



Purchasing Division  
 2019 Washington Street East  
 Post Office Box 50130  
 Charleston, WV 25305-0130

State of West Virginia  
 Request for Quotation  
 09 - Construction

Proc Folder: 354060

Doc Description: ADDENDUM 3 Phase II HVAC Project at PCC

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2017-09-11	2017-09-19 13:30:00	CRFQ 0608 COR1800000002	4

**BID RECEIVING LOCATION**

BID CLERK

DEPARTMENT OF ADMINISTRATION

PURCHASING DIVISION

2019 WASHINGTON ST E

CHARLESTON

WV 25305

US

**VENDOR**

Vendor Name, Address and Telephone Number:

DSO Mechanical LLC

515 3rd Avenue

South Charleston WV 25303

(304) 744-8479

09/19/17 13:02:24  
 WV Purchasing Division

**FOR INFORMATION CONTACT THE BUYER**

Crystal Rink

(304) 558-2402

crystal.g.rink@wv.gov

Signature X

FEIN #

46-1525016

DATE

9/19/17

All offers subject to all terms and conditions contained in this solicitation

**ADDITIONAL INFORMATION:**

**Request for Quotation**

The West Virginia Purchasing Division is soliciting bids on behalf of Parkersburg Correctional Center (PBCC), a West Virginia Division of Corrections Facility (DOC), to establish a contract for a lump sum quotation for the phase II HVAC variable refrigerant flow system project for the Parkersburg Corrections Center, Parkersburg, Wood County, WV, per the bid requirements, specifications, Terms and conditions that are apart of this solicitation.

INVOICE TO		SHIP TO	
FISCAL DEPARTMENT DIVISION OF CORRECTIONS - CENTRAL OFFICE 1409 GREENBRIER ST STE 300		BUSINESS OFFICE PARKERSBURG CORRECTIONAL CTR 225 HOLIDAY HILLS DR	
CHARLESTON	WV25311	PARKERSBURG	WV 26104
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Phase II HVAC Project	0.00000			

Comm Code	Manufacturer	Specification	Model #
72151200	Toshiba Carrier		MMY-MAP-1686 FT 6P-UL

**Extended Description :**

Phase II HVAC Project Lump Sum Total

<b>COR1800000002</b>	<b>Document Phase</b> Final	<b>Document Description</b> ADDENDUM 3 Phase II HVAC Project at PCC	<b>Page 3</b> <b>of 3</b>
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**ADDITIONAL TERMS AND CONDITIONS**

See attached document(s) for additional Terms and Conditions

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: COR1800000002**

**Instructions:** Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

**Acknowledgment:** I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

**Addendum Numbers Received:**

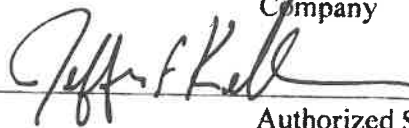
(Check the box next to each addendum received)

- |                                                    |                                          |
|----------------------------------------------------|------------------------------------------|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6  |
| <input checked="" type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7  |
| <input checked="" type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8  |
| <input type="checkbox"/> Addendum No. 4            | <input type="checkbox"/> Addendum No. 9  |
| <input type="checkbox"/> Addendum No. 5            | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

DSO Mechanical LLC

Company



Authorized Signature

9/19/17

Date

**NOTE:** This addendum acknowledgement should be submitted with the bid to expedite document processing.

Revised 6/8/2012

**ADDITIONAL TERMS AND CONDITIONS (Construction Contracts Only)**

**1. CONTRACTOR'S LICENSE:** West Virginia Code § 21-11-2 requires that all persons desiring to perform contracting work in this state be licensed. The West Virginia Contractors Licensing Board is empowered to issue the contractor's license. Applications for a contractor's license may be made by contacting the West Virginia Division of Labor. West Virginia Code § 21-11-11 requires any prospective Vendor to include the contractor's license number on its bid. If an apparent low bidder fails to submit a license number in accordance with this section, the Purchasing Division will promptly request by telephone and electronic mail that the low bidder and the second low bidder provide the license number within one business day of the request. Failure of the bidder to provide the license number within one business day of receiving the request shall result in disqualification of the bid. Vendors should include a contractor's license number in the space provided below.

Contractor's Name: DSO Mechanical LLC

Contractor's License No.: WV- 050370

The apparent successful Vendor must furnish a copy of its contractor's license prior to the issuance of a contract award document.

**2. DRUG-FREE WORKPLACE AFFIDAVIT:** W. Va. Code § 21-1D-5 provides that any solicitation for a public improvement contract requires each Vendor that submits a bid for the work to submit an affidavit that the Vendor has a written plan for a drug-free workplace policy. If the affidavit is not submitted with the bid submission, the Purchasing Division shall promptly request by telephone and electronic mail that the low bidder and second low bidder provide the affidavit within one business day of the request. Failure to submit the affidavit within one business day of receiving the request shall result in disqualification of the bid. To comply with this law, Vendor should complete the enclosed drug-free workplace affidavit and submit the same with its bid. Failure to submit the signed and notarized drugfree workplace affidavit or a similar affidavit that fully complies with the requirements of the applicable code, within one business day of being requested to do so shall result in disqualification of Vendor's bid. Pursuant to W. Va. Code 21-1D-2(b) and (k), this provision does not apply to public improvement contracts the value of which is \$100,000 or less or temporary or emergency repairs.

**2.1. DRUG-FREE WORKPLACE POLICY:** Pursuant to W. Va. Code § 21-1D-4, Vendor and its subcontractors must implement and maintain a written drug-free workplace policy that complies with said article. The awarding public authority shall cancel this contract if: (1) Vendor fails to implement and maintain a written drug-free workplace policy described in the preceding paragraph, (2) Vendor fails to provide information regarding implementation of its drug-free workplace policy at the request of the public authority; or (3) Vendor provides to the public authority false information regarding the contractor's drug-free workplace policy.

Pursuant to W. Va. Code 21-1D-2(b) and (k), this provision does not apply to public improvement contracts the value of which is \$100,000 or less or temporary or emergency repairs.

**3. DRUG FREE WORKPLACE REPORT:** Pursuant to W. Va. Code § 21-1D-7b, no less than once per year, or upon completion of the project, every contractor shall provide a certified report to the public authority which let the contract. For contracts over \$25,000, the public authority shall be the West Virginia Purchasing Division. For contracts of \$25,000 or less, the public authority shall be the agency issuing the contract. The report shall include:

- (1) Information to show that the education and training service to the requirements of West Virginia Code § 21-1D-5 was provided;
- (2) The name of the laboratory certified by the United States Department of Health and Human Services or its successor that performs the drug tests;
- (3) The average number of employees in connection with the construction on the public improvement;
- (4) Drug test results for the following categories including the number of positive tests and the number of negative tests: (A) Pre-employment and new hires; (B) Reasonable suspicion; (C) Post-accident; and (D) Random.

Vendor should utilize the attached Certified Drug Free Workplace Report Coversheet when submitting the report required hereunder. Pursuant to W. Va. Code 21-1D-2(b) and (k), this provision does not apply to public improvement contracts the value of which is \$100,000 or less or temporary or emergency repairs.

**4. AIA DOCUMENTS:** All construction contracts that will be completed in conjunction with architectural services procured under Chapter 5G of the West Virginia Code will be governed by the AIA A101-2007 and A201-2007 or the A107-2007 documents, as amended by the Supplementary Conditions for the State of West Virginia, in addition to the terms and conditions contained herein.

**5. GREEN BUILDINGS MINIMUM ENERGY STANDARDS:** In accordance with § 22-29-4, all new building construction projects of public agencies that have not entered the schematic design phase prior to July 1, 2012, or any building construction project receiving state grant funds and appropriations, including public schools, that have not entered the schematic design phase prior to July 1, 2012, shall be designed and constructed complying with the ICC International Energy Conservation Code, adopted by the State Fire Commission, and the ANSI/ASHRAE/IESNA Standard 90.1-2007: Provided, That if any construction project has a commitment of federal funds to pay for a portion of such project, this provision shall only apply to the extent such standards are consistent with the federal standards.

**6. LOCAL LABOR MARKET HIRING REQUIREMENT:** Pursuant to West Virginia Code §21-1C-1 et seq., Employers shall hire at least seventy-five percent of employees for public improvement construction projects from the local labor market, to be rounded off, with at least two employees from outside the local labor market permissible for each employer per project.

Any employer unable to employ the minimum number of employees from the local labor market shall inform the nearest office of the bureau of employment programs' division of employment services of the number of qualified employees needed and provide a job description of the positions to be filled.

If, within three business days following the placing of a job order, the division is unable to refer any qualified job applicants to the employer or refers less qualified job applicants than the number requested, then the division shall issue a waiver to the employer stating the unavailability of applicant and shall permit the employer to fill any positions covered by the waiver from outside the local labor market. The waiver shall be either oral or in writing and shall be issued within the prescribed three days. A waiver certificate shall be sent to both the employer for its permanent project records and to the public authority.

Any employer who violates any provision of this article is subject to a civil penalty of one hundred dollars per day of violation. The West Virginia Division of Labor is responsible for establishing procedures for the collection of civil penalties.

The following terms used in this section have the meaning shown below.

- (1) The term "construction project" means any construction, reconstruction, improvement, enlargement, painting, decorating or repair of any public improvement let to contract in an amount equal to or greater than \$500,000. The term "construction project" does not include temporary or emergency repairs;
- (2) The term "employee" means any person hired or permitted to perform hourly work for wages by a person, firm or corporation in the construction industry; The term "employee" does not include:(i) Bona fide employees of a public authority or individuals engaged in making temporary or emergency repairs;(ii) Bona fide independent contractors; or(iii) Salaried supervisory personnel necessary to assure efficient execution of the employee's work;
- (3) The term "employer" means any person, firm or corporation employing one or more employees on any public improvement and includes all contractors and subcontractors;
- (4) The term "local labor market" means every county in West Virginia and any county outside of West Virginia if any portion of that county is within fifty miles of the border of West Virginia;
- (5) The term "public improvement" includes the construction of all buildings, roads, highways, bridges, streets, alleys, sewers, ditches, sewage disposal plants, waterworks, airports and all other structures that may be let to contract by a public authority, excluding improvements funded, in whole or in part, by federal funds.

## 7. DAVIS-BACON AND RELATED ACT WAGE RATES:

- The work performed under this contract is federally funded in whole, or in part. Pursuant to \_\_\_\_\_, Vendors are required to pay applicable Davis-Bacon wage rates.
- The work performed under this contract is not subject to Davis-Bacon wage rates.

**8. SUBCONTRACTOR LIST SUBMISSION:** In accordance with W. Va. Code § 5-22-1, the apparent low bidder on a contract valued at more than \$250,000.00 for the construction, alteration, decoration, painting or improvement of a new or existing building or structure shall submit a list of all subcontractors who will perform more than \$25,000.00 of work on the project including labor and materials. (This section does not apply to any other construction projects, such as highway, mine reclamation, water or sewer projects.) The subcontractor list shall be provided to the Purchasing Division within one business day of the opening of bids for review. If the apparent low bidder fails to submit the subcontractor list, the Purchasing Division shall promptly request by telephone and electronic mail that the low bidder and second low bidder provide the subcontractor list within one business day of the request. Failure to submit the subcontractor list within one business day of receiving the request shall result in disqualification of the bid.

If no subcontractors who will perform more than \$25,000.00 of work are to be used to complete the project, the apparent low bidder must make this clear on the subcontractor list, in the bid itself, or in response to the Purchasing Division's request for the subcontractor list.

a. Required Information. The subcontractor list must contain the following information:

- i. Bidder's name
- ii. Name of each subcontractor performing more than \$25,000 of work on the project.
- iii. The license number of each subcontractor, as required by W. Va. Code § 21-11-1 et. seq.
- iv. If applicable, a notation that no subcontractor will be used to perform more than \$25,000.00 of work. (This item iv. is not required if the vendor makes this clear in the bid itself or in documentation following the request for the subcontractor list.)

b. Subcontractor List Submission Form: The subcontractor list may be submitted in any form, including the attached form, as long as the required information noted above is included. If any information is missing from the bidder's subcontractor list submission, it may be obtained from other documents such as bids, emails, letters, etc. that accompany the subcontractor list submission.



**c. Substitution of Subcontractor.** Written approval must be obtained from the State Spending Unit before any subcontractor substitution is permitted. Substitutions are not permitted unless:

- i. The subcontractor listed in the original bid has filed for bankruptcy;
- ii. The subcontractor in the original bid has been debarred or suspended; or
- iii. The contractor certifies in writing that the subcontractor listed in the original bid fails, is unable, or refuses to perform his subcontract.

Subcontractor List Submission (Construction Contracts Only)

Bidder's Name: DSO Mechanical LLC

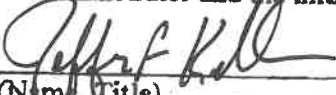
Check this box if no subcontractors will perform more than \$25,000.00 of work to complete the project.

Subcontractor Name	License Number if Required by W. Va. Code § 21-11-1 et. seq.
Plateau Electric	WV033642

Attach additional pages if necessary

Revised 07/07/2017

**DESIGNATED CONTACT:** Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

 Operations Manager  
\_\_\_\_\_  
(Name, Title) Jeffrey Kelley - Operations Manager

\_\_\_\_\_  
(Printed Name and Title) 515 3rd Avenue South Charleston WV 25303

\_\_\_\_\_  
(Address) (304) 744-8479 (304) 744-8491

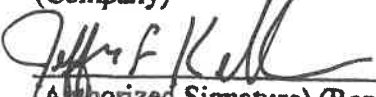
\_\_\_\_\_  
(Phone Number) / (Fax Number) jkelley@dsomech.com

\_\_\_\_\_  
(email address)

**CERTIFICATION AND SIGNATURE:** By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

DSO Mechanical LLC

\_\_\_\_\_  
(Company)

 Jeffrey Kelley - Operations Manager  
\_\_\_\_\_  
(Authorized Signature) (Representative Name, Title)

Jeffrey Kelley - Operations Manager

\_\_\_\_\_  
(Printed Name and Title of Authorized Representative)

9/19/17

\_\_\_\_\_  
(Date)

(304) 744-8479 (304) 744-8491

\_\_\_\_\_  
(Phone Number) (Fax Number)

REQUEST FOR QUOTATION  
PHASE II HVAC PROJECT AT PARKERSBURG CORRECTIONS CENTER,  
WOOD County, WV

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GENERAL CONSTRUCTION SPECIFICATIONS (No AIA Documents)

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of Parkersburg Correctional Center (PBCC), a West Virginia Division of Corrections Facility (DOC), to establish a contract for a lump sum quotation for the phase II HVAC project.

1.1 The project will include the general specifications, a project manual, and contract drawings. The project consists of the construction of a variable refrigerate flow system and below is additional information about the project:

1.1.1 Variable Refrigeration Flow System:

1.1.1.1 The variable refrigerate flow system will consist of two (2) 12-ton outdoor units that will be mounted on the roof, thirty-six (36) indoor ceiling mounted units, and four (4) indoor wall mounted units.

1.1.1.2 The outdoor units that will be installed on the roof will be located in the center of the roof area on the north end of the building. The contractor will have to install roof curves above the existing rubber membrane roof system.

Any work that must be done to the existing roof system must be done by N.F. Mansuetto & Sons, Inc. They were the contractor that installed the existing roof system and not to void the warranty, they must be the contractor to do any roof system modifications. Their address information is as follows: 116 Wood Street, Martins Ferry, OH 43935. The contact phone number is 740-633-7320.

1.1.1.3 The contractor must cut a hole through the existing concrete roof and install two (2) sets of three (3) refrigerant pipes into the north hallway of the second floor.

1.1.1.4 In the inner rooms on the second floor, there used to be a two (2) pipe water, HVAC system, that consisted of water and fan coil units in each of the rooms. The DOC has removed the existing system.

1.1.1.5 On the second floor, there are twenty-eight (28) housing rooms and four (4) multi-purpose rooms that the indoor ceiling mounted units must be installed. The multipurpose rooms will contain two (2) indoor ceiling mounted units each.

1.1.1.6 On the second floor, there are four (4) storage rooms that the indoor wall

REQUEST FOR QUOTATION  
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mounted units must be installed.

- 1.1.1.7 From the outdoor units to the selector boxes, for the main suction lines, the contractor must use solid straight refrigerant copper piping. It is believed that for the main suction lines that the pipe must be 1-1/8", but contractor must verify.
  - 1.1.1.8 From the selector boxes, for the liquid lines, the contractor can use refrigerant soft copper or line set piping. It is believed the for the liquid lines the pipe must be 7/8", but contractor must verify.
  - 1.1.1.9 The electrical for the outdoor units must be feed from Panel – B, 208-volt, three-phase, breaker slots: 1) Breakers 37, 39, and 41, 2) Breakers 38, 40, and 42. Contractor must provide breakers.
  - 1.1.1.10 The electrical for the indoor units must be feed from Panel – A, Panel – B, and Panel – C. Whichever is closer in each of the three hallways. Contractor can choose which breaker slots are open. Contractor must provide breakers.
  - 1.1.1.11 For each indoor unit, contractor must provide a thermostat control for each.
  - 1.1.1.12 The contractor must provide all addition materials required to install a complete variable refrigerant flow system.
- 1.2 The Vendor shall furnish all materials, labor, and equipment necessary to complete all Construction Services. The Vendor shall furnish any incidental work, materials, labor, and equipment that are necessary to complete the Construction Services, even if such incidental work is not explicitly included in the Project Plans.
2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions and in the Project Plans as defined below.
- 2.1 "Construction Services" means installation on a variable refrigeration flow system on the on the phase II project as more fully described in the Project Manual and Contract Drawings.
  - 2.2 "Pricing Page" means the pages contained in wvOASIS, attached hereto as Exhibit A, or included in the Project Plans upon which Vendor should list its proposed price for the Construction Services.

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2.3 "Solicitation" means the official notice of an opportunity to supply the State with Construction Services that is published by the Purchasing Division.

2.4 "Project Plans" means documents developed by an architect, an engineer, the Agency, or another design professional, which are attached hereto as Exhibit B, that provide detailed instructions on how the Construction Services are to be performed. In the event that Project Plans contain drawings or other documents too large to attach in Exhibit B, Vendors can obtain copies in accordance with Section 9 of these Specifications.

3. **ORDER OF PRECEDENCE:** This General Construction Specifications document will have priority over, and supersede, anything contained in the Project Plans.
4. **QUALIFICATIONS:** Vendor, or Vendor's staff if requirements are inherently limited to individuals rather than corporate entities, shall have the following minimum qualifications:
  - 4.1 The vendor's installer technicians must be factory trained, authorized to sell and service the manufacturer equipment that is being bid, with three (3) years' experience.
  - 4.2 At all times, vendor shall ensure appropriately trained and qualified technicians do the installation.
  - 4.3 **Experience:** Vendor, or Vendor's supervisory staff assigned to this project, must have successfully completed at least three (3) projects that involved work similar to that described in these specifications or the Project Plans. Compliance with this experience requirement will be determined prior to contract award by the State through references provided by the Vendor upon request, through knowledge or documentation of the Vendor's past projects, through confirmation of experience requirements from the architect assisting the State in this project, or some other method that the State determines to be acceptable. Vendor must provide any documentation requested by the State to assist in confirmation of compliance with this provision. References, documentation, or other information to confirm compliance with this experience requirement may be requested after bid opening and prior to contract award.
5. **CONTRACT AWARD:** The Contract is intended to provide Agency with a purchase price for the Construction Services. The Contract will be awarded to the lowest qualified responsible bidder meeting the required specifications. If the Pricing Pages contain alternates/add-ons, the Contract will be awarded based on the grand total of the base bid and any alternates/add-ons selected.
6. **SELECTION OF ALTERNATES:** Pursuant to W. Va. Code § 5-22-1(e), if the Pricing Pages contain alternates/add-ons, there must be no more than seven listed, and the alternates/add-ons will be selected in the order of priority listed on the Pricing Pages. The first

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alternate/add-on must be selected before the second alternate/add-on can be selected and so on. Provided, that Agency may accept an alternate out of the listed order if acceptance would not affect determination of the lowest qualified responsible bidder. Any unaccepted alternate contained within a bid shall expire one hundred fifty days after the date of the opening of bids for review.

7. **PERFORMANCE:** Vendor shall perform the Construction Services in accordance with this document and the Project Plans.
8. **SUBSTITUTIONS:** Any substitution requests must be submitted in accordance with the official question and answer period described in the INSTRUCTIONS TO VENDORS SUBMITTING BIDS, Paragraph 4. Vendor Question Deadline. Vendors submitting substitution requests should submit product brochures and product specifications during the official question and answer period.
9. **PROJECT PLANS:** The checked box will apply to Project Plans for this solicitation.
- No Additional Project Plan Documents:** There are no additional Project Plans other than those attached hereto as Exhibit B or any subsequent addenda modifying Exhibit B.

**10. CONDITIONS OF THE WORK**

- 10.1. **Permits:** The Vendor shall procure all necessary permits and licenses to comply with all applicable Federal, State, or Local laws, regulations and ordinances of any regulating body.
- 10.2. **Existing Conditions:** If discrepancies are discovered between the existing conditions and those noted in the specifications, Vendor must immediately notify the Agency's representative. Vendor must also immediately notify the Agency if suspected hazardous materials are encountered.
- 10.3. **Standard Work Hours:** The standard hours for this contract are listed below, excluding holidays recognized by the State of West Virginia. Any work outside of the standard hours of work must be approved in advance at the Agency's sole discretion. Authorization of work outside of the standard hours of work will not entitle Vendor to additional compensation.
- 10.3.1 **On-Site Work Hours:** Limit work in the existing buildings to normal business working hours specified below:
- 10.3.1.1 The standard hours of work for this Contract will be Monday thru Friday from 8:00 am until 4:00 pm.

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**10.3.1.2** If the vendor wishes to work a different schedule other than what was previously stated, the DOC facility will work with the vendor. For example, the vendor works for four (4) days a week for a ten (10) hour shift each day.

**10.3.1.3** Vendor should not plan on working at the DOC facility on any holiday recognized by the State of West Virginia. This is due to the reduced amount of DOC facility staff members that would be available to escort the vendor staff.

**10.3.1.3.1** State Holidays are:

- o New Year's Day (January 1)
- o Martin Luther King Day (Third Monday in January)
- o President's Day (Third Monday in February)
- o Memorial Day (Last Monday in May)
- o West Virginia Day (June 20)
- o Independence Day (July 4)
- o Labor Day (First Monday in September)
- o Columbus Day (Second Monday in October)
- o Veterans Day (November 11)
- o Thanksgiving (Fourth Thursday in November)
- o Day After Thanksgiving (Fourth Friday in November)
- o Christmas Day (December 25)

**10.3.1.4** All work done within the secure area, work times and coordinated areas, will be at the discretion of the DOC facility administration.

**10.3.1.5** If for any reason, the vendor wishes to work other than the previous stated days and hours, the request must be turned into the Facility at least forty-eight (48) hours in advance for approval. The request must be submitted to the Associate Warden of Operations or designee.

**10.4. Project Closeout:** Project Closeout shall include the following:

**10.4.1. Final Cleanup:** Vendor shall perform the final cleanup activities listed below, along with any other final cleanup activities normally associated with the work performed under this Contract, prior to final inspection:

**10.4.1.1** Return the job site to its original condition upon completion of the work.

**10.4.2. Final Inspection:** Vendor shall participate in a final inspection with the Agency's project manager. The purpose of the final inspection will be to identify deficiencies that need to be remedied prior to Agency's final



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acceptance of the work. Vendor shall at all times be obligated to perform in accordance with the Contract and must take all actions necessary to ensure that work complies with requirements of Contract prior to final acceptance. Final acceptance does not waive or release Vendor from its obligation to ensure that work complies with the Contract requirements. Vendor shall submit any warranty documents to the Agency project manager at final inspection.

**11. FACILITIES ACCESS:** Performance of Contract Services may require access cards and/or keys to gain entrance to Agency's facilities. In the event that access cards and/or keys are required:

11.1. Please note that the vendor will not be issued access cards and/or keys on this project.

11.2. Vendor must identify principal service personnel which will be issued access cards and/or keys to perform service.

11.3. Vendor will be responsible for controlling cards and keys and will pay replacement fee, if the cards or keys become lost or stolen.

11.4. Vendor shall notify Agency immediately of any lost, stolen, or missing card or key.

11.5. Anyone performing under this Contract will be subject to Agency's security protocol and procedures.

11.6. Vendor shall inform all staff of Agency's security protocol and procedures.

**12. MISCELLANEOUS:**

12.1. **Contract Manager:** During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: Jeffrey Kelley

Telephone Number: (304)744-8479

Fax Number: (304)744-8491

Email Address: jkelly@dsomech.com

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Exhibit A - Pricing Page

WEST VIRGINIA DIVISION OF CORRECTION / PARKERSBURG CORRECTIONAL CENTER  
225 HOLIDAY HILLS DRIVE  
PARKERSBURG, WOOD COUNTY, WV, 26104

PHASE II: HVAC PROJECT

Vendor's Company Name: DSO Mechanical LLC

Vendor's Address:

515 3rd Avenue

South Charleton WV 25303

Phone Number: (304) 744-8479

Fax Number: (304) 744-8491

Email Address: jkelly@dsomech.com

WV Contractor's License Number: WV-050370

We, the undersigned, hereby propose to furnish all materials, equipment, and labor to complete all work in a workmanlike manner, as described in the Bidding Documents.

TOTAL BID AMOUNT: 263,270

(\$ Two hundred Sixty Three Thousand Two hundred seventy  
(Total bid amount to be written in words and numbers.)



State of West Virginia  
DRUG FREE WORKPLACE CONFORMANCE AFFIDAVIT  
West Virginia Code §21-1D-5

STATE OF WEST VIRGINIA,  
COUNTY OF Kanawha, TO-WIT:

I, Jeffrey Kelley, after being first duly sworn, depose and state as follows:

1. I am an employee of DSO Mechanical LLC; and,  
(Company Name)
2. I do hereby attest that DSO Mechanical LLC  
(Company Name)

maintains a written plan for a drug-free workplace policy and that such plan and policy are in compliance with *West Virginia Code §21-1D*.

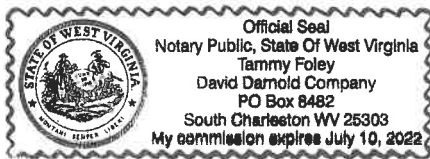
The above statements are sworn to under the penalty of perjury.

Printed Name: Jeffrey Kelley  
 Signature: *Jeffrey Kelley*  
 Title: Operations Manager  
 Company Name: DSO Mechanical LLC  
 Date: 9/19/17

Taken, subscribed and sworn to before me this 19 day of September, 2017.

By Commission expires 7/10/22

(Seal)



*Tammy Foley*  
(Notary Public)

STATE OF WEST VIRGINIA  
Purchasing Division

PURCHASING AFFIDAVIT

**CONSTRUCTION CONTRACTS:** Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

**ALL OTHER CONTRACTS:** Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

**EXCEPTION:** The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

**DEFINITIONS:**

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

**AFFIRMATION:** By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

**WITNESS THE FOLLOWING SIGNATURE:**

Vendor's Name: DSO Mechanical LLC

Authorized Signature: [Signature] Date: 9/19/17

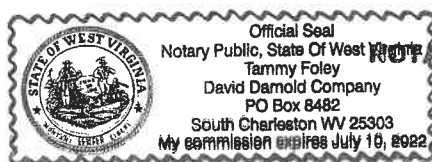
State of WV

County of Kanawha, to-wit:

Taken, subscribed, and sworn to before me this 19 day of September, 2017.

My Commission expires 7/10/, 2022.

