SECTION 23 81 00

UNITARY AIR-CONDITIONING EQUIPMENT

PART 1 GENERAL

1.1 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. Air-Conditioning and Refrigeration Institute (ARI): 210/240, Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
   2. Canadian Gas Association (CGA).
   3. Air Moving and Conditioning Association (AMCA): Bulletin 300, Setup No. 1.
   4. American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE):
      a. 52, Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
      b. 90.1, Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings.
      c. HVAC Applications chapter in Seismic Restraint Design.
   5. ASTM International (ASTM):
      a. B117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
      b. D2370, Standard Test Method for Tensile Properties of Organic Coatings.
      c. D4060, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
      d. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
      e. G154, Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.
   6. Canadian Standards Association (CSA).
   7. ETL Testing Laboratories (ETL).
   8. International Organization for Standardization (ISO): ISO 13256-1, Water-Source Heat Pumps—Testing and Rating for Performance—Part 1: Water-to-Air and Brine-to-Air Heat Pumps.
   9. National Electrical Manufacturers Association (NEMA).
   10. National Fire Protection Association (NFPA): 255, Method of Test of Surface Burning Characteristics of Building Materials
   11. Underwriters Laboratories Inc. (UL): UL 94-5V, Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
   12. Underwriters Laboratories of Canada (ULC).

1.2 DEFINITIONS

A. The following is a list of abbreviations which may be used in this Section:
   1. AC: Air Conditioning.
   2. COP: Coefficient of Performance.
   3. EER: Energy Efficiency Ratio.

4. DX: Direct Expansion.
5. HP: Heat Pump.
6. IR: Infra Red.
7. LED: Light Emitting Diode.
8. PSC: Permanent Split Capacitor.
9. PTAC: Packaged Terminal Air Conditioner.
10. SPST: Single Pole, Single Throw.
11. TXV: Thermostatic Expansion Valve.
12. UV: Ultra Violet.

1.3 SUBMITTALS

A. Action Submittals:
   1. Complete specifications, descriptive drawings, catalog cuts, and descriptive literature which shall include make, model, dimensions, weight of equipment, and electrical schematics for all products specified.
   2. Manufacturer's standard finish color selection for enclosure finishes.
   3. Complete performance data that will indicate full compliance with the specifications:
      a. Include fan sound power level data (ref. 10 to 12 watts) at design operating point, based on AMCA Bulletin 300, Setup No. 1.
      b. Include heating and cooling performance data at design operating conditions.
   4. Air Pressurization Unit: Documentation that media filter modules are UL rated Class 1.
   5. Factory dip-applied protective coating product data.

B. Informational Submittals:
   1. Manufacturer's Certificate of Compliance, Certificate of Proper Installation in accordance with Section 01 43 33, Contractor Field Services, for heat pumps, air conditioning units, and motors.
   2. Detailed information on structural, mechanical, electrical, or other modifications necessary to adapt arrangement or details shown to equipment furnished.
   3. Sample copy of guarantee.
   4. Test reports.
   5. Operation and Maintenance Data in conformance with Section 01 78 23, Operation and Maintenance Data.
      a. Include wiring and control diagrams for equipment.
      b. Include as-built version of equipment schedules.

1.4 QUALITY ASSURANCE

A. Heating and Cooling Equipment: Minimum operating efficiencies, defined as COP and EER, as specified in ASHRAE 90.1.

B. Unit shall be rated (when matched with appropriate outdoor unit) per ARI 210/240.

C. Units shall be certified by UL/ULC and CSA, and shall be UL/ULC or ETL listed and labeled.

D. Cooling performance rated in accordance with ARI testing procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

B. Protection of Equipment:
1. Box, crate, or otherwise protect from damage and moisture during shipment, handling, and storage.
2. Protect from exposure to corrosive fumes and keep thoroughly dry at all times.
3. Store motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings in weathertight and heated storage facilities prior to installation.
4. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

1.6 SPECIAL GUARANTEE

A. Refrigerant Compressors: Furnish manufacturer's extended guarantee or warranty, with the City named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the City, removal and replacement of compressors specified in this Specification section found defective during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.

1.7 EXTRA MATERIALS

A. Furnish, tag, and box for shipment and storage the following materials:

Item		Quantity
Fan Belts		One complete set for each belt-driven fan.
Filters		two complete set per unit.

B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. Specified components of this Section, including insulation, facings, mastics, and adhesives, shall have fire hazard rating not to exceed 25 for flame spread without evidence of continued progressive combustion, and 50 for smoke developed, as per test conducted in accordance with ASTM E84 and NFPA 255 methods.

B. Multiple Compressor Units:
1. Provide completely independent refrigeration circuits and controls.
2. Indoor unit air coils shall have intermingled circuits, unless specified otherwise.

2.2 EQUIPMENT SCHEDULES

A. Refer to Article, Supplements.

2.3 SPLIT SYSTEM IN-CEILING CASSETTE AC UNIT, DUCTLESS

A. General:
1. Split system, indoor, DX, ductless, fan coil AC unit, complete with DX coil, fan, fan motor, piping connectors, electrical controls, condensate pump, and hanging brackets.
2. Suitable for use with air conditioner or heat pump outdoor unit.
3. Indoor unit shall be of the same manufacturer as the associated outdoor unit.
4. Entire system to be fed from one common power supply.
5. Integral overload protection for all motors.

B. Unit Cabinet:
1. Constructed of zinc-coated steel.
2. Fully insulated.
3. Discharge and inlet grilles, high-impact polystyrene.
4. Adjacent room cooling to be provided by a simple knockout in cabinet side panel.

C. Evaporator Fan:
1. Centrifugal, direct-drive blower type with air intake in center of unit and discharge on perimeter.
2. Air louvers shall be adjustable for 2-, 3-, or 4-way discharge.
3. Motors:
   a. Totally enclosed and permanently lubricated with inherent protection.
   b. Three-speed.

D. DX Evaporator Coil:
1. Copper tube with aluminum fins and galvanized steel tube sheets.
2. Fins bonded to tubes by mechanical expansion.
3. Condensate Drip Pan: Locate under coil with drain connection for hose attachment to remove condensate.

E. Internal Condensate Pump:
1. To remove condensate from drain pan when gravity drainage cannot be used.
2. Lift capability of condensate pump shall be 5 kPa.

F. Controls:
1. Refrigerant Metering:
   a. Factory installed refrigerant metering device.
   b. Heat Pump Applications: Reverse flow bypass refrigerant metering device with internal check valves.
2. Automatic restart after power failure at same operating conditions as at failure.
3. Timer function to provide a minimum 15-hour timer cycle for system AUTO/START/STOP.
4. Temperature-sensing controls shall sense return air temperature. Provide indoor air high discharge temperature shutdown.
5. Indoor coil freeze protection.

