

**FUJITSU GENERAL AMERICA, INC.**  
Halcyon Mini-Split Master Specifications Guide

**CSI 2004 Format**

**Division 23** HEATING VENTILATING AND AIR CONDITIONING  
**23 81 26** SPLIT-SYSTEM AIR-CONDITIONERS

**CSI 1995 Format**

**Section 157 00** DECENTRALIZED HVAC EQUIPMENT

Single-Split Wall Mounts: (9, 12, 15RLS3Y), (9, 12, 15RLS3YH), (18, 24RLXFWH), (9, 12, 18, 24RLXFW1)

Single-Split Compact Cassettes: (9, 12, 18RLFCC)

Single-Split Ducted Units: (9, 12, 18RLFCD)

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**Part 01 - General :**

**1.01 Description**

The Heating Ventilation and Air Conditioning system shall be a single zone and multi-zone split systems.

The HVAC System shall be a heat-pump single zone system. It shall consist of one indoor and one outdoor unit per refrigerant circuit and a digital control. The outdoor unit shall be a 208-230V/1-phase.

**1.02 Approved Manufacturers and models:**

- A. Fujitsu shall be the Base of Design (BOD) using the Halcyon split system.

**1.03 Quality Assurance:**

- A. The split system shall be manufactured in facilities registered to follow the International Standard Organization (ISO) ISO 9001 - Quality Management and ISO 14001 - Environmental Management Standards.
- B. All outdoor and indoor units shall be listed under Electrical Testing Laboratories (ETL) and carries the ETL label.
- C. ASHRAE Compliance:
  - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- E. All wiring shall be in accordance with the National Electric Code (NEC).
- F. All single-phase outdoor units must be listed in the Department of Energy (DOE) Compliance certificate Database under "Air Conditioners and Heat Pumps – Residential Central".

**1.04 Delivery, Storage, and handling:**

All outdoor units, indoor units, controls, and piping components shall be stored and handled according to the manufacturer's recommendation.

**1.05 Warranty:**

The outdoor units and indoor units shall be covered by a minimum of (5) year parts and (7) years compressor as per the manufacturer's Limited Standard Warranty. The warranty shall only cover any defects in material or workmanship as long as the system is used for human thermal comfort or other approved applications under normal use and service. Any repaired or replaced component or part shall be warranted for the remainder of the original Standard Limited Warranty period or thirty (30) days after shipment of replacement part, whichever is longer.

The Manufacturer shall offer a (10) year Extended Warranty. The manufacturer shall also offer (12) year Extended Warranty if installed by a contractor that is verified by the manufacturer to meet further equipment installation experience (Elite Contractor). The outdoor units and indoor units shall qualify to receive the manufacturer's Extended Warranty when installed according to all the manufacturer's Qualified System requirements listed:

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- a. The System is registered ONLINE within 60 days from the date of installation, or, in the case of a newly constructed home, within 60 days of the transfer of title.
- b. The System is installed in a residential single family or owner occupied multifamily home.
- c. The Purchaser resides at the location where the System is installed.
- d. The System is purchased after June 1, 2015.
- e. Defective Parts and Compressor are made available for return to FGAI and become the property of FGAI.

**1.06 Installer Training:**

Split system manufacturers vary in requirements. Contractor must verify requirements and complete installation training prior to installing the system. The contractor shall comply with the specified manufacturer system installation requirements without change in cost to Owner. Equipment supplier must inspect installation at various stages to ensure proper installation.

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**Part 2 - Products**

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**2.01 Split System – High Efficiency Wall Mount Heat-Pump (9 – 15 KBTU)**

**A. General:**

The high efficiency wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The system must be capable of providing full rated heating capacity at -5°F.
3. The outdoor unit heating efficiency shall be AHRI rated a minimum of 13.4 HSPF.
4. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 25.3 SEER.
5. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
6. The outdoor unit shall offer a quiet operation option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -5°F ambient temperature.
2. The system outdoor unit shall be capable of cooling down to 14°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

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**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Wi-Fi Communication:**

1. The indoor unit shall also be equipped with built-in Wi-fi that can be controlled remotely through the Internet via smart phone or tablet apps.