AFFIX SEAL HERE



NOTARY PUBLIC

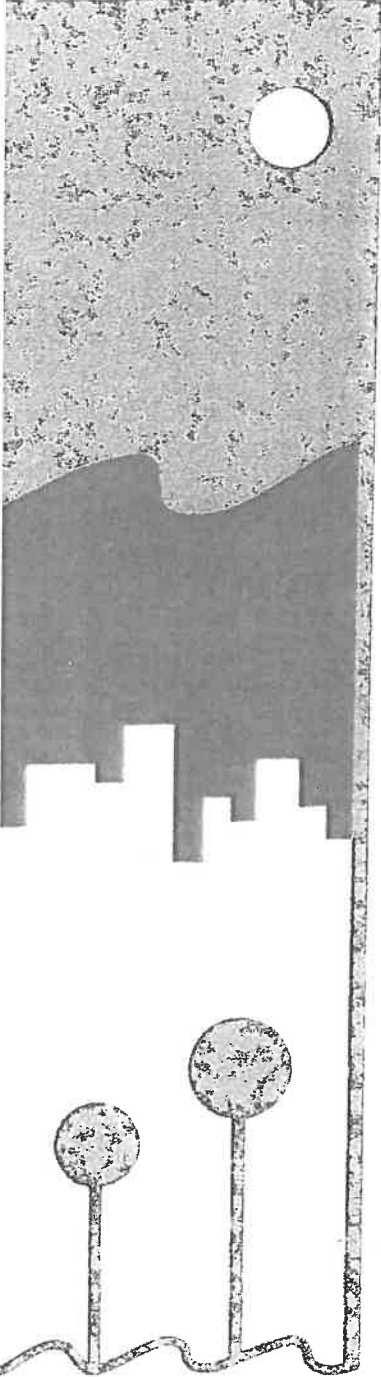
[Signature]



# CONTRACTOR LICENSE

Authorized by the

West Virginia Contractor Licensing Board



Number: WV050370

**Classification:**

HEATING, VENTILATING & COOLING  
PLUMBING

DSO MECHANICAL LLC  
DBA DSO MECHANICAL LLC  
PO BOX 8482  
SOUTH CHARLESTON, WV 25303

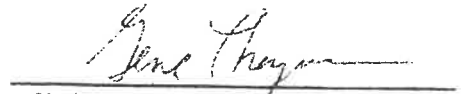
**Date Issued**

**Expiration Date**

JANUARY 21, 2017

JANUARY 21, 2018

  
Authorized Company Signature

  
Chair, West Virginia Contractor  
Licensing Board

**WEST VIRGINIA  
CONTRACTOR  
LICENSING  
BOARD**



This license, or a copy thereof, must be posted in a conspicuous place at every construction site where work is being performed. This license number must appear in all advertisements, on all bid submissions and on all fully executed and binding contracts. This license cannot be assigned or transferred by licensee. Issued under provisions of West Virginia Code, Chapter 21, Article 11.

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned, DSO Mechancial LLC  
of 515 West 3rd St., S. Charleston WV 25303, as Principal, and Western Surety Company  
of Sioux Falls, South Dakota, a corporation organized and existing under the laws of the State of South Dakota with its principal office in the City of Chicago, as Surety, are held and firmly bound unto the State of West Virginia, as Obligee, in the penal sum of 5% of the total amount bid (\$                    ) for the payment of which, well and truly to be made, we jointly and severally bind ourselves, our heirs, administrators, executors, successors and assigns.

The Condition of the above obligation is such that whereas the Principal has submitted to the Purchasing Section of the Department of Administration a certain bid or proposal, attached hereto and made a part hereof, to enter into a contract in writing for Division of Corrections  
1 Phase II HVAC Project at PCC  
CRFQ 0608 COR1800000002

NOW THEREFORE,

- (a) If said bid shall be rejected, or
- (b) If said bid shall be accepted and the Principal shall enter into a contract in accordance with the bid or proposal attached hereto and shall furnish any other bonds and insurance required by the bid or proposal, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be null and void, otherwise this obligation shall remain in full force and effect. It is expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for the value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

WITNESS, the following signatures and seals of Principal and Surety, executed and sealed by a proper officer of Principal and Surety, or by Principal individually if Principal is an individual, this 31st day of August, 2017.

Principal Seal

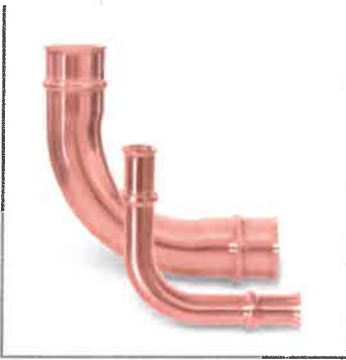
DSO Mechanical LLC  
(Name of Principal)  
By [Signature]  
(Must be President, Vice President, or Duly Authorized Agent)  
Operations Manager  
(Title)

Surety Seal

Western Surety Company  
(Name of Surety)  
[Signature]  
Attorney-in-Fact  
Mary E. Brenner-Miller

**IMPORTANT – Surety executing bonds must be licensed in West Virginia to transact surety insurance, must affix its seal, and must attach a power of attorney with its seal affixed.**





aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



**RDR HVAC/R**  
RATED UP TO  
**700 PSI**

# ZoomLock™

**FLAME-FREE  
REFRIGERANT FITTINGS**

## ZoomLock™ Flame-Free Refrigerant Fittings

Catalog K-1, Engineering Submittal, June 2017



ENGINEERING YOUR SUCCESS.

## PARKER SAFETY GUIDE FOR SELECTING AND USING ZOOMLOCK FITTINGS AND RELATED ACCESSORIES

# WARNING

**FAILURE TO FOLLOW INSTALLATION INSTRUCTIONS, IMPROPER SELECTION OR IMPROPER USE OF ZOOMLOCK FITTINGS AND RELATED ACCESSORIES (“PRODUCTS”) CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE, IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:**

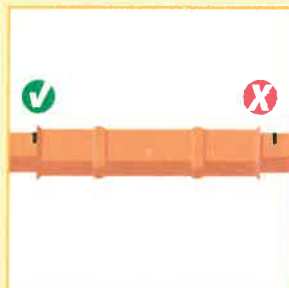
- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocutation from high voltage electric power lines.
- Contact with suddenly moving or falling objects that are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping copper line.
- Contact with conveyed fluids that may be hot, cold, toxic or otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion from flammable liquids.

**BEFORE SELECTING OR USING ANY OF THESE PRODUCTS, IT IS IMPORTANT THAT YOU READ AND FOLLOW THE INSTALLATION INSTRUCTIONS.**

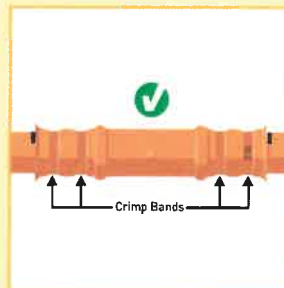
## KEY STEPS FOR SAFETY



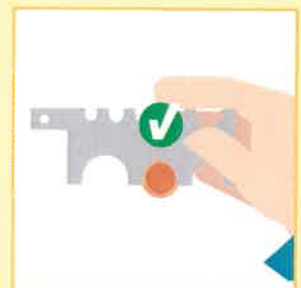
**MARK  
TUBE DEPTH**



**CHECK  
TUBE DEPTH**



**CHECK FOR “RLS”  
MARK AFTER CRIMP**



**CHECK CRIMP  
WITH CRIMP GAUGE**

### **⚠ WARNING – USER RESPONSIBILITY**

**Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.**

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

For safety information see the Safety Guide at [www.parker.com/safety](http://www.parker.com/safety) or call 1-800-CParker.

### **OFFER OF SALE**

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the detailed “Offer of Sale” elsewhere in this document or available at [www.parker.com](http://www.parker.com).

Catalog K-1, June 2017 supersedes Catalog K-1, May 2016 and all prior publications.



# ZoomLock Flame-Free Refrigerant Fittings

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**Fittings**  
pages 6-10



**Tool Kits**  
page 12



**Jaw Kits**  
page 12

### Compatible Components

To make a system convenient to install, ODM x ODM ZoomLock compatible components are available including:

- Ball Valves
- Filter-Driers
- Moisture and Liquid Indicators
- Solenoid Valves



### ATTENTION!

**WARRANTY COULD BE VOID IF ZOOMLOCK IS NOT APPLIED PER INSTRUCTIONS! CAREFULLY READ ALL INSTALLATION INSTRUCTIONS (SEE PAGES 16-17) AND WATCH VIDEOS.**



<http://solutions.parker.com/zoomvid>

# ZoomLock™

## FLAME-FREE REFRIGERANT FITTINGS *Increase productivity and profitability*

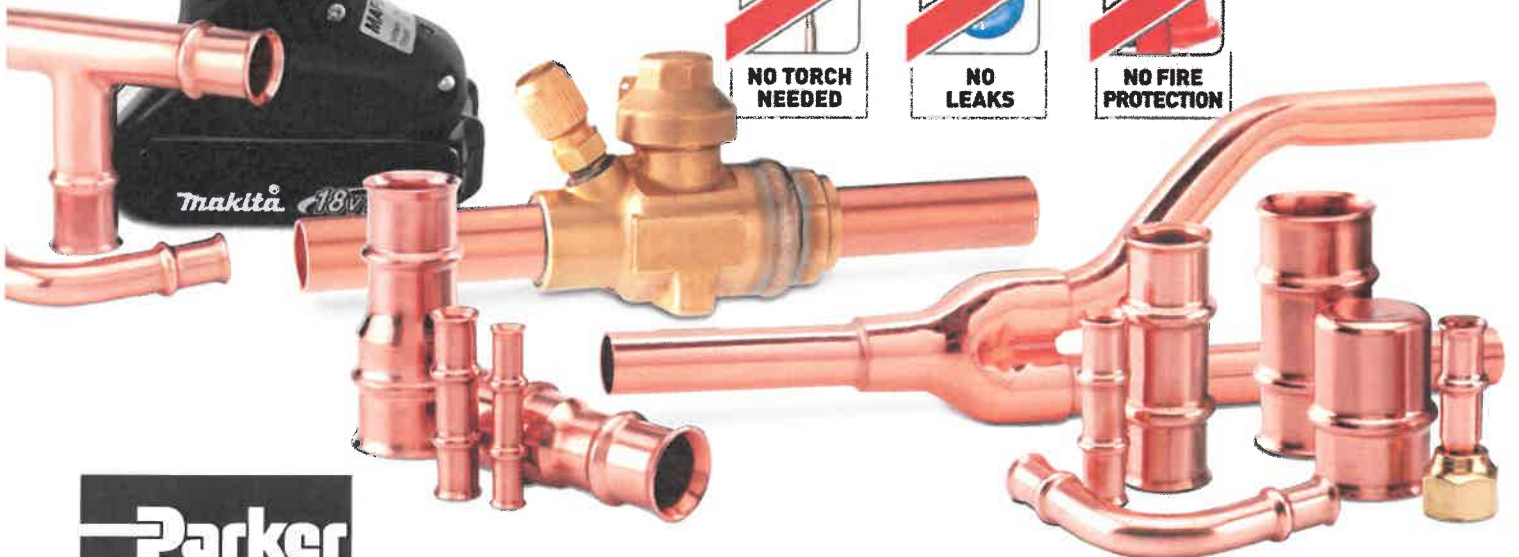
ZoomLock™ flame-free refrigerant fittings are specially designed to work without brazing, which automatically makes your job simpler and faster when joining copper tubes.

Professionals who have tried ZoomLock flame-free refrigerant fittings report their time and labor costs on tube connections are typically reduced 60% on average by eliminating the need for brazing. The biggest benefits are **more productivity and increased profit**, but there are also many other exciting advantages to flame-free tube connecting.



### The ZoomLock Advantage

- For HVAC/R up to 700 psi
- Huge labor and time savings
- Less equipment required
- Safer conditions, no fire hazards
- No hot-work permit
- No need to nitrogen-purge
- More flexible access to job sites



# ZoomLock Flame-Free Refrigerant Fittings



## Applications

- High Pressure HVAC/R
- Glycol
- Non-Potable Water

## Product Parameters

- **Continuous Operating Temperature:**  
250°F / 121°C
- **O-Ring Temperature Rating:**  
-40°F to +300°F  
-40°C to +149°C
- **Maximum Rated Pressure (MRP):**  
700 psi / 48 bar
- **Minimum Burst Pressure (UL 207):**  
2,100 psi / 145 bar
- **Vacuum Pressure Capability:**  
20 Microns
- **External Leak Rate:**  
<0.1 Ounces of Helium per Year at Operating Pressure Range
- **Vibration Resistance:**  
Conforms to UL109
- **Size Availability (Inches):**  
1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8

## Fitting Materials

- **Fitting Body:**  
Refrigerant Grade Copper, per ASTM-B75 or ASTM-B743
- **O-Ring:**  
HNBR

## Fitting Warranty

- 5 years from date of install. Read page 28 for more details.

## Compatibility

- **Approved Oils:**  
Mineral Oil, POE, PVE, PAG
- **Approved Tubing Materials:**  
Copper to Copper Connections
- **Approved Tubing Tolerance:**  
Meets ASTM B280
- **Approved Copper Tubing Types for Use with Klauke® 15 kN Compatible Jaws:**  
Hard Copper (Drawn)
  - 1/4" – 1-1/8" Type ACR, M, L
  - Type K only up to 7/8"
 Soft Copper (Annealed)
  - 1/4" – 1-1/8" Type ACR, L
  - Type K only up to 7/8"
- **Approved Copper Tubing Types for Use with Klauke® 19 kN and RIDGID® Compatible Jaws:**  
Hard Copper (Drawn)
  - 1/4" – 1-3/8" Type ACR, M, L, K
 Soft Copper (Annealed)
  - 1/4" – 1-3/8" Type ACR, L, K

## Agency Approvals and Certifications

- UL 207, SA#33958, SDTW(7) (Except where noted)
- ASHRAE-15
- ICC-ES, PMG-1296
  - 2015 IMC (International Mechanical Code)
  - 2015 IRC (International Residential Code)
  - 2015 UMC (Uniform Mechanical Code)
- CRN
  - Approved for couplings and 90 degree elbows
  - More fittings coming soon

## Approved Refrigerants

- |          |         |
|----------|---------|
| ■ 1234yf | ■ 449A  |
| ■ 1234ze | ■ 450A  |
| ■ 125    | ■ 452A  |
| ■ 134a   | ■ 452B  |
| ■ 143a   | ■ 507   |
| ■ 404A   | ■ 513A  |
| ■ 407A   | ■ 718   |
| ■ 407C   | ■ 32*   |
| ■ 407F   | ■ 290*  |
| ■ 410A   | ■ 600*  |
| ■ 447A   | ■ 600a* |
| ■ 448A   |         |

\*Flammable refrigerants. Check with Local Building or Mechanical Code Officials.

## Patents

- U.S. Patent No.
  - 9,145,992
  - 9,638,361
  - D730,494
- Australian Patent No.
  - 2012362443
- Japanese Patent No.
  - 6051468
- Other pending patent applications



RIDGID is a registered trademark of RIDGID, Inc.



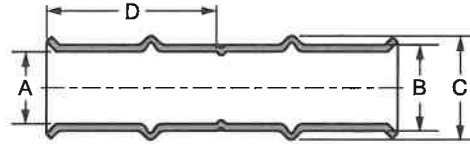


# ZoomLock Flame-Free Refrigerant Fittings

## Couplings



### Dimensions

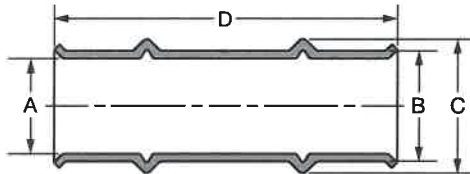


Size	Part Number	Description	Dimensions							
			A		B		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/4	770500	PZK-C4-HNBR	0.26	6.6	0.34	8.6	0.45	11.5	0.95	24.1
5/16	770501	PZK-C5-HNBR	0.32	8.2	0.40	10.2	0.52	13.1	0.93	23.6
3/8	770502	PZK-C6-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	0.98	24.9
1/2	770503	PZK-C8-HNBR	0.51	13.0	0.59	15.0	0.73	18.6	1.25	31.8
5/8	770504	PZK-C10-HNBR	0.64	16.1	0.74	18.7	0.89	22.5	1.24	31.5
3/4	770505	PZK-C12-HNBR	0.76	19.3	0.88	22.4	1.07	27.2	1.29	32.8
7/8	770506	PZK-C14-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	1.31	33.3
1-1/8	770507	PZK-C18-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	1.29	32.8
1-3/8*	770508	PZK-C22-HNBR	1.39	35.3	1.54	39.1	1.75	44.5	1.57	39.9

## Slip Couplings



### Dimensions

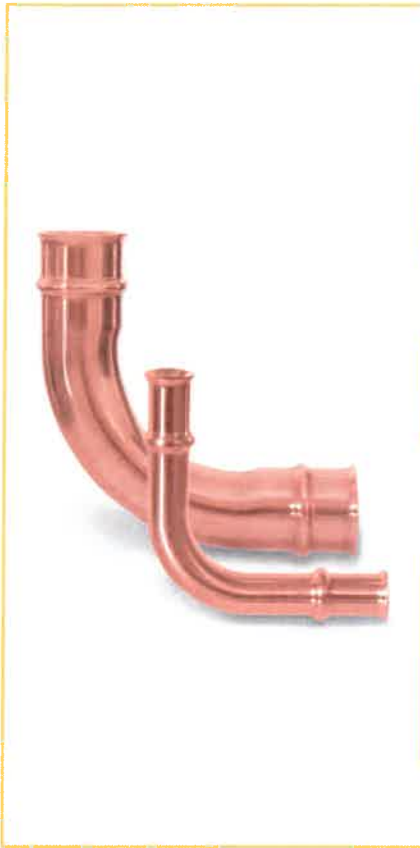


Size	Part Number	Description	Dimensions							
			A		B		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/4	770550	PZK-RC4-HNBR	0.26	6.6	0.34	8.6	0.45	11.5	2.00	50.8
3/8	770552	PZK-RC6-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	2.05	52.1
1/2	770553	PZK-RC8-HNBR	0.51	13.0	0.59	15.0	0.73	18.6	2.74	69.6
5/8	770554	PZK-RC10-HNBR	0.64	16.1	0.74	18.7	0.89	22.5	2.75	69.9
3/4	770555	PZK-RC12-HNBR	0.76	19.3	0.88	22.4	1.07	27.2	2.75	69.9
7/8	770556	PZK-RC14-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	2.74	69.9
1-1/8	770557	PZK-RC18-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	2.77	70.4
1-3/8*	770558	PZK-RC22-HNBR	1.39	35.3	1.54	39.1	1.75	44.5	1.57	39.9

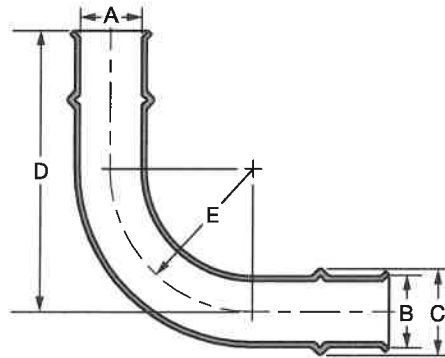
\*ZoomLock 1-3/8" fittings can only be crimped with 19 kN Klauke tools or RIDGID crimping jaws.

# ZoomLock Flame-Free Refrigerant Fittings

## Long Radius Elbows

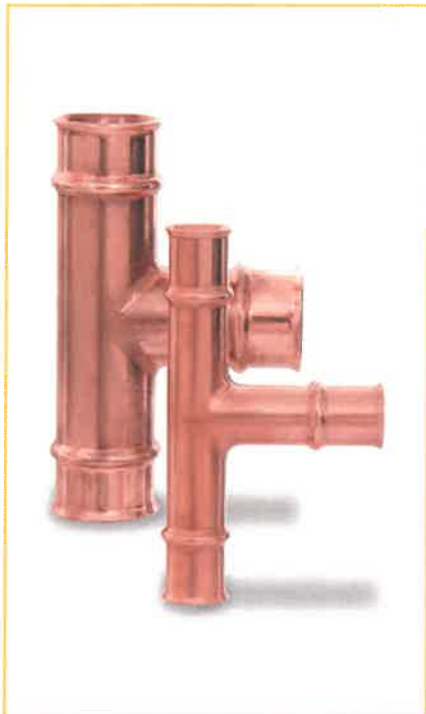


### Dimensions

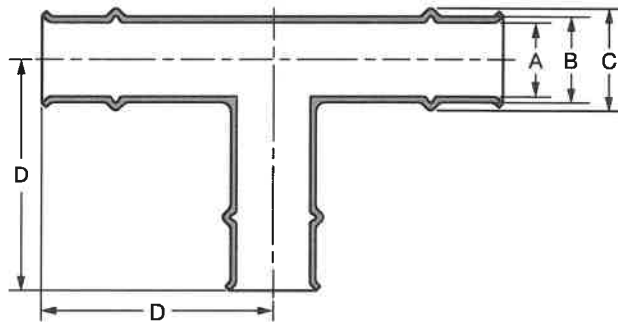


Size	Part Number	Description	Dimensions									
			A		B		C		D		E (Ref.)	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/4	770600	PZK-90E4-HNBR	0.26	6.6	0.34	8.6	0.45	11.5	2.01	51.1	0.50	12.7
5/16	770601	PZK-90E5-HNBR	0.32	8.2	0.40	10.2	0.52	13.1	2.13	54.1	0.60	15.2
3/8	770602	PZK-90E6-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	2.27	57.7	0.65	16.5
1/2	770603	PZK-90E8-HNBR	0.51	13.0	0.59	15.0	0.73	18.6	2.88	73.2	0.90	22.9
5/8	770604	PZK-90E10-HNBR	0.64	16.1	0.74	18.7	0.89	22.5	3.21	81.4	1.13	28.7
3/4	770605	PZK-90E12-HNBR	0.76	19.3	0.88	22.4	1.07	27.2	3.47	88.0	1.50	38.1
7/8	770606	PZK-90E14-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	3.75	95.3	2.25	57.2
1-1/8	770607	PZK-90E18-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	4.29	108.8	2.85	72.4
1-3/8*	770608	PZK-90E22-HNBR	1.39	35.3	1.54	39.1	1.75	44.5	4.54	115.3	3.05	77.5

## Tees



### Dimensions



Size	Part Number	Description	Dimensions									
			A		B		C		D			
			Inch	mm	Inch	mm	Inch	mm	Inch	mm		
3/8	770702	PZK-T6-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	1.63	41.4		
1/2	770703	PZK-T8-HNBR	0.51	13.0	0.59	15.0	0.72	18.2	2.23	56.6		
5/8	770704	PZK-T10-HNBR	0.64	16.1	0.74	18.7	0.87	22.0	2.29	58.2		
3/4	770705	PZK-T12-HNBR	0.76	19.3	0.88	22.4	1.05	26.6	2.37	60.2		
7/8	770706	PZK-T14-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	2.44	62.0		
1-1/8	770707	PZK-T18-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	2.56	65.0		
1-3/8*	770708	PZK-T22-HNBR	1.39	35.2	1.54	39.0	1.75	44.4	2.75	69.9		

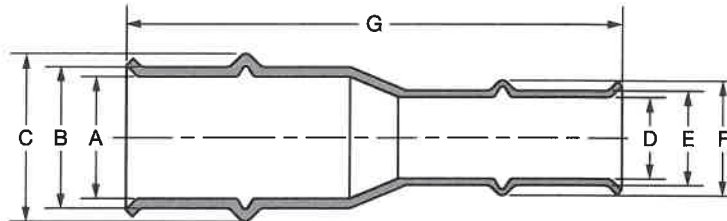
\*ZoomLock 1-3/8" fittings can only be crimped with 19 kN Klauke tools or RIDGID crimping jaws.

# ZoomLock Flame-Free Refrigerant Fittings

## Reducers



### Dimensions

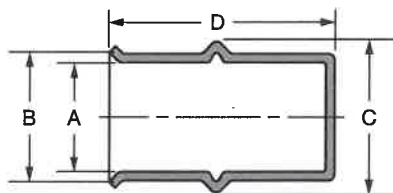


Size	Part Number	Description	Dimensions													
			A		B		C		D		E		F		G	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
3/8 in to 1/4	770800	PZK-R64-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	0.26	6.6	0.34	8.6	0.45	11.5	2.20	55.9
1/2 in to 1/4	770808	PZK-R84-HNBR	0.51	13.0	0.59	15.0	0.73	18.6	0.26	6.6	0.34	8.6	0.45	11.5	2.63	66.8
1/2 in to 3/8	770801	PZK-R86-HNBR	0.51	13.0	0.59	15.0	0.73	18.6	0.39	9.8	0.47	11.8	0.58	14.8	2.63	66.8
5/8 in to 1/4	770809	PZK-R104-HNBR	0.64	16.1	0.74	18.7	0.89	22.5	0.26	6.6	0.34	8.6	0.45	11.5	2.70	68.6
5/8 in to 3/8	770810	PZK-R106-HNBR	0.64	16.1	0.74	18.7	0.89	22.5	0.39	9.8	0.47	11.8	0.58	14.8	2.70	68.6
5/8 in to 1/2	770802	PZK-R108-HNBR	0.64	16.1	0.74	18.7	0.87	22.0	0.51	13.0	0.59	15.0	0.72	18.2	3.00	76.2
3/4 in to 1/2	770811	PZK-R128-HNBR	0.76	19.3	0.88	22.4	1.05	26.6	0.51	13.0	0.59	15.0	0.72	18.2	3.10	78.7
3/4 in to 5/8	770803	PZK-R1210-HNBR	0.76	19.3	0.88	22.4	1.05	26.6	0.64	16.1	0.74	18.7	0.87	22.0	3.00	76.2
7/8 in to 1/2	770812	PZK-R148-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	0.51	13.0	0.59	15.0	0.72	18.2	3.05	77.5
7/8 in to 5/8	770804	PZK-R1410-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	0.64	16.1	0.74	18.7	0.87	22.0	3.05	77.5
7/8 in to 3/4	770805	PZK-R1412-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	0.76	19.3	0.88	22.4	1.05	26.6	3.11	79.0
1-1/8 in to 1/2	770813	PZK-R188-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	0.51	13.0	0.60	15.0	0.72	18.2	3.25	82.6
1-1/8 in to 5/8	770814	PZK-R1810-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	0.64	16.1	0.74	18.7	0.87	22.0	3.25	82.6
1-1/8 in to 3/4	770806	PZK-R1812-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	0.76	19.3	0.88	22.4	1.05	26.6	3.25	82.6
1-1/8 in to 7/8	770807	PZK-R1814-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	0.89	22.5	1.02	25.8	1.12	28.4	3.11	79.0

## Caps



### Dimensions



Size	Part Number	Description	Dimensions							
			A		B		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/4	770900	PZK-CP4-HNBR	0.26	6.6	0.34	8.6	0.45	11.5	1.11	28.2
5/16	770901	PZK-CP5-HNBR	0.32	8.2	0.40	10.2	0.52	13.1	1.11	28.2
3/8	770902	PZK-CP6-HNBR	0.39	9.8	0.47	11.8	0.58	14.8	1.13	28.7
1/2	770903	PZK-CP8-HNBR	0.51	13.0	0.59	15.0	0.72	18.2	1.47	37.3
5/8	770904	PZK-CP10-HNBR	0.64	16.1	0.74	18.7	0.87	22.0	1.56	39.6
3/4	770905	PZK-CP12-HNBR	0.76	19.3	0.88	22.4	1.05	26.6	1.57	39.9
7/8	770906	PZK-CP14-HNBR	0.89	22.5	1.02	25.8	1.19	30.2	1.60	40.6
1-1/8	770907	PZK-CP18-HNBR	1.14	28.8	1.29	32.6	1.44	36.7	2.05	52.1
1-3/8*	770908	PZK-CP22-HNBR	1.39	35.2	1.54	39.0	1.75	44.4	2.11	53.6

\*ZoomLock 1-3/8" fittings can only be crimped with 19 kN Klauke tools or RIDGID crimping jaws.