6. Wireless infrared remote control to enter set points and operating conditions.
7. Filter status indication after 250 hours of indoor fan operation.
8. Test mode button to run self-diagnostics and aid in troubleshooting.
9. AUTO/STOP features shall have integral setback control.
10. Automatic air sweep control provides ON or OFF activation of air sweep louvers.
11. Dehumidification mode provides increased latent removal capability by modulating fan speed and set point temperature.
12. Fan only operation provides room air circulation when no cooling is required.
13. Diagnostics to provide continuous checks of unit operation and warn of possible malfunctions. Error message shall be displayed at the unit and at the remote controller.
14. Fan Speed Control: User-selectable for high, medium, low or microprocessor automatic operation during all operating modes.
15. Time delay shall prevent compressor restart in less than 3 minutes.
16. Provide outdoor unit high temperature protection to detect excessive outdoor unit discharge temperatures.
17. Automatic heating-to-cooling changeover to provide automatic heating and cooling operation. Control shall include deadband to prevent rapid mode cycling.
18. Manual defrost button to initiate defrost cycle from handset.
19. Demand defrost shall be provided and shall minimize defrost cycles by internally adjusting defrost timing based on frost accumulation.
20. Provide indoor coil high temperature protection to detect excessive indoor discharge temperature when unit is in heat pump mode.

G. Air Filters: Easily removed washable filter. Accessories: Provide as follows:
   1. Electronic Programmable Thermostat:
      a. Commercial grade, 7-day, four-event scheduling.
      b. Integral subbase, three-speed fan control, heating/cooling switchover capability, air sweep auto changeover.
      c. Shall not require battery to retain memory.

H. Manufacturers and Products:
   1. Mitsubishi; Model PLA/PLFY.
   2. Carrier; Model 40QK Series.

2.4 SPLIT SYSTEM HIGH WALL AC UNIT, DUCTLESS

A. General:
   1. Split system, indoor, DX, ductless, fan coil AC unit, complete with DX coil, fan, fan motor, piping connectors, electrical controls, and microprocessor control system.
   2. Suitable for use with air conditioner or heat pump outdoor unit.
   3. Indoor unit shall be of the same manufacturer as the associated outdoor unit.
   4. Entire system to be fed from one common power supply.
   5. Integral overload protection for all motors.

B. Unit Cabinet:
   1. High-impact plastic or painted galvanized steel.
   2. Fully insulated.
   3. Discharge and inlet grilles, high-impact polystyrene.

C. Evaporator Fan:
   1. Tangential direct-drive blower type with air intake at upper front face of unit and discharge at bottom front.
   2. Air Sweep:
      a. Provide automatic, motor-driven horizontal air sweep as standard.
      b. Air sweep operation shall be user selectable.
      c. Vertical direction may be manually adjusted and horizontal air sweep may be manually set.
   3. Motor:
      a. Open drip-proof, permanently lubricated ball bearing with inherent overload protection.
      b. Three speed.

D. DX Evaporator Coil:
   1. Copper tube with aluminum fins and galvanized steel tube sheets.
   2. Fins bonded to tubes by mechanical expansion
   3. Condensate Drip Pan:
      a. Locate under coil with drain connection for hose attachment to remove condensate.
      b. Provide condensate drip pan under coil header.

E. Controls:
   1. Refrigerant Metering:
      a. Factory installed refrigerant metering device.
      b. Heat Pump Applications: Reverse flow bypass refrigerant metering device with internal check valves.
   2. Automatic restart after power failure at same operating conditions as at failure.
   3. Timer function to provide a minimum 15-hour timer cycle for system AUTO/START/STOP.
   4. Temperature-sensing controls shall sense return air temperature. Provide indoor air high discharge temperature shutdown.
   5. Indoor coil freeze protection.
   6. Wireless infrared remote control to enter set points and operating conditions.
   7. Filter status indication after 250 hours of indoor fan operation.
   8. Test mode button to run self-diagnostics and aid in troubleshooting.
   9. AUTO/STOP features shall have integral setback control.
   10. Automatic air sweep control provides ON or OFF activation of air sweep louvers.
   11. Dehumidification mode provides increased latent removal capability by modulating fan speed and set point temperature.
   12. Fan only operation provides room air circulation when no cooling is required.
   13. Diagnostics to provide continuous checks of unit operation and warn of possible malfunctions. Error message shall be displayed at the unit and at the remote controller.
   14. Fan Speed Control: User-selectable for high, medium, low or microprocessor automatic operation during all operating modes.
   15. Time delay shall prevent compressor restart in less than 3 minutes.
   16. Provide outdoor unit high temperature protection to detect excessive outdoor unit discharge temperatures.
   17. Automatic heating-to-cooling changeover to provide automatic heating and cooling operation. Control shall include deadband to prevent rapid mode cycling.

18. Manual defrost button to initiate defrost cycle from handset.
19. Demand defrost shall be provided and shall minimize defrost cycles by internally adjusting defrost timing based on frost accumulation.
20. Provide indoor coil high temperature protection to detect excessive indoor discharge temperature when unit is in heat pump mode.

F. Air Filters: Filter track with factory-supplied cleanable filters.

G. Accessories: As per attached datasheets

H. Manufacturers and Products:
1. Mitsubishi; Model PKA.
2. Carrier; Model 40QN Series.

2.5 SPLIT SYSTEM AC INDOOR UNIT, DUCTED (UP TO 17.5 MINIMAL KW)

A. General:
1. Indoor mounted, draw-through, packaged air-handling unit consisting of forward-curved centrifugal fan(s), motor and drive assembly, prewired fan motor contactor, factory-installed refrigerant metering devices, cooling coil, washable air filters, and condensate drain pan.
2. Suitable for use with air conditioner or heat pump outdoor unit.
3. Indoor unit shall be of the same manufacturer as the associated outdoor unit.
4. Modular design for horizontal flow.
5. Entire system to be fed from one common power supply.
6. Integral overload protection for all motors.

B. Unit Cabinet:
1. Heavy gauge galvanized steel sheets.
2. Sufficient removable panels for access to all internal components.
3. Duct flanges for connection of supply and return ductwork, and filter racks.
4. Knockouts for unit electrical power and condensate piping connections.

C. Evaporator Fan:
1. Double-inlet, double-width, forward-curved fans mounted on rubber isolators.
2. Direct-drive or belt-drive as standard with the unit furnished.
3. Fan Motor:
   a. Totally enclosed and permanently lubricated with inherent protection.
   b. Three-speed.

D. DX Evaporator Coil:
1. Copper tube with aluminum fins and galvanized steel tube sheets.
2. Fins bonded to tubes by mechanical expansion.
3. Condensate Drain Pan: High-impact thermoplastic, insulated, with primary and secondary brass drain fittings.
4. Refrigerant piping sweat connections.

E. Electric Heating Coil:
1. UL/ULC listed.

2. Heavy-duty nickel-chromium elements.
3. Contactors with 24-volt coils, power wiring, 24-volt control wiring terminal blocks, and a hinged access panel.
4. Individual line-break HIGH limit control for each stage.
5. HIGH limit control operating through heating element contactors, equipped with automatic reset.
6. Internally factory-wired to provide single-point power connection with unit.

F. Controls:
1. Refrigerant Metering:
a. Factory installed refrigerant metering device.
b. Heat Pump Applications: Reverse flow bypass refrigerant metering device with internal check valves.
2. Overload protection in each leg.
3. Control voltage transformer.
4. Terminal strip for connection of remote controls.
5. Control board fusing.

