12WA	Outdoor Unit: MUZ-JP12WA	Wireless Remote Controller
		

AC-1/CU-1

GENERAL FEATURES

- 115V
- Single-zone heat pump systems
- Blue Fin anti-corrosion treatment applied to the outdoor unit heat exchanger for increased coil protection and longer life
- Four fan speeds: Low, Medium, High, Super-high
- INVERTER-driven heat pump
- Cooling operation range: 14° F to 115° F
- Heating operation range: -4° F to 75° F
- Multiple control options available:
  - Hand-held Remote Controller (provided with unit)
  - kumo cloud® smart device app for remote access
  - Third-party interface options
  - Wired or wireless controllers
- 12-hour timer
- ECONO COOL mode
- AUTO restart
- Washable air filter
- Optional anti-allergy enzyme filter

SPECIFICATIONS: MSZ-JP12WA & MUZ-JP12WA

Cooling at 95°F[1]	Maximum Capacity	BTU/H	12,200
	Rated Capacity	BTU/H	12,000
	Minimum Capacity	BTU/H	3,800
	Maximum Power Input	W	1,300
	Rated Power Input	W	1,210
	Moisture Removal	Pints/h	2.5
	Sensible Heat Factor		0.77
	Power Factor (208/230V)	%	93
Cooling at 82°F	Maximum Capacity	BTU/H	13,474
	Rated Capacity	BTU/H	12,900
	Minimum Capacity	BTU/H	4,196
	Maximum Power Input	W	1,170
	Rated Power Input	W	1,090
Heating at 47°F[2]	Maximum Capacity	BTU/H	14,500
	Rated Capacity	BTU/H	12,200
	Minimum Capacity	BTU/H	4,500
	Maximum Power Input	W	1,220
	Rated Power Input	W	990
	Power Factor	%	94
Heating at 17°F[3]	Maximum Capacity	BTU/H	9,000
	Rated Capacity	BTU/H	7,600
	Maximum Power Input	W	990
	Rated Power Input	W	800
Heating at 5°F[4]	Maximum Capacity	BTU/H	7,440
	Maximum Power Input	W	840
Heating at -4°F[5]	Maximum Capacity	BTU/H	5,850
Efficiency	SEER		17.0
	EER[1]		9.9
	HSPF (IV)		9.0
	COP at 47°F[2]		3.61
	COP at 17°F in Maximum Capacity[3]		2.66
	COP at 5°F in Maximum Capacity[4]		2.60
Electrical	Voltage, Phase, Frequency		115V, 1 phase, 60Hz
	Guaranteed Voltage Range	V AC	103-127
	Voltage: Indoor - Outdoor, S1-S2	V AC	115
	Voltage: Indoor - Outdoor, S2-S3	V DC	24
	Short-circuit Current Rating (SCCR)	kA	5
	Recommended Fuse/Breaker Size (Outdoor)	A	15
	Recommended Wire Size (Indoor - Outdoor)	AWG	14
Indoor Unit	MCA	A	1.4
	Blower Motor Full Load Amperage	A	1.07
	Blower Motor Output	W	30
	Airflow Rate at Cooling, Dry	CFM	399-321-237-170
	Airflow Rate at Cooling, Wet	CFM	364-286-201-134
	Airflow Rate at Heating, Dry	CFM	406-321-237-170
	Sound Pressure Level (Cooling)	dB(A)	45-37-30-22
	Sound Pressure Level (Heating)	dB(A)	43-37-30-22
	Drain Pipe Size	In. (mm)	5/8 (15.88)
	Heat Exchanger Type		Plate fin coil
	External Finish Color		Munsell 1.0Y 9.2/0.2

Specifications are subject to change without notice.

SPECIFICATIONS: MSZ-JP12WA & MUZ-JP12WA

	Unit Dimensions	W: In. (mm)	31-7/16 (798)
		D: In. (mm)	9-1/8 (232)
		H: In. (mm)	11-5/8 (295)
	Package Dimensions	W: In. (mm)	33-1/2 (850)
		D: In. (mm)	12 (300)
		H: In. (mm)	14 (350)
	Unit Weight	Lbs. (kg)	22 (10)
	Package Weight	Lbs. (kg)	26 (11.5)
Indoor Unit Operating Temperature Range	Cooling Intake Air Temp (Maximum / Minimum)*	°F	90F D.B / 73F W.B // 67F D.B / 57F W.B
	Heating Intake Air Temp (Maximum / Minimum)	°F	80F D.B // 70F D.B
Outdoor Unit	MCA	A	14
	MOCP	A	15
	Fan Motor Full Load Amperage	A	0.7
	Fan Motor Output	W	55
	Airflow Rate	CFM	1,105 / 1,225
	Refrigerant Control		LEV
	Defrost Method		Reverse cycle
	Heat Exchanger Type		Plate fin coil
	Blue Fin Coating on Heat Exchanger		Yes
	Sound Pressure Level, Cooling[1]	dB(A)	49
	Sound Pressure Level, Heating[2]	dB(A)	51
	Compressor Type		DC INVERTER-driven
	Compressor Model		KNB073FRXMC
	Compressor Rated Load Amps	A	10.4
	Compressor Locked Rotor Amps	A	13.0
	Compressor Oil Type // Charge	oz.	FV50S // 9.1
	External Finish Color		Ivory Munsell 3Y 7.8/1.1
	Unit Dimensions	W: In. (mm)	31-1/2 (800)
		D: In. (mm)	11-1/4 (285)
		H: In. (mm)	21-5/8 (550)
	Package Dimensions	W: In. (mm)	37 (940)
		D: In. (mm)	14-15/16 (380)
		H: In. (mm)	24-13/16 (630)
	Unit Weight	Lbs. (kg)	73 (33)
	Package Weight	Lbs. (kg)	79 (36)
Outdoor Unit Operating Temperature Range	Cooling Air Temp (Maximum / Minimum)*	°F	115 / 14
	Cooling Thermal Lock-out / Re-start Temperatures**	°F	-1 / 3
	Heating Air Temp (Maximum / Minimum)	°F	75 / -4
	Heating Thermal Lock-out / Re-start Temperatures**	°F	-9 / -4
Refrigerant	Type		R410A
	Charge	Lbs, oz	1, 12
Piping	Gas Pipe Size O.D. (Flared)	In.(mm)	3/8 (9.52)
	Liquid Pipe Size O.D. (Flared)	In.(mm)	1/4 (6.35)
	Maximum Piping Length	Ft. (m)	65 (20)
	Maximum Height Difference	Ft. (m)	40 (12)
	Maximum Number of Bends		10

Specifications are subject to change without notice.

SPECIFICATIONS: MSZ-JP12WA & MUZ-JP12WA

Notes

AHRI Rated Conditions (Rated data is determined at a fixed compressor speed)	[1]Cooling (Indoor // Outdoor)	°F	80 DB, 67 WB // 95 DB, 75 WB
	[2]Heating at 47°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 47 DB, 43 WB
	[3]Heating at 17°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 17 DB, 15 WB
Conditions	[4]Heating at 5°F (Indoor // Outdoor)	°F	70 DB, 60 WB // 5 DB, 4 WB
	[5]Heating at -4°F (Indoor // Outdoor)	°F	70 DB, 60 WB // -4 DB, -5 WB
*Applications should be restricted to comfort cooling only; equipment cooling applications are not recommended for low ambient temperature conditions. **System cuts out in heating mode to avoid thermistor error and automatically restarts at these temperatures.			

Specifications are subject to change without notice.