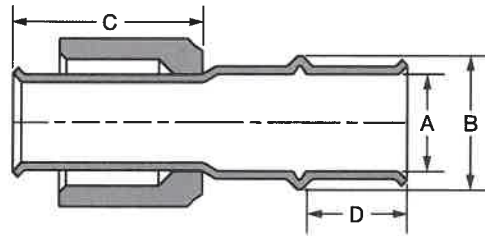


# ZoomLock Flame-Free Refrigerant Fittings

## SAE Flare

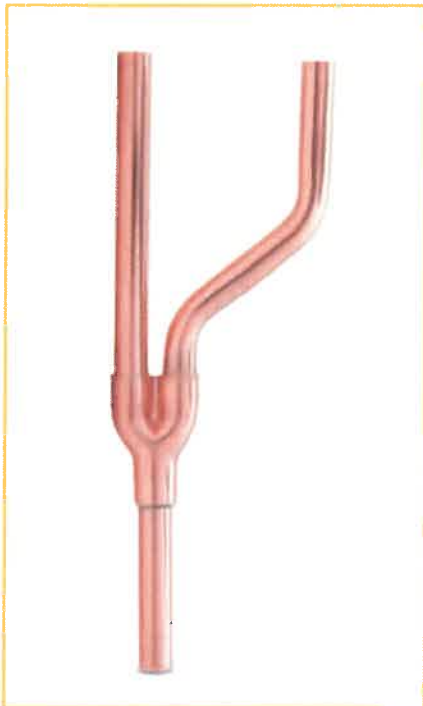


### Dimensions

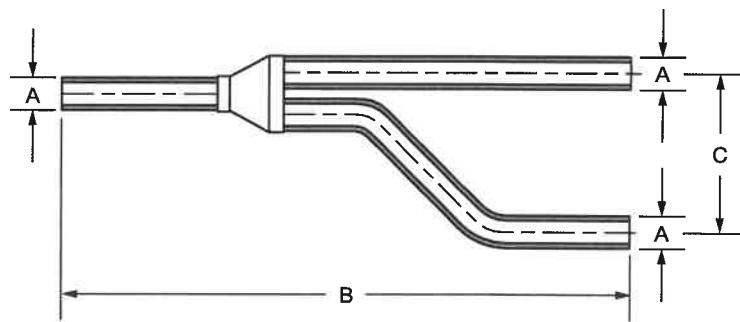


Size	Part Number	Description	Dimensions							
			A		B		C		D	
			Inch	mm	Inch	mm	Inch	mm	Inch	mm
1/4	771000	PZK-F4-HNBR	0.26	6.6	0.45	11.5	1.38	35.1	0.56	14.2
3/8	771002	PZK-F6-HNBR	0.39	9.8	0.59	14.9	1.38	35.1	0.58	14.7
1/2	771003	PZK-F8-HNBR	0.51	13.0	0.72	18.2	1.13	28.7	0.75	19.1
5/8	771004	PZK-F10-HNBR	0.64	16.1	0.87	22.1	1.48	37.6	0.75	19.1
3/4	771005	PZK-F12-HNBR	0.76	19.3	1.05	26.7	1.48	37.6	0.80	20.3

## Coming Soon! Y-Joints



### Dimensions



Size	Part Number	Description	Dimensions					
			A		B		C	
			Inch	mm	Inch	mm	Inch	mm
3/8	771102	PZK-Y6-NA	0.38	9.53	7.59	192.00	2.37	60.00
1/2	771103	PZK-Y8-NA	0.50	12.70	8.97	227.00	2.49	63.00
5/8	771104	PZK-Y10-NA	0.63	15.88	9.49	240.00	2.61	66.00
3/4	771105	PZK-Y12-NA	0.75	19.05	10.20	258.00	2.73	69.00
7/8	771106	PZK-Y14-NA	0.88	22.23	12.13	307.00	2.89	73.00
1-1/8	771107	PZK-Y18-NA	1.13	28.57	13.16	333.00	3.56	90.00

Note: Not UL Approved.

# ZoomLock Flame-Free Refrigerant Fittings

## Coming Soon!

### COUPLINGS

Size (Inches):  
1, 1-1/4



### ELBOWS - 45°

Sizes (Inches):  
3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8,  
1-3/8



### LONG RADIUS

ELBOWS - 90°  
Sizes (Inches):  
1, 1-1/4



### LONG RADIUS STREET ELBOWS - 90°

Sizes (Inches):  
1/2, 5/8, 3/4, 7/8, 1-1/8,  
1-3/8



### P-TRAPS

ODM x ODM

Sizes (Inches):  
1/2, 5/8, 3/4, 7/8, 1-1/8,  
1-3/8



Note:  
Not UL  
Approved.

### REDUCERS

Size (Inches):  
1-3/8 to 1-1/8  
1-3/8 to 7/8



### REDUCING BUSHINGS

ODM x ZoomLock

Adapter Sizes (Inches):

1/2 to 3/8  
5/8 to 1/2  
3/4 to 5/8  
7/8 to 3/4  
1-1/8 to 7/8  
1-3/8 to 1-1/8



Adapter  
Bushing

### TEES

Sizes (Inches):  
1, 1-1/4





# Crimping Tools

## Features

- Lightweight design increases productivity
- Short pressing cycle, 5-7 seconds
- Compact design and 350° jaw rotation allows technician to install in tight spaces
- Automatic piston return
- Safety feature that allows crimp cycle to be interrupted
  - Feature allows manual release of piston, if needed
- High-quality, powerful Makita Li-Ion technology for lasting, battery-powered pressing
  - 100-150 Crimps per charge
  - Short charging time of just 15 minutes (2.0 Ah)
  - Makita batteries and chargers available worldwide.
- Tool service indicated via imbedded LEDs, illuminates at 10,000 cycles
- Tool Warranty is 24 months from date of purchase
- Crimp tools are not sold separately



CRIMPS UP TO 1-1/8"



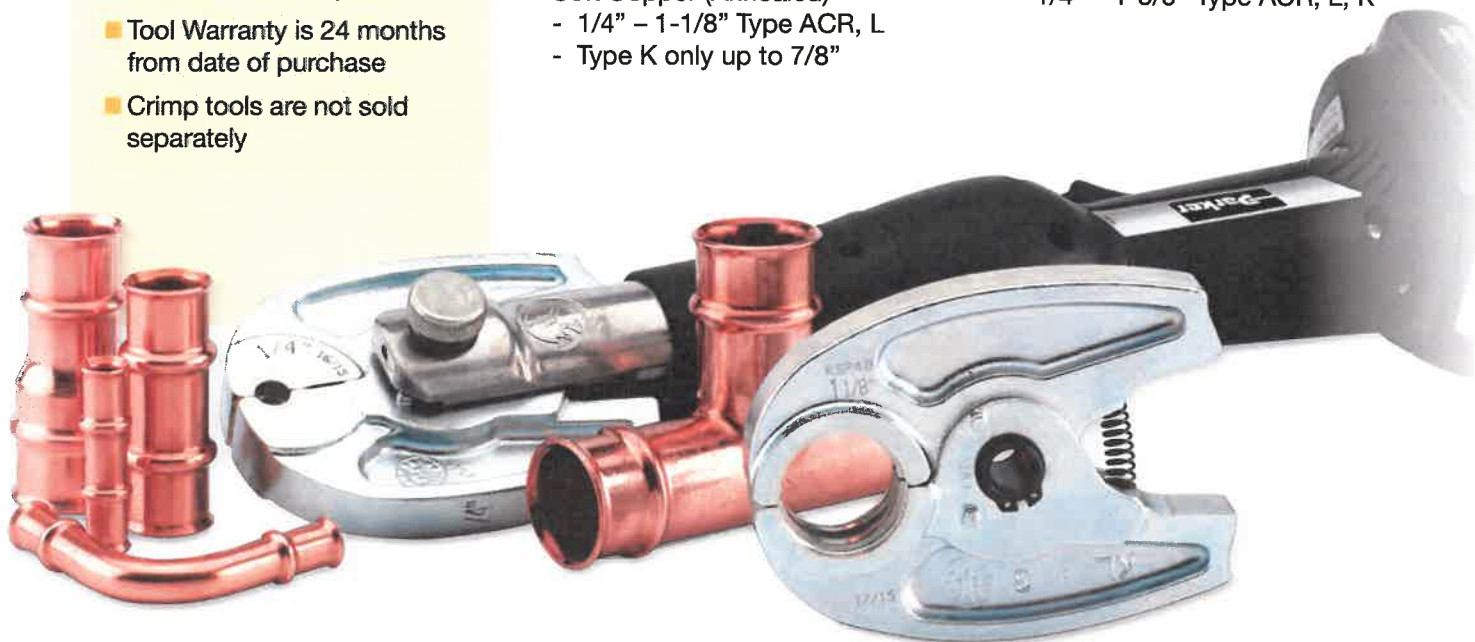
CRIMPS UP TO 1-3/8"

## Klauke® 15 kN MODEL MAP2LCER

- Available in Tool Kits:
  - 0 Jaw Tool Kit  
PZK-TK0, P/N 770000;
  - 5 Jaw Tool Kit  
PZK-TK5, P/N 770002;
- For use with J Series Jaws
- 8 Jaw Kit & Individual Jaws Sold Separately
- Approved Copper Tubing Types:
  - Hard Copper (Drawn)
    - 1/4" – 1-1/8" Type ACR, M, L
    - Type K only up to 7/8"
  - Soft Copper (Annealed)
    - 1/4" – 1-1/8" Type ACR, L
    - Type K only up to 7/8"

## Klauke® 19 kN MODEL MAP2L19

- Available in Tool Kit:
  - 0 Jaw Tool Kit  
PZK-TK190, P/N 770026
  - 5 Jaw Tool Kit  
PZK-TK195, P/N 770028;
- For use with KJ Series Jaws
- 8-Jaw Kit & Individual Jaws Sold Separately
- Approved Copper Tubing Types:
  - Hard Copper (Drawn)
    - 1/4" – 1-3/8" Type ACR, M, L, K
  - Soft Copper (Annealed)
    - 1/4" – 1-3/8" Type ACR, L, K



## Tool Kits



### 0 Jaw Tool Kits

Includes a Klauke crimping tool and the tool kit contents, listed at below right.

- **Description:** PZK-TK0
- **Part Number:** 770000
- **Includes Crimping Tool:** Klauke 15 kN MAP2LCER
- **Description:** PZK-TK190
- **Part Number:** 770026
- **Includes Crimping Tool:** Klauke 19 kN MAP2L19

### 5 Jaw Tool Kits

Includes the Klauke crimping tool (choose from 2 models), 5 jaws, and tool kit contents, listed at below right.

- **Description:** PZK-TK5
- **Part Number:** 770002
- **Jaw Sizes (Inches):** 3/8, 1/2, 5/8, 7/8, 1-1/8
- **Includes Crimping Tool:** Klauke 15 kN MAP2LCER
- **Description:** PZK-TK195
- **Part Number:** 770028
- **Jaw Sizes (Inches):** 3/8, 1/2, 5/8, 7/8, 1-1/8
- **Includes Crimping Tool:** Klauke 19 kN MAP2L19

## Jaw Kits



### Klauke 8 Jaw Kits

8 piece Klauke 15 kN jaw kit in hard plastic carrying case.

- **Description:** J4-J18 Klauke
- **Part Number:** 770208 J Series Jaws
- **Jaw Sizes (Inches):** 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8
- **Compatible with Klauke Model:** 15 kN MAP2LCER

8 piece Klauke 19 kN jaw kit in hard plastic carrying case.

- **Description:** KJ4-KJ22 Klauke
- **Part Number:** 770239 KJ Series Jaws
- **Jaw Sizes (Inches):** 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8 (5/16 jaw sold separately)
- **Compatible with Klauke Model:** 19 kN MAP2L19



### RIDGID 8 Jaw Kit

8 piece RIDGID jaw kit in hard plastic carrying case includes tube cutter, deburring tools, crimp gauge, depth gauge, stainless steel brush, abrasive pad, and permanent marker.

- **Description:** RJ4-RJ22 RIDGID
- **Part Number:** 770219 RJ Series Jaws
- **Jaw Sizes (Inches):** 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8 (5/16 jaw sold separately)
- **Compatible with RIDGID Compact Press Tool Models:** RP 100-B, RP 200-B, RP 210-B (Sold through RIDGID distributors)

### Replacement Jaw Cases (Empty)

See table on page 14 for part numbers.

## Klauke Tool Kit Contents

- Klauke Crimping Tool
- Tubing Cutter
- Deburring Tool
- RLS Crimp Gauge
- RLS Depth Gauge
- Stainless Steel Brush
- Abrasive Pad
- Permanent Marker
- Battery Charger
- (2) Lithium-Ion Rechargeable Batteries

# Crimping Tools and Jaw Selection

 <b>J Series Jaw</b>	 <b>KJ Series Jaw</b>	 <b>RJ Series Jaw</b>
 <b>Klauke 15 kN Crimping Tool MAP2LCER</b>	 <b>Klauke 19 kN Crimping Tool MAP2L19</b>	 <b>RIDGID Compact Press Tools* RP 200-B, RP 210-B RP 100-B</b>

## APPROVED COPPER TUBING TYPES

<b>Hard Copper (Drawn)</b>	1/4" – 1-1/8" Type ACR, M, L; Type K only up to 7/8"	1/4" – 1-3/8" Type ACR, M, L, K;
<b>Soft Copper (Annealed)</b>	1/4" – 1-1/8" Type ACR, L; Type K only up to 7/8"	1/4" – 1-3/8" Type ACR, L, K;

## FEATURES






<b>Crimping Force</b>	15kN	19kN	24 kN
<b>Minimum Crimp Pressure</b>	425 bar / 6,163 psi	525 bar / 7,613 psi	
<b>Number of Crimps</b>	2.0 Ah approx. 150 (for NS20)		
<b>Battery Capacity</b>	18V / 2.0 Ah Li-Ion Makita (BL1820B)		
<b>Charging Time</b>	15 minutes		
<b>Operating Temp. Range</b>	14°F to 104°F (-10°C to 40°C)		
<b>Jaw Holder</b>	Swivels through 350°		
<b>Weight with Battery Without Jaw</b>	1.7 kg (3.7 lb.)	1.8 kg (4.0 lb.)	Sold through RIDGID distributors
Including Jaw	2.3 kg (5.1 lb.)	3.1 kg (6.8 lb)	
<b>Dimensions</b>	377 x 75 x 116 mm	395 x 80 x 118 mm	
<b>Diagnostics PGA 1 Compatible</b>	<b>X</b>	<b>X</b>	
i-press Software Compatible	<b>X</b>	<b>X</b>	
<b>Tool Warranty</b>	24 months from date of purchase		

## TOOL KITS / PART NUMBER

<b>0 JAW TOOL KITS</b>	PZK-TK0 770000	PZK-TK190 770026	—
<b>5 JAW TOOL KITS</b>	PZK-TK5 770002 3/8, 1/2, 5/8, 7/8, 1-1/8	PZK-TK195 770028 3/8, 1/2, 5/8, 7/8, 1-1/8	—

\* Sold through RIDGID distributors.

# Crimping Tools and Jaw Selection

	 <b>J Series Jaw</b>	 <b>KJ Series Jaw</b>	 <b>RJ Series Jaw</b>
	 <b>Klauke 15 kN Crimping Tool MAP2LCER</b>	 <b>Klauke 19 kN Crimping Tool MAP2L19</b>	 <b>RIDGID Compact Press Tools* RP 200-B, RP 210-B RP 100-B</b>
JAW KITS / PART NUMBER			
8 PIECE JAW KITS	J4-J18 770208 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8	KJ4-KJ22 770239 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8	RJ4-RJ22 770219 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
JAW CASE (EMPTY)	770240 (9 empty slots)		770220 (8 empty slots)
INDIVIDUAL JAWS/ PART NUMBER			
1/4"	PZK-J4 770200	PZK-KJ4 770230	PZK-RJ4 770210
5/16"	PZK-J5 770201	PZK-KJ5 770231	PZK-RJ5 770211
3/8"	PZK-J6 770202	PZK-KJ6 770232	PZK-RJ6 770212
1/2"	PZK-J8 770203	PZK-KJ8 770233	PZK-RJ8 770213
5/8"	PZK-J10 770204	PZK-KJ10 770234	PZK-RJ10 770214
3/4"	PZK-J12 770205	PZK-KJ12 770235	PZK-RJ12 770215
7/8"	PZK-J14 770206	PZK-KJ14 770236	PZK-RJ14 770216
1-1/8"	PZK-J18 770207	PZK-KJ18 770237	PZK-RJ18 770217
1-3/8"	—	PZK-KJ22 770238	PZK-RJ22 770218

\* Sold through RIDGID distributors.



# Replacement Parts and Accessories



## Tubing Cutter

ZoomLock approved tubing cutter.

- **Description:** 1/4" to 1-1/8" Capacity Tubing Cutter
- **Part Number:** 770006



## Deburring Tool

ZoomLock approved deburring tool.

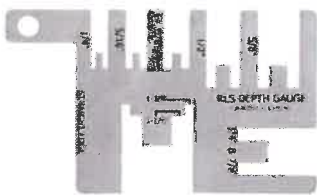
- **Description:** 1/4" to 1-3/8" Capacity Tube Deburring Tool
- **Part Number:** 770007



## RLS Crimp Gauge

Confirms the measurement of the finished crimp band diameter.

- **Description:** PZK-GNG1
- **Part Number:** 770005



## Standard RLS Depth Gauge

Metal depth gauge confirms the proper insertion depth of the tubing.

- **Description:** PZK-IDGM
- **Part Number:** 770014



## Optional Depth Gauge

Plastic depth gauge confirms the proper insertion depth of the tubing.

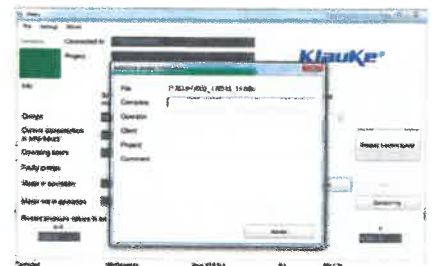
- **Description:** PZK-IDGP
- **Part Number:** 770015



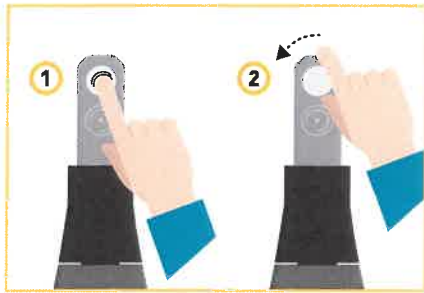
## Diagnostic Tool

Adaptor tool for crimping tool diagnostics. Easily connect to PC via USB-Interface. Provides statistical evaluation of average crimping process of tool. Free downloading of Software "iPress" via [www.klauke.com](http://www.klauke.com).

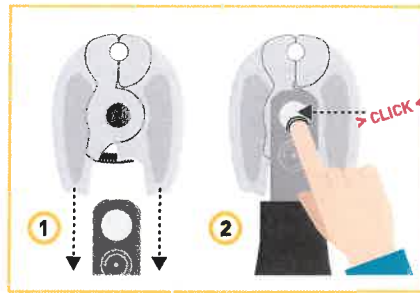
- **Description:** PGA1
- **Part Number:** 770008
- **Compatible with:**  
Klauke MAP2LCER  
Klauke MAP2L19



# Installation Instructions



**STEP 1**  
Press the ZoomLock Crimping Tool locking pin, then rotate 45° to release.



**STEP 2**  
Slide jaws over Crimping Tool head, then depress locking pin until it clicks.

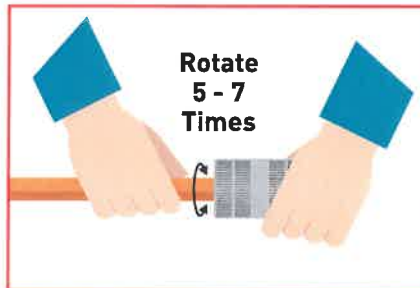


**STEP 3**  
Slide charged battery into base of Crimping Tool. Press and hold the trigger on Crimping Tool to calibrate. **Calibration is recommended daily, prior to use.**

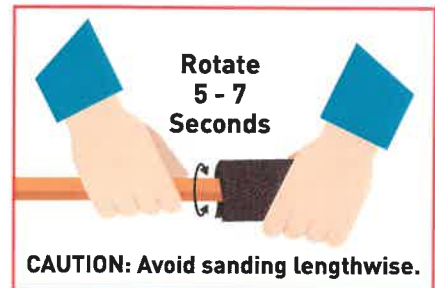
**WARNING!** COPPER TUBE ENDS SHOULD BE INSPECTED AND ANY SHARP EDGES SHOULD BE ADDRESSED. SHARP EDGES MAY CAUSE DAMAGE TO THE O-RING.



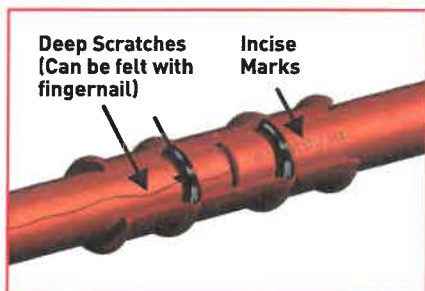
**STEP 4 - CUT**  
Cut copper tube using the **supplied** or similar commercially available tube cutter. Verify tube cutter is properly maintained and wheel is sharp. **DO NOT** use any type of saw as this creates a sharp surface that will cut the o-ring.



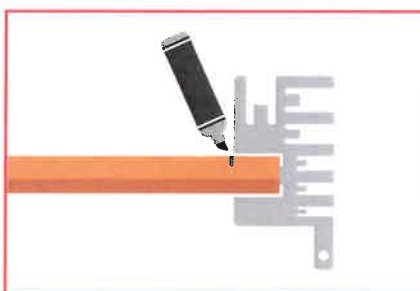
**STEP 5 - DEBURR**  
Use supplied deburring tool. **ALL tubing MUST** have its outer diameter **deburred** prior to ZoomLock fitting installation. Rotate tool back-and-forth 5 - 7 times to remove sharp edges and burrs. **Perform this step BEFORE sanding.**



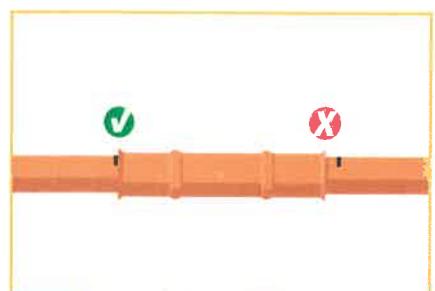
**STEP 6 - SAND & CLEAN**  
**ALL tubing must be SANDED and CLEANED.** Use provided heavy duty abrasive pad, nylon mesh abrasive pad (maroon color) or 180 grit sandpaper. **SAND tube in RADIAL DIRECTION** as shown with arrows for 5 - 7 seconds or 10 - 14 times back-and-forth. Remove residual debris from tube end.



**STEP 7 - INSPECT**  
**INSPECT copper tube AFTER sanding.** Surfaces need to appear clean and shiny. Inspect for any **VISIBLE SCRATCHES, INCISE MARKS OR OTHER TUBE DEFECTS.** Area of importance is within 1.5 inches from tube end. If scratches are present, cut off affected area and repeat Steps 4 -7 or sand thoroughly to remove.

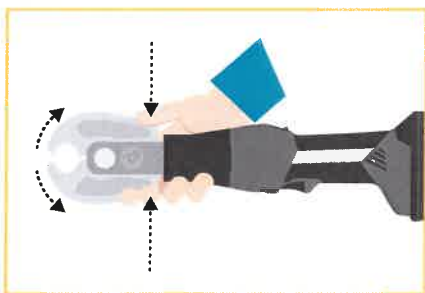


**STEP 8 - MARK**  
Using the depth gauge provided or the chart on page 19 to determine the insertion depth. Mark the tubing with a permanent marker to indicate proper insertion depth on every tube.



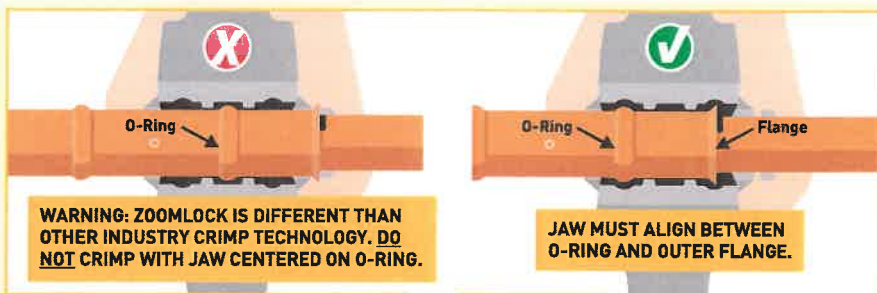
**STEP 9**  
Push the fitting onto the tube. Use the mark to assure insertion depth and secure fit.

# Installation Instructions



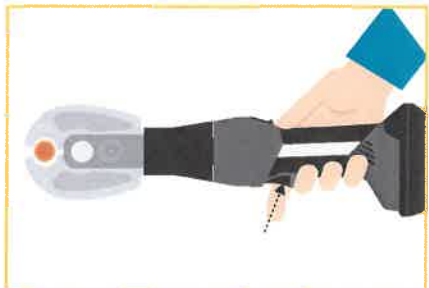
## STEP 10

Open the jaws of the ZoomLock Crimping Tool.



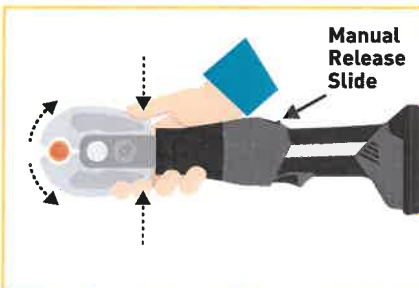
## STEP 11

Properly place the crimping jaws onto the fitting. Grooves in the jaws make it easy to align. See illustration at above right for proper crimping alignment.



## STEP 12

Press and hold the trigger on the ZoomLock Crimping Tool to begin the crimping process. Continue to hold the trigger until the ZoomLock Crimping Tool completes its cycle.



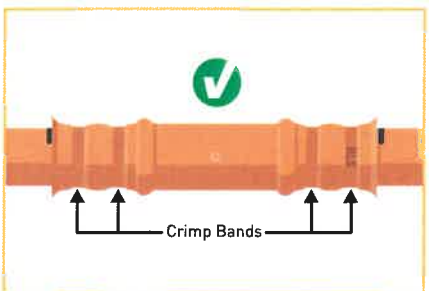
## STEP 13

Open the jaws and remove from the fitting. If the jaws do not open, crimping cycle was not completed. For manual override, slide the manual release button down to open the jaw in case of emergency.



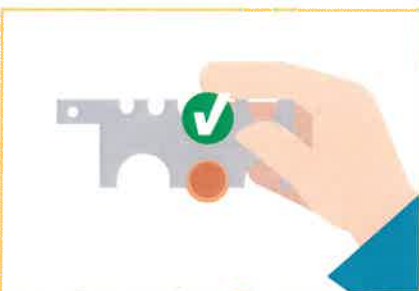
## STEP 14

**APPLIES TO 1-3/8" FITTINGS ONLY**  
Crimp 1-3/8" fitting twice, rotate crimping tool 45 to 90 degrees after first crimp and repeat crimp.