**K. Indoor Unit Occupancy Sensor:**

1. The indoor unit shall be equipped with a built-in Infrared occupancy sensor for energy savings operation.

**L. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. Each of the louvers shall be individually adjusted using remote controller.
3. The unit must be equipped with a built-in Infrared occupancy sensor.

**M. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.

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**N. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**O. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

**P. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**Q. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.02 Split System – Low Temperature Heating High Efficiency Wall Mount Heat-Pump (9 – 15 KBTU)**

**A. General:**

The high efficiency wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The system must be capable of providing full rated heating capacity at -5°F.
3. The outdoor unit heating efficiency shall be AHRI rated a minimum of 13.3 HSPF.
4. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 25.3 SEER.
5. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
6. The outdoor unit shall offer a quiet operation option.
7. The outdoor unit shall offer a heated base pan option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -15°F ambient temperature.
2. The system outdoor unit shall be capable of cooling down to 14°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

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**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Wi-Fi Communication:**

1. The indoor unit shall also be equipped with built-in Wi-Fi that can be controlled remotely through the Internet via smart phone or tablet apps.

**K. Indoor Unit Occupancy Sensor:**

1. The indoor unit shall be equipped with a built-in Infrared occupancy sensor for energy savings operation.

**L. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. Each of the louvers shall be individually adjusted using remote controller.
3. The unit must be equipped with a built-in Infrared occupancy sensor.

**M. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.



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**N. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**O. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

**P. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**Q. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.03 Split System –Wall Mount Heat-Pump (9 – 12 KBTU)**

**A. General:**

The wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The outdoor unit heating efficiency shall be AHRI rated a minimum of 11 HSPF.
3. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 22 SEER.
4. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
5. The outdoor unit shall offer a quiet operation option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -5°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to -5°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

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**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. The wall indoor unit cabinet shall have a maximum depth of 8 inches. For aesthetic reasons, units with larger depth shall not be acceptable.
3. Each of the louvers shall be individually adjusted using remote controller.
4. The unit must be equipped with a built-in Infrared occupancy sensor.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.

**L. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**M. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

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**N. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**O. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.04 Split System –Wall Mount Heat-Pump (18 – 24 KBTU)**

**A. General:**

The wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The system must be capable of providing full rated heating capacity at +5°F.
3. The outdoor unit heating efficiency shall be AHRI rated a minimum of 10.5 HSPF.
4. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 19.5 SEER.
5. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
6. The outdoor unit shall offer a quiet operation option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -5°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to -5°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

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**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. The wall indoor unit cabinet shall have a maximum depth of 9 inches. For aesthetic reasons, units with larger depth shall not be acceptable.
3. Each of the louvers shall be individually adjusted using remote controller.
4. The unit must be equipped with a built-in Infrared occupancy sensor.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.

**L. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**M. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

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**N. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**O. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.05 Split System –Extra Low-Temperature Wall Mount Heat-Pump (18 – 24 KBTU)**

**A. General:**

The extra low-temperature wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The system must be capable of providing full rated heating capacity at +5°F.
3. The outdoor unit heating efficiency shall be AHRI rated a minimum of 10.4 HSPF.
4. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 19.5 SEER.
5. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
6. The outdoor unit shall offer a quiet operation option.
7. The outdoor unit shall offer a heated base pan option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -15°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to -5°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.



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**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. The wall indoor unit cabinet shall have a maximum depth of 9 inches. For aesthetic reasons, units with larger depth shall not be acceptable.
3. Each of the louvers shall be individually adjusted using remote controller.
4. The unit must be equipped with a built-in Infrared occupancy sensor.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.