ACCESSORIES: MSZ-JP12WA

Anti-allergy Enzyme Filter	□ MAC-408FT-E
kumo touch™ RedLINK™ Wireless Controller	□ MHK2
Deluxe MA Remote Controller[1]	□ PAR-40MAAU
Simple MA Controller[1]	□ PAC-YT53CRAU-J
Touch MA Controller[1]	□ PAR-CT01MAU-SB
Wired Remote Sensor	□ M21EAA307
Wireless Temperature and Humidity Sensor	□ PAC-USWHS003-TH-1
System Control Interface[2]	□ MAC-334IF-E
Wireless Interface 2	□ PAC-USWHS002-WF-2
Thermostat Interface	□ PAC-US444CN-1
Thermostat Interface	□ PAC-US445CN-1
kumo station® for kumo cloud®	□ PAC-WHS01HC-E
USNAP Interface	□ PAC-WHS01UP-E
IT Extender	□ PAC-WHS01IE-E
BACnet® and MODBUS® Interface	□ PAC-UKPRC001-CN-1
External Fan / Heater Control Relay Adapter	□ CN24RELAY-KIT-CM3
Blue Diamond Sensor Extension Cable — 15 Ft.	□ C13-103
Blue Diamond Alarm Extension Cable — 6.5 Ft.	□ C13-192
Blue Diamond MultiTank — collection tank for use with multiple pumps	□ C21-014
Blue Diamond Rubber Foot Pads	□ F10-010
Mini Condensate Pump — 230 volt application	□ SI30-230
MegaBlue Advanced Blue Diamond Condensate Pump w/ Reservoir & Sensor	□ X87-835 - 110 to 250V
MaxiBlue Advanced Blue Diamond Mini Condensate Pump w/ Reservoir & Sensor (110V) up to 48,000 BTU/H[recommended]	□ X87-711 - 110V
MicroBlue Blue Diamond Mini Condensate Pump (110/208/230V) up to 18,000 BTU/H	□ X85-003
Fascia Kit for MicroBlue Pump – mounts the MicroBlue and sensor directly beneath the indoor unit	□ T18-016
Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	□ COMBI
Refco Condensate Pump (100-240 VAC) up to 120,000 BTU/H	□ GOBI-II
Drain Pan Level Sensor	□ SS610E
(30A/600V/UL) [fits 2" X 4" utility box] - Black	□ TAZ-MS303
(30A/600V/UL) [fits 2" X 4" utility box] - White	□ TAZ-MS303W
Flexible Mini-Split Drain Hose	□ DRX-16

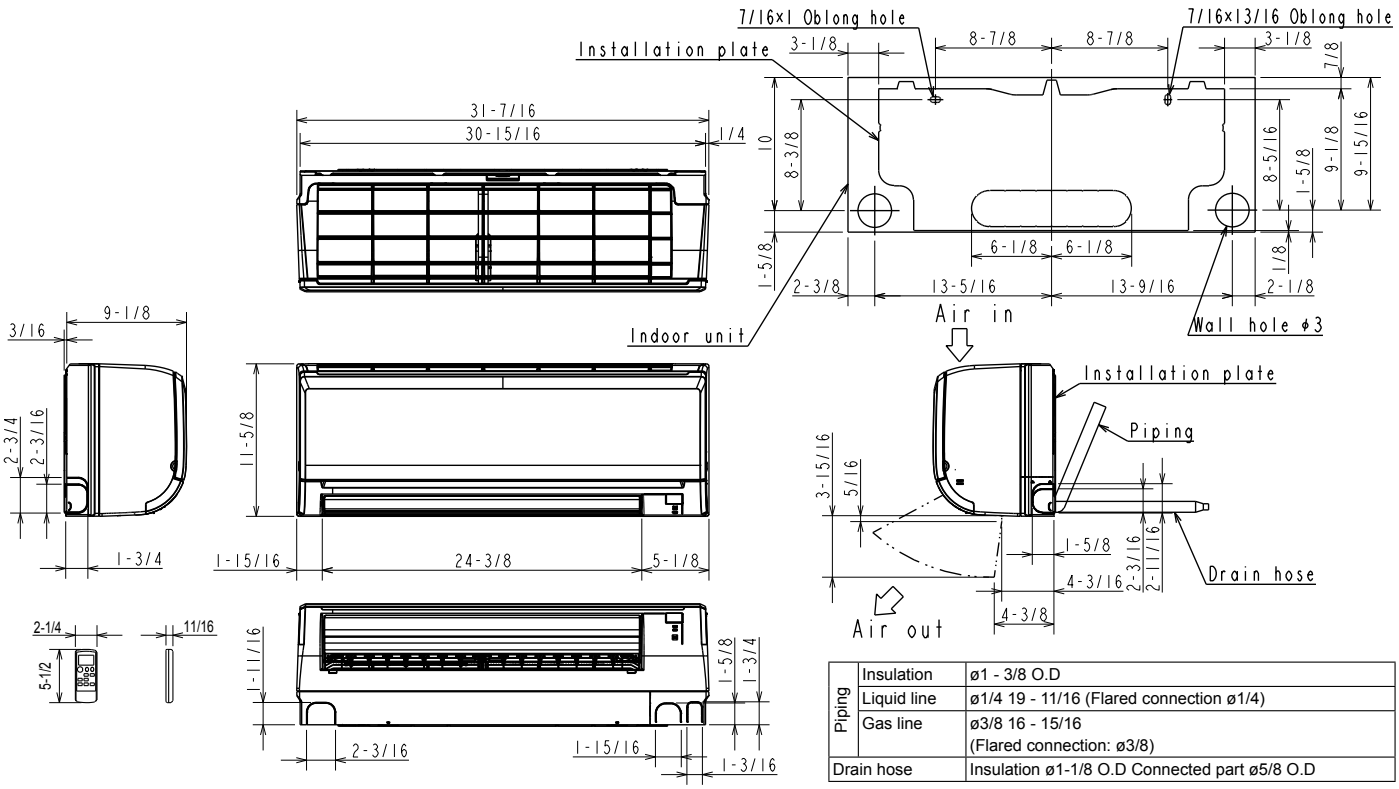
[1] Requires MAC-334IF-E
[2] Allows indoor units to connect to an MA Controller

ACCESSORIES: MUZ-JP12WA

Air Outlet Guide	□ MAC-881SG
Drain Socket	□ MAC-860DS
Hail Guard	□ HG-B4
Outdoor Unit 3-1/4 inch Mounting Base (Pair) - Plastic	□ DSD-400P
Condensing Unit Mounting Pad 16" x 36" x 3"	□ ULTRILITE1
Outdoor Unit Stand — 12" High	□ QSMS1201M
Outdoor Unit Stand — 18" High	□ QSMS1801M
Outdoor Unit Stand — 24" High	□ QSMS2401M
Heavy Duty Wall Mounting Bracket— Coated Steel	□ QSWB2000M-1
Heavy Duty Wall Mounting Bracket — 316 Series Stainless Steel	□ QSWBSS
15' x 1/4" x 15' / 3/8" Lineset (Twin-Tube Insulation)	□ MLS143812T-15
30' x 1/4" x 30' / 3/8" Lineset (Twin-Tube Insulation)	□ MLS143812T-30
50' x 1/4" x 50' / 3/8" Lineset (Twin-Tube Insulation)	□ MLS143812T-50
65' x 1/4" x 65' / 3/8" Lineset (Twin-Tube Insulation)	□ MLS143812T-65

DIMENSIONS: MSZ-JP12WA

Unit: inch



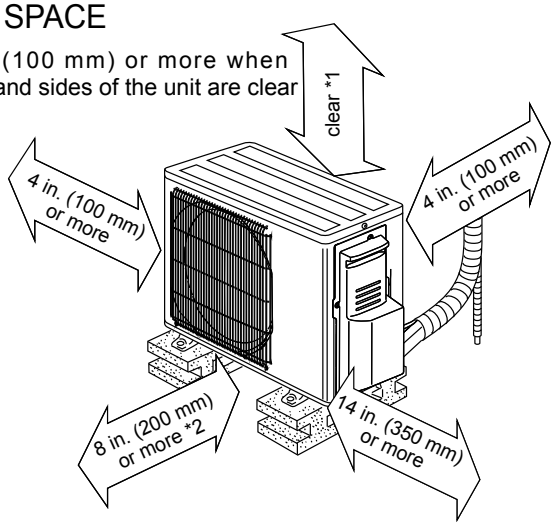
Piping	Insulation	ø1 - 3/8 O.D
	Liquid line	ø1/4 19 - 11/16 (Flared connection ø1/4)
	Gas line	ø3/8 16 - 15/16 (Flared connection: ø3/8)
Drain hose		Insulation ø1-1/8 O.D Connected part ø5/8 O.D

DIMENSIONS: MUZ-JP12WA

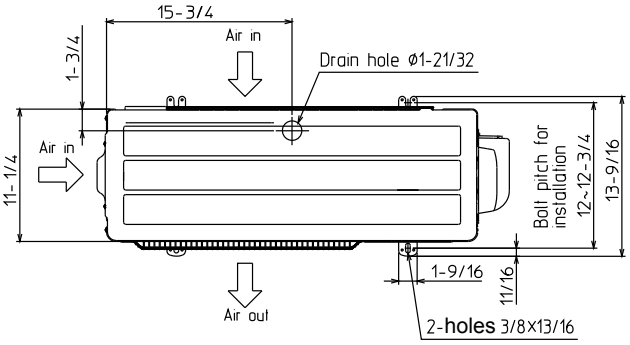
Unit: inch

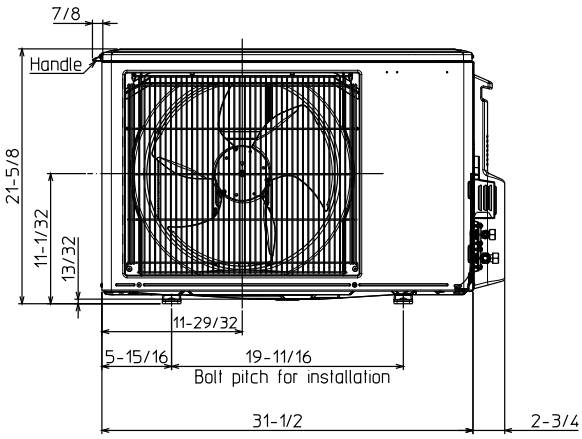
REQUIRED SPACE

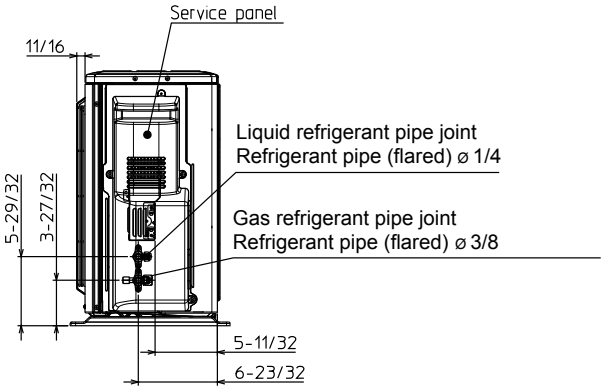
*1 4 in. (100 mm) or more when front and sides of the unit are clear