G. Air Filters: Easily removed washable filter.

H. Accessories: Provide as follows:
1. Premium Electronic Thermostat: Factory provided programmable thermostat with 7-day clock, auto-changeover, multi-stage capability, holiday scheduling, large LCD display, remote sensor capability.

I. Manufacturers:
1. Mitsubishi, Mr. Slim; Model PEA/PEAD/PEFY.
2. Carrier.

2.6 SPLIT SYSTEM AC OUTDOOR UNITS

A. General:
1. Factory assembled, single piece, air-cooled air conditioner outdoor unit.
2. Contained within the unit enclosure shall be all factory wiring, piping, controls, compressor, and holding charge of R-410A refrigerant.
3. Outdoor unit shall be of the same manufacturer as the associated indoor unit.
4. Entire system to be fed from one common power supply.
5. Integral overload protection for all motors.

B. Unit Cabinet:
1. Constructed of galvanized steel, phosphatized and coated with a baked enamel finish.
2. Removable access panels for access to all internal components.
3. Outdoor Compartment: Isolated, with acoustic lining to assure quiet operation.
4. Knockouts for unit electrical power.

C. Condenser Fans:
   1. Direct-drive propeller type shall discharge air horizontally and shall blow air through outdoor coil.
   2. Motors:
      a. Totally enclosed, with Class B insulation and permanently lubricated bearings.
      b. Thermal overload protection.
   3. Shaft shall have inherent corrosion resistance.
   4. Fan blades shall be corrosion-resistant and shall be statically and dynamically balanced.
   5. Equip openings with PVC coated protection grille over fan and coil.

D. Compressor:
   1. Fully hermetic reciprocating or scroll type.
   2. Equipped with oil system, operating oil charge, and motor.
   3. Internal overloads shall protect compressor from overtemperature and overcurrent.
   4. Motor: NEMA rated, Class F, suitable for operation in a refrigerant atmosphere.
   5. Scroll compressors shall have high discharge gas temperature protection.
   6. Reciprocating compressors shall be equipped with crankcase heaters to minimize liquid refrigerant accumulation in compressor during shutdown and to prevent refrigerant dilution of oil.
   7. Installed on rubber vibration isolators and shall have internal spring isolation.

E. Condenser Coil:
   1. Constructed of aluminum fins mechanically bonded to internally enhanced seamless copper tubes that are cleaned, dehydrated, and sealed.
   2. Blue Fin Anti-Corrosion Protection.

F. Refrigeration Components:
   1. Brass external liquid line service valve with service gauge port connections.
   2. Suction line service valve with service gauge connection port.
   3. Service gauge port connections on compressor suction and discharge lines with Schrader-type fittings with brass caps.
   4. Suction Line: Accumulator.
   5. Compressor discharge temperature sensor and high pressure transducer.

G. Controls:
   1. Factory selected, assembled, and tested.
   2. Refrigerant Metering:
      a. Reversing valve for heat pump units.
      b. Heating mode metering device for heat pump units.
   3. Automatic restart on power failure.
   4. Time delay control sequence shall be provided standard through control board on indoor units.
   5. High pressure liquid line switches. Low pressure switches where available.
   6. Automatic outdoor fan motor protection.
   7. Start capacitor and relay (single-phase units without scroll compressors).
   8. Defrost board to provide defrost control.
   9. Safeties:
      a. Time delay restart to prevent compressor reverse rotation on single-phase scroll compressors.

b. Safety lockout if any outdoor unit safety is open.
c. High condensing temperature protection.
d. System diagnostics.
e. Compressor motor current and temperature overload protection.
f. Outdoor fan failure protection.

H. Accessories: Provide as scheduled in Equipment Schedule.
1. Low-Ambient Cooling Kit for Outdoor Units:
a. Solid state condenser fan motor fully modulating speed controller; responds to saturated condensing pressure/temperature of unit.
b. Unit operates with outdoor temperatures down to minus 40 degrees C.
c. Condenser fan motor bearing internally lubricated and sealed.
2. Compressor Cycle Delay: Compressor prevented from restarting for a minimum of 5 minutes after shutdown.

3. Hot-Gas Reheat: Solenoid valve and controls shall allow redirection of refrigerant hot gas to reheat coil located in associated indoor unit.
4. Wall-Mount Kit: Steel frame, baked enamel finish.
5. Evaporator Freeze Thermostat: Performed by integral thermistors in indoor unit.

I. Manufacturers:
1. Mitsubishi; Model PUZ/PUY/PUHY/PQHY/PUMY.
2. Carrier.

2.7 UNITARY EQUIPMENT CONTROLS

A. Electronic Multistage AC Unit Controller:
1. Heating and Cooling Stages:
a. Four-stage cooling and four-stage heating electronic control.
b. Staging delay between each cycle.
c. Visual indication of activation of each stage.
2. Integrated thermostat.
3. Temperature Scale: Manually adjustable, 10 degrees C to 30 degrees C scale.
4. Duty Cycle:
a. Automatic duty cycling of equipment.
b. Manual adjustment for 1-day to 24-day cycle time.
c. Manual cycle advance.
d. Visual indication of lead unit.
5. Enclosure:
a. Single wall-mounted enclosure with operator interface on outside of panel door.
b. ETL rated enclosure.
6. Operator interface to consist of temperature adjustment, LCD room temperature display, and visual indication of lead unit and each cooling and heating stage activation.
7. Adjustments external to controller.
8. Adjustable “dead band” between heating and cooling to be between 2 degrees C and 11 degrees C.
9. Power loss memory for restoration of sequence of operation in the event of loss of power.
10. Manufacturer and Model: MIT, PAR-31 MAA .

B. Active operation mode selective heating or cooling.

C. IO Adapter for each unit to interface with PLC:
   1. Inputs (For Future Use):
      a. ON/OFF.
   2. Outputs:
      a. Status ON/OFF.
      b. Error.
   3. Manufacturer and Model: MIT, PAC-SA88-HA-EP.

2.8 ELECTRICAL

A. General:
   1. Units shall include high and low voltage terminal block connections.
   2. Control voltage to indoor unit fan shall be 24 volts.
   3. Motor Starters/Contactors: Factory installed with unitary equipment, unless otherwise noted.
   4. Disconnects: Field supplied and installed by electrical contractor in accordance with local Codes.

B. Motors:
   1. Refer to Section 26 20 00, Low Voltage AC Induction Motors, for general requirements.
   2. Unless otherwise stated, electric motors shall comply with the following:
      a. Voltage, Phase, Horsepower, Synchronous Speed: Refer to Equipment Schedule for motor driven equipment.
      b. Enclosure: Open Drip Proof (ODP), unless specified otherwise.
      c. Torque Characteristics: Sufficient to accelerate driven loads satisfactorily.
      d. Winding Thermal Protection: Manufacturer’s standard.
      e. Space Heater: Manufacturer’s standard.
      f. Multispeed Motors, Synchronous Speed, Number of Windings: Manufacturer’s standard.
      g. Efficiency: Minimum efficiency per Section 26 20 00, Low Voltage AC Induction Motors.

2.9 ACCESSORIES

A. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer, 12 mm minimum diameter, and as specified in Section 05 50 00, Metal Fabrications (Basic). Quantity as recommended by manufacturer.