## STEP 15

A special "RLS" mark will be displayed on the tube to let you know the connection is crimped properly.



## STEP 16

The supplied RLS Crimp Gauge will confirm the measurement of the finished crimp band diameter. See crimp band locations noted in Step 15. It may be necessary to rotate the gauge in order to not interfere with the copper tube flashing left from the crimping process.

## WARNING!



**FAILURE TO FOLLOW THE INSTALLATION INSTRUCTIONS, IMPROPER SELECTION OR IMPROPER USE OF ZOOMLOCK FITTINGS AND RELATED ACCESSORIES ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**



# Troubleshooting and Frequently Asked Questions

## Troubleshooting

### 1. Do you have any troubleshooting suggestions if a coupling leaks after crimp?

- Verify tubing for scratches, incise marks and dents prior to tube cutting. Be careful when using a knife to cut off plastic shipping caps on copper tubes.
- Take time to cut the tubing properly using a tubing cutter. Rushing through the cutting process may cause dents and oval tubing which can create leaks.
- Verify proper deburring and sanding/cleaning of tube surface per steps 5 to 7.
- Verify proper tube insertion depth using provided insertion gauge. One gauge is provided with the tool kit or can be ordered separately. Refer to the "minimum insertion depth" table in FAQ section if you do not have a gauge.
- Verify the proper crimp diameter using the provided crimp gauge.
- Verify correct jaw is installed for the fitting you are trying to crimp.
- Try applying a light coating of spray lubricant such as WD-40 directly to the jaws.
- Let jaw and tool do the work. If the fitting is in a hard to reach place, it is important to let the tool body move freely.
- Avoid applying any sort of pulling or twisting of the tool during the crimp process.
- If the fitting was recently crimped (15 – 20 minutes) prior to pressurization, it is possible the bubbles are a result of trapped air in the double crimp area to leak out over time. This is not a joint leak and will leak out over time. This is more likely to occur on smaller fittings.

### 2. If a fitting does leak, can you braze the fitting in rather than cutting out the fitting and having to make up for lost pipe?

If you find a fitting that has a refrigerant leak, try re-crimping the connection first. If that does not work, the fitting must be cut out and replaced. Trying to braze the fitting will very likely melt the o-ring material and thus introduce contaminants into the system that could cause other system issues.

## Installation

### 3. What is the #1 cause of leaky fittings?

Skipping the installation instructions 4 to 8 will cause the tube to leak. It is very important to use the

scouring pad and deburr tool. Refrigerant gas at the maximum rated 700 psi pressure is more likely to leak than water at a much lower pressure, therefore, following the tube preparation instructions is very important.

### 4. What is considered a "deep" scratch and what can be done to clean this?

A deep scratch is defined as one that can be felt with your fingernail. Try using a new piece of Scotch Brite® abrasive pad or 400 grit sandpaper. Alternatively, 180 grit sandpaper/cloth can be used for 15 - 20 seconds to remove a deep scratch.



Following tube preparation steps 4 to 8 is important for preventing leaks.

### 5. Can you show an example of a "good" copper tube surface after sanding?

Figure 1 below shows an example of a good tube. Figure 2 is an example of a tube with a bad scratch that requires proper tube preparation. It is very important to follow deburring, sanding and inspection steps 4 to 8.



Figure 1 - Copper tube with "good" surface.



Figure 2 - Copper tube with "bad" surface scratch.

### 6. How do I know the correct insertion depth when pushing the ZoomLock fitting onto the copper tube?

Use the depth gauge provided or the Minimum Insertion Depth chart on the following page to determine the correct insertion depth. Mark the tubing with a permanent marker to indicate proper insertion depth on every tube.



# Troubleshooting and Frequently Asked Questions

MINIMUM INSERTION DEPTH		
Fitting Size	Inches	mm
1/4	1	24
5/16	1	24
3/8	1	24
1/2	1-1/4	32
5/8	1-1/4	32
3/4	1-1/4	32
7/8	1-1/4	32
1-1/8	1-1/4	32
1-3/8	1-1/2	38

**7. How do you slide insulation over these fittings (the flare will grab insulation).**

If the flare of the fitting tends to be a problem, you can smooth the transition over the fitting by adding duct tape around the flared edge of the fitting to the tube.

**8. Do you have a solution for crimping onto flared tubing like that coming out of the condenser and evaporator on residential units?**

No, we do not have a specific product designed to crimp over the flared tubing. However, if there is at least 2 inches of straight copper tubing after the flared end and is accessible with the jaws, we suggest that you cut the flared end off and crimp directly to the tube.

**9. How much tolerance can the ZoomLock fitting handle on the pipe being crimped?**

We know that not all copper tubing is the same, but we have tested ZoomLock with most copper tube manufacturers with no issues. The tolerance for each tube to ensure a leak-free joint is defined by ASTM B280.

**10. What is the minimum brazing distance?**

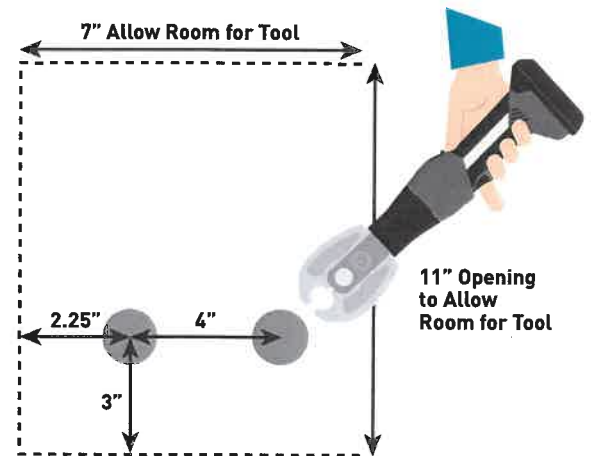
MINIMUM DISTANCE FROM ZOOMLOCK FITTING TO BRAZE		
Tube Diameter	Inches	Millimeters
1/4 to 1/2	5	127
5/8	7	178
3/4	8	203
7/8	9	229
1-1/8	11	279
1-3/8	14	356

**11. What is the minimum distance between ZoomLock fittings?**

The ends of the fittings should be no closer than 1/4 inch apart.

**12. What is the recommended minimum space (envelope) needed around the Klauke tool and jaws to crimp?**

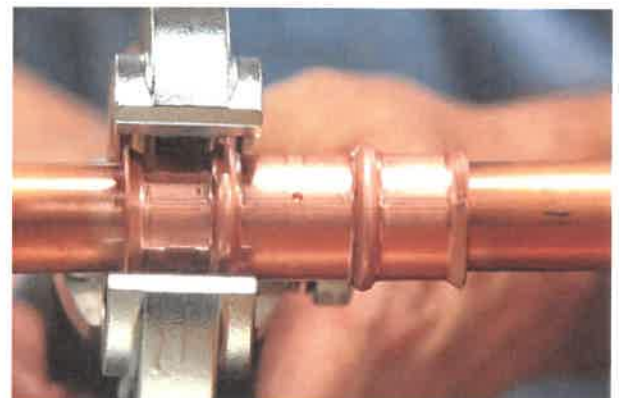
The envelope of 11" x 7" is recommended around fittings. The illustration below shows closed space around the fitting with one end open. It assumes a 4" centerline between fittings and a max 1-3/8" couplings. A minimum of 2.25" from the back wall surface is required. You need 2-1/2" between couplings for jaws if the tool is coming up from below the fittings to crimp. We realize there are many configurations, so please contact your local Parker sales engineer with any questions.



## Crimp Tool

**13. Can Zoomlock be crimped in the same location as Viega ProPress fittings?**

No. The fittings will leak if you do not crimp per step 11 of the installation instructions. Proper crimping is also illustrated in the photo below.



# Troubleshooting and Frequently Asked Questions

## 14. How many crimps can you complete on a complete battery charge?

On average you can achieve 100-150 crimps per charge depending on the size fittings being crimped. Each Klauke Tool kit comes with 2 Makita Lithium-ion 2.0 Ah 18V batteries (BL1820B) and a rapid charge charging system. To prevent any downtime, it is recommended that you have both batteries charged before going to the job site and to have one charging while the other is in use.

## 15. How can I increase the number of crimps and battery life?

You can purchase a Makita 3.0 Ah 18 V Li-Ion battery (BL1930). Parker does not sell these, but they can be purchased at your local or online retailers wherever batteries are sold.

## 16. How do you know when the tool needs to be serviced?

The 15 kN (MAP2L) and 19 kN MAP2L19 Klauke tools have red LED lights on the back of the tool that will blink for 20 seconds after a crimp. The 19 kN MAP219 tool has a screen on the tool which indicates the number of remaining crimps. Take the tool back to an authorized dealer to have the tool serviced.

## 17. What is the expected life of the jaws?

Each jaw has an expected life of 10,000 to 12,000 crimps.

## 18. How do you know when the jaw needs to be replaced?

You will know when the jaw needs to be replaced when the contact point between the upper and lower jaw starts to open up/widen. A good indication of failure is when the crimp gauge no longer engages. Use the supplied wire brush in tool kit to periodically clean pressing jaws.

## 19. Where can replacement batteries and chargers be purchased??

The 2.0 Ah 18 V Makita Li-Ion battery (BL1820B) along with the 110V AC charger (DC18RC) can be purchased at your local or online retailers wherever batteries are sold.

## Technical

### 20. What material is the o-ring made of?

The o-ring is a highly engineered HNBR Parker o-ring that has been used in HVAC applications by OEMs and suppliers for many years with no issues.

### 21. What is the expected life of the o-ring in the system?

The expected life of the o-ring that stays within the product specifications for temperature and pressure should be 30 years.

### 22. Does the o-ring compensate for imperfections in the piping to make a tight seal?

Yes, the o-ring does compensate for small/minor scratches on the surface of the tube; however, the tubing needs to be inspected prior to use per ASTM B280 and the Copper Tube Handbook published by the Copper Development Association (CDA) specifications. Imperfections in and adjacent to the crimp area could inhibit the joint integrity. These imperfections may include surface scratches, incise marks, and tubing out of round.

### 23. Are there any shelf life concerns?

No, the shelf life of the product is estimated at or above 30 years.

### 24. Is there a concern about ice building up and then thawing under fitting in a horizontal or vertical configuration?

No, ZoomLock has been thoroughly tested in freeze/thaw applications with over 10,000 cycles completed in both vertical and horizontal configurations with no leakage concerns.

### 25. Are there any concerns with corrosion due to coastal applications, cleaning agents, or off-gassing of produce/vegetables?

No, ZoomLock has gone through a battery of corrosion testing, completing over 2,000 hours of salt spray testing without failure, which proves the resilience of the product.

### 26. The product specifications state that the application temperature limits are -40°F to +300°F / -40°C to 150°C. What happens if we go beyond that limit?

If the application that the fitting is being used in goes beyond the specified limits of the o-ring (-40°F to +300°F / -40°C to 150°C) then there will be an increased likelihood that a leak can occur.

### 27. Can I use ZoomLock in a transportation application where fitting vibration is high?

Yes, ZoomLock has gone through extensive vibration testing and results are actually better than that of a braze joint. Please review the vibration testing procedure and conclusion for more information.

# Troubleshooting and Frequently Asked Questions

## 28. Can you use ZoomLock to crimp to aluminum, steel, or stainless steel?

No, ZoomLock is specifically designed for copper to copper connections. Connecting to dissimilar metals can cause formicary corrosion issues that could cause a failure.

## Other

## 29. Is ZoomLock approved by state and city building codes?

ZoomLock has been approved by UL-207, ASHRAE 15, International Code Council – Evaluation Service (ICC-ES), International Mechanical Code (IMC), Universal Mechanical Code (UMC), and International Residential Code (IRC). These approvals are all that is needed in most areas. Please contact your local building inspector with questions prior to install.

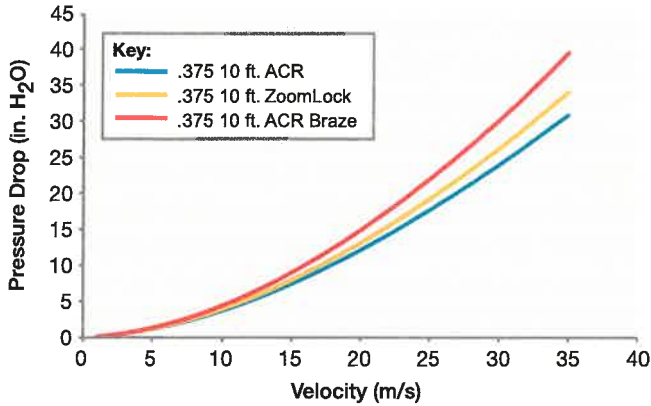




# Performance Data

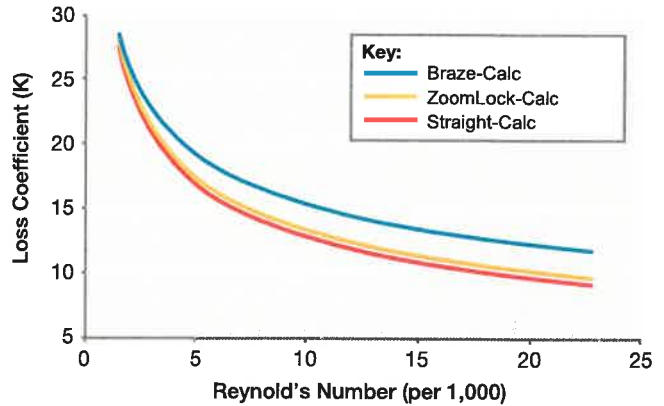
## ACR Pressure Drop (10 ft. long)

3/8" ACR Tube Pressure Drop vs. Velocity

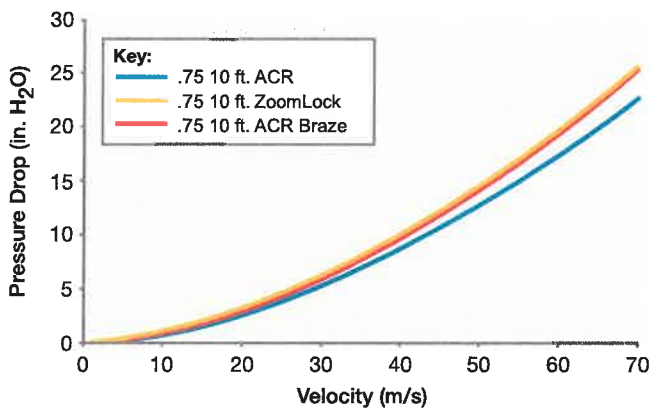


## ACR Loss Coefficient

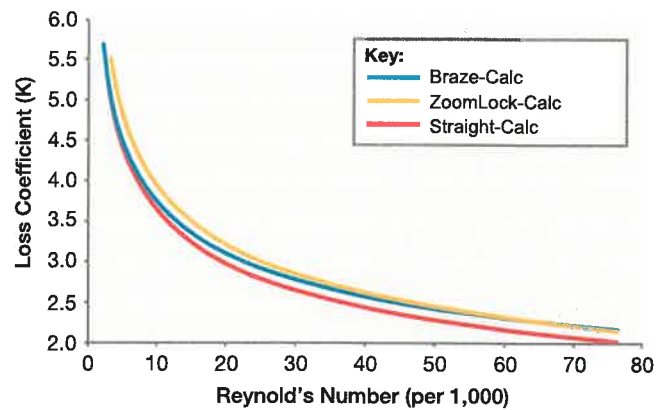
3/8" ACR Tube Loss Coefficient vs. Reynolds Number



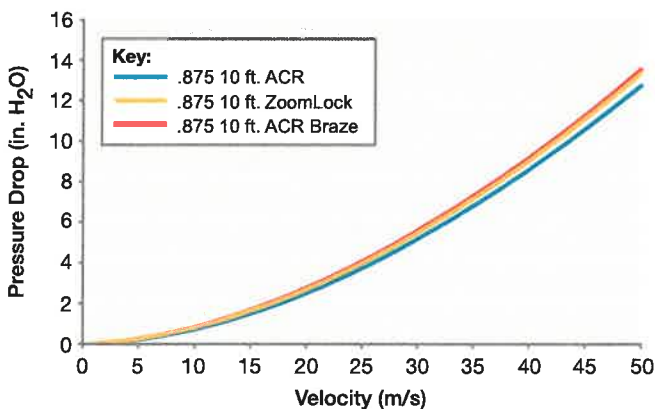
3/4" ACR Tube Pressure Drop vs. Velocity



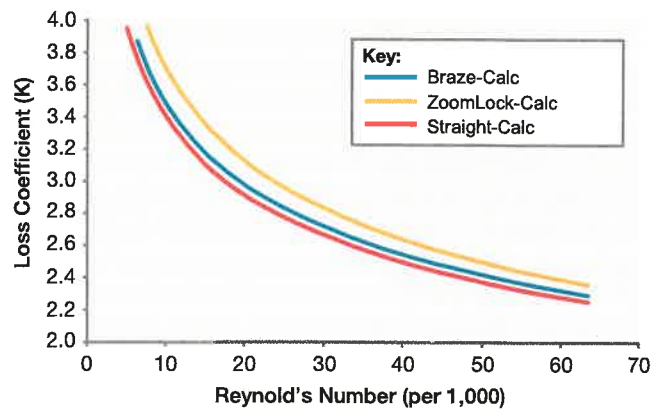
3/4" ACR Tube Loss Coefficient vs. Reynolds Number



7/8" ACR Tube Pressure Drop vs. Velocity



7/8" ACR Tube Loss Coefficient vs. Reynolds Number



# ICC-ES Evaluation Report



Effective Date: January 2015

Revision Date: January 2017

This report subject to renewal in January 2018.

## PMG-1296

CSI: DIVISION: 23 00 00—HEATING, VENTILATING AND AIR CONDITIONING (HVAC)  
Section: 23 20 00—HVAC Pipe and Fittings

Product certification system:

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

Products: Refrigeration Tubing Connectors

Listee: RLS, LLC  
101 S. Douglas Street  
Shelbina, MO 63468  
www.rlspressfittings.com

Additional Listee:

Parker Sporlan  
206 Lange Drive  
Washington, MO 63090  
www.parker.com

Compliance with the following codes:

2015, 2012, 2009 and 2006 *International Mechanical Code*® (IMC)  
2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)  
2015, 2012, 2009 and 2006 *Uniform Mechanical Code*® (UMC)\*

\**Copyrighted publication of the International Association of Plumbing and Mechanical Officials.*

Compliance with the following standards:

UL 207 (Edition 8), Standard for Refrigerant-Containing Components and Accessories, Nonelectrical

Identification:

The refrigerant tubing connectors shall be legibly and permanently marked with the manufacturer's name, trade name, trademark, or identifying symbol or other descriptive marking by which the organization responsible for the product may be identified.

The shipping carton, a separate instruction sheet included with the shipping carton or a tag attached to the component shall include a distinctive model, part number, or type designation for the connector and include information for each refrigerant type for which the connector is intended and the ICC-ES PMG listing mark.

Installation:

The refrigerant tubing connectors must be installed in accordance with the manufacturer's published installation instructions, the applicable codes and this listing.

Mechanical joints shall not be used on annealed temper copper tube in sizes larger than 7/8-inch (22.2 mm) OD size per IMC and 3/4" of an inch nominal size per UMC.

Models:

The refrigerant tubing connectors are intended for connection of copper, aluminum, titanium and other types of tubing approved by the manufacturer. The connection is accomplished by compressing (solder-free) the fitting to a pipe. The refrigerant connectors are only suitable with the following refrigerants (R-32, R-125, R-134a, R-143A, R-402, R-404A, R-407, R-410A, R-447A, R-448A, R-449A, R-450, R-452, R-507, R-513A, R-718, R-1234yf, R-1234ze, Propane, Butane, Isobutane, Propylene Glycol).

# ICC-ES Evaluation Report

Serial Model Name: RLS™ Cu

Type of Connector	Sizes (Inches)
Couplings	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Slip Couplings	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Long Radius 90°	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Stubs	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Reducers	1/4 x 5/16, 1/4 x 3/8, 1/4 x 1/2, 1/4 x 5/8, 5/16 x 3/8, 3/8 x 1/2, 3/8 x 5/8, 1/2 x 5/8, 1/2 x 3/4, 1/2 x 7/8, 1/2 x 1-1/8, 5/8 x 3/4, 5/8 x 7/8, 5/8 x 1-1/8, 3/4 x 7/8, 3/4 x 1-1/8, 3/4 x 1-3/8, 7/8 x 1-1/8, 1-1/8 x 1-3/8
Tees	3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Reducing Tees	3/8 x 3/8 x 1/4, 3/8 x 3/8 x 5/16, 1/2 x 1/2 x 1/4, 1/2 x 1/2 x 3/8, 5/8 x 5/8 x 3/8, 5/8 x 5/8 x 1/2, 5/8 x 5/8 x 7/8, 3/4 x 3/4 x 1/2, 3/4 x 3/4 x 5/8, 3/4 x 3/4 x 7/8, 7/8 x 7/8 x 5/8, 7/8 x 7/8 x 3/4, 7/8 x 7/8 x 1-1/8, 1-1/8 x 1-1/8 x 3/4, 1-1/8 x 1-1/8 x 7/8, 1-3/8 x 1-3/8 x 7/8, 1-3/8 x 1-3/8 x 1-1/8
Cap	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8, 1-3/8
Return Bend	1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8, 1-1/8

## Ratings:

Sizes	Design Pressure, psig	Maximum Abnormal Pressure, psi	Continuous Operating Temperature
1/4" RLS	700	700	250°F (121°C)
5/16" RLS	700	700	250°F (121°C)
3/8" RLS	700	700	250°F (121°C)
1/2" RLS	700	700	250°F (121°C)
3/4" RLS	700	700	250°F (121°C)
5/8" RLS	700	700	250°F (121°C)
7/8" RLS	700	700	250°F (121°C)
1-1/8" RLS	700	700	250°F (121°C)
1-3/8" RLS	700	700	250°F (121°C)

## Conditions of Listing:

- The refrigerant tubing connectors must be used with only the following refrigerants (R-32, R-125, R-134a, R-143A, R-402, R-404A, R-407, R-410A, R-447A, R-448A, R-449A, R-450, R-452, R-507, R-513A, R-718, R-1234yf, R-1234ze, Propane, Butane, Isobutane, Propylene Glycol).
- Mechanical joints shall not be used on annealed temper copper tube in sizes larger than 7/8 inch (22.2 mm) OD size per IMC and 3/4 inch (19 mm) nominal size per UMC.
- The installation must be pressure-tested for leaks in the presence of the code official of the code official's designated representative.
- When installation is in fire-resistance-rated assemblies, evidence must be provided to the code official of compliance with *International Building Code*® (IBC) Section 713 (penetrations), *Uniform Building Code* (UBC) Section 709 (walls and partitions) or UBC Section 710 (floor/ceiling or roof/ceiling), as applicable.
- The connectors must not be used as a source of electrical ground.
- When the system is embedded in concrete, tubing must be covered a minimum of 3/4 inch (19.1 mm) and installation must comply with IBC Section 1906.3 or UBC Section 1906.3, as applicable.
- The refrigerant tubing connectors is manufactured by Cerro Flow Products, LLC in Shelbina, Missouri, under a quality control program with surveillance inspectors annually by ICC-ES.

# Helium Leak Test Report



1250 Arthur E Adams Dr., Columbus, OH 43221

LAB SERVICES

## Helium Leak Test Report

page 1 of 2

**Customer:** Marmon Refrigeration Technologies

**Project No.:** 12866CSL-01

**Equipment:** Veeco MS-40

**Date Reported:** January 10, 2013

**Project Engineer:** Jim Busch

**Principal Tech:** Barb Christel

**Scope:** To test and report the leak rate of RLS press connections.

**Background:** Marmon Refrigeration Technologies (MRT) submitted RLS™ press connection samples for helium leak testing. Six (6) different RLS™ sizes were chosen to connect commercially available ACR tubing (see Table 1). Thirty (30) union connections were chosen as a sample lot with two (2) connections per fitting. Each sample connected two pieces of tubing approximately nine (9) inches long. One of the tubes was brazed shut at one end and the other tube was reduced to a ¼" tube stub.

**Table 1. Tube Diameters Tested**

Tube O.D. (in)	# of Samples	Total # of Tested Connections	Notes
0.250	30	60	Samples were made from commercially available ACR tubing (soft)
0.313	30	60	
0.375	30	60	
0.750	30	60	
0.875	30	60	
1.125	30	60	

**EWI Leak Testing Approach:** Prior to testing each lot of samples, the Veeco MS-40 helium leak tester was calibrated. After calibration, a solid ¼" dowel was tested to verify the integrity of the seals on the helium leak test fixture.

The ¼" tube stub was wiped down with methanol and connected to the leak detector via a Swagelok ¼" Ultra-Torr vacuum fitting (see Figure 1). Each sample was pumped down to a level of approximately 500 millitorr prior to applying helium gas near the RLS™ crimp joint (at atmospheric pressure). The helium leak rate was measured and recorded for each of the sixty (60) connections in a thirty (30) piece sample lot.



# Helium Leak Test Report



1250 Arthur E Adams Dr., Columbus, OH 43221

LAB SERVICES

## Helium Leak Test Report

page 2 of 2

**Customer:** Marmon Refrigeration Technologies

**Project No.:** 12866CSL-01

**Equipment:** Veeco MS-40

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**Principal Tech:** Barb Christel

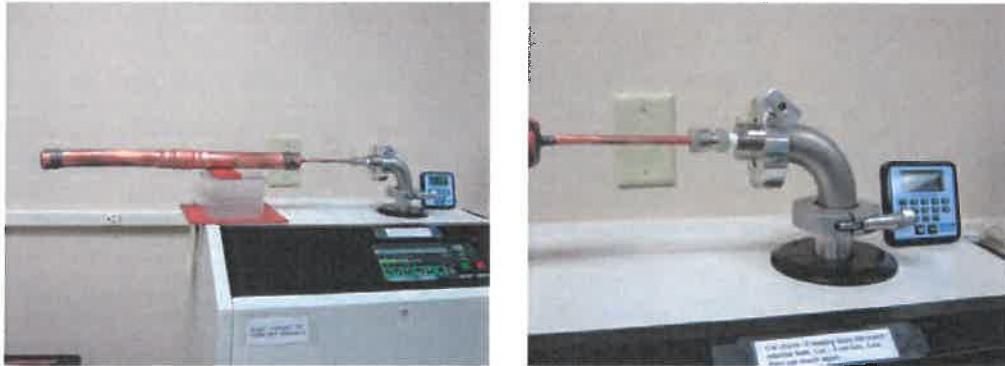


Figure 1. Test Set-up

**Results:** The maximum leak rate of all connections is summarized in Table 2. The maximum leak rate detected was 5.40E-09 std.cc/sec.

**Table 2.** Maximum Leak Rate per Lot

Tube O.D. (in)	Maximum Helium Leak std.cc/sec
0.250	4.00E-10
0.313	6.10E-10
0.375	1.30E-09
0.750	5.20E-09
0.875	5.40E-09
1.125	3.00E-10

Reported by: Brad Nagy

Signature: Brad Nagy

Title: Manager, Weld & Test Labs

# Time and Motion Study

Conducted by:

Jay Peters, Principal Advisor, Codes and Standards International

## Methodology

A time study was conducted in a controlled environment, with two stations set up for joining refrigeration tube: one by brazing and one by using ZoomLock flame-free fittings. Two different installers were used, one very experienced in making brazed connections and one very experienced in using the ZoomLock press tool.