*2 When any 2 sides of left, right and rear of the unit are clear







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FORM# MSZ-JP12WA / MUZ-JP12WA - 202209

QSWB2000M-1
Condenser Wall Bracket

MITSUBISHI ELECTRIC
HEATING & AIR CONDITIONING

Job Name:

System Reference: Date:

GENERAL FEATURES

- Designed to provide a means to mount the M-Series and P-Series outdoor units on a suitable wall or structure and keep the equipment off the ground in adverse environments like seacoast salt air or waterworks applications.
- Holds up to 500 Lbs.
- Adjustble from 0”-to 34” in width.
- Produced from 316 Series Stainless Steel.
- Shelf depth is 25” to allow correct spacing between the wall and the outdoor unit.

PLEASE NOTE

- It is the responsibility of the Project Engineer and/or the Installing Contractor / Dealer to specify, furnish, and install any anchor or attachment materials required for the wall construction at the selected mounting location. We are not responsible for any installation faults or defects.
- It is strongly recommended to have the installation periodically inspected by a skilled technician.
- All mounting hardware should be Stainless Steel or other corrosion resistant material.

ASSEMBLY INSTRUCTION

- Remove the three wall mounted bracket parts and bag hardware from the box.
- Mount the straight QSWB2000M-1 glide track to the wall the proper bolts and fasteners for the wall type and construction.
- Install the spring nuts into the ends of the QSWB2000M-1 glide track and slide them to the desired location.
- Mount the L-bars to the glide track by using the hardware provided. (Note: Insert the 1” 3/4x3/8 bolts and washers thru the L-bar into the spring nuts.

PLEASE NOTE

- It is the responsibility of the Project Engineer and/or the Installing Contractor / Dealer to specify, furnish, and install any anchor or attachment materials required for the wall construction at the selected mounting location. We are not responsible for any installation faults or defects.
- It is strongly recommended to have the installation periodically inspected by a skilled technician.
- All mounting hardware should be Stainless Steel or other corrosion resistant material.

ASSEMBLY INSTRUCTION

- Remove the three wall mounted bracket parts and bag hardware from the box.
- Mount the straight QSWB2000M-1 glide track to the wall the proper bolts and fasteners for the wall type and construction.
- Install the spring nuts into the ends of the QSWB2000M-1 glide track and slide them to the desired location.
- Mount the L-bars to the glide track by using the hardware provided. (Note: Insert the 1” 3/4x3/8 bolts and washers thru the L-bar into the spring nuts.

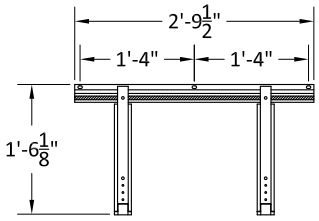
COMPATIBILITY

Single Zone
MUFZ-KJ09NAHZ
MUFZ-KJ12NAHZ
MUFZ-KJ15NAHZ
MUFZ-KJ18NAHZ
MUY-GL09NA
MUY-GL12NA
MUY-GL15NA
MUY-GL18NA
MUY-GL24NA
MUY-GS30NA
MUY-GS36NA
MUZ-FS06NA
MUZ-FS06NAH
MUZ-JP09WA
MUZ-GL09NA
MUZ-WR09NA-U2
MUZ-HM09NA
MUZ-FS09NA
MUZ-FS09NAH
MUZ-GL12NA
MUZ-JP12WA
MUZ-WR12NA-U2
MUZ-HM12NA
MUZ-FS12NAH
MUZ-FS12NA
MUZ-GL15NA
MUZ-HM15NA
MUZ-FS15NA
MUZ-FS15NAH
MUZ-GL18NA
MUZ-WR18NA-U2
MUZ-FS18NA
MUZ-FS18NAH
MUZ-GL24NA
MUZ-HM24NA
MUZ-GS30NA
MUZ-GS36NA

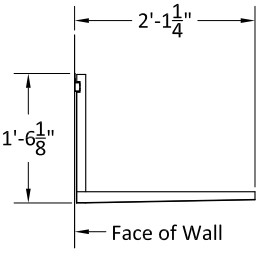
Single Zone
PUY-A12NKA7(-BS)
PUY-A18NKA7(-BS)
PUY-A24NHA7(-BS)
PUY-A30NHA7(-BS)
PUY-A36NKA7(-BS)
PUY-A42NKA7(-BS)
PUZ-A12NKA7(-BS)
PUZ-A18NKA7(-BS)
PUZ-A24NHA7(-BS)
PUZ-HA24NHA1
PUZ-A30NHA7(-BS)
PUZ-HA30NKA
PUZ-A36NKA7(-BS)
PUZ-HA36NKA
PUZ-A42NKA7(-BS)
PUZ-HA42NKA1
SUZ-KA09NAHZ
SUZ-KA09NA2
SUZ-KA12NAHZ
SUZ-KA12NA2
SUZ-KA15NAHZ
SUZ-KA15NA2
SUZ-KA18NAHZ
SUZ-KA18NA2
SUZ-KA24NA2
SUZ-KA30NA2
SUZ-KA36NA2
Multi Zone
MXZ-5C42NA3
MXZ-4C36NA3
MXZ-3C30NA3
MXZ-3C30NAHZ3
MXZ-3C24NA3
MXZ-3C24NAHZ3
MXZ-2C20NA3
MXZ-2C20NAHZ3
MXZ-SM36NAMHZ
MXZ-SM36NAM
MXZ-SM42NAMHZ
MXZ-SM48NAM
MXZ-SM48NAMHZ
MXZ-SM60NAM

DIMENSIONS; PARTS AND ASSEMBLY: QSWB2000M-1

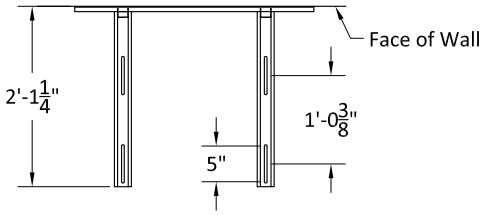
DIMENSIONS:



Elevation

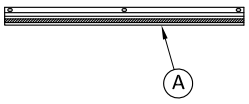


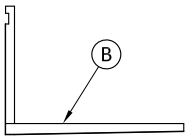
Side View



Plan View

PARTS:





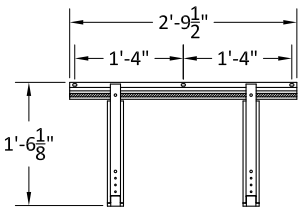
PARTS LIST

(A) (1) - 14 gauge Glide Track

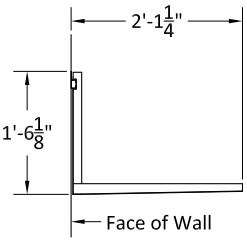
(B) (2) - 14 gauge L-Bar

Note - All assembly hardware is included

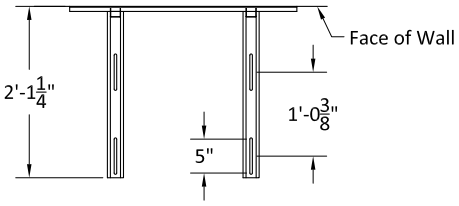
PARTS AND ASSEMBLY:



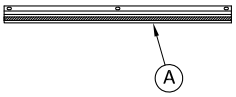
Elevation



Side View



Plan View



PARTS LIST

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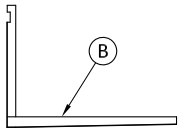
(B) (2) - 14 gauge L-Bar