2.10 SOURCE QUALITY CONTROL

A. Factory Tests:
   1. Direct expansion coils leak tested underwater with 1378 kPa air. Pressure tested to 3102 kPa.
   2. Electric heating coils tested with 2,000-volt dielectric test.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set and install equipment so that equipment is level and properly supported.

B. Make certain that piping connections to equipment do not cause any strain on equipment.

C. Make certain that vibration isolation has been installed per manufacturer's instructions and isolation devices are performing satisfactorily.

D. Install equipment in accordance with manufacturer's recommendations, and these Specifications.

E. Install all safety devices as recommended by manufacturer and/or required by code in these Specifications.

F. Air-cooled outdoor unit shall not be started without complete prestart checkout of entire refrigerant piping system and charging of system with refrigerant as recommended by equipment manufacturer.

G. Startup: Contractor shall provide a trained representative familiar with the equipment manufacturer to perform the following services. Supervision only, of Contractor personnel, will not be acceptable.
   1. Leak test.
   2. Refrigerant pressure test.
   3. Evacuate (if required).
   4. Dehydrate (if required).
   5. Charge condensing unit with refrigerant and oil (if required).

H. Factory Checkout:
   1. Contractor shall secure the services of a factory trained and qualified service engineer employed by the equipment manufacturer who shall inspect the installation including external interlock, power connections; supervise initial operation, calibration of operating and safety controls and supervise electrical testing including insulation resistance of motors and voltage balance between phases during starting and running.
   2. This service engineer shall forward a report in three copies to Contract Administrator when the unit is in safe and proper operating condition. This report shall contain all pressure and control settings, meg readings, voltage readings per phase during START and RUN, suction temperature and pressure, liquid temperature and pressure, and shall list minor discrepancies to be corrected which do not affect safe and reliable operation.
   3. One additional copy of report shall be left in unit control panel. One copy of bound installation operation and maintenance service, and parts brochures, including applicable serial numbers, full unit description, parts ordering sources, shall be placed in the unit control panel at the time of starting.

I. Locate units to provide access for filter changing; motor, drive, and bearing servicing; and fan shaft and coil removal.

J. Seal outside air intake watertight to roof curb.

K. Isolate sheet metal duct connections from all portions of the unit not internally spring-isolated from fans, or other vibrating or rotating equipment.

L. Inspect internal casing insulation, seal all exposed edges, and butt joints with mastic to ensure insulation will not be loosened during operation.

3.2 ADJUSTING AND CLEANING

A. Air System Balancing: As specified in Section 23 05 93, Testing, Adjusting, and Balancing for HVAC.

B. Lubricate unsealed bearings prior to startup.

C. Do not operate units until filters are installed. If operated without filters, completely clean ductwork, coils, and interior of units.

3.3 FILTERS

A. Install a complete set of filters in each unit before operating, and leave in place during startup and testing to keep the equipment and ductwork clean.

B. Install a complete set of filters at the time of final cleaning as defined in Section 01 77 00, Closeout Procedures.

3.4 MANUFACTURER'S SERVICES

A. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Contractor Field Services, for installation assistance, inspection, and certification of proper installation, equipment testing, startup assistance, and training of the City's personnel for specified equipment.

3.5 SUPPLEMENTS

A. The supplements listed below, following "End of Section," are a part of this Specification.
   1. 23 81 00.01, Ductless Split System DX Indoor Units Schedule.
   2. 23 81 00.02, Split System DX Outdoor Units Schedule.

END OF SECTION

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-C641	ACU-C642	ACU-C643	ACU-C644
LOCATION				ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM
FAN DATA	SUPPLY AIR		L/s	700	700	700	700
	EXTERNAL STATIC PRESS.		kPa	150	150	150	150
DX COOLING DATA	TOTAL		kW	12.3	12.3	12.3	12.3
	SENS.		kW	-	-	-	-
	ENTERING AIR TEMP.	DEG. C	DB	27	27	27	27
		DEG. C	WB	19	19	19	19
	COND. TEMP.		DEG. C	35	35	35	35
FAN MOTOR DATA	FLA			2.8	2.8	2.8	2.8
	VOLT			208	208	208	208
	PH			1	1	1	1
ELECTRICAL DATA	# CONN.			1	1	1	1
	MCA			3.5	3.5	3.5	3.5
	FUSE			15	15	15	15
	VOLT			208	208	208	208
	PH			1	1	1	1
	FACTORY INSTALLED DISCONNECT?			NO	NO	NO	NO
DIMENSIONS	WIDTH		mm	1400	1400	1400	1400
	DEPTH		mm	732	732	732	732
	HEIGHT		mm	250	250	250	250
	MAXIMUM WEIGHT		kg	43	43	43	43
MANUFACTURER				MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.				PEAD-A42AA5	PEAD-A42AA5	PEAD-A42AA5	PEAD-A42AA5
APPLICABLE REMARKS:				A	A	A	A

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS								**23 81 00.01**
SYMBOL				ACU-C645	ACU-C646		
LOCATION				ELECTRICAL ROOM	AUTOMATION ROOM		
FAN DATA	SUPPLY AIR		L/s	700	566		
	EXTERNAL STATIC PRESS.		kPa	150	-		
DX COOLING DATA	TOTAL		kW	12.3	5.3		
	SENS.		kW	-	-		
	ENTERING AIR TEMP.	DEG. C	DB	27	27		
		DEG. C	WB	19	19		
	COND. TEMP.		DEG. C	35	35		
DX HEATING DATA	TOTAL		kW	N/A	5.9		
	ENTERING AIR TEMP.	DEG. C	DB	N/A	21		
	COND. TEMP.		DEG. C	N/A	8		
FAN MOTOR DATA	FLA			2.8	0.5		
	VOLT			208	208		
	PH			1	1		
ELECTRICAL DATA	# CONN.			1	1		
	MCA			3.5	1.0		
	FUSE			15	15		
	VOLT			208	208		
	PH			1	1		
	FACTORY INSTALLED DISCONNECT?			NO	NO		
DIMENSIONS	WIDTH		mm	1400	840		
	DEPTH		mm	732	840		
	HEIGHT		mm	250	258		
	MAXIMUM WEIGHT		kg	43	22		
MANUFACTURER				MITSUBISHI	MITSUBISHI		
MODEL NO.				PEAD-A42AA5	PLA-A18BA6		
APPLICABLE REMARKS:				A	A		

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-D641	ACU-D642	ACU-D643	ACU-D651
LOCATION				ELECTRICAL ROOM A	ELECTRICAL ROOM A	ELECTRICAL ROOM A	ELECTRICAL ROOM B
FAN DATA	SUPPLY AIR		L/s	515	515	515	515
	EXTERNAL STATIC PRESS.		kPa	-	-	-	-
DX COOLING DATA	TOTAL		kW	12.3	12.3	12.3	12.3
	SENS.		kW	-	-	-	-
	ENTERING AIR TEMP.	DEG. C	DB	27	27	27	27
		DEG. C	WB	19	19	19	19
	COND. TEMP.		DEG. C	35	35	35	35
FAN MOTOR DATA	FLA			1.0	1.0	1.0	1.0
	VOLT			208	208	208	208
	PH			1	1	1	1
ELECTRICAL DATA	# CONN.			1	1	1	1
	MCA			2.0	2.0	2.0	2.0
	FUSE			15	15	15	15
	VOLT			208	208	208	208
	PH			1	1	1	1
	FACTORY INSTALLED DISCONNECT?			NO	NO	NO	NO
DIMENSIONS	WIDTH		mm	950	950	950	950
	DEPTH		mm	950	950	950	950
	HEIGHT		mm	293	293	293	293
	MAXIMUM WEIGHT		kg	25	25	25	25
MANUFACTURER				MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.				PLA-A42BA6	PLA-A42BA6	PLA-A42BA6	PLA-A42BA6
APPLICABLE REMARKS:				A	A	A	A