The two installers were timed independently making connections using various sized copper tube and fittings. Before timing began, tube was cut to length and the ends were prepared for connection (as these procedures are the same for both connection methods). Three connections were timed for each size of tube/fitting for each installer, and the three times were averaged. The results are shown in the table below.

LABOR TIME FOR INSTALLING A COPPER COUPLING			
Fitting Size	1/4"	5/8"	1-1/8"
Brazed Connection	35 seconds	42 seconds	1:15 minutes
ZoomLock Braze-Free Fitting	24 seconds	24 seconds	25 seconds
% Time Savings	31%	43%	77%

## Key Findings and Conclusions

The time savings achieved while joining tube using ZoomLock flame-free fittings, compared to brazed connections, ranged from 31% on the smallest fittings timed to 77% on the largest. The average time savings over the fitting sizes timed was approximately 50%. So, on average, ZoomLock flame-free fittings were made in roughly half the time of brazing — and in less than one-quarter the time on the largest fitting size.

Based on the study, brazed connections take longer to complete than ZoomLock flame-free fittings. When analyzing the installation techniques for both connections, a brazed connection requires a period of time to raise the temperature of the fitting and tube to about 1000°F (538°C). As the tubing and fitting increases in diameter, the amount of time it takes to heat them also increases. The ZoomLock flame-free fittings only require the connection of a press connect tool, which takes less than ten seconds to complete the actual pressing operation (two crimps) — and the time to connect does not increase significantly as the diameter of tubing and fittings increase in size.

In a controlled environment, such as the work station where the time study was conducted, the brazing operation takes less time than a similar joint made on a construction or repair project in the field. The controlled environment is already set up for brazing, with all necessary equipment and materials close at hand. However, using the ZoomLock press tool and fittings require approximately the same amount of time in any environment. Therefore, it can be assumed that the ZoomLock time savings would be even greater outside of a controlled environment.



## OFFER OF SALE

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

1. **Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at [www.parker.com/sale/terms/](http://www.parker.com/sale/terms/). Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.
2. **Price Adjustments; Payments.** Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.
3. **Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.
4. **Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of five years from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. This warranty is made only to Buyer and does not extend to anyone to whom Products are sold after purchased from Seller. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**
5. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.
6. **LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT

**SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. **Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.
8. **User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.
9. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.
10. **Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.
11. **Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.
12. **Improper use and indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.
13. **Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.
14. **Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.
15. **Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive

expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. **Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. **Termination.** This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. **Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. **Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of intellectual Property Rights.

20. **Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. **Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.



# Western Surety Company

## POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That WESTERN SURETY COMPANY, a South Dakota corporation, is a duly organized and existing corporation having its principal office in the City of Sioux Falls, and State of South Dakota, and that it does by virtue of the signature and seal herein affixed hereby make, constitute and appoint

**John S Althans, Patricia N Skalla, Susan C Barriball, James C Althans, Mary E Brenner-Miller, Stacie A Waller, Individually**

of Chagrin Falls, OH, its true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on its behalf bonds, undertakings and other obligatory instruments of similar nature

**- In Unlimited Amounts -**

and to bind it thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of the corporation and all the acts of said Attorney, pursuant to the authority hereby given, are hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law printed on the reverse hereof, duly adopted, as indicated, by the shareholders of the corporation.

In Witness Whereof, WESTERN SURETY COMPANY has caused these presents to be signed by its Vice President and its corporate seal to be hereto affixed on this 11th day of July, 2015.



WESTERN SURETY COMPANY

Paul T. Bruflat  
Paul T. Bruflat, Vice President

State of South Dakota }  
County of Minnehaha } ss

On this 11th day of July, 2015, before me personally came Paul T. Bruflat, to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is the Vice President of WESTERN SURETY COMPANY described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed pursuant to authority given by the Board of Directors of said corporation and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said corporation.

My commission expires  
February 12, 2021



S. Eich  
S. Eich, Notary Public

### CERTIFICATE

I, L. Nelson, Assistant Secretary of WESTERN SURETY COMPANY do hereby certify that the Power of Attorney hereinabove set forth is still in force, and further certify that the By-Law of the corporation printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said corporation this 31st day of August, 2017.



WESTERN SURETY COMPANY

L. Nelson  
L. Nelson, Assistant Secretary

**Authorizing By-Law**

**ADOPTED BY THE SHAREHOLDERS OF WESTERN SURETY COMPANY**

This Power of Attorney is made and executed pursuant to and by authority of the following By-Law duly adopted by the shareholders of the Company.

Section 7. All bonds, policies, undertakings, Powers of Attorney, or other obligations of the corporation shall be executed in the corporate name of the Company by the President, Secretary, and Assistant Secretary, Treasurer, or any Vice President, or by such other officers as the Board of Directors may authorize. The President, any Vice President, Secretary, any Assistant Secretary, or the Treasurer may appoint Attorneys in Fact or agents who shall have authority to issue bonds, policies, or undertakings in the name of the Company. The corporate seal is not necessary for the validity of any bonds, policies, undertakings, Powers of Attorney or other obligations of the corporation. The signature of any such officer and the corporate seal may be printed by facsimile.



# SHRMe VRF Outdoor Unit MMY-MAP1686FT6P-UL - Heat Recovery

**TOSHIBA**  
*Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### SHRMe VRF Heat Recovery Features

- 6, 8, 10, 12, and 14-ton modules available
- Capable of simultaneous cooling and heating (flow selector boxes required)
- Modules have 2 inverter-driven twin rotary compressors
- Backup capability due to multiple compressors
- Compressor speed varied in 0.1 Hz increments for comfort and efficiency
- Direct drive, inverter-driven 64-step outdoor motor
- Modules can be combined to form larger systems, up to 38 tons
- Up to 3281 ft (1000 m) actual total system piping (liquid line)
- Up to 591 ft (180 m) actual piping length from outdoor unit to furthest fan coil
- Up to 330 ft (100 m) outdoor control wiring
- Up to 6560 ft (2000 m) control wiring between outdoor and indoor units
- Operating temperature range  
 Cooling (db): 14 to 122 F (-10 to 50 C)  
 Heating (wb): -13 to 60 F (-25 to 15.6 C)
- Protection: high pressure switch, low pressure sensor and switch, PC board fuse, inverter overload protection
- 7-year compressor limited warranty, 5-year parts limited warranty

Header Unit Model	MMY-MAP1686FT6P-UL	
<b>PERFORMANCE</b>		
Nominal Cooling Capacity	Btu/h	168,000
Nominal Heating Capacity	Btu/h	189,000
Maximum Total Connected Indoor Unit Capacity		Up to 150%
<b>SIMULTANEOUS COOLING AND HEATING EFFICIENCY*</b>		
SCHE, Ducted FCUs		28.30
SCHE, Ductless FCUs		30.20
<b>COOLING EFFICIENCY*</b>		
EER/IEER, Ducted FCUs		11.00/22.00
EER/IEER, Ductless FCUs		11.00/24.00
<b>HEATING EFFICIENCY*</b>		
COP at 47 F, Ducted FCUs		3.30
COP at 47 F, Ductless FCUs		3.44
Fan Type (Qty)		Propeller (2)
Airflow, Standard Range	CFM	10,852
Sound Pressure, Cooling/Heating	dBA	64/65
External Static Pressure†	in. wg	0.16

### LEGEND

- db — Dry Bulb
- COP — Coefficient of Performance
- EER — Energy Efficiency Ratio
- FCU — Fan Coil Unit
- IEER — Integrated Energy Efficiency Ratio
- SCHE — Simultaneous Cooling and Heating Efficiency
- wb — Wet Bulb

NOTE: Unit cabinet and coil slab shall be capable of withstanding 500-hour salt spray test in accordance with the ASTM (American Society for Testing and Materials, U.S.A.) B-117 Standard.

<b>ELECTRICAL</b>		
Power Supply	V/Ph/Hz	460/3/60
Minimum Circuit Amps (MCA)	A	29.7
Recommended Fuse Size	A	35
<b>COMPRESSORS</b>		
Type (Number)		Inverter Twin Rotary (2)
Motor Output	kW	2 x 6.5
<b>FAN MOTOR</b>		
Motor Type (Steps)		Inverter Direct Driven (64)
Motor Output	kW	1.0 + 1.0
<b>PHYSICAL DATA</b>		
Pipe Connection Size - Liquid (High Pressure)	in.	3/4 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	1-1/8 (Brazed)
Discharge (High Pressure)	in.	7/8 (Flare)
Balance	in.	3/8 (Flare)
Refrigerant		R-410A
Factory Charge**	lb	24.3
External Finish		Munsell 1Y8.5/0.5
Unit Width	in.	63.0
Unit Height	in.	72.9
Unit Depth	in.	30.7
Unit Net Weight	lb	838

\*Rated per AHRI (Air-Conditioning, Heating and Refrigeration Institute) 1230 Standard.

Cooling: Indoor 80 F (35 C) db/67 F (27 C) wb; Outdoor 95 F (35 C) db  
 Heating: Indoor 70 F (21 C) db; Outdoor 47 F (8 C) db/43 F (6 C) wb  
 †Requires setting by DIP switches.

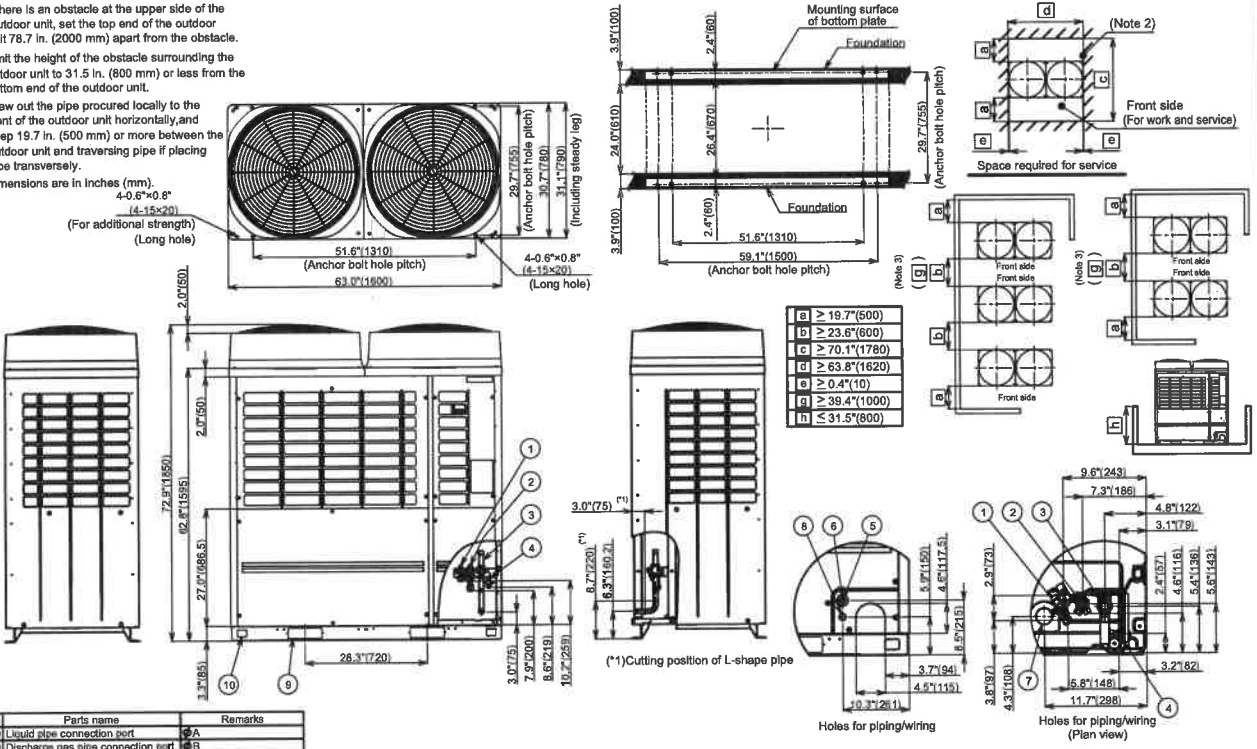
\*\*Additional charge required.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

# DIMENSIONAL DRAWING OUTDOOR UNIT HEAT RECOVERY/SINGLE UNIT MMY-MAP1686FT6P-UL

**NOTES:**

1. If there is an obstacle at the upper side of the outdoor unit, set the top end of the outdoor unit 78.7 in. (2000 mm) apart from the obstacle.
2. Limit the height of the obstacle surrounding the outdoor unit to 31.5 in. (800 mm) or less from the bottom end of the outdoor unit.
3. Draw out the pipe procured locally to the front of the outdoor unit horizontally, and keep 19.7 in. (500 mm) or more between the outdoor unit and traversing pipe if placing pipe transversely.
4. Dimensions are in inches (mm).  
4-0.6"×0.8" (4-15×20)  
(For additional strength)  
(Long hole)



No.	Parts name	Remarks
(A)	Liquid pipe connection port	φA
(B)	Discharge gas pipe connection port	φB
(C)	Suction gas pipe connection port	φ1-1/8" (28.6)
(D)	Balance pipe connection port	φ3/8" (9.5)
(E)	Knockout hole for power wiring 1	φ0.9" (22.2)
(F)	Knockout hole for power wiring 2	φ1.7" (43.7)
(G)	Knockout hole for power wiring 2	φ1.3" (48)
(H)	Knockout hole for control wiring	φ1.1" (27)
(I)	Square hole (for freight handling)	4-2.4"×7.9" (4-60×200)
(J)	Square hole (for hanging)	4-1.6"×2.2" (4-40×55)

Model Name	A	B
MAP 1446 type	5/8" (15.9)	1" (25.4)
MAP 1686 type	3/4" (19.1)	1-1/8" (28.6)



# SMMSi / SHRMi VRF Indoor Unit MMK-AP0243H2UL - High Wall

**TOSHIBA**  
*Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### SMMSi / SHRMi VRF High Wall Features

- R-410A Refrigerant
- Six sizes from 7,000 to 24,000 Btu/h
- Quiet operation, as low as 30 dBA
- Vertical airflow can be set to swing or fixed position
- Air throw up to 23 ft
- Auto or manually set three fan speeds
- Easy to remove cleanable filter
- Five-year parts limited warranty

Indoor Unit Model	MMK-AP0243H2UL	
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	24,000
Heating Rated Capacity	Btu/h	27,000
Fan Type (Qty)		Cross-Flow (1)
Airflow (L / M / H)	CFM	340 / 440 / 600
Sound Pressure (L / M / H)	dBA	35 / 40.5 / 47.5
<b>ELECTRICAL</b>		
Power Supply	V/Ph/Hz	208-230/1/60
Power Consumption (Input)	kW	0.05
Full Load Amps (FLA)	A	0.4
Minimum Circuit Amps (MCA)	A	0.5
Maximum Overcurrent Protection (MOCP)	A	15
Motor Type	DC Inverter Driven	
Motor Watts		30

### PHYSICAL DATA

Pipe Connection Size - Liquid (High Pressure)	in.	3/8 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	5/8 (Flare)
Pipe Connection Size - Drain (OD)	in.	7/8
Pipe Connection Size - Drain (ID)	in.	5/8
Refrigerant		R-410A
External Finish	Munsell 2.5GY9.0/0.5	
Unit Width	in.	41-5/16
Unit Height	in.	12-9/16
Unit Depth	in.	9
Unit Net Weight	lb	33

### CONTROLS

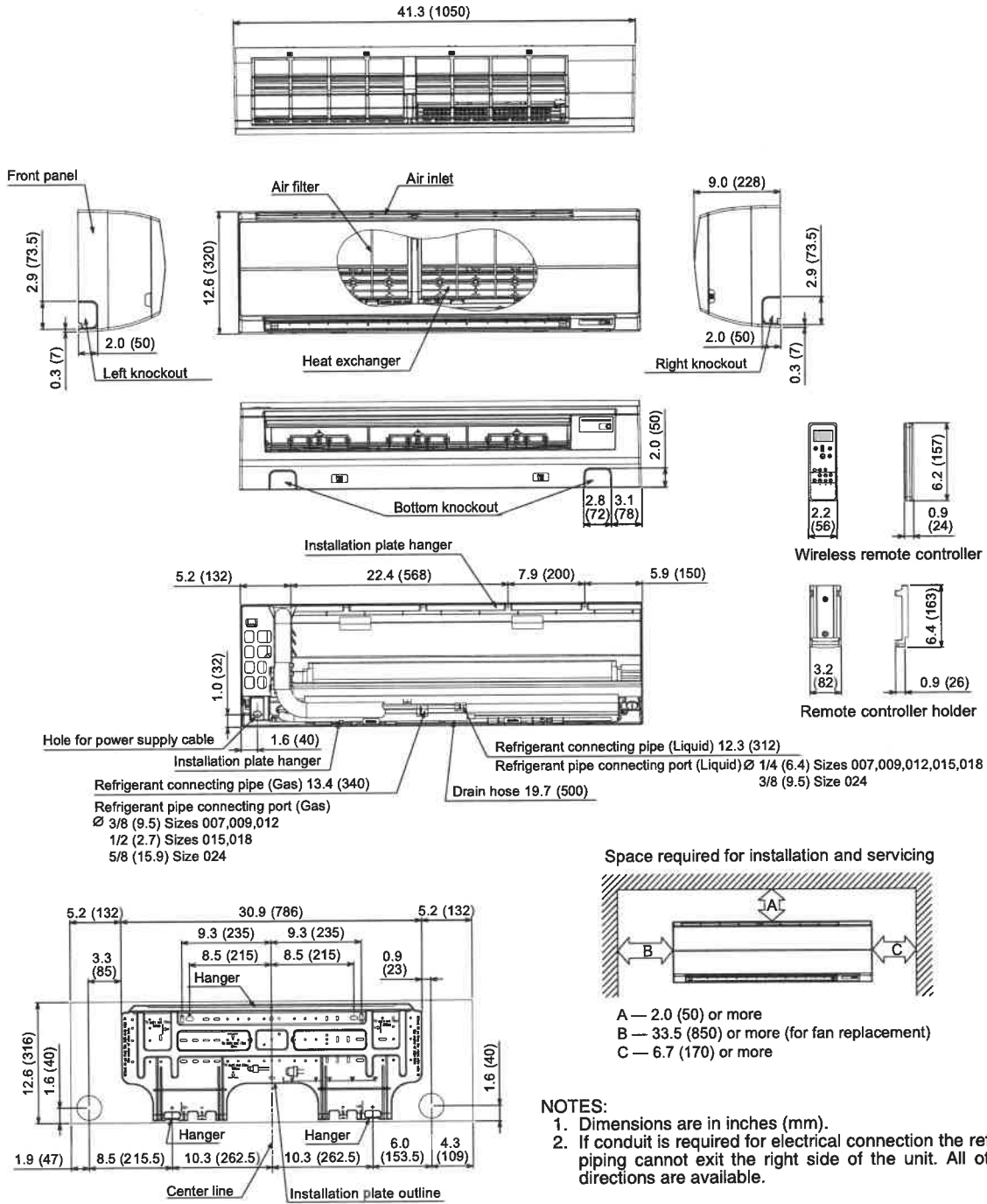
Wireless Remote Controller (Standard)

### ACCESSORIES (Optional)

- Lite Vision Plus Remote Controller (7-Day Programmable) RBC-AMS51E-ES
- Simple Wired Remote Control RBC-AS41UL
- Remote Sensor TCB-TC41LUL
- Wired Remote Controller RBC-AMT32UL
- Condensate Drain Pump Kit 53DS-900---118

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

# DIMENSIONAL DRAWING INDOOR UNIT HIGH WALL MMK-AP0243H2UL

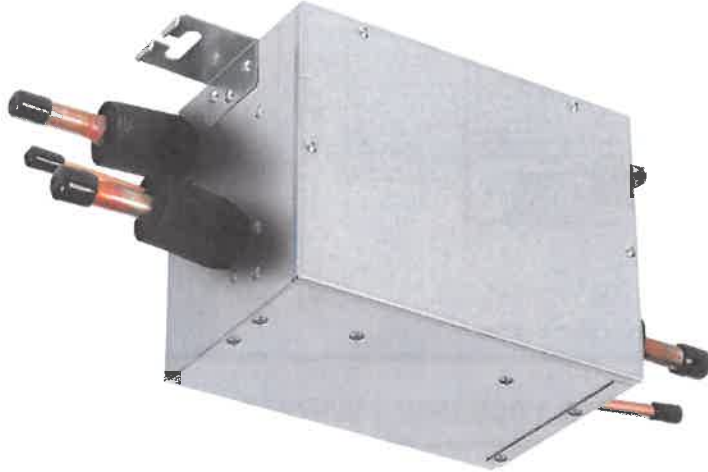


**SHRMe**  
**RBM-Y0383FUL—Single Port Flow Selector**

**TOSHIBA**  
*Carrier*

**Submittal Data**

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



**Single Port Flow Selector Features**

- Maximum piping length between port and indoor unit is 49 ft.
- Single port flow selector is powered by its indoor unit. Power and control wiring included with unit.
- Multiple indoor units can be connected to one box.

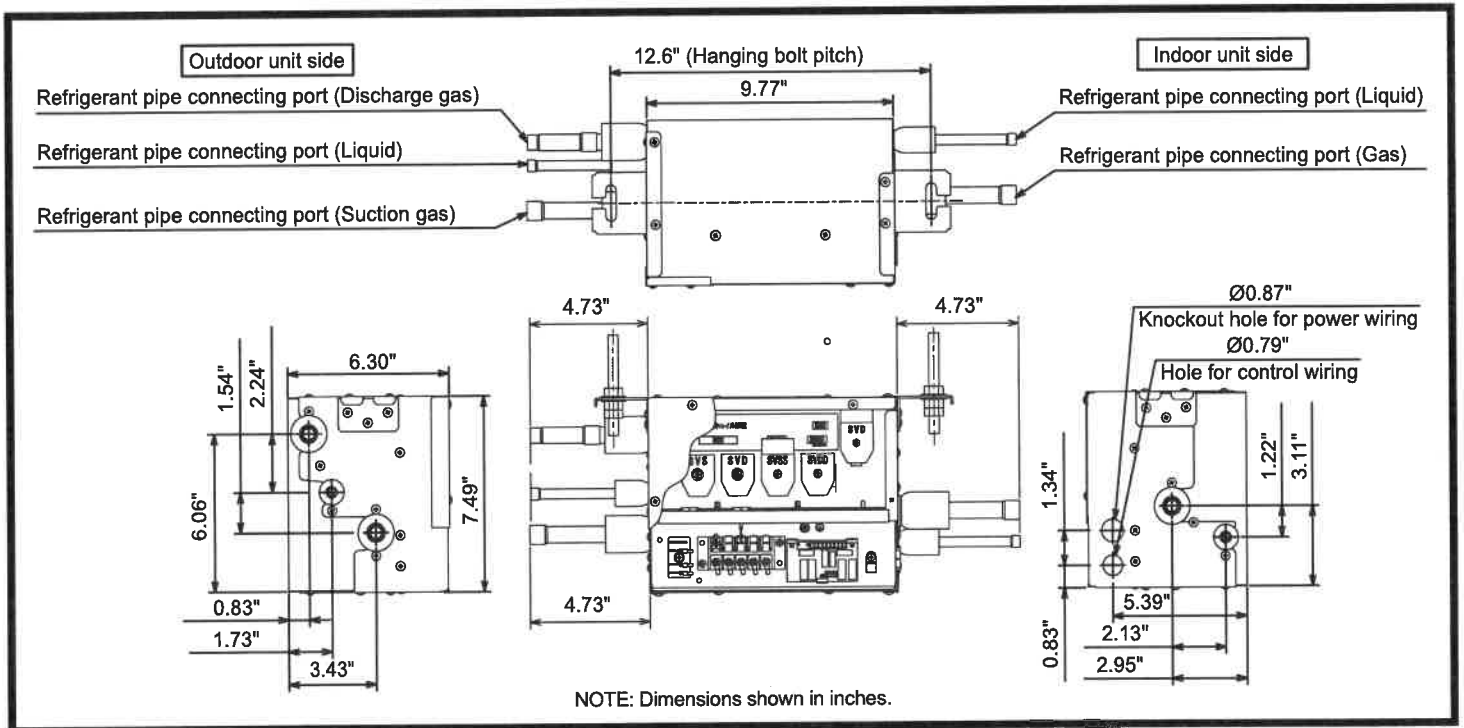
MODEL NAME	RBM-Y0383FUL	
POWER SUPPLY	208-230/1/60	
Current Draw	A	<1
MOCP	A	15
Number of Connectable Indoor Units	5	
Connectible indoor unit capacity	kBtu/h	Below 38
DIMENSIONS	Height (in)	7.49
	Width (in)	9.77
	Depth (in)	6.3
TOTAL WEIGHT	lbs	11
Connecting Port Diameter (Indoor Unit Side)	Liquid Side (in)	3/8
	Gas Side (in)	5/8
Connecting Port Diameter (Outdoor Unit Side)	Liquid Side (in)	3/8
	Discharge Gas Side (in)	1/2
	Suction Gas Side (in)	5/8
Connection	Braze	

**LEGEND**

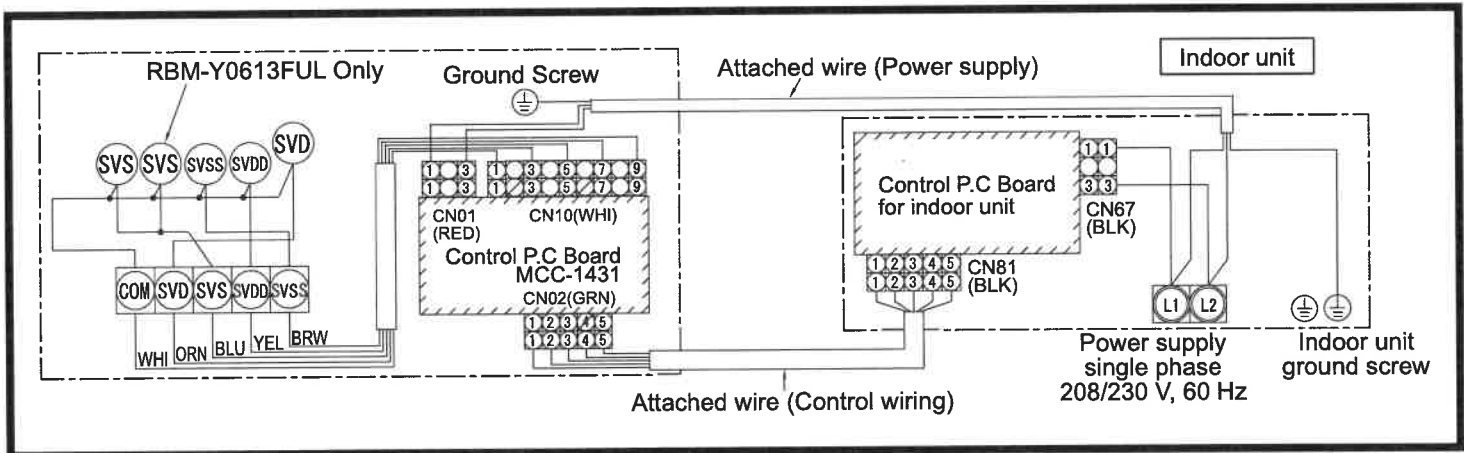
**MOCP** — Maximum Over Current Protection



# SINGLE PORT FLOW SELECTOR (RBM-Y0383FUL)

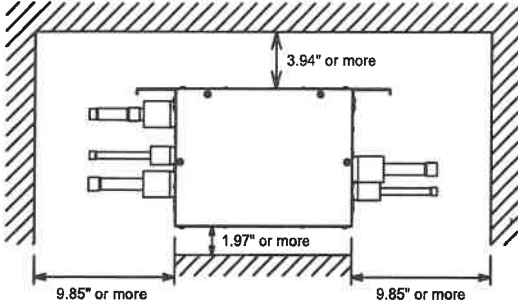


# SINGLE PORT FLOW SELECTOR (RBM-Y0383FUL) WIRING DIAGRAM

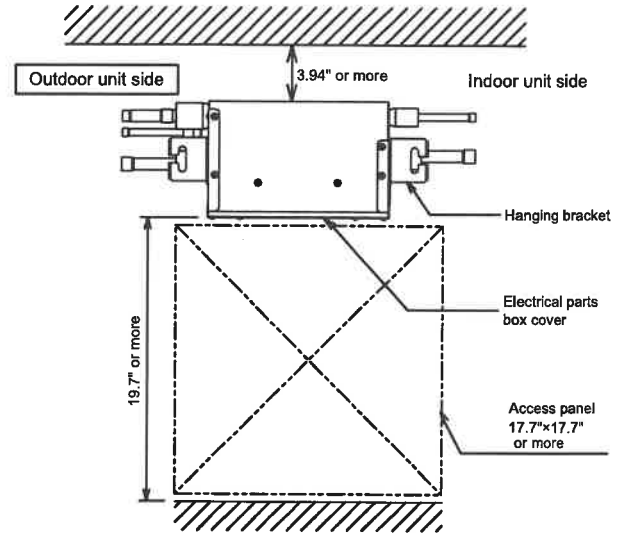
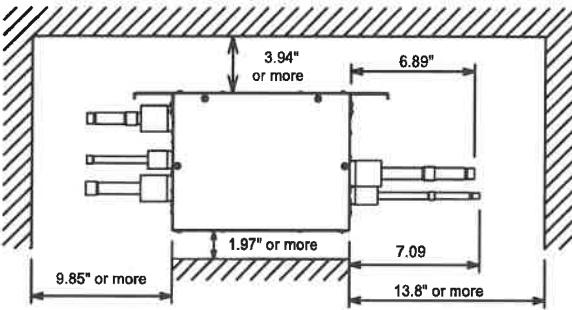


# SINGLE PORT FLOW SELECTOR (RBM-Y0383FUL) SERVICE CLEARANCE

## RBM-Y0383FUL



## RBM-Y0383FUL (When attached pipes are used)



NOTE: Dimensions shown in inches.