Note - All assembly hardware is included

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FORM# QSWB2000M-1 - 202207

2-4. Simple MA remote controller [PAC-YT53CRAU]

- Control: ON/OFF, room temperature, vane, fan speed, and operation mode
- The only wiring required is cross-over wiring based on two-wire signal lines.
- Room temperature sensors are built-in.
- Set temperature range limit
- Can operate all types of indoor units

  ∗: Since this controller has limited functions, it should always be - used in conjunction with standard controller or centralized con troller.
- Backlit LCD
- Flat back

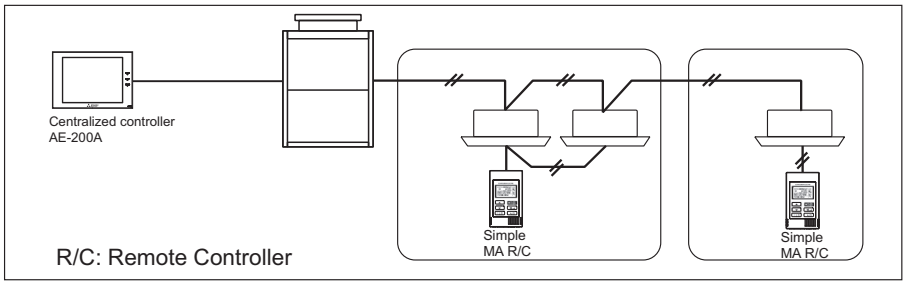
■ Functions

○: Available ×: Not available

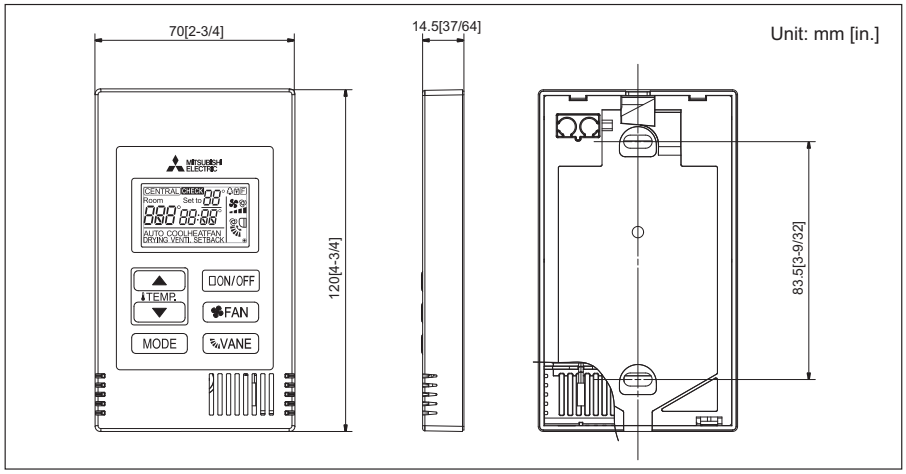
Item	Description	Setting	Display
ON/OFF	Changes between ON and OFF.	○	○
Operation mode switching *1	Select from COOL, DRYING, FAN, AUTO, and HEAT.	○	○
Temperature setting *1	Changes the set temperature. * Set temperature range varies depending on the indoor unit model.	○	○
Fan speed setting	Changes the fan speed. *The settable fan speed varies depending on the indoor unit model to be connected.	○	○
Vane setting	Switches the vane directions. *The settable vane direction varies depending on the indoor unit model to be connected.	○	○
Ventilation equipment control	Interlocked setting and interlocked operation setting with City Multi Lossnay units can be performed. The Stop/Low/High settings of the ventilation equipment can be controlled.	○	○
Backlight	Pressing the button lights up a backlight. The light automatically turns off after a certain period of time. (The brightness settings can be selected from Bright, Dark, and Light off.)	○	○
Error information	Displays the current error status with the address. *The address may not be displayed depending on the error status.	–	○
Allows/disallows local operation	By setting a centralized controller, the following local operations can be prohibited: ON/OFF, operation mode, preset temperature; *The CENTRAL icon appears while local operations are prohibited.	×	○
Operation lock	Locks all buttons.	○	○
Temperature range restriction	The preset temperature range can be restricted for each operation mode (COOL/HEAT/AUTO).	○	○
Room temperature detection	The temperature sensor is built-in on the remote controller.	–	–
Various settings	The following settings can be made by setting the dip switches. • Remote controller Main/Sub setting • Temperature display unit setting (Celsius/Fahrenheit) • Cooling/heating display in AUTO mode • Indoor temperature display	–	–

*1 AUTO mode is settable only when those functions are available on the indoor unit.

■ System example



■ External dimension



Job Name: SE1-12-432-G Cut Sheet
Tag: MK-1
Quantity: 1
Printed Date: October 28, 2022

Model: SE1-12-432-G

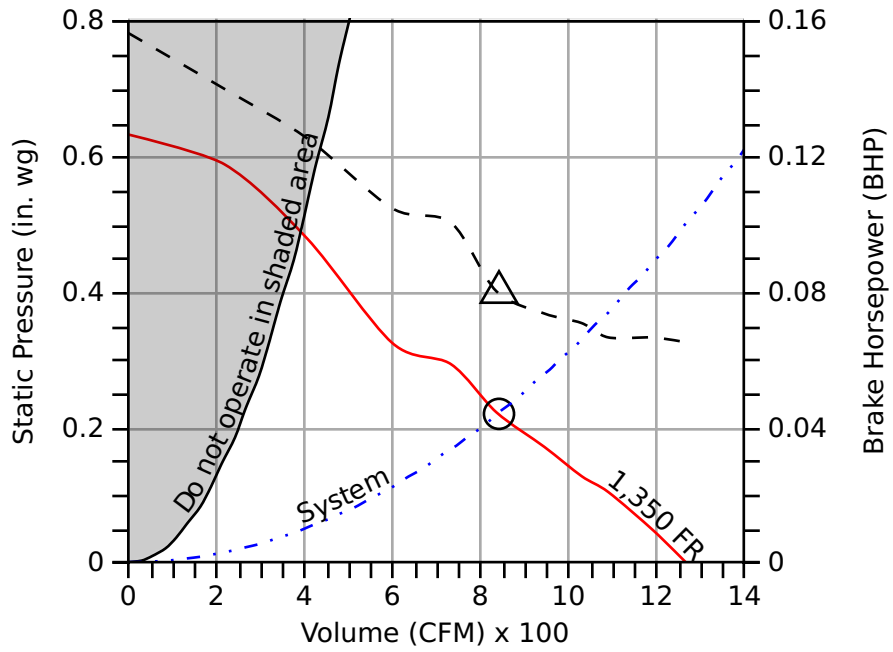
Sidewall Direct Drive Exhaust Fan

Standard Construction Features: Galvanized steel panel with fabricated galvanized steel drive frame (optional wall housing or wall collar). Propeller, aluminum. Direct driven motor in the airstream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	800
Actual Volume (CFM)	838
Total External SP (in. wg)	0.22
Fan RPM	1,350
Operating Power (bhp)	0.08
Startup Power (bhp)	0.08
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.074
Elevation (ft)	450
Static Efficiency (%)	36
Outlet Velocity (ft/min)	1,022

Motor	
Size (hp)	1/12
V/C/P	115/60/1
NEC FLA (Amps)	NA



- Fan curve
- Brake horsepower curve
- Operating Point SP
- Operating Bhp point
- Max system curve
- System curve