**L. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**M. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

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**N. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**O. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.06 Split System –Extra Low-Temperature Wall Mount Heat-Pump (30 KBTU)**

**A. General:**

The extra low-temperature wall mount heat-pump system shall consist of the following components; outdoor unit, wall mount indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The system must be capable of providing full rated heating capacity at +5°F.
3. The outdoor unit heating efficiency shall be AHRI rated a minimum of 11.7 HSPF.
4. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 18.7 SEER.
5. The system shall be capable of extending the piping between the indoor and outdoor unit to a 246Ft. Shorter pipe length capabilities shall not be allowed.
6. The system shall have a server room function setting which maintains a room at constant temperature.
7. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
8. The outdoor unit shall offer a quiet operation option.
9. The outdoor unit shall offer a heated base pan option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -15°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to -5°F ambient temperature for outdoor unit installations without any additional low ambient control kits or controls. The selection of an alternate manufacturer shall deem the contractor responsible for any additional material, cost, and labor to meet low ambient operating condition and performance.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with two propeller type fans.
2. The fan motors shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
3. The coil shall be protected with an integral metal guard.

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**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Wall Unit:**

1. The wall style indoor unit shall be designed to mount vertically on the wall.
2. The unit shall provide swinging air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers. The louvers shall close when the unit is not in operation.
3. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
4. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. The wall indoor unit cabinet shall have a maximum depth of 9 inches. For aesthetic reasons, units with larger depth shall not be acceptable.
3. Each of the louvers shall be individually adjusted using remote controller.
4. The unit must be equipped with a built-in Infrared occupancy sensor.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a high powered DC fan direct motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall be capable of swinging in two parallel directions to provide extensive and uniform air distribution.

**L. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

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**M. Drainage:**

1. The unit shall provide a condensate outlet to connect to an external condensate pump or gravity drain.

**N. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**O. Wireless Remote Control:**

1. The system shall come with a wireless remote. The remote shall be capable of displaying settings and values and controlling a single group of indoor units.
2. This remote shall be designed to be hand-held.
3. It shall use infrared signal to communicate to the indoor unit.
4. The screen shall be equipped with a display. The remote shall be equipped with buttons to facilitate its settings and display of information.
5. The remote shall be battery powered.
  - The remote shall offer the following features:
  - Temperature settings in Fahrenheit and Celsius.
  - Automatic Change over (Heat/Cool) with a dead band.
  - Temperature set point adjustment, fan speed control, and louver control.
  - On/Off timer, Sleep timer, Program timer.
  - Economy mode setting.
6. Additional features shall include: Test Operation.

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**2.07 Split System –Ducted Heat-Pump (9 – 18 KBTU)**

**A. General:**

The ducted heat-pump system shall consist of the following components; outdoor unit, slim ducted indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The outdoor unit heating efficiency shall be AHRI rated a minimum of 11.3 HSPF.
3. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 19.7 SEER.
4. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
5. The outdoor unit shall offer a quiet operation option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -5°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to 14°F ambient temperature.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

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**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.

**H. Outdoor Unit Cabinet:**

1. The outdoor unit casing shall be fabricated of painted galvanized steel.

**I. Indoor Units - Ducted Unit:**

1. The Slim Ducted style indoor unit shall be designed to be installed above ceiling or behind walls and shall be connected to ducting system.
2. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping and control circuit board and fan motor.
3. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be made out of durable plastic and can be suspended on the wall.
2. Contained within the unit shall be all factory wiring, piping, condensate pan, high-lift condensate pump, built-in removable filter, control circuit board, fan and fan motor.
3. The unit shall be capable of providing static pressure between 0 to 0.36 in.WG.
4. The unit shall be less than 8 in. in height and shall require a ceiling vertical installation space of less than 10 in. The unit shall be suitable for use in plenums.
5. The unit shall have the capability of connecting to return air duct from the back or bottom of the unit.
6. The unit shall have provisions for factory supplied louvers that can be controlled using manufacturer remote.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with two fans direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The unit shall be factory set to a static pressure of 0 in.WG. In addition, the unit shall be capable of providing a static pressure up to 0.36 in.WG.
4. The indoor fan shall offer three (4) speeds, Low, Mid, High and quiet.
5. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.