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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.  
 Printed in U.S.A. Form RBM-Y0383FUL\_01 Pg 3 3-17 Replaces: NEW

# SMMSi / SHRMi VRF Indoor Unit MMD-AP0074SPH2UL - Slim Duct

**TOSHIBA**  
*Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### SMMSi / SHRMi VRF Slim Duct Features

- R-410A Refrigerant
- Five sizes from 7,500 to 18,000 Btu/h
- Quiet operation, as low as 28 dBA
- Rear return or bottom return
- Optional wired or wireless controls
- Auto or manually set three fan speeds
- Five-year parts limited warranty

Indoor Unit Model	MMD-AP0074SPH2UL	
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PERFORMANCE		
Cooling Rated Capacity	Btu/h	7,500
Heating Rated Capacity	Btu/h	8,500
Fan Type (Qty)		Centrifugal (2)
Airflow (L / M / H)	CFM	235 / 276 / 318
Maximum External Static Pressure*	in. wg	0.08 / 0.14 / 0.2
Sound Pressure, Rear Return (L / M / H)	dBA	28 / 30 / 31
Sound Pressure, Bottom Return (L / M / H)	dBA	33 / 36 / 39
ELECTRICAL		
Power Supply	V/Ph/Hz	208-230/1/60
Power Consumption (Input)	kW	0.043
Full Load Amps (FLA)	A	0.58
Minimum Circuit Amps	A	0.73
Maximum Overcurrent Protection	A	15
Motor Type	DC Inverter Driven	
Motor Watts		60

### PHYSICAL DATA

Pipe Connection Size - Liquid (High Pressure)	in.	1/4 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	3/8 (Flare)
Pipe Connection Size - Drain (OD)	in.	1-1/4
Pipe Connection Size - Drain (ID)	in.	1
Refrigerant	R-410A	
External Finish	Zinc Hot Dipped Steel Plate	
Unit Width	in.	33-5/16
Unit Height	in.	8-5/16
Unit Depth	in.	25-3/8
Unit Net Weight	lb	49

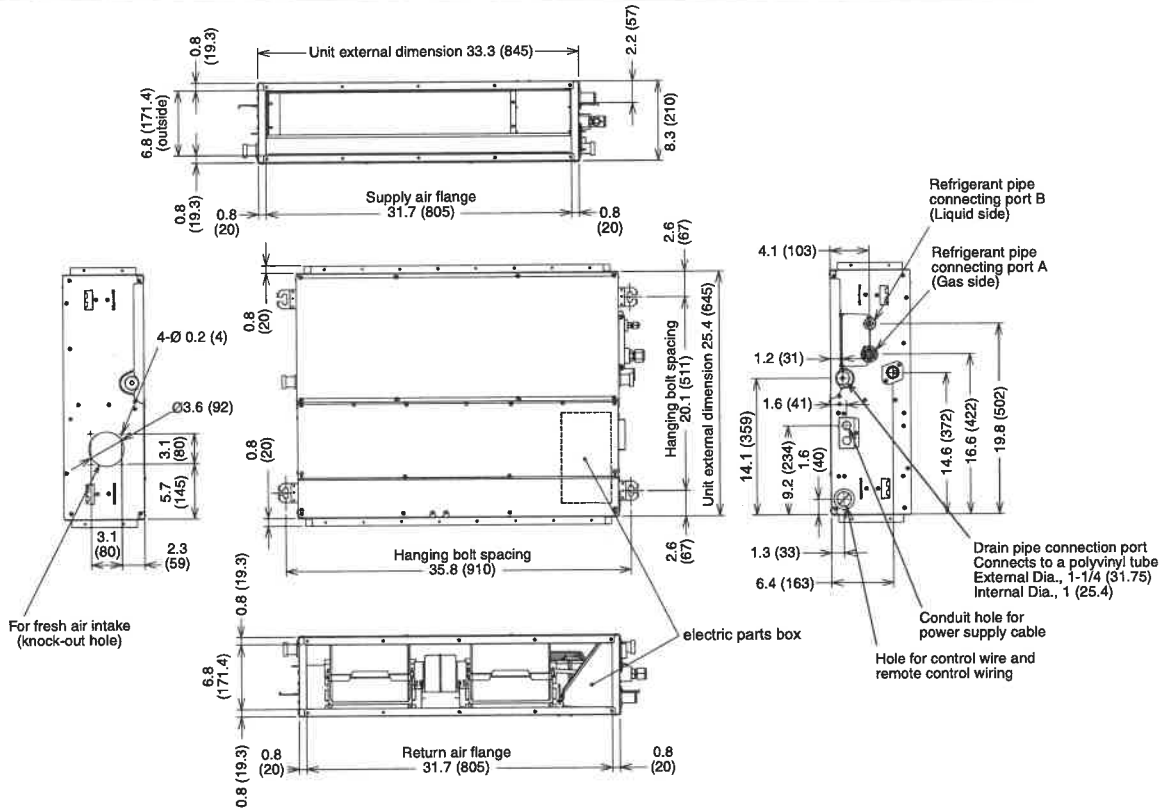
\* 0.08 is the default factory setting. 0.14 and 0.2 are available as field selectable options.

### ACCESSORIES (Optional)

- Lite Vision Plus Remote Controller (7-Day Programmable) RBC-AMS51E-ES
- Simple Wired Remote Control RBC-AS41UL
- Stand-Alone Receiver with Wireless Remote TCB-AX32UL
- Remote Sensor TCB-TC41LUL
- Wired Remote Controller RBC-AMT32UL
- Auxiliary Fresh Air Flange TCB-FF101URUL

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

# DIMENSIONAL DRAWING INDOOR UNIT SLIM DUCT MMD-AP0074SPH2UL

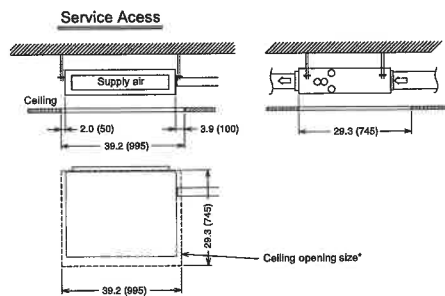
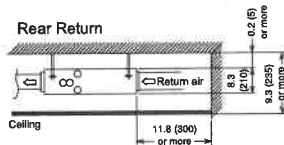
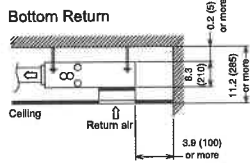
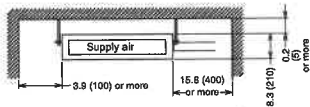


**Clearance required for installation or service work**

**NOTES:**

1. Filter is field supplied per local codes.
2. Provide sufficient access for filter removal and replacement.
3. The drain connection is ABS. If the drain piping is PVC, the correct glue must be used.
4. Dimensions are in inches (mm).

Model MMD-	A	B
AP0074SPH2UL	Ø3/8 (9.5)	Ø1/4 (6.4)



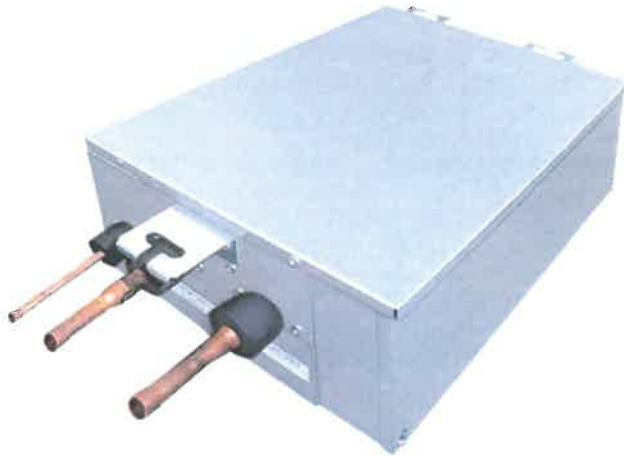
\*Required if installation is not above a suspended ceiling.



**SHRMe****RBM-Y0614FUL—Single Port Flow Selector (Long)****TOSHIBA**  
*Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### Single Port Flow Selector (Long) Features

- Maximum piping length between port and indoor unit is 164 ft.
- Separate power supply is required.
- Power and control cable are field supplied and installed.
- Multiple indoor units can be connected to one box.

MODEL NAME	RBM-Y0614FUL	
POWER SUPPLY	208-230/1/60	
Current Draw	A	<1
MOCP	A	15
Number of Connectable Indoor Units	5	
Connectible indoor unit capacity/port	kBtu/h	38~61
DIMENSIONS	Height (in)	7.10
	Width (in)	16.80
	Depth (in)	11.80
TOTAL WEIGHT	lbs	27
Connecting Port Diameter (Indoor Unit Side)	Liquid Side (in)	3/8
	Gas Side (in)	5/8
Connecting Port Diameter (Outdoor Unit Side)	Liquid Side (in)	3/8
	Discharge Gas Side (in)	1/2
	Suction Gas Side (in)	5/8
Connection	Braze	

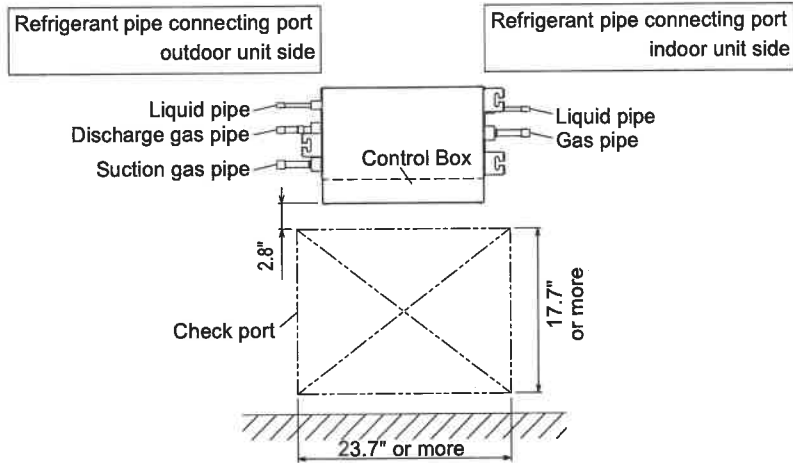
### LEGEND

**MOCP** — Maximum Over Current Protection

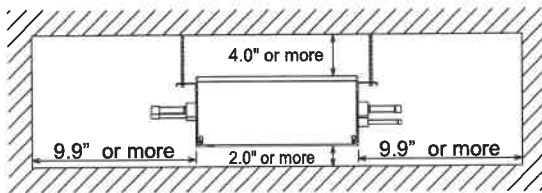


# SINGLE PORT FLOW SELECTOR CLEARANCE (RBM-Y0614FUL)

## Installation space

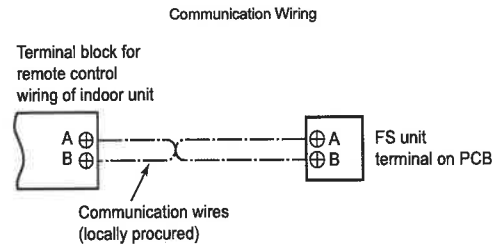
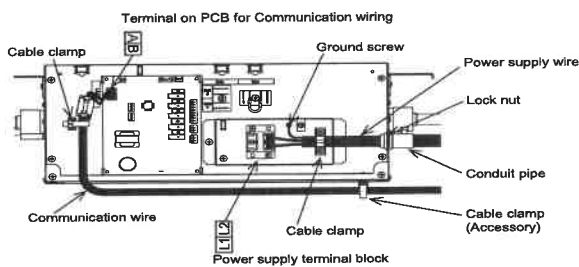


## When attached pipes are used

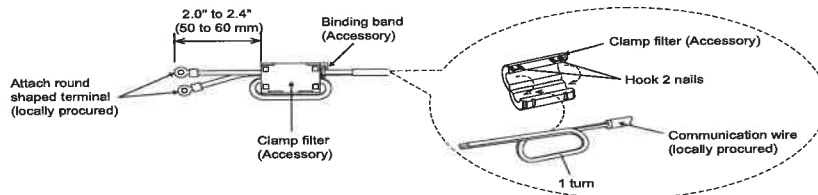


NOTE: Dimensions shown in inches.

# SINGLE PORT FLOW SELECTOR (RBM-Y0614FUL) WIRING DIAGRAM

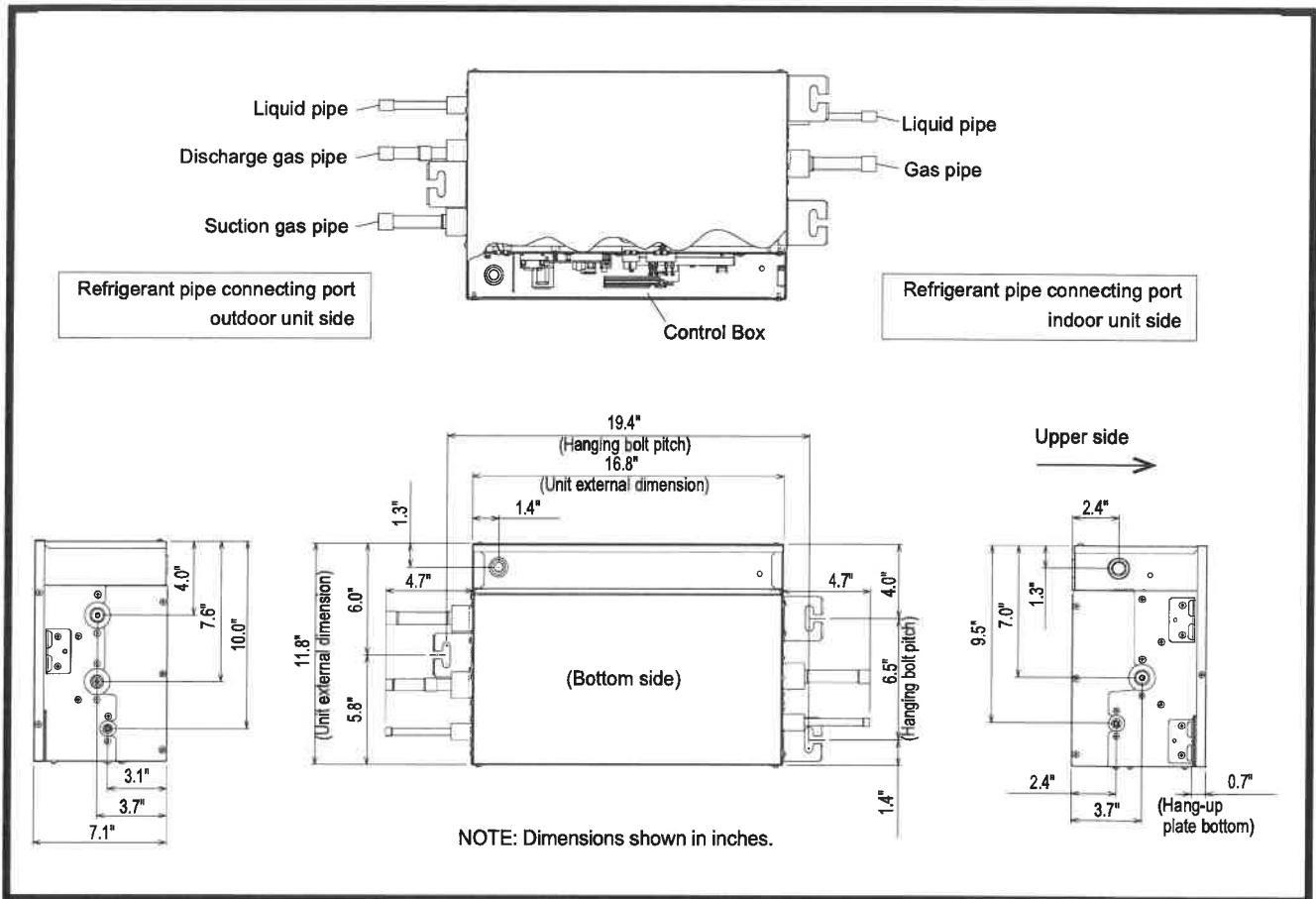


For communication wire, attach the Clamp filter (accessory) as shown in the picture below.



NOTE: Dimensions shown in inches.

# SINGLE PORT FLOW SELECTOR (RBM-Y0614FUL) DIMENSIONS



# SMMSi / SHRMi VRF Indoor Unit MMK-AP0093H2UL - High Wall

**TOSHIBA**  
*Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### SMMSi / SHRMi VRF High Wall Features

- R-410A Refrigerant
- Six sizes from 7,000 to 24,000 Btu/h
- Quiet operation, as low as 30 dBA
- Vertical airflow can be set to swing or fixed position
- Air throw up to 23 ft
- Auto or manually set three fan speeds
- Easy to remove cleanable filter
- Five-year parts limited warranty

Indoor Unit Model	MMK-AP0093H2UL	
<b>PERFORMANCE</b>		
Cooling Rated Capacity	Btu/h	9,500
Heating Rated Capacity	Btu/h	10,500
Fan Type (Qty)		Cross-Flow (1)
Airflow ( L / M / H)	CFM	230 / 280 / 340
Sound Pressure (L / M / H)	dBA	30 / 34 / 39
<b>ELECTRICAL</b>		
Power Supply	V/Ph/Hz	208-230/1/60
Power Consumption (Input)	kW	0.021
Full Load Amps (FLA)	A	0.2
Minimum Circuit Amps (MCA)	A	0.3
Maximum Overcurrent Protection (MOCP)	A	15
Motor Type	DC Inverter Driven	
Motor Watts		30

### PHYSICAL DATA

Pipe Connection Size - Liquid (High Pressure)	in.	1/4 (Flare)
Pipe Connection Size - Gas (Low Pressure)	in.	3/8 (Flare)
Pipe Connection Size - Drain (OD)	in.	7/8
Pipe Connection Size - Drain (ID)	in.	5/8
Refrigerant	R-410A	
External Finish	Munsell 2.5GY9.0/0.5	
Unit Width	in.	41-5/16
Unit Height	in.	12-9/16
Unit Depth	in.	9
Unit Net Weight	lb	33

### CONTROLS

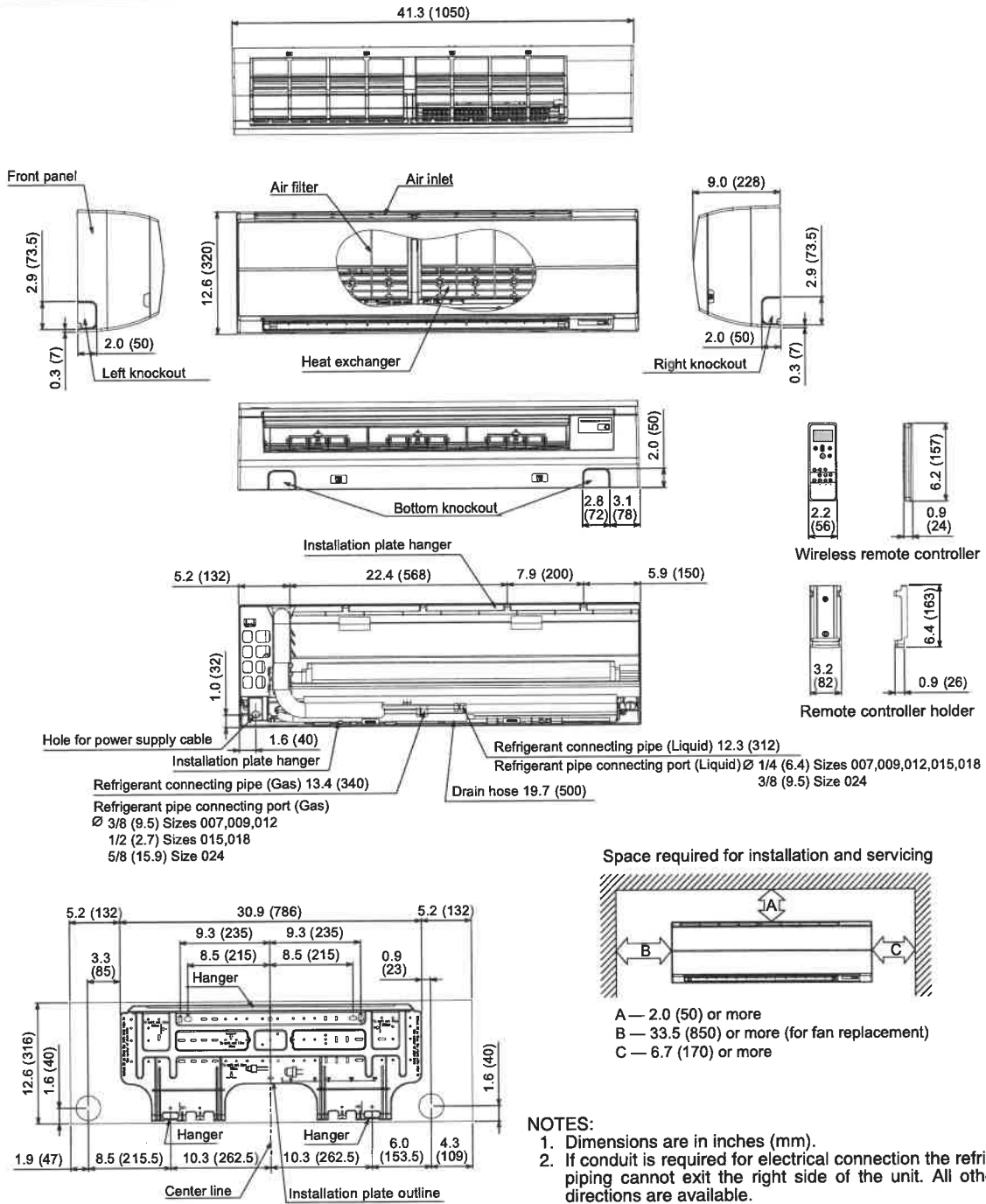
Wireless Remote Controller (Standard)

### ACCESSORIES (Optional)

- Lite Vision Plus Remote Controller (7-Day Programmable) RBC-AMS51E-ES
- Simple Wired Remote Control RBC-AS41UL
- Remote Sensor TCB-TC41LUL
- Wired Remote Controller RBC-AMT32UL
- Condensate Drain Pump Kit 53DS-900---118

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

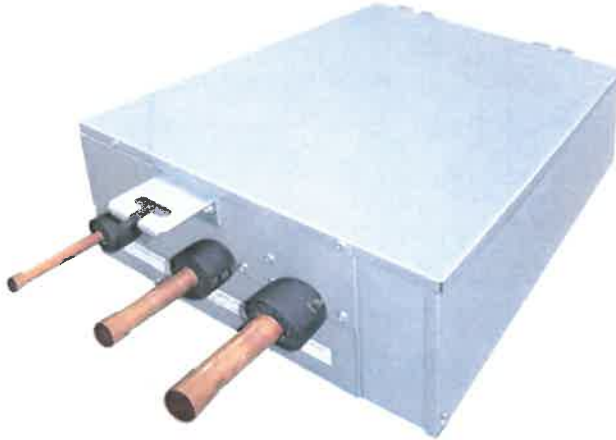
# DIMENSIONAL DRAWING INDOOR UNIT HIGH WALL MMK-AP0093H2UL



**SHRMe****RBM-Y0964FUL–Single Port Flow Selector (Long)****TOSHIBA***Carrier*

## Submittal Data

Job Data \_\_\_\_\_ Location \_\_\_\_\_  
 Buyer \_\_\_\_\_ Buyer PO # \_\_\_\_\_ Carrier # \_\_\_\_\_  
 Unit Number \_\_\_\_\_ Model Number \_\_\_\_\_  
 Performance Data Certified By \_\_\_\_\_ Date \_\_\_\_\_



### Single Port Flow Selector Features

- Maximum piping length between port and indoor unit is 164 ft.
- Single port (long) flow is powered by dedicated field power supply. Power and control wiring are field-provided.
- Multiple indoor units can be connected to one box.