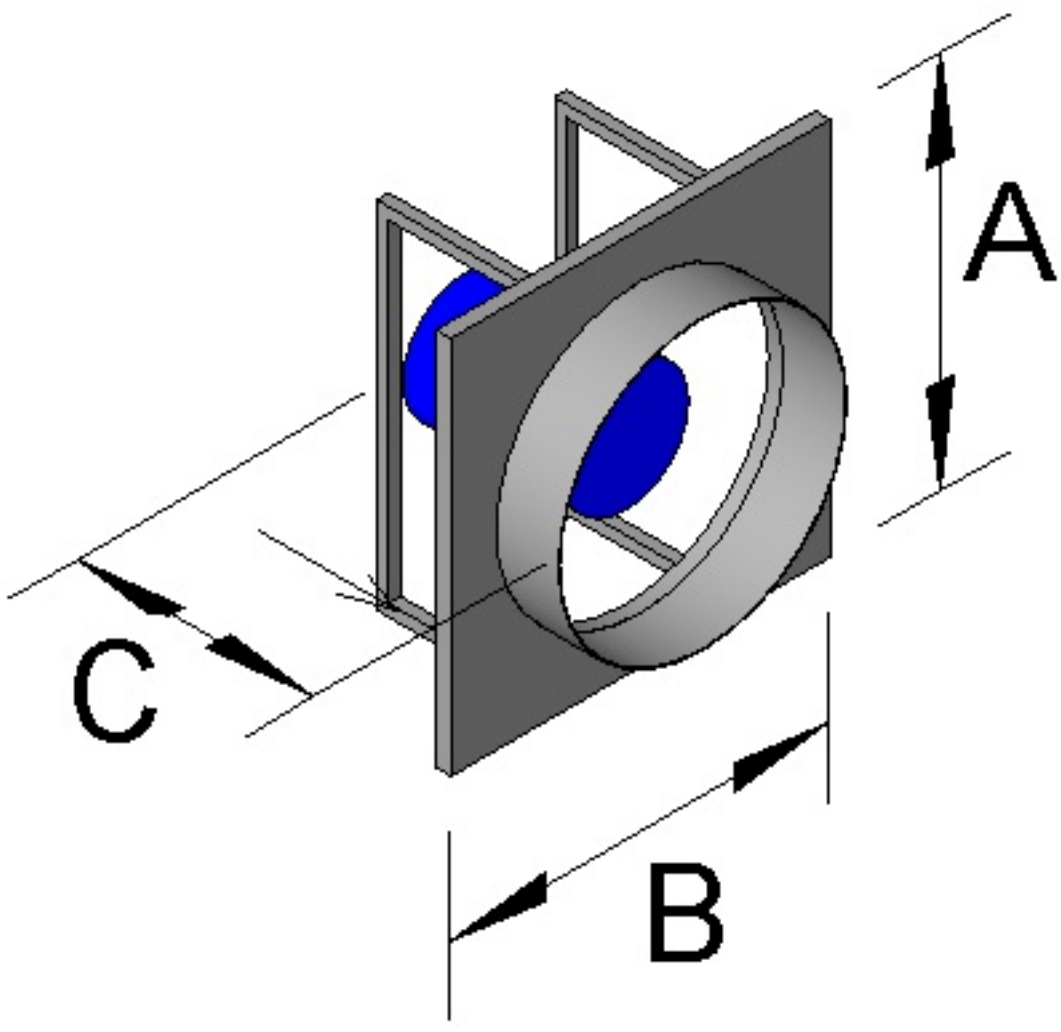
Static Pressure Calculations	
External SP	0.2 in. wg
Direct Drive RPM Adjustment	0.02 in. wg
Total External SP	0.22 in. wg

Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	74	76	61	58	59	58	51	44	65	54	7.6

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.The AMCA certified ratings seal applies to sound and air performance ratings only.Performance certified is for installation type A: Free inlet, free outlet.Power rating does not include transmission losses.Performance ratings do not include the effects of appurtenances.The sound ratings shown are loudness values in hemispherical sones at 1.5 m (5 ft) in a hemispherical free field calculated per ANSI/AMCA Standard 301.Values shown are for Installation Type A: free inlet hemispherical sone levels.dBA levels are not licensed by AMCA International. The AMCA Certified Ratings Seal for Sound applies to inlet sone ratings only.

Dimensions and Weights		
Label	**Value**	**Description**
-	28	Weight w/o accessories (lbs)
A	18	Overall Height (in)
B	18	Overall Width (in)
C	11	Overall Length (in)
-	14	Wall Opening Width (in)
-	14	Wall Opening Height (in)



*All dimensions are in inches.

RUSKIN®

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

ELF6375DX and ELF6375DXH DRAINABLE STATIONARY LOUVERS

EXTRUDED ALUMINUM LOUVER

STANDARD CONSTRUCTION

FRAME

6" (152) deep, 6063T5 extruded aluminum. ELF6375DX 1 – .081" (2.1) nominal wall thickness. ELF6375DXH – .125" (3.2) nominal wall thickness. Downspouts and caulking surfaces provided.

BLADES

6063T5 extruded aluminum.
ELF6375DX – .081" (2.1) nominal wall thickness. ELF6375DXH – .125" (3.2) nominal wall thickness. Drainable blades are positioned at at 37 1/2° angle and spaced approximately 5 29/32" (150) center to center.

SCREEN

3/4" x .051" (19 x 1.3) expanded, flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.

FINISH

Mill.

MINIMUM SIZE

12"w x 12"h (305 x 305).

APPROXIMATE SHIPPING WEIGHT

ELF6375DX - 4 lbs./ft.^{2} (19.5 kg /m^2)
ELF6375DXH - 6 lbs./ft.^{2} (29.3kg /m^2)

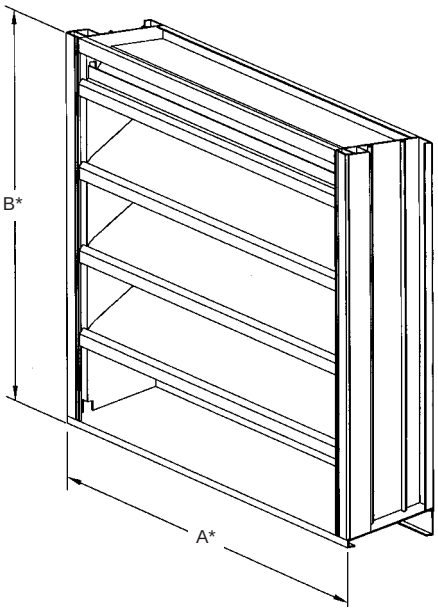
MAXIMUM FACTORY ASSEMBLY SIZE

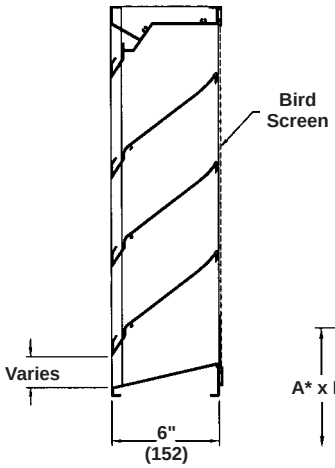
Shall be 75 sq. ft. (7m^2) per section, not to exceed 120"w x 90"h (3048 x 2286) or 90"w x 120"h (2286 x 3048).
Louvers larger than the maximum factory assembly size will require field assembly of smaller sections.

SUPPORTS

Louvers may be provided with rear mounted blade supports that increase overall louver depth depending on louver size, assembly configuration or windload.

Consult Ruskin for additional information.





FEATURES

The ELF6375DX and ELF6375DXH offers:

- 57% Free Area.
- Published performance ratings based on testing in accordance with AMCA Publication 511.
- High performance frame system with drainable head collects and removes water to provide excellent water penetration performance.
- Drain gutter in each blade minimizes water cascade between blades.
- Architecturally styled, hidden mullions allowing continuous line appearance up to 120" (3048).
- Aluminum construction for low maintenance and high resistance to corrosion.
- All welded construction.

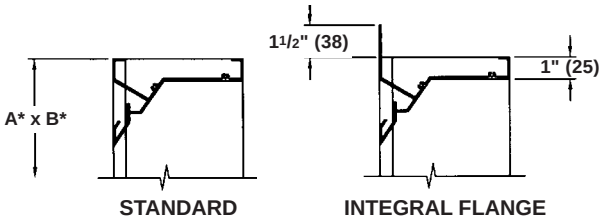
VARIATIONS

Variations to the basic design of these louvers are available at additional cost. They include:

- Extended sill.
- Hinged frame.
- Front or rear security bars.
- Filter racks.
- A variety of bird and insect screens.
- Selection of finishes: prime coat, baked enamel (modified fluoropolymer), epoxy, Acrodize, Kynar, clear and color anodize. (Some variation in anodize color consistency is possible.)

Consult Ruskin for other special requirements.

FRAME CONSTRUCTION



Dimensions in inches, parenthesis ( ) indicate millimeters.

*Units furnished 1/4" (6) smaller than given opening dimensions.

TAG	QTY.	SIZE		FRAME	VARIATIONS
		A*-WIDE	B*-HIGH		

PROJECT	**LOCATION**
ARCH./ENGR.	**CONTRACTOR**
REPRESENTATIVE	**DATE**

SUGGESTED SPECIFICATION

Furnish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary drainable type with drain gutters in each blade and downspouts in jambs and mullions. Louvers shall have a minimum of 57% free area based on a 48" wide x 48" high (1219 x 1219) size. Stationary drainable blades shall be contained within a 6" (152) frame. Louver components (heads, jambs, sills, blades, & mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required. Louver design shall limit span between visible mullions to 10 feet (3) and shall incorporate structural supports required to withstand a windload of 20 lbs. per sq. ft. (.96kPa) (equivalent of a 90 mph wind [145 KPH] wind – specifier may substitute any loading required).

Louvers shall be Ruskin Model ELF6375DX or ELF6375DXH extruded 6063T5 aluminum construction as follows:

Frame: 6" (152) deep. ELF6375DX - .081" (2.1) nominal wall thickness. ELF6375DXH - .125" (3.2) nominal wall thickness.