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-D652			
LOCATION				ELECTRICAL ROOM B			
FAN DATA	SUPPLY AIR		L/s	515			
	EXTERNAL STATIC PRESS.		kPa	-			
DX COOLING DATA	TOTAL		kW	12.3			
	SENS.		kW	-			
	ENTERING AIR TEMP.	DEG. C	DB	27			
		DEG. C	WB	19			
	COND. TEMP.		DEG. C	35			
FAN MOTOR DATA	FLA			1.0			
	VOLT			208			
	PH			1			
ELECTRICAL DATA	# CONN.			1			
	MCA			2.0			
	FUSE			15			
	VOLT			208			
	PH			1			
	FACTORY INSTALLED DISCONNECT?			NO			
DIMENSIONS	WIDTH		mm	950			
	DEPTH		mm	950			
	HEIGHT		mm	293			
	MAXIMUM WEIGHT		kg	25			
MANUFACTURER				MITSUBISHI			
MODEL NO.				PLA-A42BA6			
APPLICABLE REMARKS:				A			

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-G641	ACU-G642	ACU-G643	
LOCATION				ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	
FAN DATA	SUPPLY AIR		L/s	1400	1400	1200	
	EXTERNAL STATIC PRESS.		kPa	250	250	250	
DX COOLING DATA	TOTAL		kW	28.1	28.1	21.1	
	SENS.		kW	-	-	-	
	ENTERING AIR TEMP.	DEG. C	DB	27	27	27	
		DEG. C	WB	19	19	19	
	COND. TEMP.		DEG. C	30	30	30	
FAN MOTOR DATA	FLA						
	VOLT			208	208	208	
	PH			1	1	1	
ELECTRICAL DATA	# CONN.			1	1	1	
	MCA			8.2	8.2	7.7	
	FUSE			15	15	15	
	VOLT			208	208	208	
	PH			1	1	1	
	FACTORY INSTALLED DISCONNECT?			NO	NO	NO	
DIMENSIONS	WIDTH		mm	1250	1250	1250	
	DEPTH		mm	1120	1120	1120	
	HEIGHT		mm	470	470	470	
	MAXIMUM WEIGHT		kg	100	100	97	
MANUFACTURER				MITSUBISHI	MITSUBISHI	MITSUBISHI	
MODEL NO.				PEFY-P96NMHSU	PEFY-P96NMHSU	PEFY-P72NMHSU	
APPLICABLE REMARKS:				A	A	A	

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER (ONE THERMOSTAT FOR ALL INDOOR UNITS)

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-K641	ACU-K642		
LOCATION				ELECTRICAL ROOM	ELECTRICAL ROOM		
FAN DATA	SUPPLY AIR		L/s	434	434		
	EXTERNAL STATIC PRESS.		kPa	-	-		
DX COOLING DATA	TOTAL		kW	10.1	10.1		
	SENS.		kW	-	-		
	ENTERING AIR TEMP.	DEG. C	DB	27	27		
		DEG. C	WB	19	19		
	COND. TEMP.		DEG. C	30	30		
DX HEATING DATA	TOTAL		kW	11.2	11.2		
	ENTERING AIR TEMP.	DEG. C	DB	27	27		
	COND. TEMP.		DEG. C	20	20		
FAN MOTOR DATA	FLA			0.6	0.6		
	VOLT			208	208		
	PH			1	1		
ELECTRICAL DATA	# CONN.			1	1		
	MCA			1.0	1.0		
	FUSE			15	15		
	VOLT			208	208		
	PH			1	1		
	FACTORY INSTALLED DISCONNECT?			NO	NO		
DIMENSIONS	WIDTH		mm	1170	1170		
	DEPTH		mm	300	300		
	HEIGHT		mm	365	365		
	MAXIMUM WEIGHT		kg	21	21		
MANUFACTURER				MITSUBISHI	MITSUBISHI		
MODEL NO.				PKA-A36KA	PKA-A36KA		
APPLICABLE REMARKS:				A	A		

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS								**23 81 00.01**
SYMBOL				ACU-M641	ACU-M642		
LOCATION				CONTROL ROOM	AUTOMATION ROOM		
FAN DATA	SUPPLY AIR		L/s	500	500		
	EXTERNAL STATIC PRESS.		kPa	-	-		
DX COOLING DATA	TOTAL		kW	10.6	10.6		
	SENS.		kW	-	-		
	ENTERING AIR TEMP.	DEG. C	DB	27	27		
		DEG. C	WB	19	19		
	COND. TEMP.		DEG. C	35	35		
DX HEATING DATA	TOTAL		kW	11.7	11.7		
	ENTERING AIR TEMP.	DEG. C	DB	21	21		
	COND. TEMP.		DEG. C	8	8		
FAN MOTOR DATA	FLA						
	VOLT			208	208		
	PH			1	1		
ELECTRICAL DATA	# CONN.			1	1		
	MCA			1.3	1.3		
	FUSE			15	15		
	VOLT			208	208		
	PH			1	1		
	FACTORY INSTALLED DISCONNECT?			NO	NO		
DIMENSIONS	WIDTH		mm	840	840		
	DEPTH		mm	840	840		
	HEIGHT		mm	298	298		
	MAXIMUM WEIGHT		kg	27	27		
MANUFACTURER				MITSUBISHI	MITSUBISHI		
MODEL NO.				PLFY-P36NBMU	PLFY-P36NBMU		
APPLICABLE REMARKS:				A	A		

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-P641			
LOCATION				ELECTRICAL ROOM B			
FAN DATA	SUPPLY AIR		L/s	515			
	EXTERNAL STATIC PRESS.		kPa	-			
DX COOLING DATA	TOTAL		kW	12.3			
	SENS.		kW	-			
	ENTERING AIR TEMP.	DEG. C	DB	27			
		DEG. C	WB	19			
	COND. TEMP.		DEG. C	35			
FAN MOTOR DATA	FLA			1.0			
	VOLT			208			
	PH			1			
ELECTRICAL DATA	# CONN.			1			
	MCA			2.0			
	FUSE			15			
	VOLT			208			
	PH			1			
	FACTORY INSTALLED DISCONNECT?			NO			
DIMENSIONS	WIDTH		mm	950			
	DEPTH		mm	950			
	HEIGHT		mm	293			
	MAXIMUM WEIGHT		kg	25			
MANUFACTURER				MITSUBISHI			
MODEL NO.				PLA-A42BA6			
APPLICABLE REMARKS:				A			