MODEL NAME	RBM-Y0964FUL	
POWER SUPPLY	208-230/1/60	
Current Draw	A	<1
MOCP	A	15
Number of Connectable Indoor Units	8*	
Connectible indoor unit capacity/port	kBtu/h	61~96
DIMENSIONS	Height (in)	7.10
	Width (in)	19.50
	Depth (in)	13.80
TOTAL WEIGHT	lbs	38
Connecting Port Diameter (Indoor Unit Side)	Liquid Side (in)	1/2
	Gas Side (in)	7/8
Connecting Port Diameter (Outdoor Unit Side)	Liquid Side (in)	1/2
	Discharge Gas Side (in)	3/4
	Suction Gas Side (in)	7/8
Connection	Braze	

### LEGEND

**MOCP** — Maximum Over Current Protection

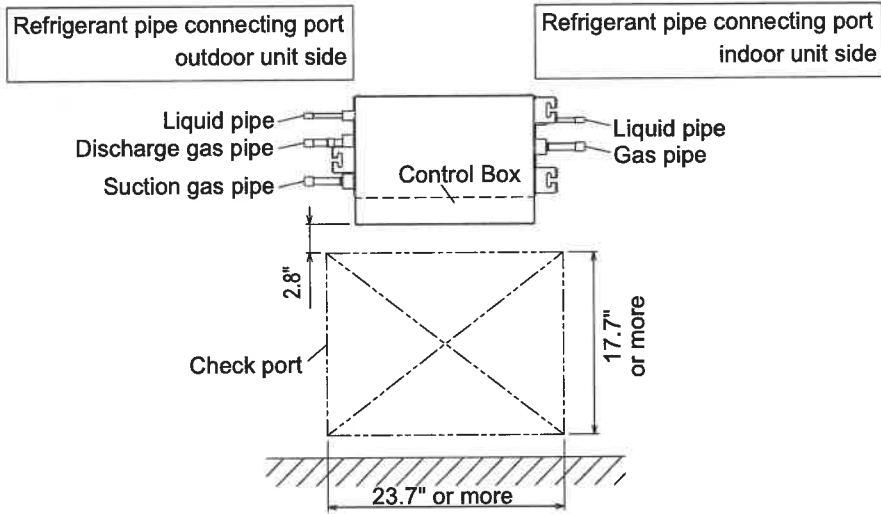
\* If using 2 remote controllers, maximum connectable indoor units is 7.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

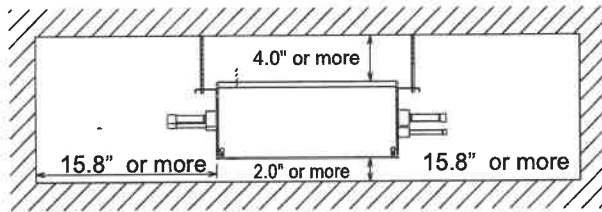


# SINGLE PORT FLOW SELECTOR CLEARANCE (RBM-Y0964FUL)

## Installation space

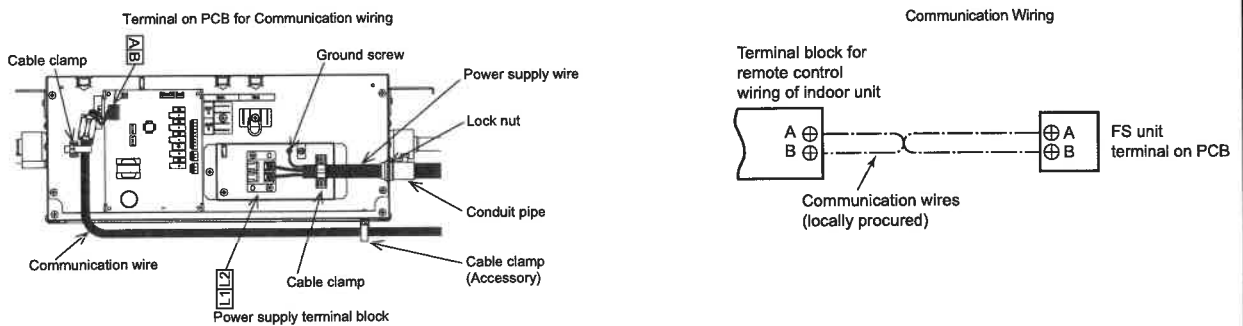


## When attached pipes are used

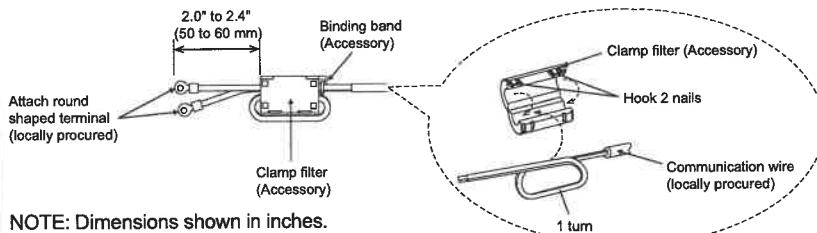


NOTE: Dimensions shown in inches.

# SINGLE PORT FLOW SELECTOR (RBM-Y0964FUL) WIRING DIAGRAM

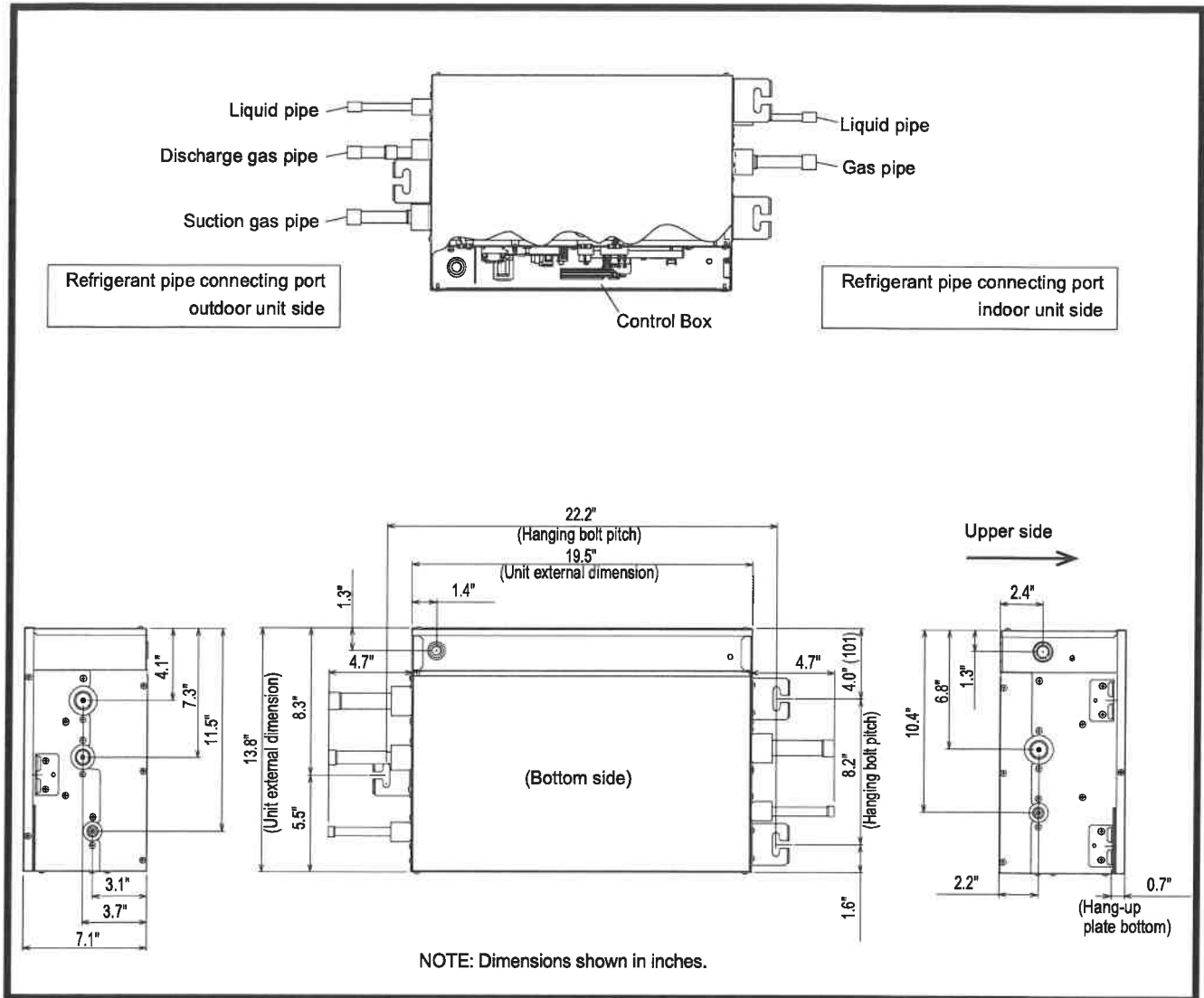


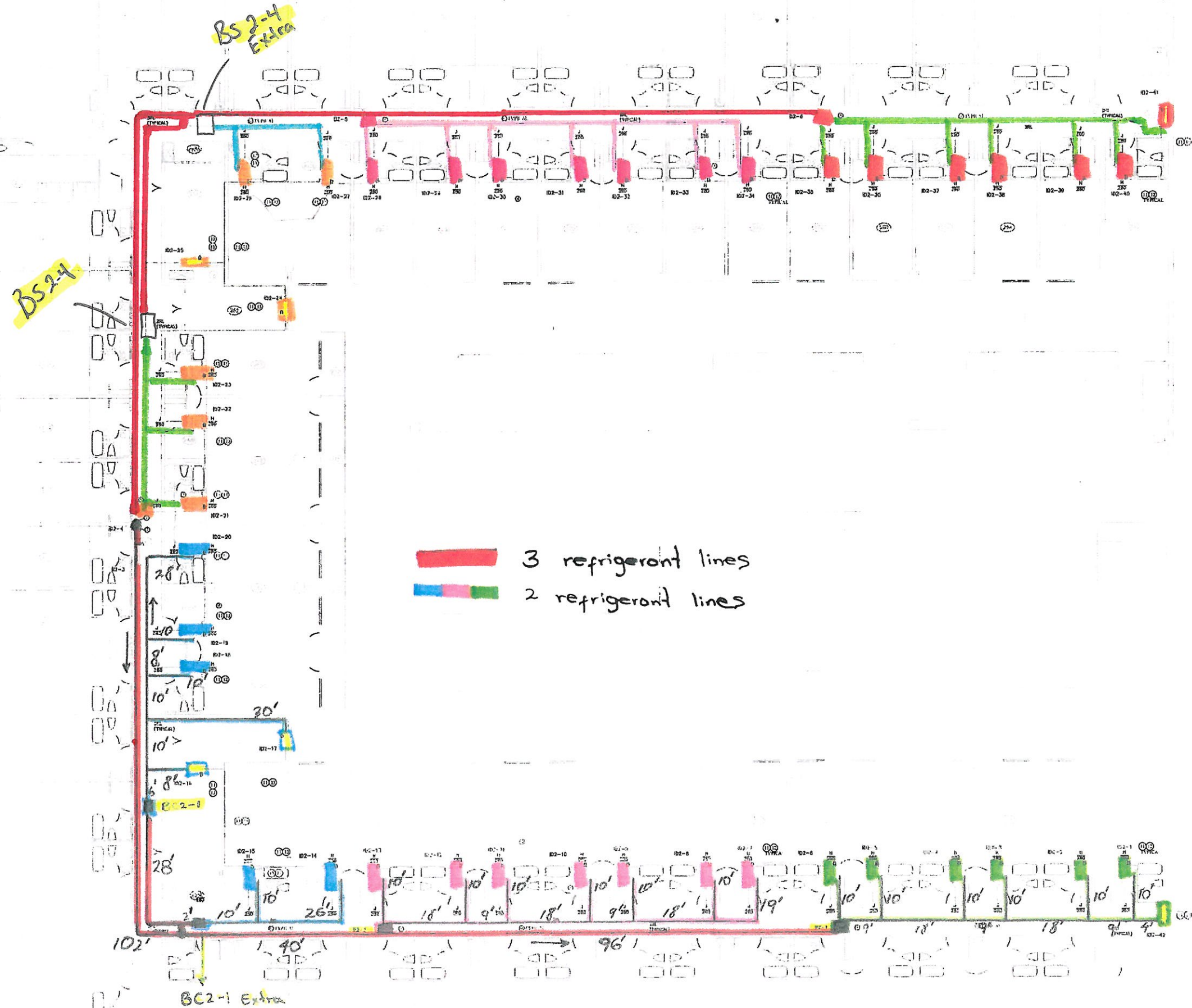
For communication wire, attach the Clamp filter (accessory) as shown in the picture below.



NOTE: Dimensions shown in inches.

# SINGLE PORT FLOW SELECTOR (RBM-Y0964FUL) DIMENSIONS





3 refrigerant lines  
 2 refrigerant lines

**General**

1. All work shall be in accordance with the applicable codes and standards.
   
 2. The contractor shall be responsible for obtaining all necessary permits.
   
 3. The contractor shall coordinate with the owner and other trades.
   
 4. All work shall be completed within the specified schedule.
   
 5. The contractor shall provide all necessary labor and materials.
   
 6. The contractor shall be responsible for the safety of all workers.
   
 7. The contractor shall maintain the cleanliness of the work area.
   
 8. The contractor shall provide weekly progress reports.
   
 9. The contractor shall provide a detailed log of all work performed.
   
 10. The contractor shall provide a final report upon completion of the project.

No.	Revisio
1	Addend

Firm Name and Address  
 West Virginia Divis  
 1409 Greenbrier Str  
 Charleston, WV 25

Project Name and Address  
 Phase II HVAC Pro  
 Parkersburg Cotice  
 225 Holiday Hills Dr  
 Parkersburg, WV 2

Project  
 COR354060

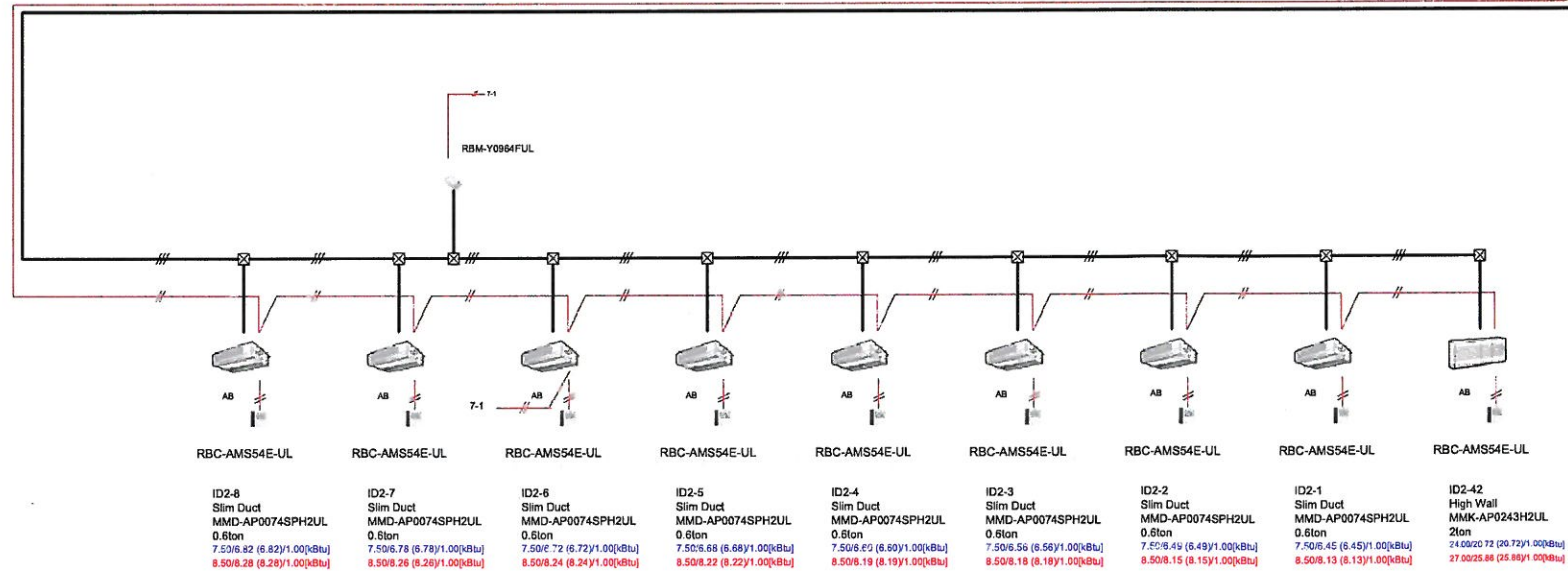
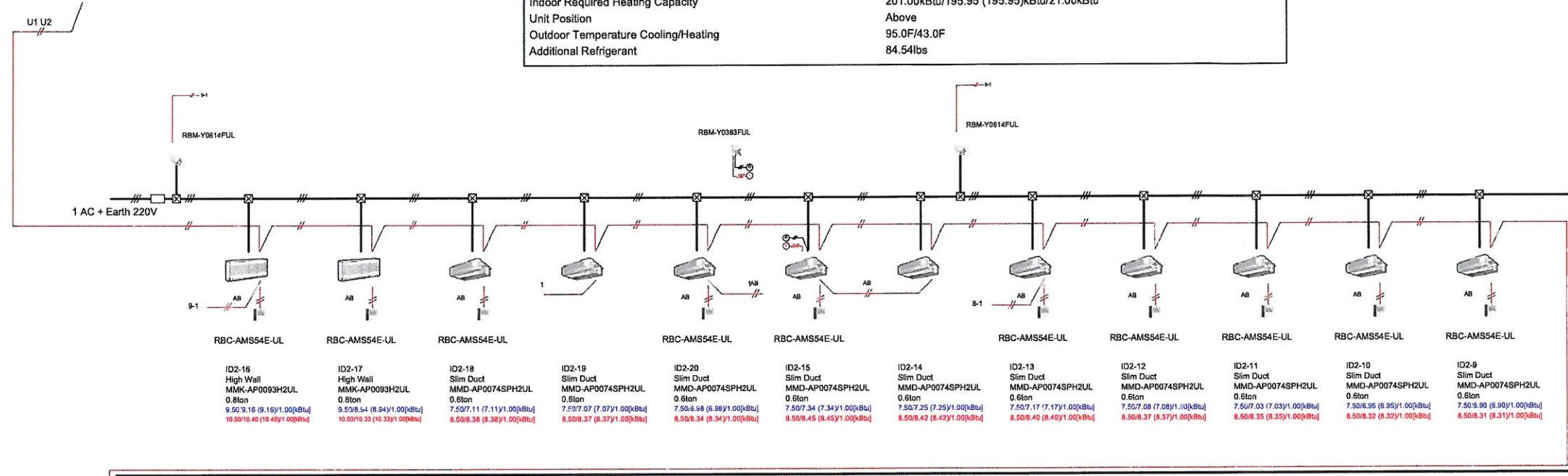




Control Wiring			
Name	Label	Wiring	Wiring Size and Length
Outdoor - Indoor Control Wiring	U1 U2	2-core Non-polarity Shielded cable	AWG16: Up to 3280 ft (1000 m)
Central Control Wiring	U3 U4	2-core Non-polarity Shielded cable	AWG14: Up to 6560 ft (2000 m)
Outdoor Units Control Wiring	U5 U6	2-core Non-polarity Shielded cable	AWG16 to AWG14/Up to 330 ft (100 m)
Remote Controller Wiring	AB	2-core	AWG20 to AWG14 - Up to 1640 ft (500 m) - Up to 1310 ft (400 m) in case of wireless remote control in group control. - Up to 660 ft (200 m) total length of control wiring between indoor units

Product Name	Model Name	Q'ty
Outdoor Unit(s)	MMY-MAP1686FT6P-UL	1
Indoor Unit(s)	MMK-AP0093H2UL	2
Indoor Unit(s)	MMK-AP0243H2UL	1
Indoor Unit(s)	MMD-AP0074SPH2UL	18
Y-Join(s)	RBM-BY6SFUL	1
Y-Join(s)	RBM-BY105FUL	1
Y-Join(s)	RBM-BY205FUL	1
Y-Join(s)	RBM-BY65FUL	15
Y-Join(s)	RBM-BY105FUL	2
FS-Unit	RBM-Y0614FUL	2
FS-Unit	RBM-Y064FUL	1
FS-Unit	RBM-Y0383FUL	1
R/C	RBC-AMS54E-UL	19
BMS System	BMS-CT5120UA	1
BMS System	BMS-IFL5V4UL	1

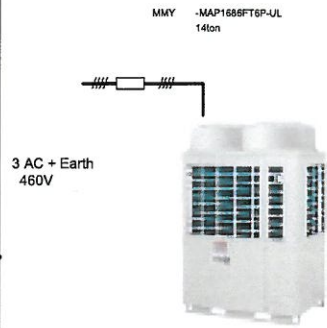
Refrigerant Cycle No.	1
Outdoor Name	OD-2A
Outdoor Type	SHRM-e
Model Name	MMY-MAP1686FT6P-UL
Horsepower	14ton
Outdoor Capacity	168.00kBTu/147.37kBTu/189.00kBTu/180.76kBTu
Indoor Required Cooling Capacity	178.00kBTu/162.80 (162.80)kBTu/21.00kBTu
Indoor Required Heating Capacity	201.00kBTu/195.95 (195.95)kBTu/21.00kBTu
Unit Position	Above
Outdoor Temperature Cooling/Heating	95.0F/43.0F
Additional Refrigerant	84.54lbs



Note: Equivalent length is calculated by coefficient 1.000  
 - The user is responsible for ensuring that all data entered is correct.  
 - Equipment selections have been based on the Design Guidelines stated within the Toshiba SMMS-e/SHRM-e/SMMS-I/SHRM-I/Mini-SMMS-e Installation Manual.  
 - It is the responsibility of the consultant or contractor, to verify and confirm that the equipment selection and system design is correct before installation.  
 - Please note that in the event of future system expansion being allowed for in the system design or a change in cooling/heating requirements, a re-evaluation of the air conditioning system must be made prior to final installation.

Software Version 2.11.8.0

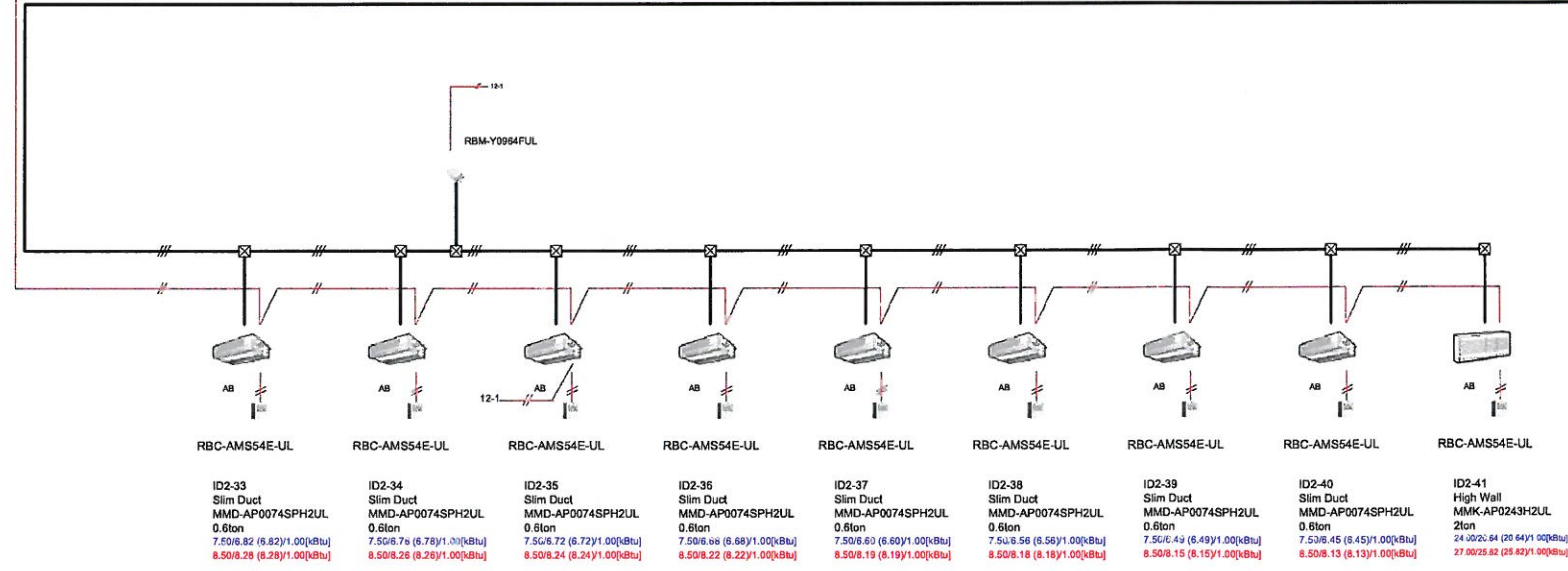
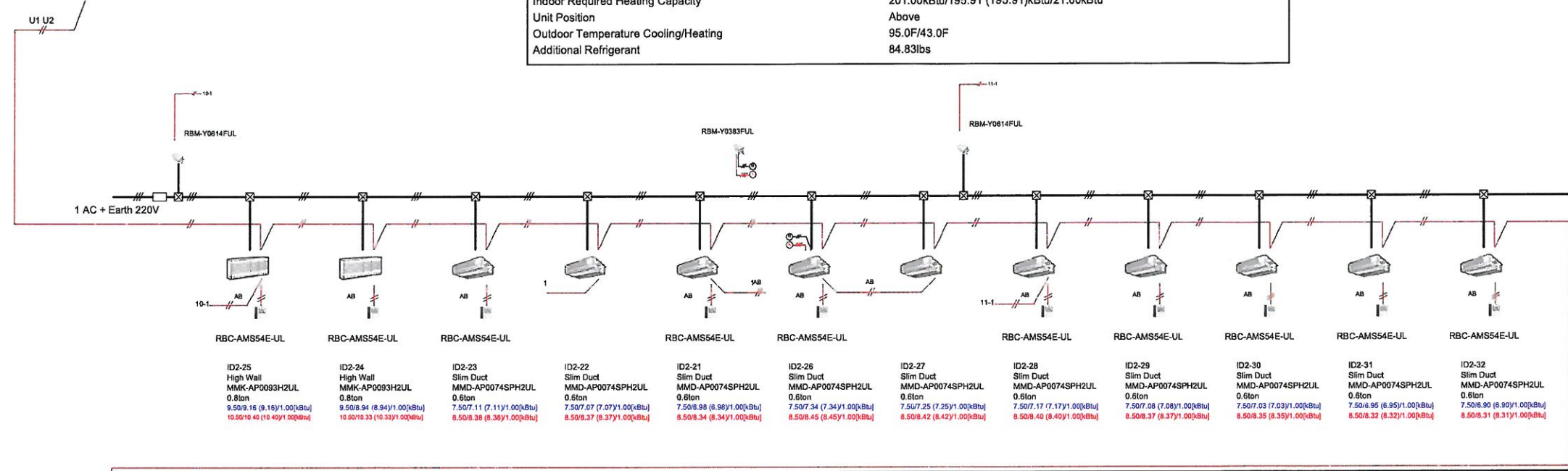
Building name	Parkersburg Correctional Center_rev_2	Date	2017-02-02	Drawing No.	_1
Drawing name		Scale	NonScale		



Control Wiring			
Name	Label	Wiring	Wiring Size and Length
Outdoor - Indoor Control Wiring	U1 U2	2-core Non-polarity Shielded cable	AWG16: Up to 3280 ft (1000 m)
Central Control Wiring	U3 U4	2-core Non-polarity Shielded cable	AWG14: Up to 6560 ft (2000 m)
Outdoor Units Control Wiring	U5 U6	2-core Non-polarity Shielded cable	AWG16 to AWG14/Up to 330 ft (100 m)
Remote Controller Wiring	AB	2-core	AWG20 to AWG14 - Up to 1640 ft (500 m) - Up to 1310 ft (400 m) in case of wireless remote control in group control. - Up to 660 ft (200 m) total length of control wiring between indoor units

Product Name	Model Name	Qty
Outdoor Unit(s)	MMY-MAP1686FT6P-UL	1
Indoor Unit(s)	MMK-AP093H2UL	2
Indoor Unit(s)	MMK-AP0243H2UL	1
Indoor Unit(s)	MMD-AP0074SPH2UL	18
Y-Join(s)	RBM-BY56FUL	1
Y-Join(s)	RBM-BY105FUL	1
Y-Join(s)	RBM-BY205FUL	1
Y-Join(s)	RBM-BY55FUL	15
Y-Join(s)	RBM-BY105FUL	2
Y-Join(s)	RBM-Y0614FUL	2
FS-Unit	RBM-Y096FUL	1
FS-Unit	RBM-Y063FUL	1
R/C	RBC-AMS54E-UL	19
BMS System	BMS-CTS120UL	1
BMS System	BMS-IFLSV4UL	1

Refrigerant Cycle No.	2
Outdoor Name	OD-2B
Outdoor Type	SHRM-e
Model Name	MMY-MAP1686FT6P-UL
Horsepower	14ton
Outdoor Capacity	168.00kBtu/147.37kBtu/189.00kBtu/180.76kBtu
Indoor Required Cooling Capacity	178.00kBtu/162.72 (162.72)kBtu/21.00kBtu
Indoor Required Heating Capacity	201.00kBtu/195.91 (195.91)kBtu/21.00kBtu
Unit Position	Above
Outdoor Temperature Cooling/Heating	95.0F/43.0F
Additional Refrigerant	84.83lbs



Note: Equivalent length is calculated by coefficient 1.000  
 - The user is responsible for ensuring that all data entered is correct.  
 - Equipment selections have been based on the Design Guidelines stated within the Toshiba SMMS-e/SHRM-e/SMMS-i/SHRM-i/Mini-SMMS-e Installation Manual.  
 - It is the responsibility of the consultant or contractor, to verify and confirm that the equipment selection and system design is correct before installation.  
 - Please note that in the event of future system expansion being allowed for in the system design or a change in cooling/heating requirements, a re-evaluation of the air conditioning system must be made prior to final installation.