Blades: ELF6375DX - .081" (2.1) nominal wall thickness. ELF6375DXH - .125" (3.2) nominal wall thickness. Drainable blades are positioned at 37 1/2° angle and spaced approximately 5 29/32" (150) center to center.

Screen: 3/4" x .051" (19 x 1.3) expanded, flattened aluminum in removable frame.

Finish: Select finish specification from Ruskin Finishes Brochure.

Published louver performance data bearing the AMCA Certified Ratings Seal for Air Performance & Water Penetration must be submitted for approval prior to fabrication and must demonstrate pressure drop and water penetration equal to or less than the Ruskin model specified.

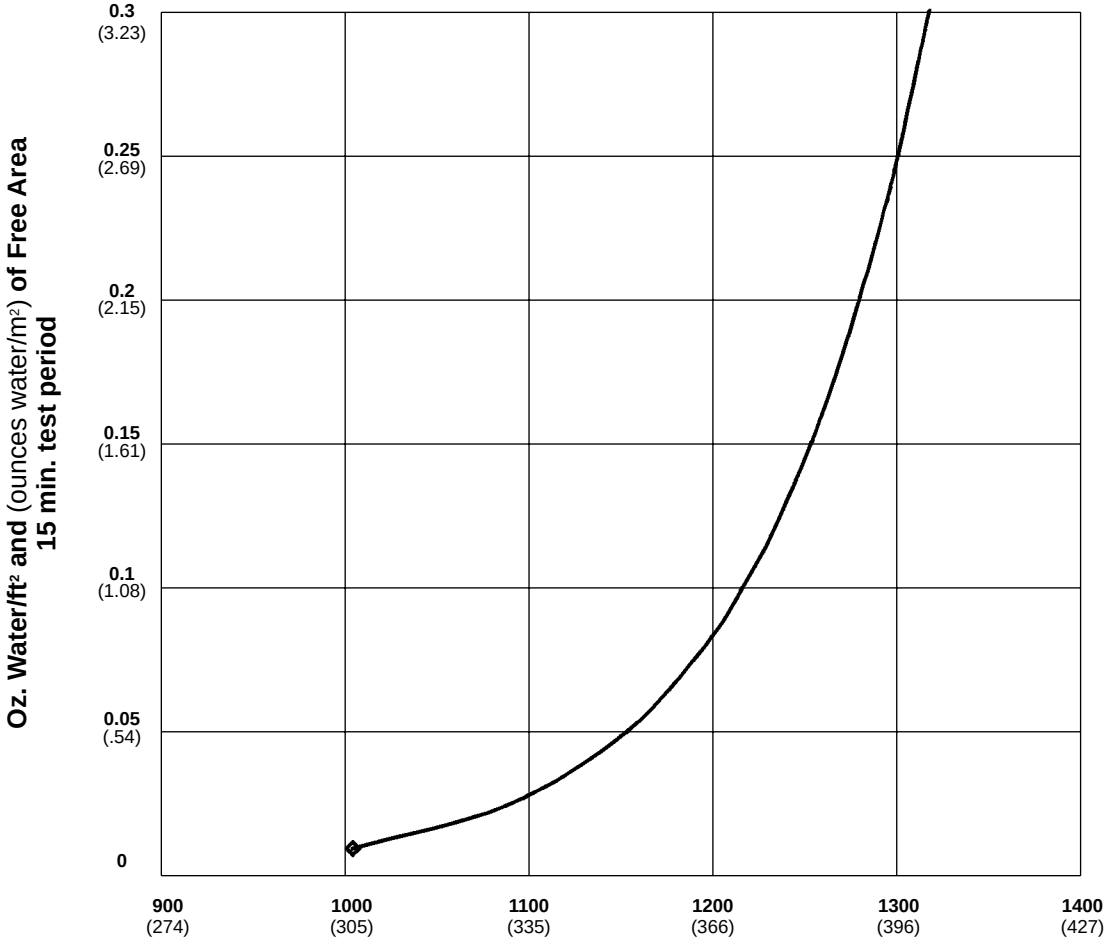
PERFORMANCE DATA

AMCA Standard 500 provides a reasonable basis for testing and rating louvers. Testing to AMCA 500 is performed under a certain set of laboratory conditions. This does not guarantee that other conditions will not occur in the actual environment where louvers must operate.

The louver system should be designed with a reasonable safety factor for louver performance. To ensure protection from water carryover, design with a performance level somewhat below maximum desired pressure drop and .01 oz./sq. ft. of water penetration.

WATER PENETRATION

Test size 48" wide x 48" high (1219 x 1219)
Beginning point of water penetration at .01 oz./sq. ft. is 1023 fpm (312 m/min)**.**



800 CFM SA @ 580 FPM, 18/24 LOUVER

FREE AREA GUIDE

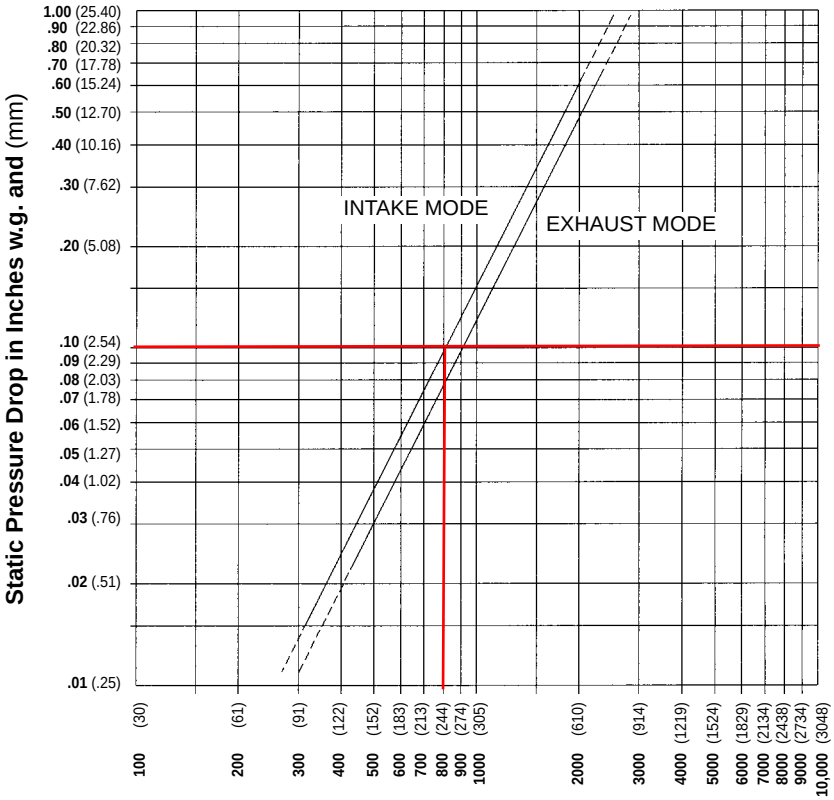
Free Area Guide shows free area in ft² and m² **for various sizes of ELF6375DX and ELF6375DXH.**