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-R641-1	ACU-R641-2	ACU-R642-1	ACU-R642-2
LOCATION				ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM
FAN DATA	SUPPLY AIR		L/s	700	700	700	700
	EXTERNAL STATIC PRESS.		kPa	-	-	-	-
DX COOLING DATA	TOTAL		kW	15.8	15.8	15.8	15.8
	SENS.		kW	-	-	-	-
	ENTERING AIR TEMP.	DEG. C	DB	27	27	27	27
		DEG. C	WB	19	19	19	19
	COND. TEMP.		DEG. C	35	35	35	35
DX HEATING DATA	TOTAL		kW	17.6	17.6	17.6	17.6
	ENTERING AIR TEMP.	DEG. C	DB	21	21	21	21
	COND. TEMP.		DEG. C	8	8	8	8
FAN MOTOR DATA	FLA			2.2	2.2	2.24	2.24
	VOLT			208	208	208	208
	PH			1	1	1	1
ELECTRICAL DATA	# CONN.			1	1	1	1
	MCA			3.3	3.3	3.31	3.31
	FUSE			15	15	15	15
	VOLT			208	208	208	208
	PH			1	1	1	1
	FACTORY INSTALLED DISCONNECT?			NO	NO	NO	NO
DIMENSIONS	WIDTH		mm	1600	1600	1600	1600
	DEPTH		mm	732	732	732	732
	HEIGHT		mm	250	250	250	250
	MAXIMUM WEIGHT		kg	42	42	42	42
MANUFACTURER				MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.				PEFY-P54NMAU	PEFY-P54NMAU	PEFY-P54NMAU	PEFY-P54NMAU
APPLICABLE REMARKS:				A	A	A	A

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS								**23 81 00.01**
SYMBOL				ACU-R643	ACU-R644		
LOCATION				AUTOMATION ROOM	CONTROL ROOM		
FAN DATA	SUPPLY AIR		L/s	378	378		
	EXTERNAL STATIC PRESS.		kPa	-	-		
DX COOLING DATA	TOTAL		kW	8.8	15.8		
	SENS.		kW	-	-		
	ENTERING AIR TEMP.	DEG. C	DB	27	27		
		DEG. C	WB	19	19		
	COND. TEMP.		DEG. C	35	35		
DX HEATING DATA	TOTAL		kW	9.4	17.6		
	ENTERING AIR TEMP.	DEG. C	DB	21	21		
	COND. TEMP.		DEG. C	8	8		
FAN MOTOR DATA	FLA			2.2	2.2		
	VOLT			208	208		
	PH			1	1		
ELECTRICAL DATA	# CONN.			1	1		
	MCA			2.7	3.3		
	FUSE			30	15		
	VOLT			208	208		
	PH			1	1		
	FACTORY INSTALLED DISCONNECT?			NO	NO		
DIMENSIONS	WIDTH		mm	1100	1600		
	DEPTH		mm	732	732		
	HEIGHT		mm	210	250		
	MAXIMUM WEIGHT		kg	33	42		
MANUFACTURER				MITSUBISHI	MITSUBISHI		
MODEL NO.				PEAD-A30AA4	PLA-A18BA6		
APPLICABLE REMARKS:				A	A		

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-S641	ACU-S642	ACU-S643	ACU-S644
LOCATION				ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM
FAN DATA	SUPPLY AIR		L/s	700	700	700	700
	EXTERNAL STATIC PRESS.		kPa	-	-	150	150
DX COOLING DATA	TOTAL		kW	12.3	12.3	12.3	12.3
	SENS.		kW	-	-	-	-
	ENTERING AIR TEMP.	DEG. C	DB	27	27	27	27
		DEG. C	WB	19	19	19	19
	COND. TEMP.		DEG. C	35	35	35	35
FAN MOTOR DATA	FLA			2.8	2.8	2.8	2.8
	VOLT			208	208	208	208
	PH			1	1	1	1
ELECTRICAL DATA	# CONN.			1	1	1	1
	MCA			26	26	26	26
	FUSE			40	40	40	40
	VOLT			208	208	208	208
	PH			1	1	1	1
	FACTORY INSTALLED DISCONNECT?			NO	NO	NO	NO
DIMENSIONS	WIDTH		mm	1400	1400	1400	1400
	DEPTH		mm	732	732	732	732
	HEIGHT		mm	250	250	250	250
	MAXIMUM WEIGHT		kg	41	41	41	41
MANUFACTURER				MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.				PEAD-A42AA5	PEAD-A42AA5	PEAD-A42AA6	PEAD-A42AA5
APPLICABLE REMARKS:				A	A	A	A

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

DUCTLESS SPLIT SYSTEM DX INDOOR UNITS							**23 81 00.01**
SYMBOL				ACU-S646			
LOCATION				LABORATORY			
FAN DATA	SUPPLY AIR		L/s	283			
	EXTERNAL STATIC PRESS.		kPa	-			
DX COOLING DATA	TOTAL		kW	5.3			
	SENS.		kW	-			
	ENTERING AIR TEMP.	DEG. C	DB	27			
		DEG. C	WB	19			
	COND. TEMP.		DEG. C	35			
DX HEATING DATA	TOTAL		kW	5.9			
	ENTERING AIR TEMP.	DEG. C	DB	21			
	COND. TEMP.		DEG. C	8			
FAN MOTOR DATA	FLA			0.51			
	VOLT			208			
	PH			1			
ELECTRICAL DATA	# CONN.			1			
	MCA			13			
	FUSE			15			
	VOLT			208			
	PH			1			
	FACTORY INSTALLED DISCONNECT?			NO			
DIMENSIONS	WIDTH		mm	950			
	DEPTH		mm	950			
	HEIGHT		mm	293			
	MAXIMUM WEIGHT		kg	22			
MANUFACTURER				MITSUBISHI			
MODEL NO.				PLA-A18BA6			
APPLICABLE REMARKS:				A			

REMARKS:

A: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-C641	CU-C642	CU-C643	CU-C644
SERVING			ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM
DX COOLING DATA	CAPACITY	kW	12.3	12.3	12.3	12.3
	AMBIENT TEMP.	DEG. C	35	35	35	35
	SEER	@ ARI	13.8	13.8	13.8	13.8
OUTDOOR FAN DATA	NO.		2	2	2	2
	kW (EA.)		0.086	0.086	0.086	0.086
	VOLT		208	208	208	208
	PH		1	1	1	1
	L/s (TOTAL)		1666	1666	1666	1666
COMPRESSOR DATA	NO.		1	1	1	1
	RLA (EA.)		20	20	20	20
	LRA (EA.)		27.5	27.5	27.5	27.5
	VOLT		208	208	208	208
	PH		1	1	1	1
ELECTRICAL DATA	# CONN.		1	1	1	1
	MCA		26	26	26	26
	MOCP (FUSE)		40	40	40	40
	VOLT		208	208	208	208
	PH		1	1	1	1
DIMENSIONS	LENGTH	mm	950	950	950	950
	WIDTH	mm	330	330	330	330
	HEIGHT	mm	1350	1350	1350	1350
	MAXIMUM WEIGHT	kg	112	112	112	112
MANUFACTURER			MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.			PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6
APPLICABLE REMARKS:			A/B/C	A/B/C	A/B/C	A/B/C