Software Version 2.11.8.0

Building name	Parkersburg Correctional Center_rev_2	Date	2017-02-02	Drawing No.	_2
Drawing name		Scale	NonScale		



# TOSHIBA Carrier

MMY-MAP1686FT6P-UL



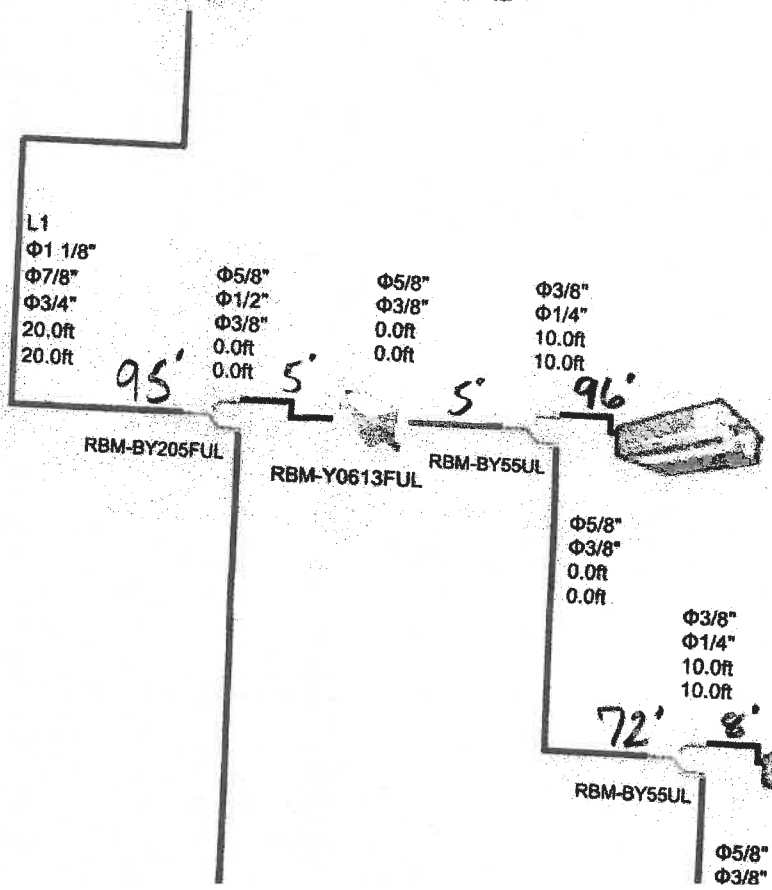
MMY-MAP1686FT6P-UL(14ton)  
 168.00/171.36[kBtu]  
 189.00/189.00[kBtu]  
 178.00/178.00 (178.00)/21.00[kBtu]  
 201.00/201.00 (201.00)/21.00[kBtu]  
 OD-2B

**Outdoor Key/Legend**  
 Outdoor Model Name  
 Outdoor Cooling Rated /Corrected Cap.  
 Heating Rated /Corrected Cap.  
 Indoor Cooling Rated/Capability (Corrected)/Required Cap.  
 Total Heating Rated/Capability (Corrected)/Required Cap.

**Piping Legend**  
 Gas pipe dia  
 Liquid pipe dia  
 Actual length  
 Equivalent length

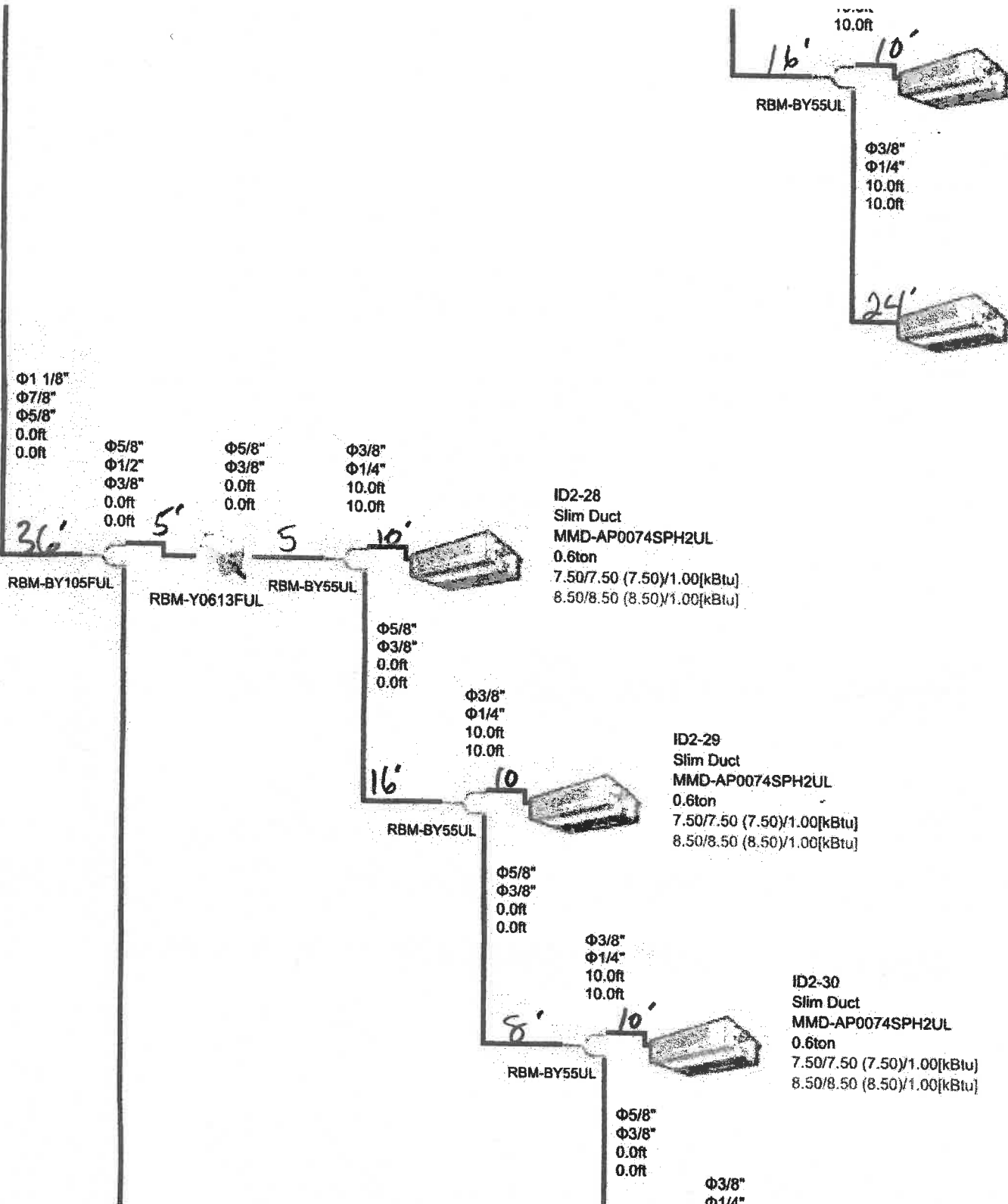
**Indoor Key/Legend**  
 Indoor Unit Name  
 Type  
 Model  
 Capacity Rank  
 Cooling Rated/Capability (Corrected)/Required Cap.  
 Heating Rated/Capability (Corrected)/Required Cap.  
 Floor Name  
 Room Name

**Piping Legend**  
 Suction Gas  
 Discharge Gas  
 Liquid Pipe dia  
 Actual Length  
 Equivalent Length



ID2-21  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

ID2-22  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]



ID2-26  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

ID2-27  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

ID2-28  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

ID2-29  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

ID2-30  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

Φ1 1/8"  
Φ7/8"  
Φ5/8"  
0.0ft  
0.0ft

Φ5/8"  
Φ1/2"  
Φ3/8"  
0.0ft  
0.0ft

Φ5/8"  
Φ3/8"  
0.0ft  
0.0ft

Φ3/8"  
Φ1/4"  
10.0ft  
10.0ft

Φ5/8"  
Φ3/8"  
0.0ft  
0.0ft

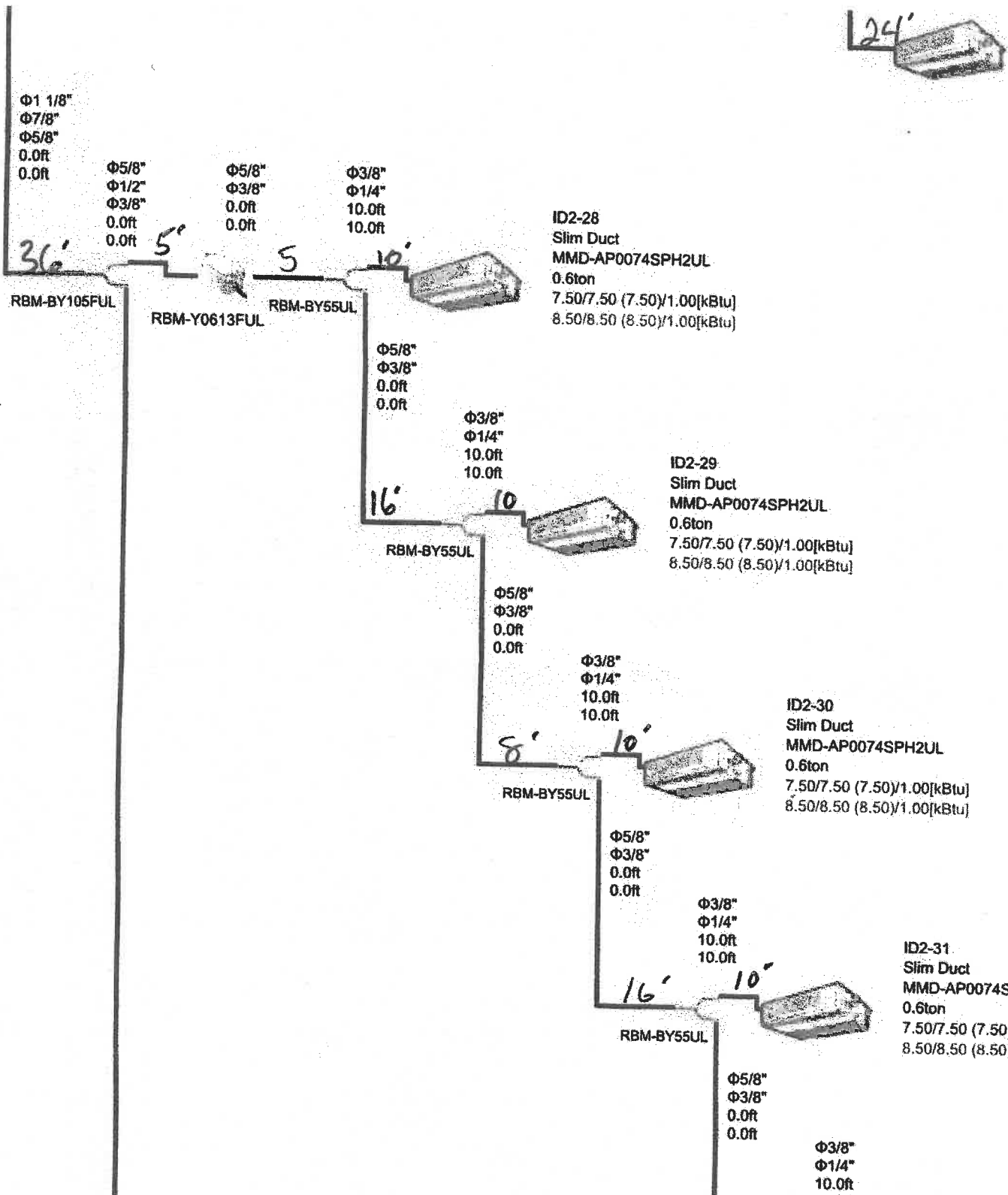
Φ3/8"  
Φ1/4"  
10.0ft  
10.0ft

Φ5/8"  
Φ3/8"  
0.0ft  
0.0ft

Φ3/8"  
Φ1/4"  
10.0ft  
10.0ft

Φ5/8"  
Φ3/8"  
0.0ft  
0.0ft

Φ3/8"  
Φ1/4"



MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

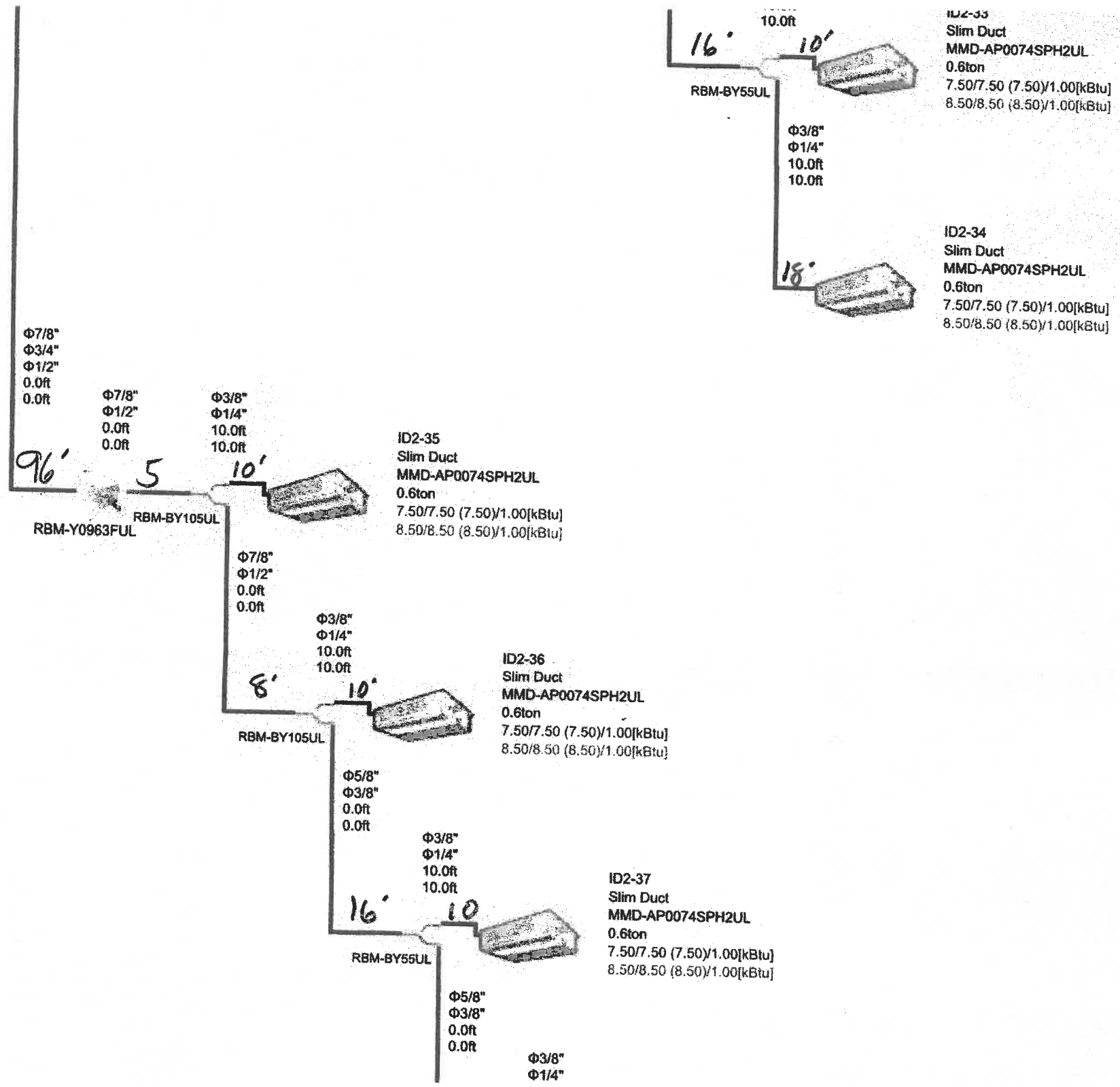
ID2-28  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

ID2-29  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

ID2-30  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

ID2-31  
 Slim Duct  
 MMD-AP0074SPH2UL  
 0.6ton  
 7.50/7.50 (7.50)/1.00[kBtu]  
 8.50/8.50 (8.50)/1.00[kBtu]

ID2-32



ey/Legend  
Model Name  
Cooling Rated /Corrected Cap.  
Heating Rated /Corrected Cap.  
Cooling Rated/Capability (Corrected)/Required Cap.  
Heating Rated/Capability (Corrected)/Required Cap.

Piping Legend  
Gas pipe diameters  
Liquid pipe diameters  
Actual length  
Equivalent length

y/Legend  
Unit Name  
  
Rank  
Rated/Capability (Corrected)/Required Cap.  
Rated/Capability (Corrected)/Required Cap.  
me  
ime

Piping Legend (3-pipe)  
Suction Gas Pipe diameters  
Discharge Gas Pipe diameters  
Liquid Pipe diameters  
Actual Length  
Equivalent Length



**TOSHIBA**  
*Carrier*

MMY-MAP1686FT6P-UL



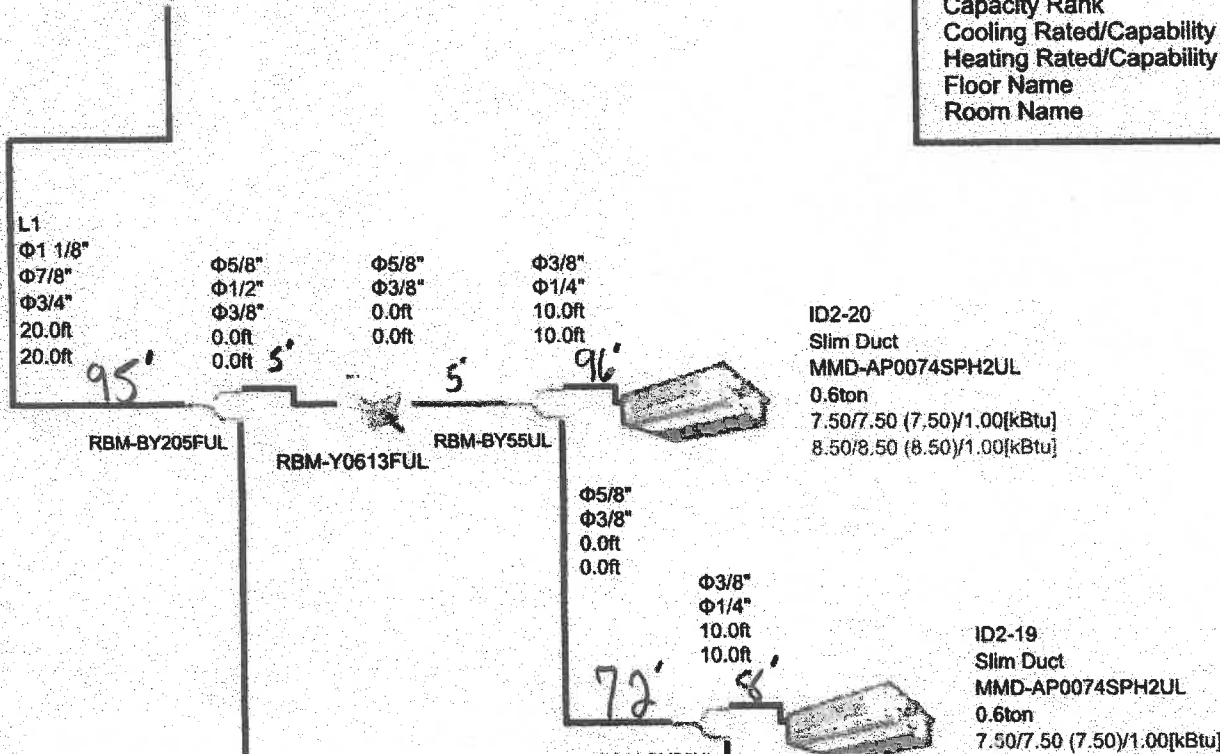
MMY-MAP1686FT6P-UL(14ton)  
168.00/171.36[kBtu]  
189.00/189.00[kBtu]  
178.00/178.00 (178.00)/21.00[kBtu]  
201.00/201.00 (201.00)/21.00[kBtu]  
OD-2A

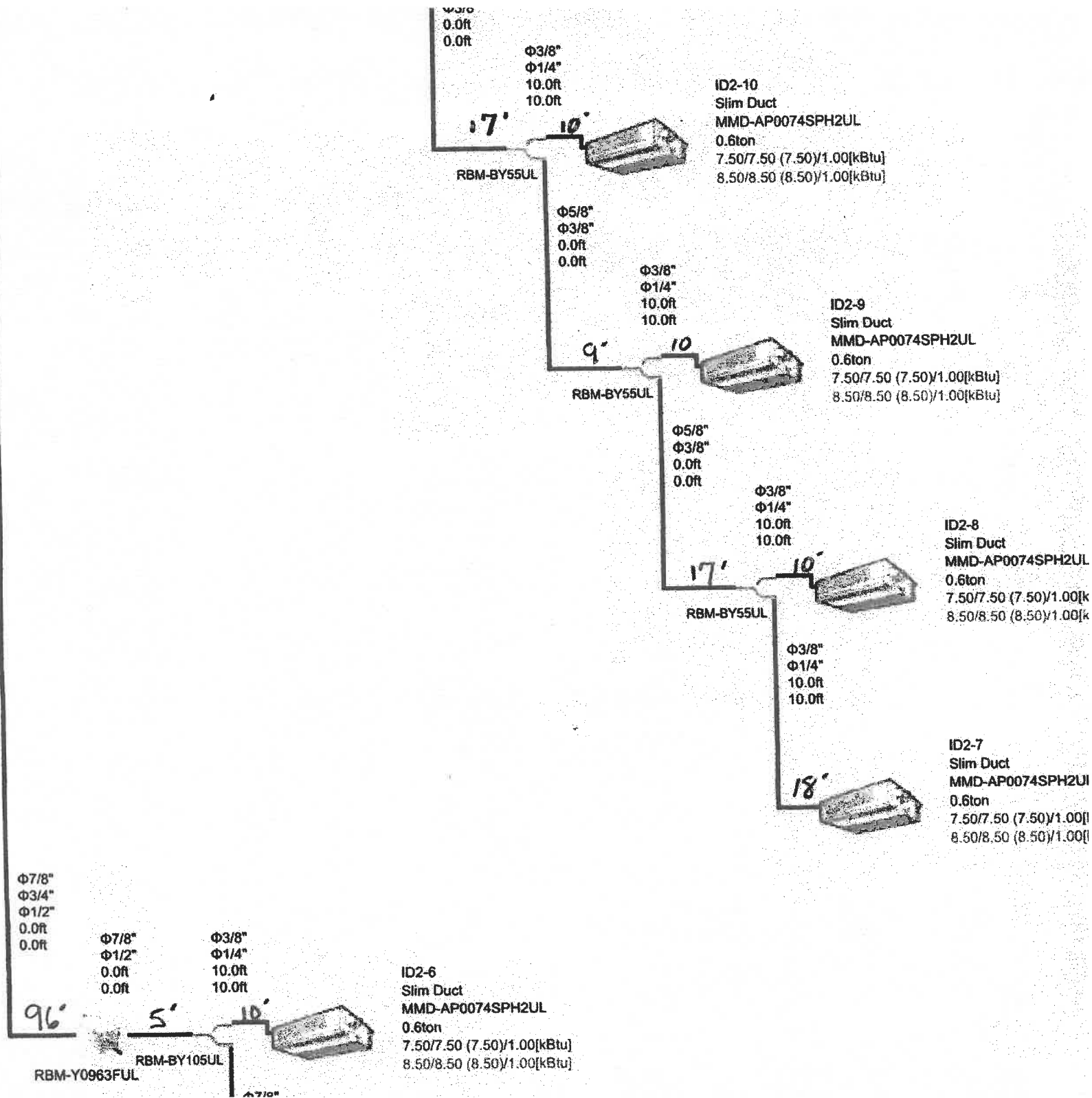
**Outdoor Key/Legend**  
Outdoor Model Name  
Outdoor Cooling Rated /Corrected Cap.  
Heating Rated /Corrected Cap.  
Indoor Cooling Rated/Capability (Corrected)/Required Cap.  
Total Heating Rated/Capability (Corrected)/Required Cap.

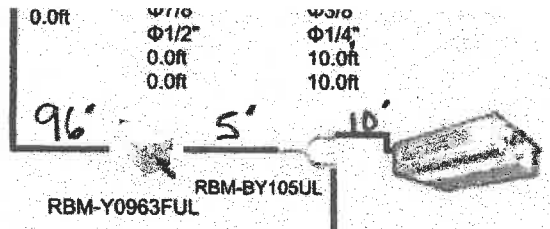
**Piping Legend**  
Gas pipe diameters  
Liquid pipe diameters  
Actual length  
Equivalent length

**Indoor Key/Legend**  
Indoor Unit Name  
Type  
Model  
Capacity Rank  
Cooling Rated/Capability (Corrected)/Required Cap.  
Heating Rated/Capability (Corrected)/Required Cap.  
Floor Name  
Room Name

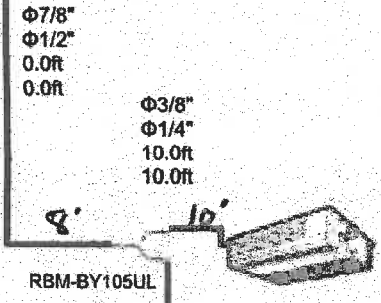
**Piping Legend (3-pi**  
Suction Gas Pipe c  
Discharge Gas Pip  
Liquid Pipe diamet  
Actual Length  
Equivalent Length



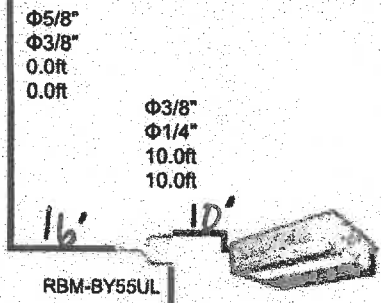




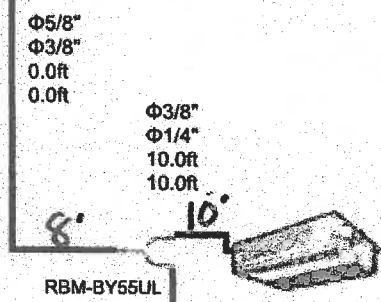
ID2-6  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]



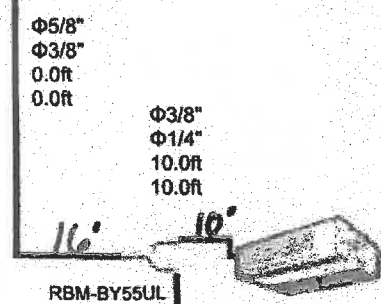
ID2-5  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]



ID2-4  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]



ID2-3  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]



ID2-2  
Slim Duct  
MMD-AP0074SPH2UL  
0.6ton  
7.50/7.50 (7.50)/1.00[kBtu]  
8.50/8.50 (8.50)/1.00[kBtu]