**L. Indoor Unit Filter:**

1. Return air shall be filtered by means of air filter.
2. The filter shall be adaptable to be mounted to the back or bottom of unit.
3. The filter construction shall include a Fungicide agent.

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**M. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.
6. A condensate pan and drain shall be provided under the coil.

**N. Drainage:**

1. The unit shall be equipped with an integral insulated drain pan and condensate pump.
2. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water at least 33 1/2 inches above the bottom of the unit drain pan.

**O. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

**P. Wired Remote Control:**

1. The Wired Remote control shall be capable of displaying settings and values and controlling a single indoor unit.
2. The Wired Remote shall be small in size measuring 4-3/4" x 4-3/4". The remote shall be equipped with buttons to facilitate its settings and display of information.
3. The remote shall have a built-in temperature sensor to facilitate ambient temperature measurement at the human comfort elevation.
4. The remote shall connect to and be powered by the indoor unit using the manufacturer specified wiring. The remote shall not require any additional controls or equipment to facilitate its operation. The remote shall offer the following features:
  - a. Temperature settings in Fahrenheit and Celsius.
  - b. Modes: Auto, Cool, Heat, Dry, Fan.
  - c. Temperature set point adjustment, fan speed control, and louver control.
  - d. Economy mode setting.
  - e. Temperature Setback Timer.
  - f. Schedule: Weekly or Daily with up to 4 settings per day using On/Off, Set temperature or occupied status.
  - g. Temperature sensing at the remote or at the indoor unit return air.
  - h. Additional features shall include: Clean filter reset, Day-Off Mode, On/Off timer, Test Operation, Error History.

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**2.08 Split System – Compact Cassette Heat-Pump (9 – 18 KBTU)**

**A. General:**

The compact cassette heat-pump system shall consist of the following components; outdoor unit, cassette indoor unit, and remote control(s). All system components shall be authorized to work together by system manufacturer.

The outdoor units must have the following capabilities:

1. The outdoor units shall be equipped with only one inverter driven twin rotary compressor.
2. The outdoor unit heating efficiency shall be AHRI rated a minimum of 11.5 HSPF.
3. The outdoor unit cooling efficiency shall be AHRI rated a minimum of 20.1 SEER.
4. The system must defrost in order to resume full heating more quickly. Defrost time shall not last more than 20 minutes. Partial defrost which may extend the no heating or reduced heating periods shall not be allowed.
5. The outdoor unit shall offer a quiet operation option.

**B. Outdoor Temperatures:**

1. The outdoor unit shall be capable of heating down to -5°F ambient temperature.
2. The system outdoor unit shall be capable of low ambient cooling down to 14°F ambient temperature.

**C. Compressor:**

1. Each outdoor unit shall be equipped with one inverter driven dual rotary compressor. The use of multiple compressors, scroll and/or non-inverter driven compressors, which cause inrush current (demand charges) and require larger wire sizing, shall not be allowed.
2. The compressor shall be equipped with automatic thermal overload protection.
3. The compressor modulating capacity shall be between 20% and 100%.

**D. Outdoor Unit Fan:**

1. Each outdoor unit fan shall be equipped with only one propeller type fan.
2. The fan motor shall be variable speed DC inverter driven.
3. The fan motors shall be electrically protected.
4. The fan shall be enclosed within outdoor unit and shall be protected with a metal grille.

**E. Outdoor Unit Coil:**

1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
2. The coil shall be protected with an integral metal guard.

**F. Electrical Power:**

1. The outdoor unit shall be powered by 208-230V/single-phase, 60 Hz.
2. The outdoor unit shall be able to operate satisfactorily within the 187 to 253 Voltage range.
3. Outdoor unit electronic circuits shall be electrically protected using fuses.

**G. Outdoor Unit Control and Communication:**

1. The outdoor unit shall be controlled by integral microprocessors.
2. The control circuit between the outdoor unit and the indoor unit shall be completed using a single cable communication wiring.
- 3.