Width – Inches and Meters

Height – Inches and Meters

	12 0.30	**18** 0.46	**24** 0.61	**30** 0.76	**36** 0.91	**42** 1.07	**48** 1.22	**54** 1.37	**60** 1.52	**66** 1.68	**72** 1.83	**78** 1.98	**84** 2.13	**90** 2.29	**96** 2.44	**102** 2.59	**108** 2.74	**114** 2.90	**120** 3.05
12 0.30	**0.31** 0.03	**0.49** 0.05	**0.67** 0.06	**0.86** 0.08	**1.04** 0.10	**1.22** 0.11	**1.41** 0.13	**1.59** 0.15	**1.77** 0.16	**1.96** 0.18	**2.14** 0.20	**2.32** 0.22	**2.51** 0.23	**2.69** 0.25	**2.88** 0.27	**3.06** 0.28	**3.25** 0.30	**3.43** 0.32	**3.61** 0.34
18 0.46	**0.58** 0.05	**0.93** 0.09	**1.28** 0.12	**1.63** 0.15	**1.98** 0.18	**2.32** 0.22	**2.68** 0.25	**3.03** 0.28	**3.37** 0.31	**3.73** 0.35	**4.08** 0.38	**4.42** 0.41	**4.77** 0.44	**5.13** 0.48	**5.48** 0.51	**5.82** 0.54	**6.18** 0.57	**6.52** 0.61	**6.87** 0.64
24 0.61	**0.86** 0.08	**1.38** 0.13	**1.89** 0.18	**2.40** 0.22	**2.92** 0.27	**3.43** 0.32	**3.96** 0.37	**4.47** 0.42	**4.98** 0.46	**5.50** 0.51	**6.02** 0.56	**6.53** 0.61	**7.05** 0.66	**7.57** 0.70	**8.09** 0.75	**8.60** 0.80	**9.12** 0.85	**9.63** 0.89	**10.15** 0.94
30 0.76	**1.14** 0.11	**1.82** 0.17	**2.50** 0.23	**3.18** 0.30	**3.87** 0.36	**4.54** 0.42	**5.24** 0.49	**5.92** 0.55	**6.59** 0.61	**7.28** 0.68	**7.97** 0.74	**8.64** 0.80	**9.33** 0.87	**10.01** 0.93	**10.70** 0.99	**11.37** 1.06	**12.06** 1.12	**12.74** 1.18	**13.42** 1.25
36 0.91	**1.41** 0.13	**2.26** 0.21	**3.11** 0.29	**3.95** 0.37	**4.80** 0.45	**5.64** 0.52	**6.52** 0.61	**7.35** 0.68	**8.18** 0.76	**9.04** 0.84	**9.89** 0.92	**10.73** 1.00	**11.58** 1.08	**12.44** 1.16	**13.29** 1.24	**14.13** 1.31	**14.98** 1.39	**15.82** 1.47	**16.67** 1.55
42 1.07	**1.69** 0.16	**2.70** 0.25	**3.72** 0.35	**4.72** 0.44	**5.75** 0.53	**6.74** 0.63	**7.79** 0.72	**8.79** 0.82	**9.79** 0.91	**10.81** 1.00	**11.83** 1.10	**12.83** 1.19	**13.86** 1.29	**14.88** 1.38	**15.89** 1.48	**16.90** 1.57	**17.92** 1.67	**18.92** 1.76	**19.94** 1.85
48 1.22	**1.97** 0.18	**3.15** 0.29	**4.33** 0.40	**5.50** 0.51	**6.69** 0.62	**7.86** 0.73	**9.08** 0.84	**10.24** 0.95	**11.40** 1.06	**12.59** 1.17	**13.78** 1.28	**14.95** 1.39	**16.14** 1.50	**17.33** 1.61	**18.51** 1.72	**19.68** 1.83	**20.87** 1.94	**22.04** 2.05	**23.23** 2.16
54 1.37	**2.24** 0.21	**3.59** 0.33	**4.94** 0.46	**6.27** 0.58	**7.63** 0.71	**8.96** 0.83	**10.35** 0.96	**11.67** 1.08	**13.00** 1.21	**14.35** 1.33	**15.71** 1.46	**17.04** 1.58	**18.40** 1.71	**19.75** 1.84	**21.10** 1.96	**22.44** 2.09	**23.79** 2.21	**25.12** 2.33	**26.48** 2.46
60 1.52	**2.52** 0.23	**4.03** 0.37	**5.55** 0.52	**7.05** 0.66	**8.57** 0.80	**10.06** 0.93	**11.62** 1.08	**13.12** 1.22	**14.60** 1.36	**16.13** 1.50	**17.65** 1.64	**19.14** 1.78	**20.67** 1.92	**22.19** 2.06	**23.71** 2.20	**25.21** 2.34	**26.73** 2.48	**28.22** 2.62	**29.75** 2.76
66 1.68	**2.80** 0.26	**4.47** 0.42	**6.16** 0.57	**7.82** 0.73	**9.51** 0.88	**11.17** 1.04	**12.90** 1.20	**14.56** 1.35	**16.20** 1.51	**17.90** 1.66	**19.59** 1.82	**21.24** 1.97	**22.94** 2.13	**24.63** 2.29	**26.31** 2.44	**27.98** 2.60	**29.67** 2.76	**31.32** 2.91	**33.01** 3.07
72 1.83	**3.08** 0.29	**4.92** 0.46	**6.76** 0.63	**8.59** 0.80	**10.45** 0.97	**12.27** 1.14	**14.18** 1.32	**16.00** 1.49	**17.81** 1.66	**19.67** 1.83	**21.53** 2.00	**23.35** 2.17	**25.21** 2.34	**27.07** 2.52	**28.91** 2.69	**30.74** 2.86	**32.60** 3.03	**34.42** 3.20	**36.28** 3.37
78 1.98	**3.35** 0.31	**5.36** 0.50	**7.37** 0.68	**9.37** 0.87	**11.40** 1.06	**13.38** 1.24	**15.45** 1.44	**17.44** 10.91	**19.41** 1.80	**21.44** 1.99	**23.47** 2.18	**25.45** 2.37	**27.48** 2.55	**29.51** 2.74	**31.52** 2.93	**33.51** 3.11	**35.54** 3.30	**37.52** 3.49	**39.55** 3.68
84 2.13	**3.63** 0.34	**5.80** 0.54	**7.98** 0.74	**10.14** 0.94	**12.34** 1.15	**14.48** 1.35	**16.73** 1.00	**18.88** 1.75	**21.02** 1.95	**23.21** 2.16	**25.41** 2.36	**27.55** 2.56	**29.75** 2.76	**31.94** 2.97	**34.12** 3.17	**36.28** 3.37	**38.48** 3.58	**40.62** 3.77	**42.82** 3.98
90 2.29	**3.91** 0.36	**6.25** 0.58	**8.59** 0.80	**10.92** 1.01	**13.28** 1.23	**15.59** 1.45	**18.01** 1.67	**20.32** 1.89	**22.62** 2.10	**24.98** 2.32	**27.35** 2.54	**29.65** 2.76	**32.02** 2.98	**34.38** 3.19	**36.73** 3.41	**39.05** 3.63	**41.41** 3.85	**43.72** 4.06	**46.09** 4.28

PRESSURE DROP



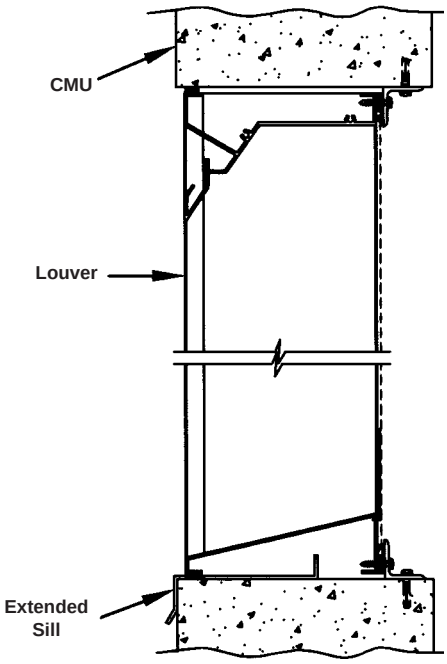
Air Velocity in feet and (meters) **per minute through Free Area**

Ratings do not include the effect of a bird screen.

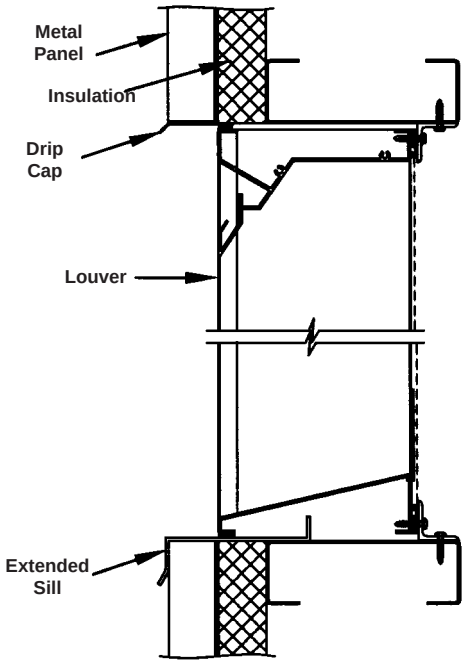
Ruskin Manufacturing Company certifies that the ELF6375DX and ELF6375DXH Louvers shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings and water penetration ratings only.