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-C645	CU-C646		
SERVING			ELECTRICAL ROOM	AUTOMATION ROOM		
DX COOLING DATA	CAPACITY	kW	12.3	5.3		
	AMBIENT TEMP.	DEG. C	35	35		
	SEER	@ ARI	13.8	14.2		
DX HEATING DATA	CAPACITY	kW	N/A	5.9		
	COND. TEMP.	DEG. C	8	8		
	COP	@ ARI	N/A	2.93		
OUTDOOR FAN DATA	NO.		2	1		
	kW (EA.)		0.086	0.04		
	VOLT		208	208		
	PH		1	1		
	L/s (TOTAL)		1666	566		
COMPRESSOR DATA	NO.		1	1		
	RLA (EA.)		20	12		
	LRA (EA.)		27.5	14		
	VOLT		208	208		
	PH		1	1		
ELECTRICAL DATA	# CONN.		1	1		
	MCA		26	13		
	MOCP (FUSE)		40	20		
	VOLT		208	208		
	PH		1	1		
DIMENSIONS	LENGTH	mm	950	800		
	WIDTH	mm	330	300		
	HEIGHT	mm	1350	600		
	MAXIMUM WEIGHT	kg	112	41		
MANUFACTURER			MITSUBISHI	MITSUBISHI		
MODEL NO.			PUY-A42NHA6	PUZ-A18NHA6		
APPLICABLE REMARKS:			A/B/C	A/C		

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-D641	CU-D642	CU-D643	CU-D651
SERVING			ELECTRICAL ROOM A	ELECTRICAL ROOM A	ELECTRICAL ROOM A	ELECTRICAL ROOM B
DX COOLING DATA	CAPACITY	kW	12.3	12.3	12.3	12.3
	AMBIENT TEMP.	DEG. C	35	35	35	35
	SEER	@ ARI	14.4	14.4	14.4	14.4
OUTDOOR FAN DATA	NO.		2	2	2	2
	kW (EA.)		0.04	0.04	0.04	0.04
	VOLT		208	208	208	208
	PH		1	1	1	1
	L/s (TOTAL)		1665	1665	1665	1665
COMPRESSOR DATA	NO.		1	1	1	1
	RLA (EA.)		20	20	20	20
	LRA (EA.)		27.5	27.5	27.5	27.5
	VOLT		208	208	208	208
	PH		1	1	1	1
ELECTRICAL DATA	# CONN.		1	1	1	1
	MCA		26	26	26	26
	MOCP (FUSE)		40	40	40	40
	VOLT		208	208	208	208
	PH		1	1	1	1
DIMENSIONS	LENGTH	mm	0.95	0.95	0.95	0.95
	WIDTH	mm	0.36	0.36	0.36	0.36
	HEIGHT	mm	1.35	1.35	1.35	1.35
	MAXIMUM WEIGHT	kg	112	112	112	112
MANUFACTURER			MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.			PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6
APPLICABLE REMARKS:			A/B/C	A/B/C	A/B/C	A/B/C

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS							**23 81 00.02**
SYMBOL			CU-D652				
SERVING			ELECTRICAL ROOM B				
DX COOLING DATA	CAPACITY	kW	12.3				
	AMBIENT TEMP.	DEG. C	35				
	SEER	@ ARI	14.4				
OUTDOOR FAN DATA	NO.		2				
	kW (EA.)		0.04				
	VOLT		208				
	PH		1				
	L/s (TOTAL)		1665				
COMPRESSOR DATA	NO.		1				
	RLA (EA.)		20				
	LRA (EA.)		27.5				
	VOLT		208				
	PH		1				
ELECTRICAL DATA	# CONN.		1				
	MCA		26				
	MOCP (FUSE)		40				
	VOLT		208				
	PH		1				
DIMENSIONS	LENGTH	mm	950				
	WIDTH	mm	360				
	HEIGHT	mm	1350				
	MAXIMUM WEIGHT	kg	112				
MANUFACTURER			MITSUBISHI				
MODEL NO.			PUY-A42NHA6				
APPLICABLE REMARKS:			A/B/C				

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-G641	CU-G642	CU-G643	
SERVING			ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	
DX COOLING DATA	CAPACITY	kW	28.1	21.1	28.1	
	AMBIENT TEMP.	DEG. C	35	35	35	
	SEER	@ ARI	14.3	14.3	14.3	
CIRCULATING WATER	FLOW RATE (L/s)		1.6	1.6	1.6	
	PRESSURE DROP (Pa)		17914	17914	17914	
	CONNECTION SIZE (mm)		38	38	38	
COMPRESSOR DATA	NO.		1	1	1	
	VOLT		575	575	575	
	PH		3	3	3	
ELECTRICAL DATA	# CONN.		1	1	1	
	MCA		12	12	12	
	MOCP (FUSE)		15	15	15	
	VOLT		575	575	575	
	PH		3	3	3	
DIMENSIONS	LENGTH	mm	880	880	880	
	WIDTH	mm	550	550	550	
	HEIGHT	mm	1100	1100	1100	
	MAXIMUM WEIGHT	kg	185	185	185	
MANUFACTURER			MITSUBISHI	MITSUBISHI	MITSUBISHI	
MODEL NO.			PQHY-P96ZKMU	PQHY-P72ZKMU	PQHY-P96ZKMU	
APPLICABLE REMARKS:			A/C/D	A/C	A/C/D	

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

D: TWINNING KIT

SPLIT SYSTEM DX OUTDOOR UNITS							**23 81 00.02**
SYMBOL			CU-K641	CU-K642			
SERVING			ELECTRICAL ROOM	ELECTRICAL ROOM			
DX COOLING DATA	CAPACITY	kW	10.1	10.1			
	AMBIENT TEMP.	DEG. C	35	35			
	SEER	@ ARI	14	14			
DX HEATING DATA	CAPACITY	kW	11.2	11.2			
	COND. TEMP.	DEG. C	8	8			
	COP	@ ARI	3	3			
OUTDOOR FAN DATA	NO.		1	1			
	kW (EA.)		0.075	0.075			
	VOLT		208	208			
	PH		1	1			
	L/s (TOTAL)		916	916			
COMPRESSOR DATA	NO.		1	1			
	RLA (EA.)		12	12			
	LRA (EA.)		17.5	17.5			
	VOLT		208	208			
	PH		1	1			
ELECTRICAL DATA	# CONN.		1	1			
	MCA		25	25			
	MOCP (FUSE)		30	30			
	VOLT		208	208			
	PH		1	1			
DIMENSIONS	LENGTH	mm	950	950			
	WIDTH	mm	360	360			
	HEIGHT	mm	943	943			
	MAXIMUM WEIGHT	kg	75	75			
MANUFACTURER			MITSUBISHI	MITSUBISHI			
MODEL NO.			PUZ-A36NHA3	PUZ-A36NHA3			
APPLICABLE REMARKS:			A/C	A/C			