**H. Outdoor Unit Cabinet:**

2. The outdoor unit casing shall be fabricated of painted galvanized steel.

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**I. Indoor Units – Compact Cassette Unit:**

1. The Compact Cassette style indoor unit shall be designed to be recessed into different types of ceilings.
2. The unit shall provide 4-way air distribution away from the unit. The air distribution shall be controlled by electronically controlled louvers.
3. The return air shall be in the center of the unit and shall have a built-in filter.
4. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, high-lift condensate pump, and control circuit board and fan motor. The indoor unit shall have an Auto-restart function that allows the unit to resume operation after power interruption.

**J. Indoor Unit Cabinet:**

1. The cabinet shall be designed to be recessed in a standard suspended ceiling square grid of 2 feet x 2 feet without any alterations.
2. The unit shall have provisions for a field installed filtered outside air intake.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way airflow using optional air-outlet shutter plates.
4. Each of the louvers shall be individually adjusted using remote controller.

**K. Indoor Unit Fan:**

1. The indoor fan shall be an assembly with a two-stage turbo fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall offer three (4) speeds, Quiet, Low, Mid, and High.
4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
5. The indoor unit vanes shall have 4 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
6. The indoor unit shall have an adjustable air outlet system offering 4-way or 2-way airflow.
7. The indoor unit shall offer optional provisions for fresh air intake.

**L. Indoor Unit Filter:**

1. Return air shall be filtered by means of a long-life washable filter.

**M. Indoor Unit Coil:**

1. The indoor coil shall be of nonferrous construction with louvered fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. The coil fins shall have hydrophilic coating.
4. All tube joints shall be brazed with phos-copper or silver alloy.
5. The coils shall be pressure tested at the factory.

**N. Drainage:**

1. The unit shall be equipped with an integral insulated drain pan and condensate pump.
2. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water at least 27 1/2 inches above the bottom of the unit drain pan.

**O. Electrical:**

1. The indoor unit shall be powered through the outdoor unit.
2. Indoor unit electric circuits shall be electronically protected using fuses.

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**P. Wired Remote Control:**

1. The Wired Remote control shall be capable of displaying settings and values and controlling a single indoor unit.
2. The Wired Remote shall be small in size measuring 4-3/4" x 4-3/4". The remote shall be equipped with buttons to facilitate its settings and display of information.
3. The remote shall have a built-in temperature sensor to facilitate ambient temperature measurement at the human comfort elevation.
4. The remote shall connect to and be powered by the indoor unit using the manufacturer specified wiring. The remote shall not require any additional controls or equipment to facilitate its operation. The remote shall offer the following features:
  - a. Temperature settings in Fahrenheit and Celsius.
  - b. Modes: Auto, Cool, Heat, Dry, Fan.
  - c. Temperature set point adjustment, fan speed control, and louver control.
  - d. Economy mode setting.
  - e. Temperature Setback Timer.
  - f. Schedule: Weekly or Daily with up to 4 settings per day using On/Off, Set temperature or occupied status.
  - g. Temperature sensing at the remote or at the indoor unit return air.
  - h. Additional features shall include: Clean filter reset, Day-Off Mode, On/Off timer, Test Operation, Error History.

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**Part 03 - Product – Controls and Remotes**

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**1.01 Remote Control – Wired Remote**

**A. General:**

The Wired Remote control shall be capable of displaying settings and values and controlling a single group of indoor units. The group shall consist of up to 16 indoor units. The Wired Remote shall be small in size measuring 4-¾" x 4-¾". The remote shall be equipped with buttons to facilitate its settings and display of information. It shall have a built-in temperature sensor to facilitate ambient temperature measurement at the human occupancy elevation. The remote shall connect to and be powered by the indoor unit using the manufacturer specified wiring. The remote shall offer the following features:

1. Back-lit LCD display.
2. Equipped with built-in temperature sensor.
3. Displays the indoor air temperature.
4. Temperature settings in Fahrenheit and Celsius.
5. Modes: Auto, Cool, Heat, Dry, Fan.
6. Temperature set point adjustment, fan speed control, and louver control.
7. Economy mode setting.
8. Temperature Setback Timer.
9. Schedule: Weekly or Daily with up to 4 settings per day using On/Off, Set temperature or occupied status.
10. Temperature sensing at the remote or at the indoor unit return air.
11. Additional features shall include: Clean filter reset, Day-Off Mode, On/Off timer, Test Operation, Error History.</RVNUM>

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**1.02 Remote Control – Simple Wired Remote with Operation Mode**

**A. General:**

The Simple Wired Remote shall be capable of displaying settings and values and controlling a single group of indoor units. The group shall consist of up to 16 indoor units. This remote shall be small in size measuring 3" x 4-¾". The screen shall be equipped with a back-lit display. The remote shall be equipped with buttons to facilitate its settings and display of information. The remote shall connect to and be powered by the indoor unit using the manufacturer specified wiring. The remote shall not require any additional controls or equipment to facilitate its operation. The remote shall offer the following features:

1. Temperature settings in Fahrenheit and Celsius.
2. Back-lit display.
3. Automatic Change over (Heat/Cool) with a dead band.
4. Modes: Auto, Cool, Heat, Dry, Fan.
5. Temperature set point adjustment, and fan speed.
6. Economy mode setting.
7. Temperature sensing at the remote or at the indoor unit return air.
8. Additional features shall include: Clean filter reset, Test Operation, Error History.</RSNUM>

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**1.03 WIFI LAN Interface Module**

**A. General:**

The WIFI LAN Interface Module shall be capable of controlling a single indoor unit per module. The module shall also be capable of controlling a limited number of outdoor unit settings. The module shall connect to and be powered by the indoor unit using the manufacturer specified wiring. The module shall connect to the manufacturer's cloud. The module shall require the use of an available connection to the internet. The module shall require the use of the FGLair application software (mobile app) on a third-party smartphone or tablet device. The module shall be compatible with the IEEE802.11b/g/n standard. The module shall use 2.4GHz (1ch~13ch) frequency band. The module shall operate in a temperature range of 32-114 °F. The module shall have two LED indicator lights for diagnostics.

When used in conjunction with the FGLair application software (mobile app), the WIFI LAN Interface Module shall offer the ability to control the following features for each separate indoor unit:

1. Turn the indoor unit on or off
2. Enable or disable email alert notifications
3. Change operation mode of the indoor unit
4. Enable, disable, or adjust indoor unit's temperature setpoint
5. Adjust indoor unit's fan speed
6. Provide louver control
7. Adjust weekly timer
8. Enable or disable indoor unit's Powerful mode
9. Enable or disable indoor unit's Economy mode
10. Enable, disable, or adjust indoor unit's Minimum Heat setting
11. Enable or disable indoor unit's Energy Saving Program
12. Enable or disable outdoor unit's Low Noise Mode
13. Display the room temperature on a smartphone or tablet
14. Enable or disable Child Lock feature. </ UTY-TFNXZ2>

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**Part 3 - Piping:**

Refrigerant piping shall meet ASTM B 280 of the ACR type that is authorized by the manufacturer.

- A. It shall be insulated according to the manufacturer and applicable national and local codes.
- B. The piping shall be factory cleaned with both ends capped to protect cleanliness of pipe interiors prior to shipping.
- C. All piping shall be stored according to the manufacturer's instructions.
- D. The piping shall be sized using the manufacturer system design software.
- E. The piping shall be installed according to the manufacturer's installation instructions and national and local code requirements.
- F. All pipe brazing must be done with Dry Nitrogen gas flowing through the piping.
- G. A startup filter drier can be installed with R410A rated isolation ball valves with a valve-regulated bypass connection.
- H. Headers shall be used to connect multiple indoor units.
- I. The system shall be capable of operation with the outdoor unit being installed higher than the furthest indoor unit by a maximum of 49 ft. The system shall be capable of operation with the outdoor unit being installed below than the furthest indoor unit by a maximum of 49ft. All piping lengths must be attainable without the need for line size changes.