TYPICAL INSTALLATION DETAILS

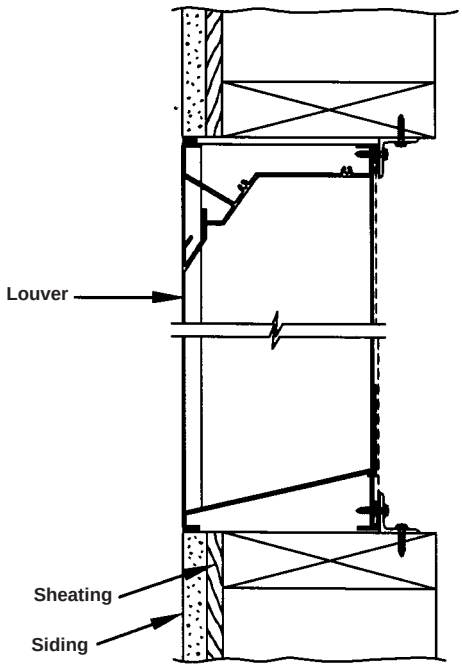
Masonry Wall



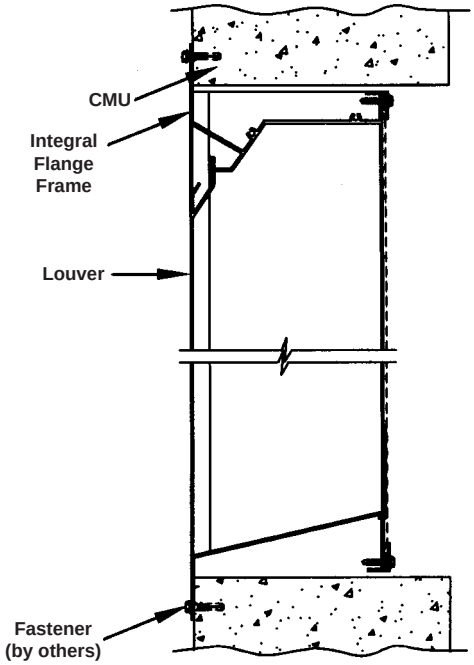
Metal Panel Wall



Wood Installation



Flange Mount



Accessories at additional cost.

RUSKIN®
3900 Dr. Greaves Rd.
Kansas City, MO 64030
(816) 761-7476
FAX (816) 765-8955

CBD6
Counterbalanced Backdraft Damper

RUSKIN
AUTHORITY IN AIR CONTROL

APPLICATION

The CBD6 counterbalanced backdraft damper will relieve at extremely low pressures (approximately .02" w.g.). It also features heavy duty aluminum construction, with the ability to handle large air flows and has maximum spot velocities up to 3,500 fpm. To maintain quiet operation synthetic corrosion resistant bearings are used. The CBD6 also offers excellent weather resistance for relief air applications in exterior walls.

STANDARD CONSTRUCTION

Frame	6063T6 extruded aluminum .125" (3.2) wall thickness
Blades	6063T6 extruded aluminum .070" (1.8) wall thickness with extruded vinyl edge seals
Bearings	Zytel
Linkage	1/8 " x 1/2 " (3 x 13) aluminum tiebars
Counterbalance	Zinc plated bar on blades (except top blade). Adjustable for final "on the job" setting
Finish	Mill
Maximum Size	Single section – 48"w x 52"h (1219 x 1321). Assembly of sections – unlimited
Minimum Size	6" w x 10"h (152 x 254)
Temperature Limits	-40°F (-40°C) minimum and +200°F (93°C) maximum

U.S. GREEN BUILDING COUNCIL MEMBER

ISO9001 CERTIFIED

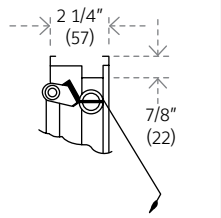
5 YEAR LIMITED WARRANTY

VARIATIONS

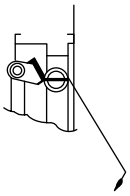
The following variations to the CBD6 are available at additional cost:

- Special finishes
- Bird or insect screens

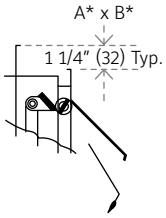
FRAME CONSTRUCTION



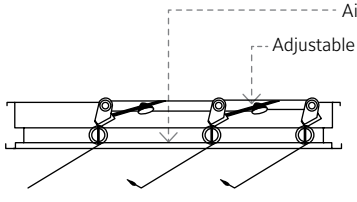
CHANNEL



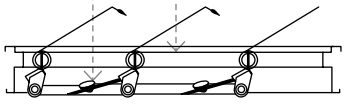
FRONT FLANGE



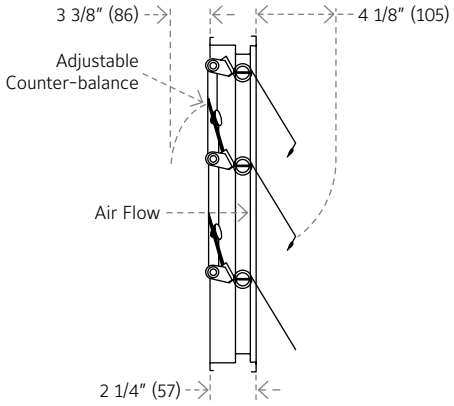
REAR FLANGE



HORIZONTAL MOUNT - AIR FLOW DOWN



HORIZONTAL MOUNT – AIR FLOW UP



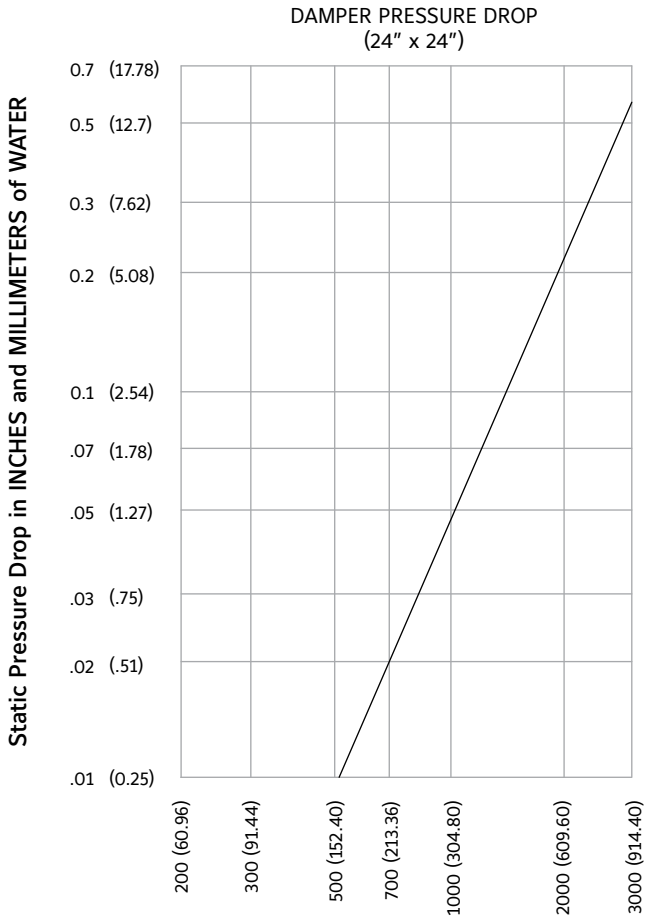
VERTICAL MOUNT -
HORIZONTAL AIR FLOW

Note:
- Unit furnished approx. 1/4" (6) smaller than given opening dimensions.
- Dimensions shown in parentheses ( ) indicate millimeters.

PERFORMANCE DATA

Damper Performance						
Damper Width	Maximum Back Pressure	Maximum System Velocity	Leakage*		Blades Start To Open	Blades Fully Open
			% Of Max. Flow	CFM/Sq. Ft.		
48" (1219)	4.0" w.g.	2500 FPM	0.6%	15	0.01" w.g.	0.05" w.g.
36" (914)	8.0" w.g.	2500 FPM	0.6%	15		
24" (610)	12.0" w.g.	2500 FPM	0.7%	17.5		
12" (305)	16.0" w.g.	2500 FPM	1%	25		

*Leakage information based on pressure differential of 1" w.g. tested per AMCA Std. 500.



Air Velocity in FEET and METERS per minute through FACE AREA.
Tested per AMCA Std. 500, Fig. 5.3, ductwork upstream and downstream.

INSTALLATION

- When used in fan discharge applications, damper should be located at least one-half the fan diameter away from the fan.
- For proper operation, damper must be installed square and free from racking.
- Bracing of multiple section assemblies:
  The CBD6 is intended to be self supporting only in the largest single section size. Multiple section damper assemblies may require bracing to support the weight of the assembly and to hold against system pressure. Ruskin recommends appropriate bracing to support the damper horizontally at least once for every 8 feet of damper width. Vertical assemblies and higher system pressures may require more bracing.

SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans or in accordance with schedules, heavy duty backdraft dampers that meet the following minimum construction standards: Frame shall be .125" (3.2) wall thickness 6063T6 extruded aluminum with 12 gage (2.8) galvanized steel structural brace at each corner. Blades shall be .070" (1.8) wall thickness 6063T6 extruded aluminum with extruded vinyl blade edge seals mechanically locked into blade edge. Adhesive or clip on type seals are unacceptable. Bearings shall be corrosion resistant, long life synthetic type for quiet operation. Linkage shall be 1/2" (13) wide tiebar connected to stainless steel pivot pins. Dampers shall be designed for maximum 3500 fpm spot velocities and minimum 4 inches w.g. back pressure depending on damper size. Dampers shall be in all respects equivalent to Ruskin model CBD6.

LINKS TO IMPORTANT DOCUMENTS

Document Title
Limited Warranty Document

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AUTHORITY IN AIR CONTROL

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