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS							**23 81 00.02**
SYMBOL			CU-M641	CU-M642			
SERVING			CONTROL ROOM	AUTOMATION ROOM			
DX COOLING DATA	CAPACITY	kW	10.6	10.6			
	AMBIENT TEMP.	DEG. C	35	35			
	SEER	@ ARI	14.3	14.3			
DX HEATING DATA	CAPACITY	kW	11.7	11.7			
	COND. TEMP.	DEG. C	8	8			
	COP	@ ARI	3.14	3.14			
OUTDOOR FAN DATA	NO.		2	2			
	kW (EA.)		0.086	0.086			
	VOLT		208	208			
	PH		1	1			
	L/s (TOTAL)		1665	1665			
COMPRESSOR DATA	NO.		1	1			
	RLA (EA.)		20	20			
	LRA (EA.)		27.5	27.5			
	VOLT		208	208			
	PH		1	1			
ELECTRICAL DATA	# CONN.		1	1			
	MCA		26	26			
	MOCP (FUSE)		40	40			
	VOLT		208	208			
	PH		1	1			
DIMENSIONS	LENGTH	mm	950	950			
	WIDTH	mm	360	360			
	HEIGHT	mm	1350	1350			
	MAXIMUM WEIGHT	kg	130	130			
MANUFACTURER			MITSUBISHI	MITSUBISHI			
MODEL NO.			PUMY-P36NHMU	PUMY-P36NHMU			
APPLICABLE REMARKS:			A/B/C	A/B/C			

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS							**23 81 00.02**
SYMBOL			CU-P641				
SERVING			ELECTRICAL ROOM B				
DX COOLING DATA	CAPACITY	kW	12.3				
	AMBIENT TEMP.	DEG. C	35				
	SEER	@ ARI	14.4				
OUTDOOR FAN DATA	NO.		2				
	kW (EA.)		0.04				
	VOLT		208				
	PH		1				
	L/s (TOTAL)		1665				
COMPRESSOR DATA	NO.		1				
	RLA (EA.)		20				
	LRA (EA.)		27.5				
	VOLT		208				
	PH		1				
ELECTRICAL DATA	# CONN.		1				
	MCA		26				
	MOCP (FUSE)		40				
	VOLT		208				
	PH		1				
DIMENSIONS	LENGTH	mm	950				
	WIDTH	mm	360				
	HEIGHT	mm	1350				
	MAXIMUM WEIGHT	kg	112				
MANUFACTURER			MITSUBISHI				
MODEL NO.			PUY-A42NHA6				
APPLICABLE REMARKS:			A/B/C				

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-R641	CU-R642	CU-R643	CU-R644
SERVING			GALLERY 8A	GALLERY 8A	GALLERY 8	GALLERY 8
DX COOLING DATA	CAPACITY	kW	35.1	28.1	8.8	5.3
	AMBIENT TEMP.	DEG. C	35	35	35	35
	IEER	@ ARI	24.6	28	16.5	14.2
DX HEATING DATA	CAPACITY	kW	33.4	27.0	9.4	5.9
	COND. TEMP.	DEG. C	8	8	8	8
	COP	@ ARI	4.01	4.14	1.9	2.94
OUTDOOR FAN DATA	NO.		2	1	1	1
	kW (EA.)		10	8	3.75	2.57
	VOLT		575	575	208	208
	PH		3	3	1	1
	L/s (TOTAL)		5333	3162	915	566
COMPRESSOR DATA	NO.		2	1	1	1
	RLA (EA.)		N/A	N/A	12	12
	LRA (EA.)		N/A	N/A	17.5	14
	VOLT		575	575	208	208
	PH		3	3	1	1
ELECTRICAL DATA	# CONN.		2	1	1	1
	MCA		19	15	25	13
	MOCP (FUSE)		30	20	40	20
	VOLT		575	575	208	208
	PH		3	3	1	1
DIMENSIONS	LENGTH	mm	1650	1650	950	800
	WIDTH	mm	1750	1220	330	365
	HEIGHT	mm	740	740	1350	600
	MAXIMUM WEIGHT	kg	316	252	75	41
MANUFACTURER			MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.			PUHY-P120ZKMU	PUHY-P96ZKMU	PUZ-A30NHA4	PUZ-A18NHA6
APPLICABLE REMARKS:			A/C	A/C	A/C	A/C

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS						**23 81 00.02**
SYMBOL			CU-S641	CU-S642	CU-S643	CU-S644
SERVING			ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM	ELECTRICAL ROOM
DX COOLING DATA	CAPACITY	kW	12.3	12.3	12.3	12.3
	AMBIENT TEMP.	DEG. C	35	35	35	35
	SEER	@ ARI	14.0	14.0	14.0	14.0
OUTDOOR FAN DATA	NO.		2	2	2	2
	kW (EA.)		0.04	0.04	0.04	0.04
	VOLT		208	208	208	208
	PH		1	1	1	1
	L/s (TOTAL)		1665	1665	1665	1665
COMPRESSOR DATA	NO.		1	1	1	1
	RLA (EA.)		20	20	20	20
	LRA (EA.)		27.5	27.5	27.5	27.5
	VOLT		208	208	208	208
	PH		1	1	1	1
ELECTRICAL DATA	# CONN.		1	1	1	1
	MCA		26	26	26	26
	MOCP (FUSE)		40	40	40	40
	VOLT		208	208	208	208
	PH		1	1	1	1
DIMENSIONS	LENGTH	mm	950	950	950	950
	WIDTH	mm	360	360	360	360
	HEIGHT	mm	1350	1350	1350	1350
	MAXIMUM WEIGHT	kg	112	112	112	112
MANUFACTURER			MITSUBISHI	MITSUBISHI	MITSUBISHI	MITSUBISHI
MODEL NO.			PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6	PUY-A42NHA6
APPLICABLE REMARKS:			A/B/C	A/B/C	A/B/C	A/B/C

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER

SPLIT SYSTEM DX OUTDOOR UNITS							**23 81 00.02**
SYMBOL			CU-S646				
SERVING			LABORATORY				
DX COOLING DATA	CAPACITY	kW	5.3				
	AMBIENT TEMP.	DEG. C	35				
	SEER	@ ARI	14.2				
DX HEATING DATA	CAPACITY	kW	5.9				
	COND. TEMP.	DEG. C	8				
	COP	@ ARI	2.94				
OUTDOOR FAN DATA	NO.		1				
	kW (EA.)		0.04				
	VOLT		208				
	PH		1				
	L/s (TOTAL)		566				
COMPRESSOR DATA	NO.		1				
	RLA (EA.)		12				
	LRA (EA.)		14				
	VOLT		208				
	PH		1				
ELECTRICAL DATA	# CONN.		1				
	MCA		13				
	MOCP (FUSE)		20				
	VOLT		208				
	PH		1				
DIMENSIONS	LENGTH	mm	800				
	WIDTH	mm	330				
	HEIGHT	mm	660				
	MAXIMUM WEIGHT	kg	41				
MANUFACTURER			MITSUBISHI				
MODEL NO.			PUZ-A18NHA6				
APPLICABLE REMARKS:			A/C				

REMARKS:

A: 5-YEAR WARRANTY FOR EACH COMPRESSOR

B: ULTRA-LOW AMBIENT COOLING KIT

C: ELECTRONIC PROGRAMMABLE THERMOSTAT AND IO ADAPTER